Board of Building Standards

EDUCATION COMMITTEE MEETING
AGENDA (AMENDED 12/15/21)

DATE: DECEMBER 16, 2021
TIME: 10:00 AM
LOCATION: 6606 TUSSING ROAD, TRAINING ROOM 3

Call to Order

Consent Agenda

Course Applications

ER-1 2017 OBC Chapter 1 Round Table (MVBOC)
All certifications (1 hour)
Staff Notes: Recommend approval
Committee Recommendation:

ER-2 Basic Blueprint Reading (Building and Fire Code Academy)
All certifications except ESI (6 hours)
Staff Notes: AIA approved course: add ESI, recommend approval.
Committee Recommendation:

ER-3 Chapter One Administration (National Inspection Corporation)
All certifications (three one-hour sessions)
Staff Notes: Recommend approval
Committee Recommendation:

ER-4 Dust Hazard Review and Overview of NFPA Standards (Society of Fire Protection Engineers)
BO, BPE, MechPE, FPPE, BI, FPI (1 hour)
Staff Notes: Outline to come.
Committee Recommendation:

ER-5 Generators and the 2020 NEC (Matthews Electrical Services)
All certifications except PI, NRIUI, RMI, and RIUI (4 hours)
Staff Notes:
ESIAC Recommendation: Recommend approval
Committee Recommendation:

ER-6 Grounding and Bonding Part 2: Beyond the Basics (Matthews Electrical Services)
BO, MPE, EPE, FPPE, BI, ESI, RBO, RPE, RBI (4 hours)
Staff Notes:
ESIAC Recommendation: Recommend approval
Committee Recommendation:

ER-7 Health Care Facilities, Fault Currents, Common Defects (IAEI)
All certifications except IU and plumbing (6 hours)
Staff Notes:
ESIAC Recommendation: Recommend Approval
Committee Recommendation:

ER-8 Ohio Backflow Tester Training (Test Gauge and Backflow Supply)
BO, PPE, PI, RBO (8 hours)
Staff Notes: Course references outdated: recommend revision of course materials to reflect OPC, current building code and standards and resubmit for committee review.
Committee Recommendation:

ER-9 2017 OBC Chapter 10 Round Table (MBBOC)
Commercial certifications (except plumbing), RBO (1 hour)
Staff Notes:
Committee Recommendation:

ER-10 2020 NEC Grounding and Bonding Part 1 (Wink Electric)
EPE, ESI (5 hours)
Staff Notes: No slides: "The syllabus is what I use and hand out in class. I promote discussion with code books out in hand."
ESIAC Recommendation: Received after ESIAC submission.
Committee Recommendation:

ER-11 2020 NEC Grounding and Bonding Part 2 (Wink Electric)
EPE, ESI (5 hours)
Staff Notes: No slides: "The syllabus is what I use and hand out in class. I promote discussion with code books out in hand."
ESIAC Recommendation: Received after ESIAC submission.
Committee Recommendation:

Old Business

New Business

Adjourn

EDUCATION COMMITTEE MEETING
CONSENT AGENDA

Course Applications

EC-1 2019 RCO Chapter 3 Round Table (MVBOC)
All certifications except MI and PI (1 hour)

EC-2 2017 OBC Chapter 4 Round Table (MVBOC)
Commercial certifications (except plumbing), RBO

EC-3 2017 OMC Chapter 5 Round Table (MVBOC)
BO, MPE, BPE, MechPE, FPPE, BI, MI, RBO (1 hour)

EC-4 2017 OBC Chapter 7 Round Table (MVBOC)
Commercial certifications, RBO, RBI (1 hour)

EC-5 2017 OBC Chapter 9 Round Table (MVBOC)
Commercial certifications except plumbing (1 hour)

EC-6 2017 OBC Chapter 11 Round Table (MVBOC)
BO, MPE, BPE, PPE, BI, RBO (1 hour)

EC-7 2017 OBC Chapter 12 Round Table (MVBOC)
Commercial certification (except plumbing and fire), RBO (1 hour)

EC-8 2017 OBC Chapter 31 Round Table (MVBOC)
Commercial certifications (except plumbing and mechanical), RBO

File Attachments for Item:

ER-1 2017 OBC Chapter 1 Round Table (MVBOC)

All certifications (1 hour)

Staff Notes: Recommend approval

Committee Recommendation:

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: Derek Spurling (Contact Name) Cert #: 1409

Organization: Miami Valley Building Officials Council (MVBOC) (Organization/Company)

Address: 100 W. Spring Valley Rd. (Include Room Number, Suite, etc.)

City: Centerville State: Ohio Zip: 45458

E-Mail: dspurling@centervilleohio.gov

Telephone: 937-428-4786 Fax:

Course Sponsor: MVBOC

COURSE INFORMATION:

Course Title: 2017 OBC - Chapter 1 Administration

New Course Submittal: [x] Update Course: [ ] Prior Approval Number:

Purpose and Objective: Provide an overview and refresher of sections within the chapter.

Number of Instructional Contact Hours that can be obtained upon completion: 1

If Multi-Session, Number of Instructional Contact Hours Per Session:

Program Applicable for the Following Participants:

Building Official [x] Master Plans Examiner [x] Building Inspector [x] Fire Protection Inspector [x] Mechanical Inspector [x]
Building Plans Exam. [x] Plumbing Inspector [x]
Plumbing Plans Exam. [x] Non-Res IU Inspector [ ]
Electrical Plans Exam. [x]
Mechanical Plans Exam. [x]
Fire Protect. Plans Exam. [x]

Res Building Official [x] Res Plans Examiner [x] Res Building Inspector [x] Res Mechanical Inspector [x] Res IU Inspector [ ]

Electrical Safety Inspectors [x]
Location of ESI Course: Date(s) of ESI Course(s):

SUBMITTAL CHECKLIST: Make Sure all of the Following Information is Submitted:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	
	Organization sponsoring or requesting the program (if any)	
Course Title:	Name of course (related to content)	
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	
Test Materials:		
Completed Application:		

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

Miami Valley Building Officials Council

Derek Spurling, President. 100 W. Spring Valley Rd. Centerville. Ohio 45458
www.mvboc.org

OFFICERS

Derek Spurling
President
City of Centerville

William Sutter
Vice President
WTFD

Derek Spurling
Secretary
City of Centerville

Dan Fitzpatrick
Treasurer
City of Springboro

Board of Directors

Scott Young
NIC

Larry Parsons
City of Springboro

Aaron Morrison
City of Piqua

Brandon Gill
City of Springfield

Bryan Parker
Champaign County
Past President

2017 OBC – Chapter 1 Administration

1 hour overview

- Section 101 – General (5-10 min.)
- Section 102 – Applicability & Jurisdictional Authority (5-10 min.)
- Section 104 – Duties & Responsibility of Building Department Personnel (10-15 min.)
- Section 105 – Approvals (10-15 min.)
- Section 106 – Construction Documents (10-15 min.)
- Section 107 Plan Approval Process (10-15 min.)
- Section 108 – Inspection Process (10-15 min.)

Instructor Information:

Derek Spurling

Certifications / Licenses
BBS Certification #: 1409

- Building Official
- Residential Building Official
- Building Plans Examiner
- Electrical Plans Examiner
- Mechanical Plans Examiner
- Fire Protection Plans Examiner
- Building Inspector
- Electrical Inspector
- Mechanical Inspector
- Fire Protection Inspector

OCILB Electrical License #: 45124

Recent Employment
City of Centerville – 2015 - Present, Building Official
Clermont County – 2009 - 2015, Building/Electrical Inspector
Warren County – 2004, Contract Inspector

Organizations
SWOBOA – Board of Director, 2014-2015
MVBOC – President, 2019 – Present
OBOA – 2009 – Present

Ohio Board of Building Standards

Recognizes Participation in

Train the Trainers: Chapter 1/Code Administration

November 18, 2019

This is to certify that

Derek Spurling

completed the training approved for 3 continuing education contact hours

Gerald O Holland

GERALD O. HOLLAND
CHAIRMAN

Ohio Board of Building Standards

BBS2019-631
Approved for all certifications
HSW: Yes

Ohio Board of Building Standards

Recognizes Participation in

2020 Train the Trainer: Chapter 1

Board of Building Standards
Online Seminar
September 23, 2020

This is to certify that

DEREK SPURLING

completed the training approved for 3 continuing education contact hours.

Ohio Board of Building Standards
Timothy Galvin
CHAIRMAN

BBS2020-632
Approved for All Certifications
HSW: Yes

Ohio Board of Building Standards

Recognizes Participation in

Train the Trainers: Existing Buildings

November 18, 2019

This is to certify that

Derek Spurling

completed the training approved for 3 continuing education contact hours

Gerald O Holland

GERALD O. HOLLAND
CHAIRMAN

Ohio Board of Building Standards

BBS2019-632
Approved for all certifications
HSW: Yes

File Attachments for Item:

ER-2 Basic Blueprint Reading (Building and Fire Code Academy)

All certifications except ESI (6 hours)

Staff Notes: AIA approved course: add ESI, recommend approval.

Committee Recommendation:

Basic Blueprint Reading

Course Outline

1.	Purpose and Components of Blueprint Reading	00:00 – 01:00
2.	Blueprint Sheets and Symbols Breakdown	01:00 – 02:00
3.	Using Scales	02:00 – 02:30
4.	Disciplines	02:30 – 03:00
5.	Lunch	
6.	Blueprint Hands-on	03:00 – 06:00

CRITERIA FOR SUBMITTING CONTINUING EDUCATION COURSES FOR BOARD OF BUILDING STANDARDS CERTIFICATIONS

The Ohio Board of Building Standards approves Continuing Education Courses for building department personnel. The courses may be used for the attainment of goals that are connected with technical and professional development as they relate to enforcing and interpreting the Ohio State Building Codes. Board approval is granted only on course instruction pertaining to OBC, OMC, OPC, and RCO requirements and such other content areas directly related to the responsibilities of the certification for which credit is being requested.

Instructors: Anyone or any organization promoting an approved course, is required to make full and accurate disclosure regarding course title, course approval number, number of credit hours, certifications for which the BBS has approved the class, and fees in promotion materials and advertising. ***The Board does not grant retroactive approval. It is recommended that courses be submitted for approval well in advance of any scheduling of classes and advertising***. Advertising shall not disclose improper approval information to the public.

Course sponsors/co-sponsors: provide participants a certificate of completion containing the following information: name of participant, title of approved courses, BBS approval #, BBS approved certifications, date of the continuing education program, number of approved credit hours awarded and signature of authorized sponsor or instructor.

Anyone or any organization administering an approved course shall provide the Board with advanced written information on scheduling of the course(s) (date and place) and provide to the Board a legible list of participants who completed the course with the name of course, date, and location.

Participants: Must attend the complete course as presented by the instructor to receive credit hours approved by the Board. No partial credit shall be given to any participant who failed to complete the entire course as approved. The sponsor/co-sponsor or instructor shall formulate a method to verify the individual's attendance and completion of the course.

Board approval: Remains in effect through the calendar year of approval. The course may be renewed administratively by sponsor application in subsequent years so long as it references current codes and standards Upon the Board's adoption of a new edition of the codes, course sponsors must update their course and submit to the Board for approval. The Board does not grant retroactive approval for courses presented prior to approval date.

Facility/training area: Shall be capable of comfortably and safely seating at least the number of attendees with writing surfaces for each attendee; accessible to/and usable for people with disabilities; sized and provided with audio/visual equipment adequate so that each attendee can see the instructor(s) and overhead screen and hear the content of the training programs; illuminated for writing and that the content on an overhead screen can be seen easily by all attendees; non-smoking in the training room; sound controlled so that outside noise will not interfere with the training.

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: George Sweeney
(Contact Name)

Organization: Building & Fire Code Academy
(Organization/Company)

Address: 2420 Vantage Drive
(Include Room Number, Suite, etc.)

City: Elgin State: IL Zip: 60124

E-Mail: gsweeney@bfcacademy.com

Telephone: 847 428-2951 Fax:

Course Sponsor: Richard A. Piccolo, Building and Fire Code Academy

COURSE INFORMATION:

Course Title: Basic Blueprint Reading

New Course Submittal: ■ Update Course: ☐ Prior Approval Number:

Purpose and Objective: A one-day course developing basic skills required in reading and distinguishing building plans and their symbols so as to examine and identify classifications of information submitted.

Students successfully completing this course will be able to:

Locate, identify, and examine information indicated on different sheets in a set of building plans.

Compare and contrast differences between plan view, sections, details, and schedules.

Differentiate symbols utilized on a basic plan.

Number of Instructional Contact Hours that can be obtained upon completion: 6.0

If Multi-Session, Number of Instructional Contact Hours Per Session: NA

Program Applicable for the Following Participants:

Building Official ■ Master Plans Examiner ■ Building Inspector ■ Fire Protection Inspector ■ Mechanical Inspector ■

Building Plans Exam. ✔ Plumbing Inspector ■

Plumbing Plans Exam. ■ Non-Res IU Inspector ■

Electrical Plans Exam. ■

Mechanical Plans Exam. ■

Fire Protect. Plans Exam. ✔

Res Building Official ■ Res Plans Examiner ■ Res Building Inspector ■ Res Mechanical Inspector ■ Res IU Inspector ■

Electrical Safety Inspectors ☐

Location of ESI Course: Date(s) of ESI Course(s):

SUBMITTAL CHECKLIST: **Make Sure** all of the Following Information is **Submitted**:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	
	Organization sponsoring or requesting the program (if any)	
Course Title:	Name of course (related to content)	
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	
Test Materials:		
Completed Application:		

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

RICHARD A. PICCOLO

Master Code Professional

PRESIDENT
B & F CONSTRUCTION CODE SERVICES, INC.
BUILDING & FIRE CODE ACADEMY

CERTIFICATIONS

- Certified Building Official
- Certified Fire Official II
- Certified Fire Fighter III
- ICC® Certified Fire Inspector
- Illinois Certified Fire Inspector
- Certified Accessibility Inspector
- Certified Property Maintenance Inspector
- Certified Plans Examiner
- Certified Building Inspector
- Certified Fire Service Instructor IV
- Certified Energy Inspector
- Certified Master Code Professional

AUTHOR/ INSTRUCTOR

- Understanding the International Building Code (2000, 2003, 2006, 2009, 2012)
- Understanding the International Fire Code (2000, 2003, 2006, 2009, 2012)
- Fire Resistive Construction Requirements
- Understanding Non Structural Plan Review
- Understanding the International Mechanical Code (2006, - 2012)
- Understanding the International Plumbing Code –(2009 – 2012)
- Kitchen Hood and Duct System Plan Review
- Understanding the BOCA® National Building Code (1990 – 1999)
- Advanced Decision Making
- Managing Special Events
- Sprinkler System Plan Review
- Understanding the 1990 – 1999 BOCA® National Fire Prevention Code
- Understanding the 1996 – 1999 BOCA® National Building Code
- Understanding the 2002 – 2012 NFPA 101

INSTRUCTOR

- 1984 BOCA® Fire Prevention Code
- National Certification For Construction Code Inspectors Workshop
- Fire Prevention Principles - Levels I & II
- Principles of the 1987 BOCA® National Building Code
- Principles of the 1984 BOCA® National Building Code

ADJUNCT FACULTY

William Rainey Harper College – Palatine, IL (1984 – 1999)

- Course Title: BOCA ® National Building Code
- Course Title: Basic Code Enforcement
- Course Title: Fire Inspection Principles

BACKGROUND	Elk Grove Village Fire Department – 19 Years Public Education Office President, Illinois Institutional Fire Training, Inc. 23 Years
EDUCATION & TRAINING	Northeastern University B.A. Harper College, Palatine IL A.S. Fire Science 240 Hour Inspectors Training Course Fire Instructor Training: Levels I & II
COURT CERTIFIED CODE EXPERT	Designated Court Certified expert on Building Codes in 1995 *Provided trial testimony for the County of Kankakee, IL (Plaintiff) in County of Kankakee vs Tim Harrington, U.S. District Court No. 940 V 134* *Provided deposition for Village of Schiller Park, IL (Plaintiff), Village of Schiller Park vs SP Club, Inc. U.S. District Court No. 94 C 1422* *Deposition for Village of Addison (Defendant), Hispanics of United DuPage County vs Village of Addison, IL U.S. District Court 94 C 6075 & 95 C 3926* *Deposition for Village of Good Field, IL (Defendant), Clark v. Village of Good Field, et al., Case No. 03 L 96* *Deposition for Charles Gaston, Jr. (Plaintiff), Charles Gaston v. City of Danville, et al., Case No.06 L 35*
PROFESSIONAL AFFILIATIONS	North West Building Officials Association Suburban Building Officials National Fire Protection Association (NFPA) International Association of Continuing Education & Training (IACET) Illinois Fire Inspectors Association Chairman, Codes and Standards Committee 1983 - Current
SPECIAL TRAINING CLASSES	Florida Pennsylvania Ohio Fire Academy AIA Presentation w/National Gypsum Association Army Corps of Engineers
MILITARY SERVICE	US Army 2 years – Honorable Discharge

Education & Certification

Education (http://www.iccsafe.org/education-certification/education/training-events/)

Certification and Testing (http://www.iccsafe.org/education-certification/certification-and-testing/)

(https://shop.iccsafe.org/codes/2015-international-codes-and-references.html)

Certified Professional Information:

Last, First MI: Piccolo, Richard
Certified under this name: Richard Piccolo
Company: B & F Construction Code Services Inc
City, State Zip: Elgin, IL 60124-7867
Phone: 847-428-7010
Certification Type(s): Accessibility Inspector/Plans Examiner (expires 06/29/2018)
Building Inspector (expires 06/29/2018)
Building Plans Examiner (expires 06/29/2018)
Commercial Building Inspector (expires 06/29/2018)
Commercial Energy Inspector (expires 06/29/2018)
Commercial Energy Plans Examiner (expires 06/29/2018)
Fire Inspector I (expires 06/29/2018)
Fire Prevention I - NFPC (expires 06/29/2018)
ICC/AACE Property Maintenance & Housing Inspector (expires 06/29/2018)
Master Code Professional (expires 06/29/2018)

Listings here may not reflect today's changes, additions, exam results, or certifications from organizations other than ICC (including BOCA, ICBO, and SBCCI). Listings are updated nightly on this web site, so please allow a full 24 hours for changes to be reflected here. ICC certification for code enforcement professions attests to competent knowledge of construction codes and standards in effect on the date of certification or renewal.

ICC does its best to maintain the privacy requests of its members and constituents. If you believe that phone number or address information listed here should not be displayed please contact us at 1-888-ICC-SAFE (422-7233) between 8am and 7pm (CT) for personal assistance.

Terms of Use: This listing is provided as a service to the constituents of ICC for these purposes: locating a certified professional or contractor in your area, or confirming status for individuals. Any other use, sale, transfer, or reproduction in any form without the express written consent of ICC is strictly prohibited. ICC reserves the right to incorporate some false names to detect improper use of this service.

Contact Information

1-888-ICC-SAFE (422-7233) ext. 5524

Contact Us (mailto:certexam@iccsafe.org

OFFICE & SHIPPING:
2420 Vantage Drive
CORRESPONDENCE:
P. X 5178
EL IL 60121-5178

CONSTRUCTION CODE SERVICES, INC.
BUILDING & FIRE PROTECTION PLAN REVIEW
TRAINING • INSPECTIONS • CODE CONSULTING

PHONE (847) 428-7010
FAX (847) 428-3151
TOLL FREE 1-800-232-5523
E-MAIL bfccs@bfccs.org

Kenneth J. Garrett

BACKGROUND

Kenneth J. Garrett has been employed by B & F Construction Code Services for 17 years as Vice President and Instructor. Ken is responsible for managing the daily operation of B & F Construction Code Services, Inc. and is positioned to provide leadership, guidance and effect teamwork for the technical staff. Ken reviews training materials, outlines and objectives for existing and new curriculum, for both internal training and classes offered externally. He develops new outlines, objectives and learning outcomes for new curriculum for company courses and serves as an instructor for Academy courses. Ken, in conjunction with the President of B & F Construction Code Services, Inc., oversees the current and future operation of training services provided by the company and shall evaluate the effectiveness and instructional technique of instructors.

Prior to working at B & F Construction Code Services, Ken was employed by the City of Zion, IL as the Assistant Director of Community Development. Ken was responsible for overseeing all functions of the building department, supervising a staff of nine employees.

EDUCATION / TRAINING

2012 Master's Degree – Public Administration, Governors State University
1995 Bachelor's Degree- Public Administration, Governors State University
1990 Code Enforcement Certificate Program, William Rainey Harper College
1983 Associate Degree- Fire Science Technology, William Rainey Harper College

CERTIFICATIONS / LICENSES / REGISTRATIONS

Certified as a Master Code Professional through the International Code Council

PREVIOUS TEACHING / TRAINING EXPERIENCE

Author and Instructor

Understanding the International Property Maintenance Code
Understanding the Basics of Code Enforcement
Management I and II
Inspection Challenges & Solutions

Instructor

Understanding the International Residential Code
Understanding the International Residential Code-Plan Review
Understanding the International Building Code – Parts I, II, III
Understanding the International Fire Code
Understanding the International Mechanical & Fuel Gas Codes
Fire Resistive Construction Requirements

Education & Certification

Education (http://www.iccsafe.org/education-certification/education/training-events/)

Certification and Testing (http://www.iccsafe.org/education-certification/certification-and-testing/)

(https://shop.iccsafe.org/codes/2015-international-codes-and-references.html)

Certified Professional Information:

Last, First MI: Garrett, Kenneth J
Certified under this name: Kenneth J Garrett
City, State Zip: Palatine, IL 60195-2089
Certification Type(s): Accessibility Inspector/Plans Examiner (expires 08/26/2017)
Building Inspector (expires 08/26/2017)
Certified Building Official (expires 08/26/2017)
Commercial Building Inspector (expires 08/26/2017)
Commercial Energy Inspector (expires 08/26/2017)
Master Code Professional (expires 08/26/2017)
Residential Energy Inspector/Plans Examiner (expires 08/26/2017)

Listings here may not reflect today's changes, additions, exam results, or certifications from organizations other than ICC (including BOCA, ICBO, and SBCCI). Listings are updated nightly on this web site, so please allow a full 24 hours for changes to be reflected here. ICC certification for code enforcement professions attests to competent knowledge of construction codes and standards in effect on the date of certification or renewal.

ICC does its best to maintain the privacy requests of its members and constituents. If you believe that phone number or address information listed here should not be displayed please contact us at 1-888-ICC-SAFE (422-7233) between 8am and 7pm (CT) for personal assistance.

Terms of Use: This listing is provided as a service to the constituents of ICC for these purposes: locating a certified professional or contractor in your area, or confirming status for individuals. Any other use, sale, transfer, or reproduction in any form without the express written consent of ICC is strictly prohibited. ICC reserves the right to incorporate some false names to detect improper use of this service.

Contact Information

1-888-ICC-SAFE (422-7233) ext. 5524

Contact Us (mailto:certexam@iccsafe.org

Gregory D. Sengstock

(630) 770-5348

1037 Ash Street, St. Charles, IL 60174

Greg@SengstockArchitects.com

Licensed Architect with a wide variety of residential and light commercial experience. Able to create and document cost-efficient, practical designs resulting in high client satisfaction. Results-oriented, creative problem-solver.

Industry Experience

Architectural Firms, 12 years experience including:

- **Sengstock Architects**, Owner / Architect
- **OKW Architects**, Senior Architect
- **Bloodgood Sharp Buster Architects and Planners**, Project Architect
- **Nelson Associates Architects**, Job Captain

Homebuilders / Remodeling, 15 years experience including:

- **Greenscape Homes**, Director of Architecture
- **Airoom Architects and Builders**, Project Architect
- **Pinehurst Homes**, Director of Architecture and Construction
- **Town and Country Homes**, Director of Architecture
- **Pulte Home Corporation**, Assistant Director of Architecture
- **Neumann Homes**, Project Architect

Environmental Engineering and Education, 6 years experience including:

- **Building & Fire Code Academy**, Adjunct Instructor
- **Westwood College**, Adjunct Instructor
- **Law Associates**, Staff Architect
- **University of Illinois**, Teaching Assistant

Education

Master of Architecture, University of Illinois, May 1989

Master of Business Administration, University of Illinois, May 1989

Bachelor of Science, Architectural Studies, University of Illinois, May 1986

Continuing Education including:

Value Engineering
Sales and Construction techniques
Building Science / Quality Management
Green Building and Energy Conservation
Hiring, Teambuilding, and Supervisory skills
Code Updates

continued

Gregory D. Sengstock is a Licensed Architect in private practice with a wide variety of residential and light commercial experience. As proprietor of Sengstock Architects, Greg specializes in the design of new custom and production homes, additions, accessibility renovations, disaster remediation, and commercial build-outs. With over 30 years of experience working with large and small builders and architectural firms, he has an in-depth understanding of project program scope creation, efficient yet elegant design, construction documentation, building codes, and construction permitting. As an effective project manager and team leader, Greg has simultaneously guided multiple developments from several clients. His interest in Value Engineering reduces building costs while Green Building and Building Science techniques have reduced operational and maintenance costs for his clients. Greg has been responsible for dozens of Key Award winning projects.

Greg earned his Bachelor of Science, Architectural Studies as well as Master of Architecture and Master of Business Administration degrees from the University of Illinois. He is an Adjunct Instructor at the Building & Fire Code Academy and has taught courses in the Construction Management program at Westwood College. He has been a Professional Member of the Association of Licensed Architects and the International Code Council. Greg lives in St. Charles, IL with his wife and two children.

BFCA®

Building & Fire Code Academy

WELCOME

BFCA®

Building & Fire Code Academy

Understanding Basic Blueprint Reading©

Building Better With Our Greatest Resource…Education®

Credit(s) earned on completion of this course will be reported to AIA CES for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.

This course is registered with AIA CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

Thank you!

Copyrighted Materials
This presentation is protected by US and International copyright laws. Reproduction, distribution, display and use of the presentation without written permission of the speaker is prohibited.
ICC® graphics used with permission.

© Building & Fire Code Academy
2018

Building Better With Our Greatest Resource…Education®

Course Description

A one-day course developing basic skills required in reading and distinguishing building plans and their symbols so as to examine and identify classifications of information submitted.

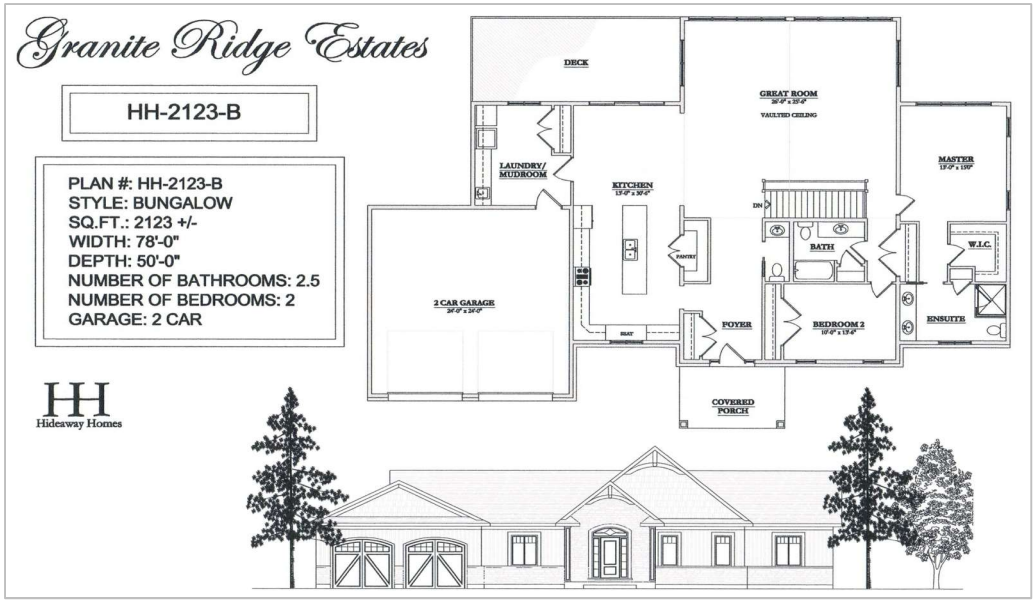
Learning Objectives / Learning Outcomes

Students successfully completing this course will be able to:

* Locate, identify, and examine information indicated on different sheets in a set of building plans.
* Compare and contrast differences between plan view, sections, details, and schedules.
* Differentiate symbols utilized on a basic plan.

Purpose Of Construction Plans

- Our basic means of communication in building industry
- Graphic representation of a building
- Provide floor plan for layouts
- Provide contractor with adequate information to construct building



* Adequate plans provide information for approval
* Plan commission
* Zoning board
* Municipal government
* Building department
    - Review and inspection

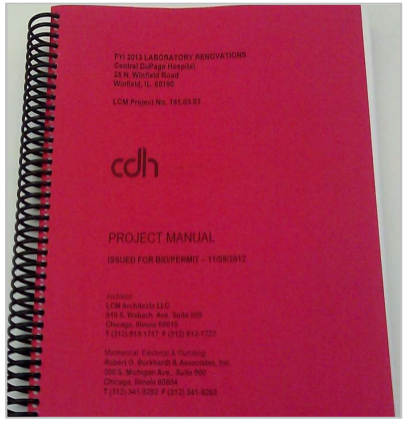
"APPROVED"

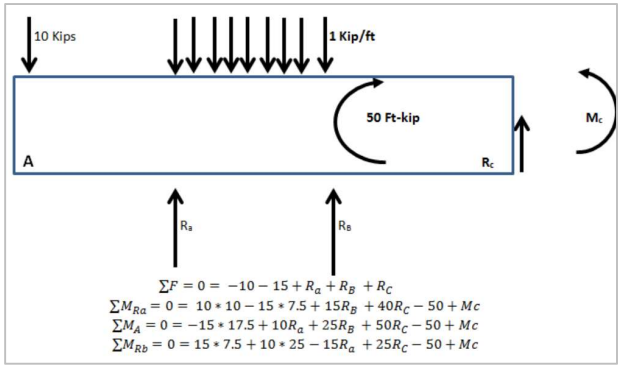
Components of a Complete Plan Set

- Plan sheets
- Cover sheets
- Sheets by discipline
  - Site plan, architectural, mechanical, plumbing, electrical, fire protection
  - Specialties
    - Kitchen hoods, racks, industrial equipment

Components Of A Complete Plan Set *(continued)*

* Other information
  - Specification (spec) books, structural calculations, soil tests, catalog cuts, shop drawings





$$\sum F = 0 = -10 - 15 + R_a + R_B + R_C$$
$$\sum M_{Ra} = 0 = 10 * 10 - 15 * 7.5 + 15R_B + 40R_C - 50 + Mc$$
$$\sum M_A = 0 = -15 * 17.5 + 10R_a + 25R_B + 50R_C - 50 + Mc$$
$$\sum M_{Rb} = 0 = 15 * 7.5 + 10 * 25 - 15R_a + 25R_C - 50 + Mc$$

- Plan Sheets
  - No standards for how the sheets are labeled
    - "S" sheets could be
      - Structural / Suppression / Specifications / Site
    - "FA" sheets could be
      - Fire alarm, or could be on "E" electric plans

* Typical sheet designations
  - “A” Architectural
  - “C” Civil
  - “P” Plumbing
  - “M” Mechanical
  - “S” Structural / Sprinkler / Site
  - “E” Electrical

- “FA” Fire Alarm
- “FP” Fire Protection
- “K” Kitchen
- “SP” Specifications if not in a separate specification book
- “T” Title sheet

* Cover or title sheet
  - Not required
  - Commercial & industrial
    - Includes:

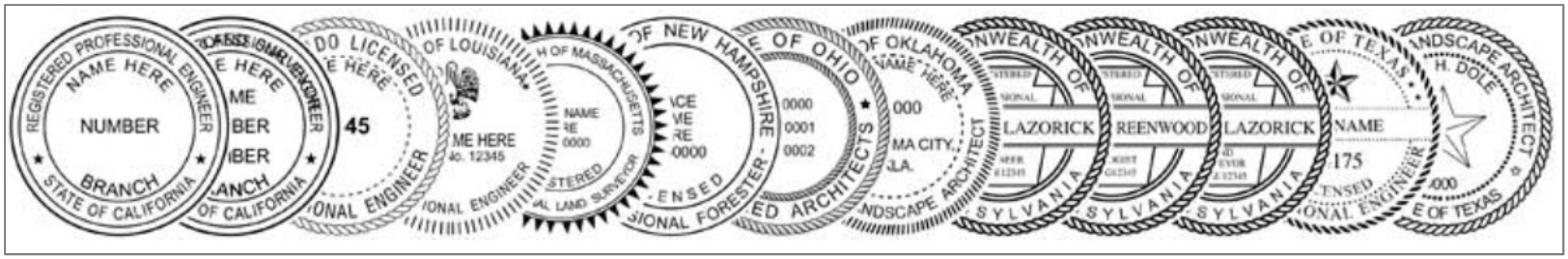
      Title block with design firm or design professional with provisions for a seal and signature

      Sheet number (T-1 or C-1) may indicate number of sheets A-1 of 8 or 1/8 or M1 of 5 or M1/5

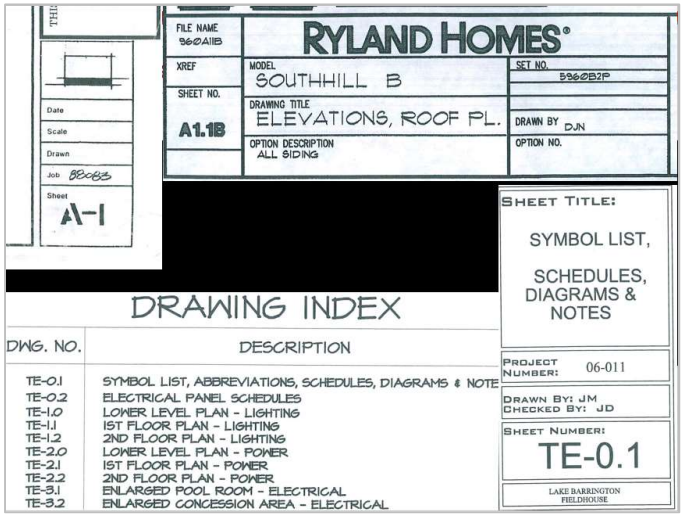
      Place for listing revisions

      Project address, lot number, job number

- Design professional's original seal and signature



* Single family – typically combined with the A sheets



FILE NAME	960A1B
XREF	
SHEET NO.	A1.1B
MODEL	SOUTHHILL B
DRAWING TITLE	ELEVATIONS, ROOF PL.
OPTION DESCRIPTION	ALL SIDING
SET NO.	5960B2P
DRAWN BY	DJN
OPTION NO.	

RYLAND HOMES®

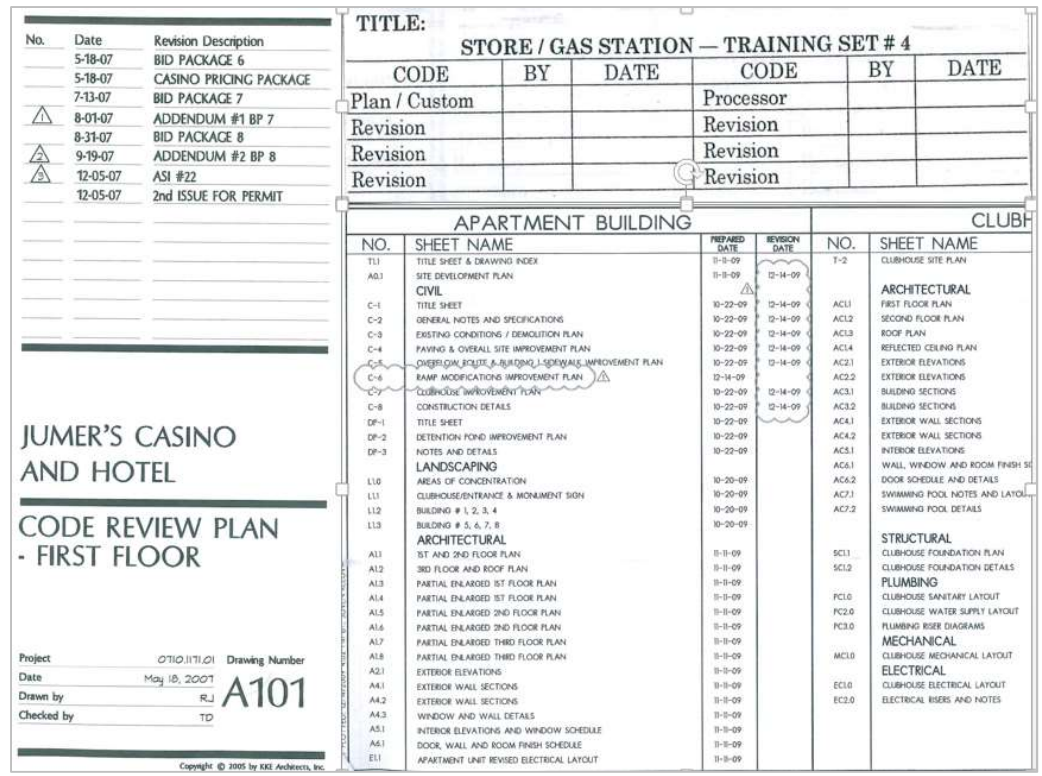
Date
Scale
Drawn
Job 8808
Sheet A-1

SHEET TITLE: SYMBOL LIST, SCHEDULES, DIAGRAMS & NOTES

DRAWING INDEX

DWG. NO.	DESCRIPTION
TE-0.1	SYMBOL LIST, ABBREVIATIONS, SCHEDULES, DIAGRAMS & NOTE
TE-0.2	ELECTRICAL PANEL SCHEDULES
TE-1.0	LOWER LEVEL PLAN - LIGHTING
TE-1.1	1ST FLOOR PLAN - LIGHTING
TE-1.2	2ND FLOOR PLAN - LIGHTING
TE-2.0	LOWER LEVEL PLAN - POWER
TE-2.1	1ST FLOOR PLAN - POWER
TE-2.2	2ND FLOOR PLAN - POWER
TE-3.1	ENLARGED POOL ROOM - ELECTRICAL
TE-3.2	ENLARGED CONCESSION AREA - ELECTRICAL

PROJECT NUMBER: 06-011
DRAWN BY: JM
CHECKED BY: JD
SHEET NUMBER: TE-0.1
LAKE BARRINGTON FIELDHOUSE



No.	Date	Revision Description
	5-18-07	BID PACKAGE 6
	5-18-07	CASINO PRICING PACKAGE
	7-13-07	BID PACKAGE 7
1	8-01-07	ADDENDUM #1 BP 7
	8-31-07	BID PACKAGE 8
2	9-19-07	ADDENDUM #2 BP 8
3	12-05-07	ASI #22
	12-05-07	2nd ISSUE FOR PERMIT

JUMER'S CASINO AND HOTEL

CODE REVIEW PLAN - FIRST FLOOR

Project	0710.1171.01
Date	May 18, 2007
Drawn by	RJ
Checked by	TD
Drawing Number	A101

Copyright © 2005 by KKE Architects, Inc.

TITLE: STORE / GAS STATION — TRAINING SET # 4

CODE	BY	DATE	CODE	BY	DATE
Plan / Custom			Processor		
Revision			Revision		
Revision			Revision		
Revision			Revision		

APARTMENT BUILDING

NO.	SHEET NAME	PREPARED DATE	REVISION DATE
T1.1	TITLE SHEET & DRAWING INDEX	11-11-09	
A0.1	SITE DEVELOPMENT PLAN	11-11-09	12-14-09
	CIVIL		
C-1	TITLE SHEET	10-22-09	12-14-09
C-2	GENERAL NOTES AND SPECIFICATIONS	10-22-09	12-14-09
C-3	EXISTING CONDITIONS / DEMOLITION PLAN	10-22-09	12-14-09
C-4	PAVING & OVERALL SITE IMPROVEMENT PLAN	10-22-09	12-14-09
C-5	OVERFLOW ROUTE & BUILDING 1 SIDEWALK IMPROVEMENT PLAN	10-22-09	12-14-09
C-6	RAMP MODIFICATIONS IMPROVEMENT PLAN	12-14-09	
C-7	CLUBHOUSE IMPROVEMENT PLAN	10-22-09	12-14-09
C-8	CONSTRUCTION DETAILS	10-22-09	12-14-09
DP-1	TITLE SHEET	10-22-09	
DP-2	DETENTION POND IMPROVEMENT PLAN	10-22-09	
DP-3	NOTES AND DETAILS	10-22-09	
	LANDSCAPING		
L1.0	AREAS OF CONCENTRATION	10-20-09	
L1.1	CLUBHOUSE/ENTRANCE & MONUMENT SIGN	10-20-09	
L1.2	BUILDING # 1, 2, 3, 4	10-20-09	
L1.3	BUILDING # 5, 6, 7, 8	10-20-09	
	ARCHITECTURAL		
A1.1	1ST AND 2ND FLOOR PLAN	11-11-09	
A1.2	3RD FLOOR AND ROOF PLAN	11-11-09	
A1.3	PARTIAL ENLARGED 1ST FLOOR PLAN	11-11-09	
A1.4	PARTIAL ENLARGED 1ST FLOOR PLAN	11-11-09	
A1.5	PARTIAL ENLARGED 2ND FLOOR PLAN	11-11-09	
A1.6	PARTIAL ENLARGED 2ND FLOOR PLAN	11-11-09	
A1.7	PARTIAL ENLARGED THIRD FLOOR PLAN	11-11-09	
A1.8	PARTIAL ENLARGED THIRD FLOOR PLAN	11-11-09	
A2.1	EXTERIOR ELEVATIONS	11-11-09	
A4.1	EXTERIOR WALL SECTIONS	11-11-09	
A4.2	EXTERIOR WALL SECTIONS	11-11-09	
A4.3	WINDOW AND WALL DETAILS	11-11-09	
A5.1	INTERIOR ELEVATIONS AND WINDOW SCHEDULE	11-11-09	
A6.1	DOOR, WALL AND ROOM FINISH SCHEDULE	11-11-09	
E1.1	APARTMENT UNIT REVISED ELECTRICAL LAYOUT	11-11-09	

CLUBH

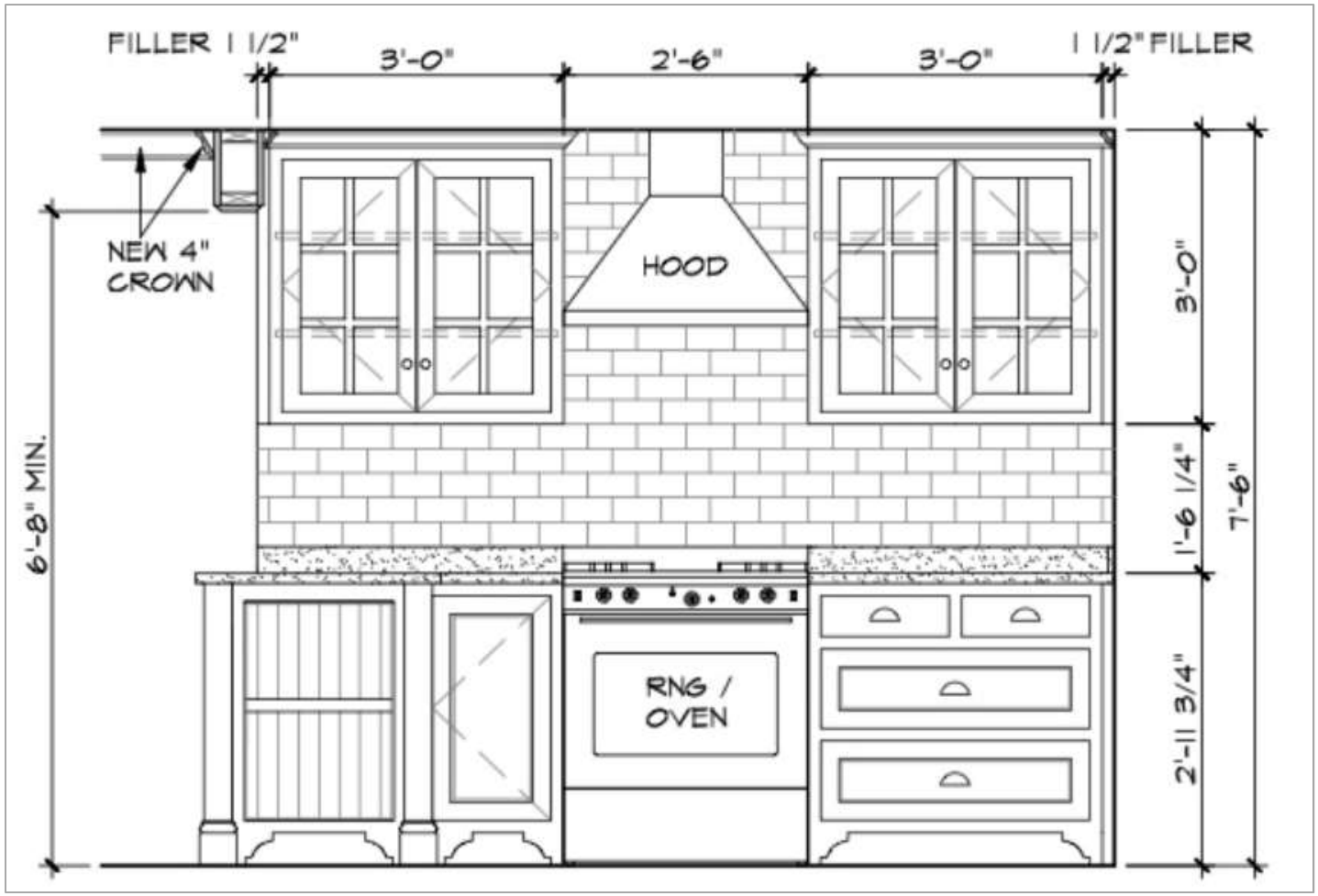
NO.	SHEET NAME
T-2	CLUBHOUSE SITE PLAN
	ARCHITECTURAL
AC1.1	FIRST FLOOR PLAN
AC1.2	SECOND FLOOR PLAN
AC1.3	ROOF PLAN
AC1.4	REFLECTED CEILING PLAN
AC2.1	EXTERIOR ELEVATIONS
AC2.2	EXTERIOR ELEVATIONS
AC3.1	BUILDING SECTIONS
AC3.2	BUILDING SECTIONS
AC4.1	EXTERIOR WALL SECTIONS
AC4.2	EXTERIOR WALL SECTIONS
AC5.1	INTERIOR ELEVATIONS
AC6.1	WALL, WINDOW AND ROOM FINISH SC
AC6.2	DOOR SCHEDULE AND DETAILS
AC7.1	SWIMMING POOL NOTES AND LAYOU
AC7.2	SWIMMING POOL DETAILS
	STRUCTURAL
SC1.1	CLUBHOUSE FOUNDATION PLAN
SC1.2	CLUBHOUSE FOUNDATION DETAILS
	PLUMBING
PC1.0	CLUBHOUSE SANITARY LAYOUT
PC2.0	CLUBHOUSE WATER SUPPLY LAYOUT
PC3.0	PLUMBING RISER DIAGRAMS
	MECHANICAL
MC1.0	CLUBHOUSE MECHANICAL LAYOUT
	ELECTRICAL
EC1.0	CLUBHOUSE ELECTRICAL LAYOUT
EC2.0	ELECTRICAL RISERS AND NOTES

BFCA®

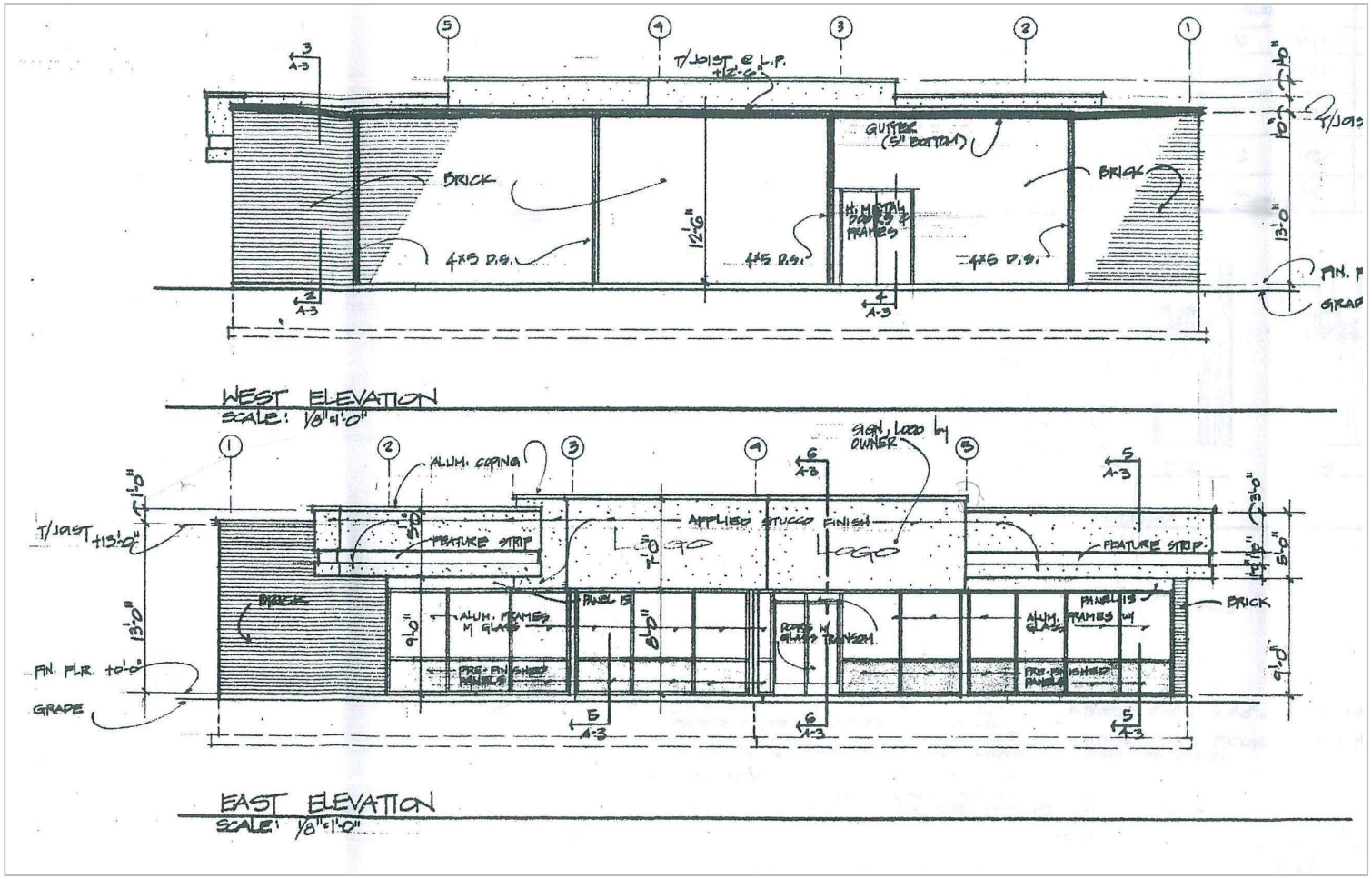
- Views
  - Elevations
    - View of a vertical surface
      - Exterior – Generally 4 elevations
      - North, South, East, West
      - Left, Right, Front, Back
      - North elevation is the north exterior wall
      - Shows windows, doors, roof, exterior finish
      - Scaled

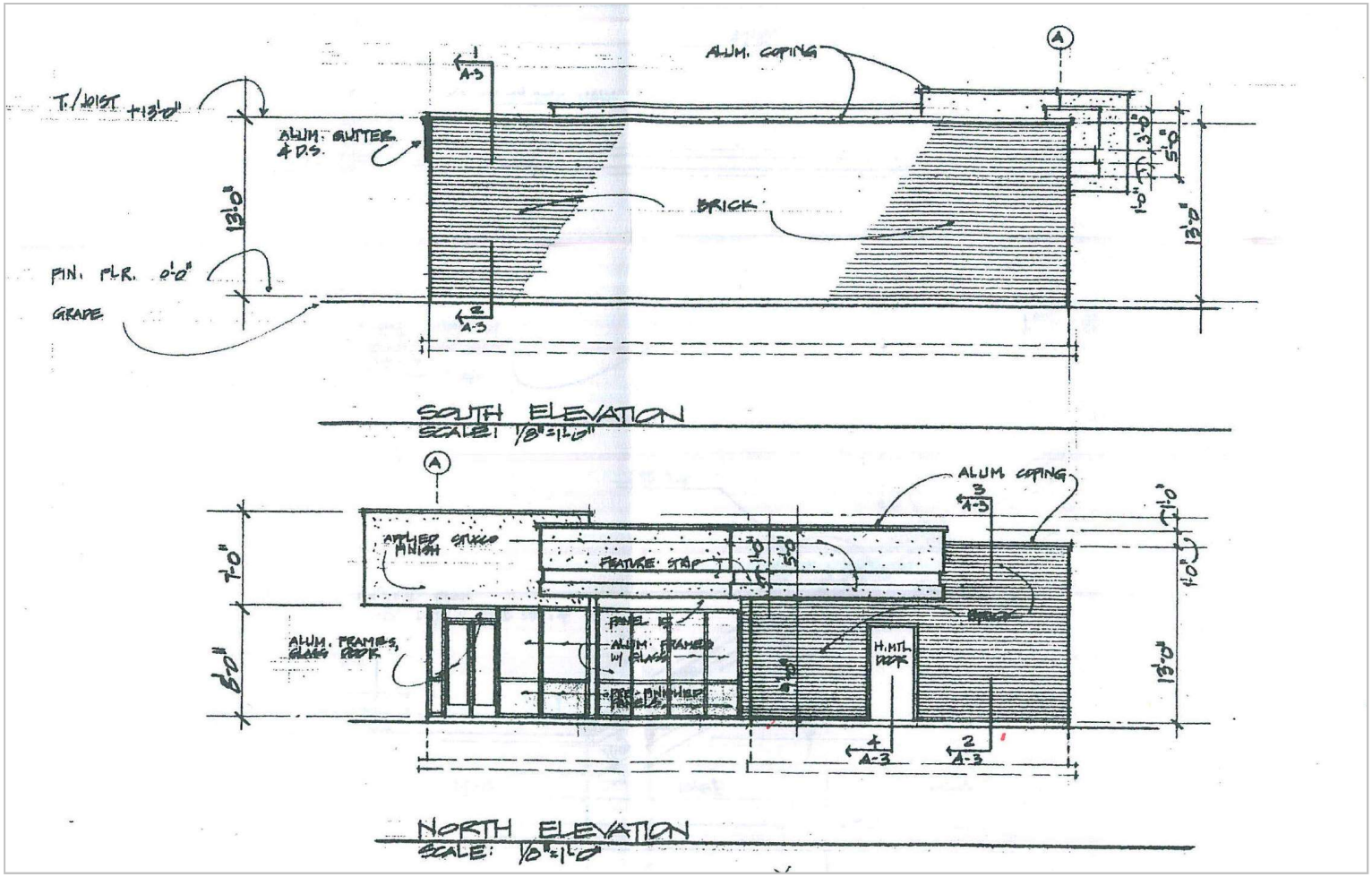
* Exterior Elevations

* Interior Elevation - Kitchen

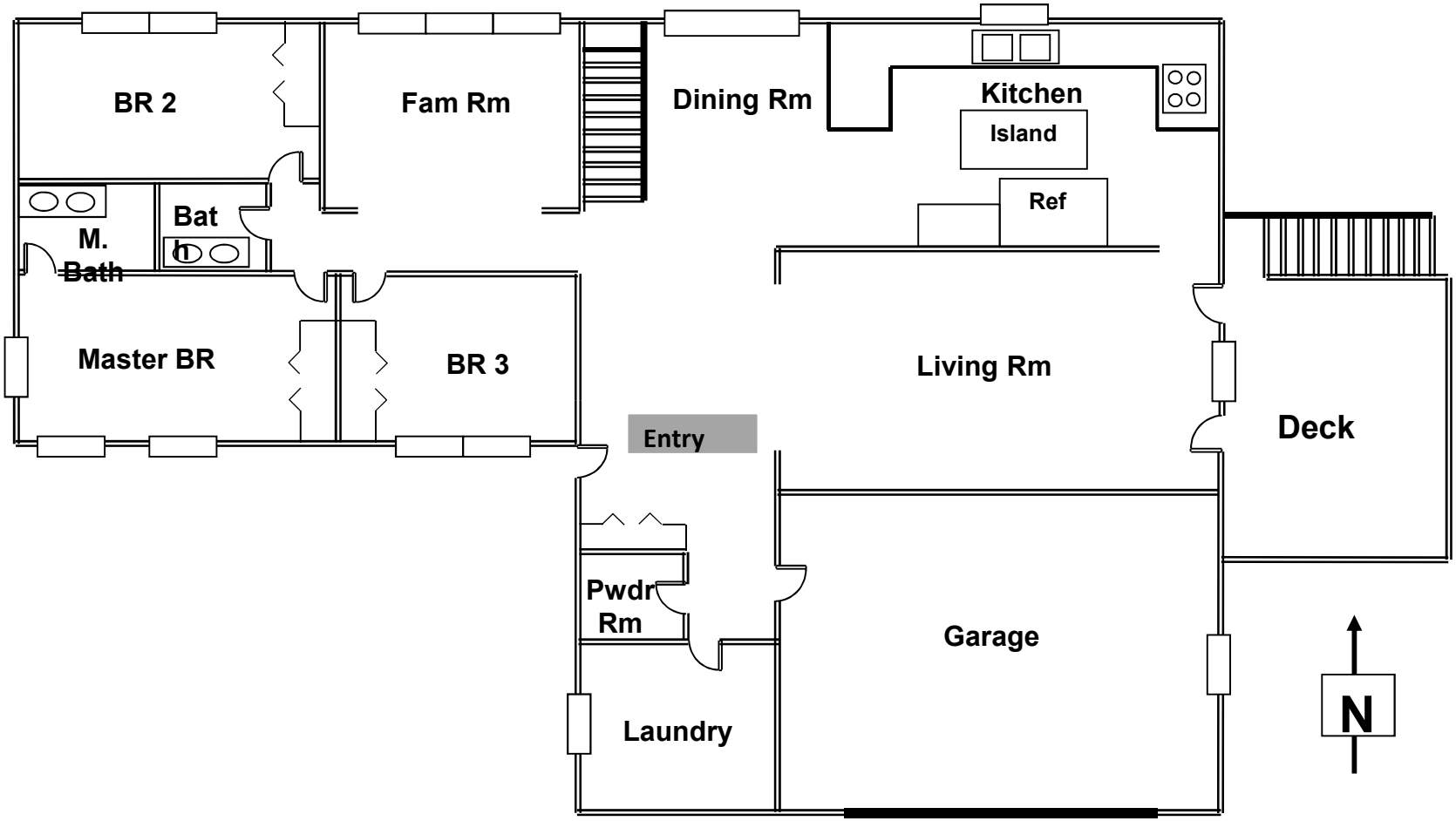


* Exterior Elevations – Typical Light Commercial



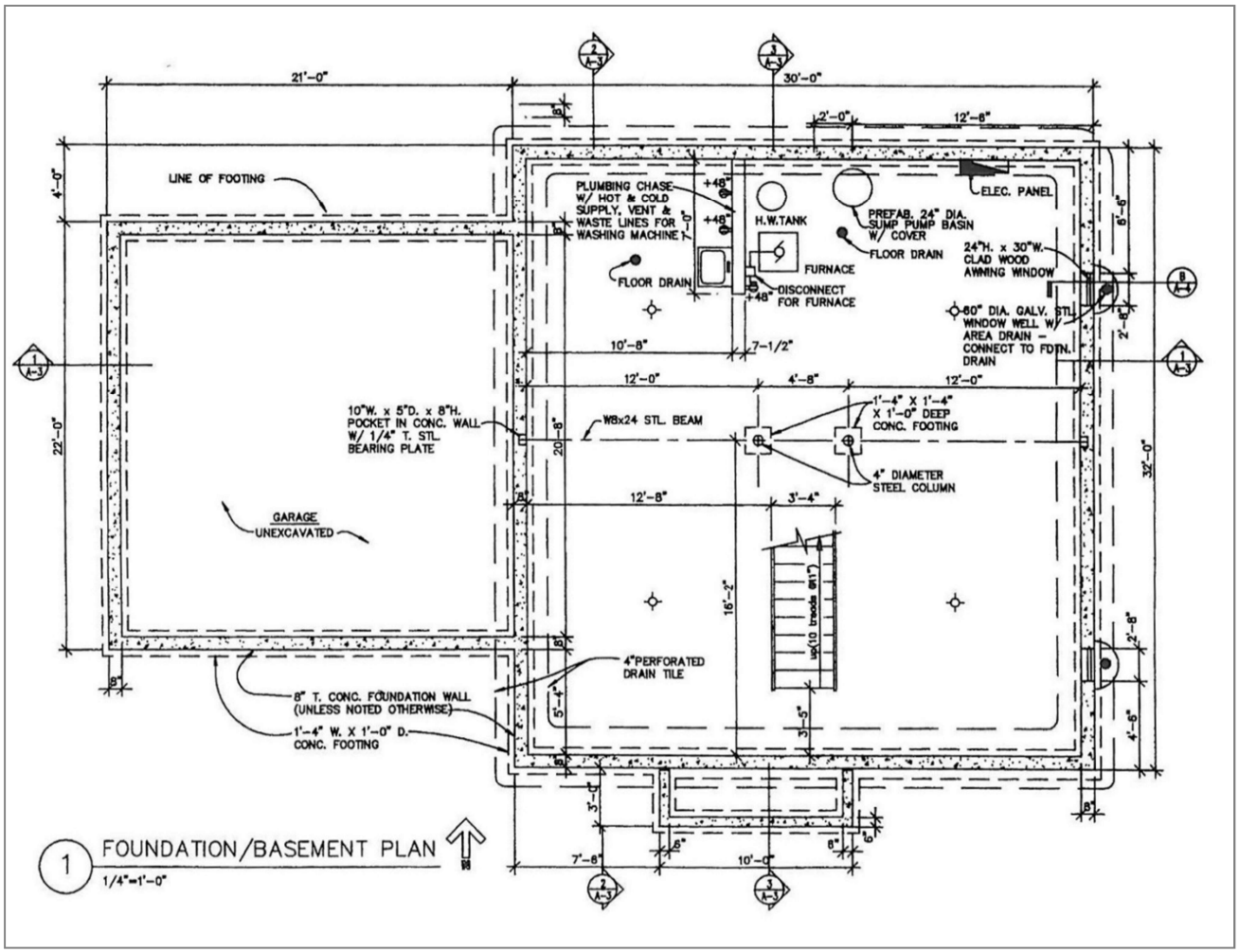

ALUM. COPING
T./JOIST +13'-0"
ALUM. GUTTER & D.S.
BRICK
FIN. FLR. 0'-0"
GRADE
13'-0"
SOUTH ELEVATION
SCALE: 1/8"=1'-0"
ALUM. COPING
APPLIED STUCCO FINISH
FEATURE STRIP
ALUM. FRAMES, GLASS DOOR
ALUM. FRAMED W/ GLASS
PRE-FINISHED PANELS
H.MTL. DOOR
7'-0"
8'-0"
13'-0"
NORTH ELEVATION
SCALE: 1/8"=1'-0"

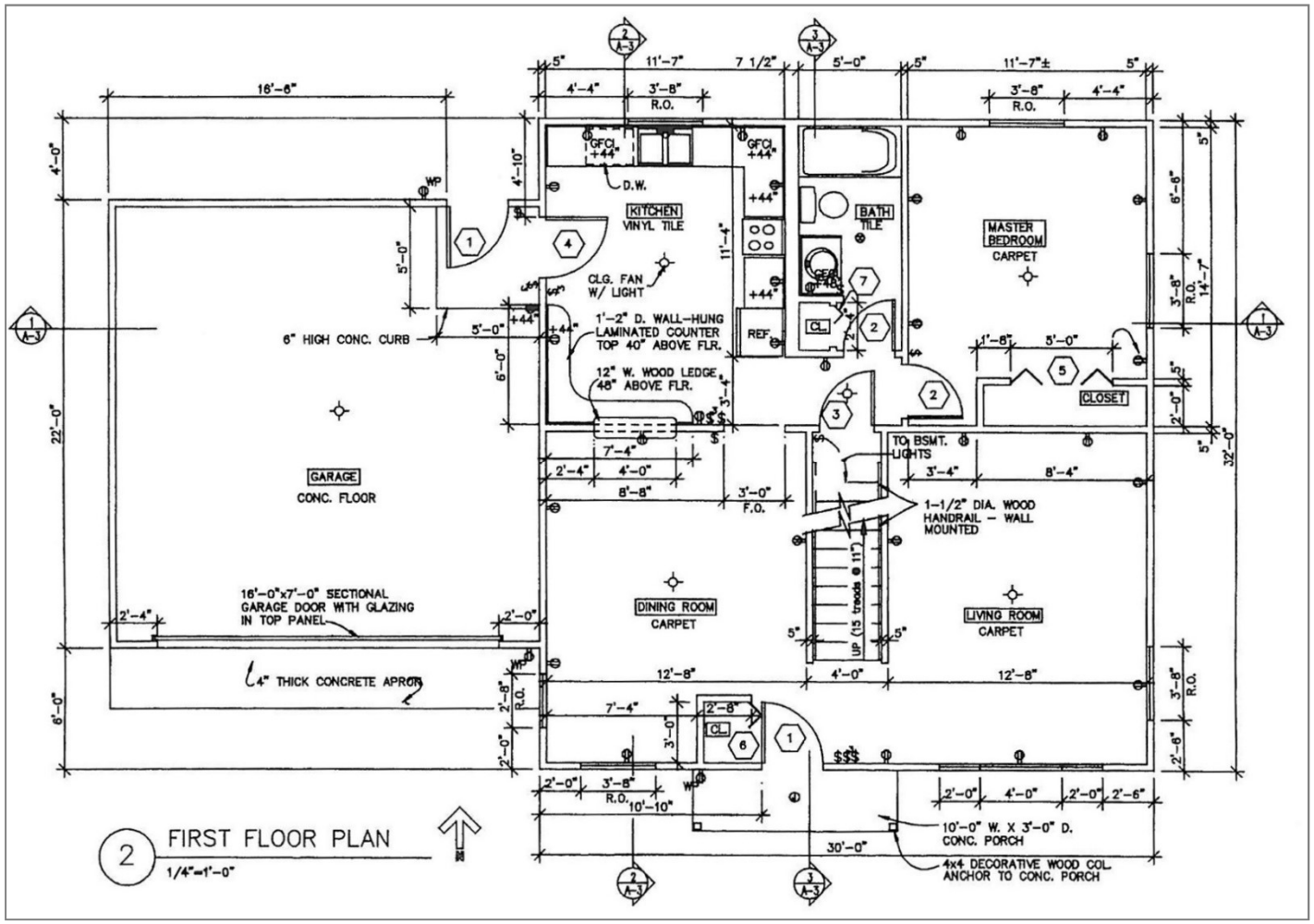
* Plan View (“Floor Plan”)



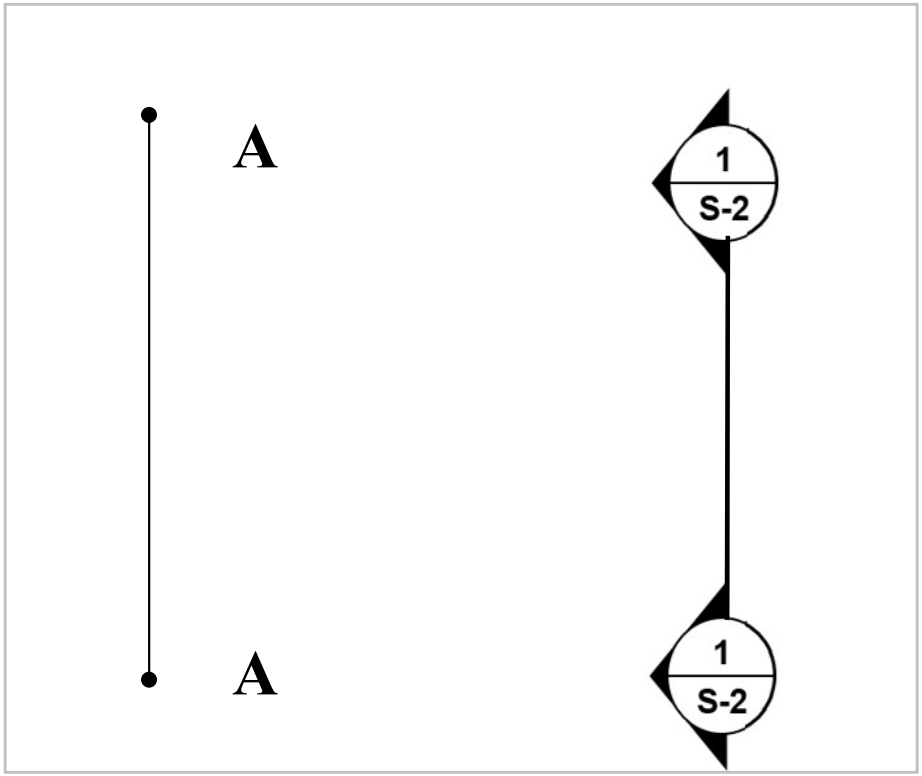
* Plan View (“Floor Plan”)
  - Arrangement of walls and partitions
  - Equipment and fixtures
  - Doors and windows
  - Dimension lines
  - Room labels
  - Used for other disciplines to show equipment

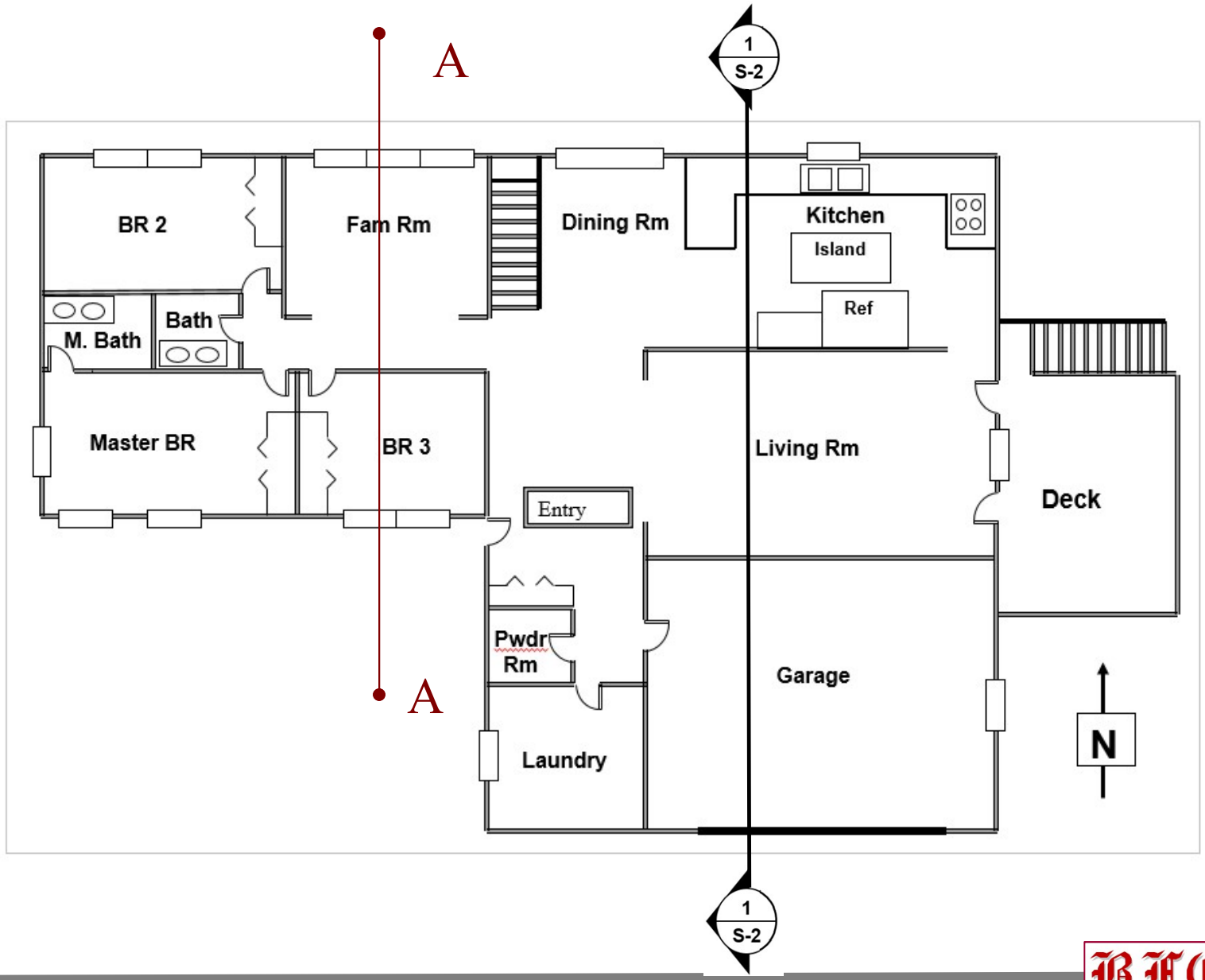
* Foundation Plan



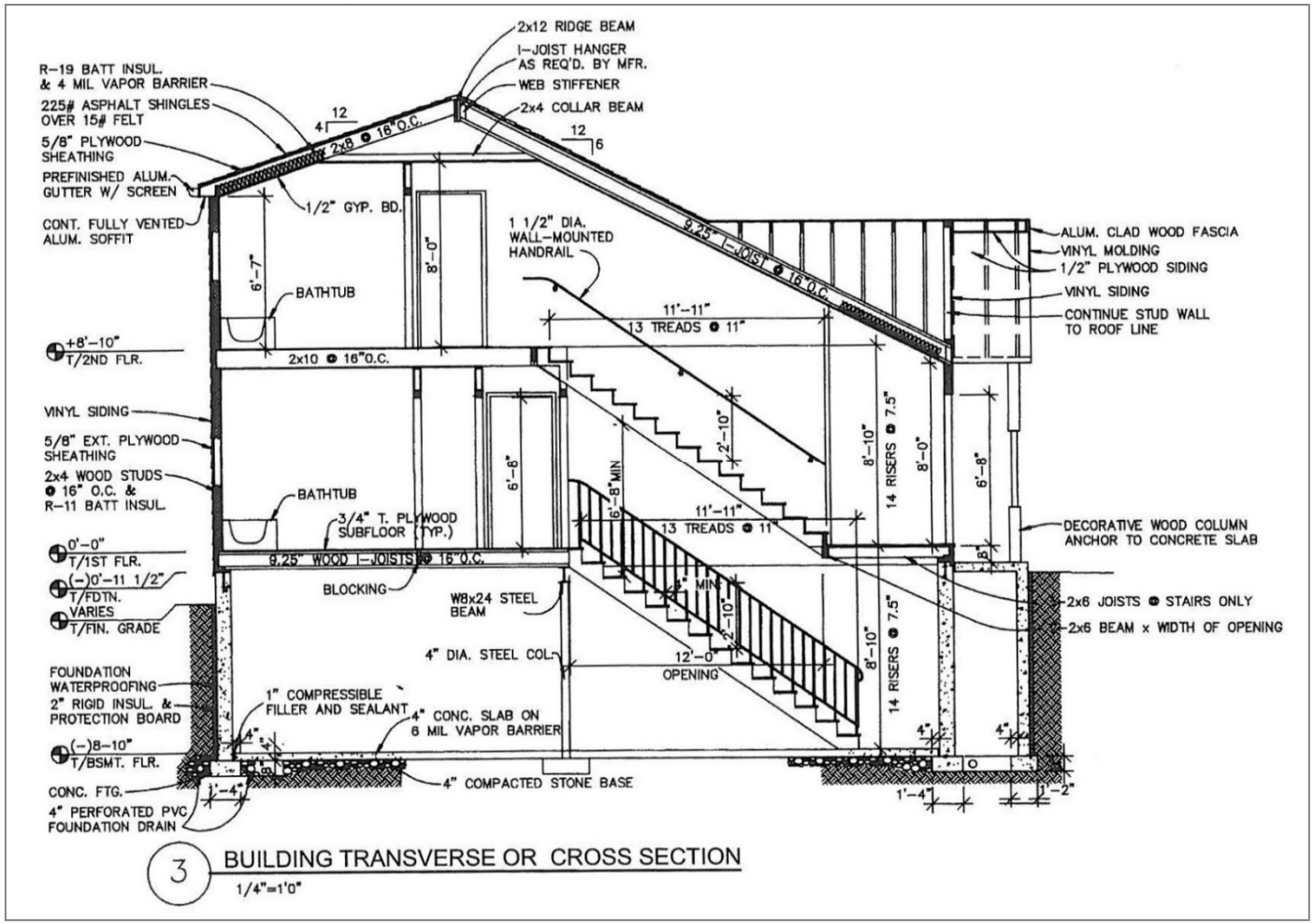

KITCHEN
VINYL TILE
D.W.
GFCI +44"
BATH
TILE
MASTER BEDROOM
CARPET
CLOSET
CLG. FAN W/ LIGHT
1'-2" D. WALL-HUNG LAMINATED COUNTER TOP 40" ABOVE FLR.
12" W. WOOD LEDGE 48" ABOVE FLR.
6" HIGH CONC. CURB
GARAGE
CONC. FLOOR
16'-0"x7'-0" SECTIONAL GARAGE DOOR WITH GLAZING IN TOP PANEL
4" THICK CONCRETE APRON
TO BSMT. LIGHTS
1-1/2" DIA. WOOD HANDRAIL - WALL MOUNTED
UP (15 treads @ 11")
DINING ROOM
CARPET
LIVING ROOM
CARPET
10'-0" W. X 3'-0" D. CONC. PORCH
4x4 DECORATIVE WOOD COL. ANCHOR TO CONC. PORCH
2 FIRST FLOOR PLAN
1/4"=1'-0"

* Sections
  - Cutting imaginary line through building
    - Think of a building cut in half

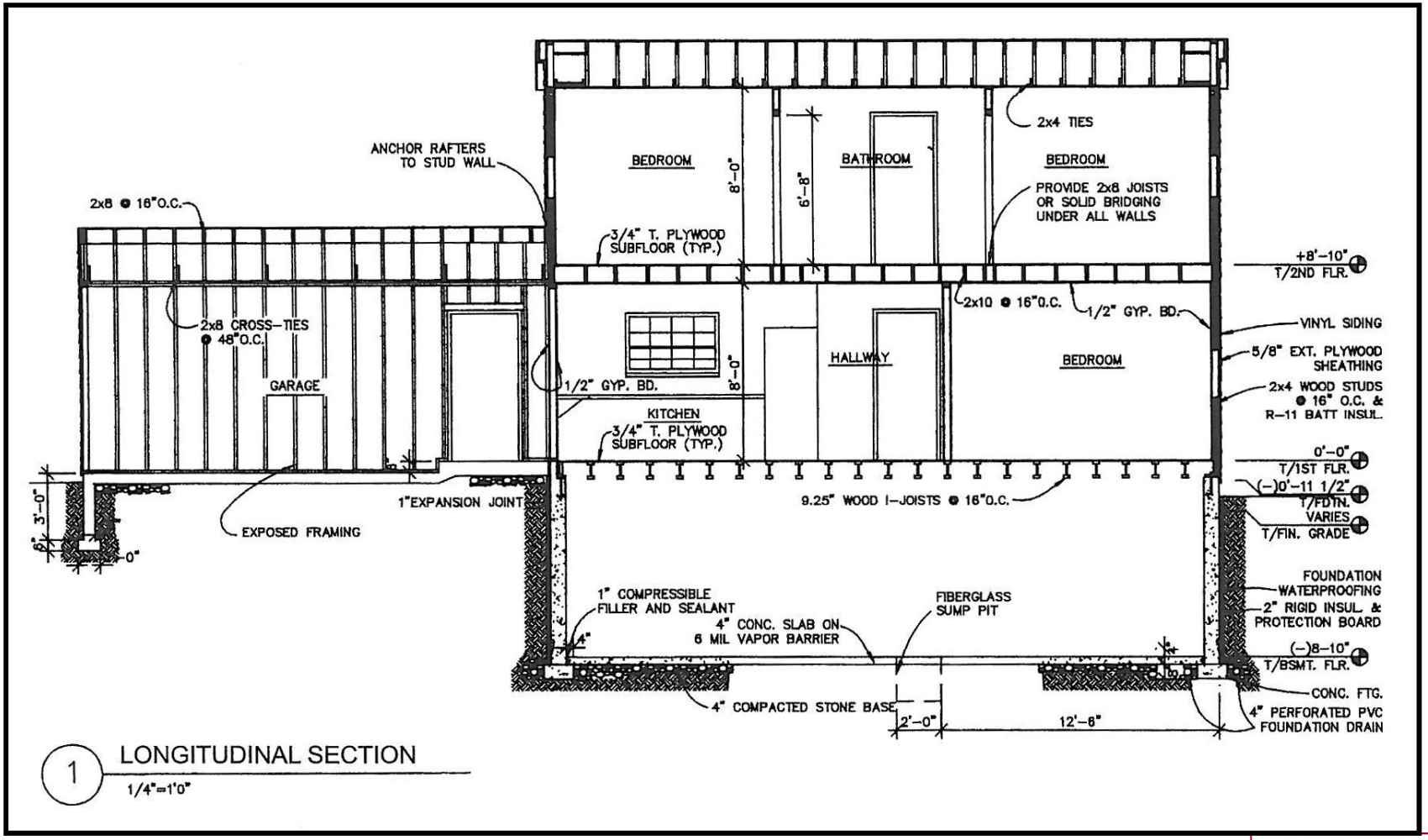



A
1
S-2
BR 2
Fam Rm
Dining Rm
Kitchen
Island
Ref
M. Bath
Bath
Master BR
BR 3
Living Rm
Deck
Entry
Pwdr
Rm
Garage
Laundry
N
A
1
S-2

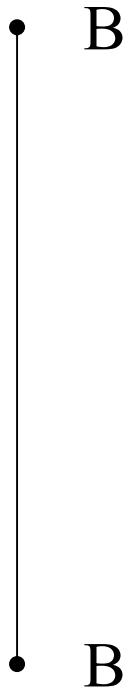
* Section through building

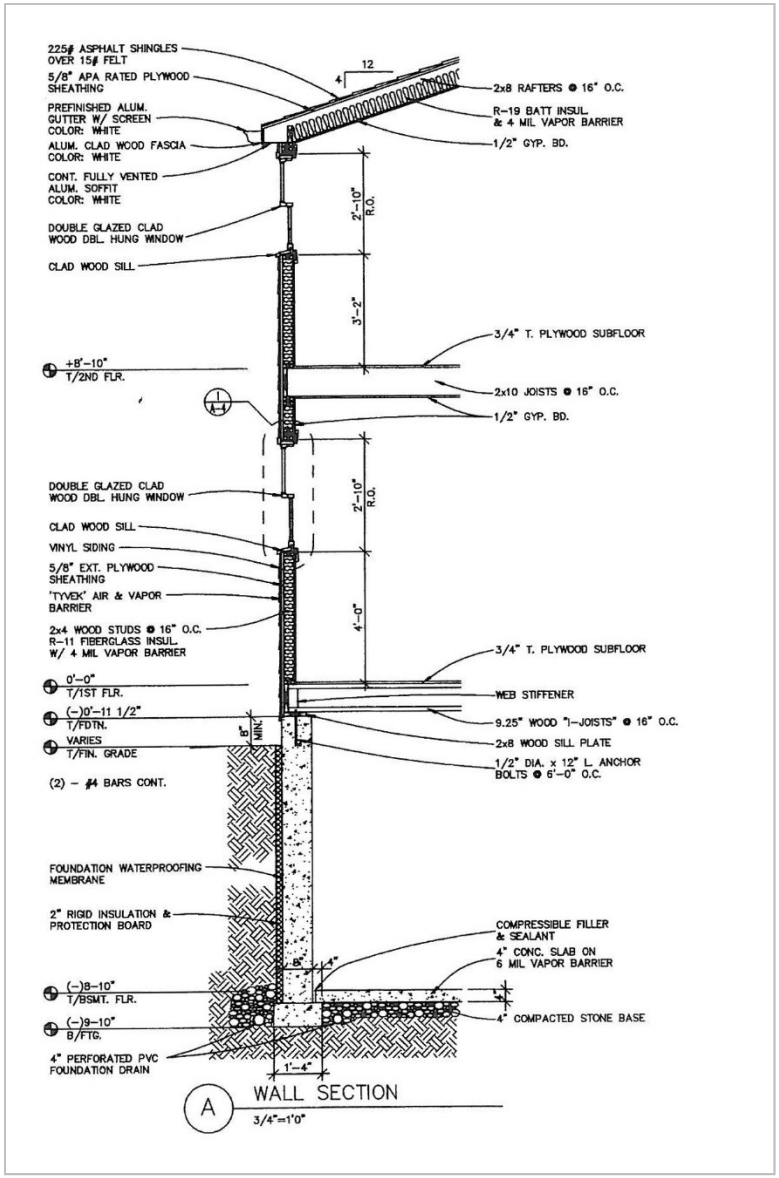


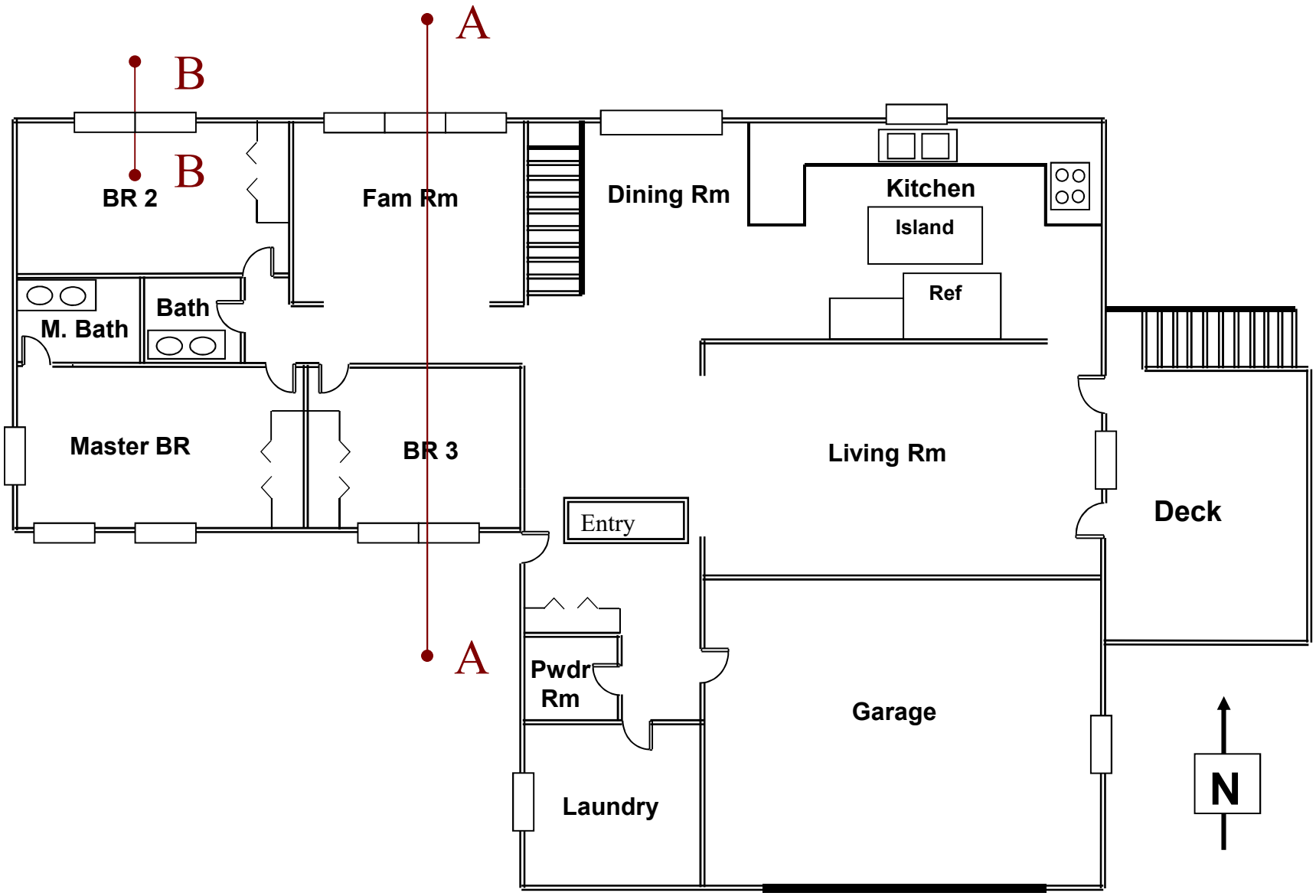
* Longitudinal section through building

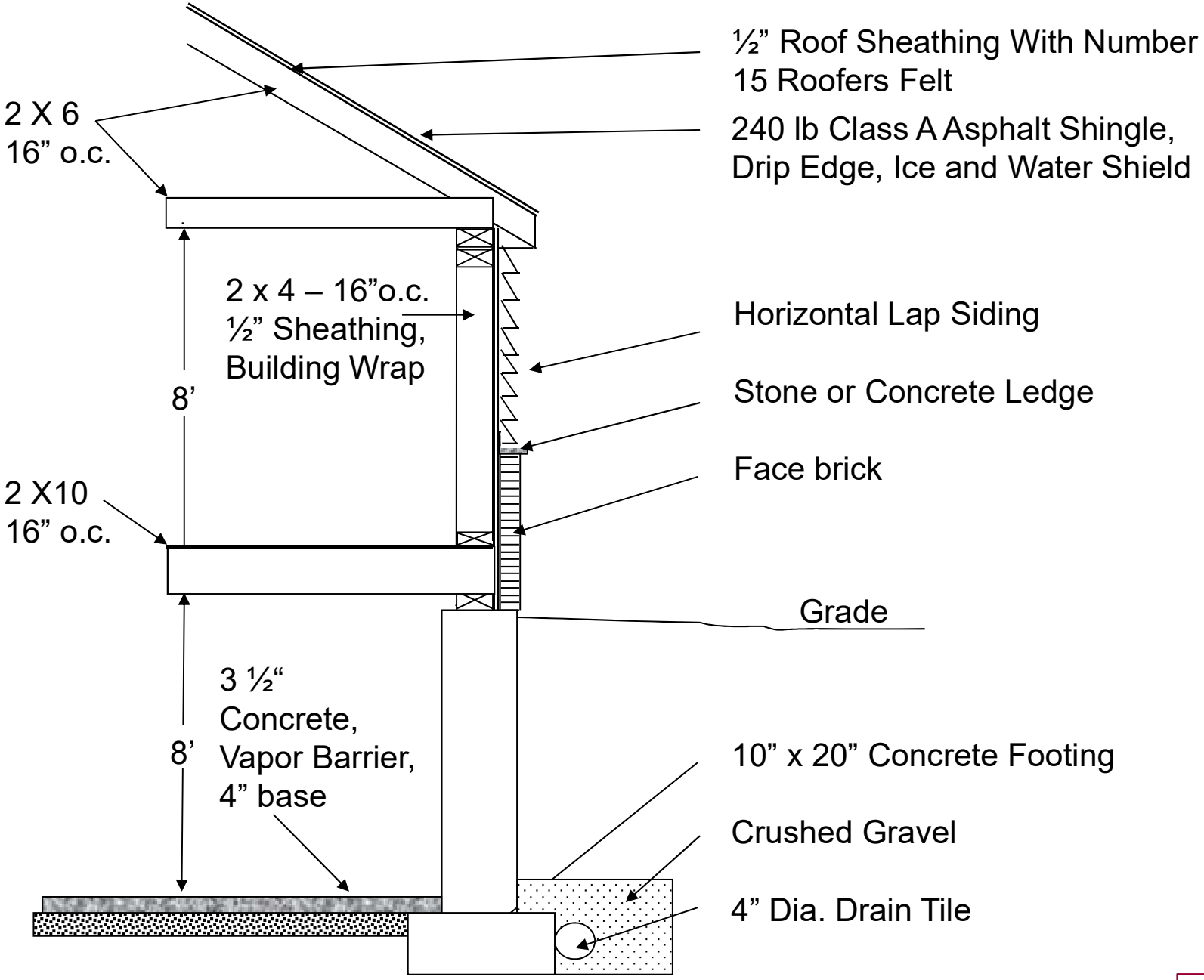


- Exterior wall section – most common




225# ASPHALT SHINGLES OVER 15# FELT
5/8" APA RATED PLYWOOD SHEATHING
PREFINISHED ALUM. GUTTER W/ SCREEN COLOR: WHITE
ALUM. CLAD WOOD FASCIA COLOR: WHITE
CONT. FULLY VENTED ALUM. SOFFIT COLOR: WHITE
DOUBLE GLAZED CLAD WOOD DBL. HUNG WINDOW
CLAD WOOD SILL
+8'-10" T/2ND FLR.
DOUBLE GLAZED CLAD WOOD DBL. HUNG WINDOW
CLAD WOOD SILL
VINYL SIDING
5/8" EXT. PLYWOOD SHEATHING
"TYVEK" AIR & VAPOR BARRIER
2x4 WOOD STUDS @ 16" O.C. R-11 FIBERGLASS INSUL. W/ 4 MIL VAPOR BARRIER
0'-0" T/1ST FLR.
(-)0'-11 1/2" T/FDTN.
VARIES T/FIN. GRADE
(2) - #4 BARS CONT.
FOUNDATION WATERPROOFING MEMBRANE
2" RIGID INSULATION & PROTECTION BOARD
(-)8-10" T/BSMT. FLR.
(-)9-10" B/FTG.
4" PERFORATED PVC FOUNDATION DRAIN
12
4
2x8 RAFTERS @ 16" O.C.
R-19 BATT INSUL. & 4 MIL VAPOR BARRIER
1/2" GYP. BD.
2'-10" R.O.
3'-2"
3/4" T. PLYWOOD SUBFLOOR
2x10 JOISTS @ 16" O.C.
1/2" GYP. BD.
2'-10" R.O.
4'-0"
3/4" T. PLYWOOD SUBFLOOR
WEB STIFFENER
9.25" WOOD "I-JOISTS" @ 16" O.C.
2x8 WOOD SILL PLATE
1/2" DIA. x 12" L. ANCHOR BOLTS @ 6'-0" O.C.
8" MIN.
COMPRESSIBLE FILLER & SEALANT
4" CONC. SLAB ON 6 MIL VAPOR BARRIER
8"
4"
4"
4" COMPACTED STONE BASE
1'-4"
A
WALL SECTION
3/4"=1'0"


A
B
B
BR 2
Fam Rm
Dining Rm
Kitchen
Island
Ref
M. Bath
Bath
Master BR
BR 3
Living Rm
Deck
Entry
A
Pwdr
Rm
Garage
Laundry
N


½” Roof Sheathing With Number 15 Roofers Felt
240 lb Class A Asphalt Shingle, Drip Edge, Ice and Water Shield
2 X 6
16” o.c.
2 x 4 – 16”o.c.
½” Sheathing,
Building Wrap
Horizontal Lap Siding
Stone or Concrete Ledge
Face brick
8’
2 X10
16” o.c.
Grade
3 ½“
Concrete,
Vapor Barrier,
4” base
8’
10” x 20” Concrete Footing
Crushed Gravel
4” Dia. Drain Tile

- Scaled
- Description of construction
- Non-continuous

MARK	SIZE	TYPE	HDWE	REMARKS
1	3'–0"x7'–0"x1–3/4"	HM	SET 1	INSULATED DOOR W/ VISION PANEL
2	2'–10"x6'–8"x1–3/8"	SC	SET 2	
3	2'–10"x6'–8"x1–3/8"	SC	SET 3	
4	3'–0"x6'–8"x1–3/4"	SC	SET 1	
5	PR. 2'–6"x6'–8"	WOOD	SET 4	BI–FOLD DOORS
6	(1)–2'–6"x6'–8"	WOOD	SET 4	BI–FOLD DOORS
7	(1)–2'–0"x6'–8"	WOOD	SET 4	BI–FOLD DOORS

NOTE:
HM = HOLLOW METAL DOOR & FRAME
SC = SOLID CORE WOOD DOOR & FRAME

HDWE. SETS

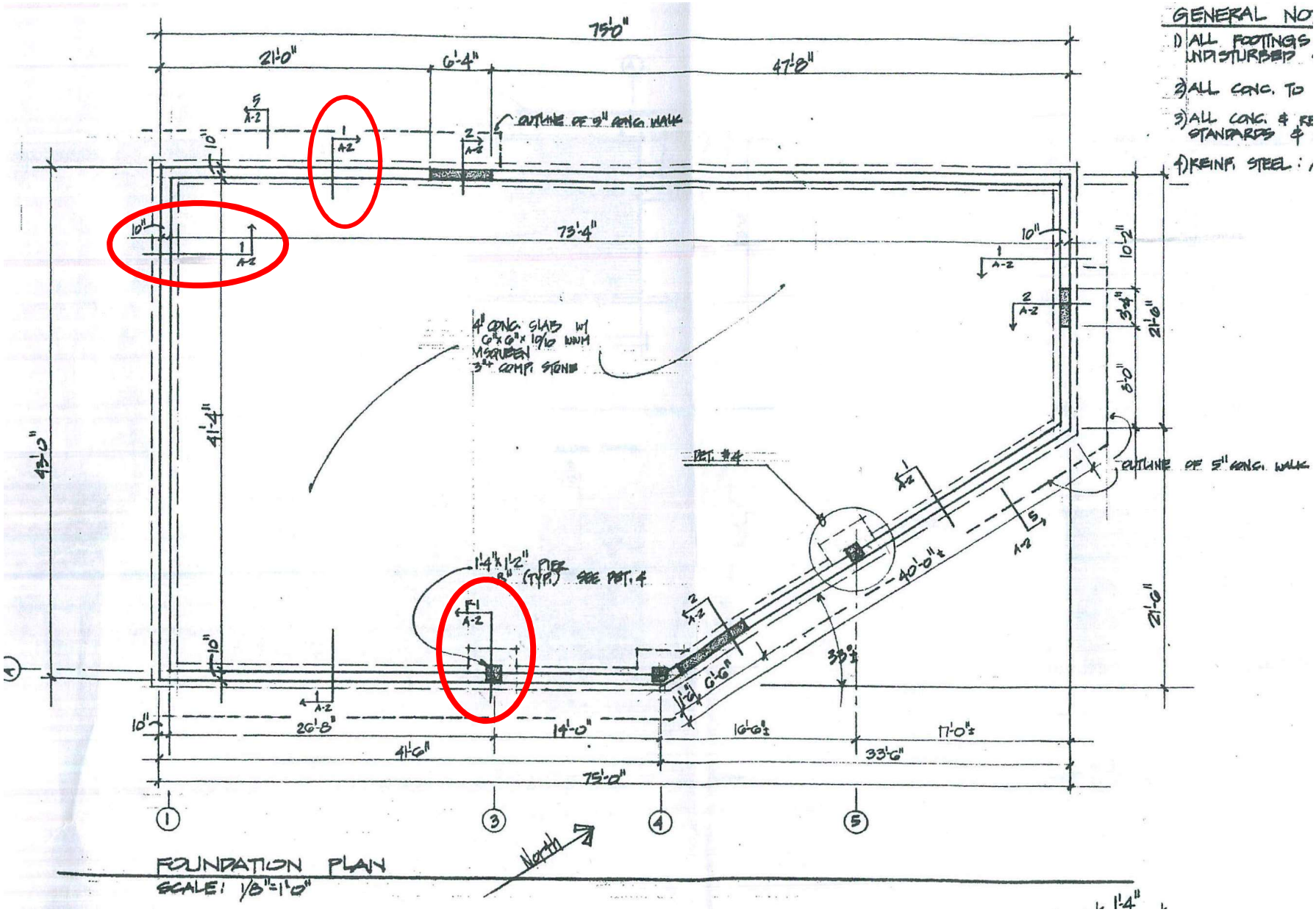
SET 1 = 1 – LOCKSET
1 – WEATHERSTRIP
1 – SILL SWEEP
1 – THRESHOLD
1–1/2 PR. HINGES

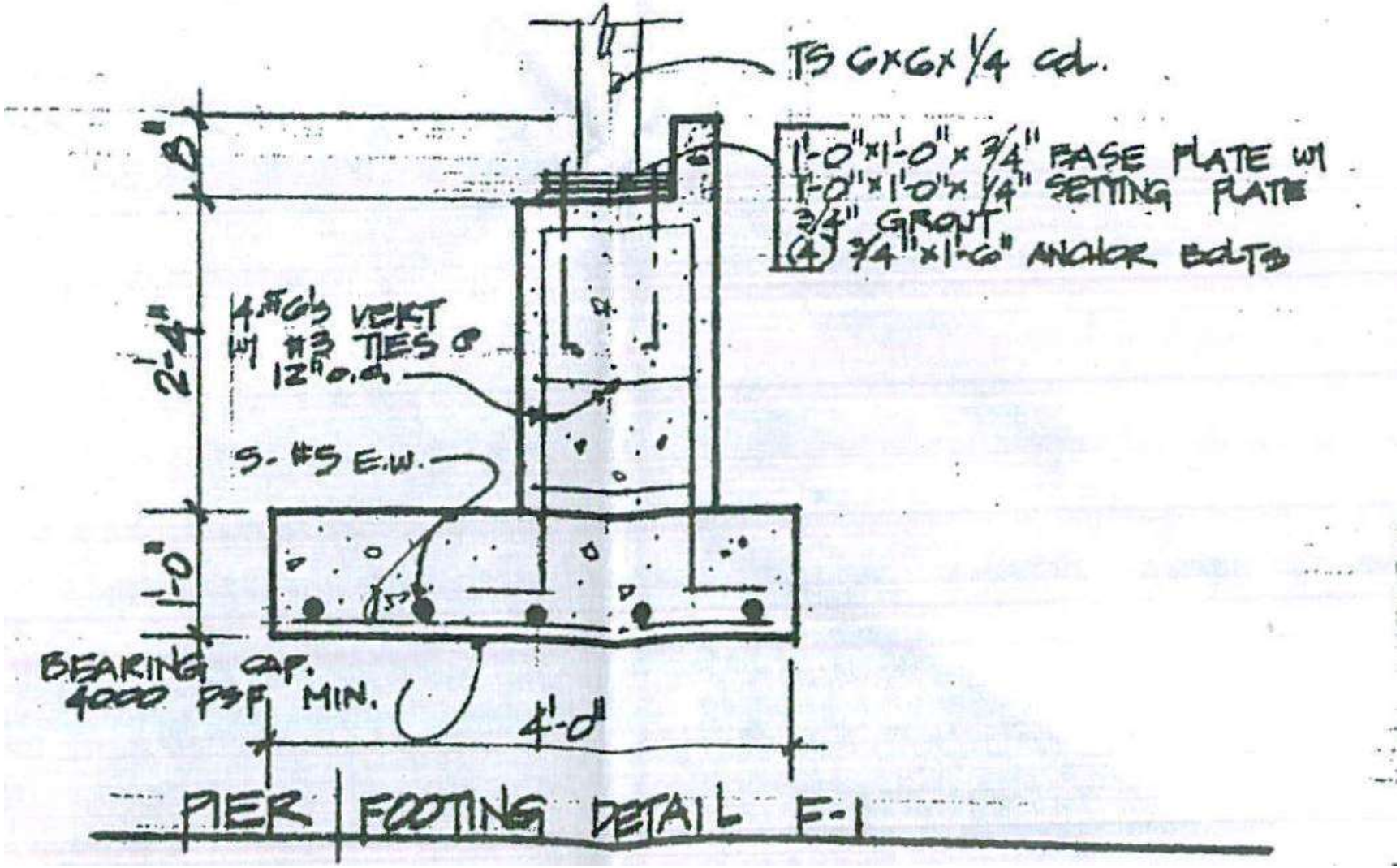
SET 2 = 1 – PRIVACY SET
1–1/2 PR. HINGES

SET 3 = 1 – PASSAGE SET
1–1/2 PR. HINGES

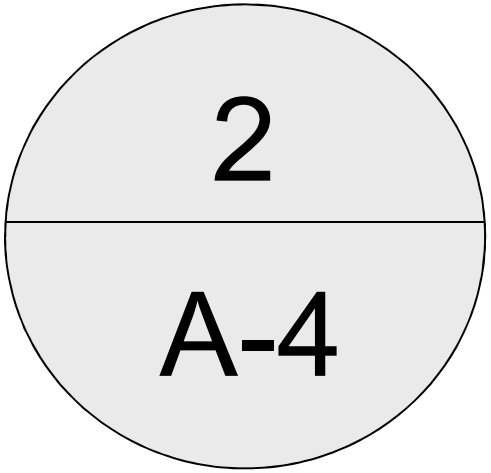
SET 4 = 1 SET BI–FOLD HDWE. & SURFACE PULL

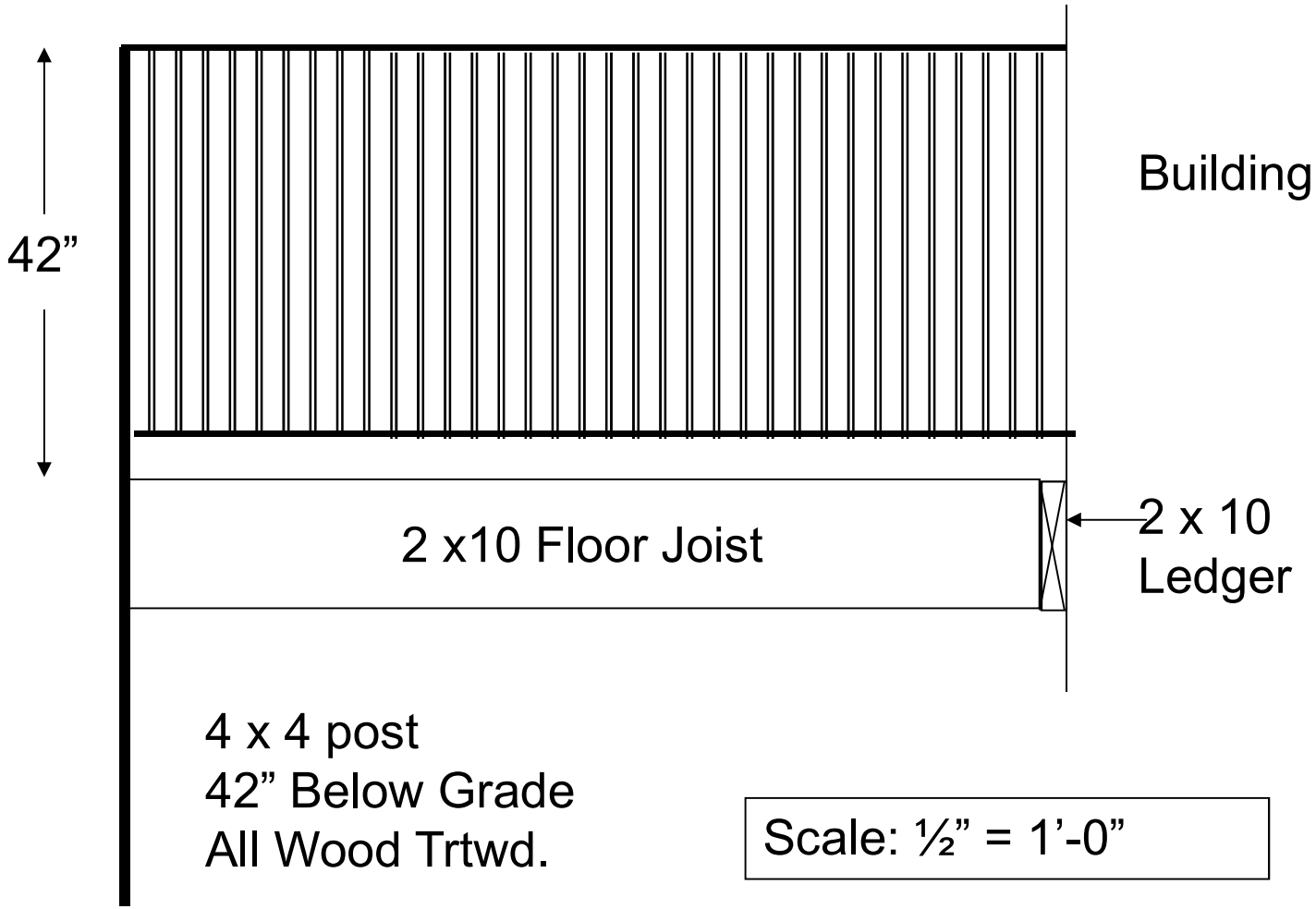
Door Schedule


GENERAL NO
1) ALL FOOTINGS UNDISTURBED
2) ALL CONC. TO
3) ALL CONC. & RE STANDARDS &
4) REINF. STEEL :
75'-0"
21'-0"
6'-4"
47'-8"
OUTLINE OF 5" CONC. WALK
73'-4"
4" CONC. SLAB W/ 6"x6"x 10/10 WWM MSQUEEN 3"± COMP. STONE
DET. #4
OUTLINE OF 5" CONC. WALK
1'-4"x1'-2" PIER 8" (TYP.) SEE DET. 4
43'-0"
41'-4"
10'-2"
3'-4"
21'-6"
8'-0"
40'-0"±
33°±
6'-6"
26'-8"
14'-0"
16'-6"±
17'-0"±
41'-6"
33'-6"
75'-0"
North
FOUNDATION PLAN
SCALE: 1/8"=1'-0"

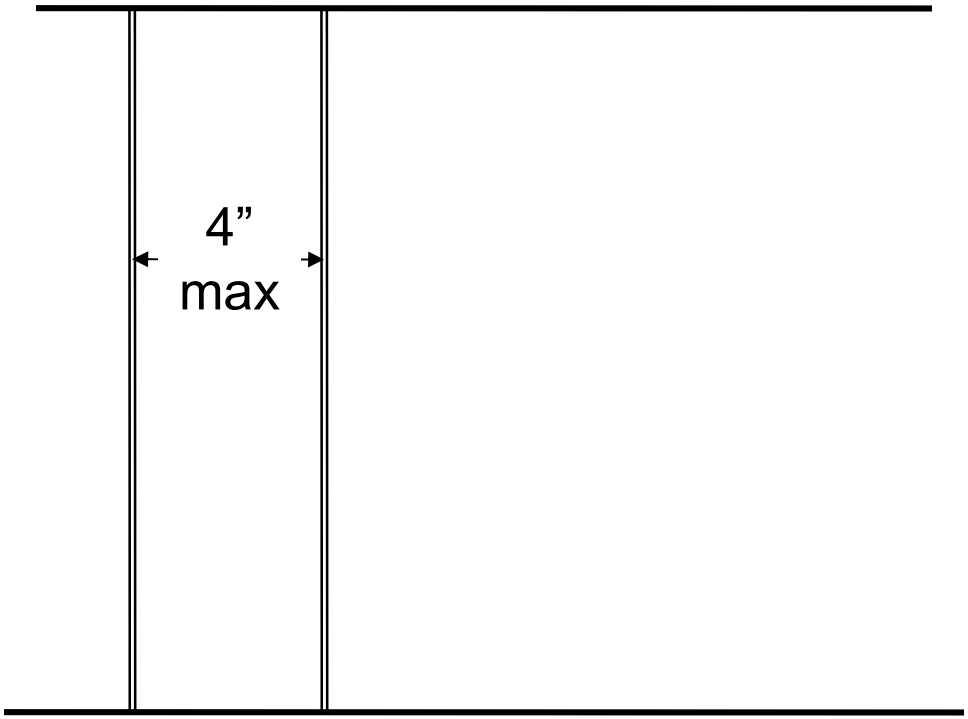

TS 6x6x1/4 cd.
1'-0"x1'-0"x 3/4" BASE PLATE W/
1'-0"x1'-0"x 1/4" SETTING PLATE
3/4" GROUT
(4) 3/4"x1'-6" ANCHOR BOLTS
4 #6's VERT
W/ #3 TIES @
12" o.c.
2'-4"
5-#5 E.W.
1'-0"
BEARING CAP.
4000 PSF MIN.
4'-0"
PIER FOOTING DETAIL F-1

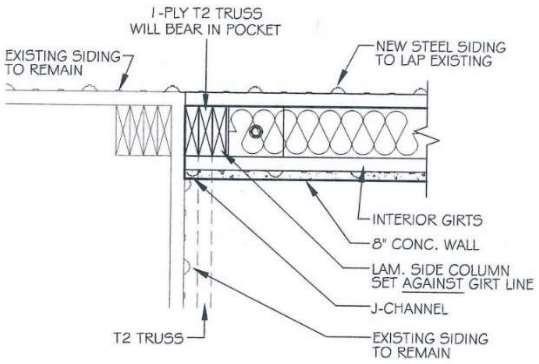
* Details
  - Expanded view of a particular portion of the structure
  - Indicator to provide location of detail
    - Same sheet – different sheet



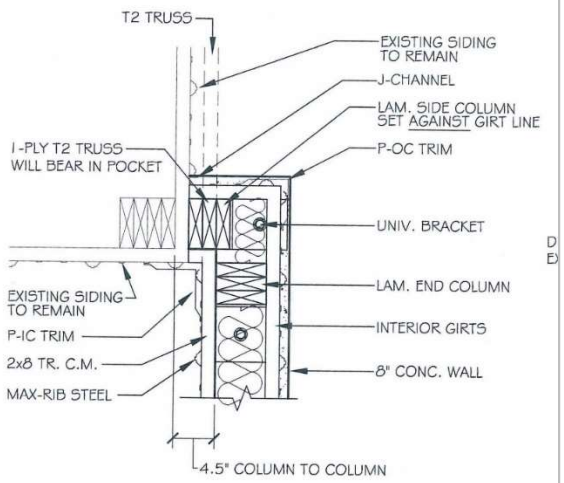

42”
Building
2 x10 Floor Joist
2 x 10
Ledger
4 x 4 post
42” Below Grade
All Wood Trtwd.

Scale: ½” = 1’-0”

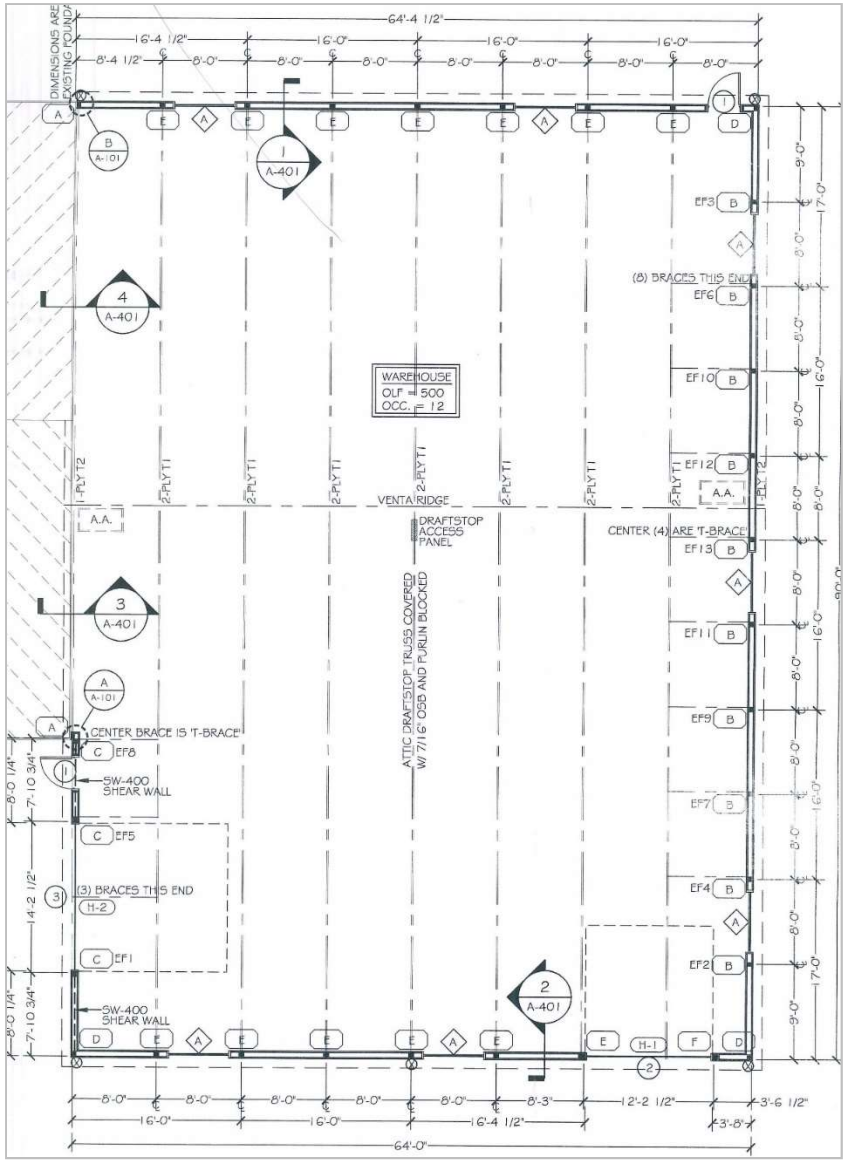

4”
max



B
A-101
CORNER DETAIL
SCALE: 1" = 1'-0"



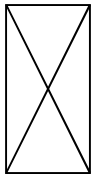
A
A-101
CORNER DETAIL
SCALE: 1" = 1'-0"



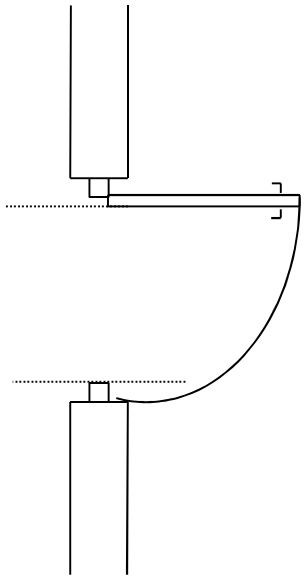
Abbreviations

- Words shortened for space
- Period at end of abb.
- No standards
  - ply. - plywood
  - conc. - concrete
  - o.c. - on center
  - clg. - ceiling
  - hor. - horizontal
  - shth. - sheathing
  - wsct. - wainscot
  - shgl. - shingle

- Symbols
  - Graphic representation of materials and components
  - No standard
  - ANSI has a standard – no requirement to follow the standard
    - American National Standards Institute
  - Plan views, elevations, sections, details

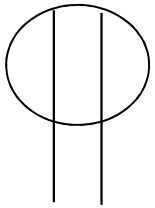


End of sawn lumber – 2x4 / 2x6 / 2x8 / 2x10

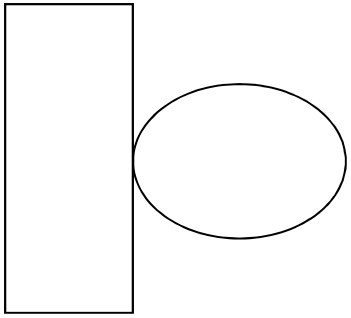


Door

* Many lists of symbols
* AutoCAD has a standard list



Duplex Electrical Outlet
S = Switched Outlet



Water Closet

ARCHITECTURAL SYMBOLS. . .

Material	Elevation	Plan	Section
EARTH			
BRICK	WITH NOTE INDICATING TYPE OF BRICK (COMMON, FACE, ETC.)	COMMON OR FACE FIREBRICK	SAME AS PLAN VIEWS
CONCRETE		LIGHTWEIGHT STRUCTURAL	SAME AS PLAN VIEWS
CONCRETE BLOCK		OR	OR
STONE	CUT STONE RUBBLE	CUT STONE RUBBLE CAST STONE (CONCRETE)	CUT STONE CAST STONE (CONCRETE) RUBBLE OR CUT STONE
WOOD	SIDING PANEL	WOOD STUD REMODELING DISPLAY	ROUGH MEMBERS FINISHED MEMBERS PLYWOOD
PLASTER		WOOD STUD, LATH, AND PLASTER METAL LATH AND PLASTER SOLID PLASTER	LATH AND PLASTER
ROOFING	SHINGLES	SAME AS ELEVATION VIEW	
GLASS	OR GLASS BLOCK	GLASS GLASS BLOCK	SMALL SCALE LARGE SCALE

. . .ARCHITECTURAL SYMBOLS

Material	Elevation	Plan	Section
FACING TILE	CERAMIC TILE	FLOOR TILE	CERAMIC TILE LARGE SCALE CERAMIC TILE SMALL SCALE
STRUCTURAL CLAY TILE			SAME AS PLAN VIEW
INSULATION		LOOSE FILL OR BATTS RIGID SPRAY FOAM	SAME AS PLAN VIEWS
SHEET METAL FLASHING		OCCASIONALLY INDICATED BY NOTE	
METALS OTHER THAN FLASHING	INDICATED BY NOTE OR DRAWN TO SCALE	SAME AS ELEVATION	SMALL SCALE STEEL CAST IRON ALUMINUM BRONZE OR BRASS
STRUCTURAL STEEL	INDICATED BY NOTE OR DRAWN TO SCALE	OR	REBARS SMALL SCALE LARGE SCALE L-ANGLES, S-BEAMS, ETC.

PLOT PLAN SYMBOLS

N NORTH	FIRE HYDRANT	WALK	E OR ELECTRIC SERVICE
POINT OF BEGINNING (POB)	MAILBOX	IMPROVED ROAD	G OR NATURAL GAS LINE
UTILITY METER OR VALVE	MANHOLE	UNIMPROVED ROAD	W OR WATER LINE
POWER POLE AND GUY	TREE	BUILDING LINE	T OR TELEPHONE LINE
LIGHT STANDARD	BUSH	PROPERTY LINE	NATURAL GRADE
TRAFFIC SIGNAL	HEDGE ROW	PROPERTY LINE	FINISH GRADE
STREET SIGN	FENCE	TOWNSHIP LINE	+ XX.00′ EXISTING ELEVATION

ELECTRICAL SYMBOLS. . .

LIGHTING OUTLETS

- OUTLET BOX AND INCANDESCENT LIGHTING FIXTURE (CEILING, WALL)
- INCANDESCENT TRACK LIGHTING
- BLANKED OUTLET
- DROP CORD
- EXIT LIGHT AND OUTLET BOX. SHADED AREAS DENOTE FACES.
- OUTDOOR POLE-MOUNTED FIXTURES
- JUNCTION BOX
- LAMPHOLDER WITH PULL SWITCH
- MULTIPLE FLOODLIGHT ASSEMBLY
- EMERGENCY BATTERY PACK WITH CHARGER
- INDIVIDUAL FLUORESCENT FIXTURE
- OUTLET BOX AND FLUORESCENT LIGHTING TRACK FIXTURE
- CONTINUOUS FLUORESCENT FIXTURE
- SURFACE-MOUNTED FLUORESCENT FIXTURE

PANELBOARDS

- FLUSH-MOUNTED PANELBOARD AND CABINET
- SURFACE-MOUNTED PANELBOARD AND CABINET

CONVENIENCE OUTLETS

- SINGLE RECEPTACLE OUTLET
- DUPLEX RECEPTACLE OUTLET
- TRIPLEX RECEPTACLE OUTLET
- SPLIT-WIRED DUPLEX RECEPTACLE OUTLET
- SPLIT-WIRED TRIPLEX RECEPTACLE OUTLET
- SINGLE SPECIAL-PURPOSE RECEPTACLE OUTLET
- DUPLEX SPECIAL-PURPOSE RECEPTACLE OUTLET
- RANGE OUTLET (R)
- SPECIAL-PURPOSE CONNECTION (DW)
- CLOSED-CIRCUIT TELEVISION CAMERA
- CLOCK HANGER RECEPTACLE
- FAN HANGER RECEPTACLE
- FLOOR SINGLE RECEPTACLE OUTLET
- FLOOR DUPLEX RECEPTACLE OUTLET
- FLOOR SPECIAL-PURPOSE OUTLET
- UNDERFLOOR DUCT AND JUNCTION BOX FOR TRIPLE, DOUBLE, OR SINGLE DUCT SYSTEM AS INDICATED BY NUMBER OF PARALLEL LINES

BUSDUCTS AND WIREWAYS

- SERVICE, FEEDER, OR PLUG-IN BUSWAY (B B B)
- CABLE THROUGH LADDER OR CHANNEL (C C C)
- WIREWAY (W W W)

SWITCH OUTLETS

- SINGLE-POLE SWITCH
- DOUBLE-POLE SWITCH
- THREE-WAY SWITCH
- FOUR-WAY SWITCH
- AUTOMATIC DOOR SWITCH
- KEY-OPERATED SWITCH
- CIRCUIT BREAKER
- WEATHERPROOF CIRCUIT BREAKER
- DIMMER
- REMOTE CONTROL SWITCH
- WEATHERPROOF SWITCH
- FUSED SWITCH
- WEATHERPROOF FUSED SWITCH
- TIME SWITCH
- CEILING PULL SWITCH
- SWITCH AND SINGLE RECEPTACLE
- SWITCH AND DOUBLE RECEPTACLE
- A STANDARD SYMBOL WITH AN ADDED LOWERCASE SUBSCRIPT LETTER IS USED TO DESIGNATE A VARIATION IN STANDARD EQUIPMENT

. . .ELECTRICAL SYMBOLS

COMMERCIAL AND INDUSTRIAL SYSTEMS

- PAGING SYSTEM DEVICE
- FIRE ALARM SYSTEM DEVICE
- COMPUTER DATA SYSTEM DEVICE
- PRIVATE TELEPHONE SYSTEM DEVICE
- SOUND SYSTEM
- FIRE ALARM CONTROL PANEL — FACP

SIGNALING SYSTEM OUTLETS FOR RESIDENTIAL SYSTEMS

- PUSHBUTTON
- BUZZER
- BELL
- BELL AND BUZZER COMBINATION
- COMPUTER DATA OUTLET
- BELL RINGING TRANSFORMER — BT
- ELECTRIC DOOR OPENER — D
- CHIME — CH
- TELEVISION OUTLET — TV
- THERMOSTAT — T

UNDERGROUND ELECTRICAL DISTRIBUTION OR ELECTRICAL LIGHTING SYSTEMS

- MANHOLE — M
- HANDHOLE — H
- TRANSFORMER-MANHOLE OR VAULT — TM
- TRANSFORMER PAD — TP
- UNDERGROUND DIRECT BURIAL CABLE
- UNDERGROUND DUCT LINE
- STREET LIGHT STANDARD FED FROM UNDERGROUND CIRCUIT

ABOVE-GROUND ELECTRICAL DISTRIBUTION OR LIGHTING SYSTEMS

- POLE
- STREET LIGHT AND BRACKET
- PRIMARY CIRCUIT
- SECONDARY CIRCUIT
- DOWN GUY
- HEAD GUY
- SIDEWALK GUY
- SERVICE WEATHERHEAD

PANEL CIRCUITS AND MISCELLANEOUS

- LIGHTING PANEL
- POWER PANEL
- WIRING – CONCEALED IN CEILING OR WALL
- WIRING – CONCEALED IN FLOOR
- WIRING EXPOSED
- HOME RUN TO PANEL BOARD
  Indicate number of circuits by number of arrows. Any circuit without such designation indicates a two-wire circuit. For a greater number of wires indicate as follows: (3 wires) (4 wires), etc.
- FEEDERS
  Use heavy lines and designate by number corresponding to listing in feeder schedule
- WIRING TURNED UP
- WIRING TURNED DOWN
- GENERATOR — G
- MOTOR — M
- INSTRUMENT (SPECIFY) — I
- TRANSFORMER — T
- CONTROLLER
- EXTERNALLY-OPERATED DISCONNECT SWITCH
- PULL BOX

PLUMBING SYMBOLS. . .

FIXTURES...

- STANDARD BATHTUB
- OVAL BATHTUB
- WHIRLPOOL BATH
- SHOWER STALL
- SHOWER HEAD
- TANK-TYPE WATER CLOSET
- WALL-MOUNTED WATER CLOSET
- FLOOR-MOUNTED WATER CLOSET
- LOW-PROFILE WATER CLOSET
- BIDET
- WALL-MOUNTED URINAL
- FLOOR-MOUNTED URINAL
- TROUGH-TYPE URINAL
- WALL-MOUNTED LAVATORY
- PEDESTAL LAVATORY
- BUILT-IN LAVATORY
- WHEELCHAIR LAVATORY
- CORNER LAVATORY
- FLOOR DRAIN
- FLOOR SINK

...FIXTURES

- LAUNDRY TRAY
- BUILT-IN SINK
- DOUBLE OR TRIPLE BUILT-IN SINK
- COMMERCIAL KITCHEN SINK
- SERVICE SINK (SS)
- CLINIC SERVICE SINK
- FLOOR-MOUNTED SERVICE SINK
- DRINKING FOUNTAIN (DF)
- WATER COOLER
- HOT WATER TANK (HW T)
- WATER HEATER (WH)
- METER (M)
- HOSE BIBB (HB)
- GAS OUTLET (G)
- GREASE SEPARATOR (G)
- GARAGE DRAIN
- FLOOR DRAIN WITH BACKWATER VALVE

PIPING...

- SOIL, WASTE, OR LEADER – ABOVE GRADE
- SOIL, WASTE, OR LEADER – BELOW GRADE
- VENT
- COMBINATION WASTE AND VENT — SV —
- STORM DRAIN — SD —
- COLD WATER

...PIPING

- CHILLED DRINKING WATER SUPPLY — DWS —
- CHILLED DRINKING WATER RETURN — DWR —
- HOT WATER
- HOT WATER RETURN
- SANITIZING HOT WATER SUPPLY (180° F)
- SANITIZING HOT WATER RETURN (180° F)
- DRY STANDPIPE — DSP —
- COMBINATION STANDPIPE — CSP —
- MAIN SUPPLIES SPRINKLER — S —
- BRANCH AND HEAD SPRINKLER
- GAS – LOW PRESSURE — G — G —
- GAS – MEDIUM PRESSURE — MG —
- GAS – HIGH PRESSURE — HG —
- COMPRESSED AIR — A —
- OXYGEN — O —
- NITROGEN — N —
- HYDROGEN — H —
- HELIUM — HE —
- ARGON — AR —
- LIQUID PETROLEUM GAS — LPG —
- INDUSTRIAL WASTE — INW —
- CAST IRON — CI —
- CULVERT PIPE — CP —
- CLAY TILE — CT —
- DUCTILE IRON — DI —
- REINFORCED CONCRETE — RCP —
- DRAIN – OPEN TILE OR AGRICULTURAL TILE

. . .PLUMBING SYMBOLS

PIPE FITTING AND VALVE SYMBOLS

	FLANGED	SCREWED	BELL & SPIGOT
BUSHING			
CAP			
REDUCING CROSS			
STRAIGHT-SIZE CROSS			
CROSSOVER			
45˚ ELBOW			
90˚ ELBOW			
ELBOW – TURNED DOWN			
ELBOW – TURNED UP			
BASE ELBOW			
DOUBLE-BRANCH ELBOW			
LONG-RADIUS ELBOW			
REDUCING ELBOW			
SIDE OUTLET ELBOW – OUTLET DOWN			
SIDE OUTLET ELBOW – OUTLET UP			
STREET ELBOW			
CONNECTING PIPE JOINT			
EXPANSION JOINT			
LATERAL			
ORIFICE FLANGE			

	FLANGED	SCREWED	BELL & SPIGOT
REDUCING FLANGE			
BULL PLUG			
PIPE PLUG			
CONCENTRIC REDUCER			
ECCENTRIC REDUCER			
SLEEVE			
STRAIGHT-SIZE TEE			
TEE – OUTLET UP			
TEE – OUTLET DOWN			
DOUBLE-SWEEP TEE			
REDUCING TEE			
SINGLE-SWEEP TEE			
SIDE OUTLET TEE – OUTLET DOWN			
SIDE OUTLET TEE – OUTLET UP			
UNION			
ANGLE CHECK VALVE			
ANGLE GATE VALVE – ELEVATION			
ANGLE GATE VALVE – PLAN			
ANGLE GLOBE VALVE – ELEVATION			
ANGLE GLOBE VALVE – PLAN			

	FLANGED	SCREWED	BELL & SPIGOT
AUTOMATIC BY-PASS VALVE			
AUTOMATIC REDUCING VALVE			
STRAIGHT CHECK VALVE			
COCK			
DIAPHRAGM VALVE			
FLOAT VALVE			
GATE VALVE			
MOTOR-OPERATED GATE VALVE			
GLOBE VALVE			
MOTOR-OPERATED GLOBE VALVE			
ANGLE HOSE VALVE			
GATE HOSE VALVE			
GLOBE HOSE VALVE			
LOCKSHIELD VALVE			
QUICK-OPENING VALVE			
SAFETY VALVE			
GOVERNOR-OPERATED AUTOMATIC VALVE			

HVAC SYMBOLS

EQUIPMENT SYMBOLS

- EXPOSED RADIATOR
- RECESSED RADIATOR
- FLUSH ENCLOSED RADIATOR
- PROJECTING ENCLOSED RADIATOR
- UNIT HEATER (PROPELLER) – PLAN
- UNIT HEATER (CENTRIFUGAL) – PLAN
- UNIT VENTILATOR – PLAN
- STEAM
- DUPLEX STRAINER
- PRESSURE-REDUCING VALVE
- AIR LINE VALVE
- STRAINER
- THERMOMETER
- PRESSURE GAUGE AND COCK
- RELIEF VALVE
- AUTOMATIC 3-WAY VALVE
- AUTOMATIC 2-WAY VALVE
- SOLENOID VALVE (S)

DUCTWORK

- DUCT (1ST FIGURE, WIDTH; 2ND FIGURE, DEPTH) — 12 X 20
- DIRECTION OF FLOW
- FLEXIBLE CONNECTION
- DUCTWORK WITH ACOUSTICAL LINING
- FIRE DAMPER WITH ACCESS DOOR — FD, AD
- MANUAL VOLUME DAMPER — VD
- AUTOMATIC VOLUME DAMPER
- EXHAUST, RETURN OR OUTSIDE AIR DUCT – SECTION — 20 X 12
- SUPPLY DUCT – SECTION — 20 X 12
- CEILING DIFFUSER SUPPLY OUTLET — 20" DIA CD 1000 CFM
- CEILING DIFFUSER SUPPLY OUTLET — 20 X 12 CD 700 CFM
- LINEAR DIFFUSER — 96 X 6-LD 400 CFM
- FLOOR REGISTER — 20 X 12 FR 700 CFM
- TURNING VANES
- FAN AND MOTOR WITH BELT GUARD
- LOUVER OPENING — 20 X 12-L 700 CFM

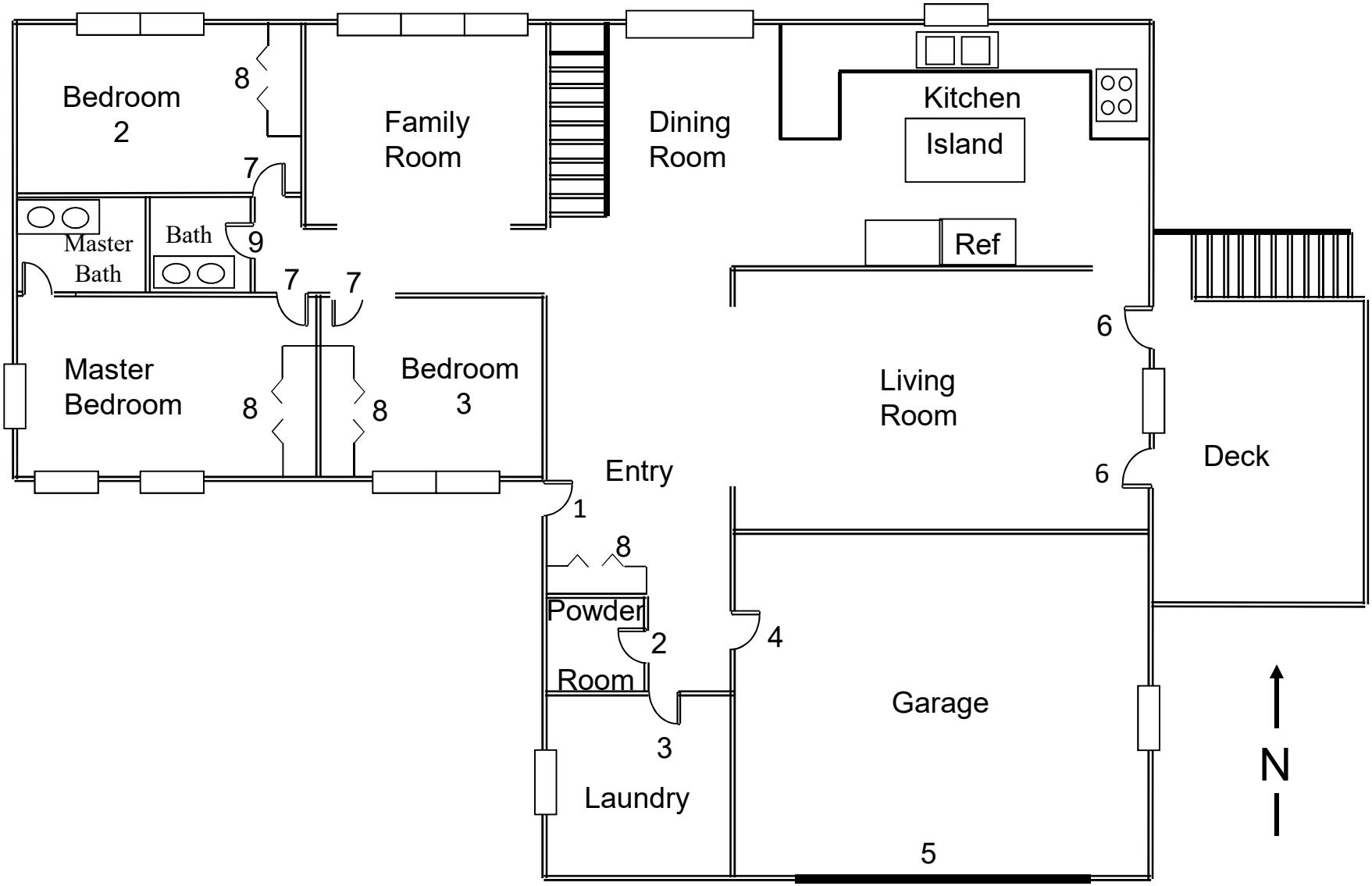
HEATING PIPING

HIGH-PRESSURE STEAM	HPS
MEDIUM-PRESSURE STEAM	MPS
LOW-PRESSURE STEAM	LPS
HIGH-PRESSURE RETURN	HPR
MEDIUM-PRESSURE RETURN	MPR
LOW-PRESSURE RETURN	LPR
BOILER BLOW OFF	BD
CONDENSATE OR VACUUM PUMP DISCHARGE	VPD
FEEDWATER PUMP DISCHARGE	PPD
MAKEUP WATER	MU
AIR RELIEF LINE	V
FUEL OIL SUCTION	FOS
FUEL OIL RETURN	FOR
FUEL OIL VENT	FOV
COMPRESSED AIR	A
HOT WATER HEATING SUPPLY	HW
HOT WATER HEATING RETURN	HWR

AIR CONDITIONING PIPING

REFRIGERANT LIQUID	RL
REFRIGERANT DISCHARGE	RD
REFRIGERANT SUCTION	RS
CONDENSER WATER SUPPLY	CWS
CONDENSER WATER RETURN	CWR
CHILLED WATER SUPPLY	CHWS
CHILLED WATER RETURN	CHWR
MAKEUP WATER	MU
HUMIDIFICATION LINE	H
DRAIN	D

- Schedules
  - Door
  - Window
  - Interior finish
  - Wall
  - Occupant load details

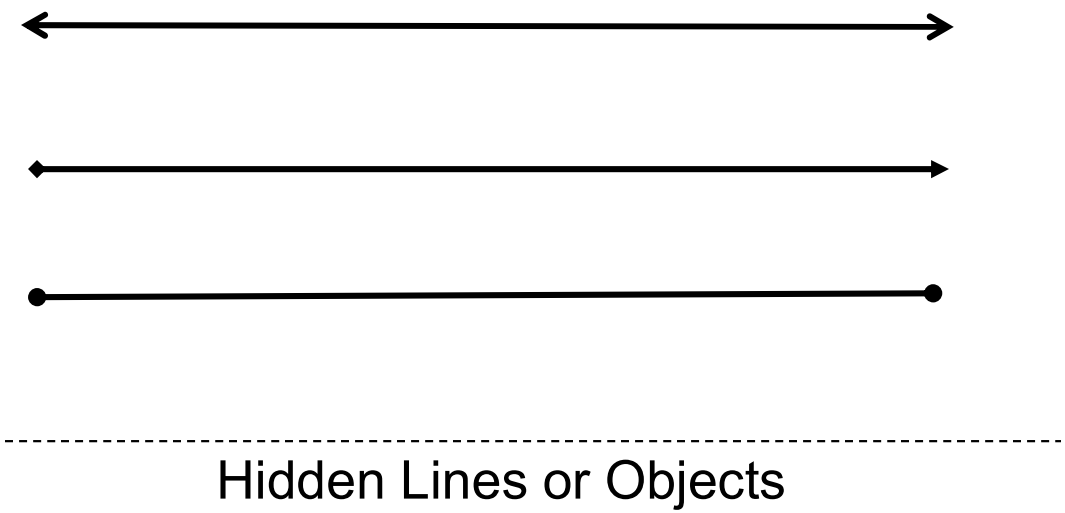

Bedroom
2
8
7
Family
Room
Dining
Room
Kitchen
Island
Ref
Master
Bath
Bath
9
7
7
Master
Bedroom
8
8
Bedroom
3
Living
Room
6
6
Deck
Entry
1
8
Powder
Room
2
4
3
Laundry
Garage
5
N

DOOR SCHEDULE						
Door	Size	Type	Material	Frame	Hardware	Other
1	3’-0 x 7’-0” x 1 ¾”	rsd.pnl.	metal	wd.	A	Wthstrp.
2	2’-8 x 7’-0” x 1 “	flsh.	wd.	wd.	B	
3	3’-0 x 7’-0” x 1 ”	flsh.	wd.	wd.	C	
4	3’-0 x 7’-0” x 1 ¾”	rrd. pnl.	metal	wd./rtd	D	20 min.
5	6’-0 x 16’-0” x 1	grge.	insul.	N/a	E	Insul.
6	3’-0 x 7’-0” x 1 ¾”	gls.	wd/gls.	wd.	F	
7	2’-8 x 7’-0” x 1 ”	Flsh.	Wd.	wd.	G	
8	2 pr. 1’-0” x 6’-8”	Bi-fld	Wd.	N/a	H	
9	2’-6 x 6’-8” x 1 ”	Flsh.	Wd.	Wd.	I	

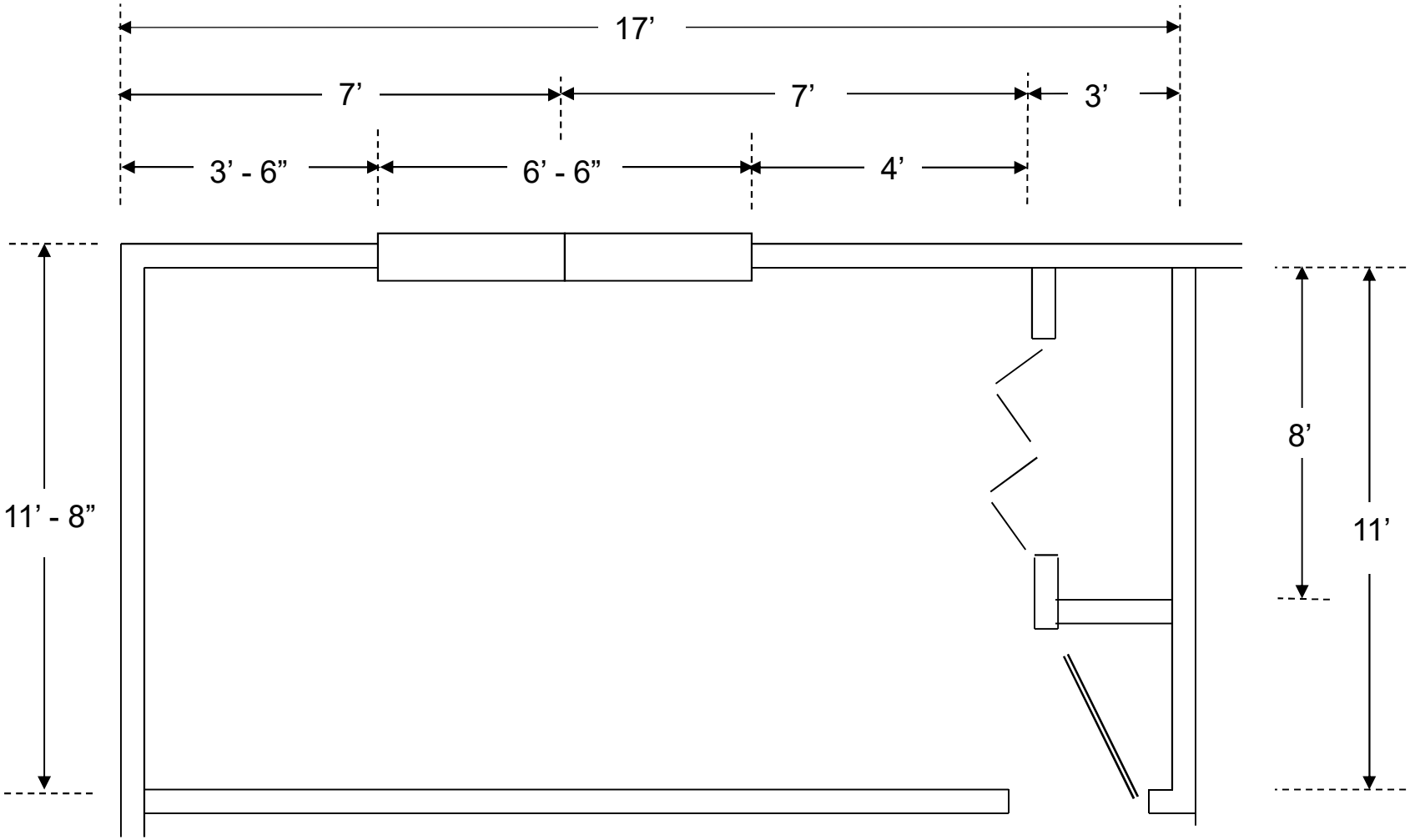
* Additional information on plan or in the specifications book
  - Hardware sets
  - Glazing
  - Insulated
  - Special installation details

* Window schedule
    - Size and type
* Interior finish
    - Type, flame spread rating

- Dimensional Lines
  - Used to show length or dimensions
  - Different styles



Hidden Lines or Objects


17’
7’
7’
3’
3’ - 6”
6’ - 6”
4’
11’ - 8”
8’
11’

- Scales
  - Architectural
    - ¼” – 1/8” – ½” – 1” – 3/32” – 3/16” – 3/8” – 3/4”
  - How long are these lines in 1/4” scale, 1/8”, scale and 3/16” scale?

Line 1 _____

Line 2 _____

- Architectural Scale

Line 1 _____

1/4” 9.5 1/8” 19 3/16” 12.5

Line 2 _____

1/4” 16.5 1/8” 33 3/16” 22

* Engineering
  - 10 – 20 – 30 – 40 – 50 – 60
* How long are these lines in 10 scale – 20 scale – 30 scale?

_____

_____

  - Never scale plans
  - Ruler used as a guide

- Engineer Scale

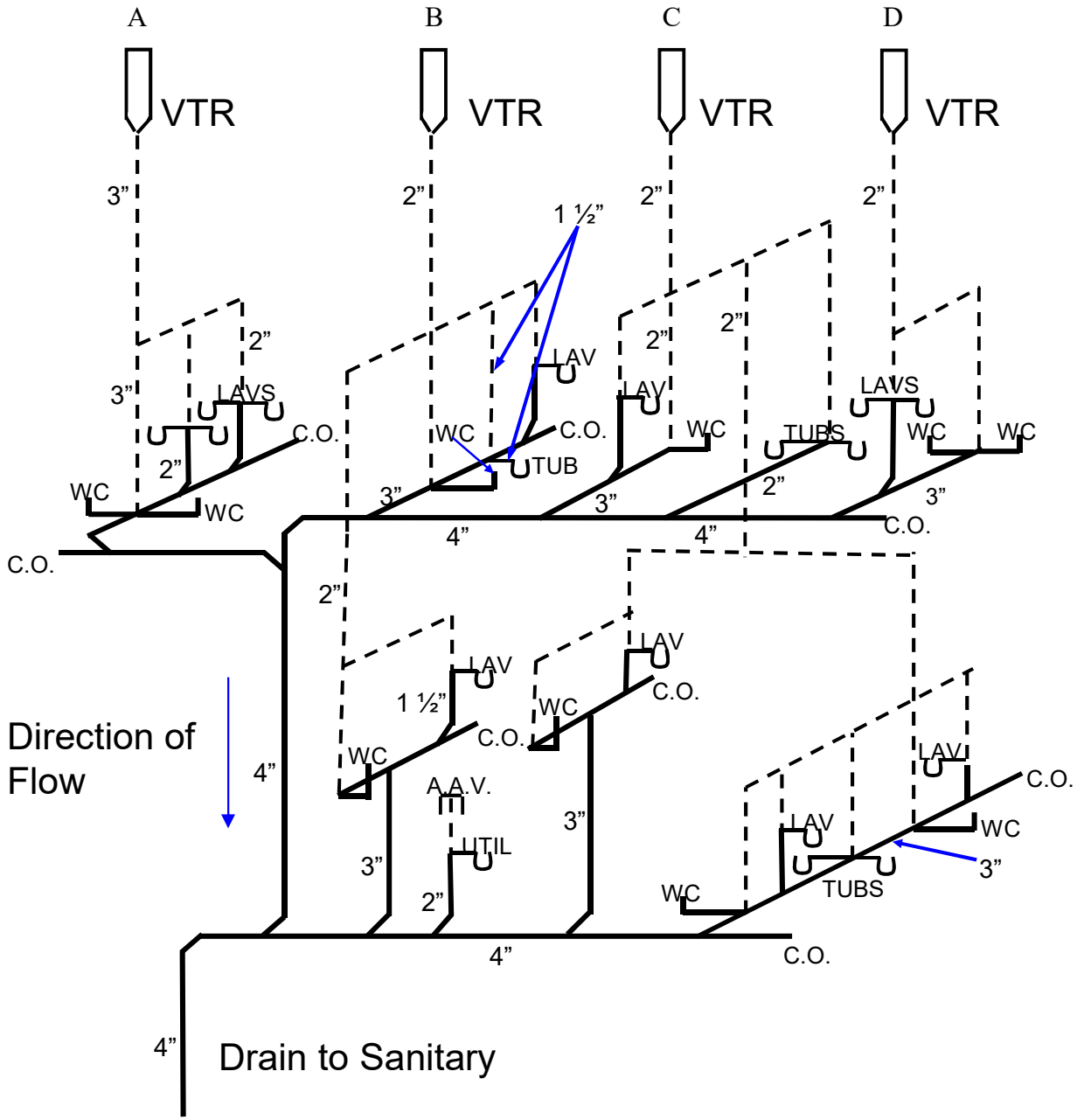
Line 1 _____

10 Scale **24** 30 Scale **71** 60 Scale **141**

Line 2 _____

10 Scale **41** 30 Scale **124** 60 Scale **246**

- Riser Diagrams
  - Shows basic layout of piping, duct work, wire layout



Legend

Drain Pipe ———

Vent Pipe - - - - - -

A.A.V. = Air Admittance Valve

C.O. = Clean out

LAV = Lavatory

TUB = Bathtub/Shower

UTIL = Utility Tub

VTR = Vent Through Roof

WC = Water Closet

- Sheets by Discipline
  - Residential typically uses the same floor plan
  - Commercial - industrial
  - Separate sheets for:
    - Architectural – HVAC – Electric – Plumbing – Fire protection
  - Use base floor plan

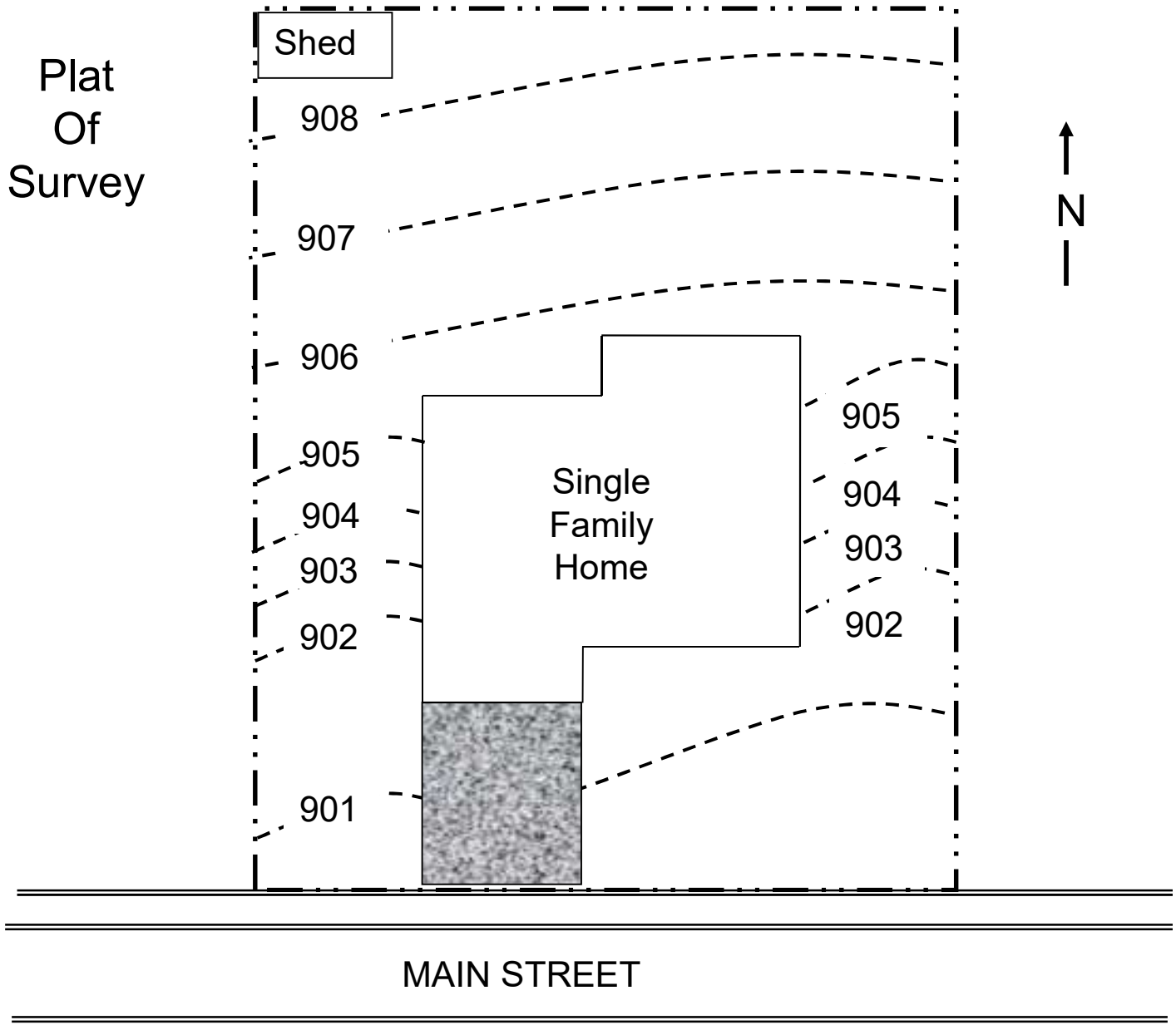
* Electric plan
  - Show location of all receptacles, fixtures, appliances
  - Approximate location of all conduit and tubes
  - Riser diagram showing main service
  - Light fixture schedule required

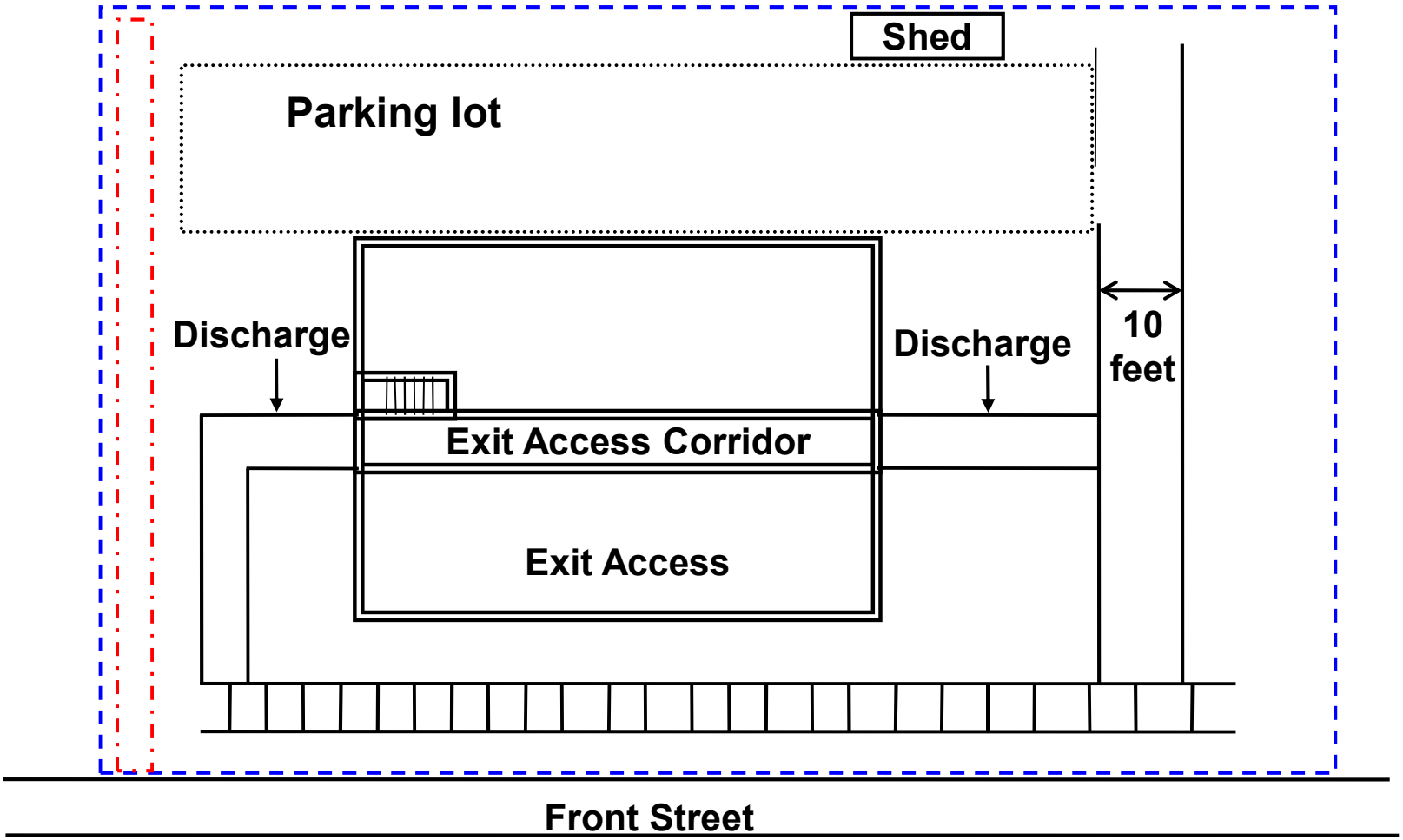
* Mechanical plan
  - Location of all appliances, registers, fire dampers
  - Approximate location of all duct work
  - Ventilation schedule required
  - Specific appliance information on plans or in the specifications
  - May include gas piping

* Plumbing plan
  - Location of all fixtures and appliances
  - Size and type of all pipe
  - Approximate location of all pipe
  - Water and sewer service – size, type, location
  - Schedule for all appliances

* Civil or site plan
    - Location of building on site
    - Setbacks
    - Parking lot
    - Exterior elevations
    - Site utilities

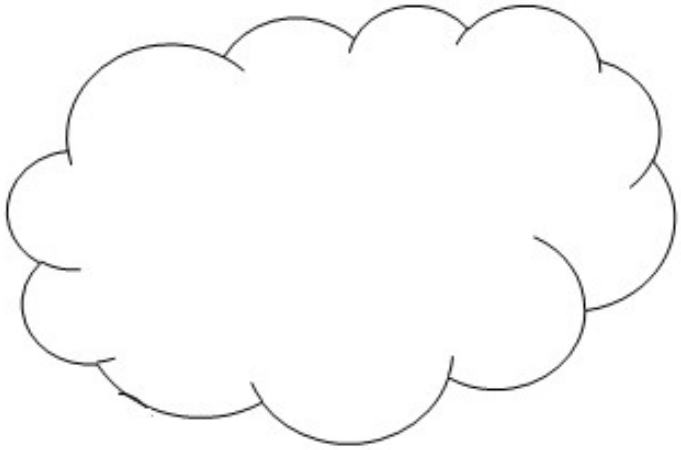
Plat Of Survey





Accessory Use - Easement - Lot, Lot Line, Building Line - Public Way
Street, Private Street, Driveway - Nonconforming Lot or Use
Yard, Front, Rear, Side - Setback

- Resubmittals
  - Highlight changes
  - Clouds
  - List revision dates on cover sheet



BFCA®

Building & Fire Code Academy

Questions?

BFCA®

Building & Fire Code Academy

Thank You For Your Time

BFCA®

Building & Fire Code Academy

Website	**bfcacademy.com**
Email	**info@bfcacademy.com**
Voice	**(800) 488-7057 (847) 428-2951**
Fax	**(847) 428-2911**

Building Better With Our Greatest Resource…Education®

File Attachments for Item:

ER-3 Chapter One Administration (National Inspection Corporation)

All certifications (three one-hour sessions)

Staff Notes: Recommend approval

Committee Recommendation:

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: Andrew Dickerson
(Contact Name)

Organization: National Inspection Corporation
(Organization/Company)

Address: 311 Regency Ridge Dr
(Include Room Number, Suite, etc.)

City: Dayton State: OH Zip: 45459

E-Mail: adickerson@natinspect.com

Telephone: 937-433-4642 Fax: NA

Course Sponsor:

COURSE INFORMATION:

Course Title: Chapter One Administration

New Course Submittal: ■ Update Course: ☐ Prior Approval Number:

Purpose and Objective: The objective of this course is to provide a minimum of three hours training on Chapter 1 of the OBC & RCO. This will include instructions and discussions regarding how the code is designed to be administered, jurisdictional authority, duties & responsibilities, what is required for construction documents, plan approval processes, inspection processes, what constitutes orders & how violations are to be addressed, processes to address unsafe building, appeals and when to use a Certificate of Occupancy verses Certificate of Completion.

Number of Instructional Contact Hours that can be obtained upon completion: 3

If Multi-Session, Number of Instructional Contact Hours Per Session: 1

Program Applicable for the Following Participants:

Building Official ■ Master Plans Examiner ■ Building Inspector ■ Fire Protection Inspector ■ Mechanical Inspector ■

Building Plans Exam. ✔ Plumbing Inspector ■

Plumbing Plans Exam. ■ Non-Res IU Inspector ■

Electrical Plans Exam. ■

Mechanical Plans Exam. ■

Fire Protect. Plans Exam. ✔

Res Building Official ■ Res Plans Examiner ■ Res Building Inspector ■ Res Mechanical Inspector ■ Res IU Inspector ■

Electrical Safety Inspectors ✔

Location of ESI Course: NIC Classroom & On-line Platform Date(s) of ESI Course(s): TBD

SUBMITTAL CHECKLIST: **Make Sure** all of the Following Information is **Submitted**:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	X
	Organization sponsoring or requesting the program (if any)	
Course Title:	Name of course (related to content)	X
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	X
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	X
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	X
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	X
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	X
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	X
Test Materials:		
Completed Application:		X

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

National Inspection Corporation

311 Regency Ridge
Dayton, Ohio 45459
Phone: 937-433-4642
Fax: 937-433-0949

MEMORANDUM

To: Ohio Board of Building Standards
Megan Foley & Michael Lane

From: Andrew Dickerson – Building Official

Date: November 17, 2021

Subject: Chapter One Administration Class Submittal

The class consist of (3) one-hour long classes discussing Chapter One of the OBC and RCO. The classes will include instructions and discussions regarding how the code is designed to be administered. These classes are intended to exceed the requirements of the mandatory 3-hour training on Chapter One required for all OBBC Certifications. The training materials to be used for the training include a PowerPoint Presentation, Chapter One Commentary, 2017 Ohio Building Code and 2019 Residential Code of Ohio.

The instructor is:

Andrew Dickerson (Primary)– BO, RBO, BI, ESI Trainee
30 years in the construction industry with 22 years of code enforcement. Completed the Train-The-Trainers with Steve Regoli. Presented and trained Local Government Staff, Building Officials, Building Inspectors, Plans Examiners, Contractors, Residents and Business Owners on legal codes, government regulations, agency rules, code enforcement, plan reviews, code interpretations, testing methods, construction methods, inspections, and practical applications of engineering and technology relating to State, Local and National Building, Fire and Zoning Codes.

The classes are one-hour in length. They will be held in our training center and on-line platforms. All three class sessions must be attended to obtain credit for the class.

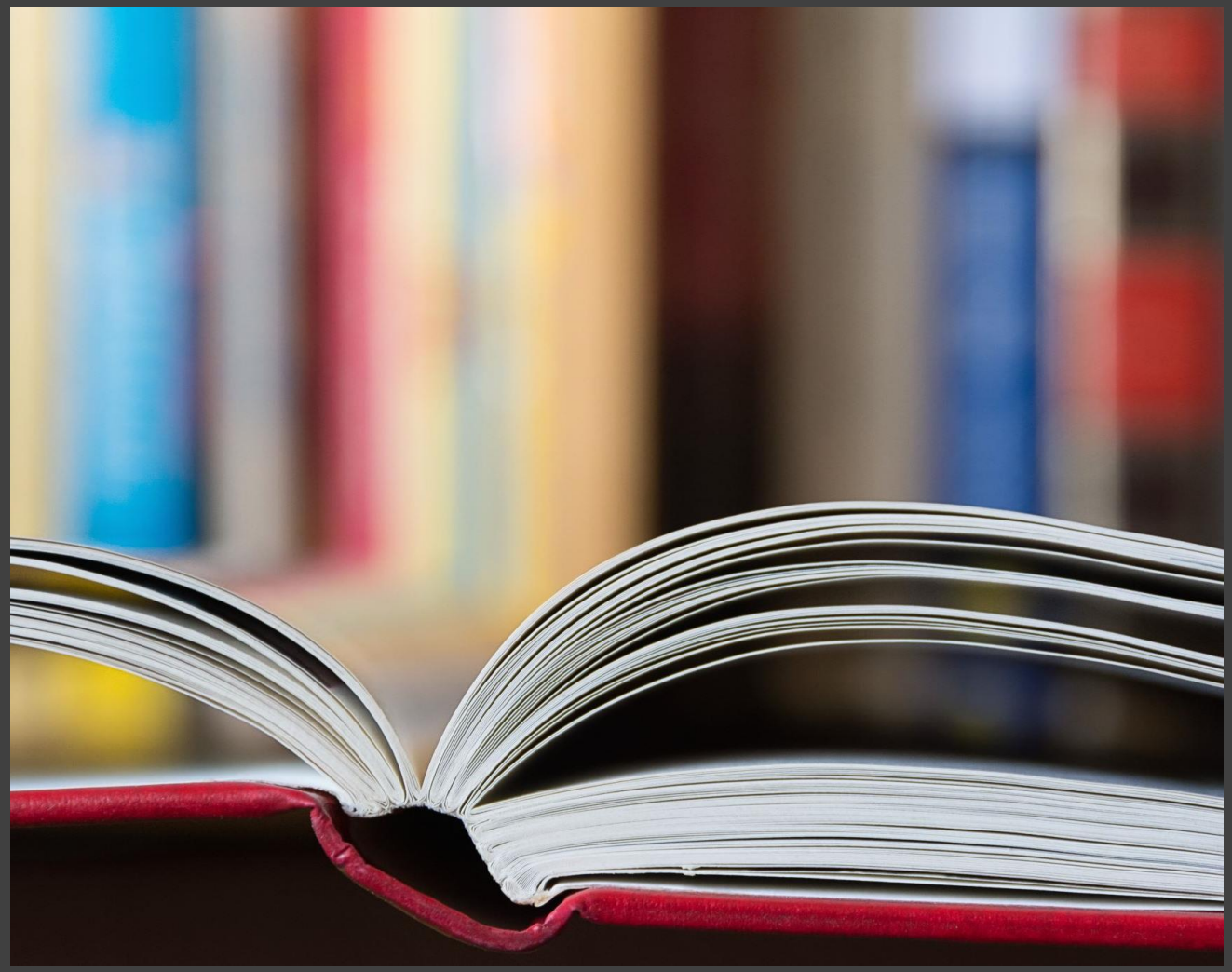
Agenda

101 General Administration
102 Applicability & Jurisdictional Authority
103 Certified Building Departments, Personnel and Appeals Boards
104 Duties & Responsibilities of Building Department Personnel
105 Approvals
106 Construction Documents
107 Plan Approval Process
108 Inspection Process
109 Orders, Violations and Unsafe Buildings
110 Appeals
111 Certificate of Occupancy & Certificate of Completion
112 Changes to the Code
113 Industrialized Units
114 Products & Materials
115 Board Organization

Roughly one third will be covered in each class the break will be determined based upon the discussions and time.

OHIO BUILDING CODE

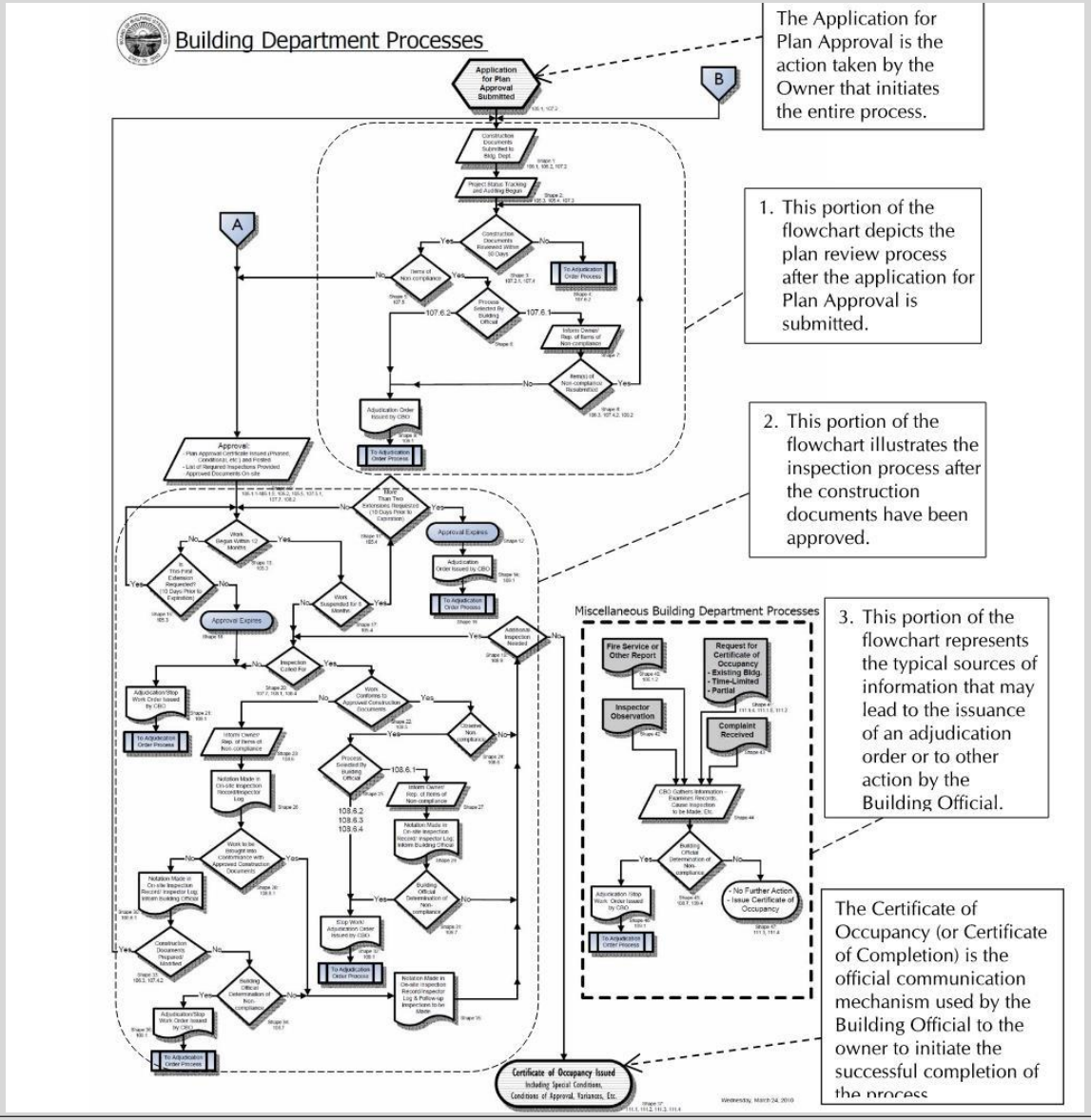
Chapter 1 - Administration



Laying the Groundwork for Chapter 1

- The Ohio Revised Code as the Foundation
  - ORC 3791.04 – Submission of Plan – Approvals – Prohibition – Fine
    - Requires submission of plans before construction
    - Requires approval before construction

The Whole Administrative Process at a Glance



The Application for Plan Approval is the action taken by the Owner that initiates the entire process.

1. This portion of the flowchart depicts the plan review process after the application for Plan Approval is submitted.

2. This portion of the flowchart illustrates the inspection process after the construction documents have been approved.

3. This portion of the flowchart represents the typical sources of information that may lead to the issuance of an adjudication order or to other action by the Building Official.

The Certificate of Occupancy (or Certificate of Completion) is the official communication mechanism used by the Building Official to the owner to initiate the successful completion of the process.

The Administrative Appeal Process at a Glance

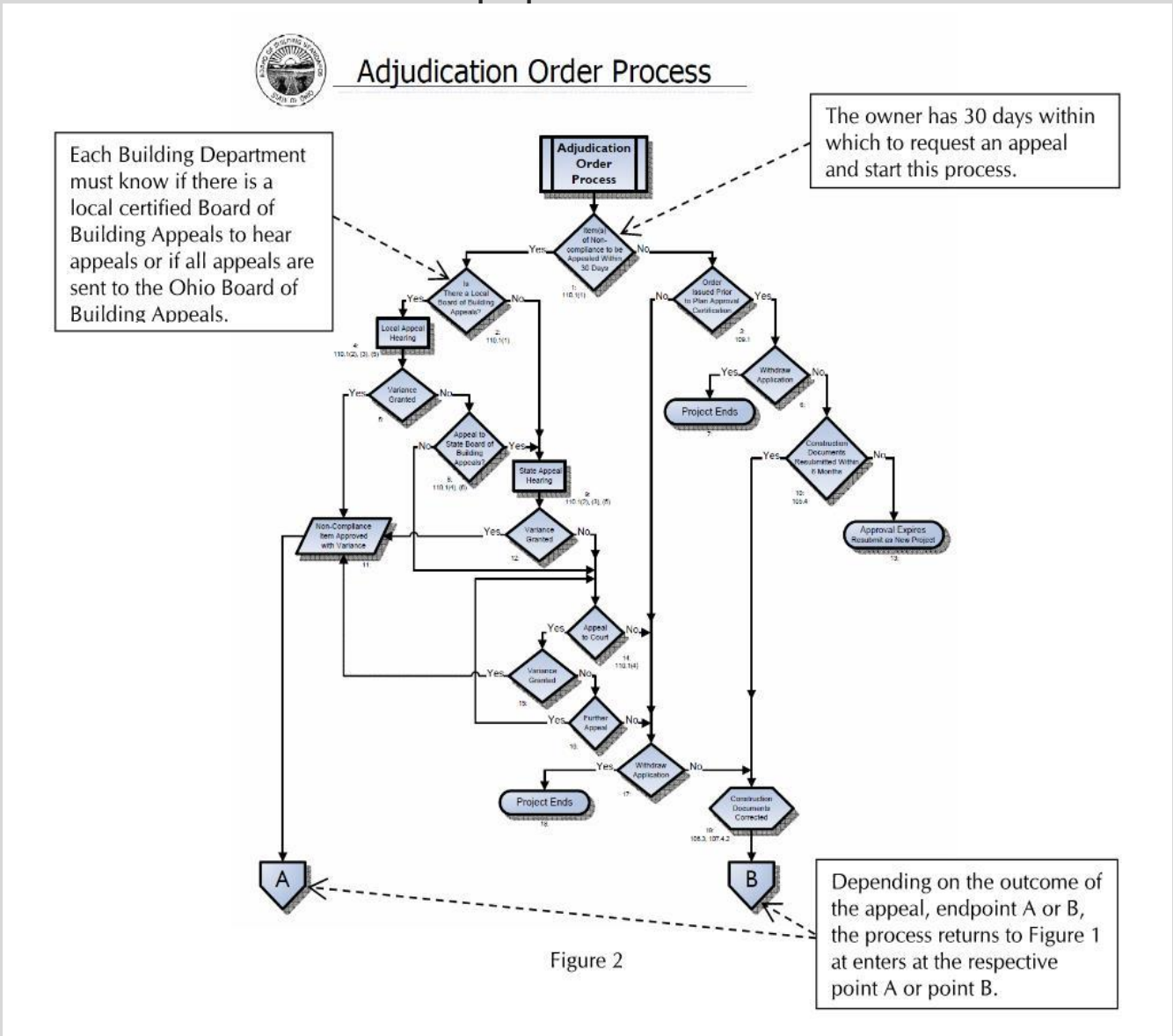


Figure 2

Scope of the Code

- Section 101 – General
- Section 102 – Application and Jurisdictional Authority

Section 101 - General

101.2 – Scope

101.3 – Intent

101.4 – Reference Codes

Section 101.2 – New Exceptions

Ground signs not over six feet in height about the adjacent grade (unless otherwise required)

Retaining walls, bridges, walkways or site stairs unless associated with or necessary for the building or the building egress to comply with the rules of the board.

Primitive transient lodging structures with only provisions for sleeping, with no building services equipment or piping, and not greater than 400 sq. ft. in area.

Section 101.3 – Intent

Performance

Extent of Use

Standardization

Section 101.4 – Reference Codes

- Mechanical
- Plumbing
- Elevator
- Fire Prevention
- Boiler

Section 102 – Application and Jurisdictional Authority

102.7 – Existing Structures

102.8 – Temporary Structures

102.10 – Work Exempt from Approval

102.11 – Building Department Jurisdictional Limitations

Section 102.7 – Existing Structures

- Alteration
- Repair
- Addition
- Maintenance
- Change of Occupancy

Section 102.8 – Temporary Structures

Conformance

Termination of Approval

Section 102.10 – Work Exempt

- Building
- Electrical
- Gas
- Mechanical
- Plumbing
- Emergency Repairs
- Minor Repairs

Section 102.10 – Building

- Detached Accessory Structure not more than 120 sq ft
- Fence not over 6 ft high
- Retaining wall not over 4 ft high
- Water tanks supported on grade
- Sidewalks and driveways
- Finishes not regulated by this code

Section 102.10 – Building

Temporary stage sets and scenery

Window awnings

Tents and membrane structures exempt in 3103.1.3

Above-ground storage tanks (as defined in rule 4101:1-2-01)

Battery-operated smoke or carbon monoxide alarms installed in existing buildings where no construction is taking place

Section 102.10 – Electrical

Minor repair work

Electrical equipment used for radio and television transmission with exceptions

Temporary system required for testing or servicing

Wiring, devices, appliances, apparatus or equipment operating at less than 25v and not capable of supplying more than 50w

Process equipment and associated wiring

Wiring equipment not connected to building services equipment and adjacent to natural or artificially made bodies of water

Section 102.10 – Gas

Portable heating appliances

Replacement of any part that does not alter approval of equipment or make unsafe

Gas distribution piping owned and maintained by public or municipal utilities and located upstream of the point of delivery

Process equipment, including the associated tanks, foundations, and process piping

Section 102.10 – Mechanical

- Portable heating appliances
- Portable ventilation equipment
- Portable cooling units
- Replacement of any part which does not alter its approval or make it unsafe
- Portable evaporative cooler
- Process equipment including the associated tanks, foundations, and process piping
- Heating and cooling distribution piping installed and maintained by public or municipal utilities

Section 102.10 – Plumbing

Repair of leaks in drains, water, soil, waste, or vent pipe unless it becomes defective and needs removed and replaced

Clearance of stoppages or the repair of leaks in pipes, valves, or fixtures

Process equipment including the associated tanks, foundations, and process piping

Section 102.11 – Building Department Jurisdictional Limitations

- Fire
- Health
- Sewerage and Drainage System
- Power Generation
- State Projects

Who Can Do What

- Section 104 – Duties and Responsibilities

Section 104 – Duties and Responsibilities

104.2 – Building Department Personnel Duties and Responsibilities

104.3 – Certified Boards of Building Appeals Duties and Responsibilities

Section 104.2 – Building Department Personnel Duties and Responsibilities

- Building Official
- Plans Examiners
- Inspectors
- Liability

Section 104.2.1 – Building Official

- Applications and plan approvals
- Orders
- Inspections
- Department records
- Department reports

Section 104.2.2 – Plans Examiner (and trainees)

- Master Plans Examiner
- Building Plans Examiner
- Mechanical Plans Examiner
- Electrical Plans Examiner
- Plumbing Plans Examiner
- Fire Protections Plans Examiner

Section 104.2.3 – Inspectors

- Building
- Plumbing
- Electrical Safety
- Mechanical
- Fire Protection
- Medical Gas Piping

Section 104.3 – Certified Boards of Building Appeals Duties and Responsibilities

Powers, Local Boards of Building Appeals

State Board of Building Appeals

What Must Be Submitted

- Section 105 – Approvals
- Section 106 – Construction Documents

Section 105 – Approvals

- 105.1 – Approvals Required
- 105.2 – Validity of Approval
- 105.3 – Expiration
- 105.4 – Extension
- 105.5 – Certificate of Plan Approval

Section 106 – Construction Documents

- 106.1 – Submittal Documents
- 106.2 – Evidence of Responsibility
- 106.3 – Amended Construction Documents
- 106.4 – Alternative Materials and Methods of Construction and Equipment
- 106.5 – Alternative Engineered Design

Section 106.1- Submittal Documents

- Index
- Site Plan
- Floor Plans
- Demolition
- Roof Plan
- Exterior Elevations

Section 106.1– Submittal Documents

- Building sections
- Exterior building envelope
- Wall sections
- Interior elevations
- Schedules
- Structure

Section 106.1- Submittal Documents

- Fire suppression system
- Fire-resistance ratings
- System descriptions
- Operations
- Additional Information

Section 106.5- Alternative Engineered Design

Design criteria

Submittal

Technical date

Assuring Compliance

- Section 107 – Plan Approval Process
- Section 108 – Inspection Process
- Section 109 – Orders and Violations
- Section 110 – Appeals

Section 107 – Plan Approval Process

107.1 – Plan Review Required

107.2 – Application for Plan Approval

107.3 – Order of Plan Review

107.4 – Review of Plans

Section 107.4- Review of Plans

- Inadequate construction documents
- Resubmitted documents
- Sealed construction documents
- Fire protections system construction documents

Section 107 – Plan Approval Process

107.5 – Plan Review, Compliance with Rules of the Board

107.6 – Plan Review, Items of Noncompliance

107.7 – Approved Construction Document Sets

Section 108 – Inspection Process

108.1 – General

108.2 – Required Inspections

108.3 – Inspection Agencies

108.4 – Right of Entry

108.5 – Inspections, Compliance with Construction Documents

Section 108.2– Required Inspections

- Lot line markers
- Footing or foundation
- Slab or under-floor
- Lowest floor elevation
- Frame
- Lath or gypsum board
- Fire-resistant penetrations

Section 108.2- Required Inspections

- Energy efficiency
- Elevator
- Boiler
- Special
- Fire protection
- Completion
- Industrialized Unit

Required Inspections Check List and Guide for Inspector Use

Required inspection for this Plan Approval	Inspection description	Inspector's notes	OK to proceed
Y / N	**Lot Line Marking**		√
	1. Verification of building location & utilities 2. Distance to lot lines 3. Distance to other on-site buildings 4. Distance to public way 5. Distance to easements, etc. 6. Other _____		
Y / N	**Excavation for footings and underground utilities**		
	1. To include soil bearing capacity verification 2. Forming: dimensions, depth, height, steps 3. Reinforcing ties & steel, dimensions to forms 4. Concrete quality check if on-site 5. Other _____		
Y / N	**Foundation**		
	1. Forming: dimensions, depth, height, steps, cantilevers 2. Relationship to footings, piers, caissons, etc. 3. Reinforcing ties & steel, dimensions to forms 4. Concrete quality check if on-site 5. Other _____		
Y / N	**Concrete slab & under-floor inspection**		
	1. To be performed after all equipment, pipes, insulation, etc. is installed but before concrete poured or sheathing installed 2. Other _____		
Y / N	**Lowest floor elevation verification**		
	1. Approved construction documents must indicate whether or not the building is to be located in flood hazard area....if it is, the documents will have the specified elevation of the lowest floor that must be verified 2. Other _____ (Chapter 1 commentary)		

Req. inspection for this approval	Inspection description	Inspector's notes	OK to proceed
Y / N	**Frame Inspection**		
To be called for & performed after: 1. Rough mechanical 2. Rough electrical 3. Rough water supply 4. Rough sanitary 5. Chimneys & vents installed 6. Structural framing is complete through roof sheathing 7. Fire blocking/stopping is in place Other _____			
	Verify: 1. Construction 2. Materials 3. Assemblies 4. Methods 5. Fastening 6. Forming: dimensions, depth, height, steps, cantilevers 7. Relationship to footings, piers, caissons, etc. 8. Reinforcing ties & steel, dimensions to forms 9. Concrete quality check if on-site (see exception & handout materials		
Y / N	**Frame Inspection**		
	1. Dimensions of structural & non-structural members 2. Grade & species, gage and type of metal, concrete assemblies & other special inspection related construction 3. Bearing/fastening of materials, connections, welds, etc. 4. Location of bearing and non-bearing walls 5. Square footage and height of spaces and ridge/building height 6. Some penetration protection 7. Other _____		

Req. inspection for this approval	Inspection description	Inspector's notes	OK to proceed
Y / N	**Lath, Gypsum Board Inspection**		
	to be requested after lath and/or gypsum board are installed before plastering, joint filling and finishing occurs. Ideally, the inspection would occur before all board is hung so the inspector can verify assemblies have proper elements within…in the alternative, random disassembly can be requested:		
	1. Verify materials 2. Design# and actual section of assembly, lateral force & STC rating 3. Size: thickness, 4. Type: interior, exterior, cement, gypsum, water resistant, fire resistant, etc. Fire-Shield, Sound Break, Shaft liner, X 5. Type of fasteners, size, spacing and depth, etc. 6. Orientation of Board: vertical, horizontal, overlap of joints (spacing) 7. Internal additional parts: resilient metal furring channel, U, Z & N spacing metal, stud type and spacing, cavity fill material(s)		
Y / N	**Fire-resistive assemblies and penetration inspection**		
To be requested before concealment.			
	1. Verify materials 2. Design # and actual section of assembly 3. Size: thickness, 4. Type: interior, exterior, cement, gypsum, water resistant, fire resistant, etc. Fire-Shield, Sound Break, Shaft liner, X 5. Type of fasteners, size, spacing and depth, etc. 6. Orientation of materials or board: vertical, horizontal, overlap of joints spacing) 7. Internal additional parts, particularly important for rated assemblies: resilient metal furring channel, U, Z & N spacing metal, stud type and spacing, cavity fill material(s) 8. Check for back to back penetrations: outlets; boxes; cabinets, etc. 9. Rated openings: Door, windows, shutters, etc.: design #s; label matches design#; parts are compatible with listing and rating of assembly; closers; reveals; opening/closing force; latching; etc. 10. Other _____		

Req. inspection for this approval	Inspection description	Inspector's notes	OK to proceed
Y / N	**Energy Efficiency/envelope Insp.**		
To be requested before concealment.			
	a. Verify materials i. Type ii. Size: thickness iii. U & R values iv. Infiltration protection method: putties; weather-striping; door & window specifications and manufacturer's instructions; ductwork wrap and sealing; infiltration wraps b. Equipment efficiency: furnace/AC unit; water heater; humidifier; dehumidifier; etc. manufacturer's plate to match spec & installation in accordance with manufacturer's installation instruction (check against listing)		
Y / N	**Building Services Equipment Systems inspections:**		
	1. Electrical 2. Plumbing 3. Sanitary 4. Water Supplies 5. Subsurface & surface water disposal 6. Specialty 7. Mechanical 8. Heating 9. Ventilation 10. Exhaust 11. Cooling 12. Fire Protection Systems • Rough ..... • Progressive ..... 13. Final/operative inspections to verify that • Equipment • Materials (pipe, conduit, duct, etc.) • Methods of installation • Fixtures are installed in accordance with the approved construction documents, listings, manufacturer's installation instructions and that all tests required have been conducted		

Req. inspection for this approval	Inspection description	Inspector's notes	OK to proceed
Y / N	**Other inspections required by Bldg. Official based on project scope**		
	1. **Accessibility** - exterior & interior 2. **Special Inspections** - reports & records of findings and sequence of corrections, etc. 3. **Industrialized units** – transportation damage, unit matching approval, site completion work, tests, etc. 4. **Roof assemblies** – design details, installation of underlayment/sub-base & exposed surface, fastening, wind exposed edge detail....installed in accordance with manufacturer's installation instructions and approved construction docs 5. **Weather** - exposed other surfaces 6. **Egress systems** – width and height clearances, door swings, posting of occupant loads, and adequacy of elements in means of egress system, assembly seating, lighting of the path of travel, exit signs, etc. 7. **Special conditions for occupancies listed in Chapter 4** – High rise and underground buildings, special amusement, HPM, institutional, atriums, covered malls, parking-storage-hazardous material containment buildings		

Revised July 10, 2012

Section 108 – Inspection Process

108.6 – Inspections, Observation of Violations, Unsafe Conditions, or Serious Hazards

108.7 – Building Official Determination of Noncompliance

108.8 – Acceptance, Performance, and Operational Testing

108.9 – Posting of Occupant and Structural Loads

Owner Compliance Options Matrix

Inspections: Process for Non Compliant work with approved construction documents (Observation of violations, unsafe conditions and serious hazards.)

When any inspector determines that the construction, installation, testing, equipment, materials or methods used, are contrary to what has been shown on the approved construction documents or specifications, the following process of options shall proceed per OBC 108.6.1 and 108.7 by the Building Official:

Option A (OBC 108.6.1.1.1.1)	Option B (OBC 108.6.1.1.1.2)	Option C (OBC 108.6.1.1.1.3,108.6.1.4, 108.7)
Item of non compliance *is to be corrected* on the site:	**On-site representative indicates that *approved construction docs/specs will be revised* per OBC 107.4.2 to match work:**	**Item of non compliance *will not be brought into compliance/ corrected:***
Step 1. A notation shall be made in the on-site inspection record and inspector's log. (OBC 108.6.1.2) *(Notations for both shall indicate inspectors name, date, inspection type, items of noncompliance, option chosen and compliance/follow-up inspection dates.)*	**Step 1.** The inspector shall ask when the building department should expect the revisions and a notation on the on-site inspection record and inspectors log will be made by the inspector. The Building Official shall be contacted with the change indication and when the building department will receive the revisions.	**Step 1.** A notation shall be made in the on-site inspection record (108.6.1.2) and inspectors log, and, inspectors will contact the Building official and explain the nature of the change.
Step 2. Indicate whether a follow-up inspection to verify the correction is necessary and communicate this to the owner's on-site representative.	**Step 2.** When revisions to the plan approval are required, it is necessary for the owner and/or the owner's representative/designer to submit revisions in writing (written description, revised construction documents and/or specifications defining these changes).	**Step 2.** The Building Official shall determine if an adjudication order (either a notice of violation or stop work type) is to be written.
Step 3. Indicate to the on-site representative when the department must be contacted when the correction has been made so a follow-up inspection may be scheduled to verify satisfactory inspection of the correction.	**Step 3.** The Plan Examiner will review the changes to determine compliance.	**Step 3.** If an order is to be written, the building official shall contact the inspector who will write and give a report on the specifics of the issue. The building official shall issue an order per OBC 109 to the owner.
	Step 4. Once approved, the revisions will be sent to the site, and copies will be attached to the on-site and in-house set of plans. Inspections will then be done to determine compliance with the modified construction documents and/or specifications.	**Step 4.** If the Building official determines an order is unnecessary, the inspector shall be informed of the Building official's determination. The inspector shall note the reason in the inspection record.

Section 109 – Orders, Violations, and Unsafe Buildings

109.1 – Adjudication Orders, Required

109.2 – Response to Orders

109.3 – Prosecution and Penalties

109.4 – Unsafe Buildings

Section 109.1– Adjudication Orders Required

- Clearly identify the rules violated
- Indicate what is necessary to change to comply
- Include notice

Section 110 – Appeals

110.1 – Hearing and Rights of Appeal, Local Board of Building Appeals

Communicating Completion

- Section 111 – Certificate of Occupancy, Certificate of Completion

Section 111 – Certificate of Occupancy and Certificate of Completion

- 111.1 – Approval Required to Occupy
- 111.2 – Certificate Issued
- 111.3 – Validity of a Certificate of Occupancy or Certificate of Completion
- 111.4 – Existing Buildings
- 111.5 – Connection of Service Utilities
- 111.6 – Temporary Connection of Service Utilities

Unique Ohio Processes

- Section 112 – Changes to the Code
- Section 113 – Industrialized Units
- Section 114 – Products and Materials
- Section 115 – Board Committees

Section 112 – Changes to the Code

112.1 – Code Change Petition Process

112.2 –Changes to the Codes and Code Enforcement

Section 113 – Industrialized Units

113.1 – Industrialized Units

113.2 – Definitions

113.3 – Application

113.4 - Evaluation

Section 113 – Industrialized Units

113.5 – Approval

113.6 – Inspections, Board Insignias, and Shipping Reports

113.7 – Manufacturer Responsibility

113.8 - Fees

Section 114 – Products and Materials

114.1 – General

114.2 – Definitions

114.3 – Building Official Approval Process

114.4 – Process for Board-Recognition of "Accreditation Bodies", "Conformity Assessment Bodies", and "Industry Trade Association Certification Programs"

Section 115 – Board Committees

115.1 – Meetings

115.2 – Notices

115.3 – Rules

115.4 – Board Committees and Duties

Any Questions?

OHIO BOARD OF BUILDING STANDARDS

2011 OBC Building Department Resource Package Index

0-1 Introduction -2011 OBC Building Department Resource Package

0-2 2011 OBC Chapter 1 with Commentary

(Refer to OBBS website 'Codes Tab'. Refer to the OBC Chapter One Commentary under the Non- Residential Building Codes Heading.

1-1 Building Department Processes Flow Chart

1-2 Application for Plan Approval 107.2

2-0 Plan review process

2-1 Plan Examination Check List 107.4-5

2-2 Document Examination Review Record and Report 107.5-6

2-3 Certificate of Plan Approval 105.5

2-4 Project Permit Sign Off Sheet 105.5

3-1 Adjudication Order Process Flow Chart

3-2 Adjudication Order 109.1

3-3 Notification Letter to Board of Appeals-[Non Reqd]-New

4-1 Required Inspections Check List 108.2

4-2 On Site Inspection Record 108.5

4-3 Owner Compliance Options Matrix 108.6.1, 108.7

4-4 Inspector Report to Building Official 108.7

4-5 Contractor Test Completion Certifications for Plumbing Systems 108.8

4-6 Notice of Recommended Change- New

5-1 Certificate of Occupancy 111.1

5-2 Time Limited Certificate of Occupancy Process 110.1.5

5-3 Posted Occupant Load Sign 1004.3

5-4 Type A Family Daycare Required Inspection Standard 101.2 Ex.5

5-5 Posted Live Load Placard 3403.3.1

Revised: 7/6/15

2011 OBC Building Department Resource Package

INTRODUCTION:

Through out Ohio, Building department personnel have developed various departmental forms, procedures, and policies to assist with their enforcement responsibilities and to communicate with office and field staff and the constituents that they serve.

Many newly formed departments have struggled at times developing these forms or have not implemented forms that the Board requires as basic vehicles of communication. The lack of and multiple variations of department forms has made enforcement inconsistent in the State of Ohio.

Though great strides have been made, the Board of Building Standards has identified the need to correct these issues and ensure uniformity of all building department operations. Board staff, along with the assistance of many contributing building officials, has developed this Building Department Resource Package as a first step toward ensuring uniform enforcement throughout the State of all of the building departments the Board certifies. The intent of this Building Department Resource Package is to provide Certified Building Officials with the tools needed to implement consistent building department administration.

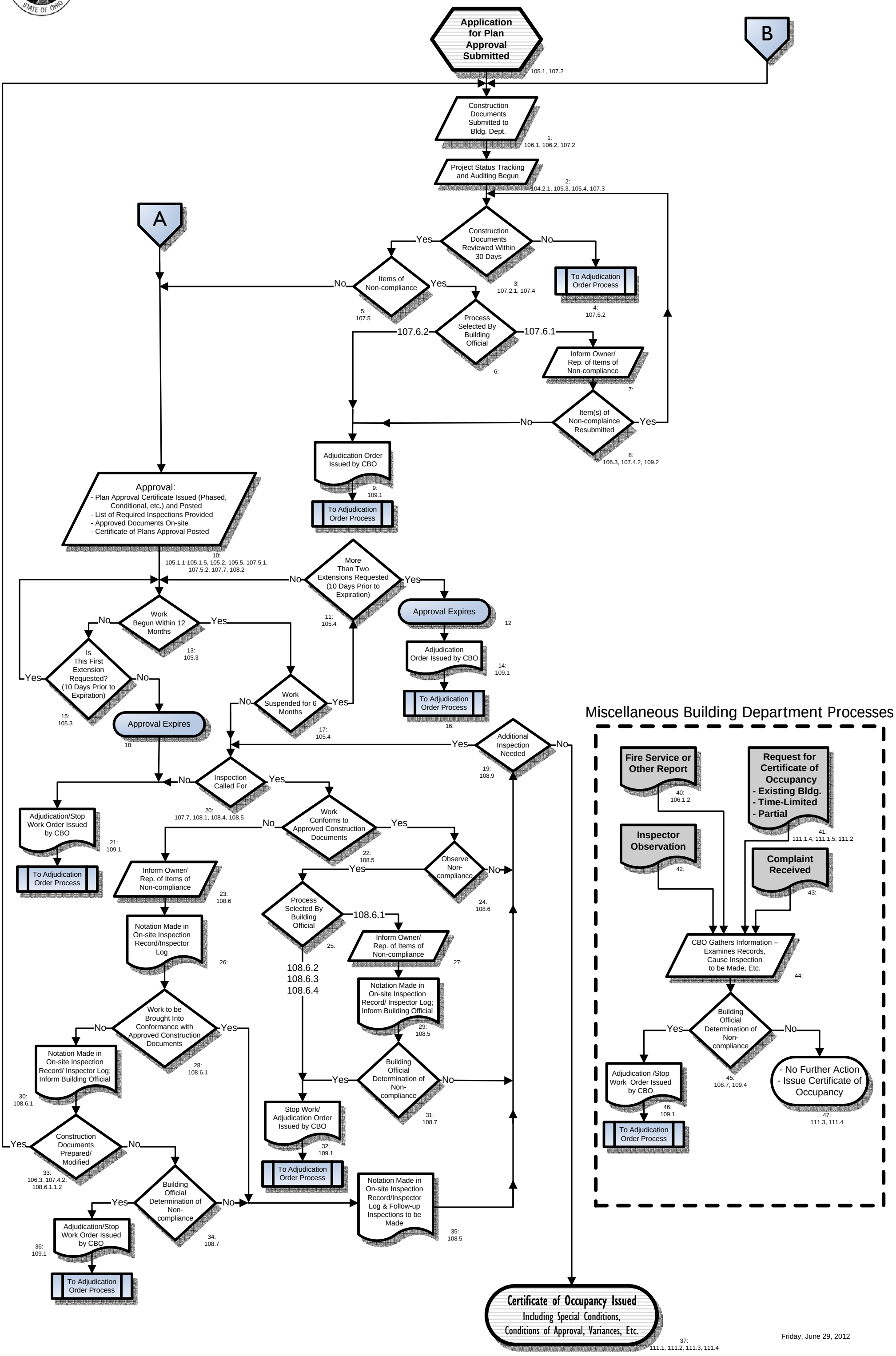
The Building Department Resource Package is to be used to either revise or replace current department forms. The adoption of these forms can easily be incorporated by amending the headers, footers and other locations within the forms with the specific department identification information. All modifiable forms are produced in a 'Word' software format for easy modification. Reference documents included in the package can be read with 'Adobe' software.

The Building Department Resource Package will be made available on the Board of Building Standards website. If you have questions or feedback to this package, please contact the Board of Building Standards for the inquiry. Any modifications required to the Building Department Resource Package in the future will be posted on the OBBS website for downloads to update your forms.

June 2012

Building Department Process Flow Chart
BBS Form 1-1

Building Department Processes Flow Chart



Friday, June 29, 2012

Application for Plan Approval
BBS Form 1-2
OBC 107.2

LOGO HERE

MY JURISDICTION

APPLICATION FOR NON RESIDENTIAL PLAN APPROVAL

This form is also available at www.MYJURISDICTION.com Submit one application per building or structure; all sections must be completed, See instruction sheet for details.

1 SCOPE OF PROJECT: (OBC 107.2.1)

___ Building General ___ Sprinkler System
___ Mechanical ___ Fire Alarm
___ Electrical ___ Plumbing

2 TYPE OF PROJECT:

___ Repairs
___ New Building Construction
___ Alteration
___ Building Addition
___ Change of Occupancy
Request Existing Bldg C of O

3 PHASED PLAN REVIEW:

___ Foundation
___
___
___
___

4 APPLICATION RELATED INFORMATION:

- Is this project being submitted as a result of a previous preliminary plan review?
  N
  ___ o ___ Yes, please provide the preliminary plan review number: _____
- Is this application being submitted as a result of a Notice of Violation or Adjudication Order that you received?
  N
  ___ o ___ Yes, please provide the adjudication order number: _____

5 PROJECT/BUILDING LOCATION: (OBC 107.2.2)

Building Name _____ Street Address _____
City/Township _____ Zip Code _____ County _____
Directions _____

- Is this project/building located in a flood plain? ___ Yes ___ No
- Has flood plain administrator been contacted for requirements? ___ Yes ___ No

6 BRIEF DESCRIPTION OF THE SCOPE OF WORK COVERED UNDER THIS APPLICATION: (OBC 107.2.1)

_____
_____
_____

7 BUILDING OWNER INFORMATION:

Name of owner _____ Attention: _____
Street Address _____ City _____ State _____ Zip _____
Phone No. _____ Fax _____ E-mail _____

8 APPLICANT INFORMATION: (Owner or designated representative) (OBC 107.2)

Applicant _____ Attention: _____
Street Address _____ City _____ State _____ Zip _____
Phone No. _____ Fax _____ E-mail _____

9 **REGISTERED DESIGN PROFESSIONAL INFORMATION:** ____ Architect ____ Engineer ____ Certified Fire protection system designer (OBC 107.4.4)

Designer _____ Registration /Certificate No.: _____

Street Address _____ City _____ State _____ Zip _____

Phone No. _____ Fax _____ E-mail _____

10 **BUILDING CODE INFORMATION:**

(Information applies to construction area in a mixed use groups building, or the entire building if a single use group building)

Current use group(s) _____ Current use group(s) _____ Current use group(s) _____

Occupancy Description:

11 **GENERAL BUILDING INFORMATION:** (The following information applies to the ***entire building***, not just construction area.) (OBC 107.2.3.)

- Building Information:

  Use group(s)? _____ Mixed use groups? ____ No ____ Yes ____ Separated ____ Non-separated

  Construction type? _____ Building height (FT)? _____ No. of stories? _____

  Occupant load? Storage height (FT)? Storage aisle width (FT)?

▪ List USE GROUP below for mixed use building.	▪ List Occupancy Type for associated use group below.
▪	▪
▪	▪
▪	▪
▪	▪
▪	▪

- Fire Protection Systems: (Enter the type of system such as NFPA 13, NFPA 72, etc., if known. Enter "N/A" if not applicable)

  Building sprinkler system? _____ Sprinkler demand @ base of riser (PSI)? _____

  Limited area sprinkler system? _____ Type 1 hood suppression? _____ In-Rack sprinkler system? _____

  Building fire alarm system? _____ Fire detection system? _____ Smoke detection system? _____

12 **CERTIFICATION:** (OBC 107.2.5)

I certify that I am the _____ Owner _____ Owner Authorized Agent

All information contained in this application is true, accurate, and complete to the best of my knowledge. All official correspondence in connection with this application should be sent to my attention at the address shown above.

Signature _____

Print Name: _____ Date _____

14 **THE AREA BELOW IS FOR OFFICIAL USE ONLY:**

Date received _____ Appl. No.: _____

Check No.: _____ Verification # _____

Processed by: _____ ____ Walk in ____ Mail in

"An Equal Opportunity Employer and Service Provider"

Notes:

This area is designated for the incorporation of fee schedules as established by the locally adopted fee schedule as indicated per Ohio Building Code Section 115.1.

DIRECTIONS FOR COMPLETING MY JURISDICTION APPLICATION FOR BUILDING PLAN APPROVAL

In accordance with Ohio Administrative Code (OAC) Chapter 4101:1-1-01, pursuant to Ohio Revised Code (ORC) Section 3791.04, before beginning the construction, erection or manufacture of any building for which construction documents are required, the owner shall submit (two or more) copies of construction drawings to this division for approval. The construction documents shall be accompanied with the application form and attached (scope / fees) worksheets. The construction documents shall be prepared by a registered design professional pursuant to OAC 4101:1-1-01. An examination and inspection fee will be assessed at the time of submittal as outlined in OAC 4101:1-1-01.

Application Directions: Complete page one of the application and attached worksheets as outlined below. All boxes, 1 through 14, must be completed in full or the application will be returned. Send this completed form along with all required documents to ("My Jurisdiction Building Department" and full address.")

1. **SCOPE OF PROJECT:** Check all the boxes that apply to the scope of work proposed in this project. Every scope of work checked must be accompanied with the appropriate fees. Without establishing the proper scope of work, the division will be unable to establish the inspection schedule for the project. Please note that "***Building General***" refers to ***all "general trade" work*** in the building including ceiling panels/grids, non-loadbearing partitions, flooring, etc.; NOT just structural loadbearing components of the building.
2. **TYPE OF PROJECT:** Check one of the types of projects from the list.
3. **PHASED PLAN REVIEW:** If you are applying for a phased plan approval, check all phases of the plan reviews that are applicable to this project. The plans examiner will review your plans according to the phased schedule. If you are not applying for a phased plan review, leave all boxes blank.
4. **APPLICATION RELATED INFORMATION:** Answer each of the questions in this block and provide additional information accordingly. Complete answers to the questions will help the division process and review the project accurately.
5. **PROJECT/BUILDING LOCATION**: Please provide complete information identifying the location of the building where the construction or renovation will occur. This will help the division determine the proper jurisdiction for the project.
6. **BRIEF DESCRIPTION OF THE SCOPE OF WORK COVERED UNDER THIS APPLICATION:** Please provide a brief description of the scope of work. Please include the names of the areas or rooms affected by the construction when only a portion of building is covered under the permit application. The description provided will be shown on your certificate of use and occupancy.
7. **BUILDING OWNER INFORMATION**: Please provide complete answers to each item. If the building is owned by a corporation, please provide the name of the corporation and identify a contact person in the section called "Attention.".
8. **APPLICANT INFORMATION**: Provide complete information. All project correspondences will be directed to the project applicant.
9. **DESIGNER INFORMATION**: Section 106.2 of the Ohio Building Code requires that the design professional be identified including the design professional's Ohio registration number.
10. **BUILDING CODE INFORMATION**: Information provided applies to the construction area in a mixed use groups building, or the entire building if it is a single use group building. For change of occupancy, the term "Current use group" refers to the approved use group under the previous occupancy. For information concerning the term "Proposed use group", please refer to Chapters 3 and 6 of Ohio Building Code for the proper classification.
11. **GENERAL BUILDING INFORMATION**: The information provided applies to the entire building and is not limited to the construction area. Even when the proposed project is a partial building renovation or a building addition, the information for the entire building is required. The information provided will be shown on your certificate of use and occupancy in accordance with section 111 of the Ohio Building Code.
12. **APPLICATION FEES**: Please check one of the preferred payment methods and provide the square footage or linear footage of the areas affected by the construction. Please refer to the Fees Worksheet in this package for more details.
13. **CERTIFICATION**: The application cannot be processed if this section is not complete.
14. **OFFICE USE ONLY**: This section is reserved for our office use only. Please do not mark in this area.

Once the plans have been examined and approved, a Certificate of Plan Approval will be issued to the owner along with two sets of construction documents. One of the sets of construction documents must remain at the job site at all times during construction pursuant to OAC 4101:1-1-01. Inspections can be obtained from the (My Jurisdiction Building Department phone number) by calling the dispatch center at least one day prior to the inspection. The dispatch phone number Is (My Jurisdiction Building Department phone number). Once all inspections have been obtained a final Certificate of Occupan will be issued pursuant to OAC 4101:1-1-01.

Work Sheet for Phased Plan Approval

1. Project location and applicant information:

Building address: _____ County: _____

Designer: _____ Phone No.: _____

Address: _____ Fax No: _____

_____ E-mail: _____

2. Check the type of work:

☐ New Construction ☐ Alterations ☐ Change of Occupancy ☐ Building Additions

Use group(s): _____ Construction type: _____

3. Phase of plan approval requested: (Please indicate all applicable phases you are requesting)

☐ Building footing and foundation:

- o Site plan showing the location of the building in relation to the property lines, public streets, and/or adjacent buildings,
- o Building footing and foundation plan showing the depth, section, and all structural design data,
- o Building floor plan showing the use occupancy and construction type classification, building area, building height, number of story, means of egress, required fire rated wall locations, etc.,
- o Soil investigation report if required by section 1802 OBC.
- o Special inspections statement for footing and foundation if required by section 1704 OBC.

☐ Building slab and perimeter insulation:

- o All documents required for building footing and foundation phase,
- o Building slab and perimeter insulation details,
- o Underground utilities including electrical, water, gas, sewer, and fire protection lines and construction details,
- o Building energy conservation reports per 1301 OBC for new building constructions,

☐ Building shell:

- o All documents required for building footing, foundation, and slab and perimeter insulation,
- o Construction details for exterior wall, load bearing and non-load bearing walls, including the required fire resistance rating wall construction details,
- o Roof truss and/or floor truss shop drawings,
- o Roof construction details,
- o Electrical service and wiring for exterior walls and required means of egress lightings,

☐ Building interior partitions:

- o All documents required for building footing, foundation, and slab and perimeter insulation, and building shell,
- o Construction details for all interior partitions including the required fire resistance rating wall construction details,
- o Electrical, plumbing, and/or mechanical drawings if the finishes of interior partitions are a part of the request.

☐ Building systems:

- o All documents required for building footing, foundation, and slab and perimeter insulation, and building shell, and interior partitions,
- o Construction drawings and details for building system such as electrical, plumbing, mechanical, fire protection systems separately if desired.

☐ Other type of phased approvals: Please attach additional sheet(s) to explain.

Plan Review Process
BBS Form 2-0

Ohio Board of Building Standards

Plan Review Process

Applicant submits application for plan approval of construction documents.

Approval vs. Permit

The term "Approval" is a term used in the Ohio Revised Code section 3791.04 to describe the action taken by the building department after plans, drawings, specifications, and other data have been reviewed and determined to be in compliance with the rules of the board. This "Approval" of plans is a "license" to build in accordance with the approved plans.

In its administrative rules, the Board has further defined the "Approval" process and the different types of approvals in OBC section 105 and defines the term "Approved" in OBC Chapter 2, Definitions, as follows: "Determined to be in compliance by the authority having jurisdiction in accordance with the rules of the board". Upon approval of the construction documents, the building official is required to furnish a "Certificate of Plan Approval" to the owner in accordance with OBC section 105.5.

In contrast to an "Approval", model building codes and many local Ohio jurisdictions use the term "Building Permit". These terms are often used interchangeably, creating confusion and misunderstandings. The term "Building Permit", while not used or defined in the rules of the BBS, is generally used to identify the whole collection of approvals needed in a jurisdiction before construction is allowed to begin, the "Certificate of Plan Approval" being only one of the required approvals. Other such approvals could be zoning approval, architectural review board approval, fire department approval, etc. Once all approvals are granted, then the "Building Permit" is issued.

<u>Step 1</u>: Cursory Review/Familiarize yourself with the project

- Examine application for scope of project
  (i.e. new construction, change of use, alteration, addition, etc.)
- Determine applicability of code
  (OBC 101.2, 102.10 and 102.11)
- Determine type of review required
  (i.e. foundation, structural, architectural, mechanical, plumbing, electrical, fire protection)

<u>Step 2:</u> Verify if other agency/ department approvals/determinations are required

- Local fire department involvement in plan review (OBC 106.1.2, item #5)
- State Fire Marshal approval of fireworks buildings (OBC 106.1.2, item #3)
- BBS approval of Industrialized Units (OBC 106.1.2(1))
- Ohio Department of Health approval of swimming pools (OBC 106.1.2, item #2), private water supplies (OPC 601.1), and private sewage disposal systems (OPC 701.1)
- Ohio Environmental Protection Agency approval if no connection to public sanitary sewer (OPC 701.2 and 701.4) and for gray water re-use systems (OPC 301.3, exception 1)
- Flood plain administrator determination (OBC 1612.3)
- Ohio Department of Rehab and Corrections preliminary approval for Jails, workhouses, or municipal lockups (OBC 106.1.2, item #6)

<u>Step 3:</u> Determine adequacy of construction documents for review (OBC 107.4)

- Use OBC 106.1.1 as your <u>general guide</u> for construction document contents
- Use NFPA standard checklists for minimum information necessary to perform fire protection working plan reviews (NFPA 13-2010 section 22.1.3 and NFPA 72-2010 section A10.18.1.2)

-Only ask for information necessary to perform plan review as determined by scope of project – this differs for each project

-Ensure that adequate detail and documentation is provided so that inspectors can perform their jobs.

-Keep in mind: Construction documents (bid set) vs. Shop or Working Drawings (prepared by successful bidder)

<u>Step 4:</u> Identify who is taking responsibility for construction documents (OBC 107.4.3)

-Ohio Seal Law (Ohio Revised Code 3791.04 and OBC 106.2.1 requires construction documents to bear the seal of a registered design professional)

Important Exceptions to 106.2.1:

- **Exception #3** - Fire protection system designs submitted under the signature of an individual certified in accordance with OBC 107.4.4

  - Fire protection system documents are required to be submitted by <u>either</u> a registered design professional or a BBS certified fire protection system designer…not both.

  - The BBS certifies three different categories of fire protection system designers:

    - Automatic Sprinkler System Designers
    - Fire Alarm System Designers
    - Special Hazard System Designers

  - A list of BBS certified designers is maintained on the BBS website for verification of certification status and BBS certification number.

- **Exception #5** - Where the building official determines that the proposed work does not involve "technical design analysis"

    - The BBS staff has issued memos and newsletters offering opinions that "pre-engineered" fire protection systems do not involve technical design analysis. Therefore, a seal is not required <u>and</u> a certified fire protection system designer is not required to sign the documents.

<u>Step 5:</u> Check plans for compliance with applicable code sections and manufacturers installation instructions.

-Review all provisions of the codes and determine applicability on a project by project basis

- Use checklists to ensure impartiality and consistency in plan review

- Review as much information as submittal will allow

- If it would help, use highlighters to mark up different systems

-For construction documents sealed by a registered design professional or submitted under the signature of a BBS certified fire protection system designer, the construction documents may only be reviewed to the extent necessary to determine compliance with prescriptive sections of the code. In other words, calculations involving technical design analysis may not be critiqued except for design assumptions. If you happen to notice obvious technical errors that could affect safety, of course, you should notify the design professional as a professional courtesy only.

<u>Step 6:</u> Identify any discrepancies and areas of perceived non-compliance.

- Plan examiners should identify perceived areas of noncompliance by using correction sheets or another form of documented communication approved by the building official

- Code sections are required to be cited on correction sheets

- Remember, the plan examiner is not the designer…be careful to not take on the liability of that role.
    - **Do not provide or suggest design solutions**
    - **Do not mark up or correct construction documents**

- Prepare a complete list of discrepancies rather than multiple lists (again, review as much information as submittal will allow)
- When reviewing re-submittals, limit the review only to the items on the correction lists previously issued. **Do not** re-review the project, starting the plan review process from the beginning. (OBC 107.4.2)

<u>Step 7:</u> Communicate your findings to the building official.

<u>Step 8:</u> The building official may ask you to communicate any discrepancies between code and construction documents with the submitter. If so, follow the steps below. In some cases, the building official may choose to issue an adjudication order or may choose to communicate directly with the submitter, ending your involvement.

-Notify owner of discrepancies and applicable code sections (preferably in writing)

-Ask submitter how discrepancies will be resolved. Two options:
-Revise drawings, or
-Refer to building official for determination of noncompliance

- Keep records of communication identifying how submitter plans to resolve outstanding issues (create and keep phone conversation records or e-mail correspondence with your plan review records)

<u>Step 9:</u> Communicate the submitter's intentions to the building official.

-Building official will then decide whether to issue an order or an approval (or both) to the owner and the owner's representative

Plan Examination Check List
BBS Form 2-1
OBC 107.4 and 5

PLAN EXAMINATION CHECK LIST (OBC 107.4, 5)

Typical location of information (may be found elsewhere in construction documents)	**Code Section**	**In compliance**	**Not in Compliance (add these to correction list)**	**N/A**	**Insufficient information on documents (add these to correction list)**	**Notes**
Title Sheet						
Applicability of Code	OBC 101.2 exemptions					
Scope of Work	OBC 101.2					
New						
Existing	OBC Ch 34					
Change of Occupancy	OBC 3408					
Alteration	OBC 3404					
Addition	OBC 3403					
Occupancy Single Occupancy	OBC 302.1					
Mixed Occupancy	OBC 508					
Accessory Occupancy	OBC 508.2					
Non –separated	OBC 508.3					
Separated	OBC 508.4					
Incidental Accessory Occupancies	OBC 508.2.5					
Special Use and Occupancy	OBC Ch 4					
High Rise	OBC 403					
Atrium	OBC 404					
Combustible storage	OBC 413					
Hazardous Materials storage	OBC 307.1, 414					
I-2	OBC 407					
I-3	OBC 408					
Garage	OBC 406					
Covered Mall	OBC 402					
Height and Area	OBC Ch 5					
Unlimited Area	OBC 507					
Type of Construction	OBC Ch 6					
Sprinkler system	OBC 506.3, 507.3, or 903					
List of Special Inspections	OBC Ch 17, 1705, 106.1.1.2					
Swimming pool	OBC 3109 & 106.1.2(2)					
Method of demonstrating energy conservation reqts	OBC Ch 13					
Site Plan						
Building Separation Distance/Location on Lot	OBC Ch 7					
Exterior wall fire resistance rating	OBC 705.5, T601, 602					
Allowable Area	OBC T503					
Increase for street frontage	OBC 506.2					
Increase for sprinkler	OBC 506.3					
Finish grade	OBC 1804.3					
Site Accessibility	OBC 1104, 1106					
Signage	OBC 1110					

Typical location of information (may be found elsewhere in construction documents)	**Code Section**	**In compliance**	**Not in Compliance (add these to correction list)**	**N/A**	**Insufficient information on documents (add these to correction list)**	**Notes**
Footing and Foundation Plan						
Fire Walls	OBC 706					
Fire Barriers	OBC 707					
Depth of Footing	OBC 1809.4					
Soil Type	OBC 1803.5.1					
Assumed Design Soil Bearing Pressure	OBC 1806					
Soil Test Reports	OBC 1803.6					
Design Loads	OBC 1603					
Live Loads/Dead Loads	OBC 1607/1606					
Snow Load	OBC 1608					
Wind Load	OBC 1609					
Seismic Design Category	OBC 1613.5.6					
Foundation Construction Details	OBC Ch 18					
Materials	OBC 1809					
Strength of Concrete	OBC 1807.1.6.2					
Reinforcement	OBC 1807.1.6.2					
Sill anchorage	OBC 2308.3.3					
Perimeter Insulation	OBC Ch 13					
Underground utilities/foundation penetrations	OBC 1805.3.3, OMC 302.1, OPC 305.5					
Flood plain/Flood loads	OBC 1804.4, 1603.1.7 and 1612					
Excavation, Fill and Drainage	OBC 1804					
Structural Plan						
Wood Frame	OBC Ch 23					
Wall bracing	OBC 2308.9.3					
Wall sheathing	OBC 2308.12.5					
Anchor bolts	OBC 2308.6					
Steel Frame	OBC Ch 22					
Masonry	OBC Ch 21					
Reinforcement	OBC 2103.13					
Mortar	OBC 2103.8					
Concrete	OBC Ch 19					
Weight of HVAC equipment	OBC 1606.2					
Roof Framing Plan						
Truss drawings	OBC 2210.3.2, 2303.4					
Nail plan or detail	OBC 2304.9					

Typical location of information (may be found elsewhere in construction documents)	**Code Section**	**In compliance**	**Not in Compliance (add these to correction list)**	**N/A**	**Insufficient information on documents (add these to correction list)**	**Notes**
Architectural Floor Plan						
Means of Egress	OBC Ch 10					
Occupant load verification	OBC 1004					
Travel distance	OBC 1016					
Dead end corridors	OBC 1018.4					
Number of exits	OBC 1015 and 1021					
Size of exits	OBC 1005					
Arrangement of exits	OBC 1016					
Stairways	OBC 1009					
Risers and treads	OBC 1009.4					
Door hardware	OBC 1008					
Exit lights	OBC 1006					
Exit signs	OBC 1011					
Guards	OBC 1013					
Handrails	OBC 1012					
Elevators	OBC 1007, 1104, & Ch 30					
Machine room	OBC 3006					
Nothing in hoistway, unless dedicated to elevator	OBC 3004.4					
Minimum room dimensions	OBC 1208					
Accessibility	OBC Ch11, ADAAG, and ANSI A117.1					
Plumbing fixtures	OBC T2902.1 and OPC T403.1					
Fire Resistance	OBC Ch 7					
Penetration fire stopping details	OBC 713 & 716					
Fire resistance of structural members	OBC T601 & 704					
Shaft enclosures	OBC 707.3.1 & 708					
Fire partitions	OBC 709					
Smoke barriers/partitions	OBC 710/711					
Elevations						
Insulation	OBC Ch 13					
Exterior weather protection	OBC 1405 & 1503					
Roof coverings	OBC Ch 15					
Ice Guard	OBC 1507.2.8.2					
Interior finishes and ratings	OBC Ch 8					
Walls and ceilings	OBC 803					
Floors	OBC 804					
Plastics	OBC Ch 26					
Doors, windows, and glazing						
Fire doors and windows	OBC 715					
Tempered glazing	OBC 2406					
Emergency escape windows	OBC 1029					

Typical location of information (may be found elsewhere in construction documents)	**Code Section**	**In compliance**	**Not in Compliance (add these to correction list)**	**N/A**	**Insufficient information on documents (add these to correction list)**	**Notes**
Energy efficiency	OBC Ch 13					
Fire protection systems (also refer to shop drawing lists below)	OBC Ch 9					
Automatic sprinkler system	OBC 506.3, 507.3 or 903					
Other type of suppression	OBC 904 and T508.2.5					
Standpipe	OBC 905					
Fire alarm	OBC 907					
Supervision of systems	OBC 901.6 & 903.4					
Fire extinghishers	OBC 906					
Smoke control	OBC 909					
Smoke and heat vents	OBC 910					
Elevator fire fighters emergency operation	OBC 3003.2 and NFPA 72					
Mechanical Plans	OBC Ch 28					
Listing and labeling of mechanical equipt.	OMC 301.4					
Specific appliance requirements	OMC Ch 9					
Location of HVAC equipt.	OMC 301.13, 303					
Notching and boring	OMC 302.3					
Welding and brazing	OMC 313					
Proper sizing of HVAC equipt.	OMC 312					
Minimum efficiency of HVAC equip	OBC Ch 13					
Minimum indoor temperature	OBC 1204 and OMC 309					
Non-gas appliance venting	OMC 802					
Clearance to combustibles	OMC 304.9, 308					
Access and service space	OMC 306					
Ducts	OMC 603					
Size	OMC 603.2					
Motors and fans	OMC 503					
Clothes dryer exhaust	OMC 504					
Maximum length	OMC 504.6.4.1					
Minimum ventilation levels	OBC 1203 and OMC 403 & 406					
Natural or mechanical ventilation required	OBC 1203 and OMC 401.2					
Mechanical ventilation rates	OMC 403					
Smoke and fire dampers	OBC 716 and OMC 607					
Plenums	OMC 602					
Duct detectors	OMC 606					
Type of kitchen hood	OMC 507.2					
Hood materials	OMC 507.4 & 507.5					
Hood interlocks	OMC 507.2.1.1					
Hood capacity	OMC 507.13					

<u>Typical location of information</u> **(may be found elsewhere in construction documents)**	**Code Section**	**In compliance**	**Not in Compliance (add these to correction list)**	**N/A**	**Insufficient information on documents (add these to correction list)**	**Notes**
Hood make-up air	OMC 508					
Hood suppression	OMC 509					
Special exhaust systems	OMC Ch 5					
Refrigeration quantities	OMC 1104					
Machinery room	OMC 1105 & 1106					
Refrigerant piping	OMC 1107					
Hydronic piping	OMC Ch 12					
Materials	OMC 1202					
Piping insulation	OMC 1204 and Ch 13					
Elevator hoistway venting	OBC 3004					
Boilers	Boiler rules (OAC 4101:4) & OMC Ch 10					
Gas piping and appliances	**IFGC**					
Listing and labeling of gas appliances	IFGC 301.3					
Combustion air for gas appliances	IFGC 304					
Elevation of source for gas appliances	IFGC 305.3					
Access and service space	IFGC 306					
Clearances	IFGC 308					
Gas piping	IFGC Ch 4					
Sizing	IFGC 402					
Materials	IFGC 403					
Electrical Bonding	IFGC 310.1					
CSST	IFGC 403.5.4					
Bonding	IFGC 310.1.1, NFPA 70, and Manufacturer's instructions					
Location of gas piping	IFGC 404					
Shutoff valves	IFGC 409					
Regulators	IFGC 410					
Vents and chimneys for gas appliances	IFGC Ch 5					
Specific gas appliances	IFGC Ch 6					
Gaseous hydrogen	IFGC Ch 7					
<u>Plumbing Plans</u>	OBC Ch 29					
Connection to sanitary drainage system	OPC 301.3 & 701.2					
Connection to water supply	OPC 301.4					
3rd party tested or certified pipe, fittings, and components	OPC 303.3 & 303.4					
Physical protection of piping	OPC 305					

<u>Typical location of information</u> **(may be found elsewhere in construction documents)**	**Code Section**	**In compliance**	**Not in Compliance (add these to correction list)**	**N/A**	**Insufficient information on documents (add these to correction list)**	**Notes**
Notching and boring	OPC 307.2					
Welding and brazing	OPC 315					
Minimum number of fixtures	OPC T403.1 & T2902.1					
Water distribution piping diagram	OPC Ch 6					
Materials	OPC 605					
Sizes	OPC 604					
Stop valves	OPC 606					
Backflow	OPC 608					
Drainage, Waste, and Venting diagram	OPC Ch 7					
Materials	OPC 702					
Sizes	OPC 710					
Venting method identified	OPC Ch 9					
Air Admittance Valve (AAV)	OPC 917 & Manufacturer's Instructions					
Storm drainage	OPC Ch 11					
Cleanouts	OPC 708					
Indirects	OPC Ch 8					
Traps	OPC 1002					
Interceptors	OPC 1003					
<u>Electrical Plan</u>	OBC Ch 27					
Listing of electrical equipment	OBC 2701.2 & NEC 110.3					
Power Riser diagram						
Number of services	NEC 230.2					
Service conductor sizing	NEC 230.23 or 230.31					
Service entrance conductor sizing	NEC 230.42, 310.15					
Disconnects	NEC 230.70					
Overcurrent protection	NEC 240.4					
Conduit size	NEC Chapter 9					
Circuit panel schedule						
Branch circuit load calcs	NEC 220.5					
Overcurrent protection	NEC 240.4					
Wiring methods	NEC 300					
Arc Fault Protection	NEC 210.12					
Ground Fault Protection	NEC 230.95					
Grounding details	NEC 250					
Working space/dedicated electrical space	NEC 110.26					
Receptacles	NEC 406					
Minimum lighting levels	OBC 1205 and 1006					
Emergency egress lights	OBC 1006					
Exit signs	OBC 1011					
Motorized equipt disconnect	NEC 430.101					
Emergency Systems	OBC 2702, NEC 700					
Standby System	OBC 2702, NEC 701					

Typical location of information (may be found elsewhere in construction documents)	**Code Section**	**In compliance**	**Not in Compliance (add these to correction list)**	**N/A**	**Insufficient information on documents (add these to correction list)**	**Notes**
Sprinkler System Shop Drawing Plan	OBC 903 & NFPA 13					
Installer certified by SFM	OBC 106.1.1.1					
Identify type of system(s)	NFPA 13: Ch 7					
Maximum size of system(s)	NFPA 13: 8.2					
Occupancy hazard classification (s)	NFPA 13: Ch 5					
Design density	NFPA 13: 11.2.3.1.1					
Design area	NFPA 13: 11.2.3.1.1					
30% added for dry system	NFPA 13: 11.2.3.2.5					
Water supply	OBC 903.3.5 & NFPA 13: Ch 23					
Flow test data current	NFPA 13: Ch 23					
Fire Pump	OBC 913 & NFPA 22					
Inside/outside hose allowance	NFPA 13: 11.1.6, 11.2.3.1.2, & 22.9					
Hydraulic Design Info. Sign	NFPA 13: 24.5					
Backflow preventer listed for Fire Protection	NFPA 13: 23.1.8.2					
Backflow preventer pressure loss included in calcs	NFPA 13: 22.1.3					
Meter loss included in calcs	NFPA 13: 23.1.7					
Water supply > calculated demand	NFPA 13: 23.1.2					
Fire Department Connection (FDC)	OBC 912 & NFPA 13: 6.8					
Check valve in FDC line	NFPA 13: 8.17.2.4					
Check valve on riser	NFPA 13: 8.16.1.1.3.2					
Main drain	NFPA 13: 8.17.4.1					
Main drain to outside or acceptable drain	NFPA 13: 8.17.4.1					
Pressure gage	NFPA 13: 7.1.1.1					
Inspector's Test Connection	NFPA 13: 8.17.4.2.4					
Alarms connected to fire alarm system	NFPA 13: 6.9					
Inspectors test connection discharge to drain or outside	NFPA 13: 8.16.2.6.1					
Auxiliary drains	NFPA 13: 8.16.2.5					
Hose Thread Compatibility	OBC 903.3.6					
Local Water Flow Alarm	OBC 903.4.2 & NFPA 13: 6.9.3					
Valves Supervised	OBC 903.4					
Seismic design applicable?	NFPA 13: 9.3					
Quick response/residential sprinklers	OBC 903.3.2					

<u>Typical location of information</u> **(may be found elsewhere in construction documents)**	**Code Section**	**In compliance**	**Not in Compliance (add these to correction list)**	**N/A**	**Insufficient information on documents (add these to correction list)**	**Notes**
Sprinklers	NFPA 13: Ch 8					
All areas protected	NFPA 13: 8.1.1					
Concealed spaces	NFPA 13: 8.15.1.1					
Shafts	NFPA 13: 8.15.2					
Temperature rating	NFPA 13: 8.3.2					
Listed for application	NFPA 13: 8.3					
K factor on plans match calcs	NFPA 13: 6.2.3					
Minimum pressure	NFPA 13: 22.4.4.10					
Spacing	NFPA 13: Ch 8					
Clearances	NFPA 13: Ch 8					
Piping	NFPA 13: Ch 6					
Materials	NFPA 13: 6.3					
C value match calcs	NFPA 13: 22.4.3.2					
Hangers	NFPA 13: 9.1					
Sizes match those shown in calcs	NFPA 13: 22.4.3.2					
Storage Occupancy special provisions	NFPA 13: Ch 12-20					
Contractor's Material & Test Certificate submitted after installation	NFPA 13: Fig. 10.10.1 and Fig. 24.1					
<u>Fire Alarm System Shop Drawing Plan</u>	OBC 907 & NFPA 72					
Installer certified by SFM	OBC 106.1.1.1					
Single and multiple station smoke alarms	OBC 907.2.11 & NFPA 72: Ch 29					
Identify type of system monitoring	OBC 907.6.5					
Protected Premises (Local)	NPFA 72: Ch 23					
Remote Station	NFPA 72: 26.5					
Proprietary	NFPA 72: 26.4					
Central Station	NFPA 72: 26.3					
Manual Pull Boxes	OBC 907.4.2 & NFPA 72: 17.14					
Power Supply	OBC 907.6.2					
Wiring	OBC 907.6.1, NFPA 72					
Zones	OBC 907.6.3					
Alarm notification appliances	OBC 907.5.2, NFPA 72: Ch 18, & OBC Ch 11					
Detectors	NFPA 72: 17.5					
Record of Completion	OBC 907.7.2 & NFPA 72: Fig.14.6.2.4					

Typical location of information (may be found elsewhere in construction documents)	**Code Section**	**In compliance**	**Not in Compliance (add these to correction list)**	**N/A**	**Insufficient information on documents (add these to correction list)**	**Notes**
Wet Chemical Hood Suppression Shop Drawing Plan	OBC 904 & NFPA 17A					
Installer certified by SFM	OBC 106.1.1.1					
Manufacturer's installation manual (MIM) provided	See notes below table					
Quantity of Agent	MIM					
Piping	MIM					
Materials	MIM					
Diameter	MIM					
Length	MIM					
Nozzle	MIM					
Type	MIM					
Location	MIM					
Number	MIM					
Flow Point value	MIM					
Appliance shut off	OBC 904.3.3 & OMC 507.2.1.1					
Manual actuator	OBC 904.11.1					
Indicators and alarm system connections	OBC 904.3.4					
Ventilation system status	OMC 507.2.1.1					
Interlocks	OBC 904.3.3 & OMC 507.2.1.1					
Minimum water pressure (if hybrid system such as PIRANHA)	MIM					

If submitter does not provide Wet Chemical Suppression System Manufacturer's Installation Manual, you can obtain your own copy as follows:

- Contact Tyco for copies of R102, PIRANHA, Kitchen Knight
  - Adam Walker 1-800-526-1079 x 73409 or adamwalker@tycoint.com

- Contact Badger for copies of Range Guard
  - Keith Curtis 1-800-446-3857 or keith.curtis@badgerfire.com

Document Examination Review Record and Report
BBS Form 2-2
OBC 107.5 and 6

OFFICE OF *JURISDICTION* *123 Main Street* **_Full Name,_ Building Official**

DOCUMENT EXAMINATION REVIEW RECORD AND REPORT TO BUILDING OFFICIAL

Plan Examiner ______________________________________.   **Project Number** ____.

Date of Review ______________________________________.   **Project Description** _______________________________________.

Item #	Code Citation	Observed item of non-compliance	Action necessary to correct item	*Owner option#

(This form can be expanded or reduced based on the number of items cited.)

OFFICE OF *JURISDICTION*

Recommended Approval Type by examiner to Building Official (OBC 107.5)

☐ Nonconformance approval _____
☐ Conditional approval _____
☐ Phased approval _____
☐ Annual approval _____

Notes:
* Non compliance process selected by Owner per OBC 107.6.1.

1.1. The owner will revise the drawings and resubmit to the department.

1.2 The items of noncompliance will not be brought into compliance and will be referred to the building official as indicated in item 4 below.

4. If the owner or the owner's representative indicates that the work will not be brought into compliance with the rules of the board or requests an adjudication order, the plan examiner shall report to the building official in accordance with section 107.6.2.

107.6.2 Building official determination of noncompliance. The building official shall evaluate the plans examiner's report and any reports received from the fire official as described in section 106.1.2 and render a final determination as to whether the items of non-compliance are to be communicated to the owner in the form of an adjudication order complying with section 109. The building official shall also determine whether any approvals are possible, and issue the appropriate approval as described in section 105.

Has Fire Official Recommendations (OBC 106.1.2) been received for review and incorporation? Y/N _____

Certificate of Plan Approval
BBS Form 2-3
OBC 105.5

Certificate of Plan Approval (OBC 105.5)

Office of the Building Official (City of, County of…)

Property Address:

Certificate No.

Scope of Project: **Description of proposed work**

- ☐ Proposed New Structure _____
- ☐ Proposed Change of Occupancy _____
- ☐ Proposed Alteration _____
- ☐ Proposed Addition _____
- ☐ Other _____

Owner Name / Address: *(ORC 3791.04)*

Scope of Plan Approval: **Notes**

- ☐ Full approval _____
- ☐ Nonconformance approval _____
- ☐ Conditional approval _____
- ☐ Phased approval _____

Conditions & Variances:

	Group(s)	Description(s)
Occupancy:	_____	_____

Mixed Use:

☐ Accessory Occupancies (OBC 508.2) ☐ Separated Mixed Use (OBC 508.4)

☐ Non-Separated Mixed Use (OBC 508.3) ☐ Combination Sep./Non-Sep. Mixed

Special Provisions: **Commodity & Storage**

Method

☐ Unlimited Area ☐ Combustible Storage _____

☐ High-Rise ☐ Hazardous Material Storage _____

☐ Other _____

Type of Construction:

Fire Protection Systems: ☐ N/A ☐ Required ☐ Non-Required

☐ Sprinkler ☐ Fire Alarm ☐ Standpipe ☐ Other _____

- ☐ NFPA 13 ☐ Manual Pull
- ☐ NFPA 13D ☐ Smoke Detection
- ☐ NFPA 13R ☐ Single-/Multiple-Station Smoke Alarms
- ☐ Limited Area

Kitchen Hood System:

☐ Type I with suppression ☐ Type II

This approval is conditional upon proceeding with construction in accordance with the approved construction documents.

The building official shall be notified of any changes from the approved construction documents. Such changes shall be submitted and approved by the building department prior to their implementation; Sections 105.2, 106, 107.4.2, & 107.6.1 of the Ohio Building Code. (OBC).

The approval is invalid if construction work has not commenced within 12 months. One extension shall be granted for an additional 12-month period if requested by the owner at least 10 days in advance of the expiration of the approval and upon payment of a fee not to exceed $100.00. (OBC 105.3)

If in the course of construction, work is delayed or suspended for more than 6 months, the approval is invalid. Two extensions shall be granted for 6 months each if requested by the owner at least 10 days in advance of the expiration of the approval and upon payment of a fee for each extension of not more than $100.00. (OBC 105.4)

This Certificate is issued pursuant to the provisions of Section 105 and 107 OBC. This certificate shall be posted (OBC 107.5.2) in a conspicuous location outside of the building and in the front part of the premises on which, or will be, located the building or equipment to which the approved plans relate. This Certificate indicates conformance with the applicable provisions of the OBC and Chapters 3781. And 3791. of the Revised Code.

Approved pursuant to the following edition of the OBC:

Building Official Date

SECTION 105 APPROVALS.

105.1 Approvals required. Any owner or authorized agent who intends to construct, enlarge, alter, repair, move, or change the occupancy of a building or structure, or portion thereof, or to erect, install, enlarge, alter, repair, remove, convert or replace any electrical, gas, mechanical, plumbing system, other building service equipment, or piping system the installation of which is regulated by this code, or to cause any such work to be done, shall first make application to the building official and obtain the required approval.

This requirement is based upon section 3791.04 of the Revised Code which states that, "Before entering into a contract for or beginning the construction, erection, or manufacture of any building to which section 3781.06 of the Revised Code is applicable, including all industrialized units, the owner thereof shall, in addition to any other submission of plans or drawings, specifications, and data required by law, submit the plans or drawings, specifications, and data prepared for the construction, erection, and equipment thereof, or the alteration thereof or addition thereto, which plans or drawings, and specifications shall indicate thereon the portions that have been approved pursuant to section 3781.12 of the Revised Code, for which no further approval shall be required, to the municipal, township, or county building department having jurisdiction if such department has been certified as provided in division (E) of section 3781.10 of the Revised Code, and if there is no certified municipal, township, or county building department, to the superintendent of the division of industrial compliance, for approval.

No owner shall proceed with the construction, erection alteration, or equipment of any such building until such plans or drawings, specifications, and data have been so approved, or the industrialized unit inspected at the point of origin. No plans or specifications shall be approved or inspection approval given unless the building represented thereby would, if constructed, repaired, erected, or equipped according to the same, comply with Chapters 3781. and 3791. of the Revised Code and any rule made under such chapters."

This Revised Code section provides the legal framework upon which the assurance of public health and safety is based. It thereby provides the "window" of time during which the certified building department must perform its construction document review leading to plan approval.

105.1.1 Nonconformance approval. When construction documents are submitted which do not conform with the requirements of the rules of the board, such documents may be approved by the building official provided such nonconformance is not considered to result in a serious hazard and the owner or owner's representative subsequently submits revised construction documents showing evidence of compliance with the applicable provisions of the rules of the board. In the event such construction documents are not received within thirty days, the building official shall issue an adjudication order revoking the plan approval.

*The Building Official may approve constructions documents which do not entirely conform to the OBC **as long as** any area of non-conformance **does not constitute a serious hazard and** the owner or owner's representative submits revised construction documents or other information missing in the original plan review to bring the construction documents into compliance with the OBC. This additional information must still be provided to demonstrate compliance with applicable provision of the OBC. The discretionary authority to issue a plan approval prior to receiving all information cannot be exercised by the building official to circumvent the owner's obligation under the law to submit construction documents which must comply with the requirements of the OBC. The situation created by allowing information to be submitted later cannot create a condition considered a serious hazard and the information must still be submitted and reviewed for compliance. This information must be received within a period of time not to exceed thirty days. Finally, if not received by the certified building department within thirty days of the initial approval, the Building Official is required to revoke the approval using the provisions of section 105 to issue an adjudication order.*

*The determination of whether a structure or component presents a serious hazard is not a subjective exercise. ORC section 3781.06 first defines what "safe" and "sanitary" which are mirrored in OBC Chapter 2, which offers definitions of "safe", "sanitary", **and** "serious hazard":*

Safe: as applied to a building, means free from danger or hazard to the life, safety, health or welfare of persons occupying or frequenting it, or of the public, and from danger of settlement, movement, disintegration, or collapse, whether such danger arises from the method or materials of its construction or from equipment installed therein, for the purpose of lighting, heating, the transmission or utilization of electric current, or from its location or otherwise.

Sanitary: as applied to a building, means free from danger or hazard to the health of persons occupying or frequenting it or to that of the public, if such danger arises from the method or materials of its construction or from any equipment installed therein for the purpose of lighting, heating, ventilating, or plumbing.

Serious hazard: a hazard of considerable consequence to safety or health through the design, location, construction, or equipment of a building, or the condition thereof, which hazard has been established through experience to be of certain or probable consequence, or which can be determined to be, or which is obviously such a hazard.

*A serious hazard is "a hazard of considerable consequence to safety or health through the design, location, construction, or equipment of a building". The first phrase clearly makes a distinction between a problem that could be construed as having a consequence and one having considerable consequence. These hazards must be **established** (proved, demonstrated) **through experience** (history, data, loss statistics, evidence, etc.) to be of **certain or probable consequence** (sure, inevitable, unquestionable, certain; not a hazard that could possibly exist under hypothetical conditions), can be **determined** (to establish conclusively after investigation) to be, or which is **obviously** (plain, evident) a serious hazard.*

*In the context of this type of construction document approval, a building official **may** grant this type of approval when conditioned upon receiving complete, code-complying documentation from the owner. However, this option can only be used when the nonconformance, which prohibited the building official from granting a full approval, does **not** involve a serious hazard as defined in the law and the OBC.*

105.1.2 Conditional approval. When construction documents are submitted which cannot be approved under the other provisions of this rule, the building official, may at the request of the owner or owner's representative, issue a conditional plan approval when an objection to any portion of the construction documents results from conflicting interpretations of the code, or compliance requires only minor modifications to the building design or construction. No conditional approval shall be issued where the objection is to the application of specific technical requirements of the code or correction of the objection would cause extensive changes in the building design or construction. A conditional approval is a conditional license to proceed with construction or materials up to the point where construction or materials objected to by the agency are to be incorporated into the building. The conditions objected to shall be in writing from the building official which shall be an adjudication order denying the issuance of a license and may be appealed in accordance with section 3781.19 of the Revised Code. In the absence of fraud or a serious safety or sanitation hazard, all items previously examined shall be conclusively presumed to comply with Chapters 3781. and 3791. of the Revised Code and the rules of the board. Reexamination of the construction documents shall be limited to those items in the adjudication order. A conditional plan approval is not a phased plan approval.

*This section outlines another option for plan approval which the Building Official has discretionary authority to grant but only **if it is requested** by the owner or owner's representative. This plan approval option is used for those cases that cannot be approved under sections 105.1.1, 105.1.4, or 105.1.5. It is for those issues about which there is a legitimate disagreement over interpretation of the code. In other words, the specific disagreement over interpretation cannot deal with an issue that is specifically addressed in or is a specific technical requirement of the OBC.*

Because a full approval cannot be granted until the interpretation question is clarified, a project could be delayed. This option allows construction to begin and proceed up to the point in the project where the issue of objection or disagreement must become part of the work. The assumption is that the issue will be handled as an adjudication order, that it will be appealed to the board of building appeals having jurisdiction, and that it will be resolved before construction reaches the point at which the item or information must be incorporated into the work

Further direction is also included in the subparagraph to make it specifically clear that once the objection has been resolved, only the information resubmitted in response to the resolution of the building department's objection and adjudication order can be reexamined by the building official's plan examiner. This prevents reexamination of the entire set of construction documents given that the construction documents had received conditional plan approval and only a portion was the cause of the objection. When the objection is resolved through the appeal process, the solution may require plan review of the proposed solution. Such plan review is restricted to the resubmitted documents, if any, and not any previously reviewed portion of the project because they are conclusively presumed to comply with the OBC.

105.1.3 Previous approvals. This code shall not require changes in the construction documents, construction or designated occupancy of a structure for which a lawful approval has previously been issued or otherwise lawfully authorized, and the construction of which has been pursued in good faith within one year of the approval of construction documents. One extension shall be granted for an additional year if requested by the owner at least ten days in advance of the expiration of the approval and upon payment of any fee not to exceed one hundred dollars. If, after the start of construction, work is delayed or suspended for more than six months, the approval is invalid. Two extensions shall be granted for six months if requested by the owner at least ten days in advance of the expiration of the approval and upon payment of any fee for each extension not to exceed one hundred dollars.

This section of makes clear that once a plan approval is no longer valid (a long delay or pause in construction without proper extension requests) the owner must resubmit construction documents to the department for review and approval. If the OBC is updated or modified during the delay, that previous plan approval becomes invalid. The plan review must be performed using the OBC in effect at the time of the resubmission. The owner cannot claim that the project should be reviewed under a previous version of the OBC that was in effect at the time of the original plan approval. There may or may not be modification required to the construction documents as a result of the resubmission and plan review.

105.1.4 Phased approval. The building official shall issue an approval for the construction of foundations or any other part of a building, structure, or building service equipment before the construction documents for the whole building, structure or building service equipment have been submitted, provided that adequate information and detailed statements have been filed complying with applicable requirements of this code. The holder of such approval for the foundation or other parts of a building or structure shall proceed at the holder's own risk with the building operation and without assurance that an approval for the entire structure will be granted. Such approvals shall be issued for various stages in the sequence of construction provided that all information and data required by the code for that portion of the building or structure has been submitted. The holder of a phased plan approval may proceed only to the point for which approval has been given.

A fourth plan approval option is described in this paragraph as a phased or partial approval. The language makes it clear that this type of plan approval is compulsory and not discretionary. A partial plan approval is given for a discrete part, component, or phase of a project. If the building official agrees that a project can be approved in phases, each portion or phase may receive a separate approval. That approved portion or component can then be constructed (assuming all other jurisdictional approvals have been granted) up to the point at which the unapproved construction is to be incorporated into the work. Once approval is received for another portion or component of the work, it can be incorporated into the project. Receiving approval on any one portion or phase does not guarantee further approvals of future submittals or that work can proceed beyond the scope of the phase or portion approved.

105.1.5 Annual approval. In lieu of an individual approval for each alteration to an existing electrical, gas, mechanical, plumbing, or piping installation, the building official may issue an annual approval upon application to any person, firm or corporation regularly employing individuals holding the related board certification in the building, structure or on the premises owned or operated by the applicant for the approval.

105.1.5.1 Annual approval records. The person to whom an annual approval is issued shall keep a detailed record of alterations made under such annual approval. The building official shall have access to such records at all times or such records shall be filed with the building official as designated. These records shall include the applicable construction documents in accordance with section 106.1.

Formerly a provision in section 4101:1-1-27-03 for electrical inspections, the annual approval process was expanded to include electrical, gas, mechanical, or plumbing systems. The intent was to provide flexibility for large manufacturing facilities, auto production plants, large apartment complexes, or other places where regular equipment changes are necessary yet provide a mechanism to assure that the work is code compliant, maintain accountability, and allow for independent verification.

<u>105.2 Validity of approval</u>. The construction, erection, and alteration of a building, and any addition thereto, and the equipment and maintenance thereof, shall conform to required plans which have been approved by the building official, except for minor deviations which do not involve a violation of the rules of the board. In the absence of fraud or a serious safety or sanitation hazard, any structure built in accordance with approved plans shall be conclusively presumed to comply with Chapters 3781. and 3791. of the Revised Code and the rules of the board.

Conformity to the approved construction documents, the "plans", is a fundamental requirement of the enforcement process and applies to new construction, additions to existing structures, building equipment, and building maintenance. Maintenance must be done to keep a building as it was originally approved. Any building so constructed, added to, equipped, and maintained (according to the approved "plans") is conclusively (settled, final, decisively) presumed (constituting reasonable evidence, accepted) to comply with the revised code and the OBC. This language mirrors that found in 3791.04(D) of the ORC.

Exception: Industrialized units shall be constructed to conform to the plans approved by the board.

Because the intent of the industrialized unit (IU) regulations is to permit them to be used anywhere in Ohio, a system was developed to assure that IUs were built conform to the OBC. This process is described in section 113 of the OBC and 3781.10, 3781.102, 3781.11 ORC. Because the construction documents are approved prior to shipping into Ohio and are, by definition, of closed construction, all IUs must have construction documents submitted to the Board for review and approval. This is true for all IUs, even one-, two-, and three-family units. Unlike site built one-, two-, and three-family dwellings, IUs are not exempt from this plan review and inspection process.

<u>105.3 Expiration</u>. The approval of plans or drawings and specifications or data in accordance with this rule is invalid if construction, erection, alteration, or other work upon the building has not commenced within twelve months of the approval of the plans or drawings and specifications.

Receiving plan approvals from a certified building department is not the end of the process; more realistically it is simply the end of the beginning of the process. Besides the required inspections and issuance of a certificate of occupancy, there is a building department responsibility between plan approval and start of construction. If a plan approval (full, conditional, partial, etc.) is granted, there are several "clocks" that start ticking, one for start of construction and one for delays in construction. Both time periods have an impact on the plan approval.

One extension shall be granted for an additional twelve-month period if requested by the owner at least ten days in advance of the expiration of the approval and upon payment of a fee not to exceed one hundred dollars.

If construction does not begin within one year after the approval, the owner has, in effect, invalidated the plan approval. It is a violation of the OBC and the ORC (3791.04) to begin construction without a valid plan approval. An owner may request that the plan approval be considered valid for an additional year if the request is made at least ten days before the original year of approval has elapsed. The responsibility for tracking this one-year time period, the expiration deadline, the deadline for extension lies clearly with the building department. The development and implementation of administrative systems to monitor these deadlines are the responsibility of the building official. Because continued requests for extension could bring the unbuilt project close to overlapping the regular cycle of code updates, the code does not permit the granting of more than one extension.

<u>105.4 Extension</u>. If in the course of construction, work is delayed or suspended for more than six months, the approval of plans or drawings and specifications or data is invalid. Two extensions shall be granted for six months each if requested by the owner at least ten days in advance of the expiration of the approval and upon payment of a fee for each extension of not more than one hundred dollars.

The second important time period for a construction project is the measurement of the length of any delay in or suspension of construction once work on a project has begun. If a delay occurs during the construction of a project or if construction is suspended for more than six months, the owner has invalidated the plan approval. It is the building department, as the administrative enforcement agency, that has the responsibility to track the delays or suspensions and enforce these code provisions. Similar to delays in the start of construction, an owner may request that the plan approval be considered valid for an additional six months if the request is made at least ten days before the original approval has elapsed due to suspensions of construction activity. Two such extensions are available to an owner.

<u>105.5 Certificate of plan approval.</u> After plans have been approved in accordance with section 107, the building official shall furnish the owner/applicant a certificate of plan approval.

*The approval of construction documents by the building official, outlined in Section 107, is accomplished as specified here. Once any correction items have been addressed, corrected, or appealed, the building official **shall** furnish the owner of the work for which documents were approved a certificate of plan approval. This instrument indicates, within the scope of the OBC, that the owner has a right to perform the work that has been approved.*

<u>105.5.1 Content</u>. The form of the certificate shall be as prescribed by the building official and shall show the serial number of the certificate, the address at which the building or equipment under consideration is or is to be located, the name and address of the owner, the signature of the building official who issued the certificate, and such other information as is necessary to facilitate and ensure the proper enforcement of the rules of the board.

The building official is responsible for prescribing this certificate's form but it must contain the following information:

- *An identification, application, or tracking number – it is the building official's responsibility to set up and maintain a project tracking system within the building department to monitor projects*
- *Address of the project site at which the work will be done – facilitate inspection scheduling, issuance of orders, project history and outstanding order research, etc.*
- *Identification of the owner and owner's address – Ohio law (3791.04 ORC) is addressed to the owner and not a tenant, renter, contractor, architect, engineer, or other party.*
- *Certificate issuer identification – another tracking item is the identification of the building official or designee issuing the certificate of plan approval.*
- *Other information as deemed necessary by the building official.*

The intent is to remove as much complexity from the enforcement process as possible yet assure that adequate information is provided to the enforcement agency for proper enforcement of the OBC.

<u>105.5.2</u> <u>Duplicate issued upon request</u>. Upon application by the owner, the building official shall issue a duplicate certificate of plan approval to replace a lost or destroyed original.

Project Permit Sign off Sheet
BBS Form 2-4
(Includes Plan Approval OBC 105.5)

This form may be used and modified by the political subdivision for the purposes of tracking all required permits, approvals, signoffs and permissions granted by the various local regulatory agencies for the development of the building site with a structure that is approved (In conformance with the building code) by the building department.

This form does not eliminate, replace or supersede the required certificate of plan approval that certifies that the building design has been reviewed to be in compliance with the State of Ohio Building codes.

Project Permit Sign off Sheet

(OBC 107.2)

City of… County of …, Ohio

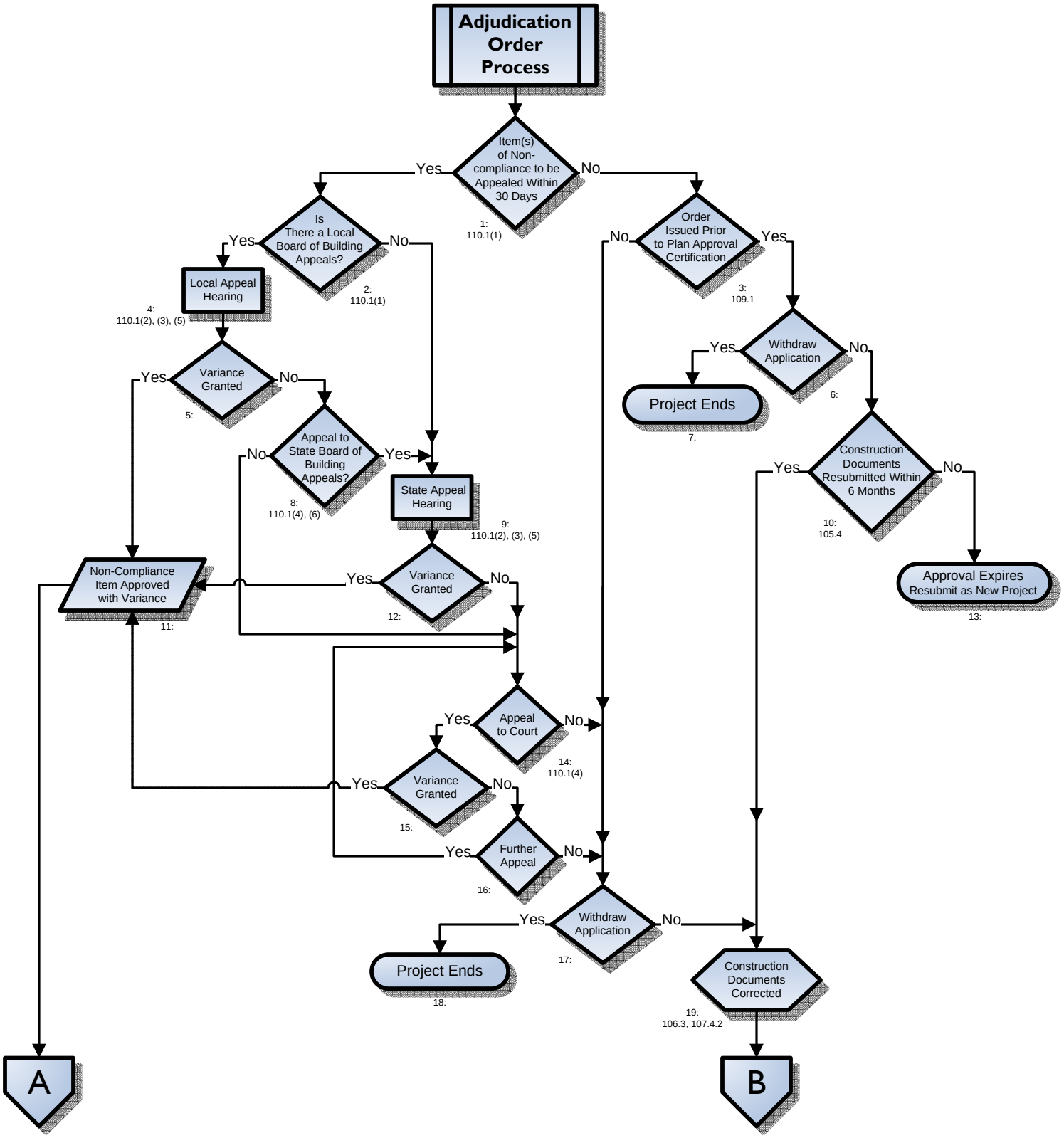
Work shall not proceed until each stage of construction has been verified after inspection and is constructed according to the approved plans.

Note: The Certificate of Plan Approval issued by the building department shall be posted by the owner at the job site per OBC 107.

Date Issued:	**Permit/ Project No.**
Address of Project:	**Owner Name / Address:** *(ORC 3791.04)*
Plan Approval Certification:	**Planning and Zoning Approval:**
Building Official Signature and Date	Planning and Zoning Officer and Date
Engineering Approval:	**Water Department Approval:**
City Engineer Signature and Date	Water Superintendent Signature and Date
Health Department Approval: *(Plumbing if applicable)*	**Architectural Review Board Approval:**
Health Commissioner Signature and Date	Architectural Review Board Chairman Signature and Date
Flood Plain Approval:	**Fire Department Review: (Approval if required)**
Flood Plain Administrator Signature and Date	Fire Official Signature and Date

Adjudication Order Process Flow Chart
BBS Form 3-1

Adjudication Order Process Flow Chart



NOTE: Refer to Building Department Processes Flow Chart – Form 1-1

Adjudication Order
BBS Form 3-2
OBC 109.1

Office of the Building Official / Name of the Department
123 Main Street
Somewhere, Ohio 43000-0000

Adjudication Order

Ohio Building Code, Section 109

Date: July 1, 2012

Project: Plan Review/Adjudication Order No. 12-07
Fire Alarm/Automatic Detection System at 8888B
Fireman Avenue 43000-0000

Owner/Owner's Authorized Agent:
(Applicant)
M.Y. Property / Built to Code, Inc.
123 Building Avenue
Somewhereville, Oh 43000-7777

In response to your Application for Plan Approval dated 06/27/11, we have reviewed the plans to determine compliance with the Ohio Building Code. Based on our review, we must deny your request to approve the plans as submitted. We have found the following items do not conform to the requirements of the rules adopted by the Ohio Board of Building Standards pursuant to Chapters 3781 and 3791 of the Ohio Revised Code. (***Note: Each of your items should contain the types of information represented in these examples***):

Item #	OBC Section	Issue of Non-Compliance	Action required
1	106.1.1	A basement plan indicating the location and type of detectors and alarm devices is not provided.	Submit dimensioned plans with sufficient detail for compliance to be determined.
2	903.4 OBC	Supervision is not indicated for the automatic sprinkler system as required.	Provide details/specifications/method used to supervise the system.

Please revise and resubmit **3** sets of corrected plans to our office. (It will help us to expedite the review of your resubmittal if you identify the changes you have made by 'clouding' the revision or otherwise indicating how you have resolved the items of non-compliance.) The owner shall bring the items listed into compliance within **30** calendar days. ***(Bldg official can set a reasonable amount of time for the owner to bring into compliance.)***

You have a right to appeal this decision. If you choose to appeal, this letter is to be used as an adjudication order pursuant to OBC Section 109. Please notify our office of your appeals board request. You have the right to be represented by counsel, present arguments or contentions orally or in writing, and present evidence and examine witnesses appearing for or against you.

In order to appeal, you must file a request within 30 days of the mailing of this notice to:

The Ohio Board of Building Appeals ***(or the appropriate certified local Appeals Board and address)***
P.O. Box 4009
6606 Tussing Road
Reynoldsburg, Ohio 43068-9009
Phone (614) 644-2616

If an appeal is waived, failure by the owner to respond to the order to comply per OBC 109.2 could result in prosecution and subject to a maximum of $500.00 as provided for in section 3791.04 of the Ohio Revised Code.

Reviewed by:_____ Building Official:_____
I.C. Plans, PE, Cert.#____ Bill D. Official, BO, Cert. #____

(All items listed in italicized red font is to be deleted.) All red fonts are to be changed based on project and jurisdiction specific information.

ADJUDICATION ORDERS

KEY ELEMENTS

Correction letters or failure to approve:

- Failure to approve or disapprove such plans within 30 days of application date is an automatic adjudication order denying the issuance of a license requiring the opportunity for an adjudication hearing per OBC 107.2.1.

Adjudication orders (109 OBC):

- Orders/actions of the building official (plan rejection/refusal to approve, violations related to non-conformance with approved plans, stop work, serious hazards, etc.) must be placed into an adjudication order and contain the following:

    - The name and address of the owner and project address.

    - Specific and clear indication of the law and/or rules (code sections) violated as well as all violations related to accessibility.

    - Specific indication of what action, changes, and procedures would be necessary to resolve the issue or otherwise comply.

    - A description of the procedure for appeal and their right to an appeal hearing if requested within 30 days of the order. Include references to their right to representation, written and oral arguments, evidence for and against, witnesses for and against, whom to contact and where, etc.

    - An adjudication order number

    - The signature of the building official

SECTION 109 ORDERS, VIOLATIONS, AND UNSAFE BUILDINGS.

Perhaps one of the more important responsibilities of the building official as well as one of the areas not clearly understood is the issuance of orders for violations. There is a definite process required to remain within the boundaries of the law; to provide due process rights to owners and to assure the public that the built environment is safe and sanitary. The adjudication process is simply one of preserving citizens' rights to obtain a fair "judgment" of a disputed issue.

109.1 Adjudication orders~~,~~ required. When the building official denies any approval or takes action in response to findings of non-compliance, such action shall be initiated by issuing an adjudication order, prior to seeking any remedy, civil or criminal. Every adjudication order shall:

Before any action is taken, therefore, a legal document must be issued to the owner that clearly cites to the administrative code (building, mechanical, or plumbing code section) and explains what it is that is that is in violation.

ADJUDICATION ORDERS:

KEY ELEMENTS

Get Correction Letters issued in a timely manner or that becomes a failure to approve:

- *Failure to approve within 30 days of application date is an automatic adjudication order.*

Adjudication orders:

- *Orders of the building official (plan rejection, violations, refusal to approve, stopping work, etc.) must be placed into an adjudication order and contain the following:*
- *The name and address of the owner and project address*
- *A clear indication of the law and/or code sections involved*
- *An indication of what action, changes, procedures would be necessary to resolve the issue or otherwise comply.*
- *A description of the procedure for appeal and their right to an appeal hearing if requested within 30 days of the order. Include references to their right to representation, written and oral arguments, evidence for and against, witnesses for and against, whom to contact and where, etc.*
- *An adjudication order number*
- *The signature of the building official*

1. **Clearly identify the section of law or rules violated;**

These citations must be to the codes or to the Ohio Revised Code (the nature) and must clearly explain what it is about the work (the cause) that is in violation. All citizens have a right to know what the charge is before availing themselves of any process to seek relief. These legal principles are consistent with both the Ohio and the U.S. Constitution (Ohio – "In any trial, in any court, the party accused shall be allowed to … demand the nature and cause of the accusation against him, and to have a copy thereof…"; U.S. – "Amendment VI: In all criminal prosecutions, the accused shall enjoy the right … to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him…").

1.1 Clearly identify, in a contrasting and obviously marked manner, all violations related to accessibility.

2. Specifically indicate which detail, installation, site preparation, material, appliance, device, addition, alteration to structures, construction documents, assemblages or procedures are necessary to change to comply with the order;

2.1 When issued to stop work, the order shall also clearly indicate the specific work that is required to cease, when the work must cease and the conditions under which the cited work will be permitted to resume. The order to stop work shall be given to the owner of the property involved, to the owner's agent and the person doing the work.

The text above specifies that it is the building official's responsibility to issue orders, including those to stop work. The implication of this section is that the way the building official determines that dangerous or unsafe work is present is through communication with the building official's field staff (refer to section 108.6). The order to stop work must be specific in stating what work must be stopped; a general stopping of all work on a site is almost never an option for the building official. Orders to stop work cannot be seen as a vehicle to "shut a project down" unless, in the extremely rare condition, every individual is at risk and all work being done on a project can be shown to be done in a dangerous or unsafe manner.

3. Include notice of the procedure for appeal and right to a hearing if requested within thirty days of the mailing of the order. The order shall also indicate that, at the hearing, the owner may be represented by counsel, present arguments or contentions orally or in writing, and present evidence and examine witnesses appearing for or against the owner;

3.1 Any hearing(s) scheduled for accessibility issues shall cause the building official or the appeals board to notify a local advocate organization for people with disabilities of the scheduled hearing. When a local advocate organization is not available, a state organization representing people with disabilities, such as the Governor's Council on People with Disabilities shall be notified;

4. Specify a reasonable period of time in which to bring the item(s) on the order into compliance;

5. Include the signature of the building official;

6. The order shall be sent by certified mail, return receipt requested, to the owner and any individual designated as a representative or agent by the owner in such matters.

<u>109.2 Response to orders</u>. The person receiving an order shall exercise their right to appeal within 30 days of the mailing of the order, comply with the order, or otherwise be released from the order by the building official.

<u>109.3 Prosecution and penalties</u>. When an owner fails to comply with section 109.2, the owner may be prosecuted and is subject to a fine of not more than five hundred dollars as provided for in section 3791.04 of the Revised Code.

109.3.1 Unlawful continuance. Failure to cease work after receipt of an order to stop work is hereby declared a public nuisance.

<u>109.4 Unsafe buildings</u>. Structures or existing equipment that are unsafe or unsanitary due to inadequate means of egress facilities, inadequate light and ventilation, or which constitute a fire hazard, or are otherwise dangerous to human life, shall be deemed a serious hazard. Where a building is found to be a serious hazard, such hazard shall be eliminated or the building shall be vacated, and where such building, when vacated, remains a serious hazard, it shall be razed.

<u>109.4.1 Orders, injunction proceedings</u>. Where the building official finds that a building is a serious hazard and the owner of such building fails, in the time specified in an order from the building official, to eliminate such hazard, or to vacate or raze the building, the building official shall proceed under section 3781.15 of the Revised Code.

Section 3781.15, R. C. provides a legal means for a building department to stop the use of a building that is found to be a public nuisance. The building department, through its prosecutor's office, would file an injunction action in the court of common pleas having jurisdiction where the building is located. The building department would have the burden of proof to show that the building is unsafe and dangerous. If the burden of proof is met at the hearing, the court should grant an injunction restraining the owner from using the building for any purpose until repairs are made to restore the building to a safe condition. If the owner fails to correct the condition, the prosecutor's office may follow up by asking the court to issue a demolition order after the appropriate hearing. Following the hearing, the court may order the building demolished at the owner expense.
Local hazard abatement or nuisance abatement ordinances may provide the best approach to resolving problems because they may not have built into them the same timeframes that a building department order does (issue order, 30 day appeal period, if no appeal requesting a court order). Local order may even have mechanisms for ordering the repair in a timely manner, back charging for a repairs, or demolition.

<u>109.4.2 Restoration</u>. Where the structure or equipment is determined to be unsafe by the building official, it is permitted to be restored to a safe condition. To the extent that repairs, alterations or additions are intended to be made or a change of occupancy occurs during the restoration of the structure, such repairs, alterations, additions or change of occupancy shall comply with Chapter 34 and this chapter.

Notification Letter to Board of Appeals BBS Form 3-3 OBC 110.1.1

1.1 For purposes of conducting adjudication hearings, the local board may require attendance of witnesses, production of records and papers, and may take depositions of witnesses in accordance with section 119.09 of the Revised Code.

1.4 The board shall keep a full and complete record of all proceedings which shall be open to public inspection.

The intent of this form is to provide the building official a tool to provide advance information to Municipal and County Appeals Board members. It summarizes the required plan examiner record or inspector report, and a building official determination when an owner requests an adjudication order to appeal any item(s) of non-compliance found during plan review or inspections. It is part of the full and complete record found in OBC Section 110.1.1, 1.4.

Revised: 04/28/2016

Jurisdiction Name
Office of the Building Official, Name
Address line 1
Address Line 2

To: *Name*, Chairman
Name Board of Building Appeals

From: Building Official Name
Building Department name

Re: *Name* Board of Appeal Hearings (location)
Hearing date:

Date: April 28, 2016

Dear Chairman,

The following is a summary of the issues regarding each case, as well as the Non-Residential Building Department's viewpoint for each respective case for your preliminary review:

BBA Case *No: 15-0000*	Appellant: *Owner/ Owner authorized agent*	CPA No: *Plan Approval number*	City/County: *Location of Project*
Items being appealed: *[Code Section(s): Provide the Ohio Building Code non-compliance item(s) related to the design or non-compliance observations related to the inspection of approved construction documents.]* *Owner request type:* *(Circle one)* *3781.19 ORC* *1. reverse or modify the order,* *2. Or to a fair interpretation or application of such laws or any rule,* *3. Or that a variance from the provisions of such laws or any rule.* *4. Or De Novo Hearing appeal from municipal/county to State OBBA.*			
Building Department's Viewpoint: *[Building Official Determination based on Plan Examiner non-compliance comments or Inspector record of non-compliance to approved construction documents.]*			

Required Inspections Check List And Guide for Inspector Use

BBS Form 4-1

OBC 108.2

A list of inspection(s) shall be provided at the time the plan approval is issued per **OBC 108.2**. The list indicates which inspections are required for the project and the items an inspector should be verifying at a minimum to ensure work constructed is in compliance with the Approved construction documents. Inspections are performed in part or in whole.

The following are those inspections listed in Chapter 1 that ***must*** occur and be included on the list for the project. This Check list may be abbreviated when given with the Certificate of Plan Approval and the Approved construction documents.

An On-Site Inspection Record (OBC 108.5) is also required and shall accompany the Certificate of Plan Approval, Approved Construction and Inspection Checklist. Refer to BBS Form 4.2 for this document record.

Required Inspections Check List and Guide for Inspector Use

Required inspection for this Plan Approval	Inspection description	Inspector's notes	OK to proceed
Y / N	**Lot Line Marking**		√
	1. Verification of building location & utilities 2. Distance to lot lines 3. Distance to other on-site buildings 4. Distance to public way 5. Distance to easements, etc. 6. Other _____		
Y / N	**Excavation for footings and underground utilities**		
	1. To include soil bearing capacity verification 2. Forming: dimensions, depth, height, steps 3. Reinforcing ties & steel, dimensions to forms 4. Concrete quality check if on-site 5. Other _____		
Y / N	**Foundation**		
	1. Forming: dimensions, depth, height, steps, cantilevers 2. Relationship to footings, piers, caissons, etc. 3. Reinforcing ties & steel, dimensions to forms 4. Concrete quality check if on-site 5. Other _____		
Y / N	**Concrete slab & under-floor inspection**		
	1. To be performed after all equipment, pipes, insulation, etc. is installed but before concrete poured or sheathing installed 2. Other _____		
Y / N	**Lowest floor elevation verification**		
	1. Approved construction documents must indicate whether or not the building is to be located in flood hazard area….if it is, the documents will have the specified elevation of the lowest floor that must be verified 2. Other _____ (Chapter 1 commentary)		

Req. inspection for this approval	Inspection description	Inspector's notes	OK to proceed
Y / N	**Frame Inspection**		
To be called for & performed after: 1. Rough mechanical 2. Rough electrical 3. Rough water supply 4. Rough sanitary 5. Chimneys & vents installed 6. Structural framing is complete through roof sheathing 7. Fire blocking/stopping is in place Other _____			
	Verify: 1. Construction 2. Materials 3. Assemblies 4. Methods 5. Fastening 6. Forming: dimensions, depth, height, steps, cantilevers 7. Relationship to footings, piers, caissons, etc. 8. Reinforcing ties & steel, dimensions to forms 9. Concrete quality check if on-site (see exception & handout materials		
Y / N	**Frame Inspection**		
	1. Dimensions of structural & non-structural members 2. Grade & species, gage and type of metal, concrete assemblies & other special inspection related construction 3. Bearing/fastening of materials, connections, welds, etc. 4. Location of bearing and non-bearing walls 5. Square footage and height of spaces and ridge/building height 6. Some penetration protection 7. Other _____		

Req. inspection for this approval	Inspection description	Inspector's notes	OK to proceed
Y / N	**Lath, Gypsum Board Inspection**		
	to be requested after lath and/or gypsum board are installed before plastering, joint filling and finishing occurs. Ideally, the inspection would occur before all board is hung so the inspector can verify assemblies have proper elements within…in the alternative, random disassembly can be requested:		
	1. Verify materials 2. Design# and actual section of assembly, lateral force & STC rating 3. Size: thickness, 4. Type: interior, exterior, cement, gypsum, water resistant, fire resistant, etc. Fire-Shield, Sound Break, Shaft liner, X 5. Type of fasteners, size, spacing and depth, etc. 6. Orientation of Board: vertical, horizontal, overlap of joints (spacing) 7. Internal additional parts: resilient metal furring channel, U, Z & N spacing metal, stud type and spacing, cavity fill material(s)		
Y / N	**Fire-resistive assemblies and penetration inspection**		
To be requested before concealment.			
	1. Verify materials 2. Design # and actual section of assembly 3. Size: thickness, 4. Type: interior, exterior, cement, gypsum, water resistant, fire resistant, etc. Fire-Shield, Sound Break, Shaft liner, X 5. Type of fasteners, size, spacing and depth, etc. 6. Orientation of materials or board: vertical, horizontal, overlap of joints spacing) 7. Internal additional parts, particularly important for rated assemblies: resilient metal furring channel, U, Z & N spacing metal, stud type and spacing, cavity fill material(s) 8. Check for back to back penetrations: outlets; boxes; cabinets, etc. 9. Rated openings: Door, windows, shutters, etc.: design #s; label matches design#; parts are compatible with listing and rating of assembly; closers; reveals; opening/closing force; latching; etc. 10. Other _____		

Req. inspection for this approval	Inspection description	Inspector's notes	OK to proceed
Y / N	**Energy Efficiency/envelope Insp.**		
To be requested before concealment.			
	a. Verify materials i. Type ii. Size: thickness iii. U & R values iv. Infiltration protection method: putties; weather-striping; door & window specifications and manufacturer's instructions; ductwork wrap and sealing; infiltration wraps b. Equipment efficiency: furnace/AC unit; water heater; humidifier; dehumidifier; etc. manufacturer's plate to match spec & installation in accordance with manufacturer's installation instruction (check against listing)		
Y / N	**Building Services Equipment Systems inspections:**		
	1. Electrical 2. Plumbing 3. Sanitary 4. Water Supplies 5. Subsurface & surface water disposal 6. Specialty 7. Mechanical 8. Heating 9. Ventilation 10. Exhaust 11. Cooling 12. Fire Protection Systems • Rough …… • Progressive ….. 13. Final/operative inspections to verify that • Equipment • Materials (pipe, conduit, duct, etc.) • Methods of installation • Fixtures are installed in accordance with the approved construction documents, listings, manufacturer's installation instructions and that all tests required have been conducted		

Req. inspection for this approval	Inspection description	Inspector's notes	OK to proceed
Y / N	**Other inspections required by Bldg. Official based on project scope**		
	1. **Accessibility** - exterior & interior 2. **Special Inspections** - reports & records of findings and sequence of corrections, etc. 3. **Industrialized units** – transportation damage, unit matching approval, site completion work, tests, etc. 4. **Roof assemblies** – design details, installation of underlayment/sub-base & exposed surface, fastening, wind exposed edge detail….installed in accordance with manufacturer's installation instructions and approved construction docs 5. **Weather** - exposed other surfaces 6. **Egress systems** – width and height clearances, door swings, posting of occupant loads, and adequacy of elements in means of egress system, assembly seating, lighting of the path of travel, exit signs, etc. 7. **Special conditions for occupancies listed in Chapter 4** – High rise and underground buildings, special amusement, HPM, institutional, atriums, covered malls, parking-storage-hazardous material containment buildings		

Revised July 10, 2012

On Site Inspection Record
BBS Form 4-2
OBC 108.5

The following form is required to be given to the Owner or owner's authorized agent when the Certificate of Plan Approval is issued. The Record is to be kept on site with the posted certificate, approved documents and inspection checklist. The building official may include the inspection 'call in procedures' on this form and /or the checklist for information purposes. This form is not intended to replace the log required for the inspector to keep for the documenting of the permanent office record.

Please note: Items of Non-compliance noted on the record requires the Owner and/or Authorized agent to make decisions on how to comply. There are no' Pass/Fail', 'approve/disapprove', 'how to do it' communications or citing/interpreting of the code allowed by the inspector.

It is the responsibility of the owner to comply and the responsibility of any inspector to verify that the installation matches the approved documents. If non-compliance occurs, the inspector shall communicate those findings to the building official regardless of the owner decision, so as to inform the building official of the status of the project.

ON-SITE INSPECTION RECORD (OBC 108.5)

***My Jurisdiction Name* - Office of the *Name of* Building Department, *Name of* Building Official**

100 Main St. Anytown, OH 40000 (614)555-5555 (Inspection Line)

Inspection Hours: M- F 8:00am-12 Noon and 1:00pm-5:00pm.

Certificate of Plan Approval #: _____ Date issued: _____

Project Address: _____

Owner: _____

Contractor: _____

Summary of Work: _____

Type of Inspection	**Date and Time of Inspection**	**Inspector Name**	**Satisfactorily Complies with Approved documents Yes/No?**	**Observed items of non-compliance**	**Inspection Observation – Comments (If inspector notes non-compliance, indicate how the owner will decide to comply;)** **1. To comply with approved plans.** **2. Drawings will be revised / resubmitted.** **3. To NOT comply- adjudication order request for building official determination. (Inspector Report required.)**
Footing / Foundation	*10/28/12 4PM*	*Gerald Kodiak*	*NO*	*Incorrect placement /location of anchor bolts at the South foundation wall.*	*1. Contractor indicates he will have the reinforcing placement corrected in the South corner by the end of the day.*

ON-SITE INSPECTION RECORD

Owner Compliance Options Matrix
BBS Form 4-3
OBC 108.6, 108.7

Owner Compliance Options Matrix

Inspections: Process for Non Compliant work with approved construction documents (Observation of violations, unsafe conditions and serious hazards.)

When any inspector determines that the construction, installation, testing, equipment, materials or methods used, are contrary to what has been shown on the approved construction documents or specifications, the following process of options shall proceed per OBC 108.6.1 and 108.7 by the Building Official:

Option A (OBC 108.6.1.1.1.1)	Option B (OBC 108.6.1.1.1.2)	Option C (OBC 108.6.1.1.1.3,108.6.1.4, 108.7)
Item of non compliance *is to be corrected* on the site:	**On-site representative indicates that *approved construction docs/specs will be revised* per OBC 107.4.2 to match work:**	**Item of non compliance *will not be brought into compliance/ corrected:***
Step 1. A notation shall be made in the on-site inspection record and inspector's log. (OBC 108.6.1.2) *(Notations for both shall indicate inspectors name, date, inspection type, items of noncompliance, option chosen and compliance/follow-up inspection dates.)*	**Step 1.** The inspector shall ask when the building department should expect the revisions and a notation on the on-site inspection record and inspectors log will be made by the inspector. The Building Official shall be contacted with the change indication and when the building department will receive the revisions.	**Step 1.** A notation shall be made in the on-site inspection record (108.6.1.2) and inspectors log, and, inspectors will contact the Building official and explain the nature of the change.
Step 2. Indicate whether a follow-up inspection to verify the correction is necessary and communicate this to the owner's on-site representative.	**Step 2.** When revisions to the plan approval are required, it is necessary for the owner and/or the owner's representative/designer to submit revisions in writing (written description, revised construction documents and/or specifications defining these changes).	**Step 2.** The Building Official shall determine if an adjudication order (either a notice of violation or stop work type) is to be written.
Step 3. Indicate to the on-site representative when the department must be contacted when the correction has been made so a follow-up inspection may be scheduled to verify satisfactory inspection of the correction.	**Step 3.** The Plan Examiner will review the changes to determine compliance.	**Step 3.** If an order is to be written, the building official shall contact the inspector who will write and give a report on the specifics of the issue. The building official shall issue an order per OBC 109 to the owner.
	Step 4. Once approved, the revisions will be sent to the site, and copies will be attached to the on-site and in-house set of plans. Inspections will then be done to determine compliance with the modified construction documents and/or specifications.	**Step 4.** If the Building official determines an order is unnecessary, the inspector shall be informed of the Building official's determination. The inspector shall note the reason in the inspection record.

Inspectors shall communicate the nature of the difference to the owner on site representative and ask if the issue will be corrected or if the construction documents and/or specifications will be changed/resubmitted, or not brought into compliance, and indicate this in the On site inspection record and the inspectors log, and/or communicated to the Building Official. The owner or representative shall indicate the option per OBC 108.6.1.2

- Minor or cosmetic changes can be made without implementing the above steps. Minor or cosmetic changes are those items where there is no code compliance issues affected by the change or no judgment of compliance is required to be rendered by the building official.
- The building official shall be the direct contact point.

Inspector Report to Building Official
BBS Form 4-4
OBC 108.7

OFFICE OF *JURISDICTION*

123 Main Street Anytown, Ohio 40000

***Full Name*, Building Official**

INSPECTOR REPORT

(FOR DETERMINATION OF NON-COMPLIANCE BY BUILDING OFFICIAL- OBC 108.6.1.4 & 108.7 WHERE OWNER HAS INDICATED WORK WILL NOT BE BROUGHT INTO COMPLIANCE)

DATE: _____

APPROVAL #: _____

PROJECT ADDRESS: _____

OWNER or REPRESENTATIVE: _____

SUMMARY REPORT BY INSPECTOR:

Where does the work not conform to approved construction documents?:

In what respect does the work or equipment NOT conform?

INSPECTOR NAME: _____

OFFICE USE ONLY BELOW THIS LINE

Building Official Determination Summary:

Are any approvals possible? Y / N TYPE? _____

ADJUDICATION ORDER REQUIRED? Y / N DATE: _____

BUILDING OFFICIAL SIGNATURE: _____

Contractor Test Completion Certification for Plumbing Systems

BBS Form 4-5

OBC 108.8

Contractor Test Completion Certification for Plumbing Systems (OBC 108.8)

This certification document was prepared by the Ohio Board of Building Standards (BBS) staff as a tool for building departments and health departments that are charged with the responsibility for approval of building plumbing systems. The plumbing inspector cannot always be present to witness all required tests. As a result, to help ensure that the plumbing systems installed within their jurisdiction have been tested in accordance with the rules of the Board, this certification document must be completed prior to final system inspection and acceptance and issuance of the certificate of occupancy.

Instructions:
In accordance with OBC 108.8, advanced notice of the test schedule shall be given to the building official. If their schedule permits, the building official may require that the tests be conducted in the presence of the building official or the plumbing inspector.

Upon completion of the system installation, required tests shall be conducted by the contractor's representative and witnessed by the property owner or the owner's representative and, if required, the building official or the plumbing inspector. All leaks and/or defects shall be corrected and the system shall be re-tested prior to final system acceptance and issuance of the certificate of occupancy.

This certificate shall be filled out by the contractor's representative and signed by both the contractor's representative and the owner's representative. Insert N/A in all unused lines. Attach additional sheets, as necessary, to provide a complete record of the testing (i.e. for multiple story buildings). Copies of this test certificate shall be made available to the building department, health department, owner, and contractor. It is understood that the signature of the owner's representative on this certificate in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with the Ohio Plumbing Code and/or the conditions of the contract.

Property Name & Description:_____

Owner's Name: _____ **Owner's Representative**: _____

Property Address: _____

Contractor: _____ **Contractor's Representative:** _____

Certificate of Plan Approval Number: _____ ***[OBC 105.5]***

Are approved plumbing plans and manufacturer's installation instructions on site? ***[OBC 107.7]***
Yes _____ No _____ If no, explain _____

Was the plumbing system installed in accordance with the approved plans and the manufacturer's installation instructions? Yes _____ No _____ If no, explain _____

TYPE OF PIPING SYSTEM	TEST or PROCEDURE REQUIRED	TEST PRESSURE or METHOD	TEST DURATION	LEAKAGE PERMITTED or RESULT	CODE SECTION REFERENCE	DATE(S) TEST(S) CONDUCTED
Drainage and Vent	Water pressure test	10-foot head of water	15 minutes	None	OPC 312.2	
	or Air pressure test (not for plastic pipe)	5 psi or sufficient to balance a 10-inch column of mercury	15 minutes	None	OPC 312.3	
	Final air test (after fixtures are connected) maybe with smoke or peppermint	1 inch water column	15 minutes prior to inspection	None	OPC 312.4	
	Shower Liner	Plug shower drain. Fill floor/receptor to 2 inch depth	15 minutes	None	OPC 312.9	
Plumbing Fixture Water Supply	Water pressure test	10% > working pressure	15 minutes	None	OPC 312.5	
	or Air pressure test (not for plastic pipe)	50 psi	15 minutes	None	OPC 312.5	
	Disinfection	Flush with potable water until clear, fill with water/chlorine solution, stand for designated time, flush with potable water	Standing time is 3 hours or 24 hours (depending upon water/chlorine solution concentration)	N/A	OPC 610.1	
Storm Drainage	Water pressure test	10-foot head of water	15 minutes	None	OPC 312.2	
	or Air pressure test (not for plastic pipe)	5 psi	15 minutes	None	OPC 312.3	

Signatures

Contractor Certification

I certify that the contractor has conducted all required tests in accordance with the Ohio Plumbing Code on the designated dates and that the system performed without leakage or defect.

For Contractor: _____ Title: _____ Date: _____

Witness Certification

Owner or owner's representative: _____ Title: _____ Date: _____

Notice of Recommended Change
BBS Form 4-6
OBC 108.6.2

<u>108.6.2 Observation of violations not shown on plans.</u> If an inspector, in the course of performing the assigned or requested inspections, observes a code violation that was either shown incorrectly or not adequately addressed or detailed in the approved construction documents, the inspector shall communicate the finding to the building official so that the building official can make a determination of whether the code violation is of such significance to warrant communicating the finding to the owner or the owner's representative as a recommended change.

Office of the Building Official / Name of the Department
123 Main Street
Somewhere, Ohio 43000-0000

Notice of Recommended Change

Ohio Building Code, Section 108.6.2

Date: July 1, 2015

Project: Certificate of Plan Approval No. 15-07
Columbus Important Project
Columbus Road
Columbus, Ohio 43000-0000

Owner/Owner's Authorized Agent: M.Y. Property / Built to Code, Inc.
123 Building Avenue
Somewhereville, Oh 43000-7777

On 6/30/15, Roger T. Inspector observed during a routine required inspection that a code violation that was not addressed during plan review was incorporated into the Approved construction documents dated 2/15/15. It was determined upon evaluation by the building official that the code violation is not an unsafe condition or serious hazard per OBC 108.6.3.

It is recommended that the owner consider making the following change(s) to the construction documents for code compliance and safe occupancy of the building. If the owner chooses to comply, please submit revised construction documents to the extent of the change to the building department for review to ensure the code violation has been eliminated. The approval will be amended and issued to reflect the recommended change. If the owner determines to not proceed with the recommended change, a note will be added as a condition to the certificate of occupancy indicating the choice in this matter. Please see below for observation of items not shown on plans.

Item #	OBC Section	Issue of Non-Compliance	Action required
1	ICC/ANSI A117.1-09 Section 604.2	Restroom 220, end toilet fixture is positioned 22" from the wall.	Centerline of toilet required to be 16" minimum and 18" maximum from sidewall or partition.
2	Chapter 27, NFPA 70 Article 110.16, & 110.26	Electrical Rm 243, Electrical Panel #2 clearance depth is reduced by 3 inches due to angled wall. Prohibits 90 deg. Door opening in corner.	Adjust location to East to increase depth of working space, which allows panel door to open to 90 degs.

Provide **3** sets of the corrected plans to our office for review if intending to comply. Please identify the changes made by 'clouding' the revision or otherwise indicate how resolution was made to the items of non-compliance.) Please respond within **30** calendar days in order for the building official track the decision. ***(Bldg official can set a reasonable amount of time for the owner to bring into compliance.)***

Reviewed by:_____ Building Official:_____
I.C. Plans, Master Plan Examiner, Cert.#____ Bill D. Official, BO, Cert. #____

(All items listed in italicized red font is to be deleted. -All red fonts are to be changed based on project.)

Revised: 7/6/15

Certificate of Occupancy
BBS Form 5-1
OBC 111.1

Certificate of Occupancy (OBC 111.1)

Anytown, Ohio Building Department, Name of the Building Official

(#2) **Property Address:**

Approved As:

Pre-Existing Condition (No Change)
New Structure
Addition
Alteration
Change of Occupancy
Temporary Occupancy

(#6) **Occupancy Groups:**

Description:

Primary:	
Accessory:	
Accessory:	
Mixed Uses:	

(#8) Attached Floor Plan dated_____indicates of how areas are approved and design occupancy loads

(#7) **Construction Type:**

(#9) **Fire Protection Systems:**

N/A ☐	Required ☐	Non-Required ☐
System Type:	Location:	

(#10) Hazard Classification:
Storage Height:
Aisle Width:
(#11) Sprinkler System Demand @ base of riser:

Standpipe System Demand @ base of riser:

(#12) **Stipulations, Conditions, Variances:**

This Certificate represents an approval that is valid only when the building and its facilities are used as stated and is conditional upon all building systems being maintained and tested in accordance with the applicable Ohio Board of Building Standards rules and applicable equipment or system schedules.
This certifies conformance with Chapters 3781. and 3791. of the Revised Code and the applicable provisions of the rules of the Ohio Board of Building Standards.

(#1) Plan Approval Application # _____
Approved pursuant to the following editions (#5) of:
OPC _____ OBC _____ OMC _____

(#3) This approval is limited to the following portion of the building: _____
(#3) The balance of the building is approved pursuant to the following dated C of Os:

(#4) Building Official:
_____

Date:

INSTRUCTIONS FOR COMPLETING A CERTIFICATE OF OCCUPANCY

The Certificate of Occupancy is *the only* document issued and used to indicate that the design and construction has been approved and the building can be occupied and maintained for use under the conditions of the approval. It is legal record of the owner and the building department. The Certificate of Occupancy shall be complete and accurate. The following information shall be included on the Certificate of Occupancy:

1. Plan approval application number.

2. Property Address. (Owner/tenant name is not required.)

3. Description of the portion of the building for which the approval is issued with reference to previous, existing approvals still valid.

4. Date of approval with signature of building official(s).

5. Edition of the code when plan approval is issued (for proposed work or change of occupancy).

6. Narrative description of what the space(s) within the building can be used for *and* the appropriate Group designation(s).

7. Type(s) of construction for all areas of the structure.

8. Design occupant loads.

9. Information related to required or non-required Fire Sprinkler System(s).

10. Information related to the Fire Sprinkler System(s).
    a. Hazard classification.
    b. Storage configuration with aisle widths, etc.

11. Sprinkler & Standpipe systems demand at the base of the riser.

12. Listing of all stipulations, conditions and variances related to the building/approval.

13. Statement of compliance (certifying conformance to the rules and Chapters 3781 & 3791 of the Ohio Revised Code) and statement of condition. (Approval is valid only if the facility used in accordance with the stated conditions and that it must be maintained.)

Requirements for a building owner in making Request for a Certificate of Occupancy for an existing building.

An owner that needs of a Certificate of Occupancy (C of O) for an existing building can request one by referencing Sections 102.7, 111.2 111 of the Ohio Building Code (OBC). This provision allows an owner (or authorized agent) to secure a building C of O for an existing building used under certain conditions:

- The building or structure continues to be used for the purpose(s) that original or subsequent approvals were made. Evidence of this previous and continued use can be verified.
- A request for a Certificate of Occupancy must be made in writing to the building department by the owner. The owner shall verify the authority having jurisdiction (County, city or township) that is certified to enforce the OBC related to the occupancy type of the building. If there is no local certified building department, then the State of Ohio Division of Industrial Compliance has jurisdiction.
- There are no outstanding orders pending against the building.
- It is established after inspection and investigation by the building official that the building/structure does not have any serious hazards.

Although the Board of Building Standards rules do not require a submission of plans for this process, it is important to establish how each area of the building is used. A floor plan is recommended with a legend to indicate how every space is used. (A copy of the evacuation plan can be used for this purpose.)

The following is an example letter containing the type of information the building owner shall provide to the building official to begin the process. Even when a building department has a form or application, this letter shall be used to convey the required information for the request.

Date

Mr./Ms. B.D. Official, CBO
My City Building Department
000 Main Street
Anywhere, OH 43000-0000

Re: Request for a Certificate of Occupancy: 00000 My Avenue

Dear Mr. Official:

I am requesting a certificate of occupancy for an existing building, (and a copy of the original and subsequent certificate of plan approval(s) for the building(s) located at the above address, and, as the owner, pursuant to section 111.2 of the Ohio Building Code.

Prior to my purchasing the property 3 years ago, it had been used as a hotel/motel. I continue to use the building(s) for that purpose. I have enclosed copies of the last two years' of hotel/motel licenses issued by the state Fire Marshal's office. To the best of my knowledge, your department has no outstanding orders pending against this property or any of the buildings.

For your reference, I have included an un-scaled floor plan sketch (evacuation plan) indicating the use of each area of the building. You may note that several of the lodging rooms are identified as suites. Each of these rooms has facilities for cooking and other extended stay amenities. It is my understanding that each of these units were originally designed and intended for this purpose.

I understand you will need to schedule inspection(s) to check for serious hazards; you can contact my office anytime at 000/000-0000 to assure your inspectors have access to the areas they need to see at their convenience.

Sincerely,
Mr. Building Owner

Time Limited
Certificate of Occupancy Process
BBS Form 5-2
OBC 110.1.5

USING BUILDING SPACES FOR SHORT TERM & EMERGENCY PURPOSES

Emergency Planning, Temporary Uses, and Special Events often occur without proper coordination and approvals.

Throughout Ohio, emergency planning includes an anticipated use of buildings located in the community that are designed and approved for purposes other than the potential use under emergency and temporary conditions. Additionally, special events are planned and occur frequently in structures not designed for the short term and unusual purposes. Communities must anticipate and prepare for these occurrences with coordinated professional involvement of the proper agencies.

Winter Weather Conditions Increases Likelihood Some Buildings Will Be Offered To Those In Need.

Church groups and other social service organizations have in the past, and will continue to try to provide help to the homeless and others who may not be able to secure warm and safe environments for their families. Although a community may recognize this need as a social priority, it is extraordinarily critical that any building used for alternate purposes, particularly housing, will be evaluated and approved to assure that basic safety occurs.

Appropriate Resolution Requires involvement of both the Building Code & Fire Code Enforcement Entities

Where the proposed short term change is intended to occur, the certified building department and the local fire prevention personnel must be utilized by the building owner to establish a legal strategy in the temporary use of the building that will result in the safe use of the facility.

Where the location of the commercial facility is in a geographic location without a certified building department, the state's building department will have jurisdiction.

Contact: Division of Industrial Compliance
Chief Building Official – 800/523-3581

Both the Division of State Fire Marshal and the Board of Building Standards can be contacted as a resource to help in the explanation on the procedure of the approval process.

Contacts: Division of State Fire Marshal: Code Enforcement Bureau
888/252-0803

Ohio Board of Building Standards
800/523-3581 or 614/644-2613

Using the Time-Limited Occupancy Approval Method

The Ohio Building Code provision for the Time-Limited Occupancy Approval Method can be used to properly respond to these issues. The Certificate of Occupancy section of the Ohio Building Code, Section 111, was revised to specifically provide a useful and practical option for building owners, building and fire departments to determine code compliance for temporary uses for buildings such as haunted houses, emergency shelters/housing, exhibits, tents for special events, etc.

Located in OBC section 110.1.5, the *Time-Limited Occupancy* provisions offer a method to approve short term changes in occupancy for an entire building or a portion thereof. This provision gives the building official discretion to approve a condition intended to occur for a short period of time.

The following is extracted from the Board's Chapter 1 Commentary:

110.1.5 Time-limited occupancy. A building or structure hereafter changed in part from one occupancy to another for a limited time may receive a certificate of occupancy reflecting that time-limited occupancy provided:

1. **There are no violations of law or orders of the building official pending;**
2. **It is established after inspection and investigation that the proposed use is not deemed to endanger public safety and welfare safely;**
3. **The building official has approved the use for an alternative purpose on a temporary basis;**
4. **The building official has issued a certificate of occupancy indicating any special conditions under which the building or part of the building can be used for the alternative purpose within the time limit specified.**

The building official has the latitude to permit time-limited occupancy of a building or structure or some portion. The occupancy, however, is permitted if it is possible to assure that the building's occupants can do so safely without being endangered.
The language does not require building officials to allow time-limited occupancy; it only states the building official ***may*** *issue a time-limited certificate of occupancy. This language is permissive to allow the building official some latitude when evaluating the methods to be used to assure safe occupancy. If the building official feels that adequate provisions can be made to permit safe occupancy, the time-limited certificate of occupancy can be issued.*
The occupancy must be issued as time-limited and it is the building official's responsibility to track the issuance of a time-limited certificate of occupancy. The content of the certificate should comply with section 111.3.

Using the Time-Limited Occupancy Process

Step 1. **Form a team** – It is imperative to have the owner (or owner's representative who has decision making authority), a plans examiner, the CBO and fire official with fire prevention responsibilities (and other decision makers with a stake in the event/project) all on the same page and at the project discussion meeting.

Step 2. **Hold a project discussion meeting** - The applicant must provide a **comprehensive description of what they intend to use the space or building for and for what amount of time.** Since each building is different, and ideas on how to use buildings are infinite, the information necessary and the questions to ask will vary with each case. Some examples:

- Minimum & maximum number of persons using the space
- Times of the day the space/building will be used for the purpose
- Types of materials/commodities that would/could change with the temporary use
- What additional fuel and/or ignition sources will be used
- Identification of combustible materials location
- Types of fire protection and egress systems are currently in place
- Travel distances to safety
- What alternate areas of refuge can be used
- Staffing available to used for alternate protection methods
- What methods are being planned as alternative protection methods
- How will other spaces within the building be secured to limit the alternate use to specified areas
- How will the evacuation plan be changed
- What fire drill planning or event announcements will occur
- Evaluation of the OBC's requirements for the proposed time limited occupancy and if the proposal accounts in some way for the risks the code provides for

Step 3. **Process the application for a time-limited change of occupancy** – In order to perform an inspection to verify existing conditions, it is necessary for the department to have a request in writing that describes the proposed temporary use. While it may be very beneficial to have a set of existing building plans available, they will not always be retrievable. In all cases, the owner must provide a footprint layout of the spaces (evacuation plan) indicating what each space is currently being used for and what spaces are intended to be used temporarily for the limited purpose. An inspection (joint building & fire department) should be conducted to verify the evacuation plan and to check for any serious hazards.

Step 4. The team should **discuss the options for what systems to have in place** in order for the building official to approve the time-limited occupancy….when an agreement is reached, the Time-Limited Certificate of Occupancy should be prepared with all the understood conditions listed. If any of the options included changes to the building or the building systems that had not been inspected, a verifying inspection(s) must occur before the Certificate of Occupancy is issued. *Note:* the owner must clearly understand that the process shall be limited to short time periods (hours, days, weeks) and not generally used for periods in excess of a month. The approval is used once. Any intent to use this process after the expiration of the approval must require a new application and evaluation.

Posted Occupant Load Sign
BBS Form 5-3
OBC 1004.3

Occupant Load Limit

(OBC 1004.3)

This space is approved to be used as a:

Add Group Here

This space is allowed to be occupied by no more than

Add # of Persons Here

At any one time.

In accordance with the Ohio Building Code and the Ohio Fire Code, this sign must be posted and maintained permanently at a location clearly readable to those leaving this space by means of the main exit.

Sample Occupant Load Limit Sign for Assembly Use Groups

Per OBC 1004.3, the **posting** of occupant load shall be provided for every room or space that is assembly occupancy in a conspicuous place, near the main exit or exit access doorway from the room or space. Posted signs shall be of an approved legible permanent design and shall be maintained by the owner or authorized agent.

When an assembly use has optional layout configurations, such as open space used for dancing, standing or variations of table and chair layouts, each maximum must be indicated and listed separately.

It is the owner's responsibility to purchase and affix the sign in a permanent manner and to maintain it. An approved sign is one that is clearly readable and indicates the appropriate information.

In addition to Occupant Load Limit signs for each space used for assembly or education occupancies, readable signs must be posted on each floor of occupancies used for B, F, M and H Use Groups. These signs must contain the Use Group, type of construction, design live load for the floor and the maximum occupant load.

Type A Family Daycare Checklist
ORC 5104.051 (A) (2)

Refer to the Ohio Department of Job and Family Services (ODJFS) Website *form* JFS 01336 located for download at

http://www.odjfs.state.oh.us/forms/findform.asp?formnum=01336

Type A Family Daycare facilities are currently exempt from the code. (See OBC 101.2, exception #5)

A Building inspector may be requested to complete the form required for licensing at the time of initial occupancy.

Posted Design Live Load Limit Sign
for
BBS Form 5-5
OBC 3403.3.1

Design Live Load Limit

(OBC 3404.3.1)

This space has been designed to safely allow:

Add PSF# Here

In accordance with the Ohio Building Code, this sign must be posted conspicuously and maintained permanently at a location clearly readable to those leaving this space by means of the main exit.

Sample Design Load Limit Sign

3403.3.1 Design live load. Where the addition does not result in increased design live load, existing gravity load-carrying structural elements shall be permitted to be evaluated and designed for live loads approved prior to the addition.

If the approved live load is less than that required by Section 1607, the area designed for the nonconforming live load shall be posted with placards of approved design indicating the approved live load.

Where the addition does result in increased design live load, the live load required by Section 1607 shall be used.

File Attachments for Item:

ER-4 Dust Hazard Review and Overview of NFPA Standards (Society of Fire Protection Engineers)

BO, BPE, MechPE, FPPE, BI, FPI (1 hour)

Staff Notes: Outline to come.

Committee Recommendation:

Stephen Dale, PE, CFPS, ARM

Stephen Dale is Director of Technical Services for the Loss Control Department at The Cincinnati Insurance Company. He leads a unit of subject matter experts in fire protection, employee safety, construction risk management, product safety and transportation safety. A fire protection engineer and property loss control specialist, Stephen serves as a principal on four NFPA committees; is a member of SFPE's CPD committee; leads the SFPE PE Exam Review course; and is Vice President of the Tri-State SFPE chapter. Prior to joining Cincinnati Insurance, Stephen worked as an HPR Engineer at Zurich Insurance and in various loss control and technical specialist roles at Liberty Mutual Group. Stephen has a bachelor's degree in Fire Protection and Safety Engineering Technology from Oklahoma State University, has completed a Certificate in Technical Leadership from the University of Wisconsin, is a licensed professional engineer (PE) and holds the Associate in Risk Management (ARM) and Certified Fire Protection Specialist (CFPS) designations.

OK PE License #28480

CRITERIA FOR SUBMITTING CONTINUING EDUCATION COURSES FOR BOARD OF BUILDING STANDARDS CERTIFICATIONS

The Ohio Board of Building Standards approves Continuing Education Courses for building department personnel. The courses may be used for the attainment of goals that are connected with technical and professional development as they relate to enforcing and interpreting the Ohio State Building Codes. Board approval is granted only on course instruction pertaining to OBC, OMC, OPC, and RCO requirements and such other content areas directly related to the responsibilities of the certification for which credit is being requested.

Instructors: Anyone or any organization promoting an approved course, is required to make full and accurate disclosure regarding course title, course approval number, number of credit hours, certifications for which the BBS has approved the class, and fees in promotion materials and advertising. ***The Board does not grant retroactive approval. It is recommended that courses be submitted for approval well in advance of any scheduling of classes and advertising***. Advertising shall not disclose improper approval information to the public.

Course sponsors/co-sponsors: provide participants a certificate of completion containing the following information: name of participant, title of approved courses, BBS approval #, BBS approved certifications, date of the continuing education program, number of approved credit hours awarded and signature of authorized sponsor or instructor.

Anyone or any organization administering an approved course shall provide the Board with advanced written information on scheduling of the course(s) (date and place) and provide to the Board a legible list of participants who completed the course with the name of course, date, and location.

Participants: Must attend the complete course as presented by the instructor to receive credit hours approved by the Board. No partial credit shall be given to any participant who failed to complete the entire course as approved. The sponsor/co-sponsor or instructor shall formulate a method to verify the individual's attendance and completion of the course.

Board approval: Remains in effect through the calendar year of approval. The course may be renewed administratively by sponsor application in subsequent years so long as it references current codes and standards Upon the Board's adoption of a new edition of the codes, course sponsors must update their course and submit to the Board for approval. The Board does not grant retroactive approval for courses presented prior to approval date.

Facility/training area: Shall be capable of comfortably and safely seating at least the number of attendees with writing surfaces for each attendee; accessible to/and usable for people with disabilities; sized and provided with audio/visual equipment adequate so that each attendee can see the instructor(s) and overhead screen and hear the content of the training programs; illuminated for writing and that the content on an overhead screen can be seen easily by all attendees; non-smoking in the training room; sound controlled so that outside noise will not interfere with the training.

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER: Stephen Dale

Course Submitter: Stephen Dale
(Contact Name)

Organization: Cincinnati Insurance
(Organization/Company)

Address: 6200 S. Gilmore RD
(Include Room Number, Suite, etc.)

City: Fairfield State: OH Zip: 45014

E-Mail: stephen_dale@cinfin.com

Telephone: 513-870-2202 Fax:

Course Sponsor: Tri-State Chapter of SFPE

COURSE INFORMATION:

Course Title: Dust Hazard Review and Overview of NFPA standards

New Course Submittal: ■ Update Course: ☐ Prior Approval Number:

Purpose and Objective: Purpose is to review the basic requirements of dust hazard controls and discuss the changes to the NFPA standards related to dusts. At the end of the session learners will 1) understand basic hazards of dusts, 2) be able to discuss fundimential dust hazard control methods, 3) understand deflagration controls, and 4) understand the current applicable NFPA standards as well as the standard consolidation effort.

Number of Instructional Contact Hours that can be obtained upon completion: 1

If Multi-Session, Number of Instructional Contact Hours Per Session:

Program Applicable for the Following Participants:

Building Official ■ Master Plans Examiner ☐ Building Inspector ■ Fire Protection Inspector ■ Mechanical Inspector ☐

Building Plans Exam. ✔ Plumbing Inspector ☐

Plumbing Plans Exam. ☐ Non-Res IU Inspector ☐

Electrical Plans Exam. ☐

Mechanical Plans Exam. ■

Fire Protect. Plans Exam. ✔

Res Building Official ☐ Res Plans Examiner ☐ Res Building Inspector ☐ Res Mechanical Inspector ☐ Res IU Inspector ☐

Electrical Safety Inspectors ☐

Location of ESI Course: Date(s) of ESI Course(s):

SUBMITTAL CHECKLIST: **Make Sure** all of the Following Information is **Submitted**:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	
	Organization sponsoring or requesting the program (if any)	
Course Title:	Name of course (related to content)	
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	
Test Materials:		
Completed Application:		

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

Dust Hazard Review and Overview of NFPA standards

Stephen Dale, PE, CFPS, ARM

Director of Technical Services

Cincinnati Insurance

Portions of the content were developed by
Jeremy Lebowitz, PE, Jensen Hughes

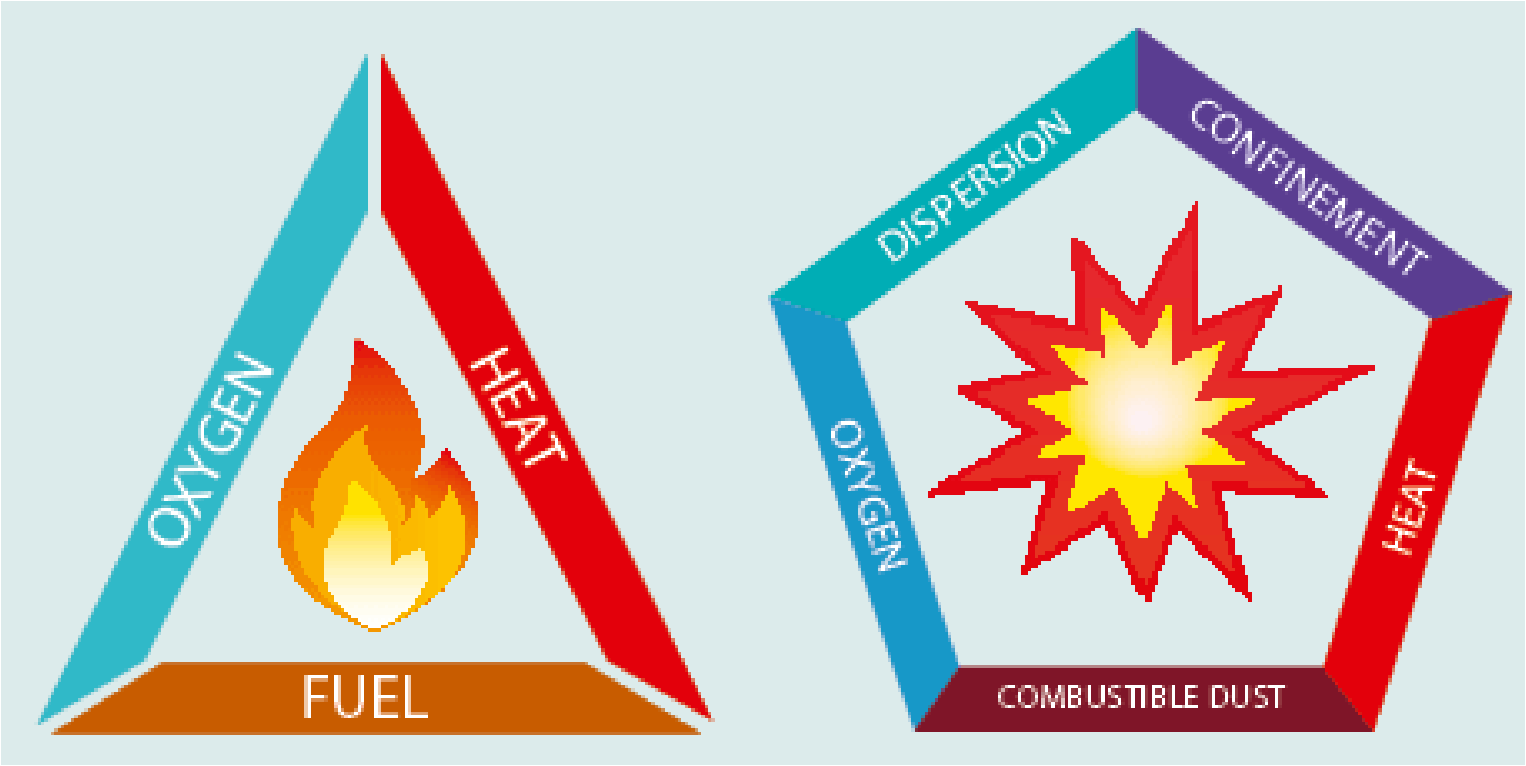
Agenda

- Review Key Dust Hazard Information
- Discuss Basic Elements of Dust Hazard Control
- Review Current NFPA standards
- Outline standard consolidation plans

Dust Hazard Pentagon

CONDITIONS NECESSARY FOR AN EXPLOSION

- Traditional “fire triangle”
  - Air / oxidizer
  - Fuel above minimum concentration
  - Ignition source
- Plus suspension of fuel (dispersion) = deflagration “tetrahedron”
- Plus Confinement = explosion “pentagon”
- Must meet conditions in the same place simultaneously



What are Combustible Dust Hazards

- Hazards related Explosion (detonation vs deflagration)

Explosion Types

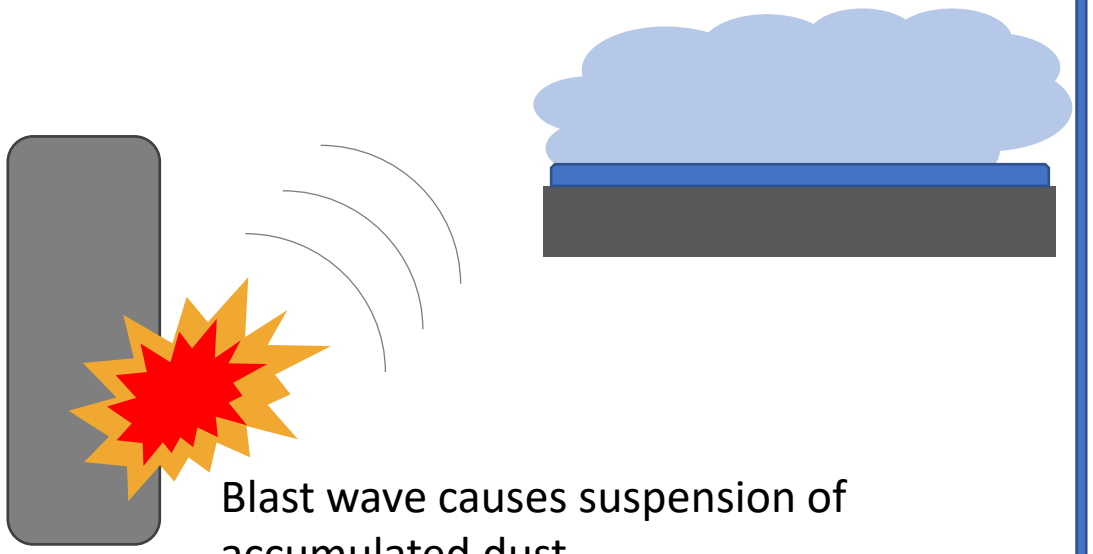
DEFLAGRATION	Vs.	DETONATION
Flame front propagates SLOWER than sound		Flame front propagates FASTER than sound
Pressure wave develops according to combustion reaction		Flame front progresses rapidly based on combustion reaction
Flame front follows		Pressure wave follows
Protection based on sensing pressure wave; quenching flame front		Protection based on mitigating detonation effects

JL

Important Characteristics

PRIMARY EXPLOSION

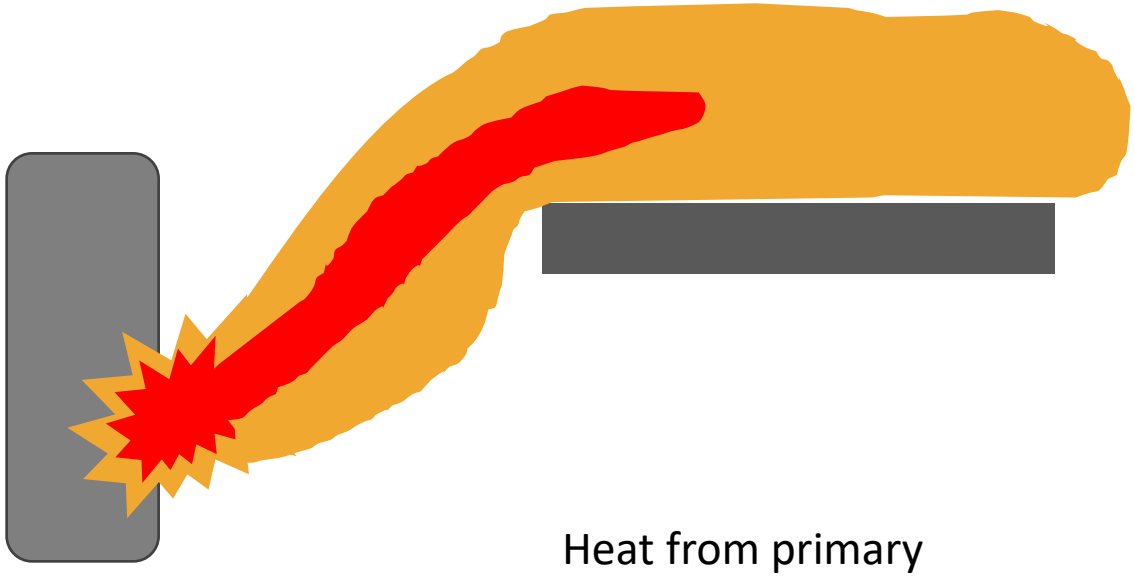
- Event's first explosion
- Typically occurs in a confined space
- Pressure wave
- Fireball



Blast wave causes suspension of accumulated dust

SECONDARY EXPLOSION

- Primary explosion
  - Creates & ignites new dust cloud
- Secondary explosion occurs
- Process may repeat many times



Heat from primary explosion ignites dust cloud

Images courtesy of Author

What is the Hazard – Combustible Dusts

Material	MIE (mJ)*	Kst*
Corn Starch	300	128
Milk powder	75	90
Sugar	14	75
Aluminum Powder	10**	515
Magnesium	20**	508
Cellulose	250	66
Paper Dust		18

*HFPE T70.1 and FPH T6.8.3
**IChemE

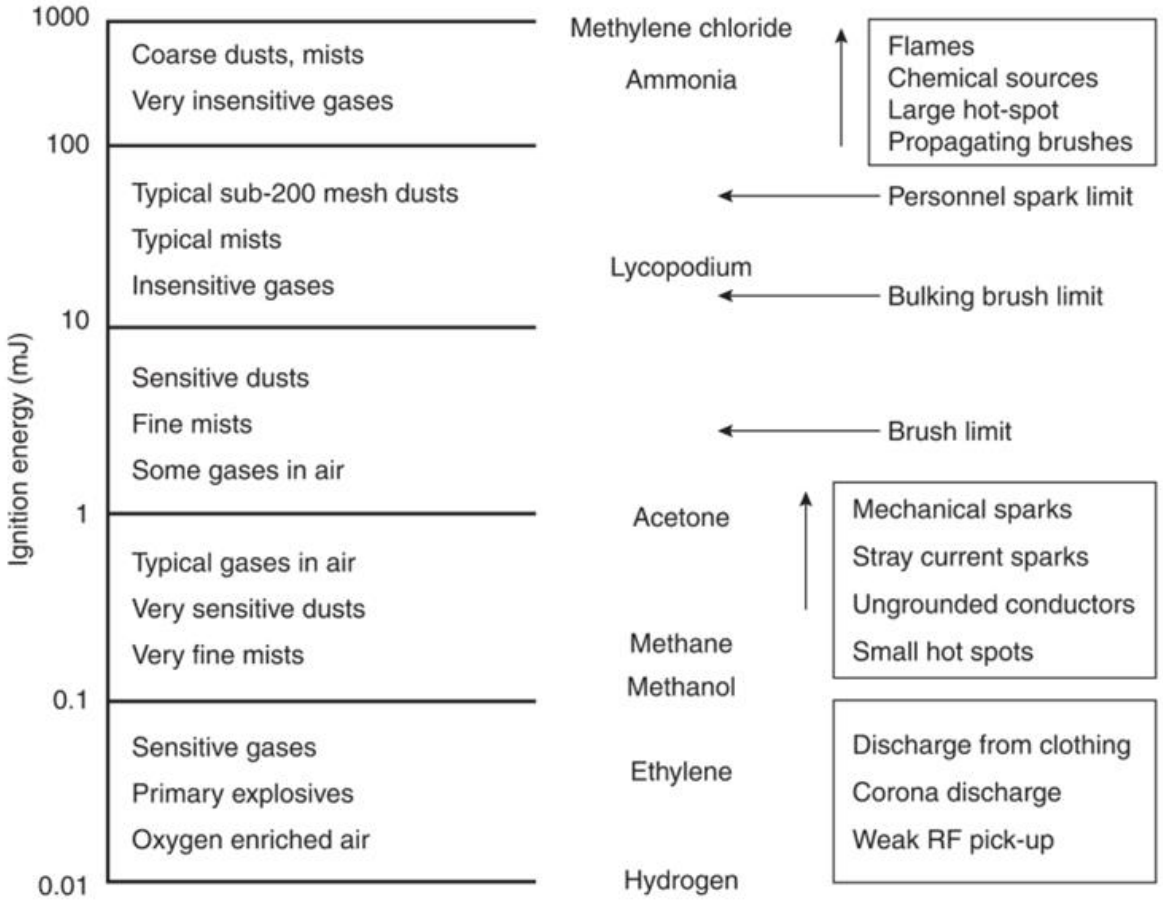
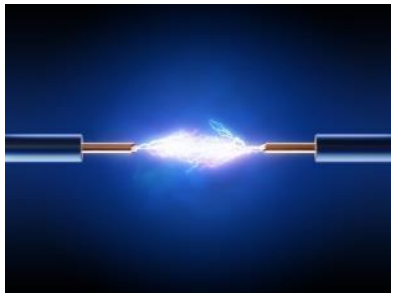


FIGURE 17.8.4 Ignition Energies of Various Materials and Types of Ignition (Source: Britton, L. G., *Avoiding Static Ignition Hazards in Chemical Operations, A CCPS Concept Book*, American Institute of Chemical Engineers, New York, 1999

2b. Explosion Causes / Sources

IGNITION SOURCES – MIE Test

- Open flames
- Mechanical sparks
- Hot slag
- Embers
- Lighting
- Heaters
- Hot surfaces (e.g. equipment)
    - Overheating bearings
    - Surfaces insulated with dust layer
- Electric sparks and arcs
- Electrostatic discharge
- Smoldering or burning dust



2b. Explosion Causes / Sources

SUSPENSION / DISPERSION

- Smaller particles are more easily suspended

- Suspension sources
  - Moving air (conveying, blowdown, deflagration)
  - Pouring (dusts)
  - Acoustic impulses (mechanical impact, vibrations, deflagration)
  - Loss of containment (pressurized gases or liquids)
  - Evaporation (liquids)

2b. Explosion Causes / Sources

CONFINEMENT

- Potential locations where confinement can occur include:
  - Buildings
  - Process equipment
    - **Dust collectors**
    - Silos, Bins, Hoppers
    - Conveyance (rotary valves, screw conveyors)
    - Blending / mixing tanks
    - Particle size reduction equipment (e.g., chippers, mills)
  - Pipes
  - Ducts
  - Equipment pits
  - Space above suspended ceilings

Dust Collection at Machine

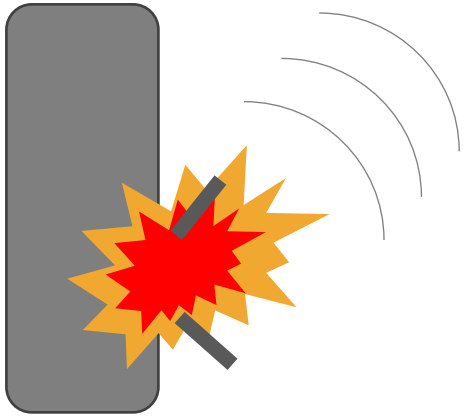
Dust Collection at Machine

Abort Gate

Collector Inside

Deflagration Venting

- Operating principle: Relieve pressure developed during a deflagration
  - Prevent failure of enclosure
- Applications
  - Buildings or compartments within a building
    - Wall or roof mounted explosion panels
    - Pressure relieving construction
  - Equipment
    - Explosion vents discharging to the exterior
      - Equipment outside or vent through discharge ducts
    - Explosion venting through flame arrestor with particulate retention
- **Venting does not protect occupants or contents in the "protected" compartment!**



Deflagration Venting

From NFPA 68:

- Maximum pressure (P_{max}) – The maximum pressure developed in a contained deflagration of an optimum mixture
- Enclosure strength (P_{es}) – **0.1 bar / 1.5 psi threshold (NFPA 68)**
  - Low-strength enclosures: Up to two-thirds the ultimate strength (pressure that results in failure of the weakest structural component)
  - High-strength enclosures: The design pressure sufficient to resist P_{red}
- Reduced pressure (P_{red}) – The maximum pressure developed in a vented enclosure during a vented explosion
- Static activation pressure (P_{stat}) – Pressure that activates a vent closure when the pressure is increased slowly (less than 0.1 bar/min)
- Vent closure – A pressure relieving cover that is placed over a vent
- Hinge vent – Vent closure that is hinged on one or more sides

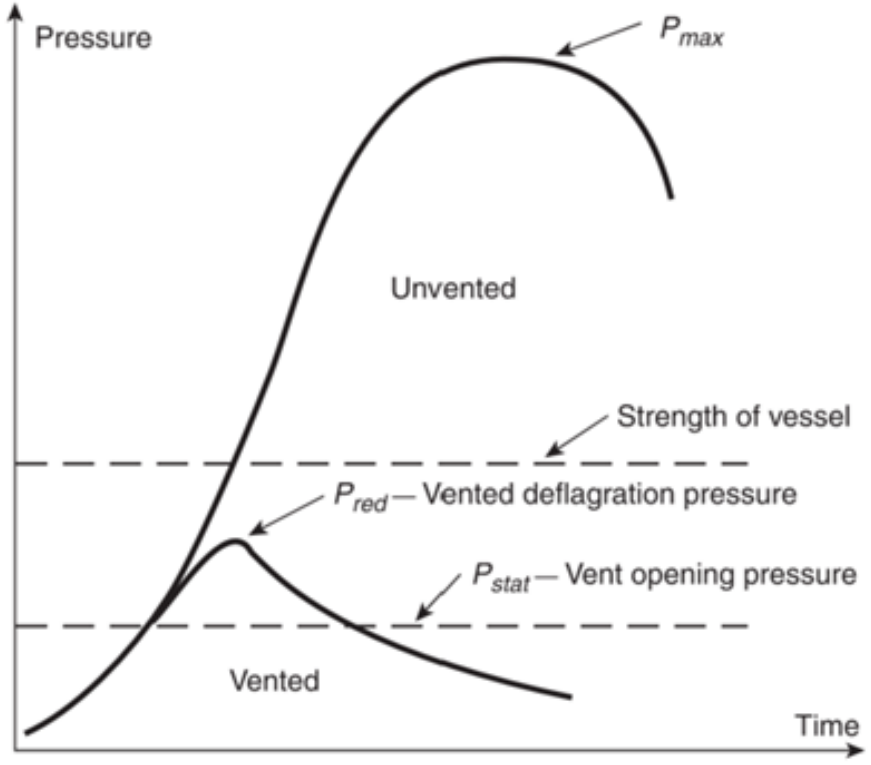


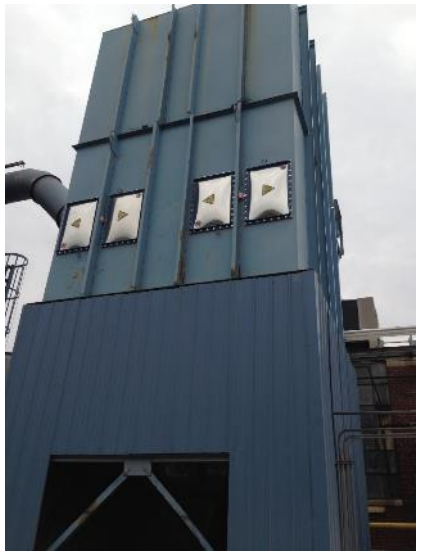
FIGURE B.4.1 Pressure–Time Graph of a Vented Deflagration.

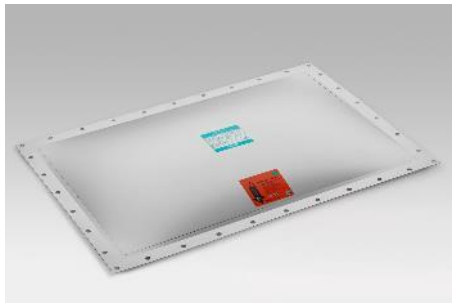
Image: NFPA 654, Figure B.4.1

Deflagration Venting

Buildings

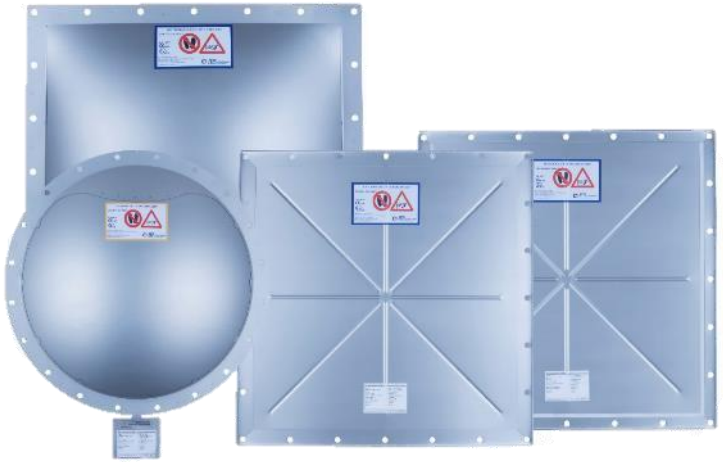
- Wall and roof panels
- Avoid roof panels @ snow loading





Equipment

- Vent (rupture) panels



Images courtesy CV Technology, Fike, IEP

Deflagration Venting

- Equipment Vent (rupture) panels

Images courtesy CV Technology, IEP

IFC Requirements - Chapter 22

Definition of Combustible Dust – Ch 2

"Finely divided solid material which is 420 microns or less in diameter and which, when dispersed in air in the proper proportions, could be ignited by a flame, spark or other source of ignition. Combustible dust will pass through a U.S. No. 40 standard sieve."

- ***Each of the NFPA standards (currently) have their own definition***
- ***This definition is dated***

IFC Requirements - Chapter 22

- 2203.2 DHA – references NFPA 652, 7.1.2

N **7.1.2**

The owner/operator of a facility where materials determined to be combustible or explosible in accordance with Chapter 5 are present in an enclosure shall be responsible to ensure a DHA is completed in accordance with the requirements of this chapter.

Table of Contents

Chapter 5 — Hazard Identification

5.1 Responsibility.

5.2 * Screening for Combustibility or Explosibility.

5.3 * Self-Heating and Reactivity Hazards. (Reserved)

5.4 Combustibility and Explosibility Tests.

5.5 Sampling.

IFC Requirements – Chapter 22

- Ignition and Housekeeping are mentioned with some specifics

- Reference is given to specific hazard standards in table 2205.1
- 61 – Agricultural and Food Processing Facilities
- 484 – Combustible Metals
- 654 – Combustible Particulate Solids (all else)
- 664 – Wood Processing and Woodworking Facilities

Other also listed

Controls

- Prevention
  - Dust Hazard Analysis
  - Fuel
    - <25% of MEC (50% for aluminum)
    - Housekeeping and accumulation
  - Confinement
  - Oxygen
  - Ignition – NFPA 77
    - Bearings, conveyors – maintenance
    - Hot work

Current Standards

- 61 – Agricultural and Food Processing Facilities
- 484 – Combustible Metals
- 652 – Fundamentals of Combustible Dusts (not referenced in 2205.1)
- 654 – Combustible Particulate Solids
- 664 – Wood Processing and Woodworking Facilities

- 68 – Explosion Protection by Deflagration Venting
- 69 – Explosion Prevention Systems

Standard Consolidation

- NFPA 660
- New standard will have fundamental and occupancy chapters
- Public Input slated to begin mid-2022
- Proposed New document issuance in 2024

Draft of TOC/Outline

Chapter 1 Administration

Chapter 2 Referenced Publications (All)

Chapter 3 Definitions (NFPA 652 – Definitions that are applicable to whole document)

Chapter 4 General Requirements (NFPA 652)

Chapter 5 Hazard Identification (NFPA 652)

Chapter 6 Performance-Based Design (NFPA 652)

Chapter 7 Dust Hazard Analysis (NFPA 652)

Chapter 8 Management Systems (NFPA 652)

Chapter 9 Hazard Management: Mitigation and Prevention (NFPA 652)

Chapter 10 Reserved

This could be a separate chapter on fire protection, which is currently part of Chapter 9 of NFPA 652.

Chapter 11 Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities (NFPA 61)

The following is an example of how the industry- or commodity-specific chapters would be organized. The first nine subsections would contain the requirements that are beyond or differing from the general/basic/fundamental chapters, and the following subsections would contain the industry- or commodity-specific chapters that are currently chapters 10-X of each document.

11.1 Administration
11.2 Reserved
11.3 Definitions Specific to Chapter 11
11.4 General Requirements
11.5 Hazard Identification
11.6 Performance-Based Design Option
11.7 Dust Hazard Analysis (DHA)
11.8 Hazard Management: Mitigation and Prevention
11.9 Management Systems

Chapter 12 Combustible Metals (NFPA 484)

Chapter 13 Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids (NFPA 654)

Chapter 14 Prevention of Sulfur Fires and Explosions (NFPA 655)

Chapter 15 Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities (NFPA 664)

Annex A Explanatory Material (All)

References

- NFPA Fire Protection Handbook FPH
  - 17.8 (Explosion Prevention & Protection)
  - 18.6 (Deflagration Venting)
- SFPE Handbook of FPE (5th) HFPE
  - 17 (Flammability Limits)
  - 69 (Flammable Gas and Vapor Explosions)
  - 70 (Dust Explosions)
- NFPA 68, *Standard on Explosion Protection by Deflagration Venting*
- NFPA 69, *Standard on Explosion Prevention Systems*
- FM Datasheets (7-0, 7-17, 7-42, 7-73, 7-76)
- NFPA FPH
  - 6-8 (Dusts), 6-10 (Gases), 9-1 (Woodworking), 9-7 (Grain Mill)
- SFPE HFPE
  - 67 (Vapor Clouds), 71 (BLEVEs and Fireballs)

Dust Hazard Review and Overview of NFPA Standards

By: Stephen Dale, PE

AVP, Cincinnati Insurance Loss Control Department

December 8, 2021

Tri-State Chapter of SFPE

Agenda for Dust Hazard and NFPA Standards Course

- Review Key Dust Hazard Information
- Discuss Basic Elements of Dust Hazard Control
- Review Current NFPA standards
- Outline standard consolidation plans
- Dust Hazard Pentagon

CONDITIONS NECESSARY FOR AN EXPLOSION

IGNITION SOURCES – MIE Test

SUSPENSION / DISPERSION

CONFINEMENT

DEFLAGRATION VENTING

From NFPA 68:

- Maximum pressure (P_{max}) – The maximum pressure developed in a contained deflagration of an optimum mixture
- Enclosure strength (P_{es}) – **0.1 bar / 1.5 psi threshold (NFPA 68)**
    - **Low-strength enclosures**: Up to two-thirds the ultimate strength (pressure that results in failure of the weakest structural component)
    - **High-strength enclosures**: The design pressure sufficient to resist P_{red}
- Reduced pressure (P_{red}) – The maximum pressure developed in a vented enclosure during a vented explosion
- Static activation pressure (P_{stat}) – Pressure that activates a vent closure when the pressure is increased slowly (less than 0.1 bar/min)

IFC REQUIREMENTS - Chapter 22

DEFINITIONS OF COMBUSTIBLE DUST – IFC Ch 2

"Finely divided solid material which is 420 microns or less in diameter and which, when dispersed in air in the proper proportions, could be ignited by a flame, spark or other source of ignition. Combustible dust will pass through a U.S. No. 40 standard sieve."

IFC REQUIEMENTS - Chapter 22

- 2203.2 DHA – references NFPA 652, 7.1.2
- IFC Requirements – Chapter 22
- Ignition and Housekeeping are mentioned with some specifics
- Reference is given to specific hazard standards in table 2205.1
- 61 – Agricultural and Food Processing Facilities
- 484 – Combustible Metals
- 654 – Combustible Particulate Solids (all else)
- 664 – Wood Processing and Woodworking Facilities

CURRENT NFPA STANDARDS

61 – Agricultural and Food Processing Facilities

- 484 – Combustible Metals
- <u>652 – Fundamentals of Combustible Dusts (not referenced in 2205.1)</u>
- 654 – Combustible Particulate Solids
- 664 – Wood Processing and Woodworking Facilities
- 68 – Explosion Protection by Deflagration Venting
- 69 – Explosion Prevention Systems

STANDARD CONSOLIDATION

REFERENCES

- NFPA Fire Protection Handbook FPH
    - 17.8 (Explosion Prevention & Protection)
    - 18.6 (Deflagration Venting)
- SFPE Handbook of FPE (5th) HFPE
    - 17 (Flammability Limits)
    - 69 (Flammable Gas and Vapor Explosions)

    - 70 (Dust Explosions)
- NFPA 68, *Standard on Explosion Protection by Deflagration Venting*
- NFPA 69, *Standard on Explosion Prevention Systems*
- FM Datasheets (7-0, 7-17, 7-42, 7-73, 7-76)
- NFPA FPH
    - 6-8 (Dusts), 6-10 (Gases), 9-1 (Woodworking), 9-7 (Grain Mill)
- SFPE HFPE
    - 67 (Vapor Clouds), 71 (BLEVEs and Fireballs)

File Attachments for Item:

ER-5 Generators and the 2020 NEC (Matthews Electrical Services)

All certifications except PI, NRIUI, RMI, and RIUI (4 hours)

Staff Notes:

ESIAC Recommendation: Recommend approval

Committee Recommendation:

Course Description and Objectives

Generators are a critical part of our lives. We depend on them to keep the lights on and for other important operations when the utility power goes down. However, improper design and use of generator systems can lead to disastrous and even fatal results.

The objective of this 4-hour course is to provide the end-user with the NEC and other requirements to install a safe and code-compliant generator installation.

This course will cover generator safety requirements, portable and standby generators, transfer switches, separately derived systems, grounding and bonding of generator systems and more.

As part of this course, the differences between Emergency Systems, Legally Required Standby Systems and Optional Standby Systems will be covered.

A design example of a home standby generator installation will be included to reinforce the main topics covered.

Generator Course Outline

1. Generator Code References
    a. Article 100 Definitions
        i. Separately Derived System
        ii. Switch, Transfer
    b. Article 445 Generators
    c. Article 250
        i. Section 250.30 information note 1
        ii. Section 250.34 (A) Portable Generators
        iii. Section 250.34(B) Vehicle-Mounted and Trailer-Mounted Generators
        iv. Section 250.34(C) Grounded Conductor Bonding
        v. Section 250.35 Permanently Installed Generators
    d. Article 685 Interconnected Electrical Systems
    e. Article 700 Emergency Systems
    f. Article 701 Legally Required Standby Systems
    g. Article 702 Optional Standby Systems
    h. Article 705 Interconnection Electrical Power Production
    i. Article 708 Critical Operations Power Systems (COPS)

Other references:
    a. NEMA Motors and Generators MG-1
    b. UL 2200 Standard for Stationary Engine Generator Assemblies
    c. NFPA 37 Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines

2. Generator Safety
    a. Proper location
    b. Fuel concerns
    c. Shock, arc flash, GFCIs etc.
3. Types of Generators and Generator systems
4. Grounding and Bonding of Generators
    a. Separately Derived Systems
5. Exercise: Sizing, Specifying and Designing a Code-Compliant Home Standby Generation Installation
6. Wrap-up
    a. Questions and Answers
    b. Code credit applicability and certificates

CRITERIA FOR SUBMITTING CONTINUING EDUCATION COURSES FOR BOARD OF BUILDING STANDARDS CERTIFICATIONS

The Ohio Board of Building Standards approves Continuing Education Courses for building department personnel. The courses may be used for the attainment of goals that are connected with technical and professional development as they relate to enforcing and interpreting the Ohio State Building Codes. Board approval is granted only on course instruction pertaining to OBC, OMC, OPC, and RCO requirements and such other content areas directly related to the responsibilities of the certification for which credit is being requested.

Instructors: Anyone or any organization promoting an approved course, is required to make full and accurate disclosure regarding course title, course approval number, number of credit hours, certifications for which the BBS has approved the class, and fees in promotion materials and advertising. ***The Board does not grant retroactive approval. It is recommended that courses be submitted for approval well in advance of any scheduling of classes and advertising***. Advertising shall not disclose improper approval information to the public.

Course sponsors/co-sponsors: provide participants a certificate of completion containing the following information: name of participant, title of approved courses, BBS approval #, BBS approved certifications, date of the continuing education program, number of approved credit hours awarded and signature of authorized sponsor or instructor.

Anyone or any organization administering an approved course shall provide the Board with advanced written information on scheduling of the course(s) (date and place) and provide to the Board a legible list of participants who completed the course with the name of course, date, and location.

Participants: Must attend the complete course as presented by the instructor to receive credit hours approved by the Board. No partial credit shall be given to any participant who failed to complete the entire course as approved. The sponsor/co-sponsor or instructor shall formulate a method to verify the individual's attendance and completion of the course.

Board approval: Remains in effect through the calendar year of approval. The course may be renewed administratively by sponsor application in subsequent years so long as it references current codes and standards Upon the Board's adoption of a new edition of the codes, course sponsors must update their course and submit to the Board for approval. The Board does not grant retroactive approval for courses presented prior to approval date.

Facility/training area: Shall be capable of comfortably and safely seating at least the number of attendees with writing surfaces for each attendee; accessible to/and usable for people with disabilities; sized and provided with audio/visual equipment adequate so that each attendee can see the instructor(s) and overhead screen and hear the content of the training programs; illuminated for writing and that the content on an overhead screen can be seen easily by all attendees; non-smoking in the training room; sound controlled so that outside noise will not interfere with the training.

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: Henry Matthews
(Contact Name)

Organization: Matthews Electrical Services
(Organization/Company)

Address: 1203 McKinley Place
(Include Room Number, Suite, etc.)

City: Fostoria State: Ohio Zip: 44830

E-Mail: hpmatthews66@att.net

Telephone: 419-575-3488 Fax: _____

Course Sponsor: _____

COURSE INFORMATION:

Course Title: Generators and the NEC - Webinar

New Course Submittal: ■ Update Course: ☐ Prior Approval Number: _____

Purpose and Objective: This course will review the contents and requirements of article 445 in the NEC - Generators. It will cover topics such as definitions, grounding and bonding of generators, overcurrent protection, GFCI requirements, generator safety, paralleling of generators and others. We will review basic generator theory and history. We will also review the concept of separately derived systems and how to ground and bond the system according. The role of the transfer switch will also be discussed.

Number of Instructional Contact Hours that can be obtained upon completion: 4

If Multi-Session, Number of Instructional Contact Hours Per Session: _____

Program Applicable for the Following Participants:

Building Official ■ Master Plans Examiner ■ Building Inspector ■ Fire Protection Inspector ■ Mechanical Inspector ■

Building Plans Exam. ✔ Plumbing Inspector ☐

Plumbing Plans Exam. ■ Non-Res IU Inspector ☐

Electrical Plans Exam. ■

Mechanical Plans Exam. ■

Fire Protect. Plans Exam. ✔

Res Building Official ■ Res Plans Examiner ■ Res Building Inspector ■ Res Mechanical Inspector ☐ Res IU Inspector ☐

Electrical Safety Inspectors X

Location of ESI Course: www.matthewselectrical.net via www.zoom.com Date(s) of ESI Course(s): 12-11-21 and others

SUBMITTAL CHECKLIST: **Make Sure** all of the Following Information is **Submitted**:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	X
	Organization sponsoring or requesting the program (if any)	
Course Title:	Name of course (related to content)	X
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	X
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	X
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	X
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	X
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	X
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	X
Test Materials:	National Electrical Code	X
Completed Application:		X

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

Generators

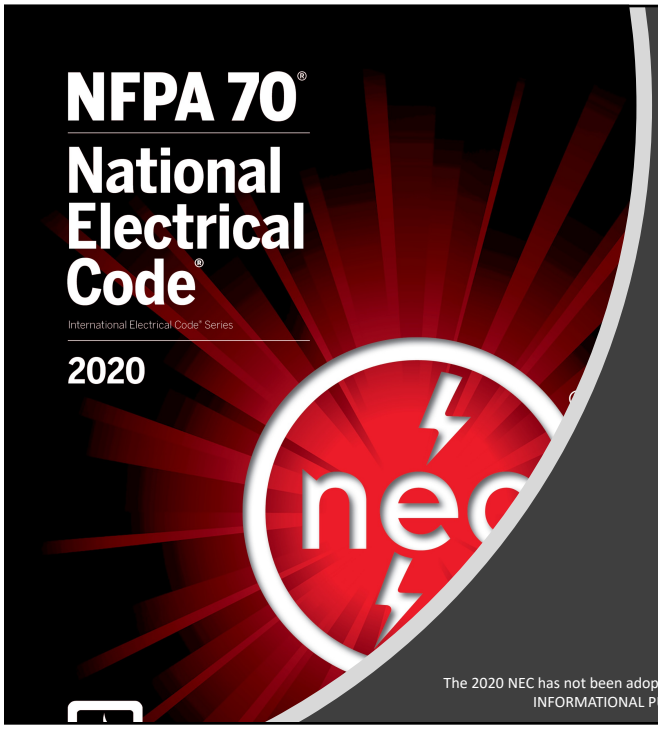
Matthews Electrical Services
Ohio Training Agency #48714
Henry Matthews, PE, CPE, CESCP

MATTHEWS ELECTRICAL SERVICES

The 2020 NEC has not been adopted in Ohio. PRESENTED FOR INFORMATIONAL PURPOSES ONLY

1

1



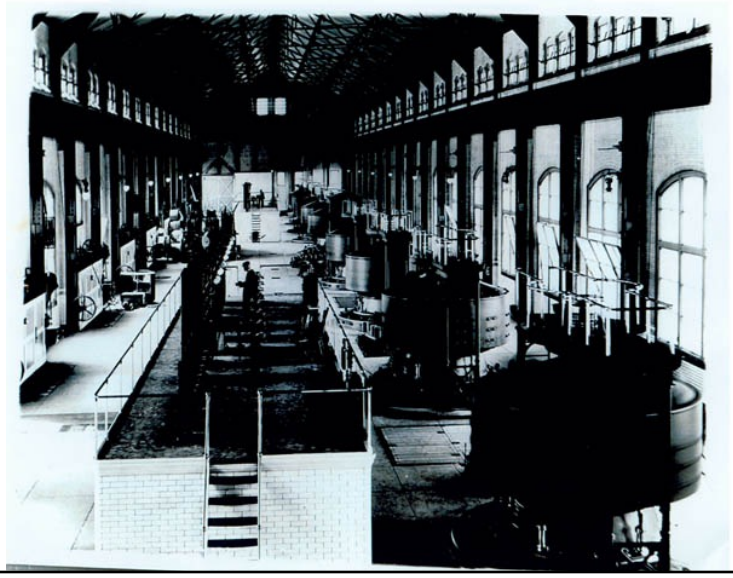
Generators
NEC Article: 445

The 2020 NEC has not been adopted in Ohio. PRESENTED FOR INFORMATIONAL PURPOSES ONLY

2

2

Niagara Falls power Co. 1895
The first major hydro-electric power plant in the world
Adams Station, power house #1



3

3

The 2020 NEC has not been adopted in Ohio. PRESENTED FOR INFORMATIONAL PURPOSES ONLY

4

4

5

5

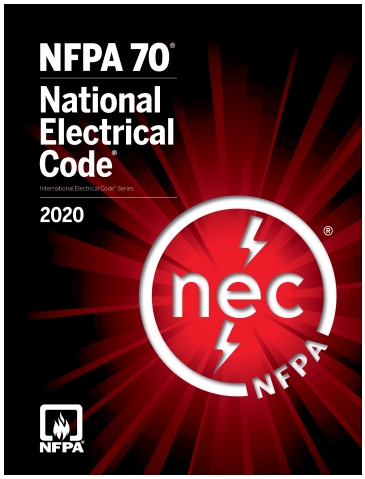
Roll Call!

The 2020 NEC has not been adopted in Ohio. PRESENTED FOR INFORMATIONAL PURPOSES ONLY

6

6

Generators
Article 445



The 2020 NEC has not been adopted in Ohio. PRESENTED FOR INFORMATIONAL PURPOSES ONLY

7

7

Course Description and Objectives

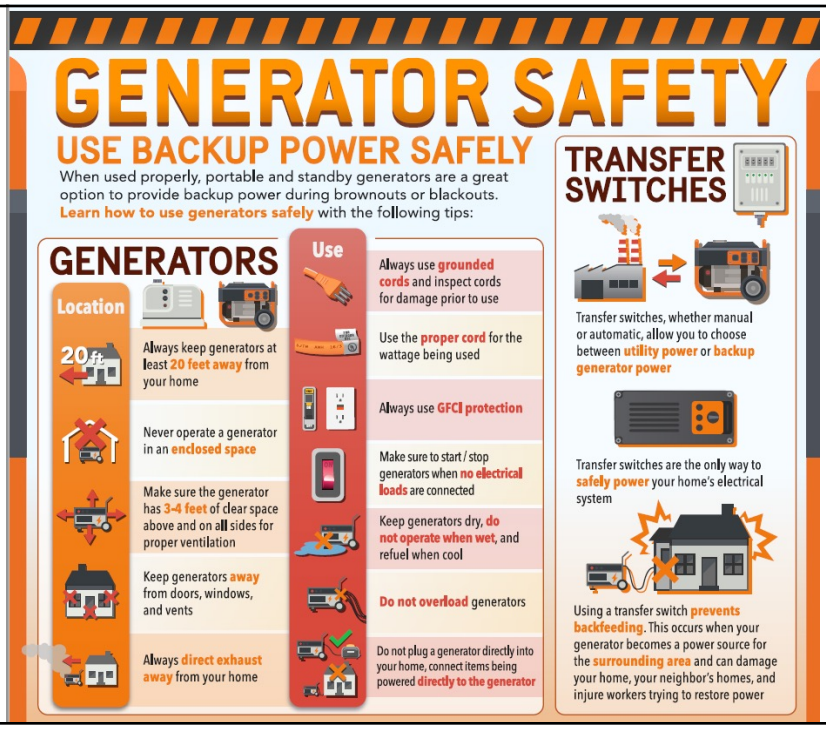
- Generators are a critical part of our lives. We depend on them to keep the lights on and for other important operations when the utility power goes down. However, improper design and use of generator systems can lead to disastrous and even fatal results.
- The objective of this 4-hour course is to provide the end-user with the NEC and other requirements to install a safe and code-compliant generator installation.
- This course will cover generator safety requirements, portable and standby generators, transfer switches, separately derived systems, grounding and bonding of generator systems and more.
- A design example of a home standby generator installation will be included to reinforce the main topics covered

8

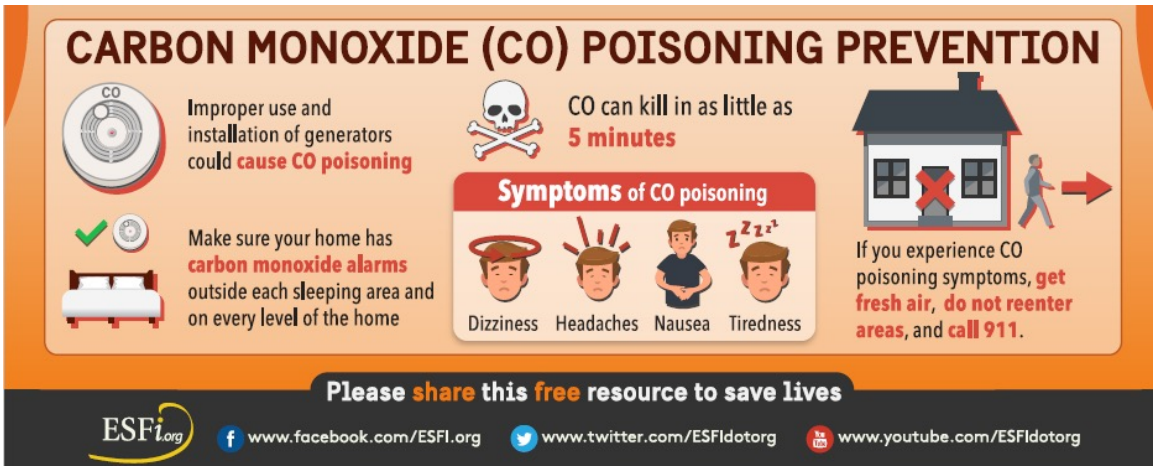
Agenda

- Generator types
  - Portable
  - Standby
  - Vehicle mounted
- Definitions
  - Separately derived system
- Applicable standards and codes
- Generator Safety
- NEC applicable articles:
- Overcurrent and overvoltage protection
- Conductor sizing
- Grounding and bonding
- Transfer switches
- Other considerations
  - Layout, placement, ventilation
  - Generators in parallel
- Maintenance
- Residential design and installation example
  - Load estimate and generator sizing
  - Surge loads

9



10



11

Generator Basics

- Generator Definition (Britannica Encyclopedia)
  - Also called dynamo
  - Any machine that converts mechanical energy to electricity
- Electric Motor Definition (Britannica Encyclopedia)
  - Any class of devices that convert electrical energy to mechanical energy, usually by employing electromagnetic phenomena

12

Emergency and Standby Power

- Resources
  - 2020 NEC
  - 2012 International Building Code
  - NFPA 101 Life Safety Code
  - NFPA 99, Health Care Facilities Code
  - NFPA 5000 Building Construction and Safety Code
- Determine which one applies to your jurisdiction

13

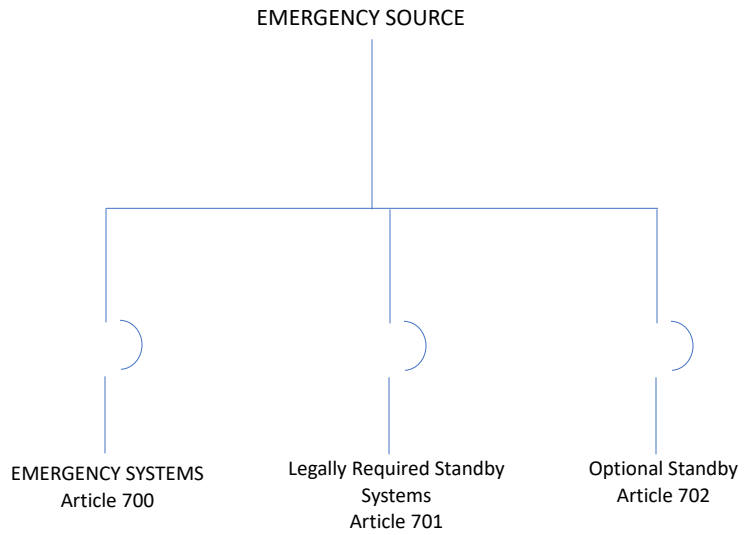
Emergency and Standby Power

- Types of systems (NEC)
  - Emergency Systems (Article 700)*
  - Legally Required Systems (Article 701)*
  - Optional Standby Systems (Article 702)

***Legally required by municipal, state, federal or other codes**

14

Emergency Source Wiring (700.10(B))



15

Definitions

- NEC 700.2
  - Emergency systems – Emergency Power shall automatically supply power within the required application (illumination, exit signs, smoke ventilation systems, fire alarms, elevators, fire pumps, PA systems, critical industrial processes etc.) in no less than 10 seconds
  - Legally Required Systems – required to automatically supply power to selected loads, other than those classified as emergency, during an event of loss of normal power. Power shall be restoring in no less than 60 seconds
    - Examples: heating and refrigeration, communications systems, sewage disposal, smoke ventilation systems and industrial processes that could create hazards or interfere with fire rescue operations if normal power was interrupted.

16

Definitions

- NEC 700.2
  - Emergency systems
  - Those systems legally required and classed as emergency by the municipal, state, federal, or other codes, or by any governmental agency having jurisdiction.
  - These systems are intended to automatically supply illumination, power, or both, to designated areas and equipment in the event of failure of the normal supply or in the event of accident to elements of a system intended to supply, distribute, and control power and illumination essential for safety to human life.

17

Definitions (Emergency Systems – continued)

- NEC 700.2
  - *Informational note:*
  - *Emergency systems are generally installed in places of assembly where artificial illumination is required for safe exiting and for panic control in buildings subject to occupancy by large numbers of persons, such as hotels, theaters, sports arenas, health care facilities, and similar institutions.*
  - *Emergency systems may also provide power for such functions as ventilation where essential to maintain life, fire detection and alarm systems, elevators, fire pumps, public safety communications systems, industrial processes where current interruption would produce serious life safety or health hazards, and similar functions.*

18

Definitions

- IBC:
  - Emergency Power – A power system that automatically provides secondary power within 10 seconds after primary power is lost
  - Standby Power – A power system that supplies secondary power within 60 seconds once primary power is lost

19

Definitions

- NEC 701.2
  - **Legally Required Standby Systems:**
  - Those systems required and so classed as legally required standby systems by municipal, state, federal, or other codes or by any governmental agency having jurisdiction.
  - These systems are intended to automatically supply power to the selected loads (other than those classed as emergency systems) in the event of failure of the normal source.
  - *Informational note: Legally required standby systems are typically installed to serve loads, such as heating and refrigeration systems, sewage disposal, lighting systems, and industrial processes, that when stopped during any interruption of the normal electrical supply, could create hazards or hamper rescue or fire-fighting operations.*

20

Definitions

- NEC 702.2
  - **Optional Standby Systems:**
  - Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system.
  - These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually.
  - *Informational note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communication systems, industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.*

21

Definitions

- **Service**: The conductors and equipment connecting the servicing utility to the wiring system of the premises served
- **Separately Derived System**: An electrical source, other than a utility, having no direct connection(s) to circuit conductors of any other electrical source other than those established by grounding and bonding connections.
- **Transfer switch**: An automatic or non-automatic device for transferring one or more load conductor connections from one power source to another.
- **Power Production Equipment** (new for 2020 NEC): Electrical generating equipment supplied by any other source other than a utility service, ut to the source system disconnecting means.
  - Examples: generators, solar PV systems and fuel cell systems

22

Generator Sizing

- Concerns:
  - Overloading
    - Engine speed drops and voltage and frequency become unstable
    - Causes amperage to surge
    - Generator trips offline or shuts down to prevent damage to itself
  - Underloading
    - Wet stacking: unburned fuel escapes into the exhaust side of the engine
    - Engine performance decreases and damage can occur
  - Ideal: 70-85% of the machine's rated capacity (Generac)

23

Types of Loads

- Continuous loads
- Surge loads: motors, pumps, compressors etc.
- Intermittent loads
- Drills, power tools, blenders

24

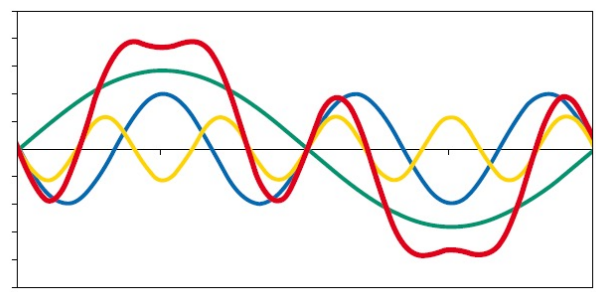
Types of Loads

- Resistive
- Inductive
  - Motors
    - Pumps
    - Refrigerators
    - Furnace
- Non-linear loads: create harmonics that can damage generators
  - May require harmonic filters or upsizing generator
  - Variable Frequency Drives (VFDs)
  - UPS
  - Switching power supplies

25

Harmonics

- Multiples of the fundamental baseline frequency of 60 Hz
- For example:
  - 2nd harmonic = 120 Hz
  - 3rd harmonic = 180 Hz
  - 4th harmonic = 240 Hz
  - 5th harmonic = 300 Hz
- See IEEE 519 for more details
  - Recommended Practice and Requirements for Harmonic Control in Electric Power Systems



Caption:
- nonsinusoidal waveform
- first harmonic (fundamental)
- third harmonic
- fifth harmonic

26

NEC Article 445

- 445.6 Listing: Stationary generators 600 volts and less shall be listed
- 445.10 Location: Generators shall be of a type suitable for the locations in which they are installed. They shall also meet the requirements for motors in 430.14
  - 430.14
    - Ventilation and maintenance – shall be located so that adequate ventilation is provided and so that maintenance such as lubrication of bearing and replacing of brushes, can be readily accomplished
    - Open motors (or generators) that have commutators or collector rings shall be located or protected so that sparks cannot reach adjacent combustible material

27

445.11 Marking

- Each generator shall be provided with a nameplate giving the
  - manufacturer's name
  - the rated frequency,
  - the number of phases if ac,
  - the rating in kilowatts or kilovolt-amperes,
  - the power factor,
  - the normal volts and amperes corresponding to the rating,
  - and the rated ambient temperature

28

445.11 Marking

- Marking shall be provided by the manufacturer to indicate whether or not the generator neutral is bonded to its frame.
- Where the bonding is modified in the field, additional marking shall be required to indicate whether the neutral is bonded to the frame.

29

445.12 Overcurrent Protection

- (A) Constant Voltage Generators shall be protected from overload by inherent design, circuit breakers, fuses, protective relays, or other identified overcurrent protective means suitable for the conditions of use.

30

445.13 Ampacity of Conductors

- (A) General: The ampacity of the conductors from the generator output terminals to the first distribution device(s) containing overcurrent protection shall not be les than 115 percent of the nameplate current rating of the generator.
- It shall be permitted to size the neutral conductors in accordance with 220.61.
- Conductors that must carry ground fault currents shall not be smaller than the minimum required size of the largest conductor.
  - Henry's note: This is the equipment grounding conductor (EGC) which is usually sized per NEC table 250.122

Exception: Where the design and operation of the generator prevent overloading, the ampacity of the conductors shall not be less than 100 percent of the nameplate current rating of the generator.

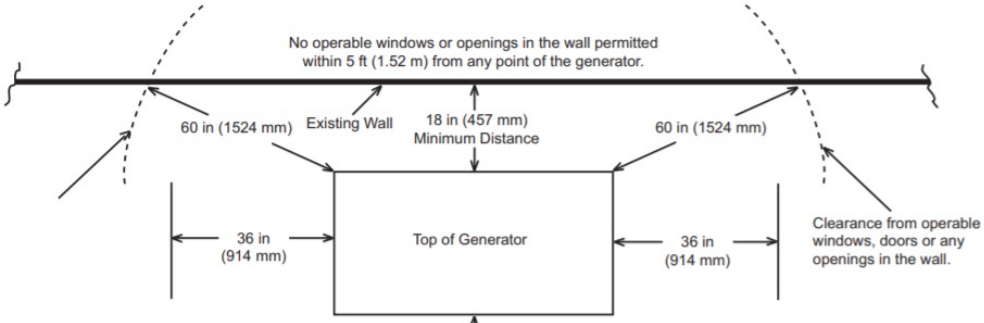
31

IEEE 142 – 2007
Grounding of Industrial and Commercial Power Systems

32

3.1 SITE SELECTION

From Generac Guardian series installation manual



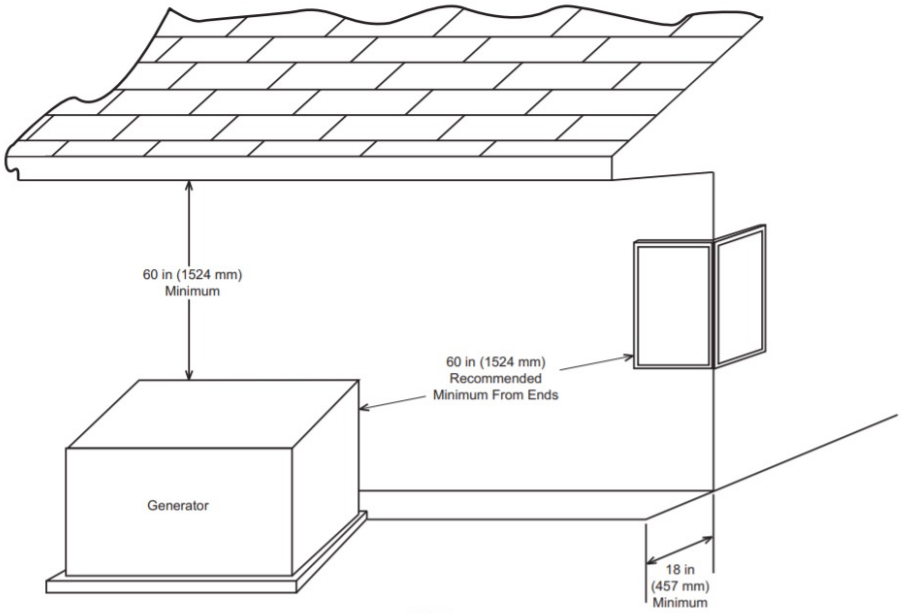
These guidelines are based upon fire testing of the generator enclosure and the manufacturer's requirement for air flow for proper operation. Local codes may be different and more restrictive than what is described here.

Clearance from the ends and front of the generator must be 36 in (914 mm). This would include shrubs, bushes or trees. Clearance at the top should be a minimum of 60 in (1524 mm) from any structure, overhang or projections from the wall. The generator should not be placed under a deck or other structure that is closed in and would limit or constrain air flow.

NOTE:
Removable fence panels for servicing cannot be placed less than 18 in (457 mm) in front of the generator.

33

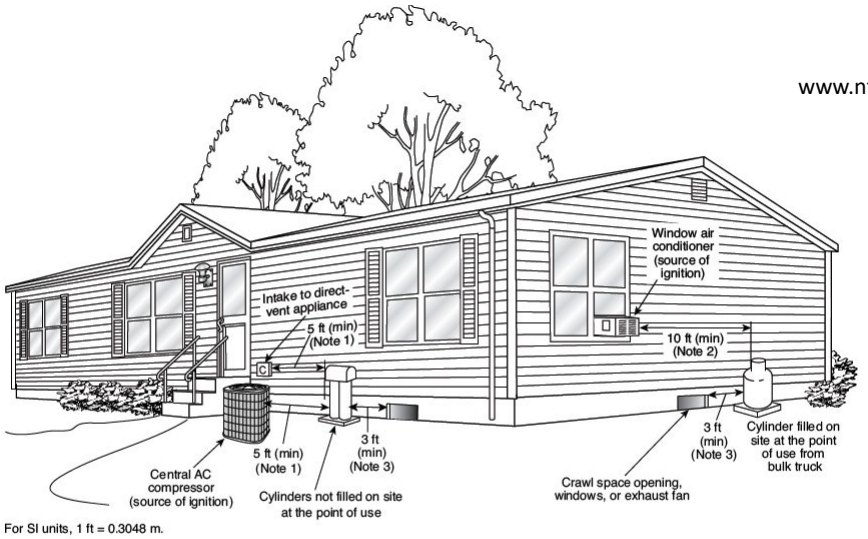
From Generac Guardian series installation manual



NOTE:
The generator can be placed under decks or structures as long as all clearances are met and local building codes are followed.

34

www.nfpa.org



For SI units, 1 ft = 0.3048 m.

Notes:
(1) 5 ft minimum from relief valve in any direction away from any exterior source of ignition, openings into direct-vent appliances, or mechanical ventilation air intakes. Refer to Table 6.3.4.3 of NFPA 58.
(2) If the cylinder is filled on site at the point of use from a bulk truck, the filling connection and vent valve must be at least 10 ft from any exterior source of ignition, openings into direct-vent appliances, or mechanical ventilation air intakes. Refer to 6.3.4.4 of NFPA 58.
(3) Refer to 6.3.4.3 of NFPA 58.

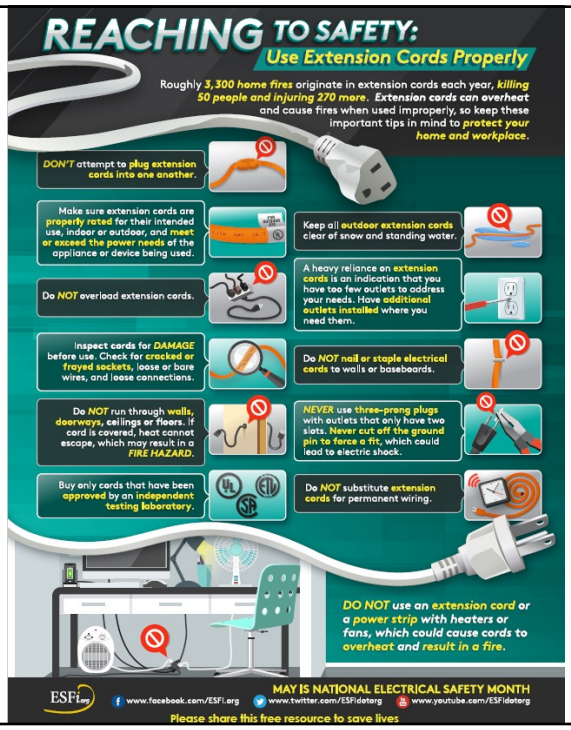
Proper placement of portable generator.

35

Extension cords

- Article 590 Temporary Installations

36



37

Electrical Sources

Utility

Other

- Generator(s)
- Solar PV
- Batteries
- Wind power
- UPS
- Etc.

38

Electrical Sources Continued

Utility

Separately Derived System

39

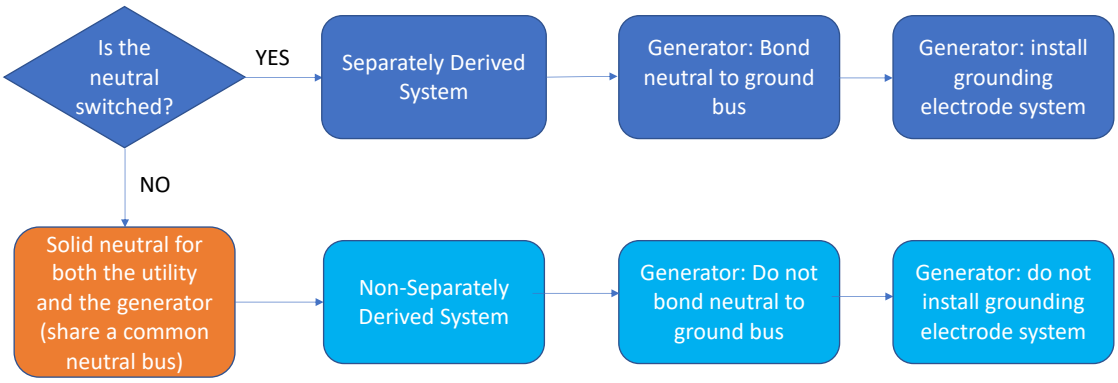
Grounding and Bonding of Sources:
Neutral to Ground Connection

Utility:	Separately Derived System:
• Main Bonding Jumper (MBJ)	• System Bonding Jumper (SBJ)

40

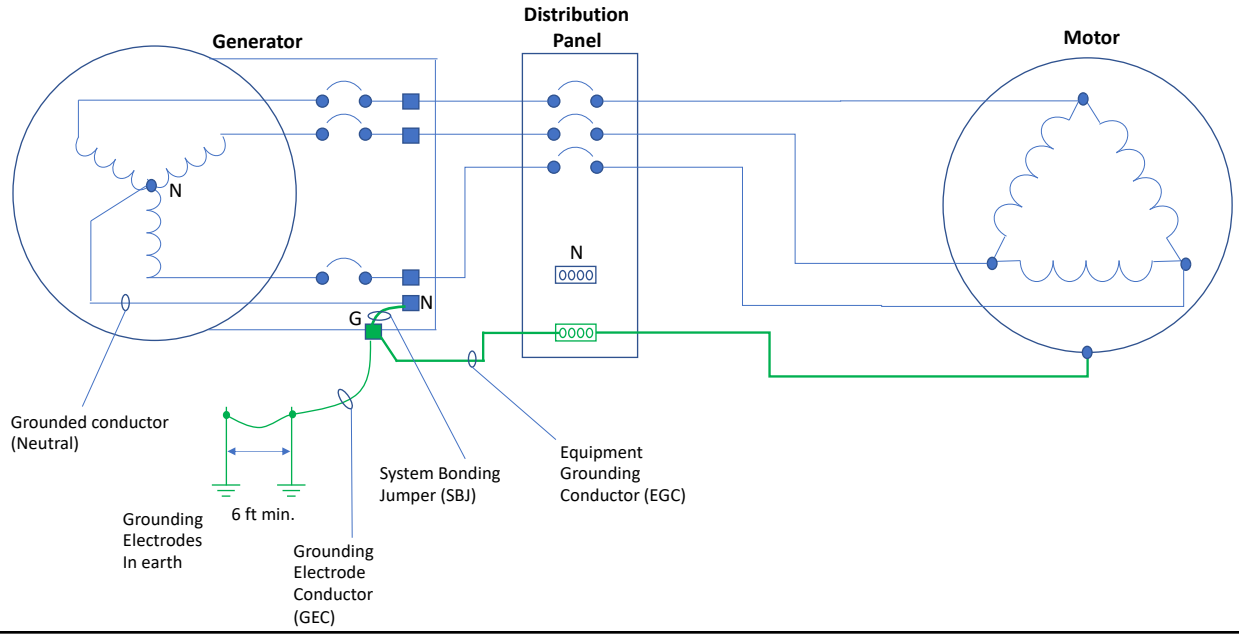
How Do You Tell With a Generator System?

- Look at the transfer switch



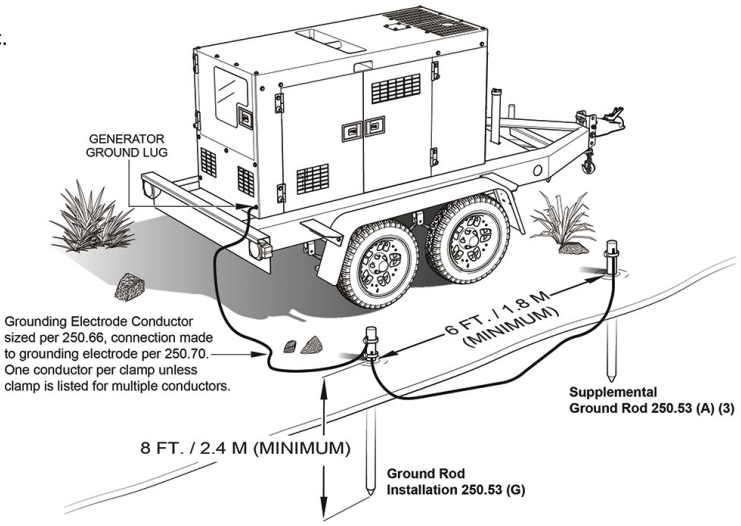
41

Generator as Separately Derived System



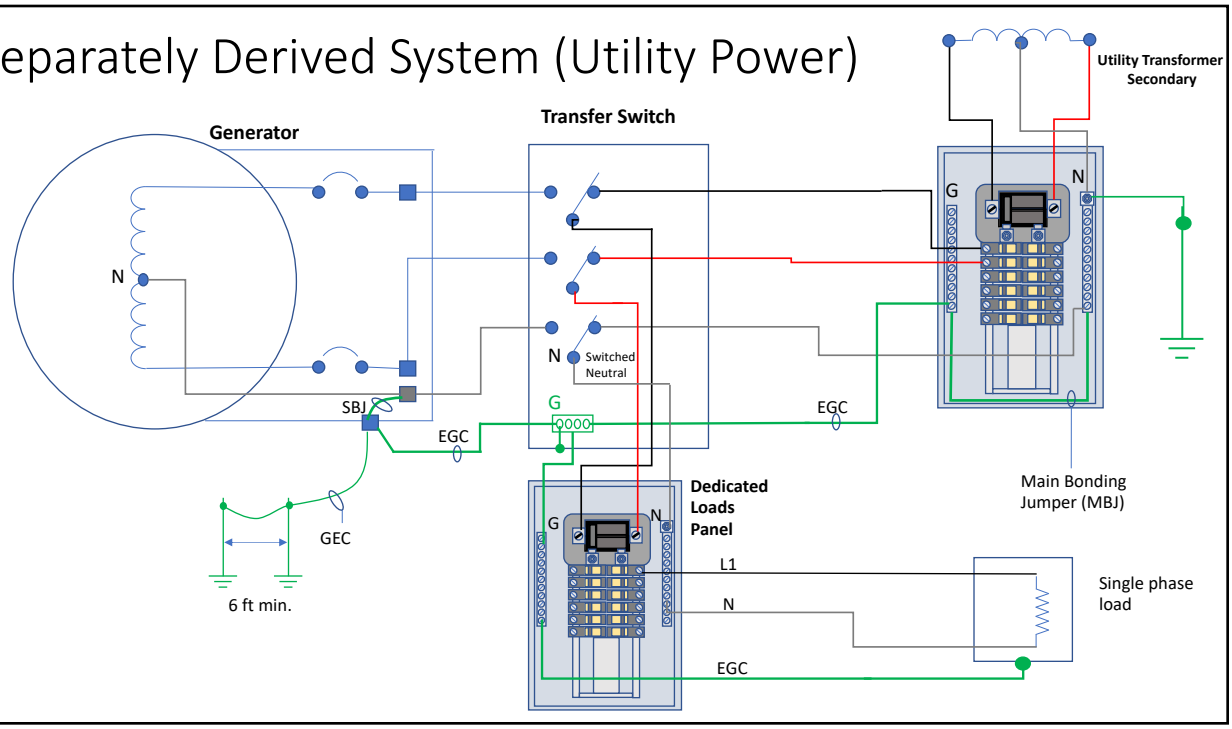
42

From Multiquip, Inc.

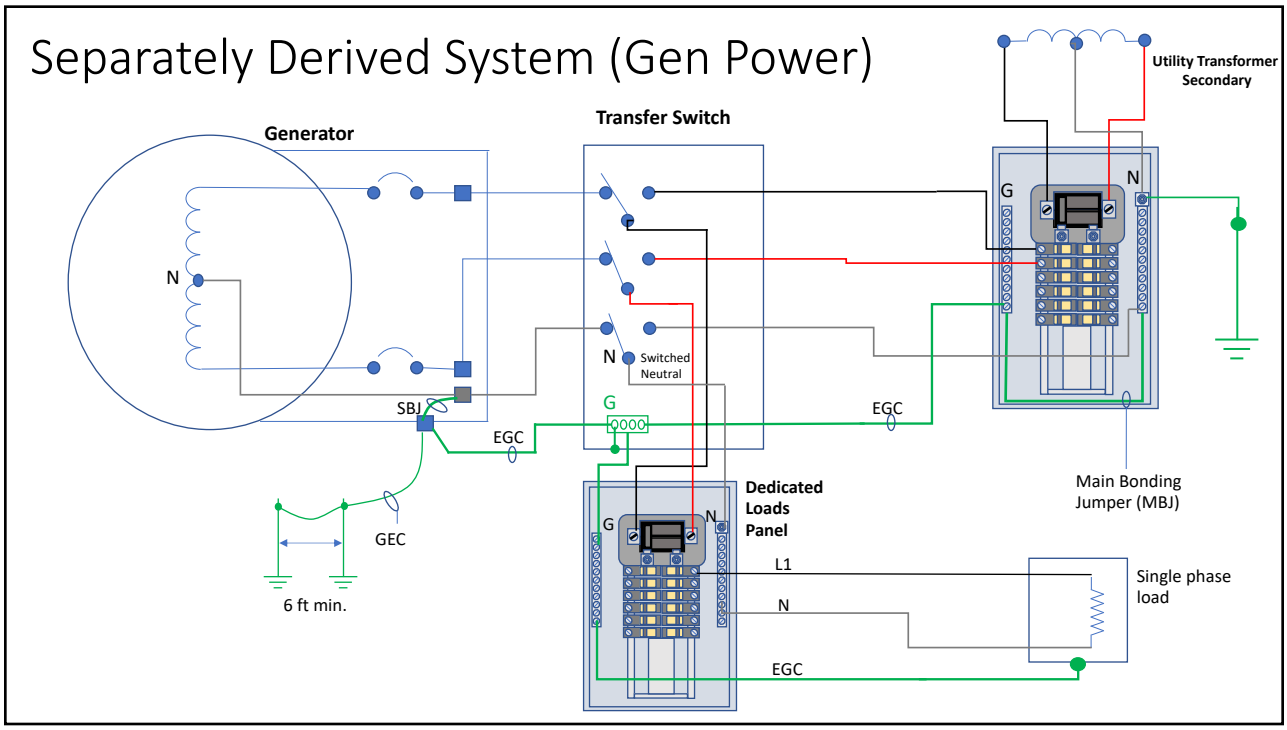


43

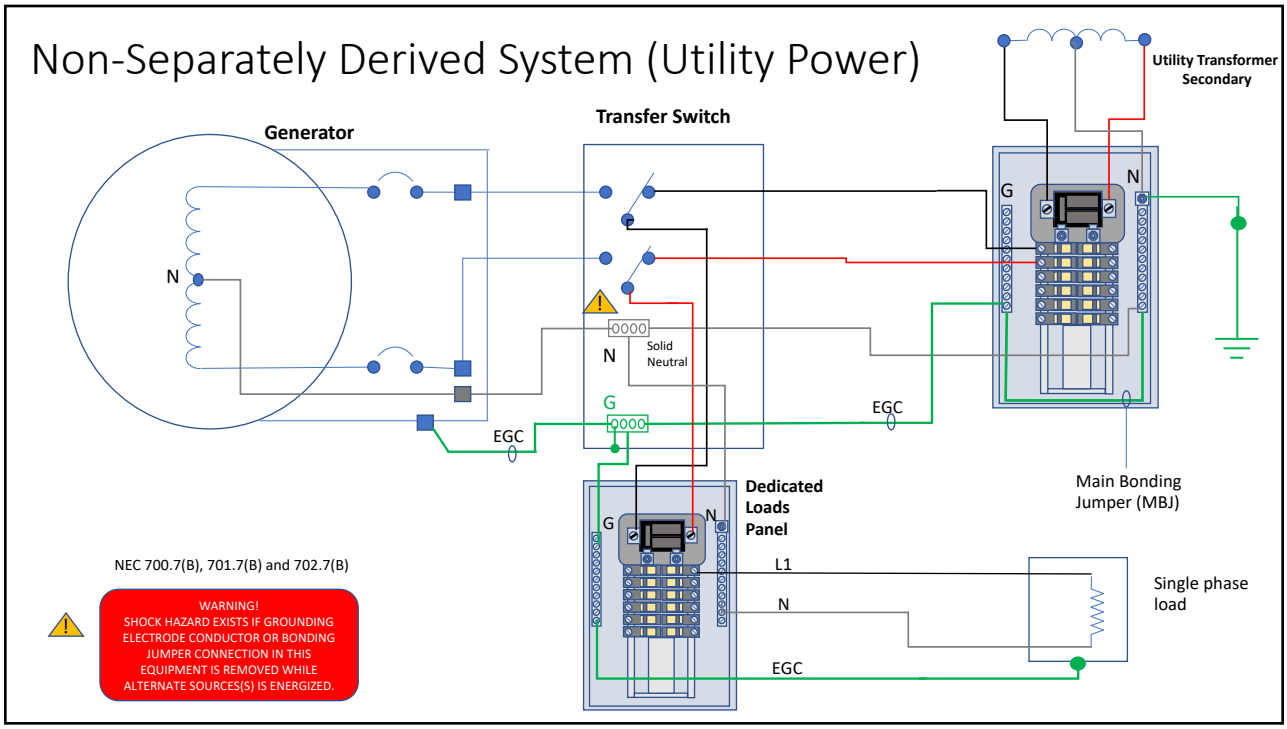
Separately Derived System (Utility Power)



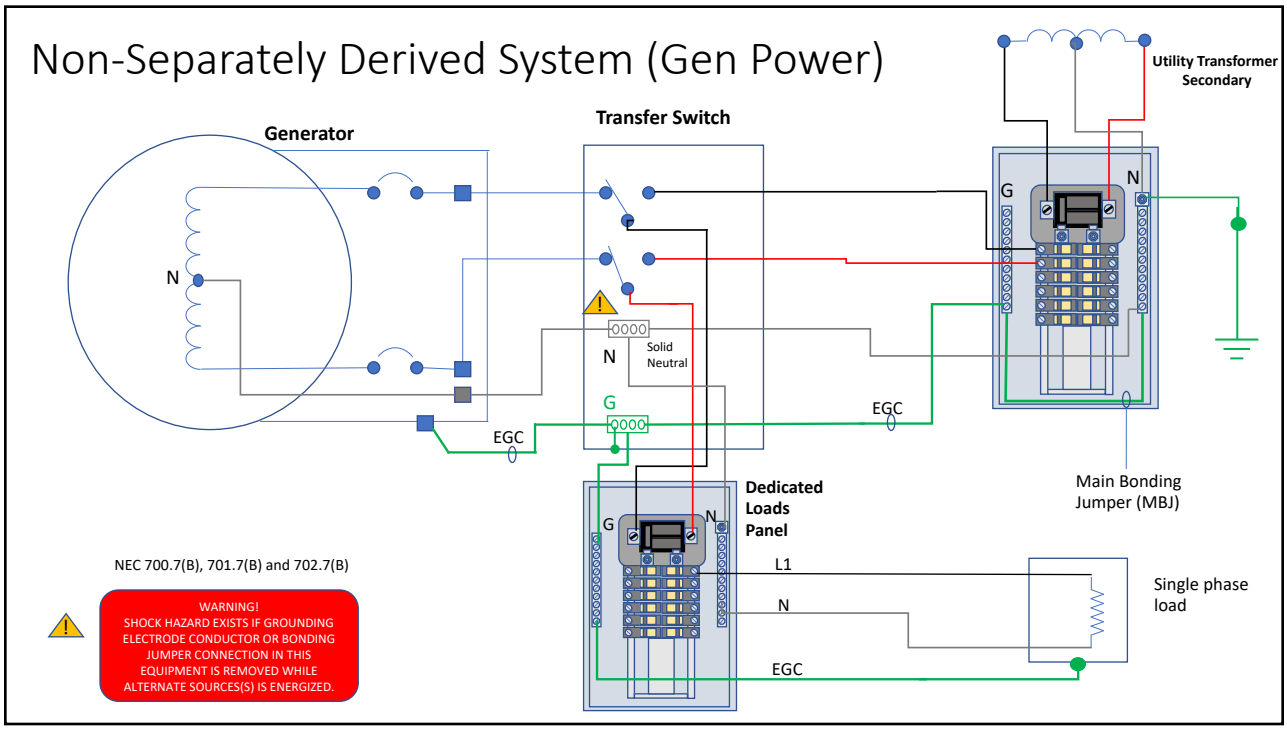
44


Separately Derived System (Gen Power)
Utility Transformer Secondary
Transfer Switch
Generator
N
G
N
N
Switched Neutral
G
SBJ
EGC
EGC
Dedicated Loads Panel
Main Bonding Jumper (MBJ)
GEC
6 ft min.
L1
N
EGC
Single phase load

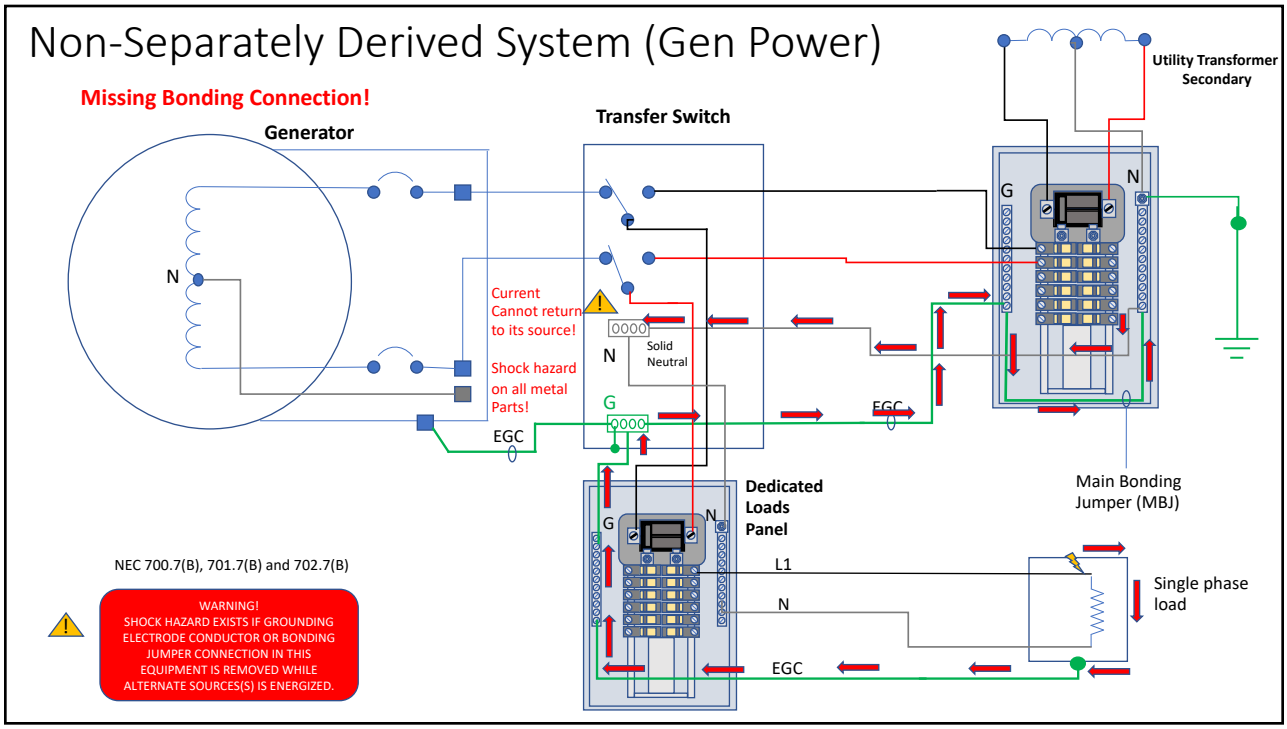
45


Non-Separately Derived System (Utility Power)
Utility Transformer Secondary
Transfer Switch
Generator
N
G
N
N
Solid Neutral
G
EGC
EGC
Dedicated Loads Panel
Main Bonding Jumper (MBJ)
NEC 700.7(B), 701.7(B) and 702.7(B)
WARNING!
SHOCK HAZARD EXISTS IF GROUNDING ELECTRODE CONDUCTOR OR BONDING JUMPER CONNECTION IN THIS EQUIPMENT IS REMOVED WHILE ALTERNATE SOURCES(S) IS ENERGIZED.
L1
N
EGC
Single phase load

46


Non-Separately Derived System (Gen Power)
Utility Transformer Secondary
Transfer Switch
Generator
N
G
N
Solid Neutral
N
G
EGC
EGC
Dedicated Loads Panel
Main Bonding Jumper (MBJ)
G
N
L1
N
EGC
Single phase load
NEC 700.7(B), 701.7(B) and 702.7(B)
WARNING!
SHOCK HAZARD EXISTS IF GROUNDING ELECTRODE CONDUCTOR OR BONDING JUMPER CONNECTION IN THIS EQUIPMENT IS REMOVED WHILE ALTERNATE SOURCE(S) IS ENERGIZED.

47


Non-Separately Derived System (Gen Power)
Missing Bonding Connection!
Utility Transformer Secondary
Transfer Switch
Generator
N
G
N
Current Cannot return to its source!
Shock hazard on all metal Parts!
Solid Neutral
N
G
EGC
EGC
Dedicated Loads Panel
Main Bonding Jumper (MBJ)
G
N
L1
N
EGC
Single phase load
NEC 700.7(B), 701.7(B) and 702.7(B)
WARNING!
SHOCK HAZARD EXISTS IF GROUNDING ELECTRODE CONDUCTOR OR BONDING JUMPER CONNECTION IN THIS EQUIPMENT IS REMOVED WHILE ALTERNATE SOURCE(S) IS ENERGIZED.

48

Other Labeling Requirements

For Portable Generators

- 702.7(C) Signs for Generator Power Inlet
- Where a power inlet is used for a temporary connection to a portable generator, a warning sign shall be placed near the inlet to indicate the type of derived system that the system is capable of based on the wiring of the transfer equipment. The sign shall display one of the following warnings:

49

WARNING!

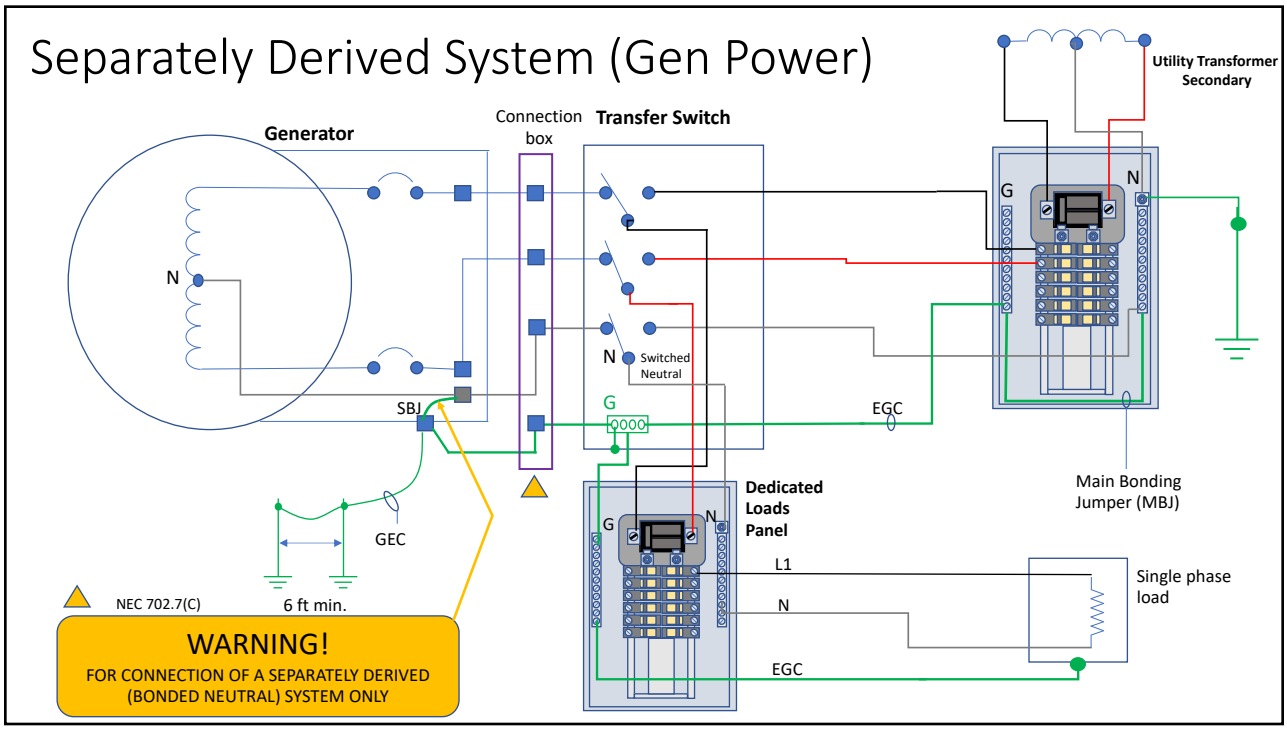
FOR CONNECTION OF A SEPARATELY DERIVED (BONDED NEUTRAL) SYSTEM ONLY

OR

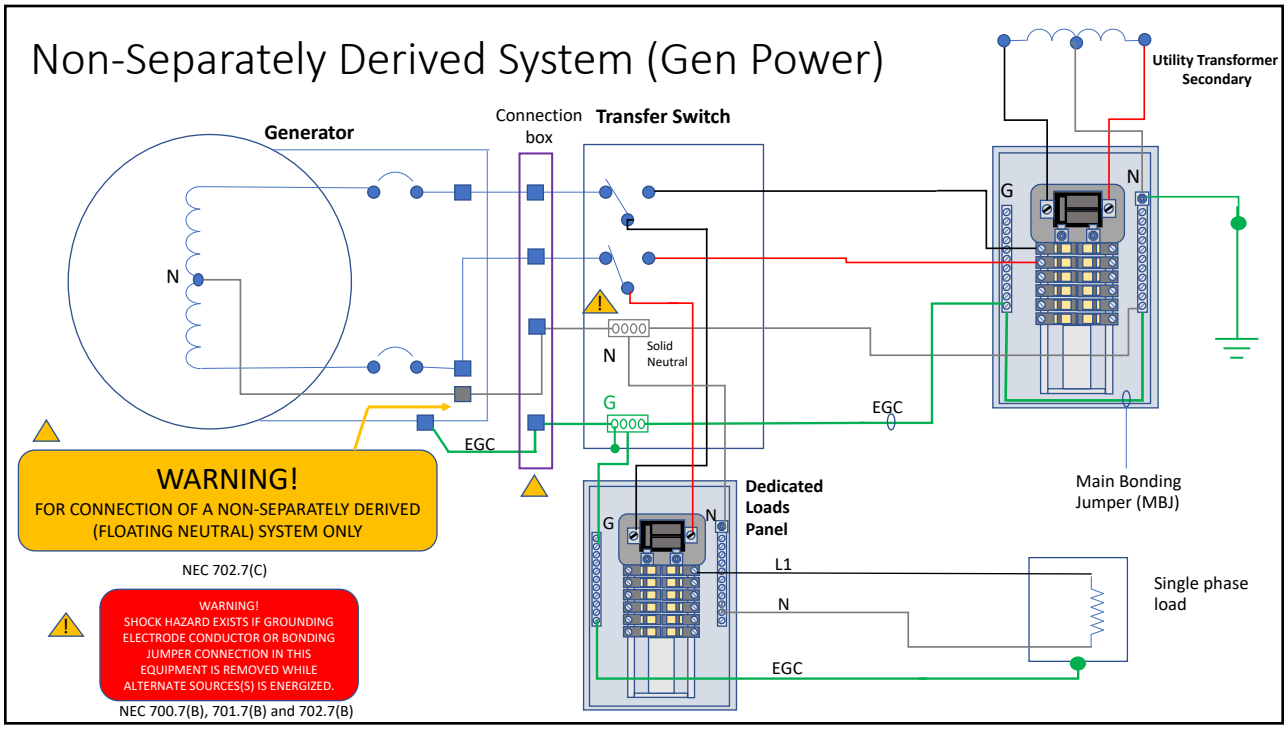
WARNING!

FOR CONNECTION OF A NON-SEPARATELY DERIVED (FLOATING NEUTRAL) SYSTEM ONLY

50

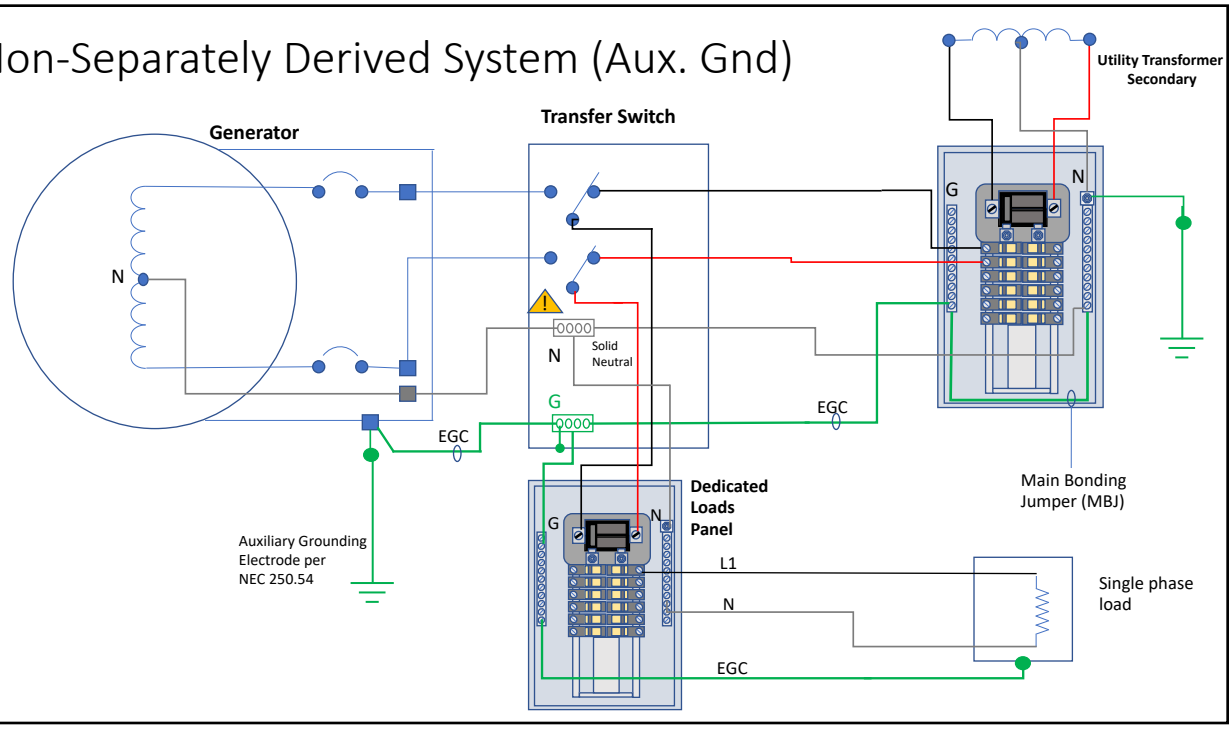

Separately Derived System (Gen Power)
Utility Transformer Secondary
Generator
Connection box
Transfer Switch
N
G
N
N
Switched Neutral
G
SBJ
EGC
Main Bonding Jumper (MBJ)
Dedicated Loads Panel
G
N
L1
N
EGC
Single phase load
GEC
6 ft min.
NEC 702.7(C)
WARNING!
FOR CONNECTION OF A SEPARATELY DERIVED (BONDED NEUTRAL) SYSTEM ONLY

51


Non-Separately Derived System (Gen Power)
Utility Transformer Secondary
Generator
Connection box
Transfer Switch
N
G
N
N
Solid Neutral
G
EGC
EGC
Main Bonding Jumper (MBJ)
WARNING!
FOR CONNECTION OF A NON-SEPARATELY DERIVED (FLOATING NEUTRAL) SYSTEM ONLY
Dedicated Loads Panel
G
N
L1
N
EGC
Single phase load
NEC 702.7(C)
WARNING!
SHOCK HAZARD EXISTS IF GROUNDING ELECTRODE CONDUCTOR OR BONDING JUMPER CONNECTION IN THIS EQUIPMENT IS REMOVED WHILE ALTERNATE SOURCES(S) IS ENERGIZED.
NEC 700.7(B), 701.7(B) and 702.7(B)

52

Non-Separately Derived System (Aux. Gnd)



53

NEC 250.54 Auxiliary Grounding Electrode

- One or more grounding electrodes shall be permitted to be connected to the equipment grounding conductors specified in 250.118 and shall not be required to comply with the electrode bonding requirements of 250.50 or 250.53(C) or the resistance requirements of 250.53(A)(2) Exception, but the earth shall not be used as an effective ground-fault current path as specified in 250.4(A)(5) and 250.4(B)(4)

54

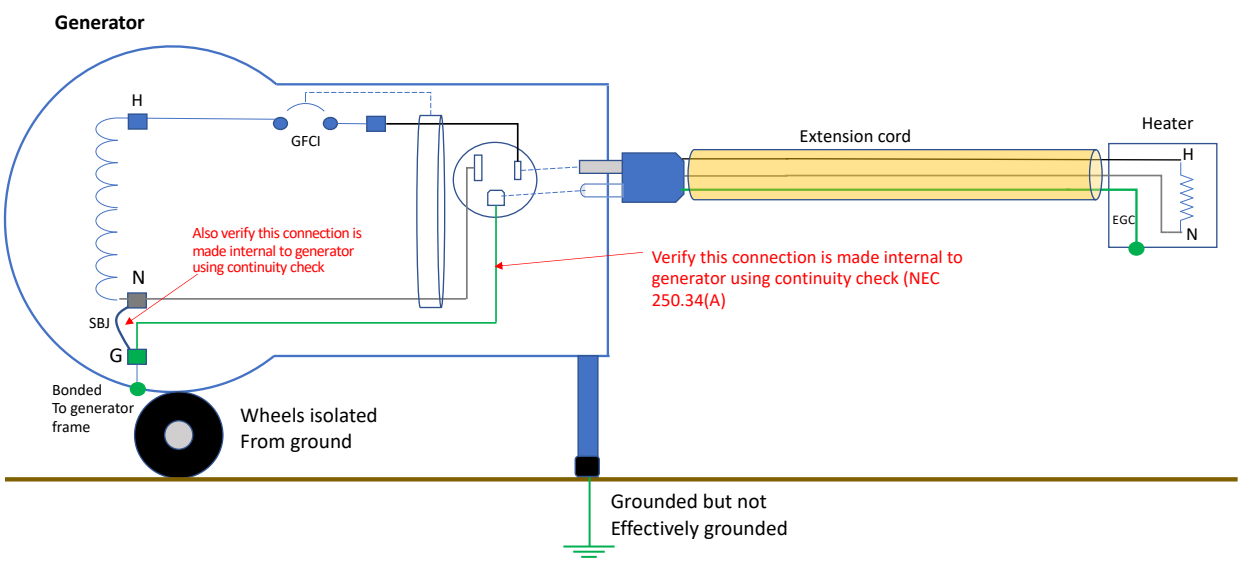
Small Portable Generator Grounding/Bonding NEC 250.34(A)

- The frame of a portable generator shall not be required to be connected to a grounding electrode as defined in 250.52 for a system supplied by the generator under both of the following conditions

1. The generator supplies only equipment mounted on the generator, cord-and-plug-connected equipment through receptacles mounted on the generator, or both
2. The normally non-current-carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles are connected to the generator frame.

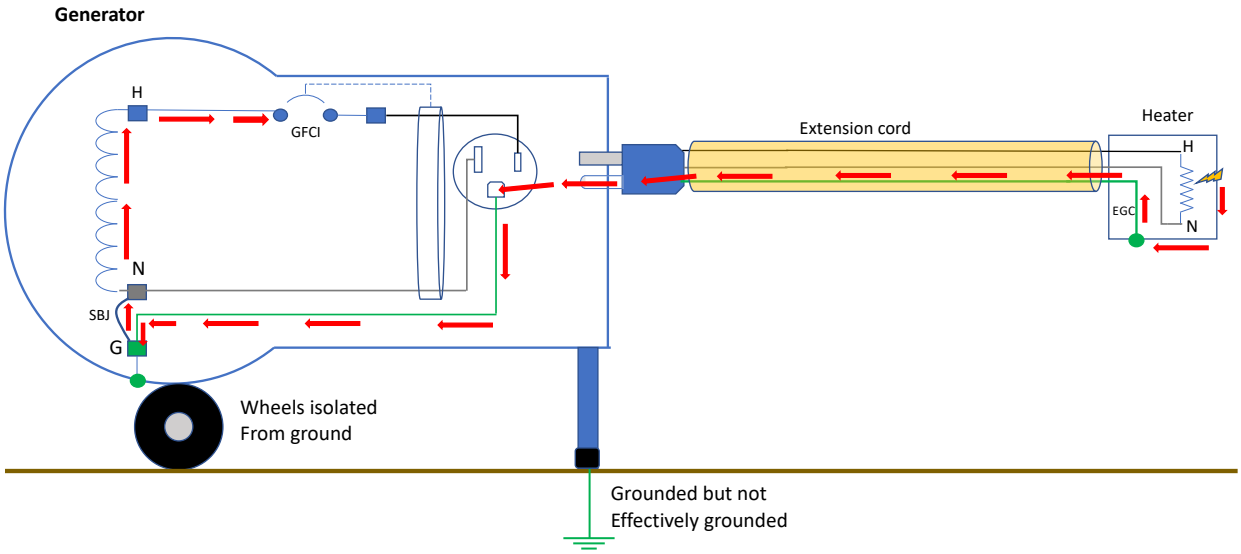
55

Portable Generator



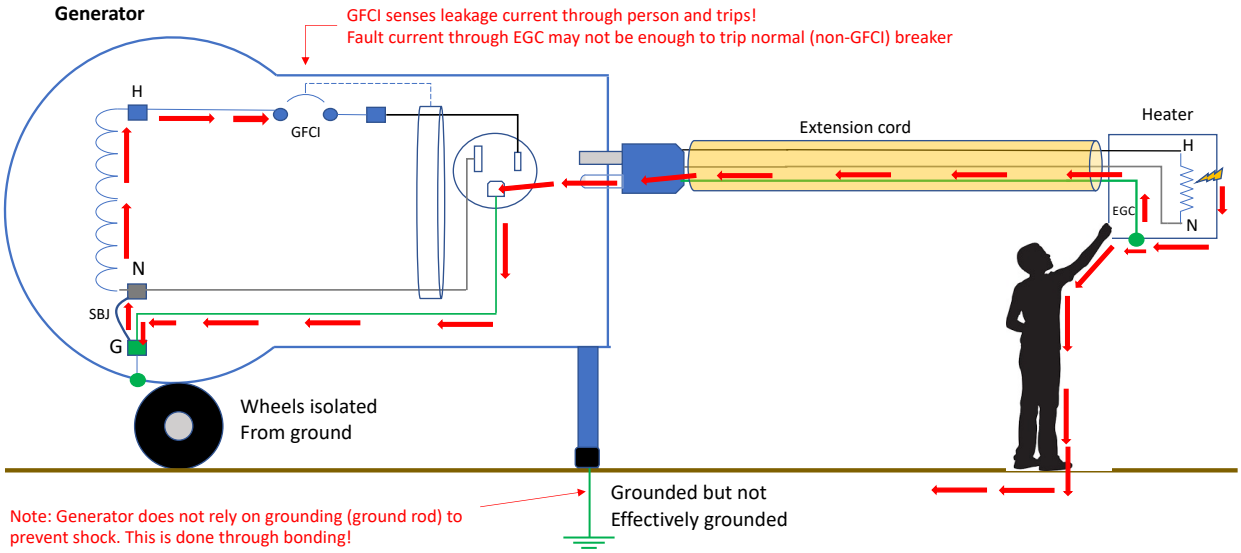
56

Portable Generator with fault in equipment



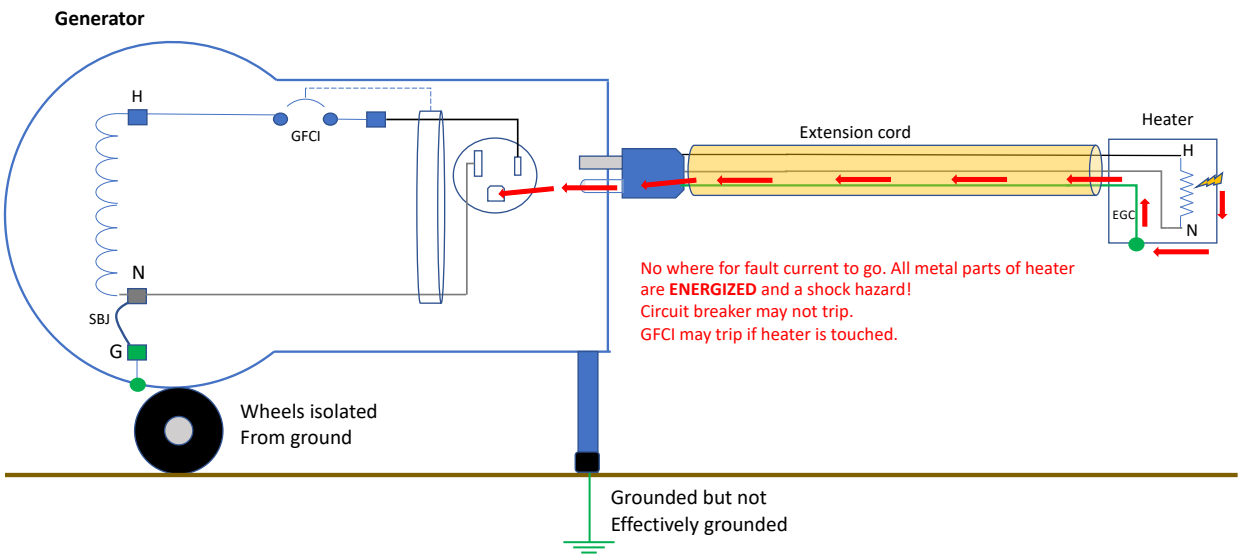
57

Portable Generator with fault in equipment and someone touches equipment frame



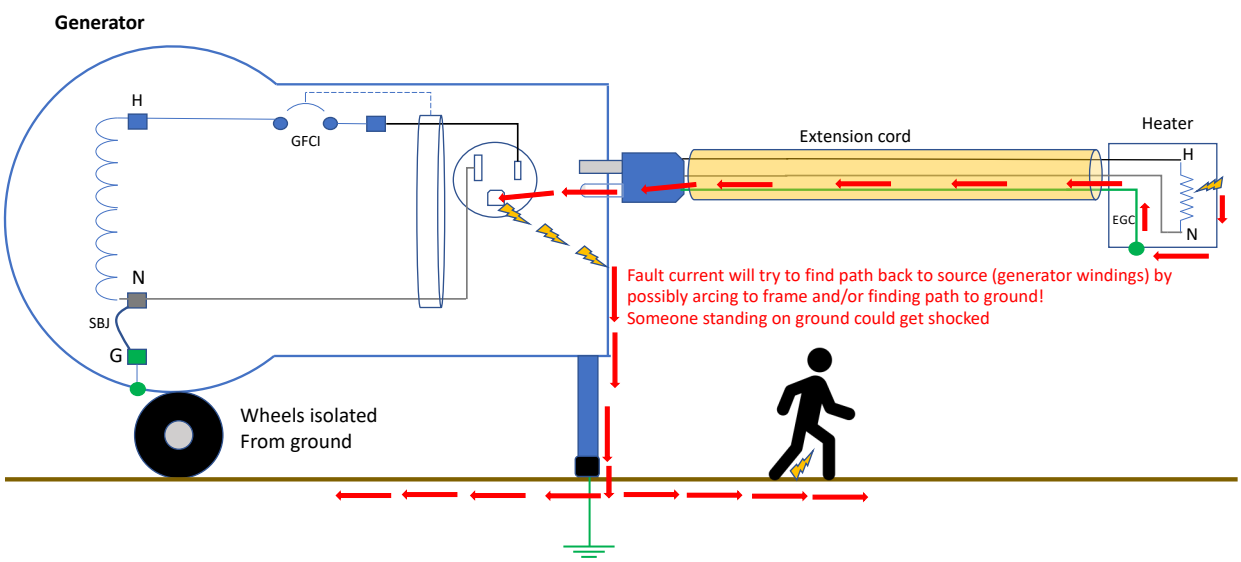
58

Portable Generator without receptacle bonded to frame



59

Portable Generator without receptacle bonded to frame



60

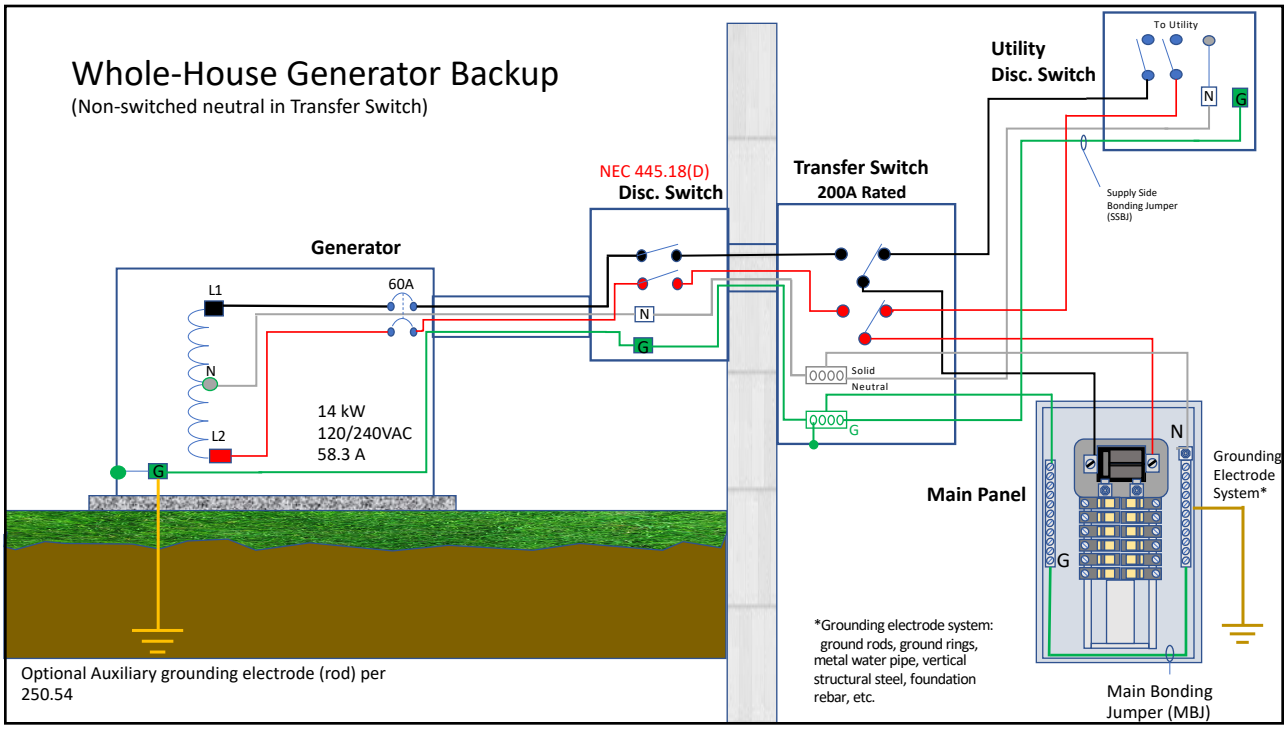
Sizing Example

- Standby generator
- 16 kW Continuous Power
- 120/240V split phase output
- Transfer switch has solid neutral connection for generator
  - No neutral switch
  - Not a separately derived system

61

Whole-House Generator Backup

(Non-switched neutral in Transfer Switch)



62

Calculations

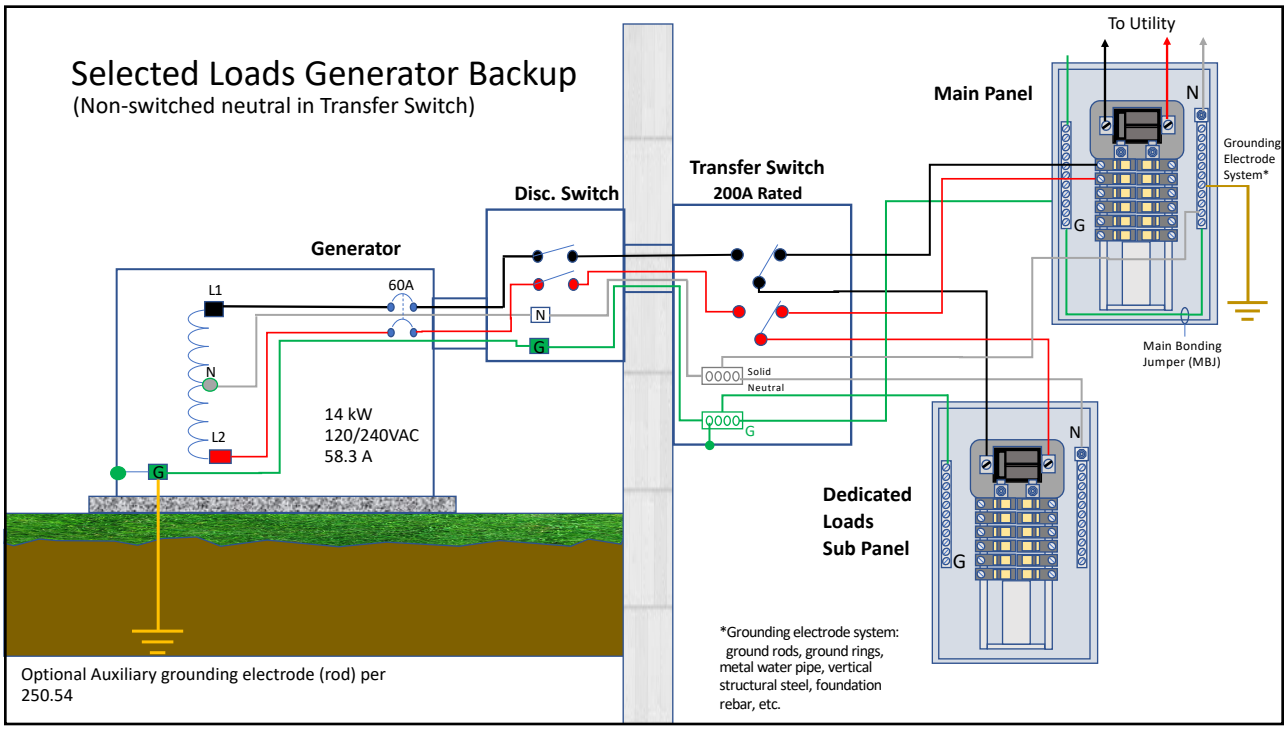
- Wire type: THWN
- **Conductor Sizing**:
  - Generator Full Load Amps (FLA): 58.3
  - Multiply FLA x 1.15 per 445.13: 58.3 x 1.15 = 67 A
  - Use Table 310.16 using 75 deg C column
    - # 6 good for 65 amps ✗
    - # 4 good for 85 amps ✓
  - Check: Will 60 amp circuit breaker on the generator protect the #4 wire? **Yes!**

63

Calculations

- **Overcurrent Protection**:
  - 60 Amp circuit breaker included in generator
  - Ok per 445.12(A)
    - "Constant-voltage generators, except ac generator exciters, shall be protected from overload by inherent design, circuit breakers, fuses, protective relays, or other identified overcurrent protective means suitable for the conditions of use."

64



65

445.18(D) Generator Emergency Shutdown in One- and Two-Family Dwelling Units

- Type of change: New
- 2020 NEC: requires an emergency shutdown device to be located outside all one- and two-family dwelling units at a readily accessible location
  - Not required cord-and-plug-connected portable generators.
- This emergency shutdown device was deemed necessary for fire service and other first responders to secure on-site power sources during emergencies such as a house fire.

FOR INFORMATIONAL PURPOSES ONLY. NOT CURRENT CODE IN OHIO

66

66

FOR INFORMATIONAL PURPOSES ONLY. NOT CURRENT CODE IN OHIO

67

67

Design Example

- House prone to power outages in summer due to storms
- Summer temps can exceed 90 degrees F on most days
- Duration of outages usually last from 2 to 24 hours
- Homeowner only wants to back up certain loads, not whole house
- Electrical service is 120/240V, 200 amps
- Backup to loads shall be automatic
- Not all appliances and lights will be on during outage, only those necessary
- Homeowner does not plan to cook anything during outage
- Homeowner does not plan to do any clothes washing/drying during outage
- Homeowner wants air conditioner to run during outages
- Natural gas is supplied to the house for heating

68

Appliance Consumption Table

Appliance	Watts	Appliance	Watts	Appliance	Watts
Kitchen		**Living Room**		**Tools**	
Blender	500	Bluray Player	15	Band Saw – 14″	1100
Can Opener	150	Cable Box	35	Belt Sander – 3″	1000
Coffee Machine	1000	DVD Player	15	Chain Saw – 12″	1100
Dishwasher	1200-1500	TV – LCD	150	Circular Saw – 7-1/4″	900
Espresso Machine	800	TV – Plasma	200	Circular Saw 8-1/4″	1400
Freezer – Upright – 15 cu. ft.	1240 Wh/Day**	Satellite Dish	25	Disc Sander – 9″	1200
Freezer – Chest – 15 cu. ft.	1080 Wh/Day**	Stereo Receiver	450	Drill – 1/4″	250
Fridge – 20 cu. ft. (AC)	1411 Wh/day**	Video Game Console	150	Drill – 1/2″	750
Fridge -16 cu. ft. (AC)	1200 Wh/day**	**Lights**		Drill – 1″	1000
Garbage Disposal	450	CFL Bulb – 40 Watt Equivalent	11	Hedge Trimmer	450
Kettle – Electric	1200	CFL Bulb – 60 Watt Equivalent	18	Weed Eater	500
Microwave	1000	CFL Bulb – 75 Watt Equivalent	20	**Misc.**	
Oven – Electric	1200	CFL Bulb – 100 Watt Equivalent	30	Clock Radio	7

69

Appliance	Watts	Appliance	Watts	Appliance	Watts
Toaster	850	Compact Fluorescent 20 Watt	22	Curling Iron	150
Toaster Oven	1200	Compact Fluorescent 25 Watt	28	Dehumidifier	280
Stand Mixer	300	Halogen – 40 Watt	40	Electric Shaver	15
Heating/Cooling		Incandescent 50 Watt	50	Electric Blanket	200
Box Fan	200	Incandescent 100 Watt	100	Hair Dryer	1500
Ceiling Fan	120	LED Bulb – 40 Watt Equivalent	10	Humidifier	200
Central Air Conditioner – 24,000 BTU NA	3800	LED Bulb – 60 Watt Equivalent	13	Radiotelephone – Receive	5
Central Air Conditioner – 10,000 BTU NA	3250	LED Bulb – 75 watt equivalent	18	Radiotelephone – Transmit	75
Furnace Fan Blower	800	LED Bulb – 100 Watt Equivalent	23	Sewing Machine	100
Space Heater NA	1500	**Office**		Vacuum	1000
Tankless Water Heater – Electric	18000	Desktop Computer (Standard)	200		
Water Heater – Electric	4500	Desktop Computer (Gaming)	500		
Window Air Conditioner 10,000 BTU NA	900	Laptop	100		
Window Air Conditioner 12,000 BTU NA	3250	LCD Monitor	100		
Well Pump – 1/3 1HP	750	Modem	7		

Note: TVs, Computers, and other devices left plugged in but not turned on still draw power.

**To estimate the number of hours that a refrigerator actually operates at its maximum wattage, divide the total time the refrigerator is plugged in by three. Refrigerators, although turned "on" all the time, actually cycle on and off as needed to maintain interior temperatures.

70

Appliance	Watts	Appliance	Watts
Laundry		Paper Shredder	150
Clothes Dryer – Electric	3000	Printer	100
Clothes Dryer – Gas	1800	Router	7
Clothes Washer	800	Smart Phone – Recharge	6
Iron	1200	Tablet – Recharge	8

71

14 kW Generator

14RCAL with Automatic Transfer Switch and OnCue Plus

(0) Write a review

Starting at $4490.00* MSRP
Model Number 14RCAL
Fuel Type LPG, Natural Gas
Phase Single Phase or Three Phase
ATS Included
Remote Monitoring Included

*Starting price in US dollars. Does not include installation or accessories or costs to export outside the US.

FIND A DEALER | GET A QUOTE
REQUIRED COMPONENTS | FINANCING INFORMATION

72

FEATURES SPECS REQUIRED COMPONENTS ACCESSORIES

Model	**14RCAL**
Rated kW LP	14 kW
Rated kW NG	12 kW
Amps LP	58 amps
Amps NG	50 amps
Peak Motor Starting kVA @240 V	33 kVa
Alternator Note	All information shown is for 1 Phase 60 Hz generator with the largest alternator option available.
Displacement	725 cm³ (44 cu. in.)
Horsepower	NG 20.5 HP, LP 23.6 HP
Enclosure Material	Aluminum
Sound Output During Weekly Exercise	63 dB(A)
Sound Output During Full-speed Operation	67 dB(A)
Response Time	10 seconds
Warranty	Premium five-year limited warranty
Country of Origin	US
Certifications/Listings	UL 2200,CSA,EPA,cUL
Automatic Transfer Switch Included	Included
Remote Monitoring Available	Included
Off Grid / Utility Backup	Off Grid,Utility Backup

73

Henry Peter Matthews, PE, CPE, CESCP, PVA

Home Address
1203 McKinley Place
Fostoria, Ohio 44830
Email: hpmatthews@matthewselectrical.net
Home Phone: 419-701-7707
Cell Phone: 419-575-3488

Work Address
Marathon Petroleum Company
539 South Main Street
Findlay, Ohio 45840
Email: hpmatthews@marathonpetroleum.com
Office phone: 419-421-3423
Cell phone: 419-957-2110

Work Experience

Marathon Petroleum Company, LP; Findlay, Ohio — June 2006 – Present

- Advanced Senior Engineer/Electrical Specialist
- Electrical Engineering Supervisor – Terminal Engineering
- Project Engineer – Major Projects
- Electrical Designer – Retail Division

Cooper Standard Automotive, Bowling Green, Ohio — July 1993 – June 2006

- Plant Engineering Manager
- Plant Electrical Engineer

Toledo Engineering Company (consultant); Toledo, Ohio — June 1989 – July 1993

- Electrical Drafter

Education

Bowling Green State University; Bowling Green, Ohio — Aug 2003
Masters of Business Administration

Pennsylvania State University; University Park, PA — Dec 1989
BS Electrical Engineering

Solar Energy International, Paonia, Colorado — Sept 2021
Solar PV Training

Owens Community College; Findlay, Ohio — April 2017
Certificate: Introductory Welding

Penn Foster Career School — July 2010
Certificate: Plumbing

Penn Foster Career School — October 2004
Certificate: Electrician

Certifications

Professional Engineer (PE): OH, MI, IN, KY, IL, WI
Photovoltaic Associate (PVA) by NABCEP
Certified Electrical Safety Compliance Professional (CESCP), NFPA
Certified Plant Engineer (CPE): Association for Facility Engineers
Building Operator Certification (BOC): Northwest Energy Efficiency Council

Licenses

Ohio Electrical Contractor, Ohio Department of Commerce, License # 46972
Ohio Training Agency, Ohio Construction Industry Licensing Board, Agency #48714
Ohio Training Agency, Ohio Board of Building Standards

Special Training

Solar Energy International (SEI), Paonia, Colorado

- Solar Electric and Design and Installation Course, April 2021, 60 hours
- PV Systems Fundamentals (Battery-Based), June 2021, 40 hours
- Advanced PV System Design and the NEC, June-July 2021, 60 hours
- Comparing Battery Technologies, July 2021, 10 hours
- Tools and Techniques for Operations and Maintenance of PV Systems, 9/21, 40 HR

Affiliations

Institute of Electrical and Electronics Engineers (IEEE) – Senior Member
International Association of Electrical Inspectors (IAEI)
NFPA Section Member for Architects, Engineers and Building Officials
Illumination Engineering Society of North America (IESNA)
API RP 545 former Co-Chair, American Petroleum Institute, Lightning Protection for Above Ground Storage Tanks (2017- 2018)

Business Ownership

Matthews Electrical Services, Owner
Designer Cuts Hair Salon, LLC; Co-owner

Biography

Henry has worked in the electrical, power, electronics, instrumentation, controls and communication fields for over 30 years. He earned his Bachelor of Science degree in Electrical Engineering from Penn State University in 1989. Henry worked as a consultant for Toledo Engineering Company in Toledo, Ohio as a drafter and field technician.

In 1993 he started working for Cooper Standard Automotive Company in Bowling Green, Ohio in 1993 as a Plant Electrical Engineer. He was then promoted to Plant Engineering Manager in 2000. During this time, he earned his Professional Engineering License in Ohio.

In 2003, Henry earned his MBA at Bowling Green State University.

In 2006, Henry joined Marathon Petroleum Company in Findlay, Ohio. He then went on to obtain his Professional Engineers license in Electrical Engineering for Michigan, Indiana, Illinois, West Virginia, Kentucky, Minnesota and Wisconsin. During his tenure at Marathon, Henry has had several roles including Electrical Design Engineer, Project Engineer and Electrical Supervisor. He is currently an Advanced Senior Engineer where he writes electrical standards for the company and conducts a community of practice for all the company's electrical engineers and safety professionals.

During his time at Cooper Standard Automotive and Marathon Petroleum, Henry developed a passion for teaching, learning and applying Electrical Construction Codes. At Cooper, he trained the entire non-electrical maintenance staff to perform basic electrical tasks.

At Marathon, Henry works with the Learning and Development Department to conduct multiple training sessions for new hires and seasoned engineers on various topics including Electrical Safety, Grounding and Bonding, Hazardous Area Location, Electrical Inspection, Motors, Lightning protection Static Electricity Mitigation, Reading and Understanding Electrical Diagrams, Programmable Logic Controllers and more.

Henry also works very closely with the Talent Acquisition Teams and visits numerous college campuses to deliver presentations on Engineering, Career Development, Networking and other topics.

Henry recently served as the Co-chair of the API Recommended Practice 545 Task Group for Lightning Mitigation for Above Ground Storage Tanks. In this role, he works with engineers, scientists and manufacturers from all over the world to evaluate the impacts of lightning and static electricity on metal above ground storage tanks.

His passion for teaching and Electrical Safety has motivated him to earn the Certified Electrical Safety Compliance Professional Certification (CESCP) from NFPA. He also regularly attends numerous electrical and safety conferences and training sessions conducted by NFPA, IEEE, API.

Previously, Henry was the President of the Fostoria, Ohio area Toastmasters team.

Henry is also a member of the International Association of Electrical Inspectors.

Henry also owns two small businesses:

> **Matthews Electrical Services** - that performs mainly limited residential and small commercial electrical services and conducts training for licensed electricians in the state of Ohio.
>
> **Designer Cuts Hair Salon, LLC** – Henry co-owns the beauty salon with his wife.

File Attachments for Item:

ER-6 Grounding and Bonding Part 2: Beyond the Basics (Matthews Electrical Services)

BO, MPE, EPE, FPPE, BI, ESI, RBO, RPE, RBI (4 hours)

Staff Notes:

ESIAC Recommendation: Recommend approval

Committee Recommendation:

Grounding and Bonding Part II Webinar – Beyond the Basics

Course Outline

1. Objective: To cover more advanced Grounding and Bonding applications and relating them to applicable NEC grounding and bonding requirements.

2. Structure
    a. Duration: 4 hour
    b. Format
        i. Webinar
            1. Register at www.matthewselectrical.net
            2. Webinar conducted at www.zoom.com
    c. Resources
        i. 2020 National Electrical Code
            1. Article 250 Grounding and Bonding
            2. Article 445 Generators
            3. Article 690 Solar Photovoltaic Systems
            4. Other applicable NEC sections
        ii. 2021 NFPA 70E Electrical Safety in the Workplace
        iii. NFPA 77
        iv. NFPA 780
        v. IEEE 80 and IEEE 142
        vi. PowerPoint Slides Developed by Matthews Electrical Services
        vii. Solar Energy International material
        viii. IAEI.org website and publications including Soares Book on Grounding and Bonding
        ix. NFPA website
        x. Electrical Safety Foundation International website and publications
        xi. Various equipment manufacturers published material

3. Curriculum: Grounding and Bonding
    a. Review of Grounding and Bonding basic concepts
    b. Proper grounding and bonding for personnel safety and equipment reliability
    c. Review of GFCI and GFPE operating principles
    d. System grounding: Utility vs. Separately Derived Systems
    e. Preventing objectionable current flow
    f. Resistance Grounding Systems
    g. Grounding and Bonding of Remote Buildings
    h. Grounding and Bonding of Generator systems and the role of the transfer switch
    i. Grounding and Bonding of Solar PV systems
    j. Lightning protection basics
    k. Static Electricity Mitigation

CRITERIA FOR SUBMITTING CONTINUING EDUCATION COURSES FOR BOARD OF BUILDING STANDARDS CERTIFICATIONS

The Ohio Board of Building Standards approves Continuing Education Courses for building department personnel. The courses may be used for the attainment of goals that are connected with technical and professional development as they relate to enforcing and interpreting the Ohio State Building Codes. Board approval is granted only on course instruction pertaining to OBC, OMC, OPC, and RCO requirements and such other content areas directly related to the responsibilities of the certification for which credit is being requested.

Instructors: Anyone or any organization promoting an approved course, is required to make full and accurate disclosure regarding course title, course approval number, number of credit hours, certifications for which the BBS has approved the class, and fees in promotion materials and advertising. ***The Board does not grant retroactive approval. It is recommended that courses be submitted for approval well in advance of any scheduling of classes and advertising***. Advertising shall not disclose improper approval information to the public.

Course sponsors/co-sponsors: provide participants a certificate of completion containing the following information: name of participant, title of approved courses, BBS approval #, BBS approved certifications, date of the continuing education program, number of approved credit hours awarded and signature of authorized sponsor or instructor.

Anyone or any organization administering an approved course shall provide the Board with advanced written information on scheduling of the course(s) (date and place) and provide to the Board a legible list of participants who completed the course with the name of course, date, and location.

Participants: Must attend the complete course as presented by the instructor to receive credit hours approved by the Board. No partial credit shall be given to any participant who failed to complete the entire course as approved. The sponsor/co-sponsor or instructor shall formulate a method to verify the individual's attendance and completion of the course.

Board approval: Remains in effect through the calendar year of approval. The course may be renewed administratively by sponsor application in subsequent years so long as it references current codes and standards Upon the Board's adoption of a new edition of the codes, course sponsors must update their course and submit to the Board for approval. The Board does not grant retroactive approval for courses presented prior to approval date.

Facility/training area: Shall be capable of comfortably and safely seating at least the number of attendees with writing surfaces for each attendee; accessible to/and usable for people with disabilities; sized and provided with audio/visual equipment adequate so that each attendee can see the instructor(s) and overhead screen and hear the content of the training programs; illuminated for writing and that the content on an overhead screen can be seen easily by all attendees; non-smoking in the training room; sound controlled so that outside noise will not interfere with the training.

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: Henry Matthews
(Contact Name)

Organization: Matthews Electrical Services
(Organization/Company)

Address: 1203 McKinley Place
(Include Room Number, Suite, etc.)

City: Fostoria State: Ohio Zip: 44830

E-Mail: hpmatthews66@att.net

Telephone: 419-575-3488 Fax: _____

Course Sponsor: _____

COURSE INFORMATION:

Course Title: Grounding and Bonding Part II Webinar - Beyond the Basics

New Course Submittal: ■ Update Course: ☐ Prior Approval Number: _____

Purpose and Objective: This course will expand upon the basic grounding and bonding principles and requirements covered in Grounding and Bonding (Part 1). This course will cover more in-depth grounding and bonding topics such as system grounding, resistance grounding, separately derived systems, grounding and bonding of generator systems, Solar PV systems and remote buildings. We will also discuss how grounding and bonding helps mitigate static electricity and is a key component of lightning protection systems.

Number of Instructional Contact Hours that can be obtained upon completion: 4

If Multi-Session, Number of Instructional Contact Hours Per Session: _____

Program Applicable for the Following Participants:

Building Official ■ Master Plans Examiner ■ Building Inspector ■ Fire Protection Inspector ☐ Mechanical Inspector ☐

Building Plans Exam. ☐ Plumbing Inspector ☐

Plumbing Plans Exam. ☐ Non-Res IU Inspector ☐

Electrical Plans Exam. ■

Mechanical Plans Exam. ☐

Fire Protect. Plans Exam. ✔

Res Building Official ■ Res Plans Examiner ■ Res Building Inspector ■ Res Mechanical Inspector ☐ Res IU Inspector ☐

Electrical Safety Inspectors X

Location of ESI Course: www.matthewselectrical.net via www.zoom.com Date(s) of ESI Course(s): 12-18-21

SUBMITTAL CHECKLIST: **Make Sure** all of the Following Information is **Submitted**:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	X
	Organization sponsoring or requesting the program (if any)	
Course Title:	Name of course (related to content)	X
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	X
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	X
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	X
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	X
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	X
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	X
Test Materials:	Qizzes will be conducted inside the Zoom Webinar	X
Completed Application:		X

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

MATTHEWS ELECTRICAL SERVICE.

Grounding and Bonding Webinar Part II

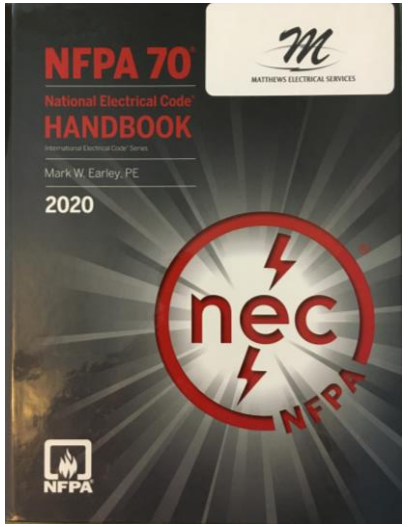
Matthews Electrical Services

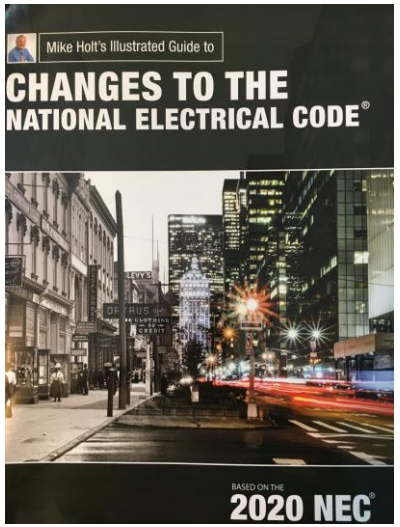
Ohio Training Agency #48714

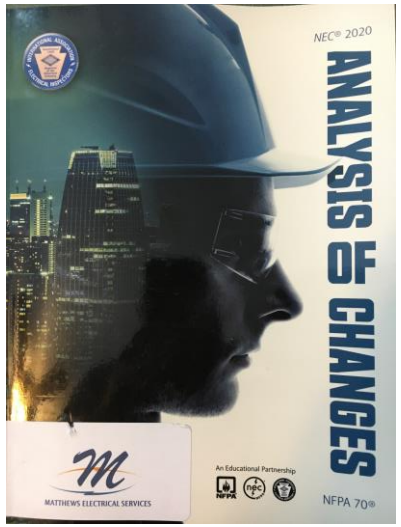
Henry Matthews, PE, CPE, CESCP

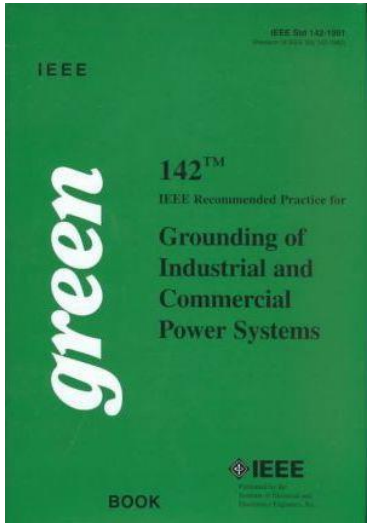
WELCOME!

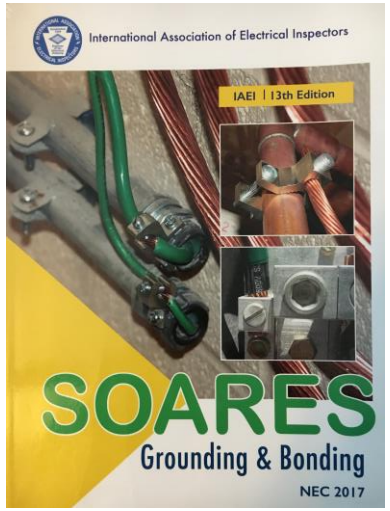
- Goals
  - Promote learning
  - Make session engaging
    - Discussion
    - Videos
    - Case Studies
    - Polls
  - Make 4 hours as productive as possible!

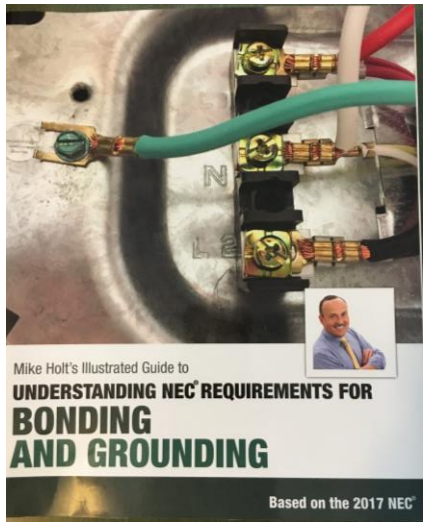

NFPA 70
National Electrical Code
HANDBOOK
Mark W. Earley, PE
2020
nec
NFPA
MATTHEWS ELECTRICAL SERVICES


Mike Holt's Illustrated Guide to
CHANGES TO THE
NATIONAL ELECTRICAL CODE®
BASED ON THE
2020 NEC®


NEC® 2020
ANALYSIS OF CHANGES
MATTHEWS ELECTRICAL SERVICES
An Educational Partnership
NFPA 70®


IEEE
green
142™
IEEE Recommended Practice for
Grounding of
Industrial and
Commercial
Power Systems
IEEE
BOOK


International Association of Electrical Inspectors
IAEI | 13th Edition
SOARES
Grounding & Bonding
NEC 2017


Mike Holt's Illustrated Guide to
UNDERSTANDING NEC® REQUIREMENTS FOR
BONDING
AND GROUNDING
Based on the 2017 NEC®

Keys to Understanding Grounding and Bonding

- Grounding and Bonding is one of the most confusing topics in the NEC
- Simplified by understanding:
  - Grounding
  - Bonding
  - Theory of current flow
  - Effective Ground Fault Current Path

Why Do We Ground and Bond? Review

Rule #1

- Electric current always wants to return to its **source** – not ground
  - Exception: Lightning

Rule #2

- Electric current will take <u>any</u> and <u>all</u> available paths to get back to its source
  - Includes:
    - Earth
    - Water
    - People
    - Metallic objects
    - Airs
    - Concrete
    - Wood
    - Pets
    - You get the picture…

https://www.youtube.com/watch?v=JKV4LGBU3pE Mythbusters

Rule #3

- Most of the current (returning back to its source) will take the path of least resistance (impedance)

Goal #1

- **Bonding** creates an intentional low impedance (resistance) path for current to return to the source
- AKA: Low Impedance Effective Ground Fault Path

Three Methods

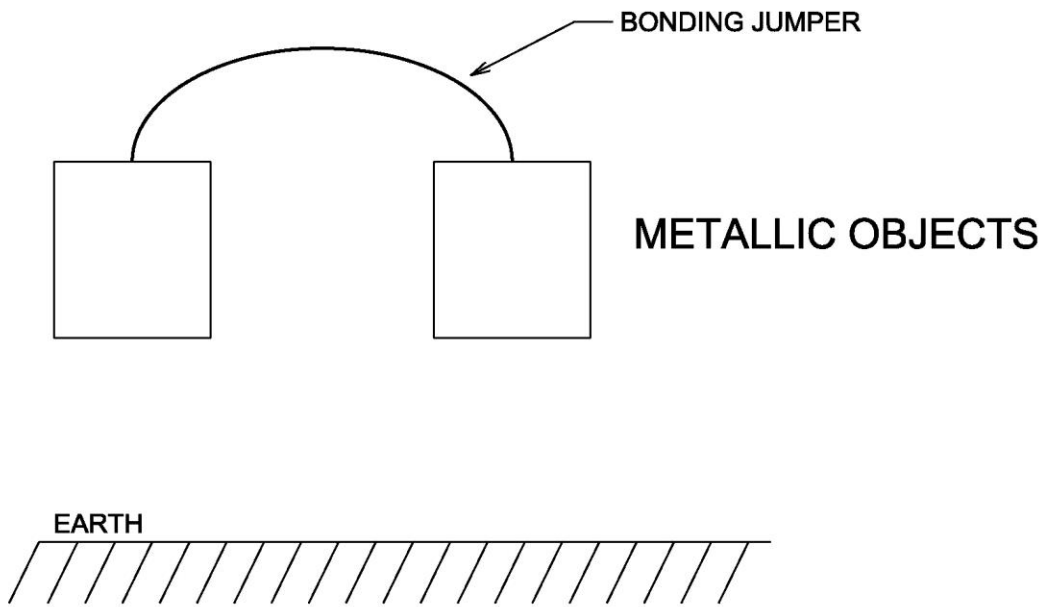
- The Neutral (Grounding Conductor): Normal Current Return Path
- Equipment Grounding Conductor: Intentional Abnormal Current (Ground Fault) Return Path
- The Earth: Unintentional Current (Ground Fault) Path - aka stray currents

Why Do We Ground and Bond?

- Grounding
  - Divert lightning to ground
  - Establish voltage reference
  - Minimize elevated voltages
  - Stabilize voltages
  - Relax static charges
  - Noise reduction (electronics)

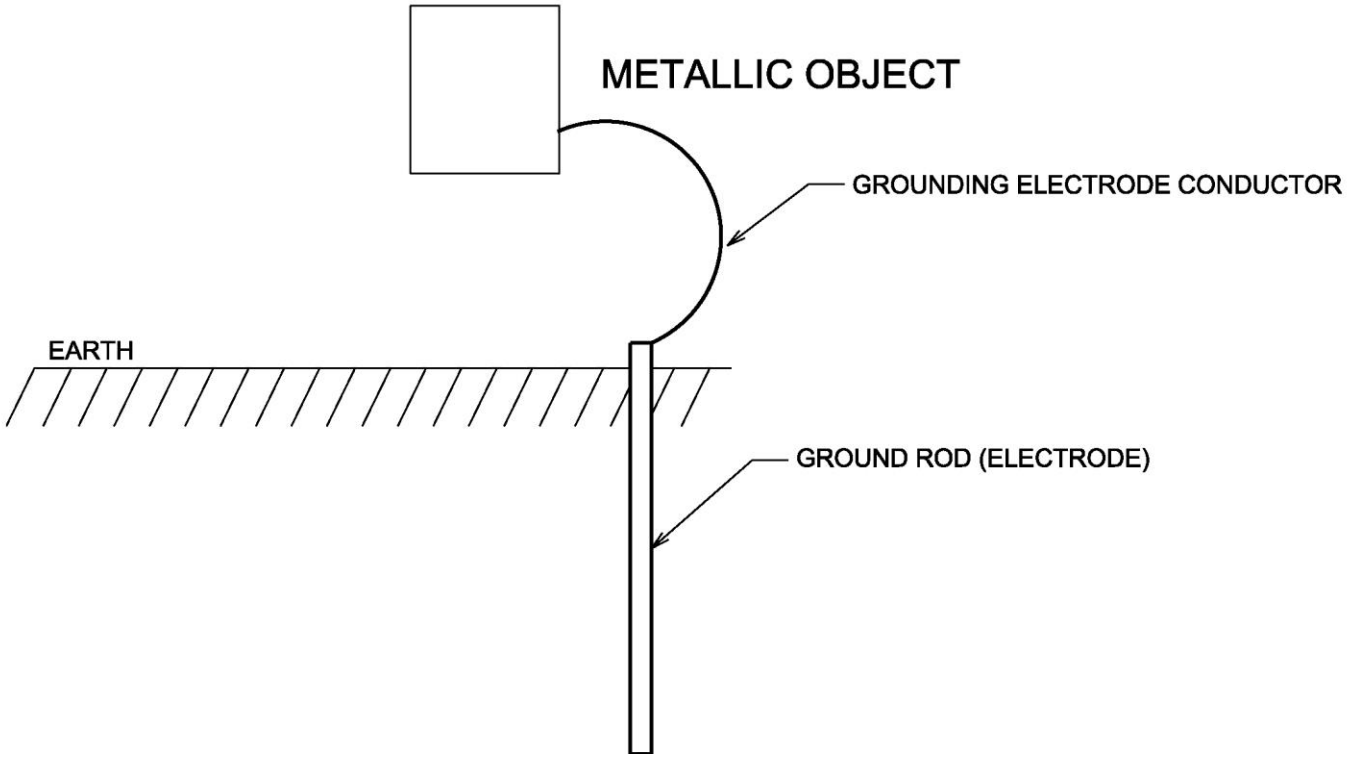
- Bonding
  - Equalize voltages (no current flow)
  - Create equipotential plans
  - Create effective ground fault path
  - Prevent static electricity buildup
  - Help minimize step and touch potential

BONDING



- Both objects are at same voltage (equi-potential), but not necessarily 0 volts
- No current flow between bonded objects

GROUNDING

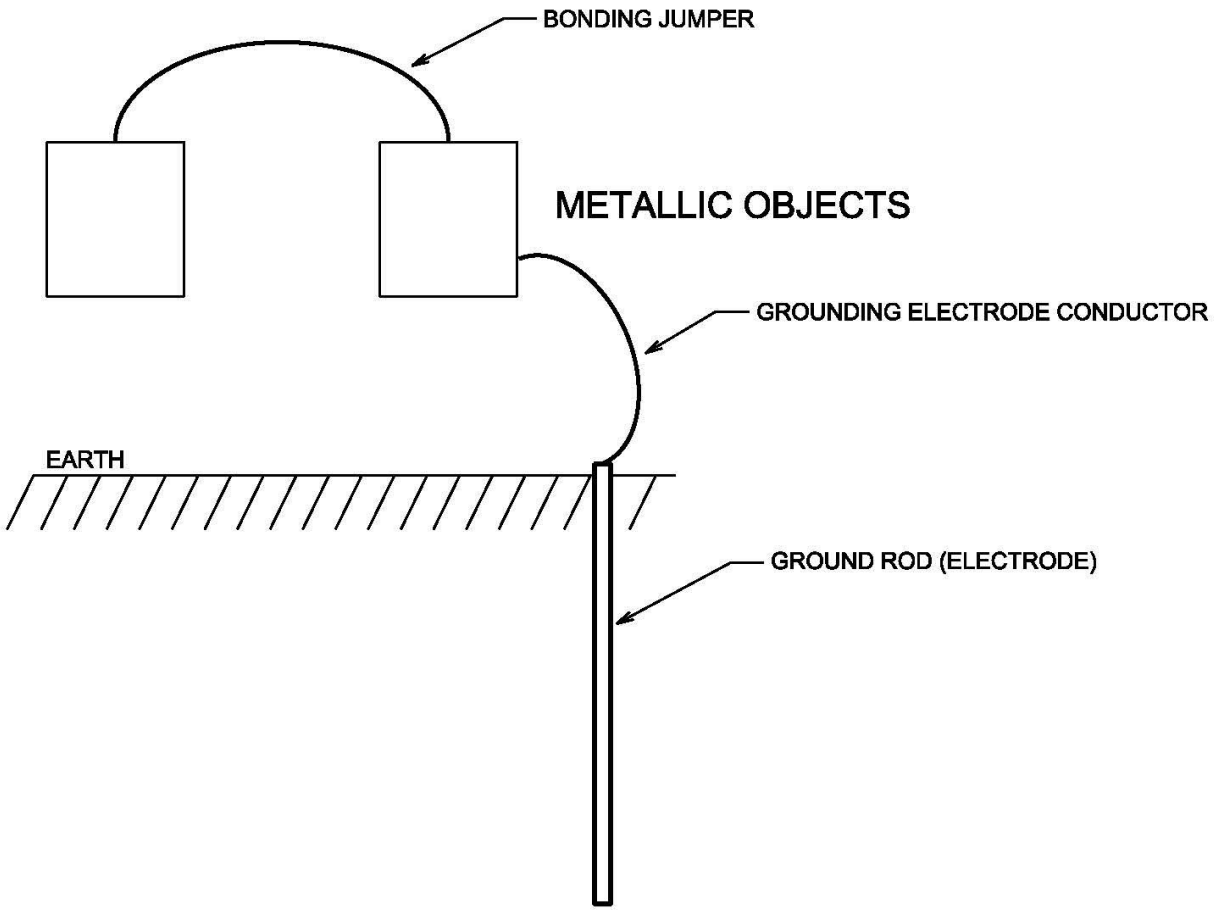


Object is now at 0 volts (ground reference)

Things that are inherently grounded*

- *perform ground resistance tests to be certain
- Some codes require additional grounding

BONDING AND GROUNDING



<u>Both</u> objects are now at 0 volts

Types of Grounding

- System Grounding [250.4(A)(1)]
  - …shall be connected to the earth in a manner that will limit the voltage imposed by lightning, line surges, or unintentional contact with higher-voltage lines and that will stabilize the voltage to earth during normal operation

- Electrical Equipment Grounding [250.4(A)(2)]
  - Normally non-current-carrying conductive materials enclosing electrical conductors or equipment, or forming part of such equipment, shall be connected to earth so as to limit the voltage to ground on these materials

  - *Examples: conduit, electrical enclosures, electrical devices and fittings, equipment enclosures, transformer cases, motor cases etc.*

Bonding

- Bonding of electrical equipment [250.4(A)(3)]
  - Normally non-current carrying conductive materials enclosing electrical conductors or equipment, or forming part of such equipment, shall be connected together and to the electrical supply source in a manner that establishes an effective ground fault path.

- Bonding of Electrically Conductive Materials and Other Equipment [250.4(A)(4)]
  - Normally non-current-carrying electrically conductive materials that are likely to become energized shall be connected together and to the electrical supply source in a manner that establishes an effective ground-fault current path

Effective Ground-Fault Current Path!

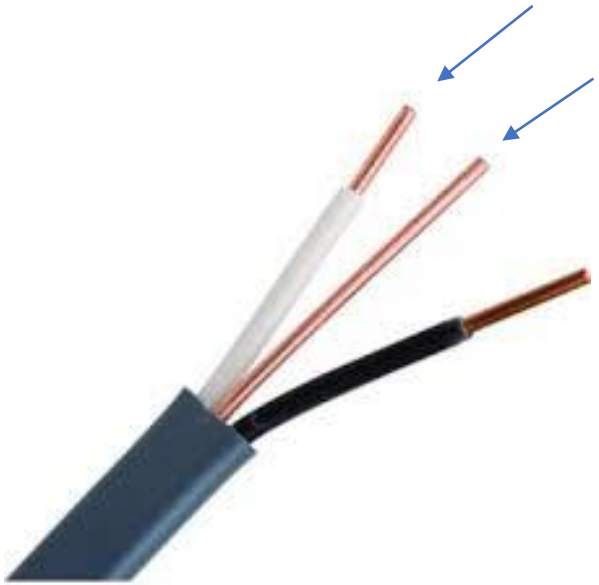
[250.4(A)(5)]

Effective Ground-Fault Current Path!

[250.4(A)(5)]

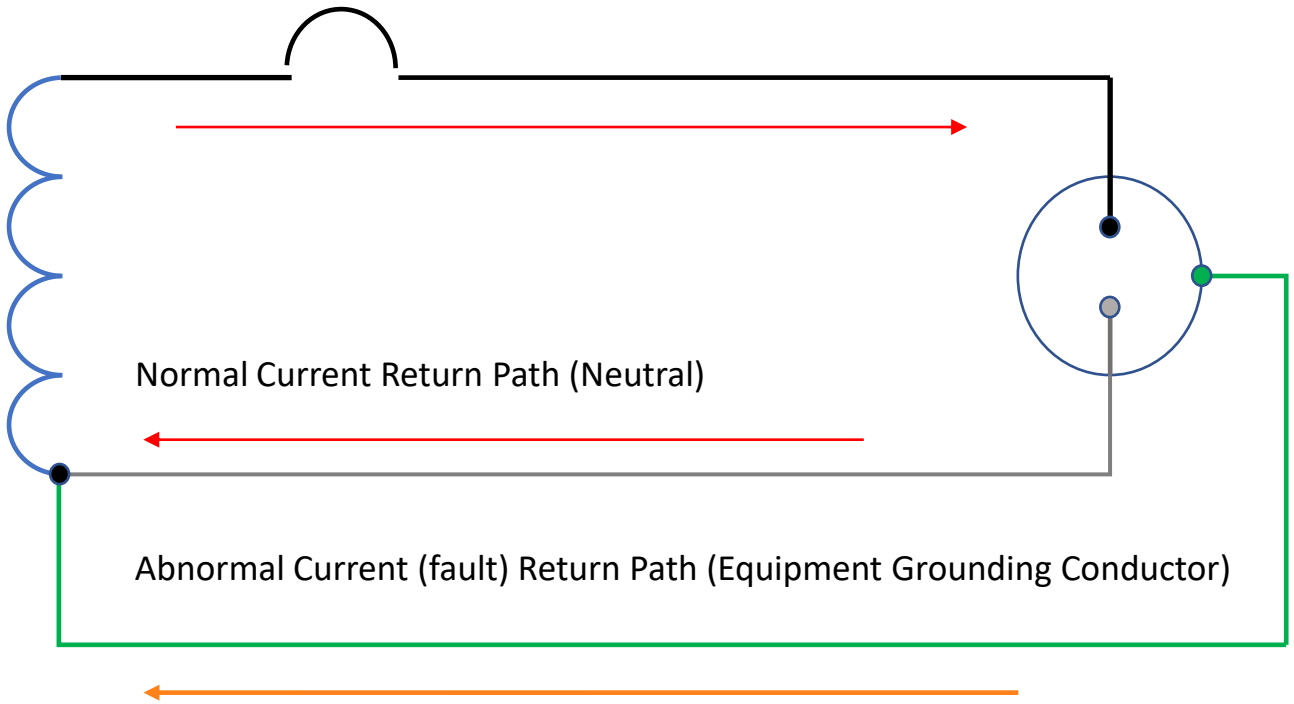
- Electrical equipment and wiring and other electrically conductive material likely to become energized shall be installed in a manner that creates a low-impedance circuit facilitating the operation of the overcurrent device *(circuit breaker, fuse e.g.)* or ground detector for high-impedance grounded systems.
- It shall be capable of safely carrying the maximum ground fault current likely to be imposed on it from any point on the wiring system where a ground fault may occur to the electrical supply source.
- The earth shall not be considered as an effective ground fault current path.

Current Return Paths



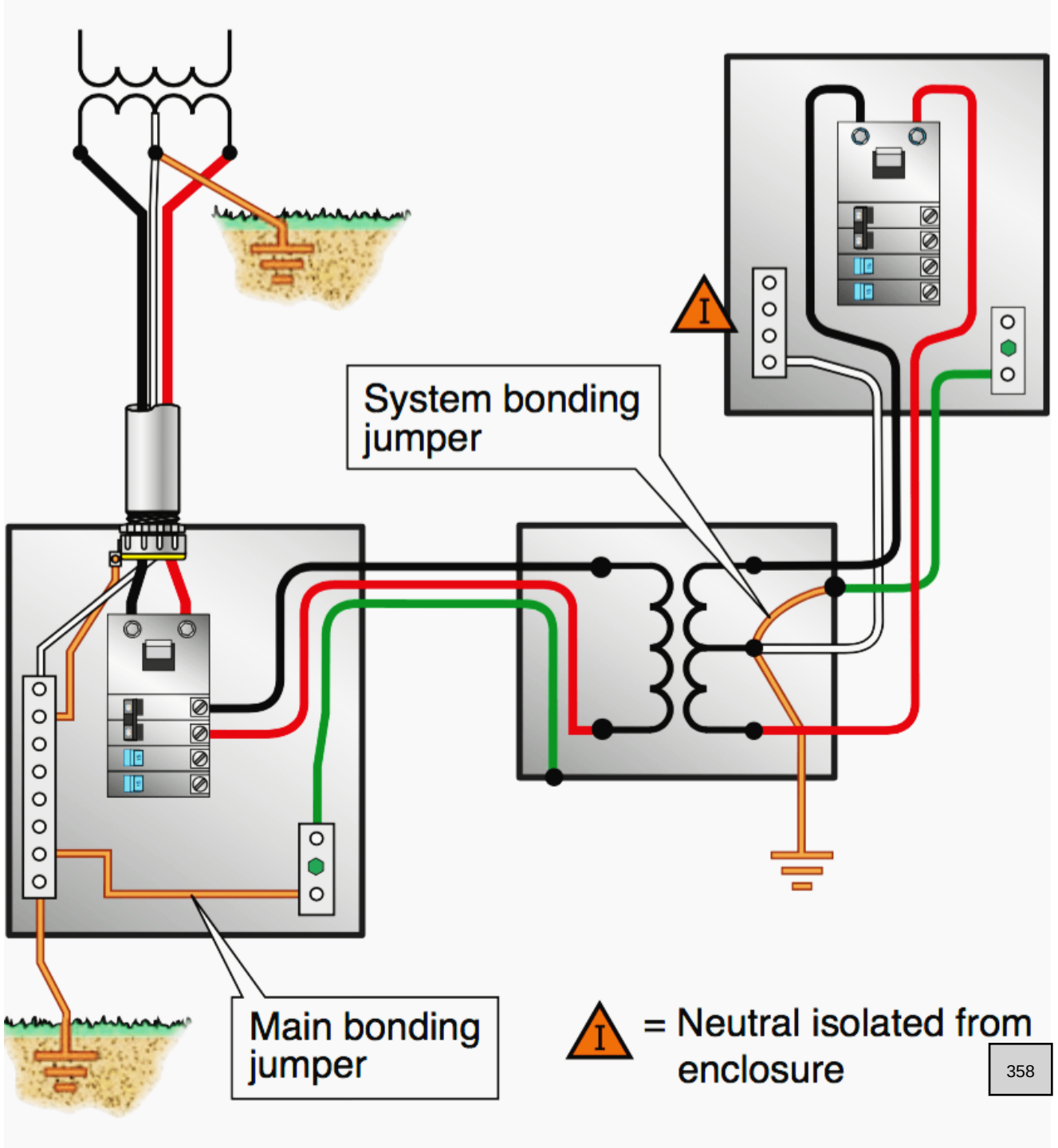
Normal Return Path

Abnormal Return Path
(fault return)



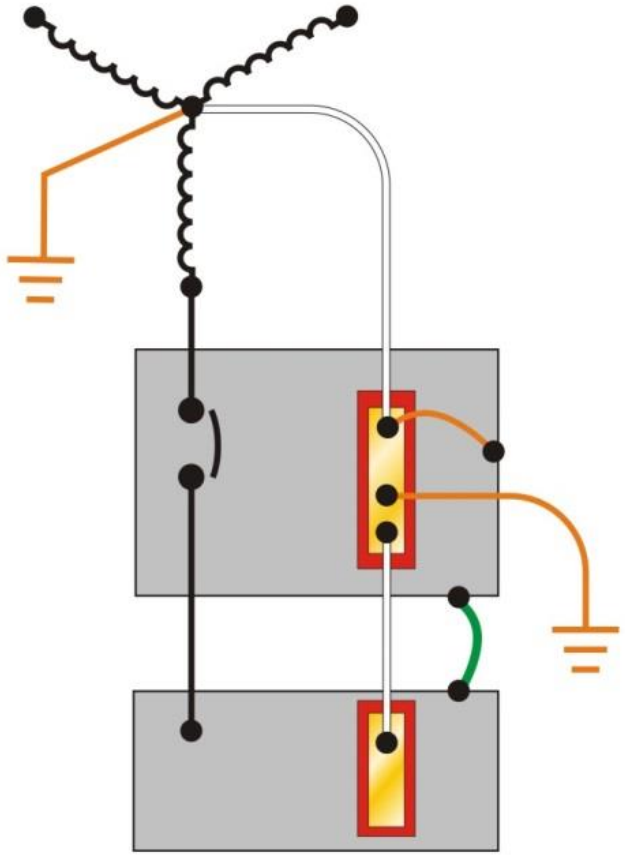
https://www.youtube.com/watch?v=BAcprdE_YdQ

Utility Service
vs. Separately Derived System

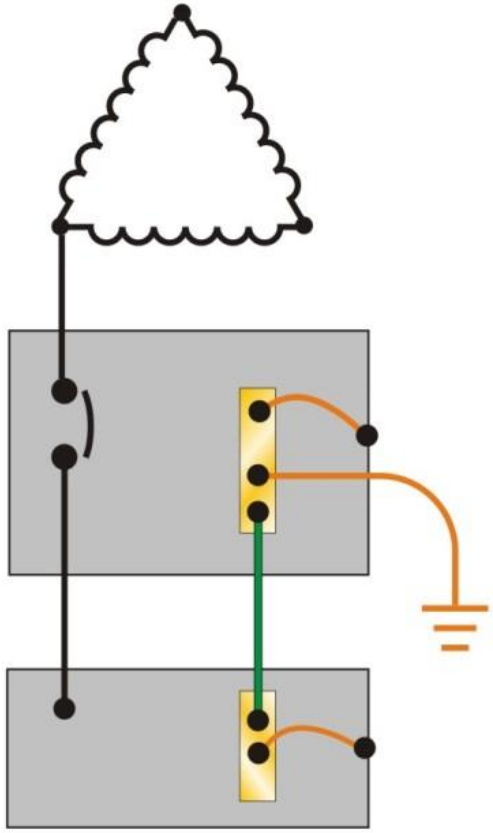


NEC 250.4(A) and (B)

Part A - Grounded System



Part B - Ungrounded System



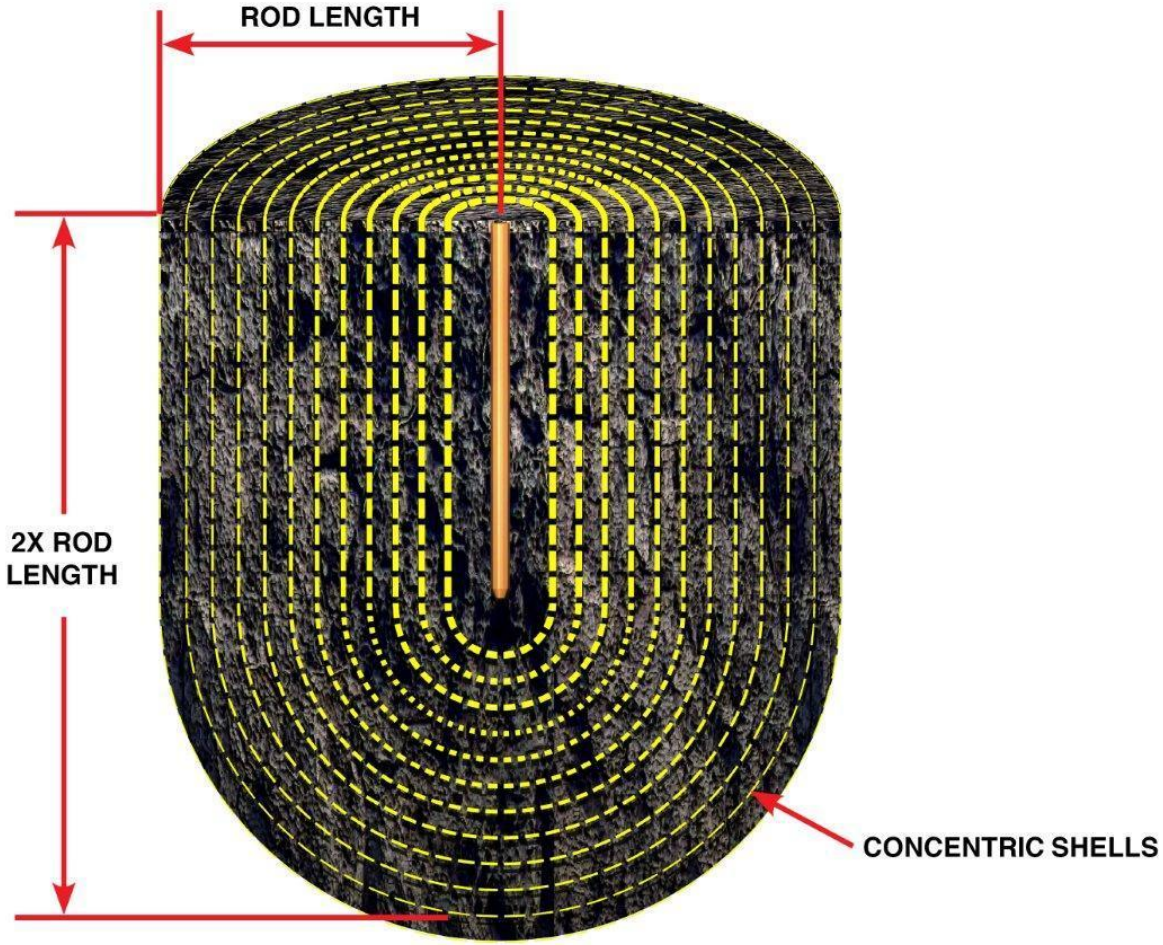
The performance requirements of the fault-current paths for each system are provided in each part

Copyright © IAEI 2014

The Conductors of the Grounding System

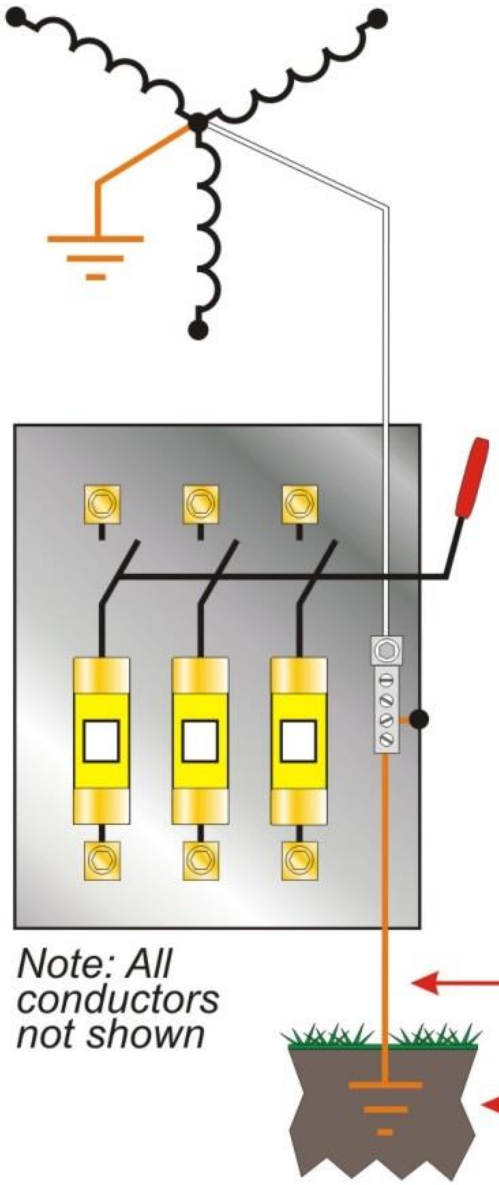
- Main Bonding Jumper (MBJ)
- Grounded Conductor (neutral)
- Grounding Electrode Conductor (GEC)
- Supply Side Bonding Jumper (SSBJ)
- System Bonding Jumper (SBJ): for separately derived systems
- Equipment Grounding Conductor (EGC)
- Bonding Conductors (Jumpers)

What is the Sphere of Influence?



https://www.youtube.com/watch?v=IqQStcKz-eY

Functions of Grounding Electrode



Grounding Electrode - A conducting object through which a direct connection to earth is established.

1. Connects the electrical system to earth
2. Connects electrical equipment to earth
3. Attempts to maintain equipment at the earth voltage potential

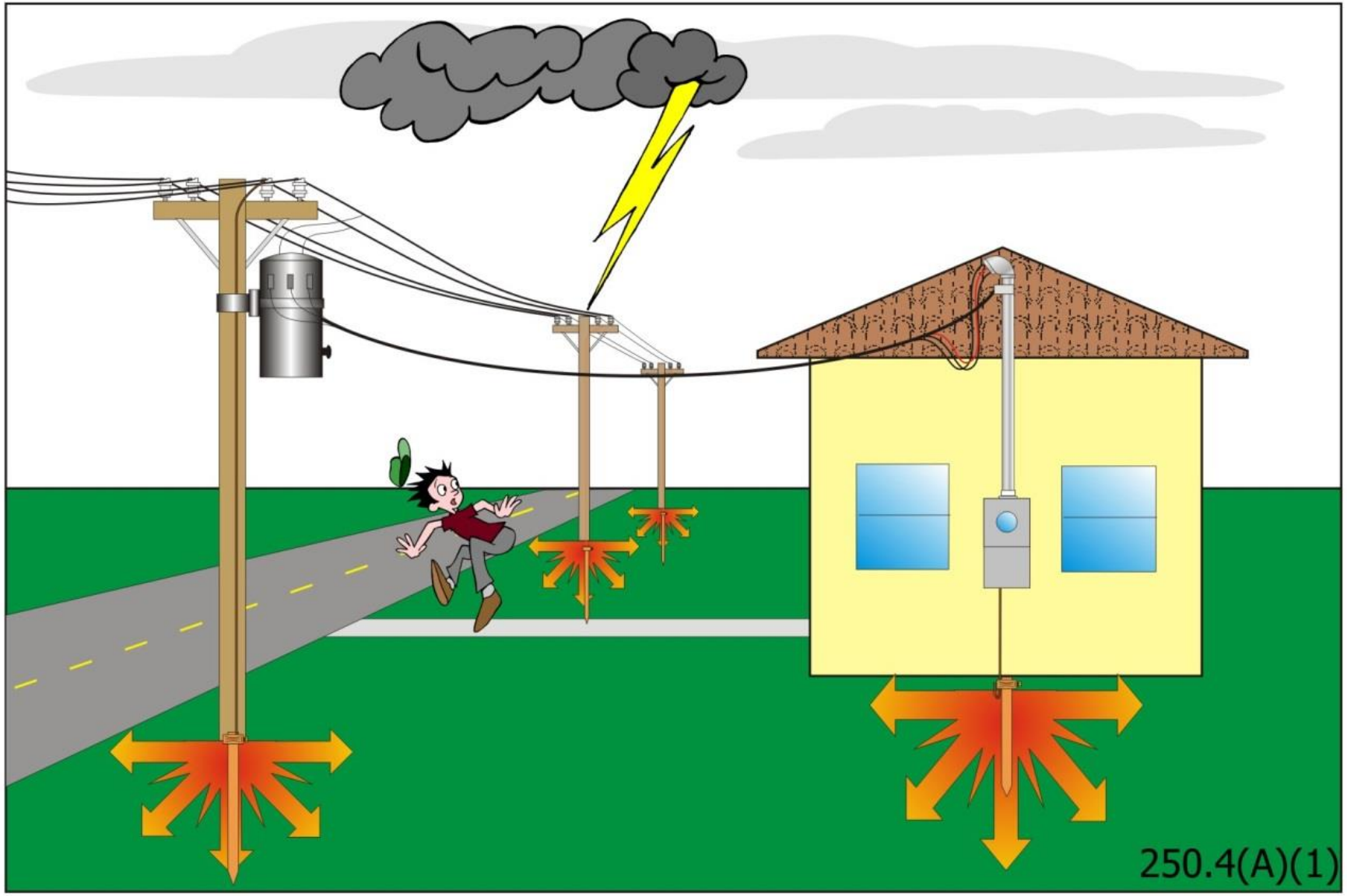
Little effect in clearing ground faults *(not its function)*

Grounding electrode conductor

Grounding electrode system

Copyright © IAEI 2014

Dissipation of Over-Voltages



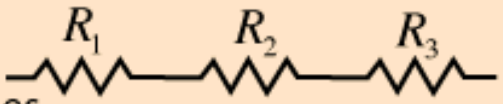
Copyright © IAEI 2014

Why Do We Put Ground Rods in Parallel?

Resistor Combinations

The combination rules for any number of resistors in series or parallel can be derived with the use of Ohm's Law, the voltage law, and the current law.

Series

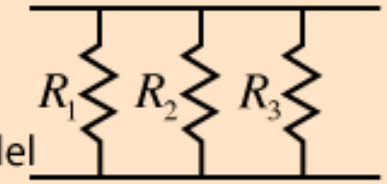


$$R_{equivalent} = R_1 + R_2 + R_3 + \ldots$$

$$R_{equivalent} = \frac{V}{I} = \frac{V_1 + V_2 + V_3 + \ldots}{I} = \frac{V_1}{I_1} + \frac{V_2}{I_2} + \frac{V_3}{I_3} + \ldots = R_1 + R_2 + R_3 + \ldots$$

Series key idea: The current is the same in each resistor by the current law.

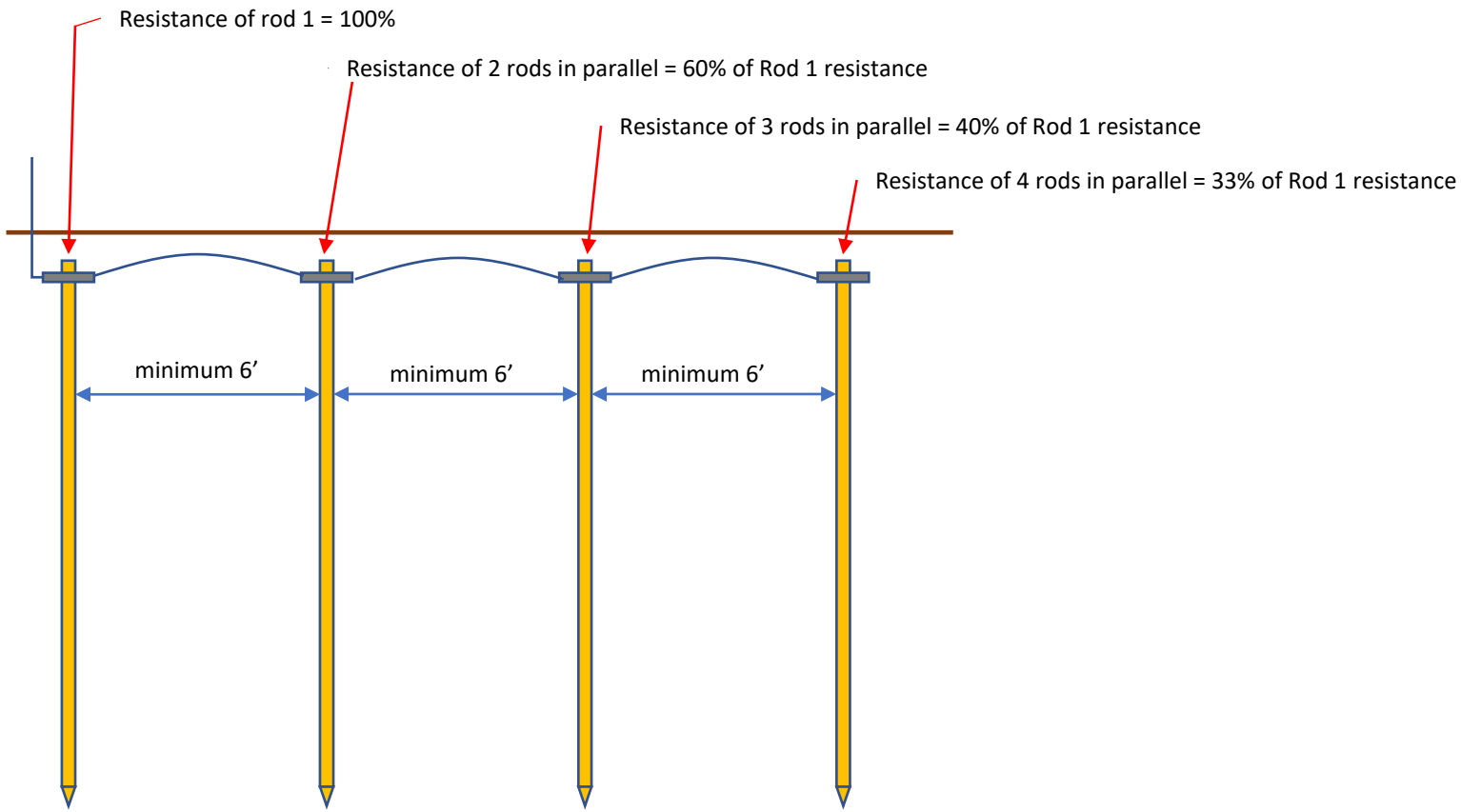
Parallel



$$\frac{1}{R_{equivalent}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots$$

To lower resistance, add ground rods (electrodes) in parallel

Ground Rods and Electrical Resistance



Example:

Rod 1 = 60 ohms
Rods 1&2 = 36 ohms
Rods 1,2,&3 = 24 ohms
Rods 1,2,3&4 = 19.8 ohms

Equipotential Bonding

- Also known as:
  - Chassis grounding, equipment grounding, instrumentation ground and safety ground
- Used for:
  - In-ground swimming pools, data-communication centers, electrical substations, dairy farms, anti-corrosion systems etc.
- Objective: To create a grounding plane that minimizes step and touch potential where regardless of where a person steps or what he/she touches, the voltage is the same. Shock mitigation.

https://www.youtube.com/watch?v=wyOILpoR39A&t=1s

20 mins

Equipotential Grounding Grid

- Primarily bare, solid #8 copper wire
- 1-ft grid, Must extend at least 3 ft past the water's edge
- All other objects within 5 ft of the pool shall have a grounding conductor bonded to the grid
- All metallic objects shall be bonded together, to the grid and to the concrete rebar
- Entire area where people are engaged in swimming or could be wet shall have all metallic objects bonded together regardless of distance.
- Recommended to extend equipotential grid to all concrete areas regardless of distance.

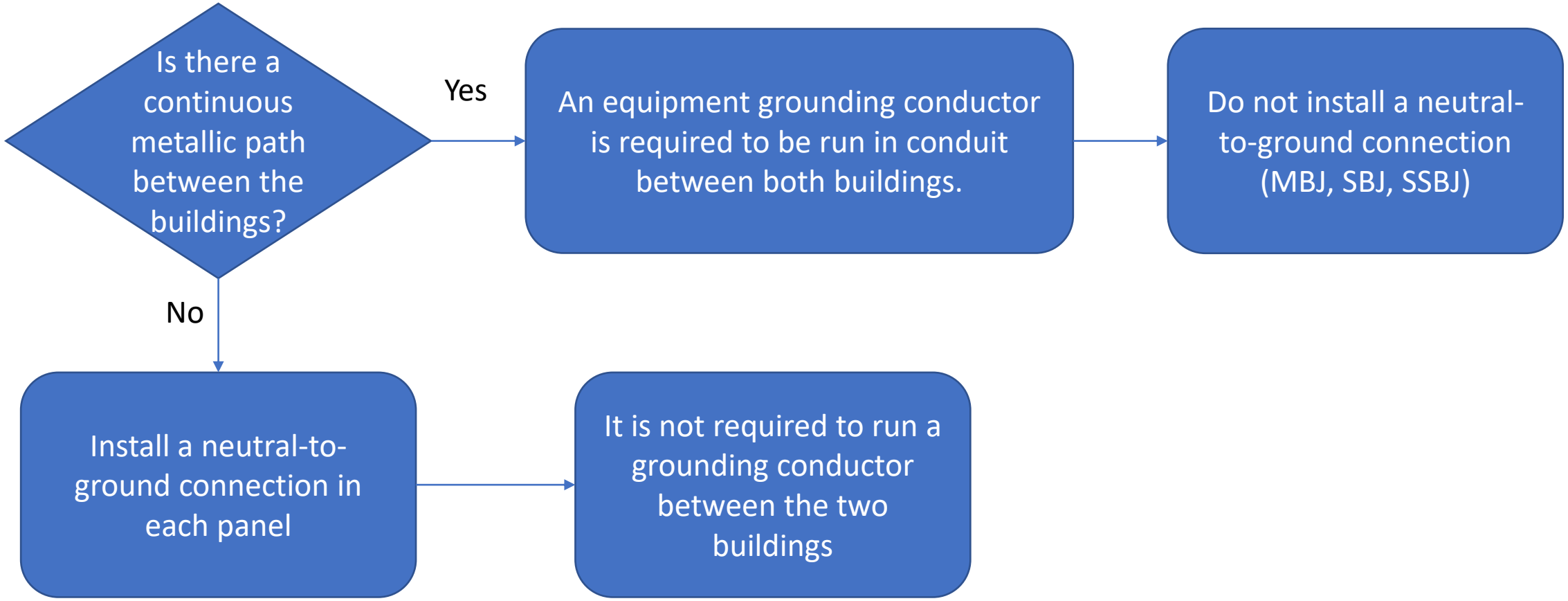
Pool Equipment and Items Requiring Grounding

- Lighting assemblies, including in-water lighting
- The pool water itself! At least 9 in^2 must be in contact with conductive surface
- All electrical equipment within 5 ft horizontally of the pool
- Conductive equipment within 12’ vertically of the pool including diving boards
- Motors, filters and other electrical recirculation equipment
- Metallic fittings
- Junction boxes, transformers, power supply enclosures
- GFCIs
- Panelboards
- Note: some low-voltage, listed, in-pool luminaires may not require a grounding conductor. VERIFY PROPER INSTALLATION WITH MANUFACTURER INSTRUCTIONS, THE AHJ AND THE NEC!

Hot tubs, Hydromassage Tubs (680.40)

- Equipotential bonding isn’t required if
  - The spa or hot tub is listed, labeled and identified as a self-contained spa or hot tub for aboveground use
  - The spa or hot tub isn’t identified as suitable for indoor use
  - The spa or hot tub is located on or above grade
  - The top rim of the spa or hot tub is at least 28 in. above a perimeter surface located within 30 in. from the spa or hot tub.

Grounding Between Multiple Buildings Fed from Single Building Panel



Metallic path can be conduit, water pipe, gas pipes, rebar in concrete, grounding conductor, communications wiring, Fencing, building structures etc.

Grounding Between Multiple Buildings Fed from Single Building Panel

- All buildings must have a grounding electrode installed, whether they are isolated or not.
- Exception: If the remote building has only one circuit breaker or fuse, then a grounding electrode is not required.
- However, an equipment grounding conductor run in conduit from the main panel is required
- A ground rod is still a good idea in this case

Grounding Electrode Required

- For each building(s) or structure(s) served by one or more feeders or branch circuits, a grounding electrode system meeting the requirements of Part III of Article 250 must be used or installed
- The grounding electrode(s) must be connected in a manner specified in 250.32(B) or (C)
- Where no grounding electrode(s) are present from the construction of the building or structure, a grounding electrode system as specified in Part III of Article 250 *(specifically 250.50)* must be installed and used
- See 250.32(A)

Grounding Electrode Requirements

- Grounding electrodes at additional buildings or structures must be bonded together to form a grounding electrode system
- Where no grounding electrodes are present at the building or structure, one or more of the grounding electrodes specified in 250.52(A)(4) through (A)(8) must be installed and used
- Rod, pipe, and plate electrodes to comply with 250.53(A)(1) through (A)(3)
- See 250.50

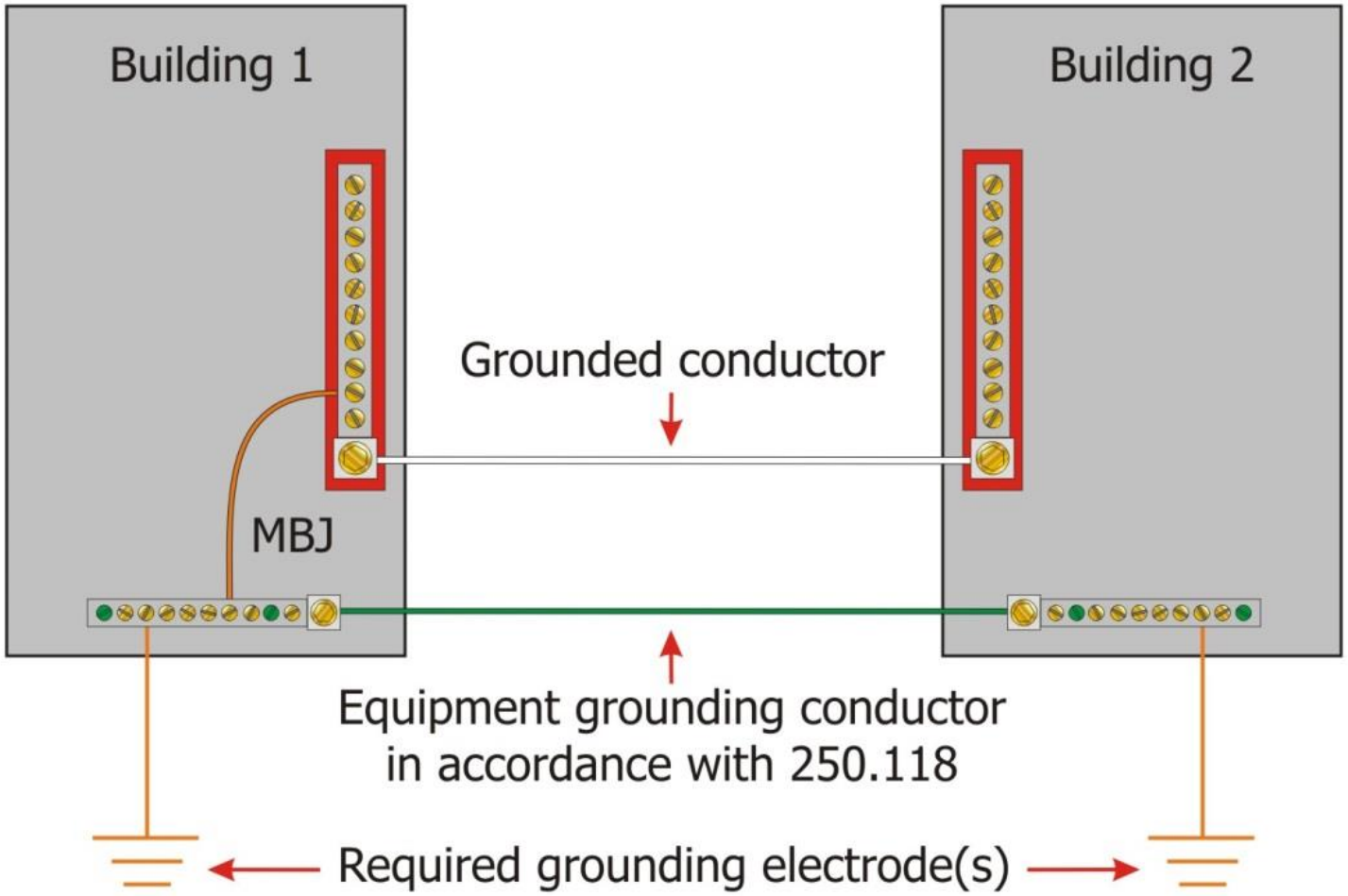
Grounding Electrode Requirements
(cont.)

250.32(A) Exception:

- *A grounding electrode shall not be required where only a <u>single branch circuit</u>, including a multiwire branch circuit, supplies the building or structure and the branch circuit includes an equipment grounding conductor for grounding the normally non–current-carrying metal parts of equipment.*

Grounding and Bonding at Seperate Building or Structure

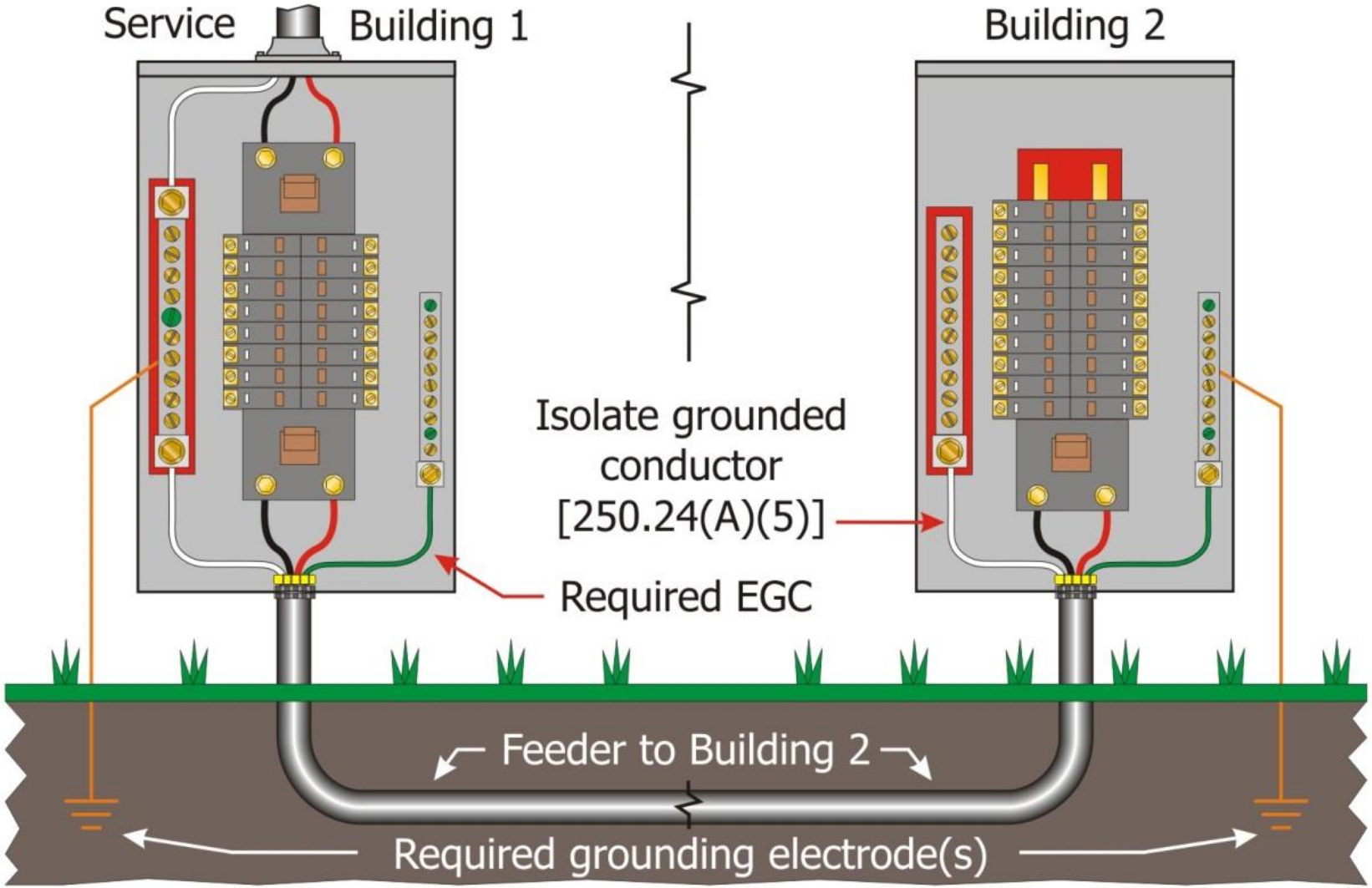
Grounding at separate building or structure using the required equipment grounding conductor *[250.32(B)(1)]*



Copyright © IAEI 2014

Grounding and Bonding at Seperate Building or Structure

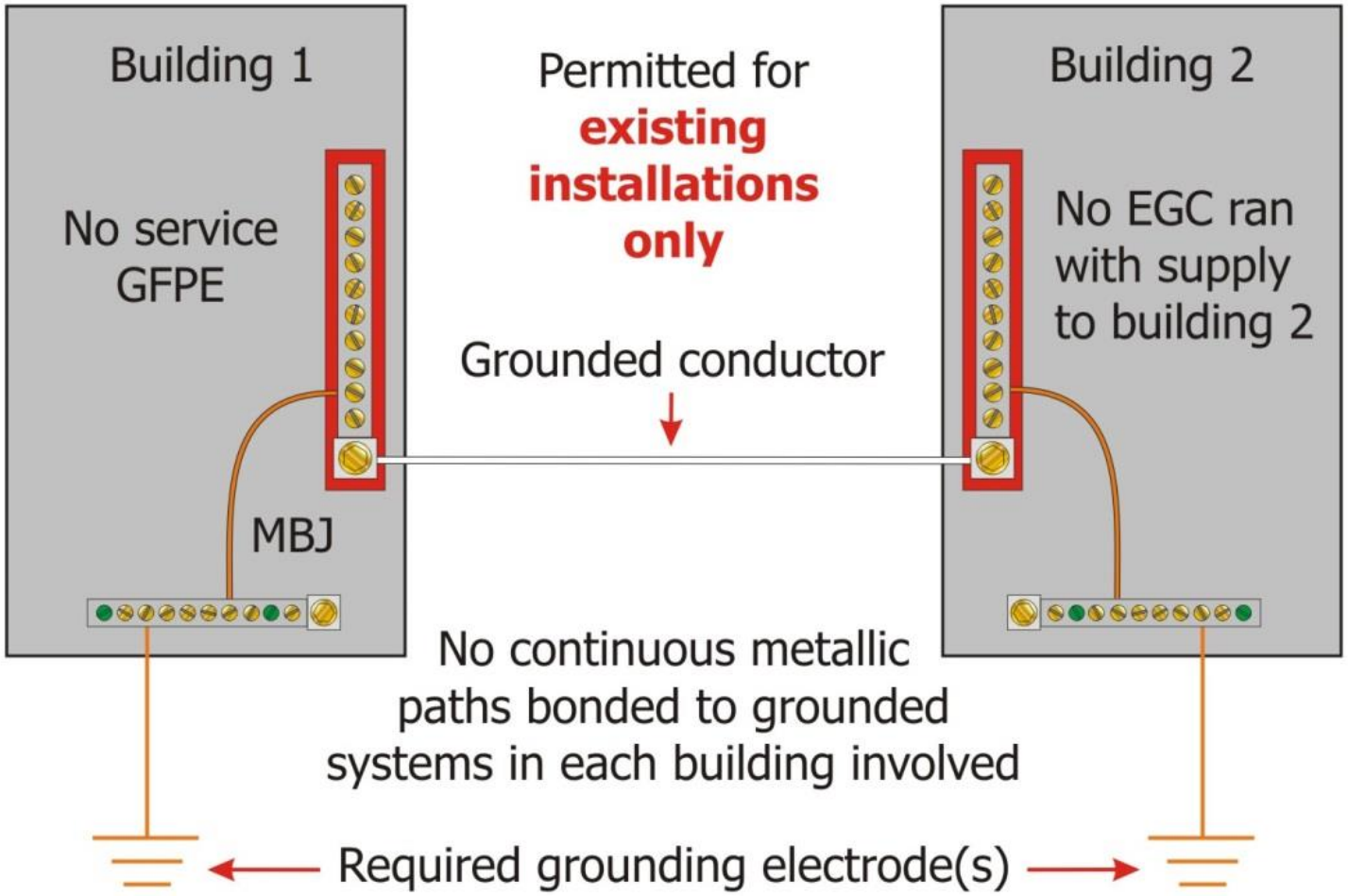
Grounding and bonding at separate building or structure using required equipment grounding conductor *[250.32(B)(1)]*



Copyright © IAEI 2014

Grounding and Bonding at Seperate Building or Structure

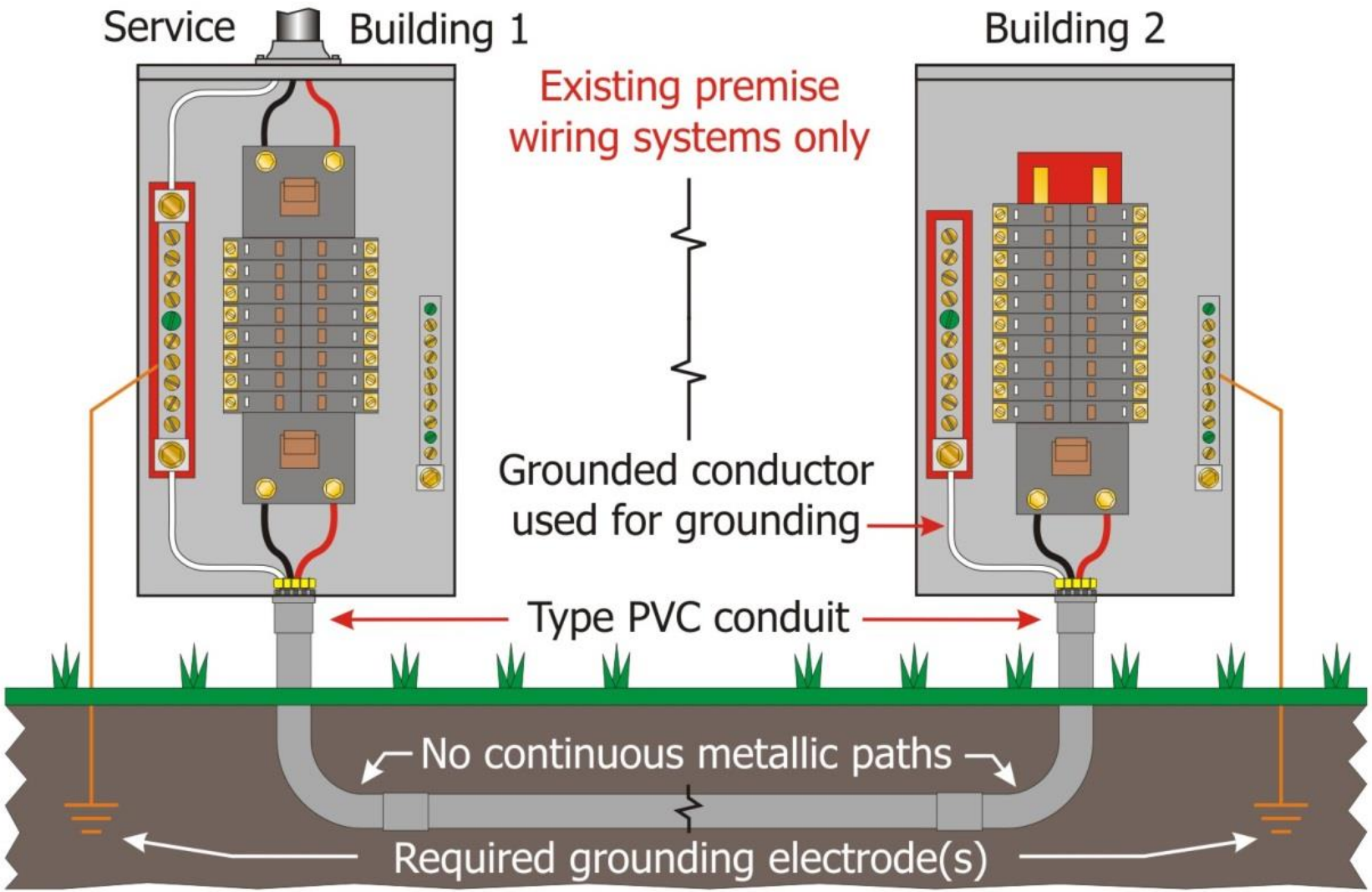
Grounding at separate building or structure using the grounded circuit conductor *[250.32(B)(1) Exception No. 1]*



Copyright © IAEI 2014

Grounding and Bonding at Seperate Building or Structure

Grounding and bonding at separate building or structure using grounded circuit conductor *[250.32(B)(1) Exception No. 1]*

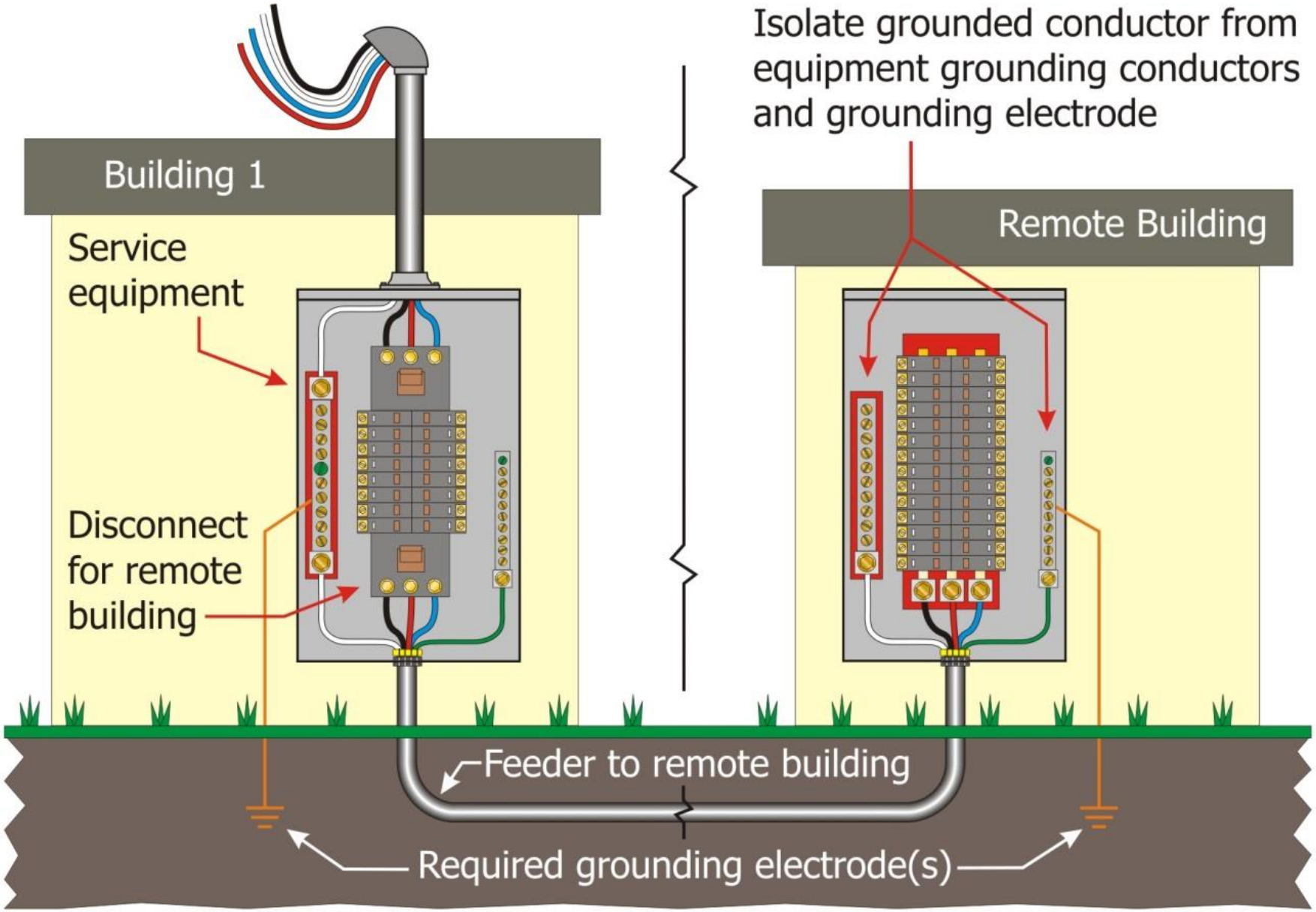


Copyright © IAEI 2014

Disconnecting Means for Separate Building or Structure on the Same Premises

- Special rules have been provided for large capacity, multibuilding industrial installations under single management *[see 250.32(D)]*
- These occupancies have trained and qualified personnel and have established procedures for safe switching of electrical feeders or branch circuits
- As a result, the disconnecting means are permitted to be at other locations on the premises rather than at the building served as generally required by 225.32

Remote Disconnect Permitted

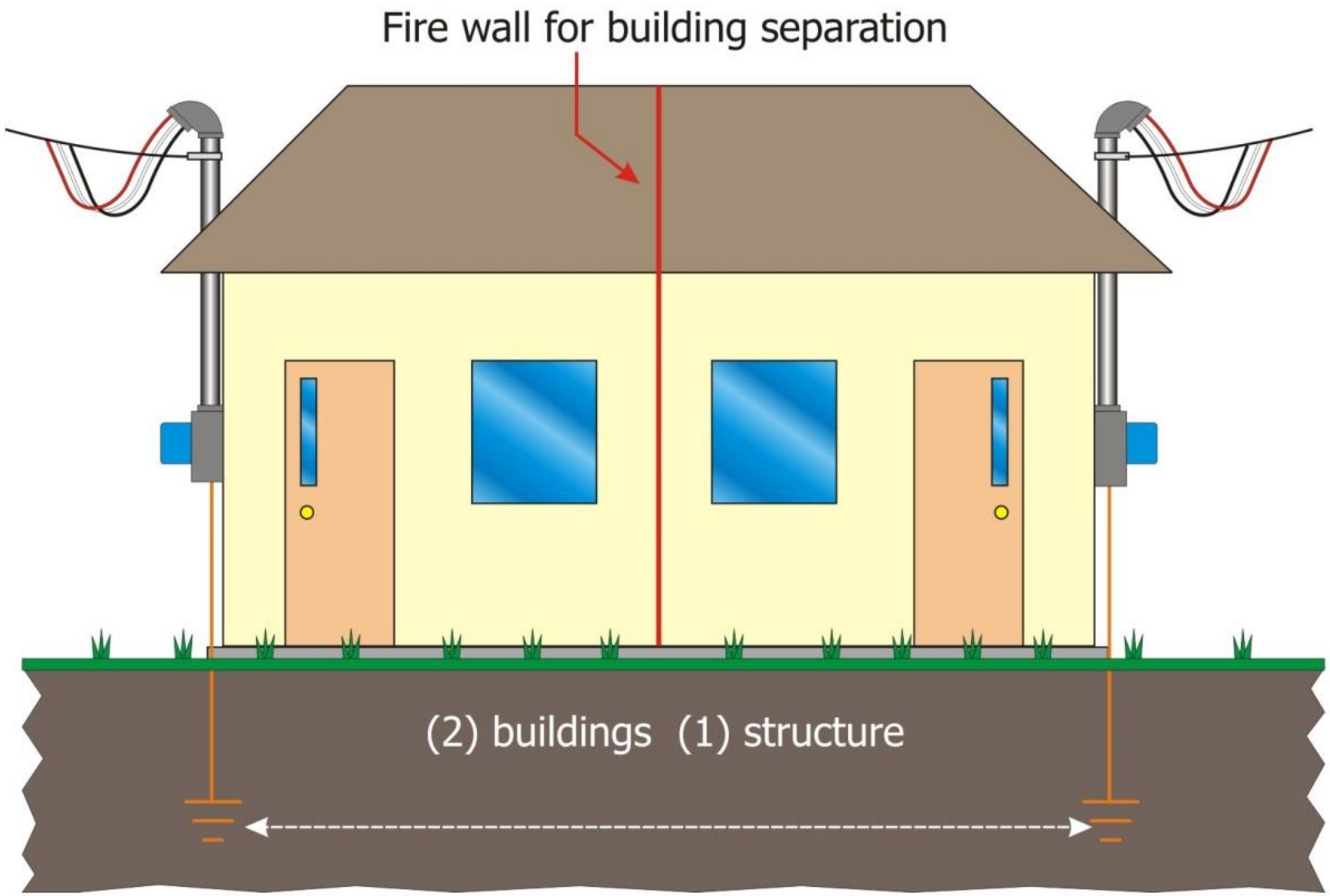


Note: Buildings under single management

[250.32(D)]

Copyright © IAEI 2014

Two Buildings on a Common Foundation



Bonding grounding electrodes together permitted but not required [250.58]

Copyright © IAEI 2014

Henry Peter Matthews, PE, CPE, CESCP, PVA

Home Address
1203 McKinley Place
Fostoria, Ohio 44830
Email: hpmatthews@matthewselectrical.net
Home Phone: 419-701-7707
Cell Phone: 419-575-3488

Work Address
Marathon Petroleum Company
539 South Main Street
Findlay, Ohio 45840
Email: hpmatthews@marathonpetroleum.com
Office phone: 419-421-3423
Cell phone: 419-957-2110

Work Experience

Marathon Petroleum Company, LP; Findlay, Ohio — June 2006 – Present

- Advanced Senior Engineer/Electrical Specialist
- Electrical Engineering Supervisor – Terminal Engineering
- Project Engineer – Major Projects
- Electrical Designer – Retail Division

Cooper Standard Automotive, Bowling Green, Ohio — July 1993 – June 2006

- Plant Engineering Manager
- Plant Electrical Engineer

Toledo Engineering Company (consultant); Toledo, Ohio — June 1989 – July 1993

- Electrical Drafter

Education

Bowling Green State University; Bowling Green, Ohio — Aug 2003
Masters of Business Administration

Pennsylvania State University; University Park, PA — Dec 1989
BS Electrical Engineering

Solar Energy International, Paonia, Colorado — Sept 2021
Solar PV Training

Owens Community College; Findlay, Ohio — April 2017
Certificate: Introductory Welding

Penn Foster Career School — July 2010
Certificate: Plumbing

Penn Foster Career School — October 2004
Certificate: Electrician

Certifications

Professional Engineer (PE): OH, MI, IN, KY, IL, WI
Photovoltaic Associate (PVA) by NABCEP
Certified Electrical Safety Compliance Professional (CESCP), NFPA
Certified Plant Engineer (CPE): Association for Facility Engineers
Building Operator Certification (BOC): Northwest Energy Efficiency Council

Licenses

Ohio Electrical Contractor, Ohio Department of Commerce, License # 46972
Ohio Training Agency, Ohio Construction Industry Licensing Board, Agency #48714
Ohio Training Agency, Ohio Board of Building Standards

Special Training

Solar Energy International (SEI), Paonia, Colorado

- Solar Electric and Design and Installation Course, April 2021, 60 hours
- PV Systems Fundamentals (Battery-Based), June 2021, 40 hours
- Advanced PV System Design and the NEC, June-July 2021, 60 hours
- Comparing Battery Technologies, July 2021, 10 hours
- Tools and Techniques for Operations and Maintenance of PV Systems, 9/21, 40 HR

Affiliations

Institute of Electrical and Electronics Engineers (IEEE) – Senior Member
International Association of Electrical Inspectors (IAEI)
NFPA Section Member for Architects, Engineers and Building Officials
Illumination Engineering Society of North America (IESNA)
API RP 545 former Co-Chair, American Petroleum Institute, Lightning Protection for Above Ground Storage Tanks (2017- 2018)

Business Ownership

Matthews Electrical Services, Owner
Designer Cuts Hair Salon, LLC; Co-owner

Biography

Henry has worked in the electrical, power, electronics, instrumentation, controls and communication fields for over 30 years. He earned his Bachelor of Science degree in Electrical Engineering from Penn State University in 1989. Henry worked as a consultant for Toledo Engineering Company in Toledo, Ohio as a drafter and field technician.

In 1993 he started working for Cooper Standard Automotive Company in Bowling Green, Ohio in 1993 as a Plant Electrical Engineer. He was then promoted to Plant Engineering Manager in 2000. During this time, he earned his Professional Engineering License in Ohio.

In 2003, Henry earned his MBA at Bowling Green State University.

In 2006, Henry joined Marathon Petroleum Company in Findlay, Ohio. He then went on to obtain his Professional Engineers license in Electrical Engineering for Michigan, Indiana, Illinois, West Virginia, Kentucky, Minnesota and Wisconsin. During his tenure at Marathon, Henry has had several roles including Electrical Design Engineer, Project Engineer and Electrical Supervisor. He is currently an Advanced Senior Engineer where he writes electrical standards for the company and conducts a community of practice for all the company's electrical engineers and safety professionals.

During his time at Cooper Standard Automotive and Marathon Petroleum, Henry developed a passion for teaching, learning and applying Electrical Construction Codes. At Cooper, he trained the entire non-electrical maintenance staff to perform basic electrical tasks.

At Marathon, Henry works with the Learning and Development Department to conduct multiple training sessions for new hires and seasoned engineers on various topics including Electrical Safety, Grounding and Bonding, Hazardous Area Location, Electrical Inspection, Motors, Lightning protection Static Electricity Mitigation, Reading and Understanding Electrical Diagrams, Programmable Logic Controllers and more.

Henry also works very closely with the Talent Acquisition Teams and visits numerous college campuses to deliver presentations on Engineering, Career Development, Networking and other topics.

Henry recently served as the Co-chair of the API Recommended Practice 545 Task Group for Lightning Mitigation for Above Ground Storage Tanks. In this role, he works with engineers, scientists and manufacturers from all over the world to evaluate the impacts of lightning and static electricity on metal above ground storage tanks.

His passion for teaching and Electrical Safety has motivated him to earn the Certified Electrical Safety Compliance Professional Certification (CESCP) from NFPA. He also regularly attends numerous electrical and safety conferences and training sessions conducted by NFPA, IEEE, API.

Previously, Henry was the President of the Fostoria, Ohio area Toastmasters team.

Henry is also a member of the International Association of Electrical Inspectors.

Henry also owns two small businesses:

> **Matthews Electrical Services** - that performs mainly limited residential and small commercial electrical services and conducts training for licensed electricians in the state of Ohio.
>
> **Designer Cuts Hair Salon, LLC** – Henry co-owns the beauty salon with his wife.

File Attachments for Item:

ER-7 Health Care Facilities, Fault Currents, Common Defects (IAEI)

All certifications except IU and plumbing (6 hours)

Staff Notes:

ESIAC Recommendation:

Committee Recommendation:

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: Lorenzo Adam
(Contact Name)

Organization: Ohio Chapter IAEI
(Organization/Company)

Address: 27 Penbrooke Ct
(Include Room Number, Suite, etc.)

City: Monroe State: Ohio Zip: 45050

E-Mail: ladam@masonoh.org

Telephone: 513-229-8520 Fax:

Course Sponsor: Ohio Chapter IAEI

COURSE INFORMATION:

Course Title: Health Care Facilities / Fault Currents / Common Defects

New Course Submittal: ■ Update Course: ☐ Prior Approval Number:

Purpose and Objective: To provide attendees with an overview and explanation of the subjects presented and to provide a level of uniformity among inspectors, contractors, professional designers and jurisdictions

Instructors: Various IAEI members

Number of Instructional Contact Hours that can be obtained upon completion: 6 hours

If Multi-Session, Number of Instructional Contact Hours Per Session:

Program Applicable for the Following Participants:

Building Official ✔ Master Plans Examiner ✔ Building Inspector ✔ Fire Protection Inspector ✔ Mechanical Inspector ✔

Building Plans Exam. ✔ Plumbing Inspector ☐

Plumbing Plans Exam. ☐ Non-Res IU Inspector ☐

Electrical Plans Exam. ✔

Mechanical Plans Exam. ✔

Fire Protect. Plans Exam. ✔

Res Building Official ✔ Res Plans Examiner ✔ Res Building Inspector ✔ Res Mechanical Inspector ✔ Res IU Inspector ☐

Electrical Safety Inspectors ✔

Location of ESI Course: Fairfield, Ohio Date(s) of ESI Course(s): Febraury 5, 2022

SUBMITTAL CHECKLIST: **Make Sure** all of the Following Information is **Submitted**:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	
	Organization sponsoring or requesting the program (if any)	
Course Title:	Name of course (related to content)	
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	
Test Materials:		
Completed Application:		

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

Agenda

NEC Analysis of Changes
February 5th 2022

Topic: See outlines for more details on these topics.

Instructors: Dewayne Jenkins, Pete Baldauf, Caty Robinson, Lorenzo Adam, Gaylord Poe, Rick Lecher

7:30 am to 8:00 am	Registration	
8:00 am to 9:00 am	Non- Hospital Health Care	1.00 h
9:00 am to 9:30 am	Break	
9:30 am to 10:30 am	Non-Hospital Health Care	1.00 h
10:30 am to 10:45 am	Break	
10:45 am to 12:00 m	Fault Current	1.25 h
12:00 pm to 1:00 pm	Break for lunch	
1:00 pm to 1:45 pm	Fault Current	0.75 h
1:45 pm to 2:30 pm	Common Electrical Defects	0.75 h
2:30 pm to 2:45 pm	Break	
2:45 pm to 4:00 pm	Common Electrical Defects	1.25 h
4:00 pm	Certificates Distributed	
	Total	6.00 h

Course Outline for Jointly Sponsored Seminar Series
February 5, 2022

Non-Hospital Health Care Facilities

All health care facilities addressed by the code are routed towards hospitals, but the misunderstanding comes when it is not a hospital. Ambulatory services, outpatient services, medical offices, dental offices and the likes, nursing homes and assisted living facilities.

The code requirements for these facilities differ from those for hospitals. We will be discussing wiring methods and how it affects which facility you are operating under.

- Definitions Art. 100
- Requirements:
    - Art. 517
        - General Part I
        - Wiring and Protection Part II

Fault Current Calculations and Misunderstanding Practices

Shor circuit current rating is a requirement in all services. It states that no electrical service shall be rated less than what is capable of withstanding when it comes to fault. The importance of this subject is crucial to understanding the seriousness of a fault, not only it could affect the health of the personnel but also the loss of the infrastructure, including production time loss and lack of readily available materials.

- Definitions Art. 100
- Requirements:
    - Art 110.9 / Interrupting Rating
    - Art. 110.10 / Circuit Impedance, Short Circuit Current Rating
    - Art. 110.24 / Available Fault Current
    - Art. 230 / Services
    - Art. 240.86 / Series Rating

Common Electrical Defects

Common electrical defects and violations are commonly found in the field. Common violations is where the consistency among inspectors and compliance among contractors would have an impact in all jurisdictions, the myth where one jurisdiction requires something while another requires exactly the opposite would tend to disappear, thus bringing the level of consistency of the NEC to uniformity. Common defects will help Inspectors, Building Officials and Contractors understand the violations that will occur during the inspection process and how to relate such violation to the respective Building Officials, according to **Section 113 in 2017 Ohio Building Code and Section 109 in 2019 RCO.**

- Various articles will be discussed throughout this topic as violations and defects changes from project to project.
- The presentation will focus on:
    - Plan Review Deficiencies
    - Field Deficiencies

These presentations will be in Power Point format and each participant will be encouraged to discuss and to participate on the subjects presented. Contractors and ESIs will benefit as well as Plans Examiners and Professional Designers by getting firsthand information on these subjects. Both, the Ohio Building Code and the Residential Code of Ohio, in chapters 27 and 33 respectively refers to NFPA 70 as the standard to comply with electrical installations

INSTRUCTOR QUALIFICATIONS

Lorenzo M. Adam

Lorenzo started his electrical training in 1983. In 1988, he started his own electrical company. In 1996, he obtained the State Electrical Inspector certification. In 1997, he joined the City of Troy as a Building/Electrical Inspector. Currently, he works for the City of Mason. Lorenzo has an Electrical Plans Examiner, Residential Building Official, Building Inspector, Building Official interim certification from the State of Ohio. Lorenzo is currently the secretary/treasurer for the SW Division of IAEI, Ohio Chapter, secretary/treasurer for the Ohio Chapter IAEI and Treasurer and Past President of the Southwestern Ohio Building Officials Association (SWOBOA).

Address: 27 Penbrooke Ct., Monroe, Ohio 45050

Gaylord K. Poe

Gaylord Poe started his longstanding career in the electrical industry in 1969. He earned his Electrical Safety Inspector Certificate (#592) in 1978. He continued to work as an electrician until 1983 when he joined the IBI team as a commercial/industrial field inspector. He was promoted to Commercial Coordinator in 1986, to Assistant Chief Electrical Inspector in 1994, and to Chief Electrical Inspector and President in 2000. He earned his Ohio Electrical Plan Examiner and IAEI Electrical Inspector-Plan Review certificates in 2005. He is the only Ohio ESI certified by the IAEI as a Master Electrical Inspector (2009).
Gaylord is a member of the UL Electrical Council, the NFPA, the Cincinnati Business Development and Permit Center Advisory Committee, the Board of Trustees for the GCEA, the Electrical Trades Advisory Committee for Scarlet Oaks JVS, and is actively involved in course development and training classes for the continuing education programs of the IAEI, IEC, GCEA, and NECA. Gaylord has been involved with the IAEI since the early 1980's. He currently has become the Past-President of the IAEI SW Division, in which he served for 17 years combine.

Address: Suite 125-W, 250 West Court Street, Cincinnati, OH 45202

Caty Robinson

Caty Robinson began her electrical career working as an apprentice in the Dayton, Ohio area. As a member of IBEW Local 82 Caty served a full apprenticeship and worked in the field as a journeyman wireman for Kastle Electric. Caty's Ohio certification #2647 is for ESI (2004) and EPE (2013). Caty joined Inspection Bureau, Inc. (IBI) in 2008 as a commercial Electrical Safety Inspector. Caty currently serves as IBI's Commercial Coordinator and inspects in IBI's commercial territories and Kentucky. Caty is also a member of the IAEI Ohio Chapter SW Division

Address: Suite 125-W, 250 West Court Street, Cincinnati, OH 45202

Peter M. Baldauf

Peter has been in the electrical industry for over 15 years. He began his electrical career working through a trade school in Dayton, Ohio. After graduation, he enrolled in the Associated Builders and Contractors State certified electrical apprenticeship program. Peter attended the program for the full four years and upon completion of the program, he relocated to Tacoma, Washington. In Tacoma, he sat for a State administered test and received State of Washington certification as a journeyman electrician, which is required by the Division of Labor and Industry in that State to perform work as an electrician. Upon his return to the State of Ohio, Peter sat for and was issued a license by the State of Ohio to perform duties associated with the installation and servicing of fire alarm systems. He also applied and sat for the test to become a State Certified Electrical Safety Inspector. He was awarded this Certification in September of 1998. Peter began his career in public service with Montgomery County Building Regulations as an Electrical Inspector in August of 1999. He is currently employed with the City of Vandalia as an Electrical Inspector. Peter also instructs classes for the Master Electrical Contractors Association, Adequate Wiring Committee, and International Association of Electrical Inspectors. He also has certification through the City of Dayton Board of Education as an Adult Education Instructor.

Address: 3600 Shroyer Road, Kettering, OH 45429

Daniel Dewayne Jenkins

Dewayne started his career in the electrical field in 1982 in Dayton, Ohio and several years of experience in the electrical industry both as a contractor and inspector. He served 4 years in an electrical apprenticeship program and has over 8 years in the field as a journeyman electrician and he has 4 years, to his credit, as an electrical estimator and project manager.

Dewayne has been a licensed electrical contractor and a certified electrical safety inspector since 1996. He also holds Ohio certifications as building inspector (1998), electrical plans examiner (2006) and residential building official (2007) and chief building official (2008). He is currently employed by the City of Kettering in the position as an electrical plans examiner, electrical safety inspector and building inspector.

Dewayne is an adjunct lecturer II for Sinclair Community College in the electrical trades for several years. A technical presenter for the Ohio Board of Building Standards (OBBS), International Association of Electrical Inspectors (IAEI), Master Electrical Contractors Association (MECA), Adequate Wiring Committee (AWC) & Greater Cincinnati Electrical Association (GCEA). He has served as President for the Ohio Chapter IAEI (2010). Dewayne has also served as President of the Miami Valley Building Officials Council (2002 & 2003). He currently is the President of the Southwest Division, IAEI and serves on the Electrical Safety Inspector Advisory Committee for the Ohio Board of Building Standards.

Address: 3600 Shroyer Road, Kettering, OH 45429

Rick Lecher

Rick has been in the electrical industry for 31 years. He received his Certification # 1671 from the State of Ohio in 1998.Rick has been employed by Inspection Bureau, Inc. (IBI) for 5 years as an Electrical Safety Inspector. Rick is currently inspecting in IBI's C-2 and R-1 territories. Rick is also an Electrical Plan Examiner for IBI.

Address: Suite 125-W, 250 West Court Street, Cincinnati, OH 45202

Jointly Sponsored Seminar Series 2022
Presented by GCEA and Southwest Division IAEI

Facility

The facility is conveniently located in Fairfield, about 1mile west from I-75 off Route 4. Classes are held at the **Receptions 5975 Boymel Drive, Fairfiled, Ohio**. The room occupancy is good for 300 students comfortably with tables and chairs. There are provisions for audio-visual equipment (screen, microphone and speakers). Restrooms are located nearby the room for females and males. Refreshments are served during the class; attendees have access to vending machines as well as water. Duration of the instruction is 6.00 hours. 8:00am – 4:00pm. on February 5th 2022.

Course Materials

Every attendee is responsible for bringing an edition of the NEC. We will use the NEC 2017. The instructors will also have on hand the necessary references to answer questions about other codes or standards. Most of the presentations are on a slide-format (Power Point).

"Who's Fault is it?"

2017 NEC Requirements

Prepared by:
Dewayne Jenkins

Definitions

- Circuit Breaker.
- A device designed to open and close a circuit by nonautomatic means and to open the circuit automatically on a predetermined overcurrent without damage to itself when properly applied within its rating.

Definitions

- Fuse.
- An overcurrent protective device with a circuit-opening fusible part that is heated and severed by the passage of overcurrent through it.

Definitions

- Interrupting Rating.
- The highest current at rated voltage that a device is intended to interrupt under standard test conditions.

Definitions

- Overcurrent.
- Any current in excess of the rated current of equipment or the ampacity of a conductor. It may result from overload, short circuit, or ground fault.
- FPN: A current in excess of rating may be accommodated by certain equipment and conductors for a given set of conditions. Therefore, the rules for overcurrent protection are specific for particular situations.

Definitions

- Overload. Operation of equipment in excess of normal, full-load rating, or of a conductor in excess of rated ampacity that, when it persists for a sufficient length of time, would cause damage or dangerous overheating. A fault, such as a short circuit or ground fault, is not an overload.

Definitions

- Qualified Person. One who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training on the hazards involved.
- FPN: Refer to NFPA 70E, Standard for Electrical Safety in the Workplace, for electrical safety training requirements.

Unqualified person?

One method of becoming familiar with the hazards involved

Gene Pool Thinned!!!

Qualified Person

Definitions

- Excerpt from NFPA 70-E – commentary following the definition of "Qualified Person"
- 110.6 Training Requirements.
- (A) Safety Training. The training requirements contained in this section shall apply to employees who face a risk of electrical hazard that is not reduced to a safe level by the electrical installation requirements of Chapter 4 [of NFPA 70E]. Such employees shall be trained to understand the specific hazards associated with electrical energy. They shall be trained in safety-related work practices and procedural requirements as necessary to provide protection from the electrical hazards associated with their respective job or task assignments. Employees shall be trained to identify and understand the relationship between electrical hazards and possible injury.

110.9 – Interrupting Rating

- Equipment intended to interrupt current at fault levels shall have an interrupting rating sufficient for the nominal circuit voltage and the current that is available at the line terminals of the equipment.

Equipment intended to interrupt current at other than fault levels shall have an interrupting rating at nominal circuit voltage sufficient for the current that must be interrupted.

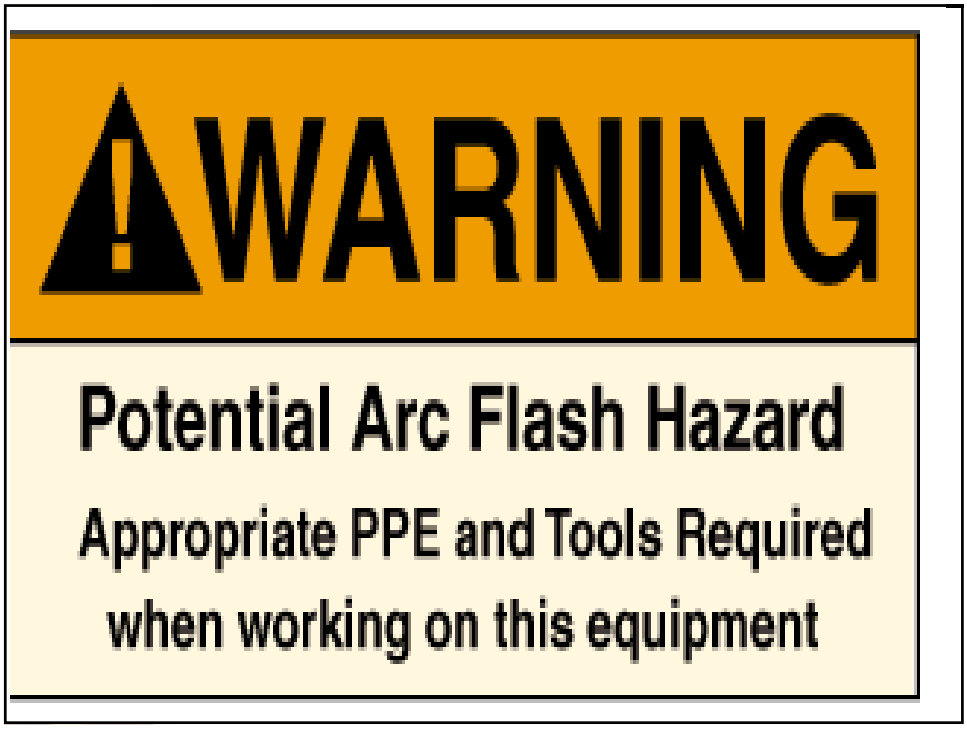
110.10 Circuit Impedance and Other Characteristics.

- 110.10 Circuit Impedance and Other Characteristics
- The overcurrent protective devices, the total impedance, the component short-circuit current ratings, and other characteristics of the circuit to be protected shall be selected and coordinated to permit the circuit-protective devices used to clear a fault to do so without extensive damage to the electrical components of the circuit. This fault shall be assumed to be either between two or more of the circuit conductors or between any circuit conductor and the grounding conductor or enclosing metal raceway. Listed products applied in accordance with their listing shall be considered to meet the requirements of this section.
- *Evidence of Extensive Damage is determined under test conditions. Equipment applied in a circuit within the ratings of the equipment should not sustain extensive damage under fault conditions*

Short Circuit

110.16 Flash Protection

- 110.16 Flash Protection
- Electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers, that are in other than dwelling occupancies, and are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked to warn qualified persons of potential electric arc flash hazards. The marking shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.


WARNING
Potential Arc Flash Hazard
Appropriate PPE and Tools Required
when working on this equipment

WARNING
Arc Flash Hazard.
Appropriate PPE Required.
Failure To Comply Can Result in Death or Injury.
Refer to NFPA 70 E.
BRADY CATALOG NO. 94913

110.22

- 110.22 Identification of Disconnecting Means
- Each disconnecting means shall be legibly marked to indicate its purpose unless located and arranged so the purpose is evident. The marking shall be of sufficient durability to withstand the environment involved.
- Where circuit breakers or fuses are applied in compliance with the series combination ratings marked on the equipment by the manufacturer, the equipment enclosure(s) shall be legibly marked in the field to indicate the equipment has been applied with a series combination rating. The marking shall be readily visible and state the following:
- CAUTION — SERIES COMBINATION SYSTEM RATED _____ AMPERES. IDENTIFIED REPLACEMENT COMPONENTS REQUIRED.

408.4 Circuit Directory or Circuit Identification.

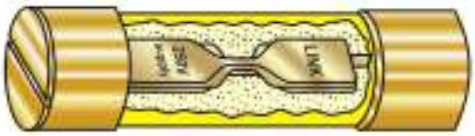
- Every circuit and circuit modification shall be legibly identified as to its clear, evident, and specific purpose or use. The identification shall include sufficient detail to allow each circuit to be distinguished from all others. Spare positions that contain unused overcurrent devices or switches shall be described accordingly. The identification shall be included in a circuit directory that is located on the face or inside of the panel door in the case of a panelboard, and located at each switch on a switchboard. No circuit shall be described in a manner that depends on transient conditions of occupancy.

240.60 (C)

- (C) Marking:
- Fuses shall be plainly marked, either by printing on the fuse barrel or by a label attached to the barrel showing the following:
- (1) Ampere rating
- (2) Voltage rating
- (3) Interrupting rating where other than 10,000 amperes
- (4) Current limiting where applicable
- (5) The name or trademark of the manufacturer
- The interrupting rating shall not be required to be marked on fuses used for supplementary protection.

240.60(D) Renewable Fuses

Class H fuses Interrupting rating 10,000 amperes (maximum)



Class H cartridge fuses of the renewable type only permitted for use as replacements in existing installations where there is no evidence of overfusing or tampering

Copyright © IAEI 2004

240.83 Marking

- (C) Interrupting Rating
- Every circuit breaker having an interrupting rating other than 5000 amperes shall have its interrupting rating shown on the circuit breaker. The interrupting rating shall not be required to be marked on circuit breakers used for supplementary protection.

240.83 Marking

- (E) Voltage Marking
- Circuit breakers shall be marked with a voltage rating not less than the nominal system voltage that is indicative of their capability to interrupt fault currents between phases or phase to ground.

240.85 Applications

- A circuit breaker with a straight voltage rating, such as 240V or 480V, shall be permitted to be applied in a circuit in which the nominal voltage between any two conductors does not exceed the circuit breaker's voltage rating. A two-pole circuit breaker shall not be used for protecting a 3-phase, corner-grounded delta circuit unless the circuit breaker is marked 1–3 to indicate such suitability.

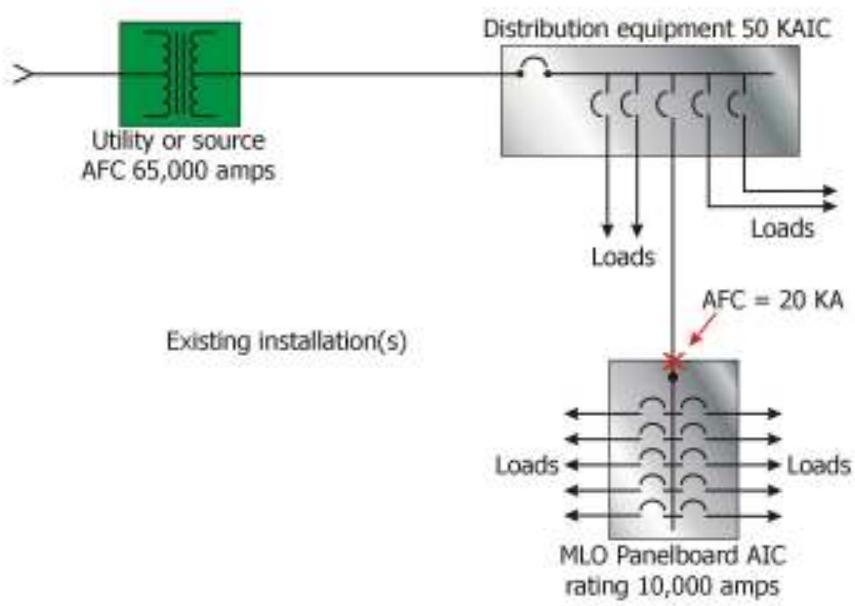
240.85 Applications

- A circuit breaker with a slash rating, such as 120/240V or 480Y/277V, shall be permitted to be applied in a solidly grounded circuit where the nominal voltage of any conductor to ground does not exceed the lower of the two values of the circuit breaker's voltage rating and the nominal voltage between any two conductors does not exceed the higher value of the circuit breaker's voltage rating.
- FPN: Proper application of molded case circuit breakers on 3-phase systems, other than solidly grounded wye, particularly on corner grounded delta systems, considers the circuit breakers' individual pole-interrupting capability.

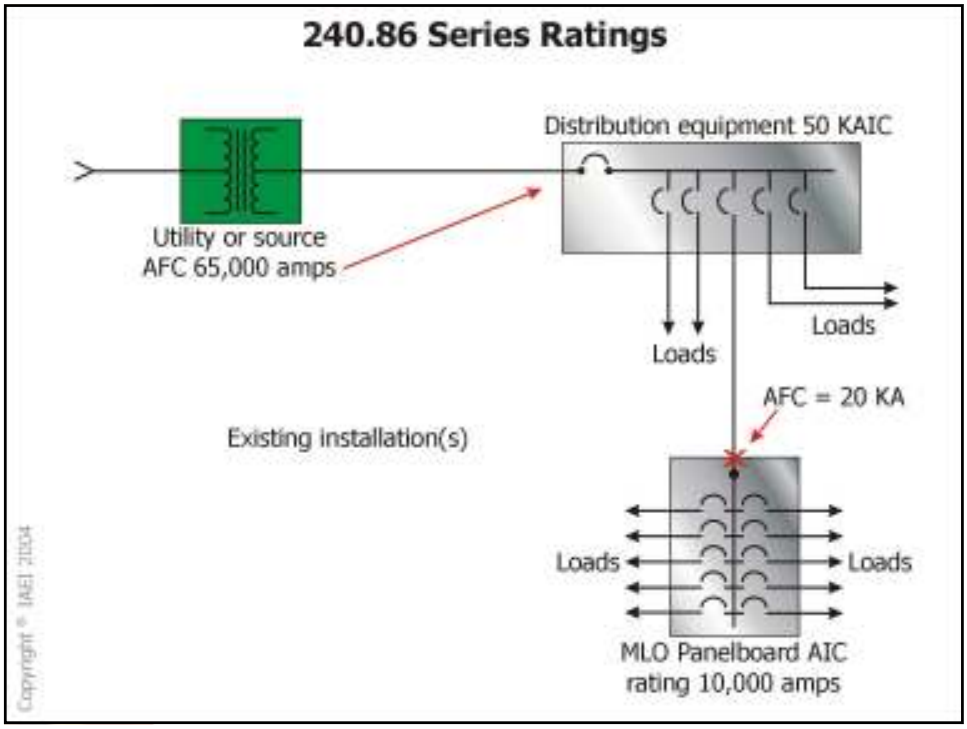
240.85 Applications

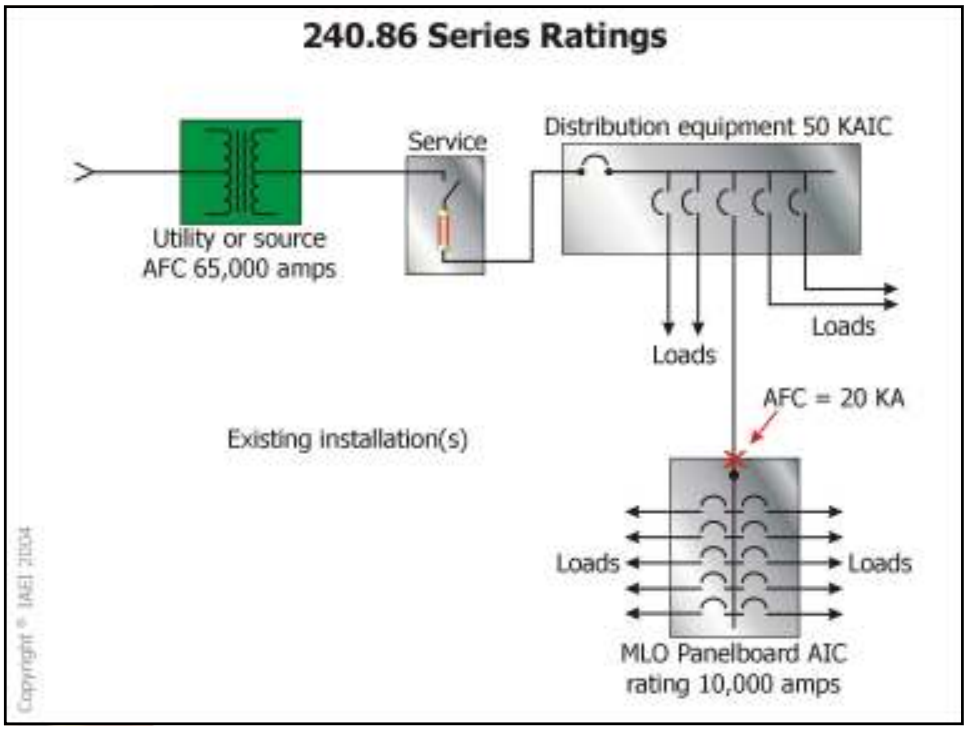
- A circuit breaker marked 480Y/277V is not intended for use on a 480-volt system with up to 480 volts to ground, such as a 480-volt circuit derived from a corner-grounded, delta-connected system. A circuit breaker marked either 480V or 600V should be used on such a system. In like manner, a circuit breaker marked 120/240V is not intended for use on a delta-connected 240-volt circuit. A 240-volt, 480-volt, or 600-volt circuit breaker should be used on such a circuit. The slash (/) between the lower and higher voltage ratings in the marking indicates that the circuit breaker has been tested for use on a circuit with the higher voltage between phases and with the lower voltage to ground.

240.86 Series Ratings



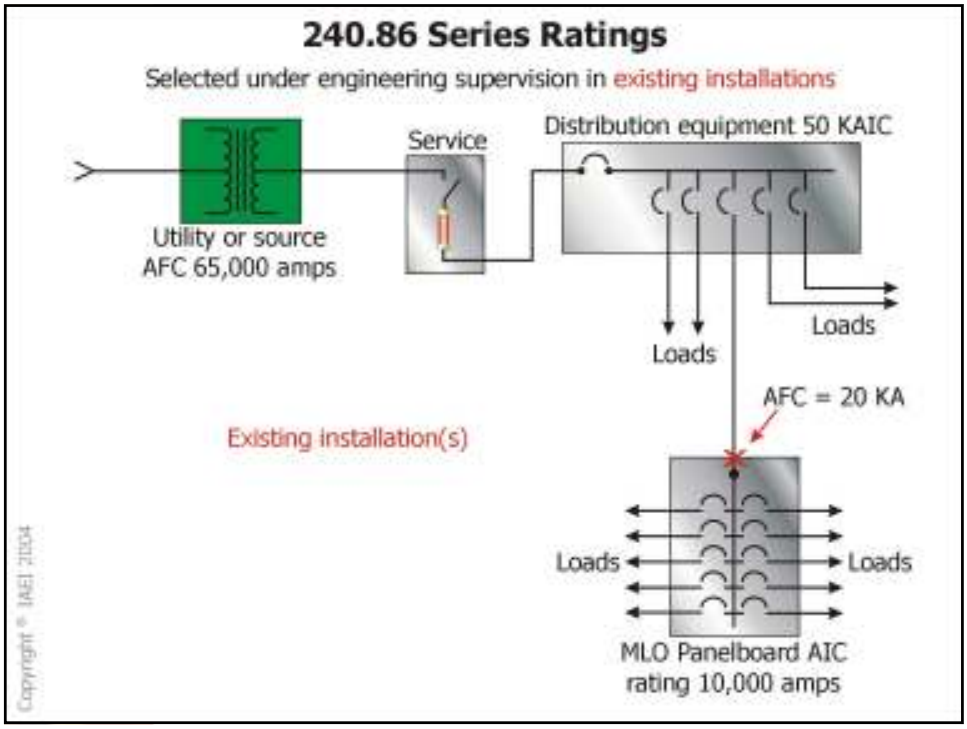
Copyright © IAEI 2004

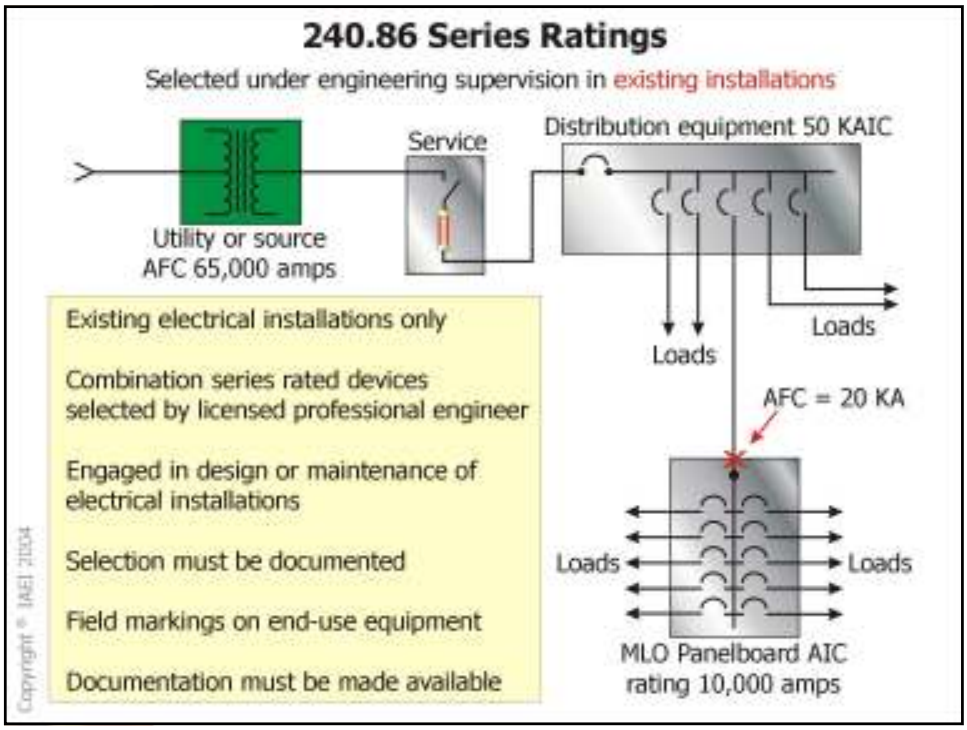

240.86 Series Ratings
Distribution equipment 50 KAIC
Utility or source
AFC 65,000 amps
Loads
Loads
AFC = 20 KA
Existing installation(s)
Loads
Loads
MLO Panelboard AIC
rating 10,000 amps
Copyright © IAEI 2004


240.86 Series Ratings
Service
Distribution equipment 50 KAIC
Utility or source
AFC 65,000 amps
Loads
Loads
AFC = 20 KA
Existing installation(s)
Loads
Loads
MLO Panelboard AIC
rating 10,000 amps
Copyright © IAEI 2004

Current Limiting Fuses

Unlimited Current Fuses


240.86 Series Ratings
Selected under engineering supervision in existing installations
Service
Distribution equipment 50 KAIC
Utility or source
AFC 65,000 amps
Loads
Loads
AFC = 20 KA
Existing installation(s)
Loads
Loads
MLO Panelboard AIC
rating 10,000 amps
Copyright © IAEI 2004


240.86 Series Ratings
Selected under engineering supervision in existing installations
Service
Distribution equipment 50 KAIC
Utility or source
AFC 65,000 amps
Existing electrical installations only
Combination series rated devices selected by licensed professional engineer
Engaged in design or maintenance of electrical installations
Selection must be documented
Field markings on end-use equipment
Documentation must be made available
Loads
Loads
AFC = 20 KA
Loads
Loads
MLO Panelboard AIC
rating 10,000 amps
Copyright © IAEI 2004

240.86 Series Ratings

- A series rated system is a combination of circuit breakers or a combination of fuses and circuit breakers that can be applied at available short-circuit levels above the interrupting rating of the load-side circuit breakers but not above that of the main or line-side device. Series rated systems can consist of fuses that protect circuit breakers or of circuit breakers that protect circuit breakers. The arrangement of protective components in a series rated system can be as specified in 240.86(A) for engineered systems applied to existing installations or in 240.86(B) for tested combinations that can be applied in any new or existing installation.

240.86 Series Ratings

- (A) Selected Under Engineering Supervision in Existing Installations: The series rated combination devices shall be selected by a licensed professional engineer engaged primarily in the design or maintenance of electrical installations. The selection shall be documented and stamped by the professional engineer. This documentation shall be available to those authorized to design, install, inspect, maintain, and operate the system. This series combination rating, including identification of the upstream device, shall be field marked on the end use equipment.

240.86 Series Ratings

- Compatibility with series rated systems will in all likelihood be limited to circuit breakers that (1) remain closed during the first 1/ 2 cycle of a fault and (2) have an interrupting rating that is not less than the let-through current of an upstream protective device (such as a current-limiting fuse). In those cases where the opening of a circuit breaker, under any level of fault current, begins in less than 1/ 2 cycle, the use of a field engineered series rated system will in all likelihood be contrary to acceptable application practices specified by the circuit breaker manufacturer. Where there is any doubt over the proper application of existing downstream circuit breakers with new upstream overcurrent protective devices, the manufacturers of the existing circuit breakers and the new upstream overcurrent protective devices must be consulted.

Component Protection Utilizing Fuses

- The two parameters IRMS and IP must be compared to the equipment's withstand rating. The rule is simple: if the RMS and peak let-through value of the fuses are less than the equipment withstand rating, the equipment will be protected. This philosophy holds true for various static components, such as wire and cable, busway, and motor starters. This basic protection requirement is mandated by NEC section 110.10. It will also be true for non-current limiting circuit breakers when their opening time is greater than one-half cycle.

Component Protection Utilizing Fuses

- In the past, as long as the fuse let-through values were less than the breakers interrupting rating, the system was considered sound. THIS METHOD HAS A SOLID HISTORY OF SUCCESSFUL APPLICATIONS. ***However,*** **due to changes in circuit breaker design, the method may not always work with today's circuit breakers. Selecting a current-limiting fuse to protect a downstream molded case circuit breaker has now become an increasingly more complex problem (emphasis added).**

Component Protection Utilizing Fuses

- Simply put, if the total clearing energy of a quicker acting molded case circuit breaker (a breaker that exhibits dynamic impedance) is less than the melting energy of a larger upstream fuse, the molded case circuit breaker will interrupt the full value of the system fault without the benefit of the fuse's current-limiting effect. This situation can have CATASTROPHIC effects on the circuit breaker as it tries to interrupt faults beyond its interrupting capacity. **Currently, there is no available engineering method to predict protection of these faster breakers (emphasis added).**
- (Source: Cooper / Bussmann "SPD electrical protection handbook". Copyright 1999 by Cooper Bussmann)

AIC Rating of equipment

- In general, protective devices are required to have an interrupting rating equal to the available fault current (NEC 110.9). However, under most circumstances, the use of current limiting fuses to protect devices with inadequate interrupting ratings meets this requirement. This eliminates the need to install more expensive fully rated devices. The most common use is protecting molded case circuit breakers (MCB's).

AIC Rating of equipment

- There are three ways of selecting current-limiting fuses for this purpose:

1. Using circuit breaker manufacturer's UL (or other NRTL) listed series ratings for their panelboard with fuses.

AIC Rating of equipment

2. Reference to Underwriters Laboratories, Inc. (UL) Recognized Component Directory (the "Yellow Book"), including any supplements. The Recognized Component Directory lists manufacturers that have obtained a UL listing of their circuit breakers when tested in series with current-limiting fuses. Unless the complete equipment assembly has obtained a UL listing and is labeled for series rating with a stated maximum available fault current, the component series ratings do not qualify such equipment for use on an available fault current higher than the interrupting rating of the lowest rated breaker.

AIC Rating of equipment

3. The "Engineered" method using peak let-through charts or software. For many years, an "engineered" method (known as the up-over-and-down method) of using current-limiting fuses has been used to successfully protect breakers with inadequate interrupting ratings. However, circa 1975, new designs of fast acting breakers began to appear. These breakers employ a "blow-apart" contact design that actually uses the repulsion energy of the fault current. The result was that current limiting fuses were not always able to protect these breakers from damage.

AIC Rating of equipment

- The interaction of the current-limiting fuse and these fast breakers cannot be mathematically modeled to analytically determine a predictable outcome. Thus the only safe course for the industry was to require documented testing of each combination of breaker and fuse prior to application.
- Today, when the downstream disconnect or overcurrent protection devices are molded case circuit breakers, you cannot arbitrarily use the current limiting effect of fuses to lower the RMS fault current value to a level below the breaker's AIC rating. You must either use listed series combinations of fuse/breaker or use fully rated fuses or breakers.

Selective Coordination

- Definition:
- Coordination(Selective).
  Localization of an overcurrent condition to restrict outages to the circuit or equipment affected, accomplished by the choice of overcurrent protective devices and their ratings or settings.

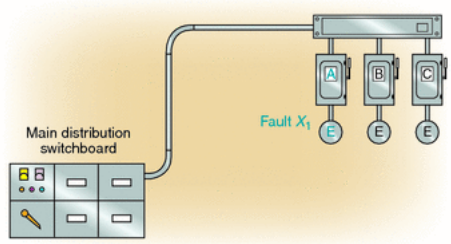
Selective Coordination

The NEC has mandatory selective coordination requirements for the following systems:

- Elevators – Article 620: 620.62
- Emergency Systems- Article 700: 700.27
- Legally Required Standby Systems- Article 701: 701.18
- Critical Operations Power Systems- Article 708: 708.54
- Healthcare - Article 517: 517.26 Required for Essential Electrical Systems

Selective Coordination

Below is an example of the requirement found in 620.62. The basic idea is to localize a fault condition to the affected machinery or apparatus so that the rest of the equipment connected to a feeder remains unaffected.



Selective Coordination

Selective coordination would be a necessity for egress lighting and other emergency systems where large groups of people gather and are faced with an emergency situation. 700.27 requires this type of protection.

Selective Coordination

517.26 requires compliance with article 700 for selective coordination for essential electrical systems within health care facilities.

Trouble

- The following pictures are examples of serious problems arising from poor planning and/or design

Worth1000.com

Worth1000.com

Construction Site

The End

- Thank you

Welcome from SW Division IAEI

The "Doctor" is in. Health Care Facilities Article 517

Presented by:
Pete Baldauf
Based on the 2017 NEC

CHARLES F. KETTERING MEMORIAL HOSPITAL
MAIN ENTRANCE

BENJAMIN & MARIAN
SCHUSTER

517.1 Scope

- The provisions of this article shall apply to electrical construction and installation criteria in health care facilities that provide services to human beings.
- The requirements in Parts II and III not only apply to single-function buildings but are also intended to be individually applied to their respective forms of occupancy within a multifunction building (e.g., a doctor's examining room located within a limited care facility would be required to meet the provisions of 517.10).

517.1 Scope

- The requirements of Article 517 are intended to apply to all types of health care facilities. The requirements for each type of health care facility are nevertheless intended to be applied in a very specific manner. Application example: In a suite of doctors' offices within an office building, a doctor's business office would be treated as an ordinary occupancy and would be required to meet only the applicable portions of other parts of this Code. However, the examining rooms attached to the doctor's business office would be required to meet the provisions of Part II and 517.45 in Article 517.

Services to Human Beings

Not Veterinarian Clinics

517.2 Definitions: Governing Body – Health Care Facilities

- New definition for "Governing Body" added to Article 517
- Term "governing body" appears at 7 different locations in Article 517
- New definition will be followed by "[99: 3.3.62]" as this is extracted material from NFPA 99 *(Healthcare Facilities Code)*
- New definition will eliminate some of the confusion that may exist for users of the *Code* when trying to determine who has responsibility for making decisions on certain matters in a health care facility

517.2 Definitions (Health Care Facilities)

Governing Body. The person or persons who have the overall legal responsibility for the operation of a health care facility.

Copyright © IAEI 2017

517.2 Definitions: Health Care Facilities

- Definition of "Health Care Facility" was revised to include "**mobile enclosures**"
- Revised definition is extracted material from NFPA 99 *(Healthcare Facilities Code)*
- Health care facility is not limited to a traditional "brick and mortar" permanently constructed building
- Health care facility can include a **mobile or portable facility** such as a mobile blood bank or mobile facilities as seen at sporting events

517.2 Definitions (Health Care Facilities)

Health Care Facilities. Buildings, portions of buildings, or mobile enclosures in which human medical, dental, psychiatric, nursing, obstetrical, or surgical care are provided. [99: 3.3.67]

Informational Note: Examples of health care facilities include, but are not limited to, hospitals, nursing homes, limited care facilities, clinics, medical and dental offices, and ambulatory care centers, whether permanent or movable.

Copyright © IAEI 2017

517.2 Definitions: Medical Office (Dental Office)

- To define a well-used term in Article 517, a new definition for "Medical Office (Dental Office)" was added at 517.2
- New definition will provide needed clarity when determining health care facility requirements such as branch circuit requirements at patient bed locations
- New definition will make it clear that overnight stays for patients or 24-hour operation facilities do not encompass a medical or dental office.

517.2 Definitions: Medical Office (Dental Office) *(cont.)*

- To define a well-used term in Article 517, a new definition for "Medical Office (Dental Office)" was added at 517.2 *(cont.)*
- The use of sedation or local anesthesia is involved in minor treatment or procedures under the continuous supervision of a medical or dental professional would be involved at a medical or dental office
- New definition is extracted material for NFPA 99 *(Health Care Facilities Code)*

517.2 Definitions (Health Care Facilities)

Medical Office (Dental Office). A building or part thereof in which the following occur:

(1) Examinations and minor treatments or procedures are performed under the continuous supervision of a medical or dental professional;
(2) Only sedation or local anesthesia is involved and treatment or procedures do not render the patient incapable of self-preservation under emergency conditions; and
(3) Overnight stays for patients or 24-hour operation are not provided. [99: 3.3.98]

Copyright © IAEI 2017

517.2 Definitions: Patient Care Space –Health Care Facilities

- Revised definition of "Patient Care Space" will include four NFPA 99 numbered categories for:
  - Basic Care (Category 3) Space
  - General Care (Category 2) Space
  - Critical Care (Category 1) Space
  - Support (Category 4) Space
- Bracketed NFPA 99 references were added after each description and informational note
- Informational notes were relocated after each definition with examples of each location.

517.2 Definitions (Health Care Facilities)

Definition for "**Patient Care Space**" was revised for clarity and to align with definitions in NFPA 99

Basic Care (Category 3) Space:
- Examination or treatment rooms in clinics
- Medical and dental offices
- Nursing homes
- Limited care facilities

General Care (Category 2) Space:
- Inpatient bedrooms
- Dialysis rooms
- In vitro fertilization rooms
- Procedural rooms
- Similar rooms

Critical Care (Category 1) Space:
- Special care unit patient rooms used for critical care
- Intensive care
- Special care treatment rooms
  - Angiography laboratories
  - Cardiac catheterization labs
  - Delivery rooms
  - Operating rooms
  - Post-anesthesia care units
  - Trauma rooms

Support (Category 4) Space:
- Anesthesia work rooms
- Sterile supply
- Laboratories
- Morgues
- Waiting rooms
- Utility rooms
- Lounges

Copyright © IAEI 2017

Patient Care Vicinity

- A space, within a location intended for the examination and treatment of patients, extending 1.8 meters or six feet beyond the normal location of the patient bed, chair, table, treadmill, or other device that supports the patient during examination and treatment and extending vertically 2.3 meters or seven foot six inches above the floor.

2017 NEC Code Sections

- We will review just some of the important related code sections to Health Care Facilities.
- This presentation is not intended to provide a comprehensive understanding or analysis of Article 517.

210.8(B)(5), Ex. No. 2 to(5) GFCI – Sinks

- Receptacles located around sinks at a dentist's or doctor's office or clinic do require GFCI protection
  - **(B) Other Than Dwelling Units –** All single-phase receptacles rated 150 volts to ground or less, 50 amps or less and three-phase100 amps or less installed in the locations specified in (1) through (10) shall have ground-fault circuit-interrupter protection for personnel
  - **(5) Sinks** — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink
  - **Exception No 2 to (5):** For receptacles located in patient bed locations of general care or critical care areas of health care facilities other than those covered under 210.8(B)(1) *(Bathrooms)*, GFCI protection shall not be required

GFCI ?
Yes

GFCI ?
No

Part II. Wiring and Protection

- 517.10 Applicability
- (A) Applicability. Part II shall apply to patient care space of all health care facilities.
- (B) Not Covered. Part II shall not apply to the following:
- (1) Business offices, corridors, waiting rooms, and the like in clinics, medical or dental offices, and outpatient facilities.
- (2) Areas of nursing homes and limited care facilities wired in accordance with Chapters 1 through 4 of this Code where these areas are used exclusively as patient sleeping rooms.

406.12 Tamper-Resistant Receptacles

- All 15- and 20- ampere, 125- and 250- volt receptacles in the areas specified in 406.12(1) through (7) shall be listed tamper-resistant receptacles.
- (5) Business offices, corridors, waiting rooms and the like in clinics, medical and dental offices and outpatient facilities.

Purpose

- 517.11 General Installation – Construction Criteria.
- The purpose of this article is to specify the installation criteria and wiring methods that minimize electrical hazards by the maintenance of adequately low potential differences only between exposed conductive surfaces that are likely to become energized and could become in contact by a patient.

517.13 Grounding of Receptacles and Fixed Electrical Equipment in Patient Care Spaces

- 517.13(A) Wiring Methods: All branch circuits serving patient care spaces shall be provided with an effective ground-fault path.
- This is accomplished by the installation of a metal raceway system or a cable having a metallic armor or sheath assembly.
- The metal raceway or metallic cable armor or sheath assembly itself qualify as an equipment grounding conductor in accordance with 250.118

517.13(B) Insulated Equipment Grounding Conductors and Insulated Bonding Jumpers

- General: The following to be directly connected to the insulated copper equipment grounding conductor that is clearly identified its entire length by green insulation and installed with the branch circuit conductors in the wiring methods specified in 517.13(A).
- (1) The grounding terminals of all receptacles other than isolated ground receptacles.
- (2) Metal outlet boxes, metal device boxes, or metal enclosures.
- (3) All non-current-carrying conductive surfaces of fixed electrical equipment likely to become energized that are subject to personal contact, operating at over 100 volts.

517.13(B) Insulated Equipment Grounding Conductors and Insulated Bonding Jumpers

- Exceptions to 517.13(B) (1) General.
- (1) For other than isolated ground receptacles, an insulated equipment bonding jumper that directly connects to the equipment grounding conductor is permitted to connect the box and the receptacle(s) to the equipment grounding conductor. Isolated ground receptacles shall be connected in accordance with 517.16
- (2)Metal faceplates are permitted to be connected by the means of the securing screws to a grounded receptacle.
- (3) Luminaires more than 7-1/2 feet above the floor and switches located outside of the patient vicinity shall be permitted to be connected to an equipment ground path complying with 517.13(A) or (B).
- (2) Sizing. Use table 250.122 to size equipment grounding and bonding jumpers.

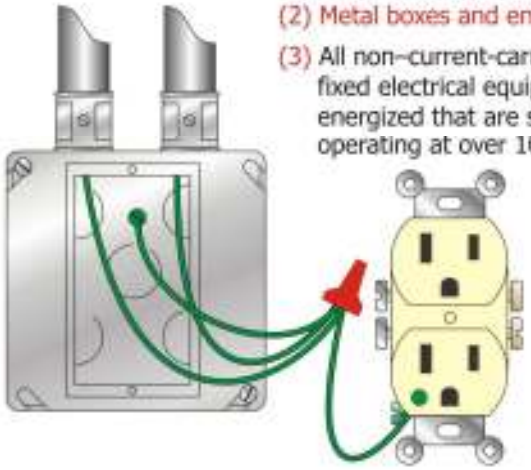
517.13(B) Grounding of Receptacles (Patient Care Areas of Health Care Facilities)

The following shall be directly connected to an insulated copper EGC that is installed with the branch-circuit conductors in the wiring methods as provided in 517.13(A)

(1) The grounding terminals of all receptacles

(2) Metal boxes and enclosures containing receptacles

(3) All non–current-carrying conductive surfaces of fixed electrical equipment likely to become energized that are subject to personal contact, operating at over 100 volts



- 517.13(B) rearranged for clarity and usability
- Metal box required to be directly connected to the insulated copper EGC required for grounding at patient care areas

Copyright © IAEI 2011

Panelboard Bonding 517.14

- The equipment grounding terminal buses of the normal and essential branch-circuit panelboards serving the same individual patient vicinity shall be bonded together with an insulated continuous copper conductor not smaller than 10 AWG.
- Where two or more panelboards serve the same patient vicinity or by separate transfer switches), they shall be bonded together.
- This 10 AWG insulated copper conductor shall be continuous from panel to panel but shall be permitted to be broken in order to terminate on the ground bus in each panel.

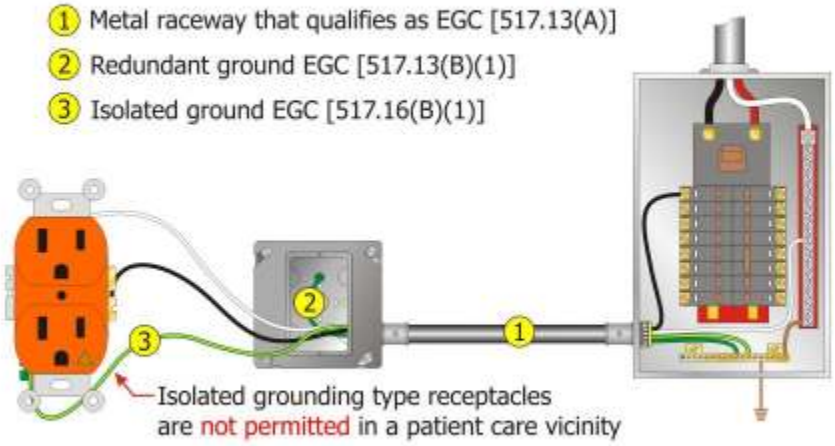
517.16 Use of Isolated Ground Receptacles

- Revisions divided 516.16 into two subdivisions for prohibition of isolated ground receptacles:
  - (A) Inside of a Patient Care Vicinity
  - (B) Outside of a Patient Care Vicinity
- New provisions identify the requirement of ***three*** grounding paths when isolated ground receptacles are required *[metal raceway equipment grounding path, green wire type equipment grounding conductor for the 517.13 "redundant grounding" requirements, and a separate isolated ground equipment grounding conductor to comply with 250.146(D)] with a* color designation of **green with one of more yellow stripes.**

517.16 Use of Isolated Ground Receptacles

New provisions were added to 517.16 pertaining to the proper installation of isolated ground receptacles located outside of a patient care vicinity

1. Metal raceway that qualifies as EGC [517.13(A)]
2. Redundant ground EGC [517.13(B)(1)]
3. Isolated ground EGC [517.16(B)(1)]



The probation of isolated ground receptacle inside a patient care vicinity are addressed at 517.16(A) and isolated ground receptacles installed outside a patient care vicinity are addressed at 517.16(B)

Copyright © IAEI 2017

517.18(A) Patient Bed Location (General Care Areas)

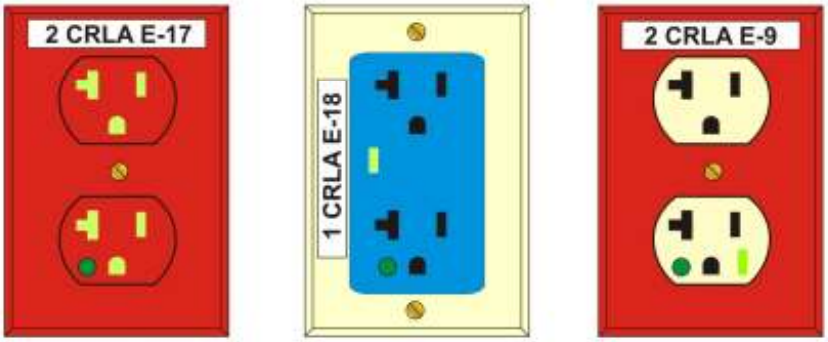
- All receptacles or the cover plate supplied from the critical branch required to have a distinctive color or marking so as to be readily identifiable.
- Marking is also to indicate the panelboard and branch circuit number supplying them.
- This change is a continuation to align Article 517 with NFPA 99 *(Health Care Facilities Code).*
- The term "emergency system" was removed from Article 517 to once again be consistent with NFPA 99.
- Removes confusion with these circuits in health care facilities with those circuits described in Article 700 for "Emergency Systems."

Copyright © IAEI 2014

517.18(A) Patient Bed Location (General Care)

Cover plates for the receptacles or the electrical receptacles themselves are required to have a distinctive color or marking so as to be readily identifiable as being supplied from the critical branch

Covers or receptacles must also indicate the panelboard and branch circuit number supplying them



Receptacle and cover plate | Receptacle only | Cover plate only

Copyright © IAEI 2014

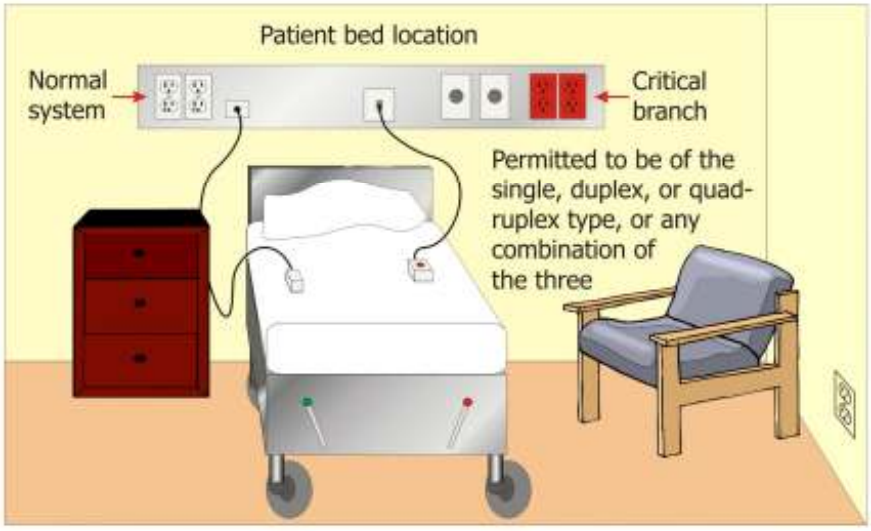
517.18(B) Patient Bed Location Receptacles (General Care Areas)

- The minimum number of receptacles required for general care area patient bed locations of health care facilities was increased from four to eight receptacles.
- Aliens the *NEC* with NFPA 99 *(Health Care Facilities Code).*
- NFPA 99 Section 6.3.2.2.6.2 requires each patient bed location in general care areas, where considered a Category 2 application, to be provided with a minimum of eight receptacles.
- Category 2 is facility systems in which failure of such equipment is likely to cause minor injury to patients or caregivers.

Copyright © IAEI 2014

517.18(B) Patient Bed Location Receptacles

The minimum number of receptacles required for general care area patient bed locations of health care facilities was increased from four to eight receptacles



Copyright © IAEI 2014

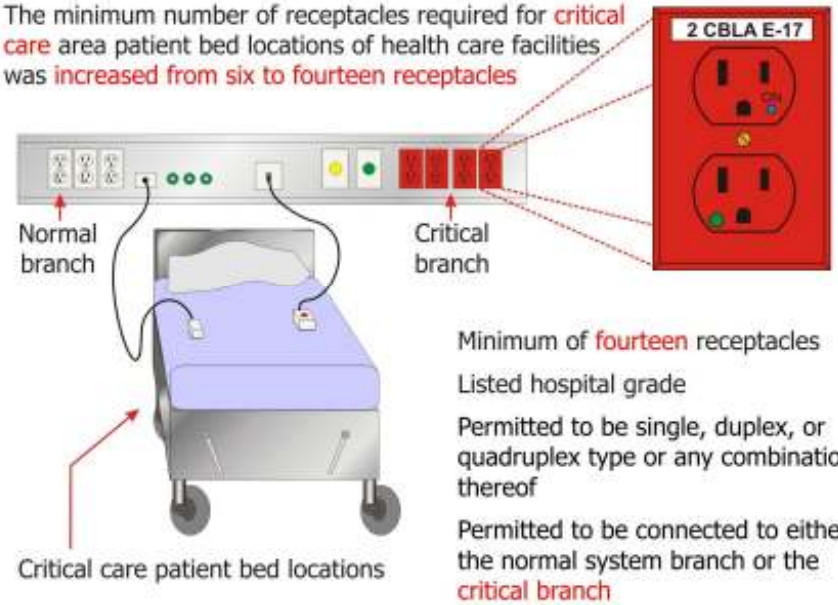
517.19(B) Patient Bed Location Receptacles (Critical Care Areas)

- The minimum number of receptacles required for critical care area patient bed locations of health care facilities was increased from six to fourteen receptacles.
- The systems required to supply at least one of these receptacles was changed from the emergency system to the critical branch as the term "emergency system" has been removed for Article 517.
- NFPA 99 Section 6.3.2.2.6.2 requires each patient bed location in critical care areas, where considered a Category 1 application, to be provided with a minimum of fourteen receptacles.
- Category 1 covers facility systems in which failure of such equipment or system is likely to cause major injury or death of patients or caregivers.

Copyright © IAEI 2014

517.19(B) Patient Bed Location Receptacles

The minimum number of receptacles required for critical care area patient bed locations of health care facilities was increased from six to fourteen receptacles



Minimum of fourteen receptacles

Listed hospital grade

Permitted to be single, duplex, or quadruplex type or any combination thereof

Permitted to be connected to either the normal system branch or the critical branch

Copyright © IAEI 2014

517.19(C) Operating Room Receptacles

- New 517.19(C) was added requiring a minimum number of thirty-six receptacles in an operating room of health care facilities.
- At least twelve of the thirty-six receptacles required to be connected to either the normal system branch or the critical branch circuit supplied by a different transfer switch than the other receptacles at the same location.
- These receptacles are permitted to be of the single or duplex types or a combination of both.
- All receptacles shall be listed hospital grade and so identified.
- NFPA 99 Section 6.3.2.2.6.2 requires each operating room to be provided with a minimum of thirty-six receptacles.

Copyright © IAEI 2014

517.19(C) Operating Room Receptacles

New 517.19(C) was added requiring a minimum number of **thirty-six** receptacles in an operating room of a health care facilities

At least twelve of the thirty-six receptacles required to be connected to either the normal system branch or the critical branch circuit supplied by a different transfer switch than the other receptacles at the same location

Copyright © IAEI 2014

517.17(B) Feeder GFP (Health Care Facilities)

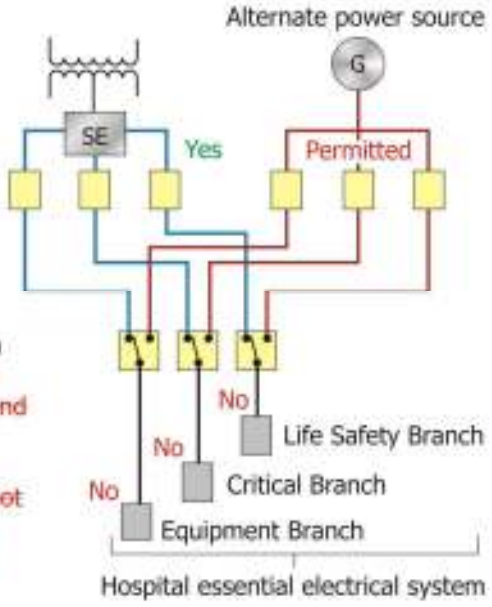
Where ground-fault protection is provided as specified by 230.95 or 215.10, an additional step of GFP is required in all next level feeder disconnecting means downstream toward the load

Additional levels of GFP shall not be installed as follows:

(1) On the load side of an essential electrical system transfer switch

~~(2) Between the on-site generating unit(s) described in 517.35(B) and the essential electrical system transfer switch(es)~~

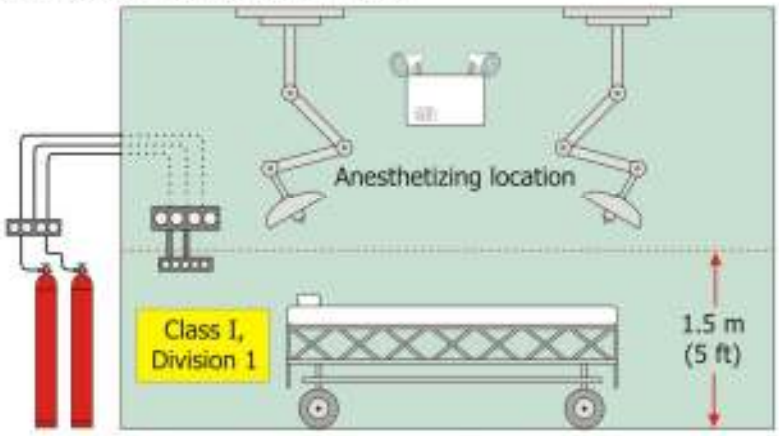
~~(3) On electrical systems that are not solidly grounded wye systems (greater than 150 volts to 600 volts phase-to-phase)~~



Copyright © IAEI 2011

517.63(A) Battery-Powered Lighting Units

Battery-powered lighting units in anesthetizing locations are permitted to be connected to the critical lighting circuits and the word "emergency" and the reference to 700.12(F) were eliminated



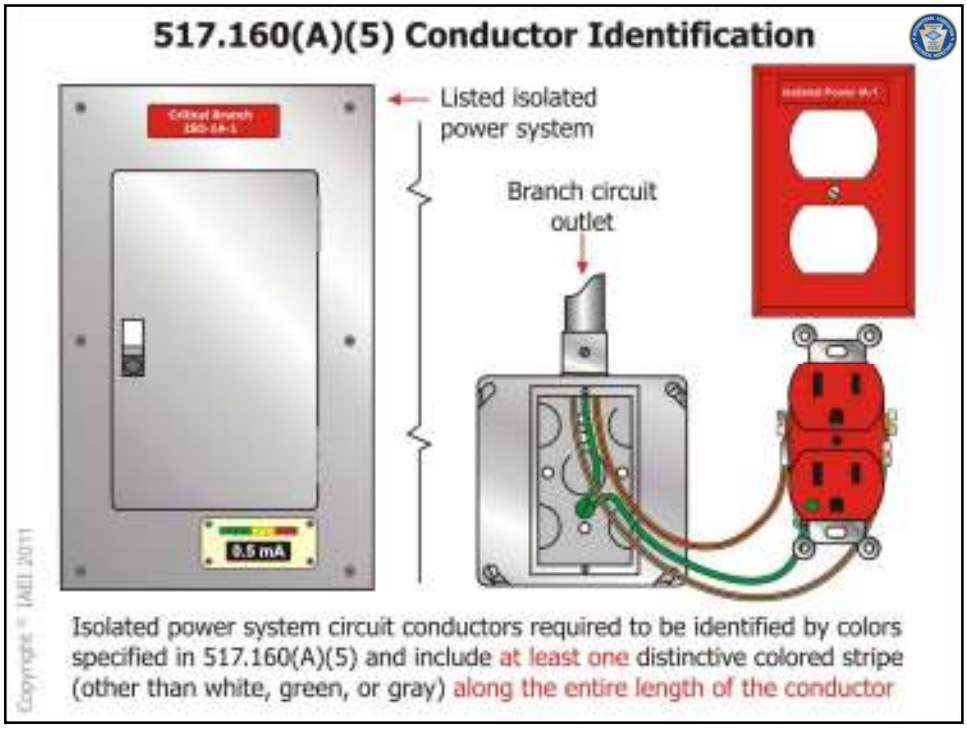
Battery-Powered Emergency Lighting Units - One or more battery-powered emergency lighting units to be provided and permitted to be wired to the critical lighting circuit in the area and connected ahead of any local switches

Copyright © IAEI 2011

Battery-Powered Lighting Units

- Individual unit equipment for backup illumination consisting of the following

1. Rechargeable battery
2. Battery-charging means
3. Provisions for one or more lamps mounted on the equipment, or with terminals fro remote lamps, or both
4. Relaying device arranged to energize the lamps automatically upon failure of the supply to the unit equipment.



Questions and Answers

- Let's review

Question #1

- Do I have to install “health care type MC/AC Cable” when I’m wiring exam rooms in a doctor’s office?

Answer #1

- NO necessarily, complete metal raceway systems such as EMT conduit & wire is the preferred method. Listed metallic cable assemblies & fittings are permitted methods.
- Listed MC or AC Type that qualify with 250.118
- Remember the exceptions 517.13(B)

Question # 2

- Is it necessary for all receptacles in a health care facility to have “redundant grounding” required by 517.13?

Answer #2

- 517.13 not only requires patient care space receptacles to be redundantly grounded, but all branch circuits serving patient care spaces.
- Note: exceptions 517.13 (B) 1 & 2
- The focus is patient care spaces and not other areas such as offices & corridors.

Question #3

- Where can I find the definition of redundant grounding in the NEC?

Answer #3

- You are not going to find the definition of redundant grounding in the NEC.
- This is a two part safe wiring scheme to minimize electrical hazards for patients who receive care in these facility spaces.

Question #4

- Do switches for general lighting need to have “redundant grounding” if they are in a patient care space?

Answer #4

- Yes, refer to 517.13(A) & (B) – All branch circuits serving patient care spaces, including switches require redundant grounding. Terms are key here!
- See 517.13(B) exception No. 3 – May apply here.
- Switches located outside the patient vicinity (six feet) may choose 517.13 (A) or (B) as a compliant option.

Question #5

- Would lighting fixtures (luminaries) in a patient care area require “redundant grounding”?

Answer #5

- Yes, again refer to 517.13(A), All branch circuits serving patient care spaces.
- Again, terms are key here.
- See 517.13(B) exception No. 3 – May apply here.
- Luminaires located outside the patient vicinity (7’6” above the floor) may choose 517.13 (A) or (B) as a compliant option.

Question #6

- Would the NEC permit ½" flex to be ran between device boxes for receptacles in a patient care area?

Answer #6

- Yes, refer to 250.118 - Normally general care spaces
- Maximum length is 6 feet in the same ground fault current path.
- Does not exceed 1-1/4" in trade size
- Must have fittings listed for grounding
- For circuits 20 amps or less
- Not installed for flexibility

Question #7

- Would it be permitted to run PVC in a slab to feed receptacles in a patient care space?

Answer #7

- Absolutely Not, again see 517.13(A) – Metal Raceways!
- Code change in 2005 allowed the use of PVC conduit in the slab for panel feeders and branch circuits not serving the patient care spaces. See 517.30(C)(3)(2)
- Definitely not branch circuits serving patient care spaces.

Question #8

- Are the requirements of Article 517 applicable to Veterinarian clinics?

Answer #8

- No, 517 does not apply to Vet clinics, only facilities for human beings.
- See 517.1 Scope

Question #9

- Who is responsible for the determination of the level of proposed patient care spaces within a facility?

Answer #9

- See definitions. 517.2 – Governing Body
- The person or persons who have the overall legal responsibility for the operation of a health care facility.

Question #10

- Do the quantity requirements for receptacles at patient bed locations (517.18 & 517.19) apply at general care space exam rooms?

Answer #10

- No, See 517.18(A) Exception No. 2
- Does not apply to patient bed locations in clinics, medical & dental offices and outpatient facilities meeting the requirements 517.10(B)(2).
- 517.19 applies to critical care areas

Question #11

- Do the requirements for receptacles at patient bed locations (517.19) apply to procedure rooms?

Answer #11

- Maybe, it would ultimately depend on the type of procedure being completed and whether or not the failure of the equipment or a system is likely to cause major injury or death of patients, staff, or visitors.
- Simple procedure rooms fall under the definition of general care spaces in definitions and would potentially only cause minor injury.

Question #12

- Are receptacles located in an exam room of a patient care space required to be of the “hospital grade” type?

Hospital Grade Receptacles?

Answer #12

- No, again see 517.18(A) exception No. 2
- Does not apply to clinic, medical & dental offices and outpatient facilities.

Question #13

- How do I comply with the redundant grounding requirements when I'm installing isolated ground receptacles in a patient care areas?

Answer #13

- They can only be installed “outside the patient vicinity”. Not permitted otherwise.
- They must meet all requirements 517.13 (A) & (B) when installed in patient care spaces and provide an insulated equipment grounding conductor with green insulation with one or more yellow stripes for the entire length per 517.16

Question #14

- Do all receptacles located in pediatric exam rooms have be tamper proof?
- What about other areas within the facility?

Answer #14

- Yes, but not tamper proof type. Tamper resistant receptacles or tamper resistant covers shall be provided for in patient care areas.
- It not only applies to exam rooms, but rooms, bathrooms, playrooms and activity rooms. See 517.18(C)
- Other areas within clinics, medical and dental offices and outpatient facilities have to meet the requirements of 406.12

Question #15

- Can nonmetallic sheathed cable (romex) be used in areas other than patient care areas within a facility?

Answer #15

- Yes, first refer to 517.12 which allows the wiring methods in chapter 3.
- Caution should be taken when choosing the NM Cable method (romex).
- Refer to 334.10(3) – Must be “concealed” within a 15-minute thermal barrier.
- 334.12 (2) is not permitted above dropped ceilings.

Thank You!

COMMON DEFECTS PART X

RICK LECHER – CATY ROBINSON – LORENZO ADAM

1

SECTION 104 OBC 2017

104.2.1.3 Inspections. *If the plans for the erection, construction, repair, alteration, relocating, or equipment of a building are subject to inspection by the building official, under section 108, the building official shall cause to be made such inspections, investigations, and determinations as are necessary to determine whether or not the work which has been performed and the installations which have been made are in conformity with the approved construction documents.*

2

SAMPLE

SECTION 108 OBC 2017

108.1 General. *After construction documents have been approved, construction or work may proceed in accordance with the approved documents. Construction or work for which an approval is required shall be subject to inspection. It shall be the duty of the owner or the owner's duly authorized representative to notify the building department when work is ready for inspection. Access to and means for inspection of such work shall be provided for any inspections that are required by this code.*

3

SECTION 104 OBC 2017

104.2.3.3 Electrical safety inspector. *An electrical safety inspector is responsible to determine electrical systems compliance with approved construction documents in accordance with section 108.*

4

SAMPLE

SECTION 108 OBC 2017

108.6 Inspections, observation of violations, unsafe conditions, or serious hazards. *When an inspector from the department having jurisdiction finds that any work in connection with the location, erection, construction, repair, alteration, moving, or equipment of a building is contrary to the approved construction documents for the same, the building inspector shall proceed as required in either section 108.6.1 or 108.7.*

5

SECTION 108 OBC 2017

108.6.1 Communication process for work contrary to approved construction documents.

1. *Communicate the nature of the differences to the owner or the owner's on-site representative and offer the following options:*

1.1 *The owner will bring the item of noncompliance into compliance,*

1.2 *The owner will revise the drawings and resubmit to the department,*

1.3 *The items of noncompliance will not be brought into compliance and will be referred to the building official as indicated in item 4 below.*

6

SAMPLE

SECTIO 108 OBC 2017

2. *The owner or the owner's on-site representative shall indicate which option (item 1 above) will be exercised*

3. *Notations on the on-site inspection record and in the inspector's log shall be made. The notations shall include the inspector's name, the date of the inspection, the type of inspection, the observed items of noncompliance, the option chosen by the owner or the owner's on-site representative, the name of the person communicated with, and the estimated dates of compliance and follow-up inspections, if applicable.*

7

SECTION 108 OBC 2017

4. *If the owner or the owner's on-site representative indicates that the work will not be brought into compliance with the approved construction documents, the inspector shall submit a report to the building official for the final determination of noncompliance in accordance with section 108.7.*

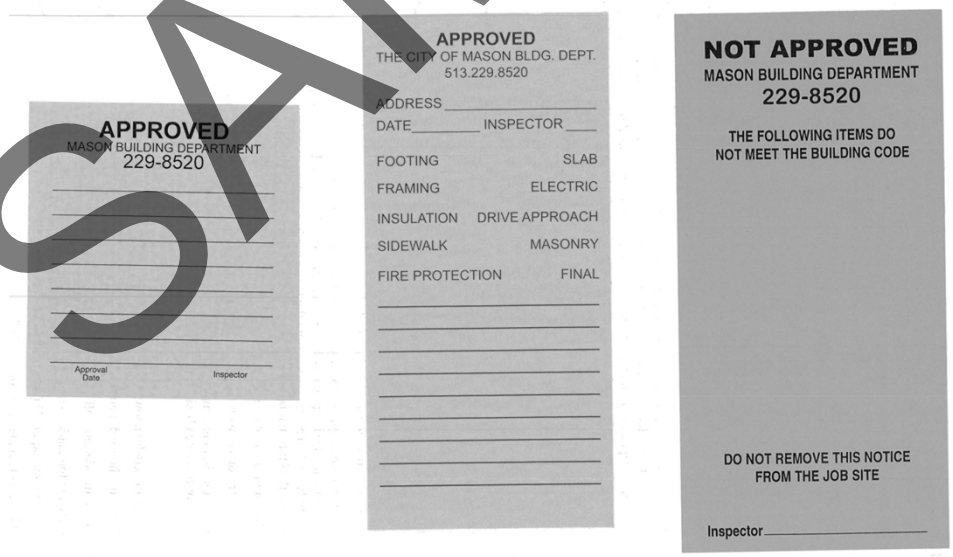
8

SAMPLE

SECTION 108 OBC 2017

108.6.2 Observation of violations not shown on plans. *If an inspector, in the course of performing the assigned or requested inspections, observes a code violation that was either shown incorrectly or not adequately addressed or detailed in the approved construction documents, the inspector shall communicate the finding to the building official so that the building official can make a determination of whether the code violation is of such significance to warrant communicating the finding to the owner or the owner's representative as a recommended change.*

9



10

SAMPLE

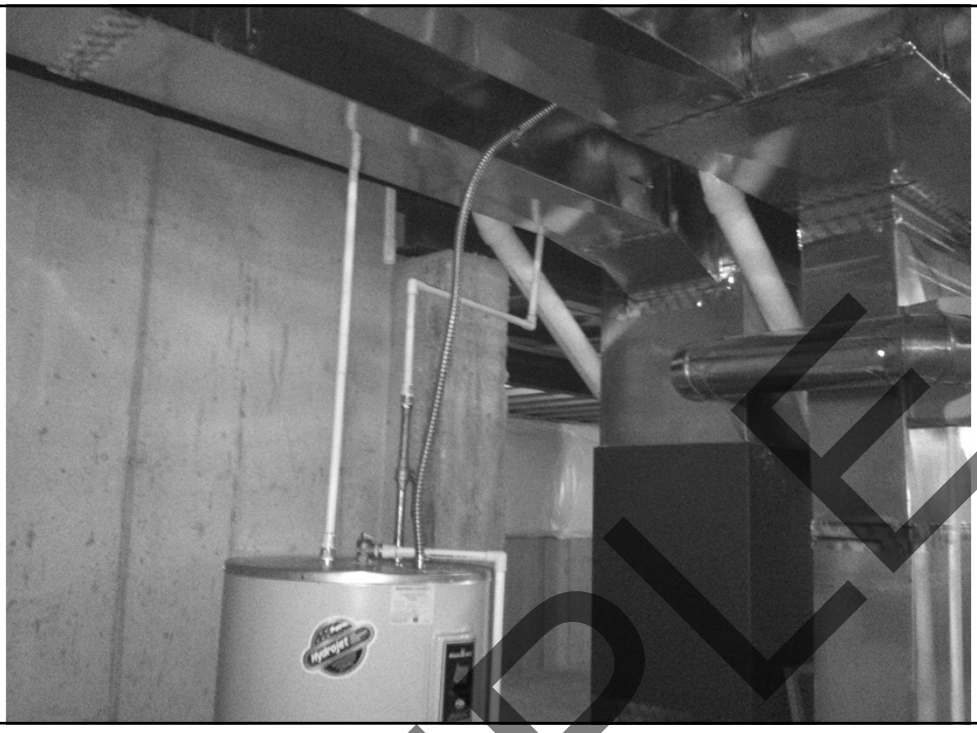
SECTION 108 OBC 2017

108.7 Building official determination of noncompliance. *The building official shall evaluate the inspector's report and render a final determination as to whether the items of non-compliance are to be communicated to the owner in the form of an adjudication order complying with section 109. The building official shall also determine whether any approvals are possible.*

11

12

SAMPLE



13

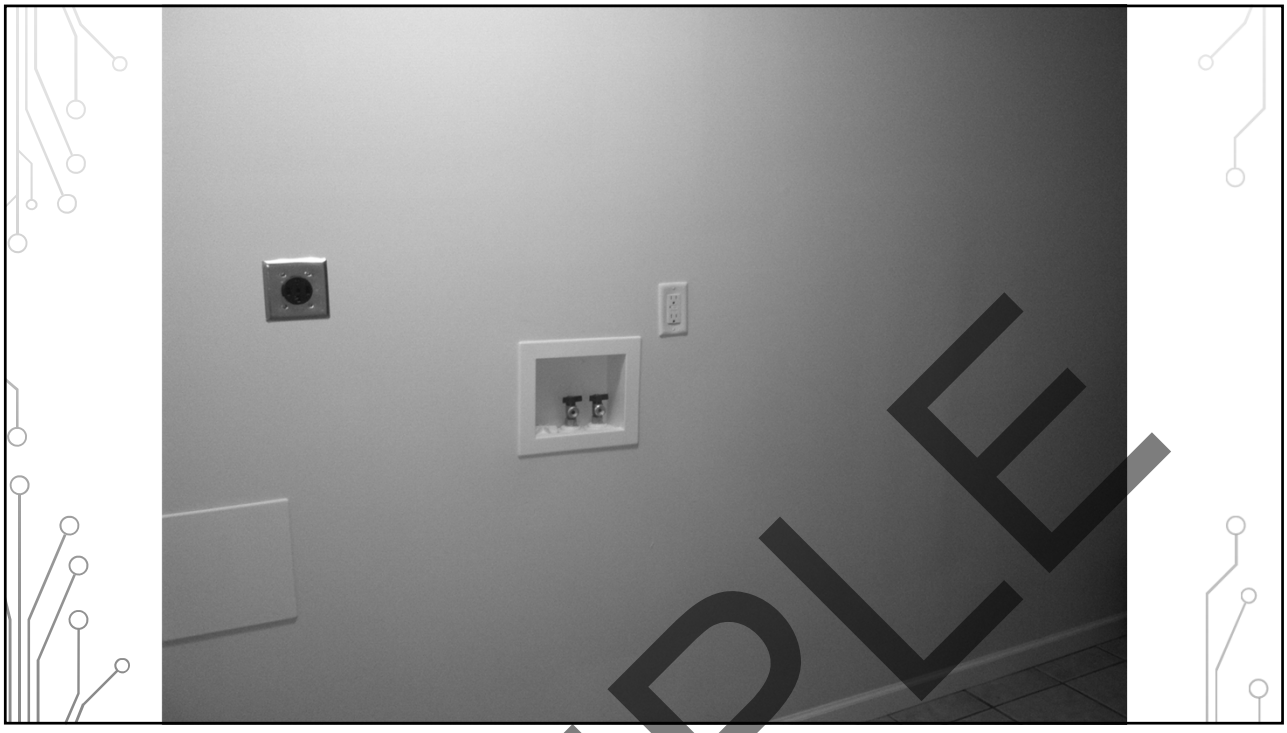
14

SAMPLE

15

16

SAMPLE



17

18

SAMPLE

19

20

SAMPLE

File Attachments for Item:

ER-8 Ohio Backflow Tester Training (Test Gauge and Backflow Supply)

BO, PPE, PI, RBO (8 hours)

Staff Notes: Course references outdated: recommend revision of course materials to reflect OPC, current building code and standards and resubmit for committee review.

Committee Recommendation:

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER

Course Submitter: James Probst
(Contact Name)

Organization: Prosperus LLC, dba Test Gauge and Backflow Supply
(Organization/Company)

Address: 5644 S Meridian Street, Ste. E
(Include Room Number, Suite, etc.)

City: Indianapolis, IN State: IN Zip: 46217

E-Mail: james@testgauge.net

Telephone: (317) 786-8990 Fax: (317) 614-7607

Course Sponsor: None

COURSE INFORMATION

Course Title: Ohio Backflow Tester One-Day Recertification Training

New Course Submittal: ■ Update Course: ☐ Prior Approval Number: _____

Purpose and Objective: To verify that all Ohio testers are up-to-date in their knowledge of Ohio state regulations regarding backflow prevention assemblies and installations as they relate to the Ohio Plumbing Code.

Number of Instructional Contact Hours that can be obtained upon completion: 8

If Multi-Session, Number of Instructional Contact Hours Per Session: N/A

Program Applicable for the Following Participants:

Building Official ■ Master Plans Examiner ☐ Building Inspector ☐ Fire Protection Inspector ☐ Mechanical Inspector ☐
Building Plans Exam. ☐ Plumbing Inspector ■
Plumbing Plans Exam. ■ Non-Res IU Inspector ☐
Electrical Plans Exam. ☐
Mechanical Plans Exam. ☐
Fire Protect. Plans Exam. ☐

Res Building Official ■ Res Plans Examiner ☐ Res Building Inspector ☐ Res Mechanical Inspector ☐ Res IU Inspector ☐

Electrical Safety Inspectors ☐
Location of ESI Course: _____ Date(s) of ESI Course(s): _____

SUBMITTAL CHECKLIST: **Make Sure** all of the Following Information is **Submitted**		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	x
	Organization sponsoring or requesting the program (if any)	x
Course Title:	Name of course (related to content)	x
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	x
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	x
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	x
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	x
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	x
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	x
Test Materials:	None for this course	x
Completed Application:		x

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

Ohio Backflow Tester Re-certification Educational Training

Training Course Scope: **Classes start promptly at 8:00 AM and ends at 5:00 PM (Lunch Included)**

Test Gauge Inc. 8 Hour Ohio Re-certification education course for backflow testers is designed include all training material derived from the Test Gauge Inc. Ohio Study Guide and Ohio Department of Commerce Backflow Manual, Ohio Environmental Protection Agency Backflow Manual, Federal and State code and the American Association of Sanitary Engineering.

8 Hours Backflow Training

1. Tester Responsibilities
2. Common Law Doctrine and Current Court Cases relating to Cross Connections
3. State and Local, Plumbing Code Revisions
4. Cross Connection Onsite Inspections
5. Audit CCC Reports and Records
6. Defensible Backflow Prevention Programs
7. Backflow Prevention Assemblies
   - Barometric Loop (BL)
   - Atmospheric Vacuum Breaker (AVB)
   - Air Gap (AG)
   - Double Check Assembly (DC)
   - Pressure Vacuum Breakers (PVB)
   - Spill Proof Vacuum Breakers (SVB)
   - Reduced Pressure Principle Assemblies (RP)
8. Troubleshooting techniques
9. Backflow Assembly Protection Commensurate with the Degree of Hazard
10. Safety and Terrorist Awareness Prevention of Potable Water Systems

Total of 8 hours

TEST GAUGE & BACKFLOW SUPPLY

Test Gauge & Backflow Supply
5644 S. Meridian Street Suite E
Indianapolis, Indiana 46217

Office 317.786.8990
Fax 317.614.7607
Website www.testgaugein.com

CEU Training Instructor Bio for James Probst

James Probst is currently one of two business owners of Test Gauge & Backflow Supply, Indiana. Test Gauge & Backflow Supply School is approved by the Indiana Department of Environmental Management (IDEM) to certify Indiana backflow testers and provide Water and Waste Water continuing education. James is a former Senior Cross Connection Control Specialist for Indiana American Water Utility from 2009 -2012. James was the ISO 9001 Quality Manager for Horner industrial Services from 2003-2009. His prior professional experience included 17 years as a licensed FAA Aircraft Technician / Machinist.

James is President of the Indiana American Backflow Prevention Association (INABPA) which he help form in 2009, and board member of the Indiana Water Utility Council of the American Water Works Association (InAWWA). In 2010 James participated on the Plumbing Review Committee helping to revise a newly proposed plumbing code for Indiana. James is an IDEM State approved backflow proxy tester for his school and an Indiana Registered Backflow Tester.

James attended the University of Cincinnati to further his education in the machine trades industry, completed 2 years machine trades vocational school and completed training in criminal justice as a California Peace officer at the College of San Mateo. James obtained his FAA Airframe & Powerplant certification at United Airline training center from 1991-1994.

James helped write the summary for a backflow protection bill introduced into the Indiana House and Senate in 2011, 2012 and 2013. He also had an article published by the ABAP national magazine regards to backflow protection. His responsibilities have included protecting customers' drinking water via a corporate cross connection program. James continually promotes cross connection control educational through workshops helping to protect the public drinking water.

James is a proud member of the American Backflow Prevention Association (ABPA), American Water Works Association (AWWA), Indiana Rural Water Association, Indy Chamber of Commerce and (IWRA) Indiana Water Resources Association and the (TBPA) Tennessee Backflow Protection Association

Presentation By
James Probst

What cost do you put on a life?

Cross Connection Control Training

Knowledge

Matrix of Cross Connection Control

You're here because you have chosen to take the Red Pill?

Backflow Definitions

What is Backflow?

- **Backflow** is any unwanted reverse flow of nonpotable water, or other substances caused by backsiphonage or backpressure that enters a potable water system.

Types of Backflow Causes

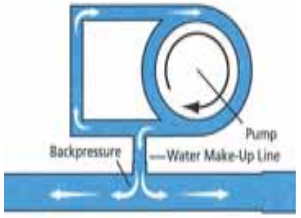
- **Backsiphonage** is backflow caused by negative or sub-atmospheric pressure.
  Examples:
  Water main breaks, firefighting efforts, high demands, and any situation where water is withdrawn from the distribution system at a high rate leads to a system pressure drop.
- **Backpressure** can cause backflow to occur when a potable water system is connected to a nonpotable supply operating at higher pressure than the distribution system.
  Examples:
  Means of a pump, boiler, elevation head pressure, air or steam pressure, or other means.

Pathways

Cross Connection Direct and Indirect

Cross-Connections
The passages through which backflow may occur are called cross-connections. A cross-connection is an actual or potential connection between a potable water supply and any non-potable substance or source. There are two types of cross-connections:

- **Indirect cross-connections**
  - An *indirect cross-connection* is a cross-connection subject to backsiphonage only.



- **Direct cross-connections**
  - A *direct cross-connection* is a cross-connection which is subject to backpressure and backsiphonage.

P.44-47

4

Hazards

Degree of Hazards – Backflow Incident

Degree of Hazard **-**It is important to know the degree of hazard, as there are different means of protecting against different degrees of hazard.

A **pollutant**, or non-health hazard, is considered to be a substance which is aesthetically objectionable. However, it will not cause illness or death. The substance may have an undesirable taste, smell, odor or look, but poses no health hazard.

A **contaminant** (or health hazard), on the other hand, is a substance which could cause illness or death. The term *lethal hazard* is used specifically for radioactive material and raw sewage.

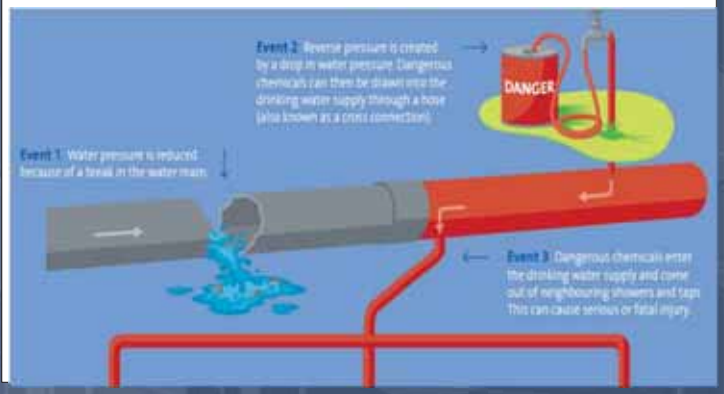
The Backflow Incident
In order for a backflow incident to occur three conditions must be met then a backflow incident may occur.

1. ***Cross-Connection*** - a passage must exist between the potable water system and another source.
2. ***Hazard*** must exist in this other source to which the potable water is connected. This may be a contaminant, a pollutant or a lethal hazard.
3. ***Hydraulic condition*** of either backsiphonage or backpressure must

P.45 5

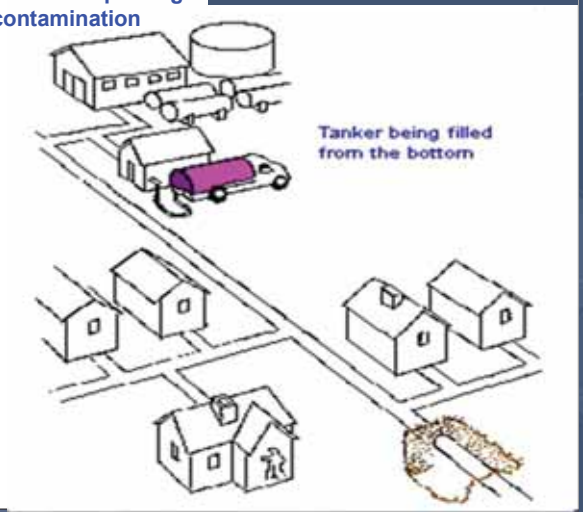
Main Breaks

Backflow contamination of the public water system



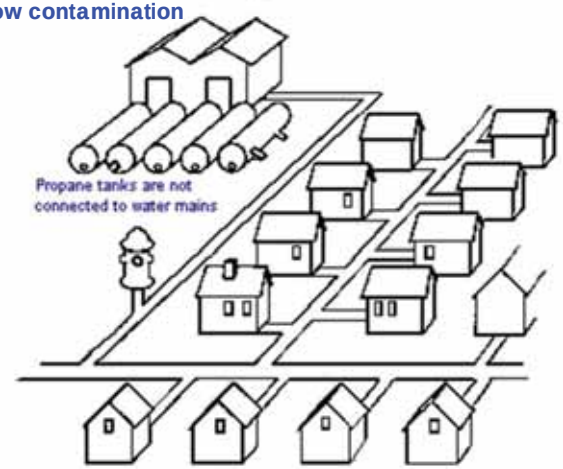
Backsiphonage

Illustration of backsiphonage backflow contamination



Backpressure

Illustration of backpressure backflow contamination



Water Hydraulics

Force, unless completely resisted, will produce motion.

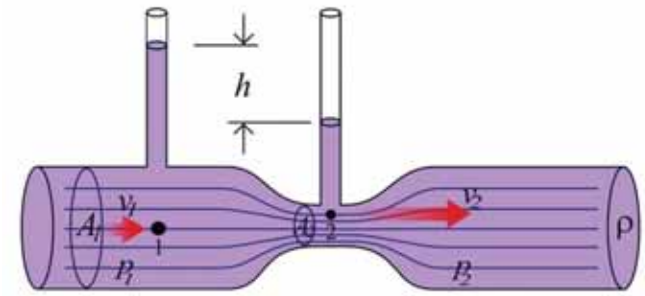
Weight is a type of force resulting from the earth's gravitational attraction.

Pressure is a force-per-unit area, such as pounds per square inch (psi).

Atmospheric pressure is the pressure exerted by the weight of the atmosphere above the earth.

Water Hydraulics

Localized physical restrictions in water lines can produce backsiphonage through the venturi effect.



The Venturi effect is the reduction in fluid pressure that results when a fluid flows through a constricted section of pipe. The pressure at point 2 is lower than the pressure point 1 as illustrated above.

P-45

Water Hydraulics

***Absolute Pressure* (PSIA)**

Absolute pressure is equal to the gauge pressure reading plus the atmospheric pressure.

P absolute = P gauge + 14.7 psi

***Gauge Pressure* (PSIG)**

Gauge pressure is simply the pressure read on a gauge. If there is no pressure on the gauge other than atmospheric, the gauge would read zero.

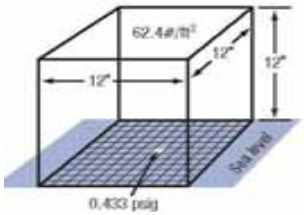
P gauge = absolute – 14.7 psi

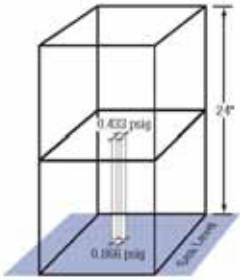
***Differential Pressure* (PSID)**

The calculated difference in pressure between two points.

Water Hydraulics

Pressure measured at the base of column of water 12" high would be subjected to **.433 psig.**





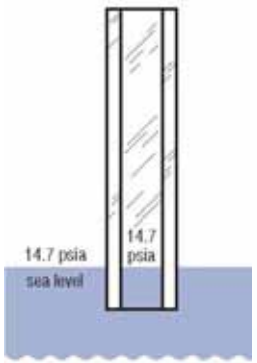
Frequently water pressure is referred to using the term **"head pressure"** . One foot of head would be equivalent to the pressure produced at the base of a column of water 1 foot in depth.

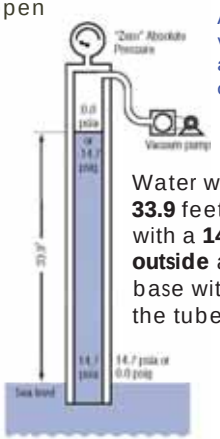
Calculating formula:

(Feet) x (.433) = Head Pressure

Water Hydraulics

Pressure on the free surface of water at sea level with open ended tubes.





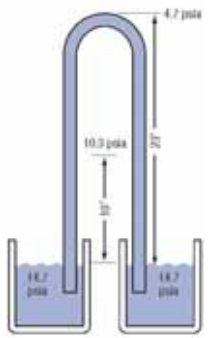
A complete or total vacuum would mean a pressure of 0.0 psia or -14.7 psig.

Water will raise in a tube to **33.9** feet high at sea level with a **14.7 psia pressure outside** a tube open at the base with a 0.0 psia inside the tube.

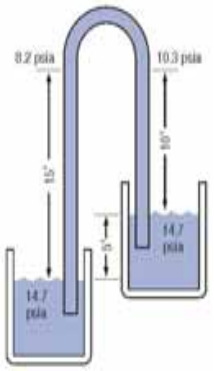
The atmospheric pressure at **sea level** is 14.7psia.

Water Hydraulics

The **crest of a siphon** cannot be higher than 33.9 feet above the upper liquid level.



A static condition exists no flow will occur.



A static condition does not exist allowing fluid to flow from the higher pressure to the lower pressure.

Regulations

Current Ohio Backflow Protection Enforcement Authority

- **Ohio Environmental Protection Agency**

Authority from water plant up to the customer service connection after the water meter. The water supplier acts as the enforcement officer for the Ohio EPA

- **Ohio Department of Commerce**

ODC has code enforcement authority for Ohio plumbing code inside the building during construction or when changes are made to the owners plumbing system. Current code in Ohio is the International Plumbing Code 2009

- **Federal Environmental Protection Agency**

Presently, there are no federal reporting requirements for potable water contamination caused by cross-connections problems, However EPA's guidance recommends, for example, that the water distribution system be checked for areas of stagnant water ("dead-ends") in which harmful bacteria may grow, and that "**cross-connections**" be monitored to decrease the chances that contaminated water and potable water will mix."

Federal EPA Regulations

EPA Total Coliform Rules

- EPA does not have a regulation mandating a cross-connection control program. EPA does, however, indirectly recognize the importance of cross-connection controls in Section 141.63 (d) (3) of its Total Coliform Rule (TCL).
- In this rule, EPA identified proper maintenance of the distribution system as one of the best techniques for achieving compliance with the maximum contaminant level (MCL) for total coliform.
- In a memorandum, "Clarification of Issues Concerning the Revised Total Coliform Rule", the Director of the Office of Drinking Water explained that the rule was intended to include a cross-connection control program as part of proper maintenance. It is the **states responsibility** to ensure that local water suppliers have proper maintenance programs.

Federal EPA Regulations

EPA Total Coliform Rules

- The ***Total Coliform Rule*** (**TCR**) was published in 1989 and became effective in 1990.
- The TCR rule set both health goals for (**Maximum Contaminant Level Goals** (**MCLG**) and legal limits (**Maximum Contaminant Levels** (**MCL**) for the presence of ***total coliform*** in drinking water.
- On February 13, 2013, EPA published revisions to the 1989 TCR. EPA anticipates greater public health protection under the **Revised Total Coliform Rule** (**RTCR**) requirement **Beginning on April 1, 2016.**(**Public Water Systems**) PWSs must comply with the RTCR requirements unless the state selects an earlier implementation date.

Federal EPA Regulations

Federal Revised Total Coliform Rule (RTCR) Requirement

- RTCR will requires systems that have an indication of coliform contamination in the distribution system to be assessed for the problem and corrective action take place to fix the problem.

Sanitary Defects

- "Sanitary defect is a defect that could provide a pathway of entry for microbial contamination into the distribution system or that is indicative of a failure or imminent failure in a barrier that is already in place. " Examples of sanitary defects include: **Cross Connections**
- The water treatment(s) that US EPA certifies to be the most effective for removing a contaminant.

Best Available Technology (BAT)

- **Cross connection control** was added to the BAT Distribution system maintenance activities(3) Proper maintenance of the distribution system including appropriate pipe replacement and repair procedures, main flushing programs, proper operation and maintenance of storage tanks and reservoirs, cross connection control, and continual maintenance of positive water pressure in all parts of the distribution system;

Ohio EPA Regulations

Chapter 3745-95-02; Cross-Connections

(A) No person shall install or maintain a water service connection to any premises where **actual or potential cross-connections to a public water system** or a consumer's water system may exist unless such actual or potential cross connections are abated or controlled to the satisfaction of the supplier of water.

(B) No person shall install or **maintain any connection whereby water from an auxiliary water system** may enter a public water system or consumer's water system unless the auxiliary water system, the method of connection and use of such system have been approved by the supplier of water and by the director as required by Section 6109.13 of the Revised Code. Chapter 3745-95-03; Surveys and Investigations.

Chapter 3745-95-03; Surveys and Investigations

(A) **The supplier of water shall conduct or cause to be conducted periodic surveys** and investigations, of frequency acceptable to the director of water use practices within a consumer's premises to determine whether there are actual or potential cross-connections to the consumer's water system through which pollutants or contaminants could backflow into the public water system.

(B) **The supplier of water, or his authorized representative, shall have the right to enter premises served by the public water system** at all reasonable times for the purpose of making surveys and investigations of water use practices within the premises. P 62

Federal EPA Regulations

Environmental Protection Agency Lead Free Rule 1-4-2014

- Change in Section 1417 of the Safe Drinking Water Act in 2011.
- The use prohibition in SDWA also applies to entities other than public water system.
- The term **"lead-free"** has been updated from not more than 8% lead content to mean "not more than a weighted average of **0.25% lead** when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures."
- Starting January 4, 2014, the prohibitions on use and introduction into commerce will apply to all pipe, pipe fittings, plumbing fittings, and fixtures (henceforth referred to as "products"), including stocked inventories that have not been installed. This includes coated or uncoated brass or bronze materials.

Federal EPA Regulations

Environmental Protection Agency Lead Free Rule 1-4-2014

- A product introduced into commerce legally on January 3, 2014 – can't be used in the installation or repair of a PWS or residential or non-residential facility providing water for human consumption on January 4, 2014.
- exemptions in SDWA Section 1417(a)(4) from the prohibitions on the use or introduction into commerce for: "**pipes, pipe fittings, plumbing fittings or fixtures, including backflow preventers, that are used exclusively for nonpotable services** such as manufacturing, industrial processing, irrigation, outdoor watering, or any other uses where the water is not anticipated to be used for human consumption;" (SDWA 1417(a)(4)(A))

"toilets, bidets, urinals, fill valves, flushometer valves, tub fillers, shower valves, service saddles, or water distribution main gate valves that are 2 inches in diameter or larger." (SDWA 1417(a)(4)(B))

Federal EPA Regulations

Environmental Protection Agency Lead Free Rule 1-4-2014

Lead Calculation

- **The weighted average lead content of a pipe, pipe fitting, plumbing fitting, or fixture shall be calculated by using the following formula**: For each wetted component, the percentage of lead in the component shall be multiplied by the ratio of the wetted surface area of that component to the total wetted surface area of the entire product to arrive at the weighted percentage of lead of the component. The weighted percentage of lead of each wetted component shall be added together, and the sum of these weighted percentages shall constitute the weighted average lead content of the product. The lead content of the material used to produce wetted components shall be used to determine compliance with paragraph (1)(B). For lead content of materials that are provided as a range, the maximum content of the range shall be used.[1]

Ohio EPA Regulations

Chapter 3745-95-04 Where Protection is Required

An approved backflow prevention device shall be installed in any of the following conditions that exist:

1. Where in the **judgement of the supplier of water or the director, a pollution, system, health or severe health hazard to the public water exists**.
2. A **Premises having an auxiliary water system**, unless such auxiliary system is accepted as an additional source by the supplier of water and the source is approved by the director;
3. Premises on which **any substance is handled in such a fashion as to create an actual or potential hazard to a public water system**. This shall include premises having sources or systems containing process fluids or waters originating from a public water system which are no longer under the control of the supplier of water.
4. Premises having internal cross-connections that, in the judgment of the supplier of water, are not correctable, or intricate plumbing arrangements which make it impractical to determine whether or not cross-connections exist;
5. Premises where, because of **security restrictions or other prohibitions or restrictions, it is impossible or impractical to make a complete cross connection survey**;
6. Premises having **a repeated history of cross-connections** being established or re-established;

P 63

Ohio EPA Regulations

OHIO ADMINISTRATIVE CODE, Ohio EPA (OEPA)

A physical separation shall be maintained between the public water system or a consumers' water system and the auxiliary water system.

Exemption: An approved backflow prevention device shall be installed on each service connection serving the consumers' water system, unless the supplier of water does all of the following:

1. **Determines, on a case-by-case basis, that the installation of an approved backflow prevention device is not required in consideration of factors including, but not limited to, the past history of cross connections being established or re-established on the premises,** the ease or difficulty of connecting the auxiliary water system with the public water system on the premises, the presence or absence of contaminants on the property or other risk factors;
2. **Requires the consumer to sign an agreement which specifies the penalties**, including those set forth in rule 3745-95-08 of the Administrative Code, for creating a connection between the public water system and the auxiliary water system: c.
3. **Conducts or causes to be conducted an inspection at least every twelve months** to certify that no connection or means of connection has been created between the public water system and the auxiliary water system;
4. **Maintains an inventory of each consumers' premises**, where an auxiliary water system is on or available to the premises, or on the real property adjacent to the premises;
5. **Develops and implements an education program to inform all consumers** served by the public water system about the dangers of cross connections and how to eliminate cross connections.

P 64

Ohio EPA Regulations

OHIO ADMINISTRATIVE CODE, Ohio EPA (OEPA)

An approved backflow prevention device shall be installed on each service line to a consumer's water system serving, but not necessarily limited to, the following types of facilities unless the director determines that no health, pollutional, or system hazard to the public water system exists:

1. Hospitals, mortuaries, clinics, nursing homes.
2. Laboratories.
3. Piers, docks, waterfront facilities.
4. Sewage treatment plants, sewage pumping stations, or storm water pumping stations.
5. Food or beverage processing plants
6. Chemical plants
7. Metal plating industries
8. Petroleum processing or storage plants
9. Radioactive material processing plants or nuclear reactors
10. Car washes; and **Others specified by the director**.
11. Where an **auxiliary water system** is used as a secondary source of water for a fire protection system, the provisions of paragraph (B) of this Rule for an approved air-gap separation or an approved interchangeable connection may be waived by the director (of the Ohio EPA)

P 65

Ohio EPA Regulations

OHIO ADMINISTRATIVE CODE, Ohio EPA (OEPA)

- **It shall be the duty of the supplier of water to see that the tests and inspections required by the customer.**
- Any backflow prevention device required by Rules 3745-95-04 and 3745-95- 05 of the Ohio Administrative Code **shall be installed at a location and in a manner approved by the supplier of water and at the expense of the water consumer**.
- In addition, any backflow prevention device required by paragraphs (B) and (C) of Rule 3745-95-05 of the Ohio Administrative Code **shall be installed in a location and in a manner approved by the director as required by Section 6109.13 of the Ohio Revised Code.**
- **These devices shall be repaired, overhauled, or replaced at the expense of the consumer whenever they are found to be defective.**
- **Records of such inspections, tests, repairs, and overhaul shall be kept by the consumer and made available to the supplier of water.**
- **The supplier of water shall inspect or cause to be inspected all installations where an approved connection exists** between auxiliary water and a consumer's water system at least once every twelve months
- **The supplier of water shall maintain an inventory of all such installations and inspection records. Such inventories and inspection records shall be made available during sanitary surveys and at other reasonable times**

P 68

Ohio EPA Regulations

OHIO ADMINISTRATIVE CODE, Ohio EPA (OEPA)

- Chapter 3745-95-07 Booster Pumps (A) **No person shall install or maintain a water service connection to any one, two, or three family dwelling where a booster pump has been installed, unless an air-gap separation is provided to ensure that the booster pump can not exert suction on the service line**.
- For booster pumps not intended to be used for fire suppression, no person shall install or maintain a water service connection to any premises not included in (A) of this rule where a booster pump has been installed on the service line to or within such premises, **unless such booster pump is equipped with a low-suction pressure cut-off controller** designed to shut off the booster pump when the pressure in the service line on the suction side of the pump drops to **ten pounds per square** inch gauge or less.
- Where a backflow prevention device, check valve, or other device is installed on a water supply system utilizing storage water heating equipment such that **thermal expansion** causes an increase in pressure, **a device for controlling pressure shall be installed.**

P 68 P-50

Ohio EPA Regulations

Backflow Assembly

Inspection of devices; time limits

- (3) The consumer shall, on any premises on which any containment principle backflow preventer required by rules 3745-95-04 and 3745-95-05 of the Administrative Code are installed, have thorough inspections and operational tests made of the backflow preventers **at the time of installation or repair**, and as may be reasonably required by the supplier of water or the director, but in all cases **at least once every twelve months**. These inspections and tests shall be at the expense of the water consumer and shall be performed by the supplier of water or a person approved by the supplier as qualified to inspect and test backflow preventers.
- (2) It shall be the duty of the **supplier of water to see that the tests and inspections required** under this paragraph are made.
- (6) The supplier of water shall maintain a **paper or electronic record of inventory of survey, investigation and containment principle backflow preventer installation reports**. Records of inspections, tests, repairs and overhauls related to the containment principle backflow preventer required by rules 3745-95-04 and 3745-95-05 of the Administrative Code shall be maintained by the supplier of water for **a minimum of five years.**

3745-95-08 Violations.

- (A) **The supplier of water shall deny or discontinue, after reasonable notice to the occupant thereof, the water service to any premises wherein any backflow prevention device required by this chapter is not installed, tested and maintained in a manner acceptable to the supplier of water**, or if it is found that the backflow prevention device has been removed or by-passed, or if an unprotected cross-connection exists on the premises or if a low pressure cut-off required by rule 3745-95-07 of the Administrative Code is not installed and maintained in working order, or if the supplier of water or the director, or the authorized representative of either, is denied entry to determine compliance with this chapter of the Administrative Code.
- (B) **Water service** to such premises **shall not be restored until the consumer has corrected or eliminated such conditions or defects in conformance** with this chapter of the Administrative Code, and to the satisfaction of the supplier of water.

ODC Regulations

SECTION 608 OHIO BASIC BUILDING CODE PLUMBING PROTECTION OF POTABLE WATER SUPPLY

608.1 General A potable water supply system shall be designed, installed and maintained in such a manner as to prevent contamination from non-potable liquids, solids or gases from being introduced into the potable water supply through cross-connections or any other piping connections to the system. Backflow preventer applications shall conform to Table 608.1, except as specifically stated in Sections 608.2 through 608.16.10.

608.2 Plumbing Fixtures The supply lines or fitting for every plumbing fixture shall be installed so as to prevent backflow. Plumbing fixture fittings shall provide backflow protection in accordance with ASME A112.18.1.

608.6 Cross-Connection Control Cross-connections shall be prohibited, except where approved protective devices are installed.

ODC Regulations

SECTION 608 OHIO BASIC BUILDING CODE PLUMBING PROTECTION OF POTABLE WATER SUPPLY (Continued)

608.6.1 Private Water Supplies Cross-connections between a private water supply and a potable public supply shall be prohibited.

608.14 Location of Backflow Preventers Access shall be provided to backflow preventers as specified by the installation instructions of the approved manufacturer.

608.16.1 Beverage Dispensers The water supply connection to carbonated beverage dispensers shall be protected against backflow by a double check valve with an intermediate atmospheric vent conforming to ASSE 1022, CSA B64.3.1 or by an air gap. The portion of the backflow preventer device downstream from the second check valve and the piping downstream therefrom shall not be affected by carbon dioxide gas (No Copper)

ODC Regulations

SECTION 608 OHIO BASIC BUILDING CODE PLUMBING PROTECTION OF POTABLE WATER SUPPLY (Continued)

608.16.4 Connections to Automatic Fire Sprinkler Systems and Standpipe Systems The potable water supply to automatic fire sprinkler systems and standpipe systems shall be protected against backflow by a double check valve assembly or a reduced pressure principle backflow preventer

Exceptions:

1. Where systems are installed as a portion of the water distribution system in accordance with the requirements of this code and are not provided with a fire department connection, isolation of the water distribution system shall not be required.

2. Isolation of the water distribution system is not required for deluge, preaction or dry pipe systems

608.16.4.1 Additives or Non-potable Sources Where systems under continuous pressure contain chemical additives or antifreeze, or where systems are connected to non-potable secondary water supply, the potable water supply shall be protected against backflow by a reduced pressure principle backflow preventer

ODC Regulations

SECTION 608 OHIO BASIC BUILDING CODE PLUMBING PROTECTION OF POTABLE WATER SUPPLY (Continued)

608.16.5 Connections to Lawn Irrigation Systems The potable water supply to lawn irrigation systems shall be protected against backflow by an atmospheric type vacuum breaker, a pressure type vacuum breaker or a reduced pressure principle backflow preventer. A valve shall not be installed downstream from an atmospheric vacuum breaker. Where chemicals are introduced into the system, the potable water supply shall be protected against backflow by a reduced pressure principle backflow preventer.

608.17 Protection of individual water supplies An individual water supply, otherwise known as a private water system, shall be located and constructed so as to be safeguarded against contamination in accordance with the rules of the "Ohio Department of Health" contained within Chapter 3701-28 of the Administrative Code, "Private Water systems."

ODC Regulations

SECTION 608 OHIO BASIC BUILDING CODE PLUMBING PROTECTION OF POTABLE WATER SUPPLY (Continued)

608.13.9 Chemical Dispenser Backflow Devices Backflow devices for chemical dispensers shall comply with ASSE 1055 or shall be equipped with an air gap fitting.

Air Gap

Venturi

Relief
ASSE 1055

P 57

ODC Regulations

PROPER BACKFLOW PROTECTION FOR THESE SPECIFIC PLUMBING COMPONENTS

608.7 Stop-and-Waste Valves Prohibited Potable water outlets and combination stop and waste valves **shall not be installed underground** or below grade. Freezeproof yard hydrants that drain the riser into the ground are considered to be stop and waste valves.

Exception: Freeezeproof yard hydrants that drain the riser into the ground shall be permitted to be installed, provided that the potable water supply to such hydrants is protected upstream of the hydrants in accordance with Section 608 and the hydrants are permanently identified as nonpotable outlets by approved signage that reads as follows: **"Nonpotable-not safe for drinking.".**

P 61

ODC Regulations

PROPER BACKFLOW PROTECTION FOR THESE SPECIFIC PLUMBING COMPONENTS

Water Powered Backup Sump Pumps This cross connection shall be considered a **high hazard** connection. Shall be one of the following Air gap, Reduced pressure principle backflow preventer, Pressure-type vacuum breaker, Atmospheric-type vacuum breaker, Spill Resistant vacuum breaker. For additional information refer to the Ohio Plumbing Code sections 608.13.1, 608.13.2, 608.13.5, 608.13.6 or 608.13.8. The Water purveyor may require containment protection at the service entrance.

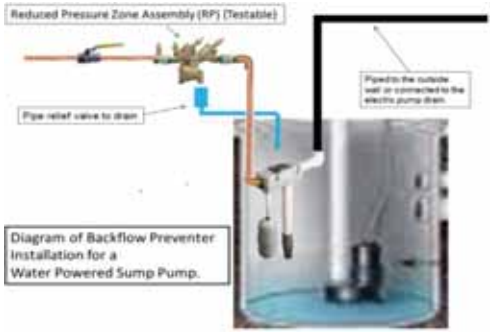


Diagram of Backflow Preventer Installation for a Water Powered Sump Pump.

P 61

CCC Liability

Liabilities associated with Backflow Contamination.

- Liability of water purveyor?
- Liability of Backflow?
- Liability of user of water?

36

CCC Liability

Responsibility of backflow tests and Cross Connection Control program

- The responsibility for backflow prevention rests jointly with the **supplier of water**, the water consumer, the plumbing inspection agencies and the Regulatory Agencies. The Regulatory Agencies include the **Ohio Environmental Protection Agency** and the **Ohio Department of Commerce**. Backflow prevention may be divided into two areas of protection:

1. **Responsibility of the supplier of water**
   The protection of the public potable water system. This responsibility begins at the source, includes all of the public water distribution system and service connections, and ends at the point of delivery to the consumer. The water service provider **is liable** for any installation that could endanger the water quality of the public water distribution system.

2. **Responsibility of the consumer-owner**
   The protection of the consumer's potable water system, which is the of their premises and the plumbing inspection agencies. dual responsibility of protecting the water users within his own premises and of protecting the public water system from contamination originating from conditions on the premises.

   This responsibility begins at the service connection and includes the entire consumer's distribution system. The water consumer **is liable** for any installation on his premises that could endanger the water quality of either the public or consumer's distribution system.

OM. P 7 & 8

CCC Liability

The Certified Technician's Responsibility

The Backflow technician is responsible for:

1. properly testing and reporting the status of each backflow assembly tested and accurately recording the test results
2. Furnish a copy of the test report to the following:
   a) Owner or representative of the owner
   b) Agency requiring the test;
   c) and retain a copy for their records

3. It is the responsibility of the technician to be completely knowledgeable regarding:
   a) regulations, rules or requirements of the Ohio Regulatory Agencies and local authorities that may be required as to registrations
   b) requirements or additional certifications to work on specific systems before performing the testing and repair of the backflow devices.
   c) The technician shall review the installation of a new or existing backflow prevention device to determine that it is correct and if the device is capable of discharging water shall review the drainage system to which it discharges to determine if the drain line(s) are capable of draining said discharge completely and recording same as a comment
   d) The comment notation should clearly indicate whether or not the drainage line(s) is capable of handling this volume of discharge without causing flooding or other damage and responsible parties should be put on notice of a design problem where damage of any nature could occur because of said discharge.

OM. P 9

CCC Liability

Water Purveyor Liability for not effectively managing a defensible Cross Connection Control program

- The duty to install protective devices and inspect was set out by the Indiana Appellate Court in the Lincoln Trust cross connection case of 1929: Pennsylvania Railroad Company vs. Lincoln Trust Company, Admr., 167 NE 721, or 91 Ind. App 28.

In this case, the Indiana water utility was **held liable for the death of a customer**. The customer had consumed tap water polluted with river water introduced into the city main through a cross connection with the railroad's main. The railroad main was carrying polluted water from the river as a secondary source. **The court said: "The City having permitted the railroad company to connect its water main with the water main of the City, was duty-bound to exercise reasonable care to see that no polluted and impure water was allowed to enter its mains through the water main of the railroad."**

- Note that the court established a duty to inspect and the use of reasonable preventive devices. Specifically, it said that **the duty of inspection does not end with installation, but continues during use. With regard to devices, the court said the water company should use every reasonable effort to adopt and use all proper means readily known to science for the prevention of accidents**.

CCC Liability

Lawsuit against a water purveyor not effectively managing a defensible Cross Connection Control program

TRIBUNE-REVIEW *Saturday, May 21, 2011*

- Executives of a Pennsylvania company filed a lawsuit on May 2011 against the Municipal Authority of their county. They are claiming the utility is violating the Safe Drinking Water Act for failing to implement a plan to enforce a cross-connection control program. According to the lawsuit, the authority has implemented its protection plan on less than 1 percent of the water agency's 123,000 customers. The plan has not been implemented for any of the authority's new customers since 1994, the suit said.

Water purveyor takes action a month after the lawsuit

- Letters went out to the authority's 123,000 water customers a month later reminding property owners of a 30-year old regulation requiring all customers to have a backflow preventer installed on their water meters.
- "We're charged with making a good-faith effort to make sure that people install them and (that they) are working properly," said the authority of the water purveyor "Nobody wants the water to be contaminated by something inside a household or business."

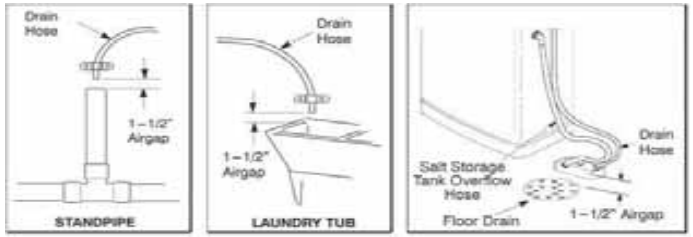
CCC Liability

Lawsuit Company Causing a Cross Connection Incident

COMMERCE CITY, Colorado *10-24-2012*

A jury awarded Roxanne Cattaneo $465,000 on claims of negligent infliction of emotional distress and extreme and outrageous conduct. On a Colorado Consumer Protection Act claim, Nick Cattaneo was awarded $462,000.

The cross-connection between water and sewer lines at the Cattaneo home was first discovered by a Commerce City employee who was completing a routine inspection and reported the issue.



CCC Liability

Lawsuit filed after apartment units burn to the ground

June 2012
A massive fire at a Noblesville apartment complex sparked a class action lawsuit. Lawyers say the fire should have been stopped before it got worse – and they say the apartment complex is to blame.

When the fire department arrived at the fire June 10, they said they found some of the water valves to the hydrants partially closed.
That meant they had to plug into hydrants a half mile away, slowing their fire fight.
"The fact there wasn't pressure at those hydrants indicates and points all the fingers at the apartment complex, for failing in their responsibility to make sure those hydrants were pressurized," says the lawyer.

They were responsible to make sure the water worked when needed. **You don't need fire hydrants very often, but when you do they need to work**. And they needed to work at that moment.

CCC Liability

$2.5 million in Damage

CCC Liability

A Indiana Fire Sprinkler company sued over restaurant fire

Saturday, September 11, 2010
A Fort Wayne fire sprinkler company is being sued after a 5,280-square-foot building restaurant burned to the ground right before its grand opening. On March 21, the restaurant caught fire from an undetermined cause and the sprinkler system did not activate. The sprinkler company admitted to shutting off the water supply to the system, according to the lawsuit.

CCC Liability

Dec. 18, 2016

Corpus Christi water contamination continues, some sick

Four days into a water contamination emergency, city leaders acknowledge they don't know how much of a toxic chemical leaked into the public water system and people are reporting they are getting sick. The Caller-Times reported a day later that the city also received dirty water calls on Dec. 1, Dec. 7 and Dec. 12 from the backflow contamination location. A sheen in the water turned out to be a mix of hydrochloric acid and Indulin, an asphalt emulsifying agent.

Dr. Sam Mannan, a world-renowned expert on safety in the chemical processing industry, said Indulin AA-86 can be toxic to skin and organs. "Once in the body, it can target the organs," Mannan said. "At what concentrate is the problem. Clearly you don't know when you don't know how much has leaked into the system."

After days of uncertainty about what led to the contamination, officials with the TCEQ confirmed that their initial review Wednesday found there had been a backflow issue at the mixing tank on Dec. 7.

McQueen implied Saturday that the mixing tank did not have a backflow preventer to ensure chemicals stored or mixed there could not seep into the public drinking water system. "**Had the third party had a backflow preventer ... they wouldn't have had a problem and we wouldn't be in in this situation," McQueen said**.

CCC Liability

Irrigation Backflow Contamination Incidents

June 2009
Cross-connection incident in southwest **Idaho** sickens 5 residents
The bacterial contamination of the system's drinking water was caused by an unprotected "cross-connection," The cross-connection in this particular situation was a physical connection (piping) between the drinking water system and a pressure irrigation system interconnection.

May 2011
A preliminary sampling taken yesterday has shown that the water system in **Kilauea** was compromised due to a cross-connection with irrigation water on private property.

CCC Liability

Utility Cross Connection Contamination Occurrence 2011

Boil advisory in effect for Utility Water System
Posted March 14, 2011 at 4:55 p.m.

The utility's workers at their filtration plant noticed the smaller of two finished drinking water tanks overflowing onto the floor about 12:30 p.m. Monday. That 1.1 million-gallon tank was disconnected and a boil water advisory issued.

Some area restaurants shrugged off the boil advisory as a nuisance.

At a local Pizzeria & Brewery, manager Tommy said his restaurant already sells bottled water. **And the only drink that uses water is tea. "And that masks the flavor anyway,"** he said, adding he did **not believe the advisory would affect the soft drink fountain**. "It just cramps everyone's style."

Amanda Lewis, hostess at the another local restaurant, said water for her restaurant already is treated through a filtration system, so no problems are expected.

Though the utility did notify the local school corp. and others about the advisory, **there is no way it could alert every affected restaurant**, The Utility said. "We try to get the word through media," he said. "There are just so many."

Local Hospital spokesman said "So for someone who drank the water now, **it could take up to three weeks for them to show signs of being sick."**

CCC Liability

Fire Hydrant Backflow Contamination Incident

June 2011
A hydro-seeding company hooked up to a fire hydrant near Brayton Street without permission from the town, Lima said.
Subsequently, the material leaked into the town water supply, making it unsafe to drink.
Hydro-seeding consists of fiber, seed, and fertilizer, he said.

Residents may not use the water to drink, cook, make ice, or wash food, though they are allowed to bath with it, Lima said.

CCC Liability

E. Coli water contamination incident

March 2011
Tillamook, Oregon . – The Tillamook Cheese Factory halted production and stopped serving food Friday and Saturday after fecal coli form and E. coli bacteria were found in the local water supply.
"The presence of fecal coliforms and E. coli bacteria indicates the water may be contaminated with human or animal wastes," the Tillamook County Emergency Management statement read. Microbes in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms.

CCC Liability

Boiler source that lead to backflow contamination incident

February 2011
Officials at Addison Trail High School said they discovered the source of water contamination that closed the school.
Industrial hygienist and other contracted plumbers to find a breach in the water system that originated when a check valve failed during a refill of the heating system.

Tests revealed trace elements of glycol. Water lines have been flushed and further tests will be conducted,
officials said.

CCC Liability

Cross Connection Causes Contamination In Indiana

September 13, 2012

Perry County Indiana was under a boil-water order since Sept. 6, as an accidental cross-connection between two pipes caused the community's water source to be contaminated.

The president of the Service Company said "**The water was cross-connected with another hook-up and the water is contaminated. As of right now, all area's of water service are under a boil water order."** The utility that services the area's water needs, said a cross-connection occurred, not at the hands of Service Company, but of a private contractor who mistakenly hooked up an incorrect pipe to another.

Tester Responsibly

Backflow Tester Reporting Accuracy

- Start with Legible Reports
- Test reports shall be filled out completely and accurately.
- List proper water service provider on test report.
- Document backflow repairs after complete (when appropriate).
- Document of replacement of existing backflow assembly.
- Correct Customer name, address, location of assembly, make, model, size and serial number.
- Report Identification of improper installations

Tester Responsibly

Backflow Tester Deficiencies

Unethical Practices

- Falsifying a test report
- Using test equipment not properly calibrated
- Incompetent assembly testing
- Allowing another person to use their certification number
- Failure to report or correct assembly installations that do not meet Federal, State, or local ordinance installation requirements.
- Failure to submit reports of testing a backflow assembly.
- Failing to maintaining records of accomplished backflow test reports.
- Testing an improperly installed backflow assembly which will not operated correctly or that was designed to protect against a potential hazard.
- Other acts deemed unethical by authorities pursuant to Business Practices and Contractor Laws.

Tester Responsibly

SUSPENSION GRID FALSIFICATION OF DOCUMENTATION

The following are the mandatory penalties for falsification of backflow testing documentation

- 1st Offense 12 Month Suspension & Attend Recertification Class
- 2nd Offense 24 Month Suspension & Attend Full Certification Class No reexamination required
- 3rd Offense Lifetime Suspension of Certification

These are penalties that are assessed by the Department of Commerce and are separate from any that can or will be assessed by the Ohio EPA in their investigation of the allegations of falsification of documentation when it involves the containment backflow device.

OM. P 9

CCC Program

Purveyor Cross Connection Control Program

Public water system is a system which provides water for human consumption through pipes or other constructed conveyances, if such system has **at least fifteen service connections** or regularly serves an average of **at least twenty-five individuals daily at least sixty days out of the year**, and any water supply system serving an agriculture labor camp, as defined in section 3733.41 of the Ohio Revised Code.

CCC Program

Backflow Prevention Programs

Containment backflow protection program

- The installation of backflow prevention devices employed downstream of the water meter that prevent backflowing contaminates from entering the public water supply through the service connection. Containment backflow prevention devices are installed for the sole propose of protecting water mains and offer no backflow protection downstream of the installed backflow device.

Isolation backflow protection program

- The backflow prevention device is installed to protect from contaminates that exist within the customer's premise. These installed backflow devices isolate the hazards at a particular location on the premise site, protecting the remaining on site potable water system from contamination.
- If the water meter is installed **inside the building** then, the containment principle backflow preventer must be installed **immediately after the water meter**. If the **meter is installed outside the building, then the containment principle backflow preventer is typically installed inside the building wall unless otherwise approved by the water supplier.**

CCC Program

Types Of Cross Connection Programs

- **The purpose of a cross connection program is to protect the public health, safety and welfare through the prevention and control of cross connections by:**

  - Protecting the public water distribution system from contamination or pollution due to cross connections containing hazards at the service connection.

  - Requiring the elimination or control of existing, actual or potential cross connections between the customer's potable water system(s) and non-potable water system(s), plumbing fixtures, and industrial piping systems.

  - Providing for the maintenance of a continuing program of cross connection control that will systematically and effectively reduce the risk of the contamination to the public water system.

CCC Program

Containment / Isolation Backflow preventers

Containment Backflow Prevention Assemblies must be approved by the water supplier before installation, most water suppliers accept the devices that meet ASSE, USC, CSA or AWWA standards

- The **Ohio EPA** recognizes only four types of backflow prevention assemblies for use as a containment principle protection:
  1. Double check valve assembly (ASSE 1015) ,
  2. Reduced pressure principle backflow preventer (ASSE 1013)
  3. Double check detector check assembly (ASSE 1048)
  4. Reduced pressure detector check assembly (ASSE 1047)
  5. Pressure vacuum breaker (ASSE 1020) acceptable backflow prevention protection for a residential irrigation system that has no pumps or additives

P 37

CCC Program

Isolation Backflow

The **Ohio Department of Commerce Recognizes** devices that have obtained the American Society of Sanitary Engineering (ASSE) seal authorization approval for use as an isolation principle backflow prevention protection.

The ASSE Standard Number will be stamped into the body of the device or printed on a metal plate that is attached to the device.

The ASSE seal authorization approval list may be viewed at www.asse-plumbing.org.

P 47

Backflow Reponses Plan

Types of Approved Backflow Assemblies

Air-Gap Separation

Standard Number: ANSI A112.1.2

Protection Provided: Backsiphonage and Backpressure

Hazard Level: Severe High, High or Low Hazard

Limitation: Must be at least two times the nominal diameter of the discharge piping but never less than one inch

Construction: A physical separation through the free atmosphere measured from the opening of the discharge piping to the flood level rim of the receiving vessel

60

Backflow Reponses Plan

Types of Approved Backflow Assemblies

Pipe Applied Atmospheric Vacuum Breaker **Standard Number: ASSE 1001**

Protection Provided: Backsiphonage Only

Hazard Level: High or Low Hazard

Limitation: May not be used under continuous pressure conditions Must be installed at least 6" above the highest downstream piping, May not have a downstream shut-off valve.

Construction: A combination check valve / air inlet valve

Backflow Reponses Plan

Types of Approved Backflow Assemblies

Anti-Siphon Fill Valve (Ballcock) for Water Closet Flush Tank

Standard Number: ASSE 1002

Protection Provided: Backsiphonage Only

Hazard Level: High or Low Hazard

Limitation: Construction: Float operated anti-siphon toilet ballcock

Backflow Reponses Plan

Types of Approved Backflow Assemblies

Hose Connection Vacuum Breaker **Standard Number: ASSE 1011**

Protection Provided: Backsiphonage and Low Head Backpressure

Hazard Level: High or Low Hazard

Limitation: May not be used under continuous pressure conditions

Construction: A single check valve & an atmospheric vent valve

Backflow Reponses Plan

Types of Approved Backflow Assemblies

Backflow Preventer with Intermediate Atmospheric Vent

Standard Number: ASSE 1012

Protection Provided: Backsiphonage and Backpressure

Hazard Level: Low Hazard Only

Limitation: Low pressure only Vent on device to be in down position with approved air-gap separation at the vent

Construction: Two independently operating check valves with a vent between the check valves that opens to atmosphere

Backflow Reponses Plan

Types of Approved Backflow Assemblies

Reduced Pressure Principle Backflow Preventer **Standard Number: ASSE 1013**

Protection Provided: Backsiphonage and Backpressure

Hazard Level: High or Low

Hazard Limitation: May not be installed in a pit Must maintain an approved air-gap separation at the relief valve vent port

Construction: Two independently-acting check valves, a hydraulic relief valve between the check valves, tightly closing inlet & outlet valves, four appropriately located test cocks

65

Backflow Reponses Plan

Types of Approved Backflow Assemblies

Reduced Pressure Principle Detector Check Assembly

Standard Number: **ASSE 1047**

Protection Provided: Backsiphonage and Backpressure

Hazard Level: High or Low Hazard

Limitation: Used for fire protection systems containing any additive or a connection to stored water or an auxiliary water source May not be installed in a pit

Construction: Two reduced pressure assemblies installed in parallel, four test cocks on each assembly, and a bypass meter to detect low water flow usage

66

Backflow Reponses Plan

Types of Approved Backflow Assemblies

Double Check Backflow Prevention Assembly **Standard Number: ASSE 1015**

Protection Provided: Backsiphonage and Backpressure

Hazard Level: Low Hazard Only Limitation:

Construction: Two independently-acting check valves, tightly closing inlet & outlet valves, and four appropriately located test cocks

67

Backflow Reponses Plan

Types of Approved Backflow Assemblies

Double Check Detector Check Assembly **Standard Number: ASSE 1048**

Protection Provided: Backsiphonage and Backpressure

Hazard Level: Low Hazard Only Limitation: Used for fire protection systems containing no additives, storage or auxiliary water connection

Construction: Two double check valve assemblies installed in parallel, four test cocks on each assembly, and a bypass meter to detect low water flow usage

68

Backflow Reponses Plan

Types of Approved Backflow Assemblies

Vacuum Breaker Wall Hydrant, Freeze Resistant, Automatic Draining Type

Standard Number: ASSE 1019

Protection Provided: Backsiphonage and Low Head Backpressure

Hazard Level: High or Low Hazard

Limitation: May not be used under continuous pressure conditions Construction: A wall hydrant with an internal vent valve and a means to drain the barrel to prevent freezing

Backflow Reponses Plan

Types of Approved Backflow Assemblies

Pressure Vacuum Breaker Assembly **Standard Number:** ASSE 1020

Protection Provided: Backsiphonage Only

Hazard Level: High or Low Hazard Limitation: The critical installation level is 12" above the highest downstream use

Construction: A spring-loaded check valve and an independently-acting, spring-loaded air inlet valve, and tightly closing inlet & outlet valves

Backflow Reponses Plan

Types of Approved Backflow Assemblies

Backflow Preventer for Carbonated Beverage Machine

Standard Number: ASSE 1022

Protection Provided: Backsiphonage and Backpressure

Hazard Level: Low Hazard Only, Required on the potable water supply line to PostMix Carbonated Beverage Dispensers

Limitation: n/a

Construction: Two independently acting check valves with a vent to atmosphere

Backflow Reponses Plan

Types of Approved Backflow Assemblies

Dual Check Valve Type Backflow Preventer

Standard Number: ASSE 1024

Protection Provided: Backsiphonage and Backpressure Hazard Level: Low Hazard Only

Limitation: Construction: Two independently acting check valves

Backflow Reponses Plan

Types of Approved Backflow Assemblies

Dual Check Valve Type Backflow Preventer for Post Mix Carbonated Beverage Dispensers

Standard Number: ASSE 1032

Protection Provided: Backsiphonage and Backpressure

Hazard Level: Low Hazard Only

Limitation: N/A

Construction: Two independently acting check valves, usually found inside the dispenser

Backflow Reponses Plan

Types of Approved Backflow Assemblies

Laboratory Faucet Backflow Preventer, Vacuum Breaker

Standard Number: ASSE 1035

Protection Provided: Backsiphonage and Low Head Backpressure Hazard Level: High or Low

Hazard Limitation: May not be used under continuous pressure conditions

Construction: Two independently acting check valves with a means to vent to atmosphere under backsiphonage condition

Backflow Reponses Plan

Types of Approved Backflow Assemblies

Hose Connection Backflow Preventer, Vacuum Breaker

Standard Number: ASSE 1052 **Protection Provided:** Backsiphonage and Low Head Backpressure

Hazard Level: High or Low Hazard Limitation: May not be used under continuous pressure conditions

Construction: Two independently acting check valves with an intermediate vent to the atmosphere

Backflow Reponses Plan

Types of Approved Backflow Assemblies

Backsiphonage Vacuum Breaker, Spill-Proof **Standard Number:** ASSE 1056

Protection Provided: Backsiphonage Only

Hazard Level: High or Low Hazard

Limitation: The critical installation level is 6" above the highest downstream use or 1" when equipment mounted

Construction: At least one check valve and an automatic vent valve to atmosphere, tightly closing inlet & outlet valves, and a test cock

CCC Program

Cross Connection Control Program Components

- Keeping track of customer backflow compliance
- Employee Training in Backflow Requirements
- Define contamination hazards in our districts
- Follow state requirements
- Receiving state approvals
- Customer surveys and customer notifications

77

CCC Program

Define and prioritize contamination hazards in your districts

1. High hazard industrial facilities
2. Commercial business having high hazards
3. Residential customers having irrigation systems
4. Contractors working within your system using fire hydrants as a source of water supply.
5. Protecting the water utility purification plant

78

CCC Program

Follow state requirements

- Receiving state approvals for protecting the utility water distribution system.
- Developing and managing a defensible cross connection control program. (If you go to court will the utility CCC program be enough to stay off a lawsuit?)
- Utility to maintain 5 years of backflow inspections on customer sites.
- Utility needs to test their own internal and containment backflow assemblies at the prescribed intervals.
- Follow State requirements in order satisfy Ohio EPA sanitary survey audits for cross connection control compliance.

79

CCC Program

Sanitary Survey

What is a Sanitary Survey?

A sanitary survey is a periodic inspection of a water system's facilities, operations, and record keeping. The inspections identify conditions that may present a sanitary or public health risk.

Water Utilities Regulatory Requirement?

The federal Safe Drinking Water Act (SDWA) calls for a sanitary survey of all public drinking water systems. Ohio conducts sanitary surveys for community systems at least once every three years. Non-community water system sanitary surveys are conducted at least once every five years.

What is reviewed during the sanitary survey ?

- Overall utility cross connection-control program.
- Documentation for all facilities required to install and test backflow assemblies.
- CCC surveys results required by regulations.
- Submitted inspection result records of required facilities that they are compliant and protected against backflow.
- Proper retention of records for the last 5 years of backflow testing.

CCC Program

Sanitary Survey Audit Findings

It is your responsibility to correct these deficiencies promptly. The letter may specify a formal written response to specific sanitary deficiencies be submitted to Ohio EPA within 45 days.

CCC Program

Customer surveys and customer notifications

- Sent out reminder to test backflow letters
- Requirement to repairs tested and failed backflow devices.
- Provide cross connection information for educating your customers.
- Online Survey Panels like Zoomerang , SurveyMonkey est….
- Follow-up of know customer issues identified in your service area.

82

CCC Program

Example of a reminder to test backflow letter

John Doe
4321 First Street
Anytown, State ZIP

June 17, 2015

Subject: ***ANNUAL BACKFLOW INSPECTION TEST***

Dear Mr. **John Doe**,

Your backflow prevention Assembly is due for its Annual field inspection test, as required by (**rule or regulation**). Please have this field test performed by a certified backflow prevention assembly tester possessing a valid Certification issued by the (**administrative authority**).

If the field tester discloses that the assembly is not operating satisfactorily, necessary repairs shall be made and the assembly retested by a Certified tester. The Certified tester shall complete the Field Test and Maintenance Report form provided and forward it to this office no later than (**due date**).

Additional information relative to this matter may be obtained by writing to our (**Email Address**) or by calling (**phone number**).

Sincerely yours,
CCC Specialist/Administrative Authority

CCC Program

Example of On Line Cross Connection Survey

- Typical water usage, such as bathrooms, household laundry or dishwashing appliances, and outside water faucets.
- Private well (s) supplying any part of your residence
- Piped into a chemical or agricultural process
- Piped into an underground lawn sprinkler/irrigation system
- Piped into a fire supression system
- Piped into a swimming pool
- Piped into a boiler
- Yard hydrant
- Other, please specify

3 Please check the type or types of backflow prevention devices installed on your plumbing system:

- Residential Double Check (RDC)
- Double Check Valve (DCV)
- Reduced Pressure Zone Device (RPZ)
- None
- Other, please specify

84

CCC Program

STATE OF OHIO

Example of a State of Ohio Backflow Test Report.

CCC Program

Certified Backflow Testers
Where do they fit into a Cross Connection Program?

- During visits to a premise sites, You need to be aware of CCC program requirements.
- Look for any unauthorized taps.
- Ensure backflow devices are original equipment manufactured assemblies
  (O.E.M. parts only)
- When communicating on site with your customers, Briefly explain the Ohio DOC and EPA state backflow testing requirements and the liability they expose themselves to by not testing the backflow on at prescribed internals.

CCC Program

What can backflow testers do to promote enforcement of Cross Connection Control?

- Potential eyes and ears for identifying backflow devices that are not tested or actual cross connections.
- Report those findings to the State or the water purveyor.
- Identify backflow devices with testing tags and contact your customer before the backflow assembly is due for testing.

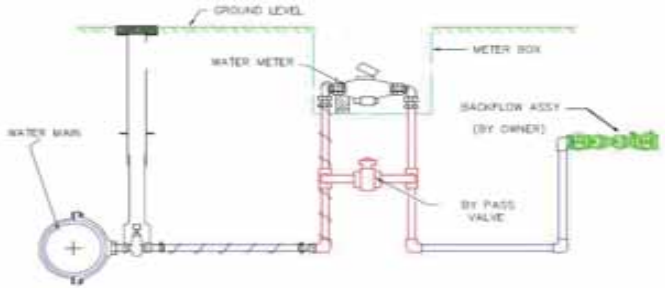
Backflow Installation

Installation of Backflow Assembles

- All Backflow assemblies shall be installed at a location that allows access to the device for maintenance and testing from floor level, without use of a ladder or other similar temporary apparatus, and that will not subject the device to flooding excessive heat or freezing.

Thermal Expansion

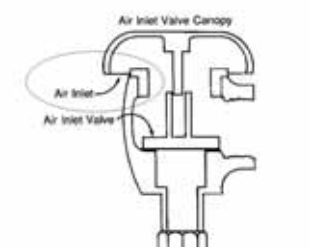
- water confined in pipes and fixtures could increase the water pressure resulting in a catastrophic failure.



Backflow Installation

Installation of Backflow Assembles

Is the backflow preventer located in a safe location, away from toxic fumes and protected from the elements? Hazards may be introduced through an atmospheric opening on the backflow preventer.

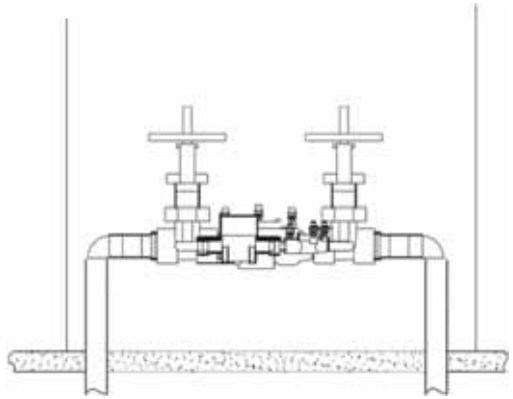


Never install a backflow under and exhaust hood

89

Backflow Installation

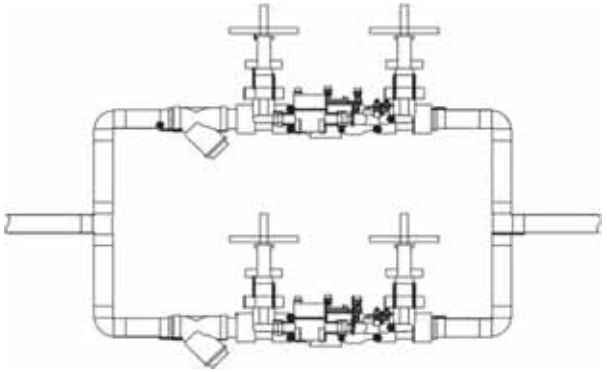
Horizontal Installation



90

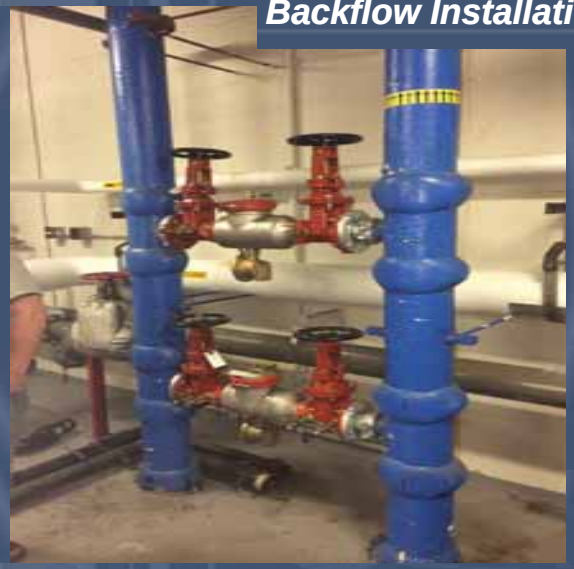
Backflow Installation

Parallel Installation



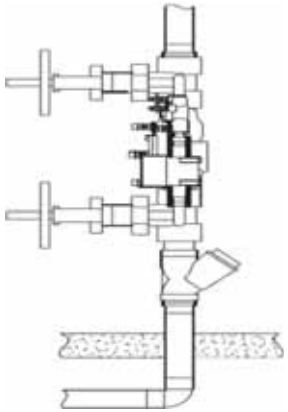
91

Backflow Installation



Backflow Installation

Vertical Installation



93

Backflow Installation

DEGREE OF HAZARD

- Determining the installed Backflow prevention assembly has adequate **commensurate** level protection associated with the degree of hazard after the water meter and/ or at each individual fixture.
- Degree of hazard is the potential for backflow to occur (can backflow happen) and the toxicity of the contaminant that could backflow (how toxic is the substance that can backflow into the piping).
- The **Plumbing Inspection Authority** under the direction of the **Ohio Department of Commerce determines the degree of hazard** presented by the individual fixtures within the premises. Based upon this evaluation, they determine the appropriate isolation principle backflow prevention device that must be installed at the fixture.
- **The Water Supplier** under the direction of the Ohio Environmental Protection Agency determines the **total degree of hazard presented by the premises** and determines the **appropriate containment** principle backflow prevention assembly that must be installed at the water meter.

P 10

Backflow Installation

Degree of Hazard

- The type of backflow prevention device that will be required at the water meter or at an individual fixture is determined by evaluating the degree of hazard that is presented.

- **Low Hazard** = Pollution Hazard (aesthetically objectionable)
- **High Hazard** = System Hazard (may cause damage to the system piping) " =
- **Health Hazard** (is a threat to the health of the water user) Severe High Hazard = Severe Health Hazard (presents a threat of death)

Backflow Installation

Degree of Hazard

- **Health Hazard** a degree of hazard that is defined as any condition, device or practice in a water system or it's operation that creates a threat to the health and well-being of it's users.
- **High Hazard** An actual or potential threat of contamination of the potable water system that would present a threat to the health of the consumer
- **Low Hazard** An actual or potential threat to the potable water system whereby the risk from backflow would be limited to the pollution of the potable system by an aesthetically objectionable but non-toxic substance, such as beverages, foods or other non-toxic substances.
- **Non Toxic Substance** Any substance that may create a low degree of hazard, is a nuisance, is aesthetically objectionable, or degrades the water quality but poses no threat to the health of the consumer.
- **Pollution Hazard** degree of hazard of a substance that tends to degrade the water quality but poses no threat to health.
- **Severe Health Hazard** degree of hazard that is defined as a threat to the health of a user that could be reasonably expected to result in significant morbidity or death.
- **System Hazard** is a threat to the physical properties of the public water system or a consumer's potable water system.

Backflow Installation

Types of Backflow Protection Assemblies

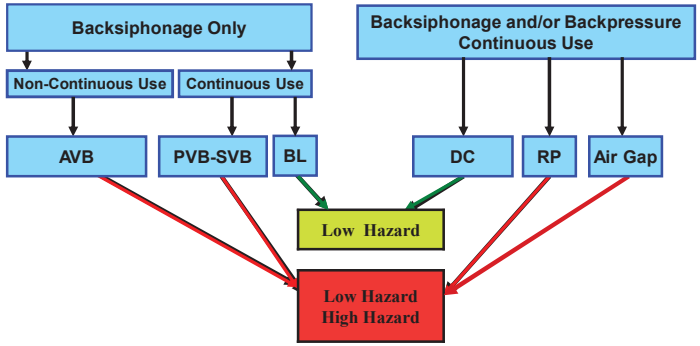
Containment Protection	Isolation Protection
▪Double Check Assembly (DC)	▪Double Check Assembly (DC)
▪Reduced Pressure Principle (RP)	▪Reduced Pressure Principle (RP)
▪Pressure Vacuum Breaker (PVB)	▪Pressure Vacuum Breaker (PVB)
▪Spill-Resistant Vacuum Breaker (SVB)	▪Spill-Resistant Vacuum Breaker (SVB)
▪Air Gap	▪Air Gap
	▪Dual Check with atmospheric vent
	▪Residential Dual Check
	▪Atmospheric Vacuum Breaker

Backflow Assembly Install Considerations

- The degree of hazard protection required.
- The likelihood that backpressure may occur.
- Will the device provide protection inside the customer's premises (isolation) or at the service connection (containment).

Backflow Installation

Selecting the correct backflow device for potential hazard

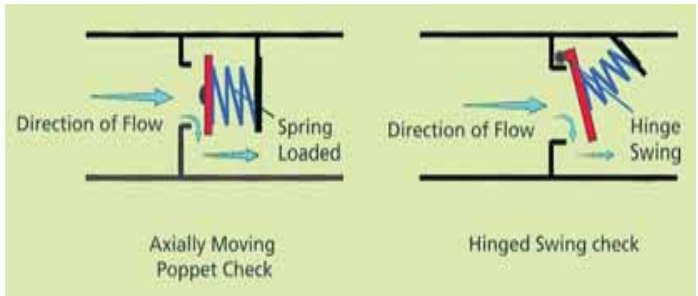


Containment Backflow Protection				
Backflow Prevention Assembly Type	**Degree of Hazard Protection**	**Type of Hydraulic Condition Designed to Protect Against**	**Operational Time Allowance Use**	**Install Requirements (No Backflow Assembly shall be subjected to freezing, flooding or excessive heat.)**
Atmospheric Vacuum Breaker (AVB) ASSE 1001	Low and High Hazard	Backsiphonage only	Non-Continuous use Only 12 hours in any 24 hour period.	Shall be installed at least 6" above the highest outlet or piping. No shutoff valve downstream.
Air Gap (AG) ANSI A112.1	Low and High Hazard	Backsiphonage and or Backpressure	Continuous use	Shall be measured from the supply pipe outlet to the overflow rim and shall be 2 times the I.D of the supply pipe and never less than 1" (2x ID <1.0")
Barometric Loop (BL) 608.13.4 B Code	Low Hazard Only	Backsiphonage only	Continuous use	35 feet high Measured from Top to Bottom
Double Check (DC) ASSE 1015 (DCDA) ASSE 1048	Low Hazard Only	Backsiphonage and or Backpressure	Continuous use	12" to 36" measure from the bottom of the body assembly from the ground or platform.
Pressure Vacuum Breaker (PVB) ASSE 1020	Low and High Hazard	Backsiphonage only	Continuous use	Shall be installed at least 12" above the highest outlet or piping
Reduced Pressure Principle (RP) ASSE 1013 (RPDA) ASSE 1047	Low and High Hazard	Backsiphonage and or Backpressure	Continuous use	12" to 36" measure from the relief valve opening point from the ground or platform. Shall not be installed below ground grade level.
Spill Resistant Vacuum Breaker (SVB) ASSE 1056	Low and High Hazard	Backsiphonage only	Continuous use	Shall be installed at least 12" above the highest outlet or piping

Backflow Checks

Backflow Check Valves

Although a single check valve is not an acceptable means of preventing backflow, it is often an important component of backflow prevention assemblies. A check valve is a one-way valve, which will allow water to pass in only one direction.

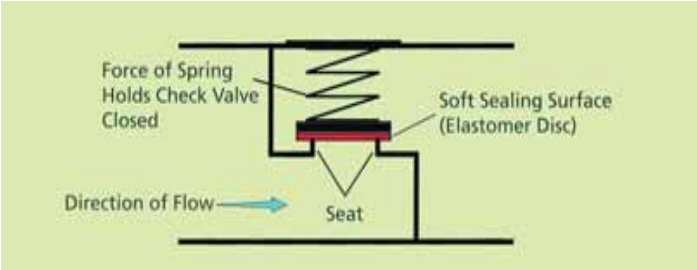


P.49

Backflow Checks

Backflow Check Valves

In order to ensure that water can only pass through check valves in one direction, check valves in backflow prevention assemblies are designed to have a drip tight seal. This cannot be accomplished effectively with two hard surfaces (e.g. , metal to metal), so the check valves typically use a soft sealing surface or elastomer disc to seal against a seat.



P.49

Backflow Checks

Backflow Check Valves

Disk Compression

P.49

Backflow Reponses Plan

Types of Approved Backflow Assemblies

There are two types of mechanical backflow preventers:

1. Assemblies are backflow preventers that have test cocks and shut-off valves enabling them to be tested inline
2. Backflow devices are designed for field-testing and the Ohio EPA requires the use of testable assemblies to satisfy regulatory requirements.

Ohio EPA requires containment backflow preventers be of a type that has been investigated and approved by the supplier of water and that meets the rule requirements.

The Ohio EPA recognizes only **four types of backflow prevention assemblies for use as a containment** principle protection, the double check valve assembly, the reduced pressure principle backflow preventer, the double check detector check assembly and the reduced pressure detector check assembly

103

Air Gap

ANSI A112.1

Air Gap

Typical uses: Sewage, extreme high hazard applications

Backflow Reponses Plan

Minimum Air Gaps For Potable Water Outlets

TABLE 1. Minimum Air Gaps For Potable Water Outlets

Outlet Size	Minimum Air Gap: When not Affected By Near Wall (*) (Inches)	Minimum Air Gap: When Affected By Near Wall (**) (Inches)
Lavatories with effective openings not greater than 1/2 inch diameter	1.0	1.5
Sinks, laundry trays, and gooseneck bath faucets with effective openings not greater than 3/4 inch diameter	1.5	2.25
Over-rim bath fillers with effective openings not greater than 1 inch diameter	2.0	3.0
Effective openings greater than ½ inch	2X Diameter of effective openings	3X Diameter of effective openings

* Side walls, ribs or similar obstructions do not affect air gaps when spaced from inside edge of spout opening a distance greater than three times the diameter of the effective opening for a single wall, or a distance greater than four times the diameter of the effective opening for two intersecting walls.

** Vertical walls, ribs, or similar obstructions extending from the water surface to or above the horizontal plane of the spout opening require a greater air gap when spaced closer to the nearest inside edge of spout opening than specified in (*) above. The effect of three or more such vertical walls or ribs has not been determined. In such cases, the air gap shall be measured from the top of the wall.

P58

10
5

Air Gap

ANSI A112.1

Air Gap Backflow Install Requirements

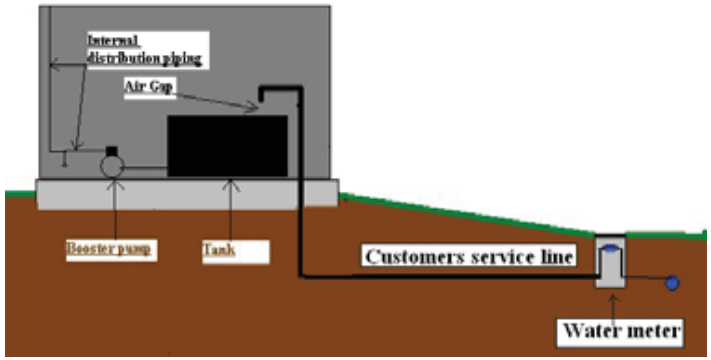
- The discharge pipe of an air gap shall terminate a minimum of two pipe diameters above the flood level rim of the receiving vessel.

Air Gap

ANSI A112.1

Air Gap Containment

High Hazard Protection



Barometric Loop

Barometric loop

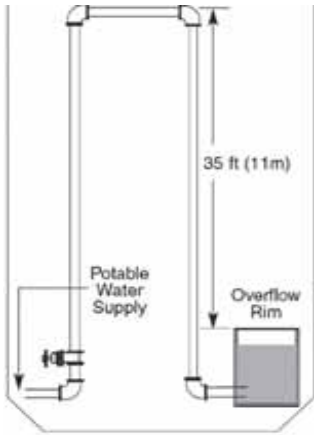
Low Hazard Protection

Barometric Loop

Barometric loop Install Requirements

Its operation, in the protection against back-siphonage, is based upon the principle that a water column, at sea level pressure, will not rise above 33.9 feet

Low Hazard Protection



Atmospheric Vacuum Breaker

Atmospheric Vacuum Breaker
ASSE 1001

Typical uses: Hose bibs, Laboratory sinks, Large commercial sinks

Atmospheric Vacuum Breaker

ASSE 1001

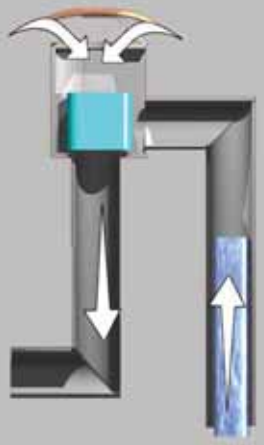
Atmospheric Vacuum Breaker (AVB)

Normal Flow

111

Atmospheric Vacuum Breaker

ASSE 1001



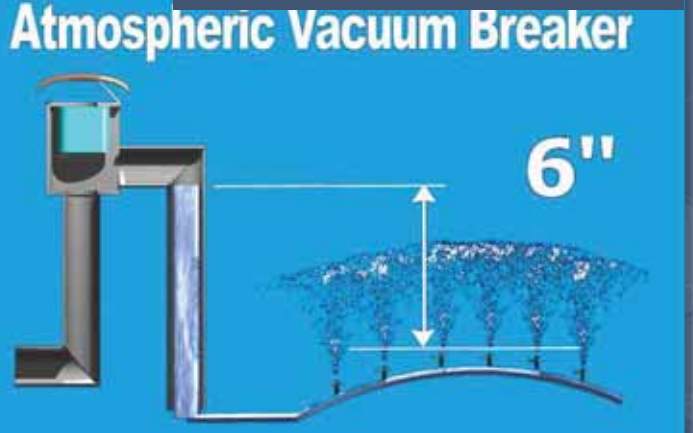
Atmospheric Vacuum Breaker (AVB)

Backsiphonage

112

Atmospheric Vacuum Breaker

ASSE 1001



No down stream shut off valves or control meters
Non-continuous use (12 hours Max.)

P.102

Pressure Vacuum Breakers

ASSE 1020

Pressure Vacuum Breakers (PVB)

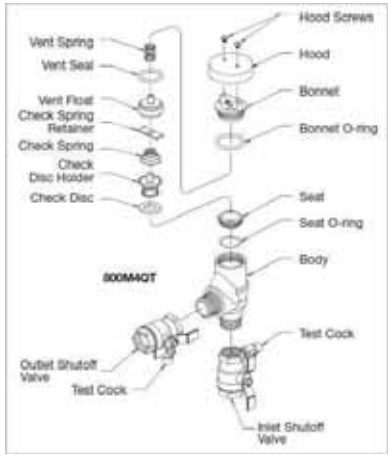
Typical uses: Lawn irrigation, Hose bibs where downstream valves will be used

High Hazard Protection

Pressure Vacuum Breakers

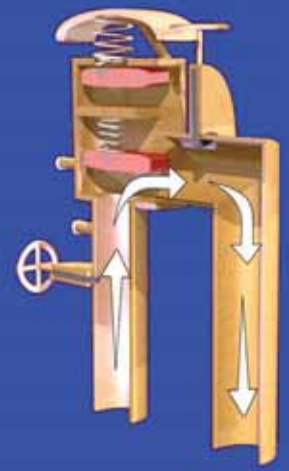
ASSE 1020

PVB Parts



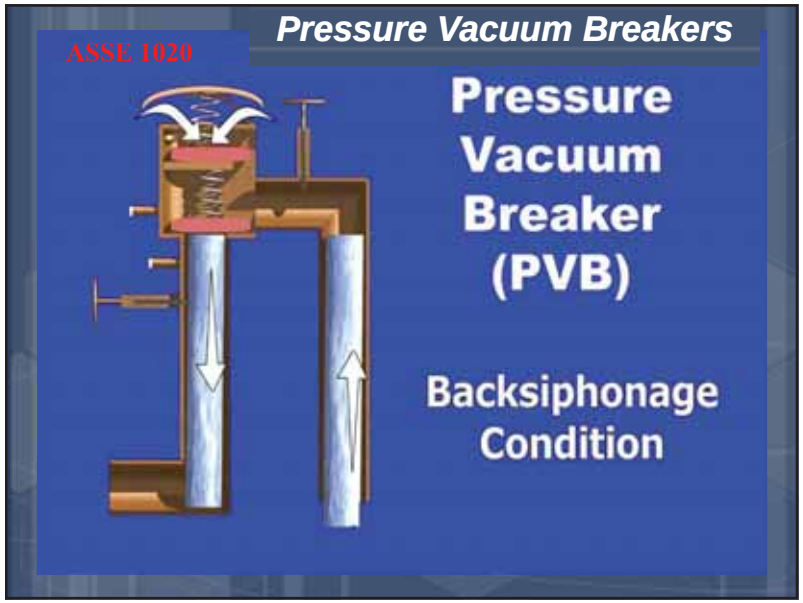
Pressure Vacuum Breakers

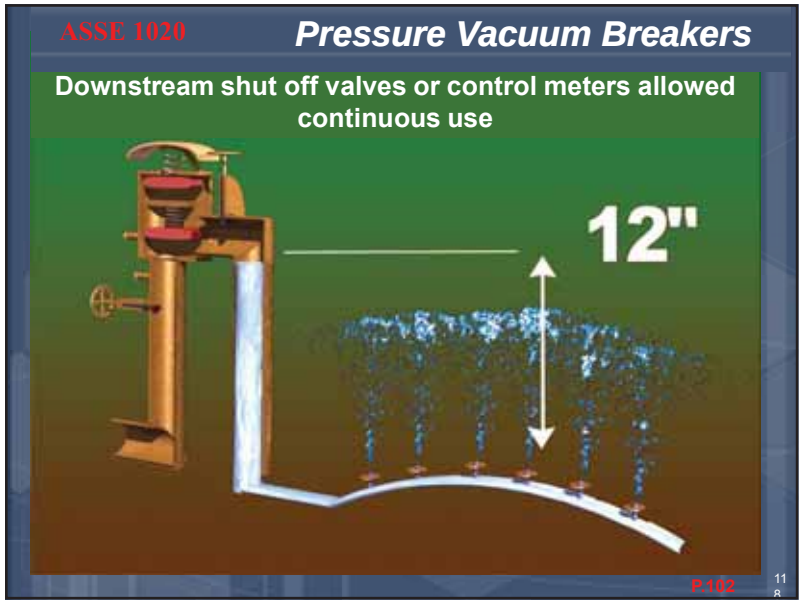
ASSE 1020

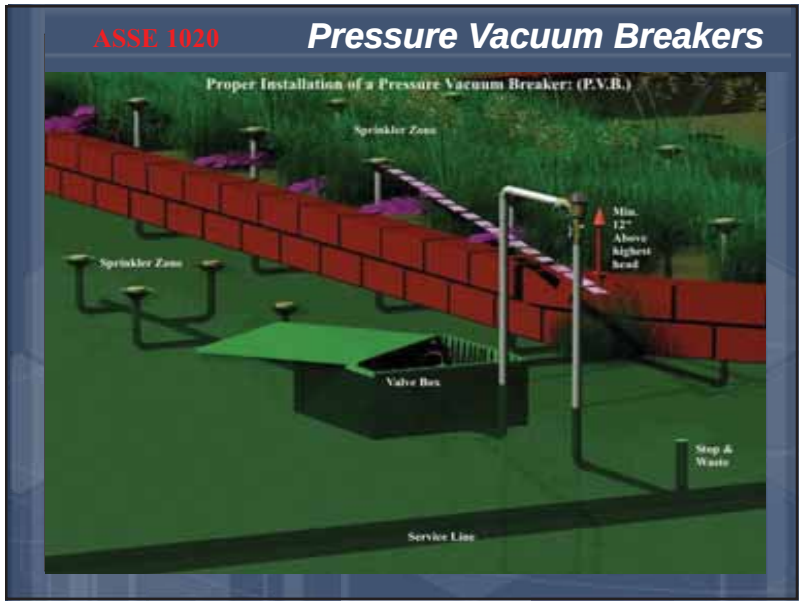


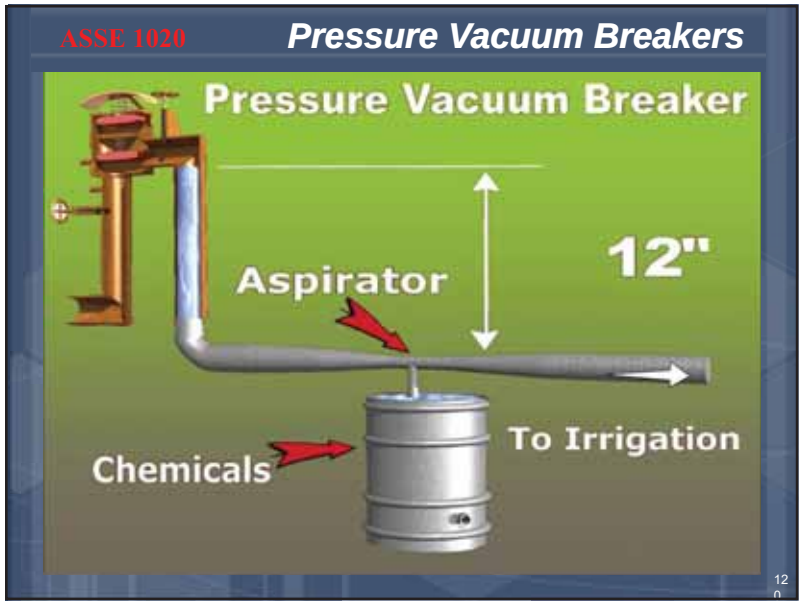
Pressure Vacuum Breaker (PVB)

Normal Flow


ASSE 1020
Pressure Vacuum Breakers
Pressure
Vacuum
Breaker
(PVB)
Backsiphonage
Condition

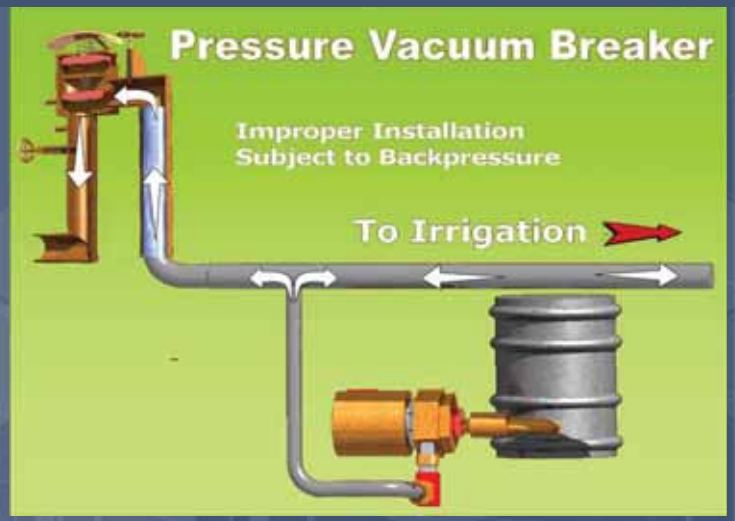

ASSE 1020
Pressure Vacuum Breakers
Downstream shut off valves or control meters allowed continuous use
12"
P-102


ASSE 1020
Pressure Vacuum Breakers
Proper Installation of a Pressure Vacuum Breaker: (P.V.B.)
Sprinkler Zone
Sprinkler Zone
Min. 12" Above highest head
Valve Box
Stop & Waste
Service Line


ASSE 1020
Pressure Vacuum Breakers
Pressure Vacuum Breaker
12"
Aspirator
Chemicals
To Irrigation

ASSE 1020

Pressure Vacuum Breakers



121

ASSE 1056

Spill Resistant Vacuum Breaker

Spill Resistant Vacuum Breaker (SVB)

Typical uses: Lawn irrigation, Hose bibs where downstream valves will be used

High Hazard Protection

Spill Resistant Vacuum Breaker (SVB) is considered the next generation of pressure vacuum breakers (PVB).

ASSE 1056

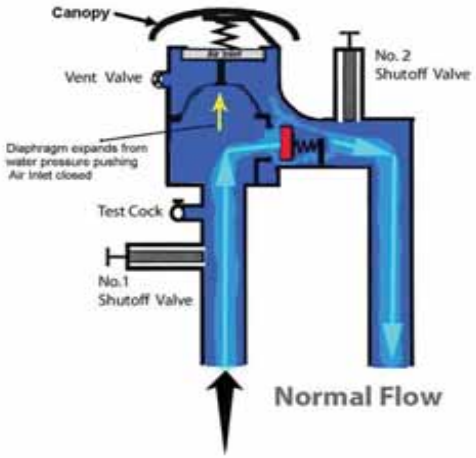
Spill Resistant Vacuum Breaker

SVB Parts

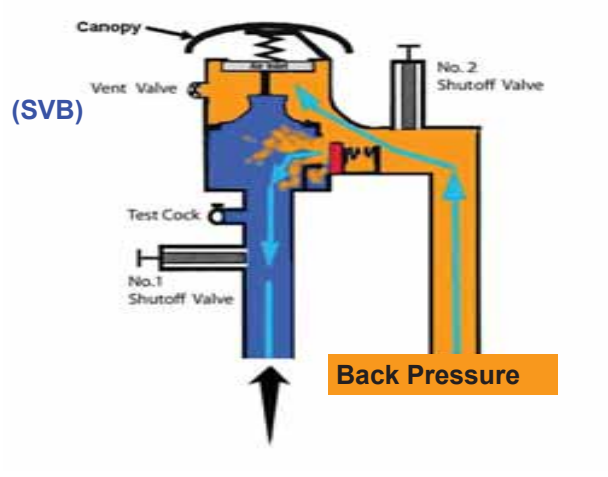
ASSE 1056

Spill Resistant Vacuum Breaker

(SVB)



ASSE 1056 Spill Resistant Vacuum Breaker



Double Check

(DC) ASSE 1015

(DCDA) ASSE 1048

Double Check Assemblies

Typical uses: Fire lines with no chemical additives

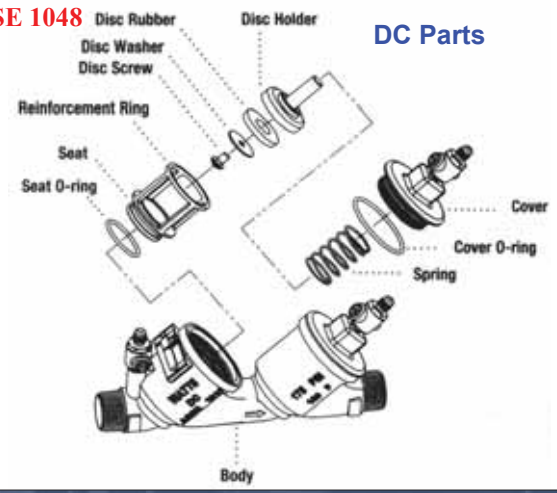
Low Hazard Protection

Double Check

(DC) ASSE 1015

(DCDA) ASSE 1048

DC Parts



Double Check

(DC) ASSE 1015

(DCDA) ASSE 1048

Double Check Assembly Backflow Install Requirements

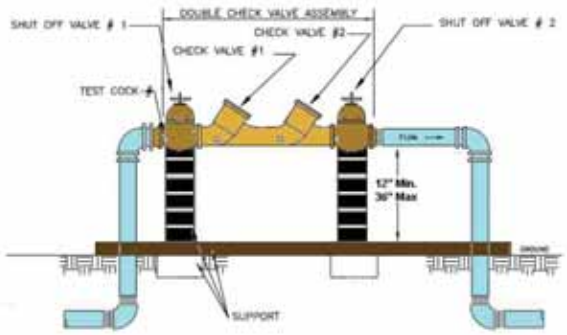
- Shall be installed horizontally unless otherwise approved .
- Location that allows access to the device for maintenance and testing from floor level without use of a ladder or other similar temporary apparatus.
- Shall not be subjected to flooding, excessive heat, or freezing.
- The bottom of the double check assembly shall be a minimum of 12 inches to a maximum 36 inches above floor level.
- Backside minimum clearance of 12 inches with a front side minimum clearance of 24 inches.

Double Check

(DC) ASSE 1015

(DCDA) ASSE 1048

Double Check Install

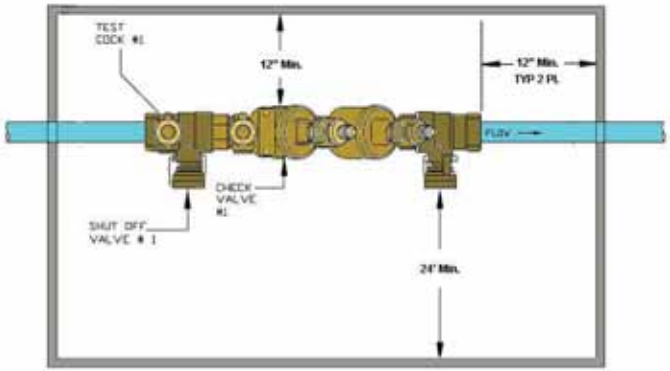


Double Check

(DC) ASSE 1015

(DCDA) ASSE 1048

Side Clearance Install

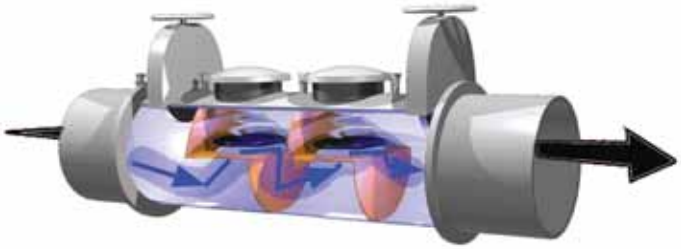


Double Check

(DC) ASSE 1015

(DCDA) ASSE 1048

Double Check



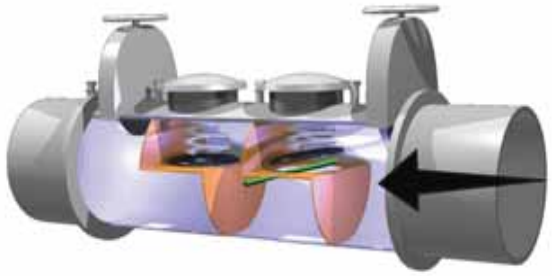
Normal Flow

Double Check

(DC) ASSE 1015

(DCDA) ASSE 1048

Double Check



Back Pressure and Fouled #2 Check

Fire Protection

Fire Protection Components

Fire Protection

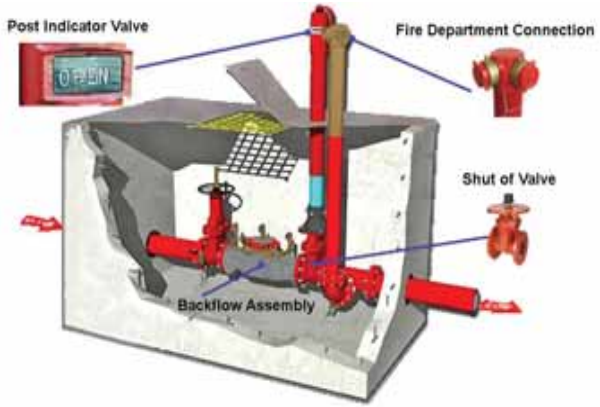
(DCDA) ASSE 1048
(RPDA) ASSE 1047

Fire Protection Backflows

134

Fire Protection

(DC) ASSE 1015
(DCDA) ASSE 1048

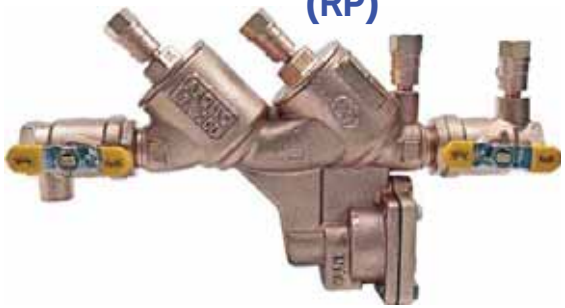


Post Indicator Backflow Assembly

Reduced Pressure Principle Backflow

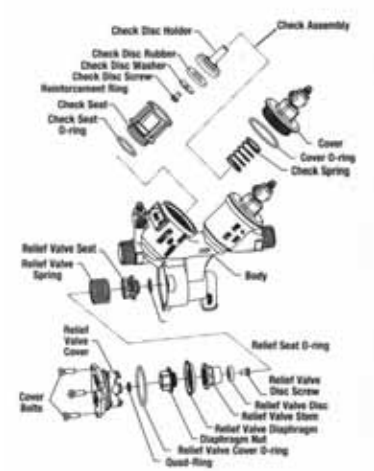
Reduced Pressure Principle Backflow

(RP)



Reduced Pressure Principle Backflow

RP Parts



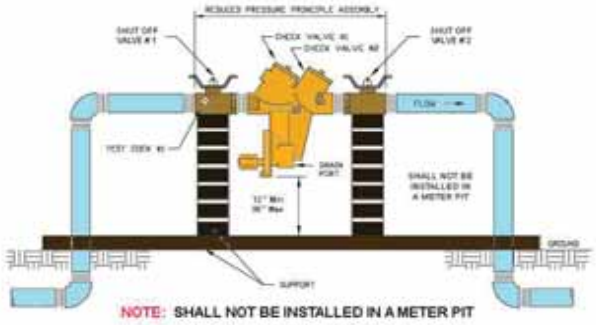
Reduced Pressure Principle Backflow

Reduced Pressure Principle Backflow Install Requirements

- Shall be installed horizontally unless approved.
- Allows access to the valve for maintenance and testing from floor level, without use of a ladder or other similar temporary apparatus.
- No plug or additional piping affixed to the pressure differential relief valve port.
- The pressure differential relief valve port shall be a minimum of 12 inches to a maximum 36 inches above floor level.
- Backside minimum clearance of 12 inches with a front side minimum clearance of 24 inches.
- Additionally, the device must be installed at a location where any leakage from the pressure differential relief valve port will be noticed.
- Shall not be subjected to flooding, excessive heat, or freezing or be installed in a meter pit.

Reduced Pressure Principle Backflow

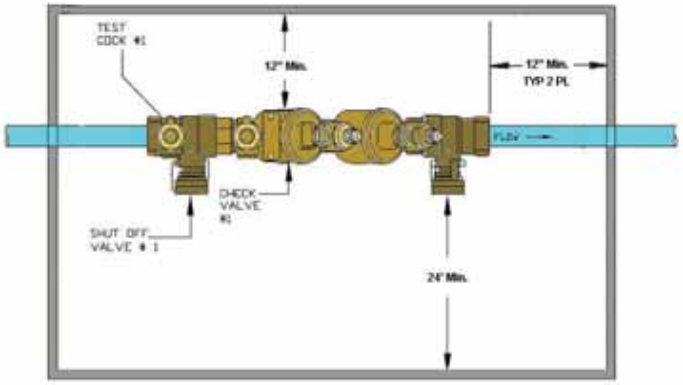
RP Install



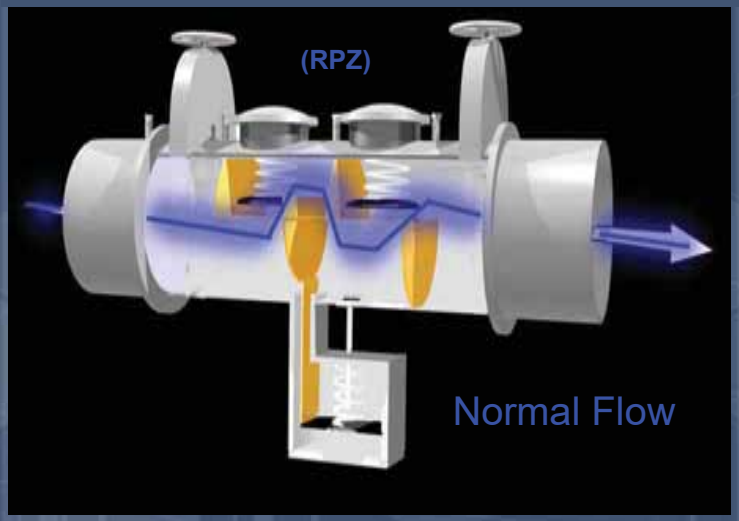
NOTE: SHALL NOT BE INSTALLED IN A METER PIT

Reduced Pressure Principle Backflow

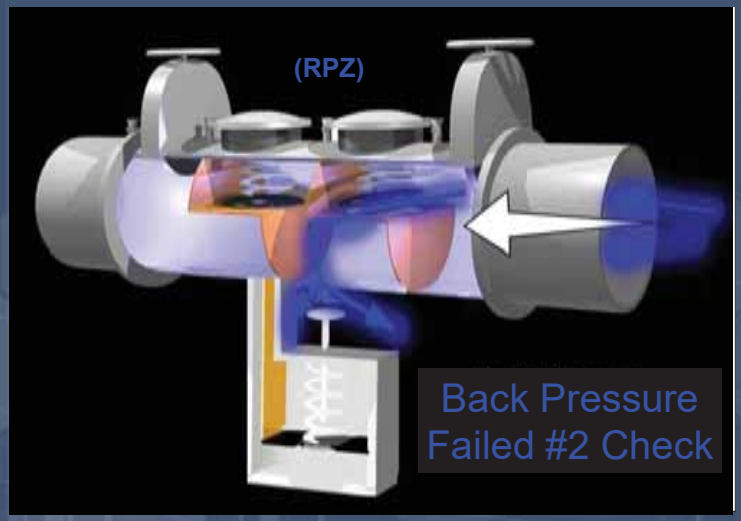
RP Side Clearance Install



Reduced Pressure Principle Backflow



Reduced Pressure Principle Backflow



14
2

Shut Off Valves

Shut Off Valves

14
3

Shut Off Valves

Ball Valve

14
4

Shut Off Valves

Non Rising Stem
NRS

145

Shut Off Valves

Outside Screw and Yoke
OS&Y

Outside Screw and Yoke (OS & Y). used mainly in fire prevention.

146

Shut Off Valves

Butterfly Valves
BFG

147

Valves Configurations

"N" pattern installations

148

Valves Configurations

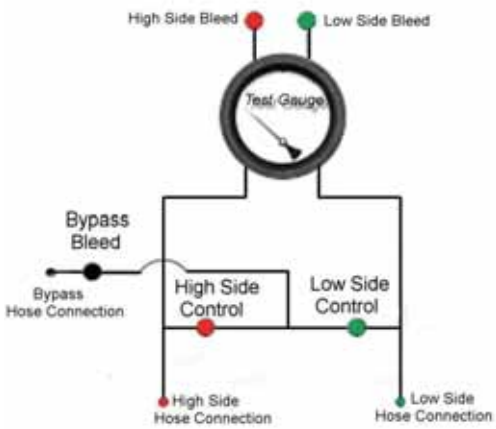
"Z" pattern installations

Valves Configurations

Requires Measurements be Traceable to N.I.S.T.

Test Gauge

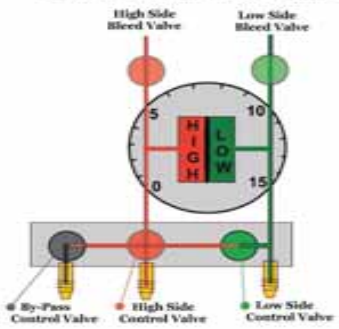
5 Valve Backflow Test Kit



Test Gauge

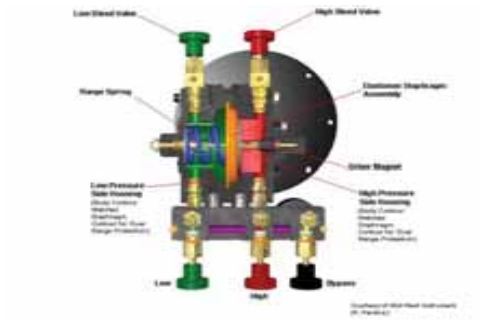
5 Valve Backflow

5 Valves Pressure Differential Gauge



Test Gauge

Requirements for Calibration of Backflow Test Gauge



Definition of N.I.S.T Traceability

Traceability requires the establishment of **an unbroken chain of comparisons to stated references.** NIST assures the traceability of results of measurements or values of standards that NIST itself provides.

Test Gauge Accessory

Backflow Gauge Accessories

90 Degree

Straight

154

Test Gauge Accessory

Test Cock Cleaner

155

Test Kit Gauge Care

Hose Inline Filter

156

Test Kit Gauge Care

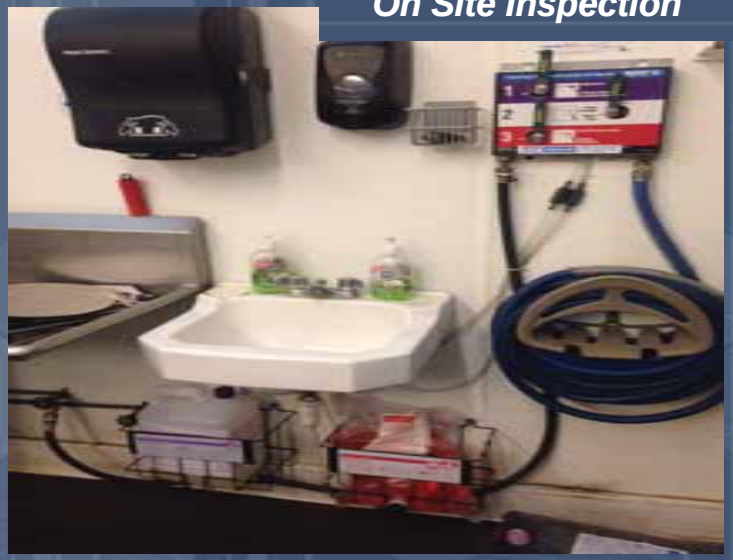
Backflow Assembly Test Kit Care

1. Always bleed water from gauges when finished testing
2. Leave all needle valves open
3. When gauge must be subjected to cold weather, blow compressed air alternately into high and low hoses with bleed valves open
4. Install filters on all hoses and clean filters frequently. The majority of internal gauge damage is caused by debris inside the test gauge
5. Periodically flush hoses and filters
6. Handle gauges with care, a test gauge is a precision instrument and can be damaged by rough treatment
7. DO NOT OVER TIGHTEN NEEDLE VALVES WHEN CLOSING

On Site Inspection

On site inspections
Customer Cross Connection Evaluations

On Site Inspection



On Site Inspection

On Site Inspection

On Site Inspection

On Site Inspection

On Site Inspection

On Site Inspection

165

On Site Inspection

Common cross connections found in commercial businesses.

Notice the air gap has been eliminated with a Y connection to a soap dispenser.

166

On Site Inspection

On Site Inspection

On Site Inspection

On Site Inspection

On Site Inspection

On Site Inspection

On Site Inspection

On Site Inspection

Has an audible alarm with no backflow assembly.

On Site Inspection

On Site Inspection

Direct cross connection with fire Hydrant

On Site Inspection

Direct cross connection with fire Hydrant

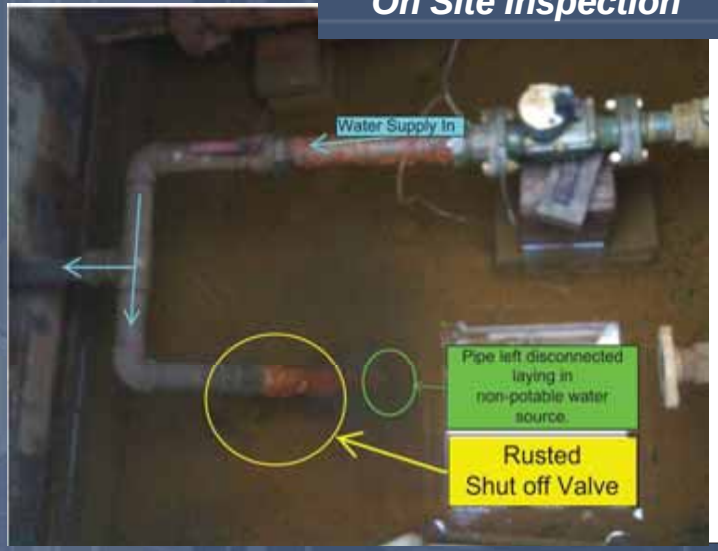
On Site Inspection

Direct cross connection with fire Hydrant

On Site Inspection

RP in a Pit

On Site Inspection



On Site Inspection

181

On Site Inspection

182

On Site Inspection

183

On Site Inspection

184

On Site Inspection

185

On Site Inspection

186

On Site Inspection

187

On Site Inspection

188

On Site Inspection

189

On Site Inspection

190

On Site Inspection

191

On Site Inspection

192

On Site Inspection

Rocks in first check

On Site Inspection

On Site Inspection

On Site Inspection

Backflow Assembly

On Site Inspection

Backflow Assembly

197

On Site Inspection

Backflow Assembly

198

On Site Inspection

Backflow Assembly

199

On Site Inspection

Find the backflow assembly?

200

On Site Inspection

Backflow Assembly

201

On Site Inspection

Well Water Mixing with City Water

202

On Site Inspection

Indirect Cross Connections

Waste Barrel Drums

- Any type of hazardous contaminate could be in this 55 gallon drum.

Kids Pools

- **Fecal matter**
- **Urine**
- **contaminates tracked in from children's feet**

203

On Site Inspection

Funeral Homes and Morgues

Arterial embalming is begun by injecting embalming fluid into an artery while the blood is drained from a nearby vein or from the heart. The two gallons or so needed is usually a mixture of formaldehyde or other chemical and water. Once the embalming fluid begins to flow into the arterial system, pressure begins to build up in the entire vascular system. This helps the fluid reach all parts of the body and penetrate into the tissues.

204

On Site Inspection

Healthcare & Medical Facilities

Bedpan Washer

Bedpan washers can also be used for washing and disinfecting urine bottles, wash bowls and small quantities of utensils for treatment of wounds.

Dialysis Machine have plastic jugs hold the liquids used to mix the dialysate. The machine mixes the dialysate, which is made up of an acidified solution, bicarbonate and purified water. Dialysate containing unwanted waste products and excess electrolytes leave the dialyzer and are washed down the drain.

Dialysis Machine

Terrorism Protection

Backflow Protection Safety

UNCLASSIFIED//FOR OFFICIAL USE ONLY

ROLL CALL RELEASE

In Collaboration with the ITACG

13 October 2011

(U//FOUO) Backpressure Contamination of Water Distribution Systems: A Potential Terrorist Tactic

(U//FOUO) Backpressure, the reverse flow of contaminated water into a potable water distribution system, has the potential to affect the public health of a community by using residential, commercial, or industrial connections in water distribution systems as a pathway for contamination. A water contamination incident using an effective contaminant and delivery method would cause immediate public health effects, require costly cleanup, and cause lasting economic and psychological impact. The amount of toxicity depends on many factors, including the type of contaminant, dilution and solubility of the contaminant, and the proximity of the consumer to the point of entry.

(U//FOUO) Over the last decade, violent extremists have expressed aspirational interest in contaminating unspecified water supplies, and as recently as July 2011 specifically raised backpressure as a means of contamination. Minimal technical expertise or equipment is needed to introduce contaminants into the water system, and general information on backpressure processes is available to the public.

Terrorism Protection

What to Look for?

(U) Potential Indicators of Contamination

(U//FOUO) Physical Indicators:

- (U//FOUO) Suspicious opening of or tampering with water distribution infrastructure (e.g., signs of forced entry or broken locks).
- (U//FOUO) A vehicle other than a fire truck hooked up to a fire hydrant or other access point to water pipes where the individual is not in possession of a permit.
- (U//FOUO) Signs of obvious tampering with water pipes in commercial buildings, especially in lower levels or stairwells.
- (U//FOUO) Water discoloration, unusual taste, objectionable odor, or decline in water quality.

(U//FOUO) Medical Indicators:

- (U//FOUO) Burning of the esophagus and respiratory symptoms associated with water consumption.

(U//FOUO) We encourage reporting of suspicious activity to appropriate authorities and encourage our homeland security, military, law enforcement, first responder, and private sector partners to remain vigilant.

Boil Water

Boil Water Advisories are Reactive

Whenever the pressure drops in a plumbing system, there is a possibility contamination will enter drinking water systems by means of backflow. Per IDEM rules water utilities are required to issue a boil water advisory and notify customers that a potential water contamination incident occurred. A Boiled Water Advisor is REATIVE to a potential contamination event. The delay that happens before customers are notified allows people to drink contaminated water. Installed Backflow Preventers inspected annually, maintained and tested are proactive means of stopping hazards from entering drinking water systems regardless of downstream pressures.

Boil Water

Boil Water Advisory Requirements

"Public notification of drinking water violations" requires PN (TV, radio, newspaper, posting - depending on the size of the user base - etc…) by the PWS to all its affected customers for all violations of drinking water regulations. There are three (3) tiers of requirements based on the severity of the violation. Tier 1 is the tier to which this document applies. Tier 1 PN is based on:

1. A violation of the maximum contaminant level (MCL) for total coliform when fecal coliform or
E. coli are present;
2. Failure to test for fecal coliform or E. coli when any repeat sample tests positive for coliform;
3. A violation of MCL for nitrate;
4. A violation of maximum allowable turbidity limit;
5. An occurrence of a waterborne disease outbreak; or
6. Other violation or situation with significant potential to have adverse effects on human health as a
result of short term exposure, such as water pressure drop or confirmed total coliform.

The Provider of Water Service has 24 hours to notify all customers of all Tier 1 PN

Boil Water

Violations Summary for Ohio Public Water Supplies

The Safe Drinking Water Act and the Ohio Public Water Supply Supervision Program mandate the monitoring and reporting of various bacteriological and chemical contaminants found in drinking water.

PWS Category Type	Number of PWSs per Category
Community (Comm)	1,443
Non-transient Non-community (NTNC)	1,131
Transient Non-community (TNC)	1,561
Total	4,135

Total of 71 Violations for Contamination

SOURCE: Indiana Department of Environmental Management 2012 Annual Compliance Report for Indiana Public Water Supply Systems

Backflow Reponses Plan

Backflow Incident Response Plan

- Quick response by personnel trained in cross-connection control and basic water quality is necessary for the success of any investigation of a backflow incident and prevention of further contamination.

- Know your safety response plan for a backflow contamination incident before one occurs. A timely response to a backflow contamination incident can eliminate of lessen the harm to people.

Backflow Reponses Plan

Who should you call?

- Contact the local operations supervisor without delay if you suspect any suspicious activity.
- Be prepared in advance by keeping the operation supervisor's contact information readily available or dial 911 for emergencies.
- Notify your Water Quality Supervisor immediately and the Cross Connection Control department if you suspect a backflow incident.

Backflow Reponses Plan

Safety aspects to look for at facilities.

- Is the backflow preventer commensurate protection against the assessed degree of hazard?
- Review of chemical signs and the MSDS (Material Safety Data Sheets) will help in determining the degrees of hazard.

Backflow Reponses Plan

Working safely to conduct backflow testing

- Be sure to get permission before shutting off water to test any backflow preventer.

Backflow Reponses Plan

Working safely to conduct backflow testing
(Continued)

- Use safety equipment when needed, such as a hard hat, safety glasses, ear protection, a flashlight, safety harness, etc….
- Follow safety guidelines if using ladder or personnel lifting equipment.

Confined Space

Working safely to conduct backflow testing
(Continued)

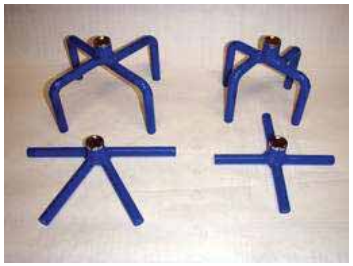
- Many backflow-prevention assemblies are installed in hazardous locations, particularly old assemblies where confined space requirements may need to be followed. Get training in confined space requirements and procedures.

YOUR LIFE AND OTHERS DEPEND ON IT !

Tools

Conducting backflow repairs safely

Repair of a backflow-prevention assemblies often requires special tools. Use of the wrong tool may result in injuries to the worker or damage to the backflow prevention assembly.



Pinch Zones

Conducting backflow repairs safely (Continued)

•Backflow preventers have places with razor sharp corners and you need to be careful not to cut yourself.

•Valves are under spring pressure and you should never place fingers in a pinch zone between the valve and the valve seat.

Cross Contamination

Conducting backflow repairs safely (Continued)

- Do not use any cleaning substances or chemicals inside of the assembly that will be washed into the potable water system when the assembly is placed back into service.

- Lock out and tag out any backflow assembly if repairs can not be accomplished right away. Failed backflow preventers are cross connection and must be taken out of service.

OEM Parts Only

Original equipment repair parts

- The original manufacturer may no longer produce repair parts for some older assemblies. In these cases, the assembly must be replaced.
- When replacing an existing assembly with a new one, it may be necessary to survey the application to ensure that the proper type of backflow prevention assembly is installed for the application.

Slips and Falls

When you're finished testing or repairing a backflow device

- Mop up water on the floor to prevent slips and falls.
- Remove any lock out tags
- Contact the facility users and **get permission before restoring water to the service line** where the backflow preventer is installed.

- Double check all shut off valves to ensure they are in the OPEN position and that the backflow device is not leaking water before leaving the area.

Testing

Pre-test Requirements

Before beginning the field test procedures on all backflow assemblies the tester must;

- **Notify** the owner of their intention to test the assembly
- **Identify** the assembly as the proper assembly to be tested
- **Inspect** the assembly for required components needed to complete the test
- **Observe** the assembly for any indication the assembly is not functioning proper

Testing

Pre-test Requirements

The backflow assembly tester must observe all safety procedures during the field test and maintenance of the backflow assembly. Safety procedures may include such things as, but not limited to;

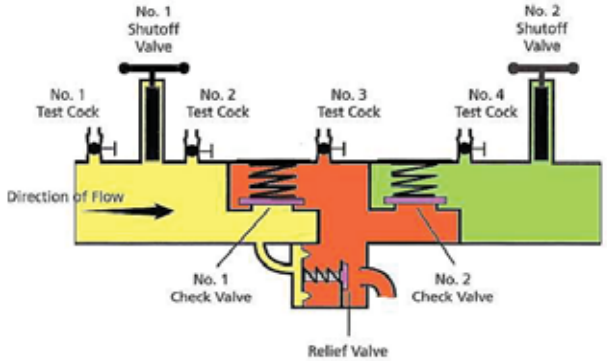
- Confined space
- Electrical hazards
- Personal safety
- Pedestrian and vehicular traffic
- Tools

The tester must inspect the condition of his/her test gauge. Visual inspection must include;

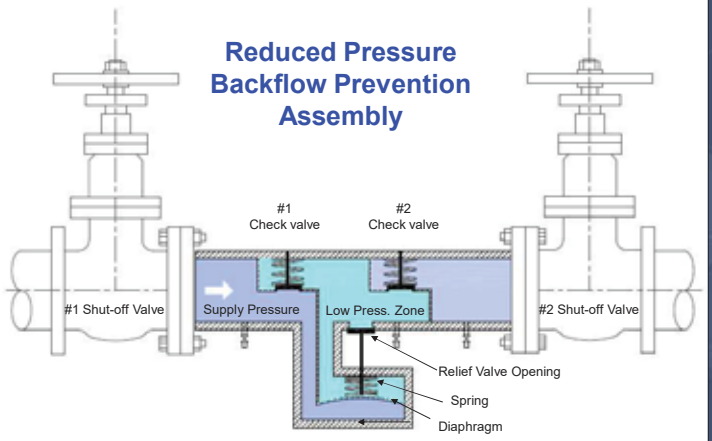
- Calibration is current
- Gauge needle zero out when not pressurized
- Check for gauge leakage
- Drip tight needle valves and fittings
- Damage to gauge or hoses

Testing

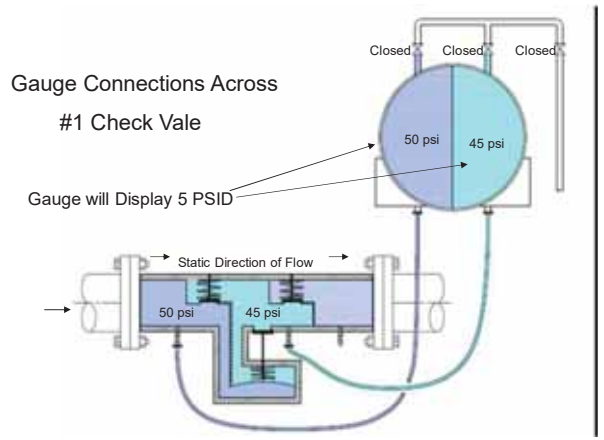
Backflow Pressure Zones RP



Testing

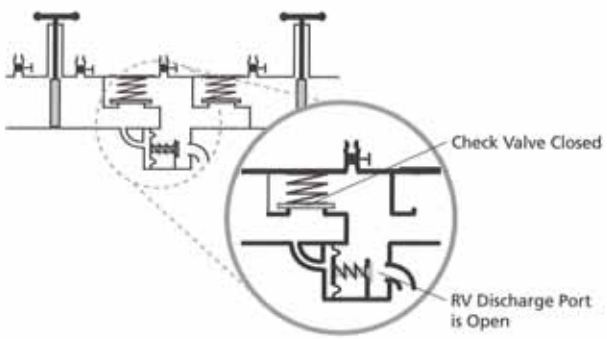


Testing



Testing

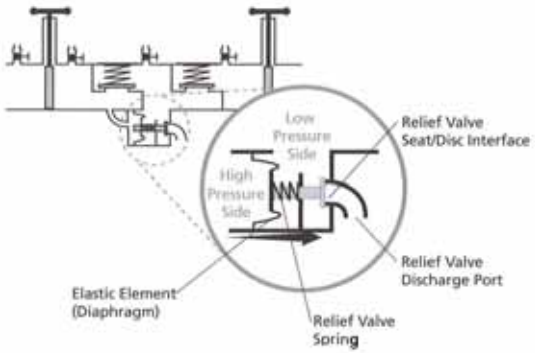
Reduced Pressure Principle backflow Assembly



Assume an assembly has been installed in a piping system and is ready to be filled and pressurized with water. With no pressure in the assembly the No.1 check valve is closed and the relief valve is open.

Testing

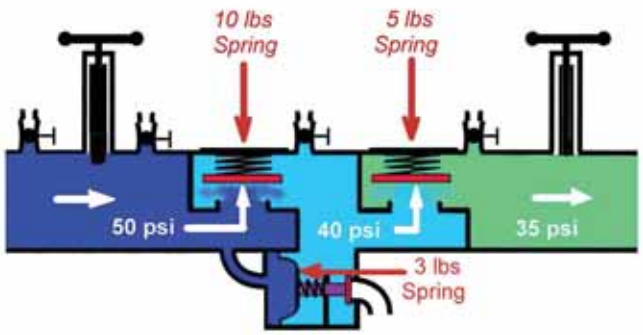
Reduced Pressure Principle backflow Assembly



The relief valve is mechanically independent and hydraulically dependent upon the differential pressure across the No.1 check valve. It is designed to keep pressure between the check valves at least 2.0 psi less than the upstream pressure.

Testing

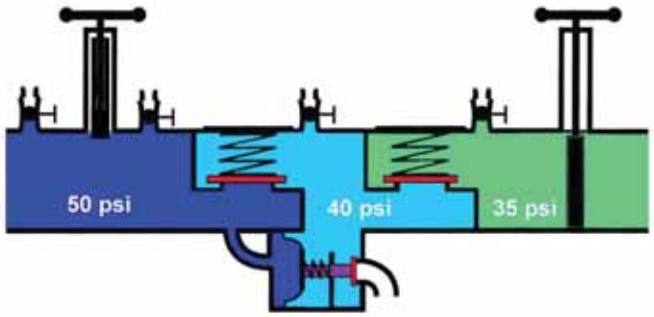
Reduced Pressure Principle backflow Assembly



The water is in a dynamic (flowing) condition. The No.1 and No.2 check valves are open while the relief valve remains closed

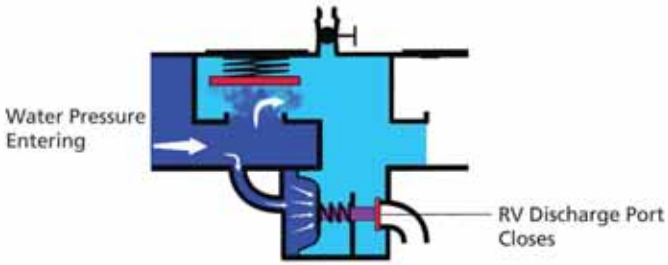
Testing

Reduced Pressure Principle backflow Assembly



Testing

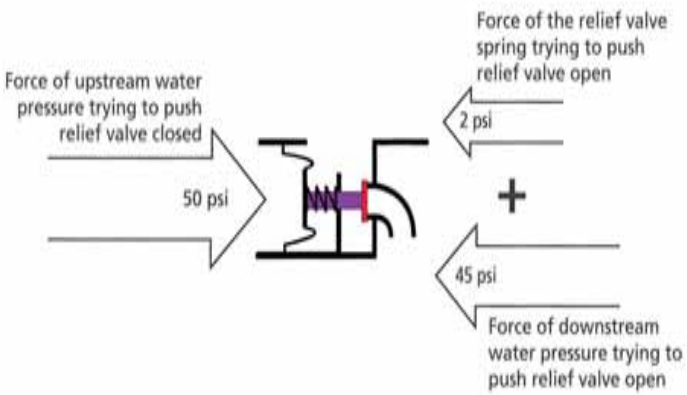
Reduced Pressure Principle backflow Assembly



The forces acting on the low pressure side is the water pressure from the chamber between the two check valves plus the force of the relief valve spring.

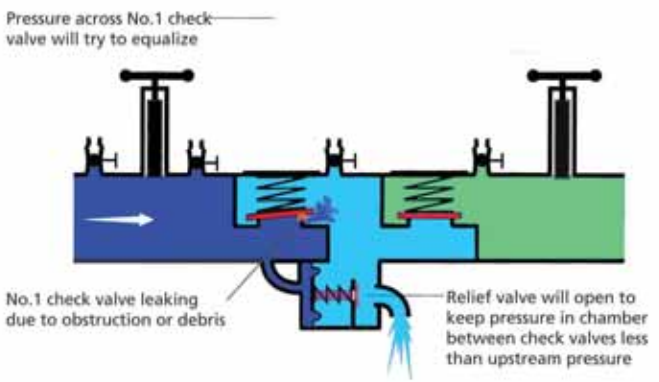
Testing

Reduced Pressure Principle backflow Assembly



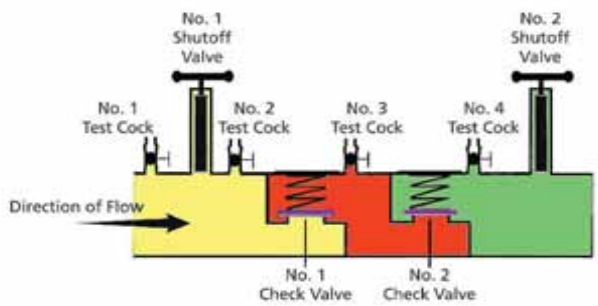
Testing

Reduced Pressure Principle backflow Assembly



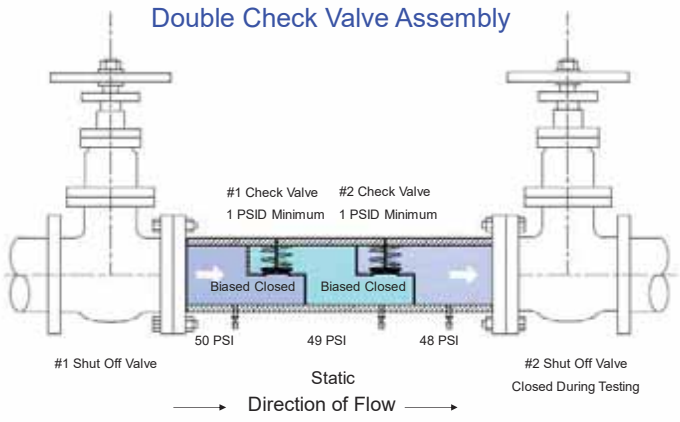
Testing

Backflow Pressure Zones DC



Testing

Double Check Valve Assembly



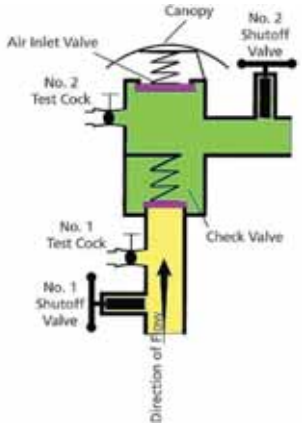
23
5

Testing

Gauge Connection to Determine Check Valve Loading

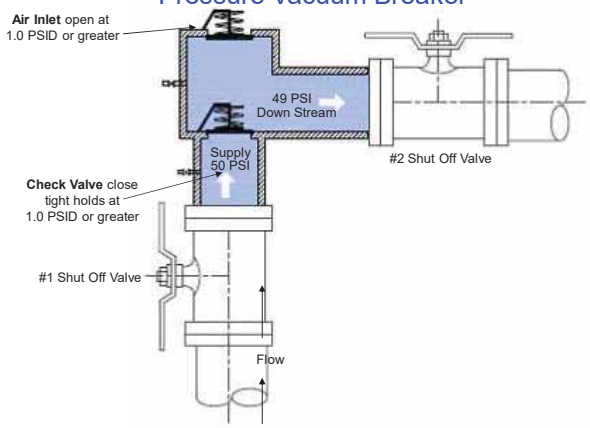
Testing

Backflow Pressure Zones PVB



Testing

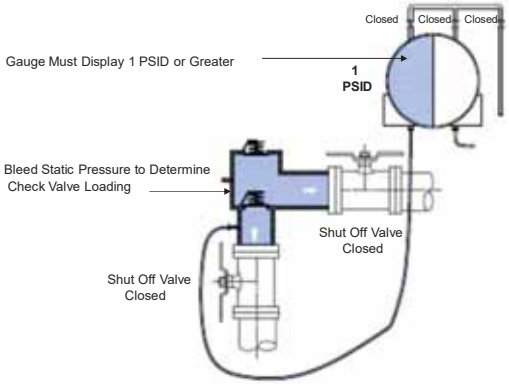
Pressure Vacuum Breaker



23

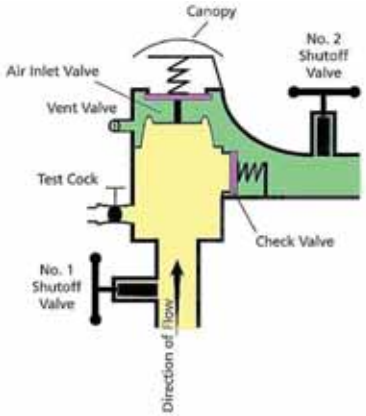
Testing

Gauge Connection to Determine Check Valve Loading



Testing

Backflow Pressure Zones SVB



Tester Requirements

Backflow Testers

- ✓ The course consists of a combined total of 24 hours of training in the classroom and the hands-on test lab.
- ✓ OHIO DEPARTMENT OF COMMERCE BACKFLOW PREVENTION MANUAL is used as an instructional aid for the classroom portion of the course.
- ✓ Your Instructor will conduct the hands-on portion of the course in the test lab
- ✓ You will be required to attend a Re-certification Course every three years to remain current, however you may attend the re-certification course more frequently if desired to remain current on testing requirements and procedures
- ✓ Your identification card will indicate the date that your certification expires or you can check the date on the Internet at www.com.state.oh.us.
- ✓ It is extremely important that a tester remember that after their expiration date they CANNOT test devices until they have taken a recertification course. Certified testers who have expired have a grace period in which they can attend a recertification class and bring their certification into active status.

THE END

TEST GAUGE INC.

Backflow Made Easy @ SHOPBACKFLOW.COM

Contact :

James@testgauge.com

877-353-4386

File Attachments for Item:

ER-9 2017 OBC Chapter 10 Round Table (MBBOC)

Commercial certifications (except plumbing), RBO (1 hour)

Staff Notes:

Committee Recommendation:

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: Derek Spurling (Contact Name) Cert #: 1409

Organization: Miami Valley Building Officials Council (MVBOC) (Organization/Company)

Address: 100 W. Spring Valley Rd. (Include Room Number, Suite, etc.)

City: Centerville State: Ohio Zip: 45458

E-Mail: dspurling@centervilleohio.gov

Telephone: 937-428-4786 Fax:

Course Sponsor: MVBOC

COURSE INFORMATION:

Course Title: 2017 OBC - Chapter 10 Means of Egress

New Course Submittal: [x] Update Course: [ ] Prior Approval Number:

Purpose and Objective: Provide an overview and refresher of sections within the chapter.

Number of Instructional Contact Hours that can be obtained upon completion: 1

If Multi-Session, Number of Instructional Contact Hours Per Session:

Program Applicable for the Following Participants:

Building Official [x] Master Plans Examiner [x] Building Inspector [x] Fire Protection Inspector [x] Mechanical Inspector [x]

Building Plans Exam. [x] Plumbing Inspector [ ]

Plumbing Plans Exam. [ ] Non-Res IU Inspector [ ]

Electrical Plans Exam. [x]

Mechanical Plans Exam. [x]

Fire Protect. Plans Exam. [x]

Res Building Official [x] Res Plans Examiner [ ] Res Building Inspector [ ] Res Mechanical Inspector [ ] Res IU Inspector [ ]

Electrical Safety Inspectors [x]

Location of ESI Course: Date(s) of ESI Course(s):

SUBMITTAL CHECKLIST: Make Sure all of the Following Information is Submitted:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	
	Organization sponsoring or requesting the program (if any)	
Course Title:	Name of course (related to content)	
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	
Test Materials:		
Completed Application:		

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

Miami Valley Building Officials Council

Derek Spurling, President. 100 W. Spring Valley Rd. Centerville. Ohio 45458
www.mvboc.org

OFFICERS

Derek Spurling
President
City of Centerville

William Sutter
Vice President
WTFD

Derek Spurling
Secretary
City of Centerville

Dan Fitzpatrick
Treasurer
City of Springboro

Board of Directors

Scott Young
NIC

Larry Parsons
City of Springboro

Aaron Morrison
City of Piqua

Brandon Gill
City of Springfield

Bryan Parker
Champaign County
Past President

2017 OBC – Chapter 10 Means of Egress

1 hour overview

- Section 1006 – Number of Exits & Exit Access Doorways (5-10 min.)
- Section 1008 – Means of Egress Illumination (5-10 min.)
- Section 1010 – Doors, Gates, & Turnstiles (5-10 min.)
- Section 1011 – Stairways (5-10 min.)
- Section 1013 – Exit Signs (5-10 min.)
- Section 1017 – Exit Access Travel Distance (5-10 min.)
- Section 1020 – Corridors (5-10 min.)
- Section 1023 – Interior Exit Stairways & Ramps (5-10 min.)
- Section 1026 – Horizontal Passageways (5-10 min.)
- Section 1027 – Exterior Exit Stairways & Ramps (5-10 min.)

File Attachments for Item:

ER-10 2020 NEC Grounding and Bonding Part 1 (Wink Electric)

EPE, ESI (5 hours)

Staff Notes: No slides: "The syllabus is what I use and hand out in class. I promote discussion with code books out in hand."

ESIAC Recommendation: Received after ESIAC submission.

Committee Recommendation:

APPLICATION
FOR
Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: CLIFF WINKEL (Contact Name)
Organization: WINK ELECTRIC (Organization/Company)
Address: 5640 BROAD (Include Room Number, Suite, etc.)
City: N. RIDGEVILLE State: OH Zip: 44039
E-Mail: WINKELECTRIC@HOTMAIL.COM
Telephone: 440 3464125 Fax:
Course Sponsor:

COURSE INFORMATION:

Course Title: 2020 NEC GROUNDING & BONDING PART I

New Course Submittal: [X] Update Course: [ ] Prior Approval Number:

Purpose and Objective: DISCUSS 2020 NEC GROUNDING AND BONDING DISCUSSION IN AN INTERACTIVE ENVIRONMENT.

Number of Instructional Contact Hours that can be obtained upon completion: 5

If Multi-Session, Number of Instructional Contact Hours Per Session:

Program Applicable for the Following Participants:

Building Official [ ] Master Plans Examiner [ ] Building Inspector [ ] Fire Protection Inspector [ ] Mechanical Inspector [ ]
Building Plans Exam. [ ] Plumbing Inspector [ ]
Plumbing Plans Exam. [ ] Non-Res IU Inspector [ ]
Electrical Plans Exam. [X]
Mechanical Plans Exam. [ ]
Fire Protect. Plans Exam. [ ]

Res Building Official [ ] Res Plans Examiner [ ] Res Building Inspector [ ] Res Mechanical Inspector [ ] Res IU Inspector [ ]

Electrical Safety Inspectors [X]
Location of ESI Course: FIELDS SWEET SCHOOL 5540 BROAD N. RIDGEVILLE OHIO
Date(s) of ESI Course(s): 2/16/22, 3/16/22, 8/16/22, 11/19/22

SUBMITTAL CHECKLIST: **Make Sure** all of the Following Information is **Submitted**:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	
	Organization sponsoring or requesting the program (if any)	
Course Title:	Name of course (related to content)	
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	
Test Materials:		
Completed Application:		

RECEIVED NOV 29 2021 BOARD OF BUILDING STANDARDS

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

Form: 1526

BBS 81

Winkelectric Class Syllabus
2020 Code Grounding and Bonding Part I
5 hour continuing education class

Sunday 2/6/22 9A-2P, Sunday 3/6/22 9A-2P,
Tuesday 8/16/22, Saturday 11/19/22 7A – 12P
Instructor: Clifford Winkel

February/March location: Fields Sweet School 8540 Root Rd North Ridgeville, Ohio 44039

August location: Wink Electric 34400 Lorain Rd North Ridgeville, Ohio 44039

November location: City of Elyria – 1194 Gulf Rd Elyria, Ohio 44035

Office Hours:

Please feel free to call our office at any time if any need arises. Our office hours are Monday through Friday 8am – 4pm. For any immediate issues, you can contact me vie cell phone at 440-346-4125

Course Objectives:

- Review 2020 grounding and bonding codes inside 2020 NEC.
- Apply covered 2020 NEC codes to circumstances in the field with discussion of practical use and actual examples of 2020 NEC applications.
- Use the ability to relate to the changes with the class from an instructor who also works in the field.
- As detailed below, there are certain changes we will be discussing. Due to the amount of changes I wish to cover, we will run a part I and a part II of this course. Both courses will be 5 hours in length to give shorter class time per day. With 5 hour classes, I believe the amount of retention will be higher opposed to a 10 hour class.

Teaching Approach and Methods:

Portions of this course will be taught in the traditional lecture note taking format. However, a large part of the class will involve class discussions, sample illustrations, handouts, and hands on code book participation. All class members will be asked to bring their 2020 NEC book. There will also be preordered 2020 NEC books available for sale on site if any class member does not own one yet. Every hour there will be a ten minute period for open discussion. At the end of the class every applicant will fill out their individual attendance form and it will be signed then, with identification verification.

Schedule of Topics and time schedule

7AM – 8AM

Code	Discussion
General	Discuss any of the following codes pertaining to 2020 NEC code updates. Confirm with class that this will go into effect once 2020 NEC is adopted.

Winkelectric Class Syllabus
2020 Code Grounding and Bonding Part I
5 hour continuing education class

Sunday 2/6/22 9A-2P, Sunday 3/6/22 9A-2P,
Tuesday 8/16/22, Saturday 11/19/22 7A – 12P
Instructor: Clifford Winkel

February/March location: Fields Sweet School 8540 Root Rd North Ridgeville, Ohio 44039

August location: Wink Electric 34400 Lorain Rd North Ridgeville, Ohio 44039

November location: City of Elyria – 1194 Gulf Rd Elyria, Ohio 44035

90.1 (A) Discuss purpose of the NEC the purpose of the code pertaining to qualified and skilled indivuduals opposed to those who are untrained or unqualified.

90.2 Discuss scope of 2020 NEC pertaining to installations.

90.3 Discuss arrangement of articles (chapters) in the code and how they pertain to different installations .

100 Definition: Accessible
Discuss definition and the difference between "readily accessible"

100 Definition: Bonding Conductor or Bonding Jumper.
Go over definition of bonding and the difference between "grounding".

100 Definition: Bonding Jumper, Equipment
Go over definition.

100 Definition: Bonding jumper, Main:
Go over definition of main bonding jumper and its relationship to various articles in the 2020 NEC.

100 Definition: Bonding jumper, supply side
Go over definition.

100 Definition: Bonding Jumper, System
Go over definition and its relationship to the neutral conductor.

100 Definition: Effective ground-fault current path ;
Discuss definition and it's day to day implications.

Winkelectric Class Syllabus
2020 Code Grounding and Bonding Part I
5 hour continuing education class

Sunday 2/6/22 9A-2P, Sunday 3/6/22 9A-2P,
Tuesday 8/16/22, Saturday 11/19/22 7A – 12P
Instructor: Clifford Winkel

February/March location: Fields Sweet School 8540 Root Rd North Ridgeville, Ohio 44039

August location: Wink Electric 34400 Lorain Rd North Ridgeville, Ohio 44039

November location: City of Elyria – 1194 Gulf Rd Elyria, Ohio 44035

8AM – 9AM

100 Definition: Ground fault
Go over definition of ground fault and its relationship to various articles in the 2017 NEC

100 Definition: Grounded (grounding):
Discuss definition.

100 Definition: Grounded system, solidly:
Discuss definition.

100 Definition: Grounded conductor
Go over definition of grounded conductor and its relationship to various articles in the 2020 NEC

100 Definition: Ground fault circuit interrupter (GFCI):
Discuss definition and function.

100 Definition: Grounding conductor, equipment.
Go over definition of equipment grounding conductor and its relationship to various articles in the 2020 NEC

100 Definition: Grounding electrode
Go over definition of grounding electrode and its relationship to various articles in the 2020 NEC

100 Definition: Grounding electrode conductor
Go over definition of grounding electrode conductor and its relationship to various articles in the 2020 NEC

100 Definition: Intersystem bonding termination
Go over definition of intersystem bonding termination and its relationship to various articles in the 2017 NEC

Winkelectric Class Syllabus
2020 Code Grounding and Bonding Part I
5 hour continuing education class

Sunday 2/6/22 9A-2P, Sunday 3/6/22 9A-2P,
Tuesday 8/16/22, Saturday 11/19/22 7A – 12P
Instructor: Clifford Winkel

February/March location: Fields Sweet School 8540 Root Rd North Ridgeville, Ohio 44039

August location: Wink Electric 34400 Lorain Rd North Ridgeville, Ohio 44039

November location: City of Elyria – 1194 Gulf Rd Elyria, Ohio 44035

100 Definition: Neutral conductor
Go over definition of neutral conductor and its relationship to various articles in the 2020 NEC

100 Definition: Neutral point:
Discuss definition with examples.

100 Definition: Separately derived system: Discuss definition determination.

100 Definition: Service equipment:
Discuss definition.

100 Definition: Special permission:
Discuss definition with examples.

110.2 Approval of conductors and eequipment
Discuss AHJ approvals and process.

110.3 Examination, identification, installation, use, and listing of equipment. Discuss new requirements for reconditioned equipment…etc.

110.5 Copper conductors
Discuss this article and the default to copper in the NEC (unless specified)

110.7 Wiring Integrity
Discuss installation expectations relating to ground faults and wiring integrity.

110.11 Deteriorating agents – Discuss definition and implications to new sections of code.

Winkelectric Class Syllabus
2020 Code Grounding and Bonding Part I
5 hour continuing education class

Sunday 2/6/22 9A-2P, Sunday 3/6/22 9A-2P,
Tuesday 8/16/22, Saturday 11/19/22 7A – 12P
Instructor: Clifford Winkel

February/March location: Fields Sweet School 8540 Root Rd North Ridgeville, Ohio 44039

August location: Wink Electric 34400 Lorain Rd North Ridgeville, Ohio 44039

November location: City of Elyria – 1194 Gulf Rd Elyria, Ohio 44035

110.12 Mechanical execution of work
Discuss what neat and workmanship manner implies

110.14 Conductor termination and splicing. Discuss different splicing techniques and new code requiring torquing (110.14D).

9AM – 10AM

250.4 (A) 1-5 Performance requirements for grounding and bonding
Discuss system grounding/bonding necessity and the importance of using the shortest path as practical. (1-5).

250.4 (B) 1-4 Ungrounded systems – Discuss requirements for ungrounded systems.

250.6 A-C Objectionable current.
Discuss definition and how to avoid and protect against objectionable current. Utilize various examples and diagrams.

250.8 Termination of grounding and bonding conductors.
Discuss approved attachment methods for grounding and bonding.

250.10 Protection of fittings
Discuss fitting protection along with approved methods.

250.12 Clean surfaces
Discuss non conductive material removal for grounding/bonding terminations.

250.20 A and B Systems to be grounded
Discuss difference in required systems to be grounded.

Winkelectric Class Syllabus
2020 Code Grounding and Bonding Part I
5 hour continuing education class

Sunday 2/6/22 9A-2P, Sunday 3/6/22 9A-2P,
Tuesday 8/16/22, Saturday 11/19/22 7A – 12P
Instructor: Clifford Winkel

February/March location: Fields Sweet School 8540 Root Rd North Ridgeville, Ohio 44039

August location: Wink Electric 34400 Lorain Rd North Ridgeville, Ohio 44039

November location: City of Elyria – 1194 Gulf Rd Elyria, Ohio 44035

10AM – 10:15 BREAK

10:15AM – 11:15AM

250.21 C - AC Systems of 50 Volts to 1000 Volts not required to be grounded.
Discuss requirements of systems not required to be grounded.

250.22 Circuits not to be grounded
Discuss various circuits not to be grounded.

250.24(A) 1, 4, 5 Service equipment grounding and bonding discussion.

250.24 (B) Main bonding jumper: Discuss main bonding jumper requirements.

250.24 (C)(1) Discuss service neutral sizing.

250.24 (C)(2) Discuss neutral sizing in parallel

250.24 (D) Grounding electrode conductor. Discuss sizing and requirements.

250.25 Grounding system permitted to be connected on the supply side of disconnect.
Discuss (A) and (B) and what is allowed to be connected.

250.28 (C) Discuss main system bonding jumper attachment.

250.28 (D) Discuss main system bonding jumper sizing requirements.

250.30(A)(4) and (A)(5) Grounding separately derived AC systems.
Discuss code pertaining to the grounding electrode preferences.

250.30(A)(6) Common GEC
Discuss code for common grounding electrode conductors.

250.30(A)(8) Bonding
Discuss structural steel and metal piping for separately derived systems.

11:15AM – 12:15PM

250.32 Buildings or structures supplied by feeder or branch circuit.
Discuss grounding electrode and equipment grounding requirements for these buildings or structures.

250.34 Generators portable and generator mounted.
Discuss requirements for these generator services.

250.35 Permanently installed generators
Discuss requirements for these generator installations.

250.50 Grounding electrode systems
Discuss grounding electrode system requirements with specific examples.

250.52 Grounding electrode types.
Discuss different grounding electrode system types and definitions
.

Winkelectric Class Syllabus
2020 Code Grounding and Bonding Part I
5 hour continuing education class

Sunday 2/6/22 9A-2P, Sunday 3/6/22 9A-2P,
Tuesday 8/16/22, Saturday 11/19/22 7A – 12P
Instructor: Clifford Winkel

February/March location: Fields Sweet School 8540 Root Rd North Ridgeville, Ohio 44039

August location: Wink Electric 34400 Lorain Rd North Ridgeville, Ohio 44039

November location: City of Elyria – 1194 Gulf Rd Elyria, Ohio 44035

250.53 Grounding electrode installation requirements.

250.54 Auxilliary Grounding Electrodes
Discuss allowing additional grounding electrodes for items such as light poles.

250.58 Common grounding electrode
Discuss requirements.

250.60 Lightning protection electrode
Discuss lightning electrode and distinction between grounding electrodes.

250.62 Grounding electrode conductor discuss

250.64 Discuss general requirements for grounding electrode conductors. Aluminum and aluminum clad conductors revised.

250.66 Sizing grounding electrode conductor requirements. Discuss connections to rods, pipes, rings and concrete cased electrodes. Grounding electrode conductor installation requirements

250.68 Grounding Electrode Conductor and Bonding Jumper Connection to Grounding Electrodes.
Discuss grounding electrode conductor connections.

250.70 Grounding electrode conductor termination fittings
Discuss fitting requirements.

250.80 Grounding enclosure, raceway, and service cable connections

250.86 Other enclosures
Discuss grounding requirements for systems 50V or less.

Winkelectric Class Syllabus
2020 Code Grounding and Bonding Part I
5 hour continuing education class

Sunday 2/6/22 9A-2P, Sunday 3/6/22 9A-2P,
Tuesday 8/16/22, Saturday 11/19/22 7A – 12P
Instructor: Clifford Winkel

February/March location: Fields Sweet School 8540 Root Rd North Ridgeville, Ohio 44039

August location: Wink Electric 34400 Lorain Rd North Ridgeville, Ohio 44039

November location: City of Elyria – 1194 Gulf Rd Elyria, Ohio 44035

250.92 (A)(B) Bonding equipment for services discussion.

250.94 (A)(B) Bonding communication systems discuss bonding these types of systems.

250.96 Bonding Other Enclosures.
Discuss Effective Ground Fault Current Path for Other Enclosures.

250.97 Bonding metal parts containing 277v and 480v circuits
Discuss other bonding requirements for these systems.

250.98 Bonding loosely jointed metal raceways
Discuss bonding jumper requirements of this section.

820.93 Grounding of the outer conductive shield of coaxial cable requirements.

820.100 Continue requirements of conductive shield requirements of coaxial cable requirements.

Clifford Winkel
5640 Broad Blvd.
North Ridgeville, Ohio 44039
440-346-4125
winkelectric@hotmail.com

BIO

Hello, my name is Cliff Winkel and I am an electrical contractor operating out of North Ridgeville, Ohio. I have been an electrician since 1990 beginning with simple house remodels and rewiring working for various companies. In 1997 I started working for an outfit out of Cleveland, Ohio which dealt with commercial, residential, and industrial applications. In 2000 I applied, tested, passed, and received my Ohio Electrical Contractor's License (#23838) and started my own business, Winkelectric. In 2004 I applied, tested, passed and received my Ohio Electrical Safety Inspector's License (#1862). In 2005 I applied for, and received my Approved Training Agency License (#517). I also am licensed as a fire alarm contractor and am entry level NABCEP certified in photovoltaic installations. I also currently have a NICET level III fire alarm certification. In 2005, 2009 - 2020 I taught OCLIB electrical continuing education classes for electrical contractors (focused on 2005 2008 2011 and 2014/2017/2020 code changes and grounding). From 2000 to current I am continuing work as an electrical contractor. Some of the projects I have been involved in projects including residential buildings, commercial shopping centers, cellular tower land sites, and industrial high voltage maintenance and testing work. I have been registered and operated in numerous municipalities throughout Ohio.

Clifford Winkel

Winkelectric
11/24/21

File Attachments for Item:

ER-11 2020 NEC Grounding and Bonding Part 2 (Wink Electric)

EPE, ESI (5 hours)

Staff Notes: No slides: "The syllabus is what I use and hand out in class. I promote discussion with code books out in hand."

ESIAC Recommendation: Received after ESIAC submission.

Committee Recommendation:

APPLICATION
FOR
Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: CLIFF WINKEL (Contact Name)
Organization: WINK ELECTRIC (Organization/Company)
Address: 5640 BROAD (Include Room Number, Suite, etc.)
City: N. RIDGEVILLE State: OH Zip: 44039
E-Mail: WINKELECTRIC@HOTMAIL.COM
Telephone: 440 346 4125 Fax:
Course Sponsor:

COURSE INFORMATION:

Course Title: 2020 NEC GROUNDING & BONDING PART II

New Course Submittal: ☒ Update Course: ☐ Prior Approval Number:

Purpose and Objective: DISCUSS 2020 NEC GROUNDING & BONDING DISCUSSION IN AN INTERACTIVE ENVIRONMENT.

Number of Instructional Contact Hours that can be obtained upon completion: 5

If Multi-Session, Number of Instructional Contact Hours Per Session:

Program Applicable for the Following Participants:

Building Official ☐ Master Plans Examiner ☐ Building Inspector ☐ Fire Protection Inspector ☐ Mechanical Inspector ☐
Building Plans Exam. ☐ Plumbing Inspector ☐
Plumbing Plans Exam. ☐ Non-Res IU Inspector ☐
Electrical Plans Exam. ☒
Mechanical Plans Exam. ☐
Fire Protect. Plans Exam. ☐

RECEIVED
NOV 29 2021
BOARD OF BUILDING STANDARDS

Res Building Official ☐ Res Plans Examiner ☐ Res Building Inspector ☐ Res Mechanical Inspector ☐ Res IU Inspector ☐

Electrical Safety Inspectors ☒
Location of ESI Course: FIELDS SWEET SCHOOL 5540 ROOT N. RIDGEVILLE OHIO
Date(s) of ESI Course(s): 2/13/22, 3/13/22, 8/23/22 11/19/22

SUBMITTAL CHECKLIST: **Make Sure** all of the Following Information is **Submitted**:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	
	Organization sponsoring or requesting the program (if any)	
Course Title:	Name of course (related to content)	
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	
Test Materials:		
Completed Application:		

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

Winkelectric Class Syllabus
2020 Code Grounding and Bonding Part II
5 hour continuing education class

Sunday 2/13/22 9A-2P, Sunday 3/13/22 9A-2P,
Tuesday 8/23/22, Saturday 11/19/22 1P – 6P
Instructor: Clifford Winkel

February/March location: Fields Sweet School 8540 Root Rd North Ridgeville, Ohio 44039

August location: Wink Electric 34400 Lorain Rd North Ridgeville, Ohio 44039

November location: City of Elyria – 1194 Gulf Rd Elyria, Ohio 44035

Office Hours:

Please feel free to call our office at any time if any need arises. Our office hours are Monday through Friday 8am – 4pm. For any immediate issues, you can contact me vie cell phone at 440-346-4125

Course Objectives:

- Review 2020 grounding and bonding codes inside 2020 NEC.
- Apply covered 2020 NEC codes to circumstances in the field with discussion of practical use and actual examples of 2020 NEC applications.
- Use the ability to relate to the changes with the class from an instructor who also works in the field.
- As detailed below, there are certain changes we will be discussing. Due to the amount of changes I wish to cover, we will run a part I and a part II of this course. Both courses will be 5 hours in length to give shorter class time per day. With 5 hour classes, I believe the amount of retention will be higher opposed to a 10 hour class.

Teaching Approach and Methods:

Portions of this course will be taught in the traditional lecture note taking format. However, a large part of the class will involve class discussions, sample illustrations, handouts, and hands on code book participation. All class members will be asked to bring their 2020 NEC book. There will also be preordered 2020 NEC books available for sale on site if any class member does not own one yet. Every hour there will be a ten minute period for open discussion. At the end of the class every applicant will fill out their individual attendance form and it will be signed then, with identification verification.

Schedule of Topics and time schedule

7AM – 8AM

Code	Discussion
General	Discuss any of the following codes pertaining to 2020 NEC code updates. Confirm with class that this will go into effect once 2020 NEC is adopted.

Winkelectric Class Syllabus
2020 Code Grounding and Bonding Part II
5 hour continuing education class

Sunday 2/13/22 9A-2P, Sunday 3/13/22 9A-2P,
Tuesday 8/23/22, Saturday 11/19/22 1P – 6P
Instructor: Clifford Winkel

February/March location: Fields Sweet School 8540 Root Rd North Ridgeville, Ohio 44039

August location: Wink Electric 34400 Lorain Rd North Ridgeville, Ohio 44039

November location: City of Elyria – 1194 Gulf Rd Elyria, Ohio 44035

250.102 (C) thru (E) Bonding conductors and jumpers
Discuss load side bonding materials and sizing requirements.

250.104 Bonding of piping systems and exposed structural metal
Discuss this article.

250.106 Lighting protection system
Discuss integration of the lightning protection system to the Grounding electrode system.

250.109 Metal Enclosures
Discuss new article allowing enclosures to be used for continuity.

250.110 Fixed equipment connected by permanent wiring methods
Discuss requirements of bonding materials to the equipment grounding conductor.

250.112 Specific equipment fastened in place or connected to permanent wiring methods.
Discuss requirements of bonding materials to the equipment grounding conductor.

250.114 Cord & plug connected equipment requirements.

250.118 Discuss types of equipment grounding conductors including details on conduit types. Clarification of GEC applications.

250.119 Identification of equipment grounding conductors
Discuss identification in relation to wire size and type.

250.120 Equipment grounding conductor installation
Discuss equipment grounding conductor installation requirements.

Winkelectric Class Syllabus
2020 Code Grounding and Bonding Part II
5 hour continuing education class

Sunday 2/13/22 9A-2P, Sunday 3/13/22 9A-2P,
Tuesday 8/23/22, Saturday 11/19/22 1P – 6P
Instructor: Clifford Winkel

February/March location: Fields Sweet School 8540 Root Rd North Ridgeville, Ohio 44039

August location: Wink Electric 34400 Lorain Rd North Ridgeville, Ohio 44039

November location: City of Elyria – 1194 Gulf Rd Elyria, Ohio 44035

8AM – 9AM

250.122 Discuss grounding electrode conductor sizing requirements including Table 250.122. Expansion to sizing EGC for voltage drop and feeders.

250.130 Replacing non-grounding receptacles discussion

250.134 Equipment Fastened in Place or Connected by Permanent Wiring Methods. Discuss equipment grounding conductor requirements

250.136 Equipment Secured to Grounded Metal Supports. Discuss equipment grounding requirements to secured equipment.

250.138 Cord and plug connected equipment Discuss plug equipment grounding requirements.

250.140 Ranges, ovens, and clothes dryers Discuss 4 wire grounding requirements for ranges, ovens, and dryers.

250.142 Discuss use of neutral conductor for equipment grounding for services and separately derived systems.

250.146 Connecting receptacle grounding terminal to metal enclosure. Discuss receptacle equipment grounding requirements in various locations.

250.148 Continuity and attachment of equipment grounding conductors in boxes Discuss box equipment grounding requirements in various locations. All EGC to be connected together in same enclosure.

Winkelectric Class Syllabus
2020 Code Grounding and Bonding Part II
5 hour continuing education class

Sunday 2/13/22 9A-2P, Sunday 3/13/22 9A-2P,
Tuesday 8/23/22, Saturday 11/19/22 1P – 6P
Instructor: Clifford Winkel

February/March location: Fields Sweet School 8540 Root Rd North Ridgeville, Ohio 44039

August location: Wink Electric 34400 Lorain Rd North Ridgeville, Ohio 44039

November location: City of Elyria – 1194 Gulf Rd Elyria, Ohio 44035

9AM – 10AM

300.1 Scope
Discuss general requirements of article 300

300.3 Conductors
Discuss grouping requirements including grounding requirements.

300.10 Electrical continuity
Emphasis NEC importance to workmanship to ensure electrical continuity of various grounding paths.

300.20 Induced Alternating Currents in Ferrous Metal Parts
Discuss minimizing the induction heating of ferrous metal raceways and enclosures.

314.3 Nonmetallic boxes. Exception clarified.
Clarify grounding requirements for nonmetallic boxes.

314.4 Metal box grounding requirements.
314.25 Covers and canopies
Clarify requirements for nonmetallic and metallic covers.

314.28 Boxes and conduit bodies for conductors 4 AWG and larger
Discuss bushing requirements for conductors over 4 AWG

314.30 Handhole enclosures
Discuss requirements for nonmetallic and metallic covers.

320.108 Armored cable equipment grounding conductor.

330.108 Metallic cable quipment grounding conductor
Discuss equipment grounding conductor requirements of MC.

Winkelectric Class Syllabus
2020 Code Grounding and Bonding Part II
5 hour continuing education class

Sunday 2/13/22 9A-2P, Sunday 3/13/22 9A-2P,
Tuesday 8/23/22, Saturday 11/19/22 1P – 6P
Instructor: Clifford Winkel

February/March location: Fields Sweet School 8540 Root Rd North Ridgeville, Ohio 44039

August location: Wink Electric 34400 Lorain Rd North Ridgeville, Ohio 44039

November location: City of Elyria – 1194 Gulf Rd Elyria, Ohio 44035

334.108 NMC quipment gournding conductor
Discuss equipment grounding conductor requirements of romex.

348.60 Greenfield grounding and bonding.
Discuss equipment grounding requirements for Greenfield.

350.60 LFMC grounding and bonding
Discuss requirements for LFMC

352.60 PVC quipment grounding conductor
Discuss requirements for an equipment grounding conductor for PVC.

356.60 LFNC equipment grounding conductor
Discuss equipment grounding conductor requirements for LFNC

358.42 Couplings and Connectors
Discuss workmanlike manner when assembling couplings and connectors.

358.60 Grounding
Discuss grounding requirements for EMT.

362.60 Equipment Grounding Conductor
Discuss grounding requirements for ENT.

386.60 Surface metal raceway equipment grounding conductor.

392.60 Equipment grounding conductors
Discuss bonding requirements for cable tray equipment grounding.

10AM – 10:15 BREAK
10:15AM – 11:15AM

Winkelectric Class Syllabus
2020 Code Grounding and Bonding Part II
5 hour continuing education class

Sunday 2/13/22 9A-2P, Sunday 3/13/22 9A-2P,
Tuesday 8/23/22, Saturday 11/19/22 1P – 6P
Instructor: Clifford Winkel

February/March location: Fields Sweet School 8540 Root Rd North Ridgeville, Ohio 44039

August location: Wink Electric 34400 Lorain Rd North Ridgeville, Ohio 44039

November location: City of Elyria – 1194 Gulf Rd Elyria, Ohio 44035

404.9 General Use Snap Switches, Dimmers, and Control Switches.
Discuss requirements for grounding and grounding of various types of switch faceplates.

404.12 Discuss requirements for grounding enclosures.

406.3 receptacle rating and type
Discuss requirements for receptacle ratings.

406.4 General installation requirements.
Discuss general requirements for grounding type receptacles and grounding methods.

406.6 Receptacle faceplates
Discuss requirements for grounding various types of receptacle covers.

406.11 Discuss receptacle grounding termination fastening to equipment grounding conductor.

408.40 Equipment grounding conductor
Discuss grounding requirements for panelboards

410.30 Luminaire supports
Discuss equipment grounding requirements for light poles.

410.44 Methods of grounding
Discuss luminaire equipment grounding methods.

410.46 Equipment Grounding Conductor Attachment
Discuss luminaire grounding requirements.

Winkelectric Class Syllabus
2020 Code Grounding and Bonding Part II
5 hour continuing education class

Sunday 2/13/22 9A-2P, Sunday 3/13/22 9A-2P,
Tuesday 8/23/22, Saturday 11/19/22 1P – 6P
Instructor: Clifford Winkel

February/March location: Fields Sweet School 8540 Root Rd North Ridgeville, Ohio 44039

August location: Wink Electric 34400 Lorain Rd North Ridgeville, Ohio 44039

November location: City of Elyria – 1194 Gulf Rd Elyria, Ohio 44035

440.9 Air conditioning and refrigeration equipment grounding and bonding requirements.
Wire type grounding conductors now required.

450.10 Grounding and bonding
Discuss requirements for terminal bars in dry type transformers.

501.30/502.30/503.30 Grounding and bonding
Discuss grounding and bonding requirements along with flexible raceway bonding.

517.2 Definitions (revisions)

517.13 Grounding of equipment in patient care areas including methods, insulated grounding conductors, and sizing.

517.16 Receptacles with insulated grounding terminals.
Discuss installation of insulated grounding terminal devices in patient care areas.

525.30 Equipment bonding requirement discussion

525.31 Equipment Grounding
Discuss equipment grounding requirements in Article 525.

525.32 Portable Equipment Grounding Conductor Continuity
Discuss requirements for grounding verification when portable equipment is connected.

547.5 Wiring methods
Discuss requirements for underground equipment grounding installations.

Winkelectric Class Syllabus
2020 Code Grounding and Bonding Part II
5 hour continuing education class

Sunday 2/13/22 9A-2P, Sunday 3/13/22 9A-2P,
Tuesday 8/23/22, Saturday 11/19/22 1P – 6P
Instructor: Clifford Winkel

February/March location: Fields Sweet School 8540 Root Rd North Ridgeville, Ohio 44039

August location: Wink Electric 34400 Lorain Rd North Ridgeville, Ohio 44039

November location: City of Elyria – 1194 Gulf Rd Elyria, Ohio 44035

547.10 Equipotential planes and bonding of such planes
Discuss definition, methods, and reasoning for equipotential planes.

555.13 Bonding of Non-Current Carrying Metal Parts
Discuss bonding of metal parts in contact with water.

555.37 Equipment Grounding Conductor
Discuss equipment grounding conductor requirements including sizing and application.

600.7 Grounding and Bonding
Discuss grounding requirements of electric signs and outline lighting.

640.7 Grounding and bonding.
Discuss IG receptacle requirements in AV equipment areas.

645.14 System grounding
Discuss separately derived system definition pertaining to this section of the code.

645.15 Equipment Grounding and bonding.
Discuss IT requirements for equipment grounding.

11:15AM – 12:15PM

680.2 Definitions
Go over general definitions of definitions pertaining to article 680.

Winkelectric Class Syllabus
2020 Code Grounding and Bonding Part II
5 hour continuing education class

Sunday 2/13/22 9A-2P, Sunday 3/13/22 9A-2P,
Tuesday 8/23/22, Saturday 11/19/22 1P – 6P
Instructor: Clifford Winkel

February/March location: Fields Sweet School 8540 Root Rd North Ridgeville, Ohio 44039

August location: Wink Electric 34400 Lorain Rd North Ridgeville, Ohio 44039

November location: City of Elyria – 1194 Gulf Rd Elyria, Ohio 44035

680.6 Bonding and Equipment grounding.
Go over general grounding requirements of article 680.

680.7 Bonding and Equipment Grounding Terminals
Swimming pools, spas, hot tubs, and spas installations relating to grounding and bonding. Location driven requirements for grounding and bonding terminals.

680.8 Cord and plug connected equipment requirements in relations to article 680.

680.21 motors
Discuss motor requirements in pool and spa areas.

680.23 Underwater luminaires
Discuss requirements for the installation of underwater lighting.

680.24 Discuss requirements for junctions boxes in relations to article 680.

680.25 Feeders
Discuss grounding requirements for feeders.

680.26 Bonded parts – Discuss pool equipotential bonding requirements.

680.42 Outdoor installations
Discuss bonding of perimeter surfaces of exterior hot tubs areas.

680.43 Indoor installations
Discuss indoor hot tub installation exception

680.53 Discuss removal of 680.53 from 2020 NEC.

Winkelectric Class Syllabus
2020 Code Grounding and Bonding Part II
5 hour continuing education class

Sunday 2/13/22 9A-2P, Sunday 3/13/22 9A-2P,
Tuesday 8/23/22, Saturday 11/19/22 1P – 6P
Instructor: Clifford Winkel

February/March location: Fields Sweet School 8540 Root Rd North Ridgeville, Ohio 44039

August location: Wink Electric 34400 Lorain Rd North Ridgeville, Ohio 44039

November location: City of Elyria – 1194 Gulf Rd Elyria, Ohio 44035

680.54 Connection to an Equipment Grounding Conductor
Discuss equipment required to be connected to equipment grounding conductor.

680.55 Discuss methods of equipment grounding in relation to flexible cord installs.

680.74 Bonding.
Discuss bonding requirements for Hydromassage Tubs.

680.83 Discuss requirements of bonding of pool lifts.

690.31 Discuss wiring methods for photovoltaic systems.

690.43 Equipment grounding
Discuss equipment grounding requirements on PV systems.

690.45 Size of equipment grounding conductors
Discuss equipment grounding conductors

690.47 (B) Grounding electrode system
Discuss PV section pertaining to grounding electrode conductors

800.100 Cable and primary protector bonding and grounding requirements.

800.180 Discuss Grounding Device types.

810.7 Discuss grounding device types.

810.15 Metal antenna support bonding and grounding requirements.

810.21 Bonding and grounding electrode conductors for antenna masts in relation to installs in article 810.

Clifford Winkel
5640 Broad Blvd.
North Ridgeville, Ohio 44039
440-346-4125
winkelectric@hotmail.com

BIO

Hello, my name is Cliff Winkel and I am an electrical contractor operating out of North Ridgeville, Ohio. I have been an electrician since 1990 beginning with simple house remodels and rewiring working for various companies. In 1997 I started working for an outfit out of Cleveland, Ohio which dealt with commercial, residential, and industrial applications. In 2000 I applied, tested, passed, and received my Ohio Electrical Contractor's License (#23838) and started my own business, Winkelectric. In 2004 I applied, tested, passed and received my Ohio Electrical Safety Inspector's License (#1862). In 2005 I applied for, and received my Approved Training Agency License (#517). I also am licensed as a fire alarm contractor and am entry level NABCEP certified in photovoltaic installations. I also currently have a NICET level III fire alarm certification. In 2005, 2009 - 2020 I taught OCLIB electrical continuing education classes for electrical contractors (focused on 2005 2008 2011 and 2014/2017/2020 code changes and grounding). From 2000 to current I am continuing work as an electrical contractor. Some of the projects I have been involved in projects including residential buildings, commercial shopping centers, cellular tower land sites, and industrial high voltage maintenance and testing work. I have been registered and operated in numerous municipalities throughout Ohio.

Clifford Winkel

Winkelectric
11/24/21

File Attachments for Item:

EC-1 2019 RCO Chapter 3 Round Table (MVBOC)

All certifications except MI and PI (1 hour)

Staff Notes:

Committee Recommendation:

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: Derek Spurling (Contact Name) Cert #: 1409

Organization: Miami Valley Building Officials Council (MVBOC) (Organization/Company)

Address: 100 W. Spring Valley Rd. (Include Room Number, Suite, etc.)

City: Centerville State: Ohio Zip: 45458

E-Mail: dspurling@centervilleohio.gov

Telephone: 937-428-4786 Fax:

Course Sponsor: MVBOC

COURSE INFORMATION:

Course Title: 2019 RCO - Chapter 3 Building Planning

New Course Submittal: [x] Update Course: [ ] Prior Approval Number:

Purpose and Objective: Provide an overview and refresher of sections within the chapter.

Number of Instructional Contact Hours that can be obtained upon completion: 1

If Multi-Session, Number of Instructional Contact Hours Per Session:

Program Applicable for the Following Participants:

Building Official [x] Master Plans Examiner [x] Building Inspector [x] Fire Protection Inspector [x] Mechanical Inspector [ ]
Building Plans Exam. [x] Plumbing Inspector [ ]
Plumbing Plans Exam. [x] Non-Res IU Inspector [ ]
Electrical Plans Exam. [x]
Mechanical Plans Exam. [x]
Fire Protect. Plans Exam. [x]

Res Building Official [x] Res Plans Examiner [x] Res Building Inspector [x] Res Mechanical Inspector [x] Res IU Inspector [ ]

Electrical Safety Inspectors [x]
Location of ESI Course: Date(s) of ESI Course(s):

SUBMITTAL CHECKLIST: Make Sure all of the Following Information is Submitted:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	
	Organization sponsoring or requesting the program (if any)	
Course Title:	Name of course (related to content)	
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	
Test Materials:		
Completed Application:		

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

Miami Valley Building Officials Council

Derek Spurling, President. 100 W. Spring Valley Rd. Centerville. Ohio 45458
www.mvboc.org

OFFICERS

Derek Spurling
President
City of Centerville

William Sutter
Vice President
WTFD

Derek Spurling
Secretary
City of Centerville

Dan Fitzpatrick
Treasurer
City of Springboro

Board of Directors

Scott Young
NIC

Larry Parsons
City of Springboro

Aaron Morrison
City of Piqua

Brandon Gill
City of Springfield

Bryan Parker
Champaign County
Past President

2019 RCO – Chapter 3 Building Planning

1 hour overview

- Section 302 - Fire-resistant Construction (10-15 min.)
- Section 310 – Emergency Escape and Rescue Openings (10-15 min.)
- Section 311 – Means of Egress (10-15 min.)
- Section 322 – Flood-resistant Construction (10-15 min.)
- Section 328 Post Frame Accessory Structures (10-15 min.)

Instructor Information:

Derek Spurling

Certifications / Licenses
BBS Certification #: 1409

- Building Official
- Residential Building Official
- Building Plans Examiner
- Electrical Plans Examiner
- Mechanical Plans Examiner
- Fire Protection Plans Examiner
- Building Inspector
- Electrical Inspector
- Mechanical Inspector
- Fire Protection Inspector

OCILB Electrical License #: 45124

Recent Employment
City of Centerville – 2015 - Present, Building Official
Clermont County – 2009 - 2015, Building/Electrical Inspector
Warren County – 2004, Contract Inspector

Organizations
SWOBOA – Board of Director, 2014-2015
MVBOC – President, 2019 – Present
OBOA – 2009 – Present

Ohio Board of Building Standards

Recognizes Participation in

Train the Trainers: Chapter 1/Code Administration

November 18, 2019

This is to certify that

Derek Spurling

completed the training approved for 3 continuing education contact hours

Gerald O Holland

GERALD O. HOLLAND
CHAIRMAN

Ohio Board of Building Standards

BBS2019-631
Approved for all certifications
HSW: Yes

Ohio Board of Building Standards

Recognizes Participation in

2020 Train the Trainer: Chapter 1

Board of Building Standards
Online Seminar
September 23, 2020

This is to certify that

DEREK SPURLING

completed the training approved for 3 continuing education contact hours.

Ohio Board of Building Standards
Timothy Galvin
CHAIRMAN

BBS2020-632
Approved for All Certifications
HSW: Yes

Ohio Board of Building Standards

Recognizes Participation in

Train the Trainers: Existing Buildings

November 18, 2019

This is to certify that

Derek Spurling

completed the training approved for 3 continuing education contact hours

Gerald O Holland

GERALD O. HOLLAND
CHAIRMAN

Ohio Board of Building Standards

BBS2019-632
Approved for all certifications
HSW: Yes

File Attachments for Item:

EC-2 2017 OBC Chapter 4 Round Table (MVBOC)

Commercial certifications (except plumbing), RBO

Staff Notes:

Committee Recommendation:

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: Derek Spurling (Contact Name) Cert #: 1409

Organization: Miami Valley Building Officials Council (MVBOC) (Organization/Company)

Address: 100 W. Spring Valley Rd. (Include Room Number, Suite, etc.)

City: Centerville State: Ohio Zip: 45458

E-Mail: dspurling@centervilleohio.gov

Telephone: 937-428-4786 Fax:

Course Sponsor: MVBOC

COURSE INFORMATION:

Course Title: 2017 OBC - Chapter 4 Special Requirements based on Use & Occupancy

New Course Submittal: [x] Update Course: [ ] Prior Approval Number:

Purpose and Objective: Provide an overview and refresher of sections within the chapter.

Number of Instructional Contact Hours that can be obtained upon completion: 1

If Multi-Session, Number of Instructional Contact Hours Per Session:

Program Applicable for the Following Participants:

Building Official [x] Master Plans Examiner [x] Building Inspector [x] Fire Protection Inspector [x] Mechanical Inspector [x]

Building Plans Exam. [x] Plumbing Inspector [ ]

Plumbing Plans Exam. [ ] Non-Res IU Inspector [ ]

Electrical Plans Exam. [x]

Mechanical Plans Exam. [x]

Fire Protect. Plans Exam. [x]

Res Building Official [x] Res Plans Examiner [ ] Res Building Inspector [ ] Res Mechanical Inspector [ ] Res IU Inspector [ ]

Electrical Safety Inspectors [x]

Location of ESI Course: Date(s) of ESI Course(s):

SUBMITTAL CHECKLIST: Make Sure all of the Following Information is Submitted:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	
	Organization sponsoring or requesting the program (if any)	
Course Title:	Name of course (related to content)	
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	
Test Materials:		
Completed Application:		

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

Miami Valley Building Officials Council

Derek Spurling, President. 100 W. Spring Valley Rd. Centerville. Ohio 45458
www.mvboc.org

OFFICERS

Derek Spurling
President
City of Centerville

William Sutter
Vice President
WTFD

Derek Spurling
Secretary
City of Centerville

Dan Fitzpatrick
Treasurer
City of Springboro

Board of Directors

Scott Young
NIC

Larry Parsons
City of Springboro

Aaron Morrison
City of Piqua

Brandon Gill
City of Springfield

Bryan Parker
Champaign County
Past President

2017 OBC – Chapter 4 Special Detailed Requirements based on Use & Occupancy

1 hour overview

- Section 404 – Atriums (5-10 min.)
- Section 406 – Motor-vehicle-related Occupancies (5-10 min.)
- Section 410 – Stages, Platforms, & Technical Production Areas (5-10 min.)
- Section 411 – Special Amusement Buildings (5-10 min.)
- Section 412 – Aircraft-related Occupancies (5-10 min.)
- Section 414 – Hazardous Materials (5-10 min.)
- Section 415 – Groups H-1, H-2, H-3, H-4, & H-5 (5-10 min.)
- Section 416 – Application of Flammable Finishes (5-10 min.)
- Section 419 – Live/Work Units (5-10 min.)
- Section 422 – Ambulatory Care Facilities (5-10 min.)

File Attachments for Item:

EC-3 2017 OMC Chapter 5 Round Table (MVBOC)

BO, MPE, BPE, MechPE, FPPE, BI, MI, RBO (1 hour)

Staff Notes:

Committee Recommendation:

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: Derek Spurling (Contact Name) Cert #: 1409

Organization: Miami Valley Building Officials Council (MVBOC) (Organization/Company)

Address: 100 W. Spring Valley Rd. (Include Room Number, Suite, etc.)

City: Centerville State: Ohio Zip: 45458

E-Mail: dspurling@centervilleohio.gov

Telephone: 937-428-4786 Fax:

Course Sponsor: MVBOC

COURSE INFORMATION:

Course Title: 2017 OMC - Chapter 5 Exhaust Systems

New Course Submittal: [x] Update Course: [ ] Prior Approval Number:

Purpose and Objective: Provide an overview and refresher of sections within the chapter.

Number of Instructional Contact Hours that can be obtained upon completion: 1

If Multi-Session, Number of Instructional Contact Hours Per Session:

Program Applicable for the Following Participants:

Building Official [x] Master Plans Examiner [x] Building Inspector [x] Fire Protection Inspector [ ] Mechanical Inspector [x]

Building Plans Exam. [x] Plumbing Inspector [ ]

Plumbing Plans Exam. [ ] Non-Res IU Inspector [ ]

Electrical Plans Exam. [ ]

Mechanical Plans Exam. [x]

Fire Protect. Plans Exam. [x]

Res Building Official [x] Res Plans Examiner [ ] Res Building Inspector [ ] Res Mechanical Inspector [ ] Res IU Inspector [ ]

Electrical Safety Inspectors [ ]

Location of ESI Course: Date(s) of ESI Course(s):

SUBMITTAL CHECKLIST: Make Sure all of the Following Information is Submitted:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	
	Organization sponsoring or requesting the program (if any)	
Course Title:	Name of course (related to content)	
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	
Test Materials:		
Completed Application:		

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

Miami Valley Building Officials Council

Derek Spurling, President. 100 W. Spring Valley Rd. Centerville. Ohio 45458
www.mvboc.org

OFFICERS

Derek Spurling
President
City of Centerville

William Sutter
Vice President
WTFD

Derek Spurling
Secretary
City of Centerville

Dan Fitzpatrick
Treasurer
City of Springboro

Board of Directors

Scott Young
NIC

Larry Parsons
City of Springboro

Aaron Morrison
City of Piqua

Brandon Gill
City of Springfield

Bryan Parker
Champaign County
Past President

2017 OMC – Chapter 5 Exhaust Systems

1 hour overview

- Section 502 – Required systems (10-15 min.)
- Section 504 – Clothes Dryer Exhaust (5-10 min.)
- Section 505 – Domestic Kitchen Exhaust Equipment (10-15 min.)
- Section 506 – Commercial Kitchen Hood Ventilation System Ducts & Exhaust Equipment (10-15 min.)
- Section 507 – Commercial Kitchen Exhaust Hoods (10-15 min.)
- Section 513 – Smoke Control Systems (10-15min.)

Instructor Information:

Derek Spurling

Certifications / Licenses
BBS Certification #: 1409

- Building Official
- Residential Building Official
- Building Plans Examiner
- Electrical Plans Examiner
- Mechanical Plans Examiner
- Fire Protection Plans Examiner
- Building Inspector
- Electrical Inspector
- Mechanical Inspector
- Fire Protection Inspector

OCILB Electrical License #: 45124

Recent Employment
City of Centerville – 2015 - Present, Building Official
Clermont County – 2009 - 2015, Building/Electrical Inspector
Warren County – 2004, Contract Inspector

Organizations
SWOBOA – Board of Director, 2014-2015
MVBOC – President, 2019 – Present
OBOA – 2009 – Present

Ohio Board of Building Standards

Recognizes Participation in

Train the Trainers: Chapter 1/Code Administration

November 18, 2019

This is to certify that

Derek Spurling

completed the training approved for 3 continuing education contact hours

Gerald O Holland

GERALD O. HOLLAND
CHAIRMAN

Ohio Board of Building Standards

BBS2019-631
Approved for all certifications
HSW: Yes

Ohio Board of Building Standards

Recognizes Participation in

2020 Train the Trainer: Chapter 1

Board of Building Standards
Online Seminar
September 23, 2020

This is to certify that

DEREK SPURLING

completed the training approved for 3 continuing education contact hours.

Ohio Board of Building Standards
Timothy Galvin
CHAIRMAN

BBS2020-632
Approved for All Certifications
HSW: Yes

Ohio Board of Building Standards

Recognizes Participation in

Train the Trainers: Existing Buildings

November 18, 2019

This is to certify that

Derek Spurling

completed the training approved for 3 continuing education contact hours

GERALD O. HOLLAND
CHAIRMAN

Ohio Board of Building Standards

BBS2019-632
Approved for all certifications
HSW: Yes

File Attachments for Item:

EC-4 2017 OBC Chapter 7 Round Table (MVBOC)

Commercial certifications, RBO, RBI (1 hour)

Staff Notes:

Committee Recommendation:

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: Derek Spurling (Contact Name) Cert #: 1409

Organization: Miami Valley Building Officials Council (MVBOC) (Organization/Company)

Address: 100 W. Spring Valley Rd. (Include Room Number, Suite, etc.)

City: Centerville State: Ohio Zip: 45458

E-Mail: dspurling@centervilleohio.gov

Telephone: 937-428-4786 Fax:

Course Sponsor: MVBOC

COURSE INFORMATION:

Course Title: 2017 OBC - Chapter 7 Fire & Smoke Protection Features

New Course Submittal: [x] Update Course: [ ] Prior Approval Number:

Purpose and Objective: Provide an overview and refresher of sections within the chapter.

Number of Instructional Contact Hours that can be obtained upon completion: 1

If Multi-Session, Number of Instructional Contact Hours Per Session:

Program Applicable for the Following Participants:

Building Official [x] Master Plans Examiner [x] Building Inspector [x] Fire Protection Inspector [x] Mechanical Inspector [x]

Building Plans Exam. [x] Plumbing Inspector [x]

Plumbing Plans Exam. [x] Non-Res IU Inspector [ ]

Electrical Plans Exam. [x]

Mechanical Plans Exam. [x]

Fire Protect. Plans Exam. [x]

Res Building Official [x] Res Plans Examiner [ ] Res Building Inspector [x] Res Mechanical Inspector [ ] Res IU Inspector [ ]

Electrical Safety Inspectors [x]

Location of ESI Course: Date(s) of ESI Course(s):

SUBMITTAL CHECKLIST: Make Sure all of the Following Information is Submitted:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	
	Organization sponsoring or requesting the program (if any)	
Course Title:	Name of course (related to content)	
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	
Test Materials:		
Completed Application:		

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

Miami Valley Building Officials Council

Derek Spurling, President. 100 W. Spring Valley Rd. Centerville. Ohio 45458
www.mvboc.org

OFFICERS

Derek Spurling
President
City of Centerville

William Sutter
Vice President
WTFD

Derek Spurling
Secretary
City of Centerville

Dan Fitzpatrick
Treasurer
City of Springboro

Board of Directors

Scott Young
NIC

Larry Parsons
City of Springboro

Aaron Morrison
City of Piqua

Brandon Gill
City of Springfield

Bryan Parker
Champaign County
Past President

2017 OBC – Chapter 7 Fire & Smoke Protection Features

1 hour overview

- Section 706 – Fire Walls (5-10 min.)
- Section 707 – Fire Barriers (5-10 min.)
- Section 708 – Fire Partitions (5-10min.)
- Section 709 – Smoke Barriers (5-10 min.)
- Section 710 – Smoke Partitions (5-10 min.)
- Section 715 – Fire-resistant Joint Systems (5-10 min.)
- Section 716 – Openings Protectives (10-15 min.)
- Section 717 – Ducts & Air Transfer Openings (5-10 min.)

File Attachments for Item:

EC-5 2017 OBC Chapter 9 Round Table (MVBOC)

Commercial certifications except plumbing (1 hour)

Staff Notes:

Committee Recommendation:

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: Derek Spurling (Contact Name) Cert #: 1409

Organization: Miami Valley Building Officials Council (MVBOC) (Organization/Company)

Address: 100 W. Spring Valley Rd. (Include Room Number, Suite, etc.)

City: Centerville State: Ohio Zip: 45458

E-Mail: dspurling@centervilleohio.gov

Telephone: 937-428-4786 Fax:

Course Sponsor: MVBOC

COURSE INFORMATION:

Course Title: 2017 OBC - Chapter 9 Fire Protection Systems

New Course Submittal: [x] Update Course: [ ] Prior Approval Number:

Purpose and Objective: Provide an overview and refresher of sections within the chapter.

Number of Instructional Contact Hours that can be obtained upon completion: 1

If Multi-Session, Number of Instructional Contact Hours Per Session:

Program Applicable for the Following Participants:

Building Official [x] Master Plans Examiner [x] Building Inspector [x] Fire Protection Inspector [x] Mechanical Inspector [x]

Building Plans Exam. [x] Plumbing Inspector [ ]

Plumbing Plans Exam. [ ] Non-Res IU Inspector [ ]

Electrical Plans Exam. [x]

Mechanical Plans Exam. [x]

Fire Protect. Plans Exam. [x]

Res Building Official [x] Res Plans Examiner [ ] Res Building Inspector [ ] Res Mechanical Inspector [ ] Res IU Inspector [ ]

Electrical Safety Inspectors [x]

Location of ESI Course: Date(s) of ESI Course(s):

SUBMITTAL CHECKLIST: Make Sure all of the Following Information is Submitted:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	
	Organization sponsoring or requesting the program (if any)	
Course Title:	Name of course (related to content)	
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	
Test Materials:		
Completed Application:		

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

Miami Valley Building Officials Council

Derek Spurling, President. 100 W. Spring Valley Rd. Centerville. Ohio 45458
www.mvboc.org

OFFICERS

Derek Spurling
President
City of Centerville

William Sutter
Vice President
WTFD

Derek Spurling
Secretary
City of Centerville

Dan Fitzpatrick
Treasurer
City of Springboro

Board of Directors

Scott Young
NIC

Larry Parsons
City of Springboro

Aaron Morrison
City of Piqua

Brandon Gill
City of Springfield

Bryan Parker
Champaign County
Past President

2017 OBC – Chapter 9 Fire Protection Systems

1 hour overview

- Section 903 – Automatic Sprinkler Systems (10-15 min.)
- Section 905 – Standpipe Systems (5-10 min.)
- Section 907 – Fire Alarm & Detection Systems (10-15 min.)
- Section 909 – Smoke Control Systems (5-10 min.)
- Section 910 – Smoke & Heat Removal (5-10 min.)
- Section 911 Fire Command Center (5-10 min.)
- Section 912 – Fire Department Connections (5-10 min.)
- Section 913 – Fire Pumps (5-10 min.)
- Section 915 – Carbon Monoxide Detection (5-10 min.)

File Attachments for Item:

EC-6 2017 OBC Chapter 11 Round Table (MVBOC)

BO, MPE, BPE, PPE, BI, RBO (1 hour)

Staff Notes:

Committee Recommendation:

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: Derek Spurling (Contact Name) Cert #: 1409

Organization: Miami Valley Building Officials Council (MVBOC) (Organization/Company)

Address: 100 W. Spring Valley Rd. (Include Room Number, Suite, etc.)

City: Centerville State: Ohio Zip: 45458

E-Mail: dspurling@centervilleohio.gov

Telephone: 937-428-4786 Fax:

Course Sponsor: MVBOC

COURSE INFORMATION:

Course Title: 2017 OBC - Chapter 11 Accessibility

New Course Submittal: [x] Update Course: [ ] Prior Approval Number:

Purpose and Objective: Provide an overview and refresher of sections within the chapter.

Number of Instructional Contact Hours that can be obtained upon completion: 1

If Multi-Session, Number of Instructional Contact Hours Per Session:

Program Applicable for the Following Participants:

Building Official [x] Master Plans Examiner [x] Building Inspector [x] Fire Protection Inspector [ ] Mechanical Inspector [ ]
Building Plans Exam. [x] Plumbing Inspector [ ]
Plumbing Plans Exam. [x] Non-Res IU Inspector [ ]
Electrical Plans Exam. [ ]
Mechanical Plans Exam. [ ]
Fire Protect. Plans Exam. [ ]

Res Building Official [x] Res Plans Examiner [ ] Res Building Inspector [ ] Res Mechanical Inspector [ ] Res IU Inspector [ ]

Electrical Safety Inspectors [ ]
Location of ESI Course: Date(s) of ESI Course(s):

SUBMITTAL CHECKLIST: Make Sure all of the Following Information is Submitted:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	
	Organization sponsoring or requesting the program (if any)	
Course Title:	Name of course (related to content)	
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	
Test Materials:		
Completed Application:		

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

Miami Valley Building Officials Council

Derek Spurling, President. 100 W. Spring Valley Rd. Centerville. Ohio 45458
www.mvboc.org

OFFICERS

Derek Spurling
President
City of Centerville

William Sutter
Vice President
WTFD

Derek Spurling
Secretary
City of Centerville

Dan Fitzpatrick
Treasurer
City of Springboro

Board of Directors

Scott Young
NIC

Larry Parsons
City of Springboro

Aaron Morrison
City of Piqua

Brandon Gill
City of Springfield

Bryan Parker
Champaign County
Past President

2017 OBC – Chapter 11 Accessibility

1 hour overview

- Section 1103 – Scoping Requirements (10-15 min.)
- Section 1104 – Accessible Route (5-10 min.)
- Section 1105 – Accessible Entrances (5-10 min.)
- Section 1107 – Dwelling Units & Sleeping Units (10-15 min.)
- Section 1108 – Special Occupancies (10-15 min.)
- Section 1109 – Other Features & Facilities (10-15 min.)
- Section 1111 – Signage (10-15 min.)

File Attachments for Item:

EC-7 2017 OBC Chapter 12 Round Table (MVBOC)

Commercial certification (except plumbing and fire), RBO (1 hour)

Staff Notes:

Committee Recommendation:

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: Derek Spurling (Contact Name) Cert #: 1409

Organization: Miami Valley Building Officials Council (MVBOC) (Organization/Company)

Address: 100 W. Spring Valley Rd. (Include Room Number, Suite, etc.)

City: Centerville State: Ohio Zip: 45458

E-Mail: dspurling@centervilleohio.gov

Telephone: 937-428-4786 Fax:

Course Sponsor: MVBOC

COURSE INFORMATION:

Course Title: 2017 OBC - Chapter 12 Interior Environment

New Course Submittal: [x] Update Course: [ ] Prior Approval Number:

Purpose and Objective: Provide an overview and refresher of sections within the chapter.

Number of Instructional Contact Hours that can be obtained upon completion: 1

If Multi-Session, Number of Instructional Contact Hours Per Session:

Program Applicable for the Following Participants:

Building Official [x] Master Plans Examiner [x] Building Inspector [x] Fire Protection Inspector [ ] Mechanical Inspector [x]

Building Plans Exam. [x] Plumbing Inspector [ ]

Plumbing Plans Exam. [ ] Non-Res IU Inspector [ ]

Electrical Plans Exam. [x]

Mechanical Plans Exam. [x]

Fire Protect. Plans Exam. [ ]

Res Building Official [x] Res Plans Examiner [ ] Res Building Inspector [ ] Res Mechanical Inspector [ ] Res IU Inspector [ ]

Electrical Safety Inspectors [x]

Location of ESI Course: Date(s) of ESI Course(s):

SUBMITTAL CHECKLIST: Make Sure all of the Following Information is Submitted:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	
	Organization sponsoring or requesting the program (if any)	
Course Title:	Name of course (related to content)	
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	
Test Materials:		
Completed Application:		

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

Miami Valley Building Officials Council

Derek Spurling, President. 100 W. Spring Valley Rd. Centerville. Ohio 45458
www.mvboc.org

OFFICERS

Derek Spurling
President
City of Centerville

William Sutter
Vice President
WTFD

Derek Spurling
Secretary
City of Centerville

Dan Fitzpatrick
Treasurer
City of Springboro

Board of Directors

Scott Young
NIC

Larry Parsons
City of Springboro

Aaron Morrison
City of Piqua

Brandon Gill
City of Springfield

Bryan Parker
Champaign County
Past President

2017 OBC – Chapter 12 Interior Environment

1 hour overview

- Section 1203 – Ventilation (10-15 min.)
- Section 1204 – Temperature Control (5-10 min.)
- Section 1205 – Lighting (10-15 min.)
- Section 1207 – Sound Transmission (5-10 min.)
- Section 1208 – Interior Space Dimensions (10-15 min.)
- Section 1209 – Access to Unoccupied Space (5-10 min.)
- Section 1210 – Toilet & Bathroom Requirements (10-15 min.)

File Attachments for Item:

EC-8 2017 OBC Chapter 31 Round Table (MVBOC)

Commercial certifications (except plumbing and mechanical), RBO

Staff Notes:

Committee Recommendation:

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: Derek Spurling (Contact Name) Cert #: 1409

Organization: Miami Valley Building Officials Council (MVBOC) (Organization/Company)

Address: 100 W. Spring Valley Rd. (Include Room Number, Suite, etc.)

City: Centerville State: Ohio Zip: 45458

E-Mail: dspurling@centervilleohio.gov

Telephone: 937-428-4786 Fax:

Course Sponsor: MVBOC

COURSE INFORMATION:

Course Title: 2017 OBC - Chapter 31 Special Construction

New Course Submittal: [x] Update Course: [ ] Prior Approval Number:

Purpose and Objective: Provide an overview and refresher of sections within the chapter.

Number of Instructional Contact Hours that can be obtained upon completion: 1

If Multi-Session, Number of Instructional Contact Hours Per Session:

Program Applicable for the Following Participants:

Building Official [x] Master Plans Examiner [x] Building Inspector [x] Fire Protection Inspector [x] Mechanical Inspector [ ]

Building Plans Exam. [x] Plumbing Inspector [ ]

Plumbing Plans Exam. [ ] Non-Res IU Inspector [ ]

Electrical Plans Exam. [x]

Mechanical Plans Exam. [ ]

Fire Protect. Plans Exam. [x]

Res Building Official [x] Res Plans Examiner [ ] Res Building Inspector [ ] Res Mechanical Inspector [ ] Res IU Inspector [ ]

Electrical Safety Inspectors [x]

Location of ESI Course: Date(s) of ESI Course(s):

SUBMITTAL CHECKLIST: Make Sure all of the Following Information is Submitted:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	
	Organization sponsoring or requesting the program (if any)	
Course Title:	Name of course (related to content)	
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	
Test Materials:		
Completed Application:		

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

Miami Valley Building Officials Council

Derek Spurling, President. 100 W. Spring Valley Rd. Centerville. Ohio 45458
www.mvboc.org

OFFICERS

Derek Spurling
President
City of Centerville

William Sutter
Vice President
WTFD

Derek Spurling
Secretary
City of Centerville

Dan Fitzpatrick
Treasurer
City of Springboro

Board of Directors

Scott Young
NIC

Larry Parsons
City of Springboro

Aaron Morrison
City of Piqua

Brandon Gill
City of Springfield

Bryan Parker
Champaign County
Past President

2017 OBC – Chapter 31 Special Construction

1 hour overview

- Section 3102 – Membrane Structures (10-15 min.)
- Section 3103 – Temporary Structures (5-10 min.)
- Section 3104 – Pedestrian Walkways & Tunnels (10-15 min.)
- Section 3107 – Signs (10-15 min.)
- Section 3108 – Telecommunication & Broadcast Towers (5-10 min.)
- Section 3109 Swimming Pool Enclosures & Safety Devices (10-15 min.)