



**CITY OF WHARTON
ELECTRICAL BOARD MEETING**

**Wednesday, February 07, 2024
8:00 AM**

***120 EAST CANEY STREET WHARTON, TEXAS
77488***

**NOTICE OF
CITY OF WHARTON
ELECTRICAL BOARD MEETING**

Notice is hereby given that an Electrical Board Meeting will be held on Wednesday, February 07, 2024, at 8:00 AM at the Wharton City Hall, 120 East Caney Street, Wharton, Texas, at which time the following subjects will be discussed to wit:

SEE ATTACHED AGENDA

Dated this 25th day of January 2024.

By: /s/ Phillip Hamlin
Phillip Hamlin, Chairman

I, the undersigned authority, do hereby certify that the above Notice of Meeting of the Electrical Board Meeting is a true and correct copy of said Notice and that I posted a true and correct copy of said Notice on the bulletin board, at the City Hall of said City in Wharton, Texas, a place convenient and readily accessible to the general public at all times, and said Notice was posted on January 25, 2024, at 10:30 a.m. and remained so posted continuously for at least 72 hours preceding the scheduled time of said Meeting.

The Wharton City Hall is wheelchair accessible. Access to the building and special parking is available at the primary entrance. Persons with disabilities, who plan to attend this meeting and who may need auxiliary aids or services such as interpreters for persons who are deaf or hearing impaired, readers, or large print, are requested to contact the City Secretary's Office at (979) 532-4811 Ext. 225 or by FAX (979) 532-0181 at least two (2) days before the meeting date. BRAILLE IS NOT AVAILABLE.

Dated this 25th day of January 2024.

CITY OF WHARTON

By: Paula Favors
Paula Favors
City Secretary



A G E N D A
CITY OF WHARTON
Electrical Board Meeting
Wednesday, February 07, 2024
City Hall - 8:00 AM

Call to Order.

Roll Call.

Review & Consider:

1. Election of Officers.
2. Adopting the 2023 National Electrical Code Book
3. Recommendation to amend the 2023 National Electrical Code.
4. Open Discussion

Adjournment.

City of Wharton
120 E. Caney Street
Wharton, TX 77488

ELECTRIC BOARD

Meeting Date:	2/7/2024	Agenda Item:	Election of Officers.
<p>At this time, the Board may elect officers for the upcoming year.</p> <ul style="list-style-type: none"> A. Chairman B. Vice-Chairman C. Secretary 			
Building Official: Claudia Velasquez		Date: Thursday, February 1, 2024	
Approval: s/			
Chairperson:			

City of Wharton
120 E. Caney Street
Wharton, TX 77488

ELECTRIC BOARD

Meeting Date:	2/7/2024	Agenda Item:	Adopting the 2023 National Electrical Code Book
<p>At this time, the Board may review and discuss the recommendation to the City Council to adopt the City of Wharton Code of Ordinances, Chapter 18, Building and Construction, Article V, Electrical Code, and adopt the National Electrical Code, 2023 Edition.</p>			
Building Official: Claudia Velasquez		Date: Thursday, February 1, 2024	
Approval: /s/			
Chairperson:			

City of Wharton
120 E. Caney Street
Wharton, TX 77488

ELECTRIC BOARD

Meeting Date:	2/7/2024	Agenda Item:	Recommendation to amend the 2023 National Electrical Code.
<p>At this time, the Board may review and recommend amendments to the City of Wharton Code of Ordinances, Chapter 18, Building and Construction, Article V, Electrical Code, 2023 Edition.</p>			
Building Official: Claudia Velasquez		Date: Thursday, February 1, 2024	
Approval: /s/			
Chairperson:			



City of Wharton

120 E. Caney • Wharton, TX 77488
Phone (979) 532-2491 • Fax (979) 532-0181

PLAN REVIEW ATTACHMENT

REFERENCE: CODES AND AMENDMENTS THAT SHALL APPLY TO CONSTRUCTION OF NEW RESIDENTIAL AND/OR COMMERCIAL STRUCTURES.

All references to the International Electrical Code in the Codes adopted above shall be replaced with the National Electrical Code, ~~2017~~2023 Edition.

AMENDMENTS:

Section 18-69 Amendments to the International Building Code.

The building code adopted by reference in this article is amended as follows:

- (1) Reference to ICC Electrical Code is hereby repealed; theretofore, substituted with the National Electrical Code.
- (11) Appendix K. Any discrepancy between requirements set forth by the City of Wharton Electrical Code Ordinance and Appendix K shall result in the more restrictive of the two.

Sec. 18-70 Amendments to the International Residential Code.

The residential code adopted by reference in this article is amended as follows:

- (1) Reference to ICC Electrical Code is hereby repealed; heretofore, substituted with the National Electrical Code.

Sec. 18-70.2. Amendments to the International Property Maintenance Code.

The property maintenance code adopted by reference in this article is amended as follows:

- (1) Reference to the ICC Electrical Code is hereby repealed; heretofore, substituted with the National Electric Code.

Sec. 18-72 Amendments to the International Plumbing Code.

The plumbing code adopted by reference in this article is amended as follows:

- (1) Reference to ICC Electrical Code is hereby repealed; heretofore, substituted with the National Electrical Code.

Sec. 18-73. Amendments to the International Fuel Gas Code.

The fuel gas code adopted by reference in this article is amended as follows:

- (1) Reference to ICC Electrical Code is hereby repealed; heretofore, substituted with the National Electrical Code.

Sec. 18-74. Amendments to the International Mechanical Code.

The mechanical code adopted by reference in this article is amended as follows:

- (1) Reference to ICC Electrical Code is hereby repealed; theretofore, substituted with the National Electrical Code.

Sec. 18-74.1 Addition to the International Mechanical Code.

The mechanical code adopted by reference in this article is added as follows;

- (1) Require the mechanical contractor to mark the air handler legend plates with the appropriate voltage/kw and phase of the installed components at the time of installation. If modifications are made, mark the appropriate electrical information at that time.

Sec. 18-75. Amendments to the International Fire Code.

The fire code adopted by reference in this article is amended as follows:

- (1) Reference to ICC Electrical Code is hereby repealed; heretofore, substituted with the National Electrical Code.

Amendments to the Electrical Code.

Sec. 18-251. Decision on questions. The electrical inspector and the electrical board shall decide all questions not provided for in this article of the installation, operation, or maintenance of electric wiring and apparatus.

Sec. 18-252. Conformity to standards; identification of maker of materials.

- (a) No electrical material, apparatus, device, appliance, fixture, or equipment shall be sold or installed in the city unless it conforms with this article, the statutes of the state, and the rules and regulations issued by the State Department of commerce under the authority of the state statutes.
- (b) The maker's name, trademark, or other identification symbol shall be placed on all electrical materials, apparatus, devices, appliances, fixtures, and equipment used or installed under this article. All items enumerated in this section shall be listed and /or labeled approved by Underwriters' Laboratories, Inc.

Sec. 18-253. Use of approved wiring. In general, any type of electric wiring or wiring system may be used in the city as approved in the national codes adopted in this article, except where specifically prohibited in this article

Sec. 18-254. Services and feeders. The use of service entrance cable type **SE** shall be prohibited use as a Service Entrance conductor.

Sec. 18-255. Placing meters on the street side of buildings. The electrical public service company shall never require the placing of a meter on the front or street side of a building unless not practical to locate the meter otherwise. In such cases, the location shall be at a point convenient to the electric public service company and as determined by the electrical board.

Sec. 18-256. No. 1 Fire Zone Wiring Methods- General Requirements. Wiring for electric light or power installed for general use in buildings or structures located within the No. 1 fire zone limit of the city shall be installed in metal raceways, flexible metal raceways, nonmetallic raceways encased in not less than 50mm (2 in.) of concrete, type MI, MC, or AC cable. Exception: Wiring for special occupancies, special equipment, and or special conditions shall be installed per the provision of the National Electrical Code.

Sec. 18-257. Aluminum cable, conductors, or wire. No aluminum or copper-clad aluminum electric cable, conductors or wire shall be used within the City on any building, structure, or apparatus wiring except as noted in this section.

Aluminum-type conductors may be used in feeders or as service entrance conductors, provided that no such aluminum conductors smaller than number one AWG shall be used. Aluminum conductors, where permitted, shall be installed in conduit and shall only be used in conjunction with compatible lugs, spliced terminals, or connectors. Aluminum conductors shall not be used as grounding electrode conductors. With the exception, of aluminum conductors consisting of either two or three insulated wires wrapped around a messenger cable in sizes number six AWG and larger may be used for outside branch circuits and feeders, provided they are installed under the provisions of the electrical code.

Sec. 18-258. Type UF cable. Type UF electric cable shall be used only for branch circuit wiring on residential properties. Where installed underground, the cable shall be buried under the latest edition of the National Electric Code. The cable shall be protected by rigid conduit on exterior walls and at the points where it enters and leaves the ground.

Sec. 18-259. Back wired wiring devices. The use of back-wired wiring devices shall be prohibited unless all wires are terminated either under the screw or by use of a screw-activated clamp. Terminating wires by a spring tension clamp is expressly prohibited.

Sec. 18-261. Service Equipment. Disconnecting Means for New Construction. The service disconnecting means shall be installed at a readily accessible location outside of a building or structure nearest the point of entrance of the service conductors.

Exception: In large commercial and/or industrial applications, this requirement could be waived by the authority of the City of Wharton Electrical Board.

Flood Zone Requirements:

If a new structure is to be located in Zone AE, an elevation determination is required to be submitted before the issuance of a building permit. An additional elevation certificate is required upon completion of the project to obtain a certificate of occupancy. If a new structure is to be located in a Zone X or Shaded X, the elevation shall be one foot (1') above the curb or adjacent grade, whichever is higher.

NOTE:

All equipment (HVAC) located adjacent to the structure is also required to be elevated above Base Flood Elevation (BFE).

Item-3.

Building Materials (2021)
Legal Q&A
TML Staff

1. What is House Bill 2439?

House Bill 2439 by Representative Dade Phelan (R – Beaumont) was adopted during the 2019 legislative session. The bill was effective September 1, 2019, and is codified at Chapter 3000 of the Texas Government Code (Chapter 3000).

House Bill 2439 generally provides – with some exceptions – that a governmental entity, including a city, may not adopt or enforce a rule, charter provision, ordinance, order, building code, or other regulation that: (1) prohibits or limits, directly or indirectly, the use or installation of a building product or material in the construction, renovation, maintenance, or other alteration of a residential or commercial building if the building product or material is approved for use by a national model code published within the last three code cycles that applies to the construction, renovation, maintenance, or other alteration of the building; or (2) establishes a standard for a building product, material, or aesthetic method in construction, renovation, maintenance, or other alteration of a residential or commercial building if the standard is more stringent than a standard for the product, material, or aesthetic method under a national model code published within the last three code cycles that applies to the construction, renovation, maintenance, or other alteration of the building. *See* TEX. GOV'T CODE § 3000.002(a)(1)-(2).

A rule, charter provision, ordinance, order, building code, or other regulation adopted by a city that conflicts with the prohibitions is void. *Id.* § 3000.002(e).

2. Why was the bill needed?

According to the Texas House Business and Commerce Committee Report:

There have been concerns raised regarding the elimination of consumer and builder choice in construction through overly restrictive local municipal zoning ordinances, building codes, design guidelines, and architectural standards. Critics argue that these restrictive ordinances, codes, guidelines, and standards create monopolies, increase the cost of construction, and ultimately price thousands of Texans out of the housing market. C.S.H.B. 2439 seeks to address these concerns and eliminate the ability of a governmental entity to enact overly restrictive, vendor-driven building regulations.

In other words, the belief was that cities were enacting ordinances that required builders to use products available from only one or a few sources to benefit those vendors. Of course, the bill goes much, much further than that, and soon after its enactment legislators heard from city officials about the bill's detrimental effects.

3. What is meant by a city regulation that “prohibits or limits, directly or indirectly, the use or installation of a building product or material in the construction, renovation, maintenance, or other alteration of a residential or commercial building if the building product or material is approved for use by a national model code published within the last

three code cycles that applies to the construction, renovation, maintenance, or other alteration of the building”?

The best way to understand this core provision of House Bill 2439 is to break it down into two elements:

First, the bill clearly applies only to residential or commercial “buildings.” *Id.* § 3000.002(a)(1). Those terms are not defined, so their normal meaning applies. *Id.* § 311.011. That means it is safe to say that single- and multi-family homes, as well apartments, are subject to the bill’s limitations. Commercial buildings typically include retail and warehouses, but not industrial or more intense uses. A city can define the terms by ordinance, but shouldn’t be unreasonable. In other words, it doesn’t make sense to classify a single-family home as an industrial use. “Construction, renovation, maintenance, or other alteration” appears to cover just about any type of change to a building.

Second, the bill applies to a “building product or material [that] is approved for use by a national model code published within the last three code cycles that applies to the construction, renovation, maintenance, or other alteration of the building.” *Id.* § 3000.002(a)(1).

Most agree that the language above references the International Code Council model codes and a handful of others. Currently, cities should normally be operating under: (1) the International Residential Code (IRC) for residential construction; (2) the National Electrical Code (NEC) for electrical construction in both residential and commercial construction; and (3) the International Energy Conservation Code (IECC) and the International Building Code (IBC) for all construction other than single-family residential. With regard to plumbing codes, a city may be operating under the plumbing provisions of the IRC and/or either the plumbing provisions of the Uniform Plumbing Code (UPC) or International Plumbing Code (IPC). Other ICC Codes include the International Fire Code (IFC), the International Fuel Gas Code (IFGS), the International Property Maintenance Code, and several more. The ICC code cycles update every three years. The last three code cycles as of 2019 are 2018, 2015, and 2012.

Examples of materials allowed by the 2018 IRC for home exteriors include, among others: (1) concrete, stone, or masonry; (2) fiber cement siding; (3) horizontal aluminum; (4) vinyl siding; or (5) wood siding. *See* Table R703.3(1). A city that has, through an IRC amendment or any other regulation, mandated a percent masonry requirement is thus preempted. A builder can now use vinyl siding or wood siding if he or she chooses because those are a “building product or material [that] is approved for use by a national model code published within the last three code cycles that applies to the construction, renovation, maintenance, or other alteration of the building.”

The bill’s prohibitions aren’t limited to aesthetic building products or materials. Any city that has amended any ICC or other code should review those amendments with their building official and legal counsel to determine if an amendment runs afoul of the bill’s prohibitions.

4. What is meant by a city regulation that “establishes a standard for a building product, material, or aesthetic method in construction, renovation, maintenance, or other alteration of a residential or commercial building if the standard is more stringent than a standard for the product, material, or aesthetic method under a national model code published within the last three code cycles that applies to the construction, renovation, maintenance, or other alteration of the building”?

Most agree that any city regulation requiring that a building look a certain way (i.e., above-and-beyond an appearance that comes about through compliance with minimum national model code standards) is prohibited. *Id.* §3000.002(a)(2). Some have argued that architectural features, front elevation requirements, roof pitch, window size, and similar requirements may be preempted.

When faced with the question of whether a city was prohibited by Section 3000.002 of the Government Code from adopting paint color and pattern requirements, the attorney general opined that a court could consider this to be an aesthetic method standard, but that the model codes’ silence as to color palette and pattern could mean that the requirement is allowed. *Tex. Att’y Gen. Op. No. KP-0370 (2021)*. The attorney general determined that an “aesthetic method” concerns procedures or processes to satisfy considerations of beauty or appearance in building construction, renovation, maintenance, or other alterations. *Id.* The attorney general ultimately concluded that whether such a requirement was prohibited was a fact question that could not be addressed in the opinion process. *Id.*

Because these issues are fact-sensitive, each city should consult its attorney on specifics.

5. Can a city continue to adopt local amendments to its building codes?

Yes, but they can’t conflict with the prohibitions in Chapter 3000. A city that adopts a building code governing the construction, renovation, maintenance, or other alteration of a residential or commercial building may amend a provision of the building code to conform to local concerns if the amendment does not conflict with the prohibitions discussed in questions 3 and 4, above. *TEX. GOV’T CODE* § 3000.002(b). In other words, the prohibition against amendments that conflict with House Bill. 2439 overrides authority in other law to make amendments. See, e.g., *TEX. LOCAL GOV’T CODE* §§ 214.212(C); 214.214(B); 214.216(C).

6. May a city use private deed restrictions to require certain materials or methods?

State law authorizes the City of Houston and any city that doesn’t have zoning to enforce certain private deed restrictions. *TEX. LOC. GOV’T CODE* Chapter 212, Subchapter F (an authorized city may enforce a deed restriction that “regulates architectural features of a structure”). Senate Bill 1090, adopted during the 2021 Regular Session, and effective September 1, 2021, also added the City of Horseshoe Bay to Subchapter F.

Senate Bill 1090 provides that Chapter 3000 does not affect “the enforcement of land use restrictions contained in plats and other instruments under Subchapter F, Chapter 212, Local Government Code.” While it preceded adoption of Senate Bill 1090, the attorney general also discussed this issue in Attorney General Opinion Number KP-0333 (2020).

Finally, it's important to note that private deed restrictions between property owners are still enforceable.

7. Does a city have any option at all with regard to controlling building materials or construction methods?

That's debatable, but the obvious method is by agreement. A city can enter into an agreement wherein a person voluntarily agrees to abide by certain standards. For commercial construction, the incentivizing tool could be a Local Government Code "Chapter 380 agreement." For residential and commercial, it could be a "neighborhood empowerment zone" under Chapter 378 of the Local Government Code. Property and/or sales tax abatements could be other options.

8. Are there exemptions from the prohibitions adopted by House Bill 2439?

Yes. The prohibitions in questions 3 and 4, above, do not apply to:

1. a program established by a state agency that requires particular standards, incentives, or financing arrangements in order to comply with requirements of a state or federal funding source or housing program;
2. a requirement for a building necessary to consider the building eligible for windstorm and hail insurance coverage;
3. an ordinance or other regulation that: (i) regulates outdoor lighting for the purpose of reducing light pollution; and (ii) is adopted by a city that is certified as a Dark Sky Community by the International Dark-Sky Association as part of the International Dark Sky Places Program;
4. an ordinance or order that: (i) regulates outdoor lighting; and (ii) is adopted under the authority of state law; or
5. a building located in a place or area designated for its historical, cultural, or architectural importance and significance that a city may regulate through zoning, if the city: (i) is a certified local government under the National Historic Preservation Act; or (ii) has an applicable landmark ordinance that meets the requirements under the certified local government program as determined by the Texas Historical Commission (a city that doesn't meet (i) or (ii) can adopt or enforce a regulation in questions 3 and 4, above, that applies to a building located in a place or area designated on or after April 1, 2019, by the city for its historical, cultural, or architectural importance and significance, if the city has the voluntary consent from the building owner);
6. a building located in a place or area designated for its historical, cultural, or architectural importance and significance by a city, if designated before April 1, 2019;
7. a building located in an area designated as a historic district on the National Register of Historic Places;
8. a building designated as a Recorded Texas Historic Landmark;
9. a building designated as a State Archeological Landmark or State Antiquities Landmark;
10. a building listed on the National Register of Historic Places or designated as a landmark by a city;
11. a building located in a World Heritage Buffer Zone; or
12. a building located in an area designated for development, restoration, or preservation in a

main street city under the main street program.

TEX. GOV'T CODE §§ 3000.002(c)(1)-(12); 3000.002(d).

In addition, the prohibitions do not affect provisions regarding the installation of a fire sprinkler protection system under Section 1301.551(i) of the Texas Occupations Code. *Id.* § 3000.004. Section 1301.551(i) provides that: “[n]otwithstanding any other provision of state law, after January 1, 2009, a municipality may not enact an ordinance, bylaw, order, building code, or rule requiring the installation of a multipurpose residential fire protection sprinkler system or any other fire sprinkler protection system in a new or existing one- or two-family dwelling. A municipality may adopt an ordinance, bylaw, order, or rule allowing a multipurpose residential fire protection sprinkler specialist or other contractor to offer, for a fee, the installation of a fire sprinkler protection system in a new one- or two-family dwelling.”

9. Were additional exemptions adopted in the Eighty-Seventh Legislative Session?

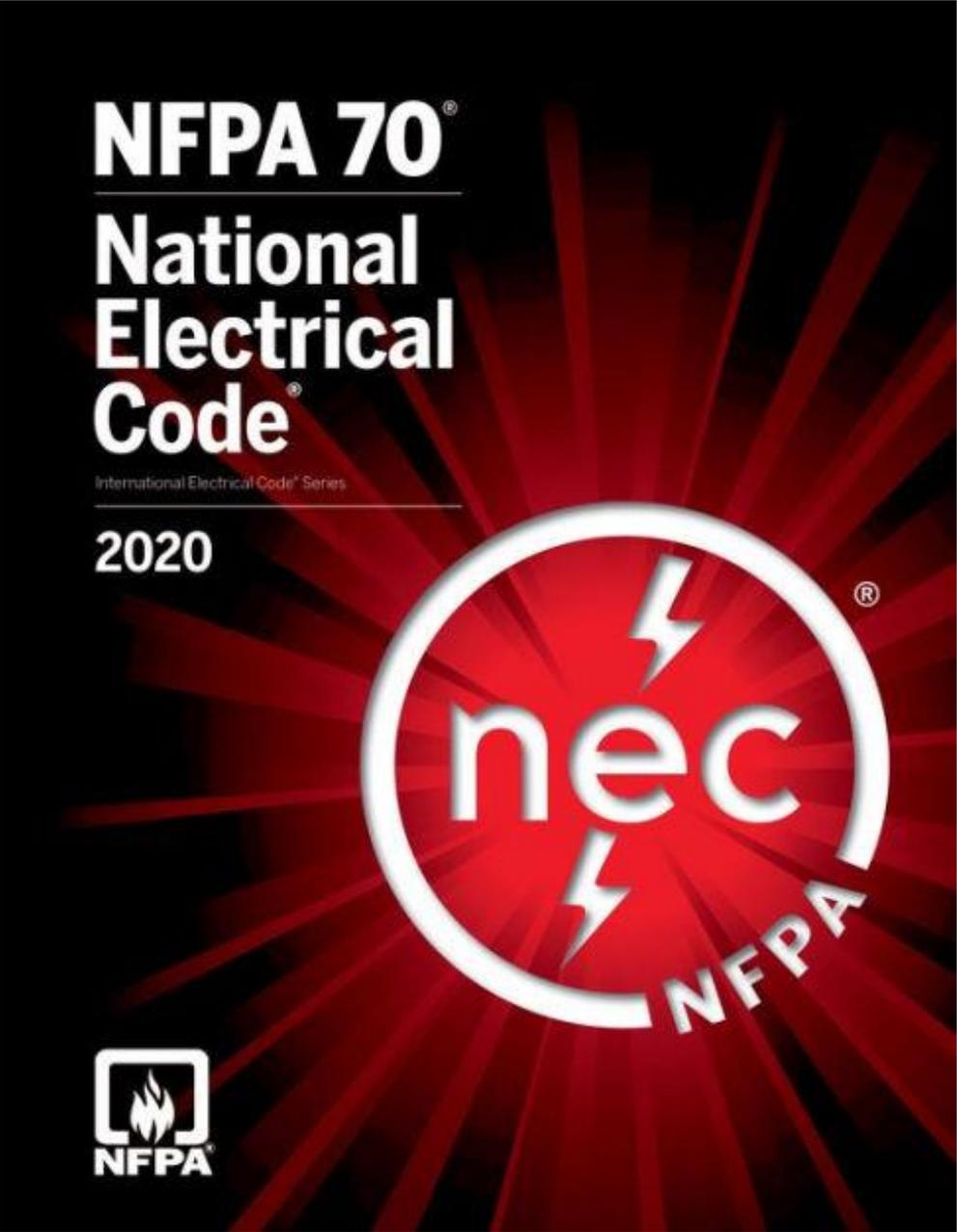
Yes, Senate Bill 1090, effective September 1, 2021, exempts the following from Government Code Section 3000.002:

1. an ordinance or other regulation that regulates outdoor lighting that is adopted for the purpose of reducing light pollution and that is adopted by a city that has adopted a resolution stating the city’s intent to become certified as a Dark Sky Community and that does not regulate outdoor lighting in a manner that is more restrictive than the prohibitions or limitations required to become certified as a Dark Sky Community*;
2. a standard for a plumbing product required by an ordinance or other regulation implementing a water conservation plan or program described by Section 11.1271 or 13.146 of the Water Code; and
3. a standard for a plumbing product imposed by the Texas Water Development Board as a condition for applying for or receiving financial assistance under a program administered by the board.

*To learn more about the requirements for certification as a Dark Sky Community, visit the International Dark-Sky Association website at www.darksky.org. The website also contains a number of example resolutions and ordinances used by Texas cities related to Dark Skies and night sky protection.

10. How are the prohibitions in Chapter 3000 enforced?

The attorney general or an aggrieved party may file an action in district court to enjoin a violation or threatened violation of the statute. *See* TEX. GOV'T CODE § 3000.003. The attorney general may recover reasonable attorney’s fees and costs incurred in bringing an action, and sovereign and governmental immunity to suit is waived and abolished to the extent necessary to enforce the bill. *Id.*



KEY NEC References for Copper-Clad Conductors

NFPA 70 – NEC 2020 Edition

Chapter One Definitions:

Copper-Clad Aluminum Conductors.

Conductors drawn from a copper-clad aluminum rod, with the copper **metallurgically bonded** to an aluminum core, where the copper forms a minimum of 10 percent of the cross-sectional area of a solid conductor or each strand of a stranded conductor. (CMP-6)

110.5 Conductors.

Conductors used to carry current shall be of copper, aluminum, or **copper-clad aluminum** unless otherwise provided in this *Code*. Where the conductor material is not specified, the sizes given in this *Code* shall apply to copper conductors. Where other materials are used, the size shall be changed accordingly.

110.14 Electrical Connections.

Because of different characteristics of dissimilar metals, devices such as pressure terminal or pressure splicing connectors and soldering lugs shall be identified for the material of the conductor and shall be properly installed and used. Conductors of dissimilar metals shall not be intermixed in a terminal or splicing connector **where physical contact occurs between dissimilar conductors** (such as copper and aluminum or **aluminum and copper-clad aluminum**), unless the device is identified for the purpose and conditions of use. Materials such as solder, fluxes, inhibitors, and compounds, where employed, shall be suitable for the use and shall be of a type that will not adversely affect the conductors, installation, or equipment.

Connectors and terminals for conductors more finely stranded than Class B and Class C stranding as shown in Chapter 9, Table 10, shall be identified for the specific conductor class or classes.

310.3 Conductors.

310.3(A) Minimum Size of Conductors.

The minimum size of conductors for voltage ratings up to and including 2000 volts shall be 14 AWG copper or 12 AWG aluminum or **copper-clad aluminum**, except as permitted elsewhere in this *Code*.

310.3(B) Conductor Material.

Conductors in this article shall be of aluminum, **copper-clad aluminum**, or copper unless otherwise specified.

Solid aluminum conductors 8, 10, and 12 AWG shall be made of an **AA-8000 series electrical grade aluminum** alloy conductor material. Stranded aluminum conductors 8 AWG through 1000 kcmil marked as Type RHH, RHW, XHHW, THW, THHW, THWN, THHN, service-entrance Type SE Style U, and SE Style R shall be made of an AA-8000 series electrical grade aluminum alloy conductor material.

310.15 Ampacity Tables.

310.15(A) General.

Ampacities for conductors rated 0 volts to 2000 volts shall be as specified in the Ampacity [Table 310.16](#) through [Table 310.21](#), as modified by 310.15(A) through (F) and [310.12](#). Under engineering supervision, ampacities of sizes not shown in ampacity tables for conductors meeting the general wiring requirements shall be permitted to be determined by interpolation of the adjacent conductors based on the conductor's area.

Table 310.16 Ampacities of Insulated Conductors **With** Not More Than Three Current-Carrying Conductors in Raceway, Cable, or Earth (Directly Buried)

Size AWG or kcmil	Temperature Rating of Conductor [See Table 310.4(A)]						Size AWG or kcmil
	60°C (140°F)	75°C (167°F)	90°C (194°F)	60°C (140°F)	75°C (167°F)	90°C (194°F)	
	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, XHWN, USE, ZW	Types TBS, SA, SIS, FEP, FEPB, MI, PFA, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, XHWN, XHWN-2, XHHN, Z, ZW-2	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, XHWN, USE	Types TBS, SA, SIS, THHN, THHW, THW-2, THWN-2, RHH, RHW-2, USE-2, XHH, XHHW, XHHW-2, XHWN, XHWN-2, XHHN	
	COPPER			ALUMINUM OR COPPER-CLAD ALUMINUM			
18*	—	—	14	—	—	—	—
16*	—	—	18	—	—	—	—
14*	15	20	25	—	—	—	—
12*	20	25	30	15	20	25	12*
10*	30	35	40	25	30	35	10*
8	40	50	55	35	40	45	8
6	55	65	75	40	50	55	6
4	70	85	95	55	65	75	4
3	85	100	115	65	75	85	3
2	95	115	130	75	90	100	2
1	110	130	145	85	100	115	1
1/0	125	150	170	100	120	135	1/0
2/0	145	175	195	115	135	150	2/0
3/0	165	200	225	130	155	175	3/0
4/0	195	230	260	150	180	205	4/0
250	215	255	290	170	205	230	250
300	240	285	320	195	230	260	300
350	260	310	350	210	250	280	350
400	280	335	380	225	270	305	400
500	320	380	430	260	310	350	500
600	350	420	475	285	340	385	600
700	385	460	520	315	375	425	700
750	400	475	535	320	385	435	750
800	410	490	555	330	395	445	800
900	435	520	585	355	425	480	900
1000	455	545	615	375	445	500	1000
1250	495	590	665	405	485	545	1250
1500	525	625	705	435	520	585	1500
1750	545	650	735	455	545	615	1750
2000	555	665	750	470	560	630	2000

- Notes:
- Section 310.15(B) shall be referenced for ampacity correction factors where the ambient temperature is other than 30°C (86°F).
 - Section 310.15(C)(1) shall be referenced for more than three current-carrying conductors.
 - Section 310.16 shall be referenced for conditions of use.

*Section 240.4(D) shall be referenced for conductor overcurrent protection limitations, except as modified elsewhere in the Code.

Item-3.

310.16 – 310.21 Amp Tables

ARTICLE 334 Nonmetallic-Sheathed Cable: Types NM and NMC

Part III. Construction Specifications

334.100 Construction.

The outer cable sheath of nonmetallic-sheathed cable shall be a nonmetallic material.

334.104 Conductors.

The 600-volt insulated power conductors shall be sizes 14 AWG through 2 AWG copper conductors or sizes 12 AWG through 2 AWG aluminum or copper-clad aluminum conductors. Control and signaling conductors shall be no smaller than 18 AWG copper.

ARTICLE 330 Metal-Clad Cable: Type MC

Part I. General

330.6 Listing Requirements.

Type MC cable shall be listed. Fittings used for connecting Type MC cable to boxes, cabinets, or other equipment shall be listed and identified for such use.

330.104 Conductors.

For ungrounded, grounded, and equipment grounding conductors, the minimum conductor sizes shall be 14 AWG copper, nickel, or nickel-coated copper and 12 AWG aluminum or copper-clad aluminum.

For control and signal conductors minimum conductor sizes shall be 18 AWG copper, nickel, or nickel-coated copper, 14 AWG copper-clad aluminum, and 12 AWG aluminum.

ARTICLE 336 Power and Control Tray Cable: Type TC

336.104 Conductors.

For ungrounded, grounded, and equipment grounding conductors, the conductor sizes shall be 14 AWG through 1000 kcmil copper, nickel, or nickel-coated copper and 12 AWG through 1000 kcmil aluminum or copper-clad aluminum. Insulation types shall be one of the types listed in [Table 310.4\(A\)](#) or [Table 310.4\(B\)](#) that is suitable for branch circuit and feeder circuits or one that is identified for such use.

For control and signal conductors, the minimum conductor sizes shall be 18 AWG copper, nickel, or nickel-coated copper, 14 AWG copper-clad aluminum, and 12 AWG aluminum.

240.4 Protection of Conductors.

Conductors, other than flexible cords, flexible cables, and fixture wires, shall be protected against overcurrent in accordance with their ampacities specified in [310.14](#), unless otherwise permitted or required in [240.4\(A\)](#) through (G).

240.4(B) Overcurrent Devices Rated 800 Amperes or Less.

The next higher standard overcurrent device rating (above the ampacity of the conductors being protected) shall be permitted to be used, provided all of the following conditions are met:

- (1) The conductors being protected are not part of a branch circuit supplying more than one receptacle for cord-and-plug-connected portable loads.
- (2) The ampacity of the conductors does not correspond with the standard ampere rating of a fuse or a circuit breaker without overload trip adjustments above its rating (but that shall be permitted to have other trip or rating adjustments).
- (3) The next higher standard rating selected does not exceed 800 amperes.

240.4(D) Small Conductors.

Unless specifically permitted in [240.4\(E\)](#) or (G), the overcurrent protection shall not exceed that required by (D)(1) through (D)(7) after any correction factors for ambient temperature and number of conductors have been applied.

240.4(D)(3) 14 AWG Copper.

15 amperes

240.4(D)(4) 12 AWG Aluminum and Copper-Clad Aluminum.

15 amperes

240.4(D)(5) 12 AWG Copper.

20 amperes

240.4(D)(6) 10 AWG Aluminum and Copper-Clad Aluminum.

25 amperes

240.4(D)(7) 10 AWG Copper.

30 amperes

314.16(B)(1) Conductor Fill.

Each conductor that originates outside the box and terminates or is spliced within the box shall be counted once, and each conductor that passes through the box without splice or termination shall be counted once. Each loop or coil of unbroken conductor not less than twice the minimum length required for free conductors in [300.14](#) shall be counted twice. The conductor fill shall be calculated using [Table 314.16\(B\)](#). A conductor, no part of which leaves the box, shall not be counted.

Exception: An equipment grounding conductor or conductors or not over four fixture wires smaller than 14 AWG, or both, shall be permitted to be omitted from the calculations where they enter a box from a domed luminaire or similar canopy and terminate within that box.

Table 314.16(B) Volume Allowance Required per Conductor

Size of Conductor (AWG)	Free Space Within Box for Each Conductor	
	cm ³	in. ³
18	24.6	1.50
16	28.7	1.75
14	32.8	2.00
12	36.9	2.25
10	41.0	2.50
8	49.2	3.00
6	81.9	5.00

Table 310.12 Single-Phase Dwelling Services and Feeders

Service or Feeder Rating (Amperes)	Conductor (AWG or kcmil)	
	Copper	Aluminum or Copper-Clad Aluminum
100	4	2
110	3	1
125	2	1/0
150	1	2/0
175	1/0	3/0
200	2/0	4/0
225	3/0	250
250	4/0	300
300	250	350
350	350	500
400	400	600

Note: If no adjustment or correction factors are required, this table shall be permitted to be applied.



Type NM-B Cu-Clad Conductor

600V | Premium Building Wire



Copper-Clad Aluminum Conductors



Defined by
CODE

Conductors drawn from a copper-clad aluminum rod, with the copper metallurgically bonded to an AA 8000 series aluminum core, where oxygen-free copper forms a minimum of 10 percent of the cross-sectional area of a solid conductor or each strand of a stranded conductor.

Application Standards — UL (UL-83, UL-719, UL-1581, UL-2556); NFPA 70 (NEC®) Article 334; ASTM-B-566; NEMA RV 2-2011

Conductors — For wire sizes 12-10, solid annealed THHN Copper-Clad Aluminum with solid Copper Clad Aluminum ground. For 8 AWG sizes and larger, stranded annealed THHN Copper-Clad Aluminum with solid Copper-Clad Aluminum ground.

Conductor Insulation — Color-coded Polyvinyl Chloride (PVC) compound meeting the required thickness of Type THHN or THWN-2 with a heat-stabilized Nylon jacket rated for 90°C in dry locations.

Grounding Conductor — For NM-B 12-10 AWG sizes: ground will be 12-10 AWG, solid, annealed conductor. For NM-B 8 AWG sizes and larger: ground will be 8 AWG, solid, annealed.

NM-B Jacket — Made with 30-mil flame retardant and moisture resistant PVC to safety listing standards. Colors according to industry norms and specific application.



- 1) PVC jacket
- 2) Craft paper sleeve
- 3) Listed THHN conductors rated at 90°C
- 4) Listed Copperweld Bimetallic Conductor

Identification, Applications and Usage

Copperweld® Copper-Clad Aluminum Type NM-B (non-metallic sheathed cable) is referenced by Article 334 of the National Electrical Code. OSHA safety listed: UL E492024. ETL listing: 5021266.

Wiring Methods: Per Article 334 of the NEC, Copperweld® Type NM-B shall not be used in wet or damp locations where an electrolyte might be present. It may only be used in dry locations for indoor wiring. Copperweld® NM-B cable should be sized per NEC ampacity table 310.16 using the 60°C column. It may be used as the primary electrical conductor for the residential branch circuit system, providing service for outlets, switches and 240 Volt appliance loads. It cannot be used as a service entry cable, nor can it be buried. Copperweld NM-B must be protected from physical damage per Article 300.4 of the NEC. It must not be installed in locations exposed to corrosive fumes or vapors. Per Article 590, Copperweld® NM-B can be used in temporary installations as feeders and branch circuits for power and lighting. Type NM-B is rated 600-volt for both exposed and concealed work in dry locations, as defined by the National Electrical Code.

Identified for use with wiring devices, splice connectors and equipment terminals rated for Cu, Cu/Al and CO/ALR. When terminating with twist-on splice connectors, pre-twisting is not recommended. Torque until the wires are tight under the cap and visibly twisted together two times outside of the cap to ensure electrical contact. Do not over-torque or under-torque. Ensure secure connection limiting wire deformation. Copperweld® NM-B is made with ASTM B-566 Copper-Clad Aluminum bare wire, which carries its own component listing, RU DVVU2. Copperweld NM-B conductors are suitable to terminate on 15 and 20 ampere rated wiring devices (receptacles and snap switches) marked 'copper only' or 'CO/ALR'. For termination on devices rated 30 amperes or greater, the termination must be marked 'CU/AL' or equivalent. Please consult UL Product IQ guide information RTRT and WJQR if further confirmation is required. Copperweld® NM-B CCA conductor satisfies Article 110.14 Electrical Connections as being a similar metal to copper for the purposes of electrical connections. Copperweld® NM-B may be pigtailed to single-metal copper wire in dry locations. Copperweld® NM-B cable should not be terminated with single-metal aluminum wire without the application of an oxide inhibitor or a terminal or connector specifically listed for the intermixing of dissimilar conductor metals. Copperweld® ASTM B-566 Copper-Clad Aluminum wire is not dissimilar to copper, brass or zinc plated steel.

Copperweld® NM-B Specifications

Type	Size (AWG or KCMIL)	Strands	Standard Jacket Color	Ground Wire Size (Solid AWG)	Insulation Thickness (in)*		Allowable Amperage at 60°C	Outside Diameter (in)	Approx. Weight (lbs/1000 ft)	Standard Packaging	Standard 48x48 Pallet Qty
					PVC	Nylon					
NM-B	12/2-G	1	White	12	0.015	0.004	15	0.191 x 0.403	45.51	250' Coil, 1000' Wood Reel	108/12
NM-B	12/3-G	1	White	12	0.015	0.004	15	0.191 x 0.522	61.25	250' Coil, 1000' Wood Reel	81/12
NM-B	10/2-G	1	Yellow	10	0.020	0.004	25	0.222 x 0.487	67.21	250' Coil, 1000' Wood Reel	81/12
NM-B	10/3-G	1	Yellow	10	0.020	0.004	25	0.222 x 0.637	89.84	250' Coil, 1000' Wood Reel	54/12
NM-B	8/2-G	7	Orange	8	0.030	0.005	35	0.277 x 0.693	123.64	1000' Wood Reel	10
NM-B	8/3-G	7	Orange	8	0.030	0.005	35	0.582	160.67	1000' Wood Reel	10
NM-B	6/2-G	7	Black	8	0.030	0.005	40	0.314 x 0.769	155.65	1000' Wood Reel	10
NM-B	6/3-G	7	Black	8	0.030	0.005	40	0.674	213.06	1000' Wood Reel	10
NM-B	4/2-G	7	Black	8	0.040	0.006	55	0.385 x 0.909	225.49	1000' Wood Reel	8
NM-B	4/3-G	7	Black	8	0.040	0.006	55	0.843	315.91	1000' Wood Reel	4

Ampacity of NM-B conductors are based on NFPA 70 (NEC) Table 310.16 for a temperature rating of the conductors of 60°C according to article 334.80 (Ampacity for NM Cable). See 110.14 (C), 240.4(D), 310.15(B) and 334.80 for other limitations where applicable. Note: Additional ampacity limitations, adjustments or corrections may apply per 310.16, 334.80 and 240.4 of the NEC

* Jacket thickness for NM-B cable is 30 mils

Allowable Ampacities

Jacket Color	Copperweld® Cu-Clad					Standard Copper			
	Cu-Clad AWG	Copper AWG X-ref	60°C (140°F) <small>Types: TW, UF</small>	75°C (167°F) <small>Types: RHW, THHW, THW, THWN, XHHW, USE</small>	90°C (194°F) <small>Types: TBS, SA, SS, THHN, THWN, THW2, THW3, RHW-2, RHW-3, USE-2, USE-3, XHHW, XHHW-2, XHHW-3, XHHW-2, ZW-2</small>	Copper AWG	60°C (140°F) <small>Types: TW, UF</small>	75°C (167°F) <small>Types: RHW, THHW, THW, THWN, XHHW, USE, ZW</small>	90°C (194°F) <small>Types: TBS, SA, SS, THHN, THWN, THW2, THW3, RHW-2, THHN, THWN, THW3, THW3-2, USE-2, XHH, XHHW, XHHW-2, ZW-2</small>
White	12**	Replaces	15	20	25	14**	15	20	25
Yellow	10**	Exceeds by 5 Amps	25	30	35	12**	20	25	30
Orange	8*	Exceeds by 5 Amps	35	40	45	10**	30	35	40
Black/Other	6	Replaces	40	50	55	8	40	50	55
Black/Other	4	Replaces	55	65	75	6	55	65	75

* Refer to 310.15(B)(2) for the ampacity correction factors where the ambient temperature is other than 30°C (86°F).

** Refer to 240.4(D) for conductor overcurrent protection limitations.

City of Wharton
120 E. Caney Street
Wharton, TX 77488

ELECTRIC BOARD

Meeting Date:	2/7/2024	Agenda Item:	Open Discussion
<p>At this time the Board may discuss upcoming items to be placed as agenda items.</p>			
Building Official: Claudia Velasquez		Date: Thursday, February 1, 2024	
Approval: /s/			
Chairperson:			