Significant Changes for The 2018 I-Codes (Mechanical)

Jason Vandever - SPEER
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Tomorrow 1/29 - Meeting Codes and Standards for Direct-Vent Gas Fireplaces
Description: This course presents an introduction to the types of gas fireplaces and vents and covers the applicable codes and standards for direct-vent, factory-built gas fireplaces. Also included are discussions on the protective safety barrier requirements, test methods for fireplace efficiency, and typical steps for installing direct-vent gas fireplaces.
Presenter - Sean Anderson, Ortal USA

Wednesday 2/3 - Eliminating Concrete Moisture through Sustainable Design
Description: Few aspects of the design process are conducted in “silos” as disassociated from one another as how many projects approach interior concrete slab specifications and subsequent flooring specification sections. This is not done intentionally, rather it is by-product of lack of coordination, and fundamental misunderstanding, between those involved with the structural elements and those involved with the aesthetic and finishing elements.

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Agenda

Changes from 2015->2018

- IMC
- IFGC
- IRC
- IECC
- TDLR
- Q&A
El trabajo que hacen es muy IMPORTANTE!

Un recibo de la luz que es más barato puede hacer la diferencia en una pareja de ancianos poder comprar medicamentos y también una madre comprar comida para sus hijos.
COMMERCIAL COOKING APPLIANCES. Appliances used in a commercial food service establishment for heating or cooking food and which produce grease vapors, steam, fumes, smoke or odors that are required to be removed through a local exhaust ventilation system. Such appliances include deep fat fryers; upright broilers; griddles; broilers; steam-jacketed kettles; hot-top ranges; underfired broilers (charbroilers); ovens; barbecues; rotisseries; and similar appliances. For the purpose of this definition, a food service establishment shall include any building or a portion thereof used for the preparation and serving of food.
COMMERCIAL COOKING APPLIANCES. Appliances used in a commercial food service establishment for heating or cooking food. For the purpose of this definition, a commercial food service establishment is where food is prepared for sale or is prepared on a scale that is by volume and frequency not representative of domestic household cooking.
403.3.2.4 **System controls.** Where provided within a dwelling unit, controls for outdoor air ventilation systems shall include text or a symbol indicating the system’s function.
403.3.2.5 Ventilating equipment.

Exhaust equipment serving single dwelling units shall be listed and labeled to provide the minimum required air flow in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51.

This section simply requires fans to be tested, listed and labeled to verify their performance in a laboratory setting, and does not require any field testing of installed fans.
IMC Changes – Ventilation

404.1 Enclosed parking garages

CHANGE SIGNIFICANCE: No technical changes were made, rather the text was rewritten to make it clear that the garage exhaust system can never shut off completely. The exhaust is either full-on all of the time, or it is allowed to be cycled between full-on and minimum-on by CO and NO₂ detectors. “Intermittent” operation implied that the system could shut off completely, which was never the intent. The detectors determine when the exhaust system goes from standby (minimum rate) to the full-on rate. If the system is operated in a continuous mode without detectors, then it would operate at the full-on rate continuously.
IMC Changes – Exhaust Systems

504.4 Exhaust installation. ...Clothes dryer exhaust ducts shall be sealed in accordance with Section 603.9.

504.4.1 ...undiminished in size... termination opening at least 12.5” clear

504.8.2 Where dryer exhaust ducts are enclosed in wall or ceiling cavities, such cavities shall allow the installation of the duct without deformation.
IMC Changes - Exhaust Systems

506.3.13
Exhaust outlets shall be located not less than 10 feet horizontally from or not less than 3 feet above air intake openings into any building.

*5’ Exception

Photo: ICC
506.5.2 POLLUTION CONTROL UNITS

CHANGE SUMMARY: The code added coverage and a definition for pollution control units which are installed in the grease exhaust system to extract smoke, grease particles and odors from the exhaust flow.
507.2.6 Clearances for Type I hood. A Type I hood shall be installed with a clearance to combustibles of not less than 18 inches.

Exception 2:
Type I hoods listed and labeled for clearances less than 18 inches in accordance with UL 710 shall be installed with the clearances specified by such listings.
**IMC Changes – New Duct Type**

603.5.2 **Phenolic ducts.** Nonmetallic phenolic ducts shall be constructed and installed in accordance with the [SMACNA Phenolic Duct Construction Standards](https://www.smacna.org).
IMC Changes – Ducts

603.9 Joints, seams and connections

Snap lock does not need to be sealed inside BTE

The new text relaxes the requirement by allowing such joints and seams that are located inside of the conditioned space to be considered as adequate without additional sealing. Such joints outside of the thermal envelope would have to have additional sealing means applied.
929.1 **General.** Where provided, high-volume large-diameter fans shall be tested and labeled in accordance with AMCA 230, listed and labeled in accordance with UL 507, and installed in accordance with the manufacturer’s instructions.
1105.6.3 Ventilation rate. The minimum required emergency ventilation rate for ammonia shall be 30 air changes per hour in accordance with IIAR2.
IMC Changes – Refrigeration

1. A fire-resistance-rated exit access corridor.
2. An interior exit stairway.
3. An interior exit ramp.
4. An exit passageway.
5. An elevator, dumbwaiter or other shaft containing a moving object.
6. A shaft that has one or more openings into a fire-resistance-rated exit access corridor, interior exit stairway or ramp or exit passageway.

1107.2 Piping location – cleared up previously ambiguous text that could’ve been interpreted to basically prohibit piping anywhere in the path of egress.
IMC Changes – Solar

Solar PV is based on the photovoltaic effect, by which a photon (the basic unit of light) impacting a surface made of a special material generates the release of an electron. Solar thermal, on the other hand, uses sunlight to heat a fluid.

CHANGE SIGNIFICANCE: Chapter 14 was significantly increased in content and it was clarified that the chapter applies only to thermal solar (as opposed to solar photovoltaic) systems. The new text relies on two newly referenced solar product standards developed and maintained by the ICC and the Solar Rating and Certification Corporation. The text addresses the various types of thermal solar system designs, including direct and indirect systems and drain-back systems. Much new text was added addressing: system design and installation, protection from freezing and excess pressure and temperature, protection of potable water and building structure, piping installation and insulation, heat exchanger application, heat transfer fluids, access for roof-mounted equipment and system labeling and signage.
303.3 ...*If it is: installed in a residential bathroom or toilet room having a permanent opening with an area of not less than 100 square inches (0.06 m²) that communicates with a space outside of a sleeping room, bathroom, toilet room or storage closet.
310.2 CSST. This section applies to corrugated stainless steel tubing (CSST) that is not listed with an arc-resistant jacket or coating system in accordance with ANSI LC 1/CSA 6.26. CSST gas piping systems and piping systems containing one or more segments of CSST shall be electrically continuous and bonded to the electrical service grounding electrode system or, where provided, the lightning protection grounding electrode system.
403.4.2 Steel.
Steel, stainless steel and wrought-iron pipe shall be not lighter than Schedule 10 and shall comply with the dimensional standards of ASME B36.10M and one of the following standards:
1. ASTM A53/A53M.
2. ASTM A106.
3. ASTM A312.
Pipe lighter than Schedule 40 shall be connected using press-connect fittings, flanges, brazing or welding.
IRC – Cooktops… Clear as Mud?

M1503 Domestic Cooking Exhaust Equipment

CHANGE SUMMARY: “Domestic cooking exhaust equipment” is the preferred terminology for “kitchen exhaust” because it is more descriptive and includes all of the components of the exhaust system.

RANGE HOODS DOMESTIC COOKING EXHAUST EQUIPMENT

M1503.1 General. Domestic cooking exhaust equipment shall comply with the requirements of this section.

M1503.2 Domestic cooking exhaust. Where domestic cooking exhaust equipment is provided it shall comply with one of the following:

1. The fan for overhead range hoods and downdraft exhaust equipment not integral with the cooking appliance shall be listed and labeled in accordance with UL 507.
2. Overhead range hoods and downdraft exhaust equipment with integral fans shall comply with UL 507.
3. Domestic cooking appliances with integral downdraft exhaust equipment shall be listed and labeled in accordance with ANSI Z21.1 or UL 858.
4. Microwave ovens with integral exhaust for installation over the cooking surface shall be listed and labeled in accordance with UL 923.
M1503.2.1 General. **Open top broiler exhaust.** Domestic **open-top broiler units** shall have be provided with a metal exhaust hood, having a minimum thickness of not less than 0.0157-inch (No. 28 gage). Such hoods shall be installed with a clearance of not less than ¼ inch clearance between the hood and the underside of combustible material or and cabinets. A clearance of not less than 24 inches shall be maintained between the cooking surface and the combustible material or and cabinets. The hood width shall be not less than the width of the broiler unit, and shall extend over the entire unit., discharge to the outdoors and be equipped with a backdraft damper or other means to control infiltration/exfiltration when not in operation.

**Exception:** Broiler units incorporating that incorporate an integral exhaust system, and that are listed and labeled for use without an exhaust hood, need shall not be required to have an exhaust hood.
M1503.2.1 Open top broiler exhaust. Domestic open-top broiler units shall be provided with a metal exhaust hood, having a thickness of not less than 0.0157-inch (No. 28 gage). Such hoods shall be installed with a clearance of not less than ¼ inch between the hood and the underside of combustible material and cabinets. A clearance of not less than 24 inches shall be maintained between the cooking surface and the combustible material and cabinets. The hood width shall be not less than the width of the broiler unit, and shall extend over the entire unit.
Exception: Broiler units that incorporate an integral exhaust system, and that are listed and labeled for use without an exhaust hood, shall not be required to have an exhaust hood.

M1503.3 Exhaust discharge. Domestic cooking exhaust equipment shall discharge to the outdoors through a duct. The duct serving the hood shall have a smooth interior surface, shall be air tight, shall be equipped with a back-draft damper and shall be independent of all other exhaust systems. Ducts serving range hoods domestic cooking exhaust equipment shall not terminate in an attic or crawl space or areas inside the building.
Exception: Where installed in accordance with the manufacturer’s instructions, and where mechanical or natural ventilation is otherwise provided, listed and labeled ductless range hoods shall not be required to discharge to the outdoors.
IRC – Cooktops… Clear as Mud?

M1503.4 **Duct material.** Ducts serving domestic cooking exhaust equipment shall be constructed of galvanized steel, stainless steel or copper.

**Exception:** Ducts for domestic kitchen cooking appliances equipped with down-draft exhaust systems shall be permitted to be constructed of schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:

1. The duct is installed under a concrete slab poured on grade.
2. The underfloor trench in which the duct is installed is completely backfilled with sand or gravel.
3. The PVC duct extends not more than 1 inch above the indoor concrete floor surface.
4. The PVC duct extends not more than 1 inch above grade outside of the building.
5. The PVC ducts are solvent cemented
CHANGE SIGNIFICANCE: For other than open-top broiler units, the IRC does not require kitchen exhaust or a range hood. When exhaust equipment is installed, however, it must meet the material, location, exhaust rate and makeup air requirements prescribed by the code. Previously, Section M1503 was titled “Range Hoods” and contained all of the system requirements for kitchen exhaust, except those for open-top broiler units. The new title for the section, “Domestic Cooking Exhaust Equipment,” is the preferred term. It more accurately describes the function and the various components of a kitchen exhaust system. Because the exhaust requirements for open-top broiler units fit within the scope of domestic cooking exhaust equipment, they have been moved into Section M1503 and the previous Section M1505 has been deleted. The new terminology and other editorial changes more accurately reflect the duct, makeup air and exhaust air requirements for kitchen exhaust. A new charging statement appears in Section M1503.1 to fill a gap in the previous exhaust provisions. It clarifies that when domestic cooking exhaust equipment is installed, it must comply with the requirements of this section. Listing standards related to kitchen exhaust have also been updated. UL 507 Standard for Electric Fans applies to fans and blowers that circulate or ventilate air, or that exhaust air to the outside of a building. Fans that are separate from and serve range hoods and downdraft exhaust equipment must be listed and labeled in accordance with UL 507. For example, the range hood might be custom fabricated or constructed in the field and the fan is installed as a separate component for the exhaust system. The second item in Section M1503.2 relates to equipment with integral fans. An overhead range hood or downdraft exhaust equipment manufactured with the fan as part of the equipment must also comply with UL 507. Other standards, UL 858 or ANSI Z21.1, apply to the cooking appliance, such as a range or cooktop, with integral downdraft exhaust equipment. For microwave ovens that are installed over cooking surfaces and provide exhaust for that cooking appliance, the microwave must be listed and labeled in accordance with UL 923. The provisions for overhead exhaust systems serving open-top broiler units have been moved from Section M1505.1 to Section M1503.2.1 and renamed “Open Top Broiler Exhaust” to more accurately identify the topic. Unlike ranges and conventional cooktops, these units do require overhead exhaust. The code prescribes the materials, dimensions and clearances for this type of exhaust system. The minimum clearances and the applicable standard for microwave ovens installed above domestic cooking appliances have been consolidated in Section M1901 covering other cooking appliances and have been removed from the exhaust systems provisions in Chapter 15. The overall reorganization and modification of Section M1503 and related sections are editorial and are not intended to change any technical provisions.
Makeup air is required for exhaust rates greater than 400 cfm unless all fuel-fired appliances are direct vent or mechanical draft.
# IECC – Demand Controlled Pumps

## Table C403.4.4 Variable Speed Drive (VSD) Requirements for Demand-Controlled Pumps

<table>
<thead>
<tr>
<th>CHILLED WATER AND HEAT REJECTION LOOP PUMPS IN THESE CLIMATE ZONES</th>
<th>HEATING WATER PUMPS IN THESE CLIMATE ZONES</th>
<th>VSD REQUIRED FOR MOTORS WITH RATED OUTPUT OF:</th>
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<tbody>
<tr>
<td>1A, 1B, 2B</td>
<td>—</td>
<td>≥ 2 hp</td>
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<tr>
<td>2A, 3B</td>
<td>—</td>
<td>≥ 3 hp</td>
</tr>
<tr>
<td>3A, 3C, 4A, 4B</td>
<td>7, 8</td>
<td>≥ 5 hp</td>
</tr>
<tr>
<td>4C, 5A, 5B, 5C, 6A, 6B</td>
<td>3C, 5A, 5C, 6A, 6B</td>
<td>≥ 7.5 hp</td>
</tr>
</tbody>
</table>

New Requirements for Variable Speed Drive Pumps
IECC – Economizers… the 2015 😞

Exceptions: Economizers are not required for the following systems.
1. Individual fan systems not served by chilled water for buildings located in Climate Zones 1A and 1B.
2. Where more than 25 percent of the air designed to be supplied by the system is to spaces that are designed to be humidified above 35°F (1.7°C) dew-point temperature to satisfy process needs.
3. Systems expected to operate less than 20 hours per week.
4. Systems serving supermarket areas with open refrigerated casework.
5. Where the cooling efficiency is greater than or equal to the efficiency requirements in Table C403.5(2).
6. Systems that include a heat recovery system in accordance with Section C403.9.5.

**TABLE C403.5(2) EQUIPMENT EFFICIENCY PERFORMANCE EXCEPTION FOR ECONOMIZERS**

<table>
<thead>
<tr>
<th>CLIMATE ZONES</th>
<th>COOLING EQUIPMENT PERFORMANCE IMPROVEMENT (EER OR IPLV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A, 2B</td>
<td>10% efficiency improvement</td>
</tr>
<tr>
<td>3A, 3B</td>
<td>15% efficiency improvement</td>
</tr>
<tr>
<td>4A, 4B</td>
<td>20% efficiency improvement</td>
</tr>
</tbody>
</table>

**TABLE C403.3(2) EQUIPMENT EFFICIENCY PERFORMANCE EXCEPTION FOR ECONOMIZERS**

<table>
<thead>
<tr>
<th>CLIMATE ZONES</th>
<th>COOLING EQUIPMENT PERFORMANCE IMPROVEMENT (EER OR IPLV)</th>
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</thead>
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<tr>
<td>2B</td>
<td>10% efficiency improvement</td>
</tr>
<tr>
<td>3B</td>
<td>15% efficiency improvement</td>
</tr>
<tr>
<td>4B</td>
<td>20% efficiency improvement</td>
</tr>
</tbody>
</table>
IECC – Commercial

New Requirements for:
• Variable air volume and multiple zoned systems
• Energy recovery ventilation
• HVAC systems for guestrooms
• Walk in cooler and freezer efficiencies
• High pressure duct systems
• Grid enabled equipment
IECC – Buried Ducts

Buried Ducts Have Been Approved in 2018 IECC

‘Conditioned Space’ Criteria (for energy modeling)

1. Buried according to R403.3.6 (duct R-value, min. insulation above and below duct).
2. Total system leakage to outside is less than 1.5 CFM per 100sf CFA.
3. Insulation R-value against and above the duct ≥ ceiling R-value – duct R-value.
4. Air handler located within the continuous air barrier and building thermal envelope.

Image courtesy of Home Innovation Research Labs.

High-Performance Ducts in a Vented Attic

Image courtesy of Home Innovation Research Labs
MISSION: To earn the trust of Texans every day by providing innovative regulatory solutions for our licensees and those they serve.
William (Bill) Weatherly
TDLR Program Chief and Chief Inspector for Air Conditioning and Refrigeration

Bill has continuously worked in the Air Conditioning and Refrigeration industry since 1976, after serving a 5 year tour in the US Navy. Previous to his current position, Bill was General Manager of Wattinger Service Company, a commercial AC and Plumbing Company serving Austin and Central Texas. Over his career Bill has worked for the Trane Company, Johnson Controls, and two residential / light commercial companies in the DFW area. Prior to starting his position with TDLR Bill was a member of the Texas State Air Conditioning and Refrigeration Advisory Board.
2018 Mechanical Codes; as adopted by the State of Texas

DECEMBER 28, 2020: Texas Commission Adopts Administrative Rules

The Texas Commission of Licensing and Regulation adopted amendments to an existing rule at 16 Texas Administrative Code, Chapter 75, §75.110, regarding the Air Conditioning and Refrigeration Program. The adopted rule is necessary to align the program’s applicable codes with currently recognized national standards and to provide clarity and consistency for the Department’s licensees.

75.110. Applicable Codes.

(...amended effective January 1, 2021, 45 TexReg 9509)

(a) Effective January 1, 2021, the commission adopts the following applicable codes as referenced in the Act and this chapter:

(1) 2018 International Residential Code;
(2) 2018 International Mechanical Code;
(3) 2018 International Fuel Gas Code; and
(4) 2018 Uniform Mechanical Code.

(b) The 2015 codes shall remain in effect through December 31, 2020. All air conditioning and refrigeration work permitted or started before January 1, 2021, may be completed in accordance with the 2015 code editions.
How does the State’s adoption of the 2018 Mechanical Codes impact Texas AC/R Contractors?

- **Authority having jurisdiction:** the first line of authority is the local municipality. The State does not issue mechanical or electrical permits or inspect for code compliance on initial installations. The State will investigate and inspect when complaints are submitted and verified as legitimate.

- **Sec. 1302.303. MUNICIPAL AIR CONDITIONING AND REFRIGERATION STANDARDS.**

  (a) A municipality may by ordinance adopt and enforce standards for air conditioning and refrigeration contractors that are consistent with the standards established under this chapter.

Texas is a "home rule" state allowing local jurisdictions to adopt amendments to the codes. The amended code must be as stringent as existing state codes. (Section 214.212, Local Government Code) In unincorporated areas, outside of ETJs, the State adopted code versions will apply.

The majority of Texas cities have adopted the 2015 editions of the Mechanical Codes, and many have already adopted the 2018 versions.
When analyzing the monetary impacts of the adoption of the 2018 ICC & IAPMO Mechanical Codes the following was determined by TDLR:

“WE DO NOT FORESEE ADOPTION OF THE 2018 ICC & IAPMO (MECHANICAL) CODES HAVING ANY ADVERSE ECONOMIC EFFECTS ON SMALL OR MICRO BUSINESSES AS THE MAJORITY OF THE REQUIREMENTS ARE CONSISTENT WITH THE 2015 CODES”
Change Type: Addition

**IFGC 2018 CODE: 409.7 Shutoff valves in tubing systems.** Shutoff valves installed in tubing systems shall be rigidly and securely supported independently of the tubing.

**CHANGE SIGNIFICANCE:** Shutoff valves at appliances such as furnaces, water heaters and boilers are typically supported by rigid steel piping, where CSST or other tubing connects to the shutoff valve inlet, and the valve is supported on its outlet side by rigid piping. However, if a shutoff valve, such as a concealed T-handle keyed valve for a fireplace, is installed in a run of CSST or other tubing material, the torque applied to the valve rotating member will transfer to the tubing, causing stress and possible tubing failure. This new code requirement is consistent with the manufacturer's installation instructions for CSST. The method of support could be a bracket made for the purpose or it could be accomplished with securely anchored rigid steel pipe nipples on the inlet and outlet sides of the valve. The intent is to prevent movement and stressing of the tubing.
Examples of Minor Code Changes

**Change Type:** Modification

**IMC 2018 CODE:** 404.1 Enclosed parking garages. Where Mechanical ventilation systems for enclosed parking garages shall operate intermittently continuously or shall be automatically operated such operation shall be automatic by means of carbon monoxide detectors applied in conjunction with nitrogen dioxide detectors. Such detectors shall be listed in accordance with UL 2075 and installed in accordance with their listing and the manufacturers’ recommendations instructions. Automatic operation shall cycle the ventilation system between the following two modes of operation:

1. Full-on at an airflow rate of not less than 0.75 cfm per square foot [0.0038 m³ / (s · m²)] of the floor area served.

2. Standby at an airflow rate of not less than 0.05 cfm per square foot [0.00025 m³ / (s · m²)] of the floor area served.

**CHANGE SUMMARY:** The code text was rewritten to clarify the intent with regard to “intermittent” operation.
SECO partners with Texas local governments, county governments, public K-12 schools, public institutions of higher education and state agencies, to reduce utility costs and maximize efficiency. **SECO also adopts energy codes for single-family residential, commercial, and state-funded buildings.**

Currently the minimum state-mandated code for single-family homes is Chapter 11 of the **2015 International Residential Code**. The applicable code for other residences and commercial and industrial buildings is the **2015 International Energy Conservation Code**.
FOR BUILDING ENERGY CODE QUESTIONS RELATING TO RESIDENTIAL OR COMMERCIAL BUILDINGS, PLEASE CONTACT:

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254.624.5693
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  ACR Program Chief & State Inspector  
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- Mobil: (512) 937-7223  
- Website: https://www.tdlr.texas.gov/acr/acr.htm
More on Return Air…

The Gist… Undercuts Suck (but not enough)

<table>
<thead>
<tr>
<th>Cfm Under Door</th>
<th>Door Width (Inches)</th>
<th>24</th>
<th>30</th>
<th>36</th>
<th>42</th>
<th>48</th>
<th>54</th>
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<td>18.3</td>
<td>16.0</td>
<td>14.2</td>
<td>12.8</td>
</tr>
</tbody>
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Door gap height based on 300 Fpm air velocity though the gap.

Table N3-2

For Airways and Air Distribution Hardware
A new definition in the code…
What is this?

1. A new type of pressure cooking appliance
2. Hospital sterilization equipment
3. COVID-19 virus containment device
4. A gas fired toilet
5. A hydronic pasta maker
Thank you!

Questions?

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william.weatherly@tdlr.texas.gov