A Closer Look Inspection Service

2018 IECC Commercial DFW area handout

The 2018 IECC has been adopted by several cities in the DFW area in 2019. More cities are expected to adopt this modified version of the 2018 IECC in 2020. Each North Central Texas city may have made modifications to their version of the adopted code. Areas of changes in the 2018 IECC are noted in the dark green text. Behind the section number, there is a red Mandatory and must be followed regardless of the Energy path selected. The red Prescriptive and may be used or not may not be used depending on the trade offs allowed by a Performance path demonstrating 2018 IECC compliance. That (M) or (P) designation will remain in existence on subsequent sub sections of that section unless otherwise noted.

C103.6.2 Compliance documentation – The document will include, compliance year for each system, fenestration, and lighting allowance compliance by building area or space by space method

C103.6.2 Systems operation control – Training for maintaining and operating equipment and manuals

C105.1 Required inspections

- **105.2.1** Footings and Foundations (Insulation requirements)
- **105.2.2** Thermal Envelope (Insulation, Air sealing, Fenestration)
- **105.2.3** Plumbing (Insulation, Controls, Heat traps)
- **105.2.4** Mechanical HVAC (equipment sizing, Controls, Damper Leakage)
- **105.2.5** Electrical System (Lighting components and controls)
- **105.2.6** Final (Verify and operate all required building controls and * commissioning if required)

C202 Definitions – Computer Room – rooms dedicated to housing electronic data storage with a power density of less than 20 watts sf or less than 10kW.

C401.2 New Construction and high rise residential will comply with 1 of the following;

- **401.2.1** ASHRAE 90.1
- **401.2.2** C402 (Building Envelope), 403 (Mechanical), 404 (Water Heating) and 405(Lighting) and 1 of Additional Options in 406
- **401.2.3** 402.5 (Air Leakage), 403.2 (HVAC Efficiency), 403.3 - 403.5.5, 403.7, 403.8.1 – 403.10.3, 403.11, 403.12, 404 (Water Heating), 405.2 (Light Controls), 405.3 (Emergency Exits), 405.4 Interior Lighting Requirements, 405.6 (Exterior Lighting) and 405.7 (Individual Metering - To achieve 15% or better in efficiency, C407 (Performance Path)

C402.1 Building Envelope general requirements

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1. Opaque portions meet R value requirements or performance path

2.3 Three year Solar reflective Index 64 ASTM E 1980 or
Three year Solar Reflectance of .55 and Thermal Emittance of .75
ASTM C 1549

3. Fenestration per C402.4

4. Air Leakage at 75 Pa at < .4 cfm/ft2 includes intakes, exhaust openings, stairways, shafts, loading docks and vestibules

402.1.4.1 Steel Stud wall assemblies new correction factor for reducing insulation R value (.35 - .55%) depending on stud depth and spacing

Table C402.1.3 Insulation values in Zone 3 (Prescriptive)

Roof Deck R-25 ci Under Roof R19 + R11 LS Attic R-38
No drop ceiling insulation allowed

Mass Wall R-7.6 ci Commercial / Residential R-9.5ci Metal Bld R13 + R6.5 ci

Metal Framed R-13 +R-7.5 ci Wood framed R-13 + R-3.8ci or R-20

Floor Insulation R - 30 Opaque non swing doors R – 4.75

402.2.3.1 Roof deck insulation shall have not less that 2 layers and staggered joints except at insulation tapers such as at roof drains

402.2.3 Mass walls include walls that weight not less than 35 psf
Have a heat capacity exceeding 7 Btu/sqft

402.4 Fenestration Inspections (Prescriptive)

Fixed Fenestration	U - .46
Operable Fenestration	U - .60
Entrance door	U - .77

Projection Factor = Horizontal awning distance / Vertical glass height

Orientation		SEW	North
Results	PF , .2	.25	.33
	PF .2 ≤ .50	.30	.37
	PF ≥ .50	.40	.40

Skylight	3% max	U - .55	SHGC .35

402.4.1 30% limit of gross wall area for all fenestration

402.4.1.1 40% limit with daylight responsive lighting controls with restrictions

402.4.2 In enclosed area >2,500 sqft with ceiling height >15 feet under a roof with location limitations shall have a Day Lighting zone covering not less that 50% of the floor area

402.5 Air Leakage Inspections (Mandatory)

402.5 Continuous air barrier (inside or outside) unless meets the Building pressure test @ 75 Pa - Use specific materials list in 402.5.1.2.1

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402.5.1.1 Air barrier penetrations (caulk, gaskets or tape)
Wall top plate penetrations sealed on all walls
Seal Bottom plate to foundation / vertical Wall intersections on exterior walls Seal around Windows & Doors & all Building envelope penetrations Seal or gasket Doors / Windows / Fixtures / Junction boxes for outlets & switches

402.5.6 Conditioned loading dock weather seals

402.5.7 Vestibule required for entry openings to > 3000 sqft area or revolving door Air Curtain with 6.56 f/s velocity with manual or automatic controls that operate with opening / closing of the door.

403.1 Mechanical Systems Inspections (Mandatory)

HVAC Systems

403.2.1 Manual J provided according to ASHRAE/ACCA standard 183 *

403.2.2 Ventilation with capability to reduce to Chapter 4 of IMC

403.3.2 Equipment Sizing output capacity – for one of two function systems

403.3.2.1 Tables for minimum HVAC system efficiency requirements

403.4.2 Programmable setback thermostat

403.5.1 Air or Water Economizer required in Type NR above 54,000 Btu and Type R greater than 270,000 Btu –
Exception for equipment with 15% HVAC efficiency improvement

403.5.2 Total supply capacity of all fans cooling units shall not exceed 20% of all fan units in building by 20% or 270,00 BTU (greater than 54,000 BTU / 1,500,000 BTU for greater than 270,00 BTU
Exception for equipment operating less than 20 hr/week. Super markets with open refrigeration cases and for equipment with 15% HVAC efficiency improvement

403.5.3.2 Economizer controls will be configured to automatically reduce outdoor to ventilation minimums if the economizer will not reduce cooling energy use.

403.7.2 Enclosed parking garage ventilation controls to reduce air flow to 50% or less, or reduce operating time by 20% of the occupied time down to ventilation minimums. Controls will automatically increase to design rate with failure of control system

403.7.5 Kitchen exhaust fans will not exceed 10% of hood flowrate

403.8.3 Fans will have FEG (Fan Efficiency Grade) of not less that 67. Total efficiency will be within 15% of operating efficiency

403.8.4 Fan motors between 1/12 and 1 hp will be electronically commutated motors or minimum efficiency of 70.

403.10.1 **Walk in Coolers / Freezers**

1. Automatic closing doors
2. Method to minimize infiltration through doors
3. Walk in Coolers R-25 insulation Walk in Freezers R-32 insulation
4. Walk in Freezers R-28 floor insulation
5. Evaporator fans, 1 hp use electronically communicated motors, brushless direct current motor or 3 phase motors
6. Condenser fan motor < 1 hp use electronically communicated motors, split capacitor type motor or 3 phase motors

403.11.1 HVAC Ducts R – 6 Unconditioned areas R – 8 Exterior Duct sealed with mastic

403.11.2.3 High pressure duct systems (equal to or greater that 3" of water column or 747 Pa) will be pressure tested and the leakage rate less than or equal to 4,

403.11.3 Heating and cooling system piping insulation will be sized per Δ T and Table 403.11.3

403.11.3.1 Piping insulation will be protected for damage by sun, moisture and wind. Adhesive tape is not allowed for this protection

Water Heating Systems (Mandatory)

404.2 Performance efficiency Electric .93 - .97 EF Gas .67 - 80% E

404.3 Integral heat traps required n hot and cold water lines at units.

404.5 Pipe Insulation 1" or R -2 Circulating systems – Hot supply

Interior Lighting (Mandatory)

405.1.2 Lighting systems will comply with one of the following

1. Lighting Controls that comply with 405.2.1 through 405.2.6
2. Luminaire level lighting that monitors occupant activity to brighten or dim when needed. Monitors ambient light levels. Controls for each strategy

Exceptions for security, emergency areas, stairways, exit ramps and passageways.

405.2.1 Occupant sensors in Classrooms, meeting rooms, copy rooms, lounges, break rooms, private offices, restrooms, storage closets, janitor closets, locker rooms, other spaces < 300 sqft and warehouses.

405.2.1.1 Occupant sensors that will turn off lights within 20 minutes of inactivity. Sensor can be manual on or automatic on. Automatic controls will limit to not more that 50%

405.2.1.2 Occupant sensors (other than warehouse) will have automatic shutoff controls within 30 minutes. Manual controls to turn on no more that 50% of lighting power. Full on controls for corridors, stairways, restrooms, entrance area and lobbies.

405.2.1.2 Occupant sensors in warehouses will reduce power by > 50% when areas are unoccupied in each aisleway independently

405.2.1.2 Occupancy sensors in open office plans will be configured to control no more than 600 sf, shut off light within 20 minutes and day light responsive when occupied

405.2.2 Timed switches required for all areas not controlled by occupant sensor with exceptions for sleeping units, patient care spaces, areas where safety is an issue, continuous operation areas and classrooms.

405.2.2.1 Timed switches functions have a 7 day clock, different 7 day types, holiday shutoff, program backup and manual over ride switch that will turn lights on for no more that 2 hours and cover areas < 5000 sqft. Exceptions for malls, arcades, auditoriums, single tenant retail spaces, industrial facilities and arenas. Other exemptions include areas with single luminary, 100 watts, spaces that use less than .6 watts / sqft, corridors, equipment rooms, public lobbies and electrical / mechanical rooms.

405.2.2.2 Light reduction controls – Manual controls that allows occupant to reduce lighting by more than 50% in reasonable pattern by controlling all lamps, alternate rows of lamps, switching middle lamps or switching each lamp. Light reduction controls not required for daylight zones with daylight responsive controls.

405.2.3 Daylight zone controls required in areas with more than 150 watts of general lighting within sidelight or top light daylight zones with exceptions for health care facilities, dwelling and sleeping units and 1st floor of Group A-2 and Group M occupancies.

405.2.3.1 Daylight Responsive control functions – Toplight zone operate independently from sidelight controls. Controls can only be operated by authorized personnel. Calibration mechanism in a ready accessible locations. Offices, classrooms, laboratories and reading rooms will reduce lighting to less than 15% or completely shutting the lights off. Lights in quadrant zones (NEWS) will operate on different controls if more than 150 watts.

405.2.3.2 Sidelight daylight zones include the distance into the building equal to the top of the window to the nearest full height wall and laterally from the edge of the window + 2 feet or the nearest full height wall. Rooftop

monitors will extend laterally the same distance as the height from the floor to the bottom of the monitor or nearest obstruction that is 0.7 time the height of the ceiling and laterally .25 times the height of the ceiling or 0.7 times the height to the nearest obstruction providing that the rooftop monitor is >24 sqft.

405.2.3.3 Top light daylight zones include the distance to the nearest obstruction that is 0.7 time the height of the ceiling or 0.7 times the height of the ceiling.

405.2.4 Specific application controls – Display, accent, supplemental task lighting and lighting equipment for sale will be controlled by an occupant sensor to time switch control that is independent of other lighting controls. Hotel and motel sleeping units will have a control device or system capable of turning off all permanently installed luminaries and switched outlets within 20 minutes after all occupants leave the room. Occupant sensors required in 405.2.1

405.2.5 Light system control will be located in a readily accessible area. Control will be able to see affected lights or identify the area and light status

405.2.6 Exterior Lighting will be automatically shut off at dawn / dusk. Decorative lighting will automatically shut off no more than 1 hour after closing and turn on no earlier that 1 hour before opening. Landscape lighting will automatically turn off or reduce by not less that 30% from midnight to 6 am,1 hour after closing and before opening or during a period of inactivity of not more that 15 minutes.

405.3.2.1 Interior lighting density tables Building Area or Space by Space
See Building Area table on next page

Electric (Mandatory)

405.4.2(3) Individual Lighting Allowances for Exterior tables

405.6.7 Transformers Mandatory – 97.7% + efficiency requirement depending on 2 phase / 3 phase and KVA

405.7 Electric Motors Mandatory – 77 % + efficiency requirement depending on # of poles and open / enclosed motors

405.7 (1) **Electric motor efficiency will have to meet the energy efficiency standards established in Table 405.7(1) – 405.7(4)**

405.8.1 Elevator / Escalator / Moving Sidewalk – Elevator Cab lighting must be > 35 lumens / watt Vent fan efficiency is > 0.33 watts /cfm Escalator moving sidewalk have multiple speed configurations to reduce speed when not in use.

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C406 Additional Efficiency Options (must choose one additional item)

406.2 10% Improved HVAC efficiency

406.3 10% Reduced Lighting Density

406.4 Enhance Lighting Controls – Continuous dimming, individual address luminaries, no more than 8 luminaries controlled together in a daylight zone, individual user control of general illumination in office areas, digital occupancy sensors & functionality test.

406.5 Onsite Renewable .5watt/sqft or 3% energy saving of total building

406.6 Dedicated outdoor air system (independent ventilation system)

406.7 10% Reduced service water heating (waste water recovery or solar water heating meeting 60% of building requirements

406.8 Enhanced Building Envelope that is 15% below its UA requirement.

405.9 Reduced air infiltration – leakage rate does not exceed .25 cfm.ft² at 75 Pa.

Table 405.3.2(1) Interior lighting Power requirements

Automotive facility	0.71
Convention Center	0.76
Courthouse	0.90
Dining: Bar lounge/leisure	0.90
Dining: Cafeteria/fast food	0.79
Dining: Family	0.78
Dormitory	0.61
Exercise center	0.65
Fire Station	0.53
Gymnasium	0.68
Heath Care clinic	0.82
Hospital	1.05
Hotel / Motel	0.75
Library	0.78
Manufacturing facility	0.90
Motion Picture theater	0.83
Multifamily	0.68
Museum	1.06
Office	0.79
Parking Garage	0.15
Penitentiary	0.75
Performing arts theater	1.18
Police Station	0.80
Post Office	0.67
Religious building	0.94
Retail	1.06
School / University	0.81
Sports arena	0.87
Town Hall	0.80
Transportation	0.61
Warehouse	0.48
Workshop	0.90

501.2.1 Existing Buildings -Additions, alterations and repairs Only required to make comply that which you touch and change.

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Infrared – A Closer Look Inc. (IACL) is a full service Energy Company that is ready and prepared to help you meet the challenges of complying with the new **2018 International Energy Conservation Code (IECC)** that has been adopted by the DFW area municipalities. The 2018 IECC has significant changes that affect permitting, inspections pressure testing and commissioning. Pressure testing of the Building Envelope are required to make sure that air infiltration and leakage are kept within regulated tolerances.

Permitting requirements

- Energy Path documentation
- Energy Reports
- Manual J (heat load), Manual S (sizing) and Manual D (duct sizing) calculations
- Green Building programs
- Commercial Building and System Commissioning

Inspections requirements

- Residential / Commercial Energy Inspections
- Commercial lighting density
- Energy Certificate
- Photometric Surveys

Pressure testing requirements

- Residential / Commercial Blower Door testing
- Residential Duct Pressurization testing

Infrared Scans

- Problems resolution using Infrared Scans to locate air leaks, water leaks, block wall grout cores and electrical system commissioning and property Insurance renewal requirements

Infrared – A Closer Look Inc. can provide these energy services to get you quickly and easily through the energy code process. To schedule your energy report, inspection or pressure test, please call our offices at **940-891-3803**.

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