



**City of Houston
Commercial Energy Code Compliance Form
Prescriptive Method – CHAPTER 8 IECC**

Part I - Form. Complete this form using the tables in Part II, and the instructions in Part III.

| | | |
|--|----------------------------|---------------------------|
| 1) Contact Name: / Phone Number: / () | 2) Project Address: | 3) Project Number: |
|--|----------------------------|---------------------------|

| | | |
|--|---|---|
| 4) Is your project exempt? <input type="checkbox"/> YES - check box below <input type="checkbox"/> Historical building – documentation required <input type="checkbox"/> Work does not affect energy compliance (STOP) <input type="checkbox"/> Low Energy Building <input type="checkbox"/> Unconditioned building (MUST STILL MEET ELEC AND PLUMB) <input type="checkbox"/> NO - continue | 5) Project Data Sq. Ft. _____ Project Area (lease, remodel, etc.) Sq. Ft. _____ Total Bldg. Area | 6) Glazing Percentage Sq. Ft. _____ Glazing Sq. Ft. _____ Above Grade Bldg. Envelope Walls = % Glazing <i>(Divide glazing by the above grade wall area and multiply by 100)</i> |
|--|---|---|

| | | |
|--|--|--|
| 7) Type of Occupancy/Use _____ | 8) Using Software? <input type="checkbox"/> YES - check box, attach report from ComCheck EZ 2001 IECC <input type="checkbox"/> NO | 9) Scope of work: (check all that apply) <input type="checkbox"/> New Construction <input type="checkbox"/> Addition <input type="checkbox"/> Remodel <input type="checkbox"/> Other: _____ |
|--|--|--|

10) Compliance Data The proposed work will affect the following areas: (check all that apply)
 Building Envelope Mechanical Electrical Service Water Heating

11) Building Envelope Requirements (Fill in the applicable information or check *Not Applicable*)
 Note: Details must be shown on plans

- A. Insulation** (Check one and complete the table)
 All insulation meets minimums
 Values averaged (If not using software attach calculations)

| Element | Area (Sq. Ft.) | Proposed R-value | Not Applicable |
|---------------------------------|----------------|------------------|----------------|
| Ceiling-Attic | | | |
| Ceiling-Roof | | | |
| Floor over outside air | | | |
| Floors over unconditioned space | | | |
| Walls | | | |
| Basement Walls | | | |
| Crawlspace | | | |

- B. Glazing** (Check one and complete the table)
 All glazing meets minimums
 Glazing Varies – Values averaged (If not using software attach calculations)

| Element | Area (Sq. Ft.) | Proposed SHGC | Proposed U-Factor | Not Applicable |
|---------------|----------------|---------------|-------------------|----------------|
| Windows | | | | |
| Glass Doors | | | | |
| Other Glazing | | | | |

- C. Projection Factor**
 All projection factors are equal for all glazing.
 Projection factors vary—Values averaged.
 (if not using software show calculations)

PROJECTION FACTOR = _____ (If applicable)

12) Mechanical Requirements –
 All equipment is existing YES, stop NO, complete applicable information for new equipment in table below

| Equipment Type (i.e. air conditioner/heat) | Category (i.e. Split System/Single Pkg) | Efficiency Rating (i.e. 10 SEER/ 78% AFUE) | Not Applicable (i.e. Plug in appliance) |
|---|--|---|--|
| | | | |
| | | | |
| | | | |

- Piping shall be insulated to the table in Part II.
- Ducts shall be insulated to R-5 in unconditioned space and R-8 when located outside the building envelope.

Remarks: _____



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INTERIOR LIGHTING POWER FOR COMMERCIAL BUILDINGS (805.4.2)

- EXEMPT FROM LIGHTING BUDGET.** Lighting is being:
- relocated with existing fixtures, or
 - reduced, (explain scope) *Note: In order to qualify for a reduction, it must be shown on the plans _____*

Switching requirements still apply. Stop.

| A | B | C | D | E | F |
|---|--------------------------------------|---|-------------------------------------|----------------------------|---------------------------------------|
| BUILDING OR AREA TYPE | Entire building (W/ft ²) | Tenant area or portion of building (W/ft ²) | Area of building or space (sq. ft.) | Allowed watts (B or C x D) | Actual Watts ^e |
| Auditorium | NA | 1.6 | | | |
| Bank/financial institution ^a | NA | 2.0 | | | |
| Classroom/lecture hall ^b | NA | 1.6 | | | |
| Convention, conference or meeting center ^a | NA | 1.5 | | | |
| Corridor, restroom, support area | NA | 0.8 | | | |
| Dining ^a | NA | 1.4 | | | |
| Exercise center ^a | 1.4 | 1.1 | | | |
| Exhibition hall | NA | 3.3 | | | |
| Grocery store ^c | 1.9 | 2.1 | | | |
| Gymnasium playing surface | NA | 1.9 | | | |
| Hotel function ^a | NA | 2.4 | | | |
| Industrial work, < 20 ft ceiling height | NA | 2.1 | | | |
| Industrial work, ≥ 20 ft ceiling height | NA | 3.0 | | | |
| Kitchen | NA | 2.2 | | | |
| Library ^a | 1.5 | 1.8 | | | |
| Lobby-hotel ^a | NA | 1.9 | | | |
| Lobby-other ^a | NA | 1.0 | | | |
| Mall, arcade or atrium | NA | 1.4 | | | |
| Medical and clinical care ^{b, d} | 1.6 | 1.6 | | | |
| Museum ^b | 1.6 | 1.6 | | | |
| Office ^b | 1.3 | 1.5 | | | |
| Religious worship ^a | 2.2 | 3.2 | | | |
| Restaurant ^a | 1.7 | 1.7 | | | |
| Retail sales, wholesale showroom ^c | 1.9 | 2.1 | | | |
| School | 1.5 | NA | | | |
| Storage, industrial and commercial | 0.6 | 1.0 | | | |
| Theater-motion picture | 1.1 | 1.0 | | | |
| Theater-performance ^a | 1.4 | 1.5 | | | |
| All others | 0.6 | 1.0 | | | |
| | | | | TOTAL ALLOWED WATTS | TOTAL ACTUAL^f WATTS |
| | | | | | |

NA = Not Applicable

a. Where lighting equipment is specified to be installed for decorative appearances in addition to lighting equipment specified for general lighting and is switched or dimmed on circuits different from the circuits for general lighting, the smaller of the actual wattage of the decorative lighting equipment or 1.0 W/ft² times the area of the space that the decorative lighting equipment is in shall be added to the interior lighting power determined in accordance with this line item.

b. Where lighting equipment is specified to be installed to meet requirements of visual display terminals as the primary viewing task, the smaller of the actual wattage of the lighting equipment or 0.35 W/ft² times the area of the space that the lighting equipment is in shall be added to the interior lighting power determined in accordance with this line item.

c. Where lighting equipment is specified to be installed to highlight specific merchandise in addition to lighting equipment specified for general lighting and is switched or dimmed on circuits different from the circuits for general lighting, the smaller of the actual wattage of the lighting equipment installed specifically for merchandise, or 1.6 W/ft² times the area of the specific display, or 3.9 W/ft² times the actual case or shelf area for displaying and selling fine merchandise such as jewelry, fine apparel and accessories, or china and silver, shall be added to the interior lighting power determined in accordance with this line item.

d. Where lighting equipment is specified to be installed, the smaller of the actual wattage of the lighting equipment, or 1.0 W/ft² times the area of the emergency, recovery medical supply and pharmacy space shall be added to the interior lighting power determined in accordance with this line item.

e. Actual watts = Number of fixtures x Watts per fixture

f. Project compliance = Total Actual Watts must be less-than-or-equal-to Total Allowed Watts.

Electrical Eng / Master Elec. / Architect

SIGNATURE: _____

SEAL/LICENSE NO.



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PART II- Basic Code Requirements.

**TABLE 803.3.7 MINIMUM PIPE INSULATION
(thickness in inches)**

| Fluid | Nominal Pipe Diameter | |
|-------------------------------------|-----------------------|--------|
| | ≤ 1.5" | > 1.5" |
| Steam | 1.5 | 3.0 |
| Hot water | 1.0 | 2.0 |
| Chilled water, brine or refrigerant | 1.0 | 1.5 |

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, °C = [(°F)-32]/1.8.

- For piping exposed to outdoor air, increase insulation thickness by 0.5 inch.
- Runouts not exceeding 12 feet in length to individual terminal units.
- Inside pipe diameter.

**AVERAGE WEIGHTED AREA CALCULATION
EXAMPLE**

Given: 4 Windows

2 each of Window Type 1 (W_1) = 15 square feet, U-factor = .72
2 each of Window Type 2 (W_2) = 21 square feet, U-factor = .30

Calculation for average weighted area U-factor:

$$\frac{(15 \times .72) + (15 \times .72) + (21 \times .30) + (21 \times .30)}{15+15+21+21} = \frac{34.2}{72}$$

$$35.7 / 72 = .475$$

Average weighted area U= .475

HOUSTON DESIGN CRITERIA

| Condition | Value |
|-------------------------|-------|
| Winter, Design Dry Bulb | 28 |
| Summer, Design Dry Bulb | 96 |
| Summer, Design Wet Bulb | 80 |
| Degree days heating | 1371 |
| Degree days cooling | 3058 |
| Climate Zone | 3b |

**TABLE 802.2(1-4) ZONE 3b BUILDING ENVELOPE REQUIREMENTS^a
WINDOW AND GLAZED DOOR AREA (0-10 / >10-25 / >25-40 / >40-50) PERCENT OF ABOVE GRADE WALL AREA**

| ELEMENT | CONDITION/VALUE | | |
|---|-----------------------------------|--------------------------------|--------------------------------|
| Skylights (U-factor) | 1 | | |
| Slab or below-grade wall (R-value) | R-0 | | |
| Windows and glass doors Projection Factor < 0.25 0.25 ≤ Projection Factor < 0.50 Projection Factor ≥ 0.50 | SHGC | | U – factor |
| | Any / 0.50 / 0.4 / 0.4* | | Any / Any / 0.7 / 0.7* |
| | Any / 0.6 / 0.5 / 0.5* | | Any / Any / 0.7 / 0.7* |
| | Any / 0.7 / 0.6 / 0.6* | | Any / Any / 0.7 / 0.7* |
| Roof assemblies (R-value) All wood joist/truss Metal joist/truss Concrete slab or deck Metal purlin with thermal block Metal purlin without thermal block | Insulation between framing | | Continuous insulation |
| | R – 19 | | R – 12 |
| | R – 19 | | R – 13 |
| | NA | | R – 12 |
| | R – 19 | | R – 13 |
| | R – 30 | | R – 13 |
| Floors over outdoor air or unconditioned space (R-value) All wood joist/truss Metal joist/truss Concrete slab or deck | Insulation between framing | | Continuous insulation |
| | R – 11 | | R – 4 |
| | R – 11 | | R – 4 |
| | NA | | R – 2 |
| Above-grade walls (R-value) Framed R-value cavity R-value continuous CMU > 8 in. with integral insulation R-value R-value continuous Other masonry walls R-value cavity R-value continuous | No framing | Metal framing | Wood framing |
| | | | |
| | NA | R – 0 / R – 0 / R – 0 / R – 7* | R – 0 / R – 0 / R – 0 / R – 7* |
| | NA | R – 0 | R – 0 |
| | | | |
| | NA | R – 0 | R – 4 |
| | R – 0 | R – 0 | R – 0 |
| | | | |
| | NA | R – 0 | R – 4 |
| | R – 0 | R – 0 | R – 0 |

* Values shown are dependant upon the amount of glazing 0-10 / > 10-25 / > 25-40 / > 40-50 percent.



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III. Form Instructions. *Use these instructions to complete Part I of this form. The instructions are numbered to correspond with the applicable number on the form.*

| Section | Instructions or information |
|-----------------|--|
| 1) | Fill in the name and contact number of the person completing this form. The person who completes this form should have knowledge of the project and the information contained in this form. If a question arises about the plan or form the plan analyst will contact this person at this number. |
| 2) | Enter the project address. |
| 3) | Enter the City of Houston assigned 8-digit project number. |
| 4) | The code allows for certain buildings to be exempted from Energy Code compliance. If the building is classified as historical and designated as such, or as a low energy building using less than 1 watt/sq. ft. or 3.4 Btu/hr, or the work does not affect the energy compliance, the building is exempt. Check the applicable situation and attach this form to the plans—there is no need to continue this form if the building is exempt. Documentation must be provided for the historical exemption. Commercial buildings shall meet the applicable electrical and service water heating requirements, regardless of exempt status. |
| 5) | Enter the square feet of the area that is covered in the permit on the top line. Enter the square feet of the entire building (if different) on the lower line. |
| 6) | Enter the square feet of all of the windows and glass in the building envelope on the top line. For each door with 50% or more glass, figure the area using the entire door area. For doors with less than 50% glass use only the area of the glass. Enter the square footage of the building envelope wall area surrounding the conditioned space on the second line. Using the two numbers calculate the percentage of glazing with the formula shown in this section and enter the correct percentage in the shaded area. As an alternate for additions, when calculating the glazing, you can calculate the areas of new windows and walls or take the values and areas for all of the existing windows and walls if preferred (total building approach). |
| 7) | Fill in the type of occupancy or use that the structure will be used for. |
| 8) | If you are using software to demonstrate compliance, check YES. Attach the summary report. If you are not using Software, check NO. If using hand calculations for average weighed area, attach calculations. |
| 9) | Check the type of work that you will be doing at this address. |
| 10) | Check the applicable boxes for the Energy Systems that will be affected. Building Envelope systems are the structural components of the building that separate conditioned and unconditioned space, i.e. roof, walls, windows, doors and glass. Mechanical applies to the heating, ventilating, and air-conditioning systems inclusive of ducts and refrigerant piping. Electrical applies to the energy consuming elements of the building measured in watts, including light fixtures, receptacles and lighting loads. This term shall also apply to switching. Service water heating applies to the supply of hot water for purposes other than comfort heating. This would include piping and equipment. |
| 11) | Fill in these tables using the Building Envelope Requirements Table in part II on page 3, based on the percentage of glazing as figured in number 6 of this form, Or, fill in the applicable values from the software report, or hand calculations. Insert the square feet of the insulation and glazing as well as the applicable R-values, U-factors, or SHGC. Check whether the figures are averaged or minimums. When using a projection factor, fill in that number on the designated line. |
| 12) | Fill in the type, category and efficiency rating information for any new mechanical equipment being installed. If no new mechanical equipment is being installed or replaced check the box for “all equipment is existing” and stop. |
| LIGHTING BUDGET | Fill in the table for the area or building type to show the allowed Watts per sq.ft and the total actual Watts per sq. ft. If the project is clearly reducing the watts check the EXEMPT FROM BUDGET box and enter the proposed watts and the existing watts in the designated blanks. |