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A large, faint sunflower graphic is centered in the background of the page. The sunflower has a detailed center and several large, pointed petals radiating outwards.

# **Residential Energy Code Submittal Requirements Based on 2018 IRC**

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Questions? Contact staff by calling (913) 715-2200.

## Johnson County, Kansas

### Residential Energy Code Submittal Requirements

The Johnson County Building Code Department has adopted the 2018 International Codes effective July 1<sup>st</sup>, 2020. Included as part of the adoption is the International Residential Code (IRC). The IRC contains specific design and submittal requirements for energy compliance. The submittal requirements for residential energy compliance are outlined below.

Energy code submittals are required for all residential projects in accordance with the applicable provisions of the 2018 IRC. There are three design path options available.

- Option 1: **Prescriptive** path as outlined in 2018 IRC Chapter 11 section N1101.14 through N1104. Using R-Values with no tradeoffs. (REScheck software will support this path with U-factor (tradeoffs within individual components, and UA (tradeoffs between envelope components)
- Option 2: **Simulated Performance Alternative** (Performance) path as outlined in 2018 IRC Section N1105. REScheck software will support this path (keyed to Prescriptive requirements)
- Option 3: **The Energy Rating Index Compliance Alternative** (ERI) path as outlined in 2018 IRC section N1106. HERS Rating Index for climate zone 4 has been amended to accept score of 80 or less as specified in 2018 Table N1106.4. Using RESNET Approved software or any design software such as REM/Rate which are in compliance with 2018 IRC is acceptable.

**Note:** The three options have similar requirements for submittal documents to meet the code requirements including:

- Building thermal envelope information.
- Equipment and appliance sizing as indicated in 2018 IRC section M1401.3 in compliance with ACCA Manual J and S methodologies.
- Above-ground duct system design as indicated in 2018 IRC Section M1601.1. in compliance with ACCA Manual D.
- All “**Mandatory**” requirements as specified in chapter 11 of 2018 IRC, and amended by Johnson County Code of Regulation regardless of any selected option shall be provided.

## Option 1: Prescriptive Path

The prescriptive path requirements for the building envelope are found in 2018 IRC Chapter 11 section N1101.14 through N1104. Unincorporated Johnson County is located in Climate Zone 4, as shown in Table N1101.7. All prescriptive information shall be taken from the various tables from 2018 IRC using Zone 4 requirements.

The prescriptive building envelope submittal shall include, at a minimum, the following information on submitted plans.

- Site specific building address.
- Outline the building thermal envelope on construction plans.
- Clarify “*Air Barrier*” assembled material(s) as prescribed in 2018, IECC section 402.5.1.2.1.
- Insulation materials; R values denoted for each individual area (wall, ceiling, floor, basement walls, etc.).
- Crawl space insulation for structural floors and other crawl space areas. (Specify whether the foundation wall or the structural floor system is to be insulated. See requirements in Section N1102.2.11.)
- Fenestration U factors in Section N1102.3.1
- Duct sealing and insulation in Section N1103.2. Note, Section N1103.3.5 has been deleted. By deleting this section, the building framing cavities still can be used as ducts or plenums return air.
- Manual J, specific to the site.
- Manual D duct design, specific to the building.
- The mandatory lighting equipment in Section N1104.1 has been deleted.
- Specific insulation requirements in Section N1102.2. Note, the wood frame R-Value listed in Table N1102.1.2 for Climate Zone 4 has been amended to R13.

## Option 2: Simulated Performance Alternative Path

The Simulated Performance Alternative Path as explained in Section N1105 of the 2018 IRC. This method still requires mandatory compliance with the following:

- Air leakage in Section N1102.4. Note, In Section N1102.4.1.2, the air leakage rate in Zones 3 through 8 have been amended to 5 air changes per hour. Air leakage testing shall be conducted in accordance with RESNET/ICC 380, ASTM E779 -2010, or ASTM 1827-2011 and reported at pressure of 50 Pascals.
- Maximum fenestration U factor and SHGC in Section N1102.5. and shall be Max 0.48 in climate zone 4.
- System requirements in Section N1103.

The Performance Path method of compliance requires the submittal of energy compliance documents meeting all requirements in Section N1105.4. An Energy Compliance Certificate shall be submitted and accepted **prior** to the scheduling of the final building inspection.

The Building Envelope compliance document shall provide, at a minimum, the following information on the submitted plans.

- Site specific address.
- An inspection checklist documenting the building component characteristics of the proposed design. (Insulation type, values, and location, U value and SHGC of fenestrations).
- Accurate square footage.
- Name and qualifications of the individual completing the compliance report.
- Name and version of the compliance software tool.

**Note:** It is important the insulation values be detailed as to the specific area.

Other details as listed below:

- Duct sealing and insulation.
- Manual J specific to the site.
- Manual D duct design specific to the building.

### **Option 3: Energy Rating Index Compliance Alternative (ERI) path**

Compliance using an Energy Rating Index (ERI) analysis will require field verification and diagnostic testing by an approved and certified Home Energy Rating System (HERS) rater. Each rater shall be considered a special inspector and shall demonstrate competence to the satisfaction of the building official.

The building energy compliance features, HERS field verification requirements, and applicable special feature eligibility criteria shall be identified on a Certificate of Compliance. The builder or subcontractor shall submit all applicable installation certificate documentation. The certificate shall certify that the construction/installation complies with all applicable requirements and complies with all applicable field verification and eligibility criteria. Field verification shall be performed by a HERS rater and documented on applicable Certificate of field Verification and Diagnostic Testing documentation that conforms to required requirements and procedures.

### **ACCA Manual J Submittal Information**

The three compliance paths outlined require the submittal of a Manual J summary at the time of permit application submittal. Manual J is a site specific submittal. All Manual J documents must be calculated using ACCA Manual J, or other approved methods.

All Manual J submittals shall list the specific mechanical equipment to be used and shall include A/C.

All manual J submittals shall match the building envelope compliance information regarding square footage of the building, U values, R values, and shall represent the orientation of the building in a North, South, East, West direction.

Manual J submittals for radiant floor heating systems shall include a manifold layout summary showing tubing size, tubing length, and tube loop spacing for each zone and room.

Customer expectations in terms of temperature and humidity must be addressed along with health, safety, and building code compliance.

## ACCA Manual D Submittal Information

A Manual D duct design is required for each home. The Manual D design must be submitted prior to issuance of permit.

Submit the Manual D design in a schematic format rather than component lists. The design must include take-off locations and size, register size, return air opening size, duct run length and size. Please design with A/C included. The schematic design enables the building inspector to have a document that can be used for inspection.

### Johnson County, KS Design Criteria for Manual J Entries

Elevation:	1100'
Latitude:	38° North
Longitude:	94°
Winter Heating (99% dry bulb):	4
Summer Cooling (1% dry bulb):	96
Coincident (wet bulb):	75
Daily Range:	High (H)
Relative Humidity:	55%
Indoor Design Temperatures:	
Heating	72°
Cooling	75°
Heating Temperature Difference (HTD)	68°
Cooling Temperature Difference (CTD)	21°

SHGC should be taken directly from sticker on glass.  
 If not known, use either the default per 2018 IRC Table N1102.1.2 or the equation  $SHGC = .87 \times SC$  (shading coefficient) in Section 19-23 of Manual J.

Insulation and Fenestration Requirements by Component for Climate Zone 4 <sub>a</sub>								
Window U-Factor	SKYLIGHT U-Factor	CEILING R-Value	WOOD FRAME WALL R-VALUE	MASS WALL R-Value	FLOOR R-VALUE	BASEMENT WALL R-Value	SLAB R-VALUE & Depth	CRAWL SPACE WALL R-Value
.32	.55	49	13	8/13	19	10/13	NR	10/13

a - Amended by Johnson County

## **Required Johnson County Inspections for prescriptive path**

1. **Foundation Insulation.** For insulation that will be covered by backfill.
2. **Fenestration.** For windows, skylights, sliding doors, etc. Factory labels must remain on the glazing to show UF factor, solar heat gain, and air leakage as required in Section N1102.3 and N1102.4.
3. **Thermal Envelope (exterior house wrap).** All house wrap, air barrier or suitable film shall be installed in accordance with manufacturer's recommendations, including overlapping, inside corners and taping. All penetrations through the building wrap have been sealed. Window and door flashing has been installed in accordance with manufacturer's specifications.
4. **Rough Energy Compliance.** All joints, seams and penetrations shall be caulked, foamed, or otherwise gasketed to prevent air leakage. Factory labels must remain on the glazing to show fenestration, solar heat gain and air leakage. Air barriers are in place, including rim joists. Air tight recessed lighting in attic spaces, required dampers (mechanical or gravity) and insulation behind junction boxes in exterior walls shall be in place.
5. **Insulation-Mechanical systems.** This inspection shall be requested after the rough-in inspection has been approved for those cases that duct insulation are not installed at time of Rough-in inspection. This inspection is to verify that all supply and return air ducts outside the conditioned space are insulated in accordance with Section N1103.3. All mechanical and circulation hot water systems shall be insulated in accordance with Section N1103.4 and N1103.5.
6. **Insulation.** This inspection includes all cavity or continuous (blanket) insulation that will be concealed. For blown in attic insulation, baffles at soffit vents, and inch markers every 300 sq. ft. shall be installed at the time of inspection.
7. **Final Energy Compliance Certificate.** A permanent certificate in accordance with section N1101.14 shall be posted on the electrical main service disconnect. The certificate shall be completed by the appropriate builder, rater, or design professional. The certificate shall list the R-values of insulation installed in or on ceiling/roof, walls, foundation wall, and ducts outside of conditioned spaces, as well as U-factors for fenestration and results from air leakage test from duct system. The certificate shall list the type and efficiency rating of heating, cooling and the water heating equipment. Crawl space and unfinished basement walls blanket insulation may be inspected at this time.

### **Note:**

- **Provide access to the attic spaces containing blown-in, sprayed roof/ceiling insulation or mechanical equipment and duct work for proper inspection. The required Insulation marker in accordance with section N1101.10.1.1 shall be visible in vicinity of the attic access in the attic space.**
- **Hers raters will also inspect similar items during their inspection prior to installation of drywall behalf of building codes department.**