Jefferson County Division of Building Safety http://building.jeffco.us
100 Jefferson County Pkwy, Golden CO 80419-3540 303-271-8260 303-271-8282 Fax

Residential Energy Code Submittal Requirements

The Jefferson County Division of Building Safety has adopted the 2009 International Codes effective January 1, 2010. Included as part of this adoption are the International Residential Code (IRC), and the International Energy Conservation Code (IECC). The IECC contains specific design and submittal requirements. The submittal requirements for residential energy compliance are outlined below as determined by the Division.

Energy code submittals shall be required for all residential projects in accordance with the applicable provisions of the 2009 IRC and 2009 IECC. There are four design path options available to the designer.

- Option #1: Prescriptive path as outlined in IRC Chapter 11
- Option #2: Total UA Alternative path (trade-off) as outlined in IRC section N1102.1.3 & IECC 402.1.4
- Option #3: Simulated Performance Alternative (Performance) path as outlined in IECC section 405
- Option #4: A Professional Design

Note: All four options have similar requirements for submittal documents to meet the code requirements including:

- Building envelope information
- A Manual J equipment design in accordance with the IRC section M1401.3
- A Manual D duct design in accordance with the IRC section M1601.1

Option #1 Prescriptive Path

The Prescriptive Path requirements for the building envelope are found in Chapter 11 of the 2009 IRC. Unincorporated Jefferson County is located in Climate Zone 5, as shown in Figure & Table N1102.1. All prescriptive information shall be taken from the various tables using Zone 5 requirements.
The Prescriptive Building Envelope submittal shall include, at the minimum, the following information on the submitted plans.

- Address of the building (this is a site specific submittal)
- Define/ Delineate your Building Thermal Envelope (this information is required to be on the plans rather than a separate document)
- Insulation materials; R values denoted for each individual area (wall, ceiling, floor over garage, 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 of section N1102.2.9)
- Fenestration U factors 402.3
- Duct sealing and insulation. 403.2
- Manual J, specific to the site
- Manual D duct design, specific to the building
- Lighting equipment 404.1
- Specific insulation 402.2

Option #2 Total UA Alternative Path

The total UA alternative path option of showing compliance is found in section N1102.1.3 of the IRC and section 402.1.4 of the IECC. This method is commonly known by users of RESCHECK. The 2009 current version of RESCHECK is available from the Department of Energy. Older versions can not be used to show compliance with the 2009 IRC and IECC. Formerly, the RESCHECK submittal method was used extensively. Some current users of the 2009 RESCHECK are finding that modifications must be made to their designs because of the procedural change that requiring the Building Thermal Envelope to pass on its' own without using the mechanical equipment as part of the trade off. As a result, buildings come closer to meeting the prescriptive path for energy compliance. This is a significant difference from previous versions.

Note: The Building Plans must clearly define and delineate the building thermal envelope.

RESCHECK submittal must include the following information:

- Site specific address: (Evergreen, Conifer, Littleton, Etc.)
- Conditioned floor area
- Insulation Type
- R-value for all areas
- Specify location where the insulation is being used (attic, floor over unconditioned space, walls, floors over air space, etc.) This information must be specific. Merely listing "Wall 1, Wall 2, etc., will not provide sufficient to the Plans Examiner or Building Inspector.
- Specify whether continuous or cavity insulation.
- Using Orientation: "**unspecified**" is not an acceptable description of a wall, window, or door location. Please specify one of the following orientations: "Front, Back, Left, or Right" and include the square footage of the wall, window, or door on each orientation.
- Fenestration U -Factors
- Accurate square footage measurements are critical.

Under the 2009 Codes, the Jefferson County Division of Building Safety requires a site specific submittal. There is no available documented historical evidence to allow the use of 'Worst Case Scenario' in order to make this path work.

Additional required details are listed below:

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

Option #3 Simulated Performance Alternative Path

The Simulated Performance Alternative Path is described in Section 405 of the 2009 IECC. This path still requires mandatory compliance with the following:

- Air leakage (402.4)
- Maximum fenestration U factor (402.5)
- SHGC (402.5)
- Systems (403) requirements.

The Performance Path method of compliance requires the submittal of energy compliance documents but has the additional task of on site inspections to be performed by a 'RESNET Certified Rater' and an Energy Compliance Certificate submitted **prior** to the Final Building Inspection.

The Building Envelope compliance document shall provide, at the 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 and values and location, U value and SHGC of fenestrations)
- Accurate square footage is critical
- Mechanical systems feature
- Name of the individual completing the compliance report
- Name and version of the compliance software tool

Note: It is very important that the insulation values be detailed as to the specific area and the required R-value for that particular area. Listing as R-19/30 for floors, walls or similar is not acceptable.

Other details are required as listed below:

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

Option #4 Professional Design

A letter, stamped and signed by a licensed Colorado professional engineer or architect, shall be submitted with the plans stating the energy design of the building at (specific address) is equal to or better than that of the 2009 International Codes required by the Jefferson County Division of Building Safety.
The Building Envelope submittal shall include, at the minimum, the following information on the submitted plans.

- Address of the building (this is a site specific submittal)
- Define/ Delineate your Building Thermal Envelope (this must be on the blueprint rather than a separate document)
- Insulation materials, R values and where these are being used (wall, ceiling, floor over garage, etc.)
- Crawl space insulation for structural floors and other crawl space areas. (Specify whether you are insulating the foundation wall or the structural floor system. See requirements of section N1102.2.9)
- Fenestration U factors
- Duct sealing and insulation.
- Manual J specific to the site
- Manual D duct design specific to the house

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Manual J Submittal Information

All four compliance paths outlined above require the submittal of a Manual J at the time of plan/permit application submittal. The Manual J is a **site specific** submittal. All Manual J documents must be calculated using one of the three ACCA accredited programs. Currently, these are limited to Wrightsoft, Nitec, and Elite.

Attached to this document is a list of the specific prescriptive design criteria to be used for the Jefferson County Division of Building Safety. The prescriptive criteria shall not be altered, or interpolated. Any submittal that does not use the prescriptive design criteria or alters it in any way will be rejected without review. The design values provided are extracted from the specific tables in the Manual J.

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

All Manual J submittals shall match the building envelope compliance information regarding square footage of the building, U values and 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, length of tubing, and tube loop spacing for each zone and each room.

Jefferson County Design Criteria as needed for Manual J entries:

Elevation:	Below **7400 ft**	Above **7400 ft**
Latitude: **39** degrees north		
Winter heating 99% Dry Bulb:	**-7**	**-11**
Summer Cooling 1% dry bulb:	**95**	**90**
Coincident wet bulb:	**59**	**59**
Design Grains difference at 50**%** RH:	**-39 to -45**	**-39 to -45**
Daily Range:	**High (H)**	**High (H)**
Relative Humidity:	**50%** winter and summer	
Indoor Design temperatures:		
Heating:	**72** degrees	**72** Degrees
Cooling:	**75** Degrees	**75** Degrees
Heating Temperature Difference **(HTD):**	**79** degrees	**83** degrees
Cooling Temperature Difference **(CTD):**	**20** degrees	**15** degrees

SHGC: While not required per table 402.1.1 of the IECC the SHGC is still required data for Manual J.

SHGC should be taken directly from sticker on glass.
If not known, either use default as per table 102.1.3(3) of the IECC or equation **SHGC= .87 x SC(shading Coefficient) under 19-23 of Manual J**.
Altitude Correction Factor **(ACF): Site specific to elevation (See Address Wizard)**

Wind Velocity Values are **15 mph** for heating and **7.5 mph** for cooling