



**Department of Community Development
Building Division**

4800 West 92nd Avenue Westminster, Colorado 80031
For Information call (303) 658-2075 Fax (303) 706-3922
www.westminsterpermits.com

Residential Energy Code Submittal Requirements

On October 1, 2010, the City of Westminster adopted the 2009 I-Codes including the International Residential Code, and the International Energy Conservation Code. The IRC and IECC contain specific design and submittal requirements. The submittal requirements for residential energy compliance are outlined below as determined by the City of Westminster.

Energy code submittals are required for all residential projects in accordance with the applicable provisions of the 2009 IRC and IECC. Replacement of equipment and/ or extensions of existing systems require compliance with code, but currently do not require submittal of documentation.

Compliance shall be demonstrated by either meeting the requirements of the International Residential Energy code (IECC) or meeting the requirements of Chapter 11 of the International Residential Code (IRC).

A complete set of energy documents must address envelope compliance, heat and cooling loads, systems, and lighting.

All three of the path options have similar requirements for submittal documents to meet the code requirements. You must submit the building envelope information, a Manual J load calculation and Manual S equipment selection in accordance with the IRC section M1401.3, and a Manual D duct design in accordance with the IRC section M1601.1.

ENVELOPE COMPLIANCE

The designer has three design path choices. As the applicant you must decide if you are using: #1 the Prescriptive path as outlined in IRC Chapter 11, #2 the Total UA Alternative (trade-off) as outlined in IRC section N1102.1.3 & IECC 402.1.4, or #3 the Simulated Performance Alternative (Performance) path as outlined in IECC section 405.

PRESCRIPTIVE PATH

The prescriptive path requirements for the building envelope are found in Chapter 11 of the IRC. The City of Westminster is located in climate zone 5 in accordance with table N1101.2. All prescriptive information shall be taken from the various tables using zone 5 requirements.

At a minimum, the Prescriptive Building Envelope submittal **must include the following information on the submitted house plans:**

1. Address of the building (this is a site specific submittal)



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2. Define/ Delineate your Building Thermal Envelope (this must be on the blueprint rather than a separate document)
3. Insulation materials, R values and where these are being used (wall, ceiling, floor over garage, etc.)
4. 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)
5. Fenestration U factors
6. Duct sealing and insulation. Applicant must include information on who will be performing the duct sealing testing as required per IRC N1103.2.2.
7. Air Sealing and Infiltration: Applicant must include information on who will be performing the blower door testing as required per IRC N1102.4.2.1. At this time the visual inspection option found in N1102.4.2.2 is not available.
8. Manual J specific to the site. Designer must use the Westminster Manual J Design Criteria (Attachment 1) when inputting information into Manual J Calculations. All R-Value and U-Factor information in the Manual J must match that of the REScheck or Performance path approach, if submitted.
9. Manual D duct design specific to the house

TOTAL UA ALTERNATIVE PATH

The total UA alternative path method 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 version of REScheck is currently available from the Department of Energy. You cannot use older versions to show compliance with the 2009 IRC and IECC. In the past, the REScheck submittal method has been commonly used. Many current users of the 2009 REScheck are seeing modifications to their designs. This has been caused by the procedural change that requires the Building Thermal Envelope to pass on its' own without using the mechanical equipment as part of the trade off. As a result, the buildings are closer to meeting the prescriptive path for energy compliance. This is a significant difference in the 2006 and 2009 Energy Codes from previous versions.

The building plan must clearly define and delineate the building thermal envelope.

RESCHECK submittal must include the following information:

1. Site specific address and building model and elevation
2. Insulation type, R-value for all areas, and specify 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 be sufficient to allow the Plans Examiner and Building Inspector to be able to determine which wall you



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considered to be “Wall 1” etc. You must also specify if this is continuous or cavity insulation.

3. Using Orientation: “unspecified” will not be acceptable when describing a wall, window, or door location. Please specify either orientation: “front, back, left, or right” and the square footage of the wall, window, or door on each orientation.
4. Fenestration U -Factors
5. Accurate Square footage.
6. R-Value will be listed for insulation only and not for any framing materials. REScheck already has that information programmed in to its calculations.

Other details are required as listed above in the Prescriptive Path.

SIMULATED PERFORMANCE ALTERNATIVE PATH (Performance)

The Simulated Performance Alternative Path is found only in the 2009 IECC in section 405. This path still requires mandatory compliance with air leakage (401), maximum fenestration U factor (402.5) and SHGC (402.6), and 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 certified Rater. The Rater must be certified by RESNET.

Submittal of the energy compliance document (often known as a HERS rating) is required along with a Manual J at the time of plan/permit submittal. Again these documents are required to be site specific.

At a minimum, the building envelope compliance document must provide the following information:

1. Site specific address.
2. An inspection checklist documenting the building component characteristics of the proposed design. (insulation type and values and where used, U value and SHGC of fenestrations)
3. Accurate square footage.
4. Mechanical systems feature.
5. Name of the individual completing the compliance report
6. Name and version of the compliance software tool.

It is very important that the insulation values not be listed as R-19/30 for floors, walls or similar. This must be detailed as to the specific area and what is the required R-value for that particular area.



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Other details are required as listed above in the Prescriptive Path.

SYSTEMS

Manual J Submittal Information

All three of the 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 five ACCA accredited programs. Currently, these are limited to Elite RHVAC, Wrightsoft Right-J8, Nitek HVAC wizard, Adtek Acculoads, Florida Solar Energy Center's Energy gauge.

Attached to this document is a list of the specific prescriptive design criteria to be used in the City of Westminster. This prescriptive criteria is not to be altered, or interpolated. Any submittal that does not use the prescriptive design criteria will be rejected without review. The design values we have 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 shall include A/C. Equipment shall be sized in accordance with ACCA Manual S.

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

Manual D Submittal

A manual D duct design is required for each home. The Manual D submittal may be deferred, but please be advised this document must be submitted a minimum of 2 weeks prior to rough inspection. Please design the Manual D with a/c included.

The Manual D submittal must be a schematic design rather than just a list of pipe sizes and lengths or equivalent duct lengths. The design must include take-off locations and sizes, register sizes, return air opening size, duct run length and size. The schematic design enables the building inspector to have a document he or she can inspect from.

Manual D documentation shall include a ACCA friction rate worksheet.



WESTMINSTER

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General Information

The city will consider the submission of energy documents based on a worst case basis for use under a master plan development. Contractors must demonstrate that the project meets the city established standards for master plan project energy submittals (Attachment 2)

As we continue thru this process we will contact the residential builders with further information regarding any changes to our submittal requirements.

The City of Westminster Building Inspection staff will be in contact with the residential builders to discuss the changes to the inspection program as a result of the adoption of the energy codes.

The City of Westminster Building Division appreciates the cooperation of all of the builders and designers in this matter. Your continued cooperation will keep this process moving forward and help to allow us to review your plans and issue permits in a timely manner.



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ATTACHEMENT 1

Westminster Design Criteria as needed for Manual J entries:

Outdoor Design Conditions: Per Table 1A:

(Use criteria for Fort Collins not Denver or Boulder with exception of Elevation.)

Elevation: **5300 ft**

Latitude: **40** degrees north

Winter heating 99% Dry Bulb: **1** degree

Summer Cooling 1% dry bulb: **91**

Daily Range: **High (H)**

Relative Humidity: **30-40%** winter and **50%** summer

Indoor Design temperatures:

Heating: **70** degrees

Cooling: **75** Degrees

Heating temperature Difference (HTD): **69** degrees

Cooling Temperature Difference (CTD): **16** 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 from the NFRC published data.

If not **known, either use default as per table 102.2(3) of the IECC or equation SHGC= .87 x SC(shading Coefficient) under A4-5 of Manual J.**

Altitude Correction Factor (ACF): **.84**

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

For a/c sizing, SHR is per Manual S. Manual J Sensible Load / Manual J Total Load. The use of the default value of .75 is not acceptable unless demonstrated by calculation.

Per manual S, section 3-4, a/c cooling capacity is not to exceed the total cooling load by more than 15%.

Cooling equipment must be sized per Manual S, section 3. Extended performance date is to be provided.



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ATTACHMENT 2

**CRITERIA FOR ACCEPTANCE OF ENERGY DOCUMENTS
UNDER A MASTER PLAN APPROACH**

The submission of energy compliance documentation under a master plan approach can involve just one element or a combination of the various requirements. On one project, just the envelope compliance might be accepted whereas on another project, the envelope and Manual J/S might qualify, but not the Manual D element. On another, all three elements might be accepted.

The approval of energy documentations under a master plan approach is intended to simplify the work and cost for both the contractor and City. Under a master plan approach, the intent is to review and approve the various elements (envelope, Manual J, Manual D, etc) only **ONCE** for each master plan model. By following this approach, the energy documents for an element approved under a master plan approach are **NOT** to be provided with the lot specific individual permit packages. If this can not be achieved, then lot specific, orientation specific, permit specific energy submittals are required.

Master plan projects can involve models and elevations with very little changes to architectural elements or amounts of conditioned space. Others may involve major changes in conditioned space, or have substantial architectural elements that substantially affect heating and cooling loads on the structure based on orientation. Some projects accepted under a master plan approach simply do not allow the energy documents to be submitted under a master plan approach. Some projects may be accepted under the master plan approach for the architectural and structural plans, but will require site specific energy documents.

To qualify for submission under a master plan approach, the following criteria must be met:

- The conditioned space variations between best case (smallest configuration architecturally and best orientation) and worst case (largest configurations architecturally and worst orientation) can not be more than 10%. If more than 10%, contractor to supply Manual J and Manual S documentation for both best case and worst case, demonstrating that equipment sizes are the same and not affected by the different space configurations or orientations. If the Manual S results in different equipment sizes, site specific Manual S will be required.
- Manual J to be run with 8 standard orientations and the a/c tonnage can not differ by more than ½ ton (after SHR and altitude adjustments). Site specific Manual S are required if the difference in tonnage exceeds ½ ton (6000 btu/hr).



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- If the ductwork configuration changes; because of changes in conditioned space due to architectural options or because of changes between unfinished areas being finished, then site specific manual Ds are required. The City will look at a master plan approach to the Manual D if the contractor can provide a design that shows the TEL is not affected by the different architectural configurations and the additional duct runs required by the added architectural spaces are accounted for (dashed lines and drawing notes?).
- The City may require an air balance report on the first home built under each master plan. If an air balance is required, the air balance report is to be provided to the City's field inspection staff at final inspections. Air balance reports may also be required on subsequent homes built off of a particular master model. The air balance need not be performed by an independent third party. The jobsite Inspection Record Card will be clearly marked "Air Balance Required by Final inspection" on those houses the City determines an air balance is required.