

Plan Submittal Energy Requirements for Additions/Alterations

1. Introduction

Montgomery County has adopted and is currently enforcing the 2021 Edition of the International Energy Conservation Code (IECC). Permits for alterations, repairs, additions and change of occupancy of existing buildings and structures submitted after on or after March 31st, 2025, shall comply with the provisions of Chapter 5 of the 2021 IECC as amended by Montgomery County Executive Regulation 13-24.

2. Montgomery County Climate Zone

The code establishes many requirements such as wall and roof insulation *R*-values, window and door thermal *U*-factors as well as provisions that affect the mechanical systems based upon the climate where the building is located. Montgomery County is in Climate Zone 4A. The table below represents the thermal criteria for Montgomery County:

Climate Zone	Thermal Criteria	
	IP Units	SI Units
4A	CDD50°F ≤ 6,300 and 3600 < HDD65°F ≤ 5,400	CDD10°C < 3500 and 2000 < HDD18°C ≤ 3000

CDD: Cooling degree day
HDD: Heating degree day
For SI: °C = [°F-32]/1.8

The indoor design temperatures used for heating and cooling load calculations shall be a maximum of 72° F (22° C) for heating 75° F (24° C) for cooling.

3. Plan Submittal Requirements

Energy Compliance Path must be selected using the Energy Compliance Worksheet:

1. Energy Compliance Worksheet (pages 3-4)

In addition to the worksheet the following requirements for all options must be provided as applicable to the project:

1. The exact location of the building thermal envelope shall be marked out on the plans, details, and cross-sections.
2. Provide all insulation *R*-values or *U*-factors, materials, and locations to be installed (walls, ceilings, cantilever floors, floors over garage, crawl space, basement walls, etc.).
2. Provide all fenestration *U*-factors for all glazing for each window and door per Table R402.1.2
3. Area-weighted *U*-factors and SHGC calculations (If applicable).
4. Mechanical system design criteria form prepared by a licensed mechanical contractor See page 5.

5. Mechanical and service water heating system and equipment types sized and efficiencies.
6. Equipment and system controls
7. Duct sealing, duct and pipe insulation, and location
8. Air sealing details depicted to verify compliance with Table R402.4.1.1
9. Documentation for mechanical ventilation, type of ventilation, CFM, and efficiency R403.6
10. Documentation that shows all lighting is high efficacy and show interior and exterior lighting controls

The information required in points 1 and 2 can be summarized on worksheets located on pages 3 and 4. The remaining information can be captured on the drawings in schedules, notes, and other supplementary worksheets or calculations.

4. PRESCRIPTIVE COMPLIANCE (Total UA Alternative or REScheck™)

Provide a copy of REScheck calculations. The submitted REScheck printout shall show all the following specific information: orientation of each individual wall; insulation types, R-values and whether continuous or cavity; accurate square footage; and accurate window and door sizes and the specific wall in which they are located, along with the U factor.

REScheck™

Montgomery County accepts REScheck™ program as a tool for energy code compliance.

<https://www.energycodes.gov/rescheck>

Before printing the report make sure to choose the 2021 IECC and input specific building information.



2021 IECC Residential Energy Compliance for Additions and Alterations

All new residential additions/alterations where conditioned space has been increased, must comply with the residential provisions of Chapter 5 of the 2021 IECC Applicants must select one compliance path option from page 1. Additional compliance documentation must be submitted with this form for the Total UA Alternative, Total Building Performance or Energy Rating Index Compliance path options.

R-Values
R402.1, R402.2, R402.3.1 through R402.3.5 and R402.4

Table R402.1.3 Minimum R-values and Fenestration Requirements by Component (2021 IECC)											
	Climate Zone	Fenestration	Skylight	Glazed Fenestration SHGC	Ceiling	Wood Frame Wall R-value	Mass Wall R-value	Floor R-value	Basement Wall	Slab R-value & Depth	Crawl Space Wall R-value
Required	4 Except Marine	0.3	0.55	0.4	60	30 or 20 & 5ci or 13 & 10ci or 0 & 20 ci	13	19	10 ci or 13	10 ci, 4 ft	10ci or 13
Provided											

U-Factors
R402.1, R402.2, R402.3.1 through R402.3.5 and R402.4

Table R402.1.2 Maximum Assembly U-Factors and Fenestration Requirements (2021 IECC)											
	Climate Zone	Fenestration U-Factor	Skylight U-Factor	Glazed Fenestration SHGC	Ceiling U-Factor	Wood Frame Wall U-Factor	Mass Wall U-Factor	Floor U-Factor	Basement Wall U-Factor	Crawl Space Wall U-Factor	
Required	4 Except Marine	0.30	0.55	0.40	0.024	0.045	0.098	0.047	0.059	0.065	
Provided											

Total UA Alternative
R402.1, R402.2, R402.3.1 through R402.3.5 and R402.4

Additional compliance report required
RE Scheck-Web
<https://energycode.pnl.gov/REScheckWeb/#/login>

MD Prescriptive R-Value Alternative
R402.1.3.1

Table R402.1.3 Insulation minimum R-values and Fenestration Requirements by Component (2021 IECC)											
	Climate Zone	Fenestration U-Factor	Skylight U-Factor	Glazed Fenestration SHGC	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
Required	4 Except Marine	0.3	0.55	0.4	49	20 or 15 & 3ci	13	19	10 ci or 13	10 ci, 4ft	10ci or 13
Provided											

Must select Additional Energy Feature to equal or exceed 6% from Table 1 – Next Page

Total Building Performance R405

Additional Compliance Report required

Conditioned Sunroom R402.2.12

Required	Ceiling R-19	Walls R-13
Provided		

MD Alternative Packages

Table 1 MD Alternative Additional Packages—Must select one or more options to meet or exceed 6%. R402.1.3.1		
<input type="checkbox"/> 1	≥ 2.5% reduction in total UA	3%
<input type="checkbox"/> 2	≥ 5% reduction in total UA	2%
<input type="checkbox"/> 3	> 7.5% reduction in total UA	2%
<input type="checkbox"/> 4	0.22 U-factor windows	3%
<input type="checkbox"/> 5	High performance cooling system (Greater than or equal to 18 SEER and 14 EER air conditioner)	3%
<input type="checkbox"/> 6	High performance cooling system (Greater than or equal to 16 SEER and 12 EER air conditioner)	3%
<input type="checkbox"/> 7	High performance gas furnace (Greater than or equal to 96 AFUE natural gas furnace)	5%
<input type="checkbox"/> 8	High performance gas furnace (Greater than or equal to 92 AFUE natural gas furnace)	4%
<input type="checkbox"/> 9	High performance heat pump system (Greater than or equal to 10 HSPF/16 SEER air source heat pump.)	8%
<input type="checkbox"/> 10	High performance heat pump system (Greater than or equal to 9 HSPF/16 SEER air source heat pump.)	8%
<input type="checkbox"/> 11	Ground source heat pump (Greater than or equal to 3.5 COP ground source heat pump.)	8%
<input type="checkbox"/> 12	Fossil fuel service water heating system (Greater than or equal to 82 Btu fossil fuel service water-heating system.)	5%
<input type="checkbox"/> 13	High performance heat pump water heating system option (Greater than or equal to 2.0 UeH electric service water-heating system.)	8%
<input type="checkbox"/> 14	High performance heat pump water heating system. (Greater than or equal to 3.2 UeH electric service water-heating system.)	8%
<input type="checkbox"/> 15	Solar hot water heating system (Greater than or equal to 0.4 solar fraction solar water-heating system.)	8%
<input type="checkbox"/> 16	More efficient HVAC distribution system. (100 percent of ductless thermal distribution system or hydronic thermal distribution system located completely inside the building thermal envelope.)	10%
<input type="checkbox"/> 17	100% of ducts in conditioned space. (100 percent of duct thermal distribution system located in conditioned space as defined by Section R403.3.2.)	12%
<input type="checkbox"/> 18	Reduced total duct leakage. (When ducts are located outside conditioned space, the total leakage of the ducts, measured in accordance with R403.3.5, shall be in accordance with one of the following: a. Where air handler is installed at the time of testing, 2.0 cubic feet per minute per 100 square feet of conditioned floor area. b. Where air handler is not installed at the time of testing, 1.75 cubic feet per minute per 100 square feet of conditioned floor area.	1%
<input type="checkbox"/> 19	2 ACH50 air leakage rate with ERV or HRV installed. (Less than or equal to 2.0 ACH50, with either an Energy Recovery Ventilator (ERV) or Heat Recovery Ventilator (HRV) installed.)	10%
<input type="checkbox"/> 20	2 ACH50 air leakage rate with balanced ventilation. (Less than or equal to 2.0 ACH50, with balanced ventilation as defined in Section 202 of the 2021 International Mechanical Code.)	4%
<input type="checkbox"/> 21	1.5 ACH50 air leakage rate with ERV or HRV installed. (Less than or equal to 1.5 ACH50, with either an ERV or HRV installed.)	12%
<input type="checkbox"/> 22	1 ACH50 air leakage rate with ERV or HRV installed. (Less than equal to 1.0 ACH50, with either an ERV or HRV installed.)	14%
<input type="checkbox"/> 23	Energy Efficient Appliances (Minimum 3 appliances not to exceed 1 from each type with follow efficient- class. Refrigerator - Energy Star Program Requirements, Product Specification for Consumer Refrigeration Products, Version 5.1 (05/05/2021), Dishwasher - Energy Star Program Requirements for Residential Dishwashers, Version 8.0 (01/29/2016), Clothes Dryer - Energy Star Program Requirements, Product Specification for Clothes Dryers, Version 1.1 (03/05/2017) and Clothes Washer - Energy Star Program Requirements, Product Specification for Clothes Washers, Version 8.1 (02/05/2018)	7%
<input type="checkbox"/> 24	Renewable Energy Measure.	11%

I hereby certify that the building design represented in the attached construction documents has been designed to meet or exceed the requirements of 2021 Edition International Energy Conservation Code (IECC)

Project Address: _____

Applicant Signature: _____ Date: _____



Residential Plans Examiner Review Form for HVAC System Design (Loads, Equipment, Ducts)



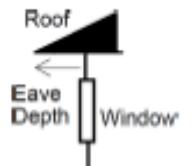
2425 Reddie Drive, 7th Floor, Wheaton, MD 20902
Phone: 311 in Montgomery County or (240)777-0311
<http://www.montgomerycountymd.gov/permittingservices>

Contractor _____
Mechanical License # _____
Building Plan # _____
Home Address (Street or Lot#, Block, Subdivision) _____

REQUIRED ATTACHMENTS	ATTACHED
Manual J1 Form (and supporting worksheets):	Yes <input type="checkbox"/>
or MJ1AE Form (and supporting worksheets):	Yes <input type="checkbox"/>
OEM performance data (heating, cooling, blower):	Yes <input type="checkbox"/>
Manual D Friction Rate Worksheet:	Yes <input type="checkbox"/>
Manual S Equipment Selection form:	Yes <input type="checkbox"/>
Duct distribution system sketch:	Yes <input type="checkbox"/>

HVAC LOAD CALCULATION (IRC M1401.3)

Design Conditions	Building Construction Information
Winter Design Conditions	
Outdoor temperature _____ °F	Building
Indoor temperature _____ °F	
Total heat loss _____ Btu	Orientation (Front door faces) _____ <small>North, East, West, South, Northeast, Northwest, Southeast, Southwest</small>
Summer Design Conditions	
Outdoor temperature _____ °F	Number of bedrooms _____
Indoor temperature _____ °F	Conditioned floor area _____ Sq Ft
Grains difference _____ Δ Gr @ _____ % Rh	Number of occupants _____
Sensible heat gain _____ Btu	Windows
Latent heat gain _____ Btu	Eave overhang depth _____ Ft
Total heat gain _____ Btu	Internal shade _____ <small>Blinds, drapes, etc.</small>
	Number of skylights _____



HVAC EQUIPMENT SELECTION (IRC M1401.3)

Heating Equipment Data	Cooling Equipment Data	Blower Data
Equipment type _____ <small>Furnace, Heat pump, Boiler, etc.</small>	Equipment type _____ <small>Air Conditioner, Heat pump, etc.</small>	Heating CFM _____ CFM
Model _____	Model _____	Cooling CFM _____ CFM
Heating output capacity _____ Btu <small>Heat pumps - capacity at winter design outdoor conditions</small>	Sensible cooling capacity _____ Btu	
Auxiliary heat output capacity _____ Btu	Latent cooling capacity _____ Btu	
	Total cooling capacity _____ Btu	

HVAC DUCT DISTRIBUTION SYSTEM DESIGN (IRC M1601.1)

Design airflow _____ CFM	Longest supply duct: _____ Ft	Duct Materials Used (circle) Trunk Duct: Duct board, Flex, Sheet metal, Lined sheet metal, Other (specify) _____
External Static Pressure (ESP) _____ IWC	Longest return duct: _____ Ft	
Component Pressure Losses (CPL) _____ IWC	Total Effective Length (TEL) _____ Ft	Branch Duct: Duct board, Flex, Sheet metal, Lined sheet metal, Other (specify) _____
Available Static Pressure (ASP) _____ IWC	Friction Rate: _____ IWC	
<small>ASP = ESP - CPL</small>	<small>Friction Rate = (ASP × 100) ÷ TEL</small>	

I declare the load calculation, equipment selection, and duct system design were rigorously performed based on the building plan listed above, I understand the claims made on these forms will be subject to review and verification.

Contractor's Printed Name _____ Date _____
Contractor's Signature _____

Reserved for use by County, Town, Municipality, or Authority having jurisdiction.