



TOWNSHIP OF CRANFORD BOROUGH OF GARWOOD



ADDITION, NEW CONSTRUCTION, GARAGE REQUIREMENTS

Please note: These are guidelines to assist homeowners in preparing drawings for permits. If the homeowner of a single-family, owner occupied dwelling cannot prepare their own plans according to the guidelines set for the N.J.A.C. 5:23-2.15, they must have drawings designed by a NJ Licensed Architect. Any use other than an owner occupied, single family dwelling, requires plans designed by a NJ design professional. Not that not all code requirements have been mentioned and are subject to change with State mandates.

A completed zoning application must accompany all permits, along with the applicable zoning fee. Depending on the extent of the work, and location (i.e. in a flood zone), your plans may require additional engineering prior approvals. Please submit 2 copies of the property survey with your permit, indicating size and location of the proposed construction, in addition to any other structures on the property (pool, deck, shed, etc).

Two sets of neat, clear and legible plans are required, including, but not limited to, the following:

- ☑ **Energy Calculations:** Two most common ways to achieve compliance are through the Energy website: www.energycodes.gov download and complete the ResCheck package or choose a Prescriptive Package.
- ☑ **Footing and Foundation Details:** Show minimum footing depth at 36" below finished grade, footing width and thickness. Foundation block size and height. Dampproofing/Waterproofing. Perimeter foundation drain and discharge location. Foundation venting for crawl space types and an anchor bolt type and spacing.
- ☑ **Slabs on Grade:** Minimum 8" above grade and 4" minimum thickness. Vapor barrier of 6 mil plastic over 4" of compacted gravel. Insulation r-value, thickness and locations. Note that slabs below grade shall be protected with a perimeter drain discharging to a sump pump or by gravity to any approved point of discharge.
- ☑ **Framing:** Provide floor plan showing size and area of new construction including floor & ceiling joist, girder sizes, spans, spacing and connection details between new and existing. Cross section of wall construction showing materials being used, spacing, heights, header sizes and spans.
- ☑ **Sheathing:** State size, type and thickness of all wall, floor and roof sheathing
- ☑ **Insulation:** For insulation requirements, please refer to the attached DCA Bulletin 15-4
- ☑ **Attic Ventilation and Access:** Show venting at upper roof area and at eaves. Note that cathedral type ceilings require continuous ventilation from eave to ridge. Attic access to be a minimum 22" x 30" or large enough to permit the replacement of any equipment and a 30" clearance from top of ceiling joist to bottom of rafter.
- ☑ **Door Sizes:** Size and location of all bedroom, bathroom and closet doors. Need Minimum of a 3'0" x 6'8" for main entry door.
- ☑ **Window Sizes:** Provide one egress type window for each bedroom with 5.7 clear feet of opening for 2nd floor sleeping rooms. Most 3'0" x 4'6" double hung windows meet these requirements (check manufacturers specs). All habitable rooms and spaces required natural or mechanical ventilation.
- ☑ **Smoke Detectors:** Any increase in habitable area from 5% to 25% will require a hard-wired, interconnected smoke detector with battery backup on each level, including the basement. Any increase

of more than 25% in habitable area will require a hard-wired interconnected smoke detector with battery backup on each level, including the basement, and one in every bedroom, new and existing.

- ☑ **Attached garage separation:** Door opening from a private garage to a living space shall be 1 $\frac{3}{8}$ " solid core door or a 20 minute rated door. No doors from a garage shall enter into a sleeping room. Garages with habitable space above shall be protected by a 1-hour fire separation or as per **R309.2 (FTO) Separation** required. The floor-ceiling assembly shall consist of two layers of $\frac{5}{8}$ " thick, Type X gypsum wallboard. The base layer shall be applied at right angles to the joists with 1 $\frac{1}{4}$ " minimum drywall screws or nails at 24 inches on center. The face layer shall be applied at right angles to the joists with 1 $\frac{7}{8}$ " minimum drywall screws or nails at 12 inches on center. The face layer joints shall be offset from the base layer joints by a minimum of one joist bay. The joints of the face layer shall be taped and provided with a minimum of one layer of spackle. Insulation may be installed in this floor-ceiling assembly. There are no restrictions on the installation of utilities above the ceiling membrane. There are no restrictions on the type of flooring to be used as the top membrane; if unusable space is located above a portion of the assembly, then no top membrane is required.
The load-bearing walls are required to be provided with one layer of $\frac{5}{8}$ " thick, Type X gypsum wallboard applied at right angles to the studs and secured with a minimum of 1 $\frac{1}{4}$ " drywall screws or nails at 12 inches on center. The joints of the wallboard shall be taped and provided with a minimum of one coat of spackle. Insulation may be installed in this wall. This wall is required to be continuous to the underside of the ceiling membrane above.
- ☑ **Mechanical Ventilation:** State type and locations of mechanical ventilation with manufacturers specs on equipment. Certification from heating and cooling contractor that existing system is sized to handle the space.
- ☑ **Interior/Exterior Finishes:** State type and thickness of interior/exterior wall, ceiling, siding and roofing finish materials. All kitchen floors to have an impervious surface. **R702.4.2 Cement, fiber-cement and glass mat gypsum backer.** Cement, fiber-cement or glass mat gypsum backers in compliance with ASTM C 1288, C 1325 or C 1178 and installed in accordance with manufacturers' recommendations shall be used as backers for wall tile in tub and shower areas and wall panels in shower areas. Provide gutters, leaders, and splash blocks.
- ☑ **Wood span tables:** Tables for span and sizing of floor joists, ceiling joist, rafters, interior / exterior header support and girders can be found at the State Department of Community Affairs website under the newly adopted ICC codes for NJ at www.state.nj.us/dca/codes.

Checklist of Items Required for Additions/New Construction/Garages

- Construction Permit Application Jacket
- Building Subcode Technical Section
- Electrical Subcode Technical Section
- Plumbing Subcode Technical Section
- Fire Subcode Technical Section
- Application for Certificate
- Zoning Permit Application
- Survey to scale with addition indicated (2 copies)
- Neat, clear and legible construction plans (2 copies)
 - Foundation plan
 - Framing detail & cross section
 - Current floor plan and proposed floor plan
 - Electrical layout
 - Plumbing riser diagram
 - Elevation details & grading plan
- Energy Calculations
- Square footage and Cubic footage of the proposed addition.
- Breakdown of addition and alteration costs, as well as breakdown of roofing and siding
- Manufacturer specifications on all mechanical equipment
 - Chimney Verification



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Date: December 2015
Supersedes Bulletin No. 11-1

Subject: Energy Subcode Compliance

Reference: N.J.A.C. 5:23-2.15(f)1.vi,
2.18(b) and 3.18

The Uniform Construction Code requires applicants to show compliance with the Energy Subcode as part of the permit application process for a newly-constructed building or an addition; rehabilitated buildings must meet the requirements under N.J.A.C. 5:23-6, the Rehabilitation Subcode.

Note: Buildings not heated or cooled do not have to meet the Energy Subcode.

Compliance methods vary dependent on climate zone and building type. The Energy Subcode separates the State into two climates zones as follows:

Zone 4A – Atlantic, Burlington, Camden, Cape May, Cumberland, Essex, Gloucester, Hudson, Middlesex, Monmouth, Ocean, Salem and Union counties;

Zone 5A – Bergen, Hunterdon, Mercer, Morris, Passaic, Somerset, Sussex and Warren counties.

The Energy Subcode divides buildings into two categories: low-rise residential and commercial, which includes all buildings that are not low-rise residential.

PERMIT APPLICATION/PLAN REVIEW

The following is a description of the alternatives for documenting energy subcode compliance at the time of permit application.

Low-rise residential buildings are defined as one- and two-family dwellings or multiple-family buildings three stories or less in height. Compliance must be in accordance with the Energy Subcode and the 2015 International Energy Conservation Code (IECC), and for low-rise residential buildings, may be demonstrated in one of four ways:

1. COMPLIANCE WITH CALCULATIONS: This has been the traditional way that compliance with energy codes has been shown. It involves calculating the "U" value (thermal transmittance) of the various building components (walls, floors, roofs, etc.) and showing that they are less than the code-specified maximum for

BULLETIN NO.

15-4

BULLETIN

the components. Guidance on how to perform the calculations can be found in the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE) Handbook of Fundamentals.

2. COMPLIANCE WITH RESCHECK SOFTWARE: The software program performs the calculations based on input about the shape and size of the building, the type of insulation and windows and the type of equipment that the applicant proposes to use. The software is available as a free download from the website: <http://www.energycodes.gov>. The 2015 IECC version of the software should be used and can be selected under "Code" in the menu bar at top. The software simply requires the input of the areas of the various components, the R value of insulation, and the U value of windows and doors. Based on Section R402.1.5, entitled "Total UA alternative," the software automatically gives trade-offs. A compliance report is generated by the software program, which is to be submitted with the permit application. It must meet or exceed the 2015 IECC ("passes" by zero percent or better) based on the applicable climate zone location specified for each municipality.

Note: REScheck is the software most commonly used to demonstrate compliance with the energy subcode. However, the US Department of Energy does list other building energy software tools that can be used in lieu of REScheck as long as the tool chosen determines compliance with the provisions of the 2015 IECC, specifically the building envelope and HVAC requirements. These tools can be found at <http://www.buildingenergysoftwaretools.com>.

3. COMPLIANCE WITH CLEAN ENERGY PROGRAM FOR RESIDENTIAL NEW CONSTRUCTION (FORMERLY NJ ENERGY STAR HOMES): This program is sponsored by the New Jersey Board of Public Utilities through its Clean Energy Program (see <http://www.njcleanenergy.com/residential>). The program provides incentives and technical assistance for projects that exceed the Energy Subcode. A letter of enrollment (typically the "builder's acknowledgment" letter) from the NJ Clean Energy Program "market manager" should be submitted with the permit application if the applicant is choosing this compliance option. Inspections for this program are handled by Home Energy Rating company, except that Section R403, entitled "Systems," of the 2015 IECC must be verified by the local construction office. Upon application for a new home's Certificate of Occupancy, the program's verification summary (i.e. passing final inspection report) should be submitted.

4. COMPLIANCE WITH PRESCRIPTIVE PACKAGE: Previous adoptions of the energy subcode allowed for the use of a prescriptive package based on climate zone location and window-to-wall ratios. Following are the applicable portions of Table R402.1.2 of the 2015 IECC that can be applied as a prescriptive package. The applicant need only identify that he/she is using the prescriptive package and then show the corresponding details on the plans. If a proposed building has U factors (a measure of the windows' efficiency) that are equal to or lower than the values found on the appropriate line in the chart, and R values that are equal to or higher than those listed in the chart, the building complies.

BULLETIN NO.

15-4

BULLETIN

Climate Zone	INSULATION AND PENETRATION REQUIREMENTS BY COMPONENT*										
	Roof/Flat U-factor ^b	Walls U-factor ^b	Windows U-factor ^b	Doors U-factor ^b	Floors U-factor ^b	Basement U-factor ^b	Attic U-factor ^b	Roof Deck U-factor ^b	Skylight U-factor ^b	Penetration U-factor ^b	Other U-factor ^b
4A	0.35	0.55	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
5A	0.32	0.55	NR	NR	NR	NR	NR	NR	NR	NR	NR

Note: Table R402.1.2 applies to typical wood-framed construction. Steel-framed construction equivalents are different and may be found in Table R402.2.6 of the 2015 IECC.

Regardless of the compliance method chosen, the documentation must be signed and sealed by a design professional, except that in Class 3 buildings, as described at N.J.A.C. 5:23-4.3A(d), the documentation may be signed and sealed by the HVAC contractor, and in the case of a single-family detached dwelling where the homeowner resides or intends to reside in the dwelling, the homeowner may sign the energy code compliance documentation.

Commercial buildings are defined as all buildings other than low-rise residential buildings. Compliance must be in accordance with the Energy Subcode and 2013 ASHRAE Standard 90.1, and for commercial buildings, may be demonstrated in one of two ways:

- COMPLIANCE WITH CALCULATIONS:** This is very much like the calculations for low-rise residential buildings mentioned above. However, the applicant must also provide information on the type of lighting installed and its usage. *Tip: For building thermal envelope, use Tables 5.5-4 and 5.5-5, as applicable, for a starting point in your calculations.*
- COMPLIANCE WITH COMCHECK SOFTWARE:** This is very much like the REScheck software mentioned above. However, the applicant must also include the type of lighting installed and its usage. The COMCHECK software is available as a free download from the website: <http://www.energycodes.gov>. The 2013 ASHRAE Standard 90.1 version of the software should be used and can be selected under "Code" in the menu bar at top. A compliance report is generated by the software program, which is to be submitted with the permit application. It must meet or exceed the 2013 ASHRAE ("passes" by zero percent or better) based on the applicable climate zone location. *Tip: For building thermal envelope, use Tables 5.5-4 and 5.5-5, as applicable, for a starting point in your calculations.*

BULLETIN NO.
15-4

BULLETIN

BULLETIN NO.
15-4

BULLETIN

Note: COMcheck is the software most commonly used to demonstrate compliance with the energy subcode. However, the US Department of Energy does list other building energy software tools that can be used in lieu of COMcheck as long as the tool chosen determines compliance with the provisions of the 2013 ASHRAE Standard 90.1, specifically the building envelope, lighting, HVAC, and service water heating requirements. These tools can be found at <http://www.buildingenergysoftwaretools.com>.

Regardless of the compliance method chosen, the documentation must be signed and sealed by a design professional, except that in Class 3 buildings, as described at N.J.A.C. 5:23-4.3A(d), the documentation may be signed and sealed by the HVAC contractor.

INSPECTION

Work done in low-rise residential buildings is inspected to verify:

- (1) The insulation specified on the plans is the insulation installed.*
 - (2) The sealing (air tightness) of the building thermal envelope (this may be done through either a visual inspection or a blower door test), and*
 - (3) Duct tightness through an air leakage test.*
- A further explanation of these inspection responsibilities follows.*

Insulation — N.J.A.C. 5:23-2.18(b)(1)(C) requires inspectors to verify that the insulation levels installed match the ones: (a) used in the calculations, (b) found in the REScheck printout, or (c) shown in the Prescriptive Package table. The one exception to inspector verification of the insulation levels is a home enrolled in the NJ Clean Energy Program where compliance is verified by a third party. In all cases, other Energy Subcode requirements, such as piping and ductwork insulation, still apply. With specific regard to ductwork, supply and return ducts in attics are to be insulated to a minimum of R-8 where 3 inches in diameter and greater and R-6 where less than 3 inches in diameter. Supply and return ducts in other portions of the building are to be insulated to a minimum of R-6 where 3 inches in diameter or greater and R-4.2 where less than 3 inches in diameter. The exception to the ductwork insulation requirement is when the duct is located completely inside the building thermal envelope.

Sealing — Previous editions of the energy subcode were not specific in the requirements for sealing of the building thermal envelope and ductwork. With the adoption of the 2009 IECC, new and specific air leakage sealing requirements have been added and have been further modified for the 2015 IECC.

- **Building Thermal Envelope tightness** — The permit holder has two options for verifying building thermal envelope tightness: (1) testing per Section R402.4.2.2, or (2) visual inspection per Section R402.4.2.1. Because inspectors are already looking at the type of insulation installed, the visual inspection (option #2) will have already been partially

completed, the remaining inspection issues for envelope tightness relate to the air barrier. If the permit holder chooses testing, the documentation showing the results of the blower door test will become part of the permit file. If the permit holder chooses a visual inspection, the code official will field-verify that the building thermal envelope tightness complies with Table R402.4.2. The air barrier inspection may be performed by a person other than the local code official, but that person must be independent of the installer and approved by the code official. The IECC establishes no credentials for persons performing these inspections. In all cases where the inspection option is used to document compliance, UCC-F392, the Air Barrier and Insulation checklist must be completed. Once completed, checklists documenting visual inspection(s) as described below, are retained in the file.

- o UCC inspector(s) – One checklist documenting both insulation and air barrier requirements have been met is filed.
- o UCC inspector(s) and independent inspector(s) – In this case, there may be two checklists filed, one for the insulation completed by the UCC inspector(s), and one for the air barrier completed by the independent inspector(s).
- o UCC inspector(s) and blower door test – Here, one checklist for insulation completed by the UCC inspector(s) is filed, and documentation of a passing blower door test is appended to the checklist.
- Duct tightness — Duct tightness must be verified by way of a leakage test unless the air handler and all ducts are located within conditioned space. The permit holder may verify duct tightness through testing either at post-construction or during rough-in; the timing of this test is the permit holder's choice. The benefit to a post-construction test is that the qualifications for passing are less stringent than a rough-in test. The benefit to a rough-in test is that the ductwork should be much more accessible to fix if it does not pass. The requirements for passing can be found at Section R403.3.2. Again, a copy of the test results will become part of the permit file. The IECC establishes no credentials for persons performing this test.

Certificate — As per Section R401.3 of the 2015 IECC, a permanent certificate is to be posted on a wall in the space where the furnace is located, a utility room or an approved location inside the building. Where located on an electrical panel, the certificate shall not cover or obstruct the visibility of the circuit directory label, service disconnect label or other required labels. The certificate (attached hereto) is to be completed by the builder or registered design professional and is to list the applicable, predominant building thermal envelope properties along with the type and efficiencies of heating, cooling and service water heating equipment installed. In lieu of the certificate provided, a certificate from RE:Check or NJ Clean Energy Program is acceptable.

BULLETIN NO.
15-4

BULLETIN

NJ IECC/2015 Energy Efficiency Certificate for Low-rise Residential Dwellings*			
Address:		Permit #:	
Insulation Rating <i>(flat, gable, blown, continuous, other)</i>		R-value	
Ceiling/Roof			
Above Grade Wall: framed _____, mass _____			
Floor: over unconditioned space _____, slab _____			
Crawlspace Wall			
Foundation/Basement Wall			
Ductwork (unconditioned spaces)			
Fenestration Rating		U-factor SHGC	
Window			
Skylight			
Door			
Heating & Cooling Equipment		Type <i>(oil, gas, electric, other)</i>	Efficiency <i>(AFUE, EER/SEER, EER/CF, other)</i>
Furnace			
Heatpump			
Boiler			
Cooling System			
Water Heater			
Other			
Renewables <i>(type of system)</i>			
Other Energy Efficiency Equipment			
Builder or Design Professional Certification			
Name:		Date:	
Registration/License Number:			
Comments			
* This is a generic certificate and some items listed above may not be applicable to this specific design when initially constructed; please leave those items blank.			

The inspection of work done in **commercial buildings** has not changed. The inspection includes, but is not limited to, verifying that:

- (1) The insulation specified on the plans is the insulation installed.
- (2) The lighting fixtures and associated controls specified on the plans are installed, and
- (3) The mechanical systems, associated controls and associated insulation specified on the plans are installed.