

Green Tech Notes

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Missouri
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CHAPTER

Audience: Residential
 Commercial
 Professional
 Consumer



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Basic Residential Requirements: 2009 International Energy Conservation Code

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The 2009 International Energy Conservation Code (IECC) was written and is published by the [International Code Council \(ICC\)](#). As of mid 2012, it has been adopted into law by 12 municipalities in the St. Louis Metro area, including St. Louis City and County.

These Tech Notes are based on the prescriptive compliance path for new residential construction projects in Zone 4 (non marine). A second, performance compliance path, outlined in the code, can be utilized if any of the criteria below are not attainable due to design preferences of the owner of the project. These requirements apply to renovation projects with many exceptions based on the scope of a project.

This outline is intended as a general overview. Further details should be sought within the code itself.

Insulation: must be in direct contact with what it is insulating

- Ceiling - R-38 (R-30 with raised Energy Trusses enabling full insulation height over plate).
- Walls above grade - R-13 (standard 2x4 wood construction 16" o.c).
- Floors - R-19 (if over unconditioned space).
- Slabs - R-5 at perimeter, down to 2' below grade (R-10 under heated slabs).
- Basement/Crawl Space Walls - R-13 full height between studs if placed inside (R-10 if placed on the exterior side).

Insulation, continued

- Windows/ Doors - U-0.35 (double pane with Low E coating or double glazing with storm windows).
- Skylight Glazing - U-0.6
- Ductwork - R-8 if run in attic and R6 if run outside the building envelope.
- Hot Water Pipes - R-3 when water is over 105 degrees.
- HVAC piping - R3 when conveying fluids above 105 degrees or chilled fluids below 55 degrees.
- Insulate behind all fixtures that interrupt normal construction including; tubs, showers, electrical devices, and recessed lighting.

Air Leakage/ Sealing - 16% of cooling and 28% of heating load is due to infiltration, so all joints must be sealed.

- Whole House Wraps - Recommended to reduce air flow with manufacturer recommendations for lapping.
- Opening covers - Weather strip and insulate doors and access panels between conditioned and unconditioned spaces.
- Joints between surfaces - Provide an air barrier and seal between window/door jams and framing, at common walls between units, behind showers and tubs, and all exterior surfaces. Seal all utility penetrations and other openings that are sources of air leaks in the building envelope.
- Recessed lights - Type IC (for insulated ceilings) and provide gaskets or sealant between housing and wall or ceiling covering.

Air Leakage/ Sealing, continued

- Fireplaces - Provide gasketed doors with outdoor combustion air (this goes away in the 2012 IECC since gaskets are usually flammable).
- Labeling - All building materials and equipment installed per the manufacturer's guidelines and bear labels so compliance can be checked.
- Testing Options - An alternative to complete visual inspection of all joints is to have a blower door test. This is best done before drywall is installed which makes remediation easier if the project fails.
- Blower Door Option - Building must pass a post rough-in blower door test resulting in below 7 ACH at 33.5 psf
- Visual Inspection - A Building Inspector visually assesses that the project achieves the following 7 items:
 1. Air barriers and thermal barriers on outside of air permeable insulation with breaks and joints filled or repaired.
 2. Dropped ceilings/ soffits - air barriers aligned with insulation and sealed gaps.
 3. Above grade walls - insulation installed in continuous alignment with building envelope air barrier.
 4. Floors - air barrier installed at exposed edge of insulation.
 5. Plumbing/wiring - insulation between outside and pipes. Batt insulation cut to fit or sprayed or blown insulation behind wiring and plumbing.
 6. Corners, headers, narrow framing cavities and rim joists insulated.
 7. Insulate between shower/tub and exterior wall.

Mechanical and Electrical Systems

- Heating and Cooling - Sized per [Air Conditioning Contractors of America \(ACCA\) Manual S](#) with building loads calculated using ACCA Manual J (so equipment will run efficiently).
- Equipment Sizing - For units serving multiple dwellings, documentation must be submitted showing compliance with 2009 IECC Commercial Building Mechanical and/or Service Hot Water Heating (sections 503 and 504).
- Temperature Controls - Primary system to be controlled with programmable thermostat and has set points initialized at 70 degrees F max for heating and 78 degrees min for cooling.

Mechanical and Electrical Systems, continued

- Ductwork - Framing cavities are not to be used as supply ducts. Seal all joints in ductwork, filter boxes and cavities to be used for return air with tapes, mastics, liquid sealants, or gasketing. Metal duct connections to be mechanically fastened, crimp joints having a lap contact of 1 ½" and be fastened with 3 screws. Outdoor air intake and exhausts need automatic or gravity dampers for when not in use.
- Domestic Hot Water - Circulating hot water systems with a manual or automatic shut off switch for the circulating pump when system is not in use.
- Lighting - Minimum of 50% of all lamps in permanently installed lights to be one of the following: compact fluorescents, T-8 or smaller diameter linear fluorescent or highly efficient incandescent lamps, per section 404.1.
- Swimming Pools - Energy efficient equipment, time switches and pool covers, per section 403.9
- Snow/Ice melting - Systems to have automatic shutoffs when pavement is above 50 degrees per 403.8
- Certificate - A permanent certificate installed on or in the electrical distribution panel listing the predominant insulation R-values, window U-factors, and efficiency of HVAC and hot water heating equipment. This certificate should not cover or obstruct circuit directory, disconnect or other required labeling.

The 2012 IECC was written to produce buildings that are 15% more energy efficient than under the 2009 Energy Code. Each subsequent cycle of Energy Code (2015, 2018) is scheduled to be written to make buildings perform 15% better than the previous code. This path has been established by the ICC in conjunction with the American Institute of Architects and US Department of Energy, to move buildings toward becoming Net Zero energy consumers (for building operation only) by 2030.

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