# 1 Foundation

*Drainage, Concrete & Masonry, Radon-Resistant Construction, Backfill*

## Standard Practice

### Drainage, Concrete & Masonry

**1.1** For basement foundations, install exterior footing drain loops. install a continuous loop of 4" perforated pipe around the perimeter of the footing. Floor drains and footing drains must extend to daylight or a sump. Plumb all sumps per Indianapolis DPW Correct Connect guidelines.

**1.2** Slope hard surfaces such as sidewalks and driveways away from foundations at a minimum pitch of 1/4" per foot.

### Radon-Resistant Construction

**1.3** When any daylighted footing drain also serves as a soil-gas collection system, install a one-way flow valve, backflow preventer, water trap or other control device.

### Backfill

**1.4** Slope earth away from all sides of the house for at least 5' at a minimum 5% grade (3" in 5'.)

## Resources

*EERE Consumer's Guide* – U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program
http://www.eere.energy.gov/consumer/your_home/

*Efficiency Dos & Don'ts From an Energy Nerd* – Journal of Light Construction, October 2006

# 1 Foundation

*Drainage, Concrete & Masonry, Radon-Resistant Construction, Backfill*

**Tier I**

## Drainage, Concrete & Masonry

**1.5** Install covered, gasketed, sealed sumps. When any sump also serves as a floor drain or condensate drain, install a lid with a trapped inlet. When any sump also serves as the termination point for a soil-gas collection system, install a lid designed to accommodate a 4" radon vent pipe.

**1.6** Damp-proof all below-grade portions of foundation walls and footings. Seal penetrations in poured concrete walls, including wall tie penetrations, on the exterior surface. **Damp-proofing compounds and form-release agents should not leach toxic chemicals into the soil. do not use fuel oil, diesel, kerosene or used motor oil.**

## Radon-Resistant Construction

**1.7** Seal the top course of hollow CMU foundation walls. Install cap blocks, one continuous course of solid masonry, one continuous course of solid grouted masonry, a poured concrete beam at or above finished ground surface level, or a full width sill plate.

**1.8** Install a passive radon-reduction system (sub-structure soil depressurization system.) See Plumbing section 4.9 and Electrical section 5.7 for additional requirements.

**1.8a** Install a soil-gas collection system. For basement foundations, interior sub-slab footing drain loops buried in aggregate are permitted to serve as soil-gas collection piping. For crawlspace foundations, install 4" perforated pipe parallel to the long dimension of the house no closer than 6' to the foundation wall.

**1.8b** For basement foundations, provide a capillary break. Install an even, 4" - 6" layer of clean (no fines), 3/4" aggregate underneath the floor slab. Install a soil-gas-retarder membrane (SGR) over the aggregate. Overlap all seams by 12”. Seal the SGR around all pipes and other penetrations. Seal tears or punctures or cover with additional sections of membrane. **Do not intentionally slash or puncture the SGR. Do not put a layer of sand on top of the SGR.**

**1.8c** For crawlspace foundations, install a soil-gas-retarder membrane (SGR) directly over the entire crawlspace floor area. Overlap all seams by 12” and seal with manufacturer specified tape or a continuous sealant bead. Seal the SGR around all pipes and other penetrations. Seal the SGR 12" - 16” up the crawlspace walls with a continuous sealant bead.

**1.8d** Seal all below-grade penetrations in foundation walls and floor slabs. Provide a continuous formed gap ("tooled edge") at all cold joints and seal with a continuous sealant bead. **Do not embed wooden grade stakes or screed boards in poured concrete floor slabs.**

# 1 Foundation

*Drainage, Concrete & Masonry, Radon-Resistant Construction, Backfill*

**Tier II**

## Drainage, Concrete & Masonry

| | |
|---|---|
| **1.9** | Surround the footing drain with washed gravel and wrap both with filter fabric. |
| **1.10** | Install a continuous drainage plane material over foundation damp-proofing or exterior insulation, if installed. |

## Resources

*EERE Consumer's Guide* – U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program
http://www.eere.energy.gov/consumer/your_home/

*Efficiency Dos & Don'ts From an Energy Nerd* – Journal of Light Construction, October 2006

# 2 Weather Envelope

*Framing, Sheathing, Roofing, Weather Barrier, Flashing, Windows & Doors, Siding, Gutters, Downspouts*

## Standard Practice

### General Conditions

**2.1** Design for bulk water. Design wall and roof structures, including flashing and weather barrier details, to shed water down and away from the home. Upper courses of building materials should always overlap lower courses.

**2.2** Design for water vapor. Design exterior wall assemblies to dry by evaporation to the exterior. Install a vapor diffusion retarder (VDR) with a perm rating of 0.1 or less on the interior (warm-in-winter) side of exterior walls. The perm rating of "cold side" materials should be 5x that of "warm side" materials.

## Resources

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# 2 Weather Envelope

*Framing, Sheathing, Roofing, Weather Barrier, Flashing, Windows & Doors, Siding, Gutters, Downspouts*

**Tier I**

## General Conditions

| | |
|---|---|
| **2.3** | Use low- or no-VOC caulks and adhesives. |

## Framing, Sheathing, Roofing

| | |
|---|---|
| **2.4** | Build exterior walls with 2-stud corners. Install 1x3 nailer for drywall or use drywall clips. |
| **2.5** | Install ladder blocking where partition walls will intersect exterior sidewalls. |
| **2.6** | Install foam seal between sill plate and foundation. |
| **2.7** | Install light colored roofing material, or install a radiant barrier on the underside of roof joists, or install radiant barrier roof sheathing. |
| **2.8** | Provide passive convective attic ventilation only. Install under-eave or soffit intake vents. Install exhaust vents at the ridge or highest point of the gable ends. **Do not install powered attic fans.** |

## Weather Barrier, Flashing, Windows & Doors

| | |
|---|---|
| **2.9** | Install a moisture permeable weather barrier such as housewrap or felt over the exterior sheathing. The weather barrier often also serves as the air barrier. |
| **2.10** | Install butyl-based, self-adhesive membrane flashing on all windowsills and door thresholds. Extend flashing minimum 6" vertically up trimmer studs. Upper courses should always overlap lower courses. |
| **2.11** | Install double pane, low-e windows with a maximum u-factor of 0.35 as indicated by the NFRC label. |
| **2.12** | When single pane windows will not be replaced, install low-e storm windows on either the interior or exterior of the primary windows. |

### Siding, Gutters, Downspouts

| | |
|---|---|
| **2.13** | When installing masonry claddings such as brick, install a drainage plane behind the cladding, provide an adequate air space, and provide weep holes. The weather barrier often also serves as the drainage plane and the air barrier. |
| **2.14** | Install a bond breaker behind stucco or other porous or applied veneers. The outer layer serves as the bond breaker, the inner layer is the weather barrier. |
| **2.15** | Install gutters and downspouts such that stormwater is directed away from any foundation. Do not connect gutters and downspouts to the city sewer. See Indianapolis DPW Correct Connect program for more information. |

### Resources

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# 2 Weather Envelope

*Framing, Sheathing, Roofing, Weather Barrier, Flashing, Windows & Doors, Siding, Gutters, Downspouts*

**Tier II**

## Framing, Sheathing, Roofing

| | |
|---|---|
| **2.16** | Design rafter/top plate interface or specify "energy heel" roof trusses to accommodate minimum R-49 insulation. |
| **2.17** | Install insulated headers. |
| **2.18** | Install Energy Star rated roofing material. Install a radiant barrier on the underside of roof joists or install radiant barrier roof sheathing. |

## Siding, Gutters, Downspouts

| | |
|---|---|
| **2.19** | Connect gutters and downspouts to a French drain installed at least 12' away from any foundation. |

## Resources

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*Efficiency Dos & Don'ts From an Energy Nerd* – Journal of Light Construction, October 2006

# 3 HVAC

*Calculations & Sizing, Combustion Air, Ducting, Ventilation*

## Standard Practice

### Heating, Cooling

**3.1** Size and select forced-air HVAC equipment per *ACCA Manual J* and *Manual S*. Provide calculation worksheet to construction manager.

**3.2** Verify contractor certification for refrigerant handling. Charge AC system with HCFC-22 (R-22) or HFC refrigerant. **Do not charge AC system with CFC refrigerant.**

### Ducting

**3.3** Size HVAC ductwork per ACCA Manual D. Provide calculation worksheet to construction manager.

**3.4** Install metal, smooth wall ducting whenever possible. **Do not "pan" joist bays or utilize framing cavities as ducts.**

**3.5** Keep flexible duct runs as short as possible. **Do not bend flexible duct at angles less than 90°.** Stretch all flexible duct runs to their full length. **Do not compress flexible duct runs.** Support all suspended flexible ducts with minimum 1-1/2" wide straps every 4'. **Do not allow flexible duct runs to sag or droop more than 1/2" for each foot between supports. Do not crush or pinch flexible ducts.**

**3.6** Extend register boots at supply and return registers through the wall, floor, or ceiling material. Mechanically fasten duct boots to the building. **Do not rely on the ductwork to support register boots.**

**3.7** Mechanically fasten all joints between sections of ductwork. Use UV-resistant zip-ties or metal worm-drive hose clamps for flexible ducts. Use a minimum of 3 screws equally spaced around each connection for sheet metal ducts.

## Resources

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# 3 HVAC

*Calculations & Sizing, Combustion Air, Ducting, Ventilation*

**Tier I**

## Heating, Cooling

| | |
|---|---|
| **3.8** | Install minimum 90% AFUE, sealed-combustion furnace within conditioned space. Connect air handler to supply ductwork using rubber gasket or similar sound absorbing mechanism. Route condensate line through solid pipe to daylight or through a trap to a floor drain. **Do not discharge condensate directly into crawlspace.** |
| **3.8a** | Install minimum SEER 14 or geothermal heat pump. Install programmable thermostat appropriate for heat pumps per section 3.10 below. Connect air handler to supply ductwork using rubber gasket or similar sound absorbing mechanism. |
| **3.8b** | Install minimum 88% AFUE, sealed-combustion or power-vented boiler within conditioned space. Insulate all piping that is part of the heating system per Plumbing section 4.6. |
| **3.9** | Install minimum SEER 14 AC unit. Install exterior condensing unit in a shady spot if possible. When installing AC in an existing forced-air system, match AC unit to size of the existing ductwork. |
| **3.10** | Install mercury-free programmable thermostat on an interior wall out of areas that receive direct sunlight or drafts and away from supply or return ducts, appliances, lighting, and doorways. Install thermostat in a location that is convenient for programming. |
| **3.11** | **Do not install electric resistance heating or electric baseboard heating.** |
| **3.12** | **Do not install unvented gas appliances such as decorative fireplaces.** |
| **3.13** | **Do not install humidifiers.** |

## Resources

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# 3 HVAC

*Calculations & Sizing, Combustion Air, Ducting, Ventilation*

**Tier I**

## Ducting

**3.14** Extend supply and return ducts to each bedroom and common living area. Keep duct runs as short and straight as possible. Install accessible balancing dampers in each supply branch duct.

**3.15** Seal all joints and adjustable elbows in ductwork with mastic or foil tape. **Do not use grey household duct tape.** Seal all register boots to the wall, floor, or ceiling through which they extend.

**3.16** Insulate all heating and cooling ductwork in unconditioned space to R-8. Vapor barrier shell should face outside of ductwork. Use galvanized lacing wire or zip-ties to hold insulation in place. Securely tape all insulation seams. **Do not allow gaps or voids in insulation.**

## Ventilation

**3.17** Install an automated fan controller to periodically activate the air handler fan (furnace fan) in order to facilitate whole-house air mixing. *Controllers functionally similar to those manufactured by AirCycler and FanCycler are recommended.* **Do not operate air handler during construction.**

**3.18** Install an exhaust fan in each kitchen (minimum 100cfm continuous) with a sone rating of 2.0 or less. **Do not install recirculating kitchen exhaust fans.**

**3.19** Install an exhaust fan in each bathroom and laundry room (minimum 50cfm continuous) with a sone rating of 1.0 or less. Install an automated fan controller to periodically activate the most centrally located exhaust fan in order to facilitate whole-house ventilation. *Fans functionally similar to those manufactured by Panasonic and controllers functionally similar to those manufactured by AireTrak are recommended.*

**3.20** Install metal, smooth wall exhaust ducting. **Do not install corrugated exhaust ducting or plastic hose.** Minimize elbows. Extend all exhaust ducting to the exterior. Insulate all exhaust ventilation ductwork in unconditioned space to R-4. Install a properly sized exterior weather hood with a damper and insect screen. **Do not install insect screens on dryer vents.**

**3.21** Provide passive attic ventilation only. **Do not install powered attic fans.**

## Heating, Cooling

**3.22** Install minimum 94% AFUE, 2-stage, sealed-combustion furnace with ECM air handler motor.

**3.23** Locate all heating and cooling ductwork within conditioned space. **Do not install heating and cooling ductwork in exterior walls.**

## Ventilation

**3.24** Limit unbalanced exhaust of 2 largest fans to 15cfm per 100sf of conditioned space. Install passive air intake vents as necessary. *Example: for a 1500sf house, the upper limit for exhaust only systems = 225cfm. A clothes dryer exhausting air @ 135cfm + a range hood exhausting air @ 100cfm = 235cfm, which is over the allowable limit.*

## Resources

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# 4 Plumbing

*Radon Vent, Water Heating*

## Standard Practice

### Water Heating

| | |
|---|---|
| **4.1** | Set thermostat to 120° F on tank-style water heaters. |
| **4.2** | Install low-flow showerheads and aerators. |

## Resources

*EERE Consumer's Guide* – U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program
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# 4 Plumbing

*Radon Vent, Water Heating*

**Tier I**

## Water Heating

| | |
|---|---|
| **4.3** | Install minimum 60% (0.60) Energy Factor sealed combustion water heater within conditioned space. |
| **4.4** | Install heat trap loops on tank-style water heaters. |
| **4.5** | Install minimum R-8 insulation jacket on tank-style water heaters. |
| **4.6** | Insulate all hot and cold water supply piping within 3' of tank-style water heaters to R-6. Install insulation "seam down." Fasten with galvanized lacing wire, zip-ties, aluminum tape, or packing tape. |
| **4.7** | When insulating gas-fired hot water heaters and piping, **do not place combustible fasteners or insulation within 6" of exhaust flue.** |
| **4.8** | Insulate all hot and cold water supply piping in exterior walls, unconditioned, or semi-conditioned space per section 4.6 above. |

## Radon-Resistant Construction

| | |
|---|---|
| **4.9** | Install a passive radon-reduction system (sub-structure soil depressurization system.) See Foundation section 1.8 and Electrical section 5.7 for additional requirements. |
| **4.9a** | Install a passive radon vent pipe. Install a 4" PVC, ABS, or approved equal vertical vent pipe from the soil-gas collection system to a point 12" above the eaves. Install vent within the thermal envelope. **Do not install vent within exterior walls.** Terminate vent 10' horizontally from chimneys and operable windows. Allow minimum 30" vertical run in attic to install future in-line radon vent fan. Insulate vent where it passes through unconditioned space. Slope to drain as DWV, minimize horizontal runs and elbows, **do not install 90° elbows**. Cement all joints. Rubber couplings may be used for removable connections to facilitate maintenance. **Do not install traps, intentional or accidental, that will collect water or restrict airflow.** Label vent pipe "Radon Reduction System" on each floor. |

## Resources

*EERE Consumer's Guide* – U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program

# 4 Plumbing

*Radon Vent, Water Heating*

**Tier II**

## Water Heating

| | |
|---|---|
| **4.10** | Install minimum 65% (0.65) Energy Factor Energy Star rated dishwasher with a booster heater. |

## Resources

*EERE Consumer's Guide* – U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program
http://www.eere.energy.gov/consumer/your_home/

*Efficiency Dos & Don'ts From an Energy Nerd* – Journal of Light Construction, October 2006

# 5 Electrical

*Radon Fan, Plug Loads, Lighting, Appliances*

## Standard Practice

### Lighting

**5.1** Install CFL bulbs in minimum 5 fixtures where the lamp is on an average of at least 10 minutes per start.

**5.2** Install dusk-to-dawn/motion detectors or timer controllers on exterior lights.

### Appliances

**5.3** Install Energy Star rated refrigerator.

## Resources

*EERE Consumer's Guide* – U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program
http://www.eere.energy.gov/consumer/your_home/

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# 5 Electrical

*Radon Fan, Plug Loads, Lighting, Appliances*

**Tier I**

## General Conditions

**5.4** Install ceiling junction boxes rated to support a 70 lb. ceiling fan in each bedroom and common living area.

**5.5** Install hardwired CO detector within combustion appliance zone.

## Lighting

**5.6** Install ICAT (Insulation Contact, Air Tight) rated can lights with gasketed trim rings in ceilings below unconditioned space.

## Radon-Resistant Construction

**5.7** Install a passive radon-reduction system (sub-structure soil depressurization system.) See Foundation section 1.8 and Plumbing section 4.9 for additional requirements.

**5.7b** Pre-wire electrical junction boxes in proximity to the anticipated locations of a future in-line radon vent fan and system failure alarm.

## Resources

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# 5 Electrical

*Radon Fan, Plug Loads, Lighting, Appliances*

**Tier II**

## General Conditions

**5.8** Install a 36" - 44" diameter ceiling fan in each bedroom and common living area.

**5.9** Install airtight electrical boxes, or caulk cutouts between standard electrical boxes and drywall. Install foam gaskets between devices and cover plates on exterior walls.

## Appliances

**5.10** Install Energy Star rated clothes washer.

## Resources

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*Efficiency Dos & Don'ts From an Energy Nerd* – Journal of Light Construction, October 2006

# 6 Thermal & Pressure Envelope

*Air Sealing, Insulation*

## Standard Practice

### Pressure Envelope

**6.1** Install a moisture permeable weather barrier such as housewrap or felt over the exterior sheathing. The weather barrier often also serves as the air barrier.

## Resources

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# 6 Thermal & Pressure Envelope

*Air Sealing, Insulation*

**Tier I**

| | Pressure Envelope |
|---|---|
| **6.2** | Align the pressure envelope with the thermal envelope. When attic encloses conditioned space, install air barrier behind attic kneewalls. Extend air barrier down into joist |
| **6.3** | Air seal spaces between framing and window and door rough openings with low-expanding foam. Caulk gaps narrower than 1/4". |
| **6.4** | Air seal electrical and mechanical penetrations through subfloor, wall plates, ceiling plane, and exterior sheathing. Pay close attention to vertical chases and interior soffits (dropped ceilings.) |
| **6.5** | Air seal masonry chimney and metal flue penetrations with high-temperature silicone fire caulk. Fabricate a metal insulation dam/barrier if necessary to maintain proper clearance from combustible material. |
| **6.6** | Air seal bottom plate to Subfloor. |
| **6.7** | Air seal drywall to framing members on exterior walls. Caulk base of drywall to subfloor. |

## Resources

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# 6 Thermal & Pressure Envelope

*Air Sealing, Insulation*

**Tier I**

| | Thermal Envelope |
|---|---|
| **6.8** | Insulate crawlspace walls to R-19. Install high-density sprayed polyurethane insulation or high-density rigid foam insulation. Insulate and weatherstrip crawlspace access door/hatch. |
| **6.9** | Insulate below-grade basement foundation walls to R-10 (exterior) & R-11 (interior) or insulate to R-21 on the interior. |
| **6.10** | When basement serves as living space, insulate foundation walls to R-21. Install high-density sprayed polyurethane insulation or high-density rigid foam insulation. **Insulation must not act as a VDR.** |
| **6.11** | Insulate floors above unconditioned or semi-conditioned spaces such as cantilevers, basements and crawlspaces to R-21. If installing batts, use galvanized lacing wire to hold batts up inside floor joist area. |
| **6.12** | Insulate rim joists at each floor to R-30. Install sprayed polyurethane insulation or rigid foam insulation that is thoroughly air sealed. Alternately, install sprayed polyurethane foam insulation with unfaced batts. **Insulation must not act as a VDR.** |
| **6.13** | Insulate exterior sidewalls to R-13, including walls behind tub/shower. Install full-cavity wet-spray cellulose insulation (dense-pack cellulose for closed wall cavities), sprayed polyurethane foam insulation with R-15 high-density unfaced batts, or other spray applied insulation system that also serves as an effective air barrier. **Insulation must not act as a VDR.** |
| **6.14** | Insulate attics to R-49. Install full-cavity blown cellulose insulation. Flag all electrical junction boxes that will be covered with insulation. Fabricate a metal insulation dam/barrier if necessary to keep insulation at least 3" away from non-IC rated can lights. Insulate and weatherstrip attic access door/hatch. **Do not cover attic soffit vents with insulation.** Install baffles or rafter vents. |
| **6.15** | When attic encloses conditioned space, insulate attic kneewalls as exterior sidewalls. |
| **6.16** | When ceiling joists are visible in the attic, add additional blown cellulose insulation or install unfaced batts perpendicular to ceiling joists. |

## Resources

# 6 Thermal & Pressure Envelope

*Air Sealing, Insulation*

**Tier II**

## Pressure Envelope

**6.17** Air seal all joints in the housewrap air barrier with manufacturer specified housewrap tape.

**6.18** Prior to installing attic insulation, or when existing attic insulation is removed, air seal the exposed ceiling from above.

## Thermal Envelope

**6.19** Insulate exterior sidewalls to R-19, including walls behind tub/shower. Install full-cavity, wet-spray cellulose insulation (dense-pack cellulose for closed wall cavities), sprayed polyurethane foam insulation with R-21 high-density unfaced batts, or other spray applied insulation system that also serves as an effective air barrier. **Insulation must not act as VDR.**

## Resources

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*Efficiency Dos & Don'ts From an Energy Nerd* – Journal of Light Construction, October 2006

# 7 Interior Finishes

*Flooring, Tile & Stone, Interior Doors, Trim, Cabinetry, Paint, Stain & Wallcoverings, Window Treatments*

## Standard Practice

### General Conditions

**7.1** Install smooth, durable, cleanable finish materials in wet areas.

## Resources

*EERE Consumer's Guide* – U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program
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# 7 Interior Finishes

*Flooring, Tile & Stone, Interior Doors, Trim, Cabinetry, Paint, Stain & Wallcoverings, Window Treatments*

**Tier I**

## General Conditions

**7.2** Use only low- or no-VOC caulks and adhesives. Provide MSDS to construction manager.

## Flooring

**7.3** Minimize carpeting. **Do not install carpeting in wet areas.** Install CRI Green Label certified carpet and carpet pad. **Do not install foam rubber carpet pad.**

**7.4** **Do not install vinyl flooring.**

## Tile & Stone

**7.5** Install cementitious backer board or other cementitious material behind any grouted finish materials. Seal all grout.

## Resources

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# 7 Interior Finishes

*Flooring, Tile & Stone, Interior Doors, Trim, Cabinetry, Paint, Stain & Wallcoverings, Window Treatments*

**Tier I**

## Trim

**7.6** Install formaldehyde-free casing, trim, and millwork. **Do not install MDF in wet areas: entryway, kitchen, bath, laundry room, utility room, basement.**

**7.7** Install composite and engineered wood products made with formaldehyde-free adhesives or phenol-formaldehyde adhesives. **Do not install engineered and composite wood products made with urea-formaldehyde adhesives.**

## Paint, Stain & Wallcovering

**7.8** Use only low- or no-VOC primers, paints, and finishes that comply with current Green Seal GS-11 standards. Provide MSDS to construction manager.

**7.9** **Do not install vinyl wallpaper.**

## Resources

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# 7 Interior Finishes

*Flooring, Tile & Stone, Interior Doors, Trim, Cabinetry, Paint, Stain & Wallcoverings, Window Treatments*

**Tier II**

## Flooring

**7.10** Install CRI Green Label Plus certified carpet and carpet pad.

## Interior Doors

**7.11** Install formaldehyde-free interior doors.

## Cabinetry

**7.12** Install formaldehyde-free cabinetry.

## Window Treatments

**7.13** Install window shades or other window treatments.

## Resources

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*Efficiency Dos & Don'ts From an Energy Nerd* – Journal of Light Construction, October 2006

# 8 Homeowner Education

*Operation & Maintenance*

## Standard Practice

| | Operation & Maintenance |
|---|---|
| **8.1** | Provide homeowner with operating instructions for all mechanical systems and controls as provided by the equipment manufacturer. Includes all furnaces, boilers, water heaters, thermostats, fans, sensors, timers, switches, valves, etc. |
| **8.2** | Provide homeowner with operating instructions for all appliances as provided by the equipment manufacturer. Includes all stoves, vent hoods, refrigerators, dishwashers, clothes washers, dryers, etc. |

## Resources

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# 8 Homeowner Education

*Operation & Maintenance*

**Tier I**

## Operation & Maintenance

**8.3** Provide homeowner with information on IAQ and chemical storage best practices as described by the EPA.

## Heating, Cooling

**8.4** Provide homeowner with a written narrative detailing design intent and proper seasonal operation of HVAC systems.

**8.5** Provide homeowner with HVAC and duct sizing calculation worksheets (Manual J, Manual S, Manual D.)

## Radon-Resistant Construction

**8.6** Provide homeowner with information on radon testing and abatement best practices as described by the EPA.

## Resources

*EERE Consumer's Guide* – U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program
http://www.eere.energy.gov/consumer/your_home/

*Efficiency Dos & Don'ts From an Energy Nerd* – Journal of Light Construction, October 2006

# 8 Homeowner Education

*Operation & Maintenance*

**Tier II**

## Operation & Maintenance

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|---|---|
| **8.7** | Enroll homeowner in IPL CoolCents program. When heat pump HVAC system is installed, enroll homeowner in IPL PerfectSense program. |

## Radon-Resistant Construction

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| **8.8** | Conduct a post-occupancy radon test. Activate the passive radon-reduction system if the test indicates radon levels above EPA thresholds. Install an in-line radon vent fan in the vertical run of the vent pipe outside of conditioned space. Minimize transfer of fan vibration to the structural framing of the building. Install a system failure alarm. |

## Resources

*EERE Consumer's Guide* – U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program
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