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# RESIDENTIAL BASEMENT FINISH

This information does not contain all of the specific codes for construction and should be used only as a guide. The permittee is responsible to meet all code requirements applicable to each project.

## PERMITS

A building permit is required to finish all single family basements. The permit may also cover electrical, plumbing, and heating system modifications to existing or roughed-in systems. The Building Department staff can help you determine what is necessary to meet minimum safety requirements.

## PLAN SUBMITTAL

1. Submit two (2) complete sets of the plans.
2. Draw a floor plan with dimensions drawn to scale that show the layout of the entire basement. Label the use for all the rooms.
3. Show electrical outlets, smoke detectors, lighting, fans, plumbing modifications, cleanouts, furnace, and water heater.
4. List window sizes and types; identify emergency escape and rescue windows, and egress window wells with ladders and clear dimensions of window wells.
5. Identify modifications to the existing structure such as posts, beams, and floor joists. Indicate height of dropped ceiling areas less than 7 feet.
6. Show clearance around the tub and fixtures.
7. You must show all work that is intended to be done, type of materials used, dimensions, and sizes, along with your application for a permit.
8. You may draw the plans yourself; provide as much construction detail as you can.

## TYPICAL CODE REQUIREMENTS FOR FINISHED BASEMENTS

- A hard-wired smoke detector with battery backup must be installed in all newly constructed areas of the basement. These detectors must be placed in each sleeping room and in the hallway serving the sleeping room(s). Smoke detectors must be installed in the remaining portions of the house in each sleeping room, hallways serving sleeping rooms, and on each floor level. These must be installed and be operational for the final inspection. Smoke detectors are required to be hard-wired and interconnected in new and existing bedrooms, halls, and on each level unless removal of interior wall or ceiling finishes would be required. In this case, battery operated devices would be acceptable. IRC R314.
- Carbon monoxide alarms are required in existing dwellings that have attached garages or have fuel-fired appliances. They shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms. R315. Approved combination smoke- and carbon-monoxide detectors shall be permitted.
- An egress window with a clear opening of 5.7 sq. ft. and within 44" of the floor must be provided in the basement and in each bedroom. Check with the inspector for more details. IRC R310.1.
- Furnaces and water heaters cannot be located in a bedroom or bathroom unless appliances are installed in a dedicated enclosure in which all combustion air is taken directly from the outdoors, and a weather stripped solid door equipped with an approved self-closing device is installed. If the furnace and water heater are being enclosed, adequate combustion air must be provided for these appliances to operate properly. For maintenance purposes, a minimum of 30 inches clear working space must be provided in front of furnaces and water heaters. Maintenance or removal of each appliance must be possible without removing the other or disturbing walls, piping, valves, wiring, and junction boxes.
- All rigid foam insulation must be covered with ½" gypsum board or an *approved* finish material. IRC R316.
- Habitable space shall not have a ceiling height of less than 7'0". Habitable rooms shall have a floor area of not less than 70 sq. ft. and not be less than 7' in any horizontal direction. IRC R304 and R305.
- All wood in direct contact with concrete or masonry is to be pressure-treated or wood of natural resistance to decay. Fasteners for treated wood shall be of **hot-dipped** zinc-coated galvanized steel, stainless steel, silicon

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bronze or copper. IRC R317.

- If using a paneling material less than ¼" thick, it must be applied over with gypsum. IRC R702.5.
- If finishing space under stairs for use as storage, or as closet space, must be sheet rocked with ½" gypsum board. IRC
- Bathrooms that do not have a window that can be opened must have mechanical ventilation vented to the outside. A ventilation fan is required in toilet rooms and bathrooms with unopenable windows. The fan must be vented to the exterior of the building and not to terminate within 3 feet of an opening. IRC R303.3. Toilets must have a minimum of 21 inches in front of the toilet and 15 inches from the center of the toilet and any sidewall or other obstruction. Showers shall have a minimum inside dimension of 900 square inches, capable of encompassing a 30 inch circle and be finished 72 inches above the floor with non-absorbent material. IRC R307.
- Fiber-cement, fiber-mat cement, and glass mat gypsum shall be used as backers for wall tile in the tub and shower areas and wall panels in shower areas. IRC R702.4.2.
- All new concealed gas piping must be air tested at 25# for 12 hours. IFGC 406.4.
- All electrical, plumbing, and heating work must be installed in accordance with appropriate State Codes.
- Lighting and ventilation are required for any finished portion of the basement.
- A 4 mil poly vapor barrier must be placed against all concrete or block exterior foundation walls prior to applying furring strips for the full height of the wall. Another 4 mil poly vapor barrier must be placed over the warm side of the insulation prior to covering with finish materials. State Energy Code Requirement.
- Every room, except closets, bathrooms, and utility rooms should have a warm air supply and return air register. Mechanical Code Section 918.

**FINISHING BASEMENT INSPECTIONS REQUIRED BY LAW – IF APPLICABLE.** It is the responsibility of the permit holder to call for the final inspection when all devices and fixtures have been installed, and wiring is completed including cover plates. **Work shall not be covered or concealed before the inspection is made and the work approved.**

1. **Rough 4-way** – When the wiring, plumbing, & heating are installed, and the framing is complete. The following inspections are generally done as part of the rough 4-way:
  - a. **Power to panel** – Electrical meter is placed and ready to be hooked-up.
  - b. **Gas line pressure test** – Have a sizing diagram available for inspector & 10 psi pressure test with gauge.
  - c. **Framing Inspection** – When all roof, walls, floor framing, fire-stopping, bracing, and exterior nailing (separate inspection for nailing is acceptable) are complete.
  - d. **Electrical Inspection** – Rough wiring, before any part of the work is concealed.
    - i. See Wiring & Inspection information below.
  - e. **Plumbing Inspection** – Rough plumbing, before any part of the work is concealed.
  - f. **Heating & Refrigeration Inspection** – Rough heating and refrigeration, before any part of the work is concealed.
2. **Re-inspections**, as required.
3. **Insulation & Vapor Barrier**, as required.
4. **Final Inspection** – When all framing, electrical, plumbing, and mechanical work is complete, but prior to final occupancy of the building. This includes decks, guards, handrails, exterior site work, etc.

**WIRING & IMPORTANT INSPECTION INFORMATION** – This inspection must be done before any wiring is covered by insulation, sheetrock, paneling, etc. Underground wiring must be inspected before the trench is covered.

- At all boxes, there must be minimum wire length of 6" including the grounding conductors.
- The outer cable jacket must extend at least ¼" into the box.
- All splicing of ground wires and other wires must be completed with approved splicing devices when calling for inspection.
- In receptacle boxes with more than one cable in the box, the ground wires must be spliced with a wire tail to be attached to the ground screw on the receptacle, as only one conductor is permitted under a terminal screw.
- All metal boxes and equipment must be grounded.
- The volume of boxes must be sufficient for the number of conductors and other items contained in the box. (See **NEC 314-16** for box sizing.)
- Do not install junction boxes in attic or conceal them in walls.
- All junctions and splices should be made in boxes that are used for fixtures, switches, or receptacles. If a regular box is too small, use a larger volume box. (See **NEC 314.16**)
- Plastic cable must be stapled at intervals not exceeding 4 ½', and within 8" of plastic boxes.
- Plastic cable must not be installed with 1 ¼" of the face of studs, joists, strips, or any framing members. This applies to cables installed through bored holes or cables strapped to the sides of studs or strips. Cables closer

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- than 1 ¼" must be protected with metal plates or sleeve a minimum of 1/16" thick.
- Outlet boxes may not be used as sole support of ceiling fans. Special approved fan boxes should be used for support of ceiling fans.
- Ground fault circuit interrupters must be used for receptacles located in bathrooms, garages, outside locations, within 6' of kitchen or bar type sinks, and unfinished areas of basements. (See **NEC 210-8** for further details of GRI protection requirements.)
- Recessed lighting fixtures installed in insulated areas must be IC rated. All recessed lighting fixtures must be installed as per the manufacturer's instructions. (Some are not approved for wiring with plastic cables.)

All electrical equipment must be listed and labeled by a testing laboratory recognized by the **2005 National Electrical Code (NEC)**.

The above information covers common mistakes made by homeowners doing their own wiring. Additional information and knowledge will be needed to install the wiring properly. Wiring by owners must comply with the same standards as required of Electrical Contractors. **State law prohibits planning, laying out, or doing electrical work by anyone other than the resident owner or a State of Utah Licensed Electrical Contractor.**

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## Single Family Residential Basement Finish

### Basement Finish Details

Floor joist      Install before installing wall

Typical soffit      Finish material

Insulate per 2006 International Residential Code

Fireblock here or here

2x4 or 16" batt insulation securely fastened

Fireblock here or here

Fireblock concealed spaces of furred walls and soffits at 10 foot intervals along the length of the wall with 2x4 lumber, 3/4 inch plywood or gypsum board nailed to wall stud and held tight to concrete foundation wall from floor to ceiling. Fill remaining gaps at top and bottom with mineral wool or fiberglass insulation.

New 2x4 perimeter wall

Existing concrete foundation wall

New 2x4 interior partition

Wall finish material

40d nails every 24 inches through bottom plate into floor plate. Pre-drill holes in bottom plate for 40d nails

Minimum 1/2 inch void space

Pressure treated 2x4 floor plate anchored to floor slab

Spacer -- same thickness as wall finish material

Basement floor slab

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#### Emergency Escape & Rescue Window Well

Emergency Escape And Rescue window wells must provide a minimum area of 9 square feet with a minimum dimension of 36 inches and shall enable the window to open fully. If the depth of the window well exceeds 44 inches, a permanently affixed ladder must be provided. The ladder must not interfere with the operation of the window.

Window well

Ladder or stair

Net clear dimensions when fully opened to provide 9 square feet of opening.

Emergency escape or rescue opening with finished sill height below the adjacent grade

Ladder or stair permitted to encroach a maximum of 6 inches into the required dimensions.

#### Emergency Escape & Rescue Window

Emergency Escape And Rescue Windows must meet the following criteria:

- A minimum total operable area of not less than 5.7 square feet
- A minimum clear operable height of not less than 24 inches
- A minimum clear operable width of not less than 20 inches
- A finished sill height of not more than 44 inches above the floor and should be operable from the inside with normal operation and without the use of tools, keys or effort.

Examples of Complying Height & Width Combinations

Minimum size window for 24" clear height

Minimum size window for 20" clear width

This handout was developed by the Colorado Chapter of the International Code Council as a basic plan submittal under the 2006 International Residential Code. It is not intended to cover all circumstances. Check with your Department of Building Safety for additional requirements.

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