



# Township of Hillsborough

COUNTY OF SOMERSET  
MUNICIPAL BUILDING  
379 SOUTH BRANCH ROAD  
HILLSBOROUGH, NEW JERSEY 08844

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## SAMPLE GUIDE FOR FINISH BASEMENT REQUIREMENTS IN EXISTING ONE AND TWO FAMILY DWELLINGS

Revised 02/21/2006

1. Please submit two sets of scaled drawings. All drawings should indicate owner's name, address of job site, block and lot number. Owner's signature must be on all copies of drawings. To draw your own plans you must be owner and occupant of said property, if not, you will need drawings by a New Jersey registered architect.
2. **Plans:** The drawings submitted shall include the following information.
  - (a) Label use of all rooms.
  - (b) Show entire basement floor plan indicating partitions, doors, windows, stairways, guards, handrails, closets, columns, electrical layout, furnace, hot water heater, chimney, draft stopping, and smoke detector.
  - (c) Show wall cross section indicating top and bottom plate, stud sizes, stud spacing, fire blocking, wall covering materials, floor material, and ceiling material.
3. **Bedrooms:** A room in the basement may not be used as a bedroom unless it has two means of egress, a door directly to the outside, or a means of egress window.
4. **Guardrails:** Guards on the sides of stairways with a total rise over 30 inches must be 34 inches or more in height measured vertically from leading edge of tread to the top of the rail. The guardrails shall be constructed so that a sphere with a diameter of four (4) inches can not pass through any opening. Guards shall be designed and constructed for a concentrated load of 200 pounds applied at any point and in any direction along the top railing member. The in-fill area of a guardrail system shall be designed and constructed for a horizontal concentrated load of 200 pounds applied on a one square foot area at any point in the system, including intermediate rails or other elements serving this purpose.
5. **Stairways:** Stairways shall have a minimum width of 36 inches, maximum riser height of 8 ¼ inches, and minimum tread depth of 9 inches. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch. A nosing not less than ¾ inch but not more than 1 ¼ inches shall be provided on stairways with solid risers. Minimum headroom of 6 feet 8 inches measured vertically from the tread nosing. Fire blocking shall be installed in concealed spaces between stair stringers at the top and bottom of the run. Fire blocking material shall consist of two-inch nominal lumber or one thickness of 23/32 plywood.

6. A stairway with three or more risers requires a handrail. Handrail grip size: For all stairway handrails located within a dwelling unit, the maximum cross-sectional dimension of the handrails shall not exceed 2 5/8 inches. The handrail ends shall be returned to a wall post.

The height of handrails above the leading edge of the stairway tread measured vertically is between 30 inches and 38 inches.

7. **Combustion Air:** Combustion air is required to keep your furnace and hot water heater burning properly. Consult the manufacturer's instruction manual or contact the Fire Subcode Official for guidance in this area.

8. **Wood in contact with concrete or masonry:** In areas subject to decay damage the following locations shall require the use of an approved species and grade of lumber, pressure preservatively treated in accordance with AWPA C1, C2, C3, C4, C9, C15, C18, C22, C23, C24, C28, P1, P2 and P3, or decay-resistant heartwood of redwood, black locust, or cedars.

Sills and sleepers on a concrete or masonry slab that is in direct contact with the ground unless separated from such slab by an impervious moisture barrier.

Wood furring strips or other wood framing members attached directly to the interior of exterior masonry walls or concrete below grade except where an approved vapor retarder is applied between the wall and the furring strips or framing members.

9. **Interior Finish:** Interior finish to have a smoke- developed rating not greater than 450. Check packaging of material to be used for specifications. For paneling the label is on back.

10. **Paneling:** Wood veneer paneling and hardboard paneling shall be placed on wood or cold-formed steel framing spaced not more than 16 inches on center. Wood veneer and hard board paneling less than 1/4 inch nominal thickness shall have not less than 3/8 inch gypsum board backer. Wood veneer paneling not less than 1/4 inch nominal thickness shall conform to ANSI/HPVA HP-1. Hardboard paneling shall conform to ANSI/AHA A135.5.

**Required inspections:**

- (a) Rough electric
- (b) Rough plumbing (if applicable)
- (c) Frame (building)
- (d) Draftstopping (building - Finished ceiling areas over 1000 sq. ft)
- (e) Final electric
- (f) Final plumbing (if applicable)
- (g) Final Fire Protection
- (h) Final building

## **INTERNATIONAL BUILDING CODE 2000 – NEW JERSEY EDITION**

### **716.2 Fireblocking:**

In combustible construction, fireblocking shall be installed to cut off concealed draft openings (both vertical and horizontal) and shall form an effective barrier between floors, between a top story and a roof or attic space. Fireblocking shall be installed in the locations specified in Sections 716.2.2 through 716.2.7.

#### **716.2.1 Fireblocking materials:**

Fireblocking shall consist of 2-inch (51 mm) nominal lumber or two thicknesses of 1-inch (25 mm) nominal lumber with broken lap joints or one thickness of 0.719-inch (18.3 mm) wood structural panel with joints backed by 0.719-inch (18.3 mm) wood structural panel or one thickness of 0.75-inch (19 mm) particleboard with joints backed by 0.75-inch (19 mm) particleboard. Gypsum board, cement fiber board, batts or blankets of mineral wool or glass fiber or other approved materials installed in such a manner as to be securely retained in place shall be permitted as an acceptable fire block. Loose-fill insulation material shall not be used as a fire block unless specifically tested in the form and manner intended for use to demonstrate its ability to remain in place and to retard the spread of fire and hot gases. The integrity of fire blocks shall be maintained.

#### **716.2.2 Concealed wall spaces.**

Fireblocking shall be provided in concealed spaces of stud walls and partitions, including furred spaces, at the ceiling and floor levels and at 10-foot (3048 mm) intervals both vertical and horizontal.

#### **716.2.3 Connections between horizontal and vertical spaces.**

Fireblocking shall be provided at interconnections between concealed vertical stud wall or partition spaces and concealed horizontal spaces created by an assembly of floor joists or trusses, and between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings, cove ceilings and similar locations.

#### **716.2.4 Stairways.**

Fireblocking shall be provided in concealed spaces between stair stringers at the top and bottom of the run and between studs along and in line with the run of stairs if the walls under the stairs are unfinished.

#### **716.2.5 Ceiling and floor openings.**

Where annular space protection is provided in accordance with Exception 6 of Section 707.2, Exception 1 of Section 711.4.2, or Section 711.4.3, fireblocking shall be installed at openings around vents, pipes, ducts, chimneys and fireplaces at ceiling and floor levels, with an approved material to resist the free passage of flame and the products of combustion. Factory-built chimneys and fireplaces shall be fireblocked in accordance with UL 103 and UL 127.

**INTERNATIONAL BUILDING CODE 2000 – NEW JERSEY EDITION**

**Draftstopping.**

Draftstopping shall be installed so that the area of the concealed space does not exceed 1,000 square feet when ceiling is suspended under the floor framing or floor framing is constructed of truss – type open web or perforated members. Draftstopping shall divide the concealed space into approximately equal areas.

**Draftstopping materials.**

Draftstopping materials shall not be less than 0.5-inch (12.7 mm) gypsum board, 0.375-inch (9.5 mm) wood structural panel, 0.375-inch (9.5 mm) particleboard or other approved materials adequately supported. The integrity of draftstops shall be maintained.

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**Fasteners.**

Fasteners for pressure preservative treated wood.

Contact pressure treated lumber manufacturer or distributor for specific fastener requirements.

The installation of smoke alarms required in any building of Groups R-3 and R-5 which undergoes an alteration.

International Residential Code for One- and Two-Family Dwellings 2000

## SECTION R317

### SMOKE ALARMS

In buildings of Groups R-3, R-4 and R-5 and in dwelling units of Group R-2, smoke detectors shall be installed and maintained on each level of the structure, outside each separate sleeping area in the immediate vicinity of the bedrooms, and located on or near the ceiling.

#### R317.1 Single- and multiple-station smoke alarms.

Single- and multiple-station smoke alarms shall be installed in the following locations:

On each additional story of the dwelling, including basements and cellars but not including crawl spaces and uninhabitable attics. In dwellings or dwelling units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

All smoke alarms shall be listed and installed in accordance with the provisions of this code and the household fire warning equipment provisions of NFPA 72.

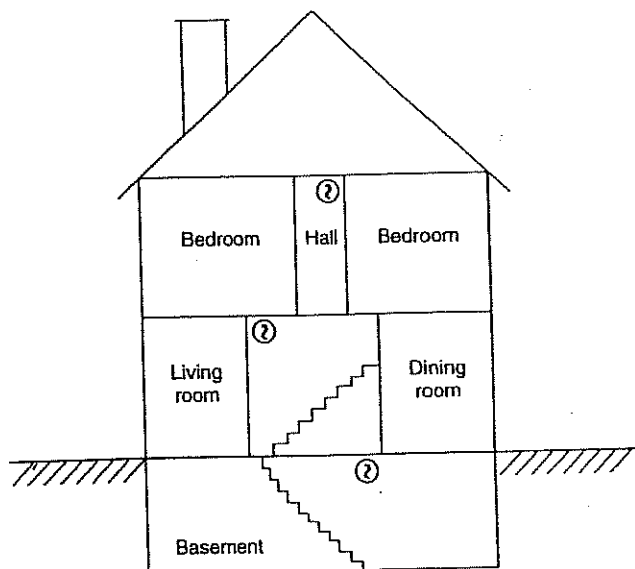


Figure A-2-5.2.1(c) A smoke detector should be located on each story.

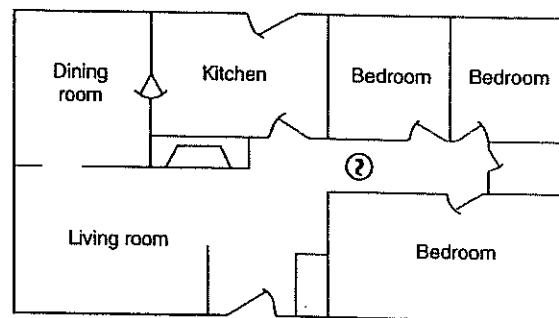


Figure A-2-5.2.1(a) A smoke detector should be located between the sleeping area and the rest of the family living unit.

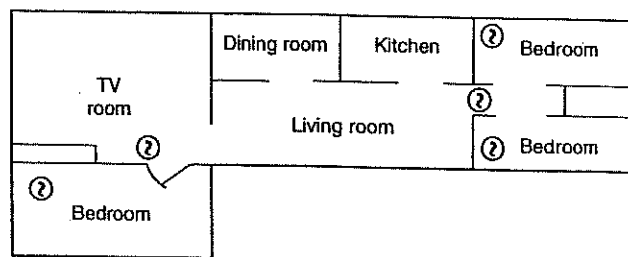
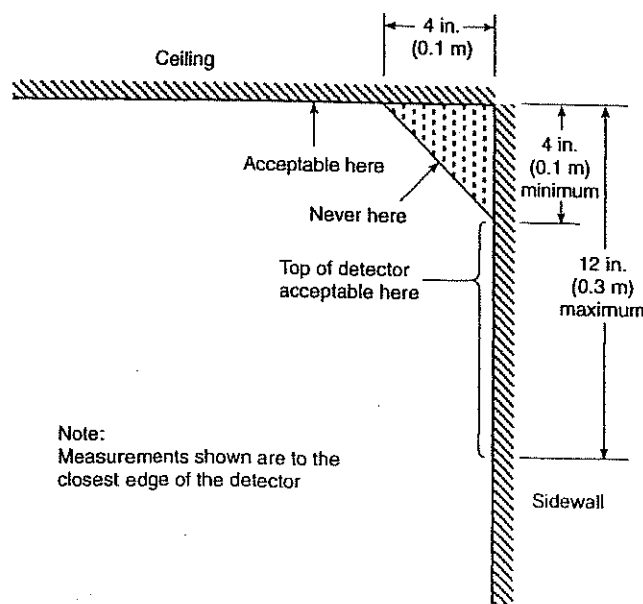


Figure A-2-5.2.1(b) In family living units with more than one sleeping area, a smoke detector should be provided to protect each sleeping area in addition to detectors required in bedrooms.



Note:  
Measurements shown are to the  
closest edge of the detector

Figure A-2-5.2.2(b) Example of proper mounting for detectors.

## **CARBON MONOXIDE DETECTORS**

In buildings of Groups I-1, R-1, R-2, R-3, R-4 or R-5 containing a fuel burning appliance or having an attached garage, carbon monoxide alarms shall be installed in accordance with the mechanical subcode.

Are required to be provided in the immediate vicinity of **all** sleeping rooms (*existing bedrooms on the upper floors*). The CO alarm is required to be manufactured, listed and labeled in accordance with UL 2034 and NFPA 720.

### **UL 2034 and NFPA 720**

*The CO alarm is required to be manufactured, listed, and labeled in accordance with UL 2034 entitled, "Single- and Multiple-Station Carbon Monoxide Alarms." Each device shall have a label indicating that it meets this requirement.*

*In the locations specified above, the alarms are required to be installed as follows:*

- 1. The device is permitted to be a battery powered, hard-wired, or plug-in type.*
- 2. If installing an electrically operated device, the AC power source is required to be supplied from either a dedicated branch circuit or the unswitched portion of a branch circuit also used for power and lighting. Operation of a switch (other than a circuit breaker) or a ground-fault circuit Interrupter is not permitted to cause loss of power to the alarm.*
- 3. The alarm may be located on the wall, ceiling, or other location as specified in the manufacturer's installation instructions.*
- 4. The device is required to be supported independently of its attachment to wires.*
- 5. For alarms installed in the vicinity of sleeping rooms, the alarm notification appliance is required to be clearly audible in all bedrooms over background noise levels and with all intervening doors closed, with a minimum rating of 85dBA at 10 feet (3m). If the alarm is intended to notify occupants in the same room, the sound pressure level is permitted to be 75dBA at 10 feet.*

*Under most situations, compliance with the requirements listed above should be acceptable for approval of the installation. However, should a situation arise that is not addressed above, please refer to NFPA 720 for additional installation requirements.*

## CHAPTER 17 COMBUSTION AIR SECTION M1701 GENERAL

### M1701.1 Air supply.

Liquid and solid fuel-burning appliances shall be provided with a supply of air for fuel combustion, draft hood dilution and ventilation of the space in which the appliance is installed, in accordance with Section M1702 or Section M1703. The methods of providing combustion air in this chapter do not apply to fireplaces, fireplace stoves and direct-vent appliances.

### SECTION M1702

#### ALL AIR FROM INSIDE THE BUILDING

##### M1702.1 Required volume.

Where the volume of the space in which fuel-burning appliances are installed is greater than 50 cubic feet per 1,000 Btu/h (4.83 L/W) of aggregate input rating in buildings of ordinary tightness, insofar as infiltration is concerned, normal infiltration shall be regarded as adequate to provide combustion air. Rooms communicating directly with the space in which the appliances are installed through openings not furnished with doors shall be considered part of the required volume.

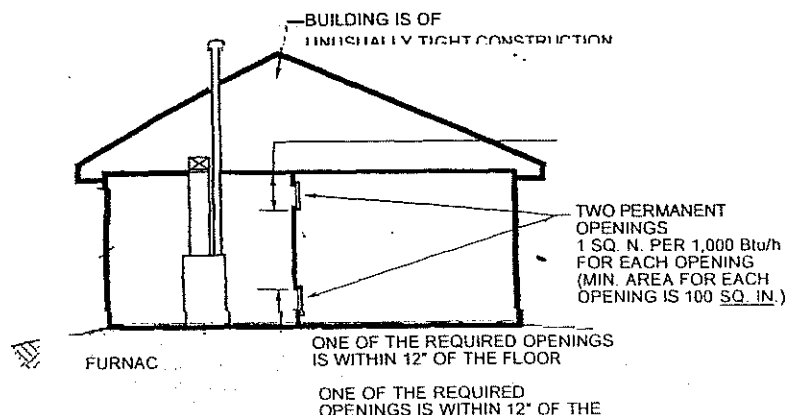
##### M1702.2 Confined space.

Where the space in which the appliance is located does not meet the criterion specified in Section M1702.1, two permanent openings to adjacent spaces shall be provided so that the combined volume of all spaces meets the criterion. One opening shall be within 12 inches (305 mm) of the top and one within 12 inches (305 mm) of the bottom of the space, as illustrated in Figure M1702.2. Each opening shall have a free area equal to a minimum of 1 square inch per 1,000 Btu/h (2.20 mm<sup>2</sup>/W) input rating of all appliances installed within the space, but not less than 100 square inches (0.064 m<sup>2</sup>).

### Combustion Air

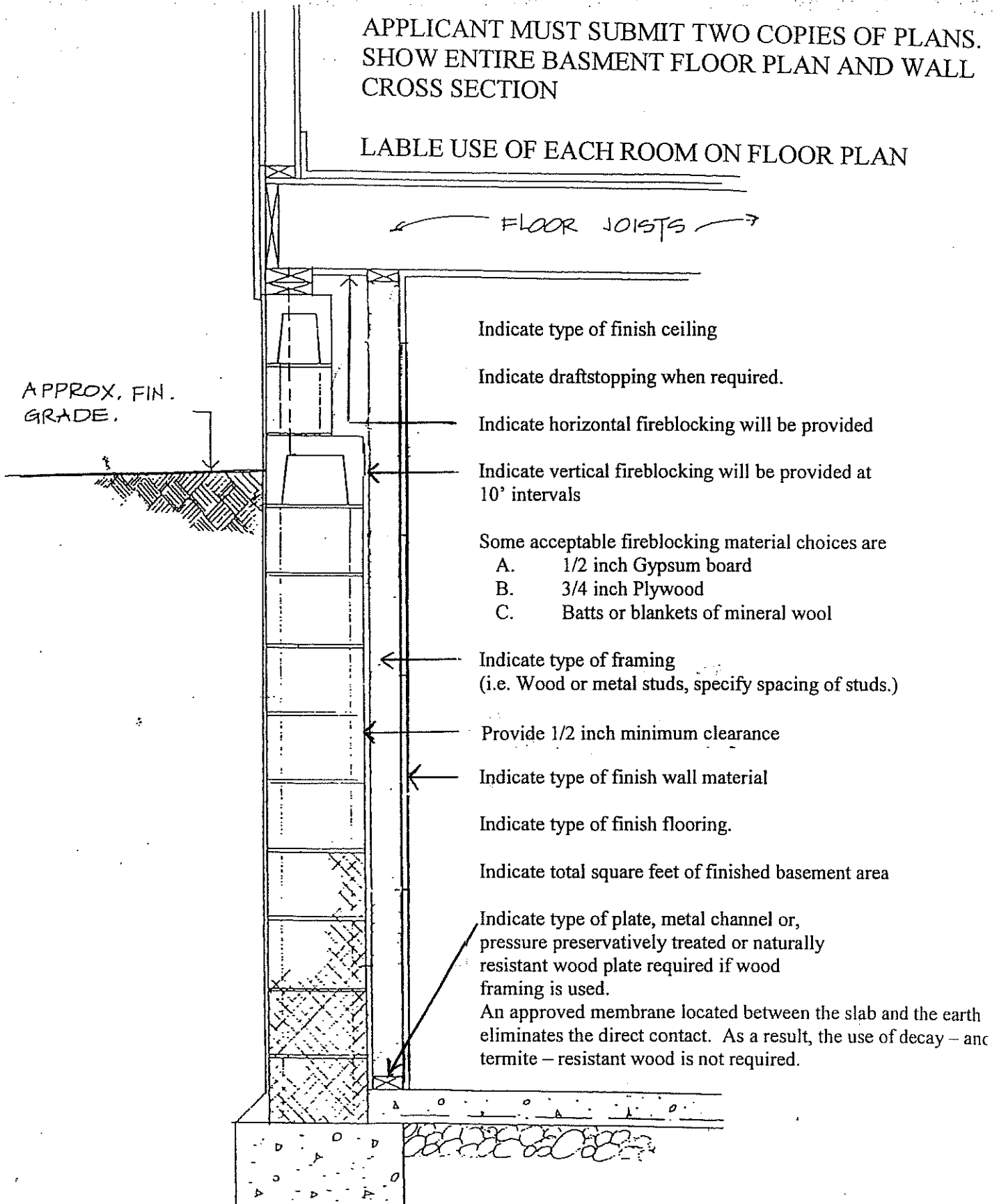
Combustion air is required to keep your furnace and hot water heater burning properly. In order for us to check the size of vents that are required, we need to know the input ratings of your furnace and hot water heater. Both heaters have data plates attached to them by the manufacturer and tell you the input rating. Manufacturer installation instructions sometimes specify different clearances and when they are more restrictive, they must be followed. A minimum of 2 combustion vents is required in small confined furnace rooms, one high and one low. The following is an excerpt from the International Mechanical Code (IMC) to assist you in understanding the requirements for combustion air in your home.

The code prescribes different methods for supplying combustion air. The methods range from simple too more complex (and inherently less dependable). Complete fuel combustion is essential for the operation of appliances, control of harmful emissions and to achieve maximum fuel utilization efficiency. By-products of incomplete combustion are poisonous, corrosive and combustible, and can cause serious equipment malfunctions leading to fire or explosion hazards.



APPLICANT MUST SUBMIT TWO COPIES OF PLANS.  
SHOW ENTIRE BASMENT FLOOR PLAN AND WALL  
CROSS SECTION

TABLE USE OF EACH ROOM ON FLOOR PLAN



## Wall Section

Finished Basement Requirements



Before signing the Certification in Lieu of Oath indicating that you are performing the work yourself, please consider the following:

1. The laws requiring new home builders to be registered and contractors in the various trades, such as plumbing or electrical work, to be licensed were adopted to protect homeowners and homebuyers. If you are signing this Certification to provide cover to an unlicensed homebuilder or contractor, you are forfeiting the protection afforded to you under the law. The contractor that you have hired may or may not be qualified. And if you encounter problems with this contractor, the government will not be able to help you because you signed the Certification indicating that you are performing the work yourself.

In the case of the construction of a new home, you are forfeiting your right to a new home warranty. Every new home builder in New Jersey is required to be registered with the State and to give a warranty to each purchaser. The warranty covers almost all defects in workmanship or materials, including appliances, for the first year; plumbing, mechanical (heating and air conditioning), and electrical systems for the first two years; and major structural defects for ten years. Further, the warranty will actually pay for the correction of defects if the builder fails or refuses to do so. By signing the Certification, you are giving up that protection.

2. You are violating the criminal laws of this State if you sign the Certification indicating that you are doing the work yourself when, in fact, you are paying someone else to do it.

3. A Copy of a Home Improvement Contractors License is required prior to start of work. A Homeowner doing the work in his own occupied residence however is exempt.

A homeowner who owns a rental unit or an attached Condo, Townhouse or duplex, cannot perform the work.

A Relative can do the work but must be Licensed.

## 11.7 SUMPS AND EJECTORS

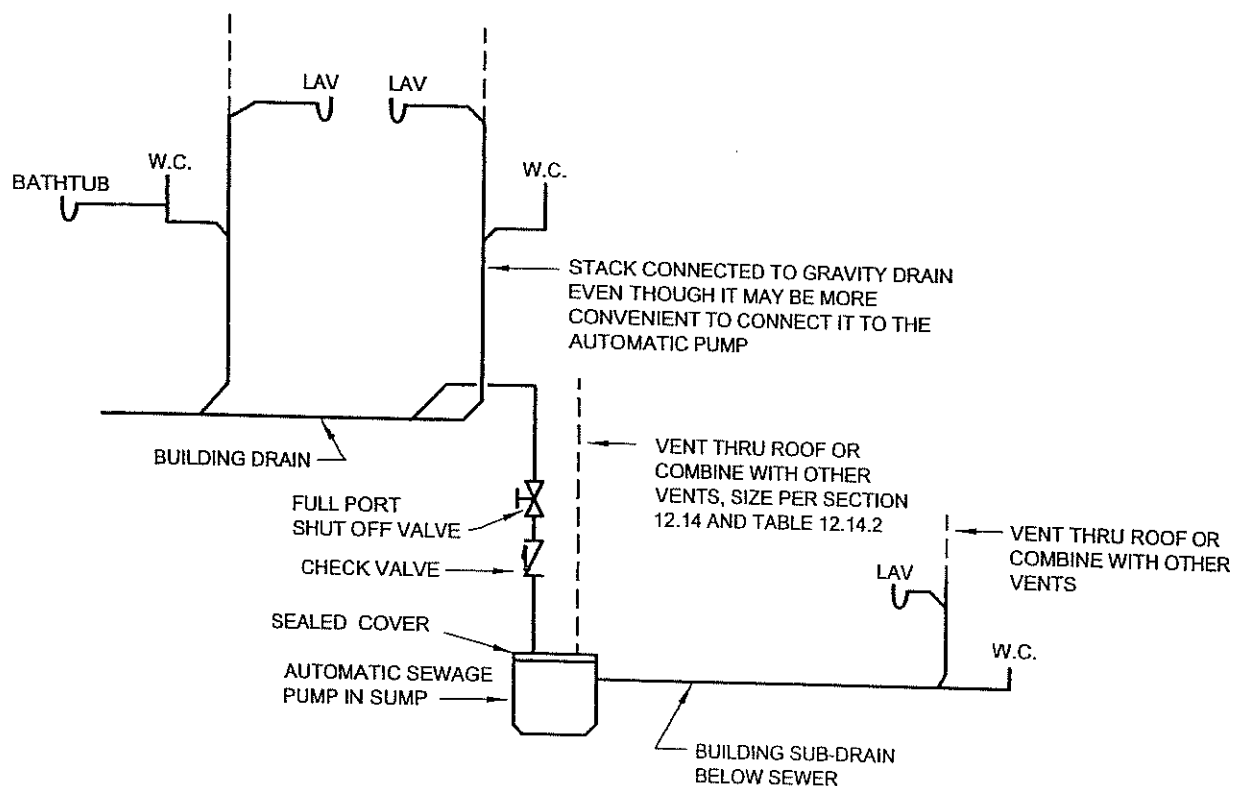
### 11.7.1 Building Subdrains

a. Building sanitary drains that cannot be discharged by gravity shall be discharged into a sump pit from which the contents shall be lifted and discharged into the building gravity drainage system by automatic pumping equipment or by an equally efficient method approved by the Authority Having Jurisdiction.

b. Only drains that must be lifted for gravity discharge shall be connected to such sump pits. All other drains shall discharge by gravity.

c. Sump pits shall be a minimum of 15 inches in diameter and 18 inches deep, and be accessible, tightly covered, and vented.

See Figure 11.7.1



#### NOTES:

1. Sewage pumps and ejectors must have audible, visual, or combination high level alarms per Section 11.7.11.

Figure 11.7.1  
A BUILDING SUBDRAIN AND SEWAGE PUMP

11.7.2 Reserved

11.7.3 Reserved

#### 11.7.4 Venting

Building subdrain systems shall be vented according to Chapter 12 of this Code.

*Comment: Sump pits with centrifugal sewage pumps must be vented in accordance with Section 12.14.2 and Table 12.14.2. Pneumatic sewage ejectors must be separately vented according to Section 12.14.3.*

#### 11.7.5 Reserved

#### 11.7.6 Grinder Pump Ejector

- a. Grinder pumps shall be permitted to be used when approved by the Authority Having Jurisdiction and installed according to the manufacturer's recommendations.
- b. The rated flow velocity for grinder pump discharge piping shall be not less than 2 feet per second.
- c. The size of grinder pump discharge piping shall be:
  1. 1-1/4" size for up to 25 gallons per minute.
  2. 1-1/2" size for up to 35 gallons per minute.
  3. 2" size for up to 65 gallons per minute.

#### 11.7.7 Pneumatic Ejectors

Vents from pneumatic ejectors shall be carried separately to the open air as a vent terminal in accordance with Section 12.14.2.

#### 11.7.8 Sewage Ejectors or Sewage Pumps

- a. A sewage ejector or sewage pump receiving the discharge from a water closet or urinal shall have a minimum capacity of 20 gallons per minute.
- b. The discharge piping from a sewage ejector and sewage pump shall include a backwater valve and a full-way shutoff valve.
- c. Ejectors or pumps in single dwelling units shall be capable of passing a 1-1/2 inch diameter solid.

EXCEPTION: Grinder pumps.

- d. In other than single dwelling units, ejectors and pumps shall be capable of passing a 2 inch diameter solid.

EXCEPTION: Grinder pumps.

#### 11.7.9 Individual Fixture Ejector or Pump

- a. Individual fixtures other than water closets, urinals, and similar fixtures, may discharge directly into an approved fixture-mounted ejector or pump, or into receptors having ejectors or pumps.
- b. The discharge piping from a sewage ejector or sewage pump for an individual fixture shall be sized on a hydraulic basis and include a backwater valve and full-way shutoff valve.
- c. Direct-mounted equipment may be manually or automatically operated.
- d. The installation of manually or automatically operated equipment shall not be subject to the venting requirements of this Code, but shall be vented only as required for proper operation of the equipment.
- e. A vent on the fixture side of the trap may terminate locally in the area served.
- f. If the equipment provides a proper water seal, additional traps are not required.

See Figure 11.7.9

THE FOLLOWING IS A PARTIAL LISTING OF THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) 2002 FOR THE FINISHING OF BASEMENTS IN SINGLE FAMILY DWELLINGS. IT IS MEANT TO BE A GUIDE AND DOES NOT REFLECT THE ENTIRE TEXT OF THE (NEC).

- THE STATE BOARD OF ELECTRICAL CONTRACTORS HAS RULED THAT ANY ELECTRICAL WORK PERFORMED IN ANY DWELLING OTHER THAN A *DETACHED* SINGLE FAMILY DWELLING MUST BE PERFORMED BY A LICENSED ELECTRICAL CONTRACTOR.

- Bathroom Branch Circuits In addition to the number of branch circuits required by other parts of this section, at least one 20-ampere branch circuit shall be provided to supply bathroom outlet(s). Such circuits shall have no other outlets.
- Basements: For a one-family dwelling, at least one receptacle outlet, in addition to any provided for laundry equipment, shall be installed in each separate unfinished portion and be GFCI protected.
- Dwelling Units: All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in (1) through (4) shall have ground-fault circuit-interrupter (GFCI) protection for personnel.
  - 1 Bathrooms. (Ejector pumps may require GFCI and a dedicated circuit by the manufacturer)
  - 2 Unfinished basements — for purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms and limited to storage areas, work areas, and the like
  - 3 Kitchens — where the receptacles are installed to serve the countertop surfaces
  - 4 Laundry, utility, and wet bar sinks — where the receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink
- Listed baseboard heaters include instructions that may not permit their installation below receptacle outlets.

- Habitable Rooms: At least one wall switch-controlled lighting outlet shall be installed in every habitable room and bathroom.
- Storage or Equipment Spaces: For utility rooms and basements, at least one lighting outlet containing a switch or controlled by a wall switch shall be installed where these spaces are used for storage or contain equipment requiring servicing. At least one point of control shall be at the usual point of entry to these spaces. The lighting outlet shall be provided at or near the equipment requiring servicing.
- The Rehabilitation SubCode deletes any spacing and clearance requirements in finished basements of existing dwellings.
- Generally: Ten(10) receptacle outlets are permitted on a twelve gauge circuit and seven(7) are permitted on a fourteen gauge circuit. (This is a rule of thumb not necessarily a Code requirement). Lighting circuits are loaded based upon the wattage of the fixtures installed on that circuit.
- Any Questions should be directed to:

Charles E Wiel  
Electrical SubCode Official  
908.369.4313 Ext.175