

APPENDIX "G"

Fire Damper types, and typical installation illustrations

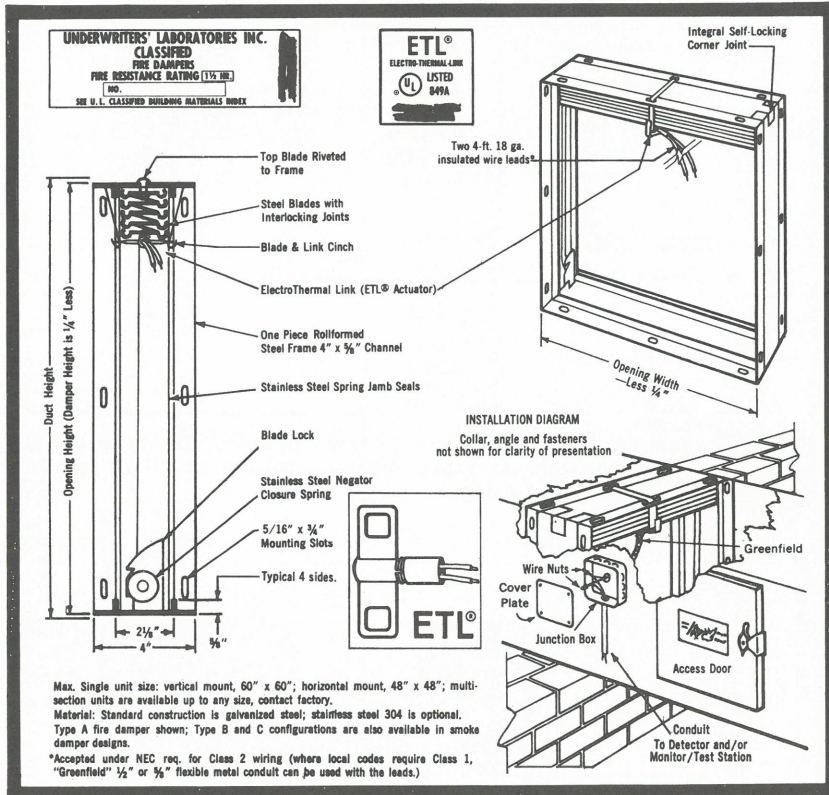


Fig. G-1 Leaf or blade type fire damper

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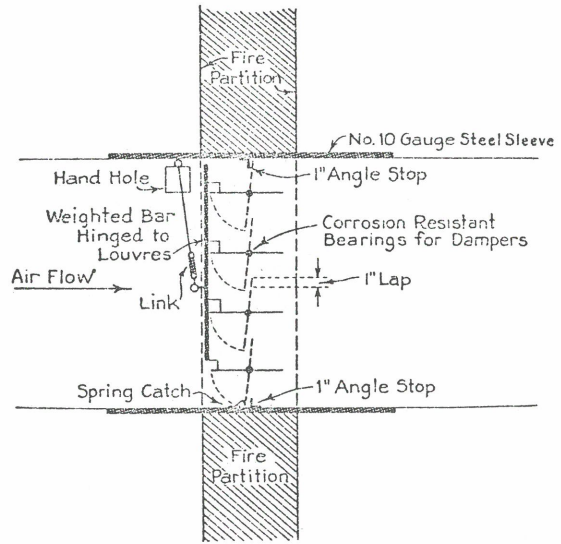


Fig. G-2 Typical arrangement of louvered type automatic fire damper. This type may be used at a fresh air intake, in fire partitions, or at the junction of a branch with a main vertical duct.

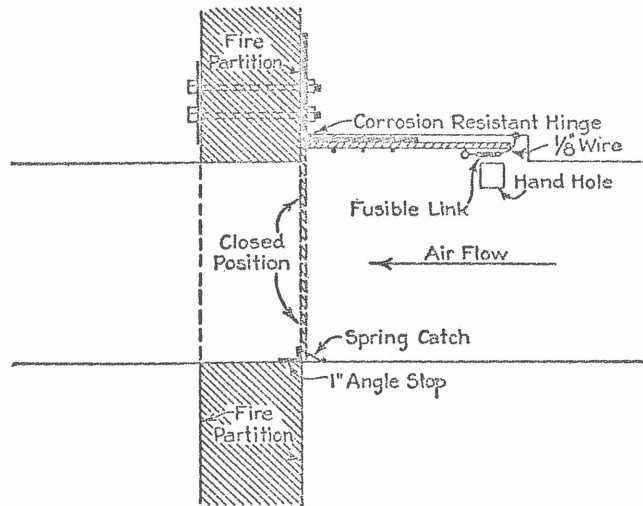


Fig. G-3. Typical arrangement of automatic hinged fire damper.

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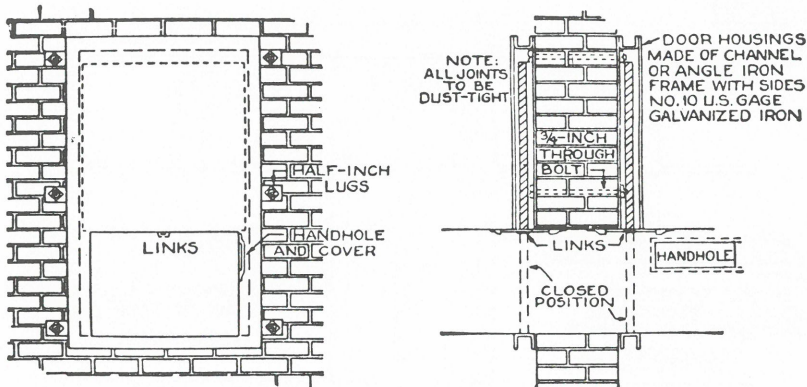


Fig. G-4 Type of vertical fire door for duct passing through opening in fire wall.

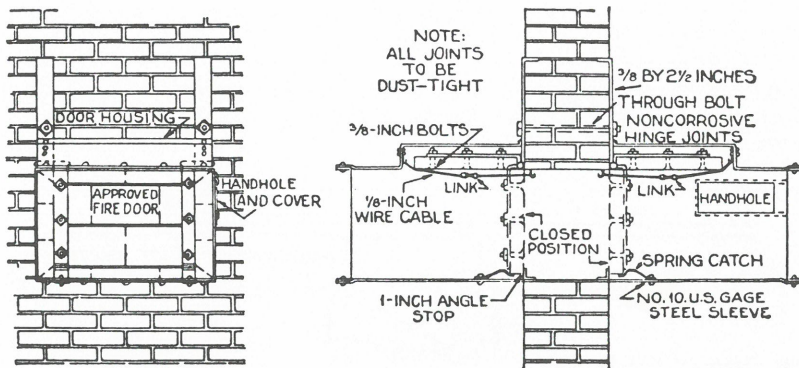


Fig. G-5 Type of hinged fire door for duct passing through opening in fire wall.

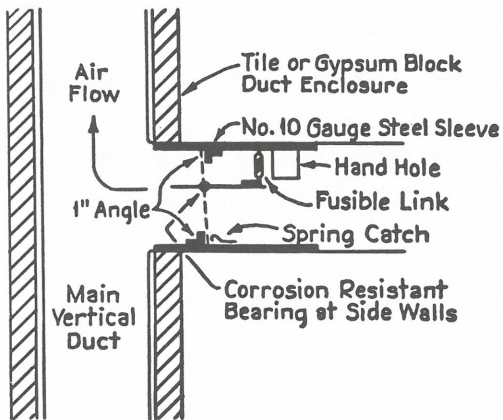


Fig. G-6 Typical arrangement of pivoted type automatic fire damper.

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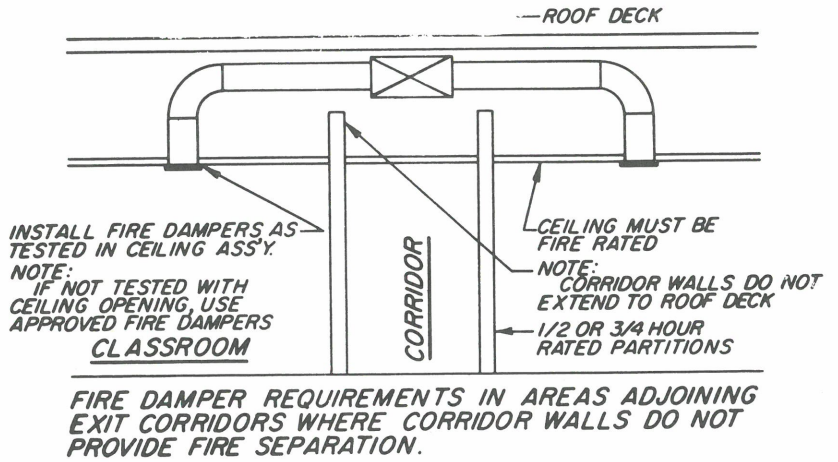


Fig. G-7

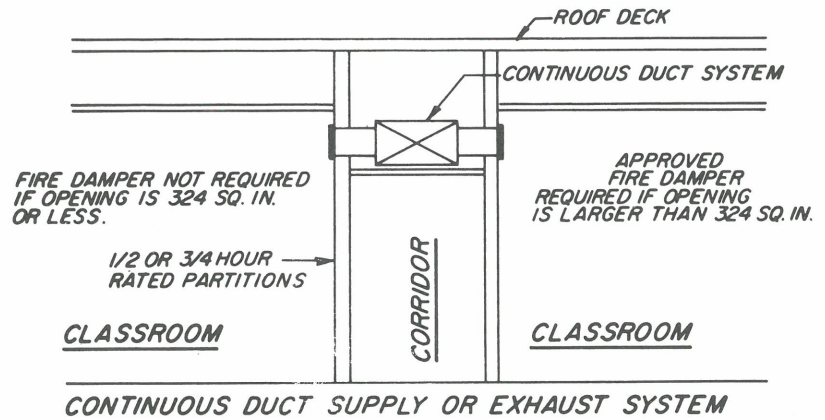


Fig. G-8 Single story construction

SINGLE STORY CONSTRUCTION

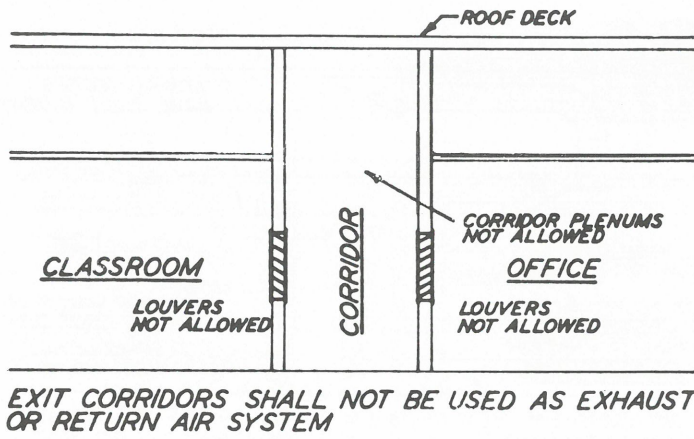


Fig. G-9

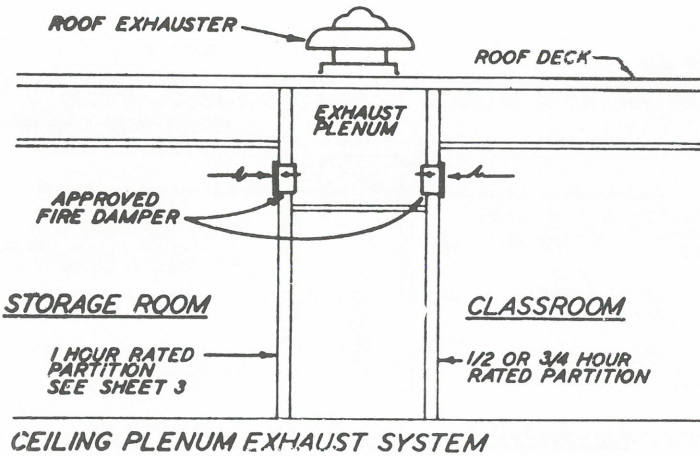


Fig. G-10

SINGLE STORY CONSTRUCTION

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NOTE 4A
 INSTALL FIRE DAMPERS AS TESTED IN CEILING ASSEMBLY
 NOTE: IF NOT TESTED WITH CEILING OPENING, USE APPROVED FIRE DAMPERS

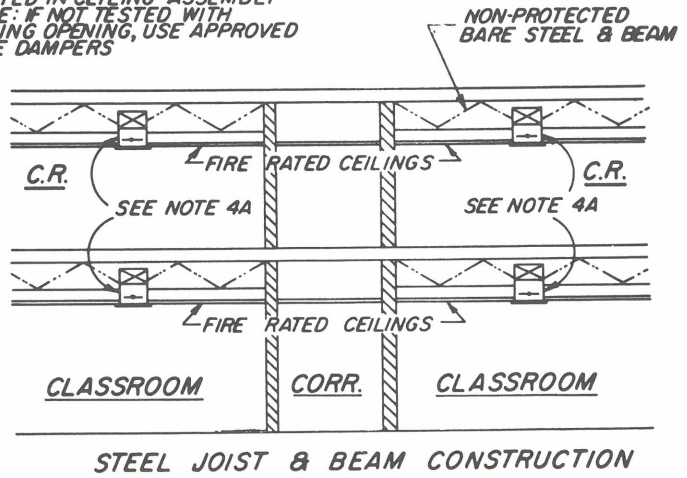


Fig. G-11

NOTE 4B
 1. APPROVED FIRE DAMPER REQUIRED IF OPENING IS LARGER THAN 324 SQ. IN.
 2. FIRE DAMPER NOT REQUIRED IF OPENING IS 324 SQ. IN. OR LESS

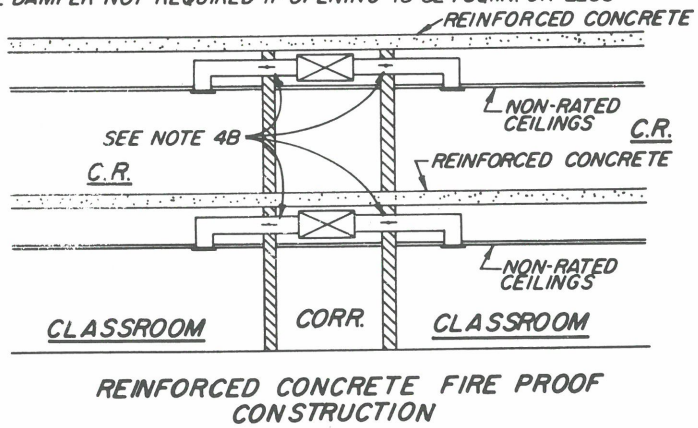
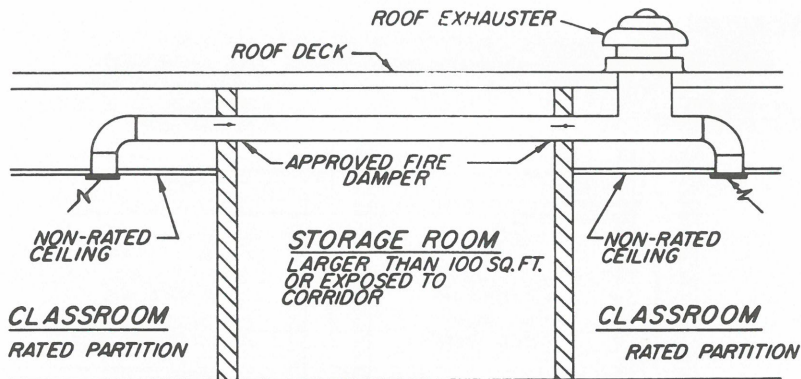


Fig. G-12

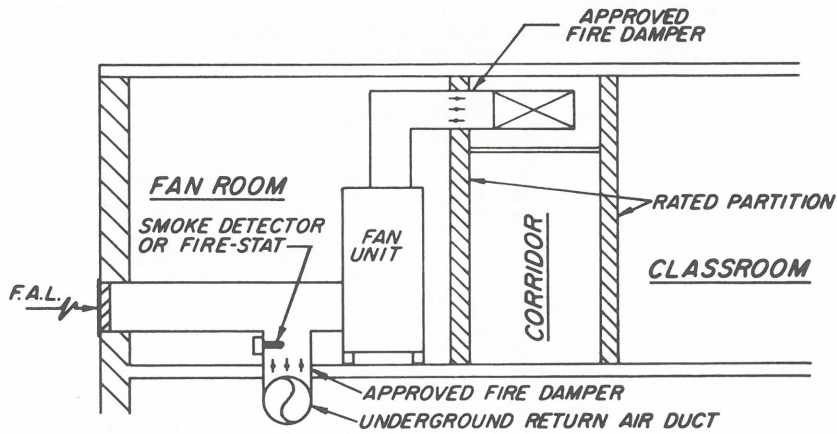
MULTI-STORY CONSTRUCTION



DUCTS EXPOSE TO FIRE RATED AREA

- A. INSTALL FIRE DAMPERS AS SHOWN, OR
- B. PROTECT DUCTWORK WITH ONE HOUR RATED FIRE RESISTIVE COATING, OR
- C. INSTALL FIRE RATED SUSPENDED CEILING IN STORAGE ROOM

Fig. G-13



FAN UNIT SERVING MORE THAN ONE INSTRUCTIONAL UNIT

Fig. G-14

SINGLE STORY CONSTRUCTION

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NOTE 6A
 INSTALL FIRE DAMPERS AS TESTED IN CEILING ASSEMBLY
 NOTE: IF NOT TESTED WITH CEILING OPENING, USE APPROVED
 FIRE DAMPERS.

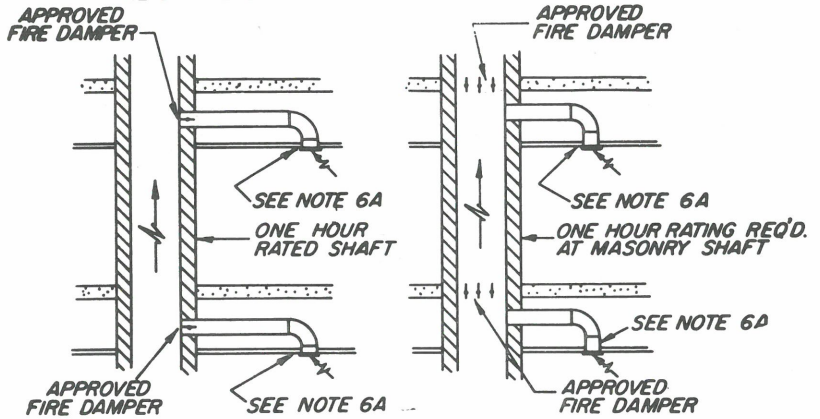
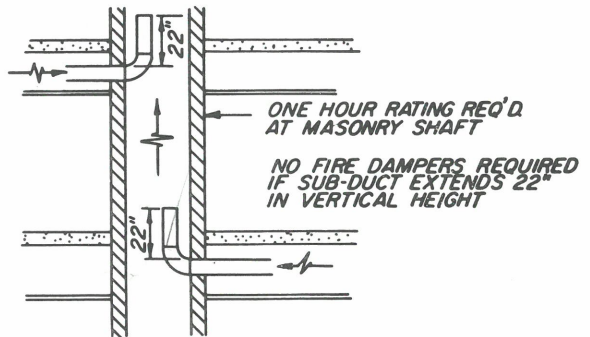


Fig. G-15

**FIRE DAMPER REQUIREMENTS AT DUCT
 SHAFTS AND RATED CEILINGS
 AS REQUIRED**

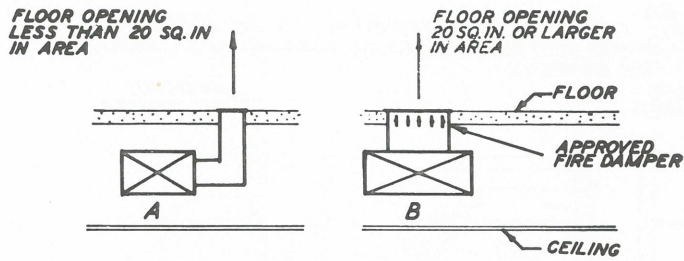


**FIRE DAMPERS NOT REQUIRED IN MASONRY
 EXHAUST SHAFT IF SUB-DUCT EXTENDS 22"
 IN VERTICAL HEIGHT IN MAIN DUCT SHAFT**

Fig. G-16

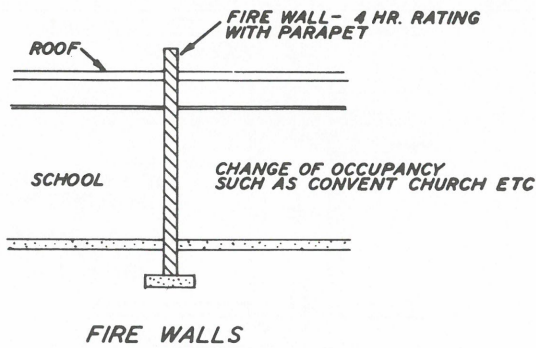
MULTI-STORY CONSTRUCTION

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- A. FIRE DAMPERS ARE NOT REQUIRED AT FLOOR OPENINGS IF AREA OF OPENING IS LESS THAN 20 SQ. IN. IN AREA
- B. PROVIDE APPROVED FIRE DAMPERS WHERE FLOOR OPENINGS ARE 20 SQ. IN. OR LARGER IN AREA

Fig. G-17



- A. FIRE WALLS SHALL BE USED TO SEGREGATE AREAS WITH CHANGE OF OCCUPANCY
- B. IF DUCT OPENINGS PIERCE FIRE WALLS, APPROVED FIRE DAMPERS MUST BE INSTALLED ON BOTH SIDES OF THE WALL

Fig. G-18

MULTI-STORY CONSTRUCTION

**Installation of
AIR CONDITIONING AND
VENTILATING SYSTEMS
(Excerpt from NFPA 90A)
1969**

902. Where Fire Dampers Are Required. Approved fire dampers shall be provided as follows, subject to the exceptions in 903:

(a) Where a duct passes through a fire partition (see Section 2(i)).

Definitions

2(i) Fire Partition. A partition which serves to restrict the spread of fire and is required to have a standard fire resistance rating of not less than two hours, but does not qualify as a fire wall.

(b) At each opening through a required fire enclosure of a verticle shaft.

Where Fire Dampers Are Required. Approved fire dampers shall be provided as follows, subject to the exceptions in 903:

(c) Where duct systems serve two or more floors, (1) at each direct outlet or inlet in the enclosure for a main vertical duct.

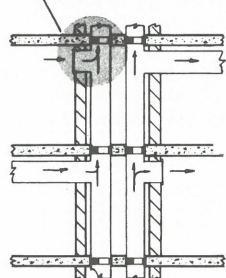
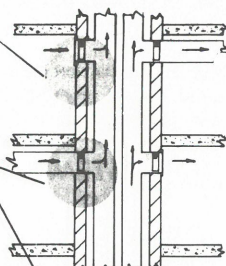
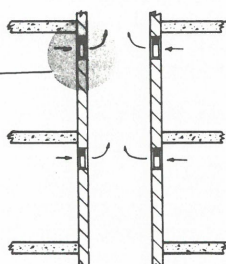
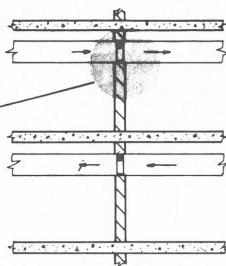
or at each point where such vertical duct pierces a floor it serves,

(2) and at the point where each branch duct pierces the enclosure for a main vertical duct (see 315).

315. Ducts which pass through floors of buildings requiring the protection of vertical openings shall be enclosed with approved non-combustible walls having fire resistance rating of not less than one hour when such ducts are located in a building 4 stories or more in height and not less than 2 hours when such ducts are located in a building 4 stories or more in height.

(a) The encasing of ducts shall not be required for branches which are cut off from the main portion of the duct by approved fire dampers.

(c) Two or more ducts serving separate floors shall not be encased in the same fire resistive enclosure unless approved fire dampers are installed where each branch is taken from such encased ducts.



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(d) A branch duct having a cross section area of less than 20 square inches which pass through one floor only and pierces the floor at one point only to supply air conditioning units in one story only is not required to be encased. Where a branch serves connectors which pierce the floor at more than one point, the portion of the duct below the floor shall be encased with not less than 1/2 inch of noncombustible insulating material such as metal lath and plaster or shall be enclosed with noncombustible material such as by locating above a noncombustible ceiling.

903. Exception: Fire dampers required under 902 may be omitted where any of the following conditions prevail:

(a) In branch ducts, not of aluminum or Class 1 duct, having a cross-sectional area of less than 20 square inches which supply only air conditioning units discharging air at not over 4 feet above the floor.

(b) Where a duct less than 20 square inches in cross-sectional area and not made of aluminum or Class 1 duct pierces the floor at one place only and supplies air conditioning units in one story only that discharge air at not over 4 feet above the floor (see 315 (c)).

(c) In small buildings with unprotected floor openings.

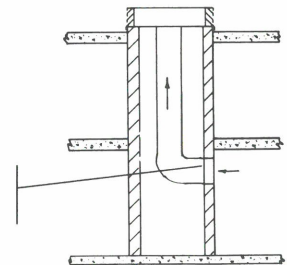
(d) In duct systems serving only one floor and used only for exhaust of air to the outside and not penetrating a fire wall or fire partition or passing entirely through the enclosure for a vertical shaft. (in applying this exception note 315 (c) Ed.)

(e) Where branch ducts connect to return risers in which the air flow is upward and subducts at least 22 inches in length are carried up inside the riser from each inlet.

Where Fire Dampers Are Required. Approved fire dampers shall be provided as follows, subject to the exceptions in 903:

(d) Where an aluminum duct or Class 1 duct regardless of size passes through a fire resistive floor, unless encased as specified in 315(d).

(e) At fresh intakes except where permission to omit them, because of light exposure, is granted by the authority having jurisdiction.



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(Editor's Note: Leading authorities have defined light exposure as intakes no lower than 10 feet above ground level and single room intakes such as classroom unit ventilators at or above ground level. Fire dampers are required at any air intake within 50 feet of an adjacent building or in the vicinity of a hazardous facility such as lumber yard or refinery.)

(f) As an alternate to encasement of vertical ducts which extend through only one floor, dampers to be located at each point where the floor is pierced (see 315 (b)).
(Also applied to 315(d) Ed.)

315(d) Ducts which are located in one story and have all duct openings extending through a floor to the story above or below may in lieu of such fire resistive enclosure be provided with approved fire dampers at each such point where the floor is pierced.

(g) Where ducts installed above a fire-resisting ceiling are provided with openings in the ceiling, and such openings require fire dampers for protection to conform with the design of the fire-resistive floor or roof and ceiling assembly as tested in accordance with NFPA No. 251, Standard Methods of Fire Tests of Building Construction and Materials (see also 315(b)).

Note: For information on means of protection of openings in fire resisting ceilings see Underwriters' Laboratories, Inc. Building Materials List under the heading. Retardant Classification (Fire), Floor or Roof, and Ceiling Construction.

906. The designer of air duct system shall show on the plans the location of all automatic fire doors and fire dampers as required by this standard.

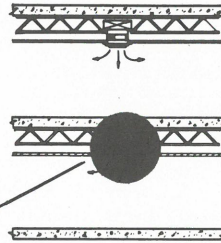
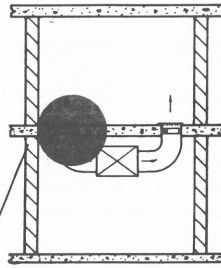
CONSTRUCTION OF FIRE DAMPERS

(Excerpt from NFPA 90A)

905. Construction of Fire Dampers. Approved fire dampers shall have the following performance characteristics:

(a) They shall be arranged to close automatically in event of abnormal high temperature.

(b) They shall provide the maximum practical barrier to passage of air when in the closed position.



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(c) They shall remain in the closed position under fire conditions.

(d) They shall have resistance to corrosion.

(e) They shall be so installed as to stay in place at the protected opening, even though the duct is disrupted during a fire, such as by the use of a substantial sleeve or frame.

(f) Suitable hand hole openings with tightly fitted covers shall be provided to make them accessible for inspection and maintenance.

(g) They shall possess a 1½ hour standard fire protection rating in accordance with NFPA No. 252, Standard Method of Fire. Tests of Door Assemblies, except for dampers protecting openings in fire-resisting ceilings.

(h) Fire Dampers provided in ducts used solely for exhaust of air to the outside shall be installed in such a way that they will not interfere with the flow of air in the main duct.

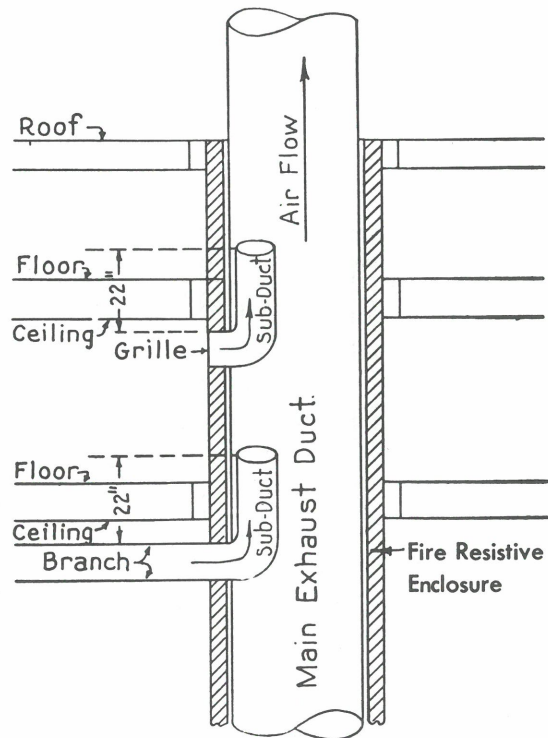


Fig. 4. Typical arrangement of sub-ducts [paragraph 903(e)] (NFPA 90A)