INTERIOR CONSTRUCTION

TO RESTRICT SPREAD OF FIRE

1. GENERAL

1.01 This section outlines standards for interior construction recommended for restricting the spread of fire in fire-resistive telephone office buildings. In designing telephone buildings to house equipment and associated personnel with greatest flexibility and economy it is essential that the safety of the occupants be assured and that interruption to service and fire losses be avoided. Although primarily for new buildings or additions of fire-resistive construction, these recommendations are considered where alterations are made to existing buildings.

1.02 The construction of floors and interior walls and partitions based upon a predetermined degree of fire resistance will prevent the spread of fire through a building. Such construction divides a building into areas in which a fire can normally be confined without endangering the structural integrity of the building. It is important, however, that proper protection be provided where the fire-resistive efficiency is impaired by the required openings in the floors, walls, and partitions.

1.03 In these recommendations, materials and construction are defined on the basis of performance standards rather than in terms of minimum dimensions and materials. "Fire Resistance Rating" is the time in hours that the material or construction will resist the standard fire exposure as determined by a fire test made in conformity with the "Standard Method of Fire Test of Building Construction and Materials" established by the American Society of Testing Materials. It is suggested that nationally recognized testing laboratories be consulted for test data on materials or construction considered for use on which fire resistance rating information is not readily available.

1.04 The use of non-combustible materials and construction is essential in restricting the spread of fire and it is assumed that the structural members not included in these recommendations are of approved non-combustible construction.

1.05 Where local or state regulations require higher degrees of protection than suggested in this practice, the legislated measures should be followed.

2. REFERENCES

2.01 The recommendations in this practice are based in general on the National Fire Codes of the National Fire Protection Association, Volume III - Building Construction and Equipment; Volume V - National Electrical Code; and the National Building Code recommended by the National Board of Fire Underwriters. National Fire Codes is a compilation of National Fire Protection Association Standards on building construction and equipment and the following standards, which have been adopted by the National Board of Fire Underwriters and pertain to this practice are available in pamphlet form.

Protection of Openings in Walls and Partitions Against Fire (N.B.F.U. No. 80) 1939

Air Conditioning, Warm Air Heating, Air Cooling and Ventilating Systems (N.B.F.U. No. 90) 1950

Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying (N.B.F.U. No. 91) 1949

Copies of the National Building Code and the pamphlets may be had on application to the offices of the National Board of Fire Underwriters, 85 John Street, New York City.

3. DEFINITIONS AND TERMS

3.01 Where reference is made to labeling in this section it refers to the label of Underwriters Laboratories, Incorporated. Materials and devices are tested by Underwriters Laboratories, Incorporated, for compliance with Laboratory standards of proper construction and performance with regard to their suitability for installation in accordance with regulations of the National Board of Fire Underwriters.

3.02 The word "approved" means acceptable to the inspection department having jurisdiction, and installed in accordance with the

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regulations of the National Board of Fire Underwriters, and when referring to devices, means tested by Underwriters Laboratories, Incorporated. The inspection department having jurisdiction will determine correctness of installation and use.

3.03 Openings in interior walls and partitions are classified A, B, or C in accordance with the fire-resistive requirements of the wall in which they are located, and the "labeled" or "approved" protection recommended applies to all materials and devices, and their installation, in accordance with the class of protection required. Fire doors used for protection of openings in walls and partitions are of two types, as follows:

(a) Self-closing doors are normally closed doors which close and latch when released from the open position.

(b) Automatic doors which are normally open and arranged to close when released by the action of heat.

To provide the protection for which they were designed, fire doors are maintained in reliable operating condition at all times. It is recommended that automatic doors be checked periodically as to condition and also test operated for proper closing. Self-closing doors should not be wedged or tied in open position or in other manner obstructed in closing. The use of fusible link hold-open devices for this purpose does not prevent the spread of smoke, and also may provide a source of draft to the fire. Latching devices should not be removed or made inoperative to eliminate the need of turning the knob in opening the door.

4. FLOORS

4.01 Floor construction has a fire resistance rating of not less than three hours.

4.02 Openings in floors for pipes, conduit, etc., are properly fire-stopped or enclosed with approved non-combustible construction.

4.03 Cable slots in floors are protected in accordance with the recommendations in B.S.P. Section H36.148, Cable Openings.

5. FIRE WALLS

5.01 A fire wall separates buildings or a single building into fire sections extending continuously from the foundation to the roof, and requires construction with a fire resistance rating of not less than four hours.

5.02 The importance of fire walls in preventing the spread of fire makes it essential that openings in such walls are limited in size and number and protected most efficiently. Necessary openings are protected on each side of the wall by approved fire wall, Class A labeled doors. The doors are either self-closing or automatic and when the opening serves as a required horizontal exit, one door of each type is used to protect the opening.

6. SHAFT ENCLOSURES

6.01 Series of floor openings providing communication between two or more successive stories are continuously enclosed to prevent the spread of fire vertically through the building. It is considered desirable to limit openings in shaft enclosures to those necessary for the purpose of the shaft.

6.02 When a floor opening is used for communication between only two stories, as for example, a convenience stairway, the enclosure of the stairway in one story is considered adequate, provided, (1) the stairway is not a required exit, (2) does not connect large equipment areas on the two floors, or (3) does not connect an equipment area with an area of hazardous occupancy.

6.03 Interior stairways and elevator hoistways are enclosed by construction having a fire resistance rating of not less than two hours.

6.04 Openings in stairway and elevator hoistways are provided with approved shaft doors labeled Class B. All such doors except manually operated elevator doors, are self-closing.

6.05 Recommendations on the construction of interior stairways are outlined in B.S.P. Section H32.610, Stairway Planning and Construction.

6.06 Cable openings where necessary in shaft enclosures are protected in accordance with B.S.P. Section H36.148, Cable Openings.

6.07 Shafts used for light, ventilation, dumbwaiters, conduit, etc., are enclosed by construction having a fire resistance rating of not less than two hours and the necessary openings require Class B labeled protection.

6.08 Shafts which do not extend through the roof are enclosed at the top with construction having a fire resistance rating equal to that of the walls of the shaft, and where

not extending to a floor are enclosed at the lowest point with floor construction of the same type as required for the lowest floor through which it passes.

7. PARTITIONS

7.01 Partitions used for the subdivision of fire sections of telephone buildings are important in safeguarding life and in restricting the spread of fire throughout the building. By separating areas of different occupancy with adequate fire-resistive construction, telephone equipment can be protected from the more hazardous occupancies of the building.

7.02 Telephone Equipment Areas are separated from other areas by partitions having a fire resistance rating of at least one hour. In equipment areas where future equipment space is used temporarily for non-equipment purposes, it is recommended that such temporary occupancy be separated from the equipment area by a partition having a fire resistance rating of one hour. Doorways in these partitions are protected by self-closing Class C labeled fire doors.

7.03 Mechanical Plant Equipment Areas, such as boiler rooms, elevator machine rooms, ventilating equipment rooms, etc., are enclosed by partitions having a fire resistance rating of one hour and doorways are protected by self-closing Class C labeled doors.

7.04 Permanent Corridor and Room Partitions have a fire resistance rating of one hour and doorways are protected by self-closing Class C labeled doors. Partitions for private offices, quarters, conference rooms, etc., within a general office area not exceeding 5000 square feet, are not required fire-resistive construction.

7.05 Storage Areas for materials used in normal telephone operations are enclosed by partitions having a fire resistance rating of one hour and doorways are protected by Class C labeled doors. It is suggested that the storage of combustible materials in telephone office buildings be limited to the requirements for normal operation and that the storage area be designed for those requirements.

7.06 The protection required for other storage of combustible materials and for all storage areas in locations considered hazardous, is determined for each specific location by the inspection department having jurisdiction. The services of Marsh and McLennan are recommended in connection with the storage of combustible materials, in accordance with B.S.P. Section H44.015, Fire and Safety Inspection and Advisory Services Rendered by Marsh and McLennan.

7.07 Ventilation Louvers, Grills and other necessary openings in the above partitions are protected by approved automatic closing devices. Heat activated closing devices, however, do not necessarily provide protection against smoke hazard and it is considered advisable to limit the number of openings, particularly in partitions forming exit corridors.

7.08 Cable Vaults are separated from the general basement area by a partition having a fire resistance rating of not less than two hours, and doorways are protected by self-closing Class B labeled fire doors. Where practicable, it is advisable to limit the openings in this partition to the required doors. The requirement for this partition is covered in B.S.P. Section H36.148, Cable Openings.

7.09 Transformers where necessarily installed within telephone buildings, are separated from other building areas by approved vault construction designed to protect building personnel and to prevent mechanical or structural damage to the building and contents in the event of fire, escape of harmful gases or possible transformer explosion. The design requirements are based in general upon the type and capacity of the transformers, and the adequacy of the ventilation provided for heat and gas dissipation and the release of pressures resulting from a possible explosion.

7.10 Suggested procedures for the design of transformer vaults with consideration of the ventilation requirements and explosion hazard are outlined in B.S.P. Section H34.284, Ventilation-Basement Spaces. The recommendations in this section pertain to the additional protection to be considered to prevent the spread of fire originating in transformer vaults. The specific provisions for safe installations of transformers of different types and capacities are recommended to conform to the requirements of the National Electrical Code of the National Fire Protection Association.

7.11 In general, the walls and roofs of transformer vaults are of reinforced concrete or masonry having a fire resistance rating of not less than three hours. Floors are of concrete not less than 4 inches thick. Building

walls and floors which meet these requirements may serve for the floor, roof or one or more walls of the vault.

7.12 In the event it is necessary to provide entrance to the vault from the building, the opening is protected by a tight fitting Class A labeled self-closing fire door. However, where added strength is indicated to reduce the possibility of explosion pressures entering the basement, as for example where oil-insulated transformers are used, it is considered advisable to provide a steel plate and angle door in metal frame firmly anchored in the wall. Doors are maintained locked and access to the vault is limited to qualified personnel. For oil-insulated transformers, a door sill or curb is provided, 4 inches high or of sufficient height to confine within the vault the oil from the largest transformer.

7.13 It is desirable wherever possible to avoid extending into or through vaults any piping or duct systems not associated with the electrical installation. If unavoidable, however, it is suggested that those sections or accessories requiring maintenance be located outside the vault. Arrangements are made where necessary to avoid possible trouble from condensation, leaks and breaks.

8. AIR DISTRIBUTION DUCTS

8.01 These recommendations are for consideration in the installation of air duct systems employing mechanical means for the movement of air and used for ventilating, heating, or cooling telephone building areas.

8.02 The protection of vertical extensions of duct through floors and of horizontal extensions where fire-resistive construction is pierced, is very important in the restriction of fire to a limited area. Automatic fan cut-off devices or alarms for the detection of fire are generally installed in air duct systems but the additional protective construction recommended in this section is necessary to prevent the communication of fire between the building areas.

8.03 Experience indicates that galvanized sheet steel with its higher melting point and strength is superior to aluminum as material for ducts and plenum chambers. It is recommended that steel be given preference to aluminum for use in duct systems up to the fire dampers protecting the branch duct work.

8.04 Where ducts pass through walls, floors or partitions, the space around the duct is sealed with rope asbestos, mineral wool or other non-combustible material to prevent the passage of flame or smoke.

8.05 Supply and return ducts in vertical extension form flues which provide a natural outlet for a fire to spread to other floors and the draft, either natural or mechanical, would increase the intensity of a fire. It is important, therefore, that such vertical ducts be enclosed by construction having a fire resistive rating of one hour. The protective construction extends from the top of the floor slab to the underside of the slab above. Duct extensions within the ventilating equipment room, however, do not require the protective construction, provided there is no open flame equipment within the room. Approved fire dampers are provided at each direct outlet or inlet and in each branch duct at its junction with the main vertical duct where the duct system serves two or more stories. Dampers are not required at room openings of the branch duct.

8.06 The passing of duct through fire walls is avoided wherever possible. Where ducts or the outlets from or inlets to them pass through fire walls they are provided with approved automatic fire doors on both sides of the wall through which they pass.

8.07 Fire doors at openings through fire walls and fire dampers at enclosures or partitions where required, are so arranged that the disruption of the duct will not cause failure to protect the opening.

8.08 An approved fire damper is provided on each opening where a duct passes through a required fire-resistive partition. Fire-resistive partitions required in telephone buildings are outlined in Paragraphs 7.01 through 7.06 above.

8.09 The passing of duct through cable vault walls is avoided wherever possible. Where ducts or the outlets from or inlets to them pass through the wall, the duct within the cable vault is enclosed by construction having a fire resistance rating of not less than two hours and each duct opening through the wall is provided with an approved fire damper.

8.10 Duct extensions through storage area walls are not generally recommended as they require protective construction in accordance

with the exposure. Ducts passing through walls of storage areas housing normal amounts of combustible materials as outlined in Paragraph 7.05, are provided with approved fire dampers at each wall opening. In other storage areas as outlined in Paragraph 7.06, the duct work within the storage is enclosed by protective construction having a fire resistance rating of not less than two hours and each duct opening through the wall is provided with an approved fire damper.

8.11 It is desirable that no portion of the basement space be connected to the recirculatory system of any ventilating plant serving stories above the basement. Suggested procedures for ventilation of power rooms, cable vaults and other basement areas, are outlined in B.S.P. Section H34.284, Ventilation-Basement Spaces.

9. KITCHEN EXHAUST SYSTEMS

9.01 For the ventilation of kitchen cooking equipment an independent system is required, in no manner connected to any other ventilating system. The system is designed to lead as directly as possible to outside.

9.02 Vertical risers where necessarily located inside the building are enclosed in a shaft preferably constructed of masonry at least equivalent to four-inch hollow tile, extending from the first floor pierced and through the roof. Residue traps with provision for clean out are provided at the base of each vertical riser.

9.03 Exhaust ducts are not extended through fire walls and dampers are not installed in any portion of the system.

9.04 Openings in horizontal runs of duct for inspection or cleaning purposes are equipped with tight-fitting sliding or swinging doors and latches.

9.05 Range or grease filters, if used, are of non-combustible construction designed for the specific purpose and so proportioned as not to decrease the air velocity in the duct below the 2000 feet per minute minimum operating velocity recommended for kitchen exhaust systems.

9.06 It is suggested that periodic inspection be made to determine the amount of residue in hood, ducts, fans and related portions of the system, and cleaning should be undertaken whenever an inspection indicates the need.

9.07 Recommendations pertaining to the design and construction of kitchen exhaust systems are outlined in B.S.P. Section H42.120, Ventilation of Kitchen Cooking Equipment.