

MEMORANDUM

To: Architects and Engineers
Licensed Sprinkler Contractors
Plan Review
Pat Slaughter, Inspections Administrator
Pat Day, Inspections Supervisor, Health Care

From: Jerry W. Jones
Deputy Assistant Secretary/Chief Architect

Date: February 19, 1999

Re: Protection of Mechanical Equipment in Concealed Locations

Please note the following attachments, which serve as guidelines to establish policy, concerning the subject protection requirements.

1. Attachment: 1996 NFPA 13 Sprinkler System Handbook

With respect to the commentary at 4-13.1.2, please note the second paragraph, underlined. Sprinkler protection is not required "in a concealed noncombustible space containing mechanical equipment that is made of noncombustible materials". The key issues of concern here, are underlined. See the commentary at 4-13.1.1, first paragraph, underlined. Reiterating this commentary, "If none of the three prescribed conditions exists, the space is defined as a concealed, noncombustible space...and requires no additional sprinkler protection."

2. Attachment: 1997 NFPA 101 Life Safety Code Handbook

Concerning the mechanical equipment materials referenced above, please refer to 101: A-6-4.1.1. One area deemed more hazardous than that normal to the general occupancy, is "areas housing heat producing appliances". Please refer to the commentary following this paragraph. As underlined, "The occupancy chapters identify the particular hazards against which protection is to be provided and generally addresses them in the -3.2 subsection of each occupancy chapter. ...For example, see Table 14-3.2.1." At this table, the "Boiler and fuel-fired heater rooms" are underlined.

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Determination

This office has determined that the intent of the code's reference to "mechanical equipment that is made of noncombustible materials", is that not only the equipment itself shall be noncombustible, but the energy

source shall also be noncombustible. In summation, it is the determination of this office that all fossil fuel-fired (natural gas, propane, fuel oil, etc.) mechanical equipment shall be considered combustible. Combustible mechanical equipment, located within any type of non-rated concealed space (combustible or noncombustible concealed space), shall require fire protection as specified in the applicable -3.2 occupancy subsection of NFPA 101. Also, remember that all combustible concealed spaces in a sprinklered facility require sprinkler protection in accordance with NFPA 13: 4-13.1, when designed per the NFPA 13 standard.

3. Attachment: 1996 NFPA 70 National Electric Code Handbook

Electric space-heating equipment is noncombustible and its energy source, electricity, is also noncombustible (being acknowledged as other than a fossil fuel-fired energy source). Per Article 424-9, "All fixed electric space-heating equipment shall be installed in an approved manner".

Determination

In summation, it is the determination of this office that all electric driven mechanical equipment shall be considered noncombustible. Noncombustible mechanical equipment located within any type of non-rated concealed space (combustible or noncombustible concealed space), shall not require fire protection, provided that the equipment is listed for this type location, and is installed in an approved manner. Also, remember that all combustible concealed spaces in a sprinklered facility require sprinkler protection in accordance with NFPA 13: 4-13.1, when designed per the NFPA 13 standard.

4. Attachment: 1996 NFPA 101 Life Safety Code Handbook

Please keep in mind, that penetrations and miscellaneous openings in a fire barrier may present more restrictive requirements. Please refer to the underlined commentary, at 6-2.3.4.2.1. Penetrations involving mechanical equipment through a fire barrier (single component or rated assembly) require compliance with NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems. Pipes, conduits, bus ducts, cables, wires, air ducts, pneumatic tubes and ducts, and similar building service equipment that pass through fire barriers shall be protected as described in 6-2.3.2.4.2. A fire barrier composed of a listed fire rated assembly may simultaneously create a concealed space. Therefore, if mechanical equipment is installed in a fire barrier concealed space, then compliance with these code sections is required.

JCC/jcc

Cc: Marc Reech

4-13 Special Situations

4-13.1.2 Sprinklers in concealed spaces having no access for storage or other use shall be installed in accordance with the requirements for Light Hazard Occupancy.

This paragraph is intended to apply to a concealed combustible space that requires sprinkler protection because of 4-13.1.1. The reference to Light Hazard Occupancy is for the purpose of selecting a density or the appropriate pipe schedule table (if allowed in Chapter 5). The type of construction must be evaluated to determine what area of coverage is needed for the sprinklers.

It is not intent of this paragraph to require sprinklers in a concealed noncombustible space containing mechanical equipment that is made of noncombustible materials. Nor is the intent to require sprinklers simply because an access panel is installed to gain entry to such equipment.

The existence of an access to a concealed space could lead to the space being used for storage or other purposes. However, if the size or arrangement of the access is such that it is determined not to allow any use of the space, sprinklers can then be installed according to the requirements for a Light Hazard Occupancy.

4-13 Special Situations.

4-13.1 Concealed Spaces.

4-13.1.1* **All concealed spaces enclosed wholly or partly by exposed combustible construction shall be protected by sprinklers.**

The formal interpretations that follow relate to a few of the many conditions under which protection of concealed spaces is required. This paragraph applies to those portions of a building that: (1) have construction materials of a combustible nature or combustible finish materials; (2) are used for the storage of combustible materials; and (3) may contain combustibles associates with building system features such as computer wiring or large quantities of nonmetallic piping. Any of these scenarios could be found in a concealed space. It is important to recognize that concealed spaces are not exclusively limited to areas above ceilings, but can also be found in walls and in spaces beneath the floor. An example of this is a raised floor in a computer room. If none of the three prescribed conditions exists, the space is defined as a concealed, noncombustible space with respect to combustible objects, and requires no additional sprinkler protection.

Paragraph 4-13.1.1 recognizes that some minor quantities of combustible materials, such as communication wiring, will be present in some concealed spaces but should not typically be viewed as requiring sprinklers. There is no defined threshold value at which sprinklers become necessary in the concealed space. For example, the usual amounts of data or telephone wiring found above a ceiling would not constitute a threat. If, however, bundles of unsheathed computer wiring are installed above the ceiling or beneath

6-4.1.1 Areas requiring special hazard protection may include, but are not limited to, areas such as those used for storage of combustibles or flammables, areas housing heat-producing appliances, or areas used for maintenance purposes.

Here, the *Code* attempts to minimize the effects of fire originating in hazardous areas by isolating those areas that have a high potential for fire or a high fuel load. The occupancy chapters identify the particular hazards against which protection is to be provided and generally address them in the 3.2 subsection of each occupancy chapter. With each new edition of the *Code*, additional occupancy chapters reformat their 3.2 subsection to include a list of typical hazardous areas and the required level of associated protection. For example, see table 14-3.2.1. This represents the fundamental fire protection concept of either protecting against known hazards via automatic extinguishment systems or isolating known hazards by means of fire-rate construction. The authority having jurisdiction is responsible for the final determination of what constitutes a hazardous area.

Chapter 14 ? New Detection and Correctional Occupancies

14-3.2.1.1 Protection from Hazards.

14-3.2.1* Hazardous Areas. Any hazardous areas shall be protected in accordance with Section 6-4. The areas described in the Table 14-3.2.1 shall be protected as indicated.

Table 14-3.2.1 Hazardous Area Protection

Hazardous Area Description	Separation/Protection
Areas not incidental to resident housing	2-hr
<u>Boiler and fuel-fired heater rooms</u>	2-hr or 1-hr and sprinklers
Commercial cooking equipment	In accordance with 7-2.3
Commissaries	1-hr or sprinklers
Employee Locker Rooms	1-hr or sprinklers
Hobby/handicraft shops	1-hr or sprinklers
Central or bulk laundries over 100 sq. ft. (9.3 sq m)	1-hr and sprinklers
Maintenance shops	1-hr or sprinklers
Padded Cells	1-hr and sprinklers
Soiled linen rooms	1-hr and sprinklers
Storage rooms >50 sq ft (4.6 sq m) in area but = 100 sq ft (9.3 sq m) in area	1-hr or sprinklers
Storage Rooms > 100 sq ft (9.3 sq m) storing combustible materials	1-hr and sprinklers
Trash collection rooms	1-hr and sprinklers

424-9. General. All fixed electric space-heating equipment shall be installed in approved manner.

1997 Life Safety Code Handbook

6-2.3.2.4 Penetrations and Miscellaneous Openings in Fire Barriers.

6-2.3.2.4.1* Openings in fire barriers for air handling duct-work or air movement shall be protected in accordance with 7-2.1.

In referencing 7-2.1 for protection of openings in fire barriers for air-handling duct work or air movement, the Code mandates that the requirements of NFPA 90A, *Standard for the Installation of Air Conditioning and Ventilating Systems*,¹⁷ and not the usual Life Safety Code requirements for opening protectives (6-2.3.2.3.1), apply to heating, ventilating, and air conditioning system (HVAC) penetrations of fire barriers. NFPA 90A requires that approved fire dampers be provided in all air transfer openings in partitions that are required to have a fire resistance rating. It also requires that approved fire dampers be provided where ducts or air grilles penetrate partitions that are required to have a fire resistance rating of 2 hours or more. Thus, although any air transfer opening would have to be fire dampered in a required fire barrier of any rating, penetrations by ducts of air grilles would not have to be fire dampered if the required rating of the fire barrier were less than 2 hours. These requirements are depicted in Figure 6-5.

A-6-2.3.2.4.1 In engineered smoke management systems, the designer should consider the use of high temperature links of fire dampers, where air-handling ducts penetrate fire barriers.

6.2.3.2.4.2* Pipes, conduites, bus ducts, cables, wires air ducts, pneumatic tubes and ducts, and similar building service equipment that pass through fire barriers shall be protected as follows.