NFPA No.

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PROTECTION OF RECORDS 1967

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Official NFPA Definitions

Adopted Jan. 23, 1964. Where variances to these definitions are found, efforts to eliminate such conflicts are in process.

SHALL is intended to indicate requirements.

SHOULD is intended to indicate recommendations or that which is advised but not required.

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*Among the laboratories nationally recognized by the authorities having jurisdiction in the United States and Canada are the Underwriters' Laboratories, Inc., the Factory Mutual Engineering Corporation, the American Gas Association Laboratories, the Underwriters' Laboratories of Canada, the Canadian Standards Association Testing Laboratories, and the Canadian Gas Association Approvals Division, and Yacht Safety Bureau.

LISTED: Equipment or materials included in a list published by a nationally recognized testing laboratory that maintains periodic inspection of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner.

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AUTHORITY HAVING JURISDICTION: The organization, office or individual responsible for "approving" equipment, an installation, or a procedure.

Units of Measurements

Units of measurements used here are U. S. standard. 1 U. S. gallon = 0.83 Imperial gallons = 3.785 liters. One foot = 0.3048 meters. One inch = 25.40 millimeters. One pound per square inch = 0.06805 atmospheres = 2.307 feet of water. One pound = 453.6 grams.

Standard for the Protection of Records

NFPA No. 232 — 1967

1967 Edition of No. 232

The 1967 edition of the Standard for the Protection of Records incorporates changes prepared by the Committee on Record Protection and adopted by the National Fire Protection Association at the 1967 Annual Meeting in Boston, Mass.

Origin and Development of No. 232

The destructive fire in the general offices of the Chicago, Burlington and Quincy Railway, Chicago, on March 15, 1922, was definite proof that valuable and often irreplaceable business records, unless properly protected, can be destroyed even in so-called "fire-resistive" buildings. Following this destructive fire in 1922, the Committee on Protection of Records was organized. Reports were submitted annually from 1923 through 1936, and in 1939. In 1947, a separate pamphlet was prepared from the officially adopted committee reports of 1942 to 1946. In 1960 the Standard underwent a major editorial revision and was revised again in 1963. This 1967 edition supersedes the 1963 edition.

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SCOPE: The protection of books, papers, plans and other records from loss incident to fire, including: the design, equipment, fire protection, and use of vaults, safes, and other record containers and record rooms and buildings; prevention and control of fire which may expose records; protection by duplication; evaluation and classification of records incident to programs of record protection; and elimination of useless records.

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Standard for the PROTECTION OF RECORDS

NFPA No. 232 — 1967

INTRODUCTION

1. **Purpose.** This standard is prepared for the use and guidance of those charged with the purchasing, designing, constructing, installing, inspecting, approving, listing, operating, or maintaining records protecting equipment, in order that this equipment, when called upon, will protect the records it contains against fire and its associated effects.

This standard is also prepared for the use and guidance of those charged with the planning, surveying, classifying, retaining, disposing, and otherwise handling of records, in order that they may enjoy the benefits of systematic fire safe records keeping.

2. **Scope.** This includes minimum requirements for records protection equipment and records handling techniques that provide protection from the hazards of fire; it does not consider the degree of protection against burglarious entry afforded by the equipment.

Only those skilled in the field are competent to design and recommend installation of equipment. It may be necessary for many of those charged with the planning, inspecting, approving, operating, and maintaining of this equipment and these techniques to consult with an experienced and competent fire protection engineer or records protection consultant in order to discharge effectively their respective duties. Because of size and the character of the records, this standard does not cover large archives or records buildings.

3. **Arrangement.** This standard is arranged as follows:

CHAPTER 1

GENERAL INFORMATION

101. The Basic Need.

1011. How valuable are business and public records? What should be done to protect these records against fire or other loss? Unfortunately these questions become acute in all too many cases only after a fire or flood has destroyed them.

1012. The fire loss to valuable property in this country is over $1 billion annually. When we analyze this figure, we find that 1⅛ per cent of the total number of fires caused 66 per cent of the total dollar loss. This means that a few large fires in manufacturing plants, wholesale and distributing warehouses, department stores, large businesses, and public buildings account for about two-thirds of the annual fire loss registered in this nation.

1013. Businesses have been discontinued because of the insurmountable task of replacing organizational and operational records. While accurate nation-wide statistics are needed, we do know that the losses sustained in fires by these business concerns had the adverse effect of lowering their credit ratings and that some concerns went out of business just because of the destruction of their records.

1014. We have only to turn back to that destructive fire in the general offices of the Chicago, Burlington and Quincy Railway Company, Chicago, to be reminded that valuable business records, unless properly protected, can be destroyed even in so-called "fireproof" buildings. Since then the lesson has been often repeated, the 1959 fire in the Pentagon building in Arlington, Va., being a more recent example.

1015. The National Fire Protection Association in 1923 appointed a committee to study the subject of proper protection of records. The information presented herewith is the result of a searching inquiry as to the proper answers to the very important question of how to protect records.

102. The Need for Protection of Records Increasing.

1021. Since the turn of the century, the volume of records, especially of business records, has increased rapidly. These records naturally have to be housed. This need stimulated, through competition among manufacturers, the development of better record containers, especially of lighter weight containers with greater capacity and fire resistance. The heavy old-line safes of uncertain fire resistance could no longer meet the needs of business and have been largely replaced by modern fire-resistive containers. Newer techniques of record keeping (i.e., micro-film and electronic computers) are creating new problems and new needs.

1022. The greatest need in the record protection field today is better acceptance and study of the records protection problem. Technically, the equipment needed to provide the necessary protection has been produced and ruggedly tested. It is now up to record owners and custodians to learn how to estimate the protection needed and up to architects, contractors, builders, as well as custodians, to know how to provide this protection. It is the hope of the committee that this revision of "Protection of Records" will make it easier (1) to understand the need for and (2) to know how to provide for, record protection.

103. Equipment Improved by Fire Tests.

1031. The science of protecting records from the effects of fire may be said to have begun about 1910 when Underwriters' Laboratories, Inc., conducted the first test in which both the temperatures of the furnace and of the air inside the record container under test, were recorded. While the container first tested was woefully lacking in fire-resistive properties and the test was a crude one as compared with present-day tests of equipment, the method followed set a precedent that was destined to exert an influence not only upon the testing of record containers but upon fire testing in general.

1032. In the case of all devices that had been tested previously (doors, windows, walls) it was possible to see the exposed and the unexposed sides of the test specimens. As it is not possible to see what happens in the interior of a safe surrounded by fire, remote-reading electrical thermometers were used to measure the inside temperature.

1033. Measuring temperatures inside record containers, i.e., safes, naturally called for the fixing of a maximum permissible interior temperature because of the fire-resistive rating of the container. In view of the fact that the rate of temperature rise inside a safe was influenced by the temperature of the furnace fire, the new method called for closer furnace control and following a definite schedule of furnace fire temperatures. Gradually, as fire testing increased, practices tended toward uniformity and eventually to the Standard Curve now in use.

1034. The maximum permissible interior temperature was set at 350°F in order to provide a safety factor since the ignition temperature of most paper is somewhat higher. This limit was set before the Standard Time-Temperature Curve was adopted and helped to emphasize the desirability of a uniform rule for regulation of testing furnace temperatures. Adoption of a temperature rise limit served to place the rating of record containers upon a quantitative basis. The terms Class A, Class B, and Class C were suggested by experience in the testing of fire-resistive safes.

104. The Role of Automatic Sprinklers.

1041. For many years record custodians, librarians, and other keepers of documents have maintained that automatic sprinklers have simply added a water hazard to the already existing fire hazard. The result they claimed was two hazards where they started with only one.

1042. The fire protection engineers on the other hand claimed that the sprinklers, in fact, added negligible water hazards, and removed the serious fire hazard so that in effect there was only a minor hazard where there had been a major one before.

1043. Example:

a. The following is an illustration of the role sprinklers actually play as a possible record protection medium. The Factory Mutual Engineering Division ran a test on sprinklered and unsprinklered 4-tiered, steel, open deck library stacks. Two fires of identical nature were started

in a test section containing 11,000 books. The first test was with automatic sprinklers in service and the second without.

b. In the sprinklered test, the fire burned unhampered for 3 min. and 43 sec. when the first sprinkler opened. All fire spread halted at this point. Another sprinkler opened at 7 min. and 53 sec. and they both discharged for the remainder of the test (30 min. from start). Combined, their output was 41 gallons a minute for a total of 978 gallons discharged on 27 per cent of the books. Wetting of the books ranged from slightly damp to soaked. Ten per cent of the books were fire damaged ranging from slight charring to deep burns. Not a book was knocked from its shelf by the sprinklers.

c. In the unsprinklered test, the fire burned unhampered for ten minutes when all four tiers were heavily involved. Hoses were applied since the test structure was in danger. A one inch hose line was tried first but had little effect, and a two and one half inch line discharging 265 gallons per minute had to be brought in 17 seconds later in order to save the test structure. Books were knocked onto the floors of the tiers, and out of the stack. Afterwards, 89 per cent of the books were charred deeply or destroyed, 2½ per cent were scorched, and the remaining 8½ per cent were soaked.†

1044. Conclusion.

a. Sprinklers will work effectively to provide protection for records. The sprinkler performance history shows premature operation of sprinklers to be a negligible problem.

b. The provision of sprinklers does not remove the need for adequate record protection, but it can reduce the severe exposure to records.

†The complete report on this test with pictures is available in the NFPA Occupancy Fire Record on Libraries (OFR — 60-1) and "Fire Tests of Library Bookstacks" in the April 1960 NFPA *Quarterly*.

CHAPTER 2
STANDARD FOR FIRE-RESISTIVE VAULTS

The 2-story vault (below) was in this sprinklered 4-story brick, plank-on-timber hardware factory in Syracuse (above). The $977,000 fire was detected by the watchman. After the fire of suspicious origin, sprinkler valves were found shut off.

Satisfactory performance of a labeled vault door saved records in the upper story of this 2-story vault. A labeled fire door (not a vault door) at the first story level was damaged and records in the first story were destroyed. Top picture shows the fire exposure to vault.

20. GENERAL.

201. Scope.

2011. This chapter deals with the minimum requirements, from a fire protection standpoint, for record vaults.

2012. This chapter deals primarily with protection of records against fire and does not presume to deal particularly with other hazards. However, it may be stated that all fire-resistive vaults do afford a measure of protection against burglary. Where a greater burglary protection is desired, burglary-resistant safes or chests of the desired classification may be installed within a fire-resistive vault, or relocking device protection may be installed on the vault door. Although fire-resistive vault doors are not designed to be water-tight, modern doors do provide reasonable protection against entrance, at door jambs, of water from fire hose streams. Where specific protection against burglar or flood conditions is desired, the problem should be submitted to a competent engineer.

202. Definitions.

2021. **Approved.** The term "approved" refers to a material or equipment tested and listed by Underwriters' Laboratories, Inc., or other nationally recognized testing laboratory.

2022. **Vault.**

a. The term "vault" as used in this chapter refers to a completely fire-resistive enclosure, to be used exclusively for storage. NO WORK TO BE CARRIED ON IN THE VAULT. The vault is to be so equipped, maintained and supervised as to minimize the possibility of origin of fire within and to prevent entrance of fire from without.

b. The construction specified herein is intended to provide not only a factor of safety for structural conditions but also (1) to prevent the passage of flame or the passage of heat above a specified temperature into the vault chamber for a stated period, and (2) to permit withstanding the stresses and strains due to the application of a fire hose stream while the unit is in a highly heated condition with-

out materially reducing its fire resistance. On the basis of the foregoing, vaults are classified as "six-hour," "four-hour" or "two-hour."

2023. Nonfire-Resistive Building.

a. The term "nonfire-resistive building" as used in this chapter refers to a building, the structural members of which including floors and roof cannot withstand a fire completely consuming combustible contents, trim and floor surfacing without collapse.

b. This type includes buildings having wood exterior walls and interior wood framing; masonry walls (exterior, or exterior and interior), and interior wood framing either of the joisted type or of heavy timbers as in "mill construction"; masonry exterior walls and unprotected or insufficiently protected interior metal framing and noncombustible exterior walls, and interior framing with structural members whose fire resistance is deficient to an extent that general collapse of interior construction could occur in event of a fire completely consuming combustible contents, trim and floor surfacing.

2024. Fire-Resistive Building. The term "fire-resistive building" as used in this chapter refers to a building whose structural members (including floors and roof if used as part of a vault) are of noncombustible material throughout and *can* withstand a fire completely consuming combustible contents, trim and floor surfacing on any floor without collapse, thereby assuring that record containers on one floor of the building will not be exposed to the burning of additional combustible materials from other floors. For a complete definition of "fire-resistive" see NFPA Standard No. 220, Standard Types of Building Construction.

2025. Ground-Supported Vault. The term "ground-supported vault" means, as the name implies, one which is supported from the ground up and which is structurally independent of the building in which it is located.

2026. Structure-Supported Vault. The term "structure-supported vault" means one which is supported by the framework of a fire-resistive building and may be supported individually on any floor of such a building.

2027. **Vault Door.** The term "vault door" as used in this chapter is defined in the section entitled "Vault Door."

21. DESIGN OF VAULT.

211. Selection of Type.

2111. **In a Fire-Resistive Building.** In a fire-resistive building, the vault may be of either the ground-supported or the structure-supported type.

2112. **In a Nonfire-Resistive Building.** In a nonfire-resistive building, the vaults shall be of the gound-supported type. Walls of building shall not be used as walls of vault because collapse of building may cause damage to the vault and its contents.

212. Location.

2121. The vault shall be located in a normally dry place, preferably accessible to the section of the building where the records are used.

2122. Because of the difficulty of providing resistance to severe impact, vaults in nonfire-resistive buildings should be located where they will not be exposed to the fall of a heavy object, such as a safe, machine, or water tank, in the event of collapse of the building as the result of a fire.

2123. Basement vaults are undesirable, not only because under certain conditions burning or smoldering debris may be accumulated in a basement sufficient to produce a "cooking effect" of such duration that it cannot be resisted by construction alone (within practical limitations), but also basement vaults may be damp causing destruction of records by mold, and they are subject to flooding, under either flood or fire conditions, and consequent damage by water to some or all of the records.

2124. Exterior building walls forming part of a vault enclosure are subject to the penetration of moisture, and condensation within the vault may result from differences between the inside and outside temperatures. Remedial

treatment is described in the sections entitled "Dampproofing" (Sec. 226) and "Waterproofing" (Sec. 227).

213. Size.

2131. Standard Vault. Standard record vaults shall not exceed 5,000 cu. ft. in volume and the interior height shall not exceed 12 ft. These limitations are for the purpose of restricting the quantity of vital records exposed to destruction by fire in a single enclosure, and to reduce the possibility of fire originating within the vault.

2132. For Larger Vaults. For conditions requiring space in excess of 5,000 cu. ft., see Section 261, "Working Vault," or Chapter 3, "Standard for Fire-Resistive File Rooms."

214. Vault Design Considerations.

2141. Vaults require unusually good design and construction to insure that the structure will withstand satisfactorily all of the conditions which may be imposed upon it by fire. Plans and specifications shall be prepared and construction supervised by a competent engineer or architect.

2142. Proper design and construction of a vault include not only its qualities as a flame barrier and as a heat-retardant, but also its ability to avoid settlement and consequent cracking, and its ability to maintain the integrity of the vault structure under the stresses and impacts to which it may be subjected during a fire, including impact from falling objects and stresses, strains and erosion due to sudden cooling with fire hose streams. Proper design includes: determination of classification, selection of type, choice of materials, independence of floor, walls and roof of vault from nonfire-resistive building, bonding of floor, walls and roof of vault to each other, load capacity, etc.

215. Supervision of Construction.

2151. Proper construction involves supervision of details to avoid subsequent settlement and cracking of walls and to insure that all structural considerations related to fire resistance will be observed.

22. CONSTRUCTION OF VAULT.

221. Foundation.

2211. Ground-Supported Vaults. Foundations for vaults of the ground-supported type shall be of reinforced concrete adequate for the entire load of the vault structure and its contents, or tier of vaults and their contents. Structural members supporting vaults of the ground-supported type shall have steel-work protected by at least 4 in. of fireproofing.

2212. Structure-Supported Vaults.

a. The supporting structures for vaults of the structure-supported type shall be of adequate strength to carry the full load including the weight of the vault structure and its contents.

b. There shall be no combustible material in any portion of the supporting members of the structure. All structural members of the building which support the vault shall have steel protected by at least 4 in. of fireproofing concrete.

c. The walls of a structure-supported vault shall follow the panels of the building wherever possible and shall extend from floor to ceiling of the building in each story where a vault is located. If vaults are located on more than one floor of a building, they shall preferably be placed one above the other in the several stories.

222. Floor.

2221. In Structure-Supported Vaults. In structure-supported type, the floor of the fire-resistive building may serve for the floor of the vault, provided it is of noncombustible construction throughout and complies with the following requirements:

a. Thickness — Floor of vault shall be reinforced concrete not less than 6 in. thick and greater if necessary to

support the full load; or, if exposed to fire from outside the vault, equivalent to that required for the walls of the vault (sec. 223).

NOTE—It is good practice to have the portion of the floor under the record storage space about 4 in. higher than the floor of the building to avoid wetting of records in lowest storage space.

b. Floor Openings — Floor of vault shall not be pierced for any purpose.

c. Floor Surfacing — No wood or other combustible material shall be used for floor surfacing.

2222. **In Ground-Supported Vaults.** In ground-supported type, vaults shall meet the requirements of Paragraph 2221 in addition to the following requirements:

a. Materials — Floor of vault shall be of noncombustible material; exposed floors, i.e., floors exposed to fire from outside the vault, shall be of reinforced concrete.

b. Independence from Building Structure — In non-fire-resistive buildings, the floor construction of vaults shall be independent of the floor construction of the building.

223. Walls.

2231. Walls shall be of noncombustible construction throughout, consisting of reinforced concrete or brickwork with vertical as well as horizontal joints filled with mortar; or in a fire-resistive building, a framework of heat-protected steel or reinforced concrete with panels of reinforced concrete or brickwork; walls of two-hour vaults (not four-hour nor six-hour) may be of approved concrete masonry units. Walls of hollow units shall be plastered on both sides with at least ½ in. of gypsum or portland cement plaster.

2232. Reinforcement for concrete shall consist of steel rods at least ½ in. in diameter spaced 6 in. on center and running at right angles in both directions. Rods shall be securely wired at intersections not over 12 in. apart in both directions, and be installed centrally in the wall or panel.

2233. Where a structural steel frame is used, the steel shall be protected with at least 4 in. of concrete, brickwork or its equivalent tied with steel ties or wire mesh equivalent to No. 8 A.S.W. gage wire on 8-in. pitch. Brick protection if used shall be filled solidly to the steel with concrete.

2234. No combustible material shall be used for trim or partitions.

2235. **Thickness.**

a. To provide not only the necessary minimum resistance to fire and fire hose streams, but also to provide for structural consideration and variations in quality of materials and workmanship, walls shall not in any event at any point be less than 6 in. thick if of reinforced concrete, nor 8 in. if of brick or hollow concrete units. Walls of these minimum thicknesses are hereinafter referred to as walls for two-hour vaults.

b. Two-hour vaults may be expected to protect against a complete burn out of: (1) the section of a fire-resistive building adjoining a vault, or (2) of buildings of nonfire-resistive construction having not more than two floors; if, in both cases, the area in the vicinity of the vault, and particularly the vault door, has an occupancy containing a moderate amount of combustible material, such as, an office occupancy consisting of an ordinary assortment and arrangement of desks, tables, chairs, filing cabinets, cupboards, open containers, etc., and no combustible partitions.

c. Where the fire area in the vicinity of the vault has an occupancy containing a large amount of combustible material (an office occupancy with combustible partitions, or an extraordinary amount of combustible furniture or open shelving, or a congested file storage area, or a factory, store or warehouse in which the vault is in the vicinity of combustible merchandise), walls shall be of greater thickness as in four-hour vaults, not less than 8 in. thick, of reinforced concrete or 12 in. if of brick.

d. Where the combustible merchandise or other contents of the fire area in the vicinity of the vault are of extreme concentration or are highly flammable, walls shall be of the thickness required for six-hour vaults, not less

than 10 in. thick if of reinforced concrete or 12 in. if of brick.

e. Walls of ground-supported vaults shall be of greater thickness than those described above where necessary to take care of unusual structural conditions, loads, etc. (See Table 1 in Appendix A on page 232-88, "Suggested Minimum Thicknesses for Ground-Supported Vaults.")

f. Expert judgment is required in determining vault classification based on actual weights of combustibles in fire area. (See Article 54 entitled "Fire Exposure Hazards to Records.")

2236. Openings in Walls.

a. Walls of vaults shall have no openings except door openings which shall be protected with approved vault doors. Doors shall not open into elevator, conveyor or other shafts, and there shall be no openings from one vault into another.

b. Openings shall not exceed two for any one vault, and shall be limited in area to that necessary for convenient ingress and egress, and for ventilation.

2237. Bonding to Fire-Resistive Structures.

a. The walls of vaults, unless ground-supported, shall be laid directly on the rough structural arch or floor slab construction of the fire-resistive building which shall afford a solid and roughened surface free from combustible or loose material, dirt or other foreign matter. Such surfaces shall be swept clean and dampened when the construction of the walls and floors of the vaults is started.

b. If any wall of a building is of suitable construction to form part of the vault enclosure, the wall or walls of the vault at the intersection with the building wall shall, when practicable, be bonded into it for the full height and width of the vault wall or walls.

c. When such bonding is not practicable, the wall or walls of the vault shall be (a) rabbeted into the building wall for their full height and width, to a depth of not less than 4 in., or (b) the bonding may consist of a series of keys the full width of the vault wall and let into the building wall

not less than 4 in., these keys to be not less than three brick courses in height and spaced not to exceed 2 ft. on the centers, with the lower key at the floor and the upper key at the ceiling, and with all joints between the keys and the building wall thoroughly filled with mortar or cement grout.

d. Where structural steel members of a building come in contact with vault construction, such members and their fire-resistant protection shall in no case reduce the minimum thickness of the vault construction prescribed in these specifications.

e. Interior columns or pilasters shall not be considered in determining the thickness of vault walls, but the wall of the vault shall be bonded or anchored to each column or pilaster if the two intersect or adjoin.

2238. Bonding of Walls, Floor, and Roof.

a. Vault walls of masonry units shall be laid with angles and corners well bonded throughout their height.

b. Where the floor construction of a fire-resistive building forms the roof of the vault, the joint between the top of the vault wall and the underside of the floor arch or slab shall be tightly finished and thoroughly filled with mortar or cement grout. Wedging with slate should be done where required to secure adequate bonding.

2239. Independence from Building Structure.

a. Vault construction shall not be used as a support or bearing for the structural members of the building.

b. In buildings of nonfire-resistive construction, the walls of vaults shall be structurally independent of the building.

224. Roof.

2241. Definition. The term "roof of vault" refers to the ceiling or roof of a single vault and to the ceiling or roof of the top vault of a tier, not to the slab between vaults in a tier which is classified as a floor.

2242. **In Structure-Supported Vaults.** In structure-supported type, the roof or the floor of the fire-resistive building may serve for the roof of the vault, provided it is of noncombustible construction throughout and complies with the following requirements:

a. Materials — Roof of vault shall be reinforced concrete on reinforced concrete or protected steel supports.

b. Thickness — Roof of vault shall be at least 6 in. in thickness and greater if subject to unusual impact, or if exposed to fire from outside the vault, thickness of roof shall be equivalent to that required for the walls of the vault.

c. Interior Supports — All interior structural steel shall be protected with at least 2 in. of fireproofing.

d. Roof Openings — Roofs of vaults shall not be pierced for any purpose.

e. Bonding of Vault Roof to Walls of Vault — As required by the materials and type of construction used, the vault roof shall be adequately bonded or anchored to the walls of the vault. For reinforced concrete construction, the reinforcing steel in the vault roof shall be extended into the walls for not less than one-half the thickness of the wall and finished with a right angle or hook anchor. The wall reinforcing steel shall be extended into the vault roof construction not less than 18 in. and similarly finished. If steel beams are used in the roof construction, they shall be provided with suitable wall anchors or secured to structural members forming part of the wall construction.

2243. **In Ground-Supported Vaults.** In ground-supported type, the requirements of paragraph 2242 shall apply in addition to the following requirement:

a. Independence of vault roof from building structure — In nonfire-resistive buildings, the roof of vaults shall be entirely independent of the wall, floor, ceiling, columns, piers, or roof construction of the building.

225. Vault Door.

2251. Definition.

a. The term "vault door" as used in these specifications designates a unit consisting of a frame, generally

known to the trade as a vestibule, which is designed to be installed in the wall of the vault and into which is hung a single or a pair of fire-insulated doors equipped with suitable hinges, latches or bolts and locking mechanism. The term "vault door" is limited to approved vault door units bearing the label of the Underwriters' Laboratories, Inc., or other nationally recognized testing laboratories.

b. Such doors are capable (1) of preventing the passage into the vault chamber of flame or of heat, above a specified temperature, for the period of time indicated on the label, and (2) of withstanding the stresses and strains due to fire or the application of a fire hose stream while the unit is in a highly heated condition without materially reducing its fire resistance. Inner steel doors may be hung in the vestibule if desired; they provide little fire resistance, but have some value in keeping combustible material inside the vault.

2252. Classification.

a. Each wall opening in the vault shall be provided with a vault door unit bearing a rating, in hours of fire-resistance, comparable to the classification of the walls of the vault, as follows:

Two-hour vault — Two-hour door.

Four-hour vault — Four-hour door.

Six-hour vault — Six-hour door.

b. Ordinary fire doors such as hollow metal, tinclad, sheet metal or metalclad types, steel plate type and file room doors, are not acceptable as vault doors.

2253. Installation of Frame.

a. Installation of the vault door unit shall be made in conformity with instructions supplied by the manufacturer and shall be entrusted only to those experienced in such installation work. This will insure that the vault door unit as installed will maintain its integrity not only as a flame barrier but also as a heat retardant under the stresses and impacts to which it may be subjected during a fire, and expansion or distortion of the vault door itself due to fire or the sudden cooling with fire hose streams.

b. The following procedure is recommended: The masonry at the bottom of the opening shall be built up to the bottom of the steel of the frame and covered with a thick coat of cement mortar on which the sill of the frame is placed. The frame and door assembly shall be braced in position and the space between the jambs and the head and masonry completely filled with cement grouting. Typical methods of installation for jambs and head are shown in Figures 1, 2 and 3 in Appendix A on page 232-89.

2254. Escape Device. The door-locking mechanism shall be of a type enabling a person accidentally locked inside the vault to open the door from the inside.

2255. Door Closers. Doors should preferably be equipped with self-closers. When conditions are such that the doors may be fastened in the open position, the self-closers should be utilized for this purpose and be equipped with heat-actuated releases to close them in case of fire.

226. Dampproofing.

2261. When walls, floor or roof of vault are dampproofed, methods and materials used shall be such that the desired fire resistance of the vault will not be impaired. When temperature changes between the exterior and interior of the vault may be encountered, the resultant condensation (sweating) may be avoided by constructing a continuous air space of preferably 2 in. formed by a noncombustible lining inside the vault.

227. Waterproofing.

2271. Where conditions require waterproofing, the problem should be referred to a competent engineer or architect.

23. SERVICES TO VAULT.

231. Lighting.

2311. Floors, walls, and roofs of vaults shall not be pierced for lighting.

2312. Any lighting inside the vault shall be electric

with all wiring in conduit and installed in accordance with the National Electrical Code, NFPA No. 70. Power to such lighting shall be by means of a short cord which can be connected to an outlet outside the vault.

2313. The wiring shall provide as many fixed lamps as needed for adequate illumination. There shall be no pendent lamp or extension cord used within a vault. Bulbs shall be protected by a suitable guard. Care should be taken to make the fixed lighting adequate for illumination of all portions of the vault, as otherwise matches or other hazardous forms of illumination are likely to be used.

232. Heating.

2321. No heating other than indirect heating through the door opening is permissible. Wall, floor and roof of the vault shall not be pierced for piping.

233. Ventilation.

2331. Ventilation of the interior of the vault shall be only through the door openings. Floors and roofs of vaults shall not be pierced for ventilation.

2332. Where the natural circulation of air through the door opening does not provide sufficient ventilation, an electric fan may be placed outside the vault close to the door, directed through the door opening. Such fans may be conveniently placed on wall brackets near the top of the door. Fans should be so located that they will not obstruct the closing of the door.

24. VAULT OPERATING PRACTICES.

241. Filing Equipment.

2411. Filing equipment shall be noncombustible throughout. All records shall be stored in fully enclosed containers so far as possible. If complete enclosure of certain records is impractical, shelving having only the front open may be used, but loose papers shall not be filed on open shelving. Cubical contents of individual compartments of shelving should have a volume of not more than 10 cu. ft., preferably less.

2412. Arrangement of filing devices within the vault shall be such that they will be in short sections and with ample aisles between for convenient access and to retard the spread of fire. If open-front shelving is used, the sections of shelving should be broken up with fully enclosed containers forming fire stops.

2413. Open-front containers should be located at least 36 in. away from door openings; fully enclosed containers at least 4 in. away from door openings.

2414. If floor of vault, at least the portion under record storage space, is not at least 4 in. higher than the floor of the building, the bottoms of the lowest record storage spaces should be not less than 4 in. above the floor of the vault.

242. Supervision.

2421. The vault shall be under responsible supervision from opening until closing time and inspections shall be made daily, particularly before closing time, to insure that all containers are closed, no records left on top of containers or elsewhere exposed, all waste papers removed, and vault doors closed and locked.

2422. Vaults should not be used as working spaces. Persons other than those authorized to handle the records should not be permitted in the vaults.

2423. All vault door openings should be marked to caution firefighters against needlessly opening the doors or directing hose streams into them.

243. Housekeeping.

2431. General cleanliness shall be of the highest type.

2432. No materials other than records and record storage equipment shall be permitted even temporarily in vaults.

2433. Safety photographic film may be treated as records, but flammable nitrate film must not, under any circumstances, be kept in record vaults.

2434. Smoking inside vaults shall be positively forbidden. Matches shall not be allowed inside the vaults.

2435. No furniture polishing or refinishing of any sort shall be done inside vaults.

25. FIRE PROTECTION EQUIPMENT FOR VAULTS.

251. Automatic Extinguishing Systems.

2511. Since no openings shall be made in vault walls, floor or roof, automatic or manual fire protection devices piercing the walls are not recommended.

252. Manual Extinguishing Equipment.

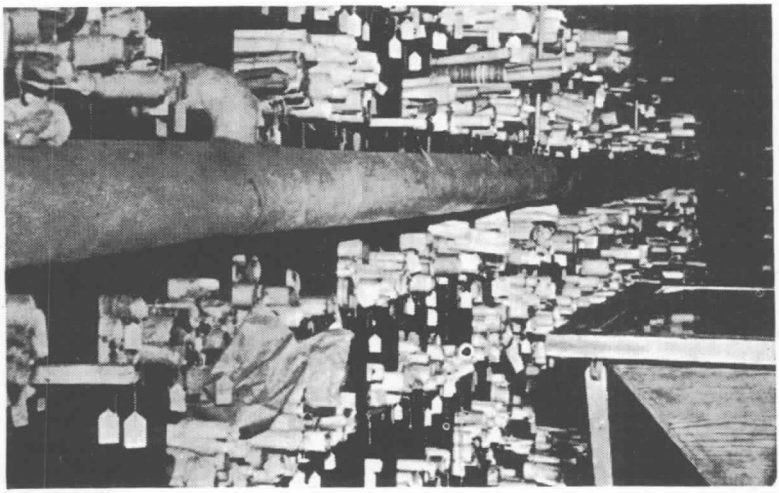
2521. Portable fire extinguishers of type suitable for Class A fires (see Standards for the Installation of Portable Fire Extinguishers, NFPA No. 10 and Maintenance and Use of Portable Fire Extinguishers, NFPA No. 10A) or standpipe systems with small hose suitable for use by occupants of the building (see Standard for the Installation of Standpipe and Hose Systems, NFPA No. 14) should be provided at a conveniently accessible location outside the door of the vault. Such protection is recommended in all cases.

26. OTHER VAULT TYPES.

261. Working Vault.

2611. Where the volume of "vital" records exceeds that which can be stored in a record vault of maximum permissible size (5,000 cu. ft.), they may be protected as follows: If the building is fire-resistive, the records may be segregated in an isolated fire-resistive section of not over 25,000 cu. ft., designed and constructed as a standard vault, and equipped and maintained either as a standard vault or as a standard file room; or the records may be segregated in an isolated fire-resistive records building. In either event, it should be borne in mind that if filing personnel work in such an enclosure, their presence and lighting, heating, and ventilation incident thereto, result in a greater possibility of the origin of fire within the enclosure than within the standard vault.

CHAPTER 3
STANDARD FOR FIRE-RESISTIVE FILE ROOMS



Pat Mitchell

The $2,500,000 property damage caused by fire at the State Office Building, Lansing, Michigan, February 8, 1951, was minor in comparison to direct and indirect losses of records, plans, etc. An estimated 1,000 to 1,500 tons of records were destroyed.

Michigan State Police

Records in the substandard filing cabinets shown here were part of the records destroyed in the Michigan State Office Building fire. The large area of stored records in this fire-resistive building could have been protected by a series of Standard File Rooms.

30. GENERAL.

301. Scope.

3011. This chapter deals with the minimum requirements, from a fire protection standpoint, for rooms in fire-resistive buildings intended to segregate a large volume of current records from the hazards of the remainder of the building.

3012. This chapter does not presume to deal with hazards other than fire. However, it may be stated that fire-resistive file rooms do afford a measure of protection against burglary. Where greater burglary protection is desired, burglary-resistive chests of the desired classification may be installed within a fire-resistive file room, or relocking device protection may be installed on the file room door. Although fire-insulated file room doors are not designed to be water tight, modern doors do provide reasonable protection at jamb joints against entrance of water from fire hose streams. Where specific protection against burglary or flood conditions is desired, the problem should be submitted to a competent engineer.

302. Definitions.

3021. **Approved.** The term "approved" refers to a material or equipment tested and listed by Underwriters' Laboratories, Inc., or other nationally recognized testing laboratory.

3022. **File Room.**

a. The term "file room," as used in these specifications, refers to a fire-resistive enclosure in a fire-resistive building, the enclosure having less fire resistance than a standard vault. The enclosure is to be used exclusively for the *storage* and *handling* of records, and to be so equipped, maintained, and supervised as to minimize the possibility of origin of fire within, and to exclude fire from outside the file room.

b. It should be recognized that if filing personnel work in a record storage enclosure, their constant presence and the hazard of lighting, ventilation, and heating equipment incident thereto, as well as the greater volume of records likely to be exposed at one time, add to the possibility of origin of fire and destruction of records *within* the enclosure.

c. A file room with openings protected by approved file room doors, suitable for the surrounding exposure, offers protection against the fire hazard outside the room, even though such a fire might completely consume the combustible contents, building trim and floor surfacing in the section of the building in which the file room is located.

d. Class 1 (vital) and Class 2 (important)* records should not be subjected to these possibilities of destruction by fire.

3023. Fire-Resistive Building.

a. The term "fire-resistive building" as used in this chapter refers to a building, the structural members of which (including floors, and roof if used as a part of a file room) are of noncombustible material throughout and which can withstand a fire completely consuming combustible contents, trim and floor surfacing on any floor without collapse, thereby assuring that record containers on one floor of the building will not be exposed to the burning of additional combustible materials from other floors.

b. The term "fire-resistive building" does not include: buildings having wood exterior walls and interior wood framing; masonry walls exterior or exterior and interior, and interior wood framing either of the joisted type or of heavy timbers as in "mill construction"; masonry exterior walls and unprotected or insufficiently protected interior metal framing; and noncombustible exterior walls and interior framing with structural members whose fire resistance is deficient to an extent that general collapse of interior construction could occur in event of a fire completely consuming combustible contents, trim, and floor surfacing.

3024. File-Room Door. The term "file-room door," as used in these specifications, is defined in Section 325, "File Room Door."

*See Section 522, "Identification Factors"

31. DESIGN OF FILE ROOM.

311. Location.

3111. The file room should preferably be located in a place accessible to the section of the building where the records are used.

3112. Because of the difficulty of providing resistance to severe impact, file rooms should be located where they will not be exposed to the fall of a heavy safe, machine, or water tank.

3113. Basement file rooms are undesirable, not only because under certain conditions burning or smoldering debris may be accumulated in a basement sufficient to produce a "cooking effect" of such duration that it cannot be resisted by construction alone (within practical limitations), but also because basement rooms are apt to be damp, causing destruction of records by mold, and they are subject to flooding, under either flood or fire conditions, and consequent damage by water to some or all of the records.

3114. Exterior building walls forming part of a file room are subject to the penetration of moisture, and condensation within the file room may result from differences between the inside and outside temperatures. Remedial treatment is described under sections headed "Dampproofing" (Sec. 326) and "Waterproofing" (Sec. 327).

312. Size.

3121. File rooms shall not exceed 50,000 cu. ft. in volume, and the height shall not exceed 12 feet.

3122. The foregoing limitations are for the purpose of restricting the quantity of records exposed to destruction by fire in a single enclosure, and to reduce the possibility of fire originating within the enclosure.

313. Design Considerations.

3131. File rooms call for unusually good design and construction to insure that the structure will withstand satisfactorily all of the conditions which may be imposed upon it by fire. Plans and specifications shall be prepared and construction supervised by a competent engineer or architect.

3132. Proper design and construction of a file room include not only its qualities as a flame barrier and as a heat retardant, but also its ability to avoid settling and consequent cracking, and its ability to maintain the integrity of the file room structure under the stresses and impacts to which it may be subjected during a fire, including impact from falling objects, and stresses, strains, and erosion due to sudden cooling with fire hose streams. Proper design includes: determination of classification, choice of materials, bonding of the walls, floors, and roof of the file room to each other and to the building, load capacity, etc.

314. Supervision of Construction.

3141. Proper construction involves supervision of details to avoid subsequent settlement and cracking of walls and to insure that all structural considerations related to fire resistance will be observed.

32. CONSTRUCTION OF FILE ROOM.

321. Supporting Structure.

3211. The supporting structure for the file room shall be of adequate strength to carry the full building load including the weight of the file room structure and its contents. There shall be no combustible material in any portion of the supporting members of the structure. All structural members of the building which support the file room shall have a degree of fire resistance of not less than that required for the walls of the file room.

3212. The walls of the file room shall follow the panels (if any) of the building wherever possible, and shall extend from floor to ceiling of the building in each story where a file room is located. If file rooms are located on more than one story they shall preferably be placed one above the other in the several stories.

3213. When a building wall, particularly one bearing the weight of that portion of the building above it, is used to enclose a file room, the failure of the building may result in damage to the file room and its contents.

322. Floor.

3221. The term "floor of file room" includes the slab between rooms in a tier.

3222. **Materials.** The floor of the fire-resistive building may serve for the floor of the file room provided it is of noncombustible construction throughout and complies with the following paragraphs.

3223. **Thickness.** Floor of file room shall be reinforced concrete not less than 6 in. thick and greater if necessary to support the full load.

3224. **Floor Openings.** Floor of file room shall not be pierced for any purpose.

3225. **Floor Surfacing.** No wood or other combustible material shall be used for floor surfacing.

3226. **Bonding to Walls.** Except where formed by the fire-resistive construction of the building, the floor construction of file rooms shall be of fire-resistive materials so designed and built into and bonded or anchored to the wall construction of the file room as to provide the structural strength to safely sustain the dead and live loads involved, in accordance with approved engineering practice.

3227. **Drainage.** It is good practice to have floor of file room (at least the portion under record storage space) about 6 in. higher than the floor of building to avoid wetting of records in lowest storage space.

323. Walls.

3231. **Materials.**

a. Walls shall be of noncombustible construction throughout, consisting of reinforced concrete or brickwork with vertical as well as horizontal joints filled with mortar; or may be approved hollow concrete masonry units. Walls of hollow units shall be plastered on both sides with at least ½ in. of gypsum or portland cement plaster.

b. Reinforcement for concrete shall consist of steel rods of at least ½ in. diameter spaced 6 in. on centers and running at right angles in both directions. Rods shall be

securely wired at intersections not over 12 in. apart in both directions and be installed centrally in the wall or panel, or an equivalent form of reinforcement may be used.

c. No combustible material shall be used for trim or partitions.

3232. **Thickness.**

a. To provide not only the necessary minimum resistance to fire and fire hose streams, but also to provide for structural considerations and variations in quality of materials and workmanship, walls shall not in any event at any point be less than 6 in. in thickness if of reinforced concrete, nor 8 in. if of brick or hollow concrete units. Walls of these minimum thicknesses are hereinafter referred to as walls for a one-hour file room.

b. One-hour file rooms with one-hour file room doors may be expected to be capable of protecting against a complete burning out of the section of the fire-resistive building adjoining the file room, only if the fire area in the vicinity of the room, particularly of the door, has an occupancy containing a moderate amount of combustible material, such as an office occupancy consisting of an ordinary assortment and arrangement of desks, tables, chairs, filing cabinets, cupboards, open containers, etc., and no combustible partitions.

c. Where the fire area in the vicinity of the file room (e.g., the area within a radius of 25 ft., particularly of the door) has an occupancy having a large amount of combustible material (an office occupancy with combustible partitions or an extraordinary amount of combustible furniture or open shelving, etc., or a congested file storage area, or a factory, store, or warehouse in which the file room is in the vicinity of combustible merchandise), vault construction is necessary for protection against a complete burn-out. (See Chapter 2, Standard for Fire-Resistive Record Vaults.) It may be desirable to give additional protection to current Class 1 (vital) and Class 2 (important)† records by housing them in safes, insulated cabinets or insulated filing devices within file rooms.

†See Section 522, "Identification Factors."

3233. Openings in Walls.

a. Interior walls of file room (i.e., those walls which are wholly within the building) shall be unpierced except for protected openings which are required for essential facilities specifically mentioned in this chapter. Such door openings shall be protected with file room doors (See Sec. 325, "File Room Door.")

b. Exterior walls of file room (i.e., those walls which are exterior walls of building) shall be unpierced except by door or window openings. Such openings shall be protected with approved file room doors or with approved fire doors suitable for openings in exterior walls or with approved fire window frames fitted with wired glass, with fire-actuated releases for closing them in event of fire. If these openings are exposed by adjoining buildings or structures within 50 ft., windows shall be protected with fire shutters or outside sprinklers. Installation of fire doors, windows, and shutters to be in conformity with the Standard for Fire Doors and Windows, NFPA No. 80 and the Recommended Practice for Protection of Buildings from Exterior Fire Exposure, NFPA No. 80A. Installation of outside sprinklers to be in conformity with the Standard for the Installation of Sprinkler Systems, NFPA No. 13.

c. There shall be no openings from the file room into elevator, stairway, conveyor or other shafts, and no openings from one file room into another.

d. It is recommended that windows shall be as few and small as practicable and placed above the level of containers housing records. It is also recommended wherever practical that a standard size (78 by 32 in.) single door be used.

3234. Bonding to Fire-Resistive Structures.

a. The walls of file rooms shall be laid directly upon the rough structural arch or floor slab construction of the fire-resistive building which shall provide a solid and roughened surface free from combustible or loose material, dirt, or other foreign matter. Such surfaces shall be swept clean

and dampened when the construction of the walls and floors of the file room is started.

b. If any wall of the building is of suitable construction to form part of the file room enclosure, the wall or walls of the file room at the intersection with the building wall shall, when practicable, be bonded into it for the full height and width of the file room wall or walls. When such bonding is not practicable, the wall or walls of the file room shall be (a) rabbeted into the building wall for their full height and width to a depth of not less than 4 in., or (b) the bonding may consist of keys the full width of the file room wall and let into the building wall not less than 4 in. These keys to be not less than three (3) brick courses in height, spaced not to exceed 2 ft. on centers, the lower key to be at the floor and the upper key at the ceiling, and with all joints between the keys and the building wall thoroughly filled with mortar or cement grout.

c. Where structural steel members of a building come in contact with file room construction, such members and their fire-resistant protection shall in no case reduce the minimum thickness of the file room construction called for in these specifications.

d. Interior columns or pilasters shall not be considered in determining the thickness of file room walls, but such walls shall be bonded or anchored to the fire-resistant protection of columns where they intersect file room and building walls, as provided above.

3235. **Bonding of File Room Walls, Floor, and Roof.** File room walls of masonry units shall be laid with angles and corners well bonded throughout their height. Where the floor construction of the building forms the roof of the file room the joint between the same and the top of the side walls shall be tightly finished and thoroughly filled with mortar or cement grout. Wedging with slate to be provided where required by conditions to insure adequate bonding.

3236. **Independence from Building Structure.** The file room construction shall not be used as a support or bearing for the structural members of the building.

324. Roof.

3241. The term "roof of file room" refers to the ceiling or roof of a single file room and to the ceiling or roof of the top room of a tier, not to the slab between rooms in a tier, which latter is classified as a floor.

3242. **Materials.** If the file room extends to the roof of the fire-resistive building, the roof of the building may serve for the roof of the file room; otherwise, the floor of the fire-resistive building may serve for the roof of the file room provided the roof or floor of the building is of noncombustible construction throughout and complies with the following paragraphs.

3243. **Thickness.** Roof of file room shall be at least 6 in. in thickness and greater if subject to unusual impact, or if exposed to fire from outside file room, thickness of roof shall be equivalent to that required for the file room wall.

3244. **Interior Supports.** Where long spans are needed in file rooms the introduction of interior columns, girders, or division walls may be necessary. All such supports shall be of noncombustible material and all interior steel work shall be protected with at least 2 in. of fireproofing.

3245. **Roof Openings.** Roofs of file rooms shall not be pierced for any purpose.

3246. **Bonding Independent Roof to File Room Walls.** Where the floor or roof of the building does not serve as the roof of a file room, its roof construction shall be adequately bonded or anchored to the wall construction, as required by the materials and type of construction used. For reinforced concrete construction, the reinforcing steel in the file room roof shall be extended into the walls for not less than one-half the thickness of the wall and finished with a right-angle or hook anchor. The wall reinforcing steel to be extended into the file room roof construction not less than 18 in. and similarly finished. If steel beams are used in the roof construction, they shall be provided with suitable wall anchors or secured to structural members incorporated in the wall construction.

325. File Room Door.

3251. The term "file room door" as used in these specifications designates a unit consisting of a frame, generally known to the trade as a vestibule, which is designed to be installed in the wall of the file room and into which is hung a single or a pair of fire-insulated doors equipped with suitable hinges and latching mechanism. The term "file room door" is limited to approved file room door units bearing the label of the Underwriters' Laboratories or other nationally recognized testing laboratories.

3252. Such doors are capable (1) of preventing the passage into the file room of flame or of heat above a specified temperature for the period indicated on the label and (2) the stresses and strains due to fire or the application of a fire hose stream while the unit is in a highly heated condition without materially reducing its fire resistance.

3253. **Classification.**

a. Each opening in the wall of file room shall be provided with a fire-insulated file room door unit bearing a one-hour rating.

b. Ordinary fire doors such as tinclad, hollow metal, sheet metal, or metalclad types and plate steel doors are not acceptable as file room doors.

3254. **Installation of Frame.** Installation of the door unit shall be made in conformity with instructions supplied by the manufacturer and shall be entrusted only to those experienced in such work. This will insure that the door unit as installed will maintain its integrity, not only as a flame barrier, but also as a heat retardant under the stresses and impacts to which it may be subjected during a fire, including impact from falling objects, settlement of the wall, and expansion or distortion of the door itself due to sudden cooling with fire hose streams.

3255. **Escape Device.** The door-locking mechanism shall be of a type which enables a person accidentally locked inside the file room to unlock the door from inside the room.

3256. **Door Closers.** Doors should preferably be equipped with self-closers. When conditions are such that the doors may be fastened in the open position, the self-closers should be utilized for this purpose and be equipped with heat actuated releases to close them in case of fire.

326. Dampproofing.

3261. When walls, floor, or roof are dampproofed, methods and materials used shall be such that the desired fire-resistance of the file room will not be impaired. When temperature changes between the exterior and interior of the file room may be encountered, the resultant condensation (sweating) may be avoided by constructing a continuous air space of preferably 2 in. formed by a noncombustible lining inside the file room.

327. Waterproofing.

3271. Where conditions require waterproofing, the problem shall be referred to a competent engineer or architect.

33. SERVICES TO FILE ROOM.

331. Lighting.

3311. The lighting shall be electric, with all interior wiring in conduit and installed in accordance with the National Electrical Code, NFPA No. 70. The conduit if exposed shall preferably be located on the ceiling so as to avoid the possibility of records coming in contact with it; where it is carried through the wall of the file room, the hole shall be made as small as possible and the space around the conduit shall be completely filled with cement grouting. Floors and roofs shall not be pierced for conduit.

3312. The wiring shall provide as many fixed lamps as needed for adequate illumination. There shall be no pendant or extension cord within the file room. Care should be taken to make fixed lighting adequate to illuminate all portions of the file room, as otherwise matches or other hazardous forms of illumination are likely to be used.

3313. Wiring shall be so arranged that both wires of the circuit shall be disconnected when the lights are out.

Main switches shall be outside the room and provided with a red pilot light.

332. Heating.

3321. Heating shall be by hot water or steam. When steam heating is used, the coils or radiators shall be so located as to avoid the possibility of any records coming in contact with them. Piping should preferably be placed overhead. Where the pipe is carried through the wall, the hole shall be made as small as practicable, the pipe provided with a close-fitting, noncombustible sleeve and the space around the outside of the sleeve shall be completely filled with cement grouting. Floors and roofs of file rooms shall not be pierced for piping. Open flame heaters, electrical heaters, etc., shall not be employed.

333. Ventilation.

3331. Ventilation of interior shall be through door openings.

3332. It is sometimes imperative that a ventilation system be provided. Therefore, it should be recognized that the presence of the system adds to the possibility of entrance of fire or paper-damaging heat from outside the file room.

3333. To minimize this possibility, the system should be installed in accordance with the Standard for Air Conditioning Systems, NFPA No. 90A, and the following safeguards should be taken: The system should be independent of any other ventilating system; all air conditioning apparatus, fans, filters, etc., should be located outside the file room; each duct should be provided with an adjustable fire damper equipped with approved automatic means for closing it and shutting down fans in event of fire outside or inside the file room; ducts should be so located as to avoid the possibility of records coming in contact with them, preferably on the ceiling; where a duct is carried through a file room wall its installation should be such that it will not impair the ability of the vault to protect its contents against fire (and heat) from outside the room.

3334. The floors and roofs of file rooms should not be pierced for ducts.

34. FILE ROOM OPERATING PRACTICES.

341. Equipment.

3411. Filing equipment shall be noncombustible throughout. All records shall be stored in fully enclosed containers so far as possible. If complete enclosure of certain records is impracticable, shelving having only the front open may be used, but loose papers should not be filed on open shelving. Cubical contents of individual compartments of shelving should have a volume of not more than 10 cu. ft., preferably less.

3412. Arrangement of filing devices within the room shall be such that they will be in short sections and with ample aisles between so as to retard the spread of fire. If open-front shelving is used, the sections of shelving should be broken up with fully enclosed containers to form fire stops.

3413. Open-front containers shall be located at least 36 in. away from door and window openings; fully enclosed containers at least 6 in. away.

3414. All furniture (including desks, chairs, cupboards, etc.) shall be noncombustible and shall be limited to that needed for filing operations.

3415. If floor of file room, at least the portion under record storage space, is not 4 in. higher than the floor of the building, the bottom of the lowest record storage space in filing equipment or on shelving should be not less than 4 in. above the floor of the room.

342. Supervision.

3421. The room shall be under responsible supervision from opening until closing time, and inspections shall be made daily, particularly before closing time, to insure that all containers are closed, no records left on top of desks, containers, or elsewhere exposed, all waste paper removed, and all doors, windows and containers closed.

3422. The room should not be used as a working space for other than filing operations. Persons other than authorized personnel should not be permitted in the room.

3423. All doors and window openings to file rooms should be marked to caution firemen against opening the doors or windows or directing hose streams into them, unless a fire is in progress within.

343. Housekeeping.

3431. In addition to the precautions regarding lighting, heating, ventilation, and supervision previously mentioned, the following shall apply:

3432. General cleanliness shall be of the highest type.

3433. Safety photographic film may be treated as records, but flammable nitrate film must not under any circumstances be housed in file rooms.

3434. Smoking inside file rooms shall be positively forbidden. Matches shall not be allowed inside the room.

3435. No furniture polishing or refinishing of any sort should be done inside file rooms.

35. FIRE PROTECTION EQUIPMENT FOR FILE ROOMS.

351. Automatic Fire Extinguishing Systems.

3511. Automatic sprinklers installed in accordance with the Standard for the Installation of Sprinkler Systems, NFPA No. 13, are effective in extinguishing or limiting the spread of fire, but involve the possibility of water damage. Water damage to file room contents would be greater if, in the absence of needed automatic sprinklers, hose streams were used. Where sprinklers are installed, conveniently located sprinkler alarms and shut-off valves outside the file room should be provided to permit turning water off promptly after fire is extinguished, thus preventing unnecessary water damage.

352. Automatic Fire Alarm Systems.

3521. Automatic fire detecting systems installed in accordance with the recommendations of the Standards on Protective Signaling Systems, NFPA Nos. 71, 72A, 72B, 72C and 72D, are valuable in giving warning of fire inside file rooms. They should be relied upon only when there is assurance that the alarms will bring prompt response at all times.

353. Manual Fire Extinguishing Equipment.

3531. Portable fire extinguishers of type suitable for Class A fires (see Standard for the Installation of Portable Fire Extinguishers, NFPA No. 10 and Maintenance and Use of Portable Fire Extinguishers, NFPA No. 10A) or standpipe systems with small hose suitable for use by occupants of the building (see Standard for the Installation of Standpipe and Hose Systems, NFPA No. 14) should be provided at a conveniently accessible location outside the door of the file room. Such protection is recommended in all cases.

CHAPTER 4

STANDARD FOR FIRE-RESISTIVE SAFES, CONTAINERS, AND DEVICES

These two pictures of the same equipment show graphically the value of industrial containers for protection of records. These containers were in a 1-story brick and steel building occupied by a metalworker and destroyed by a 5-hour fire. The 1-hour insulated files at the right and the 2-hour insulated safe at center protected their contents. Records in the uninsulated files at left were destroyed.

40. GENERAL.

401. Introduction.

4011. Record protection equipment discussed in this chapter is all more or less portable and is referred to in the trade as safes, insulated record containers, insulated filing devices, and insulated cabinets. These devices, irrespective of name or designation, are intended to provide protection to records for varying durations of fire exposure. From an outward appearance, especially to the inexperienced, the judgment of the duration of protection is impractical; therefore, only those devices which bear the label of Underwriters' Laboratories, Inc., or other nationally recognized testing authorities should be given recognition as having definite indications of the protection afforded to the contents against destruction by fire.

4012. The fire protection afforded by these devices is indicated on the attached labels. The classifications as recorded by the labels should be carefully investigated as to the details of tests from which the classifications have been derived. Some of these devices are classified to withstand impact while others are not. The temperatures and time which govern the classification may vary as to the method of determination. The following explains in a general way the classification existing at the present time.

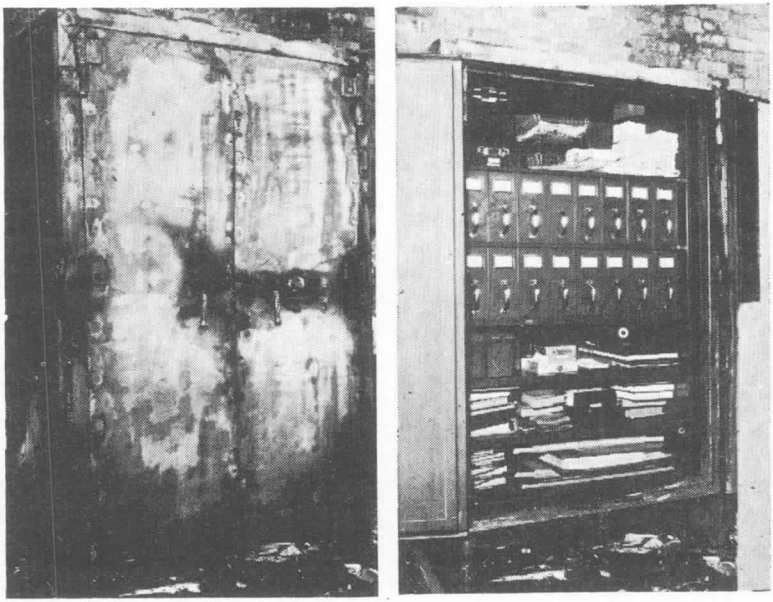
402. Scope.

4021. This chapter deals with the minimum requirements, from a fire protection standpoint, for movable equipment intended to segregate records from surrounding exposure and hazards.

403. Classification or Ratings.

4031. **Class A Safe.** Class A safes (sometimes referred to as 4-hour safes) are effective in withstanding: (1) a standardized fire for at least 4 hours (reaching 2000° F), before temperature of 350° F is reached 6 in. from the top and back of the interior and 1 in. from the side walls and door or doors, either during the period of fire exposure or the cooling period inside the furnace after the fire exposure; (2) a sudden heating, 2000° F for 30 min., without producing an explosion sufficient to cause an opening into the in-

terior; (3) an impact due to falling 30 ft. in the clear after being heated for 1 hour and then reheated for 1 hour in the inverted position; all the foregoing without destroying the usability of papers or records stored inside.



At the left is a one-year-old Class A labeled safe after it passed through three hours of severe fire in Morgantown, N. C. The door was slightly warped and opened with difficulty, but the contents were preserved in perfect condition, as shown at the right.

4032. Class B Safe. Class B safes (sometimes referred to as 2-hour safes) are effective in withstanding: (1) a standardized fire for at least 2 hours (reaching 1850° F), before an interior temperature of 350° F is reached 6 in. from the top and back of the interior and 1 in. from the side wall and door or doors, either during the period of fire exposure or the cooling period inside the furnace after the fire exposure; (2) a sudden heating, 2000° F for 30 min., without producing an explosion sufficient to cause an opening into the interior; (3) an impact due to falling 30 ft. in the clear after being heated for 45 min. and then reheat-

ed for 1 hour in the inverted position; all the foregoing without destroying the usability of papers or records stored inside.

4033. **Class C Safe.** Class C safes (sometimes referred to as 1-hour safes) are effective in withstanding: (1) a standardized fire for at least 1 hour (reaching 1700° F) before an interior temperature of 350° F is reached 6 in. from the top and back of the interior and 1 in. from the side walls and door or doors, either during the period of fire exposure or the cooling period inside the furnace after fire exposure; (2) a sudden heating, 2000° F for 30 min., without producing an explosion sufficient to cause an opening into the interior; (3) an impact due to falling 30 ft. in the clear after being heated for ½ hour, and then reheated for ½ hour in the inverted position; all the foregoing, without destroying the usability of papers or records stored inside.

4034. **Insulated Record Containers.** Insulated Record Containers with Class B and C ratings (sometimes referred to as 2-hour and 1-hour containers) are used for identification of equipment such as file cases and special design containers and are classified on the same tests as used for Class B and C safes respectively except that the thermocouples recording interior temperatures are located as follows:

2 in. from top and 1 in. from side walls and back and 1 in. from face of drawer heads or other closure members, of each insulated compartment where contents are stored, however, in some designs, the thermocouple may be placed 1 in. from all interior faces.

4035. **Insulated Filing Devices.** The Insulated Filing Devices with Class D and E ratings are used to identify equipment of varied designs, intended to provide protection in fire-resistive buildings having small concentrations of combustibles. The protection to records is considerably less than equipment rated as Class C because of the location of the thermocouples which record the interior temperatures. In testing Class D and E equipment these thermocouples are located in the center of any compartment where contents may be placed, but in no case more than 7½ in. from any of the interior faces.

With the thermocouples thus placed these filing devices are effective in withstanding: (1) a standardized fire for at least 1 hour (reaching 1700° F) for Class D; ½ hour (reaching 1550° F) for Class E; before interior temperature of 350° F is reached during the period of exposure or during the cooling period inside the furnace after the fire exposure; (2) a sudden heating, 2000° F for 30 min. for Class D and 20 min. for Class E without producing an explosion sufficient to cause an opening into the interior. No impact test is conducted.

404. Definitions.

4041. Fire Area. "Fire Area" as used in this connection is that area, the combustible contents of which would produce a fire of the duration and severity to which it is contemplated the record containers may be exposed.

4042. Fire-Resistive Building. The term "fire-resistive" building as used herein refers to a building the structural members of which are of noncombustible material throughout and which can withstand a fire completely consuming combustible contents, trim, and floor surfacing on any floor without collapse, thereby assuring that record containers on one floor of the building will not be exposed to the burning of additional combustibles (fuel) from other floors.

4043. Nonfire-Resistive Building. The term "fire-resistive" building does not include: buildings of the following types, which are classified as nonfire-resistive; buildings having wood exterior walls and interior wood framing; buildings with masonry exterior, or exterior and interior, walls and interior wood framing either of the joisted type or of heavy timbers as in "mill construction"; buildings having masonry exterior walls, and unprotected or insufficiently protected interior metal framing; and buildings having noncombustible exterior walls, and interior framing with structural members the fire-resistance of which is deficient to an extent that general collapse of interior construction could occur in event of a fire completely consuming combustible contents, trim, and floor surfacing.

41. SELECTION OF RATED EQUIPMENT.

411. General.

4111. In many fires, record protection equipment is subjected to severe impact. At times, in nonfire-resistive buildings, floors collapse and the record enclosures thus fall through two or more stories. The resistance of record protection equipment to impact when highly heated will differ markedly from its resistance when cold. It is essential that when these devices are intended for location where impact is probable that their classification indicate resistance to impact.

4112. The selection of the class of record protection equipment shall be based on the type of building and the severity and duration of fire to which such device might be subjected. See Article 54, "Fire Exposure Hazards to Records" and Article 55, "Record Protection Equipment and Techniques," for recommended selections.

4113. Record protection equipment used to house "vital" records should have sufficient fire resistance for the protection of records against paper-damaging heat even if there is a complete burning-out of the room or section of the building in which they are located.

4114. The fire records show that it is not good practice to rely for protection of valuable records on a record protection equipment having lesser resistance to heat and fire than required for the fire hazard in its vicinity.

NOTE.—The fire records of the past 25 or 30 years show that many so-called "old line" or "iron" safes (i.e., safes of the types made prior to about 1917, i.e., made before the availability of standards and testing facilities, and before the availability of present-day construction methods and materials) involved in many fires in nonfire-resistive buildings, lost their contents due to their inability to withstand the stresses and strains (1) resulting from impact caused by falling through two or more floors as a result of the building collapse, or (2) because their resistance to fire exposure was less than it was assumed to be (safes of those days, prior to about 1917, were not usually labeled with their fire rating — today their fire resistance is treated as "Uncertain"). It is obviously not good practice to rely for protection of valuable records on any safe of unknown or uncertain resistance to fire or impact.

4115. Record protection equipment may, generally speaking, be considered to be capable of protecting its contents against a complete burning-out of the fire area in its vicinity, when classification, in relation to the amount of combustibles (fuel for a fire) within that area — based on type of building and occupancy — is as follows:

412. Class A.

4121. Class A record protection equipment is necessary in nonfire-resistive buildings, and in fire-resistive buildings where the fire area in its vicinity has an occupancy having a large quantity of combustible material (e.g., an office occupancy with combustible partitions, or an extraordinary amount of combustible furniture, or open shelving, etc.; or a congested file storage area; or a factory, store, or warehouse in which the record container is in the vicinity of combustible merchandise).

4122. Class 1 public records housed in nonfire-resistive buildings shall be afforded not less than Class A record protection equipment.

413. Class B.

4131. Class B or higher rated record protection equipment is suitable in any type of building, if the fire area in its vicinity has an occupancy having a moderate quantity of combustible material (e.g., an office occupancy consisting of an ordinary assortment and arrangement of desks, tables, chairs, filing cabinets, cupboards, open containers, etc.).

414. Class C.

4141. Class C insulated protection equipment is suitable in one-story-and-basement (or two-story-without-basement) nonfire-resistive buildings, also in fire-resistive buildings of any height — provided the fire area in the vicinity of the record enclosure has an occupancy having a moderate quantity of combustible material (e.g., an office occupancy consisting of an ordinary assortment and arrangement of desks, tables, chairs, filing cabinets, cupboards, open containers, etc.).

415. Class D.

4151. Class D record protection equipment may be expected to afford protection against a burn-out only in fire-resistive buildings, and where the fire area in the vicinity of the record container is an occupancy having a small quantity of combustible material (e.g., an office occupancy where the combustibles are predominantly records in desks, tables, or steel filing cabinets and where there are no open containers or shelving, no combustible partitions or trim, and little or no combustible floor finish).

NOTE: See Section 403 for definitions of fire area, nonfire-resistive buildings, and fire-resistive buildings.

416. Class E.

4161. Class E record protection equipment can be expected to give protection against a burnout only under conditions considerably more favorable than those described in the preceding paragraph (e.g., in addition, no combustible furniture or floor finish).

417. Lower than Class E.

4171. Products rated less than Class E should not be recognized as fire-protection equipment for any situation.

418. Making the Choice.

4181. It will be obvious that the determination of a record enclosure rating on the foregoing basis involves the exercise of a certain amount of judgment. When in doubt, it is obviously best to let judgment err on the side of making sure that Class 1 (vital) and Class 2 (important) records will survive a fire completely consuming the combustibles (fuel) in the fire area of the proposed location for the record enclosure.

4182. If there are any different degrees of fire hazard on the property at places where Class 1 (vital) and Class 2 (important) records are or may be stored or used, it may be good economy in some instances to standardize on a classification or rating that will preserve records at the place of greatest hazards so that in the event of a record enclosure being shifted from a place of lightest fire hazard to a place

of greatest hazard, the records will not be placed in jeopardy through oversight or for any other reason. Further protection for a given record enclosure can be obtained by placing it in a vault or a file room.

42. SELECTION OF NONRATED EQUIPMENT.

421. General.

4211. Record handling devices of less than ½-hour rating including record containers which withstand only a blowtorch or Bunsen burner test — whether insulated or uninsulated, are not recognized as suitable protection for valuable records, even under the minimum of fire hazard conditions.

422. Light-Insulated Steel Files and Cabinets.

4221. Noncombustible files and cabinets with cellular or solid insulation less than 1 in. thickness have been found by test to afford about 10- to 20-min. resistance to fire under standard test conditions for insulated filing devices, the exact rating depending upon the thickness and character of the insulation and other factors. They fall in the same field of usefulness as uninsulated steel filing devices, as do also noncombustible containers with an air space.

423. Uninsulated Steel Files and Cabinets.

4231. While uninsulated steel files and cabinets are noncombustible and do not contribute to the spread of fire, they do quickly transmit charring heat (approximately 400° F) to the records within. Noncombustible files and cabinets have been found by test to afford about 5-min. resistance to fire under standard test conditions for insulated filing devices.

4232. Uninsulated steel devices have a field of use in the housing of records stored in fire-resistive vaults, file rooms or document buildings, in all of which situations it is desirable that combustible material (other than the records themselves) should be completely excluded. Such installations give less opportunity for fire to originate and have a decided retarding effect on the spread of fire, thereby re-

ducing the possibility of a free sweep of flames or the building up of room temperatures above the ignition point of ordinary combustible materials.

424. Combustible Files and Cabinets.

4241. Files and cabinets made of wood, fiberboard or other combustible materials add to the fire hazard and should therefore be segregated where they will not expose containers housing valuable records.

CHAPTER 5
MANAGEMENT OF RECORDS

50. GENERAL.

501. Introduction.

5011. Every thinking person is conscious in a general way of the value of records and of the desirability of protecting them from fortuitous destruction. This chapter gives some specific knowledge of how to protect records from fire. Of course, there are other ways whereby records may be lost, such as by flood, vermin, and neglect. But consideration of these ways is only incidental to the work of a committee of an association dedicated to the furtherance of protection from fire. Actually, however, if records are adequately protected from fire, they will in a large measure be protected from the other destructive influences mentioned, except flood waters.

5012. **Recognizing the Hazard.** Perhaps the greatest handicap of the movement to protect records from fire is lack of appreciation by the average owner or custodian of records of the serious consequences that can follow their destruction. While records are accidentally destroyed by fire every day, no one individual experiences or even realizes the serious effects of such losses more than a few times at most in a lifetime. Some persons may never have first-hand information of such disaster. This results in an unwarranted sense of security and, in some cases, of indifference. The individual who has lost valuable records realizes the importance of the subject of protection too late. No one knows whether or not he will be the next to suffer such loss. It is, therefore, only elementary prudence to provide adequate protection for one's records even though it is hoped and expected that they will never be lost from fire.

5013. **Loss of Business Records.** The consequences of destruction of records are many and for some business enterprises may even mean the necessity of discontinuance with attendant loss of property and means of livelihood. The high mortality among firms suffering disastrous fires is due in no small measure to loss of records that formed the basis of the concern's tangible and intangible assets.

5014. **Loss of Public Records.** Business enterprises,

however, are not the only sufferers because of loss of records by fire. Located throughout the length and breadth of the land and, in some instances, indifferently protected, are the public records of births, marriages, deaths, deeds of conveyance and trust, testaments, court decrees, and the multitude of written evidence on which proof of citizenship, legal status, rights, and ownership depends. Their loss may mean expensive litigation and deprivation of rights and property that may have required a lifetime of effort and sacrifice. Almost any public officer can cite numerous examples of records that are missing because of fire, water, vermin, and neglect.

5015. Valuable Record Loss Irrevocable. While protection of records and of tangible property from fire have some things in common, the consequences following therefrom are by no means the same. A burned building can be replaced, even though there has been a real loss of wealth. But, if a record of which there is no copy extant is burned, it is gone forever. Nothing can tell us when a person was born or give us the details of a business merger if the only records of such events are destroyed. Therefore, records call for absolute preservation for the periods in which they serve an important purpose.

51. THE SURVEY.

510. Purpose.

5101. A survey is the key to the provision of needed protection at minimum cost.

511. Introduction.

5111. Before a comprehensive plan for protecting records can be made, it is necessary to know the kind of records involved, their volume, their use, and present protection. This information along with other necessary details will also assist in determining the requirements for their retention or disposition.

5112. An intelligent approach to the problem of record protection involves a recognition of the value of records, the hazards to which they are exposed, and the relative merits of the protective methods available.

5113. Before these general principles can be wisely applied, the records currently produced should be compared with those that would be needed after a disaster. By examining requirement on an after-a-disaster basis, the records that will be needed can be identified. Such an examination may disclose the need for creation of new records, or modification of records being created, to resolve problems arising after a disaster. Also, reliance on a survey without a study of after-disaster requirements, may lead to too many records being selected for special protection. Careful selection makes possible a protection program within reasonable financial limitations by indicating the minimum number of records demanding the highest degree of safety. At the same time, this guards against the probability of overlooking important links in the chain of records, a condition almost certain to occur if decision is on the basis of generalities and not the result of detailed analysis.

512. Responsibility.

5121. Responsibility for a program of records management, which includes records protection and disposition, should be delegated to an experienced and trained records manager. The actual survey should be planned and coordinated by a person with authority to make necessary decisions.

5122. The real benefits of the adoption of such a program can be derived only when the subjects of destruction, preservation, and protection of records are considered at one time. In other words, the setting aside of certain records as necessary for preservation presupposes periodic reevaluation in an orderly manner by competent authority. Having established that certain documents are worthy of preservation, they should receive physical protection commensurate with their value.

513. Procedure.

5131. The survey should be made by actually reviewing the records to determine:

a. their physical volume, measured in cubic feet, and their description,

b. the type of record media (paper, magnetic tape, photographic film, etc.),

c. the rate at which they are being made and their distribution, use, and relation to other records,

d. the rate at which they may be transferred to storage or destroyed,

e. how they are housed,

f. the effects of the loss of each record upon the enterprise, office, or department.

5132. It is important that the records be classified by actual physical survey of the records in detail. Misleading results are almost certain to follow any attempt to work from an assumed knowledge of the various record systems, and the factors that make them up.

5133. Department heads and others creating or handling records should be freely consulted in determining the importance of the records. However, with business methods as complex as they are today, the department head, though familiar with broad principles, probably does not have an intimate knowledge of the detailed applications and the minute points of daily routine which, however, may constitute the vital parts of the record system. If possible, the same person should conduct the consultations in all departments in order that there may be uniformity of viewpoint, and in order that there may be developed in the mind of one individual, a picture of the entire records situation which will help prevent a distorted judgment otherwise likely to be made.

52. CLASSIFICATION OF RECORDS.

521. General.

5211. To determine whether a record should be protected against fire and other natural disasters, it is only necessary to decide whether the record would be needed after the disaster in reconstructing the operations of the company. A record will be needed or it will not. Nearly every case should be decided by a variety of factors, the values of which must be appraised as a matter of judgment rather than on the basis of sharply defined definitions.

522. Identification Factors.

5221. **"After-a-fire" Value.** The "after-a-fire" value of various business records is measured by the question, how

seriously would the business be affected if particular records were suddenly destroyed? The answer to this question involves such factors as:

a. the extent to which destruction of records would jeopardize the general public interest,

b. the extent to which the unavailability of particular records would delay recovery of monies with which to replace buildings and equipment,

c. the extent to which their unavailability would delay restoration of production, sales, and service,

d. the relative difficulty with which particular records could be replaced if they were destroyed by fire.

5222. General Record Classes. A method that has been found satisfactory assumes four broad classes which may be designated as:

Class 1 — Vital Records
Class 2 — Important Records
Class 3 — Useful Records
Class 4 — Nonessential Records

These four broad classes have been adopted to illustrate the relative "after-a-fire" value of various business records. A few examples of the type of records, not all-inclusive, which could be so classified follow:

a. Class 1 (Vital) records: This class includes records which are irreplaceable; records a reproduction of which does not have the same value as an original; records needed to promptly recover monies with which to replace buildings and equipment, raw materials, finished goods and work in process; and records needed to avoid delay in restoration of production, sales and service.

NOTE: Included in this class are:— property plans, costs and appraisals; inventories of factory and office equipment; inventories of finished goods and goods in process; all original books of account and supporting papers; independent audit reports; tax returns, accounts receivable; accounts payable; engineering records (such as drawings and tracings); stock transfer and bond records; records required by law (such as social security records, wage and hour records, government-contract-cost records); charters; franchises; deeds; minutes of directors' meetings; major contracts; etc.

b. Class 2 (Important) records: This class includes records, a reproduction of which could be obtained only at

considerable expense and labor or only after considerable delay.

NOTE: Most operating and statistical records belong in this class, such as those whose purpose it is to maintain a check on efficiencies, operating costs, etc. It includes minor contracts, customers' credit files, sales records, designs in process of development, records of experiments in progress, etc.

c. Class 3 (Useful) records: This class includes those records whose loss might occasion much inconvenience but which could quite readily be replaced and which would not in the meantime present an insurmountable obstacle to the prompt restoration of the business.

d. Class 4 (Nonessential) records: This class includes principally the material which upon examination in accordance with prearranged plans (see Schedule for Retention of Records, Table 2, Appendix B) is deemed eligible for destruction. Their disposal should be accomplished as promptly as possible so as to reduce the fire hazard of unnecessary record accumulations. Until destroyed, they should be segregated from more important records.

5223. Public Records.

a. The care of public records is influenced by the laws and regulations of federal, state or local governments.

b. Public records have been defined to mean any written or printed document or book or map which is the property of the government, state, or any county, city, town or village or part thereof, and in or on which any entry has been made or is required to be made by law for which any officer or employee of the government, state or political subdivision has received or is required to receive for filing.

c. Laws are sometimes so strictly drawn that seemingly unimportant records may not be destroyed without formal permission from the proper officer. This often results in an accumulation of records from delayed destruction which constitutes a fire hazard.

d. The four classes suggested for business records can be used as a guide for public records if the laws of the government or state authorities do not conflict.

523. Factors Influencing Classification.

5231. Some of the more common factors which influence classification may be readily stated, but it will be found in each individual case that there are many others which must be considered. All factors should be duly weighed before assigning a classification.

5232. **Contingent Value.** Some types of records have what might be called a contingent value. For instance, minutes of meetings might in many cases be lost without serious consequences, provided the business proceeds smoothly and without difficulty. Such minutes, however, might be of the utmost value in event of legal complications or internal difficulties.

5233. **Legal Value.** Many records will be of value from a legal standpoint. It should be remembered that there are important differences to be observed in records in this regard. From a legal standpoint a photographic copy of any sort is not as useful as the signed original, and hence for such purposes, the maintenance of photocopies at another point may not be an adequate safeguard. For this reason the originals would be placed in a higher classification than the duplicates.

5234. **Interference with Operations.** As business is handled today, particularly in the larger organizations, records are an important implement in carrying on productive operations. Without them production might be seriously impaired, deliveries to customers might be delayed, and collection of outstanding bills might be seriously interrupted. All these consequences of possible loss should be considered in assigning a classification to any given record.

5235. **Relations with Public or Customers.** To almost any enterprise, records are an essential factor in rendering satisfactory service to the customer. In the case of a public service corporation, this is of particular importance, although it applies with evident force to any concern having customers. Loss of records means that service to customers cannot be continued on the accustomed orderly basis, and dissatisfaction, if not resentment, is very likely to follow.

5236. Relations with Government Authorities. Public service corporations are faced with the problem of maintaining satisfactory relations (to which suitable records contribute) with public service commissions, and on account of relations with various taxing bodies and other governmental authorities, such business organizations could be thrown into serious confusion by the destruction of the records pertaining to these relationships.

5237. Difficulty of Replacement.

a. Some records will be recognized at once as non-replaceable. This includes not only historical records, such as those in the possession of governmental authorities, museums, libraries, and not a few business organizations, but also certain very common records, which, if lost, could not be reconstructed in the original form, but, at best, could only be replaced by substitutes. To replace an old set of general books would be almost an impossibility. Minutes of directors' meetings cannot be replaced in the strictest sense because the meetings covered by the minutes can never be held again. Many other such instances could be cited.

b. Other records may be replaceable but only at a cost almost prohibitive. Consider, for instance, the cost of replacing the records covering an underground gas or electric distribution system for a large city. Or, consider the difficulties in the way of reconstructing, if completely destroyed, the stock transfer records of a large corporation.

c. These possibilities should be squarely faced and should be given due weight in determining the classification to which records apply.

5238. Expense of Replacement.

a. The clerical or engineering labor necessary to replace records, even when it is possible to replace them, may be astonishingly expensive. This will be recognized when thought is given to the current expenses of departments constantly at work making records. To reconstruct, under emergency conditions, the records created by many departments during many years clearly would involve a very substantial sum.

b. Thought must be given also to the additional ex-

pense attendant upon the absence of records. Instances are known, for example, where it is necessary to maintain additional engineering staffs, costing hundreds of thousands of dollars annually, by reason of the fact that data, previously available from records which were destroyed, must now be secured by physical survey in the field.

524. Recommended Degree of Protection by Class.

5241. It is recommended that protection be provided for each class of record on the following basis:

5242. Class 1 Records.

a. Class 1 (Vital) records should have protection which will assure that the records will be preserved even if there is a complete burn-out of the section of the building in which the records are located. This for the reason that records classed as "vital" cannot be assigned a monetary value and either are not insurable, or are not usually insured, or if insured can be replaced only after considerable delay or not at all. Whereas, prompt restoration of the business required that such records be available immediately after a fire — especially if the fire results in a complete burn-out of the building.

b. This degree of protection may be achieved by housing them in a standard fire-resistive vault, or in safes, or record protection equipment having a fire rating comparable with the maximum fire hazard to which they may be exposed.

c. Where the volume of vital records exceeds that which can be stored in a vault, they may be protected in a fire-resistive building, by segregation in a fire-resistive section designed, equipped and maintained in all essential respects the same as a standard vault; or the records may be segregated in an isolated fire-resistive document building.

5243. Class 2 Records.

a. Class 2 (Important) records should be given the protection recommended for Class 1 records to the greatest possible extent.

b. If conditions are such that it is physically impossible to so protect all of them, and if the building is fire-resistive, such of them as cannot be protected as recommended for Class 1 records should as a minimum be seg-

regated in a fire-resistive file storage room equipped and maintained as recommended for such areas. This segregation should not be considered as protecting those particular records against a complete burn-out of the building.

5244. Class 3 Records.

a. Class 3 (Useful) records are not usually of sufficient importance to demand special forms of protection.

b. If not protected as recommended for Class 2 records, the more essential of Class 3 records should as a minimum be housed in closed steel containers located where they will be least exposed by combustibles, but this should not be regarded as full protection against fire.

5245. Class 4 Records. Class 4 (Nonessential) records manifestly demand no special protection so far as their value is concerned. Any undue accumulation of such records should be destroyed so as to reduce the fire hazard, and those which are retained should be segregated from more valuable records.

NOTE: As a composite, a collection of Class 2 or Class 3 type of records in one place may warrant a higher class of protection.

53. RETENTION AND SUBSEQUENT DISPOSAL OF RECORDS.

531. The economy of good record handling.

5311. Obsolete and useless records take up valuable floor space, occupy costly filing equipment, and entail constant labor costs of filing into them, transferring them to make room for current records, or searching through them for old data casually sought. Accumulations of old records of temporary value are objectionable by reason of their presence in vaults and file rooms, because they add to the combustible contents and constitute an exposure to important records.

5312. The path of least resistance is to let records accumulate whether they have value or not. Without an authorized procedure for their destruction, no one can take the responsibility for destroying them even though they have outlived their usefulness.

5313. The application of a records retention and disposal plan will result in the lessening of the fire hazard by reducing the volume of records requiring protection. It will have a beneficial effect on the organization as a whole which will more than compensate for the expenditure of time and effort required for the systems initiation and a continuous successful operation.

532. The Record Retention Period.

5321. Determination of retention period.

a. Determining how long records are to be retained is the most important feature of any system for the elimination of useless records. There are many types of records. The requirements of federal, state and municipal regulatory bodies often specify how long certain records must be retained. Other records will be retained for part or all of the time periods covered by pertinent statutes of limitation. It should be understood that a statute of limitations may or may not require that a record be retained. It merely permits a claim or other action to be brought within the time specified. If the records are not available as defense then, of course, the decision may be against the organization. It is necessary for an organization preparing its schedules to determine when taking a calculated risk is advisable. It may cost more to retain the records than it would to satisfy possible claims.

b. Other records may be retained because of their operational, research or historical value to the organization concerned.

5322. **Suggested Schedule.**

a. Table 2 in Appendix B represents a suggested schedule for periods of retention of important business records of a general nature.

b. Table 2 is a skeleton schedule; every type of organization has records peculiar to itself which are not listed. With this schedule as a guide, it should not be difficult to arrive at proper conclusions as to the retention of such records.

c. Federal, state, and municipal statutes and regulations require the creation and retention of certain records

by the public. For example, the U. S. Department of Transportation, the Internal Revenue Service, and Labor Department have established numerous requirements for retention of records by the public. These statutes and regulations over-ride any of the recommendations in Table 2.

5323. Retention Schedules.

a. Final conclusions relative to retention periods should be reduced to writing and copies given to all offices concerned with the making, receiving, and handling of records. These schedules of retention should specify not only the total retention period of the record but also how long it should be retained in the office, when it should be sent to storage for inexpensive maintenance, and whether the record is to be duplicated in some form for alternate security storage.

b. The schedules of retention and disposition which are prepared and approved by all concerned are sufficient authority to apply them to the records when specified time periods have expired. No further notification or approval should be necessary. It should be the responsibility of pertinent departments to see that records are not retained beyond the periods specified or that the persons responsible for the custody of the records retain them no longer than the retention periods specified unless there is sufficient justification for doing so.

533. Destruction of records no longer useful.

5331. To insure that accumulations of useless records are not continued, the retention schedules should be applied as a regular and continuous operation. Accordingly, controls should be established to insure that there will be periodic identification and destruction of records in accordance with schedules to obtain the utmost advantages of a records retention and disposal program. This program should apply to both those records which are in the office and those which have been transferred to storage.

5332. **Method of disposal.** The disposal program should provide for the prompt removal of unnecessary records to reduce the amount of fire risk. If fire is used as a disposal method, the burning should be done at a location remote from the record storage.

54. FIRE EXPOSURE HAZARD TO RECORDS

541. General.

5411. The intensity and duration of a fire, with a given type of building and occupancy, is subject to great variation due to the particular conditions of each fire. The amount, character and concentration of combustible materials, wall and floor openings, wind conditions, fire-fighting methods employed, all affect fire severity. In considering the protection of records it is necessary to neglect conditions giving rise to fires of minor severity and consider only those giving maximum severity in intensity and duration. This necessitates assuming complete destruction of all combustible portions of buildings and contents under conditions favorable for the development of fires of the most destructive intensity and duration probable for the given building and occupancy.

5412. In fire-resistive construction no heavy impacts are probable, as regards objects falling on the record container or the fall of the record container itself. With combustible or nonfire-resistive construction the impacts can have a wide range in severity, depending on the height of the building and the type of construction. Vault construction can also be severely taxed by stresses from failure of adjacent building members. Light vault construction may also be injured by high-pressure hose streams used in fire extinguishment.

5413. Before the degree and nature of the fire protection required for records can be estimated, it is necessary to know to what hazards they are exposed by making a survey of the building and its occupancy in each area where records are kept. The assistance of a capable fire or record protection engineer in making and interpreting such a survey is recommended.

542. The Building Housing the Records

5421. Considered from the record protection viewpoint, two general classes of buildings, namely, nonfire-resistive and fire-resistive, are recognized as defined below:

5422. **A Fire-Resistive Building.**

a. A fire-resistive building is one in which all structural members (including floors and roof) are of noncom-

bustible material. Such a building can withstand a fire completely consuming combustible contents, trim, and floor surfacing on any floor without collapse. In this type of building the degree of protection can be evaluated to a more or less definite degree.

b. The building must be protected against fire in neighboring buildings or areas by means of suitable protection for exterior openings (see Standard for Fire Doors and Windows, NFPA No. 80). If located in an area where a conflagration may occur, this matter would need more careful consideration. However, under such conditions, modern fire-resistive buildings have given a good account of themselves where openings have been protected by metal window frames with wired glass, or protection of higher rating, combined with fire-fighting equipment within the building.

c. The interior design involves protection of all vertical and horizontal openings that might communicate fire from floor to floor. The areas between fire division walls should be kept as small as consistent with the requirements of the occupancy. Noncombustible partitions, doors, frames, and trim should be used for subdivision since these constructions have a decided retarding effect on the spread of fire.

d. Where several occupancies share one building, the problem of securing a desired degree of protection for one of these occupancies is, in a large part, the same as that involved in securing protection where the same occupancy covers the whole building. If the building has sufficient fire resistance to withstand burning-out of contents of any or all portions thereof, without collapse of main structure members, it is possible to secure for any portion of the building the required degree of protection under conditions of a fire that involves the rest of the building.

5423. Nonfire-Resistive Buildings.

a. Nonfire-resistive buildings can be briefly defined as constructions that cannot withstand burning-out of contents without collapse.

b. Buildings in this group comprise those having wood exterior and wood interior framing; buildings with masonry exterior walls and interior wood framing, either of the joisted type or of heavy timbers as in "mill construction";

buildings having masonry exterior walls and unprotected or insufficiently protected interior metal framing; and buildings having noncombustible exterior walls and interior framing with structural members, the fire resistance of which is deficient to an extent that general collapse of interior construction could occur.

c. The main difference between nonfire-resistive and fire-resistive buildings is due to such collapse which destroys the value of floors as fire barriers, in effect making the whole space between exterior and fire walls one unrestricted fire area. Before collapse of interior framing, a fire severity equivalent to from 15 minutes to about 1 hour of the furnace test may have obtained within each story, the time depending on the size of beams and columns, thickness of the floor, and the protection afforded by any ceiling, wall or partition finish that may be present. Collapsing roofs or upper floors often carry down with them floors below that may or may not be on fire.

d. The exterior protection of a nonfire-resistive type building is more difficult to obtain than with fire-resistive construction even where heavy masonry walls are used, since combustible trim and similar details can afford a fire an opportunity to enter. A nonfire-resistive building with combustible interior construction generally affords fire a more ready start and more ready spread than the fire-resistive type. The protection that can be applied to interior vertical and horizontal openings is also generally less effective. Such factors as the stability of walls after the construction of one side has been destroyed by fire makes the prediction of definite degree of protection difficult.

5424. Reducing Hazards to Unprotected Records.

a. Records, without other protection, can be kept if the hazards to them are minimized as outlined below. Such conditions occur mainly where protection must be afforded for a large volume of records in current or occasional use and not of vital importance. For the vital records of any business (usually a small proportion of the whole) adequate protective containers (vaults or safes) should be provided.

b. The building construction should be of the fire-resistive type, in which areas are small, external exposure is amply protected against, and interior combustibles in consequential amounts are entirely eliminated except for

the records themselves. Where conditions fall short of these much may still be done to increase record safety, but the limitations of such procedure should not be overlooked and a false sense of security should not be permitted to obscure the necessity for adequate protection for vital records. In either case strict housekeeping standards shall be maintained.

c. In fire-resistive buildings conforming with the requirements outlined above, additional security can be obtained by the use of noncombustible furniture and record containers which totally enclose the records. These give less opportunity for fires to originate and have a decided retarding effect on the spread of fire. This applies particularly to items of equipment such as desks, closed filing cabinets, and cupboards. While heat in a cupboard or enclosed shelf will be communicated to adjacent sections through a sheet-metal wall, the spread will be relatively slow since there is no opportunity for the free sweep of flames or building up of room temperatures above the ignition point of ordinary combustible materials.

d. A noncombustible floor finish is a help in preventing spread of fire from one container to the other. In fact, even under moderate exposure conditions from fires in large accumulations of combustibles within a room, no such spread of fire from one closed container to the other is likely to take place on noncombustible floors. On wood finish floors a fire in the flooring, while spreading slowly, can communicate fire to the contents of cabinets, desks and tables in all portions of the room.

e. The protection afforded by noncombustible shelving is dependent largely on the design. With open back and sides little more protection than with wood shelving is afforded. A fire originating at one point in the shelving can be readily communicated to all portions of the room. For shelving with closed back and sides, the protection given is dependent to a considerable extent upon the size of the openings. The spread of fire is relatively slow for openings as large as those in the ordinary shelving bay, say, 12 by 36 in. As the openings decrease in size, the spread of fire becomes much slower and where the openings are a few inches in width and height, no appreciable spread of fire from one

opening to the other should be expected provided the contents do not overhang the front of the opening.

For further information on the general subject, reference can be made to the paper on "Record Protection and Office Equipment" published in the NFPA *Quarterly,* Vol. 24, No. 4, April 1931, Page 410.

f. Where optimum conditions from the record protection standpoint of the structural and equipment details are unattainable, automatic fire detection and/or extinguishing equipment or other equally effective measures afford added protection.

5425. Maintenance of Area Adjacent to Records.

a. The proper maintenance of buildings from the standpoint of record protection as well as general fire safety requires recognition of the conditions conducive to the origin and spread of fire. It is recognized that even in nonfire-resistive buildings, fires originate most frequently in accumulations of combustibles or in highly flammable materials, the presence of which can be avoided.

b. Proper care in this respect will reduce fires from origins such as discarded cigarettes and matches. All waste materials should be cleaned up at the close of each day or more often and kept in proper containers until removed from the building. Proper containers should be provided for oil mops, oily waste, and materials of similar hazard. The hazard of materials such as pyroxylin plastics, matches, disinfectants, cleaning fluids and other highly flammable materials should be recognized and the needed precautions taken.

c. Many fires that occur immediately after working hours from discarded matches, cigars and cigarettes can be prevented by systematic inspection of the premises during the first half hour or hour following closing time.

d. Repair, painting and renovating operations present particular hazards that require extra precautions while they are in progress. Other hazards peculiar to each occupancy will need attention as well as the general hazards from heating, lighting and power requirements common to most buildings, if a desired degree of fire safety is to be achieved particularly where structural and equipment conditions are unfavorable.

e. Only activity connected with handling of records should be carried on within vaults, file storage rooms, and the file storage portions of document buildings. No flammable cleaning liquids, no nitrocellulose film, or other highly flammable materials shall be kept in such places.

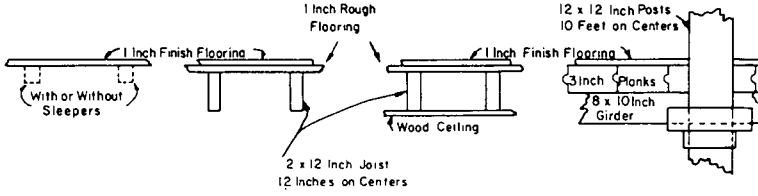
543. Estimating the Combustible Material Exposure.

5431. To determine the class of record protection device needed, it is necessary to estimate the combustible to which the device may be exposed.

5432. Estimating Technique.

a. Estimating the combustible contents of a given area can generally be done with fair accuracy without much difficulty.

b. The weight of wood in the structure of nonfire-resistive buildings can be conveniently estimated as 2.7 lb. per board foot (board foot is 1 in. nominal, ¾ to ⅞ in. actual thickness and 12 in. square), using actual area of flooring, ceiling and partition spacing and nominal dimensions of joists and other timbers. The combustible content of outside walls would not be included. Typical examples are:

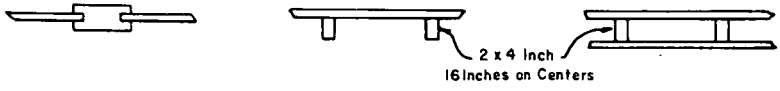


Wood floor finish on concrete avg. wt. per sq. ft. 4 lb.	Double floor on open joists avg. wt. per sq. ft. 12 lb.	Double floor on closed joists avg. wt. per sq. ft. 15 lb.	Mill construction avg. wt. per sq. ft. 18 lb.

c. The weight of finish, floors and trim can be computed. Wood used as finish in buildings can be taken as weighing 36 lb. per cu. ft. which gives 3 lb. per sq. ft. for trim of 1 in. actual thickness.

d. The weight of a single top floor of wood on wooden sleepers will be between 3 and 4 lb. per sq. ft. depending on the species of wood.

e. The weight of partitions can similarly be computed. Typical partitions are:



Single wall avg. wt. per sq. ft. 3 lb. | **Single wall on studding** avg. wt. per sq. ft. 5 lb. | **Double wall on studding** avg. wt. per sq. ft. 8 lb.

f. The weight of shelves can be computed by using the board weight per square foot.

g. Typical pieces of furniture and furniture contents can be weighed.

h. The weight of all other wood or paper within the area should be computed. Where contents other than wood or paper are involved, the following allowances for differences in heat value of the materials can be made:

Cotton, wool, straw, grain, sugar, and similar organic materials can be taken at their actual weight; the actual weight of animal and vegetable oils, fats, waxes, petroleum oils, and other petroleum products, asphalt, bitumin, paraffin, pitch, alcohol and naphthalene, should be multiplied by two for the purpose of determining combustible contents approximately equivalent to wood and paper in fuel value. Coal, coke, and charcoal, while having fuel value approximately 50 per cent higher, probably contribute no more to the severity of fire above the debris as an equal weight of wood or paper. As concerns exposures in the debris, they should probably be rated at their full fuel value.

i. The total weight of combustibles in a given area is then divided by the area to obtain the amount in pounds per square foot, assumed uniformly distributed.

NOTE: Figures 4 through 7 in Appendix B show several rooms in which the combustible was measured and the amount in pounds per square foot calculated. These pictures indicate the impossibility of estimate by visual inspection and emphasize the need for measurement and calculation.

55. RECORD PROTECTION EQUIPMENT AND TECHNIQUES.

551. General.

5511. Selection of record protection equipment involves not only the character of the building and its occupancy

(Sec. 540), which determine the probable maximum fire severity, but also consideration of the character, relative importance, volume and frequency of use of the records (Sec. 520) and the relative adaptability and the cost of the various methods of protection available at a given rating.

552. Types of Record Protection Equipment.

5521. Document Buildings.

a. Definition: The "document building" is defined as an isolated, strictly fire-resistive building, usually in an outlying district, in which inactive records can be kept.

b. Document buildings are used for storage of important records in considerable volume where ground space is available for a detached and unexposed fire-resistive building for transfer of seldom-used records from working areas in offices. A number of cases have come to the notice of the committee where companies have considered it worthwhile to provide such buildings. Such an arrangement permits the transfer of a large amount of records from working areas in valuable office space, releasing it for other purposes. Such records are thus brought together where they can be kept under proper conditions and supervision.

c. Records stored in document buildings escape the hazards inherent upon storage at locations never really intended for that purpose such as important records that are crowded out of vaults and other safe storage into out-of-the-way corners where they not only lack protection but may actually be exposed to grave hazards.

d. A document building, if large enough, may be put in charge of one or more persons, competent to handle and file the records and to handle inquiries over the telephone, in order to avoid, as far as possible, actually removing the records.

e. A building of this type should, of course, have the characteristics of a vault as to construction, absence of combustible interior finish, arrangement of lighting, heating, etc. Exterior openings should be protected in a suitable manner.

5522. Vaults.

a. Vaults (see Chapter 2) are usually where the volume of valuable records is large.

b. A vault is designed to accomplish a specific purpose, that is, the complete protection of its contents in case of fire. It is most important that its construction be such that there will be no doubt as to its ability to provide complete protection. This depends not only upon its heat-insulating qualities, but also upon the maintenance of the integrity of the structure under the strains and impacts to which it may be subjected during a fire. Therefore, the design, the selection of materials, and supervision of the construction should be entrusted only to a competent engineer or architect.

c. Record vaults should not be located in buildings housing explosives. Where this cannot be avoided, a measure of protection can be provided by vault construction that will resist explosion shock. Explosions from smoke produced by ordinary combustible materials sometimes occur and on this account even where there are no explosives present, it is desirable to incorporate in record containers the maximum structural strength that can consistently be attained.

d. Vaults and vault doors are available in 6-, 4-, and 2-hr. classifications.

5523. **File Storage Rooms.** File storage rooms (see Chapter 3) are generally much larger than vaults, and are used in fire-resistive buildings where, because the volume of the records is too great, or their importance not vital, or by reason of other considerations, protection by vaults or safes may be impracticable or disproportionately costly.

5524. **Safes.** Safes (see Chapter 4) are used for smaller volumes of records in situations where the cost of vault construction would be prohibitive, or where the building does not lend itself to vault construction. Safes are available in Class A, Class B, and Class C classifications.

5525. **Insulated Record Containers.** Insulated record containers (see Chapter 4) designed for the handling of continuously used records at the point of use to provide continuous protection for such records are available in Class B and Class C classifications.

5526. Other Types. Other insulated record protection equipment (see Chapter 4) designed for protection of records in fire-resistive buildings with very small amounts of combustibles is available in Class D and Class E classifications.

553. Fire Resistance Requirements for Record Containers.

5531. Having determined the total weight of combustibles involved (Sec. 543) and having determined the type of protection to be used (Sec. 552), the fire resistance rating necessary to protect records against the worst possible fire condition may be determined by reference to the following tables which summarize the conclusions derived from burn-out tests conducted by the National Bureau of Standards. They refer to recognized classifications for record protection equipment and are derived partly from results of the tests and otherwise from estimates based thereon. In the latter case, an effort has been made to allow for differences in combustible contents, containers, and pertaining conditions as defined in the table compared with those present in the tests.

5532. The tables assume no cooling by hose streams.

5533. Record Containers for Fire-Resistive Buildings.

a. The recommendations in the second column of Table 5533 above are for complete or nearly complete equipment of noncombustible filing cabinets, desks and shelving, no more than 30 per cent of the weight of combustible given in the first column of the table being assumed to be in open shelves, cupboards, or as material in the equipment or building trim. The estimates of severity are based on that obtainable from the exposed combustibles plus an allowance for those contained within closed containers, the heat evolution from the latter being too slow to contribute its full quota to the severity during the period significant from the standpoint of combustibles freely exposed.

b. Comparisons of the recommendations in the last two columns of the table indicate a little lower severity where open noncombustible shelving or other open containers are used, compared with that for an equal amount contained within or constituting a part of combustible equip-

ment. Also, with the latter, a comparatively greater combustible content will be present for equal weights of contained records.

c. Office, residential and institutional occupancies in fire-resistive buildings are typical of those giving rise to fires of light or moderate severity. At the other end of the scale, fires in buildings or parts of buildings normally housing large amounts of combustible materials, such as those used for storage of merchandise, are known to have attained intensity and duration fully equal in effect to the standard 4-hr. fire test.

TABLE 5533. EQUIPMENT FOR A FIRE-RESISTIVE BUILDING.

Total Combustible Contents per Floor (Including any Combustible Flooring, Partitions and Trim), Lb. Per Sq. Ft. of Floor Area	Noncombustible Decks, Filing Cabinets, Lockers, and Other Closed Containers. Not Over 30% of Combustibles Exposed	Noncombustible Open-Front Shelving and Other Open Containers	Combustible Desks, Filing Cabinets, Shelving, Containers, Etc.
Less than 5 lbs.	Class E device.	Class E device.	Class D device.
5 to 10 lbs.	Class D device.	Class D device.	Class C safe or container.
10 to 15 lbs.	Class D device.	Class C safe or container.	Class B safe, container, or 2-hr. vault.
15 to 20 lbs.	Class C safe or container.	Class B safe, container, or 2-hr. vault.	Class B safe, container, or 2-hr. vault.
20 to 30 lbs.	Class C safe or container.	Class B safe, container, or 2-hr. vault.	Class A safe, or 4-hr. vault.
30 to 35 lbs.	Class B safe, container, or 2-hr. vault.	Class A safe, or 4-hr. vault.	Class A safe, or 4-hr. vault.
35 to 45 lbs.	Class B safe, container, or 2-hr. vault.	Class A safe, or 4-hr. vault.	6-hr. vault.
45 to 50 lbs.	Class A safe, or 4-hr. vault.	6-hr. vault.	6-hr. vault.
50 to 60 lbs.	Class A safe, or 4-hr. vault.	6-hr. vault.	6-hr. vault with no combustible near door.

5534. Record Containers for Nonfire-Resistive Buildings. The degree of exposure to individual record containers in nonfire-resistive buildings varies widely with chance conditions. The recommendations given above are based on the higher ranges in severity as indicated in tests, although in exceptional cases the severity may be greater for given amounts of combustible contents. Ratings one step higher than those given will give a better factor of safety.

TABLE 5534. EQUIPMENT FOR A NONFIRE-RESISTIVE BUILDING.

Total Weight of Combustibles, Including Contents and Building Members of All Floors Including Roof, but not Exterior Walls, Lb. Per Sq. Ft. of Ground Area	Record Container Rating
Less than 25 lbs.	Class B safe, container, or 2-hr. vault; except in one-story and basement buildings (or two-story without basement) Class C. Where impacts or blanketing of ruins by collapse of masonry wall or adjoining buildings is possible a Class B equipment or vault of 2-hr. or higher rating should be used.
25 to 50 lbs.	Class B safe, container, or 2-hr. vault.
50 to 100 lbs.	Class A safe, or 4-hr. vault. 4-hr. vault for basement or ground story, 2-hr. above.
100 to 150 lbs.	Vault; basement or ground (first) story, 6-hr.; first floor, 4-hr.; upper floors, 2-hr.
Over 150 lbs.	Vault: Do not locate in basement or ground story without basement. First floor, 6-hr.; second floor, 4-hr.; upper floors, 2-hr.

554. Types of Fire Protection Equipment.

5541. Automatic Extinguishing Systems. Automatic sprinklers installed in accordance with the Standard for the Installation of Sprinkler Systems, NFPA No. 13, are effective in extinguishing or limiting the spread of fire, but involve the possibility of water damage. Water damage would be greater if, in the absence of needed automatic sprinklers, hose streams were used. Where sprinklers are installed, conveniently located sprinkler alarms and shut-off valves should be provided to permit turning water off promptly after fire is extinguished, thus preventing unnecessary water damage.