Specifications for a Fireproof Vault

SECTION 130070

FIRE VAULT CHAMBER

1. SUMMARY

A. Section includes fire-rated vault panels and doors, cable trays and all penetrations of the vault chamber. All Vault Chamber components shall be rated for the same fire-performance as required for the whole assembly (e.g., Class 350 Document Rating, Class 125 Media Rating) as well as the hourly duration of the entire assembly.

2. SYSTEM DESCRIPTION

A. Vital records shall be protected from damage through the use of protective enclosures that limit exposure to heat to a level below which physical destruction or damage will occur. This standard defines handling techniques that provide protection from the hazards of fire, humidity and water damage. It does not consider forcible entry.

B. The Record Vault shall be ground supported or structure supported and the walls, structural members, partitions, columns, floors and roofs are to be of non-combustible materials.

C. The walls, floors and ceiling shall be of an assembly that will protect vital records against fire for its rated exposure.

D. Damage to computer media, magnetic tapes, flexible disks and similar material may begin at sustained ambient temperatures above 100 degrees F. Successful reconditioning lessens rapidly above 120 degrees F. Record vault construction for this media should provide Class 125-2 Hour protection. This requires that the temperature within the enclosure not exceed 125 degrees F. and 80% relative humidity. (NFPA-75 - Protection of Electronic Computer/Data Processing Equipment).

E. Damage to disks may begin at sustained ambient temperatures above 150 degrees F. Record vault construction for this media should provide Class 150-2 Hour protection. This requires that the temperature within the enclosure not exceed 150 degrees F. and 85% relative humidity. (NFPA-75)

F. Damage to microfilm may begin at a sustained ambient temperature of 150 degrees- 225 degrees F. in the presence of steam. Record vault construction for this media should provide Class 150-2 Hour protection. (NFPA-75)

G. Damage to paper products may begin at 350 degrees F. Record vault construction for paper records should provide Class 350-4 Hour protection. NFPA-232)

H. The design shall provide the necessary minimum resistance to heat, humidity, fire, vapor penetration and fire hose streams for the rated exposure of the record vault enclosure.

3. PERFORMANCE REQUIREMENTS

A. Seismic Performance: Provide modular vaults capable of withstanding the effects of earthquake motions determined according to the building code in effect for this Project or ASCE 7, "Minimum

Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads," whichever is more stringent.

4. SUBMITTALS

A. Shop Drawings: Show details of fabrication and installation. Include construction details for materials, dimensions of individual components, location of light fixtures, and required clearances. Include the following:
   1. Plans, elevations, sections, details, and attachments to other work.
   2. Location of electrical outlets.
   3. Details of wiring for power, signal, and control systems. Differentiate between manufacturer-installed and field-installed wiring.
   4. Provide Shop Drawings prepared by or under the supervision of a qualified professional engineer.
      a. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

B. Installer Certificates: Signed by manufacturer certifying that installers comply with requirements.

C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

5. QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who employs only workers trained and approved by vault manufacturer to install manufacturer's products.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of modular vaults that are similar to those indicated for this Project in material, design, and extent.

C. Vault Assembly for Storage of Photographs and Film, Aperature/Film Engineering Documents: Comply with NAPM IT9.11. **Vault chamber is required to provide a Class 150 Fire Rating to protect microfilm and microfiche as described in NFPA 232 Protection of Records Standard.**

6. COORDINATION

A. Coordinate modular vault installation with adjacent construction to ensure that assemblies are protected against damage.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Firelock Fireproof Modular Vaults.
   2. Or approved equal.

7. VAULT DOORS, GENERAL

A. Floor track shall have 1/4 inch diameter holes at intervals along track to provide for attaching to existing floor with expansion fastener.

B. The vault roof panels shall have corrugated steel decking attached to protect the vault roof from sprinklers or water pipes located in areas above or from fire hose stream in the evnt of a fire occurrence.

C. Vapor barrier shall be an integral part of vaults designed for magnetic media or film storage. This barrier shall prevent migration of water vapor, or steam from exterior of vault to interior of vault. Vapor barrier shall be located on the interior face of the panel.

D. All joints or seams between wall and ceiling panels shall be gasketed with high temperature fibrous insulation which meets Fire Resistance Classification ASTM E119, UL 263 Time/Temperature Curve. Fiber strips shall be used to cover all internal panel structural members to protect sheetrock (or other veneer finish) from heat exposure. All fiber utilized in panels, gasketing or door insulation shall be ceramic fiber capable of withstanding 2300 degrees F. with no breakdown of insulating efficiency. The laboratory tested rating for the fiber shall be:

1. Flame Spread = 0 Smoke Developed = 0 Fuel Contributed = 0 as tested according to ASTM E84/UL 723 with melting point of 3200 degrees F. and continuous operating temperature of 2000 degrees F.
2. Insulation values for all fiber utilized in panels, gasketing or door insulation shall meet standards established by ASTM C177.

E. Fire rated sheetrock of 5/8 inch minimum thickness shall be attached to the interior and exterior panel sidewalls and roof mounted on ¾ galvanized furring strips (20 gauge) which are attached to the surface with self tapping screws (#10 – ¾ “).

F. If a suspended ceiling is used with surface mounted lighting, attachment to the roof panels shall be made at the panel joints. In this case, sheetrock and gasket strip are not required to be applied to the internal surface of the roof panel joints. Only Class A rated non-combustible materials shall be permitted in the space between the panels and the suspended ceiling.

G. Joints between panels and existing structure such as concrete floor shall be sealed with high temperature fibrous insulation in moldable form which meets Fire Resistance Classification ASTM E119, UL 263 Time/Temperature Curve.

H. All junction points around door stanchion and door assembly shall be packed with high temperature fibrous insulation which meets Fire Resistance Classification ASTM E119 Time/Temperature Curve.

I. Floor construction shall be designed to conform to the same level of protection as wall and ceiling construction. Floors located as slab on grade shall require no further insulation.

8. MODULAR PANEL

A. Class 125-2 Hour Rated Panel:

1. Panel hall be designed to meet applicable requirements of NFPA 232-2011 Class 125-2 Hr. for protection of electromagnetic media.
2. Thermal resistance (ASTM C 518) R = 33 @ 70 degrees F.
3. Flammability (ASTM E 84/UL 723)
   a. Flame spread - 0 Smoke developed - 0 Fuel contributed - 0
4. Sound absorbtion characteristics:

Sound frequency, Hz	250	500	1000	2000	4000
Coefficient	0.95	0.65	0.72	0.96	1.05

5. Laboratory Testing as defined under Ul 72 and ASTM E-119 for Fire Endurance with a Listing for a minimum of four hours of fire endurance for the Class 350 Fire Rating for the vault assembly and Five Hour Structural Endurance ratings as defined in this Specification.

9. AIR CONDITIONING AND ENVIRONMENTAL CONTROLS

A. Class 125-2 Hour Data Vault shall utilize equipment capable of controlling temperature and humidity within the range of 60-70 degrees F.and 40-50% relative humidity. This can be provided by a dedicated HVAC system or by accessing ducting from a central system. The HVAC System is

not included as part of the vault manufacturer's scope of work. This equipment is detailed in the Mechanical Section of the Project Design Drawings and Specifications.

1. A dedicated HVAC System shall be installed with condensing unit located outside the vault enclosure with the air handling system within the vault enclosure.
2. Coolant supply and return and condensate removal shall be through CPVC tubing.
3. AC System tube penetrations through the vault panels shall be designed to meet applicable standards for Class 125-2 Hour insulation from heat migration into vault enclosure.
4. An intumescent potting compound which expands when heated (such as 3 M Company CP25WB) shall be used to seal around the PVC tubing penetration.
5. Electrical service to the HVAC system shall be provided through cable tray assembly designed to meet applicable standards for Class 125-2 Hr. insulation from heat migration through the vault enclosure. (See VI. Cable Tray Specifications)

B. For HVAC provided from central environmental control system, a fire duct system designed to meet applicable standards for Class 125-2 Hour insulation from heat migration into vault enclosure shall be utilized.

1. Damper Construction Detail: The damper assembly for shall be constructed with three fire rated dampers located in series within the galvanized steel 16 gauge housing. Each shall be held in the open position by use of 165 degrees F. fusible links. The duct shall be insulated with ceramic fiber and protected from physical abuse by an external steel jacket.
2. The damper assembly shall be field located with penetrations cut into the panel at the jobsite as specified by HVAC contractor/owner.
3. A motorized louver damper for preventing smoke contamination shall be provided by the Mechanical Contractor that closes when the HVAC System is shut down or a power loss occurs. (This louver damper shall be activated by the clean agent fire suppression system if one is to be provided, that will seal the vault when the fire suppression system is activated.) The motorized louver damper is to close and seal whenever power is out to the building or signaled from the HVAC that it is in shut down mode.

10. INSULATING DOOR ASSEMBLY

A. Class 125-2 Hour Data Vault Door Assembly

1. Door assembly system designed to meet applicable standards for Class 125-2 Hour insulation from heat migration through the vault enclosure.
2. Door assembly system to include an insulated vault door with an Underwriters Laboratories, Inc., 350-4 Hour rating. This door will provide a clear opening of either 32" W x 78" H or 40" W x 78" H. This door shall be installed as the exterior door in the dual door entryway. The interior door shall be installed utilizing a custom stanchion. The interior insulating door will be UL rated to 3 Hr. - 250 degrees F. Rate of Rise Classification and will be installed on the custom stanchion. Size of the clear opening shall meet or exceed that of the exterior doorway. The total system includes the dual doors, custom stanchion, insulating gasketing and automatic door closer system; which is controlled through remote heat/smoke alarm units.
3. Fire Resistance (ASTM E-119, UL 263 Time/Temperature Curve). The rating of the door assembly in the closed position after duration of 2 hour test shall not exceed 125 degrees F. at the inner vault.
4. The vault door assembly system shall be equipped with a Norton/Assa Abloy 7245 MPSO Closer, 24 volt with remote smoke detectors electromechanical closer-holder or equivalent. The hold open position can be set between 90 degrees and 150 degrees. These electrically powered units employ a solenoid operated bullet plunger valve. Whenever the unit is energized, the bullet plunger valve seals the closer's hydraulic closing circuit. The inner heat insulated door shall also be equipped with a hold open magnet which acts as a slave to the out door or can be closed independently by a building alarm or fire suppression alarm notification. Vault Door Assemblies must close the doors during any electrical power interruption to the unit, activation of the smoke

detection unit and/or activation of the exterior smoke/heat alarm sensors. Doorways must be maintained free of obstructions that would prevent full closure of the door.

B. Door Assembly Construction Detail

1. The door assembly shall consist of two heat-insulated doors, the first of which is an exterior stanchion integral to the modular wall panels. This stanchion shall have high temperature (2300 degrees F.) gasket strips at the junction of the wall panel and stanchion. The exterior door shall fasten to the stanchion. An inner stanchion shall be fastened to the concrete floor with anchor bolts and again at the header of the frame. Insulating gasket strips are used between the junction of exterior stanchion and interior stanchion.
2. The interior door shall be gasketed to provide a vapor seal to prevent migration of water vapor into the vault or gas fire suppressant agents out of the vault.
3. The electromechanical door closers are installed on each door to ensure that in the event of a power failure, alarm condition, temperature rise, and/or combustion vapors in the vault area, that the doors will be in the closed position to maintain the integrity of the vault enclosure.
4. Doors will be equipped with inside escape mechanism to ensure life safety evacuation in the event that personnel are within the vault during activation of the door closure system.
5. Install an emergency lighting system within vault to assist evacuation during an alarm and/or power failure. Emergency lighting is not in the scope of work of the vault chamber but is covered within the lighting diagram and specifications.

11. CABLE TRAY SPECIFICATIONS

A. Class 125-2 Hour Data Vault Cable Tray:

1. Cable tray assemblies are designed to meet applicable standards for Class 125-2 Hour insulation from heat migration through vault enclosure. Panel and cable tray shall be protected as shown on Standard Drawing STD-7AAA.
2. Cable tray assembly box attaches to the vault exterior and includes one 4" square electrical junction box mounted both on the exterior face and the interior face of the vault panel. PVC conduit, 1" diameter, is used to penetrate the vault panel to carry the wiring to the interior of the vault enclosure.
3. A UL rated firestop device such as CAJ 2042 shall be used to seal cable tray conduit in the event of fire. The firestop device shall be attached to a 20 Ga. steel sheet at the interior face of the panel at the point of penetration. Junction boxes shall be filled with intumescent caulk
4. Fire Resistance (ASTM E-119, UL 263 Time/Temperature Curve). Cable tray assembly shall resist migration of heat, after duration of 2 hour test, temperature shall not exceed 125 degrees F. at the inner vault.
5. Cable Tray Installation Procedure The cable tray assembly box is positioned on the exterior face of the panel and penetration points are marked and core drilled at those locations. CPVC conduit of required size is placed through the panel and the cable tray assembly box with a 1" extension exposed both at the interior and exterior surfaces. Intumescent caulk such as 3M CP25WB is used to fill junction boxes.
6. Wires are drawn through conduit and electrical system is completed. Conduit is installed to meet local codes and project specifications. J-box cover plates are attached to complete installation.

12. EXAMINATION

A. Existing Conditions

1. Walls shall not be pierced for ventilation, air conditioning or heating without the use of a fire duct system equivalent to the rated exposure of the vault enclosure. (If a dedicated unit is utilized instead of accessing an existing central system, see HVAC Specifications for Class 125-2 Hour vault.).

2. Fire duct shall be equipped with UL rated fire dampers per UL 555. Dampers shall be activated either by heat or smoke detecting devices.
3. When the duct is in the closed position, heat migration and humidity transfer should be to the standard of the media being protected.
4. The fire duct shall be equipped with an automatic closing device and a heat-actuated or smoke actuated release to close them in case of fire.
5. The fire duct shall consist of three fire-rated, insulated dampers mounted in series within the duct. Dampers shall be equipped with thermal links which release above 165 degrees F. to allow the dampers to close.
6. The fire duct shall be covered with an insulating cover assembly of high temperature insulation equivalent to the vault panel insulation. Fire duct insulation shall be protected from physical abuse or removal by a steel outer jacket.
7. Fire duct shall have independent actuating devices in addition to any existing fire alarm devices.
8. For vaults utilizing a gaseous fire suppressant system to extinguish a fire within the vault enclosure, a fire and leakage rated motorized louver style damper shall be provided by the owner/owner's HVAC contractor to prevent the escape of the fire suppressant gas upon release.
9. HVAC Contractor is required to provide a dry set of contacts to the automatic door closer or the fire suppression alarm panel so that the vault or the alarm panel can effect a closing of the HVAC Duct to prevent smoke migration into the vault during a fire or alarm event. **(NEED TO COORDINATE WITH HVAC CONTRACTOR)**
10. Electrical service, telephone cabling, computer connections or any other penetrations for electrical or communication cabling shall penetrate the vault in cable tray units. These units shall have ratings per ASTM-E119, equivalent to the rating of the enclosure.
11. Cable tray units shall be filled with intumescent potting compound per UL for the thickness of the wall to prevent smoke, heat, flame or water penetration.
12. All electrical service within the vault shall be in conduit and in accordance with NFPA 70, National Electrical Code.
13. Necessary lighting shall be limited to dust and vapor resistant lighting fixtures and lamps controlled by a 2-pole switch located outside of the vault. The lighting fixtures for the vault chamber are to be provided under the electrical subcontract and are not a part of the scope of work of the vault manufacture and install. All light fixtures shall be on an arc breaker. Emergency lighting in the vault shall be trickle-charge type to ensure light within the vault during a power outage for egress of vault occupants. **(NEED TO COORDINATE WITH ELECTRICAL AND WITH DWGS)**

B. Examine areas and conditions, with Installer present, for compliance with requirements for clearance, installation tolerances, and other conditions affecting performance of modular vaults.
   1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of modular vaults. (e.g., floor conditions)

C. Proceed with installation only after unsatisfactory conditions have been corrected.

13. INSTALLATION

A. Install vault assembly according to manufacturer's written instructions, including setting support angles and shims.

B. Install modular vaults level and plumb.

C. Installation Clearances: Install vault assembly according to manufacturer's written instructions for clearance between exterior of vault wall panel and existing construction and for clearance between top of ceiling and existing construction.

D. Install vault door and frame according to vault manufacturer's written instructions.

14. DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain modular vaults as specified below:
   1. Train Owner's maintenance personnel on procedures and schedules for troubleshooting, servicing, and maintaining equipment and schedules.
   2. Review data in maintenance manuals. Refer to Division 1 Section "Contract Closeout."
   3. Review data in maintenance manuals. Refer to Division 1 Section "Operation and Maintenance Data."
   4. Schedule training with Owner with at least seven days' advance notice.

15. PROTECTION

A. Provide protection for stainless-steel surface of clad vault door to ensure that finish is without damage at the time of Substantial Completion.

Vault Chamber to Provide Laboratory Listing and Label

END OF SECTION

FIRELOCK®
Fireproof Modular Vaults

FIRELOCK Vault Door Specifications - Fire Vault Doors

The FIRELOCK Vault Doors are designed for fireproof vault chamber manufacturers for Modular Vault Chambers which are required to deliver either the following rating:

- Class 350 Four (4) Hour Document Rating (Paper) as well as a Class 125 Fire Rating for Media (Microfilm, Computer Media, Motion Picture Film, Audio Recordings) as well as historical artifacts

- Class 350 Six (6) Hour Document Rating (Paper) as well as a Class 125 Fire Rating for Media (Microfilm, Computer Media, Motion Picture Film, Audio Recordings) as well as historical artifacts.

- The Media Rated Vaults doors require vapor barriers to protect high value historical artifacts, parchment documents, media or other collections that would be destroyed by mold, mildew or exposure to steam and smoke. Vaults should be designed to minimize the degradation of historical records due to decay. (e.g. Slow burn or environmental degradation.)

Vault Door Construction:

Door Frame: Heavy Duty Steel Frame with two (2) heavy duty steel hinge blocks with roller bearings to promote ease of swing of the vault door. This is provided to allow for the use of a hydraulic door closer with activation during power failure, fire alarm activation and proprietary smoke detector to ensure the vault door closes in the event of a fire.

Hinge Block: Hinges are two (1-1/2” (38 mm) with interior roller-thrust bearing type hinges. The hinges provide sooth operation through a full 110o open to 170o open rotation.

Locking System: Door Bolts are 1” (25mm diameter, stainless steel rods. The strike side vertical opening of door structure provides five bolts that extend into the surrounding door frame to lock the door in place. The hinge side of the door provide five fixed 1” diameter (25 mm) cold rolled steel posts that lock the door into the door frame to prevent attack by removing the hinges and prying open the high side of door.

Door bolts retract on strike side when the vault door handle is operated in clockwise rotation and are held open by a spring loaded detent. The bolts withdraw into the main door body and remain in an open and spring loaded position until the vault door is closed. The rigger mechanism of the detent will fire the stainless steel rods into the locked position when the door is fully closed.

Combination Lock: Combination Lock is UL 768, Group 2, three wheel mechanical type which is capable of of no less than one million possible combination settings. Combination dial available as a Group 1 mechanical lock, or as an upgrade option with key locking dial.

A 1/4” (6 mm) hard plate cold rolled steel is provided in front of the combination lock to provide additional protections against mechanical attack

Relocking Device: A UL 140 separate re-locking device automatically deadlocks the door bolts when the lock is subjected to a mechanical attack.

Bolt Detent: This detent device automatically extends the active door bolt rods into the frame each time the door is moved into a closed position.

Escape Mechanism: The inside back of the door is equipped with a handle which can move the locking rods from the locked position to an open position to provide an Emergency Release for anyone locked inside the vault when the vault door is closed with occupants inside the vault.

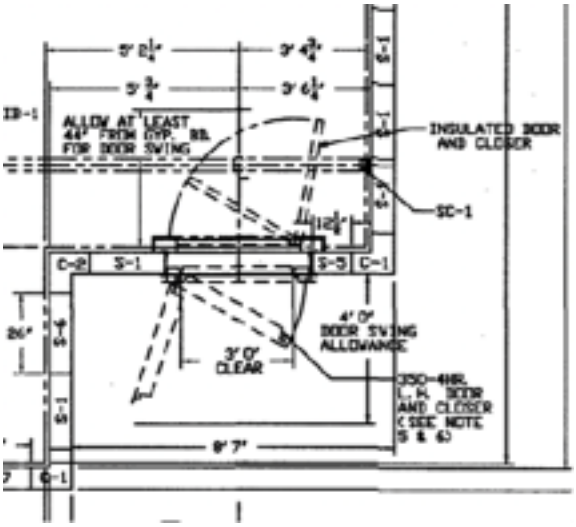
Sill Plate: A reinforced formed steel sill plate acts to seal the bottom of the door.

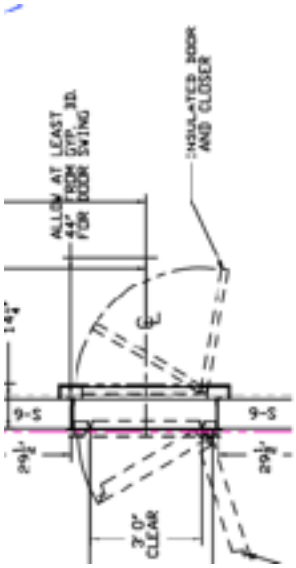
FIRELOCK Class 125 Inner Door Vault Upgrade

An Inner Door can be added to the Class 350 Four (4) Hour or the Class 350 Six (6) Hour Vault to increase the fire rating to provide a Class 125 Media Rating to the vault. The inner door is equipped with a key lock and this can also include an electric strike for card access control or biometric type lock and unlock devices. (See Inner Door Class 125 Detail provided.)

Automatic Vault Closer Devices: The Inner door is equipped with automatic closer and hold open magnet controlled by the outer vault door closer, the smoke detector, the clean agent alarm panel and any loss of power

Class 125 Vault Door Assembly Configuration





Left Swing Outer Door 36”

Right Swing Inner Door 36”

Right Swing Outer Door 36”

Right Swing Inner Door 36”

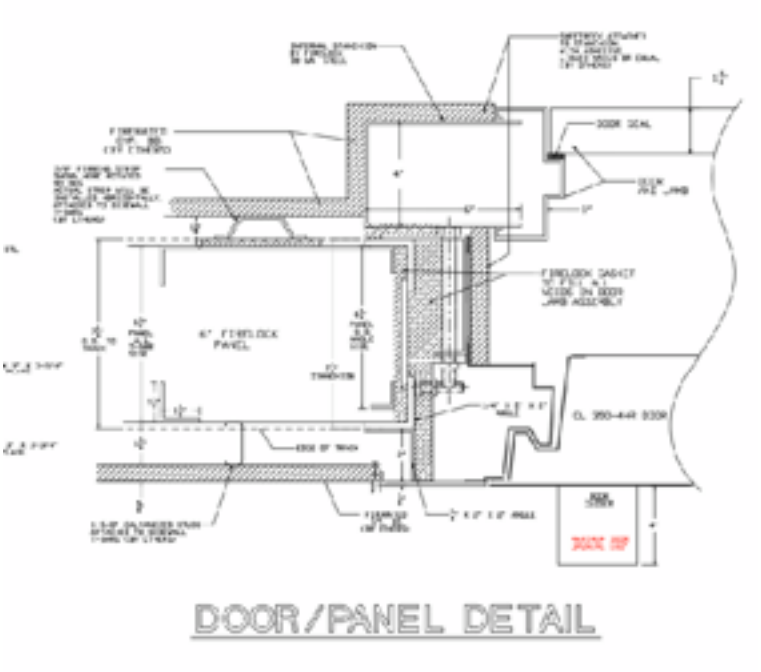
Automatic Closing Vault Door

- Locking Detent
- Hydraulic Closer

Class 125 Inner Door w/ Closer

- Hold Open Magnet

Door Vestibule Detail



Automatic Vault Closer Devices: (Cont'd) Clean Agent Systems must be connected to the Vault Door Step Down Transformer with a line interrupting set of normally closed contacts that when the alarm is activated cuts the power from the 24 Volt Step Down Transformer to both closers and seals the vault.

Vault Door and Frame Construction: The outer body of the vault door is made of 11 gauge steel with frame reinforcements in key positions and filled with a core of lightweight concrete designed for fire vault doors. The outer frame of the door is also 11 gauge steel plate on a structural frame and an inner frame to complete the vestibule of the door. Manufacturer's standard factory-applied water based paint, applied to vault door, frame, and wall flanges.The door can clamp on walls from 7: to 12: wall thickness. The Inner and outer frames are drawn together with galvanized steel bolt work.

See Detail for the mounting detail of the vault door onto the Vault Passageway Stanchion.

National and State Vault Design Guidelines requires automatic vault door closers to seal vault in the event of a fire or to seal the vault prior to release of the Clean Agent System.

Door Sizes: Vault Doors are available in 32", 36" and 40" widths. Typically the 36" door is utilized to satisfy ADA requirements.

Nodal	A Clear opening width	B Masonary opening width	C Door swing	D Overall width	E Clear opening height	F Masonrary opening height	G Wall thickness	Approx. Weight
4 Hour Fire Resistance								
7832-4	32"	42"	38"	43"	78	83	7-18"	990 lbs
7836-4	36"	46"	42"	47"	78	83	7-18"	1090 lbs
7840-4	40"	50	46"	51"	78	83	7-18"	1190 lbs
6 Hour Fire Resistance								
7832-6	32"	42"	38"	43"	78	83	7-18"	1255 lbs
7836-6	36"	46"	42"	47"	78	83	7-18"	1380 lbs
7840-6	40"	50	46"	51"	78	83	7-18"	1505 lbs

Vault Foundation Floor Specification:

Concrete floors must be Flat and Level in the area of the vault door to provide proper installation on the site. **(ACI Standard FF > 50 FL > 32**)

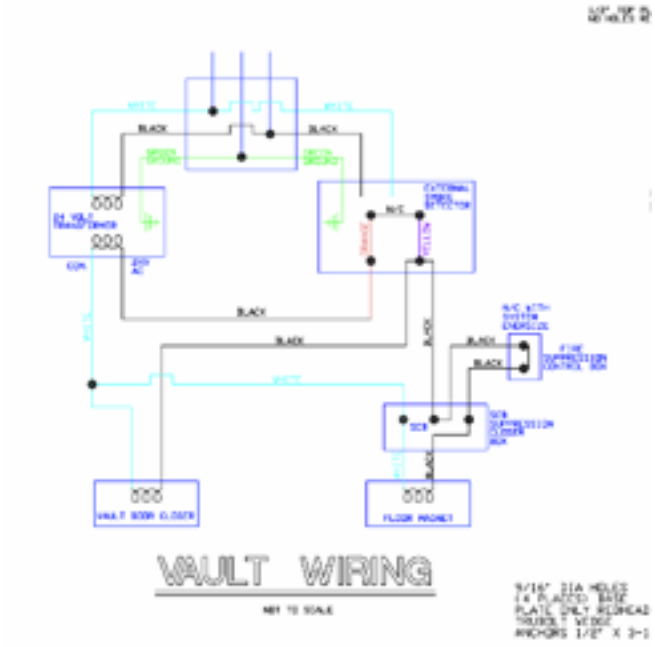
- End of Specification -

Detail Photos:

Smoke Detector to Activate Vault Door

Smoke Detector Activator

Electrical Details:



Vault Door Designed to Seal Automatically

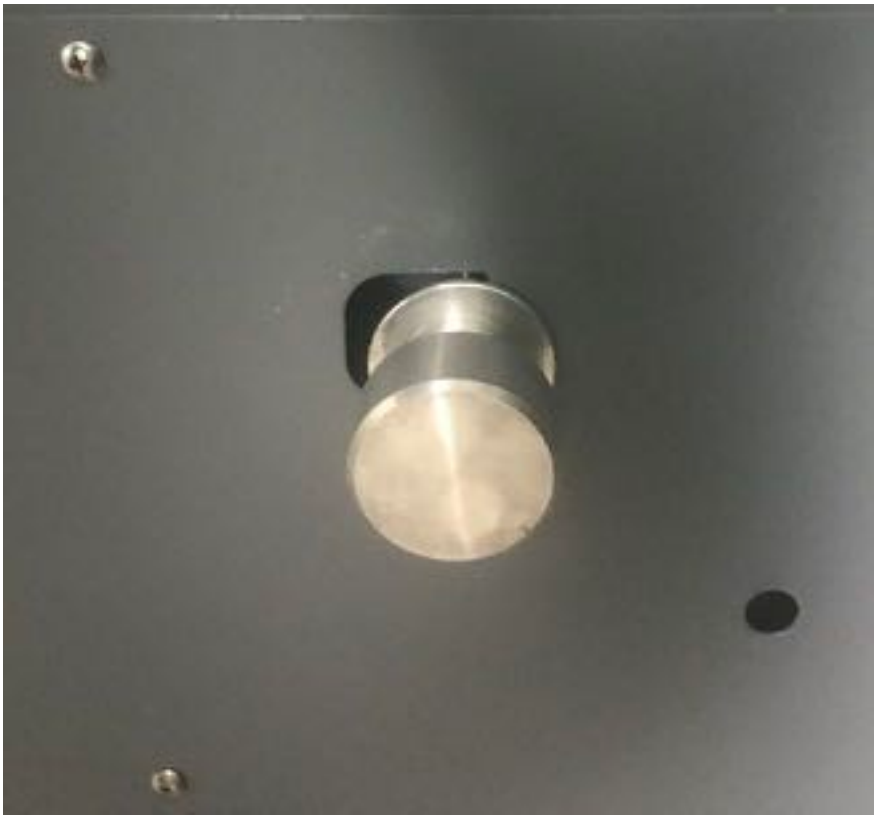
Hinge Block

Star Locking Handle & Combination Lock

Star Locking Handle & Combination Lock with Key Locking Dial (Option)

Key Locking Dial provides dual control where required.

Emergency Exit Release



Vapor Barrier for Vapor Tight Vault Chamber

Vault Chamber to Provide Laboratory Listing and Label

- End of Vault Photos and Specifications