The following are guidelines that shall be used by A/E firms in the preparation of drawings and specifications for construction of all Cleveland Clinic facilities.

The general purpose of Design Standards is to provide the minimum criteria for design at Cleveland Clinic facilities to meet the requirements of the Building Codes, NFPA 101 the Life Safety Code, FM Global compliance and the proper installation of approved materials while maintaining uniformity throughout all facilities. The Standards are intended to be used to address system design aspects that the Cleveland Clinic desires to standardize among facilities, and identify prohibited materials and construction practices.

The use of these Standards is mandatory for the design of new construction, renovation and maintenance projects; deviations are highly discouraged. However, if project conditions arise which require a deviation; it shall be thoroughly documented by the user and submitted to Cleveland Clinic Department of Planning and Design for review and approval using the Design Standards Revision Request documents. Additionally, all Cleveland Clinic staff, architects, engineers, and contractors are encouraged to participate in the ongoing development of these guidelines by communicating any suggestions by use of the Revision Request document.
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## APPENDIX A

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## Master Specifications

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Introduction:
The Cleveland Clinic is committed to the life safety of all patients, visitors, and caregivers. The Passive Fire Protection & Life Safety Design Standards (Design Standards) have been developed with the intent to promote a holistic approach to fire protection and life safety systems design. Through the integration of multi-disciplinary design features and a “defend in place” approach with the objective to provide an environment that is reasonably safe for our patients, visitors and staff from a single fire source and products of combustion in all new construction and renovation projects. The Design Standards apply to all Cleveland Clinic facilities, owned and leased. The Design Standards are a tool for Cleveland Clinic contractors and employees and set a minimum standard for contractual compliance.

Definition:
Passive Fire Protection is defined as the inherit fire resistance built into a structure as prescribed by code for various building types and occupancies. The key element is compartmentation of the overall building through the use of fire-resistance rated walls and floors into areas of known risk. Organization of the structure into smaller fire compartments, consisting of one or more rooms or floors, prevents or slows the spread of fire from the room of fire origin to other building spaces, limiting building damage and providing more time to the building occupants for emergency evacuation or to reach an area of refuge and allows first responders to pinpoint their efforts to the point of origin.

Elements of Passive Fire Protection such as fire rated walls / floors, fire rated building joints, fire proofing and firestopping are all examples of materials that are required to be constructed as an assembly in a manner proven to provide the necessary hourly fire resistance rating as verified by accredited third party testing laboratory. It is never an individual material but rather the assembly that carries the fire resistance rating and therefore strict adherence to the installation of these materials according to the tested design for each application is mandatory to insure proper compliance and only those assemblies tested for the intended use may be employed for that specific application.

Compartmentation of a building is necessary to maximize the effectiveness of Active Fire Protection systems such as smoke and fire detection systems and automatic sprinklers which are designed to operate with the only the minimum number of heads activating. However, Passive Fire Protection must act as the first and last line of defense should Active Fire Protection systems be compromised by low water pressure, electrical outages or simultaneous events beyond the design capabilities of the systems.

Purpose:
These Design Standards establish a minimum level of passive fire protection and life safety for all Cleveland Clinic facilities by building upon current code requirements, utilizing the latest recommended industry practices, and specifying additional requirements deemed appropriate by Cleveland Clinic.

To insure that all classified fire resistive materials are properly installed in strict accordance with their tested design assemblies as is required by Code. That non-standard construction is modified to meet the requirements of a tested design assembly and to minimize the use of Engineering Judgments to only those applications where no tested assembly exists and then only with the express written permission of the Cleveland Clinic Department of Planning and Design prior to installation.
Proper application of these design standards will insure that all applicable code requirements are met during design and construction when costs can best be controlled vs. repairing defective construction afterward in a fully occupied and operational facility at ten times the installed cost.

These Design Standards supersede previous Passive Fire Protection and Life Safety Standards published by Cleveland Clinic which are dated prior to the issuance of these Design Standards.

Application:
This document applies to new construction and renovation projects at all Cleveland Clinic facilities, including owned and leased facilities. Use these Design Standards in conjunction with other standards published by Cleveland Clinic. Where conflicts arise between published documents, seek written resolution from the Fire & Life Safety Engineer – Cleveland Clinic Department of Planning and Design.

The intent of this document is to supplement the codes and standards applicable in the jurisdiction. Where conflicts arise between this document and applicable codes adopted by the jurisdiction, the most stringent provisions apply. It is not the intent of this document to reduce or eliminate applicable code provisions adopted by law.

For code interpretation and enforcement, the Authority Having Jurisdiction (AHJ) for all Cleveland Clinic construction projects is the Fire & Life Safety Engineer – Cleveland Clinic Department of Planning and Design.

Applicable Codes, Standards, Guidelines and References:
During concept design, the Architect/Engineer (A/E) is responsible for submitting the list of applicable codes, standards, guidelines, and references to the Fire & Life Safety Engineer – Cleveland Clinic Department of Planning and Design for approval.

Cleveland Clinic adopts the 2000 Life Safety Code (NFPA 101) and standards specifically referenced by NFPA 101, except when state and local requirements are more stringent. The intent of this requirement is to adopt the edition of NFPA 101 enforced by The Joint Commission (TJC) and Center for Medicare and Medicaid Services (CMS). The A/E is responsible for confirming these editions early in the design process.

State and local codes adopted by the jurisdiction apply to all Cleveland Clinic designs. The A/E is responsible for documenting the state and local codes applicable in the jurisdiction. Where conflicts arise between state/local codes and NFPA 101, the most stringent applies. Do not construe approval from the AHJ as relieving installer from compliance with the requirements of this design standard that are in excess of Code requirements.

In addition, the A/E is responsible for including a list of the applicable design standards referenced in the appendices of the applicable codes. The A/E must provide written justification to the Fire & Life Safety Engineer – Cleveland Clinic Department of Planning and Design for use of a standard (or edition of standard) not specially referenced by the applicable codes.

If a NFPA 101 analysis for existing buildings is permitted by the AHJ, the analysis must be prepared by a licensed Fire Protection Engineer and reviewed by the Fire & Life Safety Engineer – Cleveland Clinic Department of Planning and Design.
Fire Test Requirements:

Underwriters Laboratories, Inc. (UL):
- ANSI / UL1479 “Fire Tests of Through Penetration Firestop”
- ANSI / UL263 “Fire Tests of Building Construction and Materials”
- ANSI / UL723 “Surface Burning Characteristics of Building Materials”

American Society of Testing and Materials (ASTM):
- ASTM E-814 “Fire Tests of Through Penetration Fire Stops”
- ASTM E-2307 “Test Method for Perimeter Fire Barrier Systems”
- ASTM E-84 “Surface Burning Characteristics of Building Materials”
- ASTM E-2174 “Standard Practice for On-site Inspection of Installed Firestop”
- ASTM E-2393 “Standard Practice for On-Site Inspection of Installed Fire Stop Joint Systems”

References:

Building Codes:
- International Building Code
- Ohio Building Code
- Ohio Fire Code

Approved Independent Testing Agencies:
- Underwriters Laboratories (UL) “Fire Resistance Directory”.
- Intertek Testing Services NA Ltd.
- Factory Mutual Approvals (FM)

Passive Fire Protection Consultant

When directed by the Cleveland Clinic Department of Planning and Design, construction projects will engage the services of the Passive Fire Protection Consultant. The consultant will be engaged at the beginning of the Construction Drawing phase of the project and included in all phases of design and construction of the project. The consultant will review the construction documents for compliance with applicable codes and standards, including the Cleveland Clinic Fire Passive Fire Protection & Life Safety Design Standards, reviewing contractor submittals and making field recommendations as required.

Document Submittal:

As required by the Cleveland Clinic Planning & Design Process, detail the following provisions:

- Building Code Analysis (Construction Type and building separations)
- Occupancy Classification (i.e. Use Group)
- Identification of various occupancies, hazardous areas and pressurized rooms
- Occupant load, travel distance, egress capacity and Fire/Smoke Zones
- Life Safety Floor Plans including details indicating barrier walls and partitions and their respective fire-resistive ratings:
Barrier Types:

Fire Barrier
A continuous assembly with a specified fire resistance rating in which openings and penetrations are protected. A fire barrier may be vertically or horizontally aligned, such as a wall or floor assembly.

In areas where glass walls are used in or as a fire barrier wall, only those framing/glazing systems tested independently of automatic suppression systems shall be employed.

Smoke Barrier
Smoke barriers shall be a continuous assembly of minimum 1-hour fire-resistance rated construction with protected openings, penetrations and joints sealed with UL systems tested with L Ratings.

Smoke Partition
A continuous barrier wall consisting of drywall on each side of the assembly designed to form a barrier to limit the transfer of smoke. A fire rating is not required for smoke partitions; however all penetrations and joints must be properly sealed with approved materials having passed UL1479 for air leakage and capable of maintaining the STC rating of the wall.

Full Height Partition
A continuous wall with drywall on each side of the assembly extending from the floor to the underside of the floor or roof deck assembly that is designed to form a barrier to limit the transfer of sound. All penetrations and joints must be properly sealed on both sides of the wall with approved materials having passed UL1479 for air leakage and capable of maintaining the STC rating of the wall.
Firestopping:
SpecSeal Firestop Products manufactured by Specified Technologies, Inc. (STI), Somerville, NJ 800.992.1180 shall be the only materials approved for use in Cleveland Clinic facilities.

- SpecSeal Series 100 Intumescent firestop sealant (SSS) shall incorporate controlled two-stage intumescent technology - with a visible initial reaction occurring at 230° F resulting in expansion of four times the original size while maintaining the original shape and a second stage occurring at 350° F resulting in a minimum free expansion of 500% - to provide protection from the migration of cold smoke.
- All firestopping shall be installed in accordance to the U.L. tested system designed for the application.
  - F-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F ratings indicated, as determined per ASTM E-814, but not less than that equaling or exceeding the fire-resistance rating of the constructions penetrated.
  - T-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with T ratings not less than one hour but equal to the fire-resistance rating of the floor being penetrated as determined per ASTM E-814, the firestop systems protect penetrations located outside of wall cavities.
  - L-Rated Through-Penetration Firestop Systems: Provide firestop systems with L Ratings for joints and penetrations in both rated and non-rated Smoke Barriers and Smoke Partitions. The air leakage rating shall not exceed 5 CFM per square foot at 0.30 inch of water for both ambient and elevated temperatures as determined per UL 1479.
  - W-Rated Through-Penetration Firestop Systems: Provide firestop systems with W Water Resistance ratings, in addition to F, T and L ratings, as determined per UL 1479, where indicated in areas subject to frequent ponding exposure.
- Provide products that upon curing shall not re-emulsify, dissolve, leach, break down or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during and after construction.
- Provide firestop sealants that shall be sufficiently flexible to accommodate motion such as pipe vibration, water hammer, thermal expansion and other normal building movement without damage to the seal.
- Provide fire-resistant joint sealants shall accommodate a specific range of movement and tested for this purpose in accordance with a cyclic movement test criteria as outlined in Standards ASTM E-1966 or ANSI / UL 2079.
- Provide fire-resistant joint systems shall have been subjected to an air leakage test conducted in accordance with ASTM E-1966 or ANSI / UL2079 with published L-Ratings for ambient and elevated temperatures as evidence of the ability of the fire-resistant joint system to restrict the movement of smoke.
- Provide fire-resistant joint sealants that shall have been tested to maintain STC ratings of barriers and partitions being penetrated.
- All smoke barriers shall be firestopped with systems designed to maintain a minimum 1-hour fire rating or that which is equal to the rating of the wall.
- Provide firestopping for conditions specified whether or not firestopping is indicated on drawings and, if indicated, whether such material is designated as insulation, safing, or otherwise. Insulation types specified in contract documents shall not be installed in lieu of firestopping.
- All penetrations and joints in floor slabs of Type IIB construction are to be firestopped with a UL system with a minimum one hour fire resistance rating.
Penetrations - Provide Firestopping:

- Only two-stage intumescent firestop sealant (SSS) shall be utilized as part of the UL rated system for the intended application.
- Where penetrations including conduit, cable, wire, pipe, duct, or other elements pass through one or both outer surfaces of a fire rated wall or floor.
- High traffic openings (cable trays, openings for data cable, etc.) shall be firestopped using EZ Path fire rated pathway or re-installable materials (Firestop Putty or Pillows) and shall be sized to provide 75% excess capacity for future growth. Devices shall be 100% self-contained and not require mechanical opening/closing or removal/re-insertion of components to remain compliant with the UL design.
- Applications utilizing Firestop Pillows shall utilize 1” octagonal wire mesh or 1”steel strapping to restrain material on both sides of the floor or wall.
- Pipe insulation shall not be removed, cut away or otherwise interrupted through wall or floor openings. Provide a tested assembly appropriate for the thickness and type of insulation utilized.
- Provide firestop devices, wrap strips or collars for plastic DWV piping penetrations. Caulk only systems will not be accepted for penetrations larger than nominal 1” trade pipe sizes.
- These requirements for penetrations shall apply whether or not sleeves have been provided, and whether or not penetrations are to be equipped with escutcheons or other trim. If penetrations are sleeved, firestop annular space, if any, between sleeve and wall opening.
- Single membrane penetrations shall be firestopped as one half of a symmetrical through penetration firestop system.
- No penetrations shall be installed within 4 vertical inches of the bottom edge of head of wall joints.
- Provide firestopping for blank openings in fire-rated construction.

Fire Rated Joints – Provide firestopping:

- All fire rated joint assemblies must maintain a 1-hour fire (“F”) rating or that which is equal to the rating of the wall and a leakage (“L”) rating of less than 1 CFM/LF.
- Firestop joint systems for areas subject to movement from dynamic loading, thermal expansion, or building movement shall be tested per UL 2079 for 500 cycles at a minimum of 10 cycles per minute.
- Confirm in writing with the structural engineer the movement requirements for deflection, thermal and wind load to determine that the appropriate joint system is tested to meet the greatest anticipated movement among these criteria.
- Firestop joint systems shall not be used in lieu of mechanical joint systems for any seismic building joint.
- Where the top edge of a fire-rated wall abuts the bottom of a floor or roof with or without fluted-type metal decking, provide a fire rated joint system that allows for the dynamic movement of the floor or roof deck with a minimum 1-hour fire rating or that which is equal to the rating of the wall.
  - Mineral wool safing may not be used alone but only as a component of a UL tested firestop joint system and must be fully encapsulated with firestop spray/sealant.
  - There shall be no drywall tape or joint compound installed in the joint opening prior to the installation of the fire rated joint assembly.
- Where a wall or partition is continuous past a structural floor, such as at stairwells and vertical shafts, and a space would otherwise remain open between the sheathing of the wall and edge of the adjoining structural floor, provide a fire rated joint system designed to maintain a minimum 1-hour fire rating or equal to the rating of the floor. Whether or not there are any clips, angles, plates

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or other members bridging or interconnecting the floor and wall systems.

- For zero rated floors, provide a fire rated joint system designed to maintain a minimum 1-hour fire rating.
- Where a drywall partition abuts the floor provide a fire rated bottom of wall joint system designed to maintain a minimum 1-hour fire rating or that equal to the rating of the wall.
- Where joint application is exposed to the elements, fire-resistive joint sealant must be approved by manufacturer for use in exterior applications and shall comply with ASTM C-920, “Specification for Elastomeric Joint Sealants”.

Perimeter Fire Barrier Systems – Provide Firestopping:

- To fill the gap between the edge of the floor slab and the exterior sheathing or curtain wall assembly, the Perimeter Fire Barrier System selected shall have been tested using the Intermediate Scale Multi-story Apparatus using exterior wall systems similar to actual field conditions.
- Where exterior facing is continuous past a structural floor, and a space would otherwise remain open between the inner face of the wall construction and the perimeter edge of the structural floor, provide a perimeter fire barrier system designed to maintain a minimum 1-hour fire rating or equal to the rating of the floor.
  - For zero rated floors, provide a perimeter fire barrier system designed to maintain a minimum 1-hour fire rating.
- Where an exterior wall of composite type construction is continuous past a structural floor/roof, and a space would otherwise remain open at the intersection of the floor/roof and the exterior sheathing of the wall system, provide a perimeter fire barrier system designed to maintain a minimum 1-hour fire rating or that which is equal to the rating of the floor/roof.
  - For zero rated floor/roof, provide a perimeter fire barrier system designed to maintain a minimum 1-hour fire rating.

Full Height Partitions (Sound Walls) and Smoke Partitions – Provide Smoke Stopping:

- Where the top edge of the wall abuts the bottom of a floor or roof with or without fluted-type metal decking, provide a smoke rated joint system that allows for the dynamic movement of the floor or roof deck.
  - Smoke / Sound sealant shall be tested to UL 1479 for air leakage and maintain the STC Rating of the wall.
  - Mineral wool safing may not be used alone but only as a component of the joint system and must be fully encapsulated.
  - There shall be no drywall tape or joint compound installed in the joint opening prior to the installation of the joint assembly.
- Confirm in writing with the structural engineer the movement requirements for deflection, thermal and wind load to determine that the appropriate joint system is tested to meet the greatest anticipated movement among these criteria.
- Where a drywall partition abuts the floor provide a bottom of wall joint system utilizing Smoke / Sound Sealant shall be tested to UL 1479 for air leakage and maintain the STC Rating of the wall.
- Penetrations shall be sealed on both sides of the wall using Smoke / Sound sealant shall be tested to UL 1479 for air leakage and maintain the STC Rating of the wall.
- EZ Path Smoke & Acoustical Pathways to be installed for cable penetrations and shall be sized to provide 75% excess capacity for future growth.
Installer Qualifications:

- Employ only firms that have been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by Underwriters Laboratories and found to comply with its "Qualified Firestop Contractor Program Requirements."
  - Firestop installers shall have successfully completed the “Cleveland Clinic Firestop Training Program” offered quarterly at the Cleveland Clinic.
    - Installers shall have completed the Firestop Instructional Training (FIT™) Level 1 examination.
  - Completion of the standard Firestop Instructional Training (FIT™) Level 1 training curriculum and examination does not constitute compliance with this requirement.

Quality Assurance:

- Independent inspection agency employed by the owner, will examine penetration firestopping in accordance with ASTM E-2174, “Standard Practice for On-Site Inspection of Installed Fire Stops” and ASTM E-2393, “Standard Practice for On-Site Inspection of Installed Fire Stop Joint Systems” prior to the concealment of the installation by other construction or the placement of ceiling tiles.
  - Destructive testing shall be employed in accordance with the standards.
  - Where deficiencies are found, remove and reinstall firestopping products to comply with requirements of the tested assembly.
  - The Fire & Life Safety Engineer - Cleveland Clinic Department of Planning and Design shall be notified of any existing conditions requiring firestopping that have not been included in the scope of the current project.

Labeling:

- Identify each firestopping system with approved Cleveland Clinic Firestop Identification Label properly listing the following:
  
  | UL System Number | Firestop Permit Number |
  | Firestopping product | Installation date |
  | Company Name | Installer Name |
  | Certification # | Expiration Date |

- Placement: Place labels so they are readily visible. Special attention required for locations exposed to public; place labels at locations approved by Architect.
  - Walls: Attach labels directly to penetrating item or immediately adjacent to penetration.
  - Floors: Attach labels directly to penetrating item approximately 4 to 8 inches above floor. Where finish floor treatments or wall base materials are applied to penetrant, attach label 2 to 4 inches above such treatments or materials.
  - Joints: Attach labels to wall directly beneath the head of wall joint; 10 LF on center.
  - Soft Substrates: For penetrants, which are difficult to obtain good permanent adherence to such as fabric-covered insulation or similar substrates, attach label to substrate and wrap penetrant and label with clear tape to maintain placement or improve bond using spray adhesive.
- Cleveland Clinic Inspector Label to be affixed near each Cleveland Clinic Firestop Identification Label upon approval of the installation.
Stenciling:
Barrier walls to be stenciled in 4” tall letters every ten feet as follows:
- Fire Barriers (Red) Fire Barrier
  - Penetrations By Permit Only
- Smoke Barriers (Red) Smoke Barrier
  - Penetrations By Permit Only
- Smoke Partitions (Blue) Smoke Partition
  - All Penetrations To Be Sealed

Engineering Judgments:
The use of Engineering Judgments is limited to only those applications where no tested assembly exists and then only with the express written permission of the CLEVELAND CLINIC Department of Planning and Design prior to installation.
- Engineering judgments are NOT to be used
  - to remedy defective construction
  - as a cost savings alternative to defend improper construction that has already been installed
- Engineering Judgments may be employed in cases of:
  - Existing or archaic construction for which no tested system exists
  - Minor deviations from tested systems for penetration / hole size / annular spacing

Engineering Judgment Permit Process:
Architect must submit the Request for Engineering Judgment Permit form to the CC Department of Planning & Design along with all back up documentation prior to installation.

Fire Rated Expansion Joint Systems:
Pyroflex Fire Barrier products manufactured by MM Systems Corporation Atlanta, GA 800.241.3460 shall be the only materials approved for use in Cleveland Clinic facilities.
- All fire rated joint assemblies must maintain a 1-hour fire (“F”) rating or that which is equal to the rating of the floor or wall and a leakage (“L”) rating of less than 1 CFM/LF.
- Fire Barrier joint systems subject to movement from deflection, thermal expansion, or building movement shall be tested per UL 2079 for 500 cycles at a minimum of 10 cycles per minute.
- Confirm in writing with the structural engineer the movement requirements for deflection, thermal and wind load to determine that the appropriate joint system is tested to meet the greatest anticipated movement among these criteria.
- Fire barrier expansion joint systems shall be installed at all building joints.

Installer Qualifications:
- Employ only firms that have been factory certified in fire barrier installation by the manufacturer or firms that have been approved by FM Global according to FM Global 4991, “Approval of Firestop Contractors,” or been evaluated by Underwriters Laboratories and found to comply with its "Qualified Firestop Contractor Program Requirements."
Fireproofing:
Cementitious fireproofing shall be approved for use in Cleveland Clinic facilities.
- Spray applied mineral fiber fireproofing is expressly prohibited.

The fireproofing material shall have been tested and reported by Underwriters Laboratories, Inc. (UL) in accordance with the procedures of UL 263 (ASTM E119)

Cementitious Fireproofing:

Low Density Materials – for structures under 75' tall:
- Isolatex International  CAFCO® 300
- W. R. Grace   Monokote® MK-6
- Carboline   Type Five GP

Materials shall be applied to conform to the following:
- Provide fireproofing material that shall not crack or delaminate when the non-concrete topped galvanized deck to which it is applied is subjected to a one time vertical center load resulting in a downward deflection of 1/120th of the span when tested in accordance with ASTM E 759.
- Provide fireproofing material that shall not crack or delaminate from the concrete topped galvanized deck to which it is applied when tested in accordance with ASTM E 760
- Provide fireproofing material that when applied over uncoated or galvanized steel shall have an average bond strength of 150 psf when tested in accordance with ASTM E 736.
- Provide fireproofing material that shall not be subject to losses from the finished application greater than 0.025 grams per sq. ft. when tested in accordance with ASTM E 859
- Provide fireproofing material that shall not deform more than 10 percent when subjected to a crushing force of 750 psf when tested in accordance with ASTM E 761.
- Provide fireproofing material that shall not promote corrosion of steel when tested in accordance with ASTM E 859.
- Provide fireproofing material that shall be determined to be noncombustible when tested to ASTM E 136.
- Provide fireproofing material that shall exhibit surface burning characteristics of zero flame spread and zero smoke development when tested to ASTM E 84.
- Provide fireproofing material that shall meet the minimum individual and average density values as listed in the appropriate UL design or as required by the authority having jurisdiction, or shall have a minimum average of 15 pcf when tested to ASTM E605.
- Air Erosion: Maximum weight loss of 0.025 g/sq. ft. in 24 hours according to ASTM E-859.
- Fungal Resistance: When tested in accordance with ASTM G21, the material shall show resistance to mold growth for a minimum period of 28 days with or without the use of a mold inhibitor.

Medium Density Materials – for structures over 75’ tall:
- Isolatex International  CAFCO® 400
- W. R. Grace   Monokote® Z-106
- Carboline   Type Seven GP
Materials shall be applied to conform to the following:

- Provide fireproofing material that shall not crack or delaminate when the non-concrete topped galvanized deck to which it is applied is subjected to a one time vertical center load resulting in a downward deflection of 1/120th of the span when tested in accordance with ASTM E 759.
- Provide fireproofing material that shall not crack or delaminate from the concrete topped galvanized deck to which it is applied when tested in accordance with ASTM E 760.
- Provide fireproofing material that when applied over uncoated or galvanized steel shall have an average bond strength of 434 psf when tested in accordance with ASTM E 736.
- Provide fireproofing material that shall not be subject to losses from the finished application greater than 0.025 grams per sq. ft. when tested in accordance with ASTM E 859.
- Provide fireproofing material that shall not deform more than 10 percent when subjected to a crushing force of 7,344 psf when tested in accordance with ASTM E 761.
- Provide fireproofing material that shall not promote corrosion of steel when tested in accordance with ASTM E 859.
- Provide fireproofing material that shall be determined to be noncombustible when tested to ASTM E 136.
- Provide fireproofing material that shall exhibit surface burning characteristics of zero flame spread and zero smoke development when tested to ASTM E 84.
- Provide fireproofing material that shall meet the minimum individual and average density values as listed in the appropriate UL design or as required by the authority having jurisdiction, or shall have a minimum average of 22 pcf when tested to ASTM E 605.
- Air Erosion: Maximum weight loss of 0.025 g/sq. ft. in 24 hours according to ASTM E-859.
- Fungal Resistance: When tested in accordance with ASTM G21, the material shall show resistance to mold growth for a minimum period of 28 days with or without the use of a mold inhibitor.

Quality Assurance

- Independent inspection agency employed by the owner, will examine fireproofing in strict accordance with the requirements of the Ohio Building Code section 1704. Where deficiencies are found, remove and reinstall fireproofing materials to comply with requirements of the tested assembly.
  - Perform the tests and inspections of completed work in successive stages. Do not proceed with application of fireproofing for the next area until test results for previously applications of fireproofing show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.
  - Fireproofing will be considered defective if it does not pass tests and inspections.
    - Remove and replace fireproofing that does not pass tests and inspections, and retest.
    - Apply additional fireproofing, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.
- The Fire & Life Safety Engineer - C Cleveland Clinic Department of Planning and Design shall be notified of any existing conditions requiring fireproofing that have not been included in the scope of the current project.
**Intumescent Fireproofing:**
Albi Fireproofing Products as manufactured by Albi Manufacturing Division of Stan-Chem Incorporated East Berlin, CT 860.828.3297 shall be the only materials approved for use in Cleveland Clinic facilities.

The material shall have been tested and reported by Underwriters Laboratories, Inc. (UL) in accordance with the procedures of UL 263 (ASTM E119)

- Interior applications – must be listed for “General Purpose” applications by UL and shall not require the use of a top coat as part of the system.
  - Albi Clad TF Water based thin film intumescent fireproof coating
  - Albi Clad FP Water based thin film intumescent fireproof coating

- Exterior Applications – must be listed for “Exterior” applications by UL and shall not require the use of a top coat as a component of the system.
  - Albi Clad 800 Solvent based single component intumescent mastic coating.

**Quality Assurance**

- Independent inspection agency employed by the owner, will examine fireproofing in strict accordance with the requirements of the Ohio Building Code section 1704. Where deficiencies are found, remove and reinstall fireproofing materials to comply with requirements of the tested assembly.
  - Perform the tests and inspections of completed work in successive stages. Do not proceed with application of fireproofing for the next area until test results for previously applications of fireproofing show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.
  - Fireproofing will be considered defective if it does not pass tests and inspections.
    - Remove and replace fireproofing that does not pass tests and inspections, and retest.
    - Apply additional fireproofing, per manufacturer’s written instructions, where test results indicate insufficient thickness, and retest.

- The Fire & Life Safety Engineer - Cleveland Clinic Department of Planning and Design shall be notified of any existing conditions requiring fireproofing that have not been included in the scope of the current project.

**Mineral Fiber Board Fireproofing:**
Albi Fireproofing Products as manufactured by Albi Manufacturing Division of Stan-Chem Incorporated East Berlin, CT 860.828.3297 shall be the only materials approved for use in Cleveland Clinic facilities.

This material shall have been tested and reported by Underwriters Laboratories, Inc. (UL) in accordance with the procedures of UL 263 (ASTM E119);

Mineral fiber fireproofing board.
  - Albi DriClad  Mineral fiber board fireproofing

Materials shall be applied to conform to the following:

- Material: Basalt mineral fiberboard.
- Surface Burning Characteristics (ASTM E84): Class A; flamespread 0, smoke developed 0.
Dry Applied Density, Average: 10.5 pcf (168 kg/m$^3$).
Compressive Strength at 10% (ASTM C165): 936 psf (44,816 Pa).
Moisture Absorption (ASTM C209) < 0.5% by volume.
Moisture Adsorption (ASTM C553): < 0.03% by volume.
Deflection (ASTM E759): No delamination.
Leachable Chlorides (ASTM C871): None.
Thermal Performance (ASTM C158): R-4.2 ft$^2$ × h × °F/Btu/inch (0.74 m$^2$ × K/W)/25.4 mm).
Sound Absorption (ASTM C423): NRC 0.80

Quality Assurance
- Independent inspection agency employed by the owner, will examine fireproofing in strict accordance with the requirements of the Ohio Building Code section 1704. Where deficiencies are found, remove and reinstall fireproofing materials to comply with requirements of the tested assembly.
  - Perform the tests and inspections of completed work in successive stages. Do not proceed with application of fireproofing for the next area until test results for previously applications of fireproofing show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.
  - Fireproofing will be considered defective if it does not pass tests and inspections.
    - Remove and replace fireproofing that does not pass tests and inspections, and retest.
    - Apply additional fireproofing, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.
- The Fire & Life Safety Engineer - Cleveland Clinic Department of Planning and Design shall be notified of any existing conditions requiring fireproofing that have not been included in the scope of the current project.

FIRE RATED INSULATION
Pyroscat fire rated insulation as manufactured by Morgan Thermal Ceramics Augusta, GA 800.338.9284 shall be the only materials approved for use in Cleveland Clinic facilities.

Physical Properties:
- Thermal Material: 2192 F degree rated core blanket, manufactured from patented bio-soluble Superwool chemistry (Calcium Magnesium Silicate)
- Fully encapsulated thermal material in fiberglass reinforced aluminum/polypropylene scrim (FSP).
  - Encapsulation FSP marked with UL Classification Mark
  - Encapsulation FSP marked with ICC-ES report number ESR 2832
- Nominal Density of 6 pcf
- R-Value: 7.35 per 1-1/2” layer of Pyroscat Duct Wrap XL when tested in accordance with ASTM C 518 at 75 F.
- Flame Spread: <25 when tested in accordance with ASTM E 84.
- Smoke Development: <50 when tested in accordance with ASTM E 84.
Fire-rated insulation for the following applications:
- Commercial kitchen grease ducts.
- Air ventilation ducts.
- Chemical exhaust ducts.
- Stair pressurization ducts.
- Hazardous exhaust ducts.
- Trash and linen chutes.
- Clothes dryer vents.
- Construction requiring fire-rated enclosure assembly construction.
- Plenum rated insulation to cover non-plenum rated plastic pipe and plastic jacketed electric cables.

Materials shall conform to the following:
- **Grease Duct Enclosure System Test Standards:**
  - ASTM E 814 (UL1479); ‘Standard Test Method for Fire Tests of Through-Penetration Fire Stops’.
  - UL 1978; ‘Standard for Grease Ducts’.
- **Ventilation Air Duct Enclosure System Test Standards:**
  - ASTM E 814 (UL1479); ‘Standard Test Method for Fire Tests of Through-Penetration Fire Stops’.
- **Plenum Rated Enclosure System Test Standards:**
  - UL 1887; ‘Fire Test of Plastic Sprinkler Pipe for Visible Flame and Smoke Characteristics’.
  - NFPA 252 (UL 910); ‘Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces’.
- **Independent Listing Agency References:**
  - Underwriters Laboratories (UL).

**Installer Qualifications:**
- Employ only firms that have been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by Underwriters Laboratories and found to comply with its "Qualified Firestop Contractor Program Requirements."
  - Firestop installers shall have successfully completed the “Cleveland Clinic Firestop Training Program” offered quarterly at the Cleveland Clinic.
Installers shall have completed the Firestop Instructional Training (FIT™) Level 1 examination.

- Completion of the standard Firestop Instructional Training (FIT™) Level 1 training curriculum and examination does not constitute compliance with this requirement.

**Installation**

- Thermal Ceramics Pyroscat Duct Wrap XL shall be installed directly to the grease duct to provide a zero-clearance and 2-hour fire resistance-rated grease duct enclosure as required by IMC 506.3.6 and 506.3.10 and as detailed in UL Listing HNKT.G-18 and tested per ASTM E 2336. Product shall be UL classified and labelled for the application.
  - When required by IMC 506.3.8 for adequate clean out of commercial kitchen grease duct, Thermal Ceramics FastDoor XL Access Doors to be installed by qualified installer as per UL Listing HNKT.G-18.
- Thermal Ceramics PlenumWrap+ shall be installed directly to the plastic pipe or plastic jacketed electrical cable to provide an assembly meeting the ASTM E 84 requirements for materials allowed in return air plenums.
- Thermal Ceramics Pyroscat Duct Wrap XL shall be installed directly to the air duct to provide a 1 or 2 hour fire resistance-rated shaft enclosure alternative per testing to ISO 6944, ASTM E 814 (UL 1479), and ASTM E 84. Product shall be UL classified and labelled for the application.

**Quality Assurance**

- Independent inspection agency employed by the owner, will examine fireproofing in strict accordance with the requirements of the Ohio Building Code section 1704. Where deficiencies are found, remove and reinstall fire rated insulation to comply with requirements of the tested assembly.
  - Perform the tests and inspections of completed work in successive stages.
  - Fire rated insulation will be considered defective if it does not pass tests and inspections.
    - Remove and replace fire rated insulation that does not pass tests and inspections, and retest.
- The Fire & Life Safety Engineer - Cleveland Clinic Department of Planning and Design shall be notified of any existing conditions requiring fire rated insulation that have not been included in the scope of the current project.