

**FCIA
Webinar
Series**

**Fire-Resistive
Ductwork
*Enclosure
Systems***

**Bill McHugh, Executive Director of FCIA
Rich Walke, CTI, Consultant to FCIA**

FCIA – Firestop Contractors International Association



- **Fire Exits??**
- **Thanks to FCIA Members – Dues = Programs!**
 - Firestop Contractors
 - Manufacturers, Consultants
 - Firestop Distributors, Reps, Friends

Welcome, Thanks, From FCIA.....

Firestop Contractors International Association
FREE PDF MOP, SPECIFICATION & Life Safety Digest
for Code Officials, Fire Marshals,
& Specifiers with Design Firms

Info@FCIA.org
www.FCIA.org



FCIA Actions - 2022

- Conferences - HYBRID
 - FCIA ECA @ Nashville, USA – May 18-20
 - FCIA ME @ Doha, Dubai – June 19-25
 - FCIA CAN @ VANCOUVER – Oct. 3-4
 - **FCIA FIC @ Amelia Island, FL – Nov. 2-4**
 - **Webinars – Nov/Dec www.FCIA.org**
- Webinars & Symposiums
- Code Development & Standards Discussions
- Committee Action
- International Discussions
- ***NEW Education for Careers in Firestopping!!***
 - ***FCIA's Firestop Certificate of Achievement & Education Program***

- ***NEW Education for Careers in Firestopping!!***
 - ***FCIA's Firestop Certificate of Achievement***
 - ***4 Levels***
 - ***Level 1 – General Knowledge Certificate***
 - ***Level 2 – In Depth Materials & Systems Certificate***
 - ***Level 3 – SOON***
 - ***Level 4 - SOON***
 - ***Career Path Education***
 - ***FCIA Education Respected Worldwide***

FCIA – Firestop Contractors International Association

- **FREE Life Safety Digest**
- **UL/ULC, FM 4991 Contractor Programs,**
 - DRI's
- **IAS AC 291 Inspection Agency Program**
 - Responsible Individuals / Competence
- **ASTM Inspection Standards – ASTM E2174 & ASTM E2393**
 - *High Rise, Category III & IV, R>250 ('21), NFPA 1, NFPA 101 Appx. & in Specifications Worldwide*
- **Tools @ FCIA.org** for Specifiers, AHJ's, Building Owners, Firestop Contractors & Inspection Agencies
- **Watch FCIA.org for Webinar Announcements!**

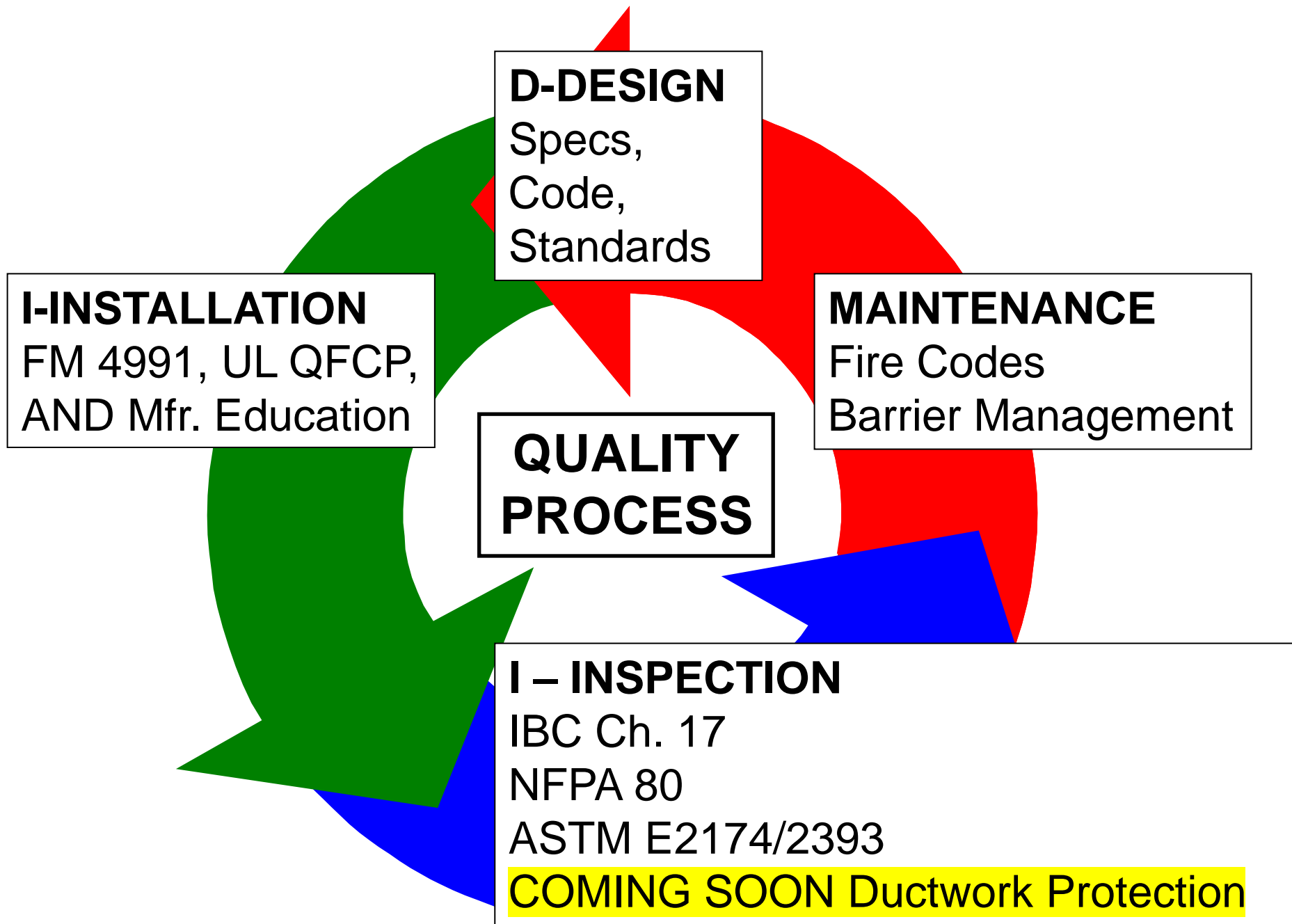


Systems & Materials....



“TOTAL FIRE PROTECTION”

- Effective Compartmentation
 - Fire Barriers, Fire Walls, Floors, Smoke Barriers
 - Firestopping, Fire Dampers, Swinging and Rolling Fire Doors, Fire Rated Glazing
 - Fire-Resistive Protection for Ductwork
- Detection & Alarm Systems
- Sprinkler Suppression Systems
- Education & Egress –
 - Building Owners & Managers, Building Occupants and Firefighters

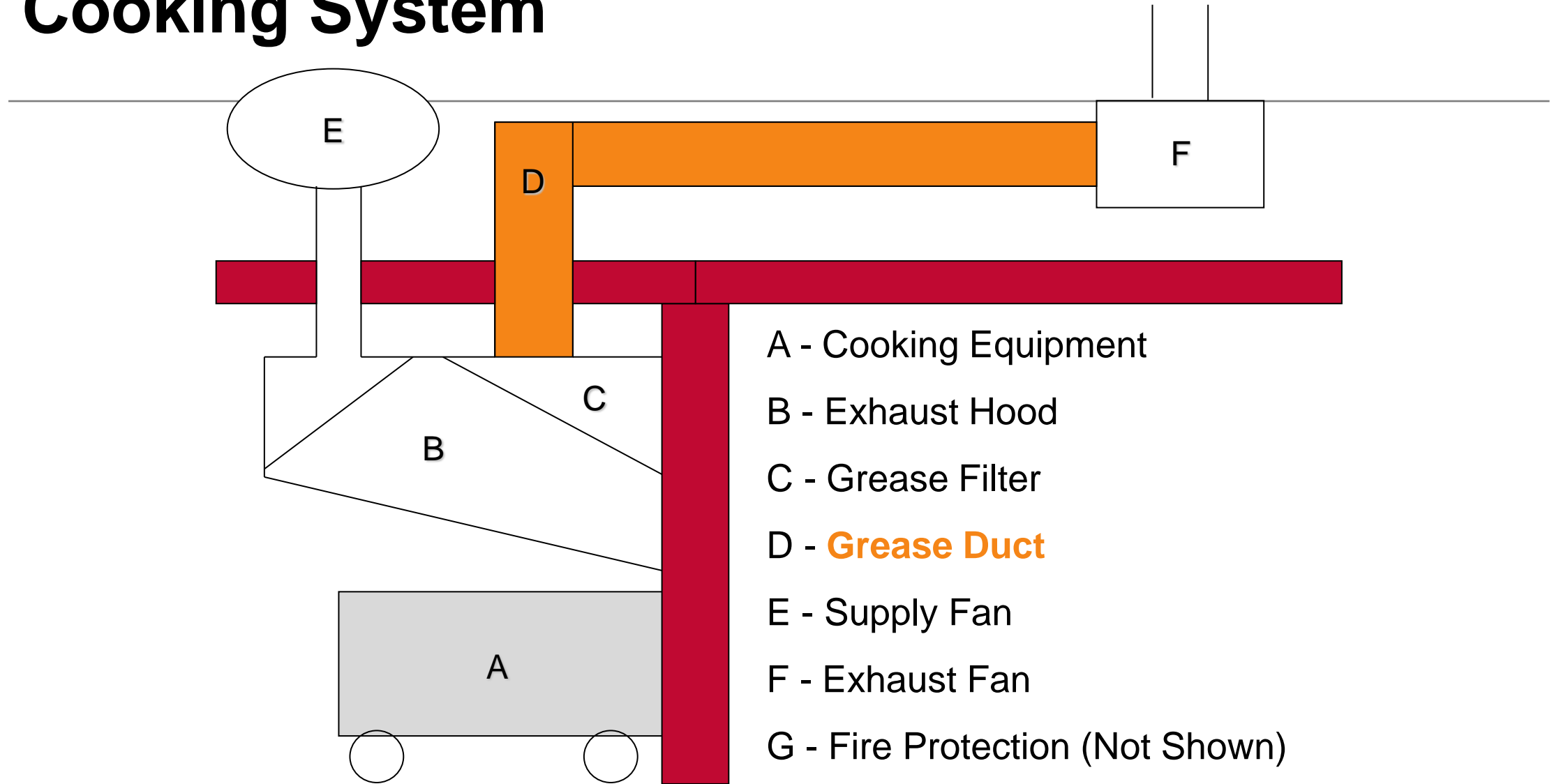


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Cooking System



- A - Cooking Equipment
- B - Exhaust Hood
- C - Grease Filter
- D - **Grease Duct**
- E - Supply Fan
- F - Exhaust Fan
- G - Fire Protection (Not Shown)

The Early Years

- Where a grease duct penetrated a ceiling, wall, floor or any concealed space, the legacy codes and NFPA 96 required the duct be enclosed in a fire-rated enclosure
 - Traditionally that meant a gypsum board shaft enclosure. Issues with shaft enclosures included:
 - Constructability
 - Temperature within enclosure resulted in gypsum board exceeding their maximum working temperature
 - Clearance requirements resulted in large enclosures

The Early Years Cont.

- Thermal Ceramics introduced a new method of protecting grease ducts using ceramic fiber blanket. Challenges included:
 - No code requirements existed
 - No test standard existed
- Thermal Ceramics requested each of the Legacy Code Evaluation Services develop an Acceptance Criteria for duct wrap materials

The Early Years Cont.

- Each Evaluation Service developed their own criteria based on what they judged to be the hazard. The three criteria were conceptually similar, but different.
- Criteria addressed the following hazards:
 - Flammability of wrap
 - Durability of wrap
 - Internal Grease Duct Fire Test (i.e. grease fire inside duct)
 - Engulfment Fire Test (i.e. external fire exposure)
 - Fire Resistance Test

The Early Years Cont.

- Criteria Developed:
 - **SBCCI-ES** – Evaluation Guide on Fire Resistance Construction (Flexible Duct Wrap Enclosure Systems)
 - **BOCA-ES** – Outline of Code Requirements & Evaluation Criteria – Flexible Grease Duct Enclosures
 - **ICBO-ES** – AC101 – Acceptance Criteria for Grease Duct Enclosure Assemblies

The Early Years Cont.

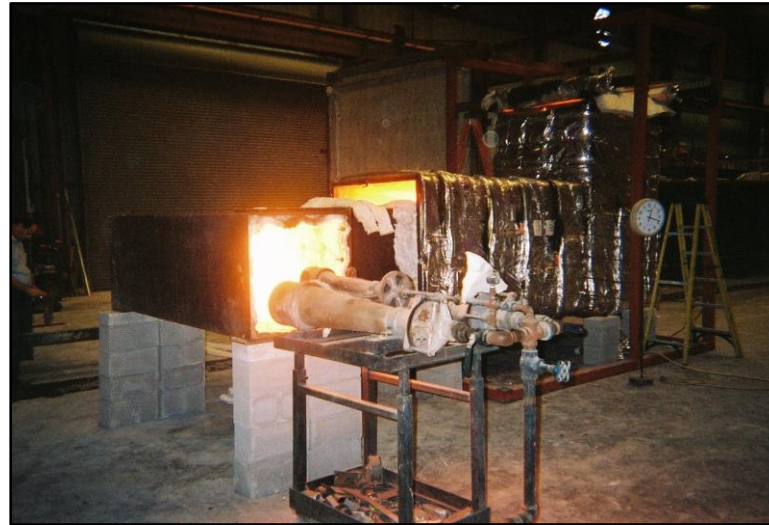
- Different test procedures, in particular the internal fire test, led to difference installation requirements:
 - SBCCI-ES and BOCA-ES Criteria – One layer of 1-1/2 in. duct wrap
 - ICBO-ES – Two layers of 1-1/2 in. duct wrap

The Early Years Cont.

- Differences led Industry, UL, OPL and ASTM to recognize need for a nationally recognized standard
- Two standards ultimately published
 - ASTM E2336 – Standard Test Method for Fire Resistant Grease Duct Enclosure Systems
 - UL 2221 – Standard for Tests of Fire Resistant Grease Duct Enclosure Assemblies

The Early Years Cont.

- ASTM E2336 – Published in 2004
 - Covers duct wrap systems
 - Based on the ICBO-ES Acceptance Criteria
 - Requires two layers of 1-1/2 in. wrap



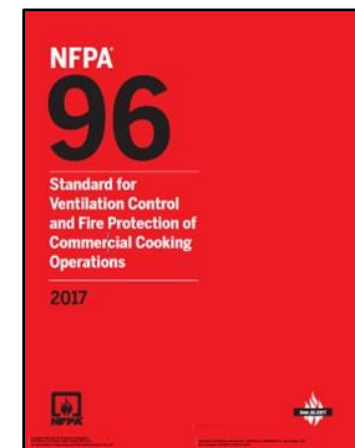
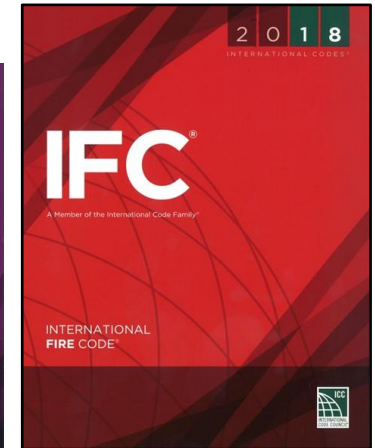
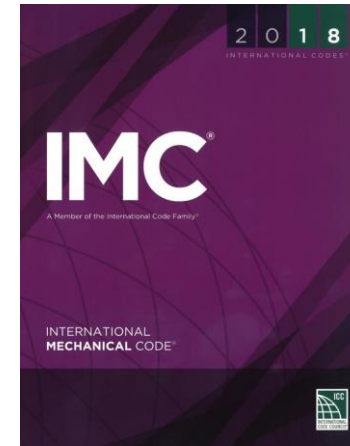
The Early Years Cont.

- UL 2221 – Published in 2001
 - Covers:
 - Duct wrap systems
 - Listed factory-built grease duct assemblies with integral fire protection enclosure



Where Do We Find the Current Code Requirements?

- ICC Codes
 - International Mechanical Code
 - International Fire Code
- NFPA Codes
 - NFPA 96 – Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations
 - NFPA 1 – Fire Code



Grease Duct Requirements

- Corrosion Protection
- Construction
- Support
- Air Velocity within duct
- Separate duct for each Type I hood
- Clearances
- Grease accumulation
- Cleanouts
- Enclosures

Types of Grease Ducts

- Field constructed grease ducts
- Listed factory produced grease ducts (UL 1978)

Field Constructed Grease Ducts (IMC)

- Materials (IMC 506.3.1.1)
 - Min 0.058 in. thick steel
 - Min 0.045 in. thick stainless steel
- Joints and Seams (IMC 506.3.2)
 - Continuous liquid tight weld or braze
- Supports (IMC 506.3.3)
 - Noncombustible
- Clearances (IMC 506.3.6)
 - 18 in. to combustibles
 - 3 in. to noncombustible construction and gypsum board on noncombustible structures

Field Constructed Grease Ducts (NFPA 96)

- Materials (NFPA 96 – 7.5.1)
 - Min 0.060 in. thick steel
 - Min 0.048 in. thick stainless steel
- Joints and Seams (NFPA 96 – 7.5.2)
 - Continuous liquid tight external weld
- Clearances (NFPA 96 – 4.2.1)
 - 18 in. to combustibles
 - 3 in. to limited combustibles
 - 0 in. to non combustibles

Listed Factory Produced Grease Ducts (IMC and NFPA 96)

- Tested and Listed to UL 1978 (YYGQ)
- Installed as specified in installation instructions
 - Joints and seams
 - Support
 - Clearances
 - Fire Resistive Enclosure
 - Etc.

Duct Enclosure Requirements (IMC)

IMC 506.3.11 Grease duct enclosures.

- Duct serving Type I hood which penetrates a ceiling, wall, floor or any concealed space shall be enclosed with fire rated enclosure
- Each enclosure shall serve only single grease exhaust duct system

Duct Enclosure Requirements Cont. (IMC)

- No enclosure required where grease duct penetrates only a non-fire-resistance-rated roof/ceiling assembly
- Duct enclosure shall have a fire-resistance rating of not less than the assembly penetrated, and not less than 1 hr

Types of Duct Enclosures (IMC)

- Fire rated shaft enclosure
 - Shaft to comply with IBC 713
 - 18 in. clearance to combustible construction
 - 6 in. clearance to noncombustible construction and gypsum board on noncombustible structures
- Field-applied grease duct enclosure – Duct Wrap (ASTM E2336)
- Listed factory-built grease duct assemblies with integral fire protection (UL 2221)

Duct Enclosure Requirements (NFPA 96 – 7.7.1)

- Duct which penetrates a vertical fire barrier shall be enclosed with fire rated enclosure
- In buildings of more than one story and in one story buildings where the roof-ceiling is required to be fire resistance rated, duct shall be enclosed with fire rated enclosure
 - Buildings less than 4 stories – 1 hr
 - Buildings 4 stories or more – 2 hr

Duct Enclosure Requirements Cont.

(NFPA 96 – 7.7.1)

- Duct shall be sealed at entrance into enclosure
- No enclosure required where grease duct penetrates only a non-fire-resistance-rated roof/ceiling assembly

Types of Duct Enclosures (NFPA 96 – 4.3 & 7.7.2.2)

- Fire rated shaft enclosure
 - 18 in. clearance to combustible construction
 - 6 in. clearance to noncombustible or limited combustible construction
- Field-applied grease duct enclosure (ASTM E2336)
- Listed factory-built grease duct assemblies with integral fire protection (UL 2221)

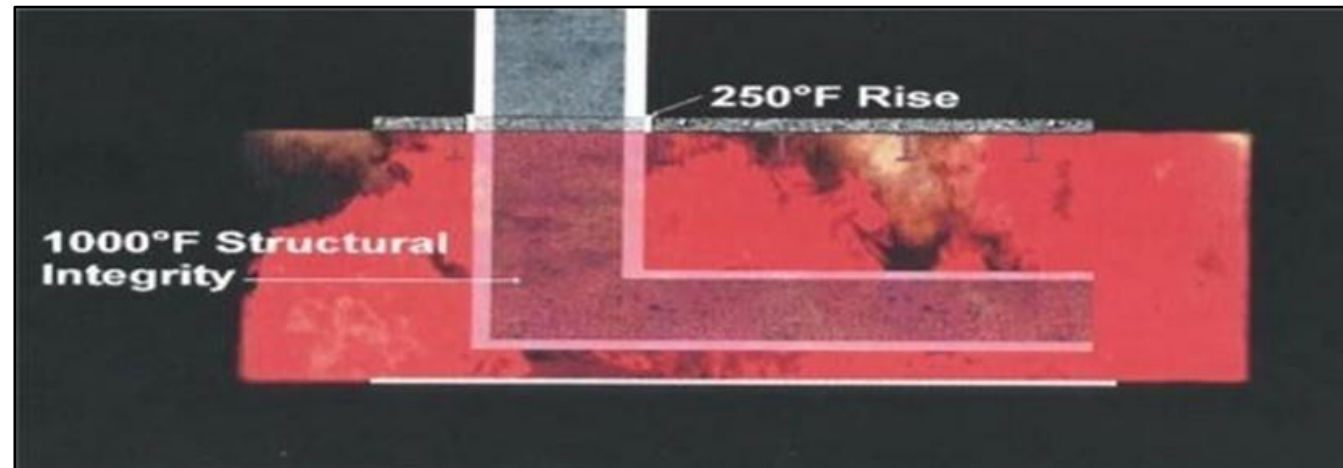
Field-applied Grease Duct Enclosure (Duct Wrap)

- Consists of wrapping field constructed grease duct
- Listed and labeled to ASTM E2336
- Through-penetration firestop system utilized at locations where duct penetrates fire rated construction



Listed Factory-built Grease Duct Assemblies

- Consists of complete unit complying with grease duct and fire-rated enclosure requirements
- Listed and labeled to both UL 1978 and UL 2221
- Through-penetration firestop system utilized at locations where duct penetrates fire rated construction



Where Can I Find The Most Current Listing?

- Directories of the Nationally Recognized Testing Laboratories
 - Intertek Directory of Building Products
 - UL/ULC Product iQ Online Directory

Products become assemblies based on testing!!!

Products installed in assemblies based on mfr's Installation Instructions

INTERTEK DIRECTORY OF BUILDING PRODUCTS

Search and view information on the Directory of Building Products, including Product Listings, Code Compliance Research Reports (CCRRs), Certificates of Compliance (COCs), Quality Assurance, and Industry Programs.

Country: Nothing selected
Company: Nothing selected
Listing Category: Nothing selected
CSI Code: Nothing selected
Standard: Nothing selected
Program: Nothing selected

Keywords: Spec ID:
CCRR #: COC #:
Trade/Brand Name: Design Document:

Limit results to listings with code compliance research reports (CCRRs)
 Limit results to listings with certificates of compliance (COCs)

UL Product iQ™

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Dashboard / Search / THROUGH-PENETRATION FIRESTOP SYSTEMS | UL Product iQ

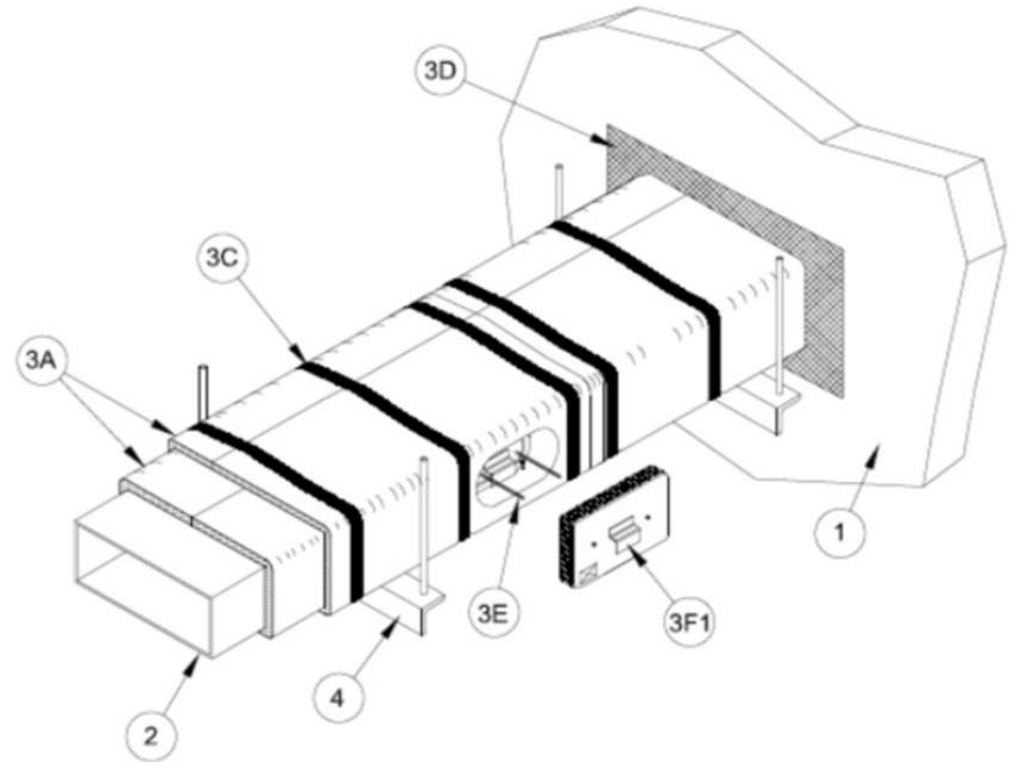
XHEZ.C-AJ-8038 - THROUGH-PENETRATION FIRESTOP SYSTEMS

DETAILS | RESOURCES | TAGS

Field-applied Grease Duct Enclosure Cont.

Assembly No. G-18
Assembly Rating – 2 Hr

1. Concrete Floor or Wall
2. Field Fabricated Grease Duct
- 3A. Duct Wrap
- 3C. Steel Band Straps
- 3D. Firestop System
- 3E/3F1. Access Door
4. Hanger System



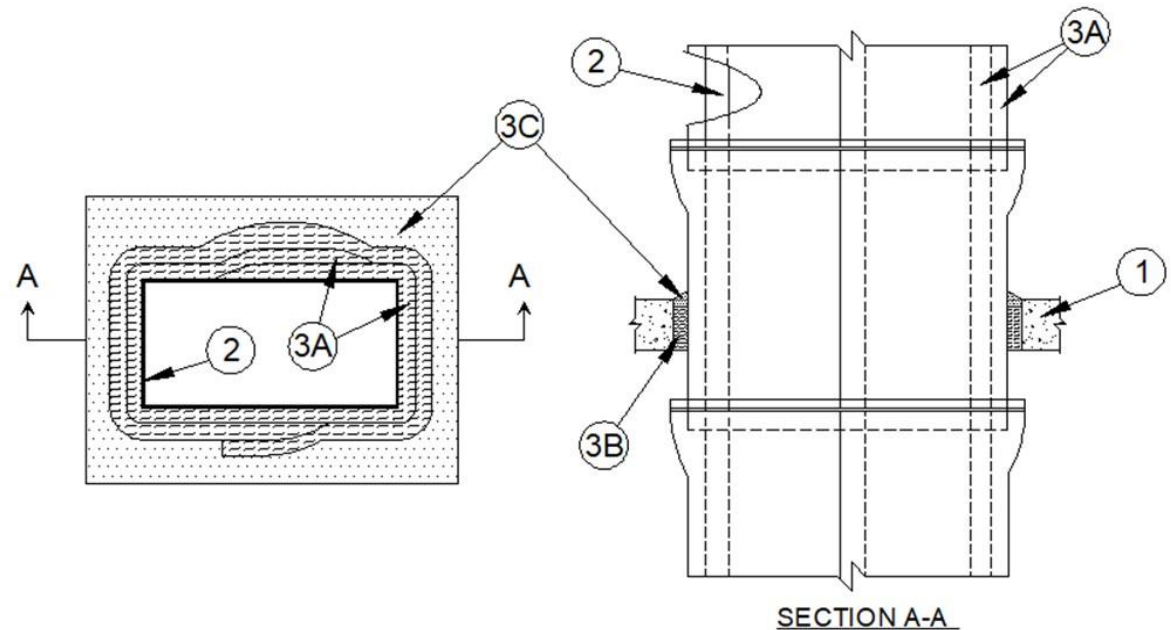
Through-penetration Firestop System at Floor Penetration

System No. C-AJ-7018

F Rating – 2 Hr

T Rating – 2 Hr

1. Concrete Floor or Wall
2. Field Fabricated Steel Grease Duct
- 3A. Duct Wrap
- 3B. Packing Material
- 3C. Caulk/Sealant

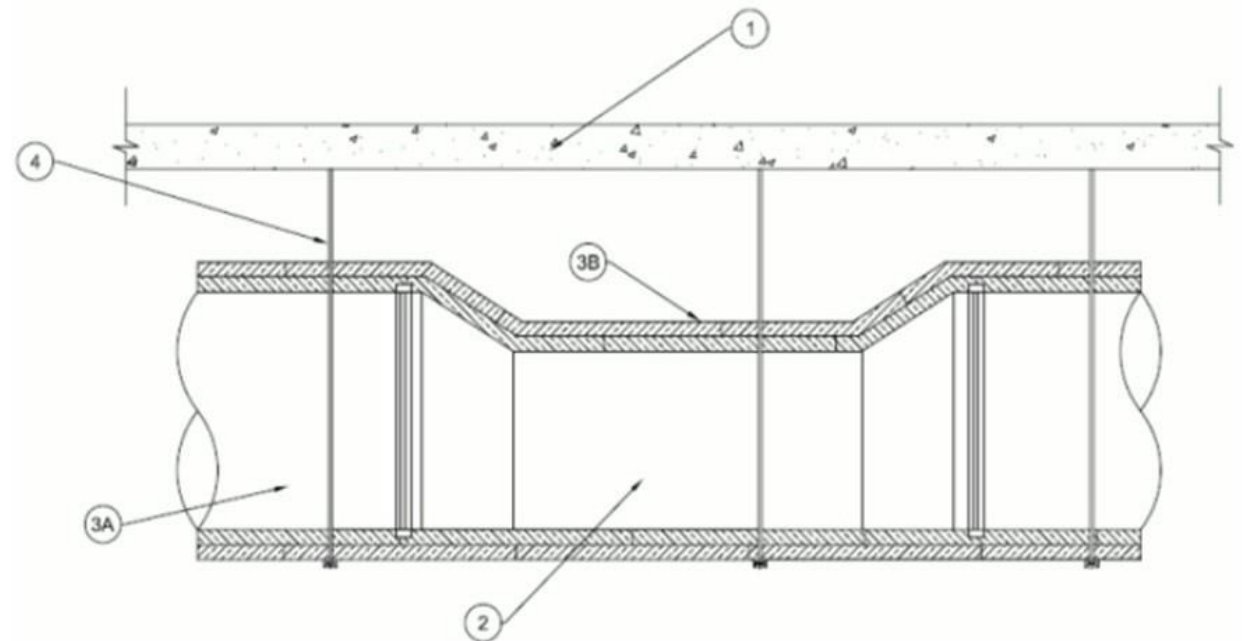


Field-applied Grease Duct Enclosure Cont.

1. Concrete Floor or Wall
2. Field Fabricated Grease Duct
- 3A. Factory Built Grease Duct (UL 1978)
- 3B. Duct Wrap
- 3C. Steel Band Straps
- 3D/3E. Access Door
4. Hanger System

Assembly No. G-21

Assembly Rating – 2 Hr



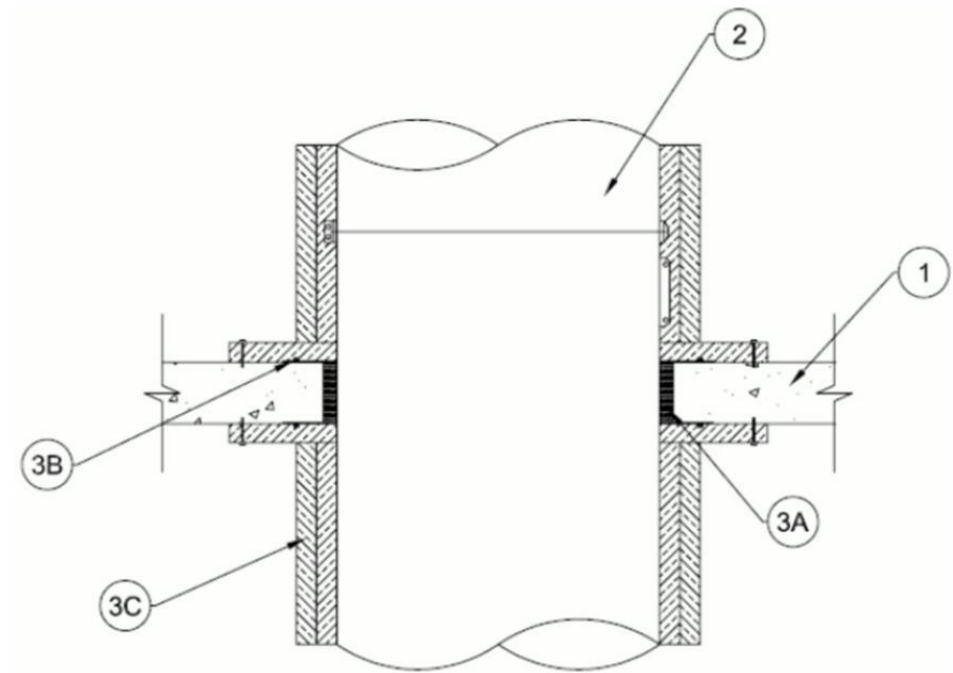
Through-penetration Firestop System at Floor Penetration

System No. C-AJ-7193

F Rating – 2 Hr

T Rating – 2 Hr

1. Concrete Floor or Wall
2. Factory Built Grease Duct (UL 1978)
- 3A. Packing Material
- 3B. Steel Cover Plate
- 3C. Duct Wrap

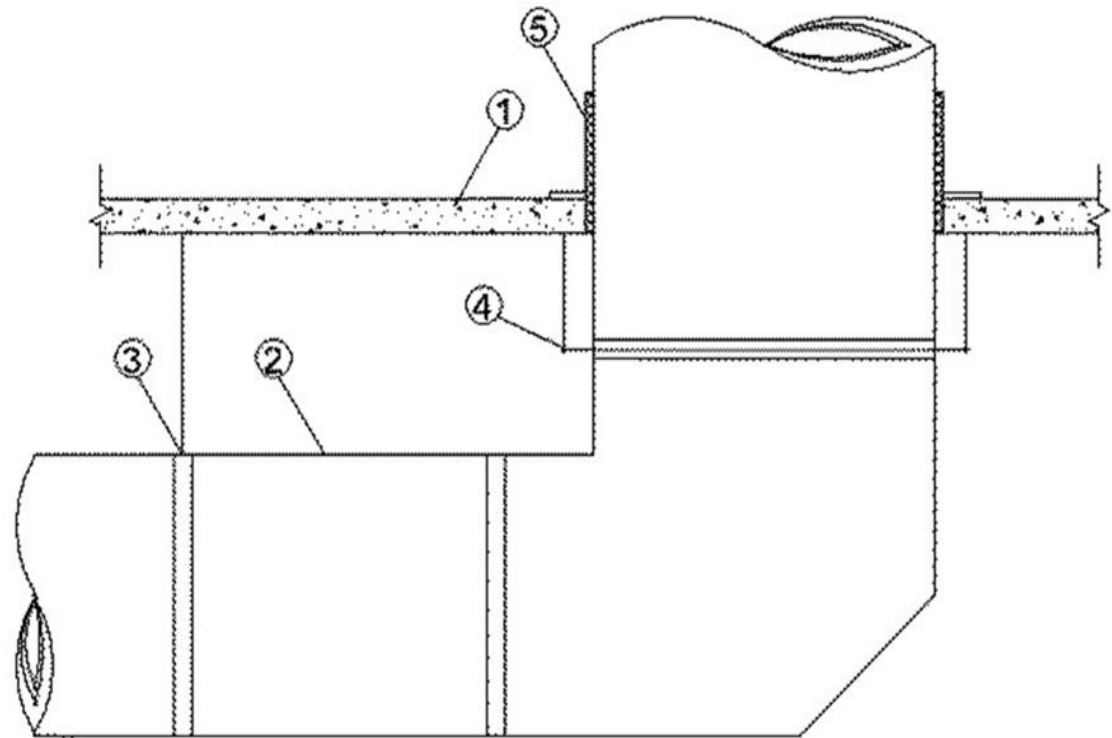


Factory-built Grease Duct Assembly Cont.

Assembly No. G-17

Assembly Ratings – 1 and 2 Hr (See Item 2)

1. Concrete Floor or Wall
2. Factory Built Grease Duct (UL 1978 and UL 2221)
3. Closure Band
4. Hanger System
5. Firestop System



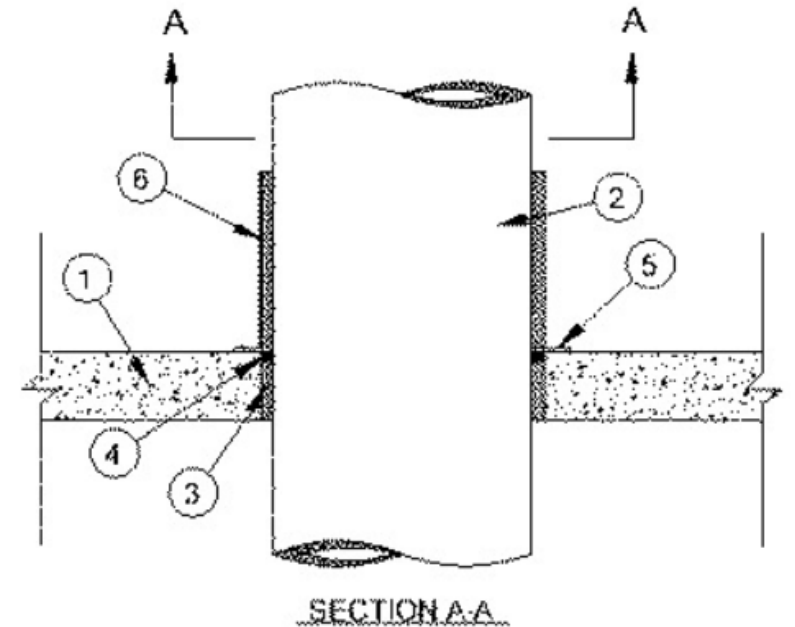
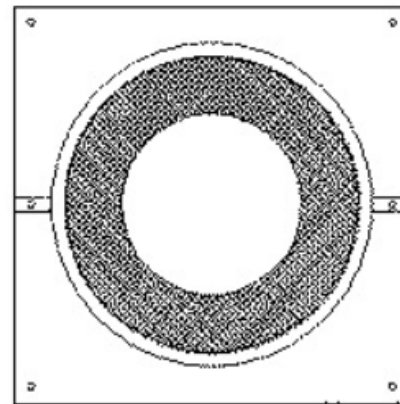
Through-penetration Firestop System at Floor Penetration

System No. C-AJ-7XXX

F Rating – 2 Hr

T Rating – 2 Hr

1. Concrete Floor or Wall
2. Factory Built Grease Duct (UL 1978 and UL 2221)
3. Packing Material
4. Caulk/Sealant
5. Cover Plate
6. Closure Band



Installation Instructions

- **IMC 304.1 General.** Field-applied grease duct enclosure must be installed in accordance with the listing, the mfr's installation instructions and this code. Instructions shall be available on the job site.
- Typical information contained in the installation instructions:
 - Overview of product uses
 - Product features

Installation Instructions Cont.

- Summary of Listings
- Product storage
- Required tools and supplies
- Required method of supporting duct
- Method of applying the two layers of duct wrap
 - Protecting cut edges
 - Method of overlapping or butting adjacent sections
 - Method of staggering joints between layers
 - Method of banding duct wrap around duct

Installation Instructions Cont.

- Pinning of duct wrap if needed
- Two of three sided installations
- Method of protecting access doors
- Method of firestopping protected ducts through rated construction
- Maintenance and repair procedures

Questions??



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