SECTION 08 34 00

FIRE PROTECTIVE SMOKE CURTAINS AND FIRE SHUTTERS

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\*\* NOTE TO SPECIFIER \*\* U.S. Smoke and Fire; fire protective smoke curtains, fire protective fire shutters.  
This section is based on the products of U.S. Smoke and Fire, which is located at:12310 Pinecrest Rd., Suite 300Reston, VA 20191Toll Free Tel: 888-917-8777Fax: 703-716-7301Email: [request info (aeteam@ussmokeandfire.com)](https://arcat.com/rfi?action=email&company=U.S.%252BSmoke%252Band%252BFire&message=RE%253A%2520Spec%2520Question%2520(08348uss)%253A%2520&coid=49264&spec=08348uss&rep=&fax=703-716-7301)  
Web: <http://www.ussmokeandfirecurtain.com>   
 [ [Click Here](https://arcat.com/company/u-s-smoke-and-fire-49264) ] for additional information.  
Scientific innovation allows for design that lifts the spirit, unleashes human potential and transforms our world. Innovation takes many forms and addresses a spectrum of challenges. The power of our breakthrough idea has propelled building smoke and fire safety forward, fueling a more open and impactful design while never compromising life safety. We are at this cross road of change.  
For two decades, we have helped companies and organizations create innovative places. From Ground Zero to Pearl Harbor, we have been entrusted with the most state-of-the-art facilities to the most historic renovations. Our clients select us to make a positive impact with collaborative vision which results in beautiful design and implementation driven by our proven processes and solutions.  
We show designers how to aesthetically protect their interiors with our automatic, gravity fail-safe systems, show contractors that they have more options, show fire protection engineers the simplicity of our approach to life dependency systems and owners the new world order in the economics of fire protective, deployable smoke curtain technology. Our integrated construction process is on time, on point and strives to achieve client references.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete, add items below not required for project.

* + 1. Fire protective vertical smoke curtains, one hour rating.
    2. Fire protective vertical smoke curtains, two hour rating.
    3. Fire protective vertical fixed fabric smoke draft curtains, one hour rating.
    4. Fire protective vertical deployable fabric smoke draft curtains, one hour rating.
    5. Fire protective vertical ICC AC 77 elevator smoke containment curtains, one hour rating.
    6. Fire protective vertical smoke curtains with egress slots, one hour rating.
    7. Fire protective vertical smoke curtains, two hour rating.
    8. Fire protective vertical smoke curtains, three hour rating.
    9. Fire protective vertical smoke curtains with egress slots, two hour rating.
    10. Fire protective vertical smoke curtains with egress slots, three hour rating.
    11. Fire protective vertical accordion smoke curtains for corner conditions with egress, three hour rating.
    12. Fire protective horizontal smoke curtains, two hour rating.
    13. Fire protective horizontal smoke curtains, three hour rating.
    14. Steel- Tex fire shutter, two hour rating.
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 05 50 00 - Metal Fabrications.
    2. Section 28 44 00 - Refrigerant Detection and Alarm.
    3. Section 26 21 00 - Low-Voltage Electrical Service Entrance.
  1. REFERENCES
     1. American National standards Institute (ANSI):
        1. ANSI/ASTM E119 - Standard Tests Methods for Fire Tests of Building Construction and Materials.
     2. International Building Code (IBC):
        1. IBC 715.4 C - Fire Door and Shutter Assemblies.
     3. ICC Evaluation Services
        1. ICC-ES AC77 - Acceptance Criteria for Smoke-Containment Systems Used with Fire-Resistive Doors and Frames.
     4. ASTM International (ASTM):
        1. ASTM A240/240M - Standard Specification for Heat Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels.
        2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials. Calculated smoke developed (CSD) of 2, a smoke developed index (SDI) of 0, and a calculated flame spread (CFS) of 0.
        3. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
     5. National Fire Protection Association (NFPA):
        1. NFPA 3 - Recommended Practice for Commissioning of Fire Protection and Life Safety Systems.
        2. NFPA 70 - National Electrical Code.
        3. NFPA 72 - National Fire Alarm Code.
        4. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
        5. NFPA 92B - Standard for Smoke Management Systems in Malls, Atria, and Large Spaces.
        6. NFPA 101 - Life Safety Code.
        7. NFPA 105 - Recommended Practice for the Installation of Smoke-Control Door Assemblies.
        8. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.
     6. Underwriters Laboratory (UL):
        1. UL 10B - Standard for Fire Tests of Door Assemblies.
        2. UL 10C - Standards for Positive Pressure Fire Door Assemblies.
        3. UL 10D - Standard for Fire Tests of Fire Protective Curtain Assemblies.
        4. UL 263 - Fire Tests of Building Construction and Material.
        5. UL 555 - Standard for Fire Dampers.
        6. UL 864 - Standard for Control Units and Accessories for Fire Alarm Systems.
        7. UL 1784 - Standard for Safety of Air Leakage Tests of Door Assemblies.
     7. California Department of Forestry and Fire Protection and Office of the State Fire Marshal Listing.
  2. SUBMITTALS
     1. Submit under provisions of Section 01 30 00 - Administrative Requirements.

\*\* NOTE TO SPECIFIER \*\* Products can contribute to U.S. Green Building Council (USGBC) - LEED- Pre-Recycled content. Assembled in the United States by factory-trained employees.

* + 1. Product Data: Manufacturer's data sheets on each product to be used, including:
       1. Manufacturer's printed fabrication and installation details and instructions, showing required preparation and installation procedures.
          1. Operating clearances.
          2. Requirements for supporting smoke curtains, track, and equipment.
          3. Locations of equipment components, switches, motors and controls.
          4. Differentiation between manufacturer-installed and field-installed wiring.
       2. Installation methods.
       3. Cleaning operation and maintenance instructions.
       4. Manufacturer's warranty.
       5. Documentation of recycled content.
    2. Verification Samples: For each type of fabric from dye lot to be used for the Work, with specified treatments applied, showing complete pattern and texture repeat, if any. Mark top and face of fabric.
       1. Sample Size: Not less than 36 inches (900 mm) square.
    3. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
    4. Closeout Submittals: Refer to Section 0 17 00 Closeout Submittals.
  1. QUALITY ASSURANCE
     1. Manufacturer shall maintain a quality control program for follow up service in accordance with ICC-ES Acceptance Criteria 77.
     2. Installer Qualifications: Minimum 5 years installing similar assemblies.
        1. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
        2. Installers work has resulted in applications with a record of successful in-service performance.
        3. Certified to ISO 9001 1994 for the design, manufacture, installation and commissioning of Automatic Fire Protective Smoke Barriers and Partitions.
     3. Pre-installation Meeting: Conduct pre-installation meeting on-site two weeks prior to commencement of installation.
  2. DELIVERY, STORAGE, AND HANDLING
     1. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations and industry standards.
     2. Deliver and store assembly materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact. Protect from damage.
  3. PROJECT CONDITIONS
     1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
  4. WARRANTY
     1. Manufacturer's Warranty: Manufacturer's standard warranty document executed by authorized company official.
        1. Warranty one year on motors, motor control circuits (MCC) and group control panels (GCP) from date of Substantial Completion.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: U.S. Smoke and Fire, which is located at:12310 Pinecrest Rd., Suite 300Reston, VA 20191Toll Free Tel: 888-917-8777Fax: 703-716-7301Email: [request info (aeteam@ussmokeandfire.com)](https://arcat.com/rfi?action=email&company=U.S.%252BSmoke%252Band%252BFire&message=RE%253A%2520Spec%2520Question%2520(08348uss)%253A%2520&coid=49264&spec=08348uss&rep=&fax=703-716-7301);Web: <http://www.ussmokeandfirecurtain.com>

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
    2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. FIRE PROTECTIVE VERTICAL SMOKE CURTAINS, ONE HOUR RATING
     1. Basis of Design: SD60 Vertical Smoke Curtain, as manufactured by U.S. Smoke and Fire. Vertical 1 hour rated gravity fail-safe, deployable, and automatic.
        1. Electrically operated automatic smoke containment barrier that provides smoke and fire protection.
        2. Curtain fabric is rolled on a round steel tube in a fire rated assembly. The curtain remains retracted above the finished ceiling by a low voltage system until activated by a fire alarm, smoke alarm or fusible link at which point it descends and creates a smoke and fire barrier.
        3. Standards Compliance:
           1. ANSI/ASTM E119.
           2. ICC-ES AC77:

Approved opening force.

Cyclic force.

Expansion characteristics.

* + - * 1. NFPA 80 Chapter 20.
        2. NFPA 92B.
        3. NFPA 105.
        4. NFPA 701.
        5. UL 10B.
        6. UL 10C.
        7. UL 10D.
        8. UL 555.
        9. UL 864.
      1. Performance Requirements:
         1. One hour rated smoke and fire curtain (UL 10D/ANSI/ASTM E119).
         2. Capable of 2000 cycles at normal ambient temperatures in the range of 32 to 1112 degrees F (0 to 600 degrees C) and can withstand hot air and smoke at temperatures at UL 10B and ANSI/ASTME119 time temperature curves.
         3. Fabric Area Density: Greater than or equal to 0.00077 lbs per sq in (540 grams per sq m) for temperature less than or equal to 1832 degrees F (1000 degrees C) for a period of 1 hr.
         4. Fabric Tensile Strength: Panama weave fabric, greater than or equal with 0.00059 lbs per sq in (415 grams per sq m) glass cloth with a 0.000284 lbs per sq in (20 grams per sq m) micronized aluminum polymer coating on each side of the fabric.
         5. Loads:

Structural Load: 11 lbs per ft (16.370 kg per m).

Structural Load: Unistrut mount 3/8 in (9 mm) threaded rods 48 in (1219 mm) on center- slab mount or to C channel framing.

Electrical Load: 15 amp circuit breaker to one group control panel.

* + - 1. Curtain Head Box Enclosure: 0.047 in (1.2 mm) galvanized steel. Rated at the same temperature as the curtain fabric.

\*\* NOTE TO SPECIFIER \*\* Larger head box enclosures may be required for curtain drops more than 118.12 in (3000 mm). If required, consult the manufacturer for more details.

* + - * 1. Dimensions: For curtain drops up to 118.12 in (3000 mm).

Single Rollers (W x D): 5.91 x 5.91 in (150 x 150 mm).

Length: Up to 216.54 in (5500 mm).

Multiple Rollers (W x D): 9.84 x 5.91 in (250 x 150 mm).

Length: Up to 216.54 in (5500 mm).

* + - 1. Cover Plates: Removable to allow access to the curtain rollers.
      2. Bottom Bar: A weighted bar preventing deflection and ensuring correct gravity operation.
      3. Rollers: Constructed from octagonal tube, incorporating a gearbox, 24 Vdc motor, and sealed heavy-duty ball bearings.
      4. Motor Control Circuit: Housed in a steel enclosure mounted on the motor end of the head box.
      5. Curtain Material: X32K woven glass or C41000WK fiber cloth.
         1. UL Certified: Greater than or equal to one hour.
      6. Operation:
         1. Normal Conditions: Curtains held in retracted position by motors operating at low voltage.

Motor manufacture must confirm motor windings are suitable for normal operation conditions.

* + - * 1. Deployment Initiation: Signal from fire alarm system in an emergency.

Upon Signal: Control panel removes supply voltage. Curtain descends via gravity in a controlled manner.

Dynamic Braking System: Housed in motor control circuit, controls speed of curtain descent.

Electromagnetic force controlled speed of descent to be from 6 to 24 in per sec (152 to 610 mm).

Descent to be electronically synchronized on overlapping curtains with a bottom bar.

* + - * 1. Fail-Safe: System must be proven to "fail-safe" to the operational position on total loss of primary and auxiliary power.

System must include a housed battery system at the Group Control Panels.

* + - * 1. Curtain Retraction: Control panel supplies 24 Vac to motor control circuits. Motors drive curtains to the retracted position.

When bottom bars contact the head box a current limiting circuit steps back voltage and current holding the curtain in retracted position.

Limit switches are not used to control the upper position of the curtain.

* + - * 1. Group Control Panel: Delayed descent system capable of controlling up to 6, 24 Vac motor assemblies.

Normal Operation: Provides 24 Vac supply to motors holding curtain in retracted position. Upon smoke detection, fire alarm contacts in the GCP are opened by the fire alarm control system. The GCP will remove then 24 Vac supply to the motors and curtains will descend under the power of gravity in a controlled manner.

Main Power Failure Mode: Power supply is automatically switched to an integral standby battery and remain fully operational until battery low voltage cut off reads 21 Vac; curtains then safely descend via gravity to the deployed position.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

Building Management System Relay: Remote monitoring in the group control panel to provide BMS contacts for mains failure and curtain zone deployment.

* + - * 1. Test Facilitation: Key switch required.
        2. ICC ES Requirements:

Push to Exit Buttons: Internal battery backup power supply for fail-safe operation.

Two-stage descent option for secondary means of manual egress.

* 1. FIRE PROTECTIVE VERTICAL SMOKE CURTAINS, TWO HOUR RATING
     1. Basis of Design: SD60 Vertical Smoke Curtain, as manufactured by U.S. Smoke and Fire. Vertical 2 hour rated gravity fail-safe, deployable, and automatic.
        1. Electrically operated automatic smoke containment barrier that provides smoke and fire protection.
        2. Curtain fabric is rolled on a round steel tube in a fire rated assembly. The curtain remains retracted above the finished ceiling by a low voltage system until activated by a fire alarm, smoke alarm or fusible link at which point it descends and creates a smoke and fire barrier.
        3. Standards Compliance:
           1. ANSI/ASTM E119.
           2. ICC-ES AC77:

Approved opening force.

Cyclic force.

Expansion characteristics.

* + - * 1. NFPA 80 Chapter 20.
        2. NFPA 92B.
        3. NFPA 105.
        4. NFPA 701.
        5. UL 10B.
        6. UL 10C.
        7. UL 10D.
        8. UL 555.
        9. UL 864.
      1. Performance Requirements:
         1. Two hour fire rating at 1112 degrees F (600 degrees C).
         2. Two hours rated smoke and fire curtain (UL 10D/ANSI/ASTM E119).
         3. Capable of 2000 cycles at normal ambient temperatures in the range of 32 to 1112 degrees F (0 to 600 degrees C) and can withstand hot air and smoke at temperatures at UL 10B and ANSI/ASTME119 time temperature curves.
         4. Fabric Area Density: Greater than or equal to 0.00077 lbs per sq in (540 grams per sq m) for temperature less than or equal to 1832 degrees F (1000 degrees C) for a period of 1 hr.
         5. Fabric Tensile Strength: Panama weave fabric, greater than or equal with 0.00059 lbs per sq in (415 grams per sq m) glass cloth with a 0.000284 lbs per sq in (20 grams per sq m) micronized aluminum polymer coating on each side of the fabric.
         6. Loads:

Structural Load: 11 lbs per ft (16.370 kg per m).

Structural Load: Unistrut mount 3/8 in (9 mm) threaded rods 48 in (1219 mm) on center- slab mount or to C channel framing.

Electrical Load: 15 amp circuit breaker to one group control panel.

* + - 1. Curtain Head Box Enclosure: 0.047 in (1.2 mm) galvanized steel. Rated at the same temperature as the curtain fabric.

\*\* NOTE TO SPECIFIER \*\* Larger head box enclosures may be required for curtain drops more than 118.12 in (3000 mm). If required, consult the manufacturer for more details.

* + - * 1. Dimensions: For curtain drops up to 118.12 in (3000 mm).

Single Rollers (W x D): 5.91 x 5.91 in (150 x 150 mm).

Length: Up to 216.54 in (5500 mm).

Multiple Rollers (W x D): 9.84 x 5.91 in (250 x 150 mm).

Length: Up to 216.54 in (5500 mm).

* + - 1. Cover Plates: Removable to allow access to the curtain rollers.
      2. Bottom Bar: A weighted bar preventing deflection and ensuring correct gravity operation.
      3. Rollers: Constructed from octagonal tube, incorporating a gearbox, 24 Vdc motor, and sealed heavy-duty ball bearings.
      4. Motor Control Circuit: Housed in a steel enclosure mounted on the motor end of the head box.
      5. Curtain Material: X32K woven glass or C41000WK fiber cloth.
         1. UL Certified: Greater than or equal to one hour.
      6. Operation:
         1. Normal Conditions: Curtains held in retracted position by motors operating at low voltage.

Motor manufacture must confirm motor windings are suitable for normal operation conditions.

* + - * 1. Deployment Initiation: Signal from fire alarm system in an emergency.

Upon Signal: Control panel removes supply voltage. Curtain descends via gravity in a controlled manner.

Dynamic Braking System: Housed in motor control circuit, controls speed of curtain descent.

Electromagnetic force controlled speed of descent to be from 6 to 24 in per sec (152 to 610 mm).

Descent to be electronically synchronized on overlapping curtains with a bottom bar.

* + - * 1. Fail-Safe: System must be proven to "fail-safe" to the operational position on total loss of primary and auxiliary power.

System must include a housed battery system at the Group Control Panels.

* + - * 1. Curtain Retraction: Control panel supplies 24 Vac to motor control circuits. Motors drive curtains to the retracted position.

When bottom bars contact the head box a current limiting circuit steps back voltage and current holding the curtain in retracted position.

Limit switches are not used to control the upper position of the curtain.

* + - * 1. Group Control Panel: Delayed descent system capable of controlling up to 6, 24 Vac motor assemblies.

Normal Operation: Provides 24 Vac supply to motors holding curtain in retracted position. Upon smoke detection, fire alarm contacts in the GCP are opened by the fire alarm control system. The GCP will remove then 24 Vac supply to the motors and curtains will descend under the power of gravity in a controlled manner.

Main Power Failure Mode: Power supply is automatically switched to an integral standby battery and remain fully operational until battery low voltage cut off reads 21 Vac; curtains then safely descend via gravity to the deployed position.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

Building Management System Relay: Remote monitoring in the group control panel to provide BMS contacts for mains failure and curtain zone deployment.

* + - * 1. Test Facilitation: Key switch required.
        2. ICC ES Requirements:

Push to Exit Buttons: Internal battery backup power supply for fail-safe operation.

Two-stage descent option for secondary means of manual egress.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. FIRE PROTECTIVE VERTICAL FIXED FABRIC SMOKE DRAFT CURTAINS, ONE HOUR RATING
     1. Basis of Design: SD60 Fixed Fabric Draft Smoke Curtains, as manufactured by U.S. Smoke and Fire, one hour fire rating.
        1. Fire protective smoke curtain system composed of tightly woven glass-fiber fabric fixed to the ceiling structure providing smoke draft control in large open spaces.
        2. Standards Compliance:
           1. ANSI/ASTM E119.
           2. ASTM E84.
           3. ASTM E136.
           4. California Department of Forestry and Fire Protection and Office of the State Fire Marshal: Listed.
           5. NFPA 105.
           6. NFPA 701.
           7. UL 10B.
           8. UL 10C.
           9. UL 10D.
        3. Performance Requirements:
           1. One hour fire and smoke rating, (UL 10D/ANSI/ASTM E119) time temperature curves.
           2. Fabric Area Density: Greater than or equal to 0.00077 lbs per sq in (540 grams per sq m) for temperature less than or equal to 1832 degrees F (1000 degrees C) for a period of 1 hr.
           3. Fabric Tensile Strength: Panama weave fabric, greater than or equal to 0.00059 lbs per sq in (415 grams per sq m) glass cloth.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. FIRE PROTECTIVE VERTICAL DEPLOYABLE FABRIC SMOKE DRAFT CURTAINS, ONE HOUR RATING
     1. Basis of Design: SD60 Deployable Draft Smoke Curtains, as manufactured by U.S. Smoke and Fire. Vertical 1 hour rated gravity fail-safe, deployable, and automatic.
        1. Electrically operated automatic smoke containment barrier that provides smoke and fire protection.
        2. Curtain fabric is rolled on a round steel tube in a fire rated assembly. The curtain remains retracted above the finished ceiling by a low voltage system until activated by a fire alarm, smoke alarm or fusible link at which point it descends and creates a smoke and fire barrier.
        3. Standards Compliance:
           1. ANSI/ASTM E119.
           2. ASTM E84.
           3. ASTM 136.
           4. ICC-ES AC77.

Approved opening force.

Cyclic force.

Expansion characteristics.

* + - * 1. NFPA 80.
        2. NFPA 92B.
        3. NFPA 701.
        4. UL 10B.
        5. UL 10C.
        6. UL 10D.
        7. UL 864.
      1. Performance Requirements:
         1. One hour fire rated at 1112 degrees F (600 degrees C).
         2. One hour rated smoke and fire curtain (UL 10D/ANSI/ASTM E119)
         3. Capable of 2000 cycles at normal ambient temperatures in the range of 32 to 1112 degrees F (0 to 600 degrees C) and can withstand hot air and smoke at temperatures at UL 10B and ANSI/ASTME119 time temperature curves.
         4. Fabric Area Density: Greater than or equal to 0.00077 lbs per sq in (540 grams per sq m) for temperature less than or equal to 1832 degrees F (1000 degrees C) for a period of 1 hr.
         5. Fabric Tensile Strength: Panama weave fabric, greater than or equal with 0.00059 lbs per sq in (415 grams per sq m) glass cloth with a 0.000284 lbs per sq in (20 grams per sq m) micronized aluminum polymer coating on each side of the fabric.
         6. Loads:

Structural Load: 11 lbs per ft (16.370 kg per m).

Structural Load: Unistrut mount 3/8 in (9 mm) threaded rods 48 in (1219 mm) on center- slab mount or to C channel framing.

Electrical Load: 15 amp circuit breaker to one group control panel.

* + - 1. Curtain Head Box Enclosure: 0.047 in (1.2 mm) galvanized steel. Rated at the same temperature as the curtain fabric.

\*\* NOTE TO SPECIFIER \*\* Larger head box enclosures may be required for curtain drops more than (3 m). If required, consult the manufacturer for more details.

* + - * 1. Dimensions: For curtain drops up to 118.12 in (3000 mm).

Single Rollers (W x D): 5.91 x 5.91 in (150 x 150 mm).

Length: Up to 216.54 in (5500 mm).

Multiple Rollers (W x D): 9.84 x 5.91 in (250 x 150 mm).

Length: Up to 216.54 in (5500 mm).

* + - 1. Cover Plates: Removable to allow access to the curtain rollers.
      2. Bottom Bar: A weighted bar preventing deflection and ensuring correct gravity operation.
      3. Roller: Constructed from octagonal tube, incorporating a gearbox, 24 Vdc motor, and sealed heavy-duty ball bearings.
      4. Motor Control Circuit: Housed in a steel enclosure mounted on the motor end of the head box.
      5. Curtain Material: X32K woven glass.
         1. UL Certified: Greater than or equal to one hour.
      6. Operation:
         1. Normal Operation Conditions: Curtains held in retracted position by motors operating at low voltage.

Motor manufacture must confirm motor windings are suitable for normal operation conditions.

* + - * 1. Deployment Initiation: A signal from fire alarm system in an emergency.

Upon Deployment Signal: Control panel removes supply voltage. Curtain descends via gravity in a controlled manner.

Dynamic Braking System: Housed in motor control circuit, controls speed of curtain descent.

Electromagnetic force controlled speed of descent to be from 6 to 24 in per sec (152 to 610 mm).

Descent to be electronically synchronized on overlapping curtains with a bottom bar.

* + - * 1. Fail-Safe: System must be proven to "fail-safe" to the operational position on total loss of primary and auxiliary power.

System must include a housed battery system at the Group Control Panels.

* + - * 1. Curtain Retraction: Control panel supplies 24 Vac to motor control circuits. Motors drive curtains to the retracted position.

When bottom bars contact the head box a current limiting circuit steps back voltage and current holding the curtain in retracted position.

Limit switches are not used to control the upper position of the curtain.

* + - * 1. Group Control Panel: Must have a delayed descent system. Capable of controlling up to 6, 24 Vac motor assemblies.

Normal Operation: Provides 24 Vac supply to motors holding curtain in retracted position. Upon smoke detection, fire alarm contacts in the GCP are opened by the fire alarm control system. The GCP will remove then 24 Vac supply to the motors and curtains will descend under the power of gravity in a controlled manner.

Main Power Failure Mode: Power supply is automatically switched to an integral standby battery and remain fully operational until battery low voltage cut off reads 21 Vac; curtains then safely descend via gravity to the deployed position.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

Building Management System Relay: Remote monitoring in the group control panel to provide BMS contacts for mains failure and curtain zone deployment.

* + - * 1. Test Facilitation: Key switch required.
        2. ICC ES Requirements:

Push to Exit Buttons: Internal battery backup power supply for fail-safe operation.

Two-stage descent option for secondary means of manual egress.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. FIRE PROTECTIVE VERTICAL ICC AC 77 ELEVATOR SMOKE CONTAINMENT CURTAINS, ONE HOUR RATING
     1. Basis of Design: SD60GS ICC AC 77 Elevator Smoke Containment Curtain, as manufactured by U.S. Smoke and Fire. Vertical 1 hour rated gravity fail-safe, deployable, and automatic.
        1. Electrically operated automatic smoke containment barrier that provides smoke and fire protection.
        2. Curtain fabric is rolled on a round steel tube in a fire rated assembly. The curtain remains retracted above the finished ceiling by a low voltage system until activated by a fire alarm, smoke alarm or fusible link at which point it descends and creates a smoke and fire barrier.
        3. Standards Compliance:
           1. ANSI/ASTM E119.
           2. ASTM A240/240M.
           3. ASTM E84.
           4. ASTM 136.
           5. IBC 715.4 C.
           6. California Department of Forestry and Fire Protection and Office of the State Fire Marshal Listing.
           7. ICC-ES AC77:

Approved opening force.

Cyclic force.

Expansion characteristics.

* + - * 1. NFPA 101.
        2. NFPA 105.
        3. NFPA 701.
        4. UL 10B.
        5. UL 10D.
        6. UL 263.
        7. UL 555.
        8. UL 864.
        9. UL 1784.
      1. Performance Requirements:
         1. One hour fire rated at 1800 degrees F (982 degrees C).
         2. One hour rated smoke and fire curtain (UL 10D/ANSI/ASTM E119).
         3. Capable of 2000 cycles at normal ambient temperatures in the range of 32 to 140 degrees F (0 to 60 degrees C) and can withstand hot air and smoke at temperatures at UL 10B and ANSI/ASTME119 Time Temperature curves.
         4. Deployment:

Approximately 8 in per sec (203 mm per sec).

Heavier bottom bar deploys approximately 12 in per sec (305 mm per sec).

* + - * 1. Air Leakage: Not to exceed 3 cu ft per min (0.001416 cu m per sec) per sf of door opening at 0.1 in (25 Pa) water pressure differential at ambient temperature and 400 degrees F (204 degrees C) tested per IBC.
        2. Fabric Area Density: Greater than or equal to 0.0006 lbs per sq in (415 grams per sq m) for temperature less than or equal to 1800 degrees F (982 degrees C) for a period of 1 hr. The fabric is UL 263 listed, UL10D listed, and UL10B tested.
        3. Fabric Tensile Strength: Panama weave fabric, greater than or equal with 0.00059 lbs per sq in (415 grams per sq m) glass cloth with a 0.000284 lbs per sq in (20 grams per sq m) silver polyurethane coating on each side of the fabric.
      1. Curtain Head Box Enclosure: 0.047 in (1.2 mm) galvanized steel. Rated at the same temperature as the curtain fabric.

\*\* NOTE TO SPECIFIER \*\* Larger head box enclosures may be required for curtain drops more than (3 m). If required, consult the manufacturer for more details.

* + - * 1. Dimensions: For curtain drops up to 540 in (13716 mm).

Single or Multiple Rollers (W x D): 5.91 x 5.91 in (150 x 150 mm).

Length: Up to 720 in (18288 mm).

* + - 1. Cover Plates: Removable to allow access to the curtain rollers.
         1. Housing bottom may be exposed and flush with adjacent ceiling, or recessed above ceiling system and concealed.
      2. Bottom Bar: A weighted bar preventing deflection and ensuring correct gravity operation.
      3. Auxiliary Rails: Side guides for curtain.
         1. Material: Galvanized structural steel, any stainless steel per ASTM A 240/240M.
         2. Size: 3-7/8 inches (100 mm) wide; min. 1-7/8 in (50 mm) deep, depth as required to project beyond face of door frame, as shown in Shop Drawings.
         3. When field applied painting is required, it shall match color of the frame unless otherwise specified. Field applied paint must be heat resistant to 300 degrees F (149 degrees C) and be spray applied, maximum 5 mils (0.13 mm) thick including primer.
      4. Rewind Motor: NFPA 70 compliant tubular 24 Vdc motor.
      5. Motor Control Circuit: Housed in a steel enclosure mounted on the motor end of the head box.
      6. Release Mechanism: Comply with UL 864.
      7. Screen Rewind Switch: Include switch to rewind screen into housing.
      8. Curtain Material: Woven glass fiber fabric manufactured from X32K.
         1. UL Certified: One hour.

\*\* NOTE TO SPECIFIER \*\* Optional Delete if not required.

* + - * 1. Method of Egress: Hand lift grab strap for manual egress per section 3.1.1. of ICC-ES AC77.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

* + - * 1. Method of Egress: Split curtain as secondary mean of manual egress per section 3.1.2. of ICC-ES AC77.
        2. Method of Egress: Egress switches on both sides of curtain per ANSI section 3.2.5 of ICS-ES AC 77.
      1. Operation:
         1. Normal Operation Conditions: Curtains held in retracted position by motors operating at low voltage.

Motor manufacture must confirm motor windings are suitable for normal operation conditions.

* + - * 1. Deployment Initiation: A signal from fire alarm system in an emergency.

Upon Deployment Signal: Control panel removes supply voltage. Curtain descends via gravity in a controlled manner.

Dynamic Braking System: Housed in motor control circuit, controls speed of curtain descent.

Electromagnetic force controlled speed of descent to be from 6 to 24 in per sec (152 to 610 mm).

Descent to be electronically synchronized on overlapping curtains with a bottom bar.

* + - * 1. Fail-Safe: System must be proven to "fail-safe" to the operational position on total loss of primary and auxiliary power.

System must include a housed battery system at the Group Control Panels.

* + - * 1. Curtain Retraction: Control panel supplies 24 Vac to motor control circuits. Motors drive curtains to the retracted position.

When bottom bars contact the head box a current limiting circuit steps back voltage and current holding the curtain in retracted position.

Limit switches are not used to control the upper position of the curtain.

* + - * 1. Group Control Panel: Must have a delayed descent system. Capable of controlling up to 5, 24 Vac motor assemblies.

Normal Operation: Provides 24 Vac supply to motors holding curtain in retracted position. Upon smoke detection, fire alarm contacts in the GCP are opened by the fire alarm control system. The GCP will remove then 24 Vac supply to the motors and curtains will descend under the power of gravity in a controlled manner.

Main Power Failure Mode: Power supply is automatically switched to an integral standby battery and remain fully operational until battery low voltage cut off reads 21 Vac; curtains then safely descend via gravity to the deployed position.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

Building Management System Relay: Remote monitoring in the group control panel to provide BMS contacts for mains failure and curtain zone deployment.

* + - * 1. Test Facilitation: Key switch required.
        2. ICC ES Requirements:

Push to Exit Buttons: Internal battery backup power supply for fail-safe operation.

Two-stage descent option for secondary means of manual egress.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. FIRE PROTECTIVE VERTICAL SMOKE CURTAINS WITH EGRESS SLOTS, ONE HOUR RATING
     1. Basis of Design: SD60GS Fire Protective Smoke Containment Curtain with Egress, as manufactured by U.S. Smoke and Fire. Vertical 1 hour rated gravity fail-safe, deployable, and automatic.
        1. Electrically operated automatic smoke containment barrier that provides smoke and fire protection.
        2. Curtain fabric is rolled on a round steel tube in a fire rated assembly. The curtain remains retracted above the finished ceiling by a low voltage system until activated by a fire alarm, smoke alarm or fusible link at which point it descends and creates a smoke and fire barrier.
        3. Standards Compliance:
           1. ANSI/ASTM E119.
           2. ASTM E84.
           3. ASTM 136.
           4. IBC 715.4 C.
           5. ICC-ES AC77:

Approved opening force.

Cyclic force.

Expansion characteristics.

* + - * 1. NFPA 101.
        2. NFPA 105.
        3. UL 10B.
        4. UL 10D.
        5. UL 263.
        6. UL 555.
        7. UL 864.
        8. UL 1784.
      1. Performance Requirements:
         1. One hour fire rated at 1800 degrees F (982 degrees C).
         2. One hour rated smoke and fire curtain (UL 10D/ANSI/ASTM E119).
         3. Capable of 2000 cycles at normal ambient temperatures in the range of 32 to 140 degrees F (0 to 60 degrees C) and can withstand hot air and smoke at temperatures at UL 10B and ANSI/ASTME119 Time Temperature curves.
         4. Deployment:

Approximately 8 in per sec (203 mm per sec).

Heavier bottom bar deploys approximately 12 in per sec (305 mm per sec).

* + - * 1. Fabric Area Density: Greater than or equal to 0.00065 lbs per sq in (455 grams per sq m) for temperature less than or equal to 1800 degrees F (982 degrees C) for a period of 1 hr. The fabric is UL 263 Listed, UL10D listed, UL10B tested.
        2. Fabric Tensile Strength: Panama weave fabric, greater than or equal with 0.00059 lbs per sq in (415 grams per sq m) glass cloth with a 0.000284 lbs per sq in (20 grams per sq m) silver polyurethane coating on each side of the fabric.
      1. Curtain Head Box Enclosure: 0.047 in (1.2 mm) galvanized steel. Rated at the same temperature as the curtain fabric.

\*\* NOTE TO SPECIFIER \*\* Larger head box enclosures may be required for curtain drops more than (3 m). If required, consult the manufacturer for more details.

* + - * 1. Dimensions: For curtain drops up to 540 in (13716 mm).

Single or Multiple Rollers (W x D): 5.91 x 5.91 in (150 x 150 mm).

Length: Up to 720 in (18288 mm).

* + - 1. Cover Plates: Removable to allow access to the curtain rollers.
         1. Housing bottom may be exposed and flush with adjacent ceiling, or recessed above ceiling system and concealed.
      2. Bottom Bar: A weighted bar preventing deflection and ensuring correct gravity operation.
      3. Auxiliary Rails: Side guides for curtain.
         1. Material: Galvanized structural steel, any stainless steel per ASTM A 240/240M.
         2. Size: 3-7/8 inches (100 mm) wide; min. 1-7/8 in (50 mm) deep, depth as required to project beyond face of door frame, as shown in Shop Drawings.
         3. When field applied painting is required, it shall match color of the frame unless otherwise specified. Field applied paint must be heat resistant to 300 degrees F (149 degrees C) and be spray applied, maximum 5 mils (0.13 mm) thick including primer.
      4. Rewind Motor: NFPA 70 compliant tubular 24 Vdc motor.
      5. Motor Control Circuit: Housed in a steel enclosure mounted on the motor end of the head box.
      6. Release Mechanism: Comply with UL 864.
      7. Screen Rewind Switch: Include switch to rewind screen into housing.
      8. Curtain Material: X32K woven glass fiber fabric.
         1. UL Certified: One hour.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

* + - * 1. Method of Egress: Hand lift grab strap for manual egress per section 3.1.1. of ICC-ES AC77.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

* + - * 1. Method of Egress: Split curtain as secondary mean of manual egress per section 3.1.2. of ICC-ES AC77.
        2. Method of Egress: Egress switches on both sides of curtain per ANSI section 3.2.5 of ICC-ES AC77.
      1. Operation:
         1. Normal Operation Conditions: Curtains held in retracted position by motors operating at low voltage.

Motor manufacture must confirm motor windings are suitable for normal operation conditions.

* + - * 1. Deployment Initiation: A signal from fire alarm system in an emergency.

Upon Deployment Signal: Control panel removes supply voltage. Curtain descends via gravity in a controlled manner.

Dynamic Braking System: Housed in motor control circuit, controls speed of curtain descent.

Electromagnetic force controlled speed of descent to be from 6 to 24 in per sec (152 to 610 mm).

Descent to be electronically synchronized on overlapping curtains with a bottom bar.

* + - * 1. Fail-Safe: System must be proven to "fail-safe" to the operational position on total loss of primary and auxiliary power.

System must include a housed battery system at the Group Control Panels.

* + - * 1. Curtain Retraction: Control panel supplies 24 Vac to motor control circuits. Motors drive curtains to the retracted position.

When bottom bars contact the head box a current limiting circuit steps back voltage and current holding the curtain in retracted position.

Limit switches are not used to control the upper position of the curtain.

* + - * 1. Group Control Panel: Must have a delayed descent system. Capable of controlling up to 5, 24 Vac motor assemblies.

Normal Operation: Provides 24 Vac supply to motors holding curtain in retracted position. Upon smoke detection, fire alarm contacts in the GCP are opened by the fire alarm control system. The GCP will remove then 24 Vac supply to the motors and curtains will descend under the power of gravity in a controlled manner.

Main Power Failure Mode: Power supply is automatically switched to an integral standby battery and remain fully operational until battery low voltage cut off reads 21 Vac; curtains then safely descend via gravity to the deployed position.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

Building Management System Relay: Remote monitoring in the group control panel to provide BMS contacts for mains failure and curtain zone deployment.

* + - * 1. Test Facilitation: Key switch required.
        2. ICC ES Requirements:

Push to Exit Buttons: Internal battery backup power supply for fail-safe operation.

Two-stage descent option for secondary means of manual egress.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. FIRE PROTECTIVE VERTICAL SMOKE CURTAINS - TWO HOUR RATING
     1. Basis of Design: SD240GS Fire Protective Smoke Containment Curtain with Egress, as manufactured by U.S. Smoke and Fire. Vertical 2 hour rated gravity fail-safe, deployable, and automatic.
        1. Electrically operated automatic smoke containment barrier that provides smoke and fire protection.
        2. Curtain fabric is rolled on a round steel tube in a fire rated assembly. The curtain remains retracted above the finished ceiling by a low voltage system until activated by a fire alarm, smoke alarm or fusible link at which point it descends and creates a smoke and fire barrier.
        3. Standards Compliance:
           1. ANSI/ASTM E119.
           2. ASTM E84.
           3. ASTM 136.
           4. IBC 715.4 C.
           5. ICC-ES AC77:

Approved opening force.

Cyclic force.

Expansion characteristics.

* + - * 1. NFPA 101.
        2. NFPA 105.
        3. UL 10B.
        4. UL 10C.
        5. UL 10D.
        6. UL 263.
        7. UL 555.
        8. UL 864.
        9. UL 1784.
      1. Performance Requirements:
         1. Three hour fire rated at 1800 degrees F (982 degrees C).
         2. Three hour rated smoke and fire curtain (UL 10D/ANSI/ASTM E119).
         3. Capable of 2000 cycles at normal ambient temperatures in the range of 32 to 140 degrees F (0 to 60 degrees C) and can withstand hot air and smoke at temperatures at UL 10B and ANSI/ASTME119 Time Temperature curves.
         4. Deployment:

Approximately 8 in per sec (203 mm per sec).

Heavier bottom bar deploys approximately 12 in per sec (305 mm per sec).

* + - * 1. Curtain Fabric: Greater than or equal to 0.00094 lbs per sq in (660 grams per sq m) for temperature less than or equal to 1800 degrees F (982 degrees C) for a period of 3 hours. The fabric is UL 263 Listed, UL10D listed, UL10B tested.
        2. Fabric Tensile Strength: Lelnwand weave fabric, greater than or equal with 0.00059 lbs per sq in (415 grams per sq m) glass cloth with a 0.000498 lbs per sq in (35 grams per sq m) silver polyurethane coating on each side of the fabric.
      1. Curtain Head Box Enclosure: 0.047 in (1.2 mm) galvanized steel. Rated at the same temperature as the curtain fabric.

\*\* NOTE TO SPECIFIER \*\* Larger head box enclosures may be required for curtain drops more than (3 m). If required, consult the manufacturer for more details.

* + - * 1. Dimensions: For curtain drops up to 540 in (13716 mm).

Single or Multiple Rollers (W x D): 7.13 x 7.13 in (181 x 181 mm).

Length: Up to 720 in (18288 mm).

* + - 1. Cover Plates: Removable to allow access to the curtain rollers.
         1. Housing bottom may be exposed and flush with adjacent ceiling, or recessed above ceiling system and concealed.
      2. Bottom Bar: A weighted bar preventing deflection and ensuring correct gravity operation.
      3. Auxiliary Rails: Side guides for curtain.
         1. Material: Galvanized structural steel, any stainless steel per ASTM A 240/240M.
         2. Size: 3-7/8 inches (100 mm) wide; min. 1-7/8 in (50 mm) deep, depth as required to project beyond face of door frame, as shown in Shop Drawings.
         3. When field applied painting is required, it shall match color of the frame unless otherwise specified. Field applied paint must be heat resistant to 300 degrees F (149 degrees C) and be spray applied, maximum 5 mils (0.13 mm) thick including primer.
      4. Rewind Motor: NFPA 70 compliant tubular 24 Vdc motor.
      5. Motor Control Circuit: Housed in a steel enclosure mounted on the motor end of the head box.
      6. Release Mechanism: Comply with UL 864.
      7. Screen Rewind Switch: Include switch to rewind screen into housing.
      8. Curtain Material: C41000WK stainless steel wire reinforced, woven glass fiber fabric.
         1. UL Certified: Three hours.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

* + - * 1. Method of Egress: Hand lift grab strap for manual egress per section 3.1.1. of ICC-ES AC77.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

* + - * 1. Method of Egress: Split curtain as secondary mean of manual egress per section 3.1.2. of ICC-ES AC77.
        2. Method of Egress: Egress switches on both sides of curtain per ANSI section 3.2.5 of ICC-ES AC77.
      1. Operation:
         1. Normal Operation Conditions: Curtains held in retracted position by motors operating at low voltage.

Motor manufacture must confirm motor windings are suitable for normal operation conditions.

* + - * 1. Deployment Initiation: A signal from fire alarm system in an emergency.

Upon Deployment Signal: Control panel removes supply voltage. Curtain descends via gravity in a controlled manner.

Dynamic Braking System: Housed in motor control circuit, controls speed of curtain descent.

Electromagnetic force controlled speed of descent to be from 6 to 24 in per sec (152 to 610 mm).

Descent to be electronically synchronized on overlapping curtains with a bottom bar.

* + - * 1. Fail-Safe: System must be proven to "fail-safe" to the operational position on total loss of primary and auxiliary power.

System must include a housed battery system at the Group Control Panels.

* + - * 1. Curtain Retraction: Control panel supplies 24 Vac to motor control circuits. Motors drive curtains to the retracted position.

When bottom bars contact the head box a current limiting circuit steps back voltage and current holding the curtain in retracted position.

Limit switches are not used to control the upper position of the curtain.

* + - * 1. Group Control Panel: Must have a delayed descent system. Capable of controlling up to 5, 24 Vac motor assemblies.

Normal Operation: Provides 24 Vac supply to motors holding curtain in retracted position. Upon smoke detection, fire alarm contacts in the GCP are opened by the fire alarm control system. The GCP will remove then 24 Vac supply to the motors and curtains will descend under the power of gravity in a controlled manner.

Main Power Failure Mode: Power supply is automatically switched to an integral standby battery and remain fully operational until battery low voltage cut off reads 21 Vac; curtains then safely descend via gravity to the deployed position.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

Building Management System Relay: Remote monitoring in the group control panel to provide BMS contacts for mains failure and curtain zone deployment.

* + - * 1. Test Facilitation: Key switch required.
        2. ICC ES Requirements:

Push to Exit Buttons: Internal battery backup power supply for fail-safe operation.

Two-stage descent option for secondary means of manual egress.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. FIRE PROTECTIVE VERTICAL SMOKE CURTAINS - THREE HOUR RATING
     1. Basis of Design: SD240GS Fire Protective Smoke Containment Curtain with Egress, as manufactured by U.S. Smoke and Fire. Vertical 3 hour rated gravity fail-safe, deployable, and automatic.
        1. Electrically operated automatic smoke containment barrier that provides smoke and fire protection.
        2. Curtain fabric is rolled on a round steel tube in a fire rated assembly. The curtain remains retracted above the finished ceiling by a low voltage system until activated by a fire alarm, smoke alarm or fusible link at which point it descends and creates a smoke and fire barrier.
        3. Standards Compliance:
           1. ANSI/ASTM E119.
           2. ASTM E84.
           3. ASTM 136.
           4. IBC 715.4 C.
           5. ICC-ES AC77:

Approved opening force.

Cyclic force.

Expansion characteristics.

* + - * 1. NFPA 101.
        2. NFPA 105.
        3. UL 10B.
        4. UL 10C.
        5. UL 10D.
        6. UL 263.
        7. UL 555.
        8. UL 864.
        9. UL 1784.
      1. Performance Requirements:
         1. Three hour fire rated at 1800 degrees F (982 degrees C).
         2. Three hour rated smoke and fire curtain (UL 10D/ANSI/ASTM E119).
         3. Capable of 2000 cycles at normal ambient temperatures in the range of 32 to 140 degrees F (0 to 60 degrees C) and can withstand hot air and smoke at temperatures at UL 10B and ANSI/ASTME119 Time Temperature curves.
         4. Deployment:

Approximately 8 in per sec (203 mm per sec).

Heavier bottom bar deploys approximately 12 in per sec (305 mm per sec).

* + - * 1. Curtain Fabric: Greater than or equal to 0.00094 lbs per sq in (660 grams per sq m) for temperature less than or equal to 1800 degrees F (982 degrees C) for a period of 3 hours. The fabric is UL 263 Listed, UL10D listed, UL10B tested.
        2. Fabric Tensile Strength: Lelnwand weave fabric, greater than or equal with 0.00059 lbs per sq in (415 grams per sq m) glass cloth with a 0.000498 lbs per sq in (35 grams per sq m) silver polyurethane coating on each side of the fabric.
      1. Curtain Head Box Enclosure: 0.047 in (1.2 mm) galvanized steel. Rated at the same temperature as the curtain fabric.

\*\* NOTE TO SPECIFIER \*\* Larger head box enclosures may be required for curtain drops more than (3 m). If required, consult the manufacturer for more details.

* + - * 1. Dimensions: For curtain drops up to 540 in (13716 mm).

Single or Multiple Rollers (W x D): 7.13 x 7.13 in (181 x 181 mm).

Length: Up to 720 in (18288 mm).

* + - 1. Cover Plates: Removable to allow access to the curtain rollers.
         1. Housing bottom may be exposed and flush with adjacent ceiling, or recessed above ceiling system and concealed.
      2. Bottom Bar: A weighted bar preventing deflection and ensuring correct gravity operation.
      3. Auxiliary Rails: Side guides for curtain.
         1. Material: Galvanized structural steel, any stainless steel per ASTM A 240/240M.
         2. Size: 3-7/8 inches (100 mm) wide; min. 1-7/8 in (50 mm) deep, depth as required to project beyond face of door frame, as shown in Shop Drawings.
         3. When field applied painting is required, it shall match color of the frame unless otherwise specified. Field applied paint must be heat resistant to 300 degrees F (149 degrees C) and be spray applied, maximum 5 mils (0.13 mm) thick including primer.
      4. Rewind Motor: NFPA 70 compliant tubular 24 Vdc motor.
      5. Motor Control Circuit: Housed in a steel enclosure mounted on the motor end of the head box.
      6. Release Mechanism: Comply with UL 864.
      7. Screen Rewind Switch: Include switch to rewind screen into housing.
      8. Curtain Material: C41000WK stainless steel wire reinforced, woven glass fiber fabric.
         1. UL Certified: Three hours.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

* + - * 1. Method of Egress: Hand lift grab strap for manual egress per section 3.1.1. of ICC-ES AC77.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

* + - * 1. Method of Egress: Split curtain as secondary mean of manual egress per section 3.1.2. of ICC-ES AC77.
        2. Method of Egress: Egress switches on both sides of curtain per ANSI section 3.2.5 of ICC-ES AC77.
      1. Operation:
         1. Normal Operation Conditions: Curtains held in retracted position by motors operating at low voltage.

Motor manufacture must confirm motor windings are suitable for normal operation conditions.

* + - * 1. Deployment Initiation: A signal from fire alarm system in an emergency.

Upon Deployment Signal: Control panel removes supply voltage. Curtain descends via gravity in a controlled manner.

Dynamic Braking System: Housed in motor control circuit, controls speed of curtain descent.

Electromagnetic force controlled speed of descent to be from 6 to 24 in per sec (152 to 610 mm).

Descent to be electronically synchronized on overlapping curtains with a bottom bar.

* + - * 1. Fail-Safe: System must be proven to "fail-safe" to the operational position on total loss of primary and auxiliary power.

System must include a housed battery system at the Group Control Panels.

* + - * 1. Curtain Retraction: Control panel supplies 24 Vac to motor control circuits. Motors drive curtains to the retracted position.

When bottom bars contact the head box a current limiting circuit steps back voltage and current holding the curtain in retracted position.

Limit switches are not used to control the upper position of the curtain.

* + - * 1. Group Control Panel: Must have a delayed descent system. Capable of controlling up to 5, 24 Vac motor assemblies.

Normal Operation: Provides 24 Vac supply to motors holding curtain in retracted position. Upon smoke detection, fire alarm contacts in the GCP are opened by the fire alarm control system. The GCP will remove then 24 Vac supply to the motors and curtains will descend under the power of gravity in a controlled manner.

Main Power Failure Mode: Power supply is automatically switched to an integral standby battery and remain fully operational until battery low voltage cut off reads 21 Vac; curtains then safely descend via gravity to the deployed position.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

Building Management System Relay: Remote monitoring in the group control panel to provide BMS contacts for mains failure and curtain zone deployment.

* + - * 1. Test Facilitation: Key switch required.
        2. ICC ES Requirements:

Push to Exit Buttons: Internal battery backup power supply for fail-safe operation.

Two-stage descent option for secondary means of manual egress.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. FIRE PROTECTIVE VERTICAL SMOKE CURTAINS WITH EGRESS SLOTS, TWO HOUR RATING
     1. Basis of Design: SD240GS Fire Protective Smoke Containment Curtain with Egress, as manufactured by U.S. Smoke and Fire. Vertical 2 hour rated gravity fail-safe, deployable, and automatic.
        1. Electrically operated automatic smoke containment barrier that provides smoke and fire protection.
        2. Curtain fabric is rolled on a round steel tube in a fire rated assembly. The curtain remains retracted above the finished ceiling by a low voltage system until activated by a fire alarm, smoke alarm or fusible link at which point it descends and creates a smoke and fire barrier.
        3. Standards Compliance:
           1. ANSI/ASTM E119.
           2. ASTM E84.
           3. ASTM 136.
           4. IBC 715.4 C.
           5. ICC-ES AC77:

Approved opening force.

Cyclic force.

Expansion characteristics.

* + - * 1. NFPA 101.
        2. NFPA 105.
        3. UL 10B.
        4. UL 10C.
        5. UL 10D.
        6. UL 263.
        7. UL 555.
        8. UL 864.
        9. UL 1784.
      1. Performance Requirements:
         1. Three hour Fire rated at 1800 degrees F (982 degrees C).
         2. Three hour rated smoke and fire curtain (UL 10D/ANSI/ASTM E119).
         3. Capable of 2000 cycles at normal ambient temperatures in the range of 32 to 140 degrees F (0 to 60 degrees C) and can withstand hot air and smoke at temperatures at UL 10B and ANSI/ASTME119 Time Temperature curves.
         4. Deployment:

Approximately 8 in per sec (203 mm per sec).

Heavier bottom bar deploys approximately 12 in per sec (305 mm per sec).

* + - * 1. Curtain Fabric: Greater than or equal to 0.00094 lbs per sq in (660 grams per sq m) for temperature less than or equal to 1800 degrees F (982 degrees C) for a period of 3 hours. The fabric is UL 263 Listed, UL10D listed, UL10B tested.
        2. Fabric Tensile Strength: Lelnwand weave fabric, greater than or equal with 0.00059 lbs per sq in (415 grams per sq m) glass cloth with a 0.000498 lbs per sq in (35 grams per sq m) silver polyurethane coating on each side of the fabric.
      1. Curtain Head Box Enclosure: 0.047 in (1.2 mm) galvanized steel. Rated at the same temperature as the curtain fabric.

\*\* NOTE TO SPECIFIER \*\* Larger head box enclosures may be required for curtain drops more than (3 m). If required, consult the manufacturer for more details.

* + - * 1. Dimensions: For curtain drops up to 540 in (13716 mm).

Single or Multiple Rollers (W x D): 7.13 x 7.13 in (181 x 181 mm).

Length: Up to 720 in (18288 mm).

* + - 1. Cover Plates: Removable to allow access to the curtain rollers.
         1. Housing bottom may be exposed and flush with adjacent ceiling, or recessed above ceiling system and concealed.
      2. Bottom Bar: A weighted bar preventing deflection and ensuring correct gravity operation.
      3. Auxiliary Rails: Side guides for curtain.
         1. Material: Galvanized structural steel, any stainless steel per ASTM A 240/240M.
         2. Size: 3-7/8 inches (100 mm) wide; min. 1-7/8 in (50 mm) deep, depth as required to project beyond face of door frame, as shown in Shop Drawings.
         3. When field applied painting is required, it shall match color of the frame unless otherwise specified. Field applied paint must be heat resistant to 300 degrees F (149 degrees C) and be spray applied, maximum 5 mils (0.13 mm) thick including primer.
      4. Rewind Motor: NFPA 70 compliant tubular 24 Vdc motor.
      5. Motor Control Circuit: Housed in a steel enclosure mounted on the motor end of the head box.
      6. Release Mechanism: Comply with UL 864.
      7. Screen Rewind Switch: Include switch to rewind screen into housing.
      8. Curtain Material: C41000WK stainless steel wire reinforced, woven glass fiber fabric.
         1. UL Certified: Three hours.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

* + - * 1. Method of Egress: Hand lift grab strap for manual egress per section 3.1.1. of ICC-ES AC77.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

* + - * 1. Method of Egress: Split curtain as secondary mean of manual egress per section 3.1.2. of ICC-ES AC77.
        2. Method of Egress: Egress switches on both sides of curtain per ANSI section 3.2.5 of ICC-ES AC77.
      1. Operation:
         1. Normal Operation Conditions: Curtains held in retracted position by motors operating at low voltage.

Motor manufacture must confirm motor windings are suitable for normal operation conditions.

* + - * 1. Deployment Initiation: A signal from fire alarm system in an emergency.

Upon Deployment Signal: Control panel removes supply voltage. Curtain descends via gravity in a controlled manner.

Dynamic Braking System: Housed in motor control circuit, controls speed of curtain descent.

Electromagnetic force controlled speed of descent to be from 6 to 24 in per sec (152 to 610 mm).

Descent to be electronically synchronized on overlapping curtains with a bottom bar.

* + - * 1. Fail-Safe: System must be proven to "fail-safe" to the operational position on total loss of primary and auxiliary power.

System must include a housed battery system at the Group Control Panels.

* + - * 1. Curtain Retraction: Control panel supplies 24 Vac to motor control circuits. Motors drive curtains to the retracted position.

When bottom bars contact the head box a current limiting circuit steps back voltage and current holding the curtain in retracted position.

Limit switches are not used to control the upper position of the curtain.

* + - * 1. Group Control Panel: Must have a delayed descent system. Capable of controlling up to 5, 24 Vac motor assemblies.

Normal Operation: Provides 24 Vac supply to motors holding curtain in retracted position. Upon smoke detection, fire alarm contacts in the GCP are opened by the fire alarm control system. The GCP will remove then 24 Vac supply to the motors and curtains will descend under the power of gravity in a controlled manner.

Main Power Failure Mode: Power supply is automatically switched to an integral standby battery and remain fully operational until battery low voltage cut off reads 21 Vac; curtains then safely descend via gravity to the deployed position.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

Building Management System Relay: Remote monitoring in the group control panel to provide BMS contacts for mains failure and curtain zone deployment.

* + - * 1. Test Facilitation: Key switch required.
        2. ICC ES Requirements:

Push to Exit Buttons: Internal battery backup power supply for fail-safe operation.

Two-stage descent option for secondary means of manual egress.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. FIRE PROTECTIVE VERTICAL SMOKE CURTAINS WITH EGRESS SLOTS, THREE HOUR RATING
     1. Basis of Design: SD240GS Fire Protective Smoke Containment Curtain with Egress, as manufactured by U.S. Smoke and Fire. Vertical 3 hour rated gravity fail-safe, deployable, and automatic.
        1. Electrically operated automatic smoke containment barrier that provides smoke and fire protection.
        2. Curtain fabric is rolled on a round steel tube in a fire rated assembly. The curtain remains retracted above the finished ceiling by a low voltage system until activated by a fire alarm, smoke alarm or fusible link at which point it descends and creates a smoke and fire barrier.
        3. Standards Compliance:
           1. ANSI/ASTM E119.
           2. ASTM E84.
           3. ASTM 136.
           4. IBC 715.4 C.
           5. ICC-ES AC77:

Approved opening force.

Cyclic force.

Expansion characteristics.

* + - * 1. NFPA 101.
        2. NFPA 105.
        3. UL 10B.
        4. UL 10C.
        5. UL 10D.
        6. UL 263.
        7. UL 555.
        8. UL 864.
        9. UL 1784.
      1. Performance Requirements:
         1. Three hour Fire rated at 1800 degrees F (982 degrees C).
         2. Three hour rated smoke and fire curtain (UL 10D/ANSI/ASTM E119).
         3. Capable of 2000 cycles at normal ambient temperatures in the range of 32 to 140 degrees F (0 to 60 degrees C) and can withstand hot air and smoke at temperatures at UL 10B and ANSI/ASTME119 Time Temperature curves.
         4. Deployment:

Approximately 8 in per sec (203 mm per sec).

Heavier bottom bar deploys approximately 12 in per sec (305 mm per sec).

* + - * 1. Curtain Fabric: Greater than or equal to 0.00094 lbs per sq in (660 grams per sq m) for temperature less than or equal to 1800 degrees F (982 degrees C) for a period of 3 hours. The fabric is UL 263 Listed, UL10D listed, UL10B tested.
        2. Fabric Tensile Strength: Lelnwand weave fabric, greater than or equal with 0.00059 lbs per sq in (415 grams per sq m) glass cloth with a 0.000498 lbs per sq in (35 grams per sq m) silver polyurethane coating on each side of the fabric.
      1. Curtain Head Box Enclosure: 0.047 in (1.2 mm) galvanized steel. Rated at the same temperature as the curtain fabric.

\*\* NOTE TO SPECIFIER \*\* Larger head box enclosures may be required for curtain drops more than (3 m). If required, consult the manufacturer for more details.

* + - * 1. Dimensions: For curtain drops up to 540 in (13716 mm).

Single or Multiple Rollers (W x D): 7.13 x 7.13 in (181 x 181 mm).

Length: Up to 720 in (18288 mm).

* + - 1. Cover Plates: Removable to allow access to the curtain rollers.
         1. Housing bottom may be exposed and flush with adjacent ceiling, or recessed above ceiling system and concealed.
      2. Bottom Bar: A weighted bar preventing deflection and ensuring correct gravity operation.
      3. Auxiliary Rails: Side guides for curtain.
         1. Material: Galvanized structural steel, any stainless steel per ASTM A 240/240M.
         2. Size: 3-7/8 inches (100 mm) wide; min. 1-7/8 in (50 mm) deep, depth as required to project beyond face of door frame, as shown in Shop Drawings.
         3. When field applied painting is required, it shall match color of the frame unless otherwise specified. Field applied paint must be heat resistant to 300 degrees F (149 degrees C) and be spray applied, maximum 5 mils (0.13 mm) thick including primer.
      4. Rewind Motor: NFPA 70 compliant tubular 24 Vdc motor.
      5. Motor Control Circuit: Housed in a steel enclosure mounted on the motor end of the head box.
      6. Release Mechanism: Comply with UL 864.
      7. Screen Rewind Switch: Include switch to rewind screen into housing.
      8. Curtain Material: C41000WK stainless steel wire reinforced, woven glass fiber fabric.
         1. UL Certified: Three hours.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

* + - * 1. Method of Egress: Hand lift grab strap for manual egress per section 3.1.1. of ICC-ES AC77.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

* + - * 1. Method of Egress: Split curtain as secondary mean of manual egress per section 3.1.2. of ICC-ES AC77.
        2. Method of Egress: Egress switches on both sides of curtain per ANSI section 3.2.5 of ICC-ES AC77.
      1. Operation:
         1. Normal Operation Conditions: Curtains held in retracted position by motors operating at low voltage.

Motor manufacture must confirm motor windings are suitable for normal operation conditions.

* + - * 1. Deployment Initiation: A signal from fire alarm system in an emergency.

Upon Deployment Signal: Control panel removes supply voltage. Curtain descends via gravity in a controlled manner.

Dynamic Braking System: Housed in motor control circuit, controls speed of curtain descent.

Electromagnetic force controlled speed of descent to be from 6 to 24 in per sec (152 to 610 mm).

Descent to be electronically synchronized on overlapping curtains with a bottom bar.

* + - * 1. Fail-Safe: System must be proven to "fail-safe" to the operational position on total loss of primary and auxiliary power.

System must include a housed battery system at the Group Control Panels.

* + - * 1. Curtain Retraction: Control panel supplies 24 Vac to motor control circuits. Motors drive curtains to the retracted position.

When bottom bars contact the head box a current limiting circuit steps back voltage and current holding the curtain in retracted position.

Limit switches are not used to control the upper position of the curtain.

* + - * 1. Group Control Panel: Must have a delayed descent system. Capable of controlling up to 5, 24 Vac motor assemblies.

Normal Operation: Provides 24 Vac supply to motors holding curtain in retracted position. Upon smoke detection, fire alarm contacts in the GCP are opened by the fire alarm control system. The GCP will remove then 24 Vac supply to the motors and curtains will descend under the power of gravity in a controlled manner.

Main Power Failure Mode: Power supply is automatically switched to an integral standby battery and remain fully operational until battery low voltage cut off reads 21 Vac; curtains then safely descend via gravity to the deployed position.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

Building Management System Relay: Remote monitoring in the group control panel to provide BMS contacts for mains failure and curtain zone deployment.

* + - * 1. Test Facilitation: Key switch required.
        2. ICC ES Requirements:

Push to Exit Buttons: Internal battery backup power supply for fail-safe operation.

Two-stage descent option for secondary means of manual egress.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. FIRE PROTECTIVE VERTICAL ACCORDION SMOKE CURTAINS FOR CORNER CONDITIONS WITH EGRESS - THREE HOUR RATING
     1. Basis of Design: SD240A Fire Protective Accordion Smoke Containment Curtains, as manufactured by U.S. Smoke and Fire. 3 hour rated deployable, and automatic.
        1. Electrically operated automatic smoke containment barrier that provides smoke and fire protection.
        2. Curtain fabric is rolled on a round steel tube in a fire rated assembly. The curtain remains retracted above the finished ceiling by a low voltage system until activated by a fire alarm, smoke alarm or fusible link at which point it descends and creates a smoke and fire barrier.
        3. Standards Compliance:
           1. ASTM E84.
           2. ASTM 136.
           3. NFPA 701.
           4. UL 10D.
           5. UL 864.
        4. Performance Requirements:
           1. Three hour rated smoke and fire curtain at 1832 degrees F (1000 degrees C).
           2. Deployment:

Approximately 8 in per sec (203 mm per sec).

Heavier bottom bar deploys approximately 12 in per sec (305 mm per sec).

* + - * 1. Curtain Fabric: UL10D listed.
        2. No corner posts or columns required.
      1. Curtain Head Box Enclosure: 0.047 in (1.2 mm) galvanized steel, up to 15 in (381 mm) deep. Rated at the same temperature as the curtain fabric.

\*\* NOTE TO SPECIFIER \*\* Larger head box enclosures may be required for curtain drops more than (3 m). If required, consult the manufacturer for more details.

* + - 1. Cover Plates: Removable to allow access to the curtain rollers.
      2. Weighted Bottom Tray:
      3. Rewind Motor: NFPA 70 compliant tubular 24 Vdc motor.
      4. Motor Control Circuit: Housed in a steel enclosure mounted on the motor end of the head box.
      5. Release Mechanism: Comply with UL 864.
      6. Screen Rewind Switch: Include switch to rewind screen into housing.
      7. Curtain Material: C41000WK stainless steel wire reinforced, woven glass fiber fabric.
         1. UL Certified: Three hours.
      8. Operation:
         1. Normal Operation Conditions: Curtains held in retracted position by motors operating at low voltage.

Motor manufacture must confirm motor windings are suitable for normal operation conditions.

* + - * 1. Deployment Initiation: A signal from fire alarm system in an emergency.

Upon Deployment Signal: Control panel removes supply voltage. Curtain descends via gravity in a controlled manner.

Dynamic Braking System: Housed in motor control circuit, controls speed of curtain descent.

Electromagnetic force controlled speed of descent to be from 6 to 24 in per sec (152 to 610 mm).

Descent to be electronically synchronized on overlapping curtains with a bottom bar.

* + - * 1. Fail-Safe: System must be proven to "fail-safe" to the operational position on total loss of primary and auxiliary power.

System must include a housed battery system at the Group Control Panels.

* + - * 1. Curtain Retraction: Control panel supplies 24 Vac to motor control circuits. Motors drive curtains to the retracted position.

When bottom bars contact the head box a current limiting circuit steps back voltage and current holding the curtain in retracted position.

Limit switches are not used to control the upper position of the curtain.

* + - * 1. Group Control Panel: Must have a delayed descent system. Capable of controlling up to 6, 24 Vac motor assemblies.

Normal Operation: Provides 24 Vac supply to motors holding curtain in retracted position. Upon smoke detection, fire alarm contacts in the GCP are opened by the fire alarm control system. The GCP will remove then 24 Vac supply to the motors and curtains will descend under the power of gravity in a controlled manner.

Main Power Failure Mode: Power supply is automatically switched to an integral standby battery and remain fully operational until battery low voltage cut off reads 21 Vac; curtains then safely descend via gravity to the deployed position.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

Building Management System Relay: Remote monitoring in the group control panel to provide BMS contacts for mains failure and curtain zone deployment.

* + - * 1. Test Facilitation: Key switch required.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. FIRE PROTECTIVE HORIZONTAL SMOKE CURTAINS - TWO HOUR RATING
     1. Basis of Design: SD240GS Horizontal Fire Protective Smoke Containment Curtain, as manufactured by U.S. Smoke and Fire. 2 hour rated deployable, and automatic.
        1. Electrically operated automatic smoke containment barrier that provides smoke and fire protection.
        2. Curtain fabric is rolled on a round steel tube in a fire rated assembly. The curtain remains retracted above the finished ceiling by a low voltage system until activated by a fire alarm, smoke alarm or fusible link at which point it descends and creates a smoke and fire barrier.
        3. Standards Compliance:
           1. ASTM E84.
           2. ASTM 136.
           3. IBC 715.4 C.
           4. ICC-ES AC77:

Approved opening force.

Cyclic force.

Expansion characteristics.

* + - * 1. NFPA 80.
        2. NFPA 101.
        3. NFPA 105.
        4. UL 10B.
        5. UL 10C.
        6. UL 10D.
        7. UL 864.
        8. UL 1784.
      1. Performance Requirements:
         1. Three hour Fire rated at 1800 degrees F (982 degrees C).
         2. Three hour rated smoke and fire curtain (UL 10D/ANSI/ASTM E119).
         3. Capable of 2000 cycles at normal ambient temperatures in the range of 32 to 140 degrees F (0 to 60 degrees C) and can withstand hot air and smoke at temperatures at UL 10B and ANSI/ASTME119 Time Temperature curves.
         4. Deployment:

Approximately 8 in per sec (203 mm per sec).

Heavier bottom bar deploys approximately 12 in per sec (305 mm per sec).

* + - * 1. Curtain Fabric: Greater than or equal to 0.00094 lbs per sq in (660 grams per sq m) for temperature less than or equal to 1800 degrees F (982 degrees C) for a period of 3 hours. The fabric is UL 263 Listed, UL10D listed, UL10B tested.
        2. Fabric Tensile Strength: Lelnwand weave fabric, greater than or equal with 0.00059 lbs per sq in (415 grams per sq m) glass cloth with a 0.000498 lbs per sq in (35 grams per sq m) silver polyurethane coating on each side of the fabric.
      1. Curtain Head Box Enclosure: 0.047 in (1.2 mm) galvanized steel. Rated at the same temperature as the curtain fabric.

\*\* NOTE TO SPECIFIER \*\* Larger head box enclosures may be required for curtain drops more than (3 m). If required, consult the manufacturer for more details.

* + - * 1. Dimensions: For curtain drops up to 45 ft (13.716 m).

Single Rollers (W x D): 5.91 x 5.91 in (150 x 150 mm).

Length: Up to 216.54 in (5500 mm).

Multiple Rollers (W x D): 9.84 x 5.91 in (250 x 150 mm).

Length: Up to 216.54 in (5500 mm).

* + - 1. Cover Plates: Removable to allow access to the curtain rollers.
         1. Housing bottom may be exposed and flush with adjacent ceiling, or recessed above ceiling system and concealed.
      2. Bottom Bar: A weighted bar preventing deflection and ensuring correct gravity operation.
      3. Auxiliary Rails: Side guides for curtain.
         1. Material: Galvanized structural steel, any stainless steel per ASTM A 240/240M.
         2. Size: 3-7/8 inches (100 mm) wide; min. 1-7/8 in (50 mm) deep, depth as required to project beyond face of door frame, as shown in Shop Drawings.
         3. When field applied painting is required, it shall match color of the frame unless otherwise specified. Field applied paint must be heat resistant to 300 degrees F (149 degrees C) and be spray applied, maximum 5 mils (0.13 mm) thick including primer.
      4. Rewind Motor: NFPA 70 compliant tubular 24 Vdc motor.
      5. Motor Control Circuit: Housed in a steel enclosure mounted on the motor end of the head box.
      6. Release Mechanism: Comply with UL 864.
      7. Screen Rewind Switch: Include switch to rewind screen into housing.
      8. Curtain Material: C41000WK stainless steel wire reinforced, woven glass fiber fabric.
         1. UL Certified: Three hours.
      9. Operation:
         1. Normal Operation Conditions: Curtains held in retracted position by motors operating at low voltage.

Motor manufacture must confirm motor windings are suitable for normal operation conditions.

* + - * 1. Deployment Initiation: A signal from fire alarm system in an emergency.

Upon Deployment Signal: Control panel removes supply voltage. Curtain descends via gravity in a controlled manner.

Dynamic Braking System: Housed in motor control circuit, controls speed of curtain descent.

Electromagnetic force controlled speed of descent to be from 6 to 24 in per sec (152 to 610 mm).

Descent to be electronically synchronized on overlapping curtains with a bottom bar.

* + - * 1. Fail-Safe: System must be proven to "fail-safe" to the operational position on total loss of primary and auxiliary power.

System must include a housed battery system at the Group Control Panels.

* + - * 1. Curtain Retraction: Control panel supplies 24 Vac to motor control circuits. Motors drive curtains to the retracted position.

When bottom bars contact the head box a current limiting circuit steps back voltage and current holding the curtain in retracted position.

Limit switches are not used to control the upper position of the curtain.

* + - * 1. Group Control Panel: Must have a delayed descent system. Capable of controlling up to 5, 24 Vac motor assemblies.

Normal Operation: Provides 24 Vac supply to motors holding curtain in retracted position. Upon smoke detection, fire alarm contacts in the GCP are opened by the fire alarm control system. The GCP will remove then 24 Vac supply to the motors and curtains will descend under the power of gravity in a controlled manner.

Main Power Failure Mode: Power supply is automatically switched to an integral standby battery and remain fully operational until battery low voltage cut off reads 21 Vac; curtains then safely descend via gravity to the deployed position.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

Building Management System Relay: Remote monitoring in the group control panel to provide BMS contacts for mains failure and curtain zone deployment.

* + - * 1. Test Facilitation: Key switch required.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. FIRE PROTECTIVE HORIZONTAL SMOKE CURTAINS - THREE HOUR RATING
     1. Basis of Design: SD240GS Horizontal Fire Protective Smoke Containment Curtain, as manufactured by U.S. Smoke and Fire. 3 hour rated deployable, and automatic.
        1. Electrically operated automatic smoke containment barrier that provides smoke and fire protection.
        2. Curtain fabric is rolled on a round steel tube in a fire rated assembly. The curtain remains retracted above the finished ceiling by a low voltage system until activated by a fire alarm, smoke alarm or fusible link at which point it descends and creates a smoke and fire barrier.
        3. Standards Compliance:
           1. ASTM E84.
           2. ASTM 136.
           3. IBC 715.4 C.
           4. ICC-ES AC77:

Approved opening force.

Cyclic force.

Expansion characteristics.

* + - * 1. NFPA 80.
        2. NFPA 101.
        3. NFPA 105.
        4. UL 10B.
        5. UL 10C.
        6. UL 10D.
        7. UL 864.
        8. UL 1784.
      1. Performance Requirements:
         1. Three hour Fire rated at 1800 degrees F (982 degrees C).
         2. Three hour rated smoke and fire curtain (UL 10D/ANSI/ASTM E119).
         3. Capable of 2000 cycles at normal ambient temperatures in the range of 32 to 140 degrees F (0 to 60 degrees C) and can withstand hot air and smoke at temperatures at UL 10B and ANSI/ASTME119 Time Temperature curves.
         4. Deployment:

Approximately 8 in per sec (203 mm per sec).

Heavier bottom bar deploys approximately 12 in per sec (305 mm per sec).

* + - * 1. Curtain Fabric: Greater than or equal to 0.00094 lbs per sq in (660 grams per sq m) for temperature less than or equal to 1800 degrees F (982 degrees C) for a period of 3 hours. The fabric is UL 263 Listed, UL10D listed, UL10B tested.
        2. Fabric Tensile Strength: Lelnwand weave fabric, greater than or equal with 0.00059 lbs per sq in (415 grams per sq m) glass cloth with a 0.000498 lbs per sq in (35 grams per sq m) silver polyurethane coating on each side of the fabric.
      1. Curtain Head Box Enclosure: 0.047 in (1.2 mm) galvanized steel. Rated at the same temperature as the curtain fabric.

\*\* NOTE TO SPECIFIER \*\* Larger head box enclosures may be required for curtain drops more than (3 m). If required, consult the manufacturer for more details.

* + - * 1. Dimensions: For curtain drops up to 45 ft (13.716 m).

Single Rollers (W x D): 5.91 x 5.91 in (150 x 150 mm).

Length: Up to 216.54 in (5500 mm).

Multiple Rollers (W x D): 9.84 x 5.91 in (250 x 150 mm).

Length: Up to 216.54 in (5500 mm).

* + - 1. Cover Plates: Removable to allow access to the curtain rollers.
         1. Housing bottom may be exposed and flush with adjacent ceiling, or recessed above ceiling system and concealed.
      2. Bottom Bar: A weighted bar preventing deflection and ensuring correct gravity operation.
      3. Auxiliary Rails: Side guides for curtain.
         1. Material: Galvanized structural steel, any stainless steel per ASTM A 240/240M.
         2. Size: 3-7/8 inches (100 mm) wide; min. 1-7/8 in (50 mm) deep, depth as required to project beyond face of door frame, as shown in Shop Drawings.
         3. When field applied painting is required, it shall match color of the frame unless otherwise specified. Field applied paint must be heat resistant to 300 degrees F (149 degrees C) and be spray applied, maximum 5 mils (0.13 mm) thick including primer.
      4. Rewind Motor: NFPA 70 compliant tubular 24 Vdc motor.
      5. Motor Control Circuit: Housed in a steel enclosure mounted on the motor end of the head box.
      6. Release Mechanism: Comply with UL 864.
      7. Screen Rewind Switch: Include switch to rewind screen into housing.
      8. Curtain Material: C41000WK stainless steel wire reinforced, woven glass fiber fabric.
         1. UL Certified: Three hours.
      9. Operation:
         1. Normal Operation Conditions: Curtains held in retracted position by motors operating at low voltage.

Motor manufacture must confirm motor windings are suitable for normal operation conditions.

* + - * 1. Deployment Initiation: A signal from fire alarm system in an emergency.

Upon Deployment Signal: Control panel removes supply voltage. Curtain descends via gravity in a controlled manner.

Dynamic Braking System: Housed in motor control circuit, controls speed of curtain descent.

Electromagnetic force controlled speed of descent to be from 6 to 24 in per sec (152 to 610 mm).

Descent to be electronically synchronized on overlapping curtains with a bottom bar.

* + - * 1. Fail-Safe: System must be proven to "fail-safe" to the operational position on total loss of primary and auxiliary power.

System must include a housed battery system at the Group Control Panels.

* + - * 1. Curtain Retraction: Control panel supplies 24 Vac to motor control circuits. Motors drive curtains to the retracted position.

When bottom bars contact the head box a current limiting circuit steps back voltage and current holding the curtain in retracted position.

Limit switches are not used to control the upper position of the curtain.

* + - * 1. Group Control Panel: Must have a delayed descent system. Capable of controlling up to 5, 24 Vac motor assemblies.

Normal Operation: Provides 24 Vac supply to motors holding curtain in retracted position. Upon smoke detection, fire alarm contacts in the GCP are opened by the fire alarm control system. The GCP will remove then 24 Vac supply to the motors and curtains will descend under the power of gravity in a controlled manner.

Main Power Failure Mode: Power supply is automatically switched to an integral standby battery and remain fully operational until battery low voltage cut off reads 21 Vac; curtains then safely descend via gravity to the deployed position.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

Building Management System Relay: Remote monitoring in the group control panel to provide BMS contacts for mains failure and curtain zone deployment.

* + - * 1. Test Facilitation: Key switch required.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. STEEL- TEX FIRE SHUTTERS (SFS) - TWO HOUR RATING
     1. Basis of Design: Hose Stream 120 as manufactured by U.S. Smoke and Fire.
        1. Standards Compliance:
           1. UL 10B and ASTM E2226 with Hose Stream Test: Fire test of Door Assemblies listed and labeled for two-hour fire wall - 2 hours. Model -Hose Stream 120.
           2. ASTM E 119 (UL 263) listed and labeled assembly with hose stream test for two hour fire wall per IBC 715 table 715.3 for rated assembly rating and in accordance with 903.3.1.1. Model- Dual Hose Stream 120.
           3. Test report by Guardian Fire Testing Laboratories Product listing and Labeling Requirement per ISO 17065 by ANSI Accreditation for Steel-Tex Fire Shutter (SFS). Testing Laboratory to be IAS Accredited, ISO 17025 Compliant. Accredited and meets the requirements of ISO/IEC 17025 as verified by ANAB per Report AT1247.
        2. Performance/Design Criteria:
           1. Head Box: The head box shall be manufactured from 0.047 inch (1.2 mm) galvanized steel. The enclosure shall be rated at the same temperature as the fabric.
           2. Cover Plates: Removable cover plates shall be incorporated to allow access to the curtain rollers.
           3. Sizes: Standard head box sizes shall be 8 x 8 inches (203 x 203 mm) for single rollers and 8 x 12 inches (203 x 305 mm) for multiple rollers. Larger head boxes may be required where the curtain drop is in excess of 15 feet (4572 mm) drop height.
           4. Bottom Bar: A weighted bottom bar shall be provided to prevent deflection and ensure correct operation.
           5. Roller Assembly: The roller shall be constructed from a round tube, which will incorporate Motor and gearbox and a sealed heavy-duty ball bearing assembly.
           6. Motor Controller: A motor control circuit housed in a steel enclosure shall be mounted onto the motor end of the head box.
           7. Steel-Textile: The multi-layer steel-textile shall be manufactured from wire inserted woven glass fiber with two hour coating. The woven wire reinforced high performance multi-layer fiber fabrics with 2 hour coating shall be tested to the standard of UL 10B with hose stream performance for an opening in a two hour fire wall per IBC 715.3 for Hose Stream 120. ASTME 119 standard listed for a two hour fire wall per NFPA 252 for sprinklered building for Dual Hose Stream 120.
           8. Side Guide Assemblies: Each guide assembly shall be fabricated of a steel channel with integral pressure retaining tabs.
           9. Finish: Factory galvanized steel enclosure. Clean all metal surfaces for paint adhesion.
        3. Operation:
           1. The SFS shall deploy upon a signal from the fire alarm system in an emergency situation.
           2. Under normal operating conditions the fabric fire shutter would be held in the retracted position via the motors operating a voltage.
           3. Upon activation of the fire alarm, the controller will remove the supply voltage and the SFS shall descend in a controlled manner. A dynamic braking system housed in the motor control circuit shall control the speed of the descent of the curtain. To retract the SFS the control panel shall supply voltage to the motor controller and motors will drive the fabric fire shutter to the upper position. As the bottom bar or stopping bar hits the shutter housing a current limiting circuit will step back the voltage and current and hold the bottom bar in the retracted position.
           4. Limit switches are not to be used to control the upper position of the curtain.
           5. In the event of power fail to the group control panel, the supply is automatically switched to the integral standby battery. The curtain remains in the housing.
           6. Provide Control Panel (CP). During normal operation, the CP will provide an AC supply to the fabric fire shutter motor holding them in the retracted position. Should smoke be detected, the fire alarm contact in the CP will be opened by the fire alarm control system, the CP will control the descent of the motors and the will descend in a controlled manner.
           7. Open on fire- signal, close on normal mode.

1. EXECUTION
   1. EXAMINATION AND PREPARATION
      1. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
         1. Examine areas and conditions for compliance with requirements; inserts, clips, supporting members, blocking, supports, installation tolerances, clearances, and other conditions affecting the Work.
         2. Verify rough and clear openings and the dimensions of other construction by field measurements before installation and indicate measurements on shop drawings.
         3. Verify capacity of each track and rigging component to support loads.
      2. Do not proceed with installation until substrates have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
      3. Commencement of installation constitutes acceptance of conditions.
   2. INSTALLATION
      1. Install in accordance with manufacturer's written instructions and recommendations as applicable to specified application.
      2. Install products in strict accordance with manufacturer's instructions, and approved submittals.
   3. FIELD QUALITY CONTROL
      1. Fire Alarm Testing: Smoke curtain is to deploy upon a signal from fire alarm in an emergency.
      2. Deployment Verification: Conducted in the presence of the authority having jurisdiction per NFPA guidelines.
         1. In emergencies, the main power supply to control panel may have already failed and cables linking curtains to the control panel may be become damaged. Under these circumstances with no power available the curtain must deploy by gravity.
            1. A total power failure should be simulated during each test ensuring gravity fail-safe deployment.

Tests in which curtains are powered down under normal test conditions from either main power or the battery supply only proves curtain can be deployed when powered.

* + - * 1. Engage a factory-authorized service representative to test system.
    1. Training: Engage a factory-authorized service representative to train Owner's Personnel to rig, adjust, operate, and maintain automatic smoke curtains.
    2. Annual Adjustment, Maintenance and Preventative Maintenance Service: Engage a U.S. Care factory authorized service representative to test, adjust and maintain system once per annum required per NFPA 3 and NFPA 80. Any system that does not undergo the required preventative maintenance over a twelve month period shall void the testing laboratory label on the assembly. No contractor nor end user shall attempt any service of the system. Such action shall void the testing laboratory label on the assembly. All maintenance must be done by a U.S. Care factory certified technician.

END OF SECTION