Marking and Application Guide Doors, Windows and Related Hardware

FIRE, SMOKE, EGRESS, AND RELATED APPLICATIONS

PREFACE

Fire and smoke protection – Building codes rely on fire and smoke protection features to safeguard the public and emergency responders from fire and smoke hazards. One aspect of this protection is based on limiting the movement of fire and smoke through the building using a compartmentation approach (also called the fire area). This includes requiring fire-resistance rated fire walls, fire barriers, fire partitions, smoke barriers, shaft enclosures and fire rated horizontal assemblies to be provided to limit the spread of fire. It also includes requirements designed to limit the movement of smoke through the building using smoke barriers and partitions. This passive protection is an integral part of the overall safety scheme included in the model codes.

An important aspect of limiting the spread of fire and smoke is protecting openings in the fire and smoke rated assemblies that are provided to allow the building to be functional. Opening protective products and systems are provided to protect these openings. These include fire doors and frames, hardware, fire windows and frames, and leakage rated door and window assemblies.

UL certifies a wide range of products and systems that are covered by opening protective requirements in national model building codes. These products and materials create systems, and the applications for which they are certified are covered in detail in this guide. Since some of the products and systems are also certified for use as part of the building's means of egress system, information on this application is also covered in this guide. Doors, windows, and related hardware that have been certified by UL to provide protection against burglary, robbery or theft or for access control are not covered in this guide. More information on those products is located in UL's Product iQ® database under security equipment.

Means of egress – Doors serving a means of egress system are required by national model building and fire codes to meet specific requirements that help provide a continuous and unobstructed path of travel from any occupied portion of a building or structure to a public way. UL certifies doors and hardware that are specifically evaluated for use as part of the means of egress system.

This guide was developed for use by code authorities, architects, engineers, contractors, installers and other interested parties to help them determine how UL Certified opening protectives can be used in code compliant installations.

1. INTRODUCTION

A. USE OF THIS GUIDE

This guide is designed to help users locate, specify or verify UL Certified doors, windows and related hardware to meet applicable national model code requirements for applications including fire and smoke protection, and egress. This guide explains the differences in product certification markings for each application. Additional information on the intended use or limitations that may apply and the standard(s) used to evaluate products under the product category is provided.

A four or five-letter code following each product category in this guide is the UL category code number (CCN), which identifies product categories under which products are certified by UL for the identified application.

Each UL CCN provides a direct link to the published Product Guide Information for the product category which is separate from the information contained in this Marking and Application Guide. The Product Guide Information includes the scope of the products and assemblies covered, information relating to limitations or special conditions applying to the product, the requirements used for the investigation of the products, general installation and use information, and information on product markings and the UL Mark to be used on the product. Product Guide information is available in the UL Product iQ database.

The product markings identified in this Guide do not include every possible marking that could be provided either on a product, product packaging or in its installation instructions, but provides an indication of the type of text and location of markings that address features that may be critical in determining if a product is certified for a particular application. With some applications, UL would recommend that the end user also reference installation standards maintained by industry associations or the NFPA as cited in each Guide (For example: NFPA 80)

B. CERTIFICATION, LISTING AND CLASSIFICATION

National model codes and federal/provincial/territorial regulations may require certain products to be “Listed”, or “Listed and Labeled”. Products that UL has certified for use in applications where “listing” or “listing and labeling” are required in the code include a UL Certified-CA, a ULC Listed, a C-UL Listed, or a C-UL Classified Mark. Collectively, these are referred to by UL in this Guide as marks. Products bearing any of these UL marks comply with the definition of a listed product in the national model codes or Federal/Provincial/Territorial regulations and should be considered to be listed. The latest information about UL marks may be found online at https://marks.ul.com/about/

Note: Throughout this document, when the term UL Certified or UL Mark is used, this encompasses the UL Certified Mark with the geographic identifier “CA”, C-UL Listing or Classification Mark, or the ULC Listing Mark.

The UL Mark on a product means UL has tested and/or evaluated representative samples of that product and determined that they meet the requirements in the applicable standard(s). The production of UL Certified products is periodically audited by UL Staff at the manufacturing facility to verify that the products continue to comply with the applicable requirements in the standard used to evaluate the products.

C. IDENTIFICATION OF UL CERTIFIED PRODUCTS

UL Certified products are eligible to bear one of the following Certification Marks, namely the UL Certified Mark, ULC Mark, C-UL Mark, or C-UL Classification Mark. Refer to the product category guide information for specific marking requirements. Products not bearing a UL Mark are not considered to be UL Certified.

UL CERTIFIED MARK

C-UL LISTING MARK

C-UL CLASSIFICATION MARK

ULC LISTING MARK

D. FIELD EVALUATIONS

You may encounter situations in which you are unable to determine if a product has been listed by a third-party organization. Or in other situations, you might encounter a product bearing a listing label that may have subsequently been modified in the field, and now you question whether or not the product still complies with the applicable standard. UL offers a field evaluation service that provides a method to assist you in making your decision whether to accept the product and/or approve the installation. The field evaluation service is available for the evaluation of doors and frames. Anyone directly involved with a product – including manufacturers, owners, contractors, and regulatory authorities – can request a Field Evaluation. Detailed information for this program can be found on UL's Field Evaluation.

2. OPENING PROTECTIVES

A. FIRE-RESISTANCE RATED GLAZING CERTIFIED FOR CANADA
Fire-resistance rated glazing tested as part of a fire-resistance rated wall assembly in accordance with the Standard Methods of Fire Endurance Tests of Building Construction and Materials, CAN/ULC-S101, is covered under the Fire-resistance Rated Glazing Materials Certified for Canada (CCET7 and CCETC) category. These materials are investigated for use in (BXUV7 and BXUVC) fire-resistance designs. The glazing materials have been investigated for use in specific fire-resistive floor-ceiling, wall and/ or partition constructions with respect to (1) construction details, and (2) maximum size of individual glazing panels, as described in the individual design (BXUV7 and BXUVC). This type of glazing material provides the insulation properties needed to achieve compliance with the CAN/ULC-S101 temperature rise requirements.

Assemblies incorporating fire-resistance rated glazing comply with all of the requirements that a fire-resistance rated wall must meet (e.g. prevent fire transmission, limit elevated unexposed surface temperatures and withstanding the impact of a hose stream). Therefore, codes do not limit the quantity or the size of the fire-resistance rated glazing that can be used in a wall. These materials typically are much thicker than the common ¼ in. or 3/8 in. thick. fire protection rated products. These materials have not been investigated by UL to determine compliance with safety glazing requirements.

UL Certified fire-resistance rated glazing materials include the word CLASSIFIED above the C-UL symbol, and the manufacturer's identification. The UL Certification marking for fire-resistance rated glazing materials intended for use in fire-resistance rated walls includes an identifier in the form:

W – xxx

Where "W" indicates the glazing meets the wall assembly criteria and "xxx" indicates the fire-resistance rating period in minutes.

ULC Mark

ULC Listed fire-resistance glazing materials include the word "Listed" below or to the side of the ULC symbol and the manufacturers identification. The marking for fire-resistance glazing materials includes the following information:

1. The ULC symbol with the words "LISTED"
2. A control number
3. Product name "Fire-Resistance Glazing Material"

B. FIRE-PROTECTION RATED GLAZING

Fire-protection Rated Glazing Materials Certified for Canada (KCMZ7) are intended for use in fire windows, fire doors and fire door frames with transoms and/or sidelights that are provided with suitable glazing frame members. These products are investigated in accordance with CAN/ULC-S104, Standard Method for Fire Tests of Door Assemblies or in accordance with CAN/ULC-S106, Standard Method for Fire Tests of Window and Glass Block Assemblies. These products are Classified for fire ratings of 20 min, 3/4 hour, 1 hour, 1-1/2 hours, and 3 hours.

Fire-protection rated glazing materials are intended for installation in fire windows, fire doors, and fire door frames with transoms and/or sidelights that are provided with suitable glazing frame members. Unless otherwise indicated in the individual Certifications, these materials have not been investigated by UL to determine compliance with safety glazing requirements.

C-UL Mark

Glazing material markings – UL Certified glazing materials include the UL symbol with the words “CERTIFIED”, “SAFETY” geographic identifier “CA” (when using the Alternate UL Mark, the C-UL symbol with the word “CLASSIFIED” above the UL symbol) and the following information:

1. Fire Protection Rated Glazing Material
2. Manufacturer name or identification

ULC Mark

ULC Listed glazing materials include the word “Listed” below or to the side of the ULC symbol and the manufacturers identification. The marking for glazing materials intended for use in fire doors and fire windows includes the following information:

1. The ULC symbol with the words “LISTED”
2. A control number
3. Product name “Glazing Material”

C. FIRE DOORS

UL certifies fire doors under a variety of different product categories that reflect the type or use of the door and the criteria used to evaluate them. See Appendix A for a complete list of fire door product categories, and the ULC Standards used to certify doors under these categories.

Some fire doors are supplied as complete assemblies, including the frame, hardware and other accessories. In other cases, fire doors are supplied independently from the other components, and are assembled at the job site with the fire door frame, glazing, hardware, and/or other accessories to form a fire door assembly, which provides the degree of fire protection required for the opening.

Fire-protection ratings – Fire doors include a rating of 3, 1-1/2, 1, and ¾ hours, or 20 minutes, which indicates the duration of exposure to fire. For products intended for use in regions outside of North America, fire doors may be rated with a 2-hour rating in accordance with local building practices.

Temperature rise ratings – Some fire doors contain a temperature-rise rating on the Certification Mark. This rating is intended for use in determining compliance with the temperature-rise requirements contained in the National Model Building Codes. The temperature rise refers to the temperature developed on the unexposed face of the door at the end of 30 or 60 minutes of fire exposure. Certification Marks that do not indicate a temperature rise are for doors that develop temperature rises in excess of 250°C during the first 30 minutes of fire exposure on the unexposed surface of the door or have not been evaluated for a temperature rise rating.

Glass lights in fire doors in excess of 0.0064 m^2 shall be fire-resistance rated and shall also be evaluated as a component of the door assembly in accordance with CAN/ULC-S104 where the door is rated for a duration greater than 45 minutes. Doors with glass light panels meeting the size limitations and the rating requirements of the installation code carry the same rating as similar doors without glass light panels.

Glazing materials – Glazing materials covered under the fire door categories are Classified for a fire-protection rating only. The glazing materials are to be installed in the fire doors in accordance with NFPA 80 and the installation instructions provided by the manufacturer of the door, glass light frame or glazing material. See Fire Door Glass Light Frames Certified for Canada (GVVX7) and Fire-protection Rated Glazing Materials Certified for Canada (KCMZ7).

A door prepared at the factory for a glass light may include the glazing members (frame) but normally does not include the glazing itself. When the door is shipped from the factory with an integral glass light frame pre-installed, the frame is considered part of the door construction and will not bear a separate Mark. Glazing materials are usually provided by other than the door manufacturer and are installed at the time of the door installation.

Oversized doors – Freight elevator type, rolling steel type, and sliding or swinging steel-covered composite type, hollow-metal type, metal-clad (Kalamein) type, sheet-metal type and tin-clad type are fire tested up to the sizes recorded in the listings published under their respective product categories. Doors exceeding this size limitation are supplied with a UL Mark for Oversized Fire Door which indicates compliance (except for size), with all requirements for design, materials and construction of the product placed under the oversized program and are based upon the maximum size door that was fire tested.

Similarly, a UL Certification Mark for Passenger Elevator Fire Door Frame Assemblies incorporating a transom panel can be provided when such frame/transom panel assemblies, designed for use with specific Classified Passenger Elevator Fire Doors (GSUX7) and Listed Passenger Elevator Fire Door Hardware (GZKZ7), exceed the maximum heights which have been subjected to Standard Fire Tests. As with the oversize doors described above, prospective users should first ascertain from the code authority whether the oversize frame assembly is acceptable for any given location.

C-UL Mark

Fire door markings – UL certified fire doors include the UL symbol with the words “CERTIFIED”, “SAFETY” geographic identifier “CA” (when using the Alternate UL Mark, the C-UL symbol with the word “CLASSIFIED” above the UL symbol) and the following information:

- Fire door category name (see Appendix A)
- Minimum Latch Throw – (e.g. 12mm (1/2 in), 15.8mm (5/8 in) or 19mm (3/4 in))
- Hourly rating (e.g. 3 HR, 1-1/2 HR, 1 HR, 3/4 HR, or 20 MIN)
- Temperature rise, if established – (e.g. 30 MIN - 250°C (450°F) MAX, 60 MIN - 250°C (450°F) MAX, 30 MIN - 650°F MAX, or no reference to temperature rise when the temperature rise exceeds 250°C at 30 min).)

Installation instructions – Fire doors are intended to be installed in accordance with the installation instructions provided by the manufacturer.

In addition, some manufacturers can furnish doors bearing the notation "FIRE DOOR TO BE EQUIPPED WITH FIRE-EXIT HARDWARE" in lieu of the notation "MINIMUM LATCH THROW: + IN.," as indicated in the individual certifications.

ULC Mark

ULC Listed fire doors include the word “Listed” below or to the side of the ULC symbol and the manufacturers identification. The marking for fire doors includes the following information:

1. The ULC symbol with the words “LISTED”
2. A control number
3. Fire Door category name (See Appendix A)

D. FIRE DOOR AND WINDOW FRAMES

UL fire door and window frames are certified under the Fire Door and Window Frames Certified for Canada (GVTV7) category. This category covers fire door frames, fire window frames, and 20-minute-type door frames. These frames are intended for installation in conjunction with fire doors, hardware, glazing and/or other accessories that together form a fire door assembly or a fire window assembly, which provides the degree of fire protection to the opening. The frames can be constructed from various materials including wood and steel.

Fire door frame and fire window frame Marks include the UL symbol, the word LISTED or CERTIFIED and a description of the certified product. This could include descriptions such as “Fire Door Frame”, “Transom or Sidelight Panel”, “Fire Window Frame (3/4 Hr., 1 Hr. or 1-½ Hr.) Fire Rating”, “Sheet-Metal Mullion for Nonbearing Fire Window Frames” and similar wording. The UL Mark typically describes if the frame includes sidelights and/or transom panels, may include hourly ratings, and may describe if the frame was evaluated without hose stream.

When the UL Mark is stamped into the frame, one of the following abbreviated product identities may be used:

“FDF” in lieu of “Fire Door Frame”
“FDF-L” in lieu of “Fire Door Frame for Lights Rated 3/4 H”
“FDF-P” in lieu of “Fire Door Frame with Panels Rated 1-1/2 H”
“FDF-20” in lieu of “Fire Door Frame Fire Rating 20 Minutes”

ULC Mark

ULC Listed fire doors and window frame include the word “Listed” below or to the side of the ULC symbol and the manufacturers identification. The marking for fire door frame and fire window frame includes the following information:

1. The ULC symbol with the words “LISTED”
2. A control number
3. Door and Window Frame

Installation instructions – Fire door and fire window frames are intended to be installed in accordance with National Model Codes and NFPA 80. Installation instructions are not required to be shipped with frames that are to be installed in accordance with NFPA 80. Installation details other than those specified in NFPA 80 are shipped with the frames. Elevator door frames, wood frames and other special use frames as identified in the individual certifications are intended for installation only in walls of the types shown in the installation instructions accompanying the door or window frame.

Hourly fire-protection ratings – Door frames are intended for use in applications where codes require a minimum hourly rating for the overall door or window assembly. However, frames may or may not be marked with hourly ratings. When combining doors, frames and hardware with different ratings the overall rating of the assembly will be the lesser of the ratings of any of the individual components.

Door frames bearing a UL Mark without an hourly rating and provided with masonry wall anchors can be used in conjunction with fire doors rated up to 3 hours and installed in masonry walls having fire resistance ratings not less than the rating of the door.

Door frames bearing a UL Mark without an hourly rating and provided with steel stud or wood stud anchors can be used in conjunction with fire doors rated up to 1-1/2 hours and installed in steel stud and wood stud walls steel stud cavity walls, steel stud shaft walls and wood stud cavity walls protected with gypsum board, having fire resistance ratings not less than the rating of the door nor more than 2 hours.

Elevator and special use frames – Elevator door frames, frames of the slip-on type, wood frames and other special use frames as identified in the individual certifications are for installation only in the walls of the types shown in the installation instructions accompanying the door frame.

Elevator door frames are intended for use with sliding freight or passenger elevator fire door designs for use in dry wall or masonry shaft construction, as identified in the individual certifications for door frames.

Special frames are constructed of materials other than steel and are intended for use with doors rated less than 3 hours. The hourly ratings for special frames are shown in the individual certifications.

Some special frames are intended for use with Certified fire doors and Certified transom panels of a specific design. These frames and the labeled components are identified in the individual certifications.

Mullions, transom panels and other features – Standard door frames are of the single-unit or three-section type and consist essentially of steel head and jamb members, including hardware reinforcements, wall anchors, door stops, and provisions for anchoring to the floor.

Door frames may be provided with mullions, transom panels, or transom lights. In addition to the steel head and jamb members, these frames should be equipped with a steel mullion, transom bar, steel-covered composite transom panel, and glazing beads. Transom panel frames of standard construction are for use with doors rated up to and including 1-1/2 hours. Transom light frames glazed with labeled glazing material are intended for use with doors rated a max of 3/4 hour.

Some manufacturers can provide labeled transom panel frames for use with doors rated up to and including 3 hours as indicated in the individual certifications. Some manufacturers can provide labeled transom frames with hollow-metal transom panels with or without a transom bar. Transoms of solid construction are for use with doors rated up to and including 1-1/2 hours (unless otherwise noted for 3 hours in the individual certifications). Some manufacturers can provide labeled door frames with side panels or sidelights. Frames with side panels are for use with doors rated up to and including 1-1/2 hours. Frames with sidelights glazed with labeled glazing material are intended for use with doors rated a max of 3/4 hour. Separately Certified and labeled wood or wood composite transom and side panels may also be installed into a labeled steel transom and or sidelight frame when the panels are properly labeled for the rating and application intended.

Double egress frames are intended for use with double egress door designs as identified in the individual certifications.

Oversized frames – Freight elevator, passenger elevator and swing-type fire door frames incorporating transom panels exceeding the heights eligible for certification and which have not been subjected to standard fire tests that are otherwise found to be in compliance (except for size) with all requirements for design, materials and construction can be provided with a Certificate for Oversized Frame Assemblies. These oversized frame assemblies are intended for use with specific certified freight elevator fire doors, passenger elevator fire doors, or swinging fire doors. Code authorities should be consulted as to whether the assembly is acceptable for a specific location. The Oversized Certificate is a label certificate affixed to the assembly.

Window frames – Fire window frames consist of sash and mullions of various designs. Fire window frames are Listed for a 3/4 hour or 20-minute fire rating except as noted in the individual certifications and on the product. The exposed area of individual glazing lights is limited to 0.84 sq m (1296 sq in.) with no dimension to exceed 1374 mm (54 in.) unless otherwise stated in individual certifications.

Fire window frames are intended to be installed in masonry-type walls unless otherwise identified in the individual certification.

Fire window frames intended to be installed in drywall construction and supported directly by a noncombustible floor bear the supplemental marking “Fire Window Frame for Installation on Noncombustible Floor with Base Anchor Provided on Frame.”

Fire window frames intended to be installed above the floor in drywall construction should be installed as specified by the installation instructions provided with the window frame.

The window frame prepared at the factory for the glazing material does not always include the glazing material. Certified glazing material is usually provided by someone other than the window frame manufacturer and installed after installation of the window frame in the building.

F. FIRE DOOR AND WINDOW HARDWARE AND ACCESSORIES

Fire door and window hardware and accessories are certified under a variety of product categories. Hardware includes locks, latches, hinges, electric strikes, flush and surface bolts, viewers and fire exit hardware. Accessories include fire door coordinators, cladding materials, glass light frames, and gasketing and edge sealing materials. Fire door closers, holders and operators are also certified by UL.

Hardware and accessories may be installed at the manufacturer's facility or at the job site. In all cases installation is to be done in accordance with the National Model Codes, NFPA 80, and the manufacturer's installation instructions.

Fire exit hardware – This hardware is intended for use on swinging fire doors to facilitate the safe egress of persons in the case of emergency, as well as provide fire protection for door assemblies. See the Means of Egress Related Door Certifications section for additional information. Only products bearing the UL Certified, C-UL Listed, or the ULC Listed Fire Exit Hardware Label are rated for use on fire door assemblies and should not be confused with UL Certified Panic Hardware Label which is only intended for use on non-rated exit doors.

Gasketing and edge seal materials – These materials are intended for installation on certified fire doors and/or certified fire door frames or in their thresholds. The gasketing material is intended to be installed in accordance with the installation instructions packaged with the material.

Gasketing materials consist of a metal frame or a flexible material, either mechanically secured within a metal frame or housing or applied by means of a pressure-sensitive adhesive to the perimeter of the certified fire door and/or certified fire door frame or installed within their thresholds, as specified in the individual certifications.

The gasketing material may be installed on the certified fire doors at the fire door and/or frame manufacturer's plant or at the job site.

Gasketing materials for fire doors have been investigated only with respect to determination that the materials do not adversely affect the fire rating of fire doors in which they are installed. Gasketing material identified for use at the meeting edges of pairs of doors is not intended to replace the astragal (if required by the door manufacturer) nor to alter the clearance between doors, as specified in NFPA 80, "Fire Doors and Other Opening Protectives," or in the door manufacturer's installation instructions.

3. MEANS OF EGRESS RELATED DOOR CERTIFICATIONS

National Model Code requirements – A key life safety concept in building and life safety codes is providing a means of egress system that allows occupants to safely evacuate a building during an emergency. The means of egress is intended to provide a continuous and unobstructed path of travel from any occupied portion of a building or structure to a public way.

National Model Codes include requirements for doors which serve the means of egress system, which are referred to as exit (egress) doors. Code requirements for exit doors include specific criteria that are not applicable for doors that are not in the means of egress travel path. These include the following:

1. National Model Codes specify the minimum width of door openings, which varies depending on the occupancy or area which they serve, and the maximum length of projections into the clear width.
2. Exit (egress) doors, with some exceptions, are required to be of the pivoted or side-hinged swinging type. In certain types of occupancies, they are also required to swing in the direction of egress travel.
3. National Model Codes include specific requirements for exit door hardware which includes the hardware mounting height, locks and latches, special locking arrangements, and delayed egress locks, and other locking arrangements.
4. To minimize this risk of creating potential crowd crush problems at exit doors through which large numbers of people must pass, panic hardware is required in certain situations. Panic hardware is required to be listed in accordance with the Standard for Egress Door Securing and Releasing Devices, CAN/ULC-S533, and fire exit hardware must be listed in accordance with CAN/ULC-S104 and CAN/ULC-S132. Additional information on panic hardware and CAN/ULC-S132 is included below.

UL certifications – UL certifies the following products for use with doors serving a building's means of egress system. Product category codes are indicated below.

Controlled Exit Panic Devices Certified for Canada (FULA7). This category covers devices intended for mounting on outward swinging exit doors to facilitate the egress of occupants. When the system is activated, it is intended to monitor against unauthorized egress and allow exiting within 15 seconds, (or a maximum of 30 seconds when approved by the code authority). These devices are intended to allow immediate exit in case of power failure or upon activation of an automatic fire alarm system (fail-safe).

Certified products include the C-UL symbol the word LISTED or CERTIFIED, ULC LISTED and Controlled Exit Panic Device.

Exit Locks Certified for Canada (FUQV7) – This category covers locking hardware assemblies intended for mounting on outward swinging doors for the purpose of locking such exit doors against unauthorized egress. These products have not been investigated for a fire resistance classification. Devices so Classified are covered under Hardware Certified for Canada (GWGR7). Exit locks are investigated in accordance with the CAN/ULC-S132 standard for Panic Hardware. UL certified exit locks include the C-UL symbol, LISTED or CERTIFIED, ULC LISTED, and Exit Lock.

Fire Exit Hardware (GXHX7) – This category covers exit hardware devices for swinging fire doors, which are intended to facilitate the safe egress of persons in the case of emergency, as well as provide fire protection for door assemblies. They have been investigated from the standpoint of fire and panic protection.

Fire-exit hardware of the single-point-latch type (mortise or rim devices) with 19 mm (3/4 in.) latch bolts and the vertical rod type (surface mounted or concealed devices) and mullion assemblies are for use on fire doors having a rating up to and including 3 hrs (unless otherwise noted in the individual certifications). In general, fire-exit hardware devices are for use on hollow-metal, composite (steel, wood, or plastic-covered), sheet-metal, wood core and metal-clad (Kalamein), type fire doors. Fire-exit hardware of the single-point-latch type (mortise or rim devices) are intended for use on swinging doors not exceeding 1220 mm (4 ft) in width and 2440 mm (8 ft) in height. Mortise-type fire-exit hardware devices can be used on the active door of doors swinging in pairs in openings not exceeding 2440 (8 ft) in width and 2440 (8 ft) in height (unless otherwise noted in the individual certifications).

Vertical-rod-type exit devices are intended for use on swinging fire doors mounted in pairs, wherein one door of the pair is equipped with a mortise-latch-type exit device. Both doors of a pair may incorporate vertical rod devices as indicated in the individual fire door certifications. See the individual fire door certifications for manufacturers eligible to provide doors swinging in pairs (same direction) equipped with vertical rod devices and without an astragal and double egress doors.

Fire-exit hardware devices are intended to be installed in accordance with the installation instructions packaged with the device. The use of sex bolts or through bolts to mount the devices to the door is required for composite (wood or plastic-covered) and wood-core-type fire doors unless an alternate mounting method is identified in the individual door manufacturer's certifications (and installation instructions). The use of sex bolts to mount the devices to the door is required for steel-covered composite type, sheet-metal type or hollow-metal-type fire doors provided without reinforcements. The use of steel machine screws to mount the devices to the door is required for steel-covered composite type, sheet-metal type or hollow-metal-type fire doors incorporating steel reinforcements.

Doors prepared at the factory for this hardware bear the marking, "Fire Door to be Equipped with Fire Exit Hardware." UL certified fire exit hardware includes the C-UL symbol, LISTED or CERTIFIED or ULC LISTED and Fire Exit Hardware.

Panic Hardware Certified for Canada (FVSR7) – This category covers devices intended for mounting on or integral with outward-swinging doors to facilitate the safe egress of persons in case of emergency. Panic hardware is investigated in accordance with CAN/ULC-S132.

CAN/ULC-S132 requirements cover releasing devices operated by an actuating bar (also referred to as a crossbar or push pad) or actuating paddle for outward-opening doors, designed to facilitate the egress of persons from buildings in the event emergency. Among other criteria CAN/ULC-S132 requires the actuating bar to extend across not less than one half of the width of the door leaf. The actuating paddle is an arm, push plate or paddle which functions as the activating mechanism of an exit lock on the egress side of the door. The active surface of the actuating paddle must be visually and physically distinct from the rest of the device.

UL certified panic hardware includes the C-UL symbol, LISTED or CERTIFIED or ULC LISTED, and Panic Hardware.

Special Locking Arrangements Certified for Canada (FWAX7) – This category covers assemblies intended to be mounted on door frames of outward-swinging exit doors for the purpose of locking such doors against unauthorized egress. These devices are designed to release automatically in case of a power failure or upon activation of an automatic fire-alarm system.

These devices are intended for use in applications where codes regulate special locking arrangements, delayed egress unlocking, access-controlled egress, and electromagnetically locked exit (egress) doors. Refer to individual manufacturer’s certifications to determine the applications for which their products are Listed.

The basic standard used to investigate special locking arrangements is the CAN/ULC-S533 Standard for Egress Door Securing and Releasing Devices. UL certified special locking arrangements include the C-UL symbol, LISTED or CERTIFIED, SECURITY, and Special Locking Arrangement.

4. DOOR AND WINDOW SELECTION AND INSTALLATION

To properly select door and window assemblies, one needs to know and understand the building design criteria, applicable code requirements, and select the appropriate UL Certified products or systems. The following steps provide a systematic approach that can be followed to provide a safe, code compliant installation. This recommended approach can also be used by code authorities during the building plan review and final approval process.

This recommended approach applies primarily to doors, but some of the concepts are also applicable to windows, specifically those intended to restrict the movement of fire and smoke in a building.

1. **Determine the size and location of doors** – A number of factors dictate the number, size and location of doors to be provided in a building. These may be driven by code requirements, the needs of the occupants or by other means.

   Locations – National model codes require doors to be provided in specific locations to protect the door openings. This includes protecting door openings (1) in required fire and smoke rated walls, barriers and partitions, (2) between dwelling units and attached garages, and (3) in various portions of the means of egress system. Besides the locations specified by code requirements, doors are also provided in locations to meet the needs of the building occupants. This includes doors that provide privacy, limit access, isolate equipment, provide security, etc.

   Door sizes – Door sizes are sometimes dictated by code requirements. This is particularly true if the door is located in the means of egress system or is covered by accessibility requirements. The code and building construction documents should be consulted to determine the size and locations of various doors within the building.

2. **Confirm if doors and windows are required to limit the passage of fire or smoke** – The fire safety system embodied in building code requirements is based on the use of walls, barriers and partitions designed to contain fires and the resulting smoke in certain areas within the building. This concept is often referred to as compartmentation (e.g. containing fires within various fire areas). Codes require doors and windows that protect openings in these walls, barriers and partitions to comply with specific ULC standards for safety and performance, and for doors and windows to have certain ratings in order to limit the spread of fire and/or smoke.

   To determine the standards and ratings these doors and windows must meet to comply with National model codes, one first needs to determine if the walls in which they installed are covered by code requirements.

   Fire Walls, Fire Barriers and Fire Partitions

   These are all vertical assemblies designed to restrict the spread of fire in which continuity is maintained. All of these assemblies are required to have a fire-resistance rating. However, the hourly rating, construction, extent of continuity and support for these structures varies.

   Door and window openings in these assemblies are required to be protected in accordance with the opening protective requirements in the code, and they may be limited to a maximum individual size, maximum area and aggregate width.

   Fire door assemblies typically have an hourly fire- protection rating that is nominally less than the corresponding hourly fire-resistance rating of the vertical (wall) assembly in which they are installed. These fire door assemblies should be certified in accordance with CAN/ULC-S104, and installed in accordance with the National model codes and NFPA 80.

   Fire window assemblies typically have an hourly fire-protection rating somewhat less than the corresponding hourly fire-resistance rating of the vertical (wall) assembly in which they are installed. These fire window assemblies should be certified in accordance with CAN/ULC-S104, and installed in accordance with the National model codes and NFPA 80. Fire window assemblies can be tested and certified for use in positive pressure applications as noted in the individual certifications.

   Smoke Barriers and Smoke Partition

   Smoke barriers are continuous membranes, either vertical or horizontal, such as a wall, floor or ceiling assembly, that are designed to restrict the movement of smoke through a building. In addition to limiting the spread of smoke, smoke barriers are required to have a fire-resistance rating as specified in the building code. Smoke partitions are continuous vertical membranes, such as a wall, that are also designed to restrict the movement of smoke through a building.

   Door and window assemblies in smoke barriers are required to be protected against fire and smoke leakage in accordance with requirements included in the opening protective portion of the code. Door assemblies in smoke partitions are required to be protected by specific construction and air leakage requirements.

To determine the appropriate standards and ratings for doors in these assemblies, refer to the specific code requirements covering the wall assemblies. This will include a leakage rating at a specified pressure and temperature for doors and windows used in smoke barriers and partitions, in conjunction with hourly fire-resistance ratings for doors and windows in smoke barriers.

3. **Identify the wall construction** – Once the size, location, standards and ratings required for the door and window assemblies are established, the next step is to identify the construction of the walls into which they will be mounted. This is important to know because the construction affects the anchoring of the door frames, transoms and side lights.

   For example, fire door and window frames used in walls with wood or steel studs and gypsum wall board construction are anchored differently than frames installed in concrete or block walls. The proper frame should be selected for each of these applications. The frame is to be provided by the manufacturer with anchors selected to match the wall construction being used. The manufacturer's installation instructions, or National model codes and NFPA 80 should be referred to for these details.

4. **Determine the type of door required** – There are a wide variety of fire door types that are listed with specific constructions features and for use in specific applications. These include rolling steel, special-purpose, chute type, sliding type, swinging type, and freight or passenger elevator type fire doors.

5. **Means of egress considerations** – Doors serving a means of egress system for a building are required to comply with specific requirements that will help facilitate the egress of occupants from the building in an emergency. It is important to identify the doors in the building that are subject to specific egress related requirements, as covered in the Means of Egress chapter of the code.

   Egress requirements include minimum door widths, projections into the doorways, and door swing requirements. It also includes specific requirements related to the use of revolving, sliding and power operated doors.

   Egress requirements also require these doors to be readily operable from the egress side without the use of a key or special knowledge or effort, and to include panic hardware that is listed in accordance with CAN/ULC-S132. There are also requirements in place for special locking arrangements that allow for egress while also providing a suitable level of security for the premises. Ensure that the product labeling for the exit hardware device matches the application as panic hardware is only for use on non-rated assemblies while fire exit hardware is to be selected for openings where a fire rating is required.

6. **Glazing** – Glazing used in fire doors, transoms, sidelights and fire windows is regulated in the opening protectives portion of the code and may be limited in aggregate and individual sizes and dimensions. Glazing is required to be listed in accordance with CAN/ULC-S104 and/or CAN/ULC-S101 requirements, and may consist of fire-protection or fire-resistance rated glazing. Glazed areas subject to human impact loads, such as in a door or side transom, are also required to meet safety glazing requirements. Wired glass is not permitted in those areas.

7. **Select appropriate hardware** – In order to operate properly, door hardware needs to be outfitted on the door assemblies. This hardware may include hinges, latches, locks, closers, and fire exit hardware. Most of these products (except leaf style commercial hinges) are required to be Certified in accordance with ULC standards.

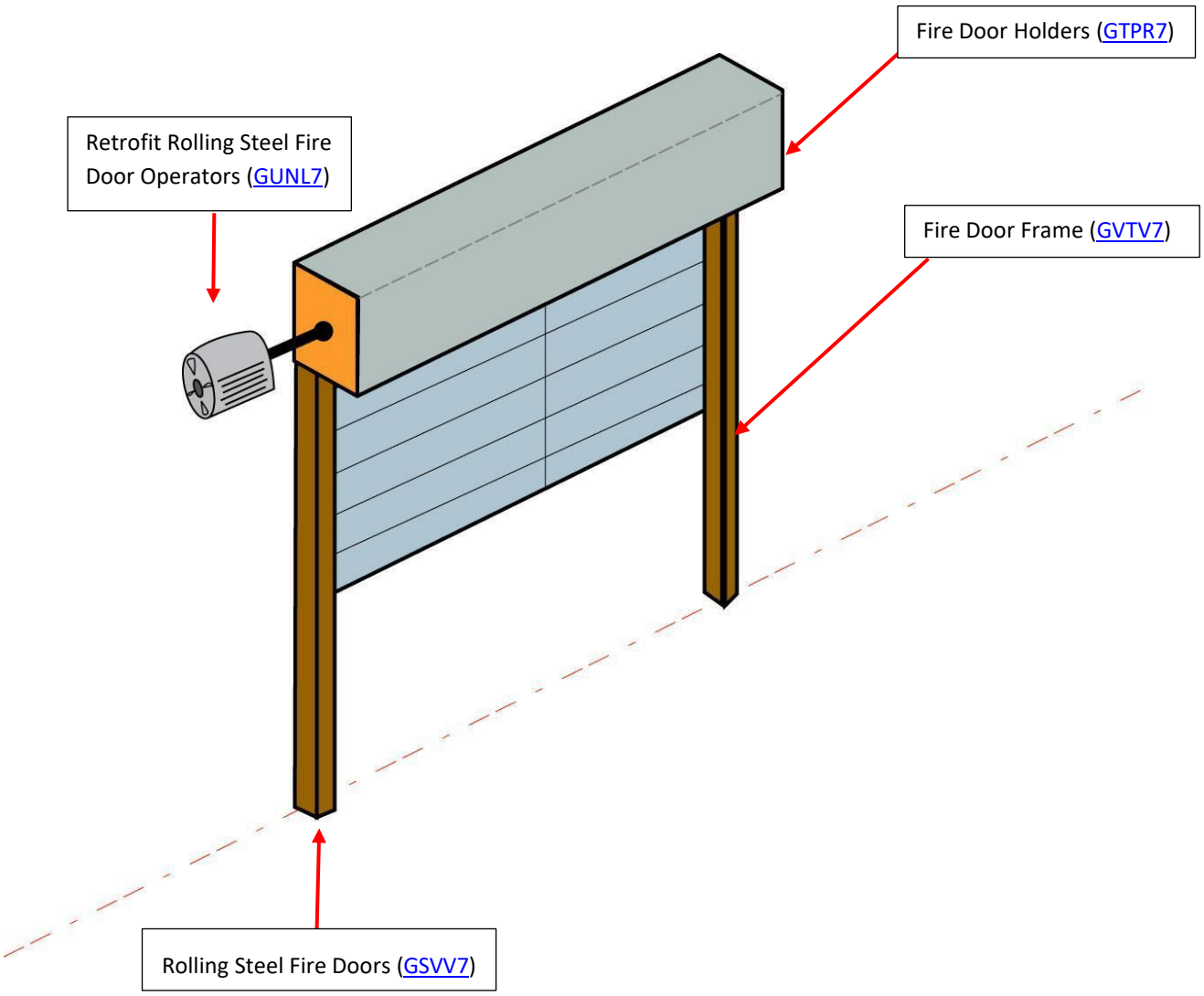
8. **Putting it all together** – In order to provide the desired door installation that complies with applicable code requirements it is important to identify the wall construction, determine the type of door required, evaluate means of egress considerations, understand the requirements applicable to glazing, and select the appropriate hardware. Similarly, for a fire window installation it is important to identify the wall construction, the type of glazing required and the appropriate frame for the glazing and wall construction.

   Care should be taken to verify that the doors, frames, glazing and hardware are installed in accordance with the manufacturer's installation instructions, and in accordance with NFPA 80 requirements.

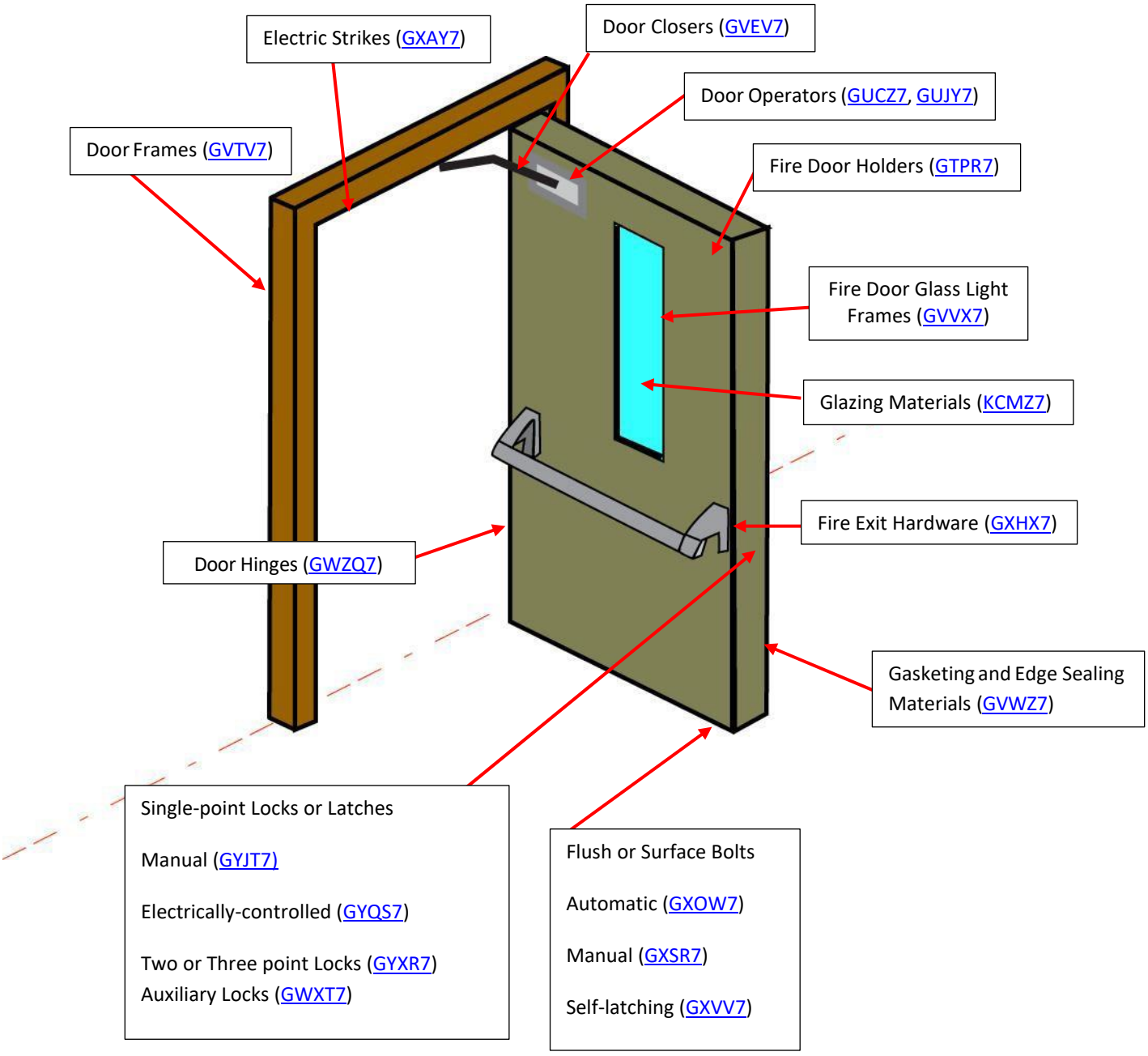
5. DIAGRAMS OF COMPLETE ASSEMBLIES

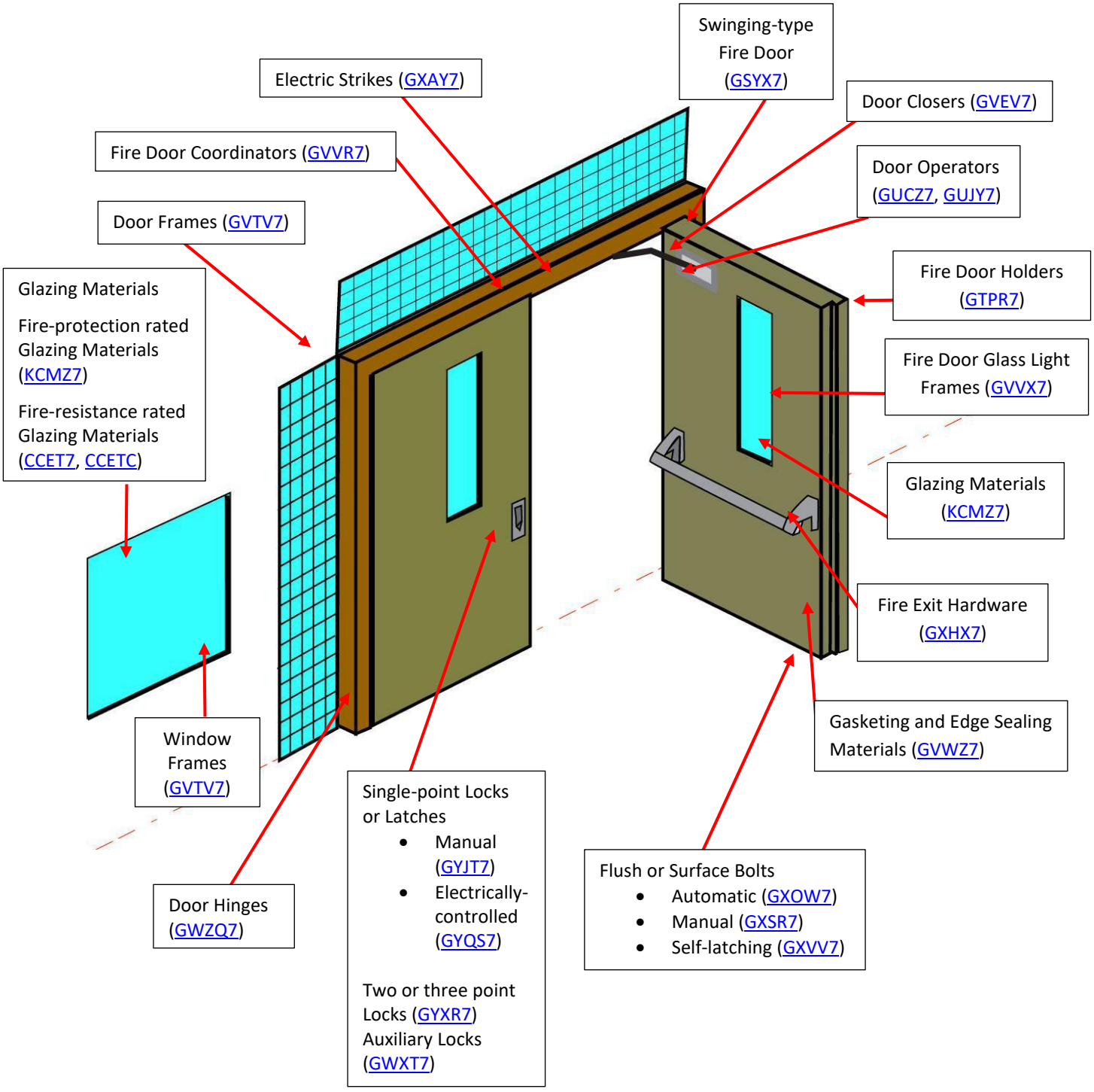
The following diagrams identify the components that make up complete assemblies, along with links to the guide information for the various product categories. Refer to Appendix A for a complete list of related product categories.

C-UL AND ULC ROLLING STEEL FIRE DOOR ILLUSTRATION



C-UL AND ULC SWINGING-TYPE FIRE DOOR ILLUSTRATION




Swinging-type Fire Door (GSYX7)
Electric Strikes (GXAY7)
Door Closers (GVEV7)
Fire Door Coordinators (GVVR7)
Door Operators (GUCZ7, GUJY7)
Door Frames (GVTV7)
Fire Door Holders (GTPR7)
Glazing Materials
Fire-protection rated Glazing Materials (KCMZ7)
Fire-resistance rated Glazing Materials (CCET7, CCETC)
Fire Door Glass Light Frames (GVVX7)
Glazing Materials (KCMZ7)
Fire Exit Hardware (GXHX7)
Window Frames (GVTV7)
Gasketing and Edge Sealing Materials (GVWZ7)
Single-point Locks or Latches
Manual (GYJT7)
Electrically-controlled (GYQS7)
Two or three point Locks (GYXR7)
Auxiliary Locks (GWXT7)
Flush or Surface Bolts
Automatic (GXOW7)
Manual (GXSR7)
Self-latching (GXVV7)
Door Hinges (GWZQ7)

APPENDIX A – DOOR, WINDOW AND RELATED HARDWARE CATEGORIES

UL certifies the door, window and related hardware under the following product categories. Click on Category Code links to view UL Guide Information for the product category. The Guide Information also has links to manufacturers whose products are certified under the category. See the UL Product iQ database at www.ul.com/PiQ for details.

Category Code	Category Name	Standard Used
GSNV7, GSNVC	**Fire Doors**	
GSOT7	Access-type Fire Doors	CAN/ULC-S104
GSPR7	Chute-type Fire Doors	CAN/ULC-S104
GSRV7	Dumbwaiter-type Fire Doors	CAN/ULC-S104
GSZC7	Finishers of Fire Doors	CAN/ULC-S104
CCJVC	Floor Access Doors	CAN/ULC-S101
GSST7	Freight-elevator-type Fire Doors	CAN/ULC-S104
GSUX7	Passenger-elevator-type Fire Doors	CAN/ULC-S104
GSVV7	Rolling Steel Fire Doors	CAN/ULC-S104
GSWT7	Service-counter-type Fire Doors	CAN/ULC-S104
GSXV7	Sliding-type Fire Doors	CAN/ULC-S104
GSXZ7	Special-purpose Fire Doors	CAN/ULC-S104
GSYX7	Swinging-type Fire Doors	CAN/ULC-S104
GSZG7	Swinging-type Fire Door Retrofit Parts	CAN/ULC-S104
GVZS7	Fire Door Louvers	CAN/ULC-S104

Category Code	Category Name	Standard Used
	Fire Windows	
CCET7, CCETC	Fire-resistance rated Glazing Materials	CAN/ULC-S101
KCMZ7	Fire-protection rated Glazing Materials	CAN/ULC-S104, CAN/ULC-S106
	Fire Door and Window Frames	
GVTV7	Fire Door and Window Frames	CAN/ULC-S104, CAN/ULC-S106
GVUP7	Finishers of Fire Door Frames and Fire Window Frames	CAN/ULC-S104, CAN/ULC-S106
CIKV7, CIKVC	Framing Members	CAN/ULC-S101
GWGR7	**Fire Door and Window Hardware**	
GWVW7	Accessories for Single-point Locks and Latches and Fire-exit Hardware	CAN/ULC-S104
GWXT7	Auxiliary Locks	CAN/ULC-S104, CAN/ULC-S533
GWZQ7	Door Hinges	CAN/ULC-S104
GXAY7	Electric Strikes	CAN/ULC-S104
GXHX7	Fire-exit Hardware	CAN/ULC-S104, CAN/ULC-S132
GXOW7	Flush and Surface Bolts, Automatic Type	CAN/ULC-S104
GXSR7	Flush and Surface Bolts, Manual Type	CAN/ULC-S104
GXVV7	Flush and Surface Bolts, Self-latching Type	CAN/ULC-S104
GYJT7	Single-point Locks and Latches	CAN/ULC-S104

Category Code	Category Name	Standard Used
GYQS7	Electrically-controlled Single-point Locks and Latches	CAN/ULC-S104
GYXR7	Two- and Three-point Locks and Latches	CAN/ULC-S104
GZKZ7	Elevator Fire Door Hardware, Passenger	CAN/ULC-S104
GZYX7	Fire Door Hardware	CAN/ULC-S104
HAAU7	Fire Door Viewers	CAN/ULC-S104
GVUW7	**Fire Door Accessories**	
GVVR7	Fire Door Coordinators	CAN/ULC-S104
GVUX7	Miscellaneous Fire Door Accessories	CAN/ULC-S104
GVUZ7	Cladding Materials for Fire Doors and Frames	CAN/ULC-S104
GVVX7	Fire Door Glass Light Frames	CAN/ULC-S104
GVWZ7	Gasketing Materials for Fire Doors	CAN/ULC-S104
GTBT7	**Fire Door Closers, Holders and Operators**	
GVEV7	Swinging Fire Door Closers	CAN/ULC-S133
GUQX7	Sliding Fire Door Closers	CAN/ULC-S104, ULC/ORD-C228
GTPR7	Fire Door Holders	ULC/ORD-C228
GTIS7	Combination Fire Door Closers and Holders	CAN/ULC-S104, CAN/ULC-S133, CAN/ULC-S529
GUCZ7	Fire Door Operators	CAN/ULC-S104, CAN/CSA-C22.2 No. 247

Category Code	Category Name	Standard Used
GUJY7	Fire Door Operators with Automatic Closers	CAN/ULC-S104, CAN/CSA-C22.2 No. 247
GUNL7	Retrofit Rolling Steel Fire Door Operators	CAN/ULC-S104, CAN/CSA-C22.2 No. 247
FCQU7	Door Operators for use in Hazardous Locations	CAN/UL 325, CAN/CSA-C22.2 No. 247
FDGF7	Door Holders for use in Hazardous Locations	ULC/ORD-C228
FUDQ7	**Means of Egress Related Certifications**	
FULA7	Controlled Exit Panic Devices	CAN/ULC-S533
FUQV7	Exit Locks	CAN/ULC-S132
FVSR7	Panic Hardware	CAN/ULC-S132
FWAX7	Special Locking Arrangements	CAN/ULC-S533