

# MACHINING SPECIFICATIONS

Effective Date: October 12, 2012  
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**Applicant File Number:**  
F411

**Report Number:**  
F411-20-1-MACH  
Edition 10

**Applicant:**  
Wolman Wood and Fire Protection GmbH  
Werk Sinzheim E-EBE/WB  
Bau 2, Dr.-Wolman – Str .31-33  
76547 Sinzheim, Germany

ATTENTION: Andreas Bolz, Business Manager Fire Protection Materials

## APPLICABLE REQUIREMENTS:

**CAN/ULC S104-15 (R2020)** *Standard Method for Fire Tests of Door Assemblies,  
(with hose stream only)*

**UL 10B (2008)** *Fire Tests of Doors Assemblies*

**UL 10C (2016)** *Fire Tests of Doors Assemblies – Positive Pressure*

**NFPA 252 (2022)** *Standard Methods of Fire Tests of Door Assemblies*

**ASTM E90-09 (2016)** *Standard Test Method for Laboratory Measurement of Airborne Sound  
Transmission Loss of Building Partitions and Elements*

**ASTM E1425-14** *Standard Practice for Determining the Acoustical Performance of  
Windows, Doors, Skylight, and Glazed Wall Systems*

## SUBJECT:

MACHINING SPECIFICATIONS FOR WOLMAN - 20 MIN NEUTRAL & POSITIVE PRESSURE  
RATED CATEGORY "A" or CATEGORY "B" FIRE DOORS WITH or WITHOUT HOSE STREAM

**20-MINUTE LAMINATED CORE PANEL FIRE DOORS:**

**Minimum 1-3/4" Door Thickness**

Swing Type:	Maximum Dimensions		Panel Type:	Latching:
	Width:	Length:		
Single Swing	4'0" (1219 mm)	8'0" (2438 mm)	Flat or Raised	Single Point or 2 Point
	3'6" (1067 mm)	9'0" (2743 mm)		
	3'6" (1067 mm)	9'0" (2743 mm)	Glazing	
	4'0" (1219 mm)	8'0" (2438 mm)		
Arched Top Single Swing	3'6" (1067 mm)	9'0" (2743 mm)	Flat or Raised	Single Point or 2 Point
Door + Transom*	3'6" (1067 mm)	10'0" (3048 mm)		Single Point
Dutch Door	3'6" (1067 mm)	8'0" (2438 mm)		2 Point
Standard Pairs	8'0" (2438 mm)	8'0" (2438 mm)	Flat or Raised, Glazing	3 or 4 point
	8'0" (2438 mm)	10'0"* (3048 mm)	Flat or Raised	4 point
Arched Top Standard Pairs	8'0" (2438 mm)	8'0" (2438 mm)	Flat or Raised	3 or 4 point
Double Egress Pairs*	8'0" (2438 mm)	8'0" (2438 mm)	Flat or Raised	4 point

\*10' height Singles or Pairs, and Door + Transom configuration requires 45 minute core construction.

**Minimum 2-1/4" Door Thickness**

Swing Type:	Maximum Dimensions		Panel Type:	Latching:
	Width:	Length:		
Standard Pairs, Double Egress Pairs	8'0" (2438 mm)	10'0"* (3048 mm)	Flat or Raised	4 Point

**Minimum 1-3/8" Door Thickness**

Swing Type:	Maximum Dimensions		Panel Type:	Latching:
	Width:	Length:		
Single Swing	3'0" (914 mm)	7'0" (2134 mm)	Flush only	Single Point
Standard Pairs, Double Egress Pairs	Not Permitted			

**Note:** Two 1 3/8" or 1 3/4" flush doors may be installed in a 45 minute rated communicating frame to achieve a 45 minute rated door and frame assembly.

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## CATEGORY “A” AND “B” DOORS

**CATEGORY “A” DOORS** CONTAIN INTUMESCENT IN THE DOOR VERTICAL EDGES AND HEADER. THE TOP OF DOOR WILL BE MARKED “CATEGORY A” OR “CATEGORY B”.

**CATEGORY “B” DOORS** AND DOORS CONFORMING TO CAN/ULC S 104 DO NOT REQUIRE THE DOOR EDGE INTUMESCENT FOR SINGLE SWING DOOR APPLICATIONS, INTUMESCENT IS OPTIONAL. FOR DOORS SWINGING IN PAIRS, INTUMESCENT IS REQUIRED AT THE MEETING EDGES ONLY.

### LATCHING OPTIONS:

- **Single Point Latching** – Cylindrical or Mortise latches and deadbolts, or Rim type fire exit hardware for single swing doors, or active leaf of pairs when permitted. Dutch doors require a single point latch for both halves.
- **Two Point Latching** – Surface mount or Concealed vertical rod exit devices for single swing doors. Concealed vertical rod exit devices requires special door construction and is acceptable per the manufacturing specifications.
- **Three Point Latching** – Single point latch for active leaf of standard pairs, Surface mounted manual, or Mortise type or manual or automatic flush bolts, or surface mount or concealed vertical rod exit devices for inactive leaf of pairs.
- **Four Point Latching** - Surface mount or concealed vertical rod exit devices for both leaves of pairs. Concealed vertical rod exit devices require special door construction and is acceptable per the manufacturing specifications.

### COMPONENTS:

**Latch Sets** (Listed and labeled for use in 20 minute wood doors, including UL 10C when required)

- Cylindrical Latches
  - Maximum 2-1/8” diameter bore
  - Maximum 2-3/4” backset
  - Minimum 1/2” throw
- Mortised Latch
  - Minimum stile width 5”
  - For stile width from 4” to 5”
    - Mortised with the sides and the back of the pocket lined with Interdens Type 15.
    - Maximum mortise pocket dimensions: 15/16” x 6-1/2” x 4-1/2” (W x H x D).
  - See Appendix for UL Listed cardlock type mortise locks that are acceptable based on the UL Listing covering 20 minute rated wood doors, and UL 10C. Check UL and other Listings for conforming mortise and cardlock models.

**Deadbolts** (Listed and labeled for use in 20 minute rated wood doors, and UL 10C when required)

- Maximum 2-1/8” diameter bore, (cylindrical).
- Maximum 2-3/4” backset, (cylindrical).
- Located a minimum of 3-1/2” center-line to center-line above the latch set
  - Interconnected Deadbolts are allowed.
- Mortised Deadbolt – see Mortised Latch Set section above.

**Hinges** (Listed and labeled for use in wood doors, and UL10C when required).

- Hinges as per NFPA 80, Table 6.4.3.1
- Listed steel butt ball bearing type spring hinges
- SOSS, Tectus concealed hinges Listed for use in 20 minute rated wood doors are permitted, hinge body wrapped with Interdens Type 15, see Figure 9.

**Fire Exit Devices** (Listed and labeled for use in 20 minute rated wood doors and UL 10C when required).

- Surface Mounted Vertical Rod Fire Exit Device.
- Concealed Vertical Rod Fire Exit Device [See Figure 7]
- Rim Type Fire Exit Devices.
- Through-bolts are optional unless required by hardware installation instructions.

**Door Closers** (Listed and labeled for rated opening)

- Surface Mounted Door Closers are required to be mounted with through-bolts.
- Concealed Door Closers in the door and frame header as shown in Figures 5 and 6.

**Door Veneers and Inlays (Optional)**

**Flush Doors:**

- Plastic Laminate (up to 1/16" thick).
- Wood Veneer (up to 1/16" thick).
- Metal Foil (up to 1/16" thick).
- Paper Finish (up to 1/16" thick).
- Fiberglass Reinforced Polymer (FRP) (up to 1/16" thick).
- Vinyl (up to 1/16" thick).
- Lead (up to 1/32" thick).

**Recessed Panel Doors:**

- Plastic Laminate (up to 1/16" thick).
- Wood Veneer (up to 1/16" thick).
- Metal Foil (up to 1/16" thick).
- Paper Finish (up to 1/16" thick).
- Glass Mirror (up to 1/8" thick).

**Face Grooves**

- Permitted for flush doors.

**Surface Mounted Protection Plates**

- Permitted, no limitations, fastened with adhesives or screws.

**Louvers**

- Listed Louvers permitted, installed in lower area of door, below latch level.

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**Metal Edges/Astragals** (Listed and labeled for rated opening)

- Metal edges and Z-Astragal set for meeting edges of pairs, Optional.

**Viewers** (Listed and labeled for use in wood doors, and UL 10C)

- Maximum size of 1" diameter
- Multiple viewers located a minimum of 12" on center
- Viewers located a minimum 5-1/2" away from edges of doors.
- Viewers shall be installed in 1 3/4" thick mid rail or panel section unless otherwise listed for wood doors.

**Electric Raceway**

- Allowed (Refer to F411-20-1-MFG Specification for door construction to accommodate raceway).

**Electric Power Transfer (EPT)** (Listed for use in 20 minute rated wood doors and UL 10C)

- Securitron Concealed Electrical Power Transfer.
- Mortised with the sides of the pocket lined with Interdens Type 15.
- Maximum mortise pocket dimensions: 1-1/4" x 7-3/4" x 1-5/8" (W x H x D).

**Flush Bolts** (Listed and labeled for rated opening)

- Mortise manual flush bolts.
- Mortise automatic flush bolts. Cutout dimensions limited to 1" wide x 8-1/2" long x 2" deep. [See Figure 8].
- Flush bolt extensions are permitted.

**Concealed Closer**

- Perkomatic door edge closer – see Figure 6, install at or below the latch level.
- Top of Door concealed closer – see Figure 5.

**Concealed Vertical Rod Hardware**

- Requires special door construction per manufacturing specifications (Refer to Figure 7 and F411-20-1-MFG Specification for door construction to accommodate concealed vertical rod).

**Glass Lights** (Listed and labeled for rated opening)

- Glazing material shall be listed and labeled for rated opening, light kit and door type. Some proprietary listed glazing materials are rated "without hose stream". Alternate listed glazing materials may be installed when used in accordance with the glazing listing which will describe the glazing kit required. Listed glazing materials may offer larger sizes than mentioned below and have limitations of door height. Multiple lites may be installed in the same door provided there is at least 4" between lites.
- Glazing installed in accordance with NFPA 80, and the listed light kit frame installation instructions. See Figures 1 to 3 for Wolman clip system and track system glazing assembly

limitations.

- Maximum 1296 sq. in. area with Listed Steel Lite Kit (Max Dimension of 54") for wired glass [See Figure 3]
- Wolman clip system – 3/16" ceramic glazing - maximum 2656 sq. in. area (Maximum Dimension of 83") [See Figures 1 and 2]
  - For Wolman – Stile & Rail Doors with Structural Composite Lumber (SCL) Stiles and Rails
  - Maximum 9/16" x 9/16" Square wood stops made MDF or solid wood with specific gravity  $\geq 0.44$  @ 12% MC. (Stops can be made of any profile that fits within the 9/16" x 9/16" square stop)
    - Single layer of Wolman Palusol 100 encapsulated with PVC (Between the stop and the glass)
- Maximum 1296 sq. in. with Listed Wolman proprietary steel channel lite kit using Listed 3/16" or thicker listed ceramic glazing or wired glazing [See Figure 3]

### Plant-Ons

- MDF or solid wood, plant-on moldings may be applied to one or both sides of a door
- Adhesive and/or mechanical fasteners with a maximum penetration of 3/4"
- Moulding may not be applied closer than 3-1/2" to edge of door, edge of light or edge of hardware cutout.
- Metal and Plastic surface plates and protection plates are permitted on the faces of doors, fastened with screws or adhesive.

### Door Bottoms or Seals (Listed for use in 20 minute rated wood doors)

- Surface Mounted Snap-In in dual durometer vinyl with bulb and fins or with all fins.
- Semi-mortised, or full-mortised bottom seals may be used [See Figure 4 for details]
- Cutout dimensions are restricted to 1" wide and 1-3/4" deep x full width of the door.

### Surface Mounted Components and Hardware (Listed and labeled for use in 20 minute rated wood doors)

- Permitted

## Sound Transmission Classification (STC) Ratings for 20 minutes rated doors

Ratings below are based on testing a 3'0 by 7'0 door installed in a Wolman composite wood frame, using (3) 4 1/2" X 4" hinges and a single point cylindrical latch. Both flush door and single flat panel recessed panel doors were tested. Ratings will vary for differing sizes and panel design or hardware configurations. The sealed rating is based on the gap around the door sealed with putty, while the operable rating is a fully operational door with seals installed. All of the threshold, weatherstrip and seal products were supplied by Legacy Manufacturing, Bronx, NY.

### A. Flush Door, 1 3/4" thick, SCL core stiles and rails, solid MDF panel.

STC Ratings		
Sealed	Operable	Seals/Weatherstrip Components Required
35	33	Threshold – 3665 Series Auto Door Bottom – 7763 (surface applied) Head and Jamb seals applied to frame stop - 7663
35	34	Above Components plus finned gasket installed in door rabbet - 505175 Bk

### B. Recessed Single Panel Door, 1 3/4" thick, MDF stiles and rails, HDF + SW 20-1 1/2" thick panel.

STC Ratings		
Sealed	Operable	Seals/Weatherstrip Components Required
33	30	Threshold – 3665 Series Auto Door Bottom – 7763 (surface applied) Finned gasket installed in door rabbet - 505175 Bk



## Labelling Guidelines

### A. Doors conforming to UL 10B, and CAN/ULC S104 (neutral pressure)

Labels shall bear the QAI listing mark with c and us identifiers, 20 minute rating with hose stream, Neutral pressure. Also, the phrase "For use in positive pressure locations a listed category G gasket system is required to be installed".

### B. Doors conforming to UL10C (positive pressure)

Labels shall bear the QAI listing mark with us identifier and indicate 20 minute rating with or without hose stream as applicable.

### C. Doors conforming to UL 10B only (with or without hose stream, neutral pressure)

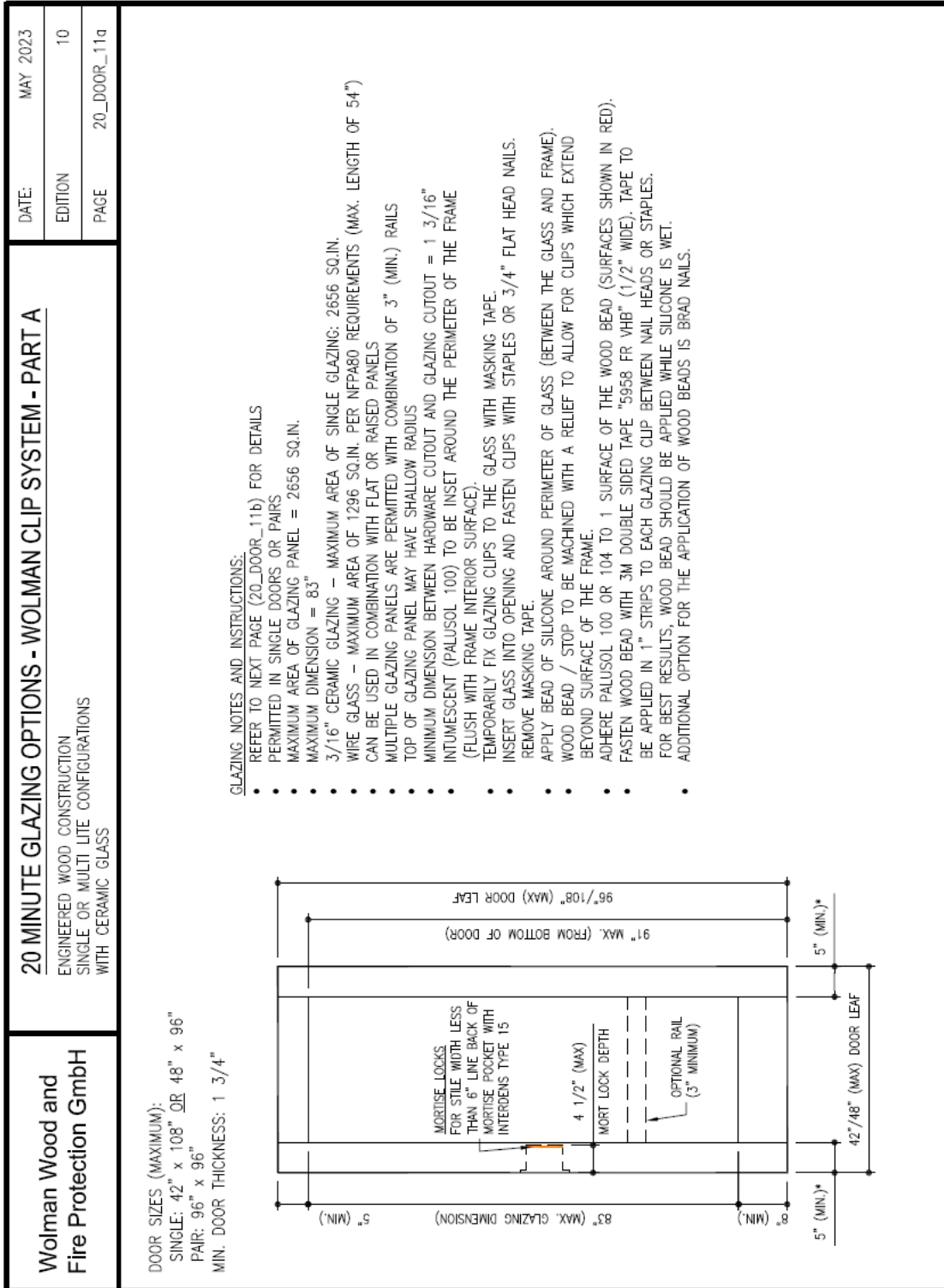
Labels shall bear the QAI listing mark with us identifier and indicate 20 minute rating with or without hose stream as applicable. Also, the phrase "For use in positive pressure locations a listed category G gasket system is required to be installed".

## Test Reports:

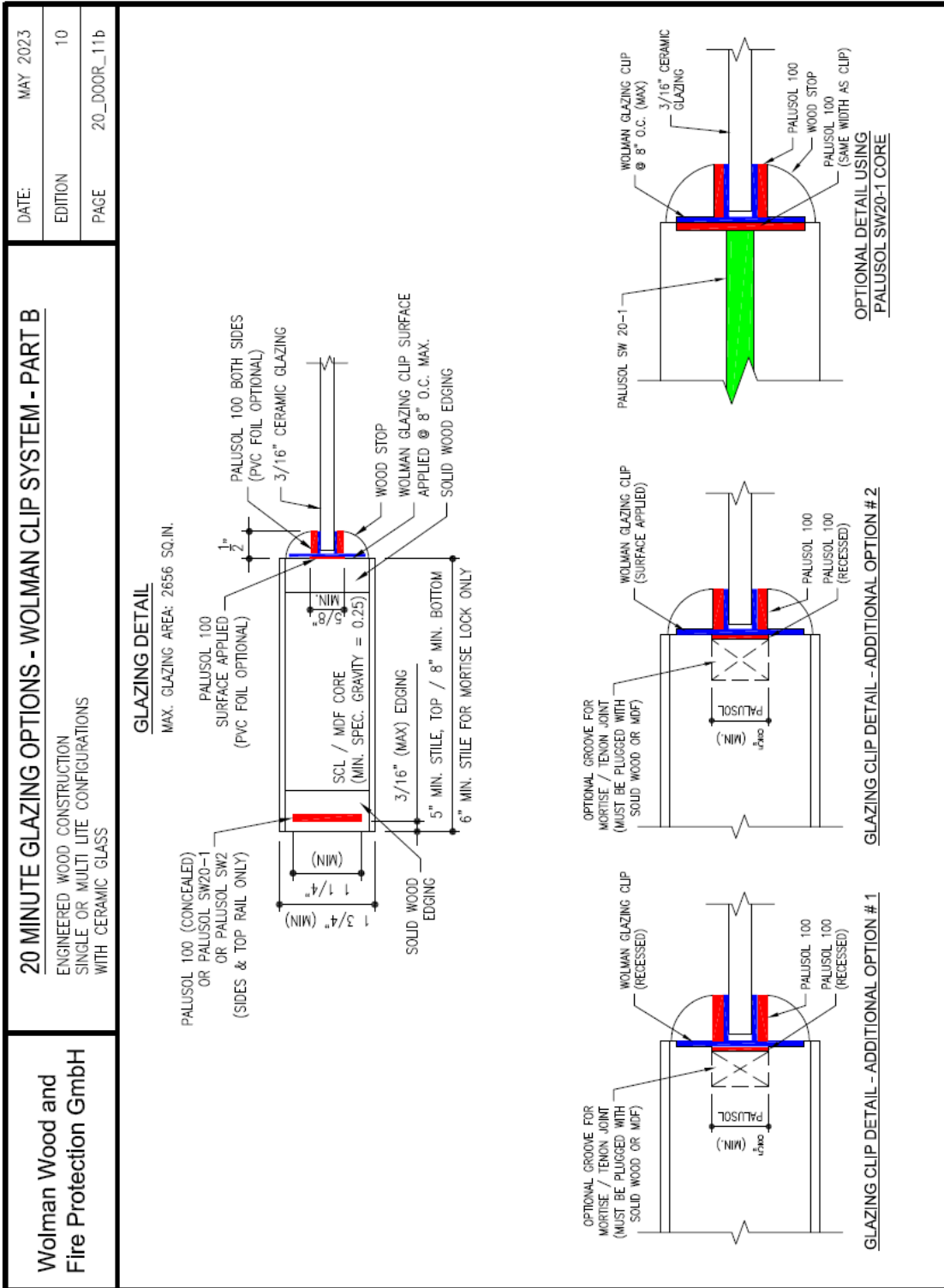
Test Report #	Date Issued
Intertek Test Report # 3105928COQ-003	June 20, 2007
Intertek Test Report # 3081748(a)	September 21, 2005
QAI Engineering Evaluation # F411-5-2	June 2, 2014
QAI Engineering Evaluation # F411-5-3	June 2, 2014
QAI Engineering Evaluation # F411-5-10	April 21, 2015
QAI Engineering Evaluation # F411-5-18	August 15, 2016
QAI Engineering Evaluation # F411-5-21	August 15, 2016
QAI Engineering Evaluation # F411-5-22	September 20, 2016
QAI Engineering Evaluation # F411-5-24	February 8, 2017
QAI Engineering Evaluation # F411-5-29	October 16, 2017
QAI Test Report # T848-11	March 17, 2016
QAI Test Report # T848-12	March 17, 2016
QAI Test Report # T848-13	March 17, 2016
QAI Test Report # T848-20b	June 27, 2017
QAI Test Report # T848-20c	June 27, 2017
QAI Test Report # T848-24E	April 16, 2019
QAI Engineering Evaluation # T848-24J	May 7, 2019
QAI Test Report # T1470C	March 24, 2022
QAI Test Report # 13038 Rev. 1	Nov. 28, 2022

## APPENDIX A

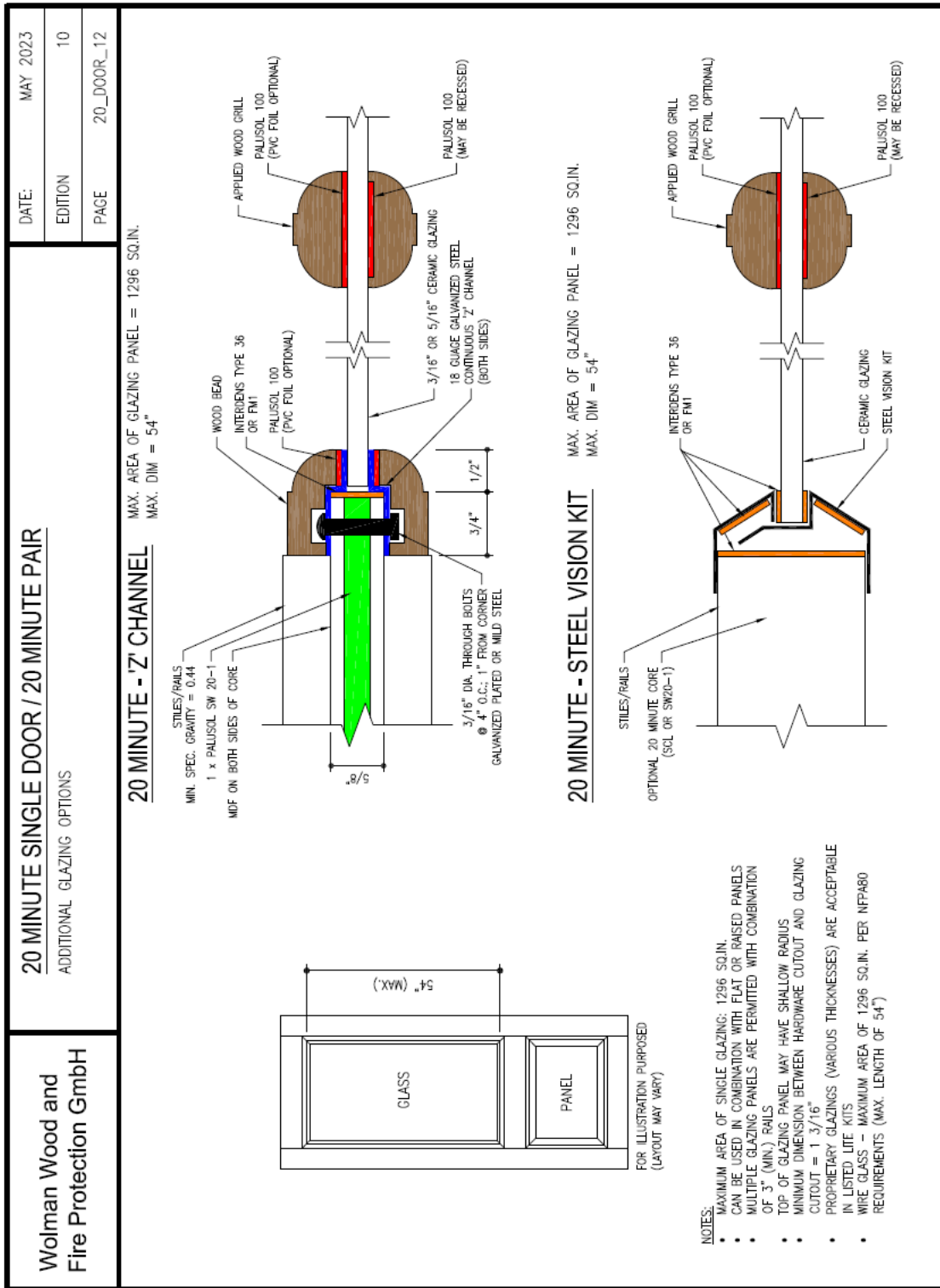
Page	Title
<b>A1 - A3</b>	Glazing details
<b>A4</b>	Concealed door bottom details
<b>A5, A6</b>	Concealed door Closer/Stop details
<b>A7</b>	Concealed vertical rod details
<b>A8</b>	Concealed flush bolt details
<b>A9</b>	Concealed hinge details
<b>A10-A11</b>	Door and Transom, Dutch Door



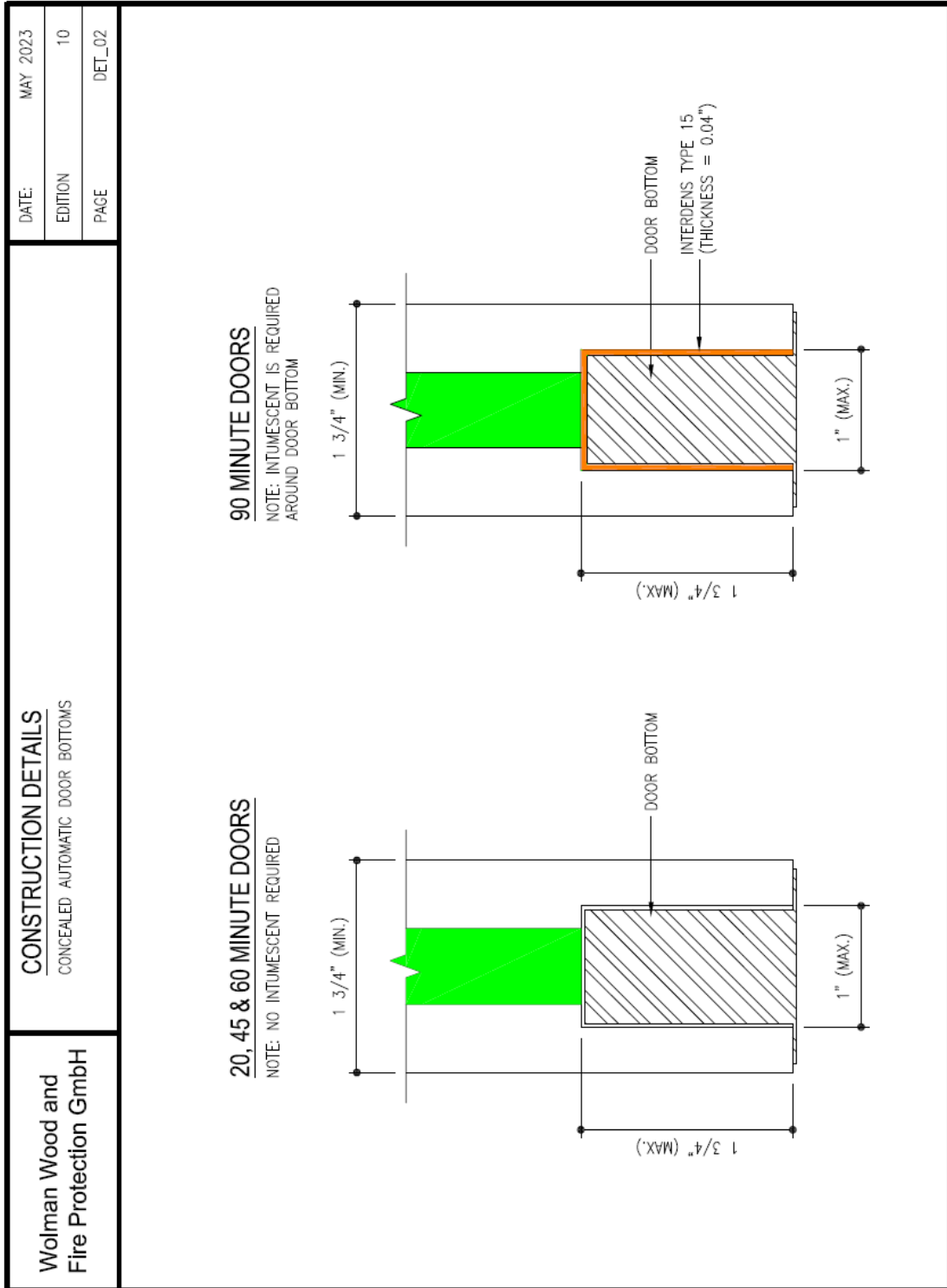
**Figure 1: Glazing with Wolman clip system details - Part A.**



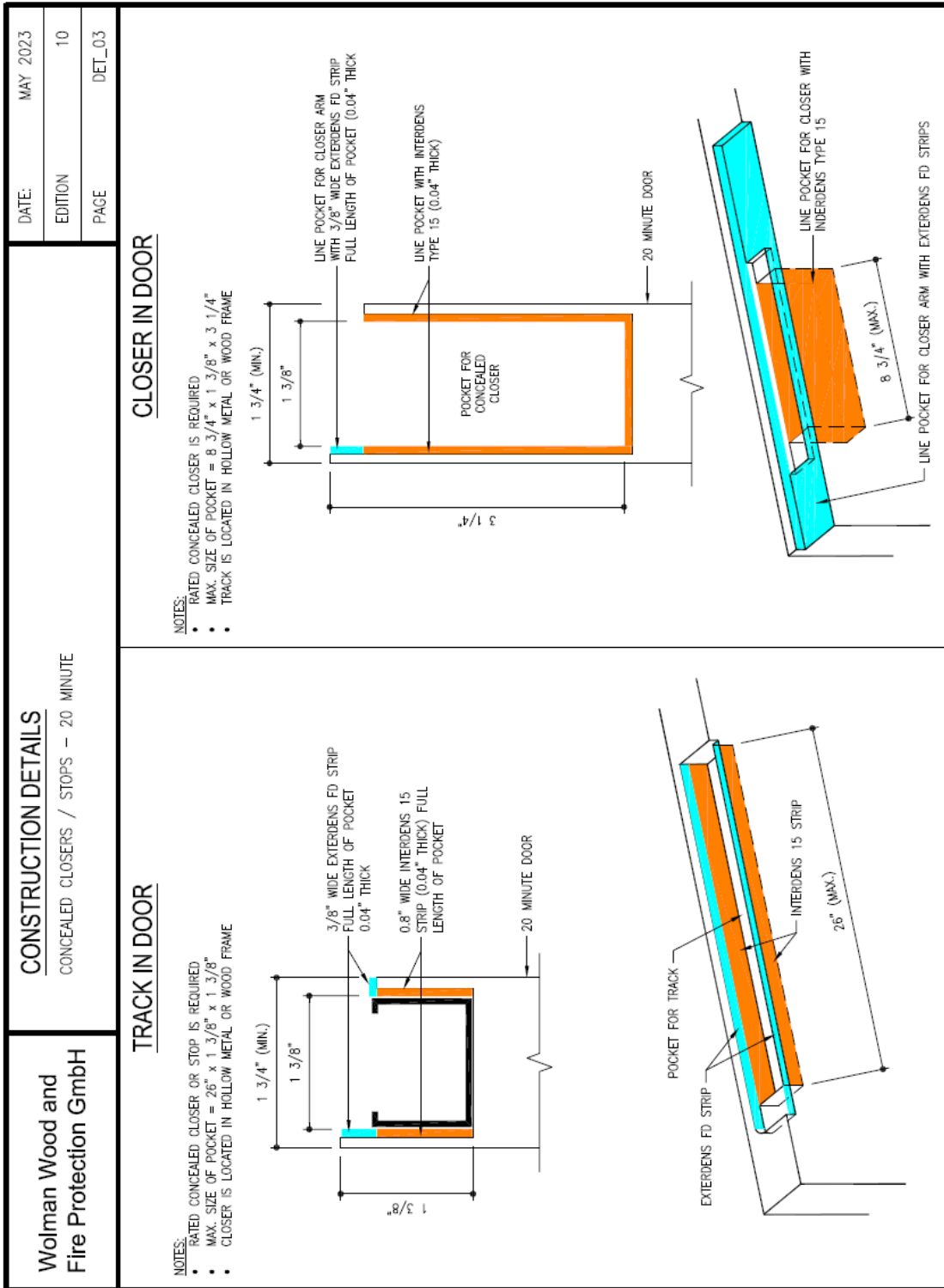
**Figure 2: Glazing with Wolman clip system details - Part B.**



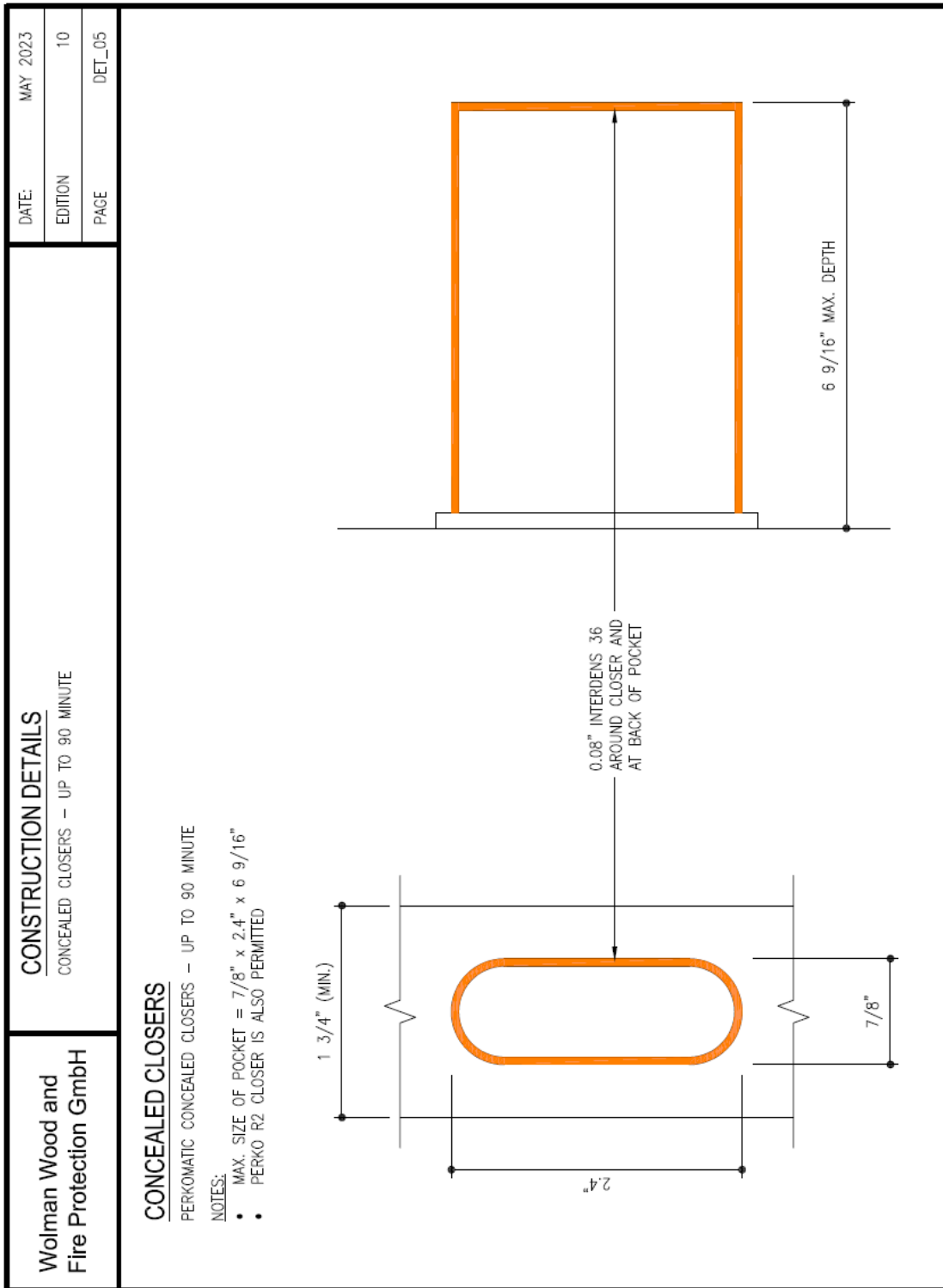
**Figure 3: Additional glazing details – steel vision kit and 'Z' channel.**



**Figure 4:** Concealed door bottom details.

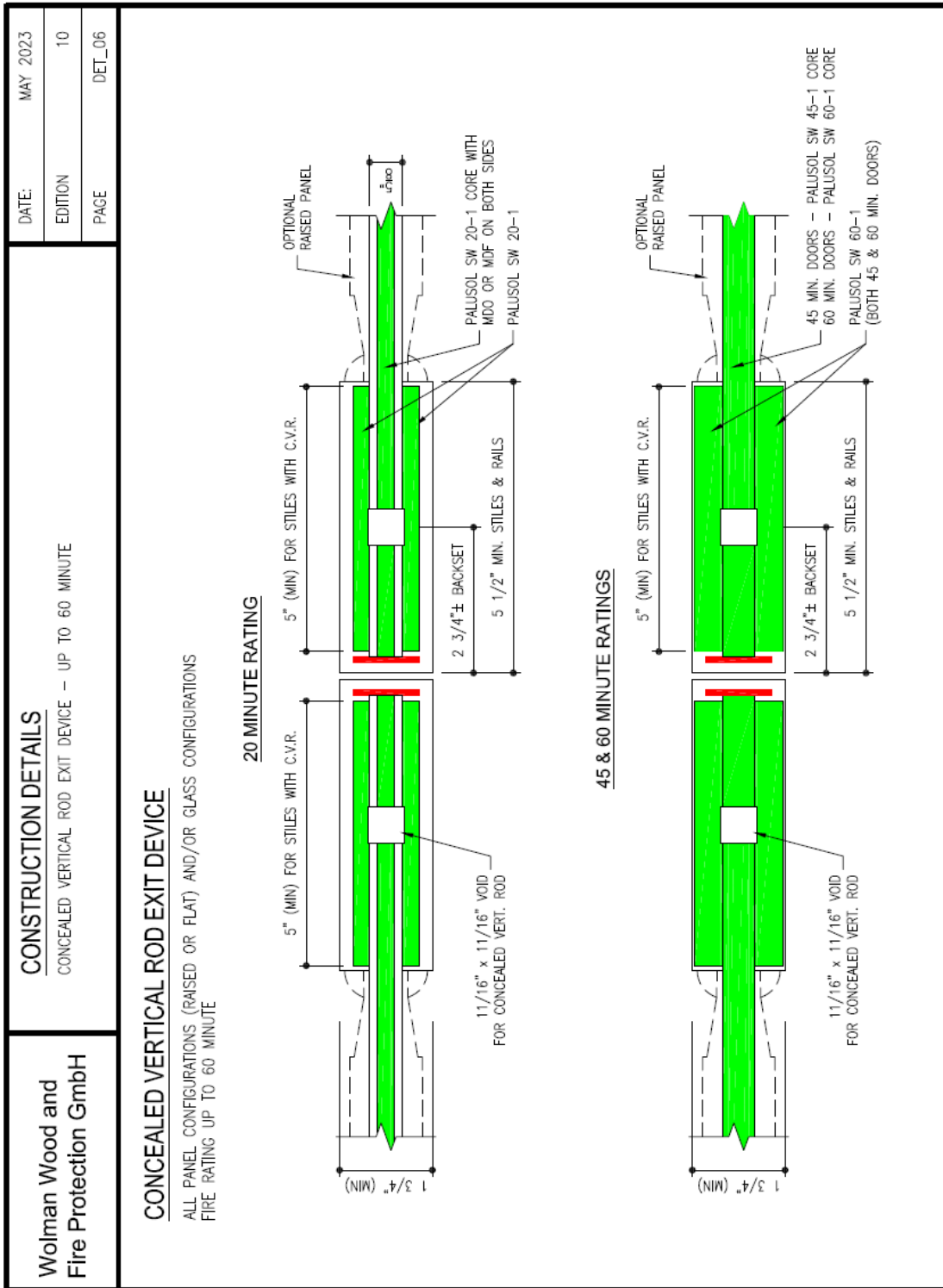


**Figure 5: Concealed closer / door stop details.**

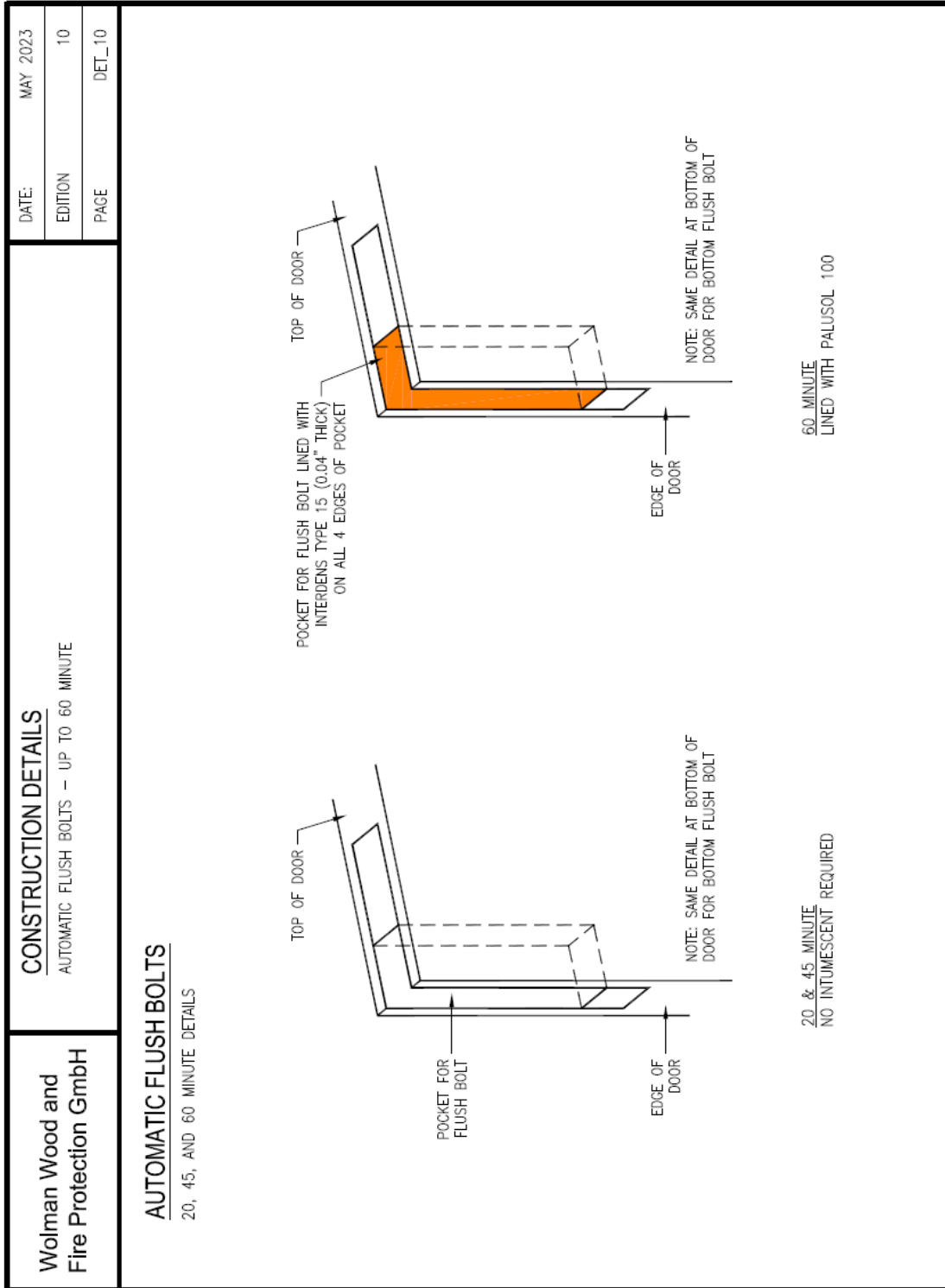


**Figure 6:** Concealed closer – closer installed in door hinge edge detail.

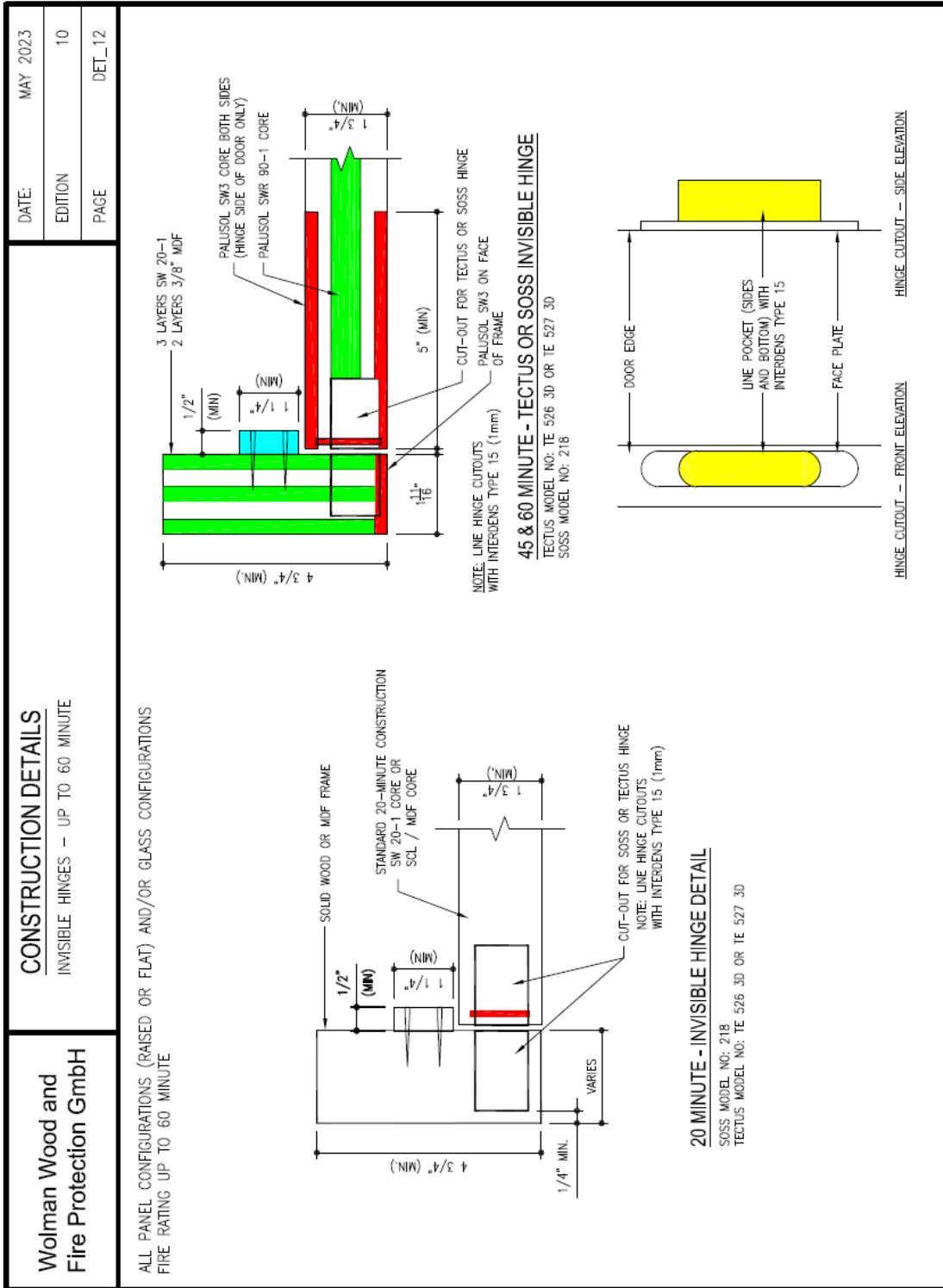




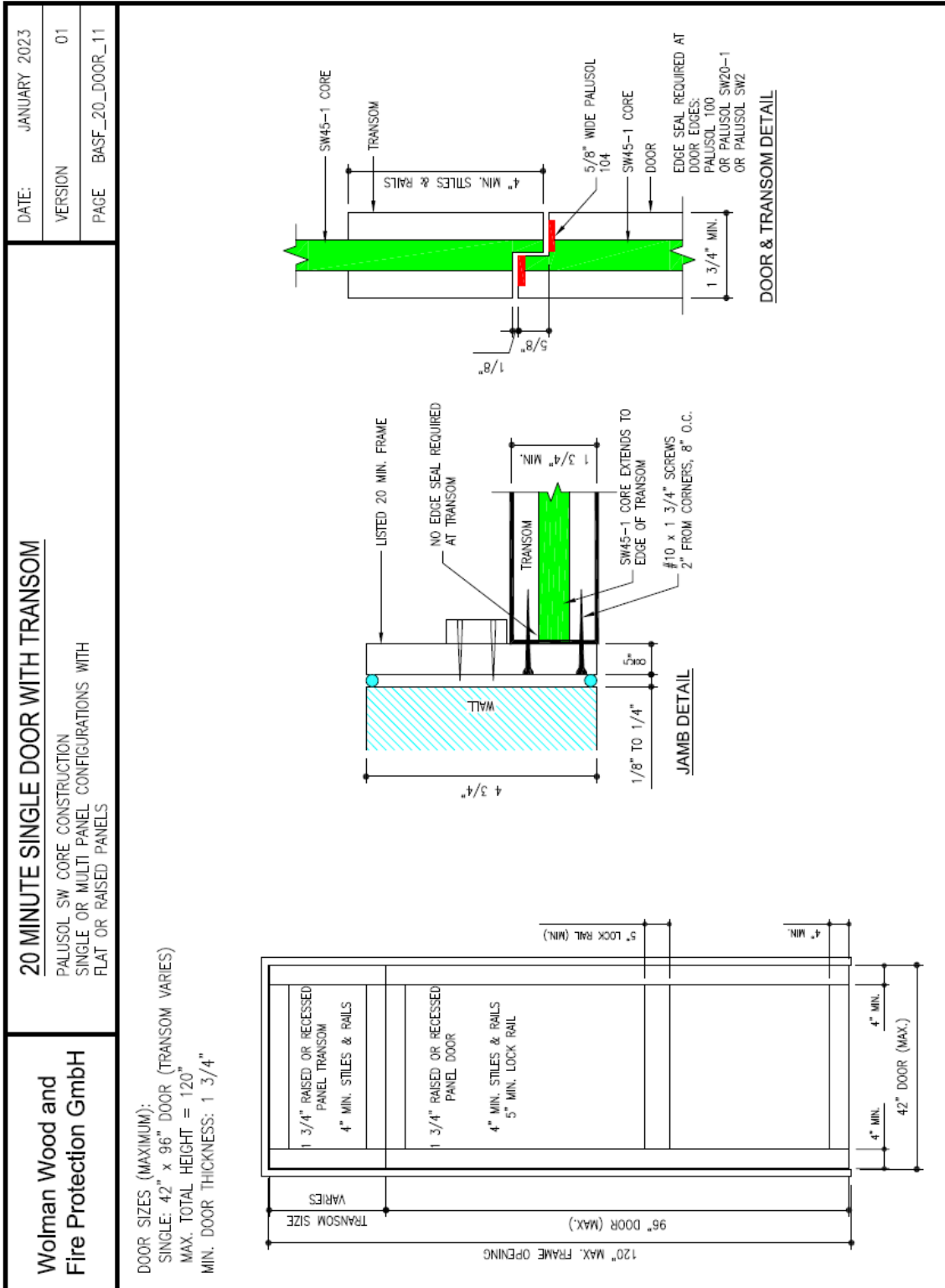
**Figure 7: Concealed vertical rod detail.**



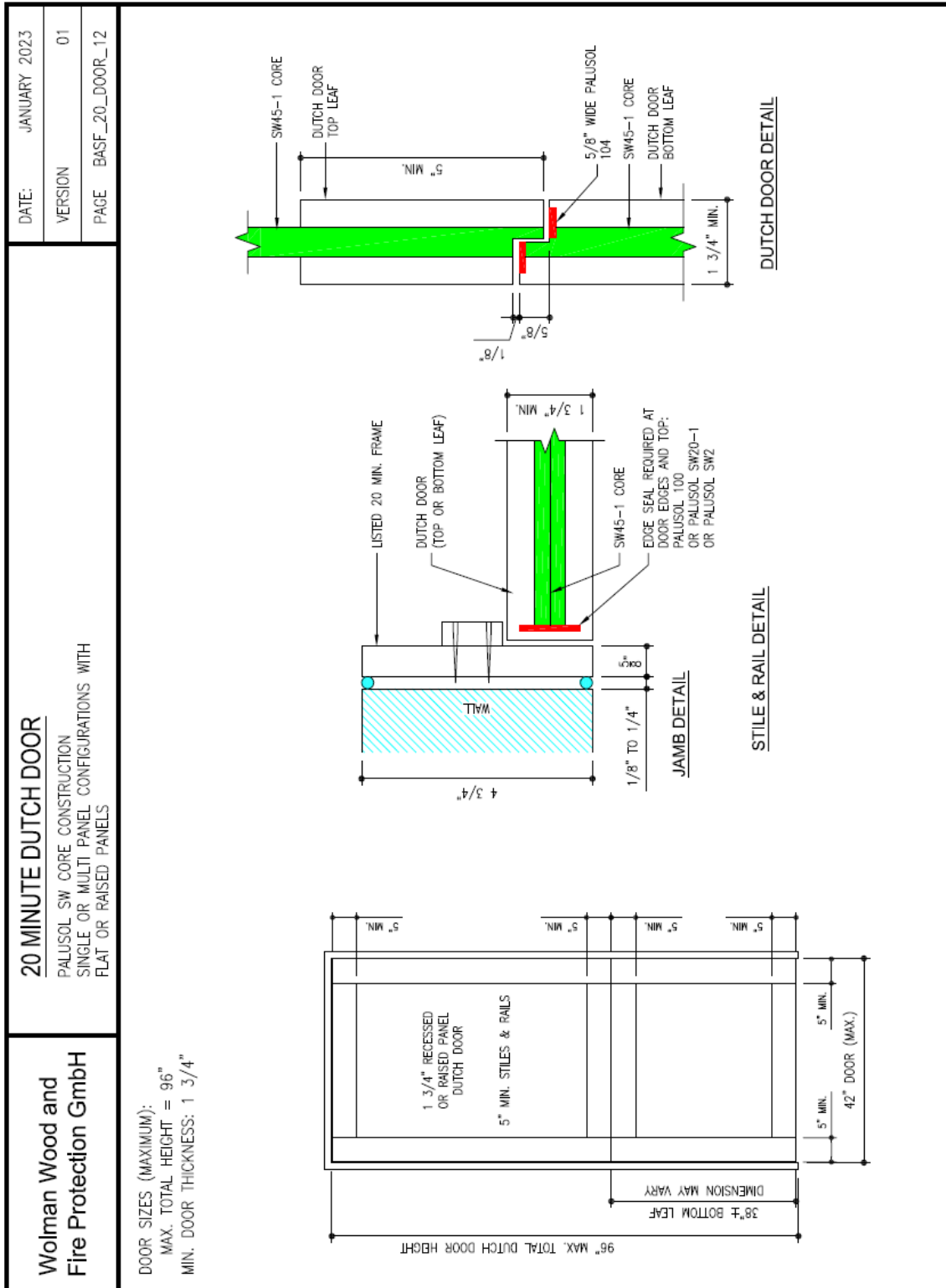
**Figure 8:** Concealed automatic flush bolt details.



**Figure 9: Concealed hinge details.**



**Figure 10: Door and Transom – rabbeted meeting edge detail.**



**Figure 11: Dutch door – rabbeted meeting edge detail.**

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## Appendix B

Wolman Card Lock / Electric lock Update 20 Minute rated doors - June 2020

# Electrically Controlled Single-point Locks and Latches

[See General Information for Electrically Controlled Single-point Locks and Latches in UL Directory](#)

**ASSA ABLOY GLOBAL SOLUTIONS NORWAY AS**

R19020

Anolitveien 1-3

1400 Ski Norway, NORWAY

**Compact multiple check in security system programmers**, Model(s) 2100, may be used with VingCard electronic locks, 2600, may be used with VingCard electronic locks.

**Mortise type, battery operated units, with 3/4 in. (19.05 mm) latch bolts, "Ving-Card and VingCard-Euro"**, Model(s) 1080\*, 1090\*, 2100\*, 3000\*, 3100\*, 3200\*, 3500\*, VC 3000 Persona, VC3000, VC3000IR

**Mortise type, battery operated units, with 3/4 in. (19.05 mm) latch bolts**, Model(s) Allure Series, Euro, ANSI and US ANSI, for use with steel doors rated 3 hr or less measuring up to 4 ft in width and 8 ft in height, wood and plastic-covered composite doors rated up to 1-1/2 hr (90 minutes) and wood core or timber doors rated 1/3 hr (20 minutes) measuring up to 3 ft 11 in. in width and 7 ft in height.

**Mortise type, battery operated units, with 3/4 in. (19.05 mm) latch bolts**, Model(s) Signature Series, Euro, ANSI and US ANSI, for use with Classified steel-covered composite, hollow-metal doors rated up to and including 3hr, wood and plastic-covered composite doors rated up to and including 1-1/2 hr measuring up to 4 ft in width and 8 ft in height.

**Mortise type, battery operated units, with 3/4 in. (19.05 mm) latch bolts, for use with doors rated 3/4 hr or less measuring up to (4 ft) in width and (8 ft) in height**, Model(s) 3000 DaVinci, Euro DaVinci, Presidio

**Mortise type, battery operated units, with 3/4 in. (19.05 mm) latch bolts, for use with steel composite and hollow metal doors rated 1/2 hr or less measuring up to 1219 mm (4 ft) in width and 2438 mm (8 ft) in height**, Model(s) Classic RFID Online

**Mortise type, battery operated units, with 3/4 in. (19.05 mm) latch bolts, for use with swinging fire doors rated up to and including 3/4 hr (45 minutes) measuring up to 4 ft in width and 8 ft in height**, Model(s) FLEX

**Mortise type, battery operated units, with 3/4 in. (19.05 mm) latch bolts, for use with timber doors rated 1/3 hr (20 minutes) measuring up to 3 ft 11 in. in width and 7 ft in height.**, Model(s) Euro, ANSI (DB) and US ANSI (DA).

**Mortise type, battery operated units, with 3/4 in. (19.05 mm) latch bolts, for use with wood and plastic-covered composite doors rated up to 1-1/2 hr (90 minutes) and wood-core doors rated 20 min, measuring up to 3 ft in width and 7 ft in height.**, Model(s) Essence Series.

\* - May include suffix C or S.

**DORMAKABA USA INC**

R13197

6161 E 75TH ST

PO BOX 50444

INDIANAPOLIS, IN 46250 USA

**Cylindrical electrified type, with 9/16 (14.3 mm) or 3/4 in. (19.1 mm) latch bolts, rated 24Vdc, 0.21 A or 12 Vdc, 0.25 A, Model(s) 8KW or 9KW, for use on doors not exceeding 4 ft (1219 mm) in width and 10 ft (3048 mm) in height, also available with aluminum or zinc.**

**Cylindrical electronic stand alone locksets, with 9/16 (14.3 mm) or 3/4 in. (19.1 mm) latch throws, Model(s) 8KV, 9KV, 9KG, 9KM, 9KN, 9KQ, 83KV, 84KV, 85KV, 83KW, 84KW, 9KBV, 93KW, 95KW or Basis 9KZ, for use on doors not exceeding 4 ft (1219 mm) in width and 10 ft (3048 mm) in height, also available with aluminum or zinc lever handles or brass or bronze knobs.**

**Cylindrical type, electrically controlled single point locksets, with 9/16 (14.3 mm) or 3/4 in. (19.1 mm) latch bolt throws, Model(s) 9KX, for Classified steel covered composite doors, hollow-metal doors rated up to 3 h, fiberglass, wood and plastic-covered composite doors rated up to 1-1/2 h, and wood-core doors rated 20 min.**

**Cylindrical type, with 1/2 in. (13 mm ) latch bolt for single doors, Model(s) C800, may be used with zinc lever handles.**

**Cylindrical type, with 1/2 in. latch bolts, rated 24 Vdc, 0.145 A or 12 Vdc, 0.25 A, Model(s) QCL170EL, QCL170ELX, QCL170EU, QCL170EUX**

**Cylindrical type, with 3/4 in. (19mm) latch bolt for pair doors, Model(s) C800, may be used with zinc lever handles.**

**Mortise electrified type, with 3/4 in. (19.1 mm) latch bolts, Model(s) 40HQ, 45HBV, 45HZ, 45HX, 45HN or 45HG, for use on doors not exceeding 4 ft. (1219 mm) in width and 10 ft. (3048 mm) in height rated up to and including 3hrs, also available with aluminum, brass, bronze, or stainless steel lever handles.**

**Mortise electrified type, with 3/4 in. (19.1 mm) latch bolts, Model(s) 45HM, 45HW or 40HW, for use on doors not exceeding 4 ft. (1219 mm) in width and 10 ft. (3048 mm) in height rated up to and including 3hrs, 45HW incorporates a Temperature Control Module (TCM-12V).**

**Mortise electrified type, with 3/4 in. (19.1 mm) latch bolts, rated 24 Vac or dc, 0.75 A or 12 Vdc, 0.55 A, Model(s) 40 IDH, 40 IDH 1300 or 40 IDH, for use on doors not exceeding 4 ft (1219 mm) in width and 10 ft (3048 mm) in height rated up to and including 3hrs, also available with aluminum, brass, bronze, stainless steel or zinc lever handles or brass or bronze knobs.**

**Mortise electrified type, with 3/4 in. (19.1 mm) latch bolts, rated 24 Vac or dc, 0.75 A; or 12 Vdc, 0.55 A, Model(s) 34HW or 35HW, for use on doors not exceeding 4 ft in width and 10 ft in height, up to and including 3hrs, also available with aluminum, brass, bronze, stainless steel or zinc lever handles or brass or bronze knobs.**

**Mortise electronic stand alone locksets, with 3/4 in. (19.1 mm) latch throws, Model(s) 34HV, 35HV, 35HG or Basis 35HZ, for use on doors not exceeding 4 ft (1219 mm) in width and 10 ft (3148 mm) in height rated up to and including 3hrs, also available with aluminum brass, bronze stainless steel or zinc lever handles or brass or bronze knobs.**

**Mortise or cylindrical type, with 1/2 or 3/4 in. latch bolt throws, Model(s) OM-100, OM-300, OM-500, followed by C, M, MD, MR, MDR, may include additional suffixes, with 1/2 inch latch bolt throw for cylindrical locks and with 3/4 inch latch bolt throw for mortise locks, 6 VDC alkaline battery operated 120 mA, for use with door rated 1-1/2 hr. and not exceeding 4 ft in width and 8 ft in height.**

**Mortise or cylindrical type, with 1/2 or 3/4 in. latch bolt throws, Model(s) OM2000, may include additional suffixes, with 1/2 inch latch bolt throw for cylindrical locks and with 3/4 inch latch bolt throw for mortise locks, 6 VDC alkaline battery operated 120 mA, for use with doors rated 1-1/2 hr. and not exceeding 4 ft in width and 8 ft in height.**



**Mortise or cylindrical type, with 1/2 or 3/4 in. latch bolt throws**, Model(s) OM250TL, followed by L, K, KB, KBC, M, MR, MD, MDR, LIC or RMS, may include additional suffixes, with 1/2 inch latch bolt throw for cylindrical locks and with 3/4 inch latch bolt throw for mortise locks, 6 VDC lithium battery operated 120 mA, for use with doors rated 20 min. and not exceeding 4 ft in width and 8 ft in height.

**Mortise or cylindrical type, with 1/2 or 3/4 in. latch bolt throws**, Model(s) OMW, OPW, EMW, PMW, PSW, QAW and QPW-2000, may include additional suffixes, with 1/2 inch latch bolt throw for cylindrical locks and with 3/4 in. latch bolt throw for mortise locks, VDC alkaline battery operated 120 mA, includes wireless antenna for access control system, for use with doors rated 1-1/2 hr. and not exceeding 4 ft in width and 8 ft in height.

**Mortise or cylindrical type, with 1/2 or 3/4 in. latch bolt throws**, Model(s) OP2000, may include additional suffixes, with 1/2 inch latch bolt throw for cylindrical locks and with 3/4 in. latch bolt throw for mortise locks, Vdc alkaline battery operated 120 mA, for use with doors rated 1-1/2 hr. and not exceeding 4 ft in width and 8 ft in height.

**Mortise type, with 3/4 in. (19 mm) latch bolt, for use with swinging type fire doors**, Model(s) M9000

**Tubular electrified type, with 1/2 in. (12.7 mm) latch bolt throws**, Model(s) QEL200, may be followed by suffixes, for use with door rated 1-1/2 hr. and not exceeding 4 ft (1219 mm) in width and 8 ft (2438 mm) in height..

Note - Models are evaluated in accordance with standard UL 10C.

Trademark and/or Tradename:    

**SCHLAGE LOCK CO LLC**  
11819 N PENNSYLVANIA ST  
CARMEL, IN 46032 USA

R8458

**Cylindrical type bored, rated 24 Vdc, 0.145 A**, Model(s) D80-EL, D80-EU may have additional suffixes. with a 1/2 in. latch bolt. The entire assembly shall be rated 24 v, dc, 0.145A. For use on fire rated steel single swing doors rated up to and including 3 h and fire rated single swing wood composite doors rated up to an including 1-1/2 h, measuring up to 4 ft. (1219 mm) wide and 10 ft. (3048 mm) high when incorporating a 1/2 in. (12.7 mm) latch throw. Fire rated steel pairs rated and fire rated wood composite pairs rated up to and including 1-1/2 h, measuring up to 8 ft. (2438 mm) wide and 10 ft. (3048 mm) high when incorporating a 3/4 in. (19.1 mm) latch throw.

**Cylindrical type bored, with 1/2 or 3/4 in. latch bolts**, Model(s) D12-EL, D12-EU, D80-EL or D80-EU, may have additional suffixes, D80PDEL, D80PDEU with 1/2 in. or 3/4 in. latch bolts, provided with solenoid rated 24 v, dc, .35 amp, for use on fire rated steel single swing doors rated up to and including 3 h and fire rated single swing wood composite doors rated up to an including 1-1/2 h, measuring up to 4 ft. (1219 mm) wide and 10 ft. (3048 mm) high when incorporating a 1/2 in. (12.7 mm) latch throw. Fire rated steel pairs rated and fire rated wood composite pairs rated up to and including 1-1/2 h, measuring up to 8 ft. (2438 mm) wide and 10 ft. (3048 mm) high when incorporating a 3/4 in. (19.1 mm) latch throw.

**Cylindrical type, with 1/2 in. (12.7 mm) or 3/4 in. (19.1 mm) latch bolts**, Model(s) Series NDE and NDEB for use on fire rated steel single swing doors rated up to and including 3 h and fire rated single swing wood composite doors rated up to an including 1-1/2 h, measuring up to 4 ft. (1219 mm) wide and 10 ft. (3048 mm) high when incorporating a 1/2 in. (12.7 mm) latch throw. Fire rated steel pairs rated and fire rated wood composite pairs rated up to and including 1-1/2 h, measuring up to 8 ft. (2438 mm) wide and 10 ft. (3048 mm) high when incorporating a 3/4 in. (19.1 mm) latch throw.

**Cylindrical type, with 1/2 in. (12.7 mm), 9/16 in. (14.3 mm) or 3/4 in. (19.1 mm) latch bolts**, Model(s) RU851 or RU881, for use with swinging fire doors measuring up to 48 in. (1219 mm) wide and 96 in. (2438 mm) height, rated for 24 Vdc, 0.15 A or 24 Vdc, 0.185 A.



**Cylindrical type, with 1/2 in. (12.7 mm), 9/16 in. (14.3 mm) or 3/4 in. (19.1 mm) latch bolts**, Model(s) T851, T881 for use on fire rated steel single swing doors rated up to and including 3 h and fire rated single swing wood composite doors rated up to an including 1-1/2 h, measuring up to 4 ft. (1219 mm) wide and 10 ft. (3048 mm) high when incorporating a 1/2 in. (12.7 mm) latch throw. Fire rated steel pairs rated and fire rated wood composite pairs rated up to and including 1-1/2 h, measuring up to 8 ft. (2438 mm) wide and 10 ft. (3048 mm) high when incorporating a 3/4 in. (19.1 mm) latch throw. Device is rated for 24 V dc, 0.15 A or 24 V dc, 0.185 A.

**Cylindrical type, with 1/2 in. latch bolts**, Model(s) KPL

**Cylindrical type, with 1/2 in. latch bolts, rated 24 Vdc, 0.145 A**, Model(s) D80-EU, D80-EU (a)

**Cylindrical type, with 1/2 or 3/4 in. latch bolts, "NDPEU and NDPEL Series"**, Model(s) NDPEU and NDPEL and Models ND12DEL, ND12DEU, ND80PDEL, ND80PDEU, ND80GDEL, ND80GDEU, ND80RDEL, ND80RDEU, ND96PDEL, ND96PDEU, ND96GDEL, ND96GDEU, ND96RDEL, ND96RDEU. For use on fire rated steel single swing doors rated up to and including 3 h and fire rated single swing wood composite doors rated up to an including 1-1/2 h, measuring up to 4 ft. (1219 mm) wide and 10 ft. (3048 mm) high when incorporating a 1/2 in. (12.7 mm) latch throw. Fire rated steel pairs rated and fire rated wood composite pairs rated up to and including 1-1/2 h, measuring up to 8 ft. (2438 mm) wide and 10 ft. (3048 mm) high when incorporating a 3/4 in. (19.1 mm) latch throw.

**Cylindrical type, with 1/2 or 3/4 in. latch bolts, for use on doors not exceeding 4 ft. (1219 MM) in wide by 10 ft. (3048 mm) high**, Model(s) Series AD 200, 300, 400 - CY, may have additional suffixes, for use on fire rated steel single swing doors rated up to and including 3 h and fire rated single swing wood composite doors rated up to an including 1-1/2 h, measuring up to 4 ft. (1219 mm) wide and 10 ft. (3048 mm) high when incorporating a 1/2 in. (12.7 mm) latch throw. Fire rated steel pairs rated and fire rated wood composite pairs rated up to and including 1-1/2 h, measuring up to 8 ft. (2438 mm) wide and 10 ft. (3048 mm) high when incorporating a 3/4 in. (19.1 mm) latch throw.

**Cylindrical type, with 1/2 or 3/4 in. latch bolts, for. (3048 mm) high**, Model(s) Series CO 100, 200, 220, 300, 400 - CY for use on fire rated steel single swing doors rated up to and including 3 h and fire rated single swing wood composite doors rated up to an including 1-1/2 h, measuring up to 4 ft. (1219 mm) wide and 10 ft. (3048 mm) high when incorporating a 1/2 in. (12.7 mm) latch throw. Fire rated steel pairs rated and fire rated wood composite pairs rated up to and including 1-1/2 h, measuring up to 8 ft. (2438 mm) wide and 10 ft. (3048 mm) high when incorporating a 3/4 in. (19.1 mm) latch throw

**Interconnected type, with a 1/2 in. (12.7 mm) latch bolts**, Model(s) FE410F20, for use with swinging type fire doors for a 20 minute rating, and suitable for use on wood core doors rated up to 20 min.

**Interconnected type, with a 1/2 in. (12.7 mm) latch bolts**, Model(s) FE410F90, for use with swinging type fire doors for a 90 minute rating.

**Interconnected type, with a 1/2 in. (12.7 mm) latch bolts, for swinging type fire doors, 9 Vdc battery operated**, Model(s) FE210F, FE215F

**Mortise type, with 3/4 in. (19 mm) latch bolts**, Model(s) LE, for use on single swinging type fire doors or on the active leaf of door pairs rated up to and including 3 hr., with individual door leafs measuring up to 48 in. (1219 mm) wide and 120 in. (3048 mm)

**Mortise type, with 3/4 in. (19.1 mm) latch bolts**, Model(s) L9090 or L9490, may be EL/EU and additional suffixes, for use on single swinging type fire doors or on the active leaf of door pairs rated up to and including 3 hr., with individual door leafs measuring up to 48 in. (1219 mm) wide and 120 in. (3048 mm) high.

**Mortise type, with 3/4 in. (19.1 mm) latch bolts**, Model(s) LEB, for use on single swinging type fire doors or on the active leaf of door pairs rated up to and including 3 hr., with individual door leafs measuring up to 48 in. (1219 mm) wide and 120 in. (3048 mm)

**Mortise type, with 3/4 in. (19.1 mm) latch bolts, rated 12 Vdc, 0.61 A or 12 Vac, 0.5 A or 24Vdc, 0.33 A or 24 Vac 0.3 A, Model(s) L9080-EL** for use on single swinging type fire doors or on the active leaf of door pairs rated up to and including 3 hr., with individual door leafs measuring up to 48 in. (1219 mm) wide and 120 in. (3048 mm) high.

**Mortise type, with 3/4 in. (19.1 mm) latch bolts, rated 12 Vdc, 0.61 A or 12 Vac, 0.5 A or 24Vdc, 0.33 A or 24 Vac 0.3 A, Model(s) L9080-EU** for use on single swinging type fire doors or on the active leaf of door pairs rated up to and including 3 hr., with individual door leafs measuring up to 48 in. (1219 mm) wide and 120 in. (3048 mm) high.

**Mortise type, with 3/4 in. (19.1 mm) latch bolts, rated 24 Vdc, 0.16 or 24 Vac, 0.255 A., Model(s) L9080-EL, L9080-EU, LV9080-EL or LV9080-EU,** may have additional suffixes, for use on single swinging type fire doors or on the active leaf of door pairs rated up to and including 3 hr., with individual door leafs measuring up to 48 in. (1219 mm) wide and 120 in. (3048 mm) high.

**Mortise type, with 3/4 in. (19.1 mm) latch bolts, with swinging type fire doors, rated 12 or 24 Vdc, "Falcon", Model(s) MA 851 (Fail Safe)** for use on single swing doors or on the active leaf of door pairs rated up to and including 3 hr., with individual door leafs measuring up to 48 in. (1219 mm) wide and 96 in. (2438 mm) high fire doors

**Mortise type, with 3/4 in. (19.1 mm) latch bolts, with swinging type fire doors, rated 12 or 24 Vdc, "Falcon", Model(s) MA 851-RX (Fail Safe)** for use on single swing doors or on the active leaf of door pairs rated up to and including 3 hr., with individual door leafs measuring up to 48 in. (1219 mm) wide and 96 in. (2438 mm) high fire doors

**Mortise type, with 3/4 in. (19.1 mm) latch bolts, with swinging type fire doors, rated 12 or 24 Vdc, "Falcon", Model(s) MA 881 (Fail Secure)** for use on single swing doors or on the active leaf of door pairs rated up to and including 3 hr., with individual door leafs measuring up to 48 in. (1219 mm) wide and 96 in. (2438 mm) high fire doors

**Mortise type, with 3/4 in. (19.1 mm) latch bolts, with swinging type fire doors, rated 12 or 24 Vdc, "Falcon", Model(s) MA 881-RX (Fail Secure)** for use on single swing doors or on the active leaf of door pairs rated up to and including 3 hr., with individual door leafs measuring up to 48 in. (1219 mm) wide and 96 in. (2438 mm) high fire doors

**Mortise type, with 3/4 in. latch bolts, for use on single swing doors or the active leaf of door pairs rated up to and including 3 hr., with individual door leafs measuring up to 48 in. (1219 mm) in wide by 120 in. (3048 mm) high, Model(s) AD 200-MD (a), AD 200-MS (a), AD 300-MD (a), AD 300-MS (a), AD 400-MD (a), AD 400-MS (a), CO 100-MD (a), CO 100-MS (a), CO 200-MD (a), CO 200-MS (a), CO 300-MD (a), CO 300-MS (a), CO 400-MD (a), CO 400-MS (a)**

**Mortise type, with 3/4 in. latch bolts, for use on single swing doors or the active leaf of door pairs rated up to and including 3 hr., with individual door leafs measuring up to 48 in. (1219 mm) in wide by 120 in. (3048 mm) high,, Model(s) CO 220-MD, CO 220-MS**

(a) - May have additional suffixes. Note - Models are also evaluated in accordance with Standard UL 10C.

**TOWNSTEEL INC**  
17901 RAILROAD ST  
CITY OF INDUSTRY, CA 91748-1113 USA

R21040

**Cylindrical type, with 1/2 in. (12.7 mm) latch bolts, Model(s) e-Elite series,** for use on single swinging type Classified steel-covered composite, hollow-metal doors rated up to 3 h; fiberglass, wood and plastic-covered composite doors rated up to 1-1/2 h; and wood-core doors rated 20 min for door sizes measuring up to 48 in. (1219 mm) wide by 96 in. (2438 mm) high

**Cylindrical type, with 1/2 in. (12.7 mm) latch bolts, Model(s) FCE,** for use on single swinging type Classified steel-covered composite, hollow-metal doors rated up to 3 h; fiberglass, wood and plastic-covered composite doors rated up to 1-1/2 h; and wood-core doors rated 20 min for door sizes measuring up to 48 in. (1219 mm) wide by 96 in. (2438 mm) high.

**Cylindrical type, with 1/2 in. (12.7 mm) latch bolts**, Model(s) XCE, for use on single swinging type Classified steel-covered composite, hollow-metal doors rated up to 3 h; fiberglass, wood and plastic-covered composite doors rated up to 1-1/2 h; and wood-core doors rated 20 min for door sizes measuring up to 48 in. (1219 mm) wide by 96 in. (2438 mm) high.

**Cylindrical type, with 1/2 or 3/4 in. latch bolts**, Model(s) XCDC

**Cylindrical type, with 3/4 in. (19 mm) latch bolts**, Model(s) XCD 6000

**Interconnected type, with 1/2 in. (12.7 mm) latch bolt, for use with swinging -type fire doors,,** Model(s) e-Genius Series

**Mortise type electrically controlled lockset, with a 3/4 in. (19 mm) latch bolt throw**, Model(s) e-KONTOS Series

**Mortise type electrically controlled locksets, with a 3/4 in. (19 mm) latch bolt throw, rated 1/3 hour**, Model(s) e-DOM, e-DOQ, e-Cronus, and e-Trident

**Mortise type, with 3/4 in. (19 mm) latch bolts, for use with swinging type fire doors, 6 Vdc battery operated**, Model(s) FME, Gibraltar, MT Select, Saflock MT, Saflok, Saflok V, TCOR A3385, TS A7385, TS A7485R4, TS A7605-PDK, TS A7615-PDK, TS M3805, TS M3807-PDK, TS M3807-PR, TS M3815, TS M3817-PDK, TS M3817-PR, TS M6705, TS M7805, TS M7815, TSL 3385A25, TSL A3335A20, TSL A3335A22, XME

Note - Models are evaluated in accordance with Standard UL 10C.

**TOWNSTEEL INC**

R26038

17901 RAILROAD ST

CITY OF INDUSTRY, CA 91748-1113 USA

**Mortise type, with 1/2 in. (12.7 mm) latch bolts, for use with swinging type fire doors**, Model(s) TS A5912-2 (Fail Secure), TS A5924-2 (Fail Secure)

**Mortise type, with 1/2 in. (12.7 mm) latch bolts, use with swinging type fire doors**, Model(s) TS A5912-1 (Fail Safe)

**Mortise type, with 3/4 in. (19 mm ) latch bolts, for use with swinging type fire doors**, Model(s) MX A7851-12 (Fail Safe), MX A7851-12-RX (a), MX A7851-24 (Fail Safe), MX A7851-24-RX (a), MX A7881-12 (Fail Secure), MX A7881-12-RX (a), MX A7881-24 (Fail Secure), MX A7881-24-RX (a), TS A7912-1 (Fail Safe), TS A7912-1-RQE-X (a), TS A7912-1DB (Fail Safe), TS A7912-2 (Fail Secure), TS A7912-2-RQE-X (a), TS A7912-2DB (Fail Secure), TS A7912PRIV-X, TS A7912PRIV-XDB, TS A7924-1 (Fail Safe), TS A7924-1-RQE-X (a), TS A7924-1DB (Fail Safe), TS A7924-2 (Fail Secure), TS A7924-2-RQE-X (a), TS A7924-2DB (Fail Secure)

(a) - Suffix -RX or RQE-X indicates - request to exit function. Note - Models are evaluated in accordance with Standard UL 10C.

**HAGER COMPANIES**

R26142

139 VICTOR ST

SAINT LOUIS, MO 63104-4724 USA

**Cylindrical type, with 1/2 in. (13 mm) latch bolts, rated 24 vdc, 0.145A or 12 vdc, 0.25A**, Model(s) 3480EL, 3480EL/RX, 3480EU, 3480EU/RX

**Cylindrical type, with 1/2 or 3/4 in. latch bolts**, Model(s) 34K Series

**Mortise Type, with 3/4 in. latch bolts, assembly may be rated 12vdc, 0.61A or 12vac, 0.5A or 24vdc, 0.33A or 24vac 0.3A**, Model(s) 3880DPM, 3880EL, 3880EL/RX, 3880EU, 3880EU/RX, 3882EL, 3882EL/RX, 3882EU, 3882EU/RX

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**Mortise Type, with 3/4 in. latch bolts, assembly may be rated as follows 12v dc, 0.61A or 12v ac, 0.5A or 24v dc, 0.33A or 24v ac 0.3A., Model(s) 3880RX**

**Mortise type, with Salto Ai6 Series Escutcheon, with 3/4 in. (19 mm) latch bolts, 6 vdc battery operated, Model(s) HB38, HE38, HK38, HP38, HR38, HS38, HT38**

Note - Models are evaluated in accordance with Standard UL 10C.

**CODELOCKS INC**

R26926

1929 Main St, Suite 104

Irvine, CA 92614 USA

**Cylindrical type, with a 1/2 in. latch bolt, 6 vdc battery operated, Model(s) CL5000**

Note - Models are evaluated in accordance with Standard UL 10C.

**SECUREALL CORP**

R27436

695 WOBURN CT

MOUNTAIN VIEW, CA 94040 USA

**Mortise type, with 1/2 in. (13 mm) latch bolts, Model(s) SA-CDR**

**Mortise type, with 3/4 in. (19 mm) latch bolts, Model(s) SA-MDR**

Note - Models are evaluated in accordance with Standard UL 10C.

**DESIGN HARDWARE L L C**

R27401

3440 STANWOOD BLVD NE

HUNTSVILLE, AL 35811 USA

**Cylindrical type, with 1/2 in. latch bolts, rated 24 v dc, 0.13A or 12 v dc, 0.29A, Model(s) E-Z-86M-FSE@, E-Z-86M-FSF@, E-Z-87M-FSE@, E-Z-87M-FSF@**

**Cylindrical type, with 1/2 in. latch bolts, rated 24 vdc, 0.145A or 12v dc, 0.25A, Model(s) E-Z-86-FSE@, E-Z-86-FSF@, E-Z-87-FSE@, E-Z-87-FSF@, Z-86@**

**Cylindrical type, with a 1/2 in. (12.7 mm) latch bolts, Model(s) KPC Series, with a 1/2 in. (12.7 mm) latch bolt intended for use on single swinging type Classified steel-covered composite, hollow-metal doors rated up to 3 h; fiberglass, wood and plastic-covered composite doors rated up to 1-1/2 h; and wood-core doors rated 20 min for door sizes measuring up to 48 in. (1219 mm) wide by 96 in. (2438 mm) high.**

**Cylindrical type, with a 1/2 in. (12.7 mm) latch bolts, Model(s) RFC Series, with a 1/2 in. (12.7 mm) latch bolt intended for use on single swinging type Classified steel-covered composite, hollow-metal doors rated up to 3 h; fiberglass, wood and plastic-covered composite doors rated up to 1-1/2 h; and wood-core doors rated 20 min for door sizes measuring up to 48 in. (1219 mm) wide by 96 in. (2438 mm) high.**

**Mortise type, with 3/4 in. (19 mm) latch bolts, rated as 12v dc, 0.61A or 12v ac, 0.5A or 24v dc, 0.33A or 24v ac 0.3A, Model(s) E-M-07-FSE\*, E-M-07-FSF\*, E-M-30-FSE\*, E-M-30-FSF\*, M-Series\***

**Mortise type, with 3/4 in. latch bolts, Model(s) E-M-07M-FSE\*, E-M-07M-FSF\*, E-M-30M-FSE\*, E-M-30M-FSF\***

**Mortise type, with 3/4 in. latch bolts, for use 6 Vdc battery operated swinging type fire doors, Model(s) KPM, RFM**

\* - May be followed by REX, LBM or SM, where M refers to the alternate motor operated lockset modifications.

@ - May be followed by REX for E-Z.

Note - Models are evaluated in accordance with Standard UL 10C.

**CORBIN RUSSWIN INC**

R7863

225 EPISCOPAL RD

BERLIN, CT 06037-1524 USA

**Cylindrical type, with 1/2 in. (13 mm) latch bolts, rated 12 or 120/24v dc**, Model(s) CL33600, IN Series access control products, prefixes IP, IPS, CP, BIP, BIPS, BCP or 700 multi-class access control products, prefixes TCPIP1, TCPWI1, SELP10 multi-class Series access control products with Access 600, prefix SE.

**Cylindrical type, with 1/2 in. (13 mm) latch bolts, rated 9v dc**, Model(s) CL33100, CL33700, CL33800 or CL33800 TCNE, IN Series access control products, prefixes IP, IPS, CP, BIP, BIPS, BCP or 700 multi-class access control products, prefixes TCPIP1, TCPWI1, SELP10 multi-class series access control products with Access 600, prefix SE.

**Mortise type, with 3/4 in. (19 mm) latch bolts, "ML20900 Series"**, Model(s) ML20906xSAF (\$), ML20906xSEC (\$), ML20907xSAF (\$), ML20907xSEC (\$), ML20914xSAF (\$), ML20914xSEC (\$), ML20915xSAF (\$), ML20915xSEC (\$), ML20932xSAF (\$), ML20932xSEC (\$), ML20987xSAF(\$), ML20987xSEC (\$)

**Mortise type, with 3/4 in. (19 mm) latch bolts**, Model(s) ML20100, ML20200, ML20700, ML20800 or ML20800 TCNE Series, for use with doors rated up to 3 hrs, measuring up to and including 4 ft (1219 mm) wide by 10 ft (3048 mm) high. Rated 9 v dc. IN Series access control products, prefixes IP, IPS, CP, BIP, BIPS, BCP or 700 multi-class access control products, prefixes TCPIP1, TCPWI1, SELP10 multi-class Series access control products with Access 600, prefix SE.

**Mortise type, with 3/4 in. (19 mm) latch bolts**, Model(s) ML20600, for use with doors rated up to 3 hrs, measuring up to and including 4 ft (1219 mm) wide by 10 ft (3048 mm) high, rated 12 or 120/24v dc, IN Series access control products, prefixes IP, IPS, CP, BIP, BIPS, BCP or 700 multi-class access control products, prefixes TCPIP1, TCPWI1, SELP10 multi-class Series access control products with Access 600, prefix SE.

(\$) - for use with doors rated up to 3 hrs, measuring up to and including 4 ft (1219 mm) wide by 10 ft (3048 mm) high.

Note - Models are also evaluated in accordance with Standard UL10C.