DESIGN N° U906
BXUV.U906
FIRE - RESISTANCE RATINGS - ANSI/UL 263

DESIGN/SYSTEM/CONSTRUCTION/ASSEMBLY USAGE DISCLAIMER:

• AUTHORITIES HAVING JURISDICTION SHOULD BE CONSULTED IN ALL CASES AS TO THE PARTICULAR REQUIREMENTS COVERING THE INSTALLATION AND USE OF UL CERTIFIED PRODUCTS, EQUIPMENT, SYSTEM, DEVICES, AND MATERIALS.
• AUTHORITIES HAVING JURISDICTION SHOULD BE CONSULTED BEFORE CONSTRUCTION.
• FIRE RESISTANCE ASSEMBLIES AND PRODUCTS ARE DEVELOPED BY THE DESIGN SUBMITTER AND HAVE BEEN INVESTIGATED BY UL FOR COMPLIANCE WITH APPLICABLE REQUIREMENTS. THE PUBLISHED INFORMATION CANNOT ALWAYS ADDRESS EVERY CONSTRUCTION NUANCE ENCOUNTERED IN THE FIELD.
• WHEN FIELD ISSUES ARISE, IT IS RECOMMENDED THE FIRST CONTACT FOR ASSISTANCE BE THE TECHNICAL SERVICE STAFF PROVIDED BY THE PRODUCT MANUFACTURER NOTED FOR THE DESIGN. USERS OF FIRE RESISTANCE ASSEMBLIES ARE ADVISED TO CONSULT THE GENERAL GUIDE INFORMATION FOR EACH PRODUCT CATEGORY AND EACH GROUP OF ASSEMBLIES. THE GUIDE INFORMATION INCLUDES SPECIFICS CONCERNING ALTERNATE MATERIALS AND ALTERNATE METHODS OF CONSTRUCTION.
• ONLY PRODUCTS WHICH BEAR UL'S MARK ARE CONSIDERED CERTIFIED.

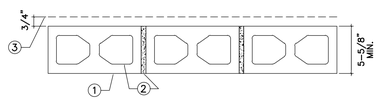
BXUV – FIRE RESISTANCE RATINGS – ANSI/UL 263
BXUV7 – FIRE RESISTANCE RATINGS – CAN/ULC–S101 CERTIFIED FOR CANADA

See General Information for Fire–resistance Ratings – ANSI/UL 263
See General Information for Fire Resistance Ratings – CAN/ULC–S101 Certified for Canada

DESIGN N° U906
BEARING WALL RATING– 2 HR.
NONBEARING WALL RATING– 2 HR.

THIS DESIGN WAS EVALUATED USING A LOAD DESIGN METHOD OTHER THAN THE LIMIT STATES DESIGN METHOD (E.G., WORKING STRESS DESIGN METHOD). FOR JURISDICTIONS EMPLOYING THE LIMIT STATES DESIGN METHOD, SUCH AS CANADA, A LOAD RESTRICTION FACTOR SHALL BE USED–SEE GUIDE BXUV OR BXUV7.

*INDICATES SUCH PRODUCTS SHALL BEAR THE UL OR CUL CERTIFICATION MARK FOR JURISDICTIONS EMPLOYING THE UL OR CUL CERTIFICATION (SUCH AS CANADA), RESPECTIVELY.



HORIZONTAL SECTION

1. **CONCRETE BLOCKS*** – NOMINAL 6 BY 8 BY 16 IN, HOLLOW OR SOLID. VARIOUS DESIGNS. CLASSIFICATION (2 HR). SEE CONCRETE BLOCKS CATEGORY FOR LIST OF ELIGIBLE MANUFACTURERS.

   ANCHOR CONCRETE PRODUCTS INC

   GAGNE & SON CONCRETE BLOCK INC

   GLENWOOD MASONRY PRODUCTS

   ALLOWABLE COMPRESSIVE STRESS OF 57% OF MAX ALLOWABLE COMPRESSIVE STRESS IN ACCORDANCE WITH THE EMPIRICAL DESIGN METHOD.

   OLDCASTLE APG SOUTH INC, DBA ADAMS PRODUCTS

   WESTBROOK CONCRETE BLOCK CO INC

   ALLOWABLE COMPRESSIVE STRESS OF 75.6% OF MAX ALLOWABLE COMPRESSIVE STRESS IN ACCORDANCE WITH THE EMPIRICAL DESIGN METHOD.

2. **MORTAR** – BLOCKS LAID IN FULL BED OF MORTAR, NOM. 3/8 IN. THICK, OF NOT LESS THAN 2–1/4 AND NOT MORE THAN 3–1/2 PARTS OF CLEAN SHARP SAND TO 1 PART PORTLAND CEMENT (PROPORTIONED BY VOLUME) AND NOT MORE THAN 50 PERCENT HYDRATED LIME (BY CEMENT VOLUME). VERTICAL JOINTS STAGGERED.

3. **PORTLAND CEMENT STUCCO OR GYPSUM PLASTER** – ADD 1/2 HR TO CLASSIFICATION IF USED. ATTACHED TO CONCRETE BLOCKS (ITEM 1).

4. **FOAMED PLASTIC*** – (OPTIONAL–NOT SHOWN) – 1–1/2" IN. THICK MAX. 4 FT WIDE SHEATHING ATTACHED TO CONCRETE BLOCKS (ITEM 1).

   ATLAS ROOFING CORP – "ENERGYSHIELD PRO WALL INSULATION", "ENERGYSHIELD PRO 2 WALL INSULATION", ENERGYSHIELD CGF PRO AND ENERGYSHIELD PLY PRO.

   CARLISLE COATINGS & WATERPROOFING INC – TYPE R2+ SHEATHE

   FIRESTONE BUILDING PRODUCTS CO L L C "ENVERGEDI CI FOIL EXTERIOR WALL INSULATION" AND "ENVERGED CI GLASS EXTERIOR WALL INSULATION"

   HUNTER PANELS – TYPES XCI–CLASS A, XCI 286.

   RMAX OPERATING L L C – "TSX–8500", "TSX–8510", "THERMASHEATH–XP", "ECOMAXCI", "THERMASHEATH–3", "DURASHEATH–3".

   THE DOW CHEMICAL CO – TYPES THERMAX SHEATHING, THERMAX LIGHT DUTY INSULATION, THERMAX HEAVY DUTY INSULATION, THERMAX METAL BUILDING BOARD, THERMAX WHITE FINISH INSULATION, THERMAX CI EXTERIOR INSULATION, THERMAX XARMOR CI EXTERIOR INSULATION, THERMAX IH INSULATION, THERMAX PLUS LINER PANEL, THERMAX HEAVY DUTY PLUS (HDP) AND TUFF–R™ CI INSULATION.

4A. **BUILDING UNITS** – AS AN ALTERNATE TO ITEMS 5, MIN. 1–IN THICK POLYISOCYANURATE COMPOSITE FOAMED PLASTIC INSULATION BOARDS, NOM. 48 BY 48 OR 96 IN.

   RMAX OPERATING L L C – "THERMASHEATH–SI".

* INDICATES SUCH PRODUCTS SHALL BEAR THE UL OR CUL CERTIFICATION MARK FOR JURISDICTIONS EMPLOYING THE UL OR CUL CERTIFICATION (SUCH AS CANADA), RESPECTIVELY.

5 DESIGN N° U906 BXUV.U906 FIRE-RESISTANCE RATINGS -ANSI/UL 263

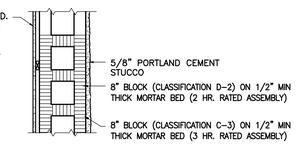
N.T.S

U.L. DESIGN # U906 (2HR. RATED ASSEMBLY)

NOTE:
SEE UL FIRE RESIST DIRECTORY FOR DETAILED ASSEMBLY CONSTRUCTION.

1/2" GYP. BD. ON 2 X 2 P.T. WD. FURRING @ 24" O.C. WITH R–7.1 INSULATION AT EXTERIOR TENANT SEPARATIONS (MTL. CHANNEL IN LIEU OF WD. FURRING @ BUILDER' SORPTION)

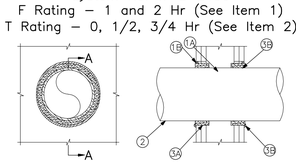
NOTE:
IF CELLS ARE FILLED WITH LOOSE MASONRY FILL, BLOCK CLASSIFICATION D2 OR C3 MAY BE USED FOR 4 HR RATING



9 RATED BLOCK WALL DETAIL (EXTERIOR)

N.T.S

System No. W–L–2406
F Rating – 1 and 2 Hr (See Item 1)
T Rating – 0, 1/2, 3/4 Hr (See Item 2)



SECTION A–A

1. Wall Assembly – The 1 or 2 hr fire–rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs – Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 3–1/2 in. wide and spaced max 24 in. OC.
   B. Gypsum Board* – One or two layers of nom 5/8 in. thick gypsum board, as specified in the individual Wall and Partition Design. See Table under Item 3B for max diam of opening.
2. Through–Penetrants – One nonmetallic pipe installed within the firestop system. See Table under Item 3B for annular space required in the firestop system. Pipe to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes may be used:
   A. Polyvinyl Chloride (PVC) Pipe – Nom 6 in. diam (or smaller) Schedule 40 cellular or solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   B. Chlorinated Polyvinyl Chloride (CPVC) Pipe – Nom 6 in. diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping system.
   C. Acrylonitrile Butadiene Styrene (ABS) Pipe – Nom 4 in. diam (or smaller) Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   The T Rating for 2 hr fire–rated walls is 0 hr. The T Rating for 1 hr fire–rated walls is 3/4 hr for nom 1–1/2, 2 and 3 in. diam through penetrants. The T Rating for 1 hr fire–rated walls is 1/2 hr for nom 4 and 6 in. diam through penetrants.
3. Firestop System – The firestop system shall consist of the following:
   A. Fill, Void or Cavity Material* – Wrap Strip – See Table under Item 3B for min size of intumescent wrap strip. The wrap strip is continuously wrapped around the outer circumference of the pipe once and slid into the annular space such that approx 1/8 in. of the wrap strip protrudes from the wall surface. Wrap strip is held in place with integral fastening tape. Wrap strip installed on each surface of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC – CP 648S – 1.5", CP 648S – 2", CP 648S – 3", CP 648S – 4" and CP 648S – 6"
   B. Fill, Void or Cavity Material* – Caulk – Min 1/4 in. thickness of fill material applied within the annulus, flush with both surfaces of wall. For 2 hr fire–rated walls, 1/4 in. bead fill material also applied at wrap strip/gypsum wall interface. In 1 hr fire–rated walls, fill material is optional for nom 1–1/2, 2, 3 and 4 in. diam penetrants.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC – FS–One Sealant

NOMINAL PIPE DIAMETER	TYPE OF PIPE	PRODUCT DESCRIPTION	MAXIMUM DIAMETER OF OPENING	ANNULAR SPACE	
				MINIMUM	MAXIMUM
1–1/2"	ALL	CP 648S – 1.5"	2–3/8"	3/16"	5/16"
2"	ALL	CP 648S – 2"	3"	3/16"	5/16"
3"	ALL	CP 648S – 3"	4"	3/16"	5/16"
4"	ALL	CP 648S – 4"	5–3/8"	3/8"	1/2"
6"	PVC AND CPVC	CP 648S – 6"	8"	9/16"	13/16"

*Bearing the UL Classification Mark

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4 WL 2406

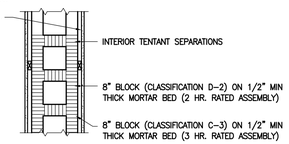
N.T.S

U.L. DESIGN # U906 (2HR. RATED ASSEMBLY)

NOTE:
SEE UL FIRE RESIST DIRECTORY FOR DETAILED ASSEMBLY CONSTRUCTION.

1/2" GYP. BD. ON 2 X 2 P.T. WD. FURRING @ 24" O.C. WITH R–4.1 INSULATION AT INTERIOR TENANT SEPARATIONS (MTL. CHANNEL IN LIEU OF WD. FURRING @ BUILDER' SORPTION)

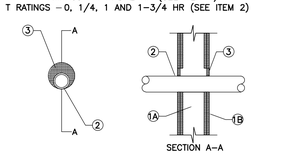
NOTE:
IF CELLS ARE FILLED WITH LOOSE MASONRY FILL, BLOCK CLASSIFICATION D2 OR C3 MAY BE USED FOR 4 HR RATING



8 RATED BLOCK WALL DETAIL (INTERIOR)

N.T.S

SYSTEM N°. W–L–2241
F RATINGS –1 AND 2 HR (SEE ITEM 1)
T RATINGS – 0, 1/4, 1 AND 1–3/4 HR (SEE ITEM 2)



SECTION A–A

1. **WALL ASSEMBLY** –THE 1 OR 2 HR FIRE–RATED GYPSUM BOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES WALL OR PARTITION DESIGN IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:

   A) STUDS – WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 BY 4 IN. LUMBER SPACED 16 IN. OC. STEEL STUDS TO BE MIN 3–5/8 IN. WIDE AND SPACED MAX 24 IN. OC.
   B) GYPSUM BOARD* – THICKNESS, TYPE, NUMBER OF LAYERS AND FASTENERS AS SPECIFIED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. MAX DIAM OF OPENING IS 1 IN. LARGER THAN OD OF CABLE (ITEM 2).

   THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED. WHEN ITEM 2G OR 2H IS USED, THE HOURLY F RATING IS 1 HR.

   3. CABLE –ONE CABLE TO BE INSTALLED ECCENTRICALLY OR CONCENTRICALLY WITHIN THE OPENING. THE ANNULAR SPACE BETWEEN THE CABLE AND THE PERIPHERY OF THE OPENING SHALL BE MIN 0 IN. (POINT CONTACT) TO MAX 1 IN. CABLE TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF THE FLOOR OR WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF CABLE MAY BE USED:

   A) MAX 200 PAIR NO. 24 AWG (OR SMALLER) COPPER CONDUCTOR WITH POLYVINYL CHLORIDE (PVC) INSULATION AND JACKETING MATERIAL.
   B) MAX 1/C NO. 350 KCMIL (OR SMALLER) COPPER CONDUCTOR CABLE WITH CROSS–LINKED POLYETHYLENE (XLPE) JACKET.
   C) MAX 7/C NO. 12 AWG (OR SMALLER) COPPER CONDUCTOR POWER AND CONTROL CABLES WITH XLPE OR PVC INSULATION WITH XLPE OR PVC JACKET.
   D) MAX 3/C NO. 2/0 AWG (OR SMALLER) COPPER OR ALUMINUM CONDUCTOR SER CABLES WITH PVC INSULATION AND JACKET.
   E) MAX 3/C NO. 2/0 AWG (OR SMALLER) COPPER CONDUCTOR PVC JACKETED ALUMINUM CLAD OR STEEL CLAD TEK CABLE.
   F) MAX 110/125 FIBER OPTIC (F.O.) CABLE WITH PVC INSULATION AND JACKET.
   G) MAX 3/C WITH GROUND NO. 8 AWG (OR SMALLER) COPPER CONDUCTOR MV CABLE (ROMEX) WITH PVC INSULATION AND JACKET.
   H) MAX RG/U COAXIAL CABLE WITH FLUORINATED ETHYLENE INSULATION AND JACKET.
   I) MAX 4 PAIR NO. 24 AWG (OR SMALLER) COPPER CONDUCTOR DATA CABLE WITH HYLAR JACKET AND INSULATION.

   2A. THROUGH PENETRATING PRODUCT* –AS AN ALTERNATE TO THE CABLES (ITEM 2), ONE MAX 4/C NO. 2/0 AWG (OR SMALLER) ALUMINUM OR STEEL ARMORED CABLE+ OR METAL CLAD CABLE+ INSTALLED WITHIN THE OPENING. ANNULAR SPACE BETWEEN THROUGH–PENETRATING PRODUCT AND PERIPHERY OF OPENING TO BE MIN 0 IN. (POINT CONTACT) TO MAX 1 IN. THROUGH PENETRATING PRODUCT RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY. WHEN ARMORED CABLE OR METAL CLAD CABLE IS USED, T RATING IS 1/4 HR. AFC CABLE SYSTEMS INC

   3. FILL, VOID OR CAVITY MATERIAL* –SEALANT –MIN 5/8 IN. THICKNESS OF FILL MATERIAL APPLIED WITHIN ANNULUS, FLUSH WITH BOTH SURFACES OF WALL ASSEMBLY. SEALANT TO BE FORCED INTO INTERSTICES OF CABLE BUNDLE TO MAX EXTENT POSSIBLE AT POINT CONTACT LOCATION. MIN 1/4 IN. (6 MM) DIAM BEAD OF FILL MATERIAL APPLIED AT CABLE/GYPSUM BOARD INTERFACE ON BOTH SURFACES OF WALL.

   SPECIFIED TECHNOLOGIES INC –SPECSEAL LCI SEALANT

   *** Bearing the UL Classification Mark**

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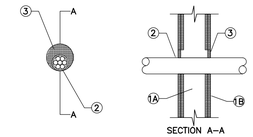
3 WL 2241

N.T.S

SYSTEM N°. W–L–3171
F RATINGS –1 AND 2 HR (SEE ITEM 1)
T RATINGS –1/4, 1 AND 3/4 HR (SEE ITEM 2A)



SECTION A–A

1. **WALL ASSEMBLY** –THE 1 OR 2 HR FIRE–RATED GYPSUM BOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES WALL OR PARTITION DESIGN IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:

   A) STUDS –WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 BY 4 IN (51 BY 102 MM) LUMBER SPACED MAX 16 IN. (406 MM) OC. STEEL STUDS TO BE MIN 3–5/8 IN. (92 MM) WIDE AND SPACED MAX 24 IN. (610 MM) OC.
   B) GYPSUM BOARD* –THICKNESS, TYPE, NUMBER OF LAYERS AND FASTENERS AS SPECIFIED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. MAX DIAM OF OPENING IS 1 IN. (25 TO 29 MM) LARGER THAN OUTSIDE DIAM OF PIPE.

   THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED. WHEN ITEM 2G OR 2H IS USED, T RATING IS 1 HR.

   2. THROUGH PENETRANTS – ONE NONMETALLIC PIPE OR CONDUIT TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. THE ANNULAR SPACE BETWEEN THE TUBING AND THE EDGE OF THE OPENING SHALL BE MIN 1/8 IN. TO (3.2 MM) MAX 1/4 IN. (6 MM). PIPE OR CONDUIT TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF THE FLOOR OR WALL ASSEMBLY. THE FOLLOWING TYPES OF PIPE OR CONDUIT MAY BE USED:

   A) POLYVINYL CHLORIDE (PVC) PIPE – NOM 2 IN. (51 MM) DIAM (OR SMALLER) SCHEDULE 40 SOLID OR CELLULAR CORE PVC PIPE FOR USE CLOSED (PROCESS OR SUPPLY) OR
   VENTED (DRAIN, WASTE OR VENT) PIPING SYSTEMS. ANNULAR SPACE SHALL BE MIN 0 IN. (0 MM, POINT CONTACT) TO MAX 1 IN. (25 MM).
   B) CHLORINATED POLYVINYL CHLORIDE (CPVC) PIPE – NOM 2 IN. (51 MM) DIAM (OR SMALLER) SDR 13.5 OR SCHEDULE 80 CPVC PIPE FOR USE IN CLOSED (PROCESS OR SUPPLY)
   PIPING SYSTEMS. ANNULAR SPACE SHALL BE MIN 0 IN. (0 MM, POINT CONTACT) TO MAX 1 IN. (25 MM).
   C) RIGID NONMETALLIC CONDUIT+ –NOM 2 IN. (51 MM) DIAM (OR SMALLER) SCHEDULE 40 PVC CONDUIT INSTALLED IN ACCORDANCE WITH ARTICLE 347 OF THE NATIONAL ELECTRICAL
   CODE (NFPA 70). ANNULAR SPACE SHALL BE MIN 0 IN. (0 MM, POINT CONTACT) TO MAX 1 IN. (25 MM).
   D) ELECTRICAL NONMETALLIC CONDUIT + –NOM 2 IN. (51 MM) DIAM (OR SMALLER) PVC TUBING INSTALLED IN ACCORDANCE WITH ARTICLE 331 OF THE NATIONAL ELECTRICAL CODE
   (NFPA 70). ANNULAR SPACE SHALL BE MIN 0 IN. (0 MM, POINT CONTACT) TO MAX 1 IN. (25 MM).
   E) CROSS LINKED POLYETHYLENE (PEX) TUBING –NOM 1 IN. (25 MM) DIAM (OR SMALLER) SDR9 PEX TUBING FOR USE IN CLOSED (PROCESS OR SUPPLY) PIPING SYSTEMS. ANNULAR
   SPACE SHALL BE MIN 0 IN. (0 MM, POINT CONTACT) TO MAX 1 IN. (25 MM).
   F) ACRYLONITRILE BUDADIENE STYRENE (ABS) PIPE –NOM 1–1/2 IN. (38 MM) DIAM (OR SMALLER) SCHEDULE 40 SOLID–CORE OR CELLULAR CORE ABS PIPE FOR USE IN CLOSED
   (PROCESS OR SUPPLY) OR VENTED (DRAIN, WASTE OR VENT) PIPING SYSTEMS. ANNULAR SPACE SHALL BE MIN 1/4 IN (6 MM) TO MAX 3/4 IN(19 MM).

   WHEN ITEM 2A OR 2B IS USED, THE T RATING IS 1/4 HR. WHEN ITEM 2C, 2D, OR 2E IS USED, THE T RATING IS 1 HR AND 1–3/4 HR FOR 1 HR AND 2 HR FIRE RATED WALLS, RESPECTIVELY. WHEN ITEM 2F, 2G, OR 2H IS USED, T RATING IS 0 HR.

   FILL, VOID OR CAVITY MATERIAL* –SEALANT –MIN 5/8 IN. (16 MM) THICKNESS OF FILL MATERIAL APPLIED WITHIN ANNULUS, FLUSH WITH BOTH SURFACES OF WALL ASSEMBLY. AT POINT CONTACT LOCATION, MIN 1/4 IN. (6 MM) DIAM BEAD OF FILL MATERIAL APPLIED AT NONMETALLIC PIPE/GYPSUM BOARD INTERFACE ON BOTH SURFACES OF WALL. **SPECIFIED TECHNOLOGIES INC** –SPECSEAL LCI SEALANT

   *** Bearing the UL Classification Mark**

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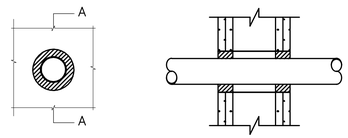
7 WL 3171

N.T.S

SEALANT CONT. @ JT. (TYP.)

F RATINGS – 1 AND 2 HR
(SEE ITEM 1)
T RATINGS – 0 HR



SECTION A–A

1. Wall Assembly The 1 or 2 hr fire–rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2–1/2 in. wide and spaced max 24 in. OC.
   B. Gypsum Board* 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 3–1/2 in.
2. Metallic Sleeve Optional Nom 3–1/2 in. (or smaller) cylindrical sleeve fabricated from min 0.016 in. thick (28 gauge) galv sheet steel and having a min 1–1/4 in. lap salong longitudinal seam. Length of sleeve to be installed flush with wall surfaces.
3. Through Penetrants One nonmetallic pipe installed within the firestop system. Pipe to be rigidly supported on both sides of wall assembly. The space between pipe and periphery of opening shall be min 1/4 in to max 11/16 in. The following types and sizes of nonmetallic pipes may be used:
   A. Polyvinyl Chloride (PVC) Pipe Nom 2 in. diam (or smaller) Schedule 40 PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   B. Chlorinated Polyvinyl Chloride (CPVC) Pipe Nom 2 in. diam (or smaller) SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
4. Fill, Void or Cavity Materials* – Sealant For 1 hr F Rating, min 5/8 in. thickness of fill material applied within the annulus, flush with both surfaces of wall. For 2 hr F Rating, min 1–1/4 in. thickness of fill material applied within annulus, flush with both surfaces of wall.

   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC – FS–ONE Sealant *Bearing the UL Classification Marking

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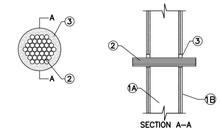
2 WL 2128

N.T.S

SYSTEM N°. W–L–3169
F RATINGS – 1 AND 2 HR (SEE ITEM 1)
T RATINGS – 1/4, 1 AND 3/4 HR (SEE ITEM 2A)



SECTION A–A

1. **WALL ASSEMBLY** –THE 1 OR 2 HR FIRE–RATED GYPSUM BOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES WALL OR PARTITION DESIGN IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:

   A. **STUDS** –WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 BY 4 IN. (51 BY 102 MM) LUMBER SPACED 16 IN. (406 MM) OC. STEEL STUDS TO BE MIN 3–5/8 IN. (92 MM) WIDE AND SPACED MAX 24 IN. (610 MM) OC.

   B. **GYPSUM BOARD*** –THICKNESS, TYPE, NUMBER OF LAYERS AND FASTENERS AS SPECIFIED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. MAX DIAM OF OPENING IS 5 IN.

   THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED.

   2. CABLES –MAX 4–1/2 IN. DIAM TIGHT BUNDLE OF CABLES TO BE INSTALLED ECCENTRICALLY OR CONCENTRICALLY WITHIN THE OPENING. THE ANNULAR SPACE BETWEEN THE CABLES AND THE PERIPHERY OF THE OPENING SHALL BE MIN 0 IN. (0 MM, POINT CONTACT) TO MAX 1/2 IN. (13 MM). CABLE BUNDLE TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF THE FLOOR OR WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF CABLES MAY BE USED:

   A) MAX 200 PAIR NO. 24 AWG (OR SMALLER) COPPER CONDUCTOR WITH POLYVINYL CHLORIDE (PVC) INSULATION AND JACKETING MATERIAL.
   B) MAX 1/C NO. 350 KCMIL (OR SMALLER) COPPER CONDUCTOR CABLE WITH CROSS–LINKED POLYETHYLENE (XLPE) JACKET.
   C) MAX 7/C NO. 12 AWG (OR SMALLER) COPPER CONDUCTOR POWER AND CONTROL CABLES WITH XLPE OR PVC INSULATION WITH XLPE OR PVC JACKET.
   D) MAX 3/C NO. 2/0 AWG (OR SMALLER) COPPER OR ALUMINUM CONDUCTOR SER CABLES WITH PVC INSULATION AND JACKET.
   E) MAX 3/C NO. 2/0 AWG (OR SMALLER) COPPER CONDUCTOR PVC JACKETED ALUMINUM CLAD OR STEEL CLAD TEK CABLE.
   F) MAX 110/125 FIBER OPTIC (F.O.) CABLE WITH PVC INSULATION AND JACKET.
   G) MAX 3/C WITH GROUND NO. 8 AWG (OR SMALLER) COPPER CONDUCTOR MV CABLE (ROMEX) WITH PVC INSULATION AND JACKET.
   H) MAX RG/U COAXIAL CABLE WITH FLUORINATED ETHYLENE INSULATION AND JACKET.
   I) MAX 4 PAIR NO. 24 AWG (OR SMALLER) COPPER CONDUCTOR DATA CABLE WITH HYLAR JACKET AND INSULATION.

   2A. THROUGH PENETRATING PRODUCT* –AS AN ALTERNATE TO THE CABLES (ITEM 2), MAX 4 IN. (102 MM) DIAM TIGHT BUNDLE OF MAX 4/C NO. 2/0 AWG (OR SMALLER) ALUMINUM OR STEEL ARMORED CABLE+ OR METAL CLAD CABLE+ INSTALLED WITHIN THE OPENING. ANNULAR SPACE BETWEEN THROUGH–PENETRATING PRODUCTS AND PERIPHERY OF OPENING TO BE MIN 0 IN. (0 MM, POINT CONTACT) TO MAX 1 IN. (25 MM). THROUGH PENETRATING PRODUCT RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY. **WHEN ARMORED CABLE OR METAL CLAD CABLE IS USED, T RATING IS 1/4 HR. AFC CABLE SYSTEMS INC**

   3. FILL, VOID OR CAVITY MATERIAL* –SEALANT –MIN 5/8 IN. (16 MM) THICKNESS OF FILL MATERIAL APPLIED WITHIN ANNULUS, FLUSH WITH BOTH SURFACES OF WALL ASSEMBLY. SEALANT TO BE FORCED INTO INTERSTICES OF CABLE BUNDLE TO MAX EXTENT POSSIBLE AT POINT CONTACT LOCATION. MIN 1/4 IN. (6 MM) DIAM BEAD OF FILL MATERIAL APPLIED AT CABLE BUNDLE/GYPSUM BOARD INTERFACE ON BOTH SURFACES OF WALL.

   SPECIFIED TECHNOLOGIES INC –SPECSEAL LCI SEALANT

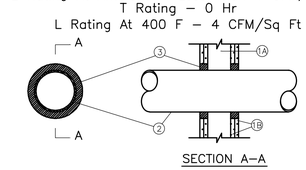
   *** Bearing the UL Classification Mark**

HILTI FIRESTOP SYSTEMS — Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. December 4, 2002 — CLASSIFIED C UL US

1 WL 1054

N.T.S

System No. W–L–1054
F Ratings – 1 and 2 Hr (See Items 1 and 3)
L Rating At Ambient – Less Than 1 CFM/Sq Ft
T Rating – 0 Hr
L Rating At 400 F – 4 CFM/Sq Ft



SECTION A–A

1. Wall Assembly The 1 or 2 hr fire–rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A) Studs: Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2–1/2 in. wide and spaced max 24 in. OC. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be
      framed on all sides using lengths of steel stud installed between the vertical studs and screw–attached to the steel studs at each end. The framed opening in the
      wall shall be 4 to 6 in. wider and 4 to 6 in. higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2
      to 3 in. clearance is present between the penetrating item and the framing on all four sides.
   B) Gypsum Board: 5/8 in. thick, 4 ft. wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation
      shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 32–1/4 in. for steel stud walls.
      Max diam of opening is 14–1/2 in. for wood stud walls. The F Rating of the firestop system is equal to the fire rating of the wall assembly.
2. Through–Penetrants: One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 in. to max 2–1/4 in. Pipe may be installed with continuous point contact. Pipe, conduit or tubing may be installed at an angle not greater than 45 degrees from perpendicular. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A) Steel Pipe: Nom 30 in diam (or smaller) cast or ductile iron pipe.
   B) Iron Pipe: Nom 30 in. diam (or smaller) cast or ductile iron pipe.
   C) Conduit: Nom 4 in diam (or smaller) steel electrical metallic tubing or 6 in. diam steel conduit.
   D) Copper Tubing: Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.
   E) Copper Pipe: Nom 6 in. diam (or smaller) regular (or heavier) copper pipe.
3. Fill, Void or Cavity Material* – Sealant: Min 5/8 in. thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point or continuous contact locations between pipe and wall, a min 1/2 in. diam bead of fill material shall be applied at the pipe wall interface on both surfaces of wall.

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