System Number	Rating	Description	Sheet Number
HEAD-OF-WALL JOINTS			
HW-D-0079	1 & 2 HR	GYPSUM WALL - MAX 3/4" JOINT - ES SEALANT	***SHEET 1***
HW-D-0044	1 & 2 HR	GYPSUM WALL - MAX 2-1/2" JOINT - MINERAL WOOL & SPRAY	***SHEET 1***
HW-D-0696	1 & 2 HR	GYPSUM WALL - 1" JOINT - TOP TRACK GASKET	***SHEET 1***
HW-D-0548	1 & 2 HR	GYPSUM SHAFT WALL - MAX 1-1/2" JOINT - ONE SIDE APPLICATION - MINERAL WOOL + SPRAY	***SHEET 1***
HW-D-0699	1 & 2 HR	GYPSUM SHAFT WALL - MAX 3/4" JOINT - TOP TRACK GASKET	***SHEET 2***
HW-D-1034	3 HR	CONCRETE OR BLOCK WALL - MAX 4" JOINT - MINERAL + AS200 SPRAY	***SHEET 2***
HW-D-0156	4 HR	CONCRETE OR BLOCK WALL - MAX 2" JOINT - MINERAL + ES SEALANT	***SHEET 2***
BOTTOM-OF-WALL JOINTS			
BW-S-0003	1 & 2 HR	GYPSUM WALL - SEALANT ONLY	***SHEET 2***
BW-S-0017	1 & 2 HR	GYPSUM WALL - TRACK TOP GASKET	***SHEET 2***
BW-S-0020	1 & 2 HR	GYPSUM SHAFT WALL - SEALANT ONLY	***SHEET 2***
BW-S-0038	1 & 2 HR	GYPSUM SHAFT WALL - TRACK TOP GASKET	***SHEET 2***
FLOOR-TO-FLOOR JOINTS			
FF-D-1001	3 HR	CONCRETE FLOOR TO CONCRETE FLOOR - MAX 4" JOINT - MINERAL + SIL300 SILICONE	***SHEET 2***
FF-D-1007	2 HR	CONCRETE FLOOR TO CONCRETE FLOOR - MAX 4" JOINT - MINERAL WOOL + AS200 SPRAY	***SHEET 2***
FF-D-1008	3 HR	CONCRETE FLOOR TO CONCRETE FLOOR - MAX 4" JOINT - MINERAL WOOL + ES SEALANT	***SHEET 2***
FLOOR-TO-WALL JOINTS			
FD-W-1001	3 HR	CONCRETE FLOOR TO CONCRETE/BLOCK WALL - MAX 4" JOINT - MINERAL WOOL + SIL300 SILICONE	***SHEET 3***
FD-W-1006	2 HR	CONCRETE FLOOR TO CONCRETE/BLOCK WAL - MAX 4" JOINT - MINERAL WOOL + AS200 SPRAY	***SHEET 3***
FD-W-1007	3 HR	CONCRETE FLOOR TO CONCRETE/BLOCK WALL - MAX 4" JOINT - MINERAL WOOL + ES SEALANT	***SHEET 3***
WALL-TO-WALL JOINTS			
WW-S-0052	1, 2, 3 & 4 HR	GYPSUM WALL TO CONCRETE/BLOCK WALL - SEALANT ONLY	***SHEET 3***
WW-S-0063	1 & 2 HR	GYPSUM WALL TO CONCRETE/BLOCK WALL - TRACK TOP GASKET	***SHEET 3***
WW-S-0064	1 & 2 HR	GYPSUM SHAFT WALL TO CONCRETE/BLOCK WALL - TRACK TOP GASKET	***SHEET 3***
WW-D-1004	3 HR	CONCRETE/BLOCK WALLS - MAX 1" JOINT - BACKER ROD + ES SEALANT	***SHEET 3***
WW-D-1007	3 HR	CONCRETE BLOCK WALLS - MAX 4" JOINT - MINERAL WOOL + ES SEALANT	***SHEET 3***
WW-D-1037	3 HR	CONCRETE/BLOCK WALLS - MAX 4" JOINT - MINERAL WOOL + AS200 SPRAY	***SHEET 3***
PERIMETER FIRE BARRIER SYSTEMS			
CW-D-1041	2 HR	CURTAIN WALL - MIN 6" SILL HEIGHT - QUICK CLIP SYSTEM	***SHEET 4***
CW-D-1044	2 HR	CURTAIN WALL - STEEL BACKPAN, FLUSH SILL - FIRESTOP SPRAY	***SHEET 4***
CW-D-1051	2 HR	CURTAIN WALL - CONTINUOUS GLAZING (KISS MULLION), OPTIONAL RAISED FLOOR - QUICK CLIP SYSTEM	***SHEET 4***
STI/BPF 120-03	2 HR	CURTAIN WALL - ALL VISION GLASS, FLUSH SILL, SHADOW BOX - FIRESTOP SPRAY	***SHEET 4***
STI/BPF 120-04	2 HR	HYBRID WINDOW WALL - MULTIPLE CLOSURE PANEL OPTIONS - WINDOW WALL GASKET	***SHEET 4***
CW-S-1007	2 HR	STEEL STUD WALL - PLATFORM FRAMED, MULTIPLE FINISH OPTIONS - TRACK TOP GASKET	***SHEET 5***
CW-S-2076	2 HR	STEEL STUD WALL - BALLOON FRAMED, MULTIPLE FINISH OPTIONS - FIRESTOP SPRAY	***SHEET 5***
METAL PIPE/CONDUIT PENETRATIONS			
F-A-1110	3 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - 1.5" - 6" METAL PIPE/CONDUIT - CAST-IN DEVICE	***SHEET 5***
F-A-1129	2 HR	CONCRETE FLOOR - TOILET FLANGE & DRAIN - CLOSET FLANGE GASKET	***SHEET 5***
F-B-1020	3 HR	CONCRETE FLOOR - TUB DRAIN - CAST-IN DEVICE + TUB BOX	***SHEET 5***
C-AJ-1353	2 & 3 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - MAX 12" METAL PIPE/CONDUIT - SEALANT & BACKING	***SHEET 5***
W-L-1049	1 & 2 HR	GYPSUM WALL - SINGLE METAL PIPE/CONDUIT - SEALANT ONLY	***SHEET 5***
W-L-1168	1 & 2 HR	GYPSUM WALL - MULTIPLE METAL PIPES/CONDUITS - RECTANGULAR OPENING - SEALANT ONLY	***SHEET 6***
INSULATED METAL PIPE PENETRATIONS			
F-A-5041	3 HR	CONCRETE FLOOR - MAX 4" METAL PIPE WITH MAX 1" GLASS FIBER INSULATION - CAST-IN DEVICE	***SHEET 6***
C-AJ-5079	3 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - MAX 4" METAL PIPE WITH 3/4" AB/PVC (FOAM RUBBER) INSULATION	***SHEET 6***
C-AJ-5132	3 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - MAX 3" METAL PIPE WITH 1" GLASS FIBER INSULATION	***SHEET 6***
W-L-5014	1 & 2 HR	GYPSUM WALL - MAX 12" METAL PIPE WITH MAX 2" GLASS FIBER INSULATION	***SHEET 6***
W-L-5054	1 & 2 HR	GYPSUM WALL - MAX 4" METAL PIPE WITH 3/4"-1" AB/PVC (FOAM RUBBER) INSULATION	***SHEET 6***
W-L-5262	1 & 2 HR	GYPSUM SHAFT WALL - MAX 2" METAL PIPE WITH 1" GLASS FIBER INSULATION	***SHEET 6***
PLASTIC PIPE/CONDUIT PENETRATIONS			
C-AJ-2578	3 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - MAX 2" PLASTIC PIPE/CONDUIT - SEALANT & BACKING	***SHEET 7***
C-AJ-2282	2 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - MAX 4" PLASTIC PIPE/CONDUIT - WRAP STRIP TUCK-IN	***SHEET 7***
C-AJ-2297	3 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - MAX 6" PLASTIC PIPE/CONDUIT - FIRESTOP COLLAR	***SHEET 7***
F-A-2246	3 HR	CONCRETE FLOOR - MAX 4" PLASTIC PIPE/CONDUIT - CAST-IN DEVICE	***SHEET 7***
F-A-2216	2 HR	CONCRETE FLOOR - PVC OR ABS TOILET FLANGE & DRAIN - CLOSET FLANGE GASKET	***SHEET 7***
F-B-1020	3 HR	CONCRETE FLOOR - PVC TUB DRAIN - CAST-IN DEVICE + TUB BOX	***SHEET 7***
W-L-2241	1 & 2 HR	GYPSUM WALL - MAX 2" PLASTIC PIPE/CONDUIT - SEALANT ONLY	***SHEET 7***
W-L-2248	1 & 2 HR	GYPSUM WALL - MAX 3" PLASTIC PIPE/CONDUIT - WRAP STRIP TUCK-IN	***SHEET 8***
W-L-2237	1 & 2 HR	GYPSUM WALL - MAX 4" PLASTIC PIPE/CONDUIT - FIRESTOP COLLAR	***SHEET 8***
W-L-2257	2 HR	GYPSUM SHAFT WALL - MAX 4" PLASTIC PIPE/CONDUIT - FIRESTOP COLLAR	***SHEET 8***
CABLE PENETRATIONS (NOT IN CONDUIT)			
C-AJ-3154	2, 3, & 4 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - CABLES WITH OPTIONAL SLEEVE - SEALANT & BACKING	***SHEET 8***
F-A-3055	2 & 3 HR	CONCRETE FLOOR - CABLES - CAST-IN DEVICE	***SHEET 8***
F-A-3054	2, 3, & 4 HR	CONCRETE FLOOR - CABLES - SINGLE EZ-PATH 44+ (FOR FREQUENT CABLE CHANGES)	***SHEET 8***
W-L-3210	1 & 2 HR	GYPSUM WALL - OPTIONAL SLEEVE - SEALANT & BACKING	***SHEET 9***
W-L-3377	1, 2, 3, & 4 HR	GYPSUM WALL - SINGLE EZ-PATH SERIES 22, 33, 44, 44+ (FOR FREQUENT CABLE CHANGES)	***SHEET 9***
W-L-3379	1 & 2 HR	GYPSUM WALL - ONE OR MORE CABLES UP TO 1/2" DIA - CABLE GROMMET RFG2	***SHEET 9***
DUCT PENETRATIONS (WITHOUT DAMPERS)			
C-AJ-7027	2 & 3 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - MAX 60" X 36" DUCT - SEALANT, BACKING & ANGLE	***SHEET 9***
C-AJ-7023	2 & 3 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - MAX 24" DIA. DUCT - OPTIONAL SLEEVE - SEALANT & BACKING	***SHEET 9***
W-L-7025	1 & 2 HR	GYPSUM WALL - MAX 100" X 100" DUCT - SEALANT & ANGLE	***SHEET 9***
W-L-7026	1 & 2 HR	GYPSUM WALL - MAX 24" DIA. ROUND DUCT - SEALANT ONLY	***SHEET 10***
W-L-7029	1 & 2 HR	GYPSUM WALL - MAX 24" X 24" - SEALANT ONLY	***SHEET 10***
W-L-7145	1 & 2 HR	GYPSUM WALL - INSULATED RECTANGULAR DUCT - SEALANT & BACKING	***SHEET 10***
W-L-7179	1 & 2 HR	GYPSUM WALL - INSULATED ROUND DUCT - SEALANT ONLY	***SHEET 10***
W-L-7099	1 & 2 HR	GYPSUM WALL - INSULATED GREASE DUCT - SEALANT & BACKING	***SHEET 10***
W-L-7066	1 & 2 HR	GYPSUM SHAFT WALL - MAX 6" DIA DUCT THRU SLEEVE - SEALANT & BACKING	***SHEET 10***
W-L-7090	1 & 2 HR	GYPSUM SHAFT WALL - MAX 8" X 8" DUCT, NO SLEEVE - SEALANT & BACKING	***SHEET 10***
W-L-7252	1 & 2 HR	GYPSUM SHAFT WALL - MAX 12' 12" DUCT THRU SLEEVE - SEALANT & BACKING	***SHEET 11***
W-L-7238	1 & 2 HR	GYPSUM SHAFT WALL - MAX 24" X 40" DUCT, NO SLEEVE - FYRE FLANGE	***SHEET 11***
W-L-7253	1 & 2 HR	GYPSUM SHAFT WALL - STEEL STRUT, CHANNEL, CABLE OR THREADED ROD	***SHEET 11***
LARGE OPENINGS & MIXED PENETRANTS			
C-AJ-8093	2 & 3 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - LARGE OPENING, MIXED PENETRANTS - PILLOWS + SEALANT OR PUTTY	***SHEET 11***
C-AJ-8113	2 HR	CONCRETE FLOOR OR CONCRETE/BLOCK WALL - LARGE OPENING, MIXED PENETRANTS - MINERAL WOOL + SEALANT	***SHEET 12***
F-A-8036	3 HR	CONCRETE FLOOR - A/C LINE SETS - CAST-IN DEVICE	***SHEET 12***
W-L-8025	1 & 2 HR	GYPSUM WALL - A/C LINE SET - SEALANT ONLY	***SHEET 12***
W-L-8026	1 & 2 HR	GYPSUM WALL - LARGE OPENING, MIXED PENETRANTS - MINERAL WOOL + SEALANT	***SHEET 12***
W-L-8050	1 & 2 HR	GYPSUM WALL - LARGE OPENING, MIXED PENETRANTS - PILLOWS + SEALANT OR PUTTY	***SHEET 13***
ELECTRICAL & UTILITY BOXES			
CLIV.R14288	1 & 2 HR	GYPSUM WALL - ELEC BOX - PUTTY PAD OR ELEC BOX INSERT	***SHEET 13***
W-J-1217	2 HR	CONCRETE/BLOCK WALL - PULL OR JUNCTION BOX - SEALANT ONLY	***SHEET 13***
W-L-1448	1 & 2 HR	GYPSUM WALL - PULL OR JUNCTION BOX - SEALANT ONLY	***SHEET 13***
W-L-7307	1 & 2 HR	GYPSUM WALL - ELEC, UTILITY, OR MED GAS VALVE BOX - E-WRAP	***SHEET 13***
CIRCUIT INTEGRITY			
STI/AF 120-01	1 & 2 HR	MIN 1" STEEL CONDUIT - E-WRAP	***SHEET 14***
FUEL LINE PROTECTION			
FP-3	2 HR	1" - 4" STEEL PIPE - E-WRAP	***SHEET 14***
FP-4	2 HR	3" - 4" OUTER CONTAINMENT PIPE - E-WRAP	***SHEET 14***
C-AJ-5347	2 HR F & T	PIPE PENETRATION - MAX 4" METAL PIPE WITH E-WRAP THRU CONCRETE/BLOCK FLOOR OR WALL - PUTTY OR SEALANT	***SHEET 14***

UL FIRE RESISTANCE DIRECTORY NOMENCLATURE

Through Penetrations

First letter represents what is being penetrated:

F = Floor
W = Wall
C = Floors or Walls (combined)

Second letter(s) provide more information about the floor or wall:

A = Concrete Floors with a min thickness that is Less than or Equal to 5".
B = Concrete Floors with a min thickness that is Greater than 5".
C = Framed Floors
E = For-Ceiling Assemblies consisting of Concrete with Membrane Protection.
J = Concrete or Masonry Walls with a min thickness that is Less than or Equal to 8".
L = Framed Walls

Four digit number describes the penetrating item(s):

0000-0999 = Blank Openings
1000-1999 = Metal Pipe, Conduit, or Tubing
2000-2999 = Non-Metallic Pipe, Conduit, or Tubing
3000-3999 = Cables
4000-4999 = Cable Trays
5000-5999 = Insulated Pipes
6000-6999 = Miscellaneous Electrical (Busway)
7000-7999 = Miscellaneous Mechanical
8000-8999 = Mixed Penetrating Items
9000-9999 = Reserved for Future Use

Example: C-AJ-1150

C = Floor or Wall Penetration
A = Concrete Floor that is 5" or less
J = Concrete or Masonry Walls that are 8" or less
1150 = Metal Pipe, Conduit, or Tubing

Joint Systems

First letter identifies the type joint:

CJ = Floor
FF = Wall
WW = Floors or Walls (combined)
FW = Floor to Wall
HW = Head to Wall
BW = Bottom of Wall

Second letter(s) provide more information about the floor or wall:

S = No Movement (Static)
D = Allows Movement (Dynamic)

Four digit number describes the joint width:

0000-0999 = Less than or Equal to 2"
1000-1999 = Greater than 2" and Less than or Equal to 6"
2000-2999 = Greater than 6" and Less than or Equal to 12"
3000-3999 = Greater than 12" and Less than or Equal to 24"
4000-4999 = Greater than 24"

Example: HW-D-0757

HW = Head to Wall
D = Allows Movement (Dynamic)
0757 = Less than or Equal to 2"

GENERAL NOTES:

1. Refer to section 07 84 00 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
2. Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   - Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.
3. If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   - UL Fire Resistance Directory; Current Edition or UL Product iQ™
   - NFPA 101 Life Safety Code
   - All governing local and regional building codes
   - Intertek Directory of Building Products
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

PROJECT NAME:

PROJECT LOCATION:

ARCHITECT/CONSULTANT:

TITLE: TYPICAL FIRESTOP DETAILS - CONCRETE BUILDING, FLAT POUR

Specified Technologies Inc.
210 Evans Way Somerville, NJ 08876
Toll Free: (800)992-1180
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STI.

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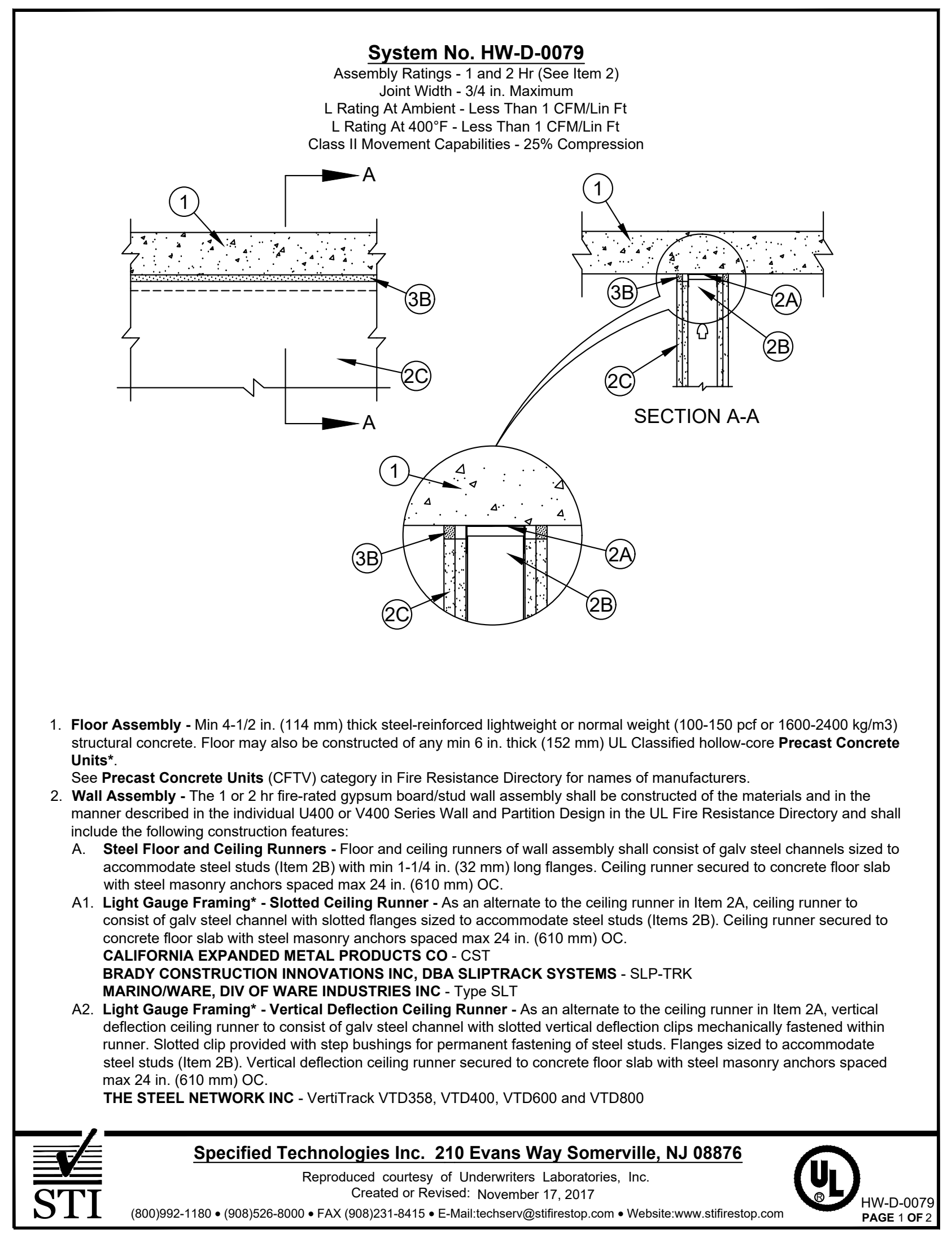

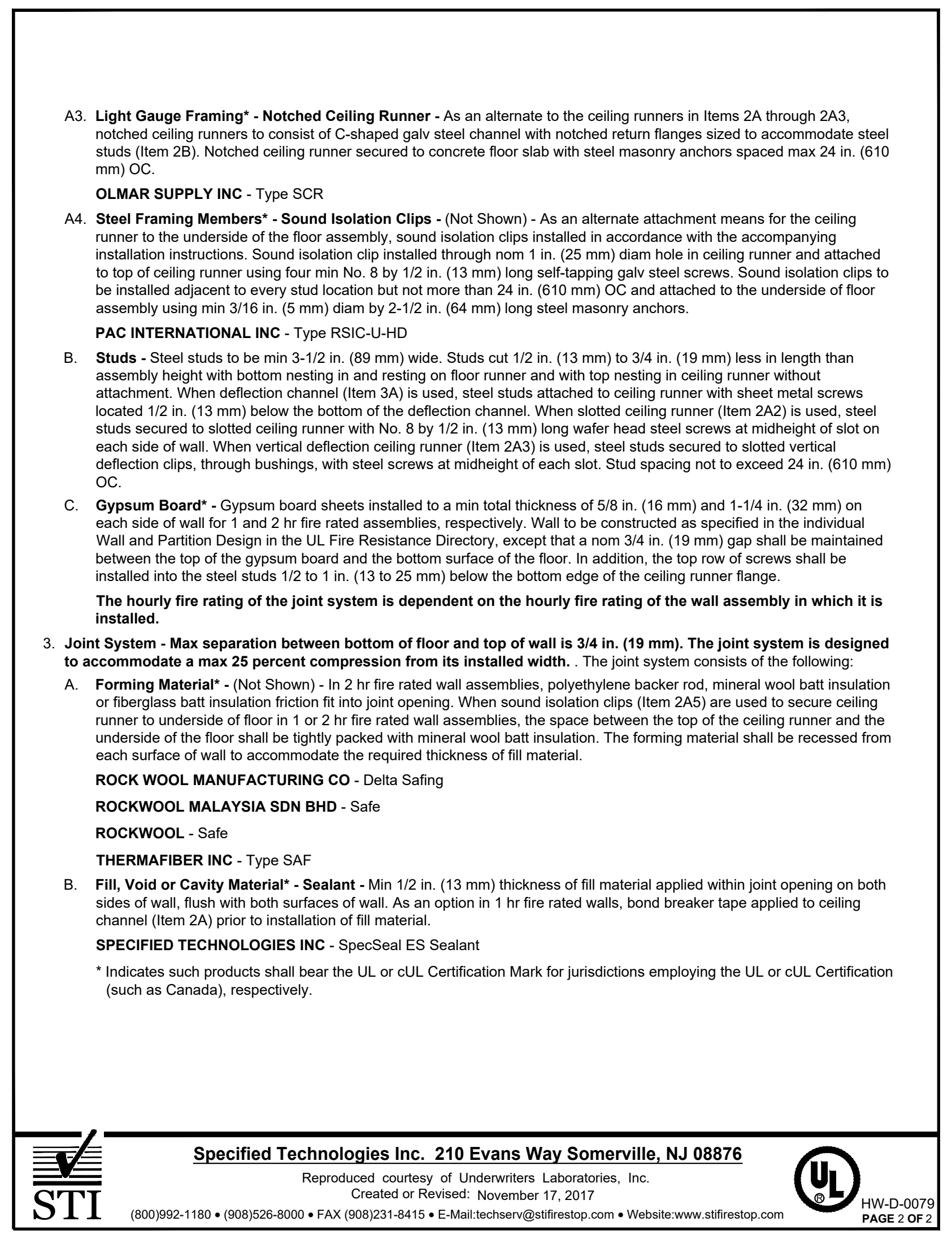

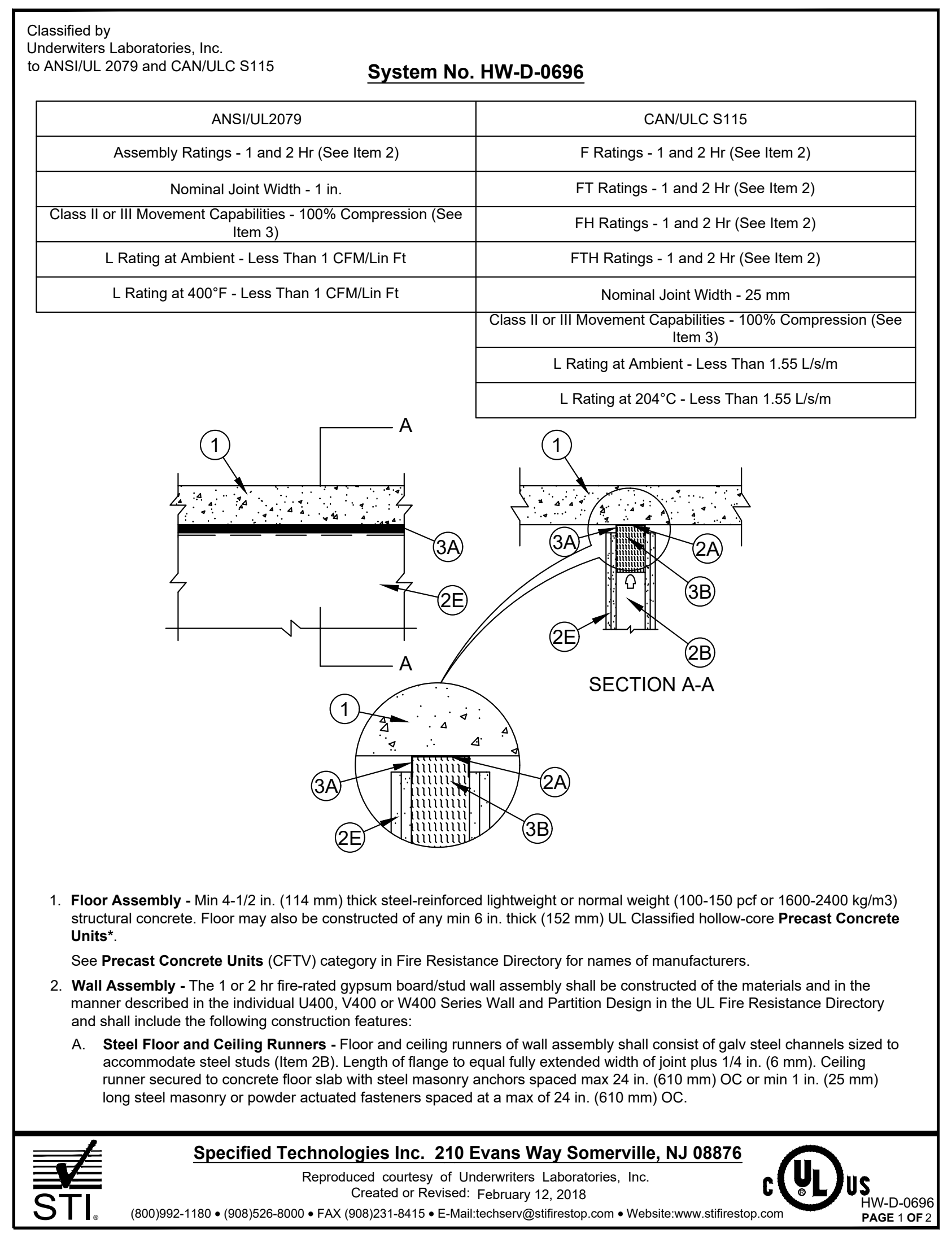

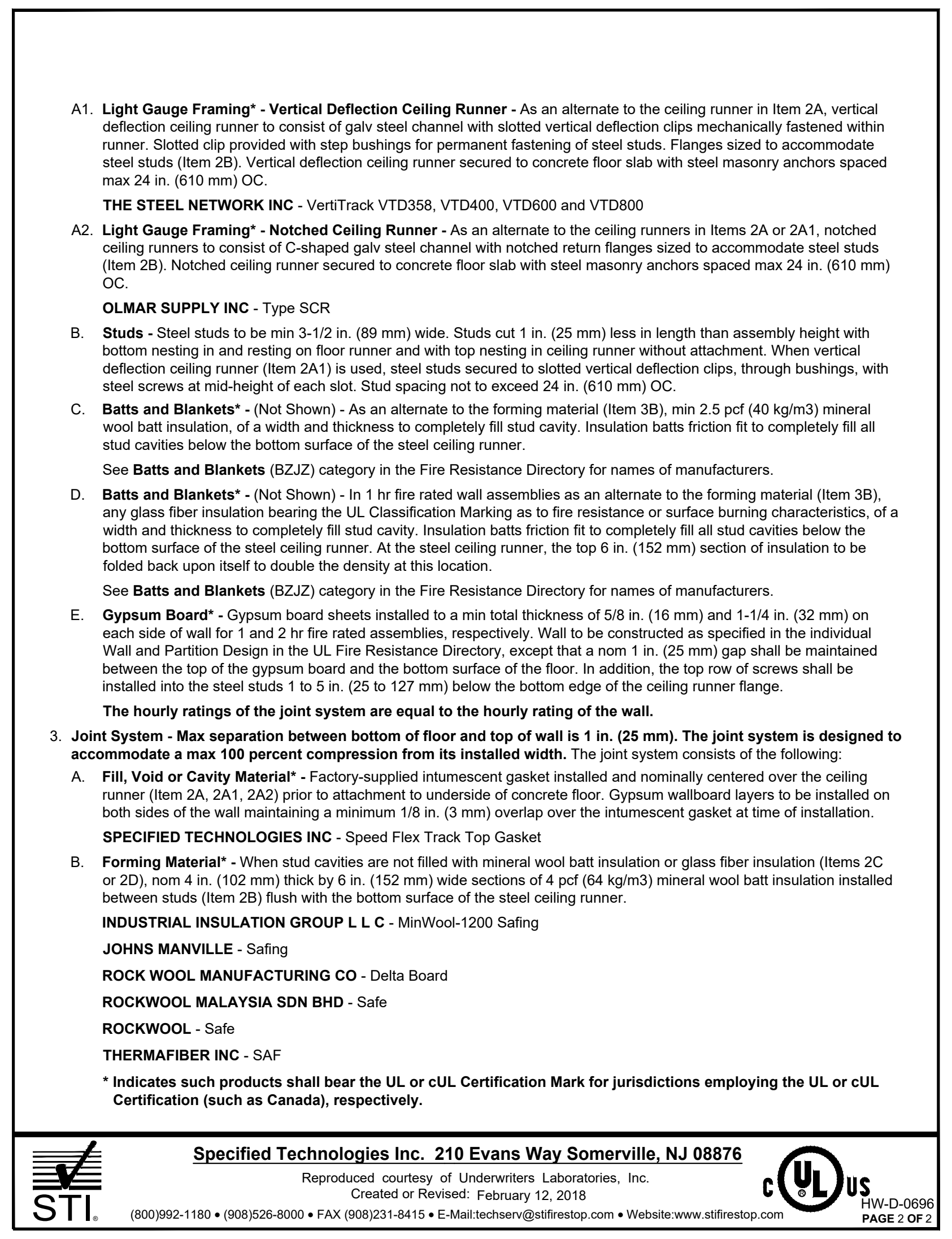

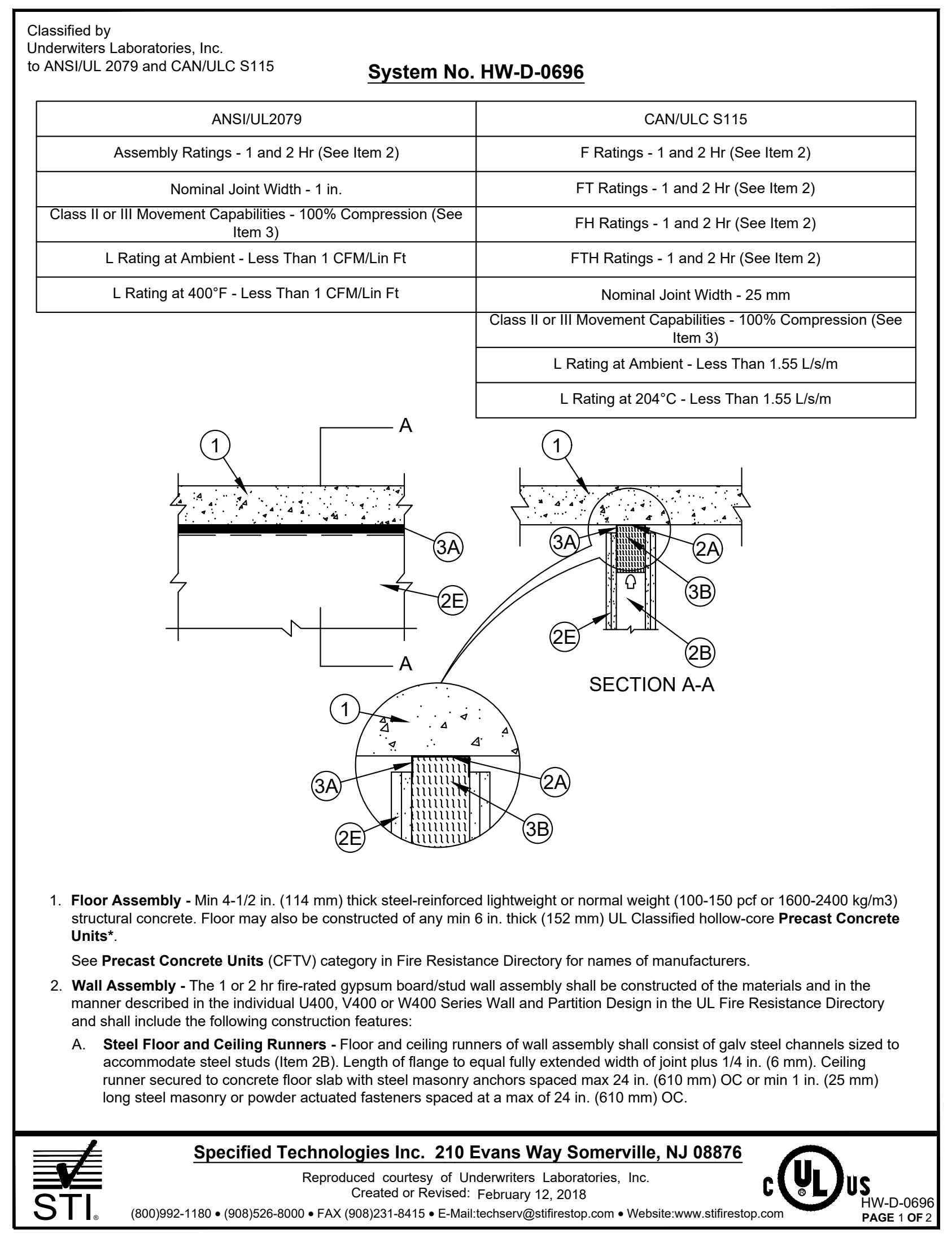

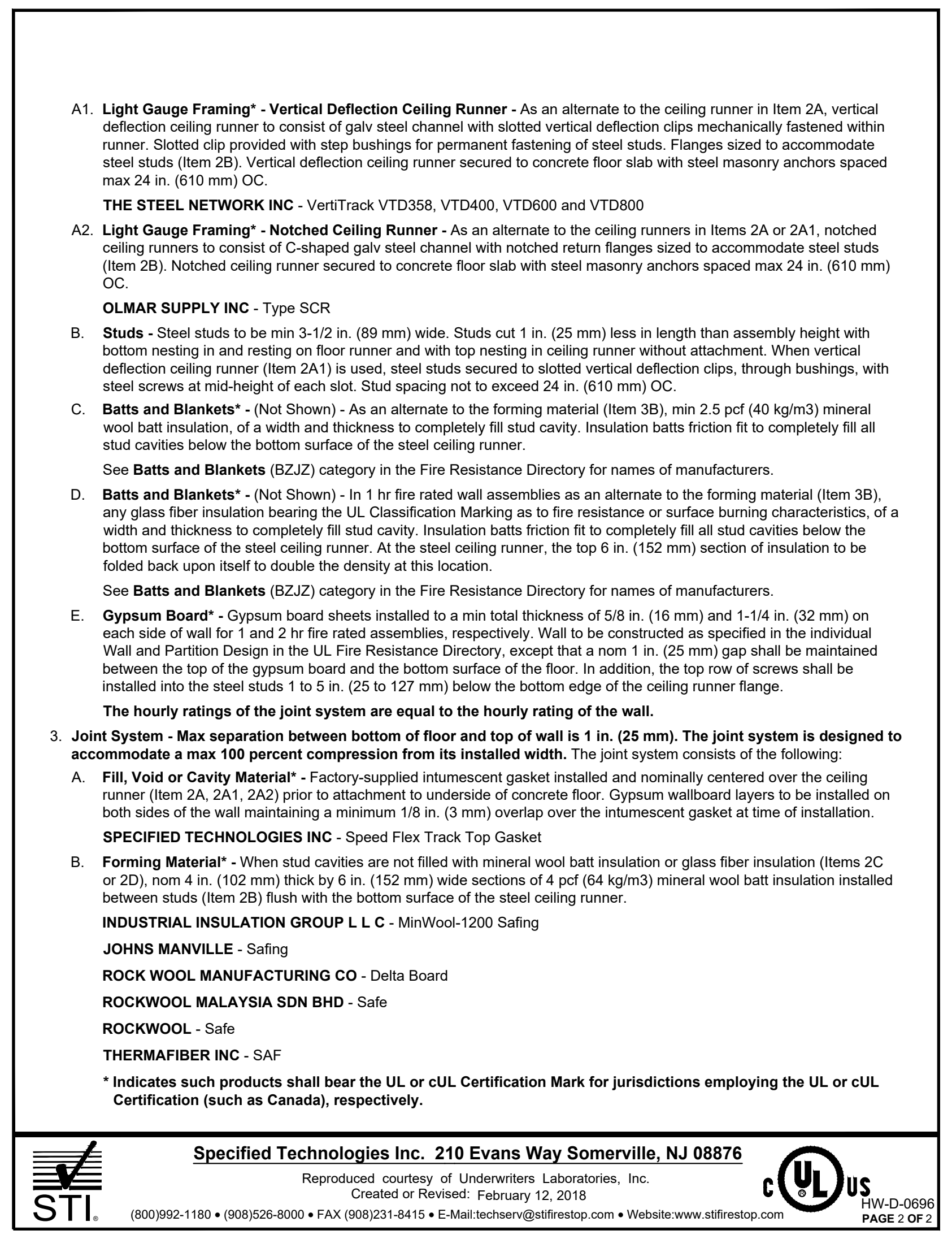

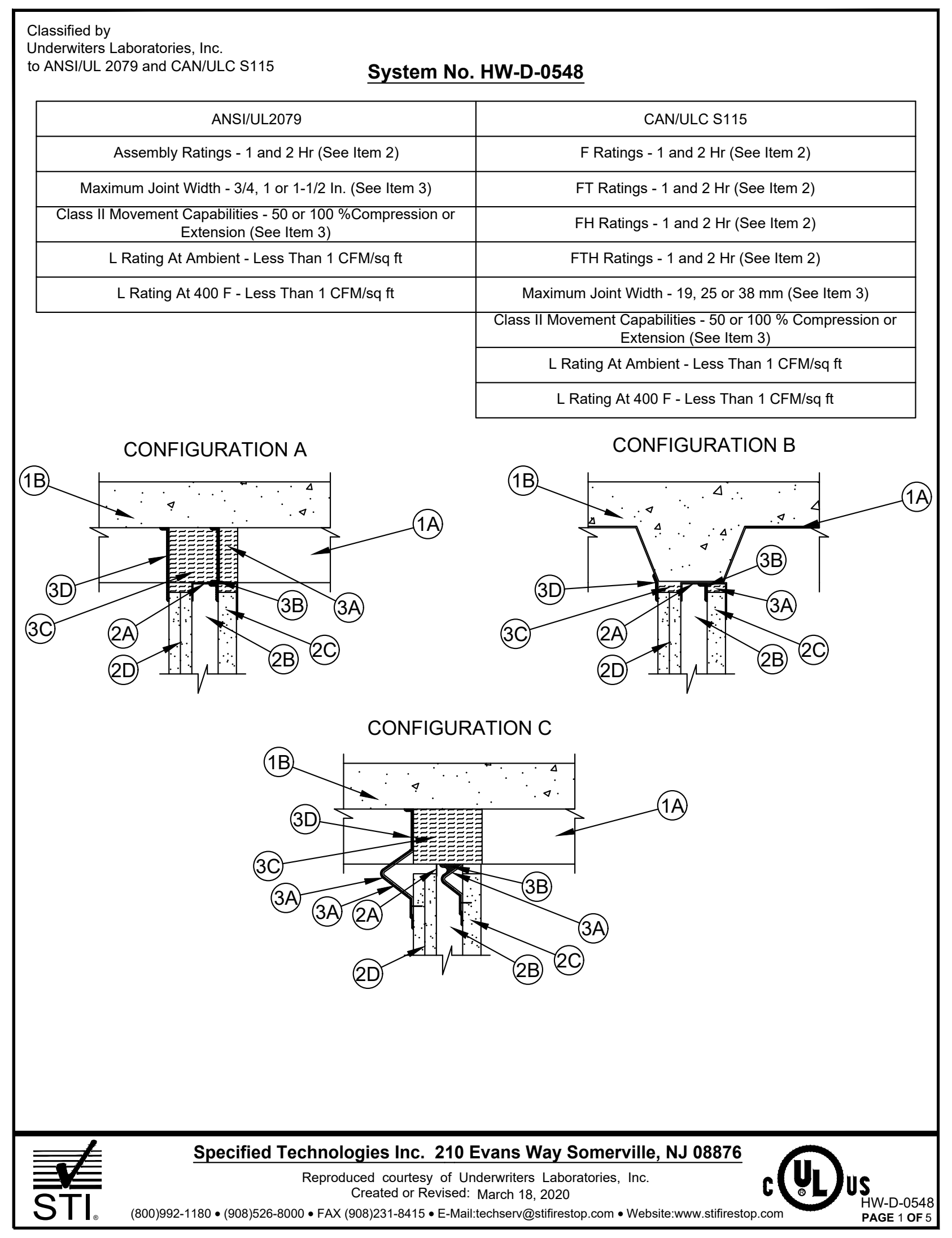

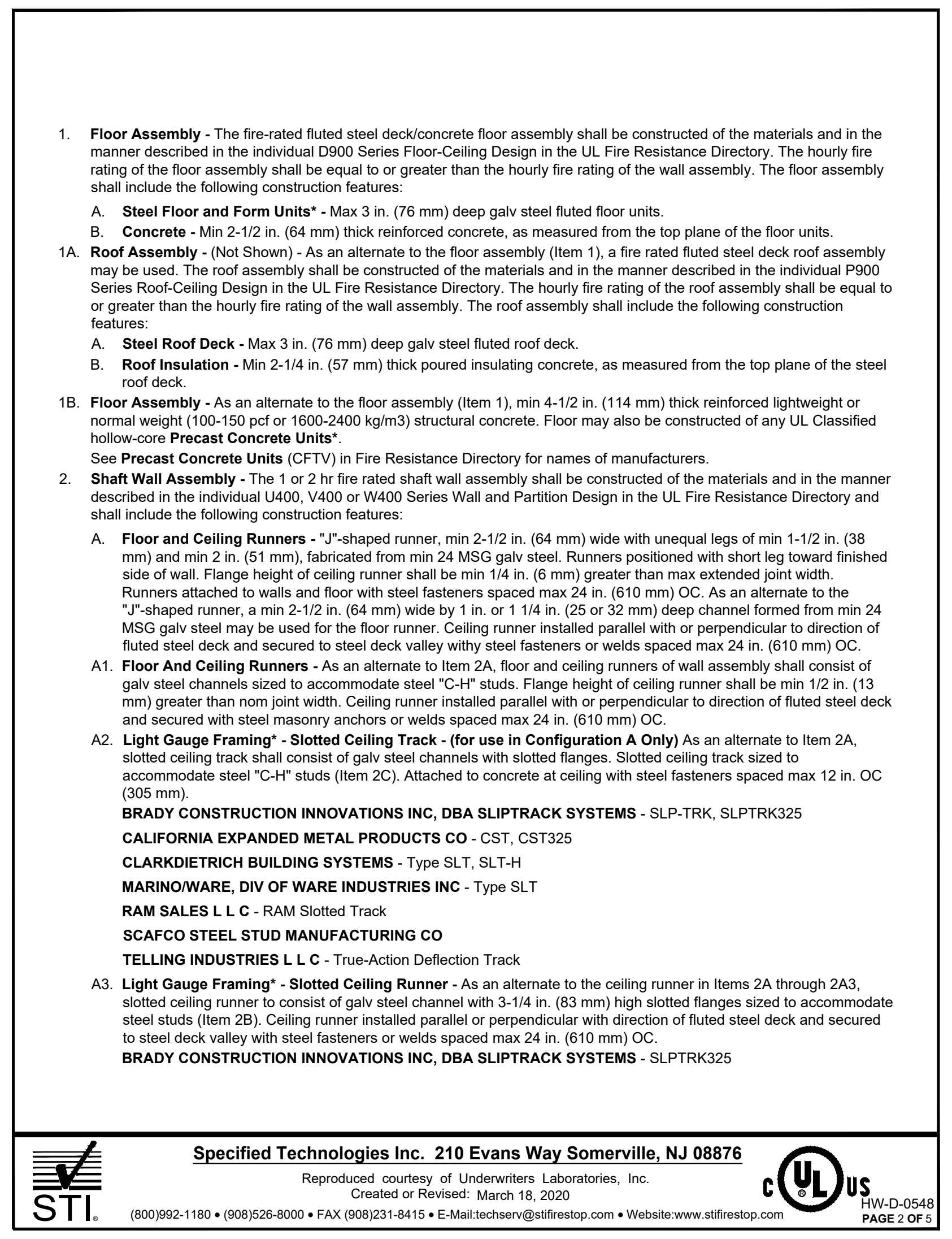

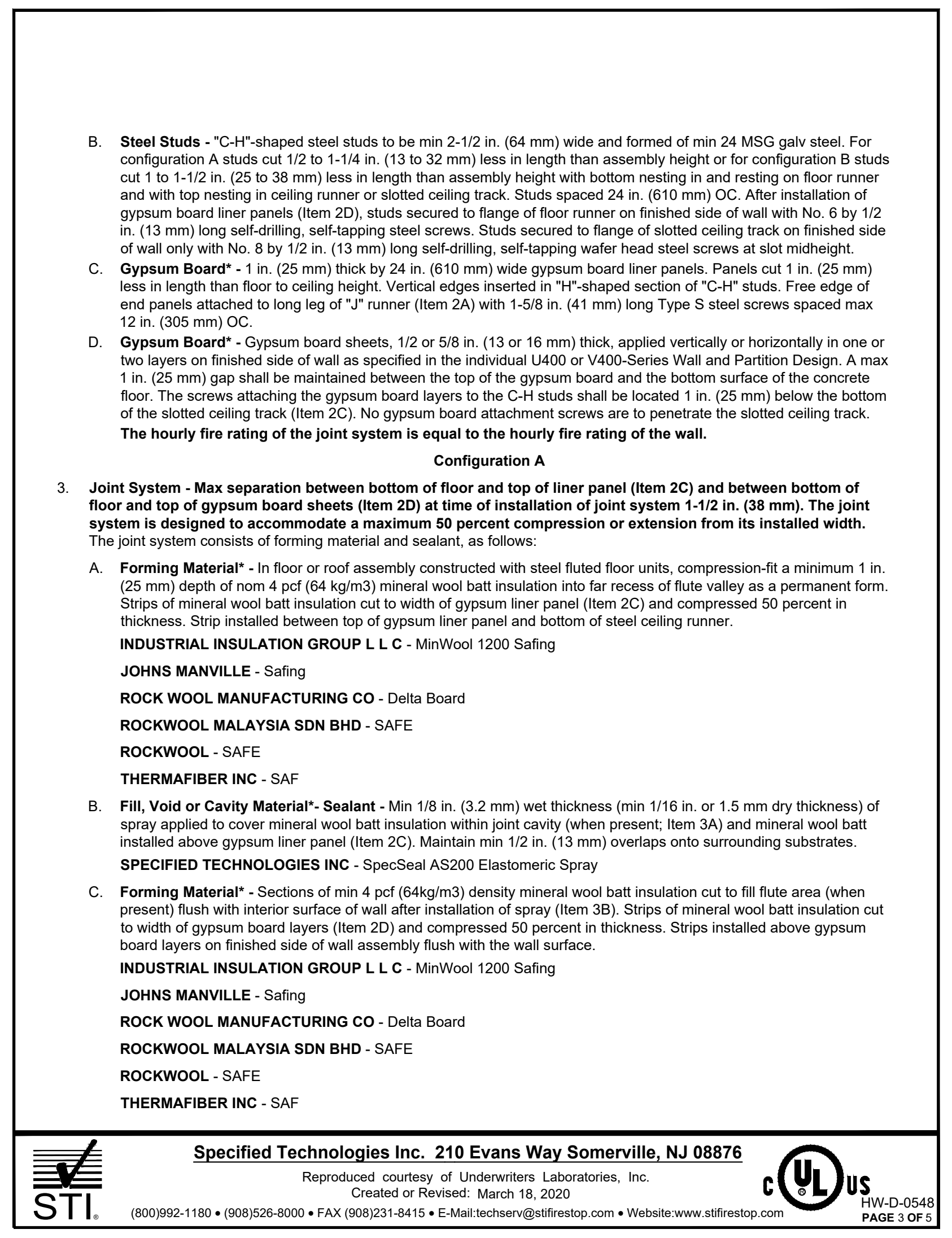

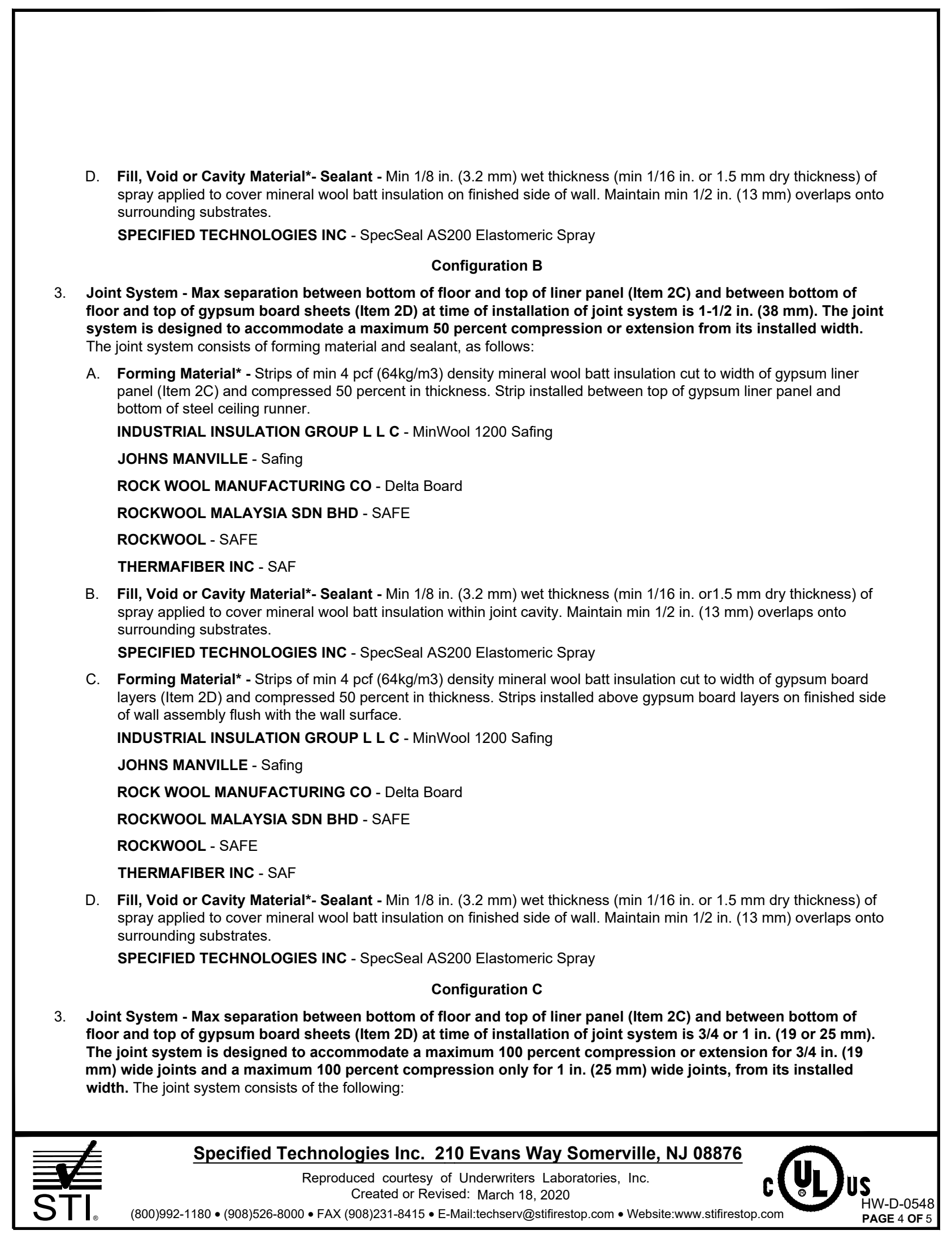

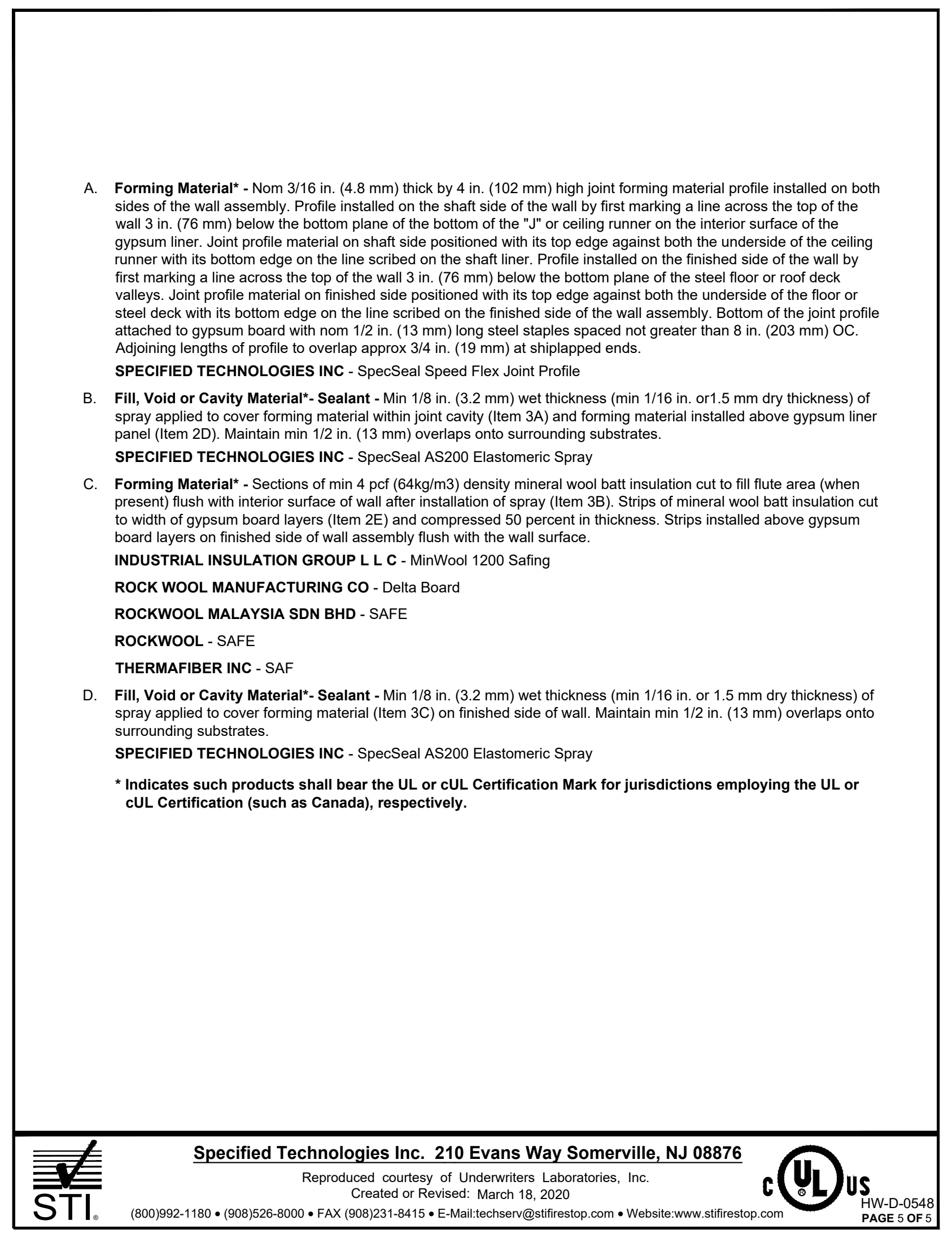

GENERAL NOTES:

1. Refer to section 07 84 00 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
2. Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
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3. If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   - UL Fire Resistance Directory; Current Edition
   - NFPA 101 Life Safety Code
   - All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

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Phone: (908)526-8000
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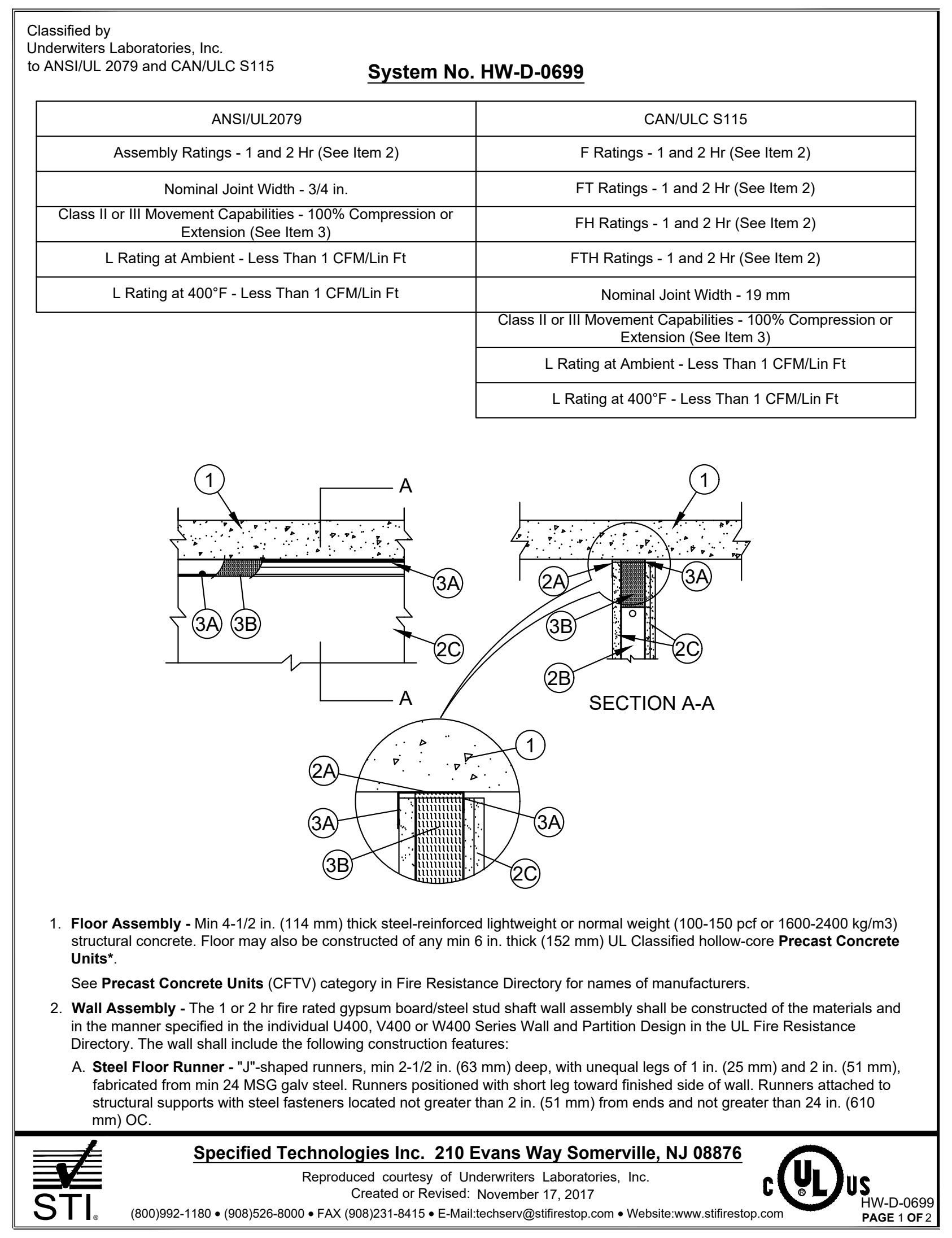

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 2079 and CAN/ULC S115

System No. HW-D-0699

ANSI/UL2079	CAN/ULC S115
Assembly Ratings - 1 and 2 Hr (See Item 2)	F Ratings - 1 and 2 Hr (See Item 2)
Nominal Joint Width - 3/4 in.	FT Ratings - 1 and 2 Hr (See Item 2)
Class II or III Movement Capabilities - 100% Compression or Extension (See Item 3)	FH Ratings - 1 and 2 Hr (See Item 2)
L Rating at Ambient - Less Than 1 CFM/Lin Ft	FTH Ratings - 1 and 2 Hr (See Item 2)
L Rating at 400°F - Less Than 1 CFM/Lin Ft	Nominal Joint Width - 19 mm
	Class II or III Movement Capabilities - 100% Compression or Extension (See Item 3)
	L Rating at Ambient - Less Than 1 CFM/Lin Ft
	L Rating at 400°F - Less Than 1 CFM/Lin Ft

1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Floor may also be constructed of any min 6 in. thick (152 mm) UL Classified hollow-core **Precast Concrete Units***.

   See **Precast Concrete Units** (CFTV) category in Fire Resistance Directory for names of manufacturers.

2. **Wall Assembly -** The 1 or 2 hr fire rated gypsum board/steel stud shaft wall assembly shall be constructed of the materials and in the manner specified in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory. The wall shall include the following construction features:
   A. **Steel Floor Runner -** "J"-shaped runners, min 2-1/2 in. (63 mm) deep, with unequal legs of 1 in. (25 mm) and 2 in. (51 mm), fabricated from min 24 MSG galv steel. Runners positioned with short leg toward finished side of wall. Runners attached to structural supports with steel fasteners located not greater than 2 in. (51 mm) from ends and not greater than 24 in. (610 mm) OC.

Specified Technologies Inc. 210 Evans Way Somerville, NJ 08876
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Created or Revised: November 17, 2017
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HW-D-0699
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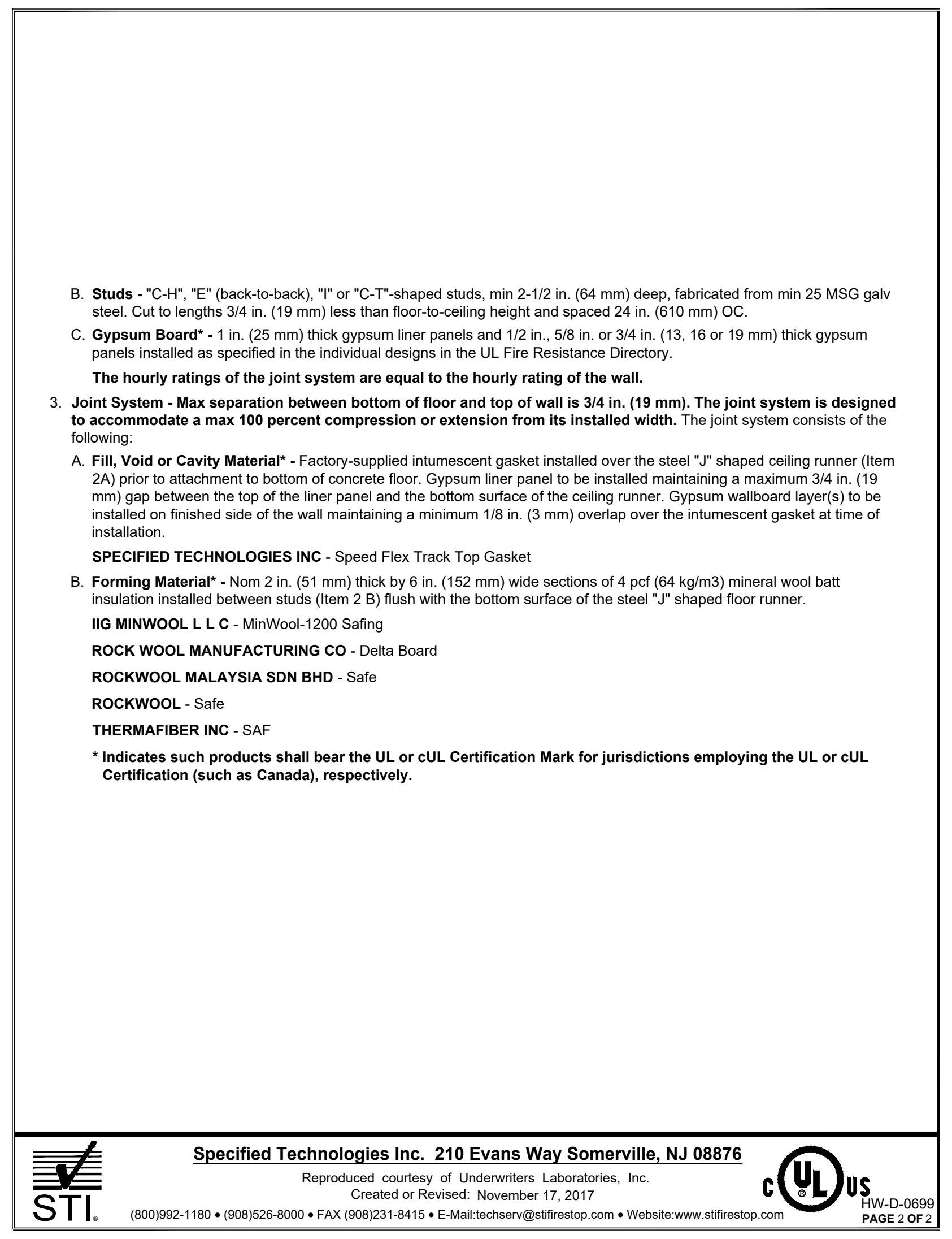

B. **Studs -** "C-H", "E" (back-to-back), "I" or "C-T"-shaped studs, min 2-1/2 in. (64 mm) deep, fabricated from min 25 MSG galv steel. Cut to lengths 3/4 in. (19 mm) less than floor-to-ceiling height and spaced 24 in. (610 mm) OC.

C. **Gypsum Board* -** 1 in. (25 mm) thick gypsum liner panels and 1/2 in., 5/8 in. or 3/4 in. (13, 16 or 19 mm) thick gypsum panels installed as specified in the individual designs in the UL Fire Resistance Directory.

The hourly ratings of the joint system are equal to the hourly rating of the wall.

3. **Joint System - Max separation between bottom of floor and top of wall is 3/4 in. (19 mm). The joint system is designed to accommodate a max 100 percent compression or extension from its installed width.** The joint system consists of the following:
   A. **Fill, Void or Cavity Material* -** Factory-supplied intumescent gasket installed over the steel "J" shaped ceiling runner (Item 2A) prior to attachment to bottom of concrete floor. Gypsum liner panel to be installed maintaining a maximum 3/4 in. (19 mm) gap between the top of the liner panel and the bottom surface of the ceiling runner. Gypsum wallboard layer(s) to be installed on finished side of the wall maintaining a minimum 1/8 in. (3 mm) overlap over the intumescent gasket at time of installation.

      SPECIFIED TECHNOLOGIES INC - Speed Flex Track Top Gasket

   B. **Forming Material* -** Nom 2 in. (51 mm) thick by 6 in. (152 mm) wide sections of 4 pcf (64 kg/m3) mineral wool batt insulation installed between studs (Item 2 B) flush with the bottom surface of the steel "J" shaped floor runner.

      IIG MINWOOL L L C - MinWool-1200 Safing

      ROCK WOOL MANUFACTURING CO - Delta Board

      ROCKWOOL MALAYSIA SDN BHD - Safe

      ROCKWOOL - Safe

      THERMAFIBER INC - SAF

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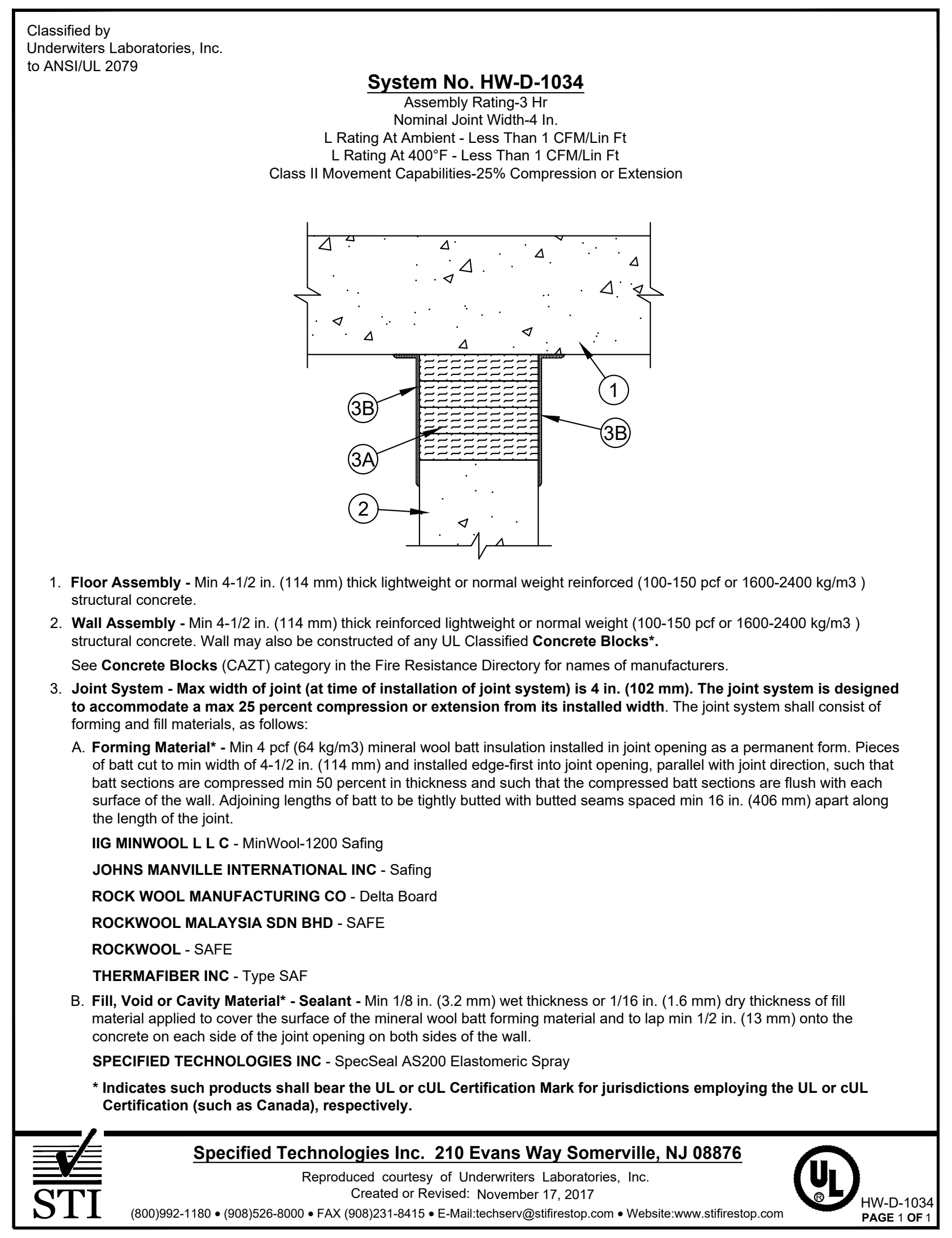

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 2079

System No. HW-D-1034

Assembly Rating-3 Hr
Nominal Joint Width-4 In.
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities-25% Compression or Extension

1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick lightweight or normal weight reinforced (100-150 pcf or 1600-2400 kg/m3) structural concrete.
2. **Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks*.**

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

3. **Joint System - Max width of joint (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 25 percent compression or extension from its installed width**. The joint system shall consist of forming and fill materials, as follows:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4-1/2 in. (114 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and such that the compressed batt sections are flush with each surface of the wall. Adjoining lengths of batt to be tightly butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.

      IIG MINWOOL L L C - MinWool-1200 Safing

      JOHNS MANVILLE INTERNATIONAL INC - Safing

      ROCK WOOL MANUFACTURING CO - Delta Board

      ROCKWOOL MALAYSIA SDN BHD - SAFE

      ROCKWOOL - SAFE

      THERMAFIBER INC - Type SAF

   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/8 in. (3.2 mm) wet thickness or 1/16 in. (1.6 mm) dry thickness of fill material applied to cover the surface of the mineral wool batt forming material and to lap min 1/2 in. (13 mm) onto the concrete on each side of the joint opening on both sides of the wall.

      SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray

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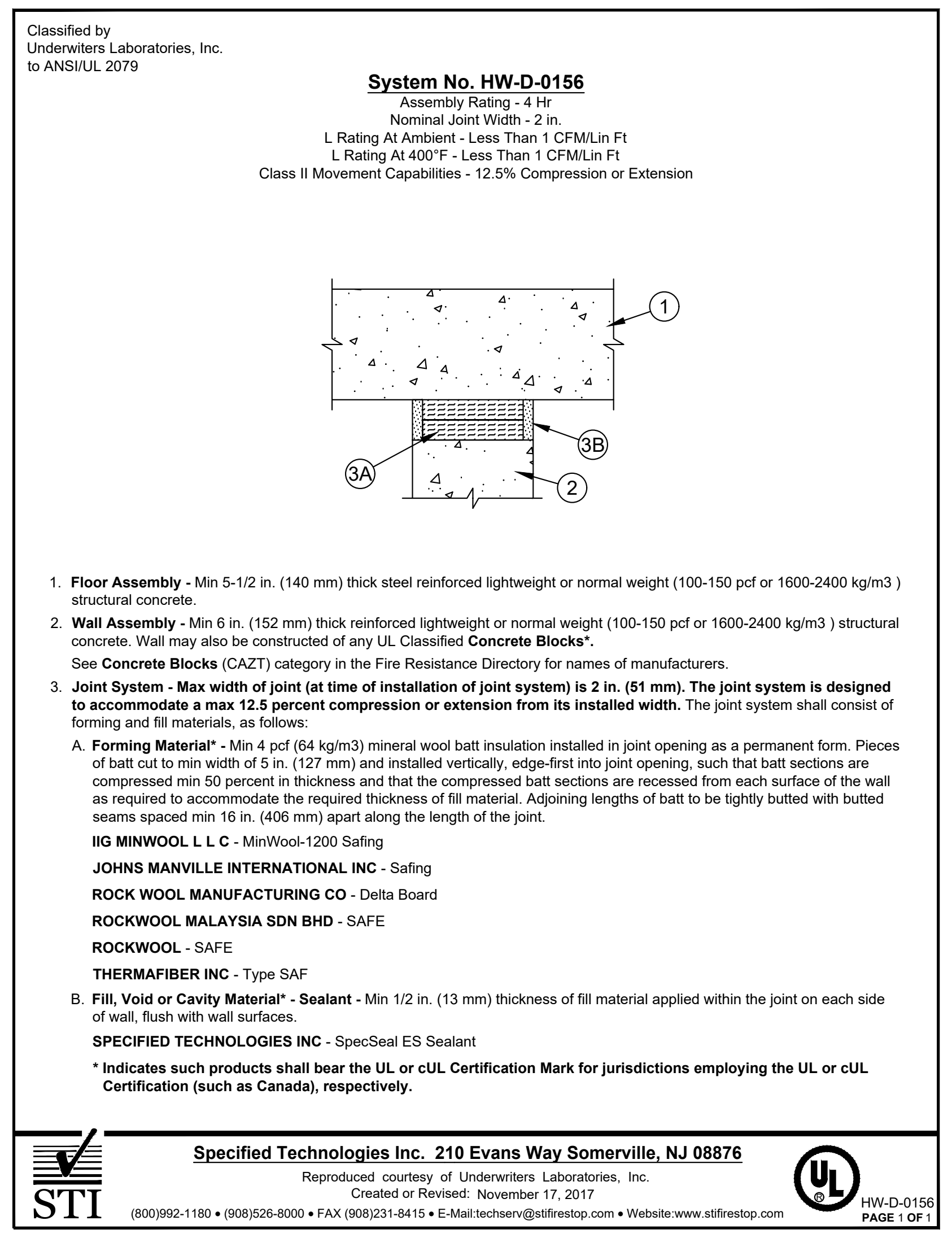

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 2079

System No. HW-D-0156

Assembly Rating - 4 Hr
Nominal Joint Width - 2 in.
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 12.5% Compression or Extension

1. **Floor Assembly -** Min 5-1/2 in. (140 mm) thick steel reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete.
2. **Wall Assembly -** Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks*.**

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

3. **Joint System - Max width of joint (at time of installation of joint system) is 2 in. (51 mm). The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width.** The joint system shall consist of forming and fill materials, as follows:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 5 in. (127 mm) and installed vertically, edge-first into joint opening, such that batt sections are compressed min 50 percent in thickness and that the compressed batt sections are recessed from each surface of the wall as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.

      IIG MINWOOL L L C - MinWool-1200 Safing

      JOHNS MANVILLE INTERNATIONAL INC - Safing

      ROCK WOOL MANUFACTURING CO - Delta Board

      ROCKWOOL MALAYSIA SDN BHD - SAFE

      ROCKWOOL - SAFE

      THERMAFIBER INC - Type SAF

   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/2 in. (13 mm) thickness of fill material applied within the joint on each side of wall, flush with wall surfaces.

      SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant

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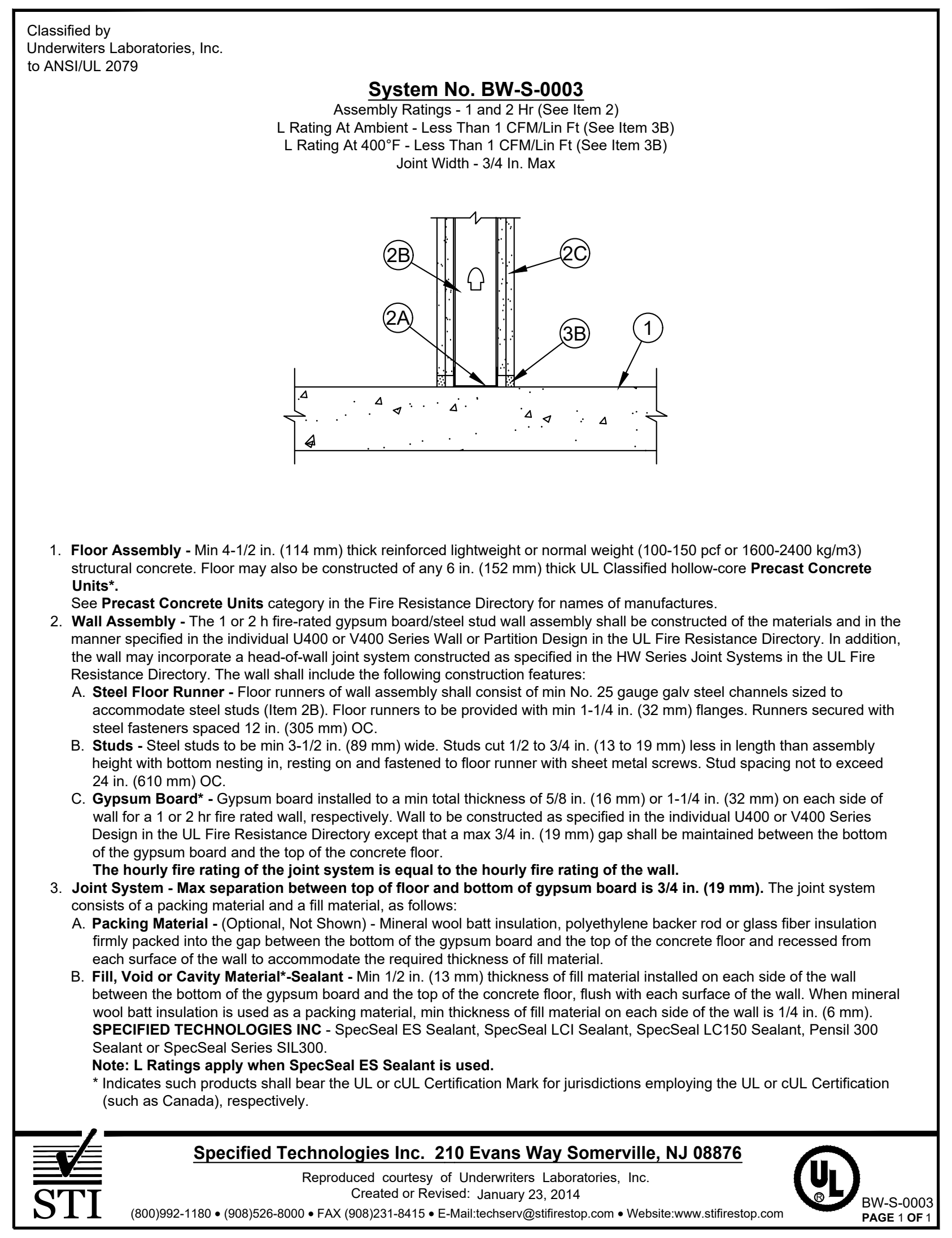

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 2079

System No. BW-S-0003

Assembly Ratings - 1 and 2 Hr (See Item 2)
L Rating At Ambient - Less Than 1 CFM/Lin Ft (See Item 3B)
L Rating At 400°F - Less Than 1 CFM/Lin Ft (See Item 3B)
Joint Width - 3/4 In. Max

1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Floor may also be constructed of any 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units*.**
   See **Precast Concrete Units** category in the Fire Resistance Directory for names of manufactures.
2. **Wall Assembly -** The 1 or 2 h fire-rated gypsum board/steel stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400 or V400 Series Wall or Partition Design in the UL Fire Resistance Directory. In addition, the wall may incorporate a head-of-wall joint system constructed as specified in the HW Series Joint Systems in the UL Fire Resistance Directory. The wall shall include the following construction features:
   A. **Steel Floor Runner -** Floor runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Floor runners to be provided with min 1-1/4 in. (32 mm) flanges. Runners secured with steel fasteners spaced 12 in. (305 mm) OC.
   B. **Studs -** Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in, resting on and fastened to floor runner with sheet metal screws. Stud spacing not to exceed 24 in. (610 mm) OC.
   C. **Gypsum Board* -** Gypsum board installed to a min total thickness of 5/8 in. (16 mm) or 1-1/4 in. (32 mm) on each side of wall for a 1 or 2 hr fire rated wall, respectively. Wall to be constructed as specified in the individual U400 or V400 Series Design in the UL Fire Resistance Directory except that a max 3/4 in. (19 mm) gap shall be maintained between the bottom of the gypsum board and the top of the concrete floor.
      The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.
3. **Joint System - Max separation between top of floor and bottom of gypsum board is 3/4 in. (19 mm).** The joint system consists of a packing material and a fill material, as follows:
   A. **Packing Material -** (Optional, Not Shown) - Mineral wool batt insulation, polyethylene backer rod or glass fiber insulation firmly packed into the gap between the bottom of the gypsum board and the top of the concrete floor and recessed from each surface of the wall to accommodate the required thickness of fill material.
   B. **Fill, Void or Cavity Material*-Sealant -** Min 1/2 in. (13 mm) thickness of fill material installed on each side of the wall between the bottom of the gypsum board and the top of the concrete floor, flush with each surface of the wall. When mineral wool batt insulation is used as a packing material, min thickness of fill material on each side of the wall is 1/4 in. (6 mm).
      SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant, SpecSeal LCI Sealant, SpecSeal LC150 Sealant, Pensil 300 Sealant or SpecSeal Series SIL300.
      Note: L Ratings apply when SpecSeal ES Sealant is used.
      * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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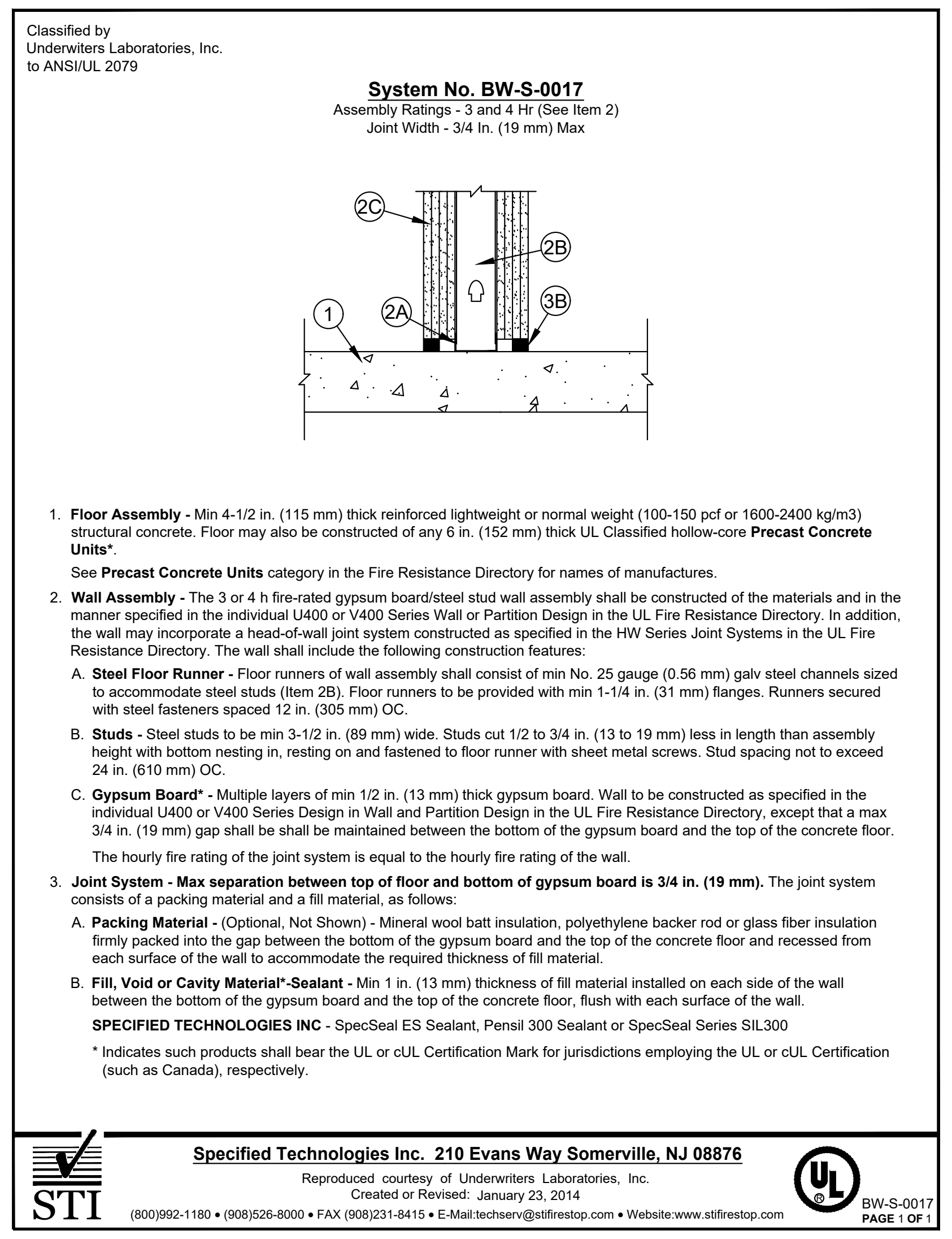

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 2079

System No. BW-S-0017

Assembly Ratings - 3 and 4 Hr (See Item 2)
Joint Width - 3/4 In. (19 mm) Max

1. **Floor Assembly -** Min 4-1/2 in. (115 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Floor may also be constructed of any 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units***.

   See **Precast Concrete Units** category in the Fire Resistance Directory for names of manufactures.

2. **Wall Assembly -** The 3 or 4 h fire-rated gypsum board/steel stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400 or V400 Series Wall or Partition Design in the UL Fire Resistance Directory. In addition, the wall may incorporate a head-of-wall joint system constructed as specified in the HW Series Joint Systems in the UL Fire Resistance Directory. The wall shall include the following construction features:
   A. **Steel Floor Runner -** Floor runners of wall assembly shall consist of min No. 25 gauge (0.56 mm) galv steel channels sized to accommodate steel studs (Item 2B). Floor runners to be provided with min 1-1/4 in. (31 mm) flanges. Runners secured with steel fasteners spaced 12 in. (305 mm) OC.
   B. **Studs -** Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in, resting on and fastened to floor runner with sheet metal screws. Stud spacing not to exceed 24 in. (610 mm) OC.
   C. **Gypsum Board* -** Multiple layers of min 1/2 in. (13 mm) thick gypsum board. Wall to be constructed as specified in the individual U400 or V400 Series Design in Wall and Partition Design in the UL Fire Resistance Directory, except that a max 3/4 in. (19 mm) gap shall be shall be maintained between the bottom of the gypsum board and the top of the concrete floor.

      The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. **Joint System - Max separation between top of floor and bottom of gypsum board is 3/4 in. (19 mm).** The joint system consists of a packing material and a fill material, as follows:
   A. **Packing Material -** (Optional, Not Shown) - Mineral wool batt insulation, polyethylene backer rod or glass fiber insulation firmly packed into the gap between the bottom of the gypsum board and the top of the concrete floor and recessed from each surface of the wall to accommodate the required thickness of fill material.
   B. **Fill, Void or Cavity Material*-Sealant -** Min 1 in. (13 mm) thickness of fill material installed on each side of the wall between the bottom of the gypsum board and the top of the concrete floor, flush with each surface of the wall.

      SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant, Pensil 300 Sealant or SpecSeal Series SIL300

      * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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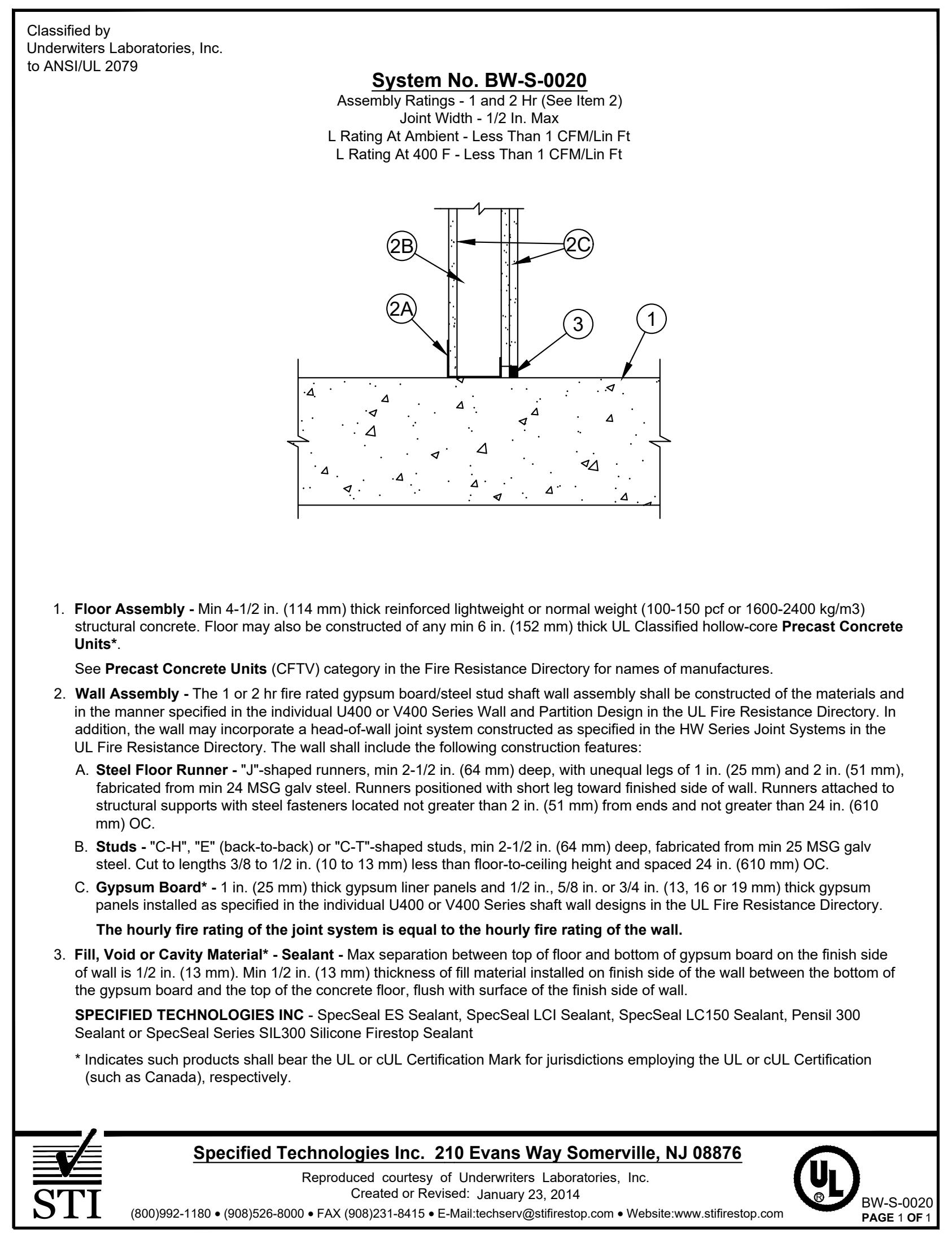

Classified by
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to ANSI/UL 2079

System No. BW-S-0020

Assembly Ratings - 1 and 2 Hr (See Item 2)
Joint Width - 1/2 In. Max
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400 F - Less Than 1 CFM/Lin Ft

1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units***.

   See **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names of manufactures.

2. **Wall Assembly -** The 1 or 2 hr fire rated gypsum board/steel stud shaft wall assembly shall be constructed of the materials and in the manner specified in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory. In addition, the wall may incorporate a head-of-wall joint system constructed as specified in the HW Series Joint Systems in the UL Fire Resistance Directory. The wall shall include the following construction features:
   A. **Steel Floor Runner -** "J"-shaped runners, min 2-1/2 in. (64 mm) deep, with unequal legs of 1 in. (25 mm) and 2 in. (51 mm), fabricated from min 24 MSG galv steel. Runners positioned with short leg toward finished side of wall. Runners attached to structural supports with steel fasteners located not greater than 2 in. (51 mm) from ends and not greater than 24 in. (610 mm) OC.
   B. **Studs -** "C-H", "E" (back-to-back) or "C-T"-shaped studs, min 2-1/2 in. (64 mm) deep, fabricated from min 25 MSG galv steel. Cut to lengths 3/8 to 1/2 in. (10 to 13 mm) less than floor-to-ceiling height and spaced 24 in. (610 mm) OC.
   C. **Gypsum Board* -** 1 in. (25 mm) thick gypsum liner panels and 1/2 in., 5/8 in. or 3/4 in. (13, 16 or 19 mm) thick gypsum panels installed as specified in the individual U400 or V400 Series shaft wall designs in the UL Fire Resistance Directory.

      The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. **Fill, Void or Cavity Material* - Sealant -** Max separation between top of floor and bottom of gypsum board on the finish side of wall is 1/2 in. (13 mm). Min 1/2 in. (13 mm) thickness of fill material installed on finish side of the wall between the bottom of the gypsum board and the top of the concrete floor, flush with surface of the finish side of wall.

   SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant, SpecSeal LCI Sealant, SpecSeal LC150 Sealant, Pensil 300 Sealant or SpecSeal Series SIL300 Silicone Firestop Sealant

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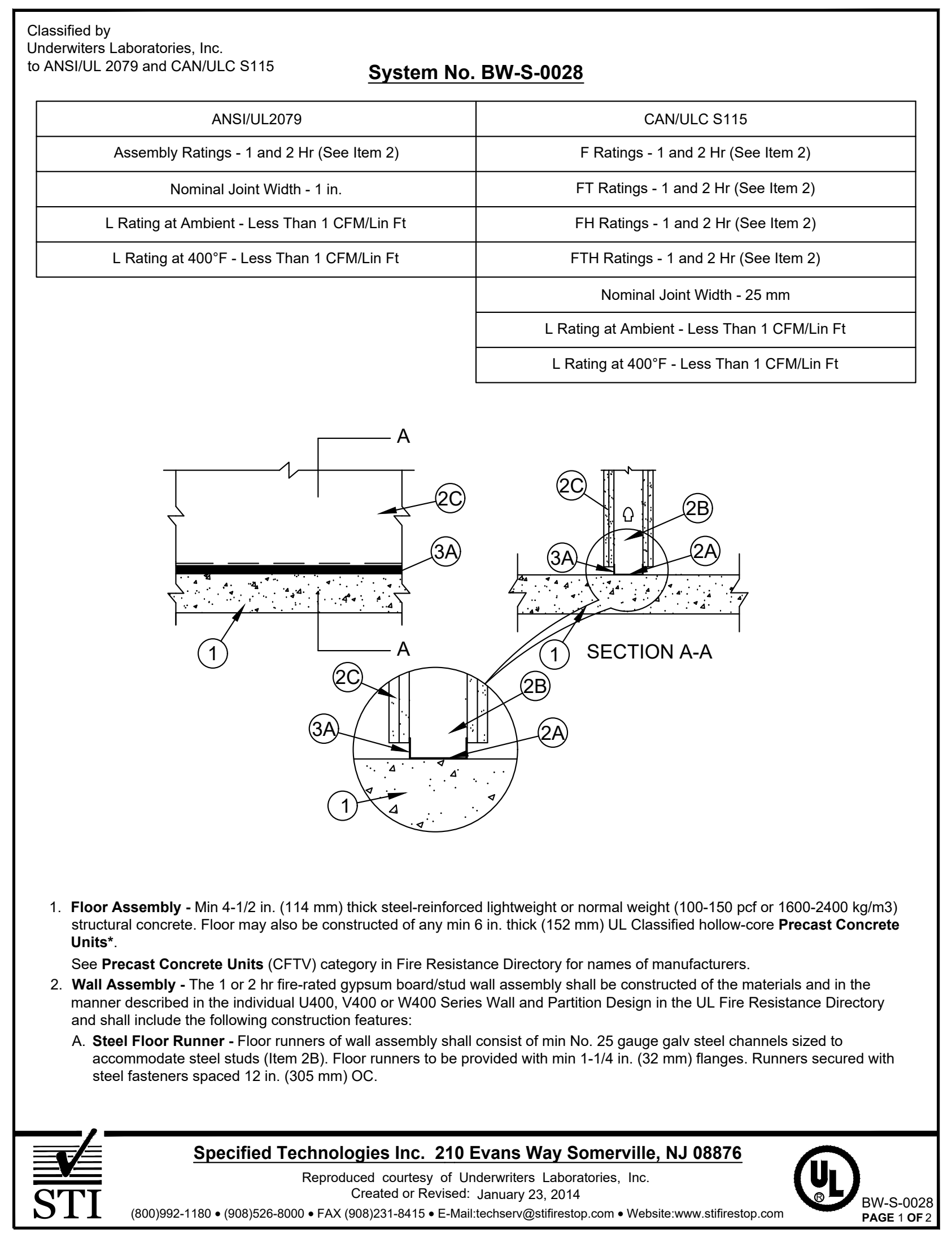

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 2079 and CAN/ULC S115

System No. BW-S-0028

ANSI/UL2079	CAN/ULC S115
Assembly Ratings - 1 and 2 Hr (See Item 2)	F Ratings - 1 and 2 Hr (See Item 2)
Nominal Joint Width - 1 in.	FT Ratings - 1 and 2 Hr (See Item 2)
L Rating at Ambient - Less Than 1 CFM/Lin Ft	FH Ratings - 1 and 2 Hr (See Item 2)
L Rating at 400°F - Less Than 1 CFM/Lin Ft	FTH Ratings - 1 and 2 Hr (See Item 2)
	Nominal Joint Width - 25 mm
	L Rating at Ambient - Less Than 1 CFM/Lin Ft
	L Rating at 400°F - Less Than 1 CFM/Lin Ft

1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Floor may also be constructed of any min 6 in. thick (152 mm) UL Classified hollow-core **Precast Concrete Units***.

   See **Precast Concrete Units** (CFTV) category in Fire Resistance Directory for names of manufacturers.

2. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Steel Floor Runner -** Floor runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Floor runners to be provided with min 1-1/4 in. (32 mm) flanges. Runners secured with steel fasteners spaced 12 in. (305 mm) OC.

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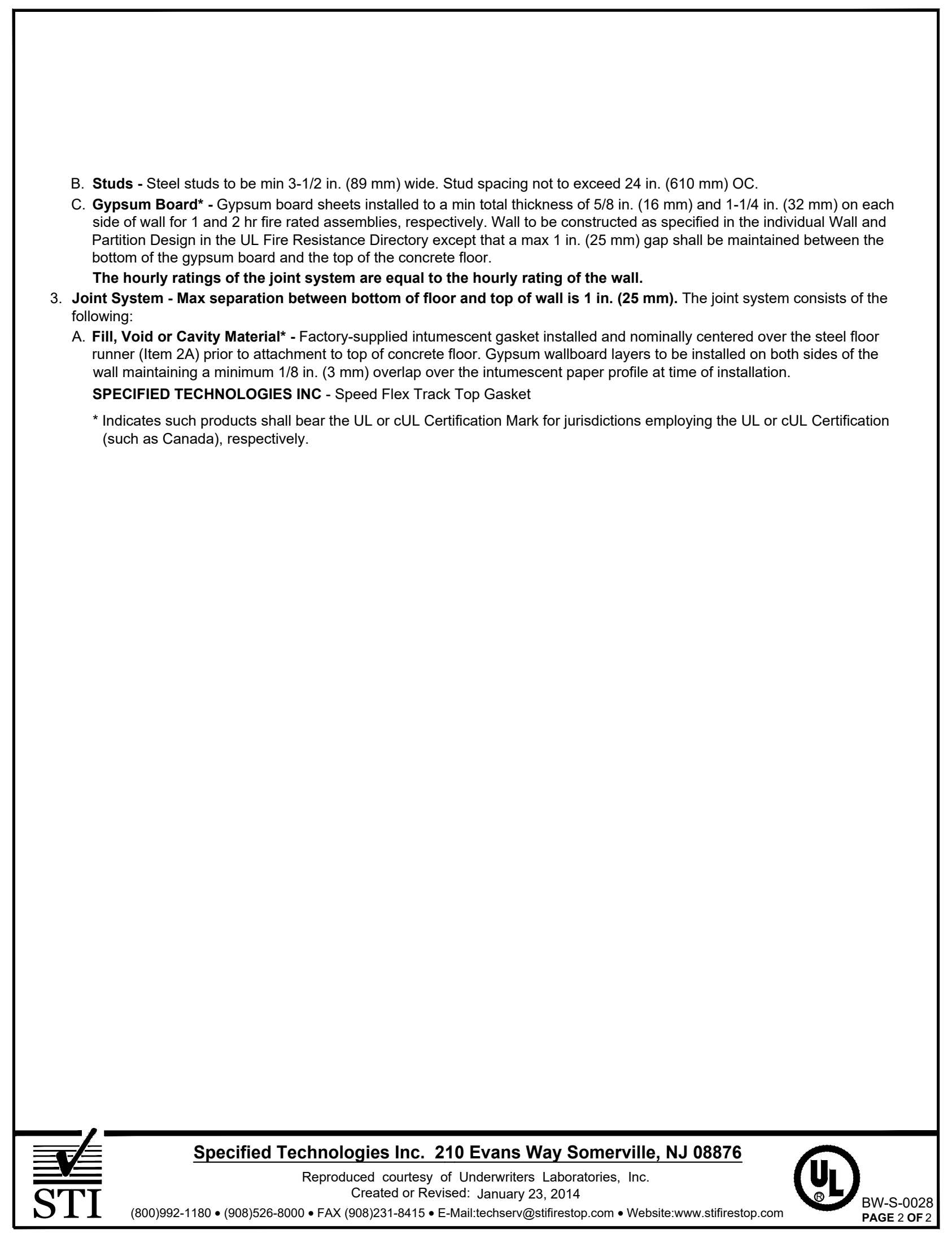

B. **Studs -** Steel studs to be min 3-1/2 in. (89 mm) wide. Stud spacing not to exceed 24 in. (610 mm) OC.
C. **Gypsum Board* -** Gypsum board sheets installed to a min total thickness of 5/8 in. (16 mm) and 1-1/4 in. (32 mm) on each side of wall for 1 and 2 hr fire rated assemblies, respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory except that a max 1 in. (25 mm) gap shall be maintained between the bottom of the gypsum board and the top of the concrete floor.
   The hourly ratings of the joint system are equal to the hourly rating of the wall.

3. **Joint System - Max separation between bottom of floor and top of wall is 1 in. (25 mm).** The joint system consists of the following:
   A. **Fill, Void or Cavity Material* -** Factory-supplied intumescent gasket installed and nominally centered over the steel floor runner (Item 2A) prior to attachment to top of concrete floor. Gypsum wallboard layers to be installed on both sides of the wall maintaining a minimum 1/8 in. (3 mm) overlap over the intumescent paper profile at time of installation.
      SPECIFIED TECHNOLOGIES INC - Speed Flex Track Top Gasket

      * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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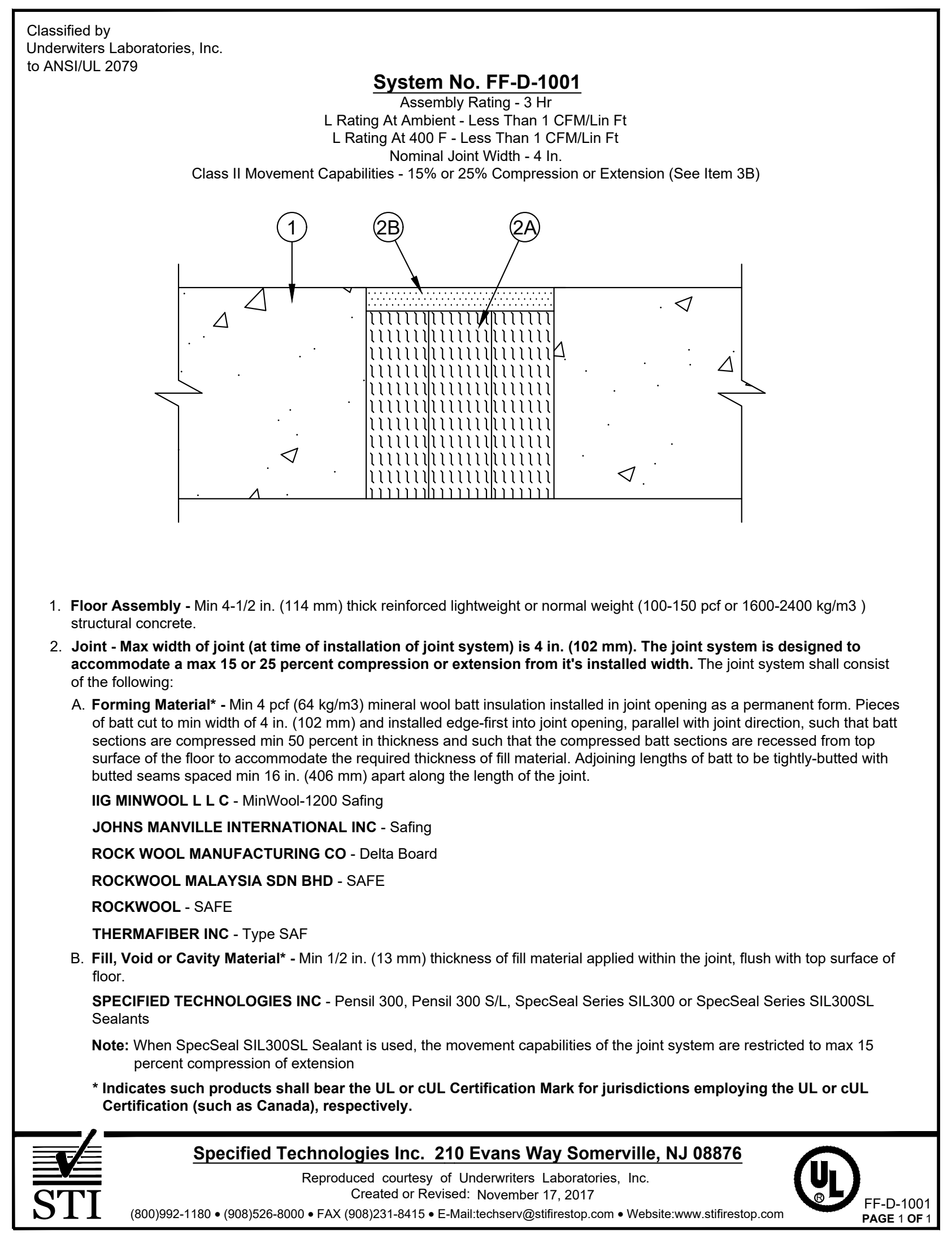

Classified by
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System No. FF-D-1001

Assembly Rating - 3 Hr
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400 F - Less Than 1 CFM/Lin Ft
Nominal Joint Width - 4 In.
Class II Movement Capabilities - 15% or 25% Compression or Extension (See Item 3B)

1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete.
2. **Joint - Max width of joint (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 15 or 25 percent compression or extension from it's installed width.** The joint system shall consist of the following:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. (102 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and such that the compressed batt sections are recessed from top surface of the floor to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.

      IIG MINWOOL L L C - MinWool-1200 Safing

      JOHNS MANVILLE INTERNATIONAL INC - Safing

      ROCK WOOL MANUFACTURING CO - Delta Board

      ROCKWOOL MALAYSIA SDN BHD - SAFE

      ROCKWOOL - SAFE

      THERMAFIBER INC - Type SAF

   B. **Fill, Void or Cavity Material* -** Min 1/2 in. (13 mm) thickness of fill material applied within the joint, flush with top surface of floor.

      SPECIFIED TECHNOLOGIES INC - Pensil 300, Pensil 300 S/L, SpecSeal Series SIL300 or SpecSeal Series SIL300SL Sealants

      Note: When SpecSeal SIL300SL Sealant is used, the movement capabilities of the joint system are restricted to max 15 percent compression of extension

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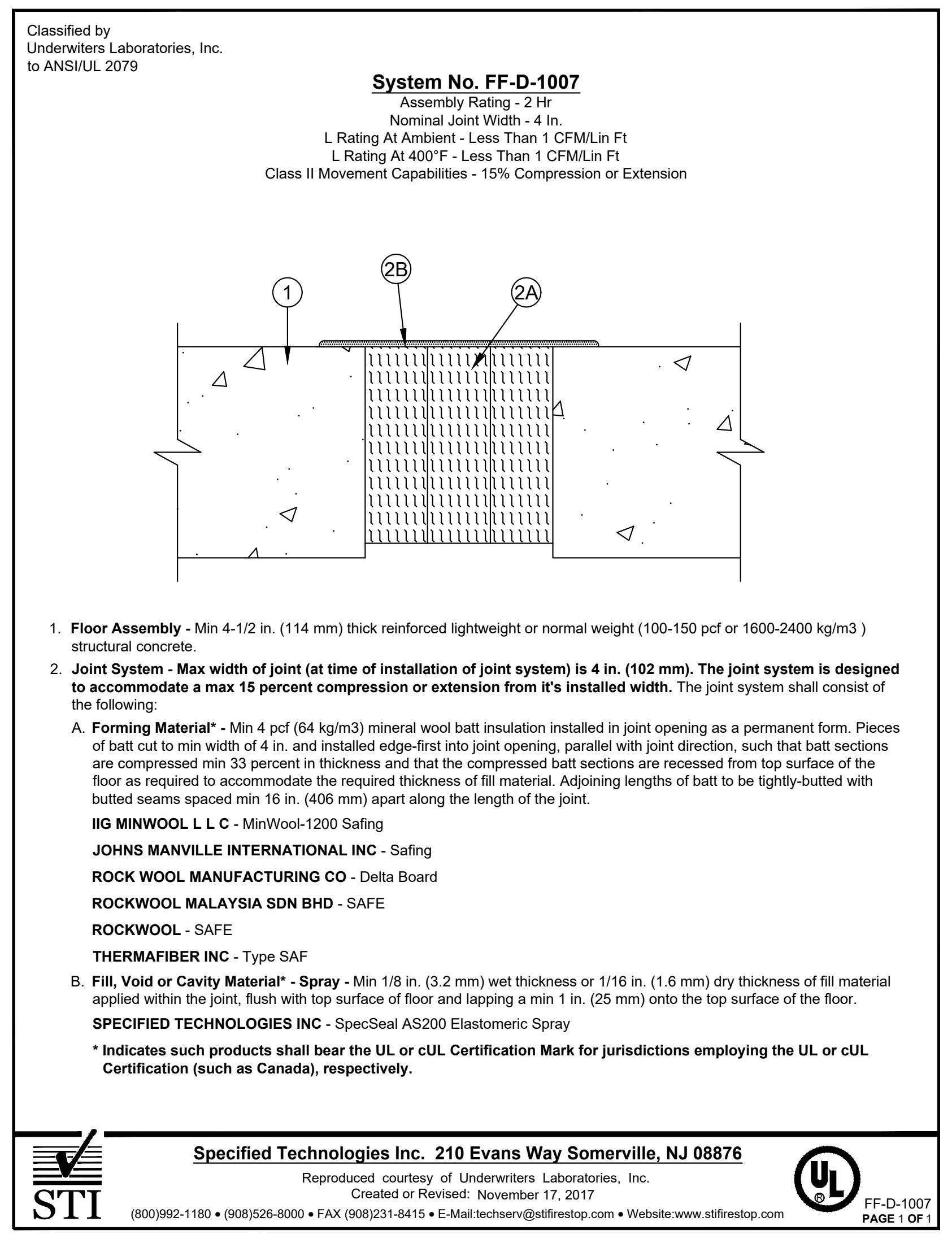

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 2079

System No. FF-D-1007

Assembly Rating - 2 Hr
Nominal Joint Width - 4 In.
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 15% Compression or Extension

1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete.
2. **Joint System - Max width of joint (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 15 percent compression or extension from it's installed width.** The joint system shall consist of the following:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 33 percent in thickness and that the compressed batt sections are recessed from top surface of the floor as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.

      IIG MINWOOL L L C - MinWool-1200 Safing

      JOHNS MANVILLE INTERNATIONAL INC - Safing

      ROCK WOOL MANUFACTURING CO - Delta Board

      ROCKWOOL MALAYSIA SDN BHD - SAFE

      ROCKWOOL - SAFE

      THERMAFIBER INC - Type SAF

   B. **Fill, Void or Cavity Material* - Spray -** Min 1/8 in. (3.2 mm) wet thickness or 1/16 in. (1.6 mm) dry thickness of fill material applied within the joint, flush with top surface of floor and lapping a min 1 in. (25 mm) onto the top surface of the floor.

      SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray

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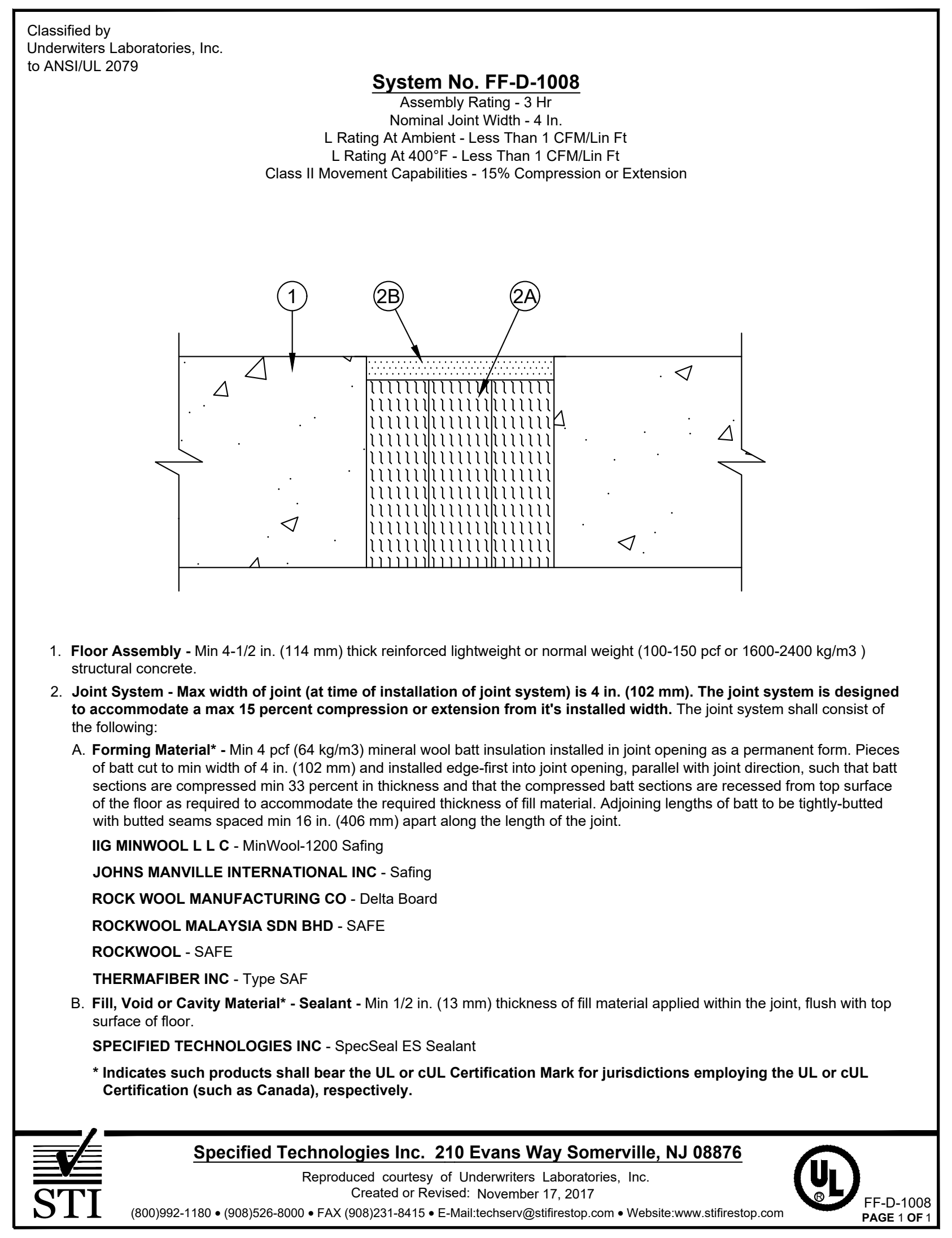

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to ANSI/UL 2079

System No. FF-D-1008

Assembly Rating - 3 Hr
Nominal Joint Width - 4 In.
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 15% Compression or Extension

1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete.
2. **Joint System - Max width of joint (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 15 percent compression or extension from it's installed width.** The joint system shall consist of the following:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. (102 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 33 percent in thickness and that the compressed batt sections are recessed from top surface of the floor as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.

      IIG MINWOOL L L C - MinWool-1200 Safing

      JOHNS MANVILLE INTERNATIONAL INC - Safing

      ROCK WOOL MANUFACTURING CO - Delta Board

      ROCKWOOL MALAYSIA SDN BHD - SAFE

      ROCKWOOL - SAFE

      THERMAFIBER INC - Type SAF

   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/2 in. (13 mm) thickness of fill material applied within the joint, flush with top surface of floor.

      SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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FF-D-1008
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GENERAL NOTES:

1. Refer to section 07 84 00 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
2. Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   - Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.
3. If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   - UL Fire Resistance Directory; Current Edition
   - NFPA 101 Life Safety Code
   - All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

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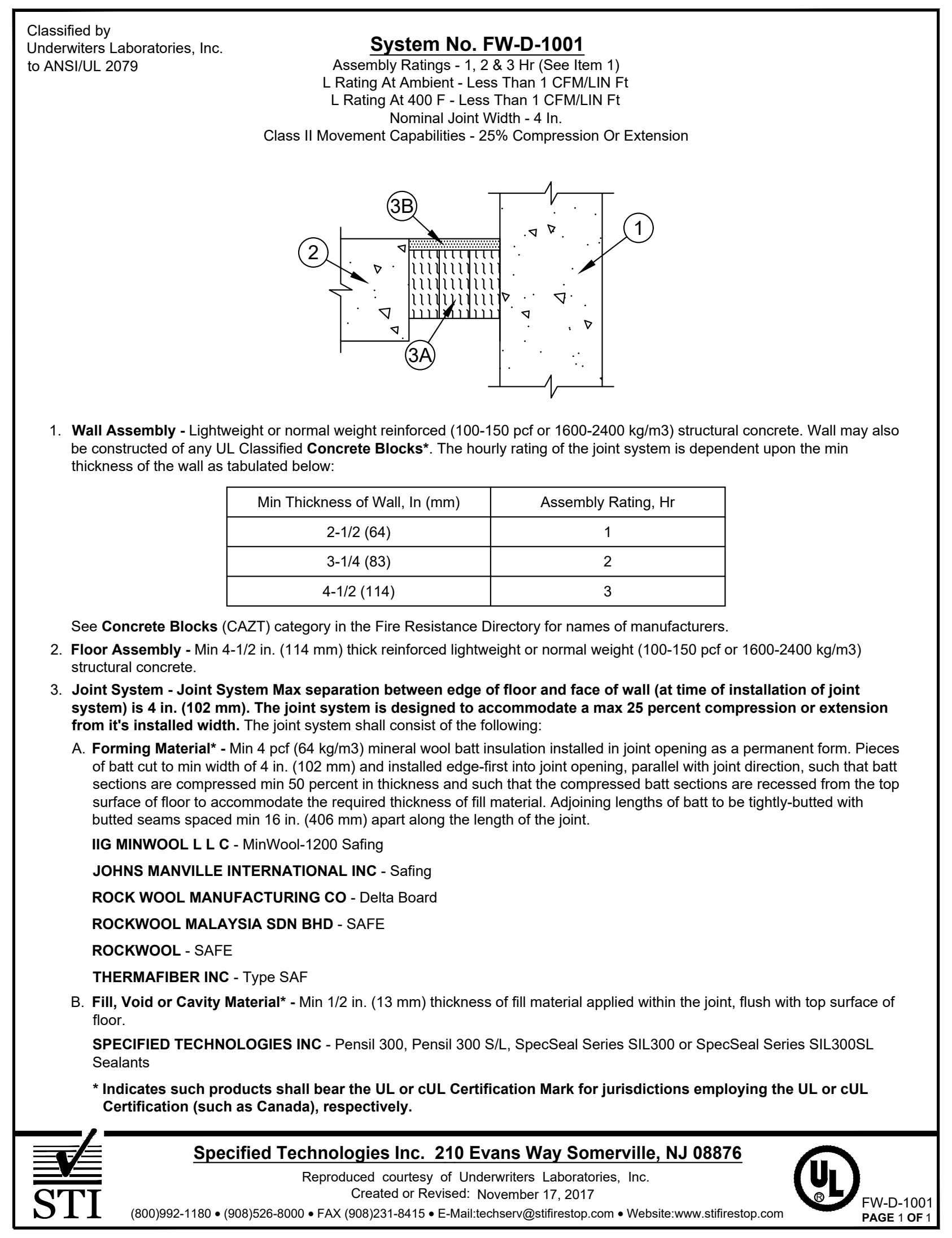

Classified by
Underwiters Laboratories, Inc.
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System No. FW-D-1001

Assembly Ratings - 1, 2 & 3 Hr (See Item 1)
L Rating At Ambient - Less Than 1 CFM/LIN Ft
L Rating At 400 F - Less Than 1 CFM/LIN Ft
Nominal Joint Width - 4 In.
Class II Movement Capabilities - 25% Compression Or Extension

1. **Wall Assembly -** Lightweight or normal weight reinforced (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. The hourly rating of the joint system is dependent upon the min thickness of the wall as tabulated below:

Min Thickness of Wall, In (mm)	Assembly Rating, Hr
2-1/2 (64)	1
3-1/4 (83)	2
4-1/2 (114)	3

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete.
3. **Joint System - Joint System Max separation between edge of floor and face of wall (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 25 percent compression or extension from it's installed width.** The joint system shall consist of the following:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. (102 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and such that the compressed batt sections are recessed from the top surface of floor to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.

   IIG MINWOOL L L C - MinWool-1200 Safing

   JOHNS MANVILLE INTERNATIONAL INC - Safing

   ROCK WOOL MANUFACTURING CO - Delta Board

   ROCKWOOL MALAYSIA SDN BHD - SAFE

   ROCKWOOL - SAFE

   THERMAFIBER INC - Type SAF

   B. **Fill, Void or Cavity Material* -** Min 1/2 in. (13 mm) thickness of fill material applied within the joint, flush with top surface of floor.

   SPECIFIED TECHNOLOGIES INC - Pensil 300, Pensil 300 S/L, SpecSeal Series SIL300 or SpecSeal Series SIL300SL Sealants

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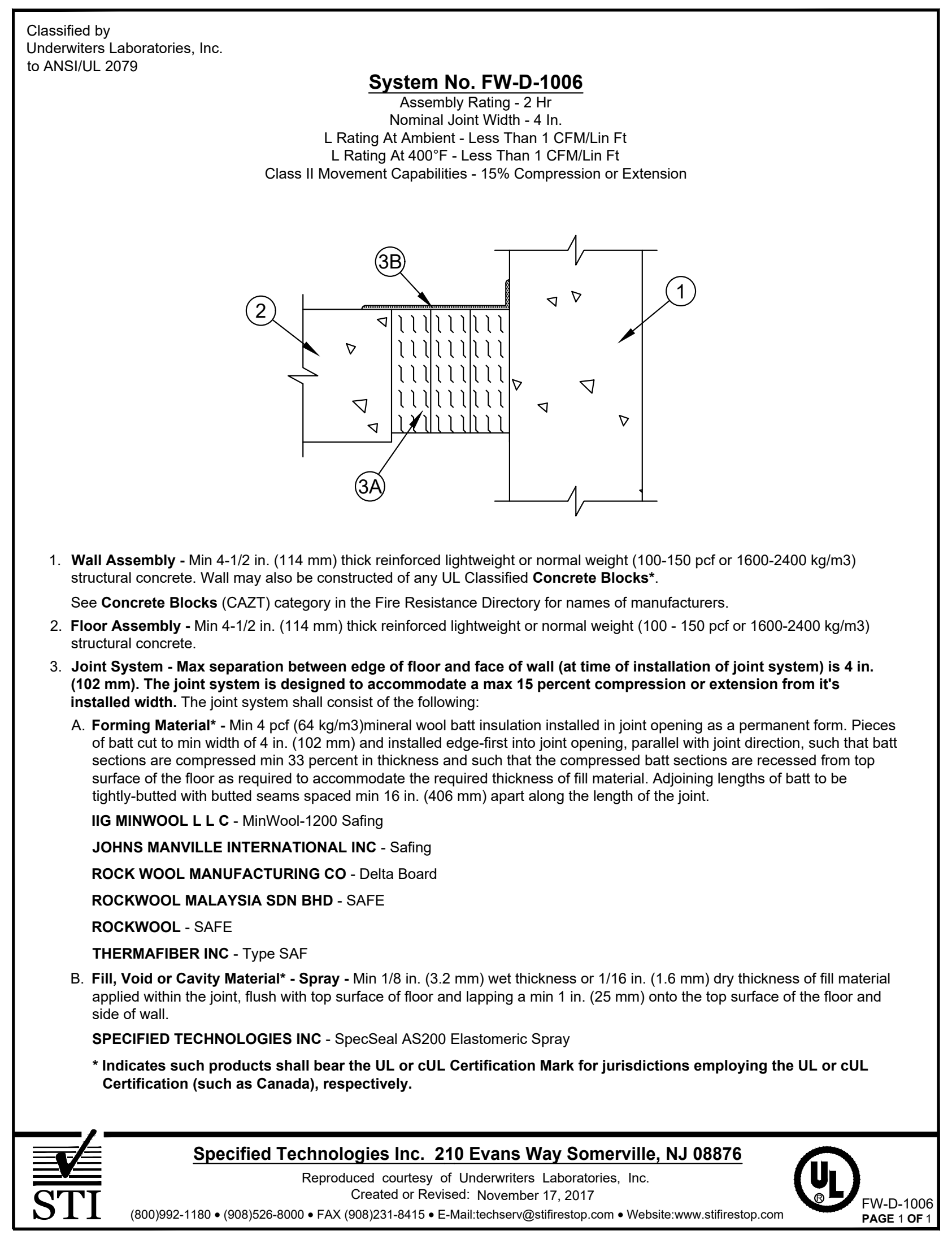

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System No. FW-D-1006

Assembly Rating - 2 Hr
Nominal Joint Width - 4 In.
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 15% Compression or Extension

1. **Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***.

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600-2400 kg/m3) structural concrete.
3. **Joint System - Max separation between edge of floor and face of wall (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 15 percent compression or extension from it's installed width.** The joint system shall consist of the following:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3)mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. (102 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 33 percent in thickness and such that the compressed batt sections are recessed from top surface of the floor as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.

   IIG MINWOOL L L C - MinWool-1200 Safing

   JOHNS MANVILLE INTERNATIONAL INC - Safing

   ROCK WOOL MANUFACTURING CO - Delta Board

   ROCKWOOL MALAYSIA SDN BHD - SAFE

   ROCKWOOL - SAFE

   THERMAFIBER INC - Type SAF

   B. **Fill, Void or Cavity Material* - Spray -** Min 1/8 in. (3.2 mm) wet thickness or 1/16 in. (1.6 mm) dry thickness of fill material applied within the joint, flush with top surface of floor and lapping a min 1 in. (25 mm) onto the top surface of the floor and side of wall.

   SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray

   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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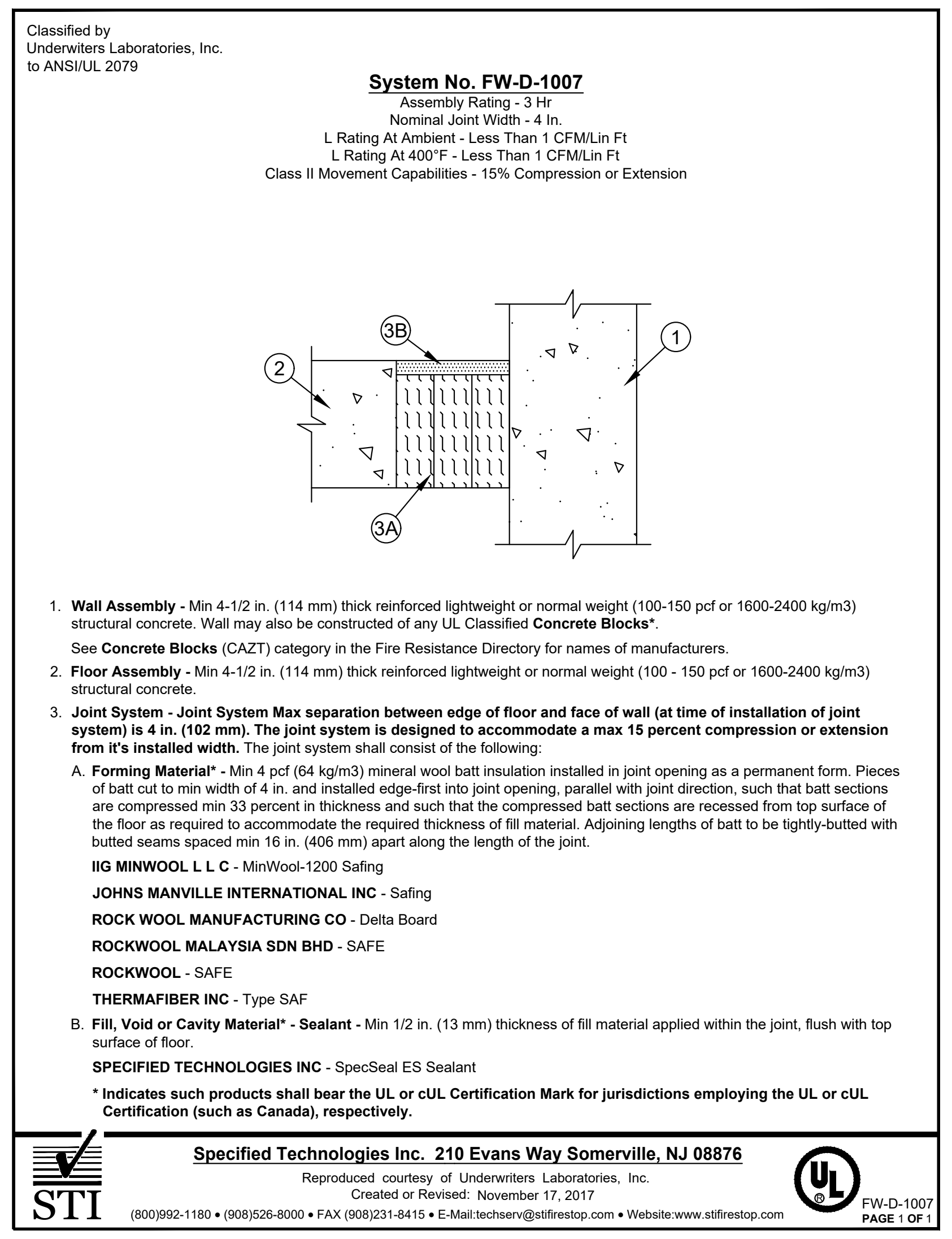

Classified by
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to ANSI/UL 2079

System No. FW-D-1007

Assembly Rating - 3 Hr
Nominal Joint Width - 4 In.
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 15% Compression or Extension

1. **Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***.

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600-2400 kg/m3) structural concrete.
3. **Joint System - Joint System Max separation between edge of floor and face of wall (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 15 percent compression or extension from it's installed width.** The joint system shall consist of the following:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 33 percent in thickness and such that the compressed batt sections are recessed from top surface of the floor as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.

   IIG MINWOOL L L C - MinWool-1200 Safing

   JOHNS MANVILLE INTERNATIONAL INC - Safing

   ROCK WOOL MANUFACTURING CO - Delta Board

   ROCKWOOL MALAYSIA SDN BHD - SAFE

   ROCKWOOL - SAFE

   THERMAFIBER INC - Type SAF

   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/2 in. (13 mm) thickness of fill material applied within the joint, flush with top surface of floor.

   SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant

   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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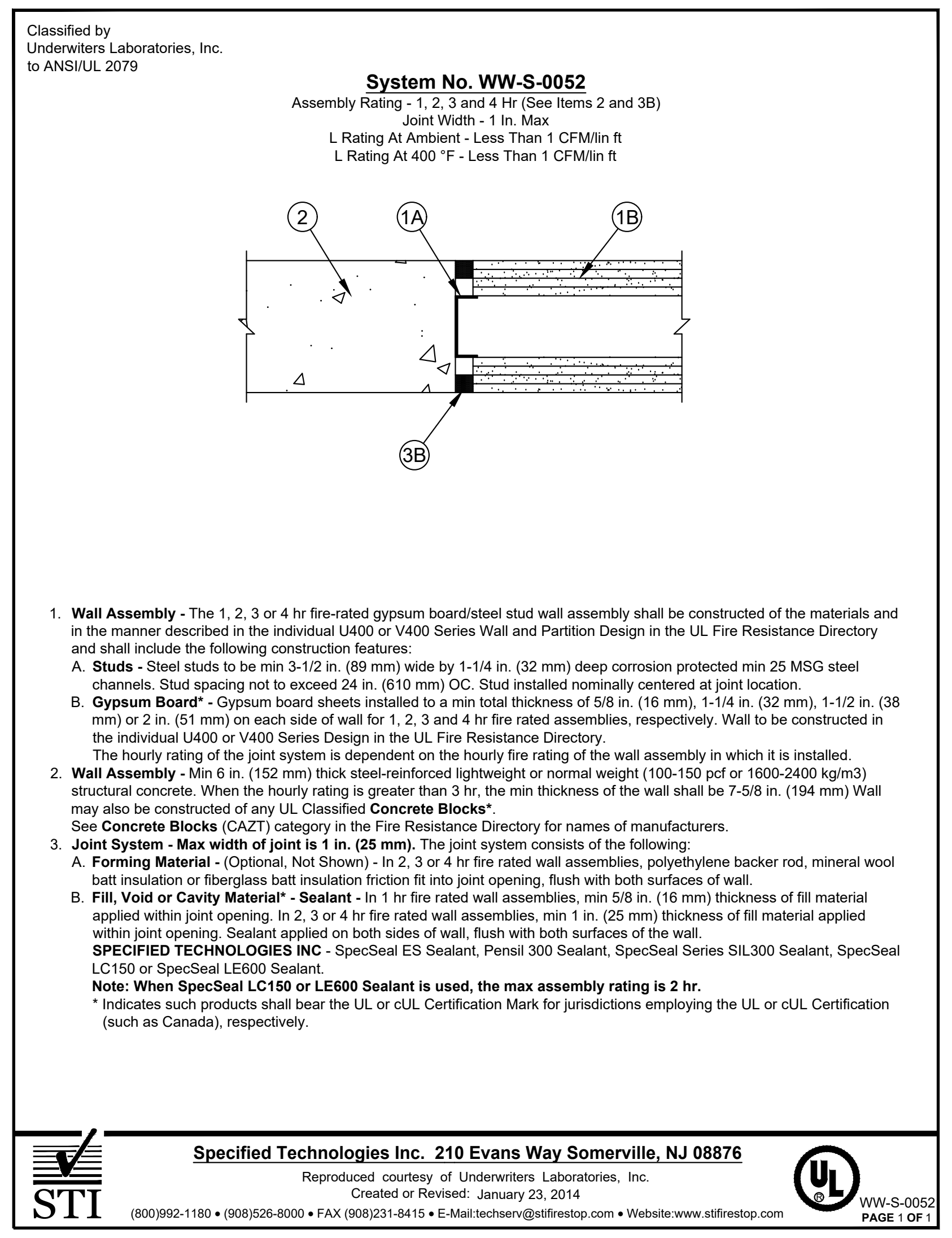

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 2079

System No. WW-S-0052

Assembly Rating - 1, 2, 3 and 4 Hr (See Items 2 and 3B)
Joint Width - 1 In. Max
L Rating At Ambient - Less Than 1 CFM/lin ft
L Rating At 400 °F - Less Than 1 CFM/lin ft

1. **Wall Assembly -** The 1, 2, 3 or 4 hr fire-rated gypsum board/steel stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Steel studs to be min 3-1/2 in. (89 mm) wide by 1-1/4 in. (32 mm) deep corrosion protected min 25 MSG steel channels. Stud spacing not to exceed 24 in. (610 mm) OC. Stud installed nominally centered at joint location.
   B. **Gypsum Board* -** Gypsum board sheets installed to a min total thickness of 5/8 in. (16 mm), 1-1/4 in. (32 mm), 1-1/2 in. (38 mm) or 2 in. (51 mm) on each side of wall for 1, 2, 3 and 4 hr fire rated assemblies, respectively. Wall to be constructed in the individual U400 or V400 Series Design in the UL Fire Resistance Directory.
   The hourly rating of the joint system is dependent on the hourly fire rating of the wall assembly in which it is installed.
2. **Wall Assembly -** Min 6 in. (152 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. When the hourly rating is greater than 3 hr, the min thickness of the wall shall be 7-5/8 in. (194 mm) Wall may also be constructed of any UL Classified **Concrete Blocks***.
   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
3. **Joint System - Max width of joint is 1 in. (25 mm).** The joint system consists of the following:
   A. **Forming Material -** (Optional, Not Shown) - In 2, 3 or 4 hr fire rated wall assemblies, polyethylene backer rod, mineral wool batt insulation or fiberglass batt insulation friction fit into joint opening, flush with both surfaces of wall.
   B. **Fill, Void or Cavity Material* - Sealant -** In 1 hr fire rated wall assemblies, min 5/8 in. (16 mm) thickness of fill material applied within joint opening. In 2, 3 or 4 hr fire rated wall assemblies, min 1 in. (25 mm) thickness of fill material applied within joint opening. Sealant applied on both sides of wall, flush with both surfaces of the wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant, Pensil 300 Sealant, SpecSeal Series SIL300 Sealant, SpecSeal LC150 or SpecSeal LE600 Sealant.
   Note: When SpecSeal LC150 or LE600 Sealant is used, the max assembly rating is 2 hr.
   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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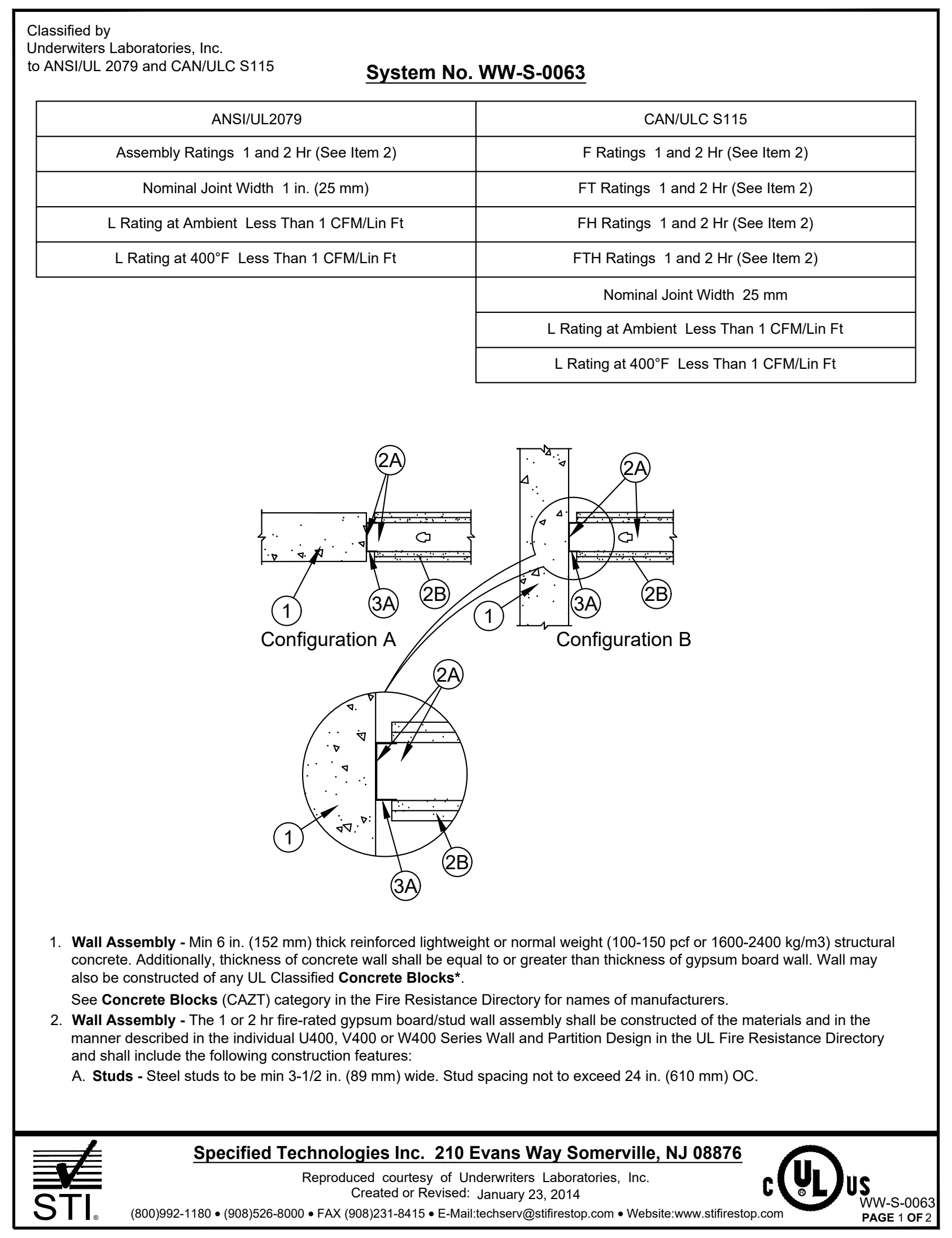

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 2079 and CAN/ULC S115

System No. WW-S-0063

ANSI/UL2079	CAN/ULC S115
Assembly Ratings 1 and 2 Hr (See Item 2)	F Ratings 1 and 2 Hr (See Item 2)
Nominal Joint Width 1 in. (25 mm)	FT Ratings 1 and 2 Hr (See Item 2)
L Rating at Ambient Less Than 1 CFM/Lin Ft	FH Ratings 1 and 2 Hr (See Item 2)
L Rating at 400°F Less Than 1 CFM/Lin Ft	FTH Ratings 1 and 2 Hr (See Item 2)
	Nominal Joint Width 25 mm
	L Rating at Ambient Less Than 1 CFM/Lin Ft
	L Rating at 400°F Less Than 1 CFM/Lin Ft

1. **Wall Assembly -** Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Additionally, thickness of concrete wall shall be equal to or greater than thickness of gypsum board wall. Wall may also be constructed of any UL Classified **Concrete Blocks***.

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Steel studs to be min 3-1/2 in. (89 mm) wide. Stud spacing not to exceed 24 in. (610 mm) OC.

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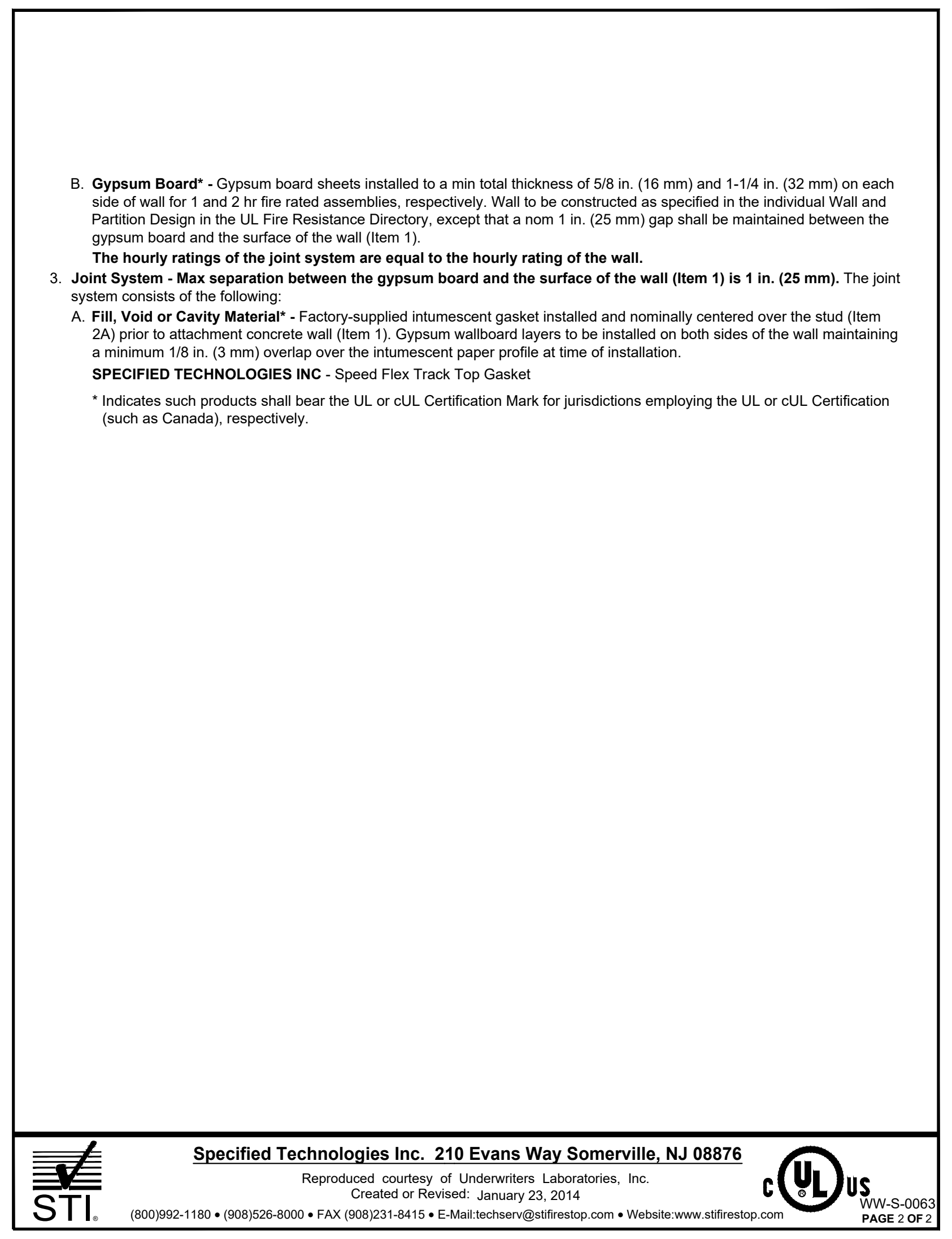

   B. **Gypsum Board* -** Gypsum board sheets installed to a min total thickness of 5/8 in. (16 mm) and 1-1/4 in. (32 mm) on each side of wall for 1 and 2 hr fire rated assemblies, respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that a nom 1 in. (25 mm) gap shall be maintained between the gypsum board and the surface of the wall (Item 1).
   The hourly ratings of the joint system are equal to the hourly rating of the wall.
3. **Joint System - Max separation between the gypsum board and the surface of the wall (Item 1) is 1 in. (25 mm).** The joint system consists of the following:
   A. **Fill, Void or Cavity Material* -** Factory-supplied intumescent gasket installed and nominally centered over the stud (Item 2A) prior to attachment concrete wall (Item 1). Gypsum wallboard layers to be installed on both sides of the wall maintaining a minimum 1/8 in. (3 mm) overlap over the intumescent paper profile at time of installation.
   SPECIFIED TECHNOLOGIES INC - Speed Flex Track Top Gasket

   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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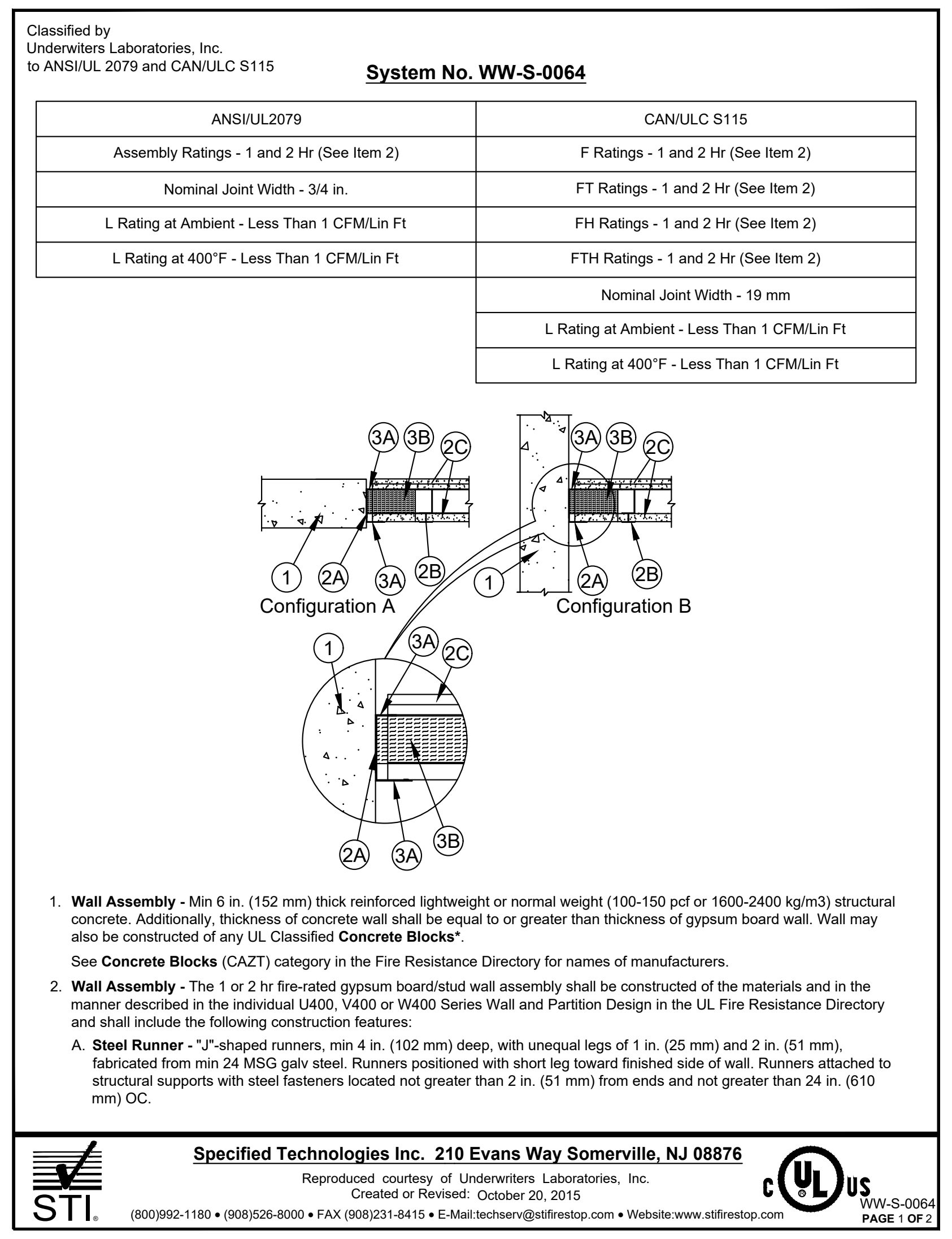

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 2079 and CAN/ULC S115

System No. WW-S-0064

ANSI/UL2079	CAN/ULC S115
Assembly Ratings - 1 and 2 Hr (See Item 2)	F Ratings - 1 and 2 Hr (See Item 2)
Nominal Joint Width - 3/4 in.	FT Ratings - 1 and 2 Hr (See Item 2)
L Rating at Ambient - Less Than 1 CFM/Lin Ft	FH Ratings - 1 and 2 Hr (See Item 2)
L Rating at 400°F - Less Than 1 CFM/Lin Ft	FTH Ratings - 1 and 2 Hr (See Item 2)
	Nominal Joint Width - 19 mm
	L Rating at Ambient - Less Than 1 CFM/Lin Ft
	L Rating at 400°F - Less Than 1 CFM/Lin Ft

1. **Wall Assembly -** Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Additionally, thickness of concrete wall shall be equal to or greater than thickness of gypsum board wall. Wall may also be constructed of any UL Classified **Concrete Blocks***.

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Steel Runner -** "J"-shaped runners, min 4 in. (102 mm) deep, with unequal legs of 1 in. (25 mm) and 2 in. (51 mm), fabricated from min 24 MSG galv steel. Runners positioned with short leg toward finished side of wall. Runners attached to structural supports with steel fasteners located not greater than 2 in. (51 mm) from ends and not greater than 24 in. (610 mm) OC.

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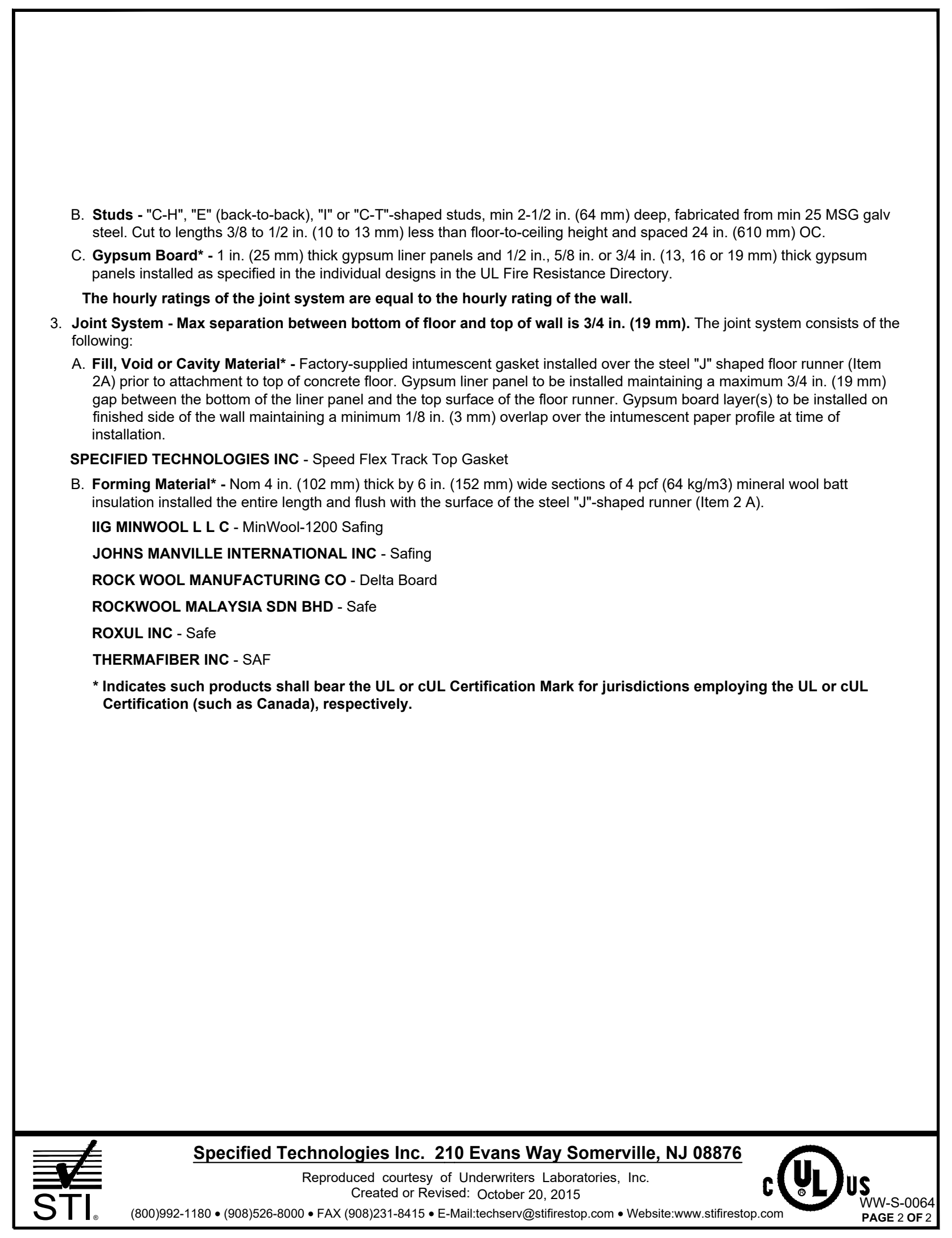

   B. **Studs -** "C-H", "E" (back-to-back), "I" or "C-T"-shaped studs, min 2-1/2 in. (64 mm) deep, fabricated from min 25 MSG galv steel. Cut to lengths 3/8 to 1/2 in. (10 to 13 mm) less than floor-to-ceiling height and spaced 24 in. (610 mm) OC.
   C. **Gypsum Board* -** 1 in. (25 mm) thick gypsum liner panels and 1/2 in., 5/8 in. or 3/4 in. (13, 16 or 19 mm) thick gypsum panels installed as specified in the individual designs in the UL Fire Resistance Directory.

   The hourly ratings of the joint system are equal to the hourly rating of the wall.
3. **Joint System - Max separation between bottom of floor and top of wall is 3/4 in. (19 mm).** The joint system consists of the following:
   A. **Fill, Void or Cavity Material* -** Factory-supplied intumescent gasket installed over the steel "J" shaped floor runner (Item 2A) prior to attachment to top of concrete floor. Gypsum liner panel to be installed maintaining a maximum 3/4 in. (19 mm) gap between the bottom of the liner panel and the top surface of the floor runner. Gypsum board layer(s) to be installed on finished side of the wall maintaining a minimum 1/8 in. (3 mm) overlap over the intumescent paper profile at time of installation.

   SPECIFIED TECHNOLOGIES INC - Speed Flex Track Top Gasket

   B. **Forming Material* -** Nom 4 in. (102 mm) thick by 6 in. (152 mm) wide sections of 4 pcf (64 kg/m3) mineral wool batt insulation installed the entire length and flush with the surface of the steel "J"-shaped runner (Item 2 A).

   IIG MINWOOL L L C - MinWool-1200 Safing

   JOHNS MANVILLE INTERNATIONAL INC - Safing

   ROCK WOOL MANUFACTURING CO - Delta Board

   ROCKWOOL MALAYSIA SDN BHD - Safe

   ROXUL INC - Safe

   THERMAFIBER INC - SAF

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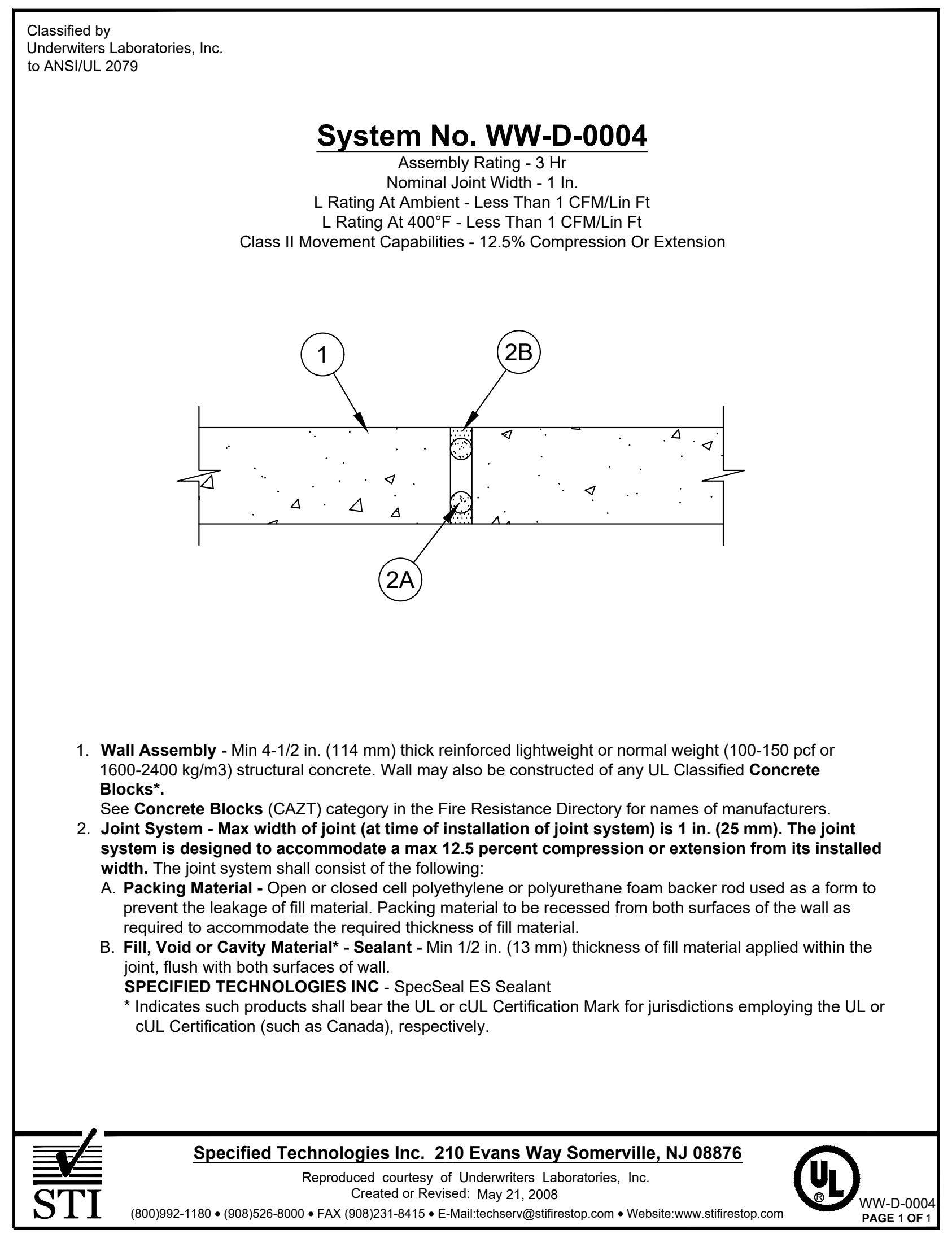

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 2079

System No. WW-D-0004

Assembly Rating - 3 Hr
Nominal Joint Width - 1 In.
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 12.5% Compression Or Extension

1. **Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks*.**
   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Joint System - Max width of joint (at time of installation of joint system) is 1 in. (25 mm). The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width.** The joint system shall consist of the following:
   A. **Packing Material -** Open or closed cell polyethylene or polyurethane foam backer rod used as a form to prevent the leakage of fill material. Packing material to be recessed from both surfaces of the wall as required to accommodate the required thickness of fill material.
   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/2 in. (13 mm) thickness of fill material applied within the joint, flush with both surfaces of wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant
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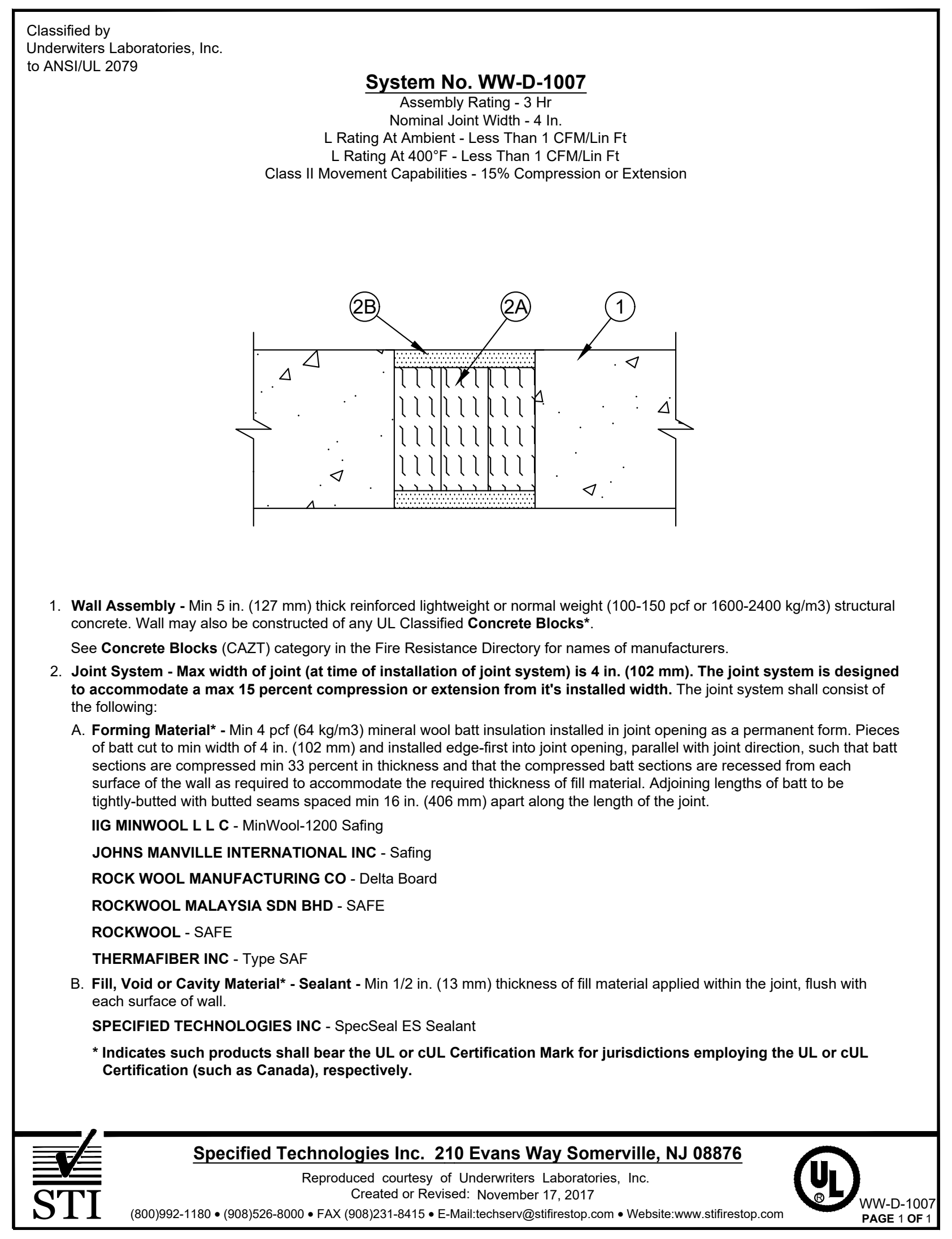

Classified by
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to ANSI/UL 2079

System No. WW-D-1007

Assembly Rating - 3 Hr
Nominal Joint Width - 4 In.
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 15% Compression or Extension

1. **Wall Assembly -** Min 5 in. (127 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***.

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Joint System - Max width of joint (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 15 percent compression or extension from it's installed width.** The joint system shall consist of the following:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. (102 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 33 percent in thickness and that the compressed batt sections are recessed from each surface of the wall as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.

   IIG MINWOOL L L C - MinWool-1200 Safing

   JOHNS MANVILLE INTERNATIONAL INC - Safing

   ROCK WOOL MANUFACTURING CO - Delta Board

   ROCKWOOL MALAYSIA SDN BHD - SAFE

   ROCKWOOL - SAFE

   THERMAFIBER INC - Type SAF

   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/2 in. (13 mm) thickness of fill material applied within the joint, flush with each surface of wall.

   SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant

   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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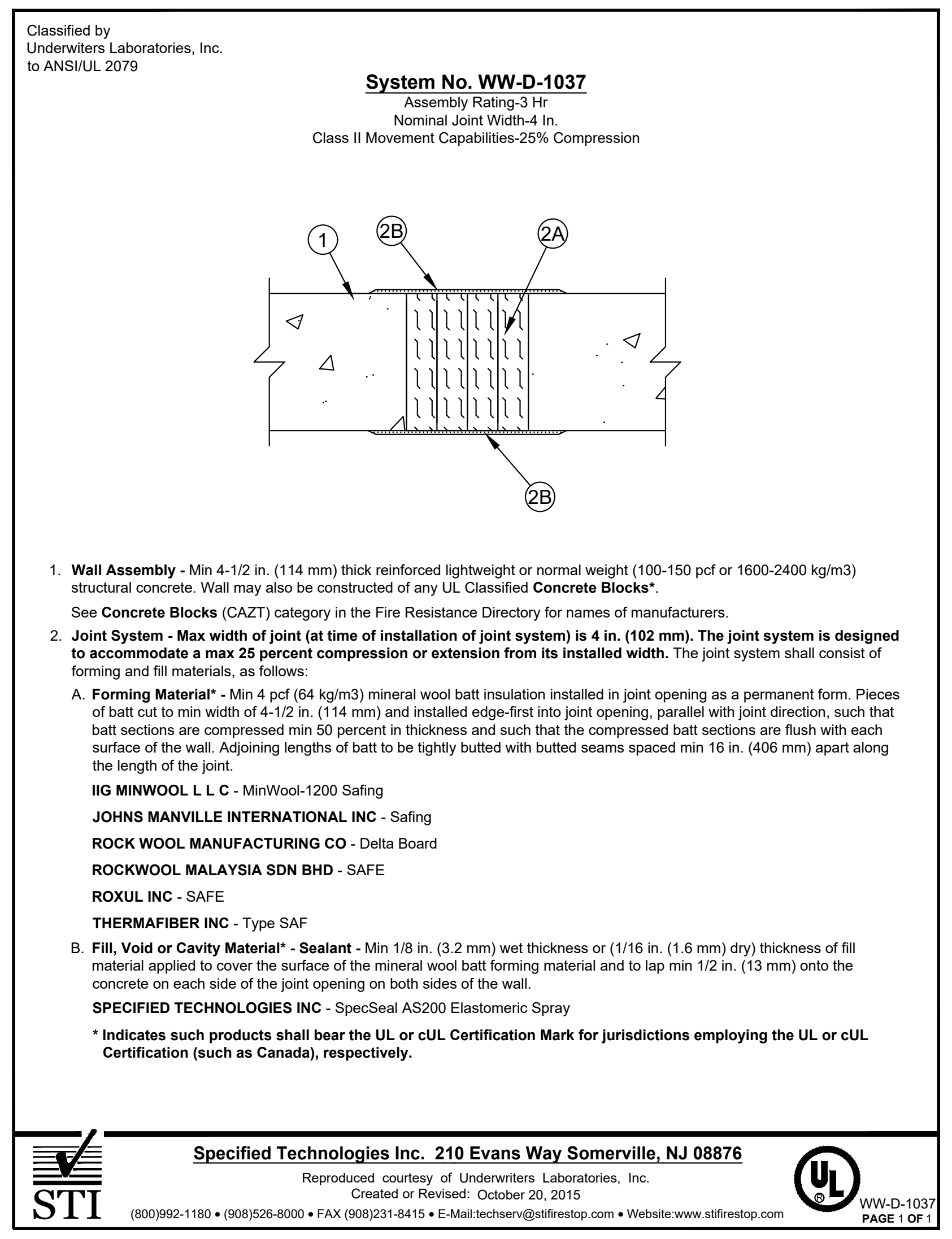

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 2079

System No. WW-D-1037

Assembly Rating-3 Hr
Nominal Joint Width-4 In.
Class II Movement Capabilities-25% Compression

1. **Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***.

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Joint System - Max width of joint (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 25 percent compression or extension from its installed width.** The joint system shall consist of forming and fill materials, as follows:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4-1/2 in. (114 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and such that the compressed batt sections are flush with each surface of the wall. Adjoining lengths of batt to be tightly butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.

   IIG MINWOOL L L C - MinWool-1200 Safing

   JOHNS MANVILLE INTERNATIONAL INC - Safing

   ROCK WOOL MANUFACTURING CO - Delta Board

   ROCKWOOL MALAYSIA SDN BHD - SAFE

   ROXUL INC - SAFE

   THERMAFIBER INC - Type SAF

   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/8 in. (3.2 mm) wet thickness or (1/16 in. (1.6 mm) dry) thickness of fill material applied to cover the surface of the mineral wool batt forming material and to lap min 1/2 in. (13 mm) onto the concrete on each side of the joint opening on both sides of the wall.

   SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray

   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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GENERAL NOTES:

1. Refer to section 07 84 00 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
2. Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   - Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.
3. If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   - UL Fire Resistance Directory; Current Edition
   - NFPA 101 Life Safety Code
   - All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

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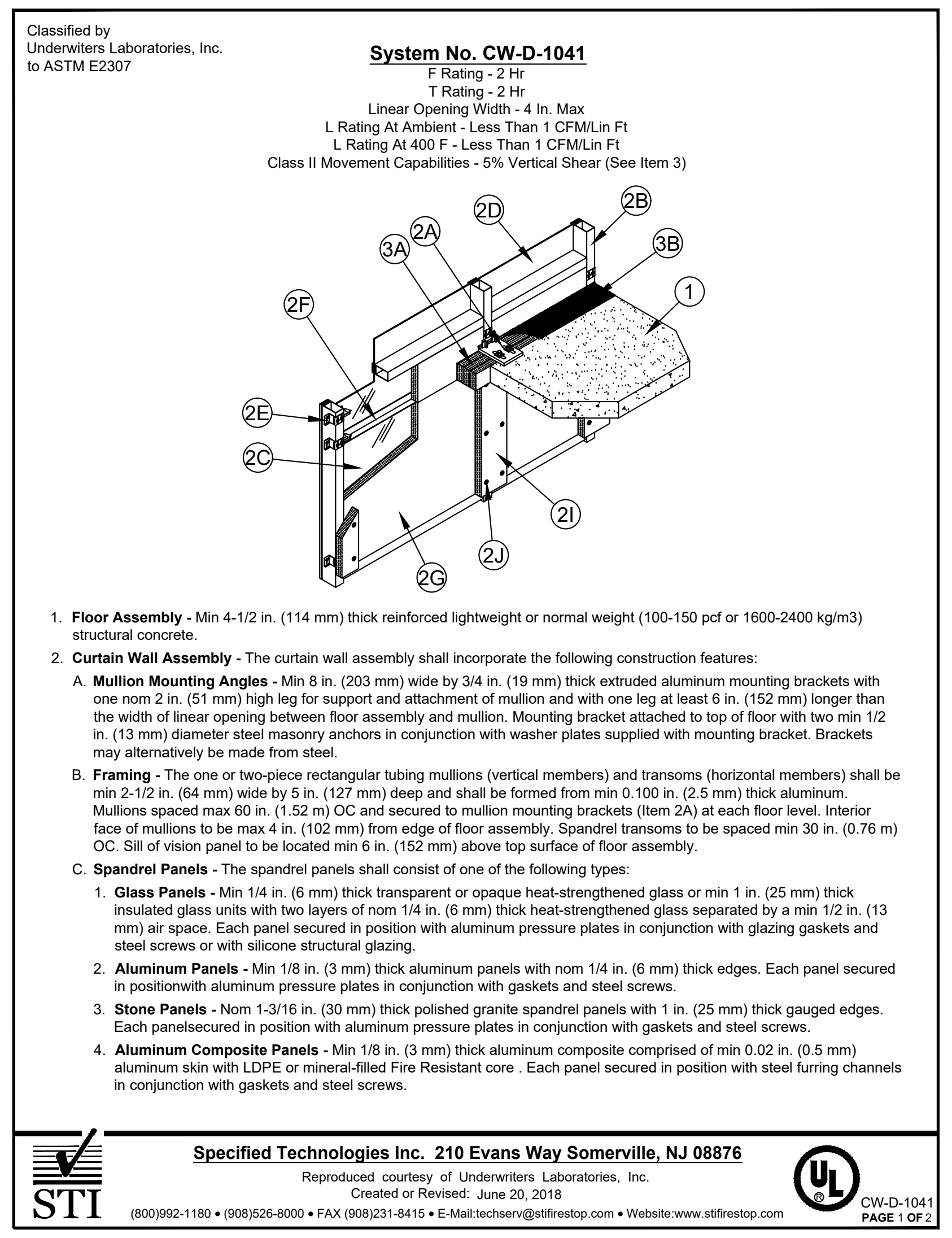

Classified by
Underwiters Laboratories, Inc.
to ASTM E2307

System No. CW-D-1041

F Rating - 2 Hr
T Rating - 2 Hr
Linear Opening Width - 4 In. Max
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400 F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 5% Vertical Shear (See Item 3)

1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete.
2. **Curtain Wall Assembly -** The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Angles -** Min 8 in. (203 mm) wide by 3/4 in. (19 mm) thick extruded aluminum mounting brackets with one nom 2 in. (51 mm) high leg for support and attachment of mullion and with one leg at least 6 in. (152 mm) longer than the width of linear opening between floor assembly and mullion. Mounting bracket attached to top of floor with two min 1/2 in. (13 mm) diameter steel masonry anchors in conjunction with washer plates supplied with mounting bracket. Brackets may alternatively be made from steel.
   B. **Framing -** The one or two-piece rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. (64 mm) wide by 5 in. (127 mm) deep and shall be formed from min 0.100 in. (2.5 mm) thick aluminum. Mullions spaced max 60 in. (1.52 m) OC and secured to mullion mounting brackets (Item 2A) at each floor level. Interior face of mullions to be max 4 in. (102 mm) from edge of floor assembly. Spandrel transoms to be spaced min 30 in. (0.76 m) OC. Sill of vision panel to be located min 6 in. (152 mm) above top surface of floor assembly.
   C. **Spandrel Panels -** The spandrel panels shall consist of one of the following types:
      1. **Glass Panels -** Min 1/4 in. (6 mm) thick transparent or opaque heat-strengthened glass or min 1 in. (25 mm) thick insulated glass units with two layers of nom 1/4 in. (6 mm) thick heat-strengthened glass separated by a min 1/2 in. (13 mm) air space. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws or with silicone structural glazing.
      2. **Aluminum Panels -** Min 1/8 in. (3 mm) thick aluminum panels with nom 1/4 in. (6 mm) thick edges. Each panel secured in positionwith aluminum pressure plates in conjunction with gaskets and steel screws.
      3. **Stone Panels -** Nom 1-3/16 in. (30 mm) thick polished granite spandrel panels with 1 in. (25 mm) thick gauged edges. Each panelsecured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
      4. **Aluminum Composite Panels -** Min 1/8 in. (3 mm) thick aluminum composite comprised of min 0.02 in. (0.5 mm) aluminum skin with LDPE or mineral-filled Fire Resistant core . Each panel secured in position with steel furring channels in conjunction with gaskets and steel screws.

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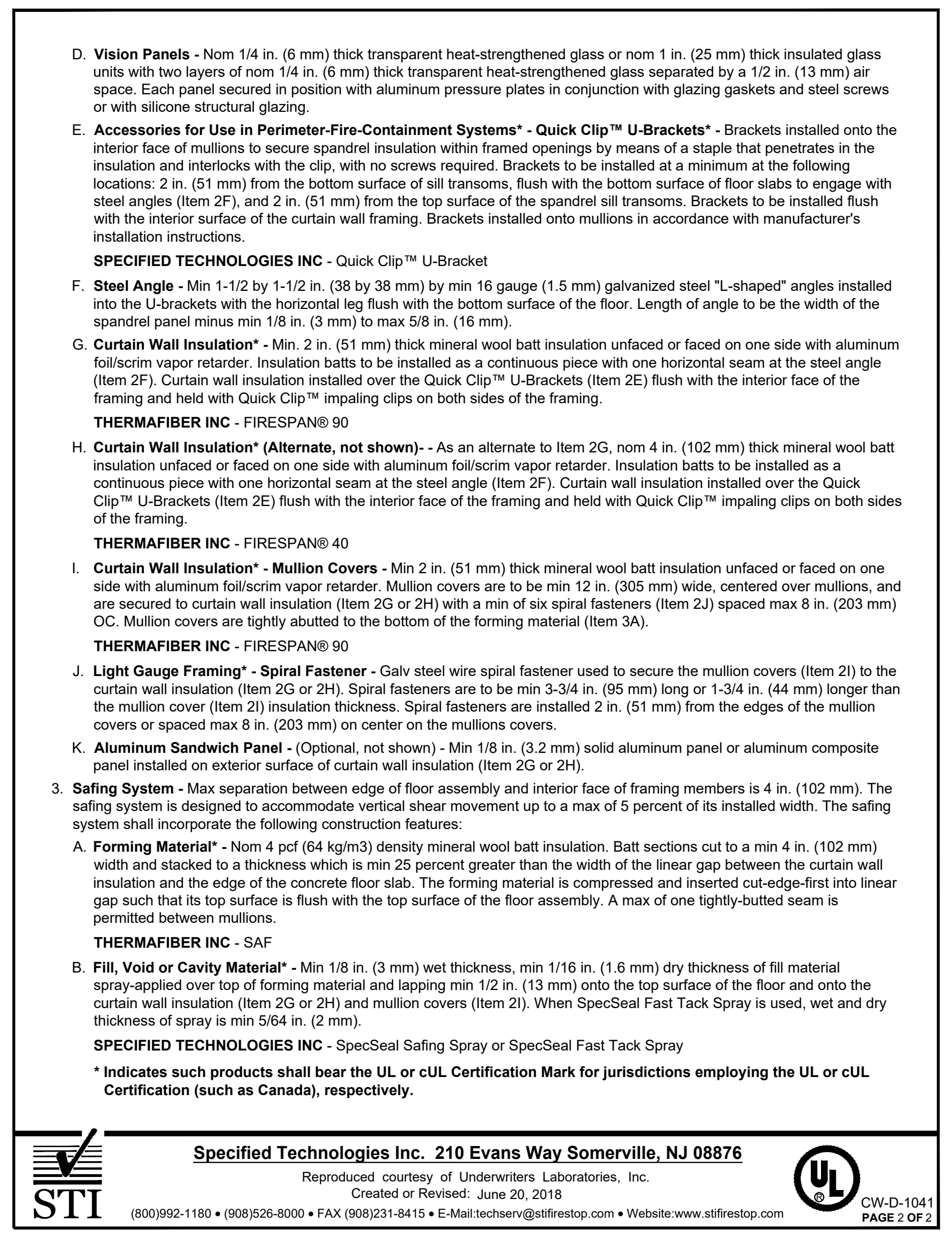

D. **Vision Panels -** Nom 1/4 in. (6 mm) thick transparent heat-strengthened glass or nom 1 in. (25 mm) thick insulated glass units with two layers of nom 1/4 in. (6 mm) thick transparent heat-strengthened glass separated by a 1/2 in. (13 mm) air space. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws or with silicone structural glazing.

E. **Accessories for Use in Perimeter-Fire-Containment Systems* - Quick Clip™ U-Brackets* -** Brackets installed onto the interior face of mullions to secure spandrel insulation within framed openings by means of a staple that penetrates in the insulation and interlocks with the clip, with no screws required. Brackets to be installed at a minimum at the following locations: 2 in. (51 mm) from the bottom surface of sill transoms, flush with the bottom surface of floor slabs to engage with steel angles (Item 2F), and 2 in. (51 mm) from the top surface of the spandrel sill transoms. Brackets to be installed flush with the interior surface of the curtain wall framing. Brackets installed onto mullions in accordance with manufacturer's installation instructions.

SPECIFIED TECHNOLOGIES INC - Quick Clip™ U-Bracket

F. **Steel Angle -** Min 1-1/2 by 1-1/2 in. (38 by 38 mm) by min 16 gauge (1.5 mm) galvanized steel "L-shaped" angles installed into the U-brackets with the horizontal leg flush with the bottom surface of the floor. Length of angle to be the width of the spandrel panel minus min 1/8 in. (3 mm) to max 5/8 in. (16 mm).

G. **Curtain Wall Insulation* -** Min. 2 in. (51 mm) thick mineral wool batt insulation unfaced or faced on one side with aluminum foil/scrim vapor retarder. Insulation batts to be installed as a continuous piece with one horizontal seam at the steel angle (Item 2F). Curtain wall insulation installed over the Quick Clip™ U-Brackets (Item 2E) flush with the interior face of the framing and held with Quick Clip™ impaling clips on both sides of the framing.

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H. **Curtain Wall Insulation* (Alternate, not shown)- -** As an alternate to Item 2G, nom 4 in. (102 mm) thick mineral wool batt insulation unfaced or faced on one side with aluminum foil/scrim vapor retarder. Insulation batts to be installed as a continuous piece with one horizontal seam at the steel angle (Item 2F). Curtain wall insulation installed over the Quick Clip™ U-Brackets (Item 2E) flush with the interior face of the framing and held with Quick Clip™ impaling clips on both sides of the framing.

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I. **Curtain Wall Insulation* - Mullion Covers -** Min 2 in. (51 mm) thick mineral wool batt insulation unfaced or faced on one side with aluminum foil/scrim vapor retarder. Mullion covers are to be min 12 in. (305 mm) wide, centered over mullions, and are secured to curtain wall insulation (Item 2G or 2H) with a min of six spiral fasteners (Item 2J) spaced max 8 in. (203 mm) OC. Mullion covers are tightly abutted to the bottom of the forming material (Item 3A).

THERMAFIBER INC - FIRESPAN® 90

J. **Light Gauge Framing* - Spiral Fastener -** Galv steel wire spiral fastener used to secure the mullion covers (Item 2I) to the curtain wall insulation (Item 2G or 2H). Spiral fasteners are to be min 3-3/4 in. (95 mm) long or 1-3/4 in. (44 mm) longer than the mullion cover (Item 2I) insulation thickness. Spiral fasteners are installed 2 in. (51 mm) from the edges of the mullion covers or spaced max 8 in. (203 mm) on center on the mullions covers.

K. **Aluminum Sandwich Panel -** (Optional, not shown) - Min 1/8 in. (3.2 mm) solid aluminum panel or aluminum composite panel installed on exterior surface of curtain wall insulation (Item 2G or 2H).

3. **Safing System -** Max separation between edge of floor assembly and interior face of framing members is 4 in. (102 mm). The safing system is designed to accommodate vertical shear movement up to a max of 5 percent of its installed width. The safing system shall incorporate the following construction features:
   A. **Forming Material* -** Nom 4 pcf (64 kg/m3) density mineral wool batt insulation. Batt sections cut to a min 4 in. (102 mm) width and stacked to a thickness which is min 25 percent greater than the width of the linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions.

   THERMAFIBER INC - SAF

   B. **Fill, Void or Cavity Material* -** Min 1/8 in. (3 mm) wet thickness, min 1/16 in. (1.6 mm) dry thickness of fill material spray-applied over top of forming material and lapping min 1/2 in. (13 mm) onto the top surface of the floor and onto the curtain wall insulation (Item 2G or 2H) and mullion covers (Item 2I). When SpecSeal Fast Tack Spray is used, wet and dry thickness of spray is min 5/64 in. (2 mm).

   SPECIFIED TECHNOLOGIES INC - SpecSeal Safing Spray or SpecSeal Fast Tack Spray

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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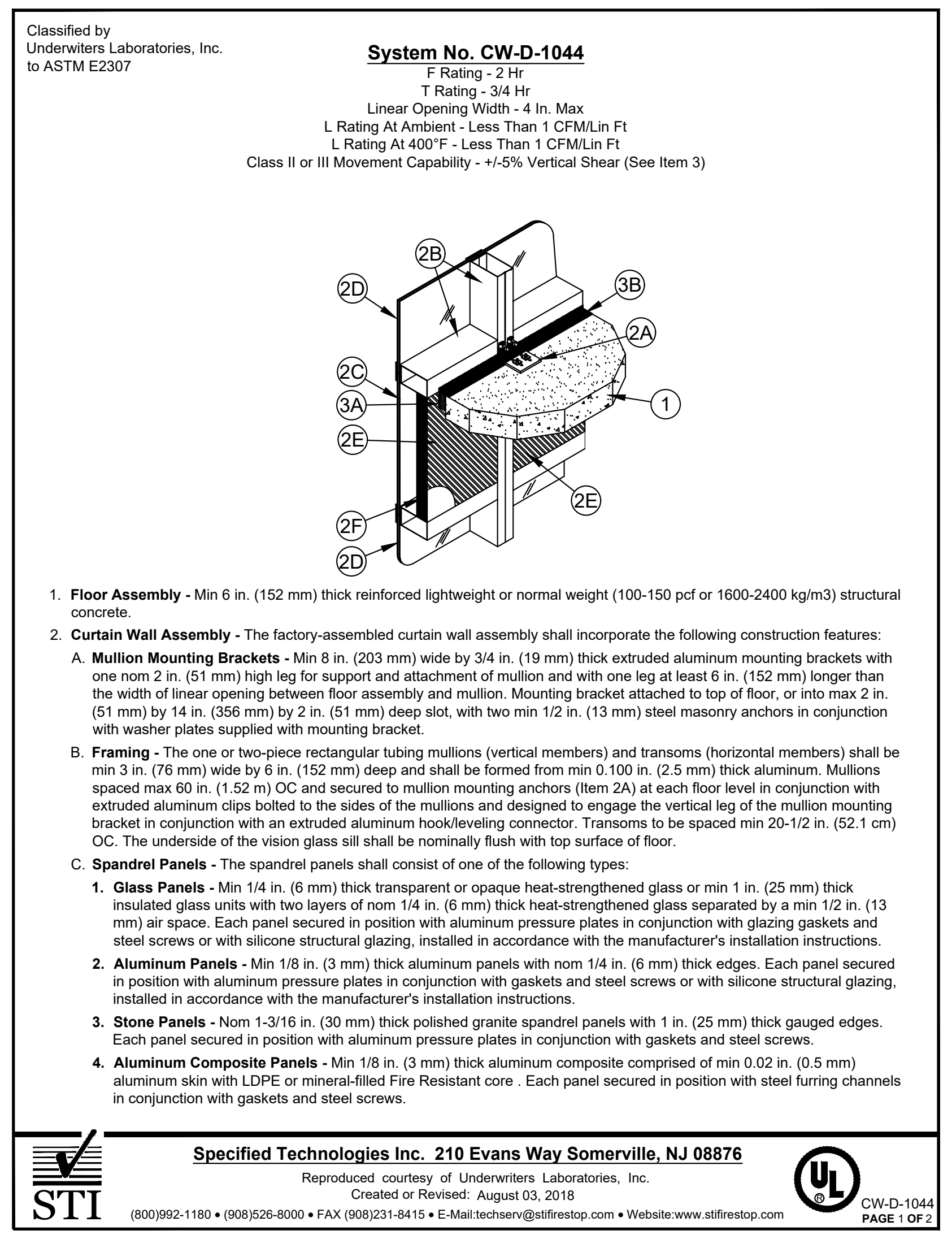

Classified by
Underwiters Laboratories, Inc.
to ASTM E2307

System No. CW-D-1044

F Rating - 2 Hr
T Rating - 3/4 Hr
Linear Opening Width - 4 In. Max
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II or III Movement Capability - +/-5% Vertical Shear (See Item 3)

1. **Floor Assembly -** Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete.
2. **Curtain Wall Assembly -** The factory-assembled curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Brackets -** Min 8 in. (203 mm) wide by 3/4 in. (19 mm) thick extruded aluminum mounting brackets with one nom 2 in. (51 mm) high leg for support and attachment of mullion and with one leg at least 6 in. (152 mm) longer than the width of linear opening between floor assembly and mullion. Mounting bracket attached to top of floor, or into max 2 in. (51 mm) by 14 in. (356 mm) by 2 in. (51 mm) deep slot, with two min 1/2 in. (13 mm) steel masonry anchors in conjunction with washer plates supplied with mounting bracket.
   B. **Framing -** The one or two-piece rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 3 in. (76 mm) wide by 6 in. (152 mm) deep and shall be formed from min 0.100 in. (2.5 mm) thick aluminum. Mullions spaced max 60 in. (1.52 m) OC and secured to mullion mounting anchors (Item 2A) at each floor level in conjunction with extruded aluminum clips bolted to the sides of the mullions and designed to engage the vertical leg of the mullion mounting bracket in conjunction with an extruded aluminum hook/leveling connector. Transoms to be spaced min 20-1/2 in. (52.1 cm) OC. The underside of the vision glass sill shall be nominally flush with top surface of floor.
   C. **Spandrel Panels -** The spandrel panels shall consist of one of the following types:
      1. Glass Panels - Min 1/4 in. (6 mm) thick transparent or opaque heat-strengthened glass or min 1 in. (25 mm) thick insulated glass units with two layers of nom 1/4 in. (6 mm) thick heat-strengthened glass separated by a min 1/2 in. (13 mm) air space. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws or with silicone structural glazing, installed in accordance with the manufacturer's installation instructions.
      2. Aluminum Panels - Min 1/8 in. (3 mm) thick aluminum panels with nom 1/4 in. (6 mm) thick edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws or with silicone structural glazing, installed in accordance with the manufacturer's installation instructions.
      3. Stone Panels - Nom 1-3/16 in. (30 mm) thick polished granite spandrel panels with 1 in. (25 mm) thick gauged edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
      4. Aluminum Composite Panels - Min 1/8 in. (3 mm) thick aluminum composite comprised of min 0.02 in. (0.5 mm) aluminum skin with LDPE or mineral-filled Fire Resistant core . Each panel secured in position with steel furring channels in conjunction with gaskets and steel screws.

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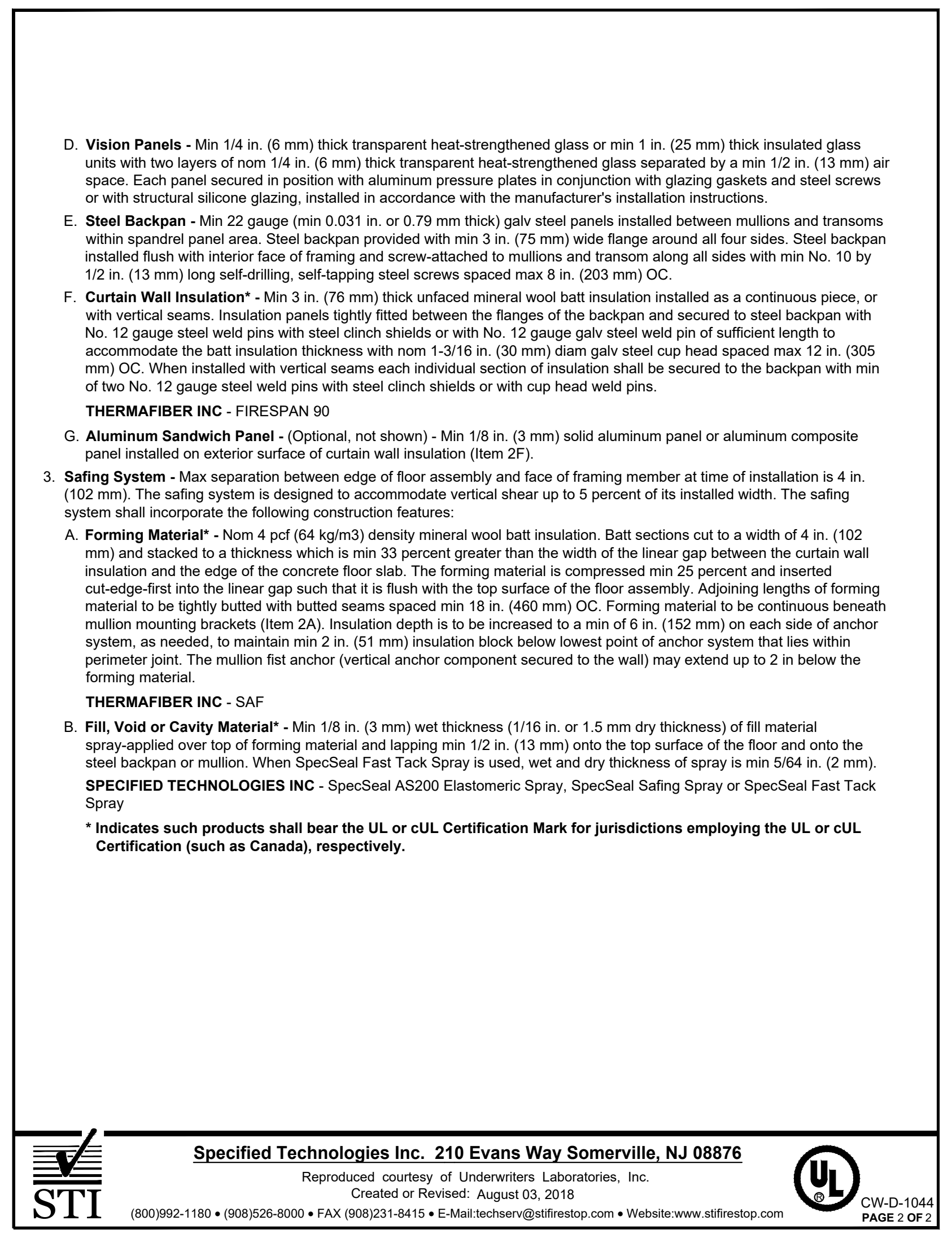

D. **Vision Panels -** Min 1/4 in. (6 mm) thick transparent heat-strengthened glass or min 1 in. (25 mm) thick insulated glass units with two layers of nom 1/4 in. (6 mm) thick transparent heat-strengthened glass separated by a min 1/2 in. (13 mm) air space. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws or with structural silicone glazing, installed in accordance with the manufacturer's installation instructions.

E. **Steel Backpan -** Min 22 gauge (min 0.031 in. or 0.79 mm thick) galv steel panels installed between mullions and transoms within spandrel panel area. Steel backpan provided with min 3 in. (75 mm) wide flange around all four sides. Steel backpan installed flush with interior face of framing and screw-attached to mullions and transom along all sides with min No. 10 by 1/2 in. (13 mm) long self-drilling, self-tapping steel screws spaced max 8 in. (203 mm) OC.

F. **Curtain Wall Insulation* -** Min 3 in. (76 mm) thick unfaced mineral wool batt insulation installed as a continuous piece, or with vertical seams. Insulation panels tightly fitted between the flanges of the backpan and secured to steel backpan with No. 12 gauge steel weld pins with steel clinch shields or with No. 12 gauge galv steel weld pin of sufficient length to accommodate the batt insulation thickness with nom 1-3/16 in. (30 mm) diam galv steel cup head spaced max 12 in. (305 mm) OC. When installed with vertical seams each individual section of insulation shall be secured to the backpan with min of two No. 12 gauge steel weld pins with steel clinch shields or with cup head weld pins.

THERMAFIBER INC - FIRESPAN 90

G. **Aluminum Sandwich Panel -** (Optional, not shown) - Min 1/8 in. (3 mm) solid aluminum panel or aluminum composite panel installed on exterior surface of curtain wall insulation (Item 2F).

3. **Safing System -** Max separation between edge of floor assembly and face of framing member at time of installation is 4 in. (102 mm). The safing system is designed to accommodate vertical shear up to 5 percent of its installed width. The safing system shall incorporate the following construction features:
   A. **Forming Material* -** Nom 4 pcf (64 kg/m3) density mineral wool batt insulation. Batt sections cut to a width of 4 in. (102 mm) and stacked to a thickness which is min 33 percent greater than the width of the linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed min 25 percent and inserted cut-edge-first into the linear gap such that it is flush with the top surface of the floor assembly. Adjoining lengths of forming material to be tightly butted with butted seams spaced min 18 in. (460 mm) OC. Forming material to be continuous beneath mullion mounting brackets (Item 2A). Insulation depth is to be increased to a min of 6 in. (152 mm) on each side of anchor system, as needed, to maintain min 2 in. (51 mm) insulation block below lowest point of anchor system that lies within perimeter joint. The mullion fist anchor (vertical anchor component secured to the wall) may extend up to 2 in below the forming material.

   THERMAFIBER INC - SAF

   B. **Fill, Void or Cavity Material* -** Min 1/8 in. (3 mm) wet thickness (1/16 in. or 1.5 mm dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. (13 mm) onto the top surface of the floor and onto the steel backpan or mullion. When SpecSeal Fast Tack Spray is used, wet and dry thickness of spray is min 5/64 in. (2 mm).

   SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray, SpecSeal Safing Spray or SpecSeal Fast Tack Spray

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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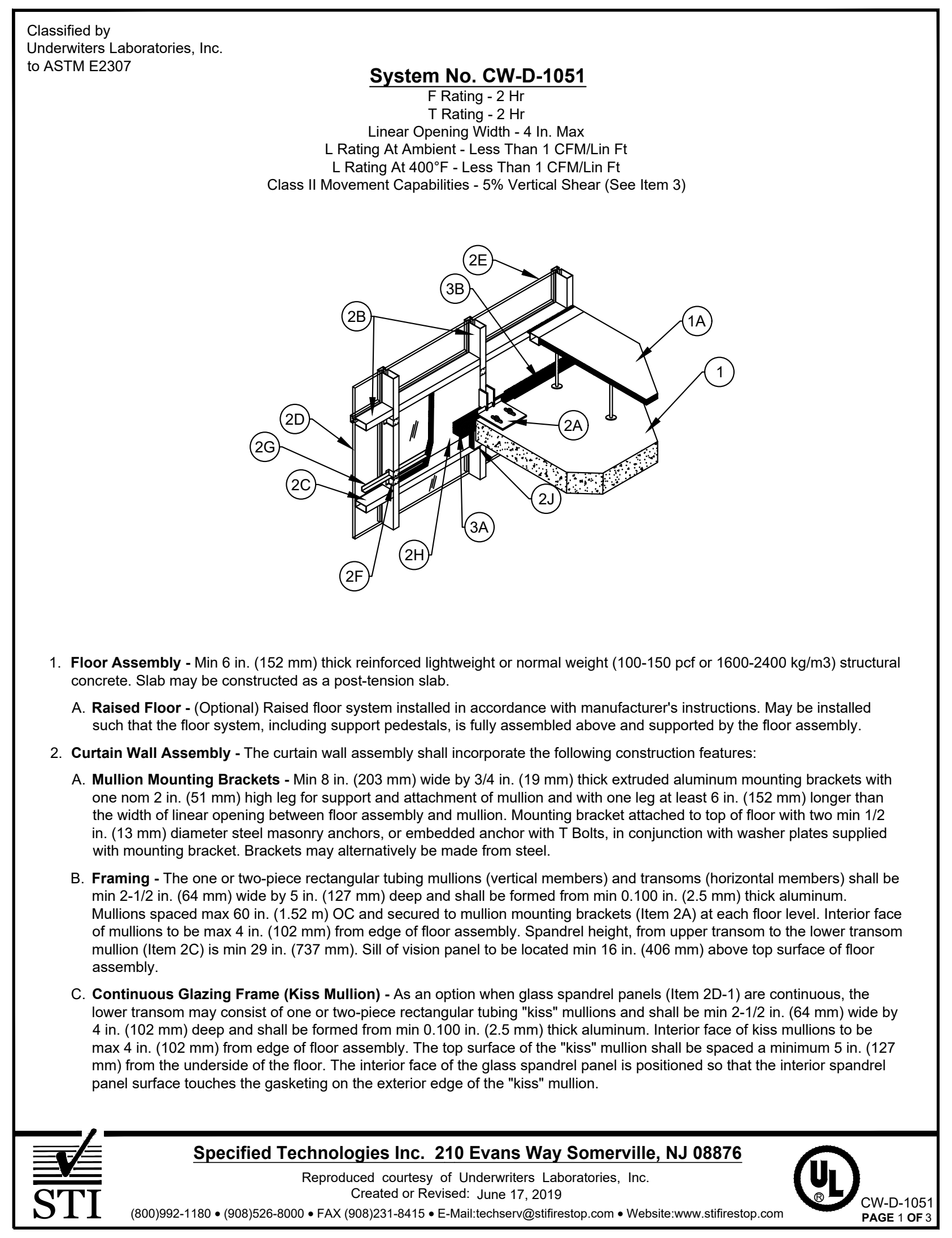

Classified by
Underwiters Laboratories, Inc.
to ASTM E2307

System No. CW-D-1051

F Rating - 2 Hr
T Rating - 2 Hr
Linear Opening Width - 4 In. Max
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 5% Vertical Shear (See Item 3)

1. **Floor Assembly -** Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Slab may be constructed as a post-tension slab.
   A. **Raised Floor -** (Optional) Raised floor system installed in accordance with manufacturer's instructions. May be installed such that the floor system, including support pedestals, is fully assembled above and supported by the floor assembly.
2. **Curtain Wall Assembly -** The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Brackets -** Min 8 in. (203 mm) wide by 3/4 in. (19 mm) thick extruded aluminum mounting brackets with one nom 2 in. (51 mm) high leg for support and attachment of mullion and with one leg at least 6 in. (152 mm) longer than the width of linear opening between floor assembly and mullion. Mounting bracket attached to top of floor with two min 1/2 in. (13 mm) diameter steel masonry anchors, or embedded anchor with T Bolts, in conjunction with washer plates supplied with mounting bracket. Brackets may alternatively be made from steel.
   B. **Framing -** The one or two-piece rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. (64 mm) wide by 5 in. (127 mm) deep and shall be formed from min 0.100 in. (2.5 mm) thick aluminum. Mullions spaced max 60 in. (1.52 m) OC and secured to mullion mounting brackets (Item 2A) at each floor level. Interior face of mullions to be max 4 in. (102 mm) from edge of floor assembly. Spandrel height, from upper transom to the lower transom mullion (Item 2C) is min 29 in. (737 mm). Sill of vision panel to be located min 16 in. (406 mm) above top surface of floor assembly.
   C. **Continuous Glazing Frame (Kiss Mullion) -** As an option when glass spandrel panels (Item 2D-1) are continuous, the lower transom may consist of one or two-piece rectangular tubing "kiss" mullions and shall be min 2-1/2 in. (64 mm) wide by 4 in. (102 mm) deep and shall be formed from min 0.100 in. (2.5 mm) thick aluminum. Interior face of kiss mullions to be max 4 in. (102 mm) from edge of floor assembly. The top surface of the "kiss" mullion shall be spaced a minimum 5 in. (127 mm) from the underside of the floor. The interior face of the glass spandrel panel is positioned so that the interior spandrel panel surface touches the gasketing on the exterior edge of the "kiss" mullion.

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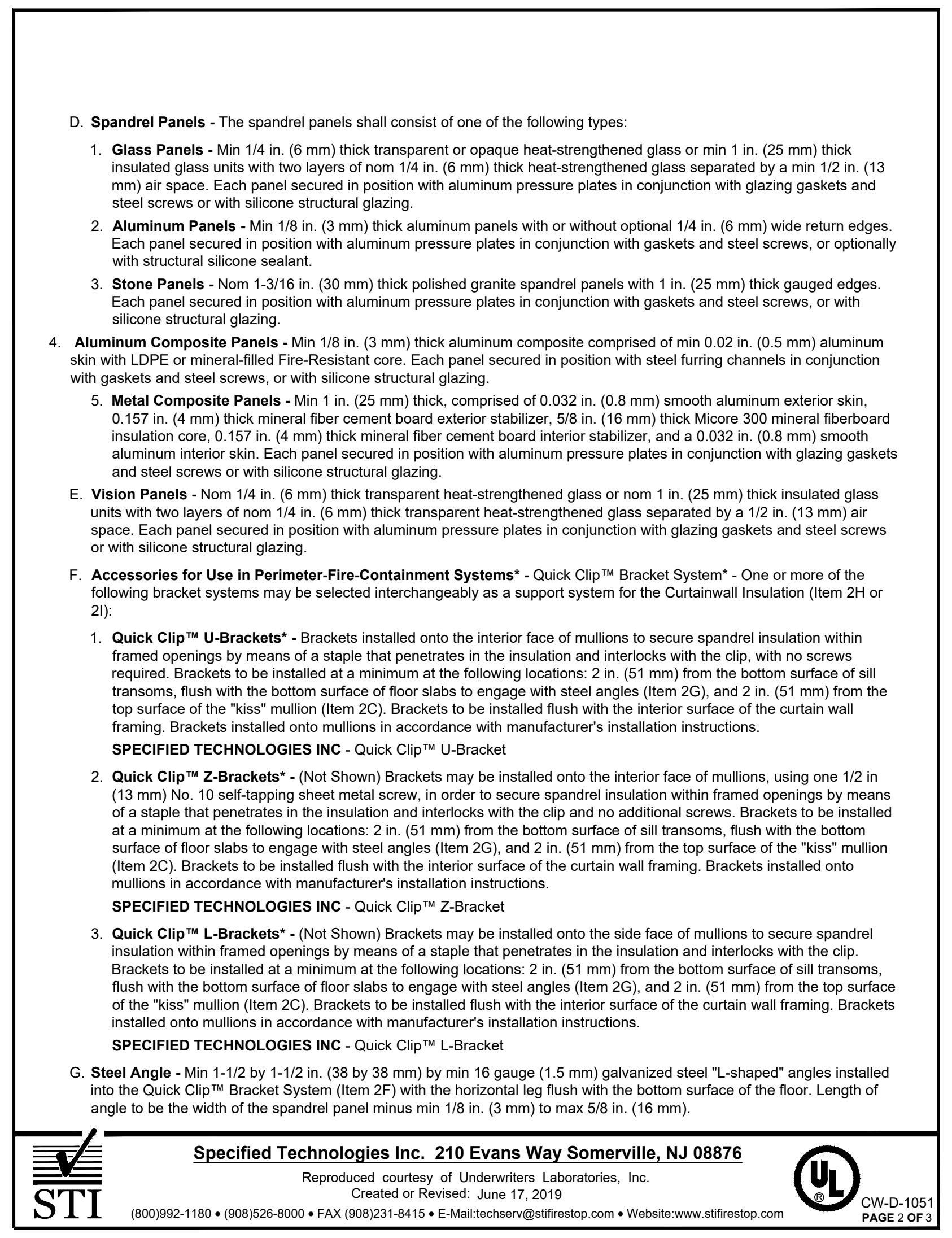

D. **Spandrel Panels -** The spandrel panels shall consist of one of the following types:
   1. **Glass Panels -** Min 1/4 in. (6 mm) thick transparent or opaque heat-strengthened glass or min 1 in. (25 mm) thick insulated glass units with two layers of nom 1/4 in. (6 mm) thick heat-strengthened glass separated by a min 1/2 in. (13 mm) air space. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws or with silicone structural glazing.
   2. **Aluminum Panels -** Min 1/8 in. (3 mm) thick aluminum panels with or without optional 1/4 in. (6 mm) wide return edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws, or optionally with structural silicone sealant.
   3. **Stone Panels -** Nom 1-3/16 in. (30 mm) thick polished granite spandrel panels with 1 in. (25 mm) thick gauged edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws, or with silicone structural glazing.

4. **Aluminum Composite Panels -** Min 1/8 in. (3 mm) thick aluminum composite comprised of min 0.02 in. (0.5 mm) aluminum skin with LDPE or mineral-filled Fire-Resistant core. Each panel secured in position with steel furring channels in conjunction with gaskets and steel screws, or with silicone structural glazing.
   5. **Metal Composite Panels -** Min 1 in. (25 mm) thick, comprised of 0.032 in. (0.8 mm) smooth aluminum exterior skin, 0.157 in. (4 mm) thick mineral fiber cement board exterior stabilizer, 5/8 in. (16 mm) thick Micore 300 mineral fiberboard insulation core, 0.157 in. (4 mm) thick mineral fiber cement board interior stabilizer, and a 0.032 in. (0.8 mm) smooth aluminum interior skin. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws or with silicone structural glazing.

E. **Vision Panels -** Nom 1/4 in. (6 mm) thick transparent heat-strengthened glass or nom 1 in. (25 mm) thick insulated glass units with two layers of nom 1/4 in. (6 mm) thick transparent heat-strengthened glass separated by a 1/2 in. (13 mm) air space. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws or with silicone structural glazing.

F. **Accessories for Use in Perimeter-Fire-Containment Systems* -** Quick Clip™ Bracket System* - One or more of the following bracket systems may be selected interchangeably as a support system for the Curtainwall Insulation (Item 2H or 2I):
   1. **Quick Clip™ U-Brackets* -** Brackets installed onto the interior face of mullions to secure spandrel insulation within framed openings by means of a staple that penetrates in the insulation and interlocks with the clip, with no screws required. Brackets to be installed at a minimum at the following locations: 2 in. (51 mm) from the bottom surface of sill transoms, flush with the bottom surface of floor slabs to engage with steel angles (Item 2G), and 2 in. (51 mm) from the top surface of the "kiss" mullion (Item 2C). Brackets to be installed flush with the interior surface of the curtain wall framing. Brackets installed onto mullions in accordance with manufacturer's installation instructions.

      SPECIFIED TECHNOLOGIES INC - Quick Clip™ U-Bracket
   2. **Quick Clip™ Z-Brackets* -** (Not Shown) Brackets may be installed onto the interior face of mullions, using one 1/2 in (13 mm) No. 10 self-tapping sheet metal screw, in order to secure spandrel insulation within framed openings by means of a staple that penetrates in the insulation and interlocks with the clip and no additional screws. Brackets to be installed at a minimum at the following locations: 2 in. (51 mm) from the bottom surface of sill transoms, flush with the bottom surface of floor slabs to engage with steel angles (Item 2G), and 2 in. (51 mm) from the top surface of the "kiss" mullion (Item 2C). Brackets to be installed flush with the interior surface of the curtain wall framing. Brackets installed onto mullions in accordance with manufacturer's installation instructions.

      SPECIFIED TECHNOLOGIES INC - Quick Clip™ Z-Bracket
   3. **Quick Clip™ L-Brackets* -** (Not Shown) Brackets may be installed onto the side face of mullions to secure spandrel insulation within framed openings by means of a staple that penetrates in the insulation and interlocks with the clip. Brackets to be installed at a minimum at the following locations: 2 in. (51 mm) from the bottom surface of sill transoms, flush with the bottom surface of floor slabs to engage with steel angles (Item 2G), and 2 in. (51 mm) from the top surface of the "kiss" mullion (Item 2C). Brackets to be installed flush with the interior surface of the curtain wall framing. Brackets installed onto mullions in accordance with manufacturer's installation instructions.

      SPECIFIED TECHNOLOGIES INC - Quick Clip™ L-Bracket

G. **Steel Angle -** Min 1-1/2 by 1-1/2 in. (38 by 38 mm) by min 16 gauge (1.5 mm) galvanized steel "L-shaped" angles installed into the Quick Clip™ Bracket System (Item 2F) with the horizontal leg flush with the bottom surface of the floor. Length of angle to be the width of the spandrel panel minus min 1/8 in. (3 mm) to max 5/8 in. (16 mm).

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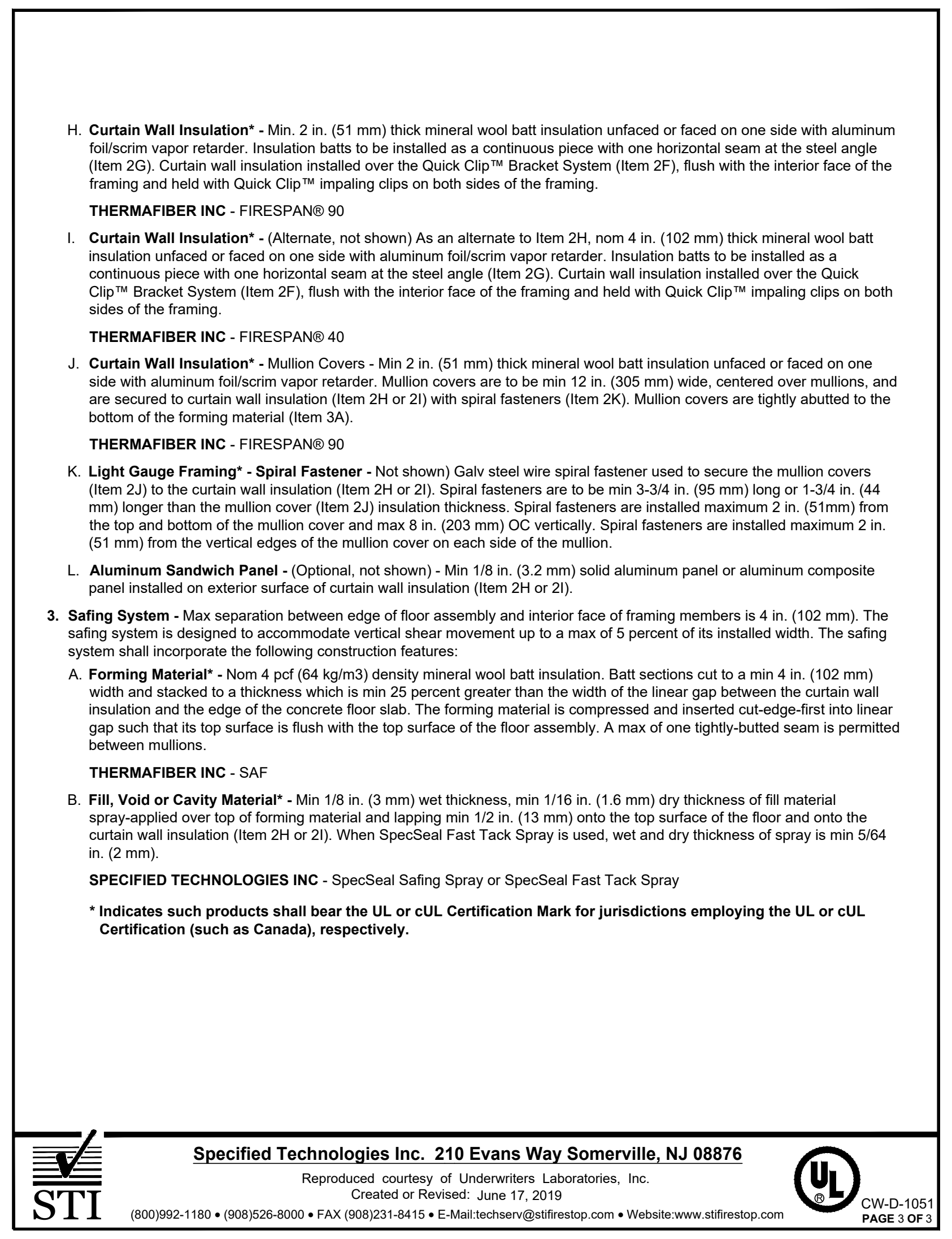

H. **Curtain Wall Insulation* -** Min. 2 in. (51 mm) thick mineral wool batt insulation unfaced or faced on one side with aluminum foil/scrim vapor retarder. Insulation batts to be installed as a continuous piece with one horizontal seam at the steel angle (Item 2G). Curtain wall insulation installed over the Quick Clip™ Bracket System (Item 2F), flush with the interior face of the framing and held with Quick Clip™ impaling clips on both sides of the framing.

THERMAFIBER INC - FIRESPAN® 90

I. **Curtain Wall Insulation* -** (Alternate, not shown) As an alternate to Item 2H, nom 4 in. (102 mm) thick mineral wool batt insulation unfaced or faced on one side with aluminum foil/scrim vapor retarder. Insulation batts to be installed as a continuous piece with one horizontal seam at the steel angle (Item 2G). Curtain wall insulation installed over the Quick Clip™ Bracket System (Item 2F), flush with the interior face of the framing and held with Quick Clip™ impaling clips on both sides of the framing.

THERMAFIBER INC - FIRESPAN® 40

J. **Curtain Wall Insulation* -** Mullion Covers - Min 2 in. (51 mm) thick mineral wool batt insulation unfaced or faced on one side with aluminum foil/scrim vapor retarder. Mullion covers are to be min 12 in. (305 mm) wide, centered over mullions, and are secured to curtain wall insulation (Item 2H or 2I) with spiral fasteners (Item 2K). Mullion covers are tightly abutted to the bottom of the forming material (Item 3A).

THERMAFIBER INC - FIRESPAN® 90

K. **Light Gauge Framing* - Spiral Fastener -** Not shown) Galv steel wire spiral fastener used to secure the mullion covers (Item 2J) to the curtain wall insulation (Item 2H or 2I). Spiral fasteners are to be min 3-3/4 in. (95 mm) long or 1-3/4 in. (44 mm) longer than the mullion cover (Item 2J) insulation thickness. Spiral fasteners are installed maximum 2 in. (51mm) from the top and bottom of the mullion cover and max 8 in. (203 mm) OC vertically. Spiral fasteners are installed maximum 2 in. (51 mm) from the vertical edges of the mullion cover on each side of the mullion.

L. **Aluminum Sandwich Panel -** (Optional, not shown) - Min 1/8 in. (3.2 mm) solid aluminum panel or aluminum composite panel installed on exterior surface of curtain wall insulation (Item 2H or 2I).

3. **Safing System -** Max separation between edge of floor assembly and interior face of framing members is 4 in. (102 mm). The safing system is designed to accommodate vertical shear movement up to a max of 5 percent of its installed width. The safing system shall incorporate the following construction features:
   A. **Forming Material* -** Nom 4 pcf (64 kg/m3) density mineral wool batt insulation. Batt sections cut to a min 4 in. (102 mm) width and stacked to a thickness which is min 25 percent greater than the width of the linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions.

   THERMAFIBER INC - SAF

   B. **Fill, Void or Cavity Material* -** Min 1/8 in. (3 mm) wet thickness, min 1/16 in. (1.6 mm) dry thickness of fill material spray-applied over top of forming material and lapping min 1/2 in. (13 mm) onto the top surface of the floor and onto the curtain wall insulation (Item 2H or 2I). When SpecSeal Fast Tack Spray is used, wet and dry thickness of spray is min 5/64 in. (2 mm).

   SPECIFIED TECHNOLOGIES INC - SpecSeal Safing Spray or SpecSeal Fast Tack Spray

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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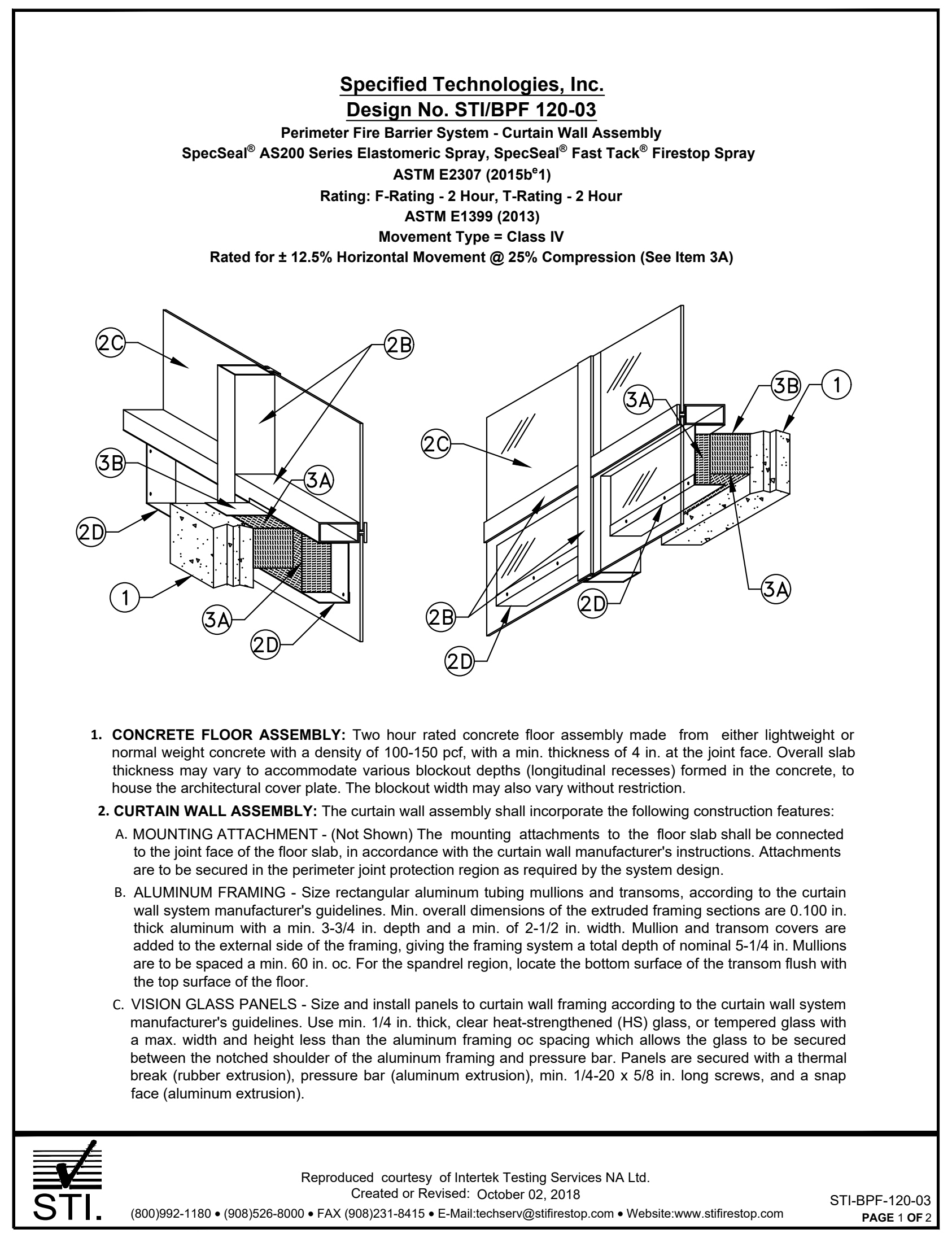

Specified Technologies, Inc.
Design No. STI/BPF 120-03

Perimeter Fire Barrier System - Curtain Wall Assembly
SpecSeal® AS200 Series Elastomeric Spray, SpecSeal® Fast Tack® Firestop Spray
ASTM E2307 (2015b^{e}1)
Rating: F-Rating - 2 Hour, T-Rating - 2 Hour
ASTM E1399 (2013)
Movement Type = Class IV
Rated for ± 12.5% Horizontal Movement @ 25% Compression (See Item 3A)

1. **CONCRETE FLOOR ASSEMBLY:** Two hour rated concrete floor assembly made from either lightweight or normal weight concrete with a density of 100-150 pcf, with a min. thickness of 4 in. at the joint face. Overall slab thickness may vary to accommodate various blockout depths (longitudinal recesses) formed in the concrete, to house the architectural cover plate. The blockout width may also vary without restriction.
2. **CURTAIN WALL ASSEMBLY:** The curtain wall assembly shall incorporate the following construction features:
   A. MOUNTING ATTACHMENT - (Not Shown) The mounting attachments to the floor slab shall be connected to the joint face of the floor slab, in accordance with the curtain wall manufacturer's instructions. Attachments are to be secured in the perimeter joint protection region as required by the system design.
   B. ALUMINUM FRAMING - Size rectangular aluminum tubing mullions and transoms, according to the curtain wall system manufacturer's guidelines. Min. overall dimensions of the extruded framing sections are 0.100 in. thick aluminum with a min. 3-3/4 in. depth and a min. of 2-1/2 in. width. Mullion and transom covers are added to the external side of the framing, giving the framing system a total depth of nominal 5-1/4 in. Mullions are to be spaced a min. 60 in. oc. For the spandrel region, locate the bottom surface of the transom flush with the top surface of the floor.
   C. VISION GLASS PANELS - Size and install panels to curtain wall framing according to the curtain wall system manufacturer's guidelines. Use min. 1/4 in. thick, clear heat-strengthened (HS) glass, or tempered glass with a max. width and height less than the aluminum framing oc spacing which allows the glass to be secured between the notched shoulder of the aluminum framing and pressure bar. Panels are secured with a thermal break (rubber extrusion), pressure bar (aluminum extrusion), min. 1/4-20 x 5/8 in. long screws, and a snap face (aluminum extrusion).

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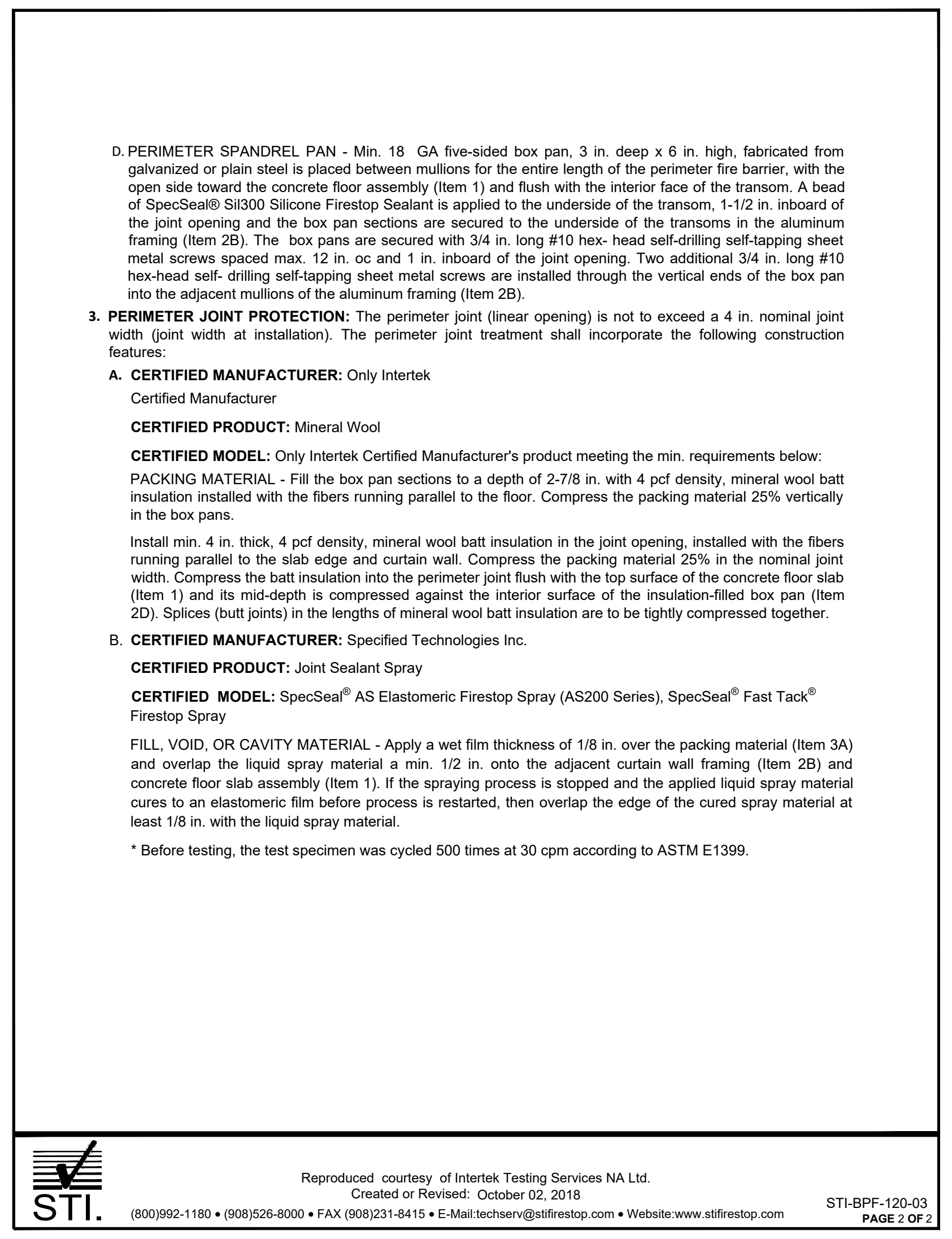

D. PERIMETER SPANDREL PAN - Min. 18 GA five-sided box pan, 3 in. deep x 6 in. high, fabricated from galvanized or plain steel is placed between mullions for the entire length of the perimeter fire barrier, with the open side toward the concrete floor assembly (Item 1) and flush with the interior face of the transom. A bead of SpecSeal® Sil300 Silicone Firestop Sealant is applied to the underside of the transom, 1-1/2 in. inboard of the joint opening and the box pan sections are secured to the underside of the transoms in the aluminum framing (Item 2B). The box pans are secured with 3/4 in. long #10 hex- head self-drilling self-tapping sheet metal screws spaced max. 12 in. oc and 1 in. inboard of the joint opening. Two additional 3/4 in. long #10 hex-head self- drilling self-tapping sheet metal screws are installed through the vertical ends of the box pan into the adjacent mullions of the aluminum framing (Item 2B).

3. **PERIMETER JOINT PROTECTION:** The perimeter joint (linear opening) is not to exceed a 4 in. nominal joint width (joint width at installation). The perimeter joint treatment shall incorporate the following construction features:
   A. CERTIFIED MANUFACTURER: Only Intertek
   Certified Manufacturer

   CERTIFIED PRODUCT: Mineral Wool

   CERTIFIED MODEL: Only Intertek Certified Manufacturer's product meeting the min. requirements below:

   PACKING MATERIAL - Fill the box pan sections to a depth of 2-7/8 in. with 4 pcf density, mineral wool batt insulation installed with the fibers running parallel to the floor. Compress the packing material 25% vertically in the box pans.

   Install min. 4 in. thick, 4 pcf density, mineral wool batt insulation in the joint opening, installed with the fibers running parallel to the slab edge and curtain wall. Compress the packing material 25% in the nominal joint width. Compress the batt insulation into the perimeter joint flush with the top surface of the concrete floor slab (Item 1) and its mid-depth is compressed against the interior surface of the insulation-filled box pan (Item 2D). Splices (butt joints) in the lengths of mineral wool batt insulation are to be tightly compressed together.

   B. **CERTIFIED MANUFACTURER:** Specified Technologies Inc.

   CERTIFIED PRODUCT: Joint Sealant Spray

   CERTIFIED MODEL: SpecSeal® AS Elastomeric Firestop Spray (AS200 Series), SpecSeal® Fast Tack® Firestop Spray

   FILL, VOID, OR CAVITY MATERIAL - Apply a wet film thickness of 1/8 in. over the packing material (Item 3A) and overlap the liquid spray material a min. 1/2 in. onto the adjacent curtain wall framing (Item 2B) and concrete floor slab assembly (Item 1). If the spraying process is stopped and the applied liquid spray material cures to an elastomeric film before process is restarted, then overlap the edge of the cured spray material at least 1/8 in. with the liquid spray material.

   * Before testing, the test specimen was cycled 500 times at 30 cpm according to ASTM E1399.

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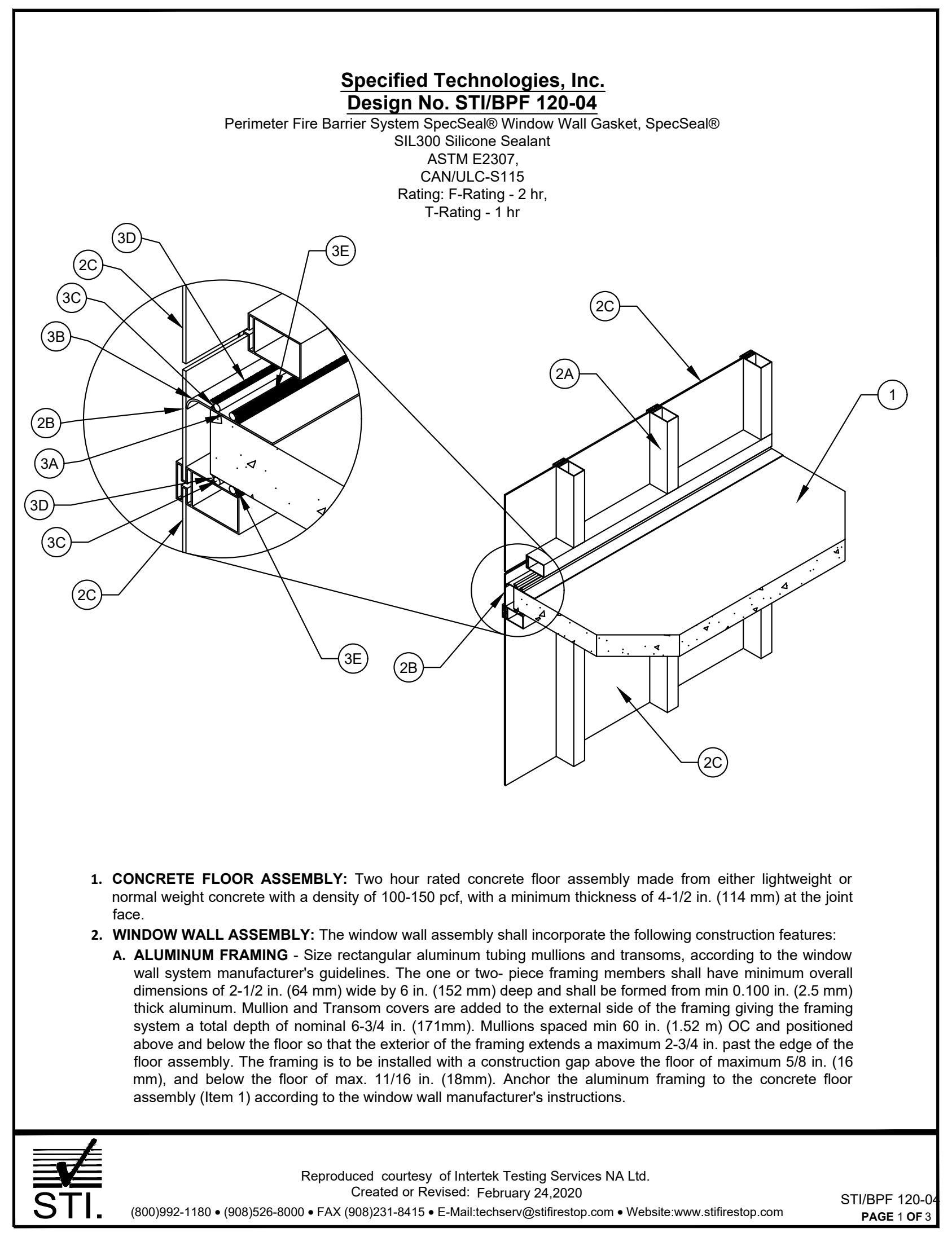

Specified Technologies, Inc.
Design No. STI/BPF 120-04

Perimeter Fire Barrier System SpecSeal® Window Wall Gasket, SpecSeal®
SIL300 Silicone Sealant
ASTM E2307,
CAN/ULC-S115
Rating: F-Rating - 2 hr,
T-Rating - 1 hr

1. **CONCRETE FLOOR ASSEMBLY:** Two hour rated concrete floor assembly made from either lightweight or normal weight concrete with a density of 100-150 pcf, with a minimum thickness of 4-1/2 in. (114 mm) at the joint face.
2. **WINDOW WALL ASSEMBLY:** The window wall assembly shall incorporate the following construction features:
   A. ALUMINUM FRAMING - Size rectangular aluminum tubing mullions and transoms, according to the window wall system manufacturer's guidelines. The one or two- piece framing members shall have minimum overall dimensions of 2-1/2 in. (64 mm) wide by 6 in. (152 mm) deep and shall be formed from min 0.100 in. (2.5 mm) thick aluminum. Mullion and Transom covers are added to the external side of the framing giving the framing system a total depth of nominal 6-3/4 in. (171mm). Mullions spaced min 60 in. (1.52 m) OC and positioned above and below the floor so that the exterior of the framing extends a maximum 2-3/4 in. past the edge of the floor assembly. The framing is to be installed with a construction gap above the floor of maximum 5/8 in. (16 mm), and below the floor of max. 11/16 in. (18mm). Anchor the aluminum framing to the concrete floor assembly (Item 1) according to the window wall manufacturer's instructions.

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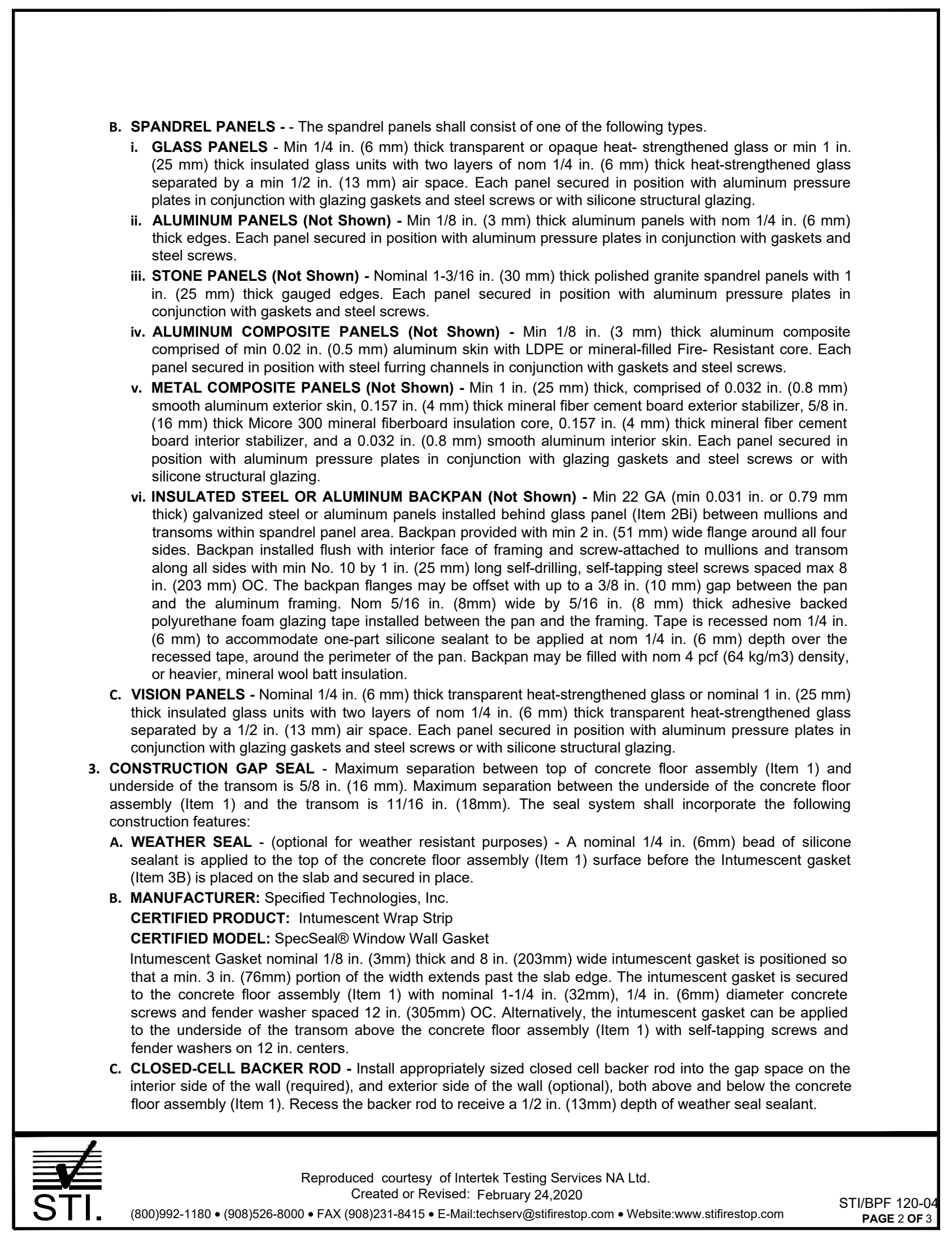

B. **SPANDREL PANELS - -** The spandrel panels shall consist of one of the following types.
   i. GLASS PANELS - Min 1/4 in. (6 mm) thick transparent or opaque heat- strengthened glass or min 1 in. (25 mm) thick insulated glass units with two layers of nom 1/4 in. (6 mm) thick heat-strengthened glass separated by a min 1/2 in. (13 mm) air space. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws or with silicone structural glazing.
   ii. ALUMINUM PANELS (Not Shown) - Min 1/8 in. (3 mm) thick aluminum panels with nom 1/4 in. (6 mm) thick edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
   iii. STONE PANELS (Not Shown) - Nominal 1-3/16 in. (30 mm) thick polished granite spandrel panels with 1 in. (25 mm) thick gauged edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
   iv. ALUMINUM COMPOSITE PANELS (Not Shown) - Min 1/8 in. (3 mm) thick aluminum composite comprised of min 0.02 in. (0.5 mm) aluminum skin with LDPE or mineral-filled Fire- Resistant core. Each panel secured in position with steel furring channels in conjunction with gaskets and steel screws.
   v. METAL COMPOSITE PANELS (Not Shown) - Min 1 in. (25 mm) thick, comprised of 0.032 in. (0.8 mm) smooth aluminum exterior skin, 0.157 in. (4 mm) thick mineral fiber cement board exterior stabilizer, 5/8 in. (16 mm) thick Micore 300 mineral fiberboard insulation core, 0.157 in. (4 mm) thick mineral fiber cement board interior stabilizer, and a 0.032 in. (0.8 mm) smooth aluminum interior skin. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws or with silicone structural glazing.
   vi. INSULATED STEEL OR ALUMINUM BACKPAN (Not Shown) - Min 22 GA (min 0.031 in. or 0.79 mm thick) galvanized steel or aluminum panels installed behind glass panel (Item 2Bi) between mullions and transoms within spandrel panel area. Backpan provided with min 2 in. (51 mm) wide flange around all four sides. Backpan installed flush with interior face of framing and screw-attached to mullions and transom along all sides with min No. 10 by 1 in. (25 mm) long self-drilling, self-tapping steel screws spaced max 8 in. (203 mm) OC. The backpan flanges may be offset with up to a 3/8 in. (10 mm) gap between the pan and the aluminum framing. Nom 5/16 in. (8mm) wide by 5/16 in. (8 mm) thick adhesive backed polyurethane foam glazing tape installed between the pan and the framing. Tape is recessed nom 1/4 in. (6 mm) to accommodate one-part silicone sealant to be applied at nom 1/4 in. (6 mm) depth over the recessed tape, around the perimeter of the pan. Backpan may be filled with nom 4 pcf (64 kg/m3) density, or heavier, mineral wool batt insulation.

C. **VISION PANELS -** Nominal 1/4 in. (6 mm) thick transparent heat-strengthened glass or nominal 1 in. (25 mm) thick insulated glass units with two layers of nom 1/4 in. (6 mm) thick transparent heat-strengthened glass separated by a 1/2 in. (13 mm) air space. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws or with silicone structural glazing.

3. **CONSTRUCTION GAP SEAL** - Maximum separation between top of concrete floor assembly (Item 1) and underside of the transom is 5/8 in. (16 mm). Maximum separation between the underside of the concrete floor assembly (Item 1) and the transom is 11/16 in. (18mm). The seal system shall incorporate the following construction features:
   A. WEATHER SEAL - (optional for weather resistant purposes) - A nominal 1/4 in. (6mm) bead of silicone sealant is applied to the top of the concrete floor assembly (Item 1) surface before the Intumescent gasket (Item 3B) is placed on the slab and secured in place.
   B. MANUFACTURER: Specified Technologies, Inc.
   CERTIFIED PRODUCT: Intumescent Wrap Strip
   CERTIFIED MODEL: SpecSeal® Window Wall Gasket
   Intumescent Gasket nominal 1/8 in. (3mm) thick and 8 in. (203mm) wide intumescent gasket is positioned so that a min. 3 in. (76mm) portion of the width extends past the slab edge. The intumescent gasket is secured to the concrete floor assembly (Item 1) with nominal 1-1/4 in. (32mm), 1/4 in. (6mm) diameter concrete screws and fender washer spaced 12 in. (305mm) OC. Alternatively, the intumescent gasket can be applied to the underside of the transom above the concrete floor assembly (Item 1) with self-tapping screws and fender washers on 12 in. centers.
   C. CLOSED-CELL BACKER ROD - Install appropriately sized closed cell backer rod into the gap space on the interior side of the wall (required), and exterior side of the wall (optional), both above and below the concrete floor assembly (Item 1). Recess the backer rod to receive a 1/2 in. (13mm) depth of weather seal sealant.

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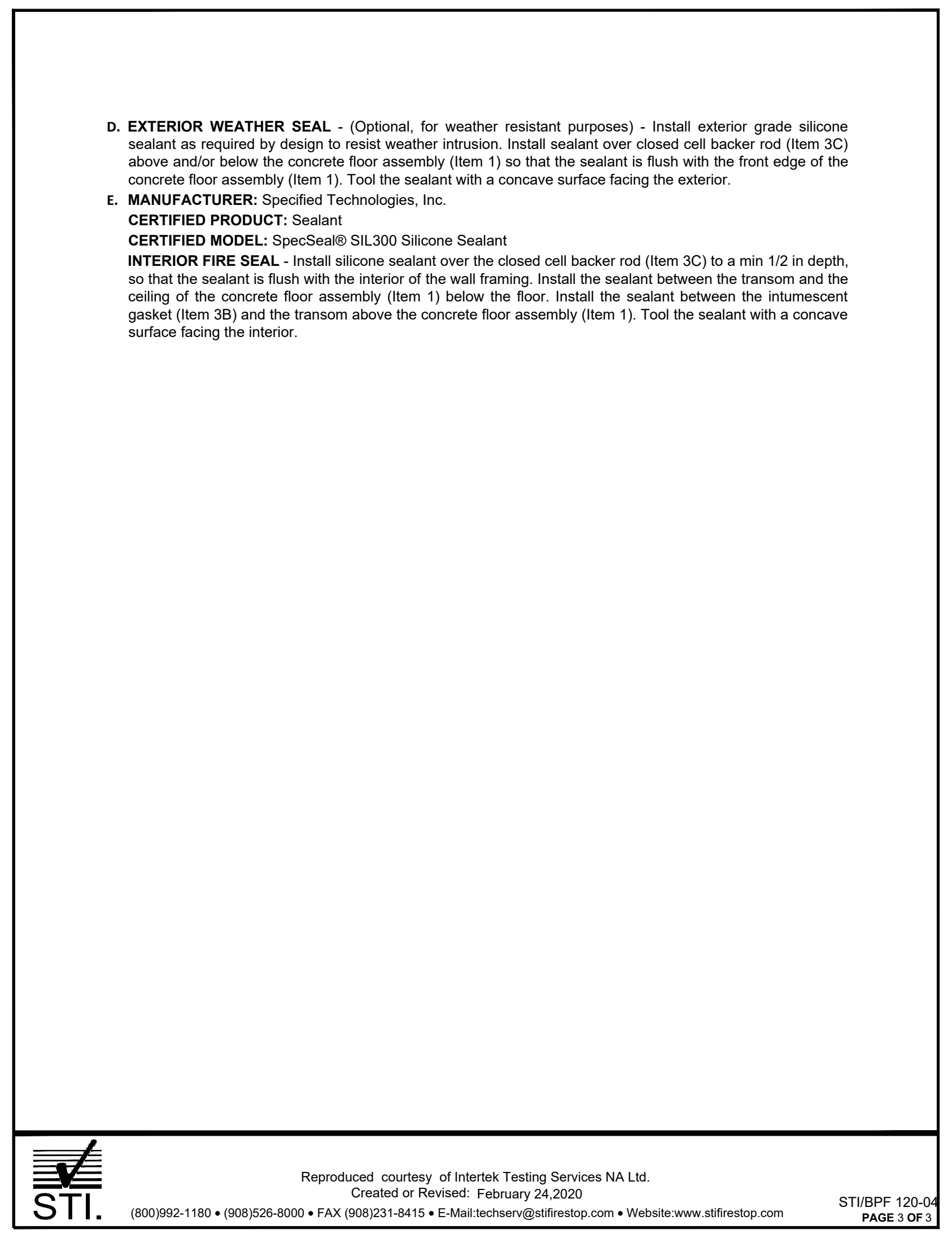

D. EXTERIOR WEATHER SEAL - (Optional, for weather resistant purposes) - Install exterior grade silicone sealant as required by design to resist weather intrusion. Install sealant over closed cell backer rod (Item 3C) above and/or below the concrete floor assembly (Item 1) so that the sealant is flush with the front edge of the concrete floor assembly (Item 1). Tool the sealant with a concave surface facing the exterior.

E. MANUFACTURER: Specified Technologies, Inc.
CERTIFIED PRODUCT: Sealant
CERTIFIED MODEL: SpecSeal® SIL300 Silicone Sealant
INTERIOR FIRE SEAL - Install silicone sealant over the closed cell backer rod (Item 3C) to a min 1/2 in depth, so that the sealant is flush with the interior of the wall framing. Install the sealant between the transom and the ceiling of the concrete floor assembly (Item 1) below the floor. Install the sealant between the intumescent gasket (Item 3B) and the transom above the concrete floor assembly (Item 1). Tool the sealant with a concave surface facing the interior.

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GENERAL NOTES:

1. Refer to section 07 84 00 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
2. Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   - Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.
3. If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   - UL Fire Resistance Directory; Current Edition
   - NFPA 101 Life Safety Code
   - All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

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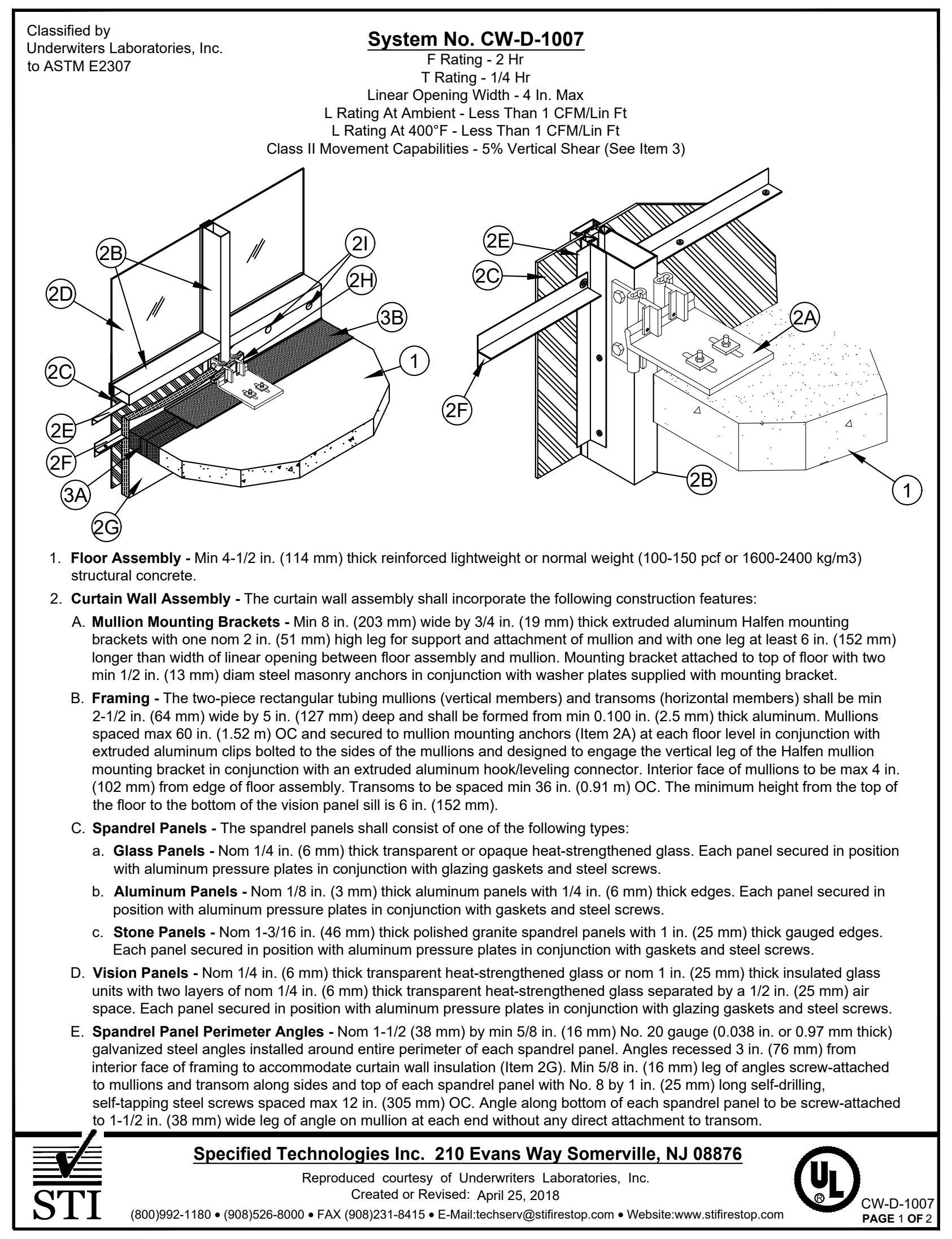

Classified by
Underwriters Laboratories, Inc.
to ASTM E2307

System No. CW-D-1007

F Rating - 2 Hr
T Rating - 1/4 Hr
Linear Opening Width - 4 In. Max
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 5% Vertical Shear (See Item 3)

1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete.
2. **Curtain Wall Assembly -** The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Brackets -** Min 8 in. (203 mm) wide by 3/4 in. (19 mm) thick extruded aluminum Halfen mounting brackets with one nom 2 in. (51 mm) high leg for support and attachment of mullion and with one leg at least 6 in. (152 mm) longer than width of linear opening between floor assembly and mullion. Mounting bracket attached to top of floor with two min 1/2 in. (13 mm) diam steel masonry anchors in conjunction with washer plates supplied with mounting bracket.
   B. **Framing -** The two-piece rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. (64 mm) wide by 5 in. (127 mm) deep and shall be formed from min 0.100 in. (2.5 mm) thick aluminum. Mullions spaced max 60 in. (1.52 m) OC and secured to mullion mounting anchors (Item 2A) at each floor level in conjunction with extruded aluminum clips bolted to the sides of the mullions and designed to engage the vertical leg of the Halfen mullion mounting bracket in conjunction with an extruded aluminum hook/leveling connector. Interior face of mullions to be max 4 in. (102 mm) from edge of floor assembly. Transoms to be spaced min 36 in. (0.91 m) OC. The minimum height from the top of the floor to the bottom of the vision panel sill is 6 in. (152 mm).
   C. **Spandrel Panels -** The spandrel panels shall consist of one of the following types:
      a. **Glass Panels -** Nom 1/4 in. (6 mm) thick transparent or opaque heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
      b. **Aluminum Panels -** Nom 1/8 in. (3 mm) thick aluminum panels with 1/4 in. (6 mm) thick edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
      c. **Stone Panels -** Nom 1-3/16 in. (46 mm) thick polished granite spandrel panels with 1 in. (25 mm) thick gauged edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
   D. **Vision Panels -** Nom 1/4 in. (6 mm) thick transparent heat-strengthened glass or nom 1 in. (25 mm) thick insulated glass units with two layers of nom 1/4 in. (6 mm) thick transparent heat-strengthened glass separated by a 1/2 in. (25 mm) air space. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Spandrel Panel Perimeter Angles -** Nom 1-1/2 (38 mm) by min 5/8 in. (16 mm) No. 20 gauge (0.038 in. or 0.97 mm thick) galvanized steel angles installed around entire perimeter of each spandrel panel. Angles recessed 3 in. (76 mm) from interior face of framing to accommodate curtain wall insulation (Item 2G). Min 5/8 in. (16 mm) leg of angles screw-attached to mullions and transom along sides and top of each spandrel panel with No. 8 by 1 in. (25 mm) long self-drilling, self-tapping steel screws spaced max 12 in. (305 mm) OC. Angle along bottom of each spandrel panel to be screw-attached to 1-1/2 in. (38 mm) wide leg of angle on mullion at each end without any direct attachment to transom.

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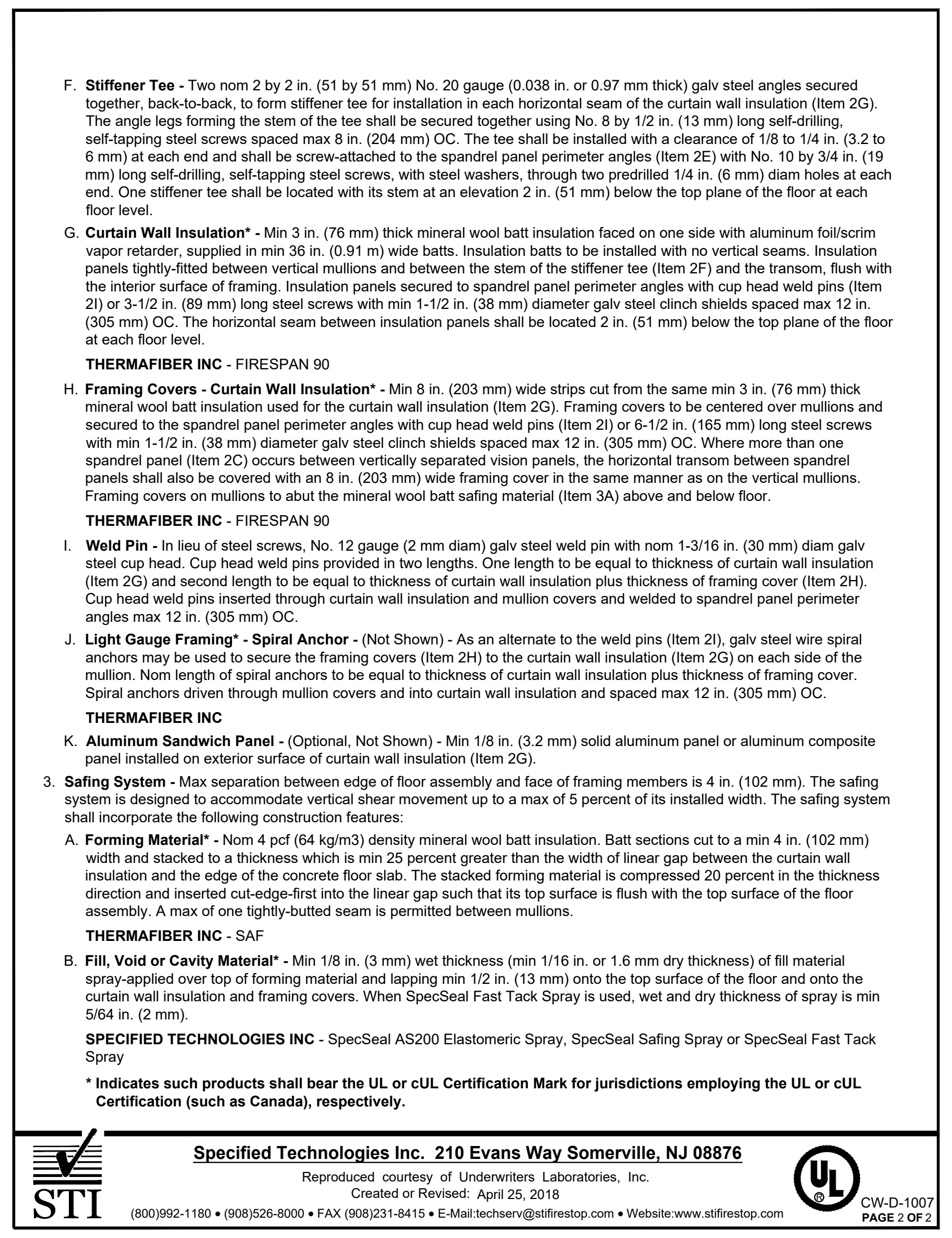

F. **Stiffener Tee -** Two nom 2 by 2 in. (51 by 51 mm) No. 20 gauge (0.038 in. or 0.97 mm thick) galv steel angles secured together, back-to-back, to form stiffener tee for installation in each horizontal seam of the curtain wall insulation (Item 2G). The angle legs forming the stem of the tee shall be secured together using No. 8 by 1/2 in. (13 mm) long self-drilling, self-tapping steel screws spaced max 8 in. (204 mm) OC. The tee shall be installed with a clearance of 1/8 to 1/4 in. (3.2 to 6 mm) at each end and shall be screw-attached to the spandrel panel perimeter angles (Item 2E) with No. 10 by 3/4 in. (19 mm) long self-drilling, self-tapping steel screws, with steel washers, through two predrilled 1/4 in. (6 mm) diam holes at each end. One stiffener tee shall be located with its stem at an elevation 2 in. (51 mm) below the top plane of the floor at each floor level.

G. **Curtain Wall Insulation* -** Min 3 in. (76 mm) thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. (0.91 m) wide batts. Insulation batts to be installed with no vertical seams. Insulation panels tightly-fitted between vertical mullions and between the stem of the stiffener tee (Item 2F) and the transom, flush with the interior surface of framing. Insulation panels secured to spandrel panel perimeter angles with cup head weld pins (Item 2I) or 3-1/2 in. (89 mm) long steel screws with min 1-1/2 in. (38 mm) diameter galv steel clinch shields spaced max 12 in. (305 mm) OC. The horizontal seam between insulation panels shall be located 2 in. (51 mm) below the top plane of the floor at each floor level.

THERMAFIBER INC - FIRESPAN 90

H. **Framing Covers - Curtain Wall Insulation* -** Min 8 in. (203 mm) wide strips cut from the same min 3 in. (76 mm) thick mineral wool batt insulation used for the curtain wall insulation (Item 2G). Framing covers to be centered over mullions and secured to the spandrel panel perimeter angles with cup head weld pins (Item 2I) or 6-1/2 in. (165 mm) long steel screws with min 1-1/2 in. (38 mm) diameter galv steel clinch shields spaced max 12 in. (305 mm) OC. Where more than one spandrel panel (Item 2C) occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. (203 mm) wide framing cover in the same manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

THERMAFIBER INC - FIRESPAN 90

I. **Weld Pin -** In lieu of steel screws, No. 12 gauge (2 mm diam) galv steel weld pin with nom 1-3/16 in. (30 mm) diam galv steel cup head. Cup head weld pins provided in two lengths. One length to be equal to thickness of curtain wall insulation (Item 2G) and second length to be equal to thickness of curtain wall insulation plus thickness of framing cover (Item 2H). Cup head weld pins inserted through curtain wall insulation and mullion covers and welded to spandrel panel perimeter angles max 12 in. (305 mm) OC.

J. **Light Gauge Framing* - Spiral Anchor -** (Not Shown) - As an alternate to the weld pins (Item 2I), galv steel wire spiral anchors may be used to secure the framing covers (Item 2H) to the curtain wall insulation (Item 2G) on each side of the mullion. Nom length of spiral anchors to be equal to thickness of curtain wall insulation plus thickness of framing cover. Spiral anchors driven through mullion covers and into curtain wall insulation and spaced max 12 in. (305 mm) OC.

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K. **Aluminum Sandwich Panel -** (Optional, Not Shown) - Min 1/8 in. (3.2 mm) solid aluminum panel or aluminum composite panel installed on exterior surface of curtain wall insulation (Item 2G).

3. **Safing System -** Max separation between edge of floor assembly and face of framing members is 4 in. (102 mm). The safing system is designed to accommodate vertical shear movement up to a max of 5 percent of its installed width. The safing system shall incorporate the following construction features:
   A. **Forming Material* -** Nom 4 pcf (64 kg/m3) density mineral wool batt insulation. Batt sections cut to a min 4 in. (102 mm) width and stacked to a thickness which is min 25 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab. The stacked forming material is compressed 20 percent in the thickness direction and inserted cut-edge-first into the linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions.

   THERMAFIBER INC - SAF

   B. **Fill, Void or Cavity Material* -** Min 1/8 in. (3 mm) wet thickness (min 1/16 in. or 1.6 mm dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. (13 mm) onto the top surface of the floor and onto the curtain wall insulation and framing covers. When SpecSeal Fast Tack Spray is used, wet and dry thickness of spray is min 5/64 in. (2 mm).

   SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray, SpecSeal Safing Spray or SpecSeal Fast Tack Spray

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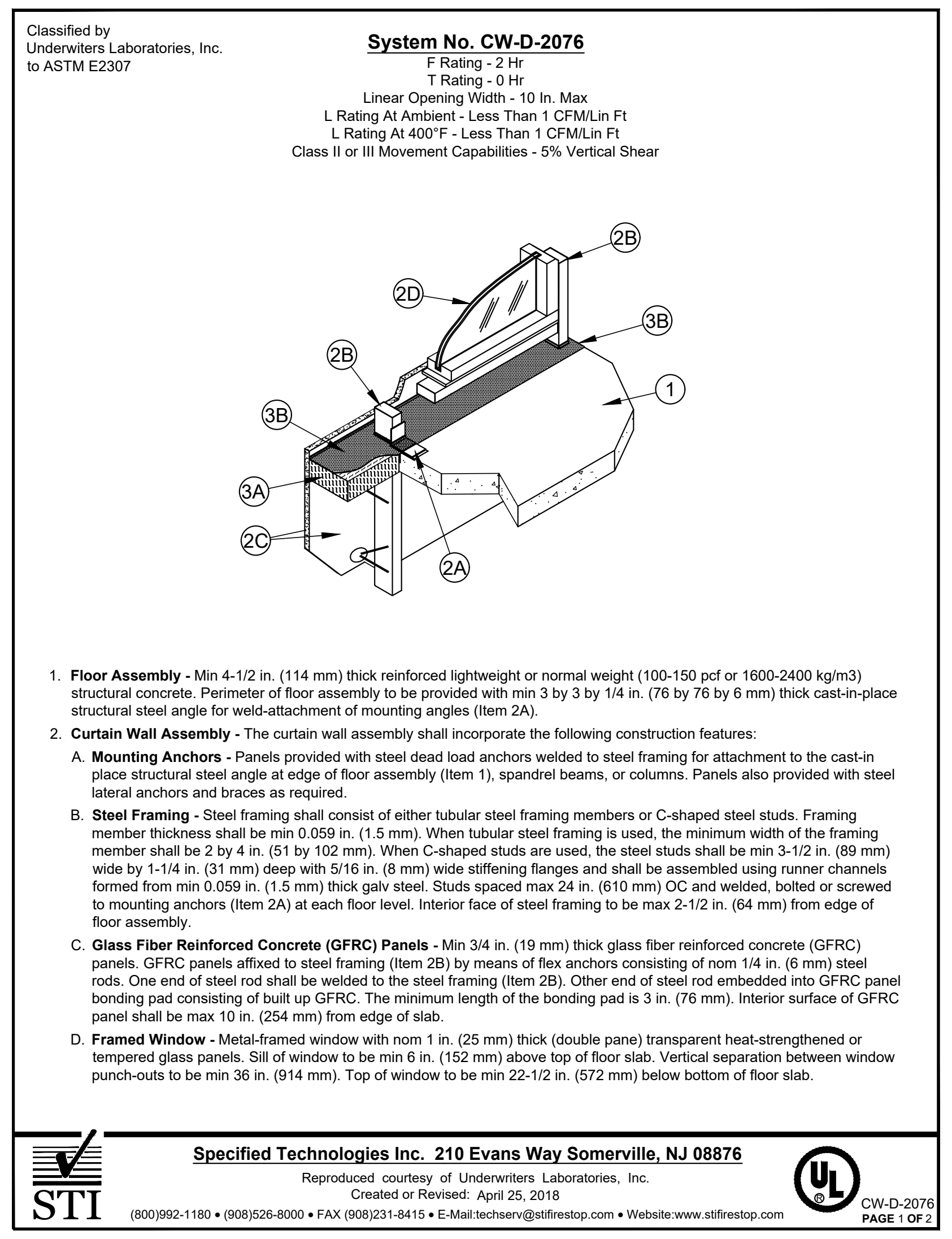

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to ASTM E2307

System No. CW-D-2076

F Rating - 2 Hr
T Rating - 0 Hr
Linear Opening Width - 10 In. Max
L Rating At Ambient - Less Than 1 CFM/Lin Ft
L Rating At 400°F - Less Than 1 CFM/Lin Ft
Class II or III Movement Capabilities - 5% Vertical Shear

1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. (76 by 76 by 6 mm) thick cast-in-place structural steel angle for weld-attachment of mounting angles (Item 2A).
2. **Curtain Wall Assembly -** The curtain wall assembly shall incorporate the following construction features:
   A. **Mounting Anchors -** Panels provided with steel dead load anchors welded to steel framing for attachment to the cast-in place structural steel angle at edge of floor assembly (Item 1), spandrel beams, or columns. Panels also provided with steel lateral anchors and braces as required.
   B. **Steel Framing -** Steel framing shall consist of either tubular steel framing members or C-shaped steel studs. Framing member thickness shall be min 0.059 in. (1.5 mm). When tubular steel framing is used, the minimum width of the framing member shall be 2 by 4 in. (51 by 102 mm). When C-shaped studs are used, the steel studs shall be min 3-1/2 in. (89 mm) wide by 1-1/4 in. (31 mm) deep with 5/16 in. (8 mm) wide stiffening flanges and shall be assembled using runner channels formed from min 0.059 in. (1.5 mm) thick galv steel. Studs spaced max 24 in. (610 mm) OC and welded, bolted or screwed to mounting anchors (Item 2A) at each floor level. Interior face of steel framing to be max 2-1/2 in. (64 mm) from edge of floor assembly.
   C. **Glass Fiber Reinforced Concrete (GFRC) Panels -** Min 3/4 in. (19 mm) thick glass fiber reinforced concrete (GFRC) panels. GFRC panels affixed to steel framing (Item 2B) by means of flex anchors consisting of nom 1/4 in. (6 mm) steel rods. One end of steel rod shall be welded to the steel framing (Item 2B). Other end of steel rod embedded into GFRC panel bonding pad consisting of built up GFRC. The minimum length of the bonding pad is 3 in. (76 mm). Interior surface of GFRC panel shall be max 10 in. (254 mm) from edge of slab.
   D. **Framed Window -** Metal-framed window with nom 1 in. (25 mm) thick (double pane) transparent heat-strengthened or tempered glass panels. Sill of window to be min 6 in. (152 mm) above top of floor slab. Vertical separation between window punch-outs to be min 36 in. (914 mm). Top of window to be min 22-1/2 in. (572 mm) below bottom of floor slab.

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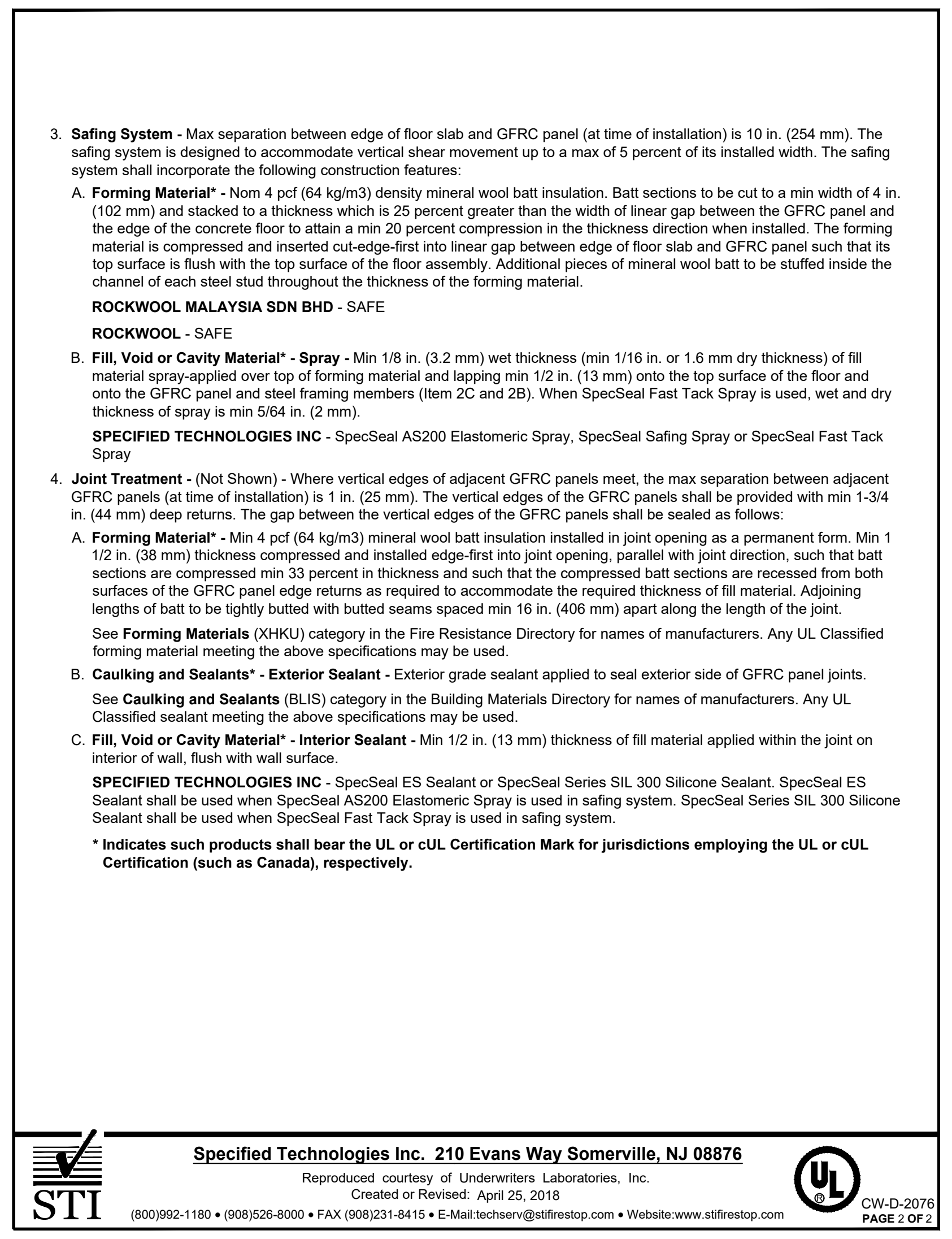

3. **Safing System -** Max separation between edge of floor slab and GFRC panel (at time of installation) is 10 in. (254 mm). The safing system is designed to accommodate vertical shear movement up to a max of 5 percent of its installed width. The safing system shall incorporate the following construction features:
   A. **Forming Material* -** Nom 4 pcf (64 kg/m3) density mineral wool batt insulation. Batt sections to be cut to a min width of 4 in. (102 mm) and stacked to a thickness which is 25 percent greater than the width of linear gap between the GFRC panel and the edge of the concrete floor to attain a min 20 percent compression in the thickness direction when installed. The forming material is compressed and inserted cut-edge-first into linear gap between edge of floor slab and GFRC panel such that its top surface is flush with the top surface of the floor assembly. Additional pieces of mineral wool batt to be stuffed inside the channel of each steel stud throughout the thickness of the forming material.

   ROCKWOOL MALAYSIA SDN BHD - SAFE

   ROCKWOOL - SAFE

   B. **Fill, Void or Cavity Material* - Spray -** Min 1/8 in. (3.2 mm) wet thickness (min 1/16 in. or 1.6 mm dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. (13 mm) onto the top surface of the floor and onto the GFRC panel and steel framing members (Item 2C and 2B). When SpecSeal Fast Tack Spray is used, wet and dry thickness of spray is min 5/64 in. (2 mm).

   SPECIFIED TECHNOLOGIES INC - SpecSeal AS200 Elastomeric Spray, SpecSeal Safing Spray or SpecSeal Fast Tack Spray
4. **Joint Treatment -** (Not Shown) - Where vertical edges of adjacent GFRC panels meet, the max separation between adjacent GFRC panels (at time of installation) is 1 in. (25 mm). The vertical edges of the GFRC panels shall be provided with min 1-3/4 in. (44 mm) deep returns. The gap between the vertical edges of the GFRC panels shall be sealed as follows:
   A. **Forming Material* -** Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Min 1 1/2 in. (38 mm) thickness compressed and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 33 percent in thickness and such that the compressed batt sections are recessed from both surfaces of the GFRC panel edge returns as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.

   See **Forming Materials** (XHKU) category in the Fire Resistance Directory for names of manufacturers. Any UL Classified forming material meeting the above specifications may be used.

   B. **Caulking and Sealants* - Exterior Sealant -** Exterior grade sealant applied to seal exterior side of GFRC panel joints.

   See **Caulking and Sealants** (BLIS) category in the Building Materials Directory for names of manufacturers. Any UL Classified sealant meeting the above specifications may be used.

   C. **Fill, Void or Cavity Material* - Interior Sealant -** Min 1/2 in. (13 mm) thickness of fill material applied within the joint on interior of wall, flush with wall surface.

   SPECIFIED TECHNOLOGIES INC - SpecSeal ES Sealant or SpecSeal Series SIL 300 Silicone Sealant. SpecSeal ES Sealant shall be used when SpecSeal AS200 Elastomeric Spray is used in safing system. SpecSeal Series SIL 300 Silicone Sealant shall be used when SpecSeal Fast Tack Spray is used in safing system.

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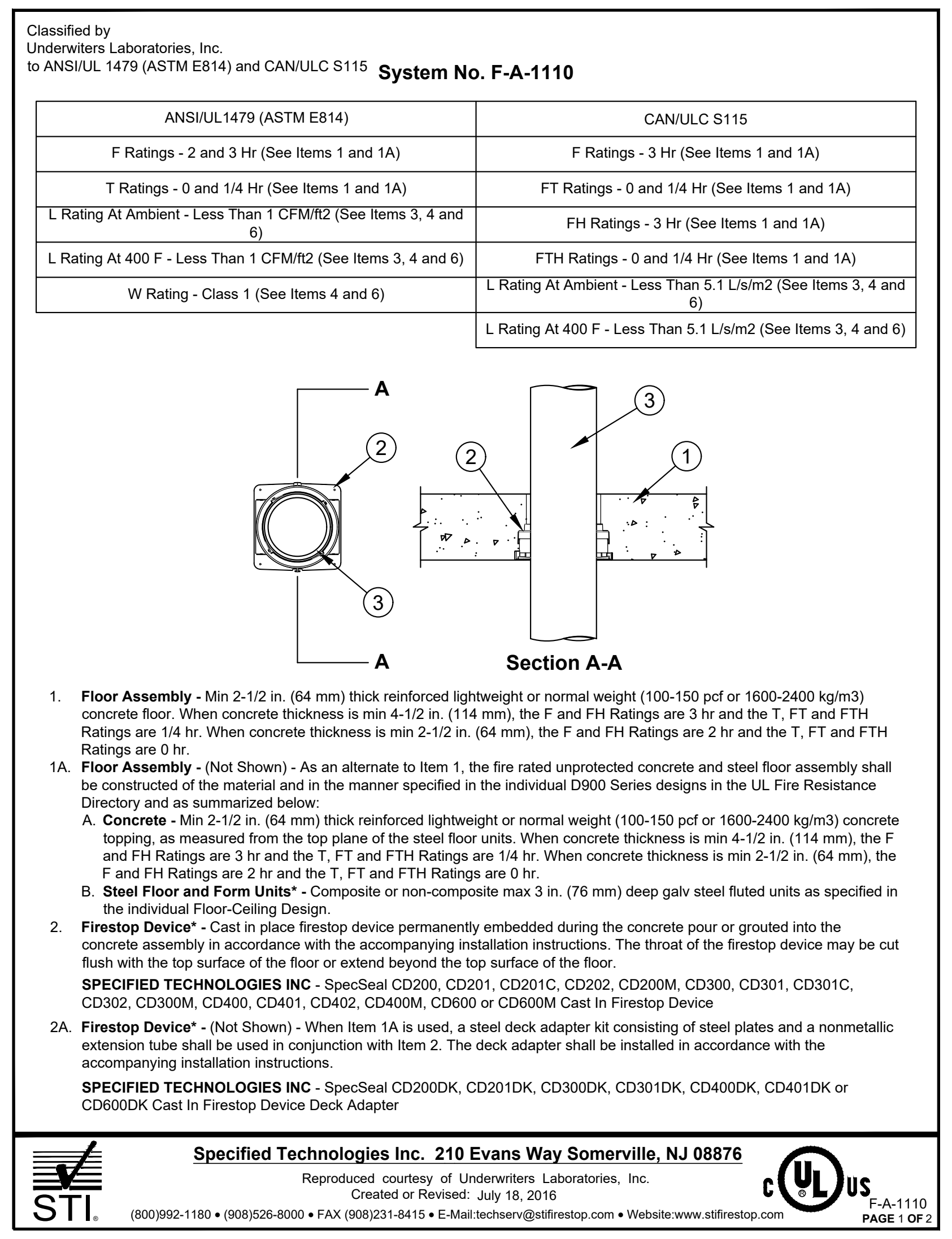

Classified by
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to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. F-A-1110

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 2 and 3 Hr (See Items 1 and 1A)	F Ratings - 3 Hr (See Items 1 and 1A)
T Ratings - 0 and 1/4 Hr (See Items 1 and 1A)	FT Ratings - 0 and 1/4 Hr (See Items 1 and 1A)
L Rating At Ambient - Less Than 1 CFM/ft2 (See Items 3, 4 and 6)	FH Ratings - 3 Hr (See Items 1 and 1A)
L Rating At 400 F - Less Than 1 CFM/ft2 (See Items 3, 4 and 6)	FTH Ratings - 0 and 1/4 Hr (See Items 1 and 1A)
W Rating - Class 1 (See Items 4 and 6)	L Rating At Ambient - Less Than 5.1 L/s/m2 (See Items 3, 4 and 6)
	L Rating At 400 F - Less Than 5.1 L/s/m2 (See Items 3, 4 and 6)

1. **Floor Assembly -** Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor. When concrete thickness is min 4-1/2 in. (114 mm), the F and FH Ratings are 3 hr and the T, FT and FTH Ratings are 1/4 hr. When concrete thickness is min 2-1/2 in. (64 mm), the F and FH Ratings are 2 hr and the T, FT and FTH Ratings are 0 hr.

1A. **Floor Assembly -** (Not Shown) - As an alternate to Item 1, the fire rated unprotected concrete and steel floor assembly shall be constructed of the material and in the manner specified in the individual D900 Series designs in the UL Fire Resistance Directory and as summarized below:
   A. **Concrete -** Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete topping, as measured from the top plane of the steel floor units. When concrete thickness is min 4-1/2 in. (114 mm), the F and FH Ratings are 3 hr and the T, FT and FTH Ratings are 1/4 hr. When concrete thickness is min 2-1/2 in. (64 mm), the F and FH Ratings are 2 hr and the T, FT and FTH Ratings are 0 hr.
   B. **Steel Floor and Form Units* -** Composite or non-composite max 3 in. (76 mm) deep galv steel fluted units as specified in the individual Floor-Ceiling Design.

2. **Firestop Device* -** Cast in place firestop device permanently embedded during the concrete pour or grouted into the concrete assembly in accordance with the accompanying installation instructions. The throat of the firestop device may be cut flush with the top surface of the floor or extend beyond the top surface of the floor.

   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200, CD201, CD201C, CD202, CD200M, CD300, CD301, CD301C, CD302, CD300M, CD400, CD401, CD402, CD400M, CD600 or CD600M Cast In Firestop Device

2A. **Firestop Device* -** (Not Shown) - When Item 1A is used, a steel deck adapter kit consisting of steel plates and a nonmetallic extension tube shall be used in conjunction with Item 2. The deck adapter shall be installed in accordance with the accompanying installation instructions.

   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200DK, CD201DK, CD300DK, CD301DK, CD400DK, CD401DK or CD600DK Cast In Firestop Device Deck Adapter

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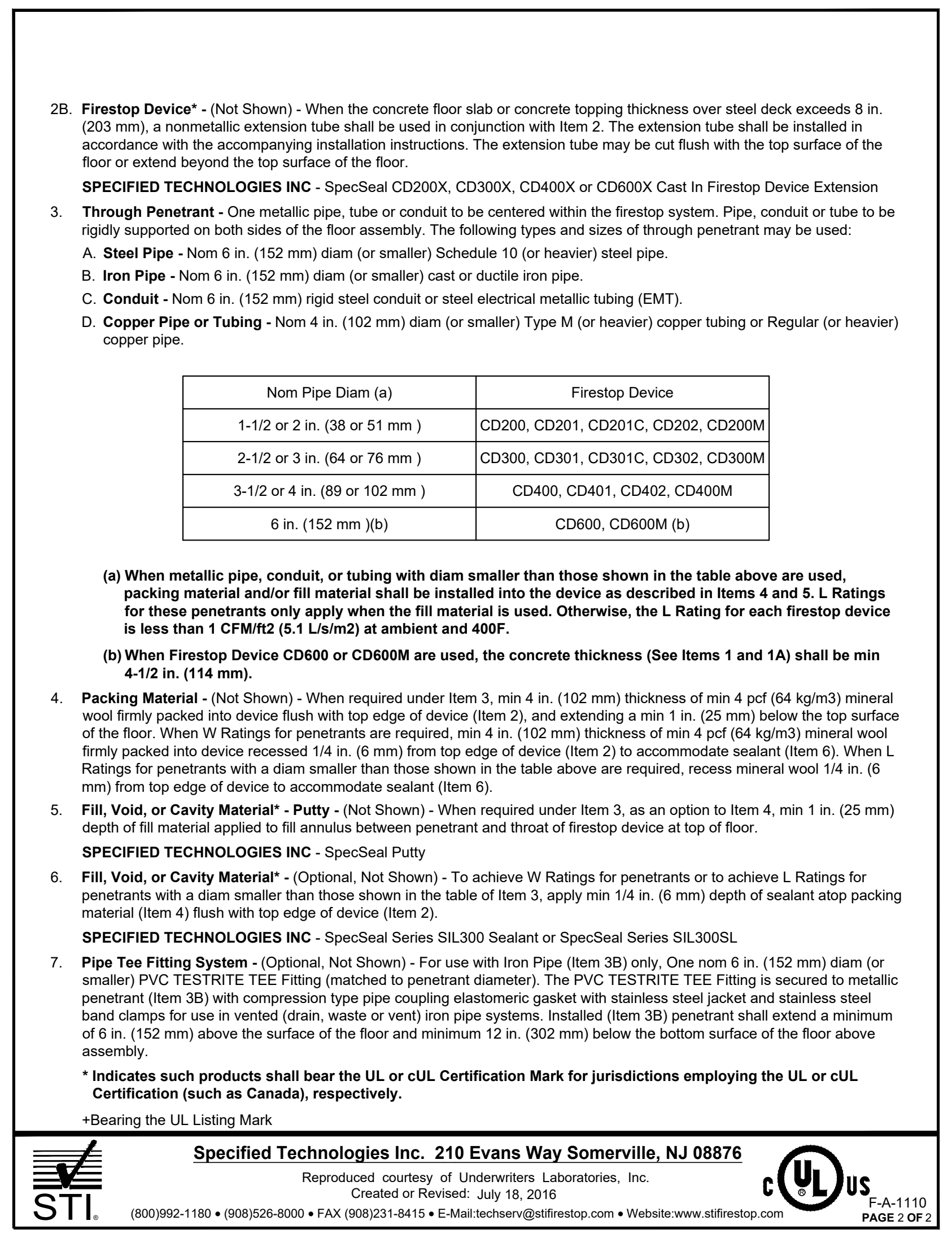

2B. **Firestop Device* -** (Not Shown) - When the concrete floor slab or concrete topping thickness over steel deck exceeds 8 in. (203 mm), a nonmetallic extension tube shall be used in conjunction with Item 2. The extension tube shall be installed in accordance with the accompanying installation instructions. The extension tube may be cut flush with the top surface of the floor or extend beyond the top surface of the floor.

   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200X, CD300X, CD400X or CD600X Cast In Firestop Device Extension

3. **Through Penetrant -** One metallic pipe, tube or conduit to be centered within the firestop system. Pipe, conduit or tube to be rigidly supported on both sides of the floor assembly. The following types and sizes of through penetrant may be used:
   A. **Steel Pipe -** Nom 6 in. (152 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 6 in. (152 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Conduit -** Nom 6 in. (152 mm) rigid steel conduit or steel electrical metallic tubing (EMT).
   D. **Copper Pipe or Tubing -** Nom 4 in. (102 mm) diam (or smaller) Type M (or heavier) copper tubing or Regular (or heavier) copper pipe.

Nom Pipe Diam (a)	Firestop Device
1-1/2 or 2 in. (38 or 51 mm)	CD200, CD201, CD201C, CD202, CD200M
2-1/2 or 3 in. (64 or 76 mm)	CD300, CD301, CD301C, CD302, CD300M
3-1/2 or 4 in. (89 or 102 mm)	CD400, CD401, CD402, CD400M
6 in. (152 mm)(b)	CD600, CD600M (b)

(a) When metallic pipe, conduit, or tubing with diam smaller than those shown in the table above are used, packing material and/or fill material shall be installed into the device as described in Items 4 and 5. L Ratings for these penetrants only apply when the fill material is used. Otherwise, the L Rating for each firestop device is less than 1 CFM/ft2 (5.1 L/s/m2) at ambient and 400F.

(b) When Firestop Device CD600 or CD600M are used, the concrete thickness (See Items 1 and 1A) shall be min 4-1/2 in. (114 mm).

4. **Packing Material -** (Not Shown) - When required under Item 3, min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool firmly packed into device flush with top edge of device (Item 2), and extending a min 1 in. (25 mm) below the top surface of the floor. When W Ratings for penetrants are required, min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool firmly packed into device recessed 1/4 in. (6 mm) from top edge of device (Item 2) to accommodate sealant (Item 6). When L Ratings for penetrants with a diam smaller than those shown in the table above are required, recess mineral wool 1/4 in. (6 mm) from top edge of device to accommodate sealant (Item 6).
5. **Fill, Void, or Cavity Material* - Putty -** (Not Shown) - When required under Item 3, as an option to Item 4, min 1 in. (25 mm) depth of fill material applied to fill annulus between penetrant and throat of firestop device at top of floor.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Putty
6. **Fill, Void, or Cavity Material* -** (Optional, Not Shown) - To achieve W Ratings for penetrants or to achieve L Ratings for penetrants with a diam smaller than those shown in the table of Item 3, apply min 1/4 in. (6 mm) depth of sealant atop packing material (Item 4) flush with top edge of device (Item 2).

   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SIL300 Sealant or SpecSeal Series SIL300SL
7. **Pipe Tee Fitting System -** (Optional, Not Shown) - For use with Iron Pipe (Item 3B) only, One nom 6 in. (152 mm) diam (or smaller) PVC TESTRITE TEE Fitting (matched to penetrant diameter). The PVC TESTRITE TEE Fitting is secured to metallic penetrant (Item 3B) with compression type pipe coupling elastomeric gasket with stainless steel jacket and stainless steel band clamps for use in vented (drain, waste or vent) iron pipe systems. Installed (Item 3B) penetrant shall extend a minimum of 6 in. (152 mm) above the surface of the floor and minimum 12 in. (302 mm) below the bottom surface of the floor above assembly.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

+Bearing the UL Listing Mark

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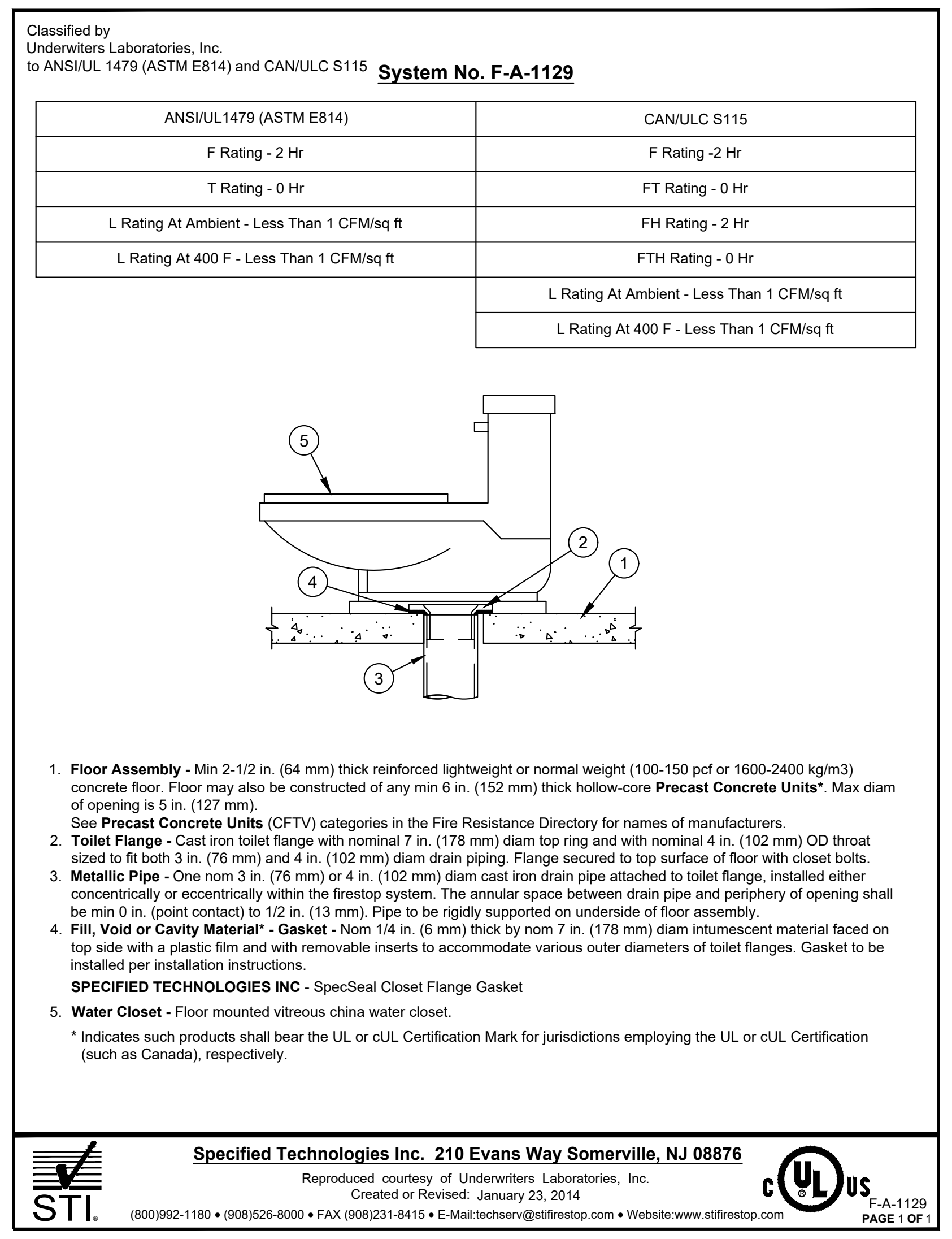

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. F-A-1129

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating - 2 Hr	F Rating -2 Hr
T Rating - 0 Hr	FT Rating - 0 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Rating - 2 Hr
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Rating - 0 Hr
	L Rating At Ambient - Less Than 1 CFM/sq ft
	L Rating At 400 F - Less Than 1 CFM/sq ft

1. **Floor Assembly -** Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor. Floor may also be constructed of any min 6 in. (152 mm) thick hollow-core **Precast Concrete Units***. Max diam of opening is 5 in. (127 mm).
   See **Precast Concrete Units** (CFTV) categories in the Fire Resistance Directory for names of manufacturers.
2. **Toilet Flange -** Cast iron toilet flange with nominal 7 in. (178 mm) diam top ring and with nominal 4 in. (102 mm) OD throat sized to fit both 3 in. (76 mm) and 4 in. (102 mm) diam drain piping. Flange secured to top surface of floor with closet bolts.
3. **Metallic Pipe -** One nom 3 in. (76 mm) or 4 in. (102 mm) diam cast iron drain pipe attached to toilet flange, installed either concentrically or eccentrically within the firestop system. The annular space between drain pipe and periphery of opening shall be min 0 in. (point contact) to 1/2 in. (13 mm). Pipe to be rigidly supported on underside of floor assembly.
4. **Fill, Void or Cavity Material* - Gasket -** Nom 1/4 in. (6 mm) thick by nom 7 in. (178 mm) diam intumescent material faced on top side with a plastic film and with removable inserts to accommodate various outer diameters of toilet flanges. Gasket to be installed per installation instructions.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Closet Flange Gasket
5. **Water Closet -** Floor mounted vitreous china water closet.

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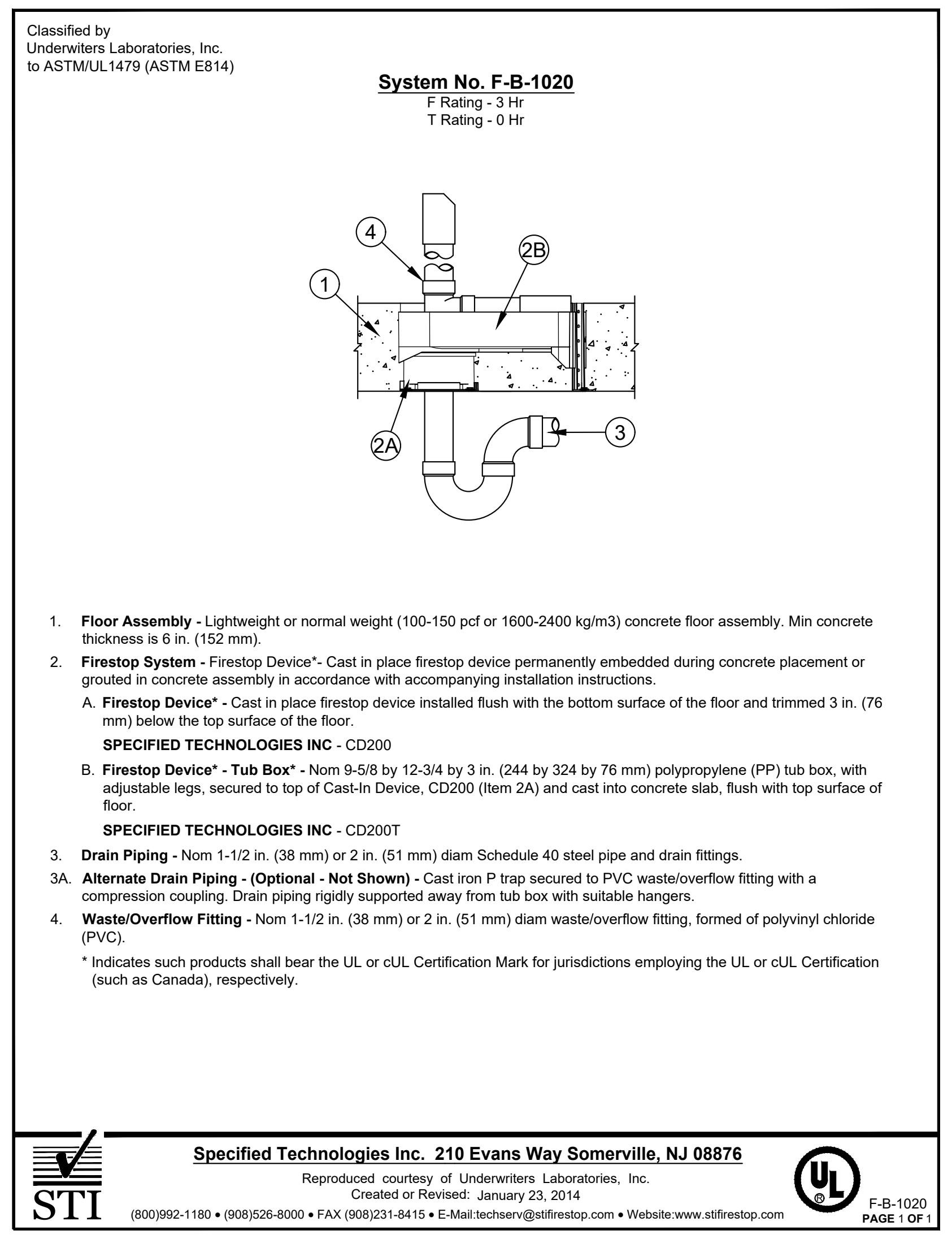

Classified by
Underwriters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. F-B-1020

F Rating - 3 Hr
T Rating - 0 Hr

1. **Floor Assembly -** Lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor assembly. Min concrete thickness is 6 in. (152 mm).
2. **Firestop System -** Firestop Device*- Cast in place firestop device permanently embedded during concrete placement or grouted in concrete assembly in accordance with accompanying installation instructions.
   A. **Firestop Device* -** Cast in place firestop device installed flush with the bottom surface of the floor and trimmed 3 in. (76 mm) below the top surface of the floor.

   SPECIFIED TECHNOLOGIES INC - CD200

   B. **Firestop Device* - Tub Box* -** Nom 9-5/8 by 12-3/4 by 3 in. (244 by 324 by 76 mm) polypropylene (PP) tub box, with adjustable legs, secured to top of Cast-In Device, CD200 (Item 2A) and cast into concrete slab, flush with top surface of floor.

   SPECIFIED TECHNOLOGIES INC - CD200T
3. **Drain Piping -** Nom 1-1/2 in. (38 mm) or 2 in. (51 mm) diam Schedule 40 steel pipe and drain fittings.

3A. **Alternate Drain Piping - (Optional - Not Shown) -** Cast iron P trap secured to PVC waste/overflow fitting with a compression coupling. Drain piping rigidly supported away from tub box with suitable hangers.

4. **Waste/Overflow Fitting -** Nom 1-1/2 in. (38 mm) or 2 in. (51 mm) diam waste/overflow fitting, formed of polyvinyl chloride (PVC).

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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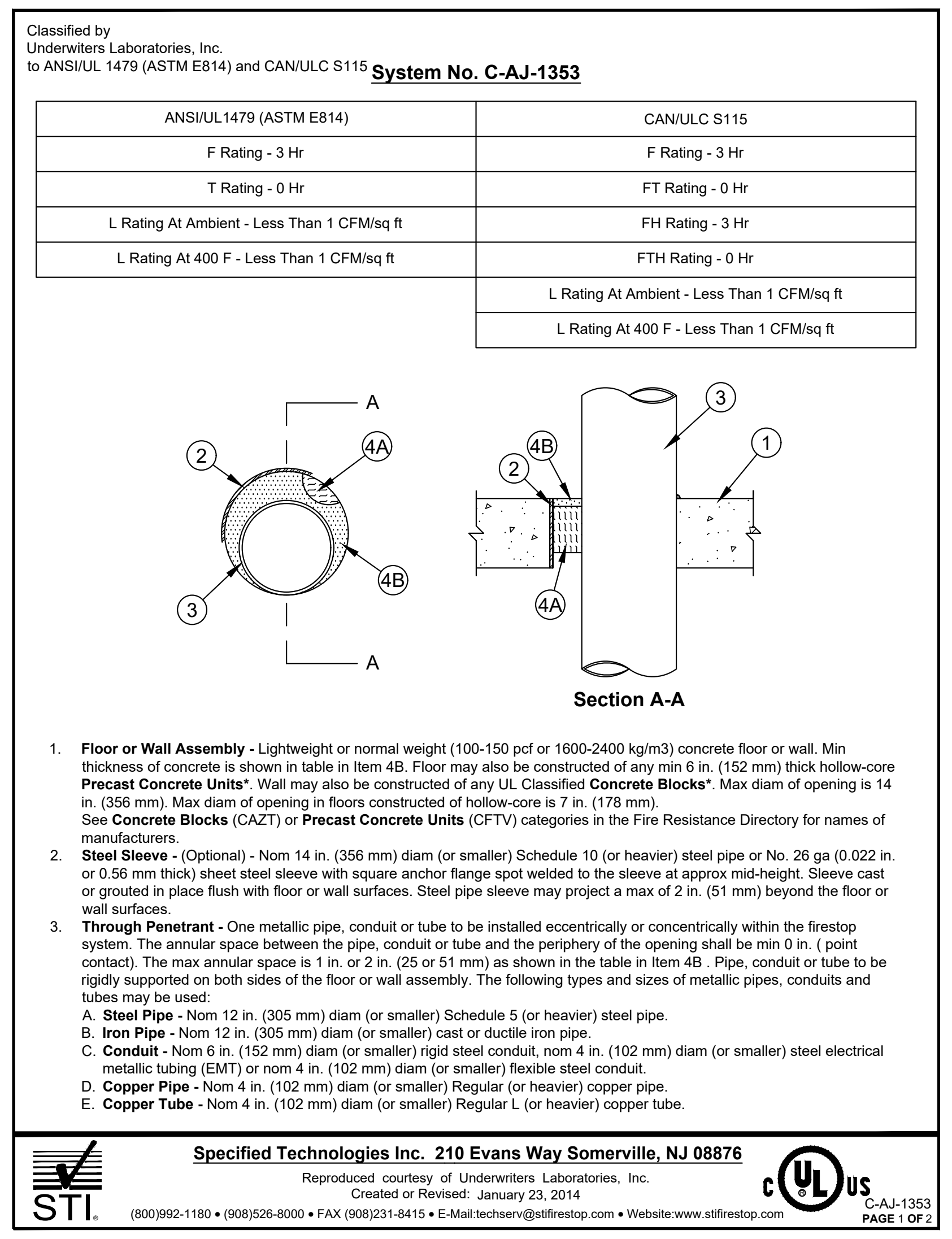

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. C-AJ-1353

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating - 3 Hr	F Rating - 3 Hr
T Rating - 0 Hr	FT Rating - 0 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Rating - 3 Hr
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Rating - 0 Hr
	L Rating At Ambient - Less Than 1 CFM/sq ft
	L Rating At 400 F - Less Than 1 CFM/sq ft

1. **Floor or Wall Assembly -** Lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor or wall. Min thickness of concrete is shown in table in Item 4B. Floor may also be constructed of any min 6 in. (152 mm) thick hollow-core **Precast Concrete Units***. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 14 in. (356 mm). Max diam of opening in floors constructed of hollow-core is 7 in. (178 mm).
   See **Concrete Blocks** (CAZT) or **Precast Concrete Units** (CFTV) categories in the Fire Resistance Directory for names of manufacturers.
2. **Steel Sleeve -** (Optional) - Nom 14 in. (356 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe or No. 26 ga (0.022 in. or 0.56 mm thick) sheet steel sleeve with square anchor flange spot welded to the sleeve at approx mid-height. Sleeve cast or grouted in place flush with floor or wall surfaces. Steel pipe sleeve may project a max of 2 in. (51 mm) beyond the floor or wall surfaces.
3. **Through Penetrant -** One metallic pipe, conduit or tube to be installed eccentrically or concentrically within the firestop system. The annular space between the pipe, conduit or tube and the periphery of the opening shall be min 0 in. (point contact). The max annular space is 1 in. or 2 in. (25 or 51 mm) as shown in the table in Item 4B . Pipe, conduit or tube to be rigidly supported on both sides of the floor or wall assembly. The following types and sizes of metallic pipes, conduits and tubes may be used:
   A. **Steel Pipe -** Nom 12 in. (305 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Conduit -** Nom 6 in. (152 mm) diam (or smaller) rigid steel conduit, nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing (EMT) or nom 4 in. (102 mm) diam (or smaller) flexible steel conduit.
   D. **Copper Pipe -** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
   E. **Copper Tube -** Nom 4 in. (102 mm) diam (or smaller) Regular L (or heavier) copper tube.

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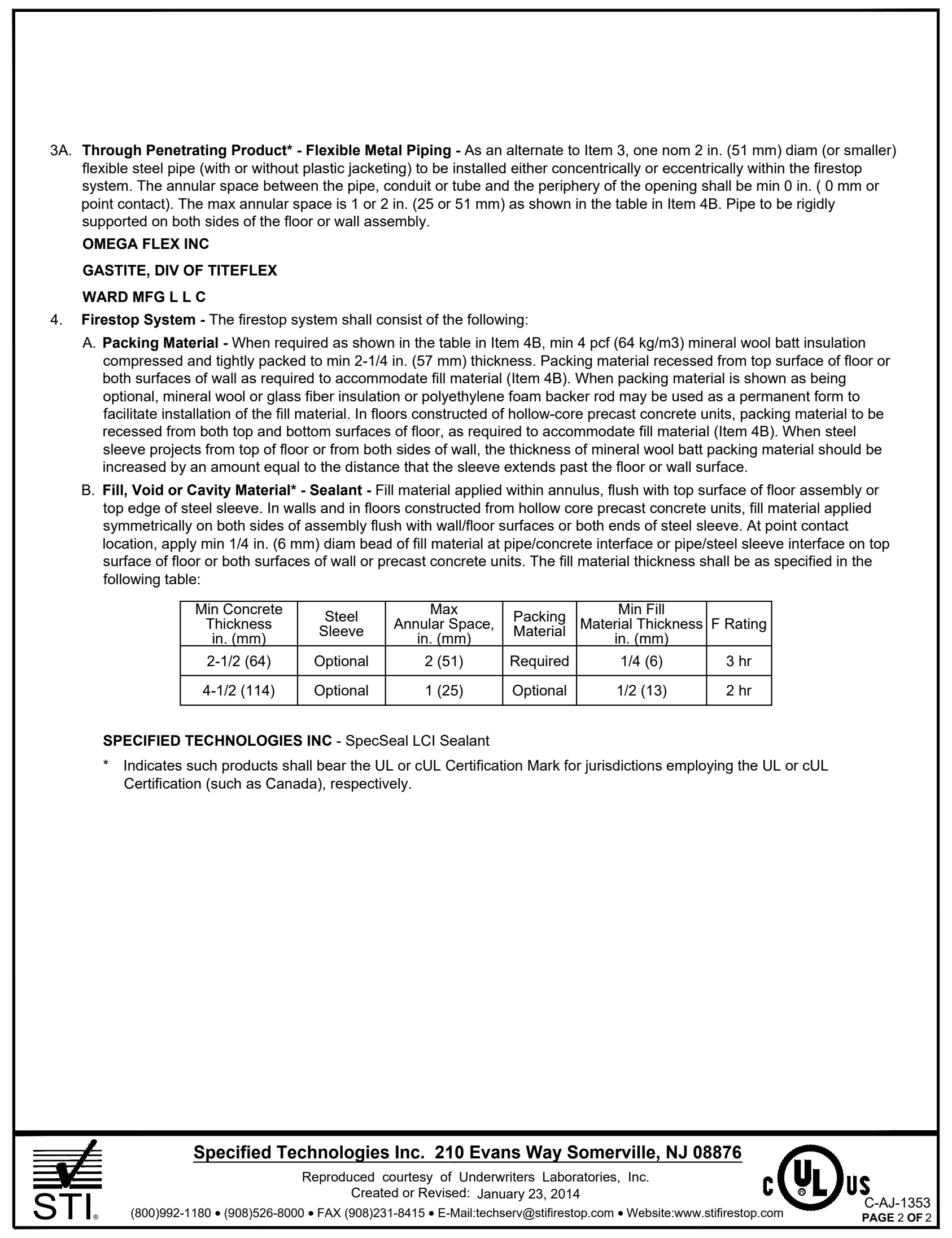

3A. **Through Penetrating Product* - Flexible Metal Piping -** As an alternate to Item 3, one nom 2 in. (51 mm) diam (or smaller) flexible steel pipe (with or without plastic jacketing) to be installed either concentrically or eccentrically within the firestop system. The annular space between the pipe, conduit or tube and the periphery of the opening shall be min 0 in. (0 mm or point contact). The max annular space is 1 or 2 in. (25 or 51 mm) as shown in the table in Item 4B. Pipe to be rigidly supported on both sides of the floor or wall assembly.

OMEGA FLEX INC

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4. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** When required as shown in the table in Item 4B, min 4 pcf (64 kg/m3) mineral wool batt insulation compressed and tightly packed to min 2-1/4 in. (57 mm) thickness. Packing material recessed from top surface of floor or both surfaces of wall as required to accommodate fill material (Item 4B). When packing material is shown as being optional, mineral wool or glass fiber insulation or polyethylene foam backer rod may be used as a permanent form to facilitate installation of the fill material. In floors constructed of hollow-core precast concrete units, packing material to be recessed from both top and bottom surfaces of floor, as required to accommodate fill material (Item 4B). When steel sleeve projects from top of floor or from both sides of wall, the thickness of mineral wool batt packing material should be increased by an amount equal to the distance that the sleeve extends past the floor or wall surface.
   B. **Fill, Void or Cavity Material* - Sealant -** Fill material applied within annulus, flush with top surface of floor assembly or top edge of steel sleeve. In walls and in floors constructed from hollow core precast concrete units, fill material applied symmetrically on both sides of assembly flush with wall/floor surfaces or both ends of steel sleeve. At point contact location, apply min 1/4 in. (6 mm) diam bead of fill material at pipe/concrete interface or pipe/steel sleeve interface on top surface of floor or both surfaces of wall or precast concrete units. The fill material thickness shall be as specified in the following table:

Min Concrete Thickness in. (mm)	Steel Sleeve	Max Annular Space, in. (mm)	Packing Material	Min Fill Material Thickness in. (mm)	F Rating
2-1/2 (64)	Optional	2 (51)	Required	1/4 (6)	3 hr
4-1/2 (114)	Optional	1 (25)	Optional	1/2 (13)	2 hr

SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant

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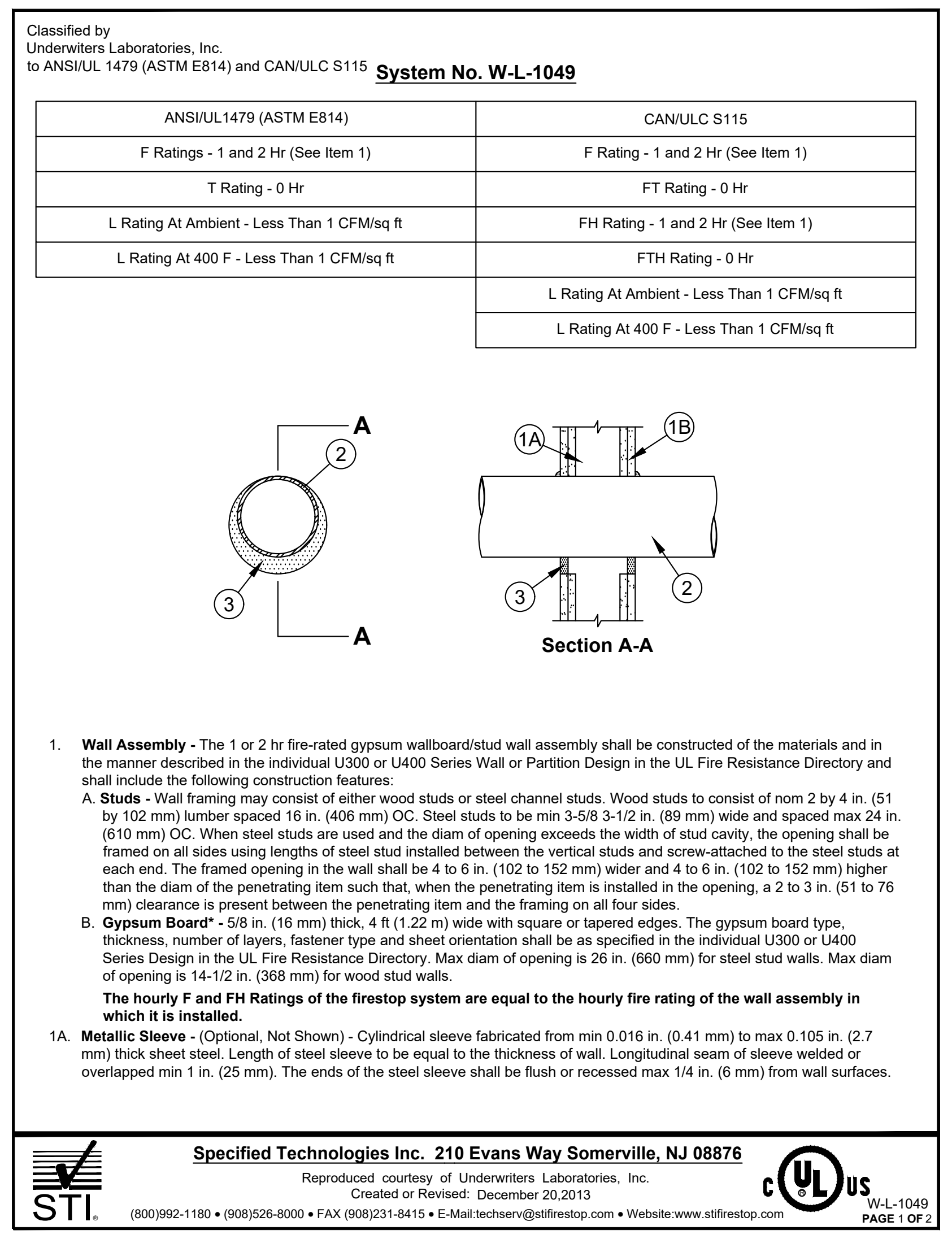

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. W-L-1049

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Rating - 1 and 2 Hr (See Item 1)
T Rating - 0 Hr	FT Rating - 0 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Rating - 1 and 2 Hr (See Item 1)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Rating - 0 Hr
	L Rating At Ambient - Less Than 1 CFM/sq ft
	L Rating At 400 F - Less Than 1 CFM/sq ft

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 described 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 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) 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. (102 to 152 mm) wider and 4 to 6 in. (102 to 152 mm) higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. (51 to 76 mm) clearance is present between the penetrating item and the framing on all four sides.
   B. **Gypsum Board* -** 5/8 in. (16 mm) thick, 4 ft (1.22 m) 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 26 in. (660 mm) for steel stud walls. Max diam of opening is 14-1/2 in. (368 mm) for wood stud walls.

   The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.

1A. **Metallic Sleeve -** (Optional, Not Shown) - Cylindrical sleeve fabricated from min 0.016 in. (0.41 mm) to max 0.105 in. (2.7 mm) thick sheet steel. Length of steel sleeve to be equal to the thickness of wall. Longitudinal seam of sleeve welded or overlapped min 1 in. (25 mm). The ends of the steel sleeve shall be flush or recessed max 1/4 in. (6 mm) from wall surfaces.

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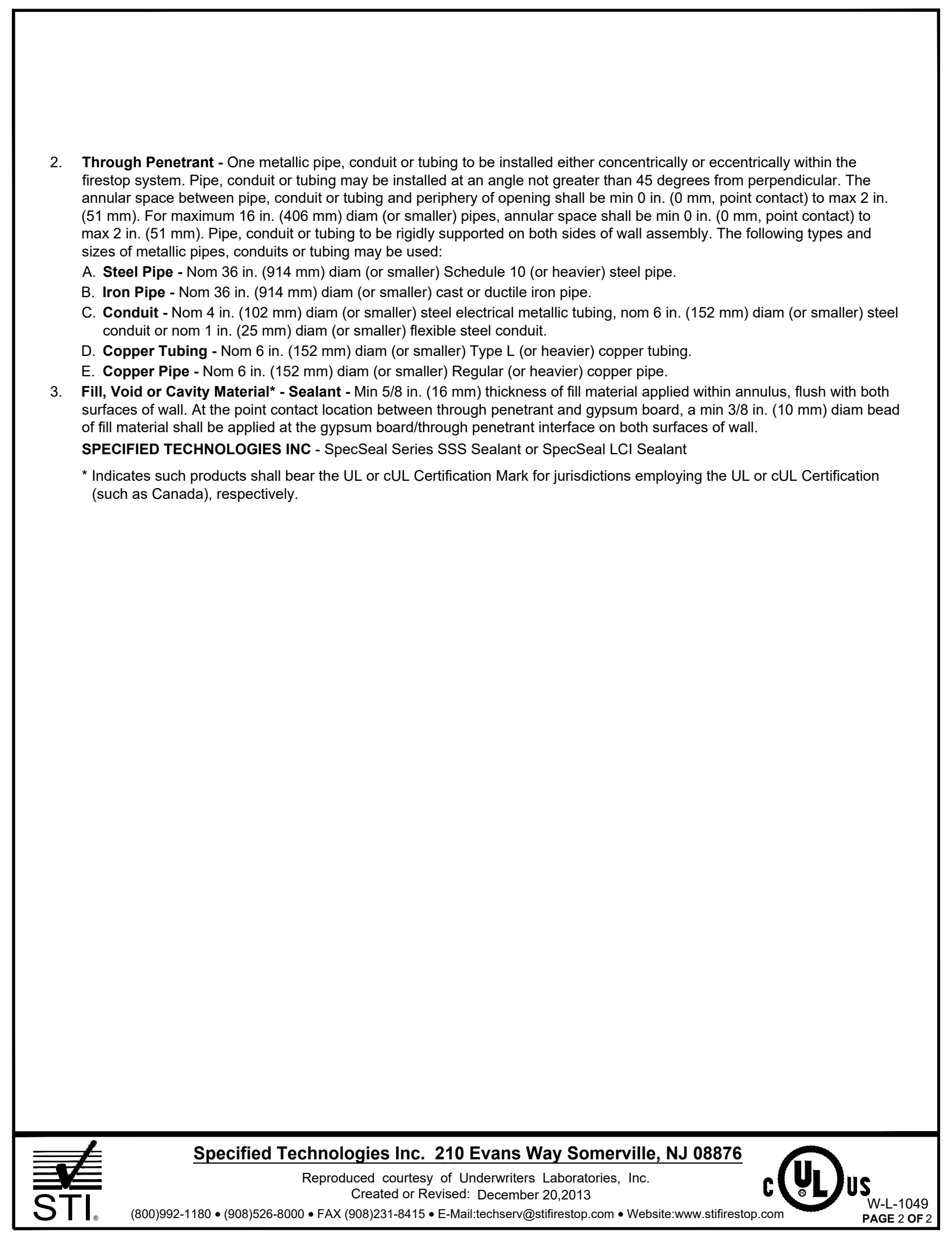

2. **Through Penetrant -** One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. Pipe, conduit or tubing may be installed at an angle not greater than 45 degrees from perpendicular. The annular space between pipe, conduit or tubing and periphery of opening shall be min 0 in. (0 mm, point contact) to max 2 in. (51 mm). For maximum 16 in. (406 mm) diam (or smaller) pipes, annular space shall be min 0 in. (0 mm, point contact) to max 2 in. (51 mm). 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 36 in. (914 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 36 in. (914 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Conduit -** Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing, nom 6 in. (152 mm) diam (or smaller) steel conduit or nom 1 in. (25 mm) diam (or smaller) flexible steel conduit.
   D. **Copper Tubing -** Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
   E. **Copper Pipe -** Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.
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. At the point contact location between through penetrant and gypsum board, a min 3/8 in. (10 mm) diam bead of fill material shall be applied at the gypsum board/through penetrant interface on both surfaces of wall.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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GENERAL NOTES:

1. Refer to section 07 84 00 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
2. Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   - Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.
3. If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   - UL Fire Resistance Directory; Current Edition
   - NFPA 101 Life Safety Code
   - All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

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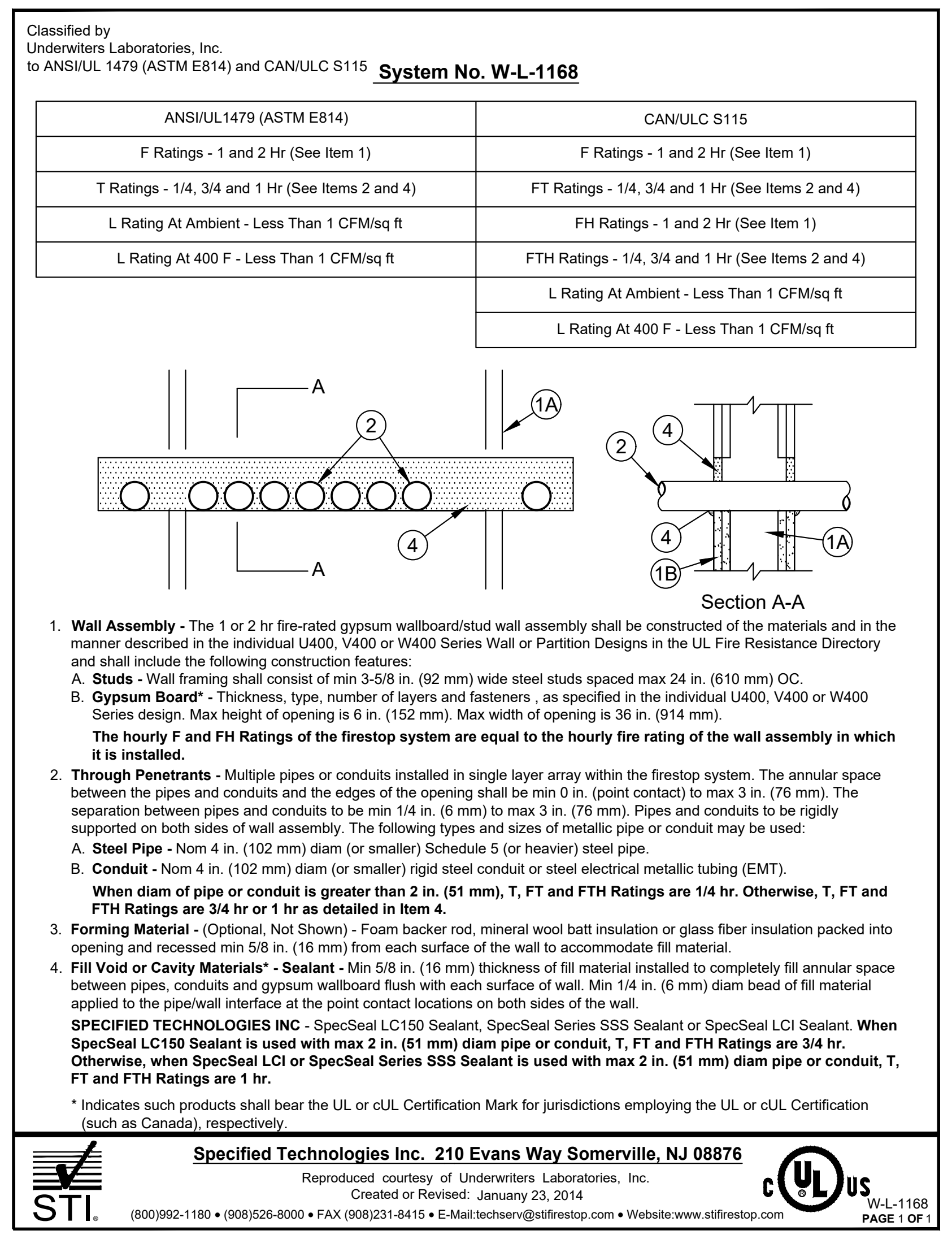

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-1168**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 1/4, 3/4 and 1 Hr (See Items 2 and 4)	FT Ratings - 1/4, 3/4 and 1 Hr (See Items 2 and 4)
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Ratings - 1 and 2 Hr (See Item 1)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Ratings - 1/4, 3/4 and 1 Hr (See Items 2 and 4)
	L Rating At Ambient - Less Than 1 CFM/sq ft
	L Rating At 400 F - Less Than 1 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 described in the individual U400, V400 or W400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs -** Wall framing shall consist of min 3-5/8 in. (92 mm) wide steel studs spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** Thickness, type, number of layers and fasteners , as specified in the individual U400, V400 or W400 Series design. Max height of opening is 6 in. (152 mm). Max width of opening is 36 in. (914 mm).

   The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.
2. **Through Penetrants -** Multiple pipes or conduits installed in single layer array within the firestop system. The annular space between the pipes and conduits and the edges of the opening shall be min 0 in. (point contact) to max 3 in. (76 mm). The separation between pipes and conduits to be min 1/4 in. (6 mm) to max 3 in. (76 mm). Pipes and conduits to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipe or conduit may be used:
   A. **Steel Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Conduit -** Nom 4 in. (102 mm) diam (or smaller) rigid steel conduit or steel electrical metallic tubing (EMT).

   When diam of pipe or conduit is greater than 2 in. (51 mm), T, FT and FTH Ratings are 1/4 hr. Otherwise, T, FT and FTH Ratings are 3/4 hr or 1 hr as detailed in Item 4.
3. **Forming Material -** (Optional, Not Shown) - Foam backer rod, mineral wool batt insulation or glass fiber insulation packed into opening and recessed min 5/8 in. (16 mm) from each surface of the wall to accommodate fill material.
4. **Fill Void or Cavity Materials* - Sealant -** Min 5/8 in. (16 mm) thickness of fill material installed to completely fill annular space between pipes, conduits and gypsum wallboard flush with each surface of wall. Min 1/4 in. (6 mm) diam bead of fill material applied to the pipe/wall interface at the point contact locations on both sides of the wall.

   SPECIFIED TECHNOLOGIES INC - SpecSeal LC150 Sealant, SpecSeal Series SSS Sealant or SpecSeal LCI Sealant. **When SpecSeal LC150 Sealant is used with max 2 in. (51 mm) diam pipe or conduit, T, FT and FTH Ratings are 3/4 hr. Otherwise, when SpecSeal LCI or SpecSeal Series SSS Sealant is used with max 2 in. (51 mm) diam pipe or conduit, T, FT and FTH Ratings are 1 hr.**

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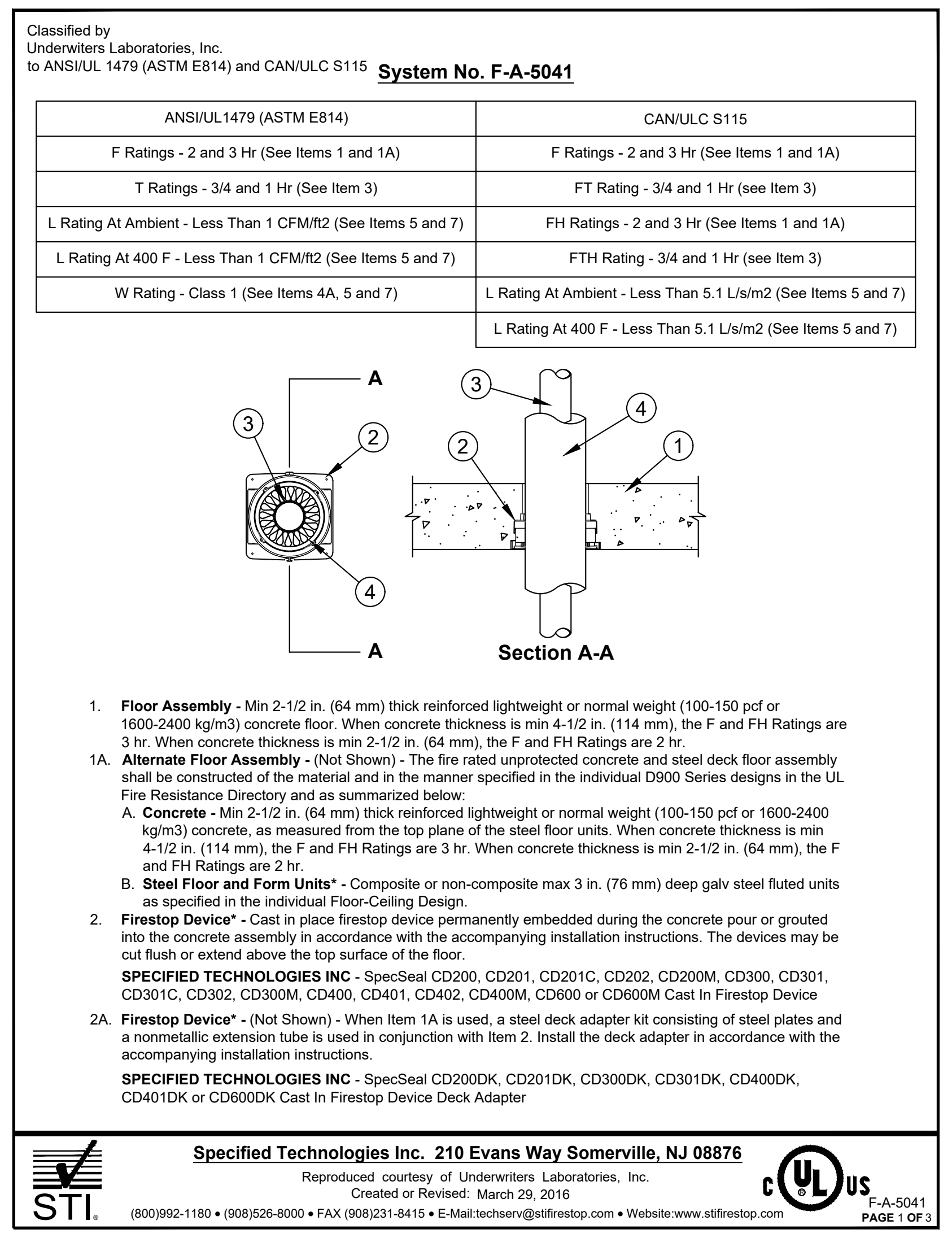

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. F-A-5041**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 2 and 3 Hr (See Items 1 and 1A)	F Ratings - 2 and 3 Hr (See Items 1 and 1A)
T Ratings - 3/4 and 1 Hr (See Item 3)	FT Rating - 3/4 and 1 Hr (see Item 3)
L Rating At Ambient - Less Than 1 CFM/ft2 (See Items 5 and 7)	FH Ratings - 2 and 3 Hr (See Items 1 and 1A)
L Rating At 400 F - Less Than 1 CFM/ft2 (See Items 5 and 7)	FTH Rating - 3/4 and 1 Hr (see Item 3)
W Rating - Class 1 (See Items 4A, 5 and 7)	L Rating At Ambient - Less Than 5.1 L/s/m2 (See Items 5 and 7)
	L Rating At 400 F - Less Than 5.1 L/s/m2 (See Items 5 and 7)

Section A-A

1. **Floor Assembly -** Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor. When concrete thickness is min 4-1/2 in. (114 mm), the F and FH Ratings are 3 hr. When concrete thickness is min 2-1/2 in. (64 mm), the F and FH Ratings are 2 hr.

1A. **Alternate Floor Assembly -** (Not Shown) - The fire rated unprotected concrete and steel deck floor assembly shall be constructed of the material and in the manner specified in the individual D900 Series designs in the UL Fire Resistance Directory and as summarized below:
   A. **Concrete -** Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete, as measured from the top plane of the steel floor units. When concrete thickness is min 4-1/2 in. (114 mm), the F and FH Ratings are 3 hr. When concrete thickness is min 2-1/2 in. (64 mm), the F and FH Ratings are 2 hr.
   B. **Steel Floor and Form Units* -** Composite or non-composite max 3 in. (76 mm) deep galv steel fluted units as specified in the individual Floor-Ceiling Design.

2. **Firestop Device* -** Cast in place firestop device permanently embedded during the concrete pour or grouted into the concrete assembly in accordance with the accompanying installation instructions. The devices may be cut flush or extend above the top surface of the floor.

   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200, CD201, CD201C, CD202, CD200M, CD300, CD301, CD301C, CD302, CD300M, CD400, CD401, CD402, CD400M, CD600 or CD600M Cast In Firestop Device

2A. **Firestop Device* -** (Not Shown) - When Item 1A is used, a steel deck adapter kit consisting of steel plates and a nonmetallic extension tube is used in conjunction with Item 2. Install the deck adapter in accordance with the accompanying installation instructions.

   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200DK, CD201DK, CD300DK, CD301DK, CD400DK, CD401DK or CD600DK Cast In Firestop Device Deck Adapter

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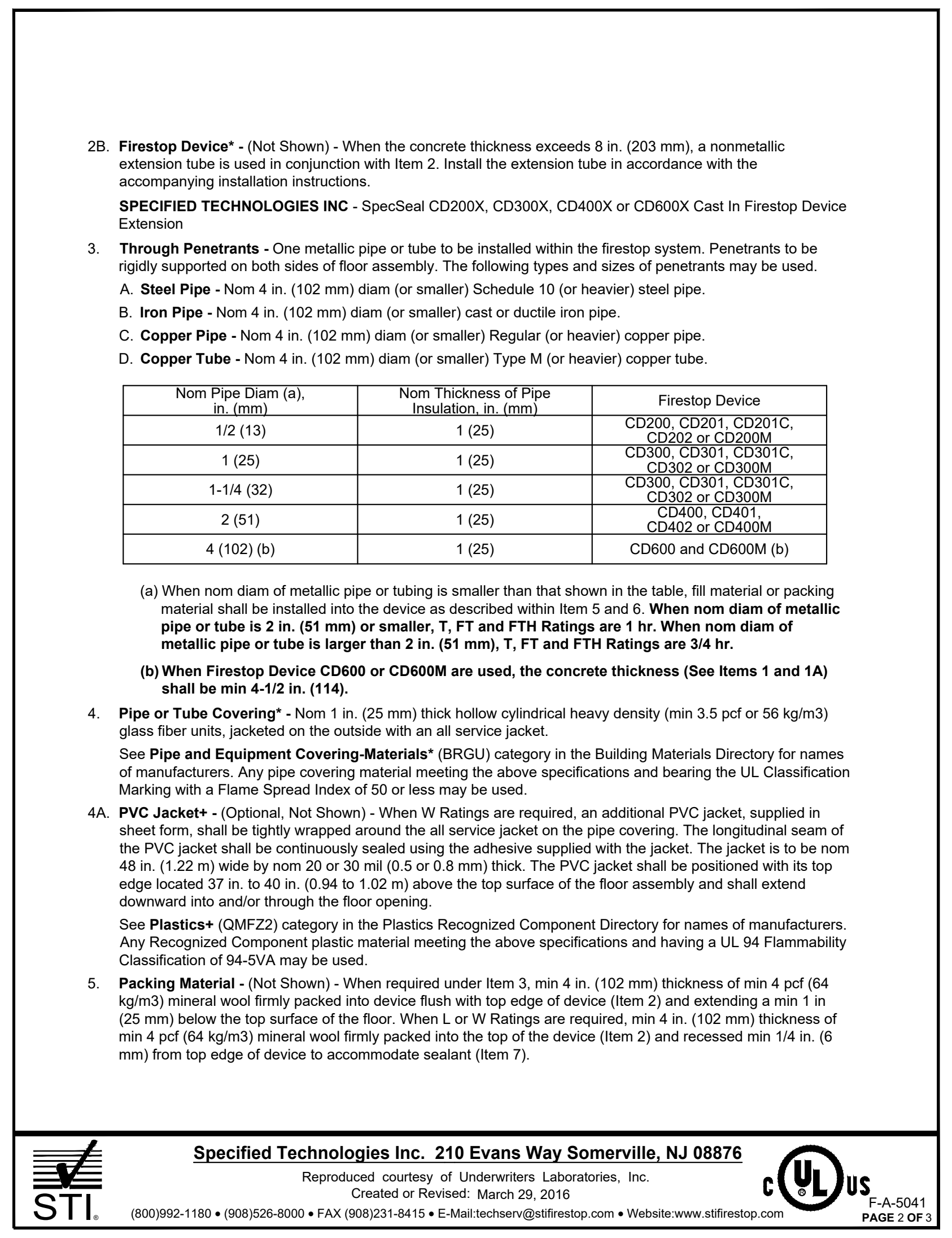

2B. **Firestop Device* -** (Not Shown) - When the concrete thickness exceeds 8 in. (203 mm), a nonmetallic extension tube is used in conjunction with Item 2. Install the extension tube in accordance with the accompanying installation instructions.

   SPECIFIED TECHNOLOGIES INC - SpecSeal CD200X, CD300X, CD400X or CD600X Cast In Firestop Device Extension

3. **Through Penetrants -** One metallic pipe or tube to be installed within the firestop system. Penetrants to be rigidly supported on both sides of floor assembly. The following types and sizes of penetrants may be used.
   A. **Steel Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Copper Pipe -** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
   D. **Copper Tube -** Nom 4 in. (102 mm) diam (or smaller) Type M (or heavier) copper tube.

Nom Pipe Diam (a), in. (mm)	Nom Thickness of Pipe Insulation, in. (mm)	Firestop Device
1/2 (13)	1 (25)	CD200, CD201, CD201C, CD202 or CD200M
1 (25)	1 (25)	CD300, CD301, CD301C, CD302 or CD300M
1-1/4 (32)	1 (25)	CD300, CD301, CD301C, CD302 or CD300M
2 (51)	1 (25)	CD400, CD401, CD402 or CD400M
4 (102) (b)	1 (25)	CD600 and CD600M (b)

(a) When nom diam of metallic pipe or tubing is smaller than that shown in the table, fill material or packing material shall be installed into the device as described within Item 5 and 6. **When nom diam of metallic pipe or tube is 2 in. (51 mm) or smaller, T, FT and FTH Ratings are 1 hr. When nom diam of metallic pipe or tube is larger than 2 in. (51 mm), T, FT and FTH Ratings are 3/4 hr.**

(b) When Firestop Device CD600 or CD600M are used, the concrete thickness (See Items 1 and 1A) shall be min 4-1/2 in. (114).

4. **Pipe or Tube Covering* -** Nom 1 in. (25 mm) thick hollow cylindrical heavy density (min 3.5 pcf or 56 kg/m3) glass fiber units, jacketed on the outside with an all service jacket.

   See **Pipe and Equipment Covering-Materials*** (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 50 or less may be used.

4A. **PVC Jacket+ -** (Optional, Not Shown) - When W Ratings are required, an additional PVC jacket, supplied in sheet form, shall be tightly wrapped around the all service jacket on the pipe covering. The longitudinal seam of the PVC jacket shall be continuously sealed using the adhesive supplied with the jacket. The jacket is to be nom 48 in. (1.22 m) wide by nom 20 or 30 mil (0.5 or 0.8 mm) thick. The PVC jacket shall be positioned with its top edge located 37 in. to 40 in. (0.94 to 1.02 m) above the top surface of the floor assembly and shall extend downward into and/or through the floor opening.

   See **Plastics+** (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component plastic material meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.

5. **Packing Material -** (Not Shown) - When required under Item 3, min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool firmly packed into device flush with top edge of device (Item 2) and extending a min 1 in (25 mm) below the top surface of the floor. When L or W Ratings are required, min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool firmly packed into the top of the device (Item 2) and recessed min 1/4 in. (6 mm) from top edge of device to accommodate sealant (Item 7).

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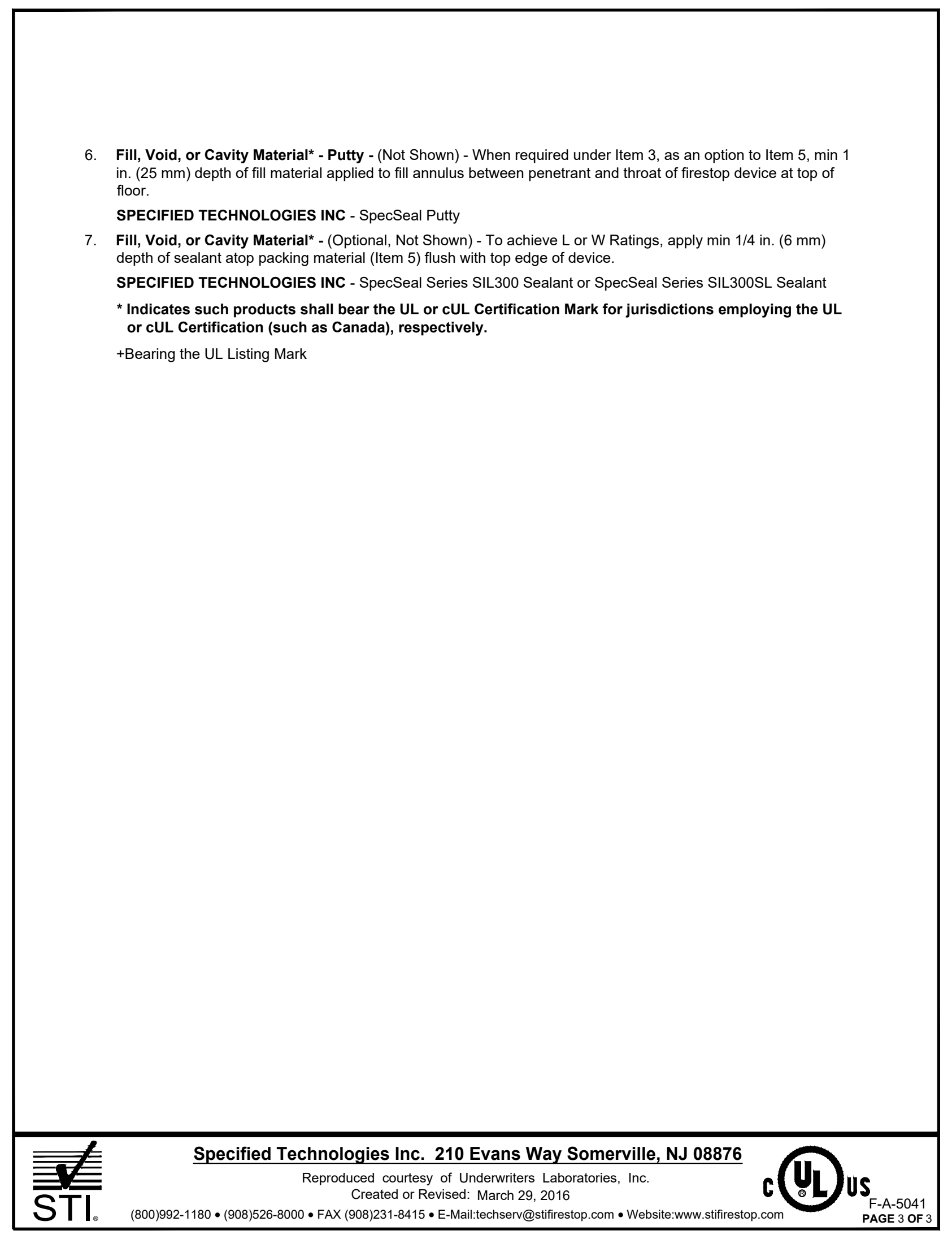

6. **Fill, Void, or Cavity Material* - Putty -** (Not Shown) - When required under Item 3, as an option to Item 5, min 1 in. (25 mm) depth of fill material applied to fill annulus between penetrant and throat of firestop device at top of floor.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Putty

7. **Fill, Void, or Cavity Material* -** (Optional, Not Shown) - To achieve L or W Ratings, apply min 1/4 in. (6 mm) depth of sealant atop packing material (Item 5) flush with top edge of device.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SIL300 Sealant or SpecSeal Series SIL300SL Sealant

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+Bearing the UL Listing Mark

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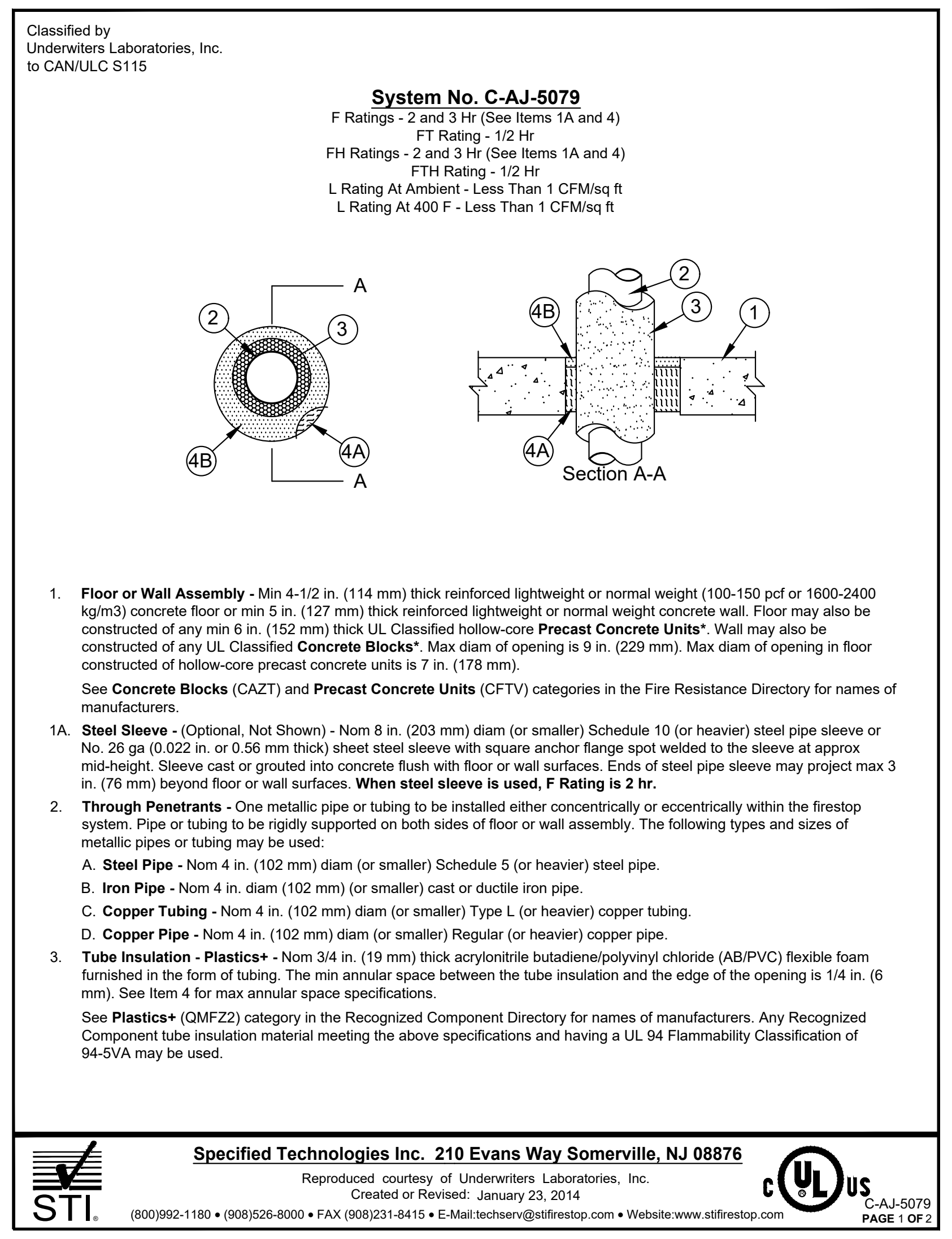

Classified by
Underwiters Laboratories, Inc.
to CAN/ULC S115

System No. C-AJ-5079
F Ratings - 2 and 3 Hr (See Items 1A and 4)
FT Rating - 1/2 Hr
FH Ratings - 2 and 3 Hr (See Items 1A and 4)
FTH Rating - 1/2 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft
L Rating At 400 F - Less Than 1 CFM/sq ft

Section A-A

1. **Floor or Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor or min 5 in. (127 mm) thick reinforced lightweight or normal weight concrete wall. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units***. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 9 in. (229 mm). Max diam of opening in floor constructed of hollow-core precast concrete units is 7 in. (178 mm).

   See **Concrete Blocks** (CAZT) and **Precast Concrete Units** (CFTV) categories in the Fire Resistance Directory for names of manufacturers.

1A. **Steel Sleeve -** (Optional, Not Shown) - Nom 8 in. (203 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe sleeve or No. 26 ga (0.022 in. or 0.56 mm thick) sheet steel sleeve with square anchor flange spot welded to the sleeve at approx mid-height. Sleeve cast or grouted into concrete flush with floor or wall surfaces. Ends of steel pipe sleeve may project max 3 in. (76 mm) beyond floor or wall surfaces. **When steel sleeve is used, F Rating is 2 hr.**

2. **Through Penetrants -** One metallic pipe or tubing to be installed either concentrically or eccentrically within the firestop system. Pipe or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or tubing may be used:
   A. **Steel Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 4 in. diam (102 mm) (or smaller) cast or ductile iron pipe.
   C. **Copper Tubing -** Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.
   D. **Copper Pipe -** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.

3. **Tube Insulation - Plastics+ -** Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The min annular space between the tube insulation and the edge of the opening is 1/4 in. (6 mm). See Item 4 for max annular space specifications.

   See **Plastics+** (QMFZ2) category in the Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.

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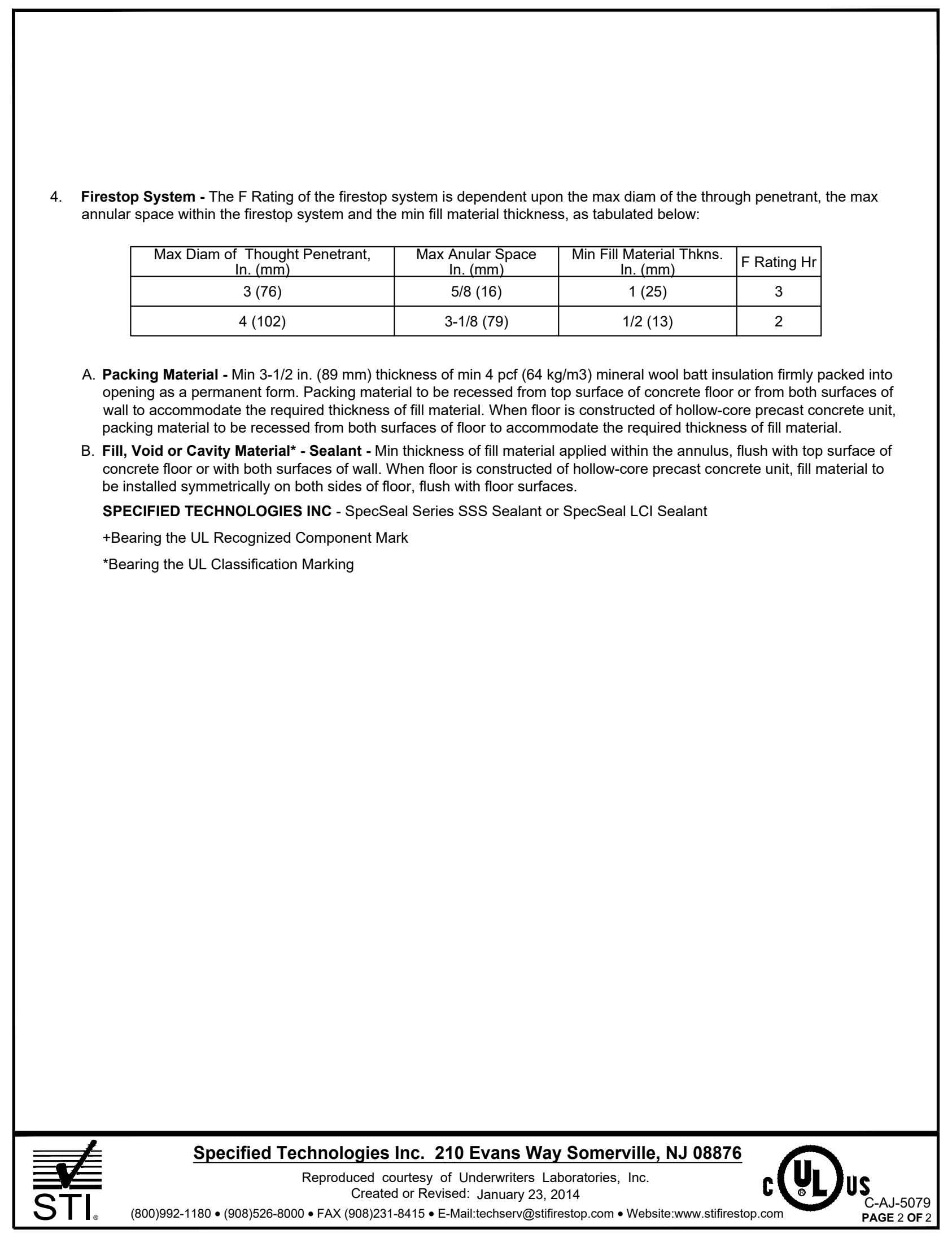

4. **Firestop System -** The F Rating of the firestop system is dependent upon the max diam of the through penetrant, the max annular space within the firestop system and the min fill material thickness, as tabulated below:

Max Diam of Thought Penetrant, In. (mm)	Max Anular Space In. (mm)	Min Fill Material Thkns. In. (mm)	F Rating Hr
3 (76)	5/8 (16)	1 (25)	3
4 (102)	3-1/8 (79)	1/2 (13)	2

   A. **Packing Material -** Min 3-1/2 in. (89 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of concrete floor or from both surfaces of wall to accommodate the required thickness of fill material. When floor is constructed of hollow-core precast concrete unit, packing material to be recessed from both surfaces of floor to accommodate the required thickness of fill material.
   B. **Fill, Void or Cavity Material* - Sealant -** Min thickness of fill material applied within the annulus, flush with top surface of concrete floor or with both surfaces of wall. When floor is constructed of hollow-core precast concrete unit, fill material to be installed symmetrically on both sides of floor, flush with floor surfaces.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant

   +Bearing the UL Recognized Component Mark

   *Bearing the UL Classification Marking

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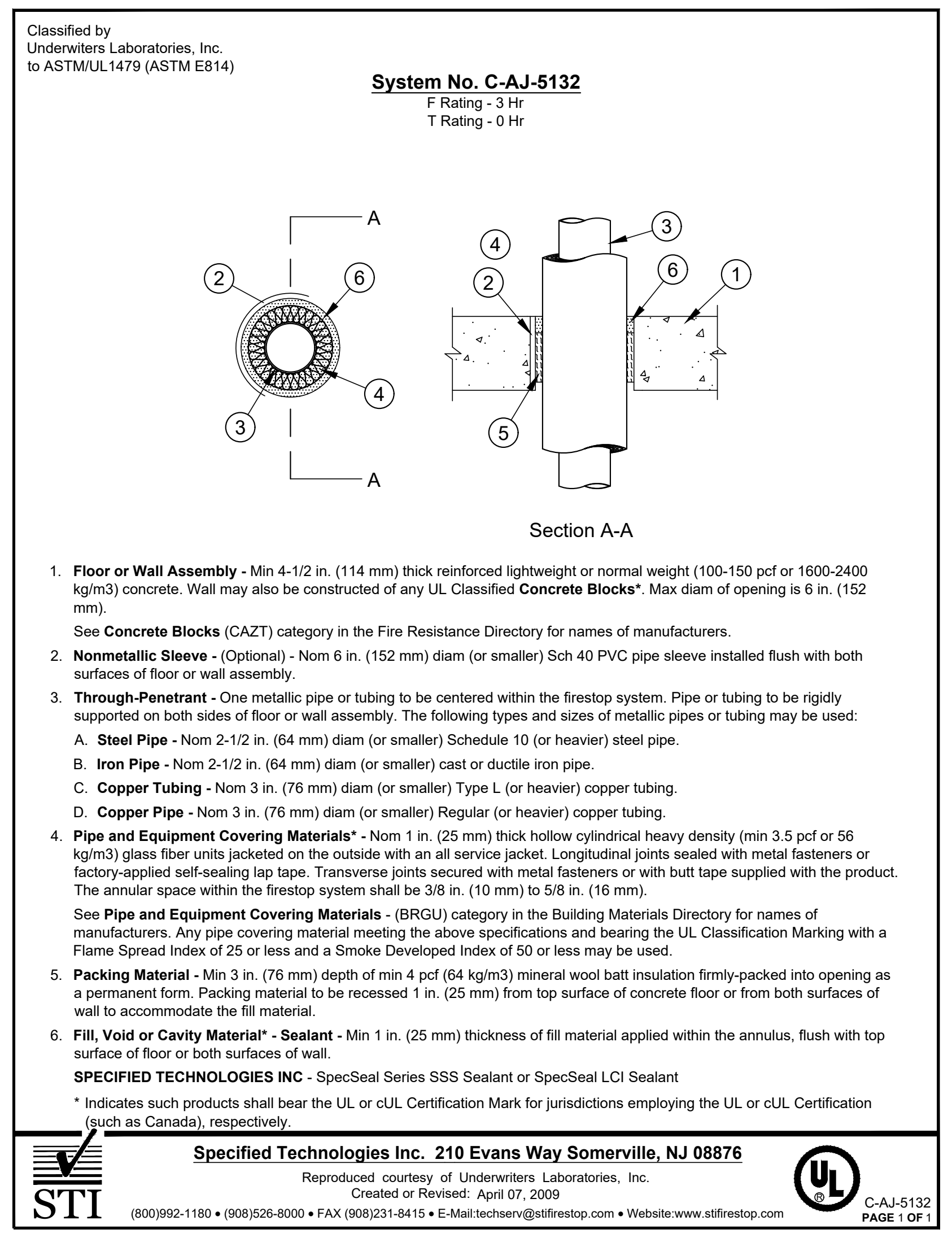

Classified by
Underwiters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. C-AJ-5132
F Rating - 3 Hr
T Rating - 0 Hr

Section A-A

1. **Floor or Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 6 in. (152 mm).

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Nonmetallic Sleeve -** (Optional) - Nom 6 in. (152 mm) diam (or smaller) Sch 40 PVC pipe sleeve installed flush with both surfaces of floor or wall assembly.
3. **Through-Penetrant -** One metallic pipe or tubing to be centered within the firestop system. Pipe or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or tubing may be used:
   A. **Steel Pipe -** Nom 2-1/2 in. (64 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 2-1/2 in. (64 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Copper Tubing -** Nom 3 in. (76 mm) diam (or smaller) Type L (or heavier) copper tubing.
   D. **Copper Pipe -** Nom 3 in. (76 mm) diam (or smaller) Regular (or heavier) copper tubing.
4. **Pipe and Equipment Covering Materials* -** Nom 1 in. (25 mm) thick hollow cylindrical heavy density (min 3.5 pcf or 56 kg/m3) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. The annular space within the firestop system shall be 3/8 in. (10 mm) to 5/8 in. (16 mm).

   See **Pipe and Equipment Covering Materials** - (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
5. **Packing Material -** Min 3 in. (76 mm) depth of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly-packed into opening as a permanent form. Packing material to be recessed 1 in. (25 mm) from top surface of concrete floor or from both surfaces of wall to accommodate the fill material.
6. **Fill, Void or Cavity Material* - Sealant -** Min 1 in. (25 mm) thickness of fill material applied within the annulus, flush with top surface of floor or both surfaces of wall.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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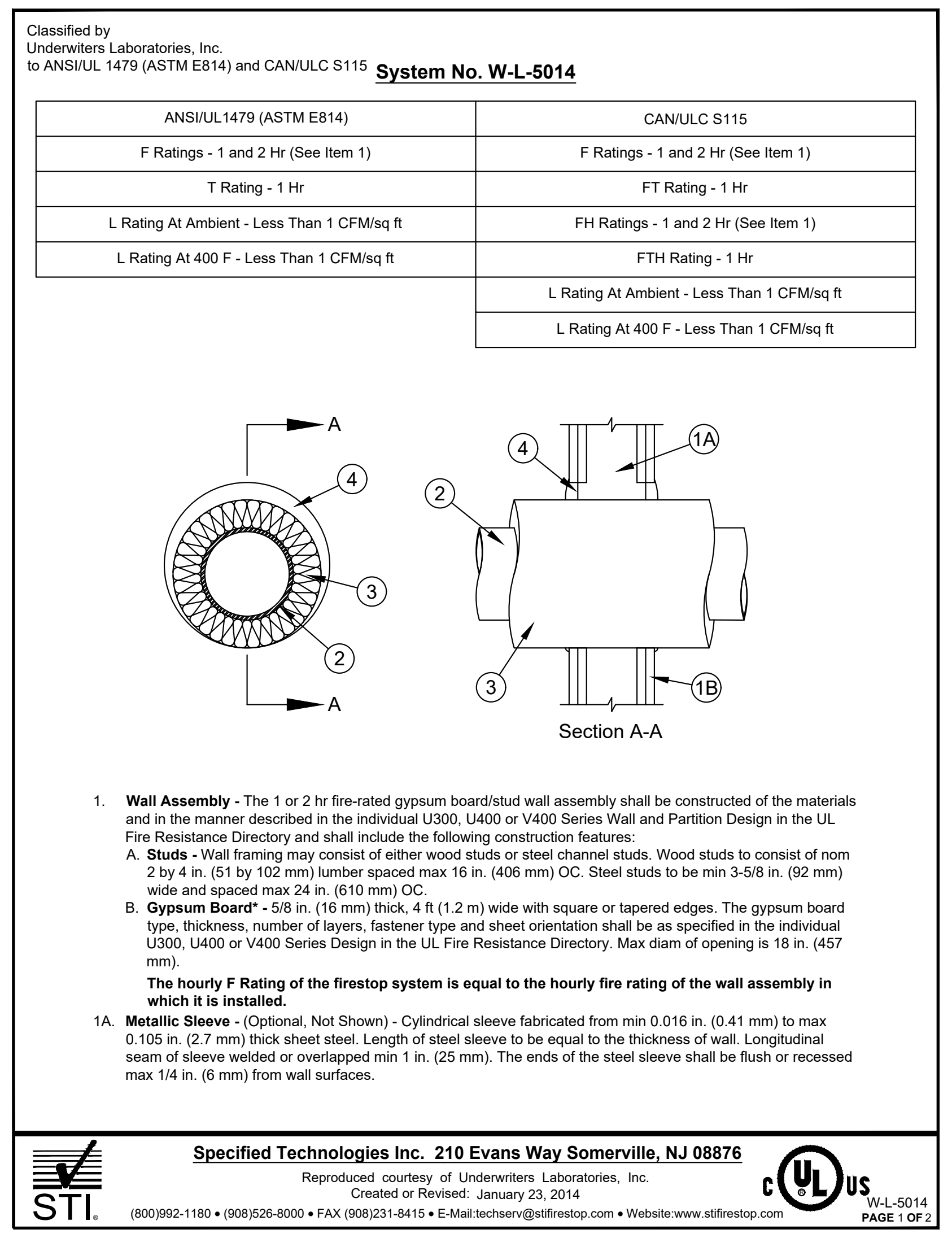

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-5014**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Rating - 1 Hr	FT Rating - 1 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Ratings - 1 and 2 Hr (See Item 1)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Rating - 1 Hr
	L Rating At Ambient - Less Than 1 CFM/sq ft
	L Rating At 400 F - Less Than 1 CFM/sq ft

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 described in the individual U300, U400 or V400 Series Wall and 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* -** 5/8 in. (16 mm) thick, 4 ft (1.2 m) 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, U400 or V400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 18 in. (457 mm).

   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

1A. **Metallic Sleeve -** (Optional, Not Shown) - Cylindrical sleeve fabricated from min 0.016 in. (0.41 mm) to max 0.105 in. (2.7 mm) thick sheet steel. Length of steel sleeve to be equal to the thickness of wall. Longitudinal seam of sleeve welded or overlapped min 1 in. (25 mm). The ends of the steel sleeve shall be flush or recessed max 1/4 in. (6 mm) from wall surfaces.

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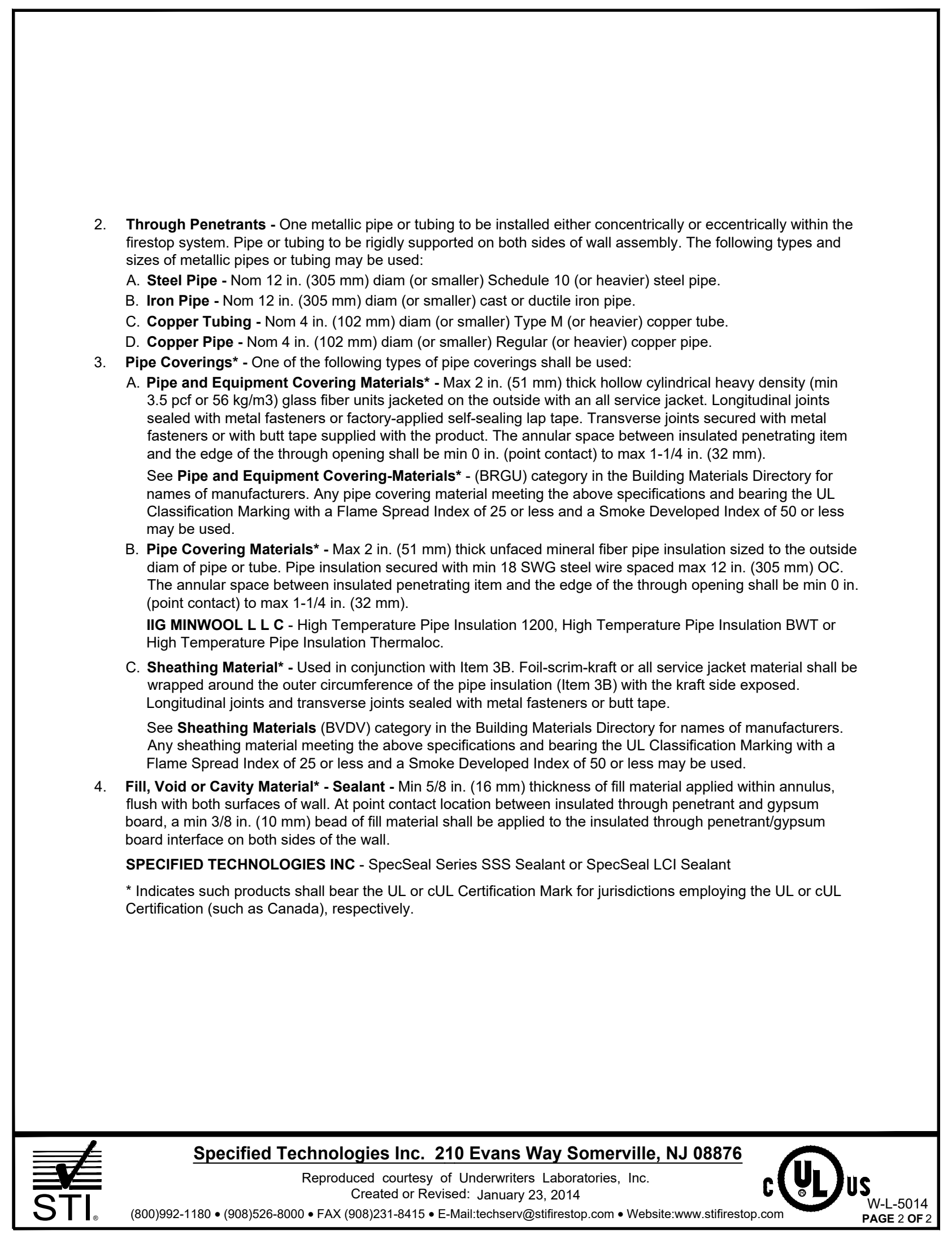

2. **Through Penetrants -** One metallic pipe or tubing to be installed either concentrically or eccentrically within the firestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used:
   A. **Steel Pipe -** Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Copper Tubing -** Nom 4 in. (102 mm) diam (or smaller) Type M (or heavier) copper tube.
   D. **Copper Pipe -** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
3. **Pipe Coverings* -** One of the following types of pipe coverings shall be used:
   A. **Pipe and Equipment Covering Materials* -** Max 2 in. (51 mm) thick hollow cylindrical heavy density (min 3.5 pcf or 56 kg/m3) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. The annular space between insulated penetrating item and the edge of the through opening shall be min 0 in. (point contact) to max 1-1/4 in. (32 mm).

   See **Pipe and Equipment Covering-Materials*** - (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
   B. **Pipe Covering Materials* -** Max 2 in. (51 mm) thick unfaced mineral fiber pipe insulation sized to the outside diam of pipe or tube. Pipe insulation secured with min 18 SWG steel wire spaced max 12 in. (305 mm) OC. The annular space between insulated penetrating item and the edge of the through opening shall be min 0 in. (point contact) to max 1-1/4 in. (32 mm).

   IIG MINWOOL L L C - High Temperature Pipe Insulation 1200, High Temperature Pipe Insulation BWT or High Temperature Pipe Insulation Thermaloc.
   C. **Sheathing Material* -** Used in conjunction with Item 3B. Foil-scrim-kraft or all service jacket material shall be wrapped around the outer circumference of the pipe insulation (Item 3B) with the kraft side exposed. Longitudinal joints and transverse joints sealed with metal fasteners or butt tape.

   See **Sheathing Materials** (BVDV) category in the Building Materials Directory for names of manufacturers. Any sheathing material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
4. **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. At point contact location between insulated through penetrant and gypsum board, a min 3/8 in. (10 mm) bead of fill material shall be applied to the insulated through penetrant/gypsum board interface on both sides of the wall.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant

   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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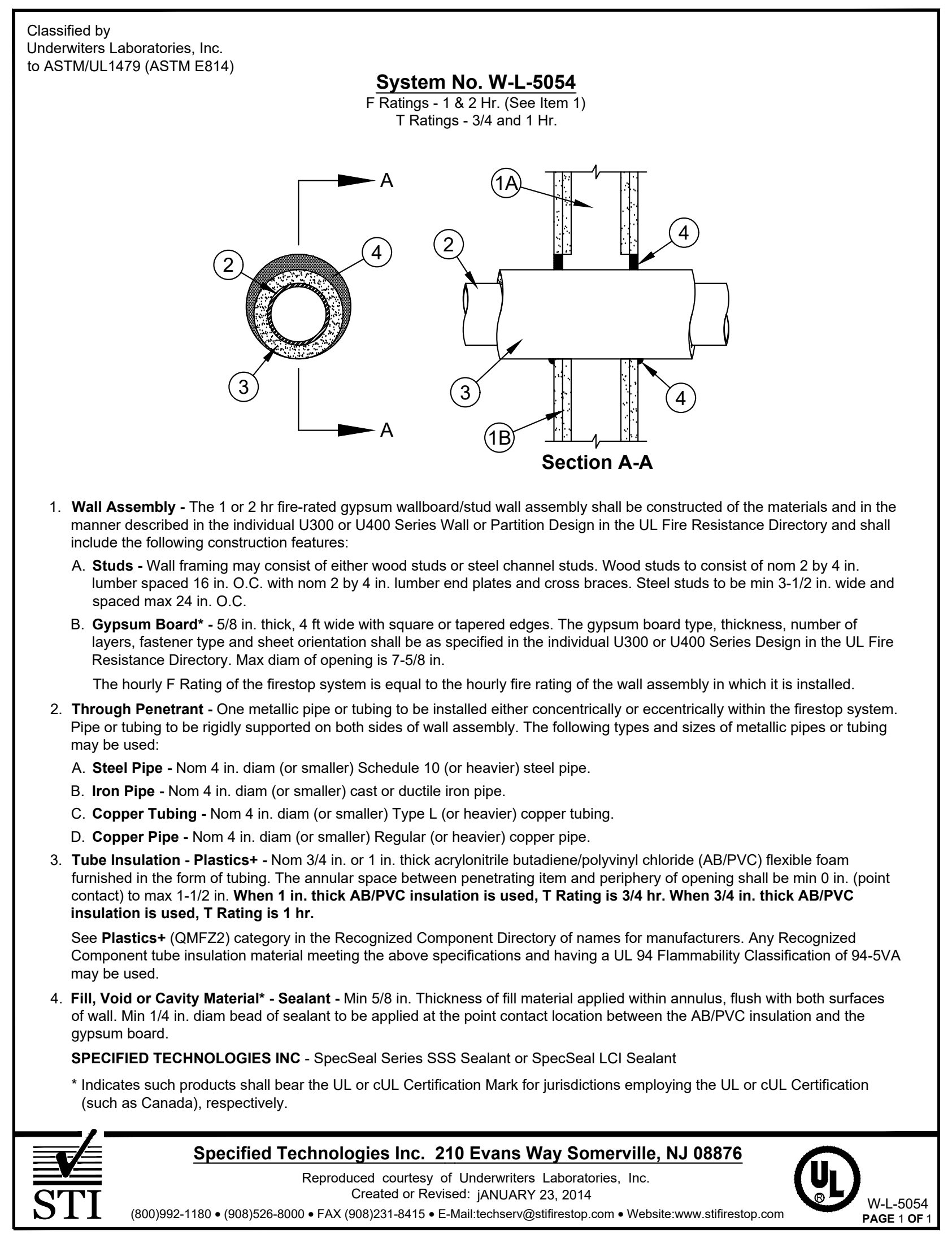

Classified by
Underwiters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. W-L-5054
F Ratings - 1 & 2 Hr. (See Item 1)
T Ratings - 3/4 and 1 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 described 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. O.C. with nom 2 by 4 in. lumber end plates and cross braces. Steel studs to be min 3-1/2 in. wide and spaced max 24 in. O.C.
   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 7-5/8 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. **Through Penetrant -** One metallic pipe or tubing to be installed either concentrically or eccentrically within the firestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used:
   A. **Steel Pipe -** Nom 4 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 4 in. diam (or smaller) cast or ductile iron pipe.
   C. **Copper Tubing -** Nom 4 in. diam (or smaller) Type L (or heavier) copper tubing.
   D. **Copper Pipe -** Nom 4 in. diam (or smaller) Regular (or heavier) copper pipe.
3. **Tube Insulation - Plastics+ -** Nom 3/4 in. or 1 in. thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space between penetrating item and periphery of opening shall be min 0 in. (point contact) to max 1-1/2 in. **When 1 in. thick AB/PVC insulation is used, T Rating is 3/4 hr. When 3/4 in. thick AB/PVC insulation is used, T Rating is 1 hr.**

   See **Plastics+** (QMFZ2) category in the Recognized Component Directory of names for manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.
4. **Fill, Void or Cavity Material* - Sealant -** Min 5/8 in. Thickness of fill material applied within annulus, flush with both surfaces of wall. Min 1/4 in. diam bead of sealant to be applied at the point contact location between the AB/PVC insulation and the gypsum board.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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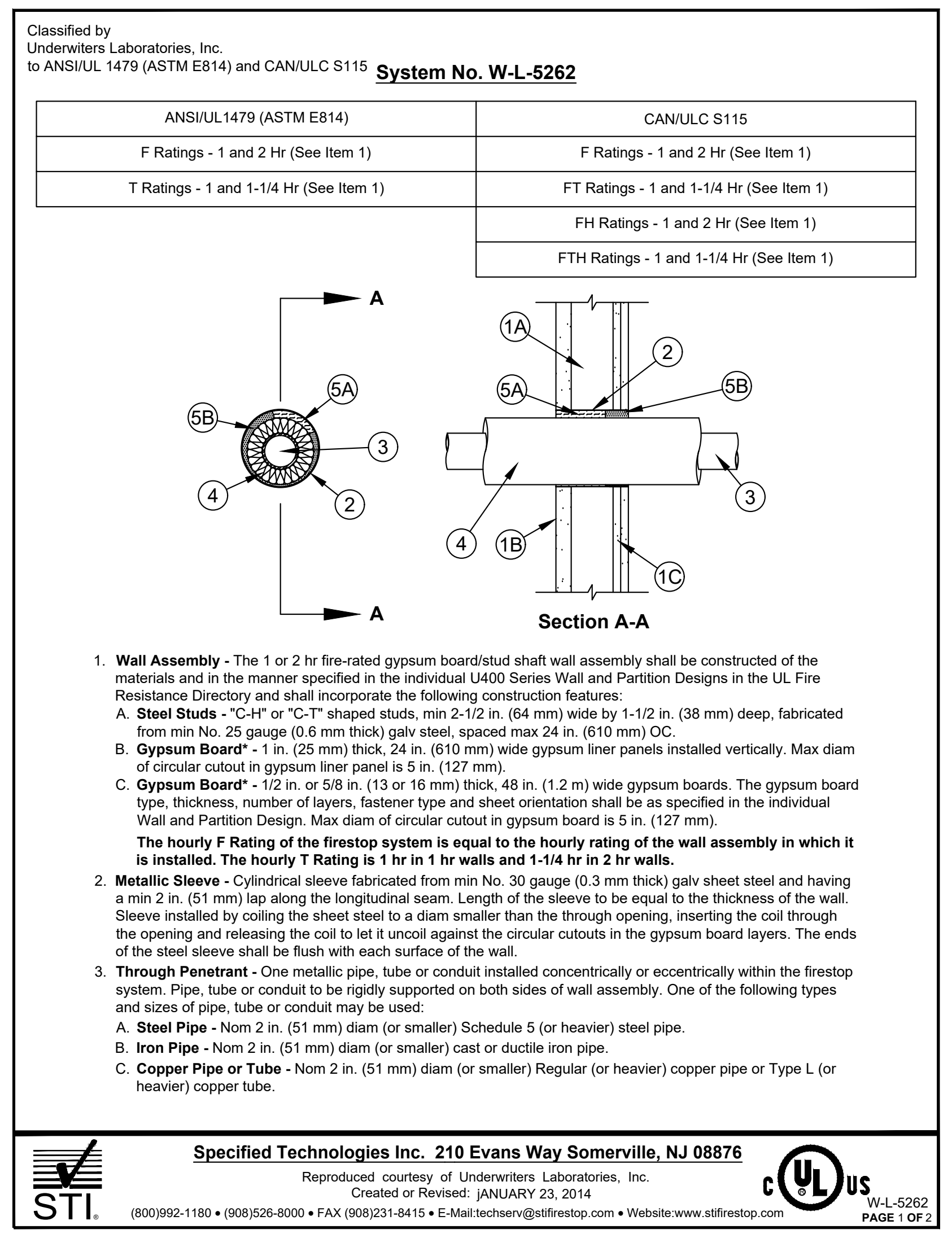

Classified by
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to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-5262**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 1 and 1-1/4 Hr (See Item 1)	FT Ratings - 1 and 1-1/4 Hr (See Item 1)
	FH Ratings - 1 and 2 Hr (See Item 1)
	FTH Ratings - 1 and 1-1/4 Hr (See Item 1)

Section A-A

1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud shaft wall assembly shall be constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
   A. **Steel Studs -** "C-H" or "C-T" shaped studs, min 2-1/2 in. (64 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from min No. 25 gauge (0.6 mm thick) galv steel, spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** 1 in. (25 mm) thick, 24 in. (610 mm) wide gypsum liner panels installed vertically. Max diam of circular cutout in gypsum liner panel is 5 in. (127 mm).
   C. **Gypsum Board* -** 1/2 in. or 5/8 in. (13 or 16 mm) thick, 48 in. (1.2 m) wide gypsum boards. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of circular cutout in gypsum board is 5 in. (127 mm).

   The hourly F Rating of the firestop system is equal to the hourly rating of the wall assembly in which it is installed. The hourly T Rating is 1 hr in 1 hr walls and 1-1/4 hr in 2 hr walls.
2. **Metallic Sleeve -** Cylindrical sleeve fabricated from min No. 30 gauge (0.3 mm thick) galv sheet steel and having a min 2 in. (51 mm) lap along the longitudinal seam. Length of the sleeve to be equal to the thickness of the wall. Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting the coil through the opening and releasing the coil to let it uncoil against the circular cutouts in the gypsum board layers. The ends of the steel sleeve shall be flush with each surface of the wall.
3. **Through Penetrant -** One metallic pipe, tube or conduit installed concentrically or eccentrically within the firestop system. Pipe, tube or conduit to be rigidly supported on both sides of wall assembly. One of the following types and sizes of pipe, tube or conduit may be used:
   A. **Steel Pipe -** Nom 2 in. (51 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 2 in. (51 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Copper Pipe or Tube -** Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe or Type L (or heavier) copper tube.

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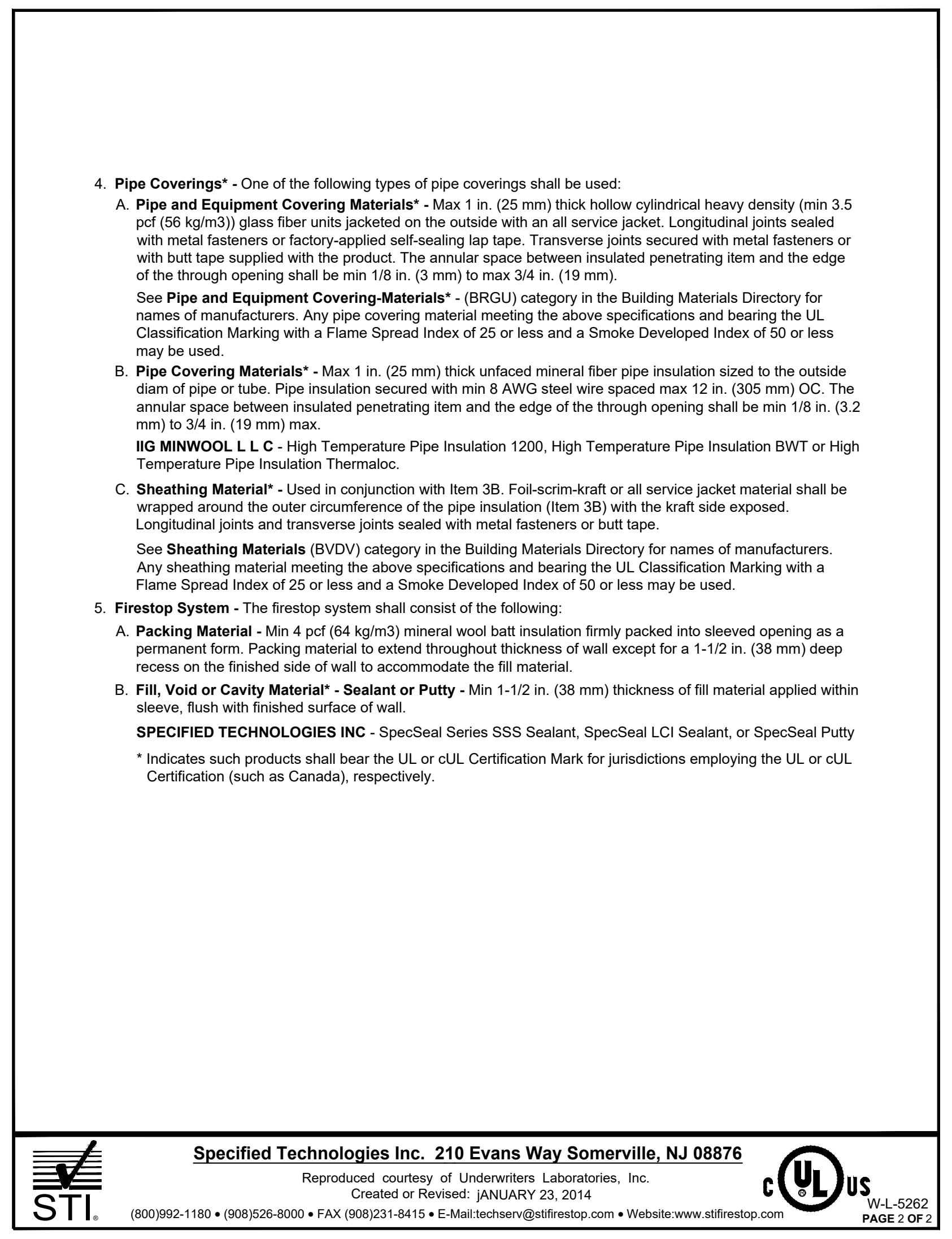

4. **Pipe Coverings* -** One of the following types of pipe coverings shall be used:
   A. **Pipe and Equipment Covering Materials* -** Max 1 in. (25 mm) thick hollow cylindrical heavy density (min 3.5 pcf (56 kg/m3)) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. The annular space between insulated penetrating item and the edge of the through opening shall be min 1/8 in. (3 mm) to max 3/4 in. (19 mm).

   See **Pipe and Equipment Covering-Materials*** - (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
   B. **Pipe Covering Materials* -** Max 1 in. (25 mm) thick unfaced mineral fiber pipe insulation sized to the outside diam of pipe or tube. Pipe insulation secured with min 8 AWG steel wire spaced max 12 in. (305 mm) OC. The annular space between insulated penetrating item and the edge of the through opening shall be min 1/8 in. (3.2 mm) to 3/4 in. (19 mm) max.

   IIG MINWOOL L L C - High Temperature Pipe Insulation 1200, High Temperature Pipe Insulation BWT or High Temperature Pipe Insulation Thermaloc.
   C. **Sheathing Material* -** Used in conjunction with Item 3B. Foil-scrim-kraft or all service jacket material shall be wrapped around the outer circumference of the pipe insulation (Item 3B) with the kraft side exposed. Longitudinal joints and transverse joints sealed with metal fasteners or butt tape.

   See **Sheathing Materials** (BVDV) category in the Building Materials Directory for names of manufacturers. Any sheathing material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
5. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** Min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into sleeved opening as a permanent form. Packing material to extend throughout thickness of wall except for a 1-1/2 in. (38 mm) deep recess on the finished side of wall to accommodate the fill material.
   B. **Fill, Void or Cavity Material* - Sealant or Putty -** Min 1-1/2 in. (38 mm) thickness of fill material applied within sleeve, flush with finished surface of wall.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant, or SpecSeal Putty

   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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GENERAL NOTES:

1. Refer to section 07 84 00 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
2. Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   - Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.
3. If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   - UL Fire Resistance Directory; Current Edition
   - NFPA 101 Life Safety Code
   - All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

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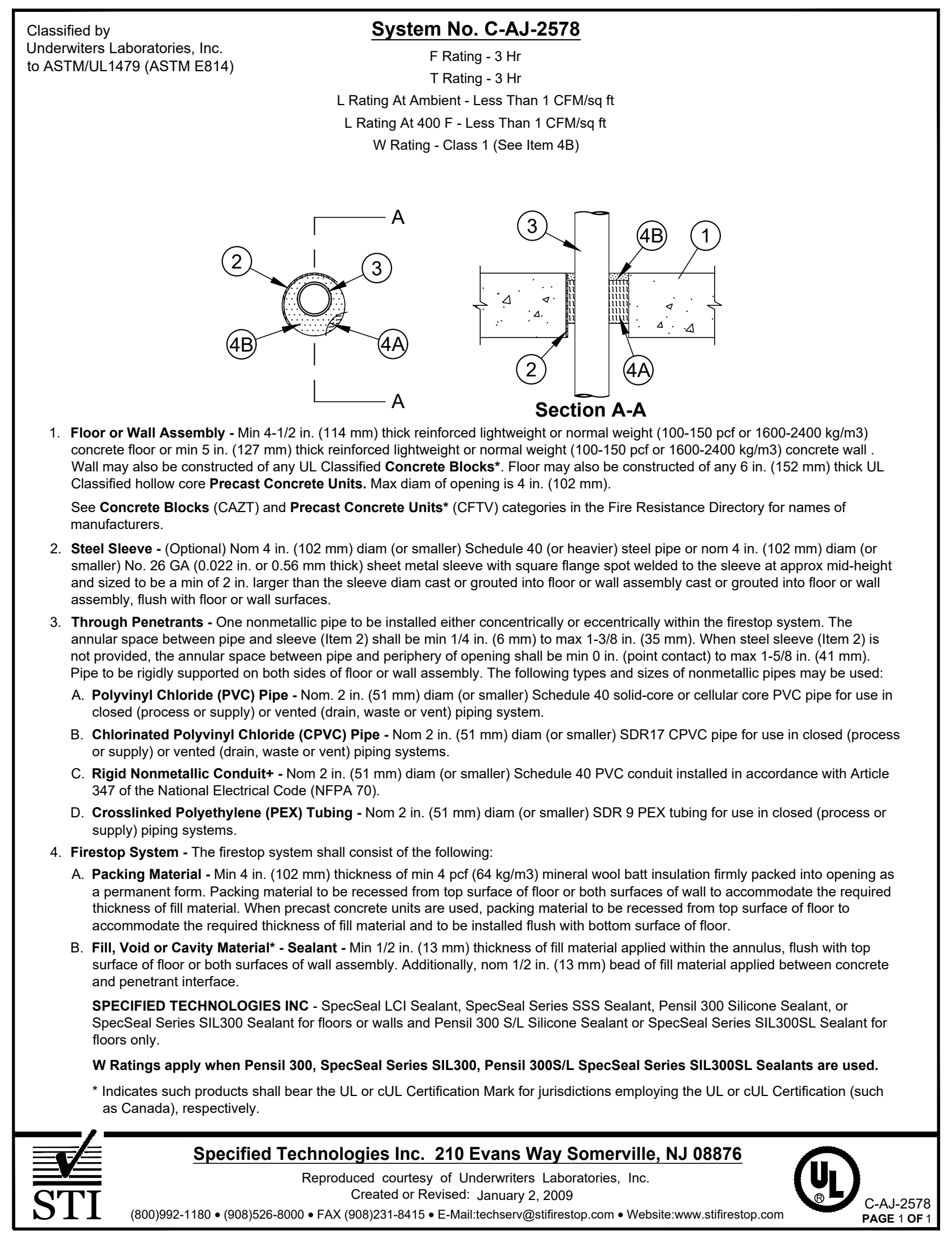

Classified by
Underwiters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. C-AJ-2578
F Rating - 3 Hr
T Rating - 3 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft
L Rating At 400 F - Less Than 1 CFM/sq ft
W Rating - Class 1 (See Item 4B)

1. **Floor or Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor or min 5 in. (127 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete wall . Wall may also be constructed of any UL Classified **Concrete Blocks***. Floor may also be constructed of any 6 in. (152 mm) thick UL Classified hollow core **Precast Concrete Units.** Max diam of opening is 4 in. (102 mm).

   See **Concrete Blocks** (CAZT) and **Precast Concrete Units*** (CFTV) categories in the Fire Resistance Directory for names of manufacturers.
2. **Steel Sleeve -** (Optional) Nom 4 in. (102 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe or nom 4 in. (102 mm) diam (or smaller) No. 26 GA (0.022 in. or 0.56 mm thick) sheet metal sleeve with square flange spot welded to the sleeve at approx mid-height and sized to be a min of 2 in. larger than the sleeve diam cast or grouted into floor or wall assembly cast or grouted into floor or wall assembly, flush with floor or wall surfaces.
3. **Through Penetrants -** One nonmetallic pipe to be installed either concentrically or eccentrically within the firestop system. The annular space between pipe and sleeve (Item 2) shall be min 1/4 in. (6 mm) to max 1-3/8 in. (35 mm). When steel sleeve (Item 2) is not provided, the annular space between pipe and periphery of opening shall be min 0 in. (point contact) to max 1-5/8 in. (41 mm). Pipe to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom. 2 in. (51 mm) diam (or smaller) Schedule 40 solid-core or cellular 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 2 in. (51 mm) diam (or smaller) SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   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).
   D. **Crosslinked Polyethylene (PEX) Tubing -** Nom 2 in. (51 mm) diam (or smaller) SDR 9 PEX tubing for use in closed (process or supply) piping systems.
4. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or both surfaces of wall to accommodate the required thickness of fill material. When precast concrete units are used, packing material to be recessed from top surface of floor to accommodate the required thickness of fill material and to be installed flush with bottom surface of floor.
   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or both surfaces of wall assembly. Additionally, nom 1/2 in. (13 mm) bead of fill material applied between concrete and penetrant interface.

   SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant, SpecSeal Series SSS Sealant, Pensil 300 Silicone Sealant, or SpecSeal Series SIL300 Sealant for floors or walls and Pensil 300 S/L Silicone Sealant or SpecSeal Series SIL300SL Sealant for floors only.

   W Ratings apply when Pensil 300, SpecSeal Series SIL300, Pensil 300S/L SpecSeal Series SIL300SL Sealants are used.

   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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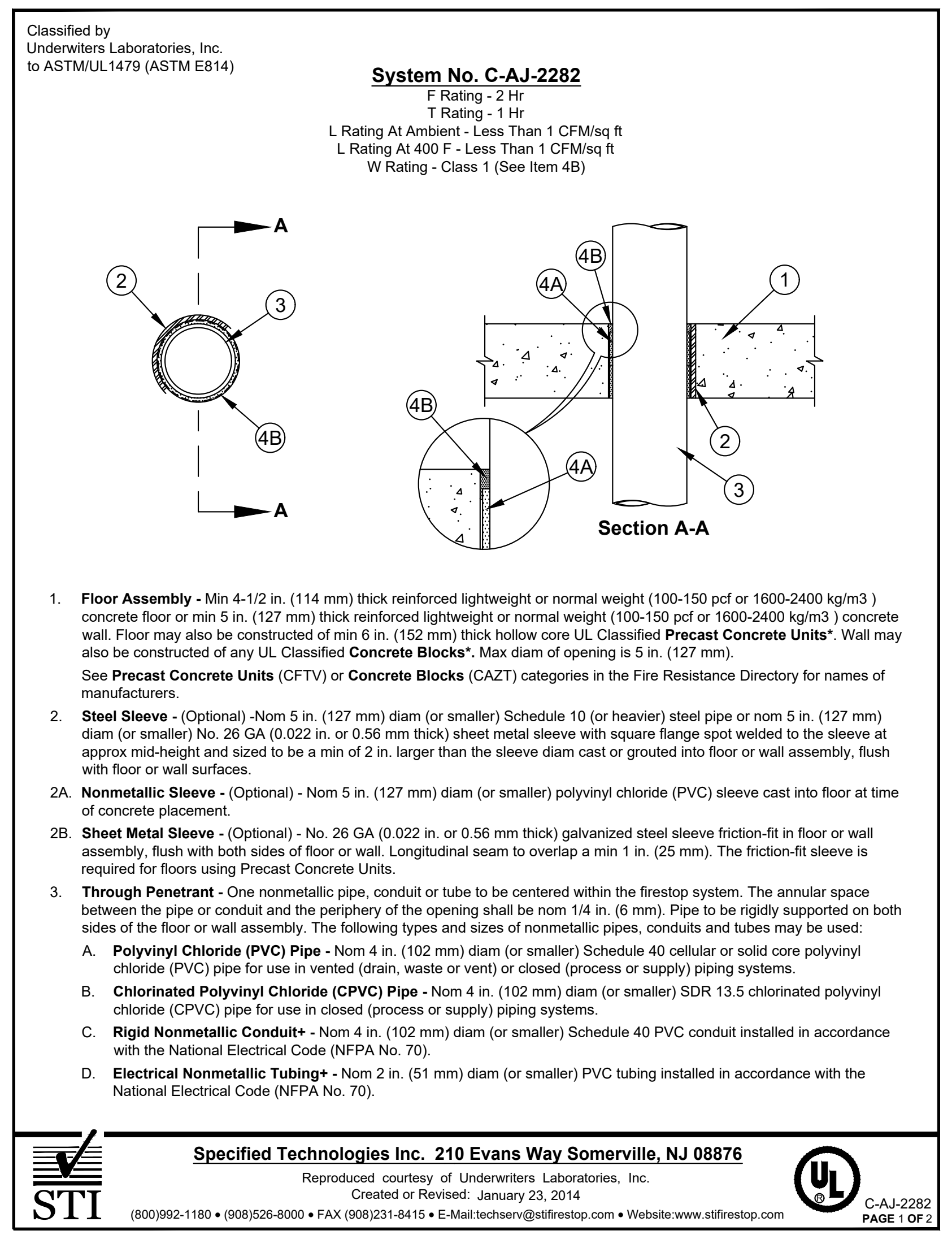

Classified by
Underwiters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. C-AJ-2282
F Rating - 2 Hr
T Rating - 1 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft
L Rating At 400 F - Less Than 1 CFM/sq ft
W Rating - Class 1 (See Item 4B)

1. **Floor Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor or min 5 in. (127 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete wall. Floor may also be constructed of min 6 in. (152 mm) thick hollow core UL Classified **Precast Concrete Units***. Wall may also be constructed of any UL Classified **Concrete Blocks*.** Max diam of opening is 5 in. (127 mm).

   See **Precast Concrete Units** (CFTV) or **Concrete Blocks** (CAZT) categories in the Fire Resistance Directory for names of manufacturers.
2. **Steel Sleeve -** (Optional) -Nom 5 in. (127 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe or nom 5 in. (127 mm) diam (or smaller) No. 26 GA (0.022 in. or 0.56 mm thick) sheet metal sleeve with square flange spot welded to the sleeve at approx mid-height and sized to be a min of 2 in. larger than the sleeve diam cast or grouted into floor or wall assembly, flush with floor or wall surfaces.

2A. **Nonmetallic Sleeve -** (Optional) - Nom 5 in. (127 mm) diam (or smaller) polyvinyl chloride (PVC) sleeve cast into floor at time of concrete placement.

2B. **Sheet Metal Sleeve -** (Optional) - No. 26 GA (0.022 in. or 0.56 mm thick) galvanized steel sleeve friction-fit in floor or wall assembly, flush with both sides of floor or wall. Longitudinal seam to overlap a min 1 in. (25 mm). The friction-fit sleeve is required for floors using Precast Concrete Units.

3. **Through Penetrant -** One nonmetallic pipe, conduit or tube to be centered within the firestop system. The annular space between the pipe or conduit and the periphery of the opening shall be nom 1/4 in. (6 mm). Pipe to be rigidly supported on both sides of the floor or wall assembly. The following types and sizes of nonmetallic pipes, conduits and tubes may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core polyvinyl chloride (PVC) pipe for use in vented (drain, waste or vent) or closed (process or supply) piping systems.
   B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 4 in. (102 mm) diam (or smaller) SDR 13.5 chlorinated polyvinyl chloride (CPVC) pipe for use in closed (process or supply) piping systems.
   C. **Rigid Nonmetallic Conduit+ -** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA No. 70).
   D. **Electrical Nonmetallic Tubing+ -** Nom 2 in. (51 mm) diam (or smaller) PVC tubing installed in accordance with the National Electrical Code (NFPA No. 70).

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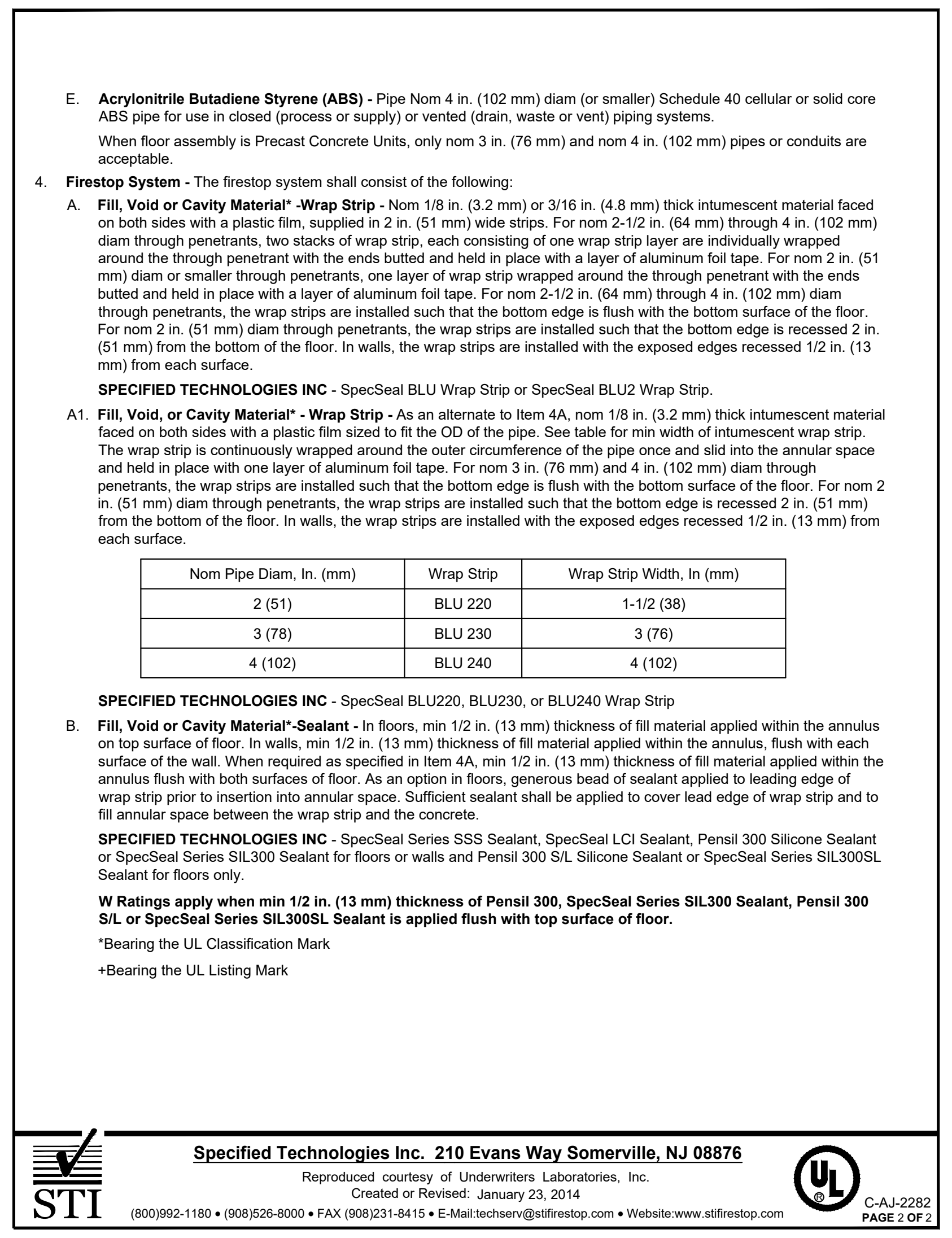

E. **Acrylonitrile Butadiene Styrene (ABS) -** Pipe Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

When floor assembly is Precast Concrete Units, only nom 3 in. (76 mm) and nom 4 in. (102 mm) pipes or conduits are acceptable.

4. **Firestop System -** The firestop system shall consist of the following:
   A. **Fill, Void or Cavity Material* -Wrap Strip -** Nom 1/8 in. (3.2 mm) or 3/16 in. (4.8 mm) thick intumescent material faced on both sides with a plastic film, supplied in 2 in. (51 mm) wide strips. For nom 2-1/2 in. (64 mm) through 4 in. (102 mm) diam through penetrants, two stacks of wrap strip, each consisting of one wrap strip layer are individually wrapped around the through penetrant with the ends butted and held in place with a layer of aluminum foil tape. For nom 2 in. (51 mm) diam or smaller through penetrants, one layer of wrap strip wrapped around the through penetrant with the ends butted and held in place with a layer of aluminum foil tape. For nom 2-1/2 in. (64 mm) through 4 in. (102 mm) diam through penetrants, the wrap strips are installed such that the bottom edge is flush with the bottom surface of the floor. For nom 2 in. (51 mm) diam through penetrants, the wrap strips are installed such that the bottom edge is recessed 2 in. (51 mm) from the bottom of the floor. In walls, the wrap strips are installed with the exposed edges recessed 1/2 in. (13 mm) from each surface.

   SPECIFIED TECHNOLOGIES INC - SpecSeal BLU Wrap Strip or SpecSeal BLU2 Wrap Strip.

   A1. **Fill, Void, or Cavity Material* - Wrap Strip -** As an alternate to Item 4A, nom 1/8 in. (3.2 mm) thick intumescent material faced on both sides with a plastic film sized to fit the OD of the pipe. See table for min width of intumescent wrap strip. The wrap strip is continuously wrapped around the outer circumference of the pipe once and slid into the annular space and held in place with one layer of aluminum foil tape. For nom 3 in. (76 mm) and 4 in. (102 mm) diam through penetrants, the wrap strips are installed such that the bottom edge is flush with the bottom surface of the floor. For nom 2 in. (51 mm) diam through penetrants, the wrap strips are installed such that the bottom edge is recessed 2 in. (51 mm) from the bottom of the floor. In walls, the wrap strips are installed with the exposed edges recessed 1/2 in. (13 mm) from each surface.

Nom Pipe Diam, In. (mm)	Wrap Strip	Wrap Strip Width, In (mm)
2 (51)	BLU 220	1-1/2 (38)
3 (78)	BLU 230	3 (76)
4 (102)	BLU 240	4 (102)

   SPECIFIED TECHNOLOGIES INC - SpecSeal BLU220, BLU230, or BLU240 Wrap Strip

   B. **Fill, Void or Cavity Material*-Sealant -** In floors, min 1/2 in. (13 mm) thickness of fill material applied within the annulus on top surface of floor. In walls, min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with each surface of the wall. When required as specified in Item 4A, min 1/2 in. (13 mm) thickness of fill material applied within the annulus flush with both surfaces of floor. As an option in floors, generous bead of sealant applied to leading edge of wrap strip prior to insertion into annular space. Sufficient sealant shall be applied to cover lead edge of wrap strip and to fill annular space between the wrap strip and the concrete.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant, Pensil 300 Silicone Sealant or SpecSeal Series SIL300 Sealant for floors or walls and Pensil 300 S/L Silicone Sealant or SpecSeal Series SIL300SL Sealant for floors only.

   W Ratings apply when min 1/2 in. (13 mm) thickness of Pensil 300, SpecSeal Series SIL300 Sealant, Pensil 300 S/L or SpecSeal Series SIL300SL Sealant is applied flush with top surface of floor.

   *Bearing the UL Classification Mark

   +Bearing the UL Listing Mark

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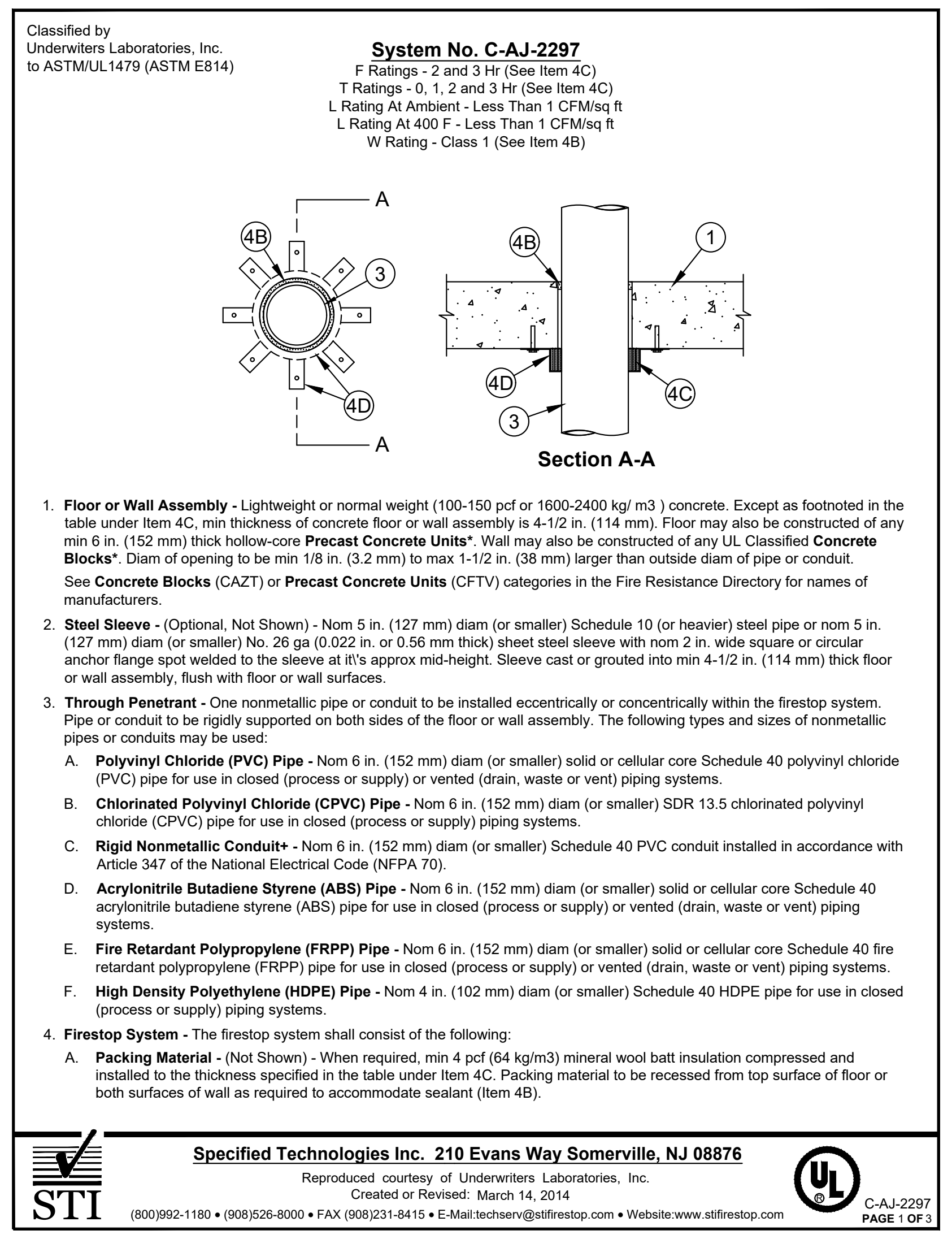

Classified by
Underwiters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. C-AJ-2297
F Ratings - 2 and 3 Hr (See Item 4C)
T Ratings - 0, 1, 2 and 3 Hr (See Item 4C)
L Rating At Ambient - Less Than 1 CFM/sq ft
L Rating At 400 F - Less Than 1 CFM/sq ft
W Rating - Class 1 (See Item 4B)

1. **Floor or Wall Assembly -** Lightweight or normal weight (100-150 pcf or 1600-2400 kg/ m3) concrete. Except as footnoted in the table under Item 4C, min thickness of concrete floor or wall assembly is 4-1/2 in. (114 mm). Floor may also be constructed of any min 6 in. (152 mm) thick hollow-core **Precast Concrete Units***. Wall may also be constructed of any UL Classified **Concrete Blocks***. Diam of opening to be min 1/8 in. (3.2 mm) to max 1-1/2 in. (38 mm) larger than outside diam of pipe or conduit.

   See **Concrete Blocks** (CAZT) or **Precast Concrete Units** (CFTV) categories in the Fire Resistance Directory for names of manufacturers.
2. **Steel Sleeve -** (Optional, Not Shown) - Nom 5 in. (127 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe or nom 5 in. (127 mm) diam (or smaller) No. 26 ga (0.022 in. or 0.56 mm thick) sheet steel sleeve with nom 2 in. wide square or circular anchor flange spot welded to the sleeve at it\'s approx mid-height. Sleeve cast or grouted into min 4-1/2 in. (114 mm) thick floor or wall assembly, flush with floor or wall surfaces.
3. **Through Penetrant -** One nonmetallic pipe or conduit to be installed eccentrically or concentrically within the firestop system. Pipe or conduit to be rigidly supported on both sides of the floor or wall assembly. The following types and sizes of nonmetallic pipes or conduits may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 6 in. (152 mm) diam (or smaller) solid or cellular core Schedule 40 polyvinyl chloride (PVC) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 6 in. (152 mm) diam (or smaller) SDR 13.5 chlorinated polyvinyl chloride (CPVC) pipe for use in closed (process or supply) piping systems.
   C. **Rigid Nonmetallic Conduit+ -** Nom 6 in. (152 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA 70).
   D. **Acrylonitrile Butadiene Styrene (ABS) Pipe -** Nom 6 in. (152 mm) diam (or smaller) solid or cellular core Schedule 40 acrylonitrile butadiene styrene (ABS) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   E. **Fire Retardant Polypropylene (FRPP) Pipe -** Nom 6 in. (152 mm) diam (or smaller) solid or cellular core Schedule 40 fire retardant polypropylene (FRPP) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   F. **High Density Polyethylene (HDPE) Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 HDPE pipe for use in closed (process or supply) piping systems.
4. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** (Not Shown) - When required, min 4 pcf (64 kg/m3) mineral wool batt insulation compressed and installed to the thickness specified in the table under Item 4C. Packing material to be recessed from top surface of floor or both surfaces of wall as required to accommodate sealant (Item 4B).

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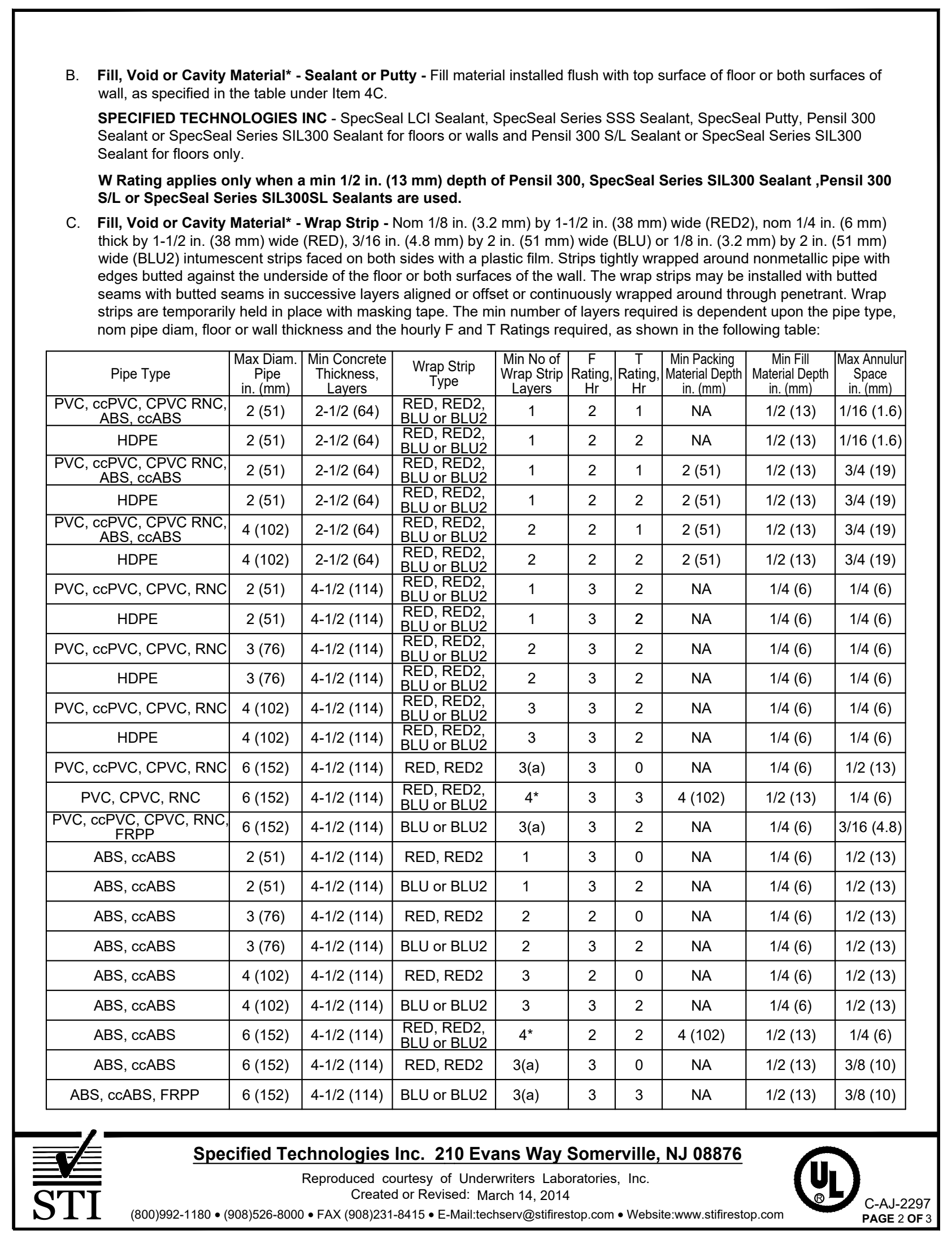

B. **Fill, Void or Cavity Material* - Sealant or Putty -** Fill material installed flush with top surface of floor or both surfaces of wall, as specified in the table under Item 4C.

SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant, SpecSeal Series SSS Sealant, SpecSeal Putty, Pensil 300 Sealant or SpecSeal Series SIL300 Sealant for floors or walls and Pensil 300 S/L Sealant or SpecSeal Series SIL300 Sealant for floors only.

W Rating applies only when a min 1/2 in. (13 mm) depth of Pensil 300, SpecSeal Series SIL300 Sealant ,Pensil 300 S/L or SpecSeal Series SIL300SL Sealants are used.

C. **Fill, Void or Cavity Material* - Wrap Strip -** Nom 1/8 in. (3.2 mm) by 1-1/2 in. (38 mm) wide (RED2), nom 1/4 in. (6 mm) thick by 1-1/2 in. (38 mm) wide (RED), 3/16 in. (4.8 mm) by 2 in. (51 mm) wide (BLU) or 1/8 in. (3.2 mm) by 2 in. (51 mm) wide (BLU2) intumescent strips faced on both sides with a plastic film. Strips tightly wrapped around nonmetallic pipe with edges butted against the underside of the floor or both surfaces of the wall. The wrap strips may be installed with butted seams with butted seams in successive layers aligned or offset or continuously wrapped around through penetrant. Wrap strips are temporarily held in place with masking tape. The min number of layers required is dependent upon the pipe type, nom pipe diam, floor or wall thickness and the hourly F and T Ratings required, as shown in the following table:

Pipe Type	Max Diam. Pipe in. (mm)	Min Concrete Thickness, Layers	Wrap Strip Type	Min No of Wrap Strip Layers	F Rating, Hr	T Rating, Hr	Min Packing Material Depth in. (mm)	Min Fill Material Depth in. (mm)	Max Annulur Space in. (mm)
PVC, ccPVC, CPVC RNC, ABS, ccABS	2 (51)	2-1/2 (64)	RED, RED2, BLU or BLU2	1	2	1	NA	1/2 (13)	1/16 (1.6)
HDPE	2 (51)	2-1/2 (64)	RED, RED2, BLU or BLU2	1	2	2	NA	1/2 (13)	1/16 (1.6)
PVC, ccPVC, CPVC RNC, ABS, ccABS	2 (51)	2-1/2 (64)	RED, RED2, BLU or BLU2	1	2	1	2 (51)	1/2 (13)	3/4 (19)
HDPE	2 (51)	2-1/2 (64)	RED, RED2, BLU or BLU2	1	2	2	2 (51)	1/2 (13)	3/4 (19)
PVC, ccPVC, CPVC RNC, ABS, ccABS	4 (102)	2-1/2 (64)	RED, RED2, BLU or BLU2	2	2	1	2 (51)	1/2 (13)	3/4 (19)
HDPE	4 (102)	2-1/2 (64)	RED, RED2, BLU or BLU2	2	2	2	2 (51)	1/2 (13)	3/4 (19)
PVC, ccPVC, CPVC, RNC	2 (51)	4-1/2 (114)	RED, RED2, BLU or BLU2	1	3	2	NA	1/4 (6)	1/4 (6)
HDPE	2 (51)	4-1/2 (114)	RED, RED2, BLU or BLU2	1	3	2	NA	1/4 (6)	1/4 (6)
PVC, ccPVC, CPVC, RNC	3 (76)	4-1/2 (114)	RED, RED2, BLU or BLU2	2	3	2	NA	1/4 (6)	1/4 (6)
HDPE	3 (76)	4-1/2 (114)	RED, RED2, BLU or BLU2	2	3	2	NA	1/4 (6)	1/4 (6)
PVC, ccPVC, CPVC, RNC	4 (102)	4-1/2 (114)	RED, RED2, BLU or BLU2	3	3	2	NA	1/4 (6)	1/4 (6)
HDPE	4 (102)	4-1/2 (114)	RED, RED2, BLU or BLU2	3	3	2	NA	1/4 (6)	1/4 (6)
PVC, ccPVC, CPVC, RNC	6 (152)	4-1/2 (114)	RED, RED2	3(a)	3	0	NA	1/4 (6)	1/2 (13)
PVC, CPVC, RNC	6 (152)	4-1/2 (114)	RED, RED2, BLU or BLU2	4*	3	3	4 (102)	1/2 (13)	1/4 (6)
PVC, ccPVC, CPVC, RNC, FRPP	6 (152)	4-1/2 (114)	BLU or BLU2	3(a)	3	2	NA	1/4 (6)	3/16 (4.8)
ABS, ccABS	2 (51)	4-1/2 (114)	RED, RED2	1	3	0	NA	1/4 (6)	1/2 (13)
ABS, ccABS	2 (51)	4-1/2 (114)	BLU or BLU2	1	3	2	NA	1/4 (6)	1/2 (13)
ABS, ccABS	3 (76)	4-1/2 (114)	RED, RED2	2	2	0	NA	1/4 (6)	1/2 (13)
ABS, ccABS	3 (76)	4-1/2 (114)	BLU or BLU2	2	3	2	NA	1/4 (6)	1/2 (13)
ABS, ccABS	4 (102)	4-1/2 (114)	RED, RED2	3	2	0	NA	1/4 (6)	1/2 (13)
ABS, ccABS	4 (102)	4-1/2 (114)	BLU or BLU2	3	3	2	NA	1/4 (6)	1/2 (13)
ABS, ccABS	6 (152)	4-1/2 (114)	RED, RED2, BLU or BLU2	4*	2	2	4 (102)	1/2 (13)	1/4 (6)
ABS, ccABS	6 (152)	4-1/2 (114)	RED, RED2	3(a)	3	0	NA	1/2 (13)	3/8 (10)
ABS, ccABS, FRPP	6 (152)	4-1/2 (114)	BLU or BLU2	3(a)	3	3	NA	1/2 (13)	3/8 (10)

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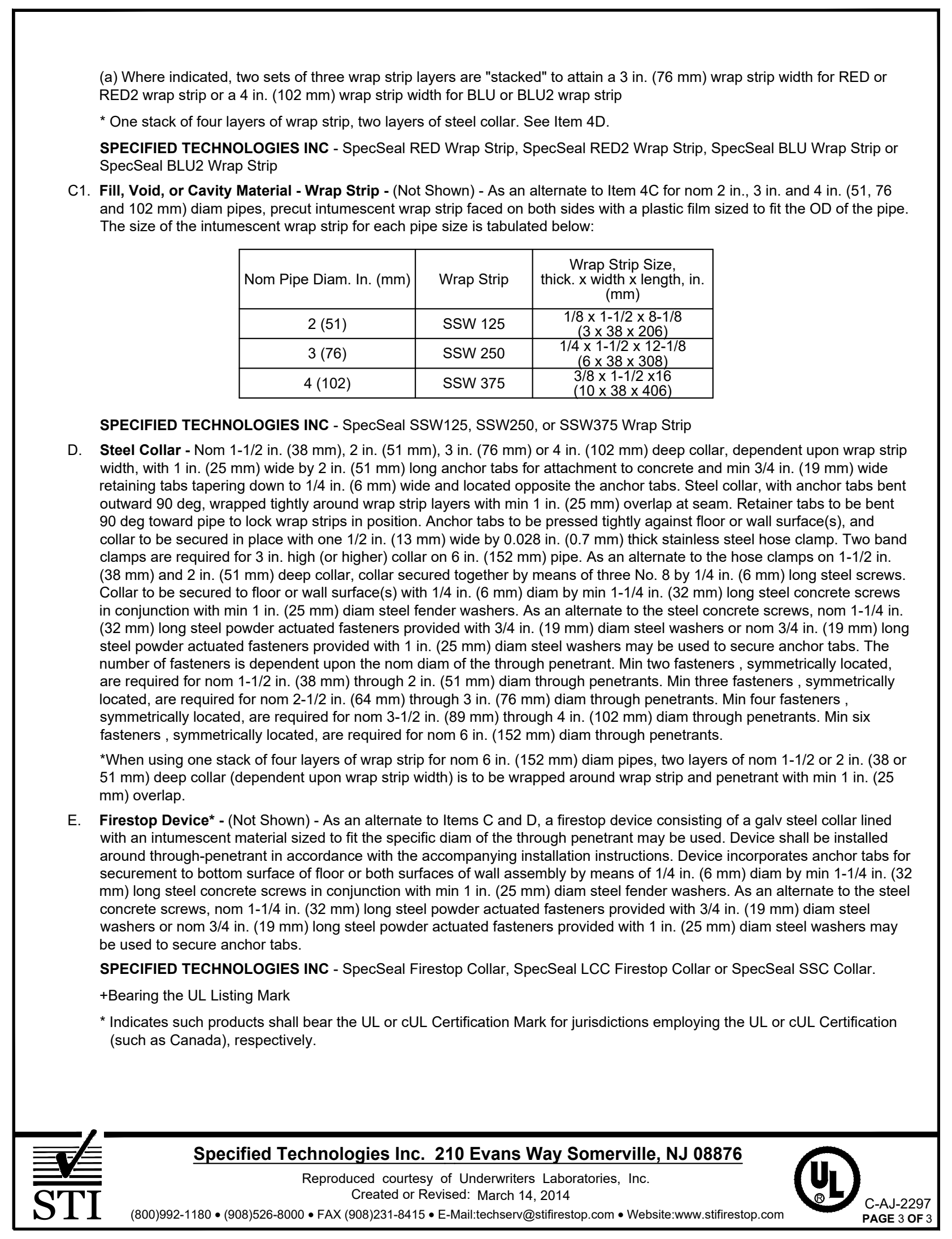

(a) Where indicated, two sets of three wrap strip layers are "stacked" to attain a 3 in. (76 mm) wrap strip width for RED or RED2 wrap strip or a 4 in. (102 mm) wrap strip width for BLU or BLU2 wrap strip

* One stack of four layers of wrap strip, two layers of steel collar. See Item 4D.

SPECIFIED TECHNOLOGIES INC - SpecSeal RED Wrap Strip, SpecSeal RED2 Wrap Strip, SpecSeal BLU Wrap Strip or SpecSeal BLU2 Wrap Strip

C1. **Fill, Void, or Cavity Material - Wrap Strip -** (Not Shown) - As an alternate to Item 4C for nom 2 in., 3 in. and 4 in. (51, 76 and 102 mm) diam pipes, precut intumescent wrap strip faced on both sides with a plastic film sized to fit the OD of the pipe. The size of the intumescent wrap strip for each pipe size is tabulated below:

Nom Pipe Diam. In. (mm)	Wrap Strip	Wrap Strip Size, thick. x width x length, in. (mm)
2 (51)	SSW 125	1/8 x 1-1/2 x 8-1/8 (3 x 38 x 206)
3 (76)	SSW 250	1/4 x 1-1/2 x 12-1/8 (6 x 38 x 308)
4 (102)	SSW 375	3/8 x 1-1/2 x16 (10 x 38 x 406)

SPECIFIED TECHNOLOGIES INC - SpecSeal SSW125, SSW250, or SSW375 Wrap Strip

D. **Steel Collar -** Nom 1-1/2 in. (38 mm), 2 in. (51 mm), 3 in. (76 mm) or 4 in. (102 mm) deep collar, dependent upon wrap strip width, with 1 in. (25 mm) wide by 2 in. (51 mm) long anchor tabs for attachment to concrete and min 3/4 in. (19 mm) wide retaining tabs tapering down to 1/4 in. (6 mm) wide and located opposite the anchor tabs. Steel collar, with anchor tabs bent outward 90 deg, wrapped tightly around wrap strip layers with min 1 in. (25 mm) overlap at seam. Retainer tabs to be bent 90 deg toward pipe to lock wrap strips in position. Anchor tabs to be pressed tightly against floor or wall surface(s), and collar to be secured in place with one 1/2 in. (13 mm) wide by 0.028 in. (0.7 mm) thick stainless steel hose clamp. Two band clamps are required for 3 in. high (or higher) collar on 6 in. (152 mm) pipe. As an alternate to the hose clamps on 1-1/2 in. (38 mm) and 2 in. (51 mm) deep collar, collar secured together by means of three No. 8 by 1/4 in. (6 mm) long steel screws. Collar to be secured to floor or wall surface(s) with 1/4 in. (6 mm) diam by min 1-1/4 in. (32 mm) long steel concrete screws in conjunction with min 1 in. (25 mm) diam steel fender washers. As an alternate to the steel concrete screws, nom 1-1/4 in. (32 mm) long steel powder actuated fasteners provided with 3/4 in. (19 mm) diam steel washers or nom 3/4 in. (19 mm) long steel powder actuated fasteners provided with 1 in. (25 mm) diam steel washers may be used to secure anchor tabs. The number of fasteners is dependent upon the nom diam of the through penetrant. Min two fasteners , symmetrically located, are required for nom 1-1/2 in. (38 mm) through 2 in. (51 mm) diam through penetrants. Min three fasteners , symmetrically located, are required for nom 2-1/2 in. (64 mm) through 3 in. (76 mm) diam through penetrants. Min four fasteners , symmetrically located, are required for nom 3-1/2 in. (89 mm) through 4 in. (102 mm) diam through penetrants. Min six fasteners , symmetrically located, are required for nom 6 in. (152 mm) diam through penetrants.

*When using one stack of four layers of wrap strip for nom 6 in. (152 mm) diam pipes, two layers of nom 1-1/2 or 2 in. (38 or 51 mm) deep collar (dependent upon wrap strip width) is to be wrapped around wrap strip and penetrant with min 1 in. (25 mm) overlap.

E. **Firestop Device* -** (Not Shown) - As an alternate to Items C and D, a firestop device consisting of a galv steel collar lined with an intumescent material sized to fit the specific diam of the through penetrant may be used. Device shall be installed around through-penetrant in accordance with the accompanying installation instructions. Device incorporates anchor tabs for securement to bottom surface of floor or both surfaces of wall assembly by means of 1/4 in. (6 mm) diam by min 1-1/4 in. (32 mm) long steel concrete screws in conjunction with min 1 in. (25 mm) diam steel fender washers. As an alternate to the steel concrete screws, nom 1-1/4 in. (32 mm) long steel powder actuated fasteners provided with 3/4 in. (19 mm) diam steel washers or nom 3/4 in. (19 mm) long steel powder actuated fasteners provided with 1 in. (25 mm) diam steel washers may be used to secure anchor tabs.

SPECIFIED TECHNOLOGIES INC - SpecSeal Firestop Collar, SpecSeal LCC Firestop Collar or SpecSeal SSC Collar.

+Bearing the UL Listing Mark

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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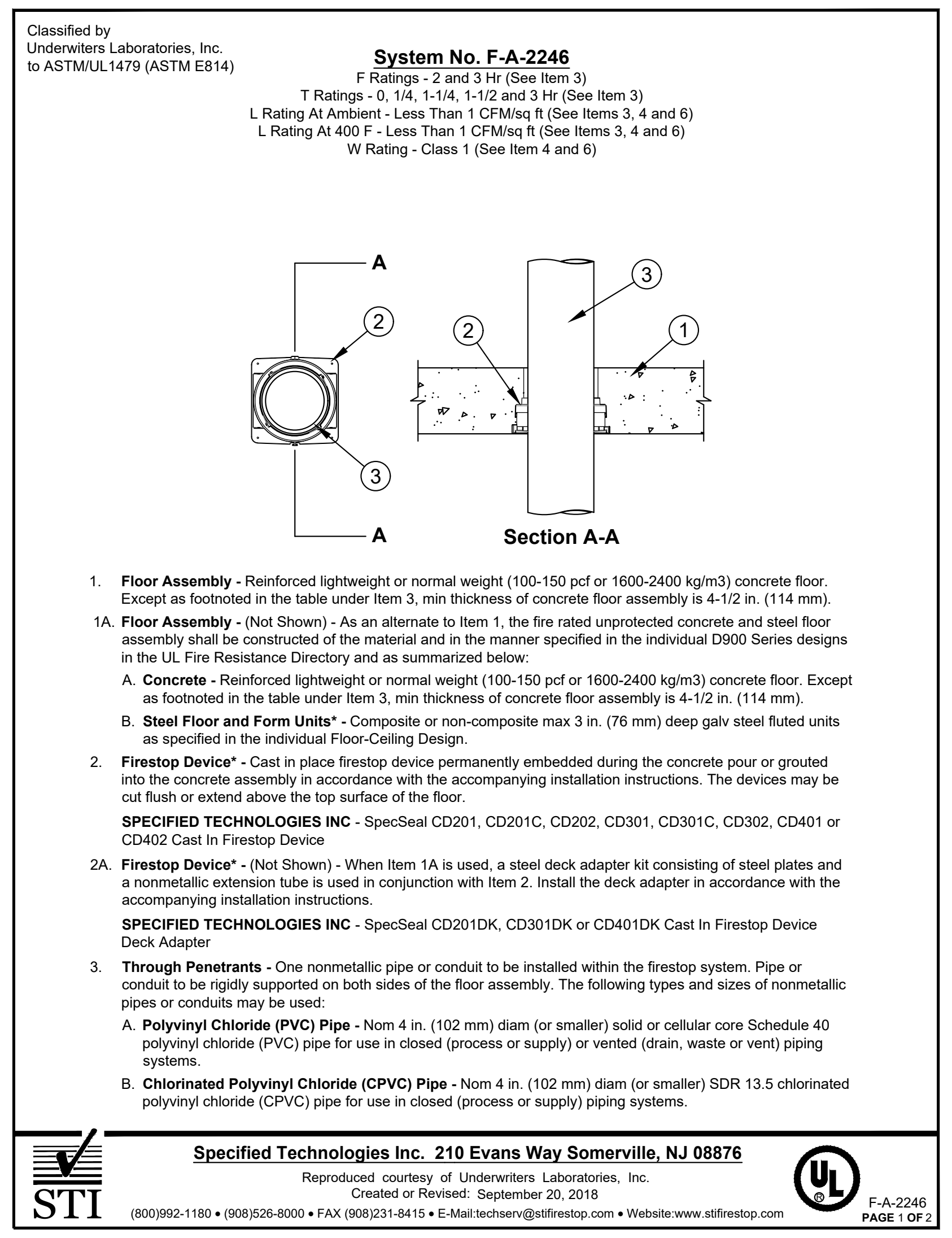

Classified by
Underwiters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. F-A-2246
F Ratings - 2 and 3 Hr (See Item 3)
T Ratings - 0, 1/4, 1-1/4, 1-1/2 and 3 Hr (See Item 3)
L Rating At Ambient - Less Than 1 CFM/sq ft (See Items 3, 4 and 6)
L Rating At 400 F - Less Than 1 CFM/sq ft (See Items 3, 4 and 6)
W Rating - Class 1 (See Item 4 and 6)

1. **Floor Assembly -** Reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor. Except as footnoted in the table under Item 3, min thickness of concrete floor assembly is 4-1/2 in. (114 mm).

1A. **Floor Assembly -** (Not Shown) - As an alternate to Item 1, the fire rated unprotected concrete and steel floor assembly shall be constructed of the material and in the manner specified in the individual D900 Series designs in the UL Fire Resistance Directory and as summarized below:
   A. **Concrete -** Reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor. Except as footnoted in the table under Item 3, min thickness of concrete floor assembly is 4-1/2 in. (114 mm).
   B. **Steel Floor and Form Units* -** Composite or non-composite max 3 in. (76 mm) deep galv steel fluted units as specified in the individual Floor-Ceiling Design.

2. **Firestop Device* -** Cast in place firestop device permanently embedded during the concrete pour or grouted into the concrete assembly in accordance with the accompanying installation instructions. The devices may be cut flush or extend above the top surface of the floor.

   SPECIFIED TECHNOLOGIES INC - SpecSeal CD201, CD201C, CD202, CD301, CD301C, CD302, CD401 or CD402 Cast In Firestop Device

2A. **Firestop Device* -** (Not Shown) - When Item 1A is used, a steel deck adapter kit consisting of steel plates and a nonmetallic extension tube is used in conjunction with Item 2. Install the deck adapter in accordance with the accompanying installation instructions.

   SPECIFIED TECHNOLOGIES INC - SpecSeal CD201DK, CD301DK or CD401DK Cast In Firestop Device Deck Adapter

3. **Through Penetrants -** One nonmetallic pipe or conduit to be installed within the firestop system. Pipe or conduit to be rigidly supported on both sides of the floor assembly. The following types and sizes of nonmetallic pipes or conduits may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 4 in. (102 mm) diam (or smaller) solid or cellular core Schedule 40 polyvinyl chloride (PVC) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 4 in. (102 mm) diam (or smaller) SDR 13.5 chlorinated polyvinyl chloride (CPVC) pipe for use in closed (process or supply) piping systems.

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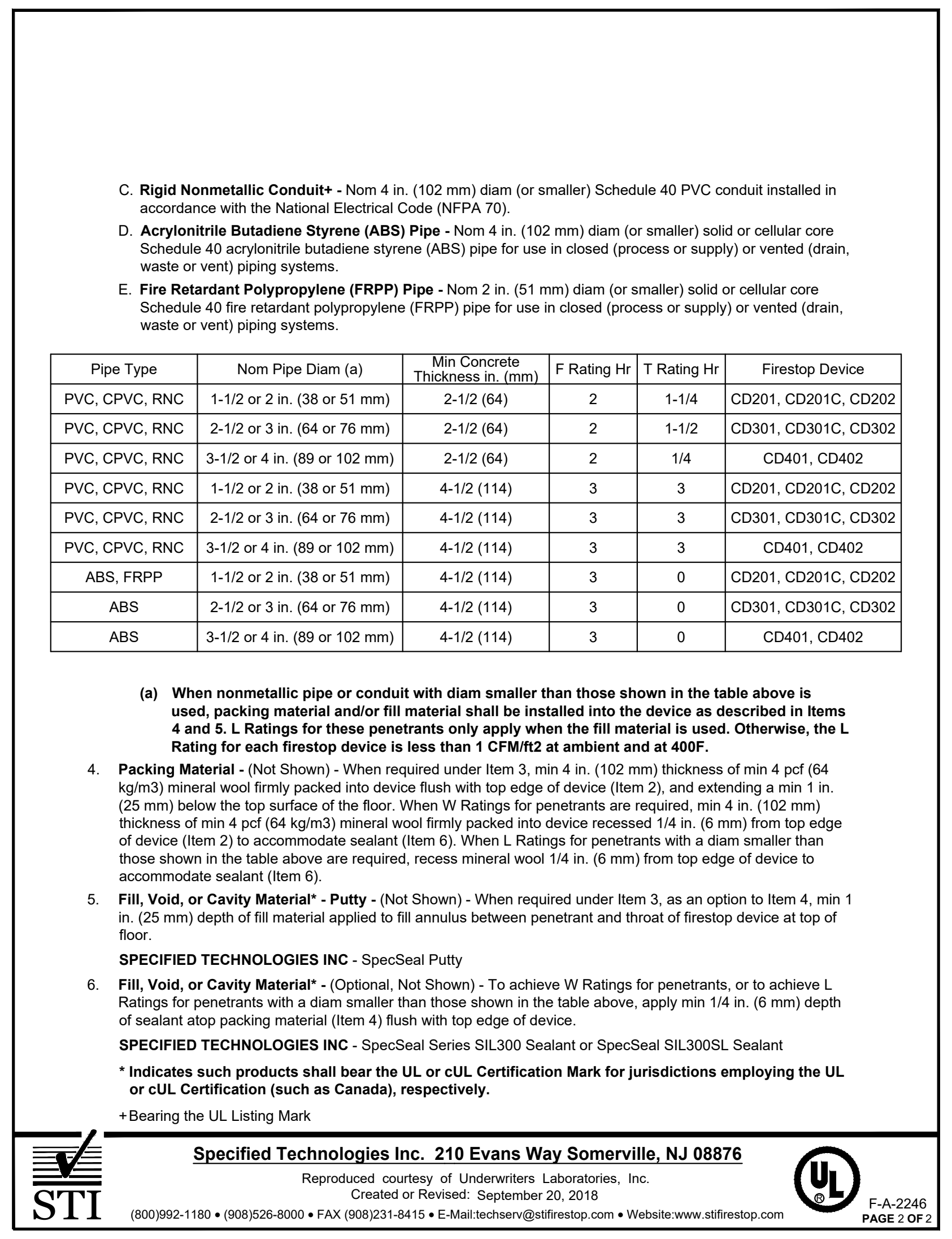

C. **Rigid Nonmetallic Conduit+ -** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA 70).

D. **Acrylonitrile Butadiene Styrene (ABS) Pipe -** Nom 4 in. (102 mm) diam (or smaller) solid or cellular core Schedule 40 acrylonitrile butadiene styrene (ABS) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

E. **Fire Retardant Polypropylene (FRPP) Pipe -** Nom 2 in. (51 mm) diam (or smaller) solid or cellular core Schedule 40 fire retardant polypropylene (FRPP) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

Pipe Type	Nom Pipe Diam (a)	Min Concrete Thickness in. (mm)	F Rating Hr	T Rating Hr	Firestop Device
PVC, CPVC, RNC	1-1/2 or 2 in. (38 or 51 mm)	2-1/2 (64)	2	1-1/4	CD201, CD201C, CD202
PVC, CPVC, RNC	2-1/2 or 3 in. (64 or 76 mm)	2-1/2 (64)	2	1-1/2	CD301, CD301C, CD302
PVC, CPVC, RNC	3-1/2 or 4 in. (89 or 102 mm)	2-1/2 (64)	2	1/4	CD401, CD402
PVC, CPVC, RNC	1-1/2 or 2 in. (38 or 51 mm)	4-1/2 (114)	3	3	CD201, CD201C, CD202
PVC, CPVC, RNC	2-1/2 or 3 in. (64 or 76 mm)	4-1/2 (114)	3	3	CD301, CD301C, CD302
PVC, CPVC, RNC	3-1/2 or 4 in. (89 or 102 mm)	4-1/2 (114)	3	3	CD401, CD402
ABS, FRPP	1-1/2 or 2 in. (38 or 51 mm)	4-1/2 (114)	3	0	CD201, CD201C, CD202
ABS	2-1/2 or 3 in. (64 or 76 mm)	4-1/2 (114)	3	0	CD301, CD301C, CD302
ABS	3-1/2 or 4 in. (89 or 102 mm)	4-1/2 (114)	3	0	CD401, CD402

(a) When nonmetallic pipe or conduit with diam smaller than those shown in the table above is used, packing material and/or fill material shall be installed into the device as described in Items 4 and 5. L Ratings for these penetrants only apply when the fill material is used. Otherwise, the L Rating for each firestop device is less than 1 CFM/ft2 at ambient and at 400F.

4. **Packing Material -** (Not Shown) - When required under Item 3, min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool firmly packed into device flush with top edge of device (Item 2), and extending a min 1 in. (25 mm) below the top surface of the floor. When W Ratings for penetrants are required, min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool firmly packed into device recessed 1/4 in. (6 mm) from top edge of device (Item 2) to accommodate sealant (Item 6). When L Ratings for penetrants with a diam smaller than those shown in the table above are required, recess mineral wool 1/4 in. (6 mm) from top edge of device to accommodate sealant (Item 6).
5. **Fill, Void, or Cavity Material* - Putty -** (Not Shown) - When required under Item 3, as an option to Item 4, min 1 in. (25 mm) depth of fill material applied to fill annulus between penetrant and throat of firestop device at top of floor.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Putty
6. **Fill, Void, or Cavity Material* -** (Optional, Not Shown) - To achieve W Ratings for penetrants, or to achieve L Ratings for penetrants with a diam smaller than those shown in the table above, apply min 1/4 in. (6 mm) depth of sealant atop packing material (Item 4) flush with top edge of device.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SIL300 Sealant or SpecSeal SIL300SL Sealant

   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

   +Bearing the UL Listing Mark

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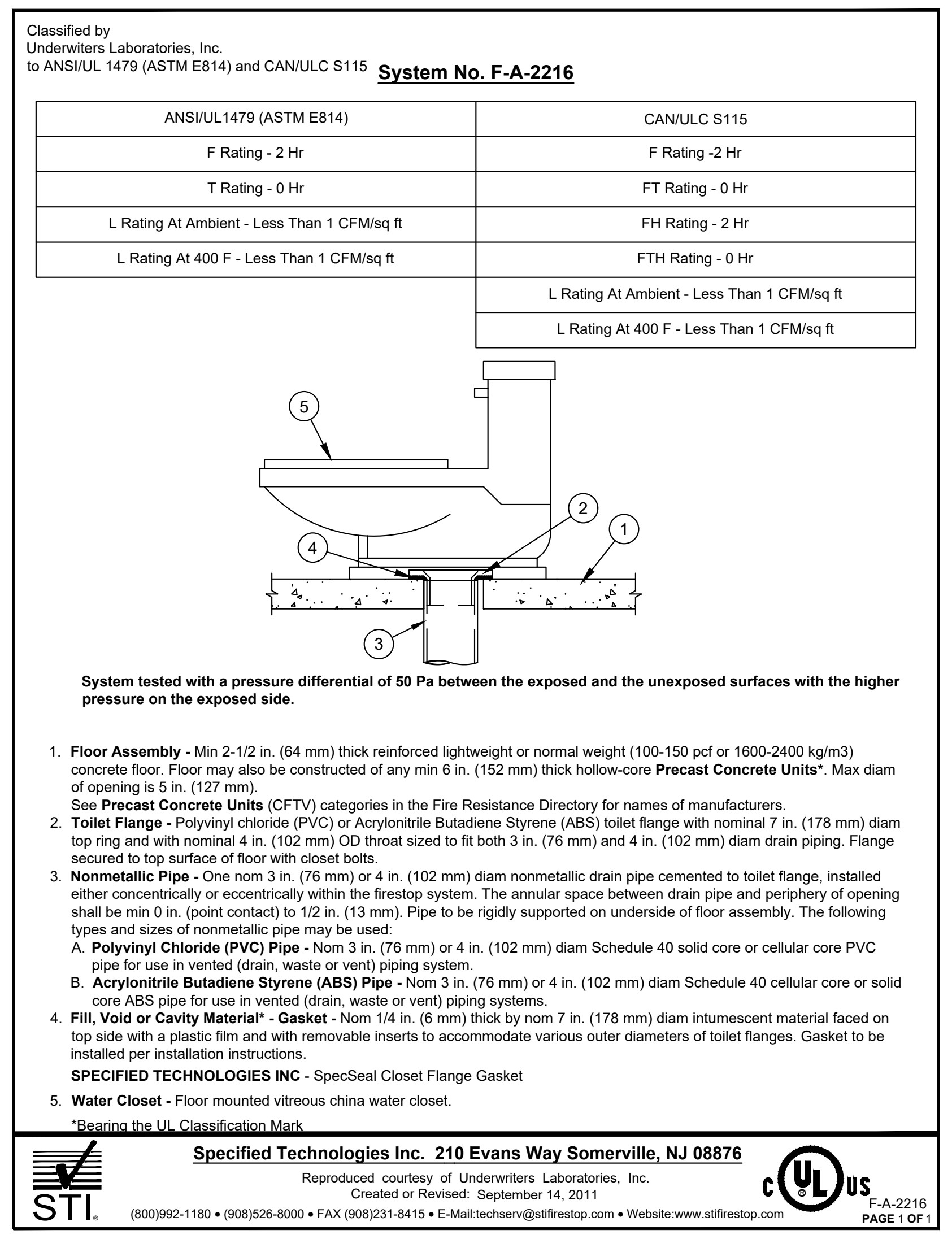

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. F-A-2216**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating - 2 Hr	F Rating -2 Hr
T Rating - 0 Hr	FT Rating - 0 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Rating - 2 Hr
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Rating - 0 Hr
	L Rating At Ambient - Less Than 1 CFM/sq ft
	L Rating At 400 F - Less Than 1 CFM/sq ft

System tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

1. **Floor Assembly -** Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor. Floor may also be constructed of any min 6 in. (152 mm) thick hollow-core **Precast Concrete Units***. Max diam of opening is 5 in. (127 mm).
   See **Precast Concrete Units** (CFTV) categories in the Fire Resistance Directory for names of manufacturers.
2. **Toilet Flange -** Polyvinyl chloride (PVC) or Acrylonitrile Butadiene Styrene (ABS) toilet flange with nominal 7 in. (178 mm) diam top ring and with nominal 4 in. (102 mm) OD throat sized to fit both 3 in. (76 mm) and 4 in. (102 mm) diam drain piping. Flange secured to top surface of floor with closet bolts.
3. **Nonmetallic Pipe -** One nom 3 in. (76 mm) or 4 in. (102 mm) diam nonmetallic drain pipe cemented to toilet flange, installed either concentrically or eccentrically within the firestop system. The annular space between drain pipe and periphery of opening shall be min 0 in. (point contact) to 1/2 in. (13 mm). Pipe to be rigidly supported on underside of floor assembly. The following types and sizes of nonmetallic pipe may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 3 in. (76 mm) or 4 in. (102 mm) diam Schedule 40 solid core or cellular core PVC pipe for use in vented (drain, waste or vent) piping system.
   B. **Acrylonitrile Butadiene Styrene (ABS) Pipe -** Nom 3 in. (76 mm) or 4 in. (102 mm) diam Schedule 40 cellular core or solid core ABS pipe for use in vented (drain, waste or vent) piping systems.
4. **Fill, Void or Cavity Material* - Gasket -** Nom 1/4 in. (6 mm) thick by nom 7 in. (178 mm) diam intumescent material faced on top side with a plastic film and with removable inserts to accommodate various outer diameters of toilet flanges. Gasket to be installed per installation instructions.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Closet Flange Gasket
5. **Water Closet -** Floor mounted vitreous china water closet.

   *Bearing the UL Classification Mark

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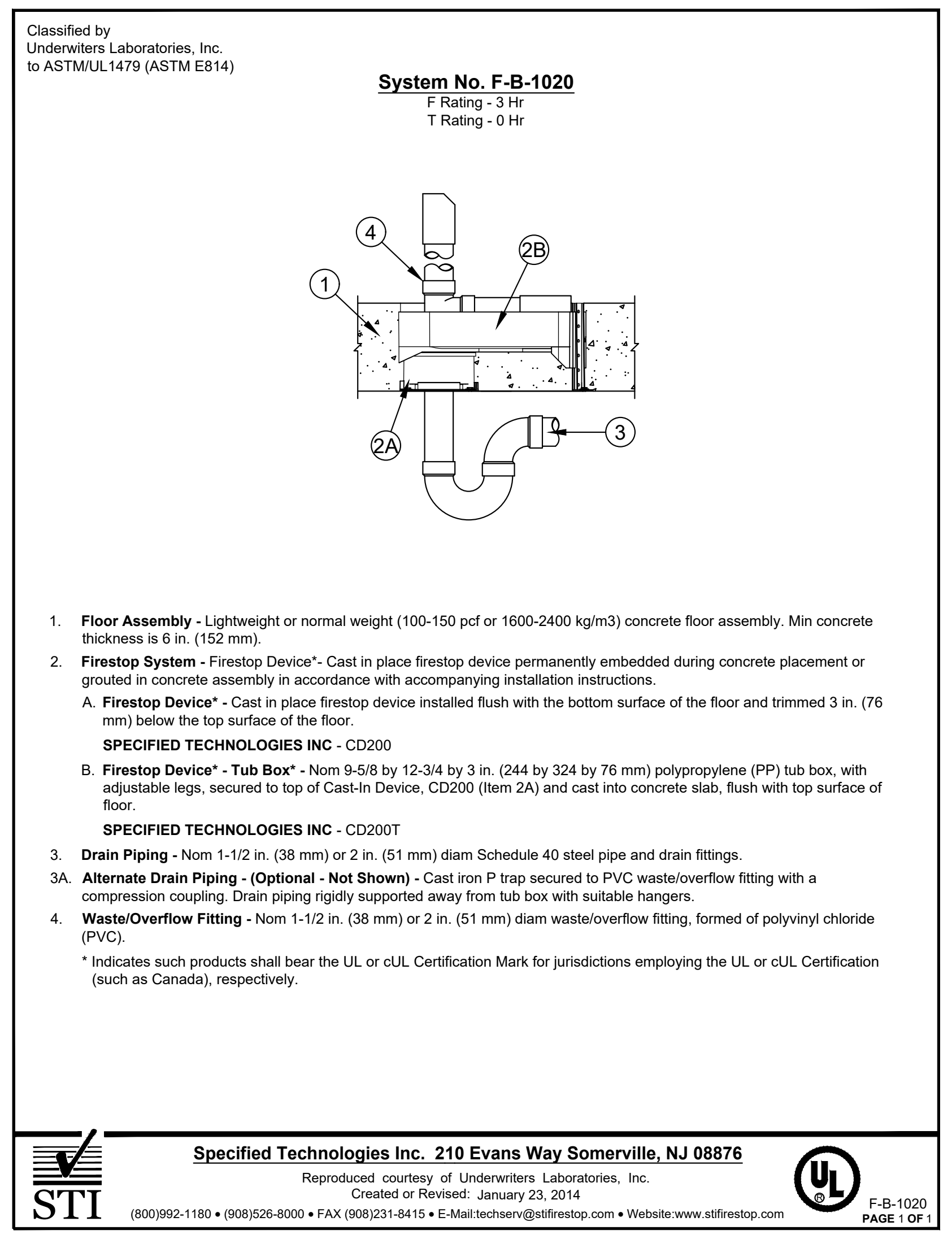

Classified by
Underwiters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. F-B-1020
F Rating - 3 Hr
T Rating - 0 Hr

1. **Floor Assembly -** Lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor assembly. Min concrete thickness is 6 in. (152 mm).
2. **Firestop System -** Firestop Device*- Cast in place firestop device permanently embedded during concrete placement or grouted in concrete assembly in accordance with accompanying installation instructions.
   A. **Firestop Device* -** Cast in place firestop device installed flush with the bottom surface of the floor and trimmed 3 in. (76 mm) below the top surface of the floor.

      SPECIFIED TECHNOLOGIES INC - CD200
   B. **Firestop Device* - Tub Box* -** Nom 9-5/8 by 12-3/4 by 3 in. (244 by 324 by 76 mm) polypropylene (PP) tub box, with adjustable legs, secured to top of Cast-In Device, CD200 (Item 2A) and cast into concrete slab, flush with top surface of floor.

      SPECIFIED TECHNOLOGIES INC - CD200T
3. **Drain Piping -** Nom 1-1/2 in. (38 mm) or 2 in. (51 mm) diam Schedule 40 steel pipe and drain fittings.

3A. **Alternate Drain Piping - (Optional - Not Shown) -** Cast iron P trap secured to PVC waste/overflow fitting with a compression coupling. Drain piping rigidly supported away from tub box with suitable hangers.

4. **Waste/Overflow Fitting -** Nom 1-1/2 in. (38 mm) or 2 in. (51 mm) diam waste/overflow fitting, formed of polyvinyl chloride (PVC).

   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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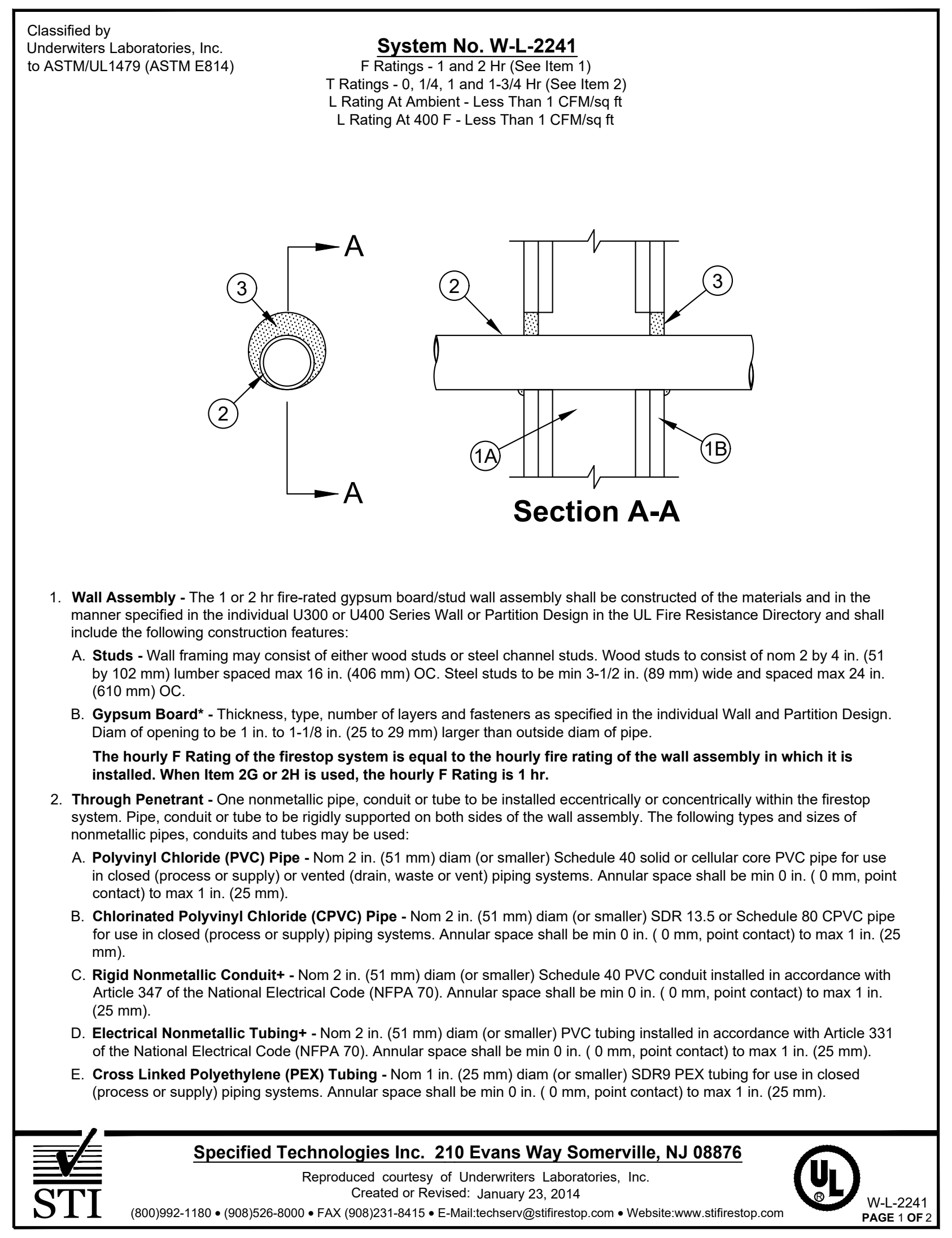

Classified by
Underwiters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. 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)
L Rating At Ambient - Less Than 1 CFM/sq ft
L Rating At 400 F - Less Than 1 CFM/sq ft

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 3-1/2 in. (89 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. Diam of opening to be 1 in. to 1-1/8 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, the hourly F Rating is 1 hr.
2. **Through Penetrant -** One nonmetallic pipe, conduit or tube to be installed eccentrically or concentrically within the firestop system. Pipe, conduit or tube to be rigidly supported on both sides of the wall assembly. The following types and sizes of nonmetallic pipes, conduits and tubes 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 in 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 Tubing+ -** 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).

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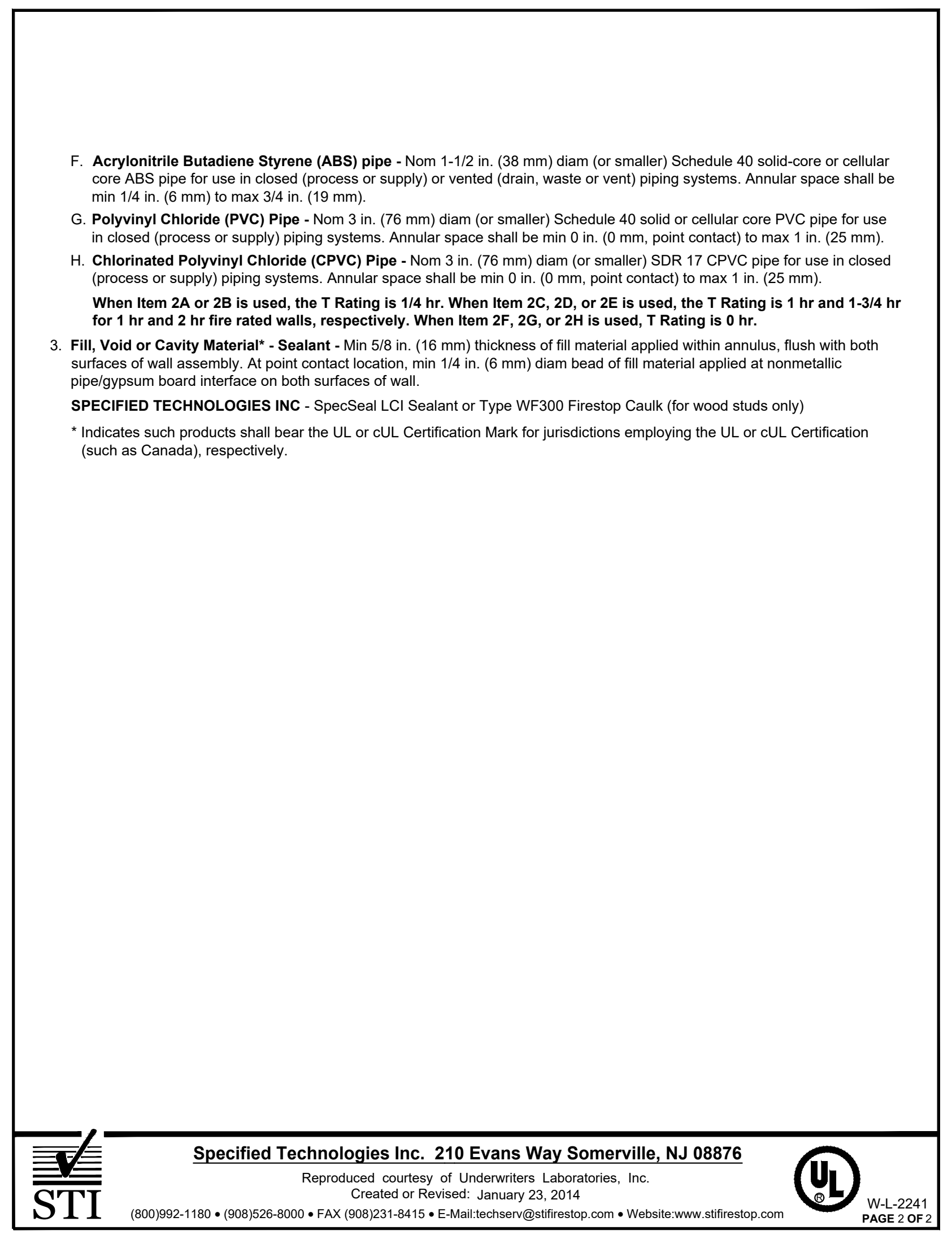

F. **Acrylonitrile Butadiene Styrene (ABS) pipe -** Nom 1-1/2 in. (38 mm) diam (or smaller) Schedule 40 solid-core or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems. Annular space shall be min 1/4 in. (6 mm) to max 3/4 in. (19 mm).

G. **Polyvinyl Chloride (PVC) Pipe -** Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid or cellular core PVC 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).

H. **Chlorinated Polyvinyl Chloride (CPVC) Pipe -** Nom 3 in. (76 mm) diam (or smaller) SDR 17 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).

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.

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. 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 or Type WF300 Firestop Caulk (for wood studs only)

   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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GENERAL NOTES:
1. Refer to section 07 84 00 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
2. Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   · Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.
3. If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   · UL Fire Resistance Directory; Current Edition
   · NFPA 101 Life Safety Code
   · All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

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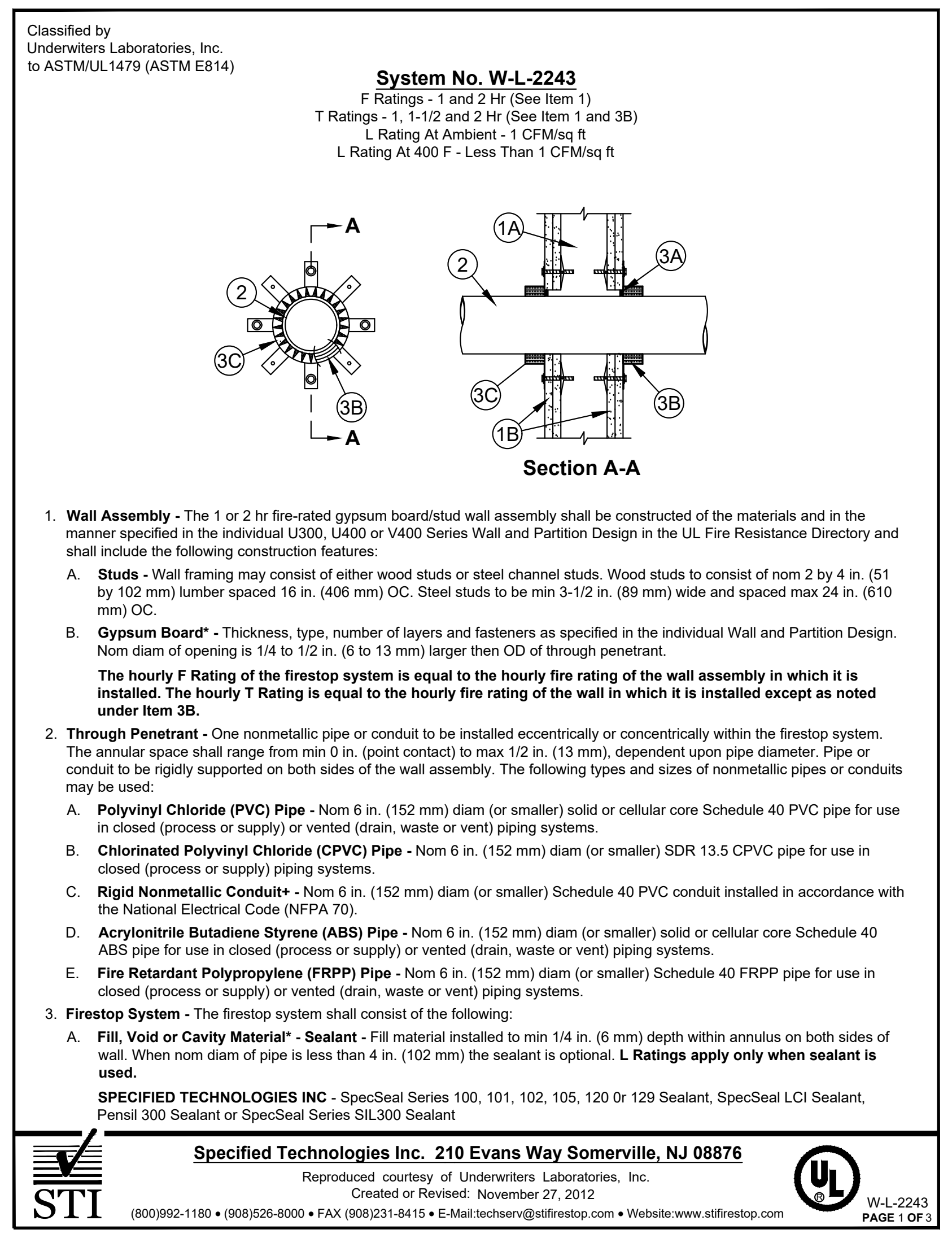

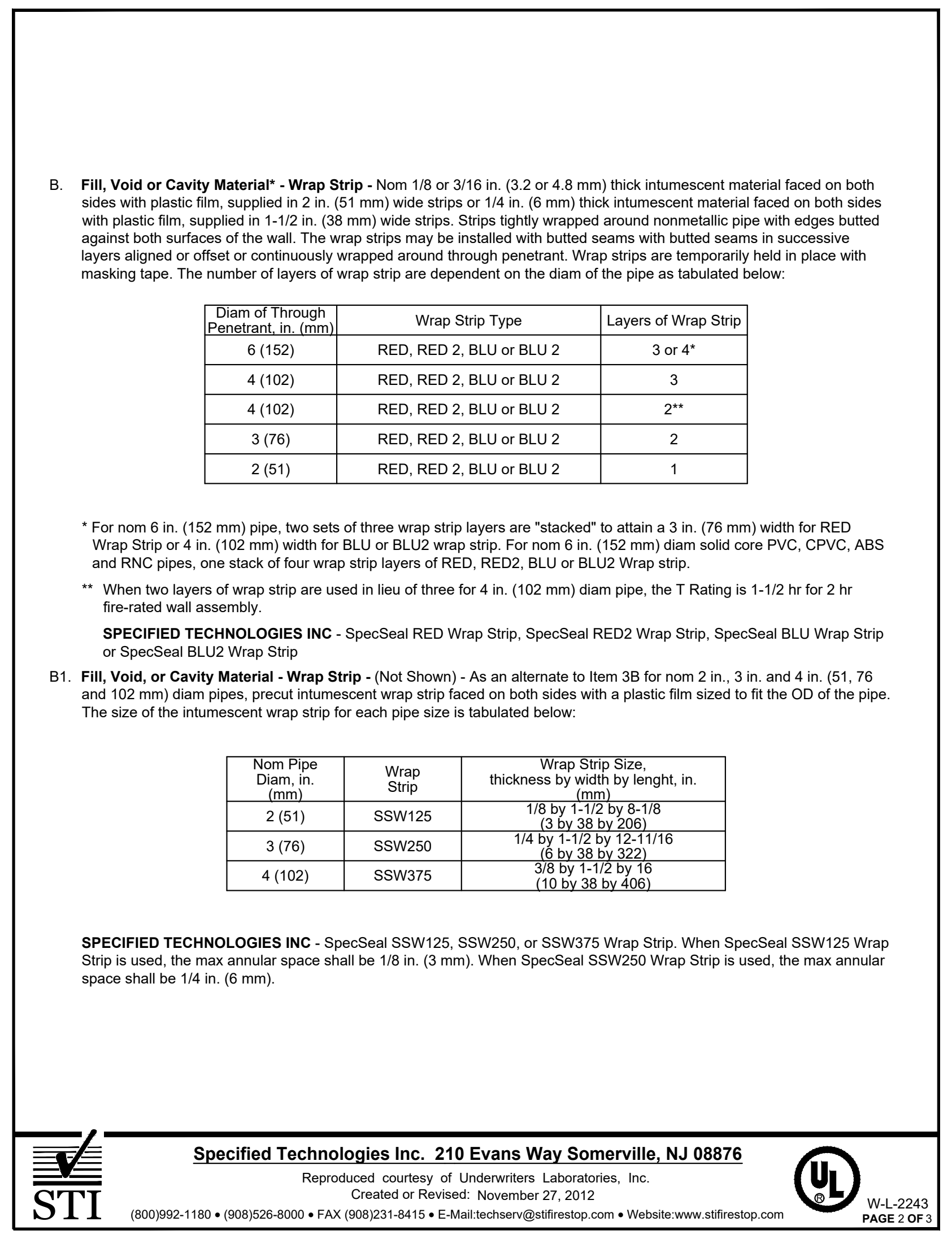

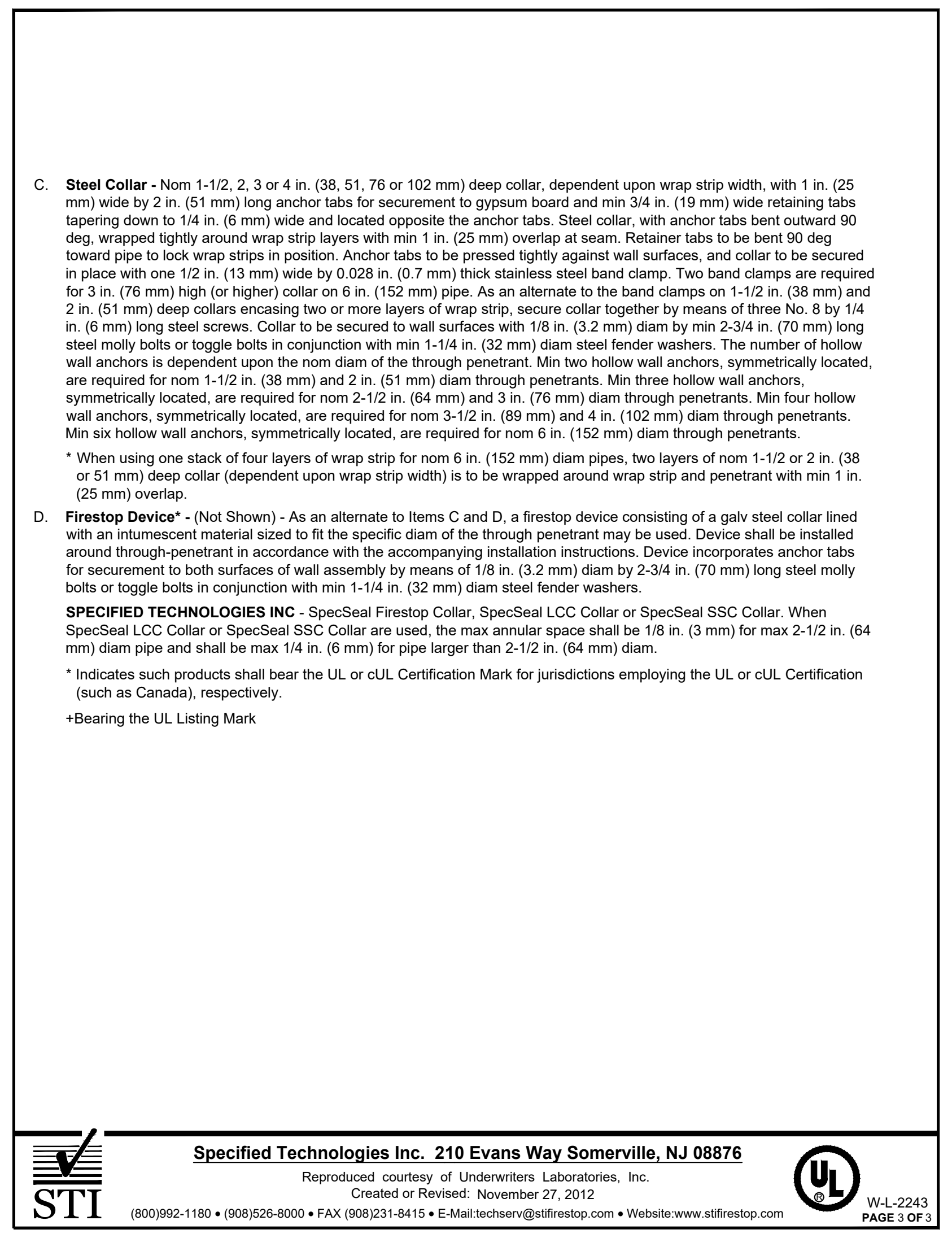

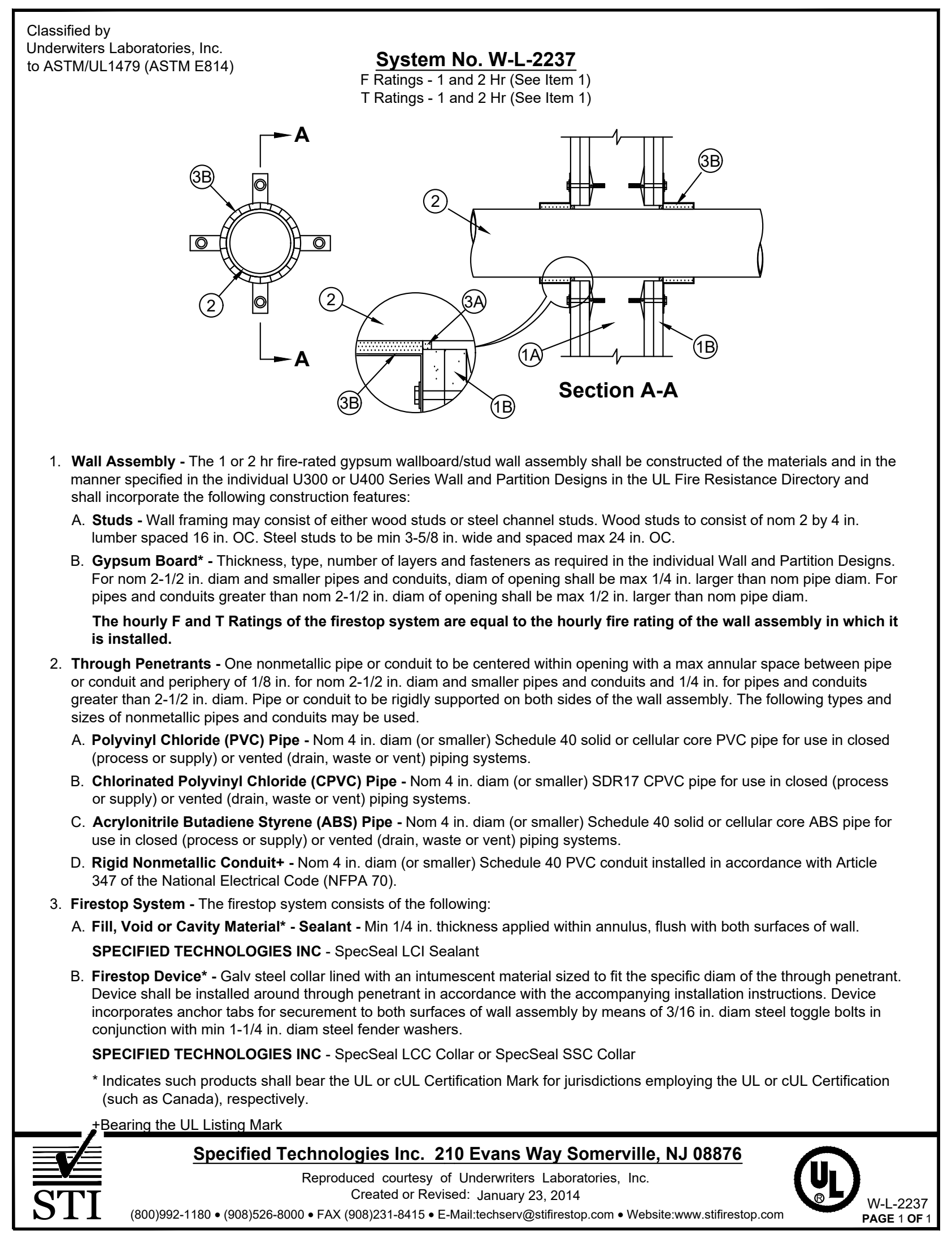

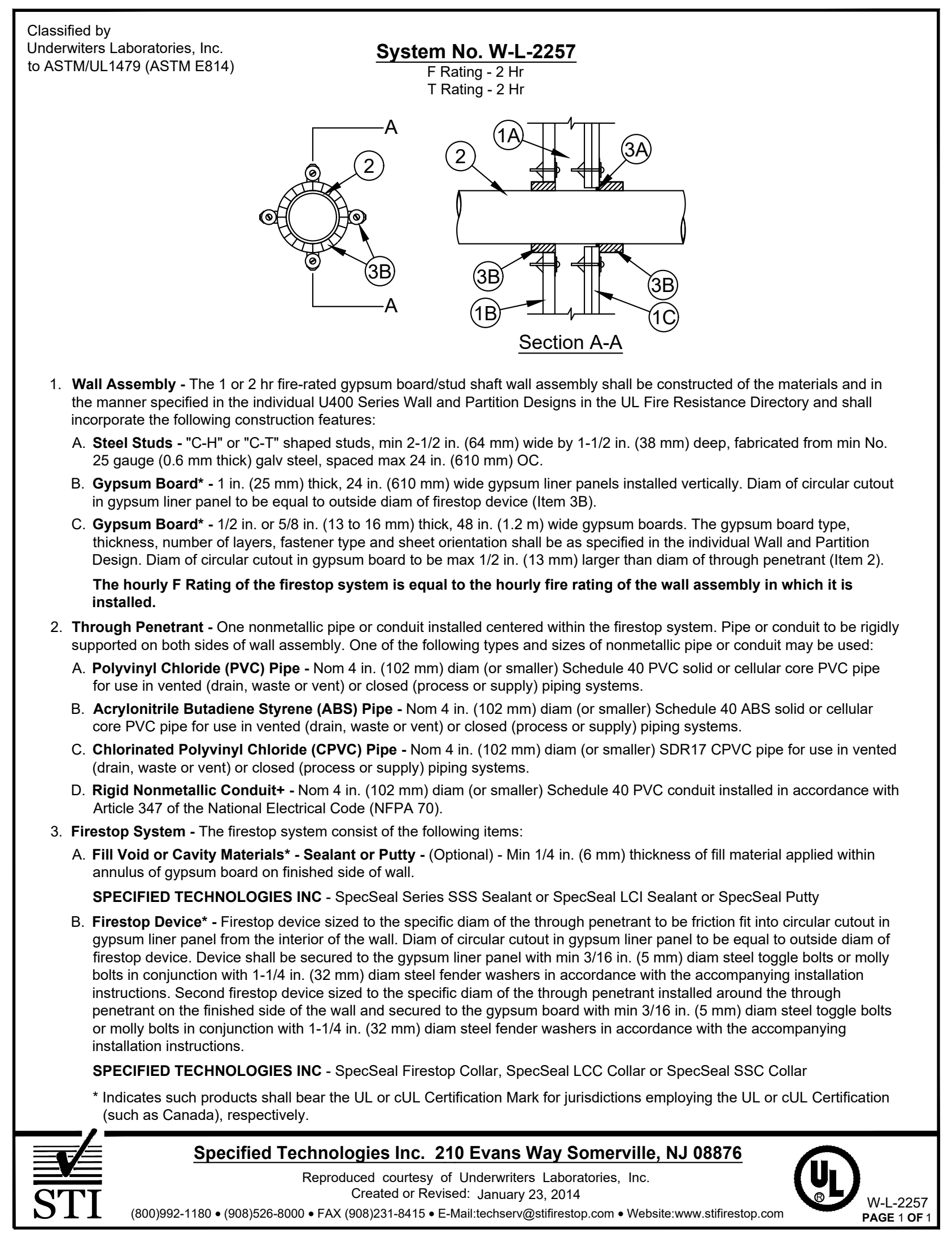

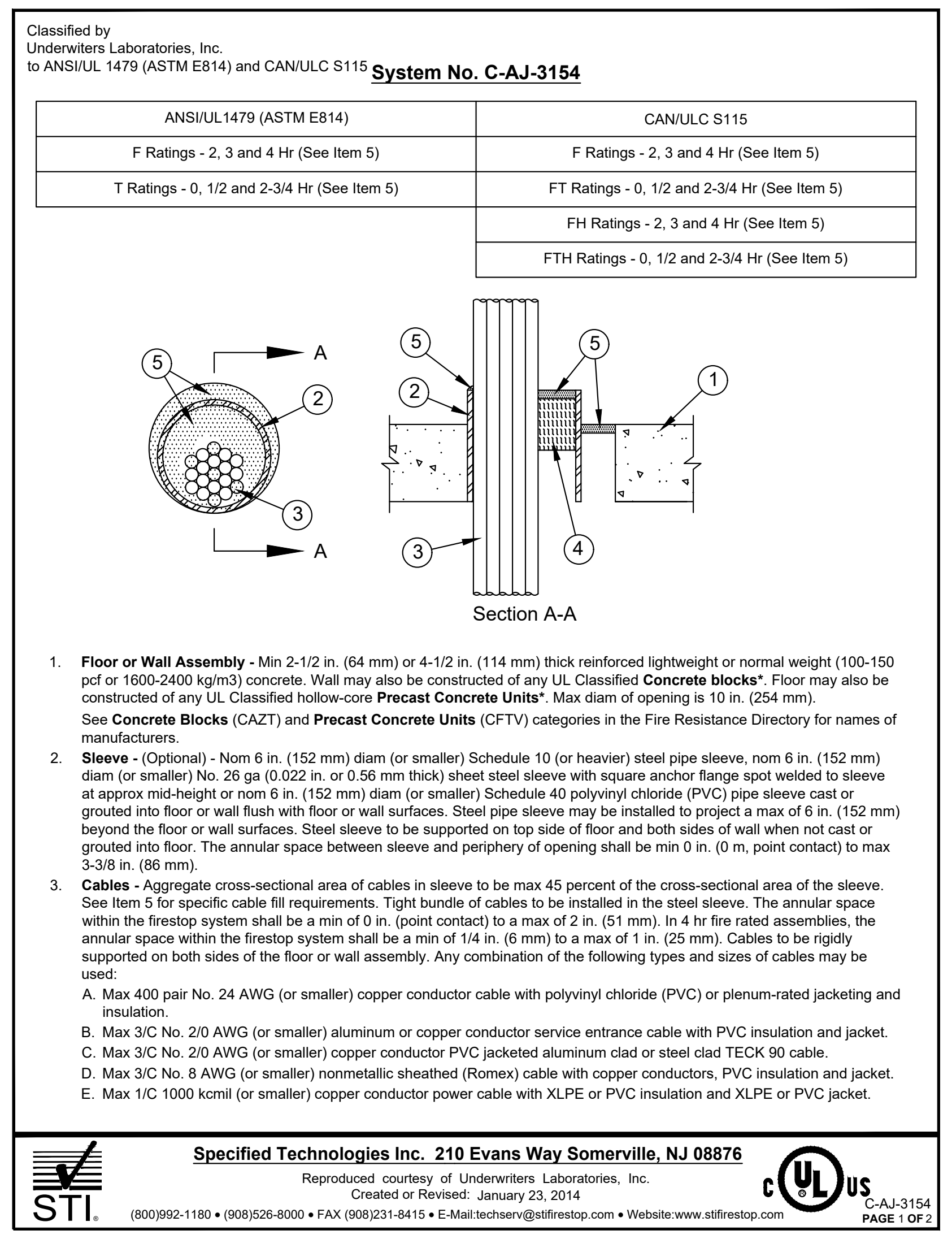

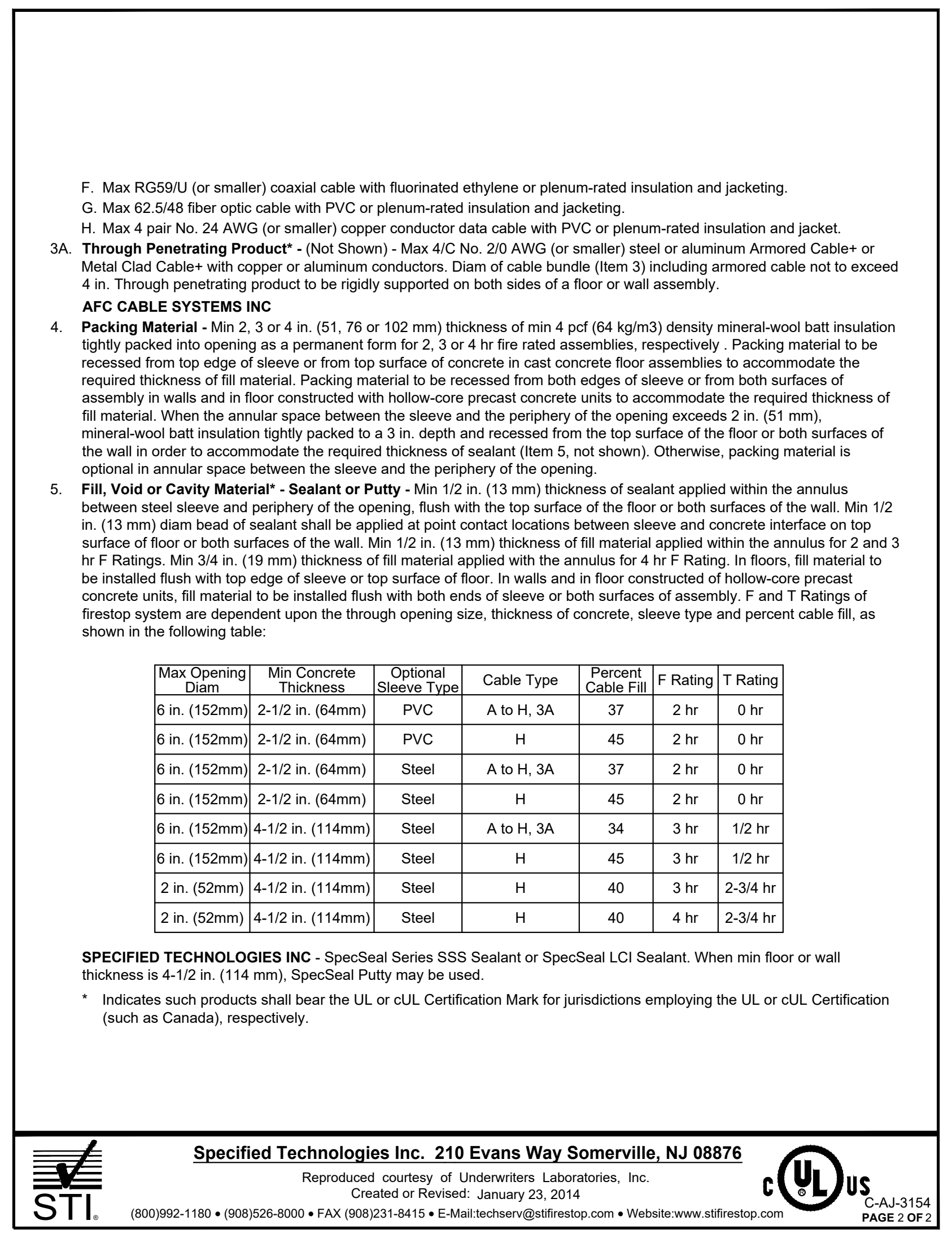

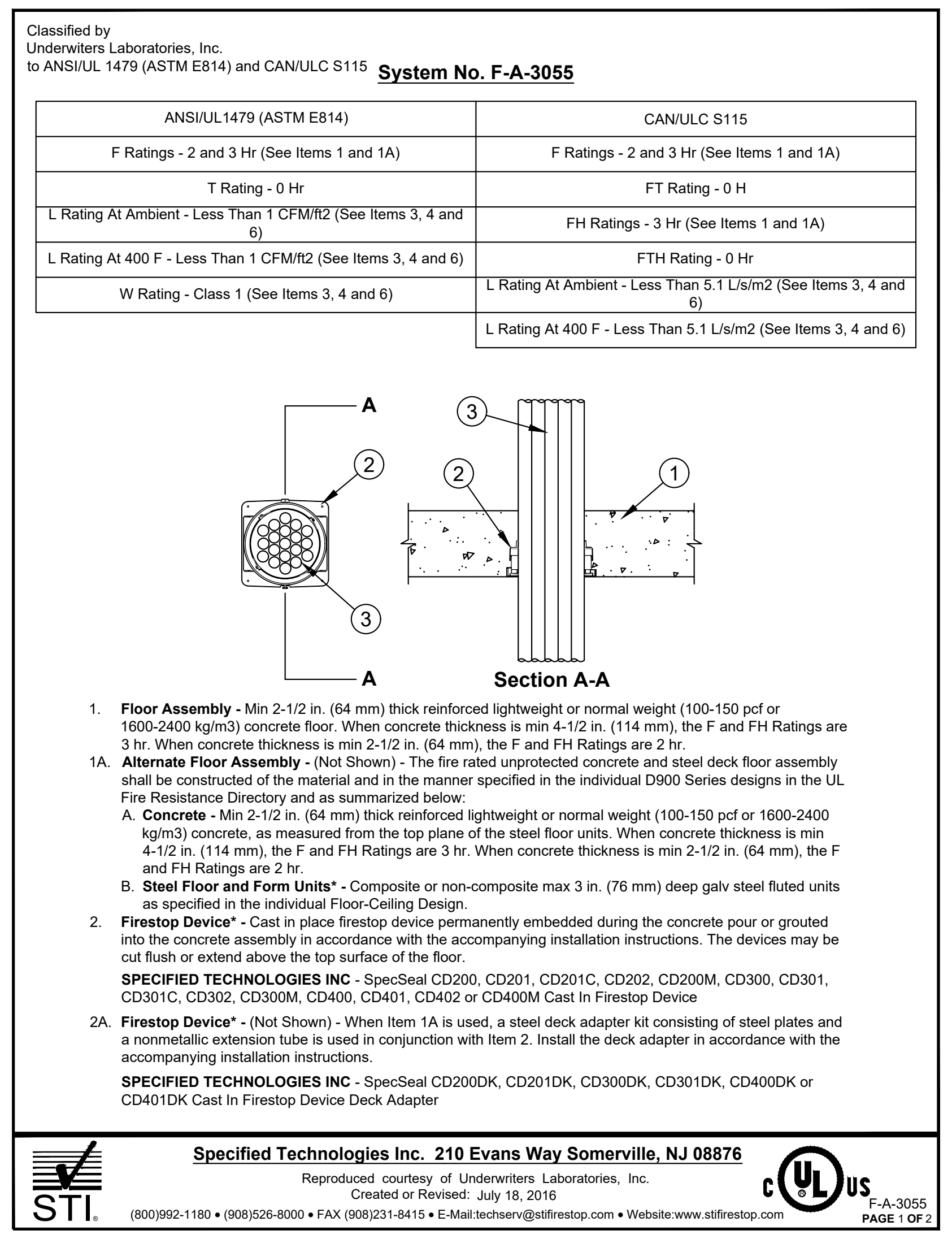

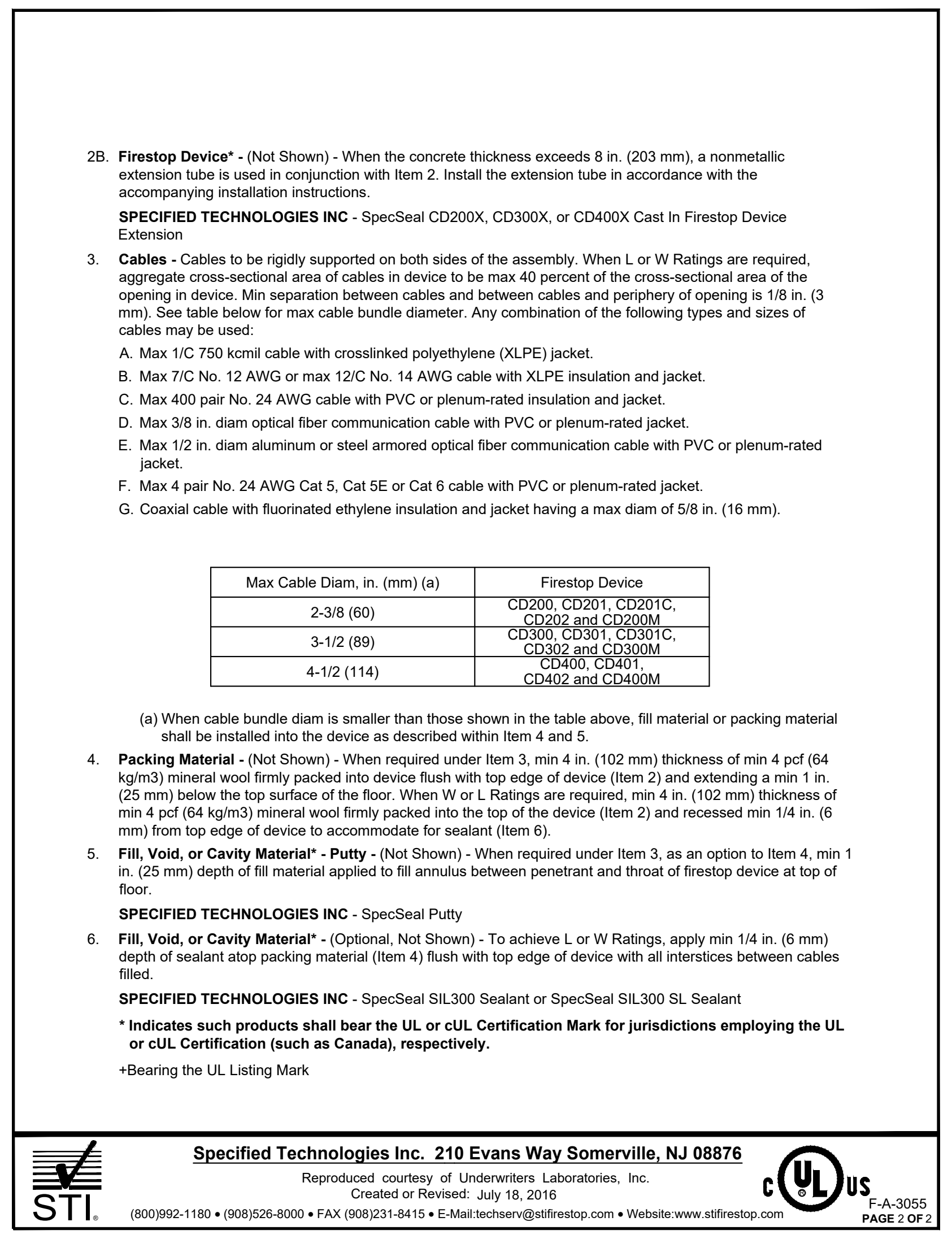

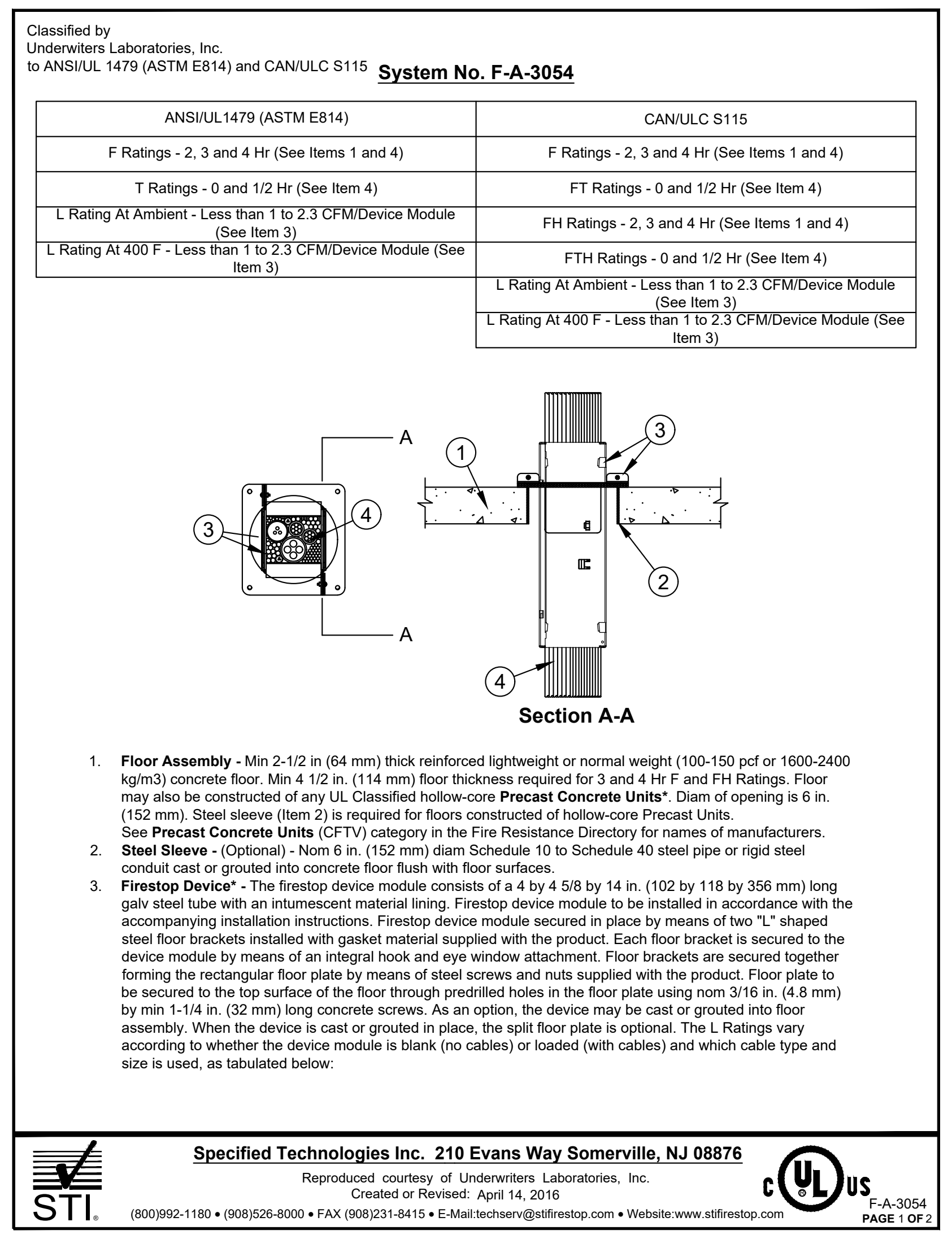

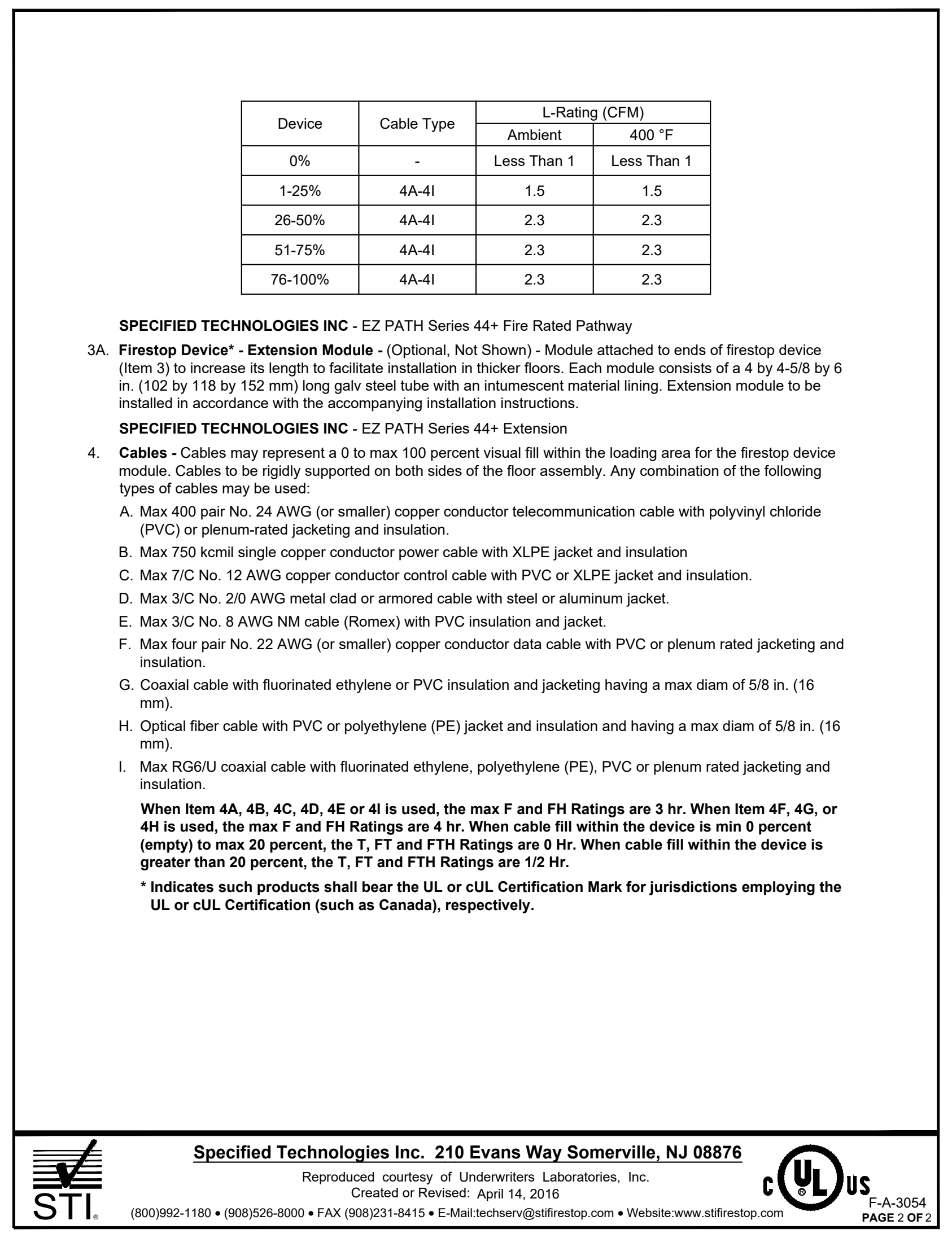

GENERAL NOTES:

1. Refer to section 07 84 00 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
2. Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   - Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.
3. If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   - UL Fire Resistance Directory; Current Edition
   - NFPA 101 Life Safety Code
   - All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:

PROJECT_NAME:

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PROJECT_LOCATION:

ARCHITECT/CONSULTANT:

ARCHITECT/CONSULTANT:

TITLE:

STI FIRESTOP SYSTEMS

Specified Technologies Inc.
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E-Mail:techserv@stifirestop.com
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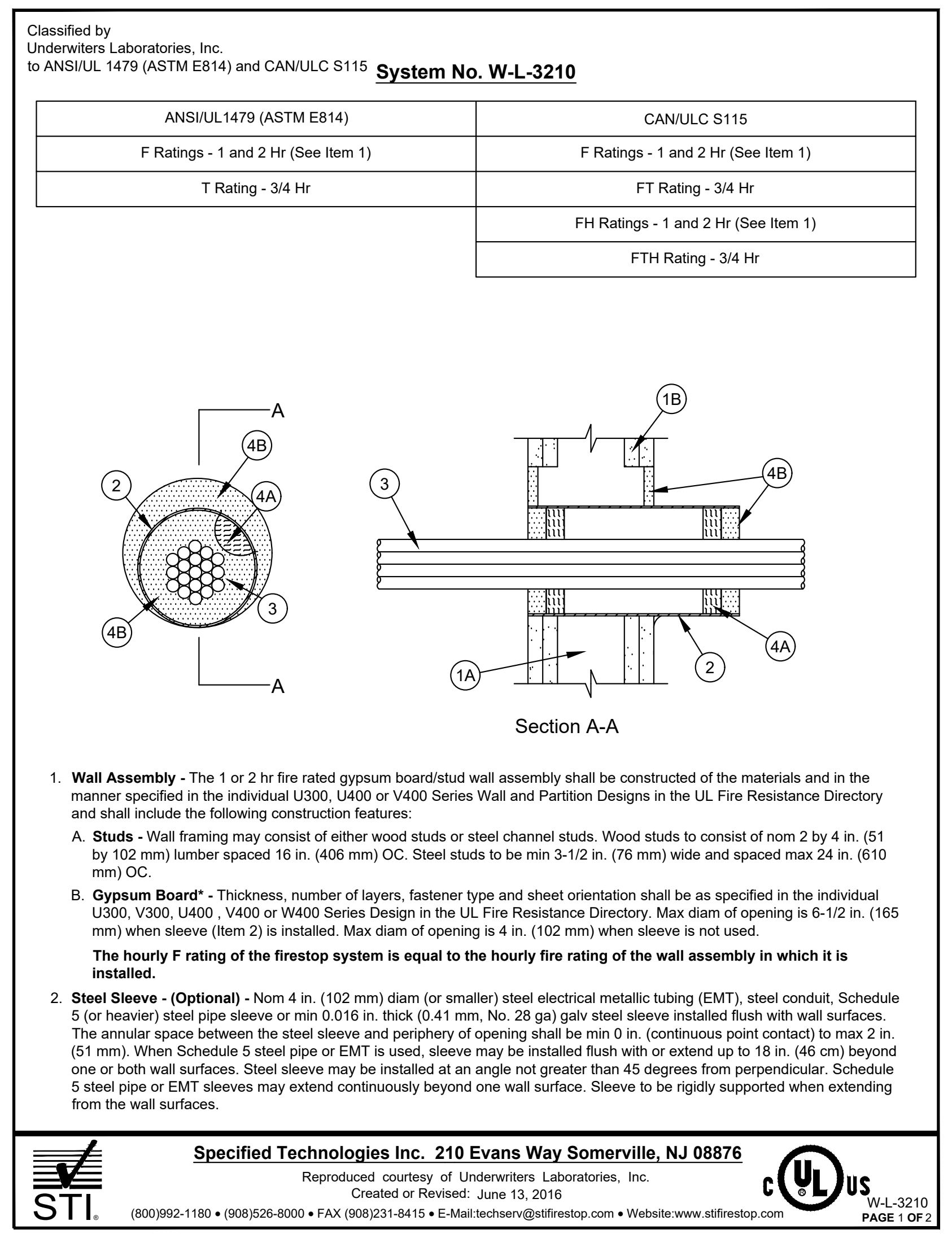
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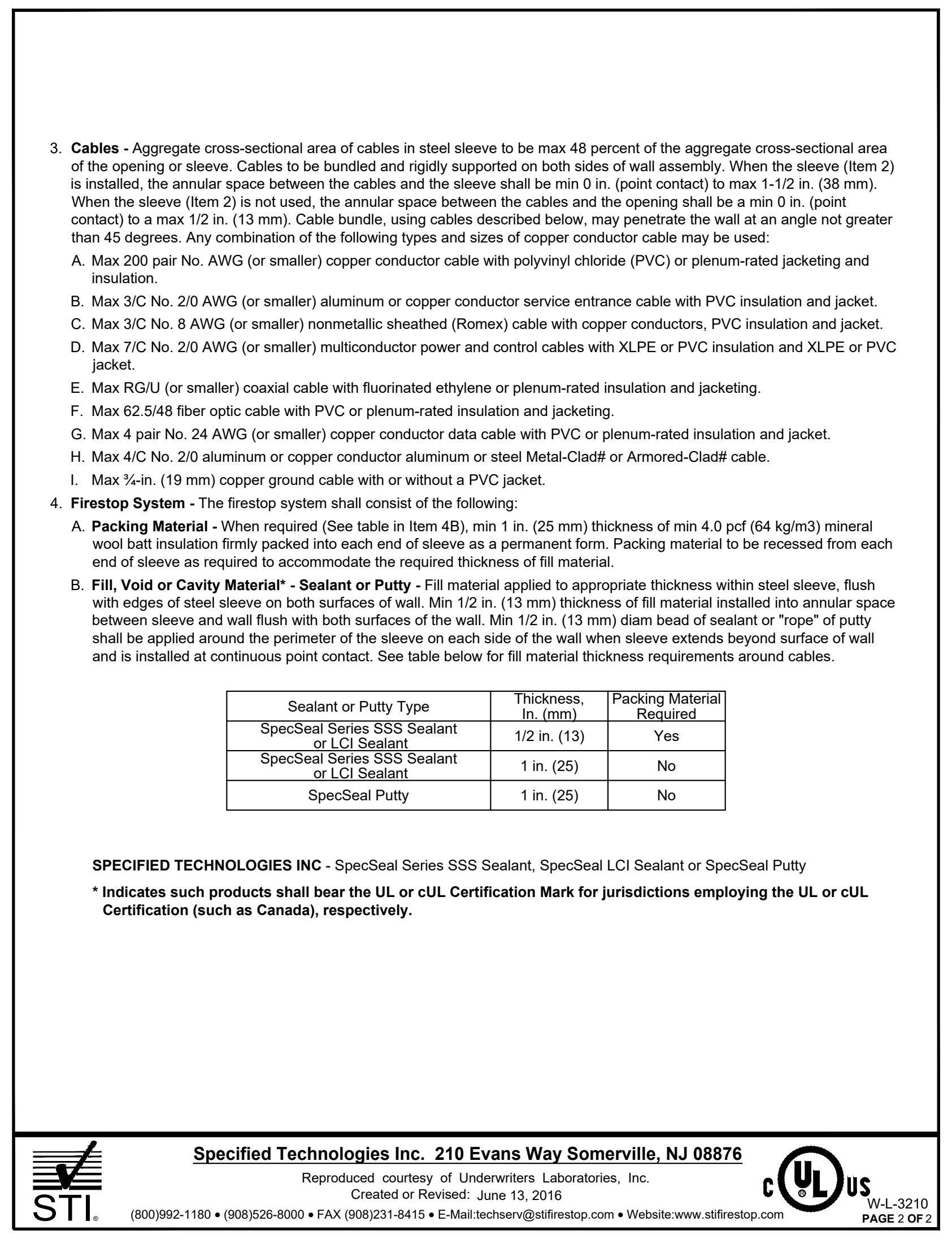
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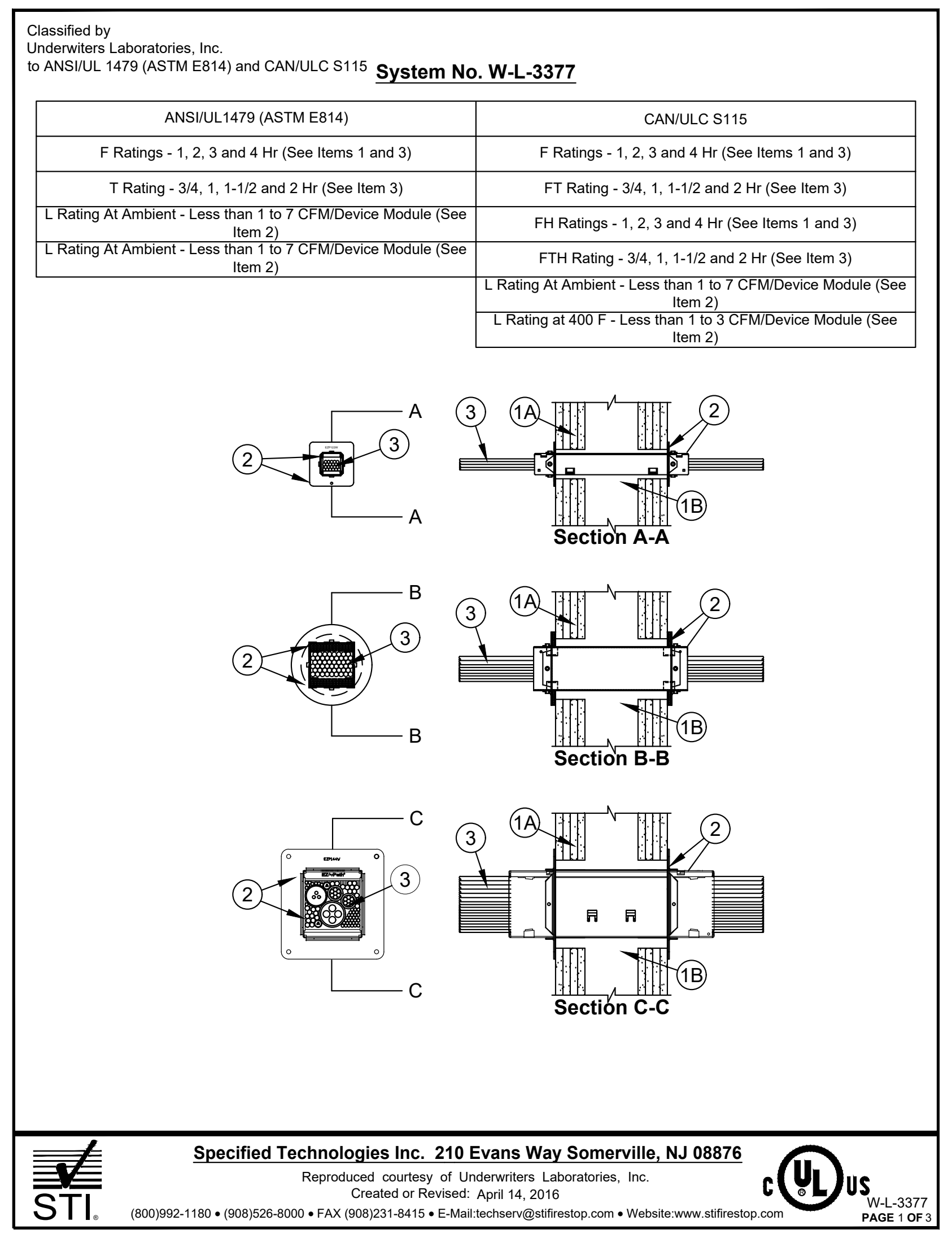
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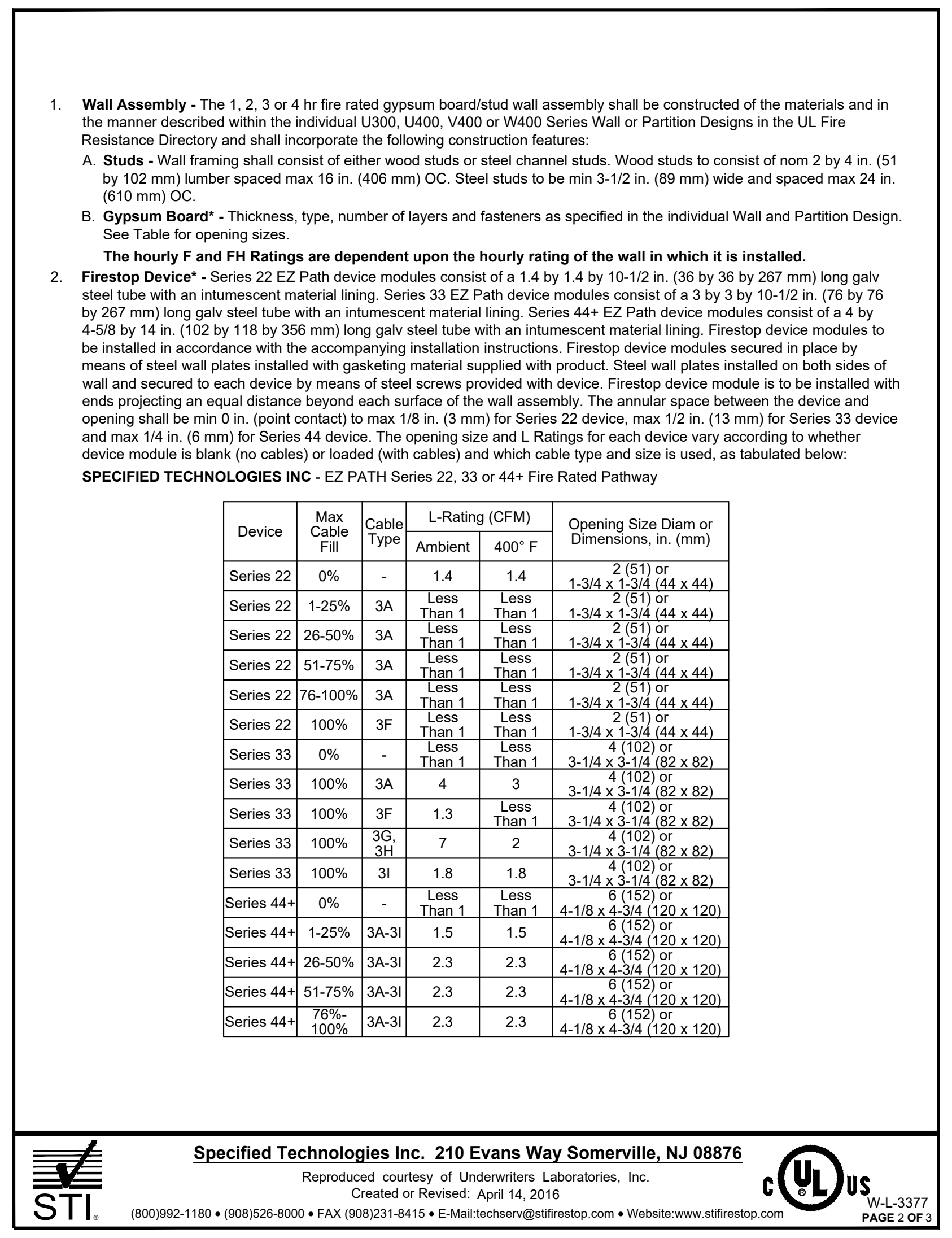
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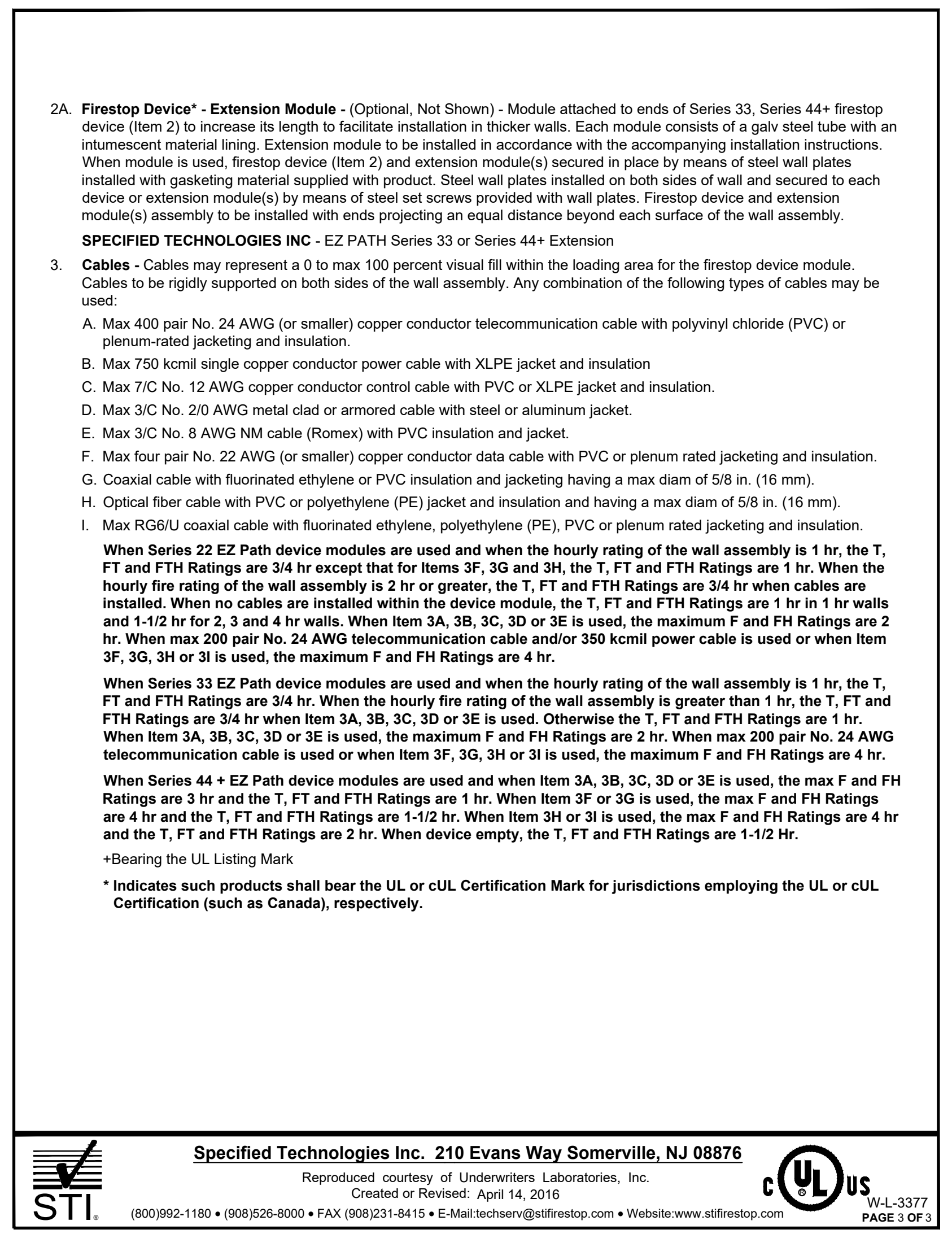
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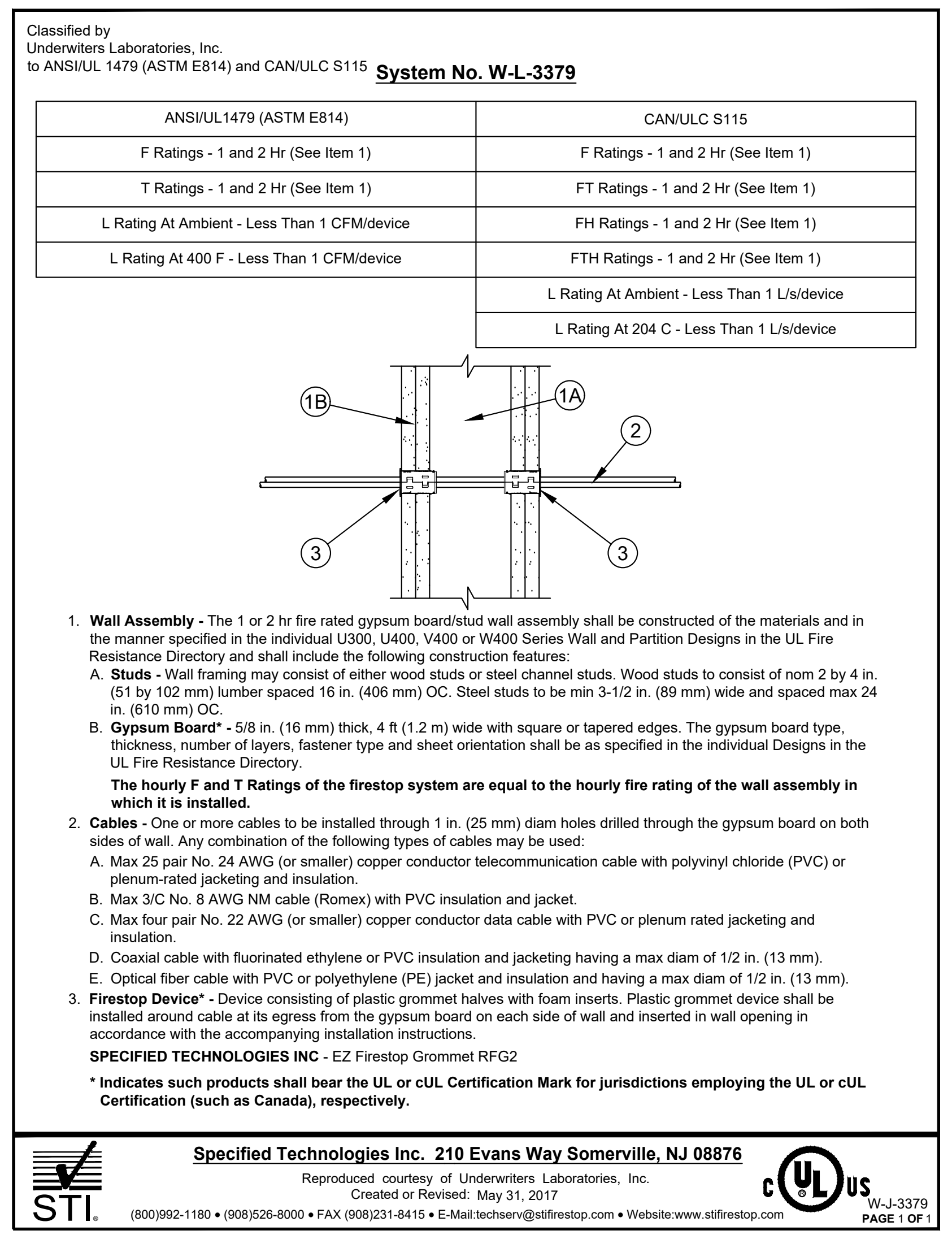
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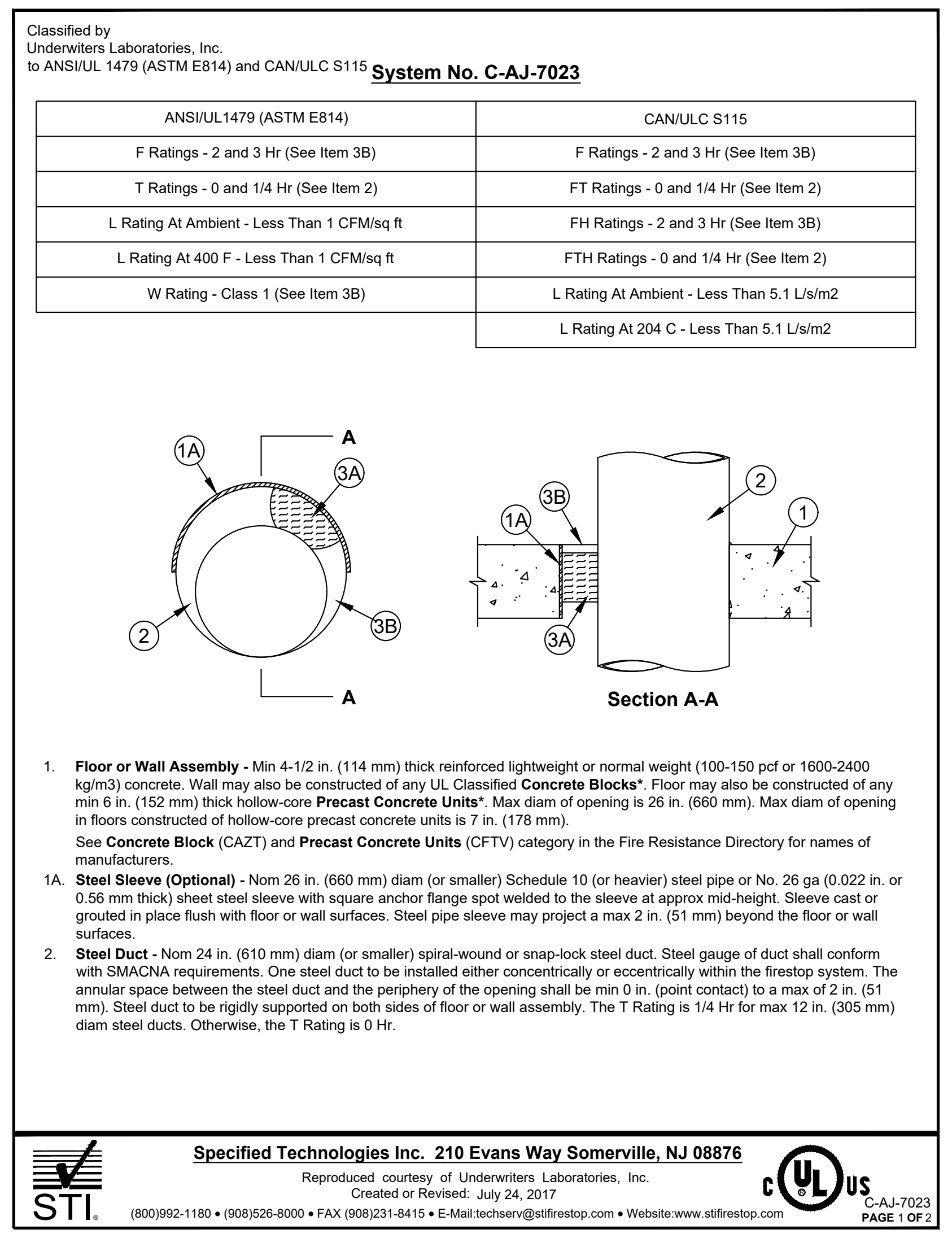
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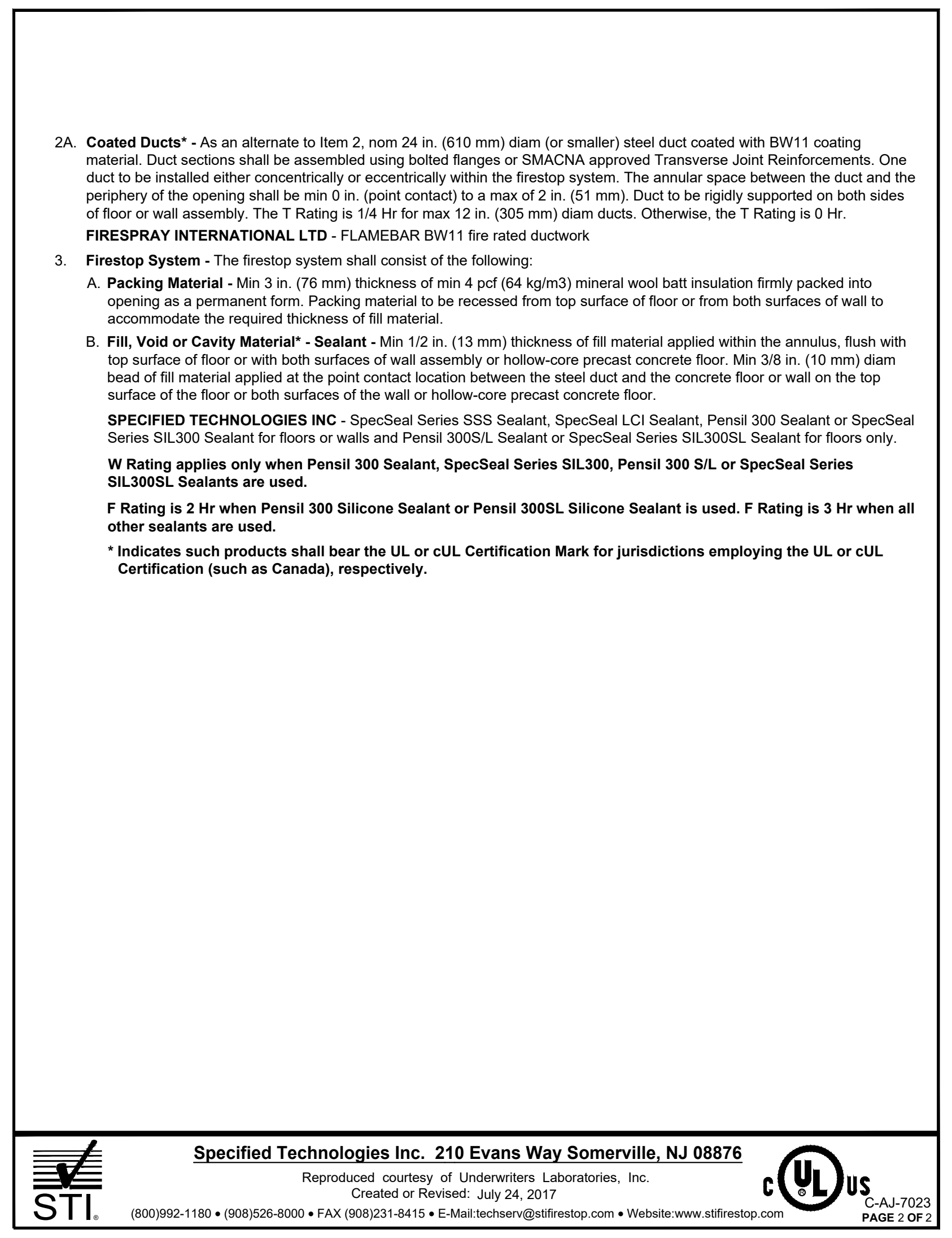
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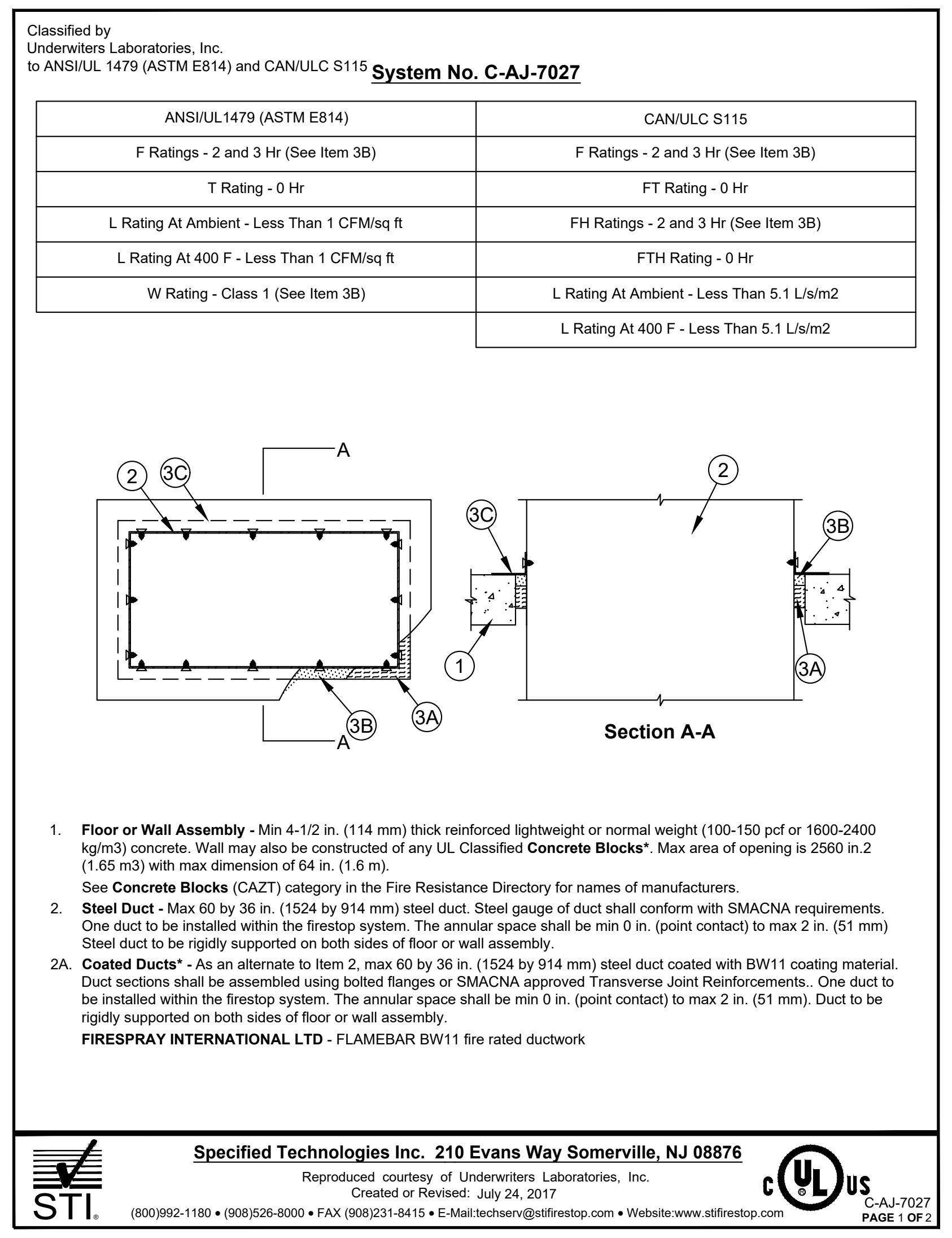
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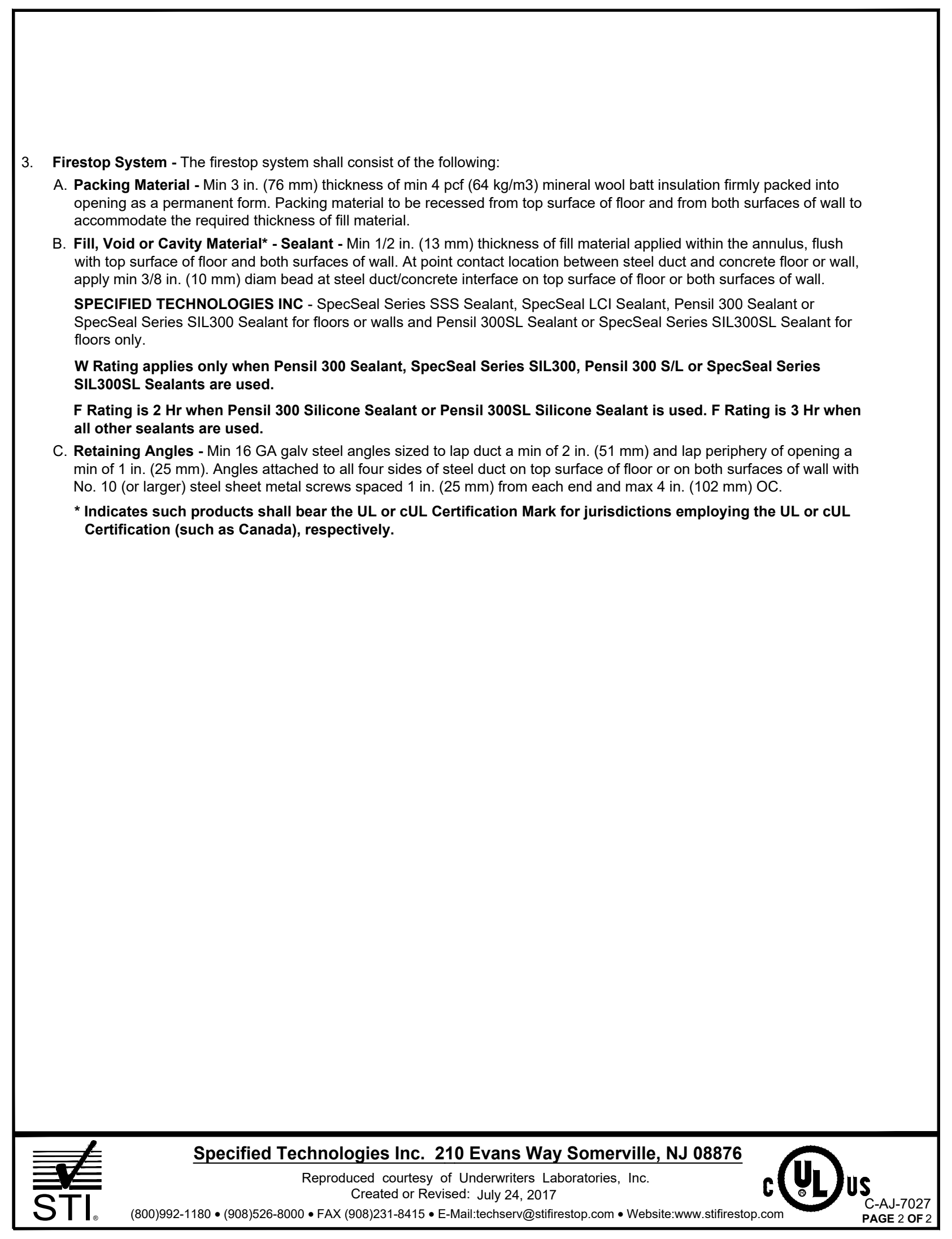
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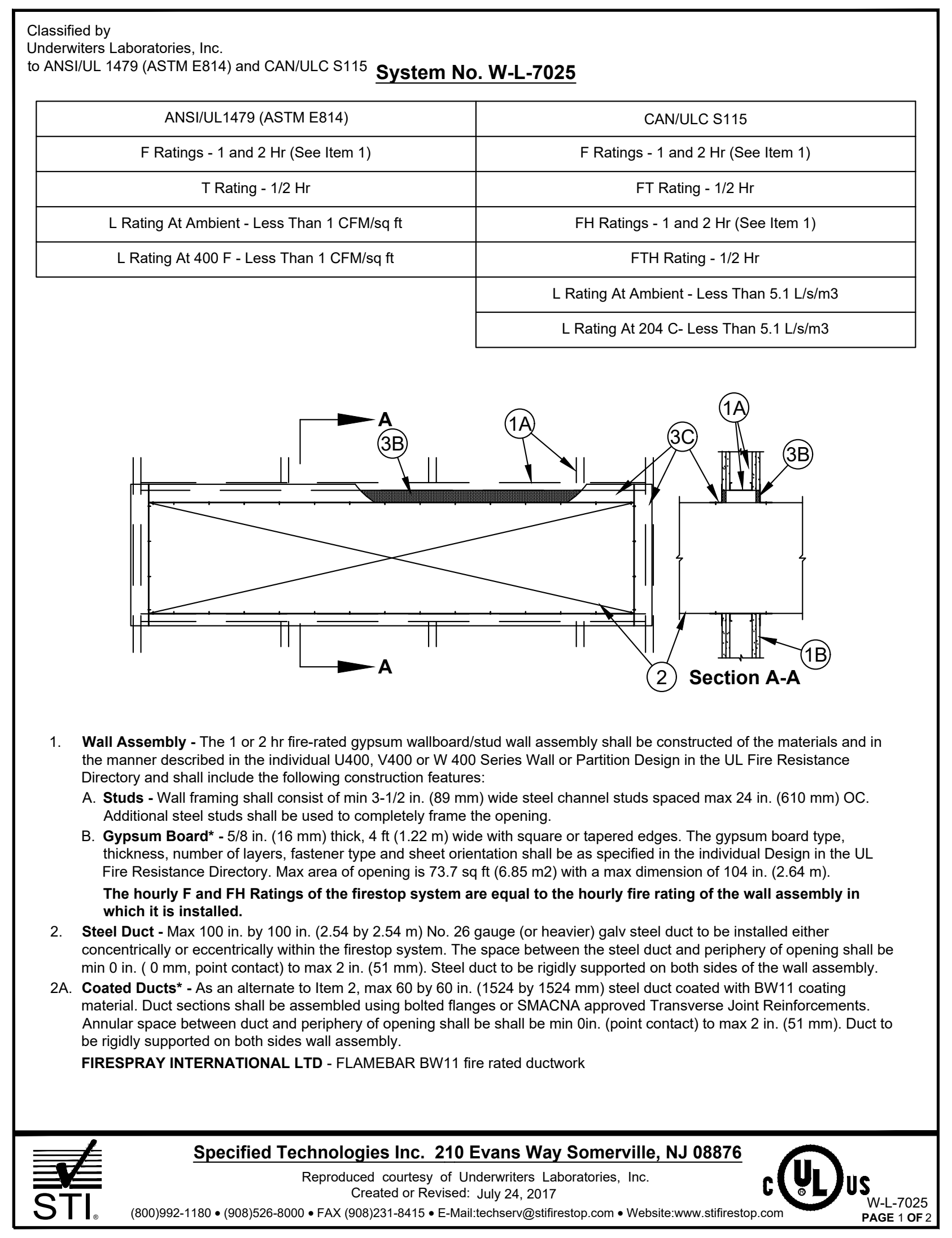
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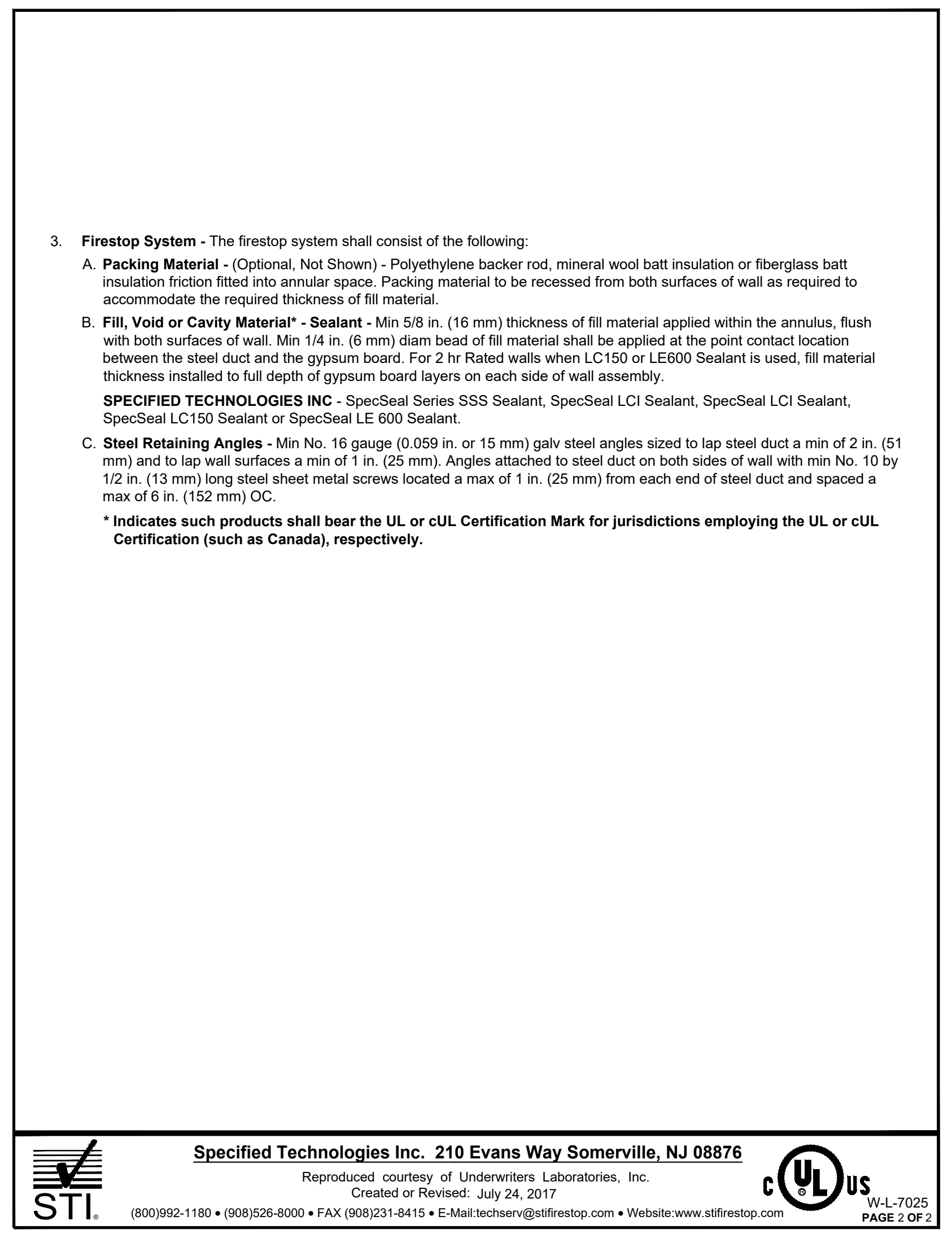
W-L-7025

GENERAL NOTES:

1. Refer to section 07 84 00 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
2. Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   - Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.
3. If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   - UL Fire Resistance Directory; Current Edition
   - NFPA 101 Life Safety Code
   - All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:

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ARCHITECT/CONSULTANT:

ARCHITECT/CONSULTANT:

TITLE:

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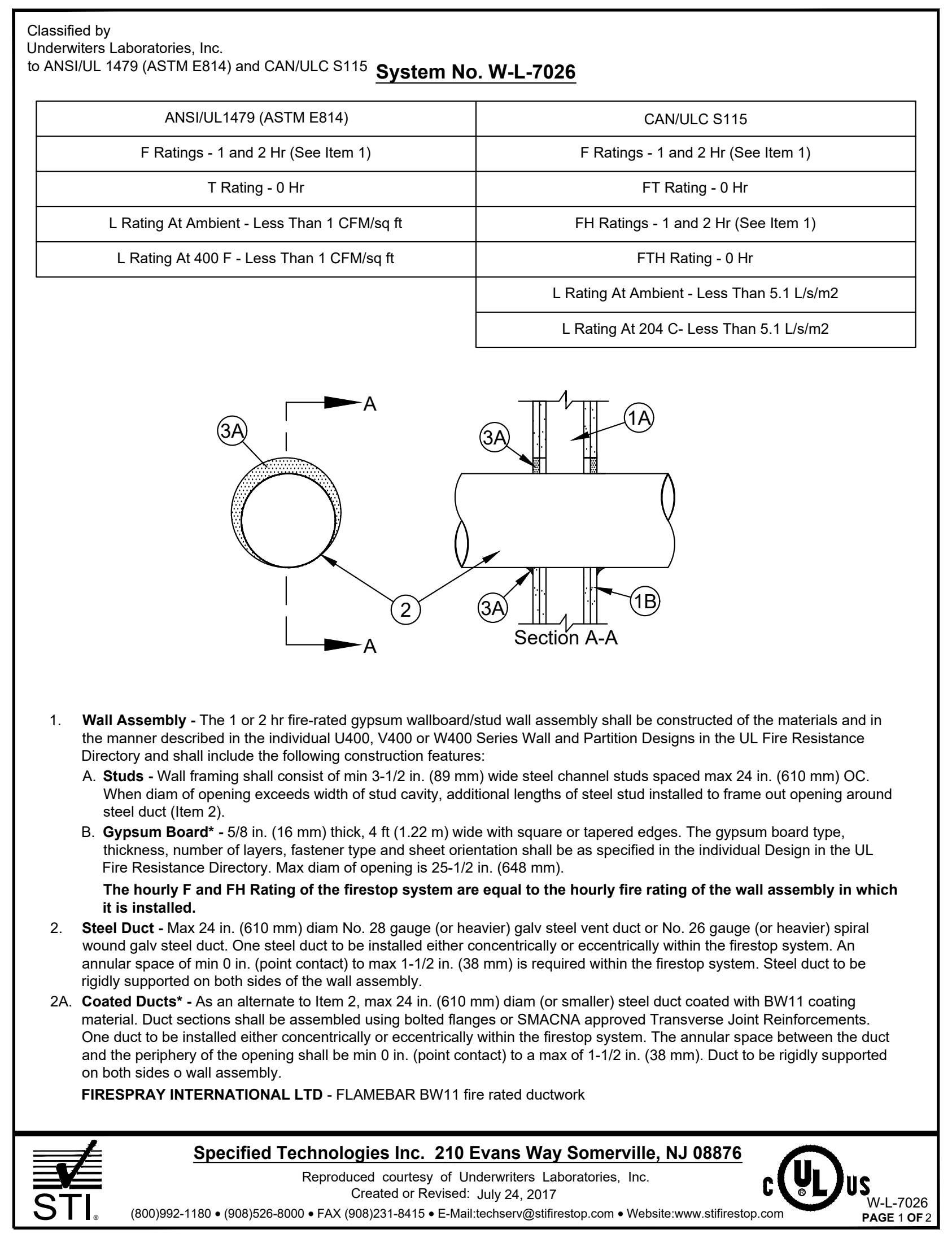
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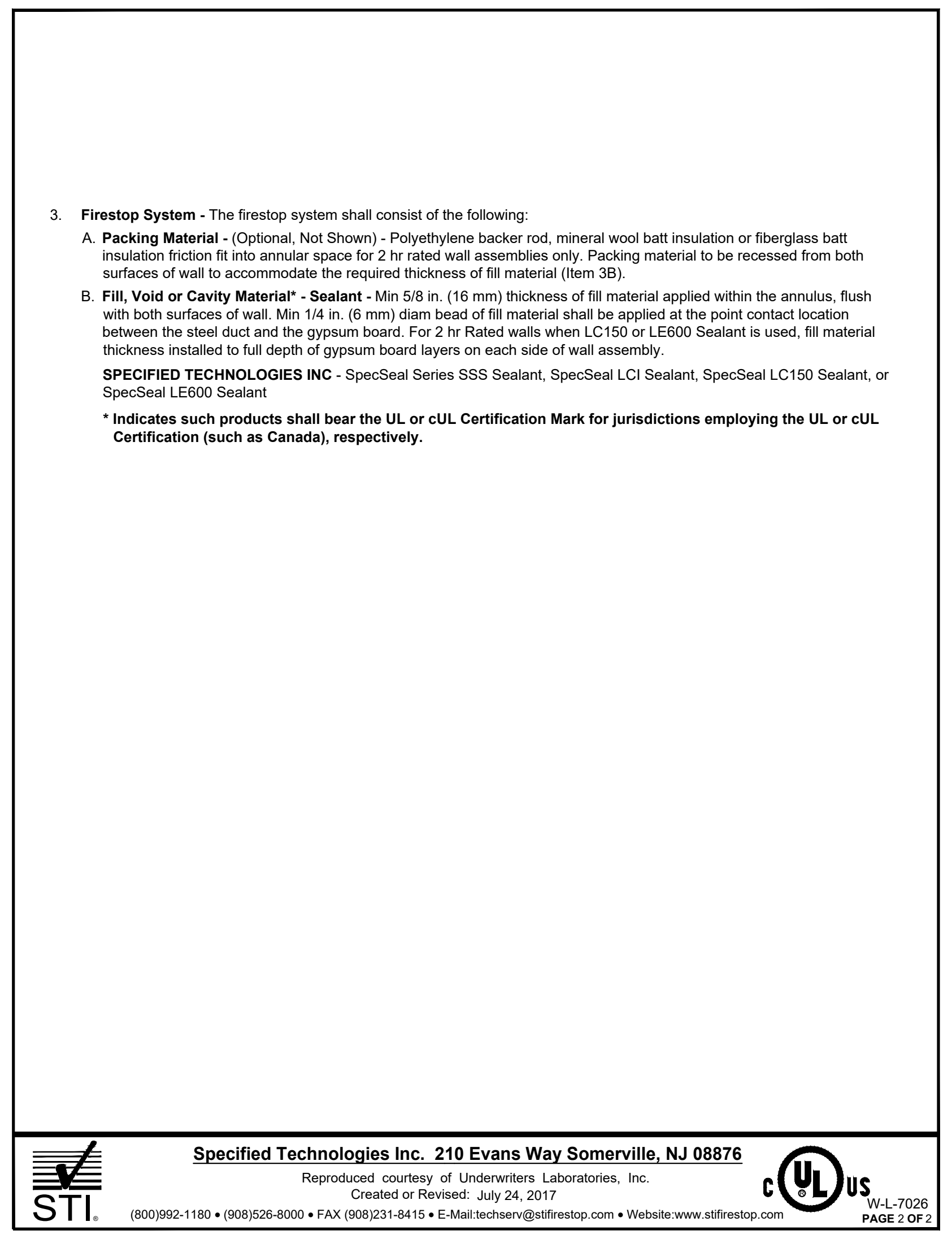

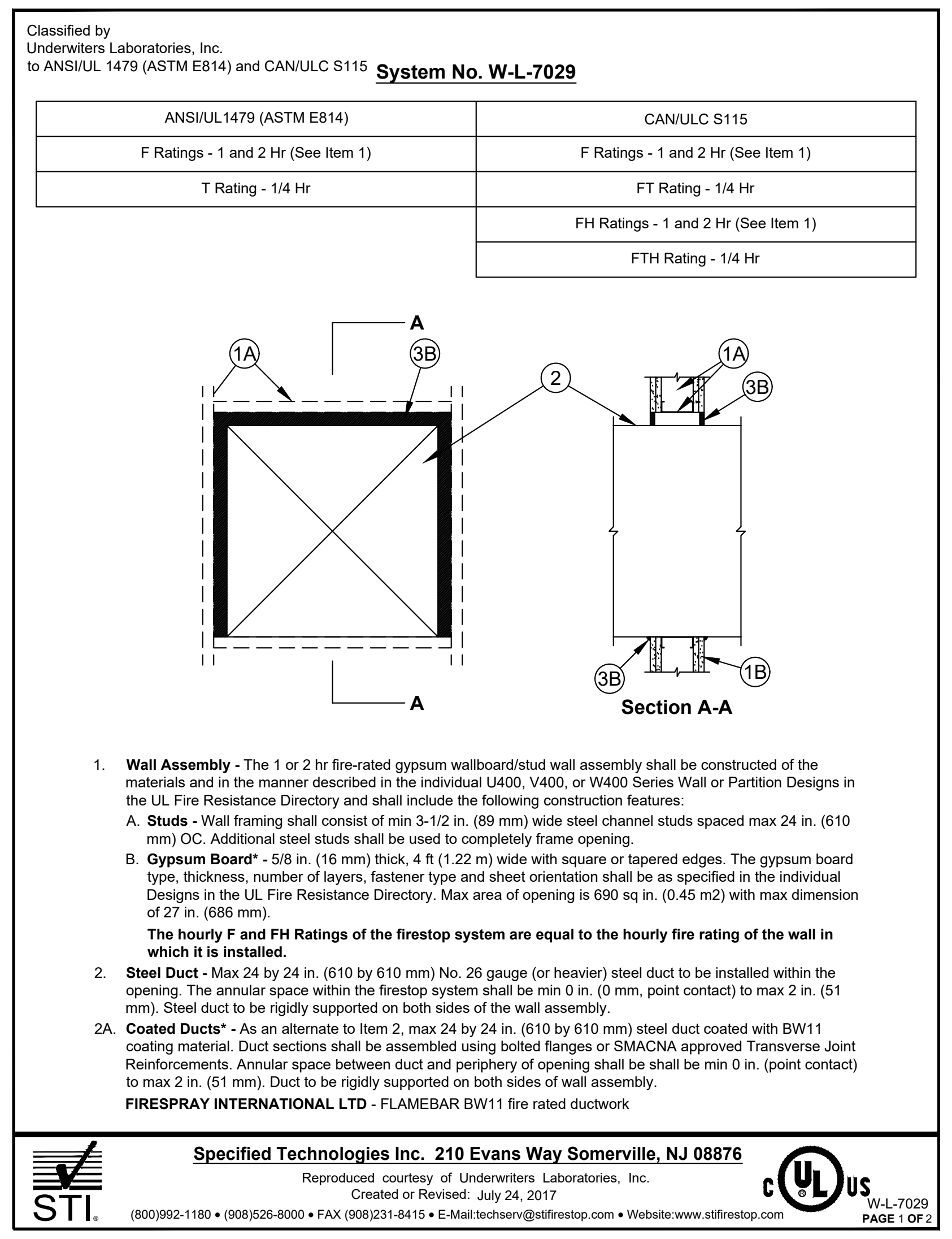
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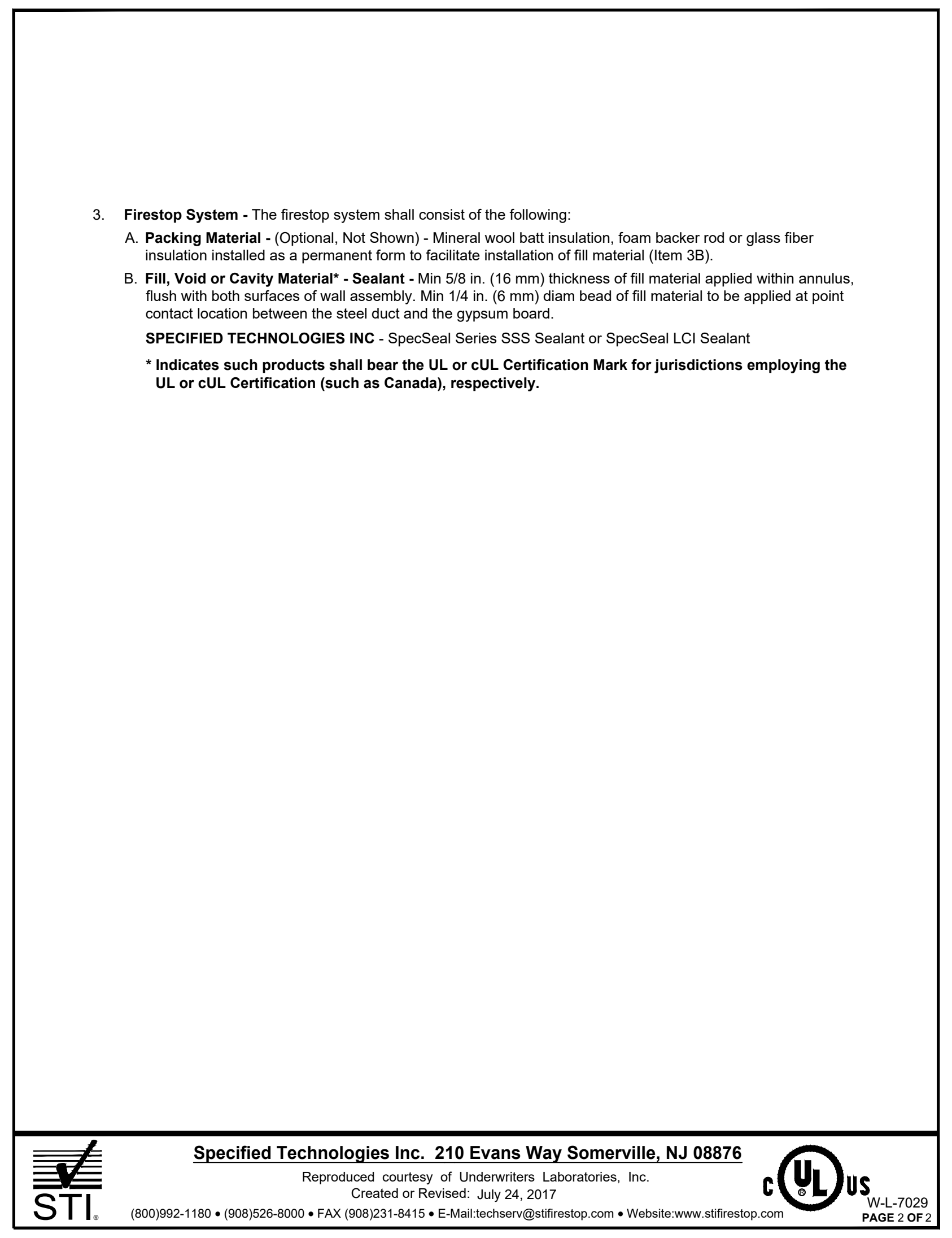

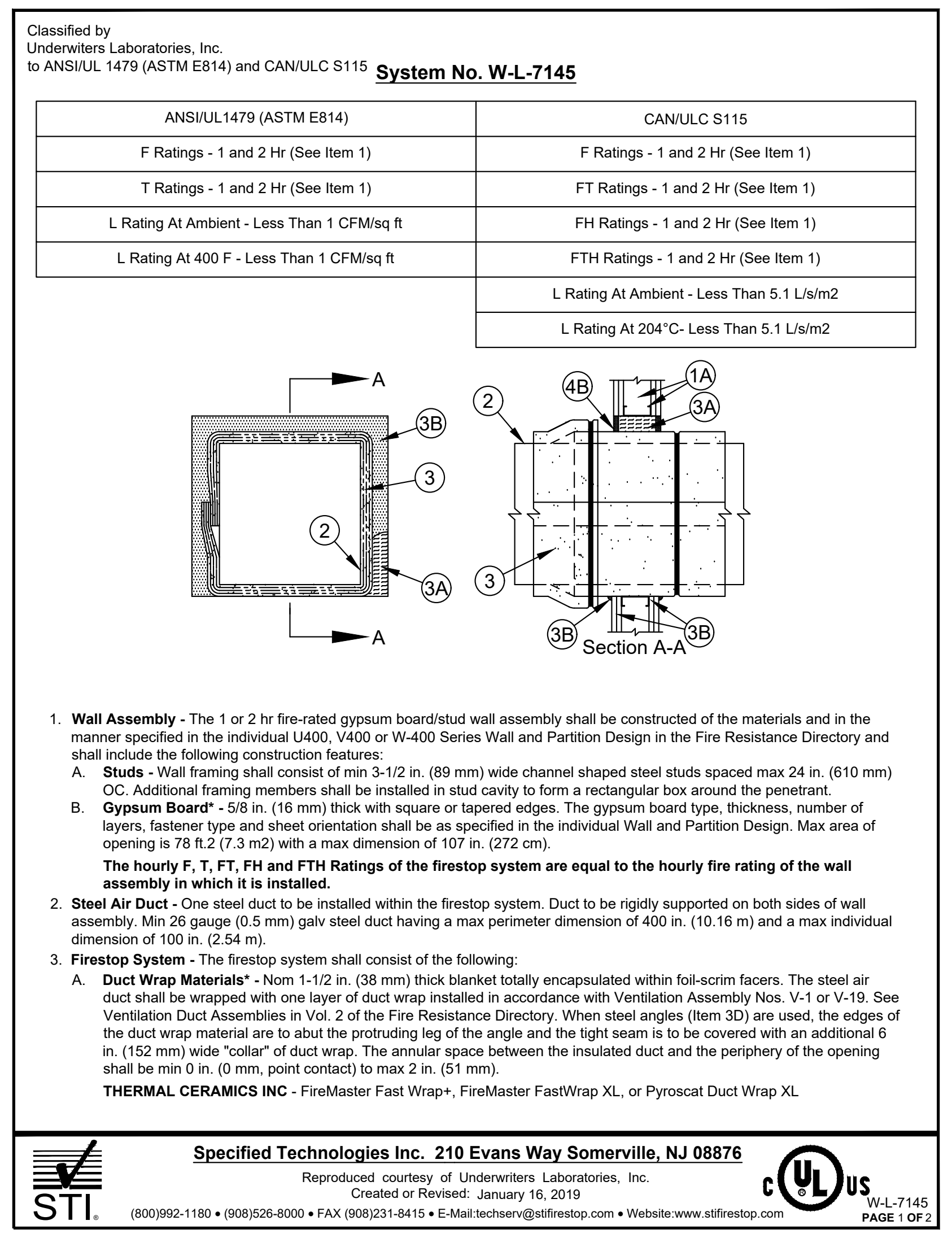
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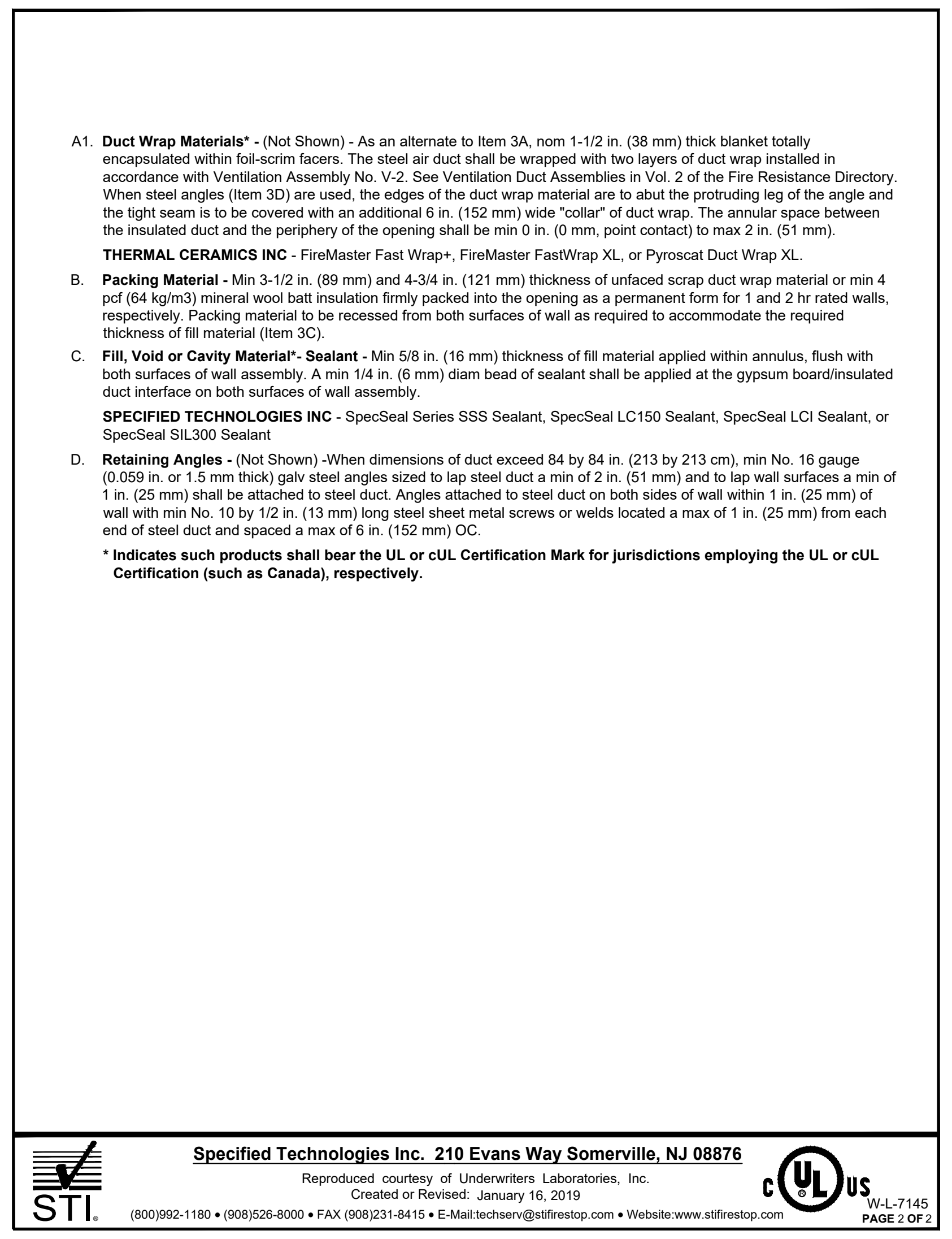

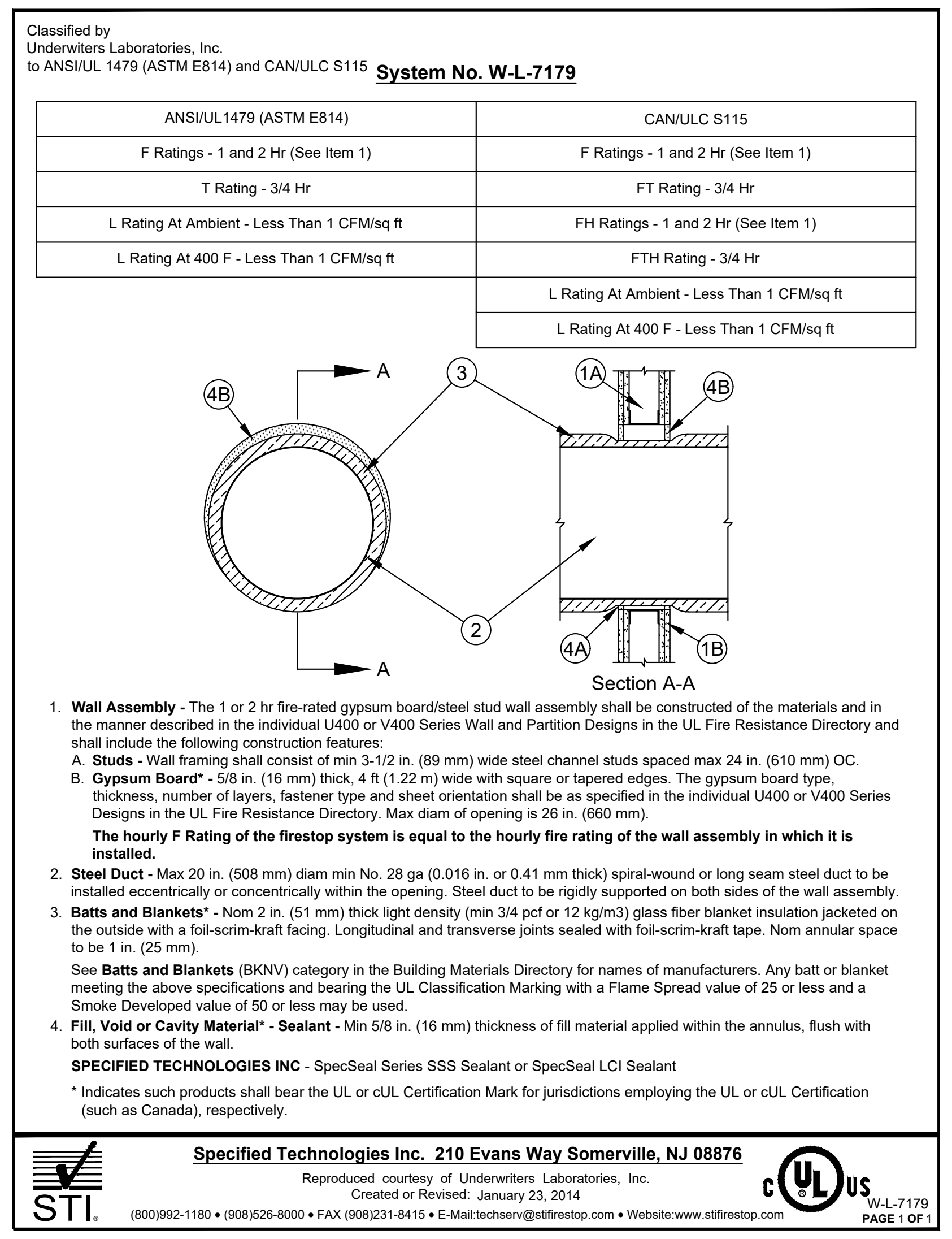
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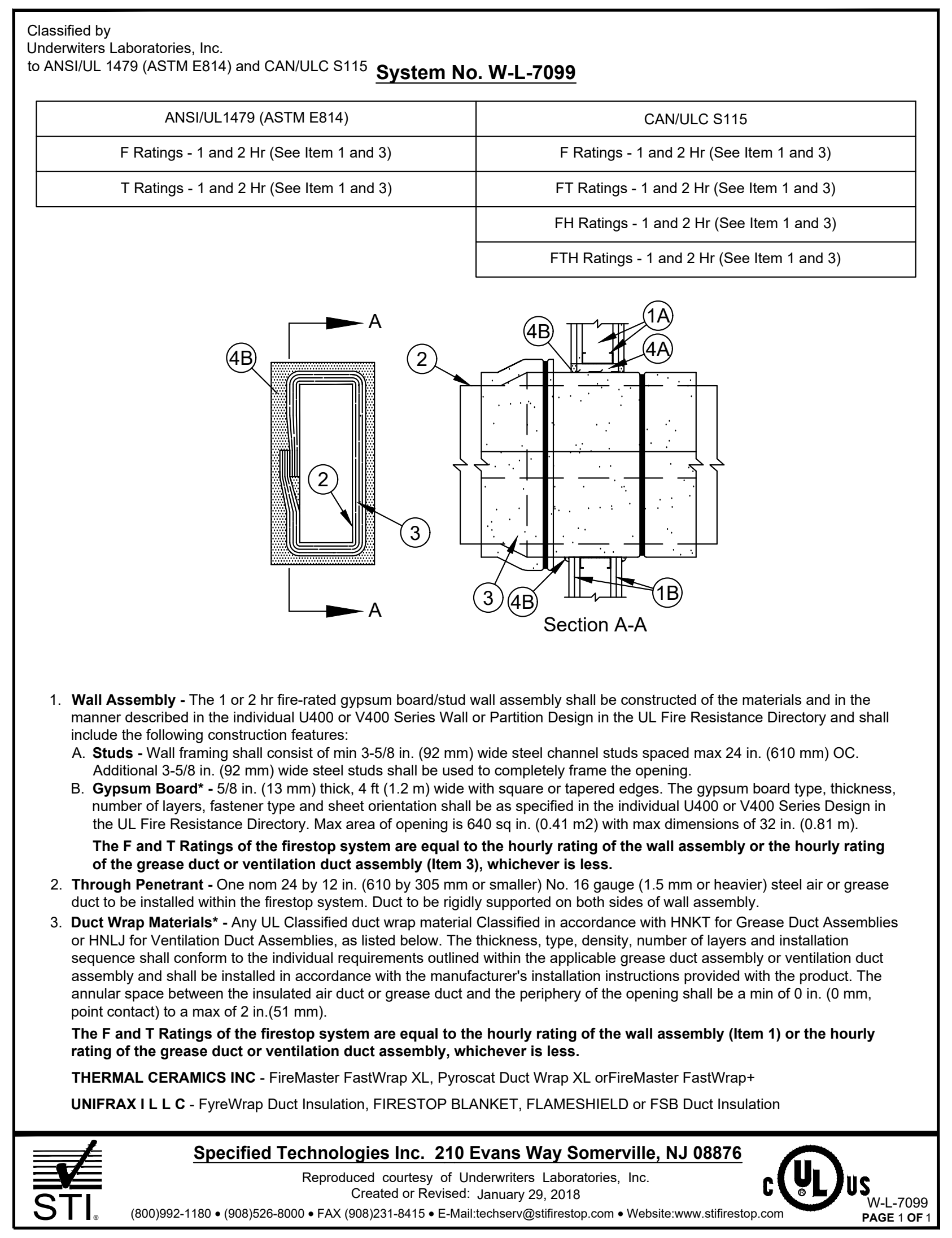
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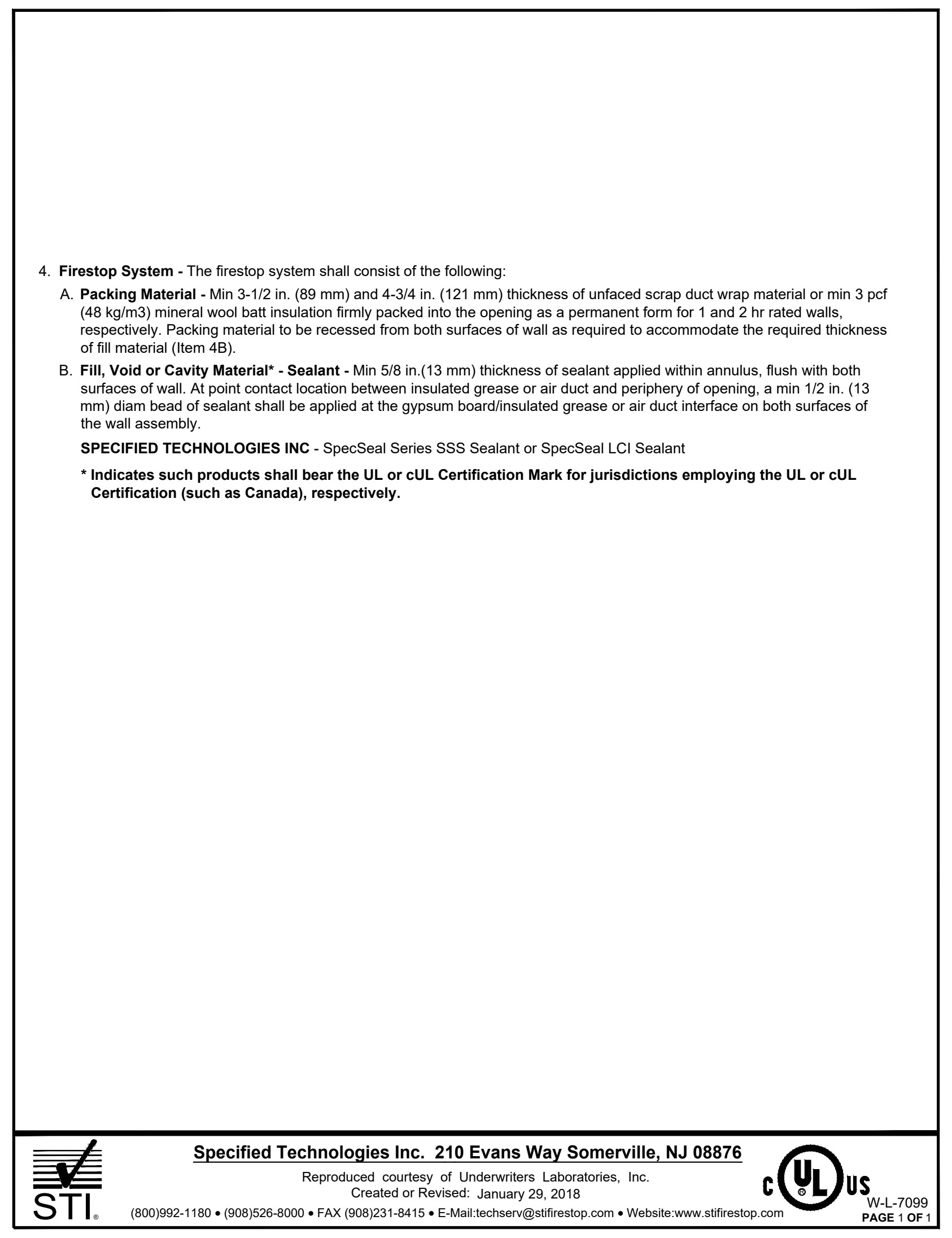

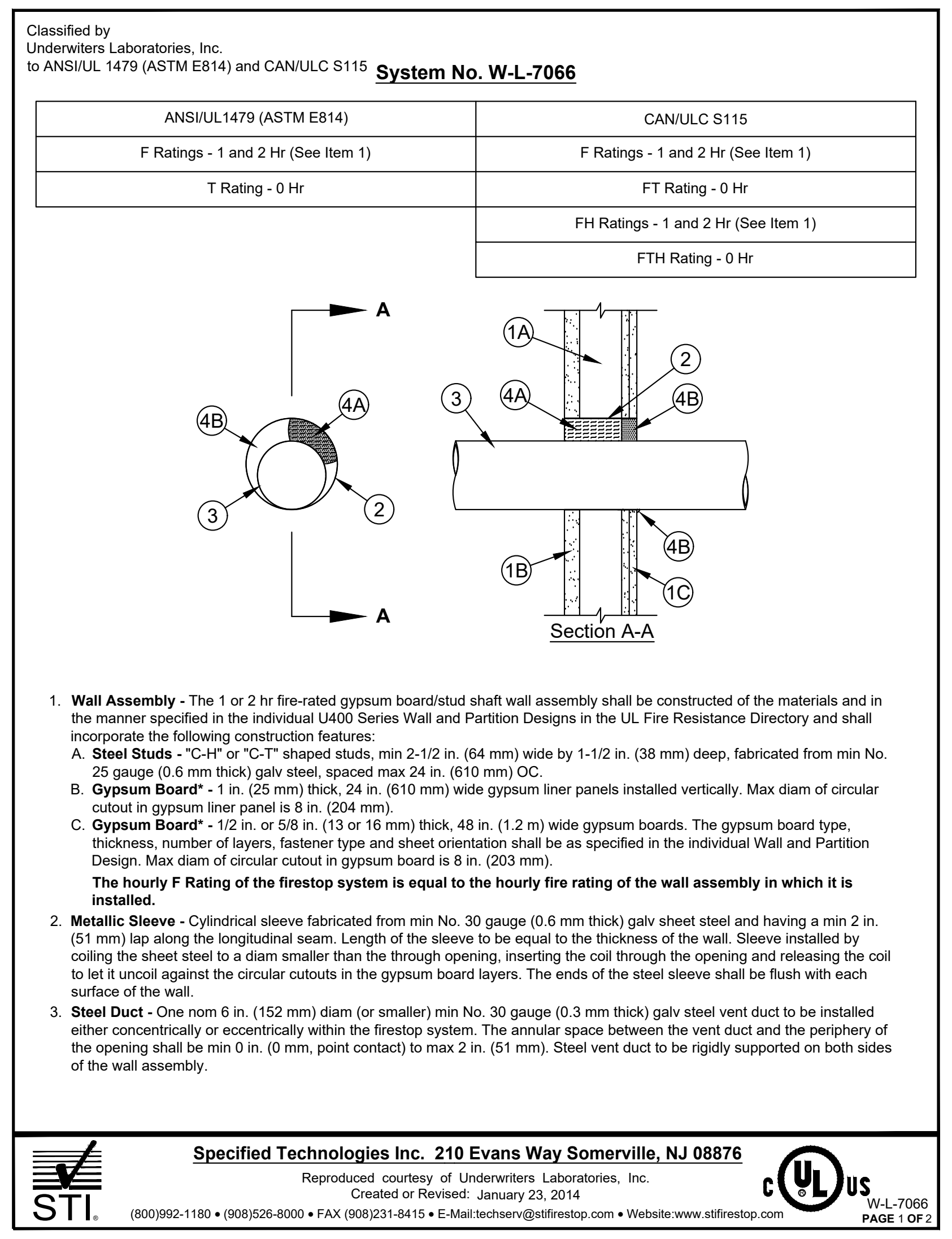
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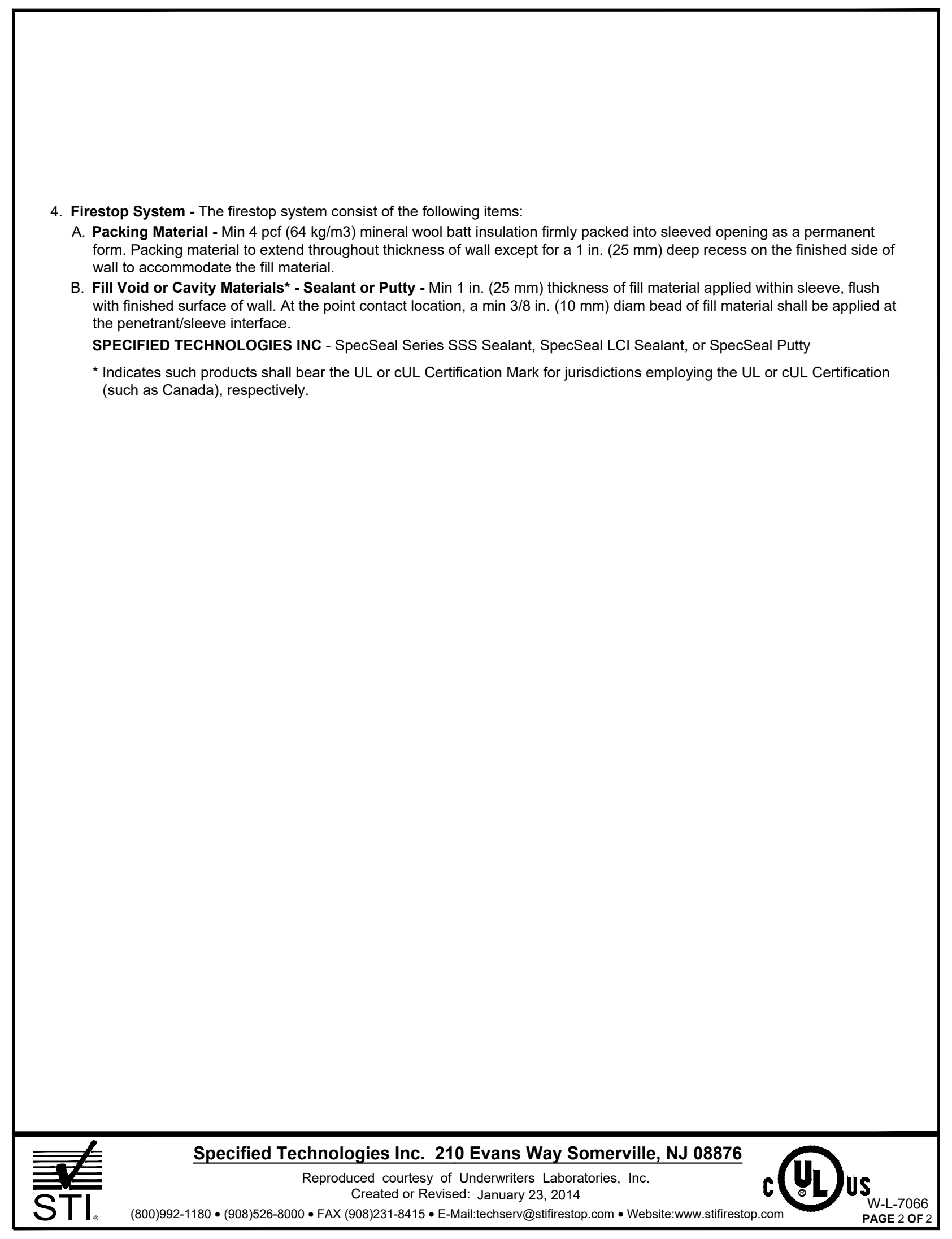

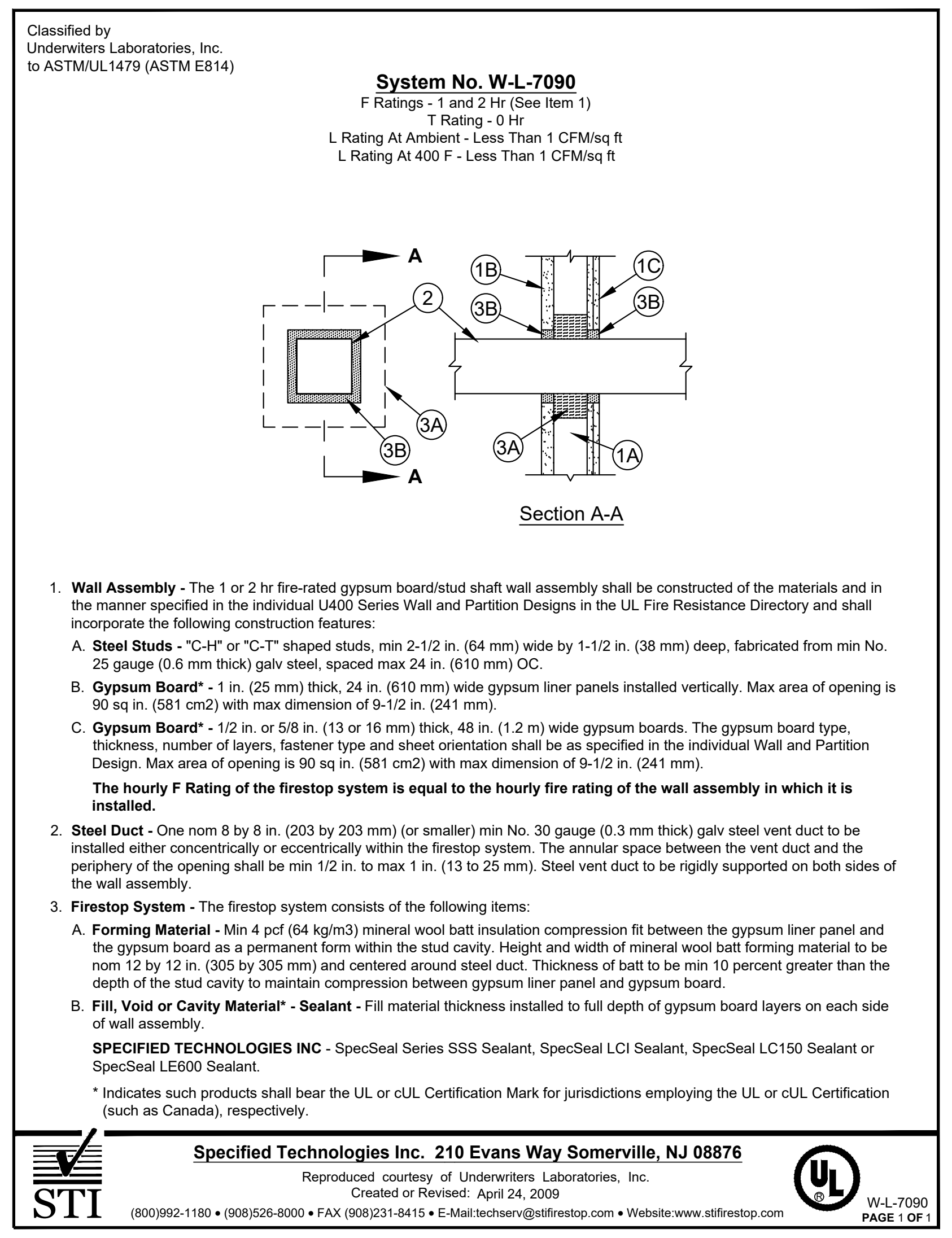
System No. W-L-7090

GENERAL NOTES:

1. Refer to section 07 84 00 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
2. Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   - Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.
3. If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   - UL Fire Resistance Directory; Current Edition
   - NFPA 101 Life Safety Code
   - All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

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Website:www.stifirestop.com

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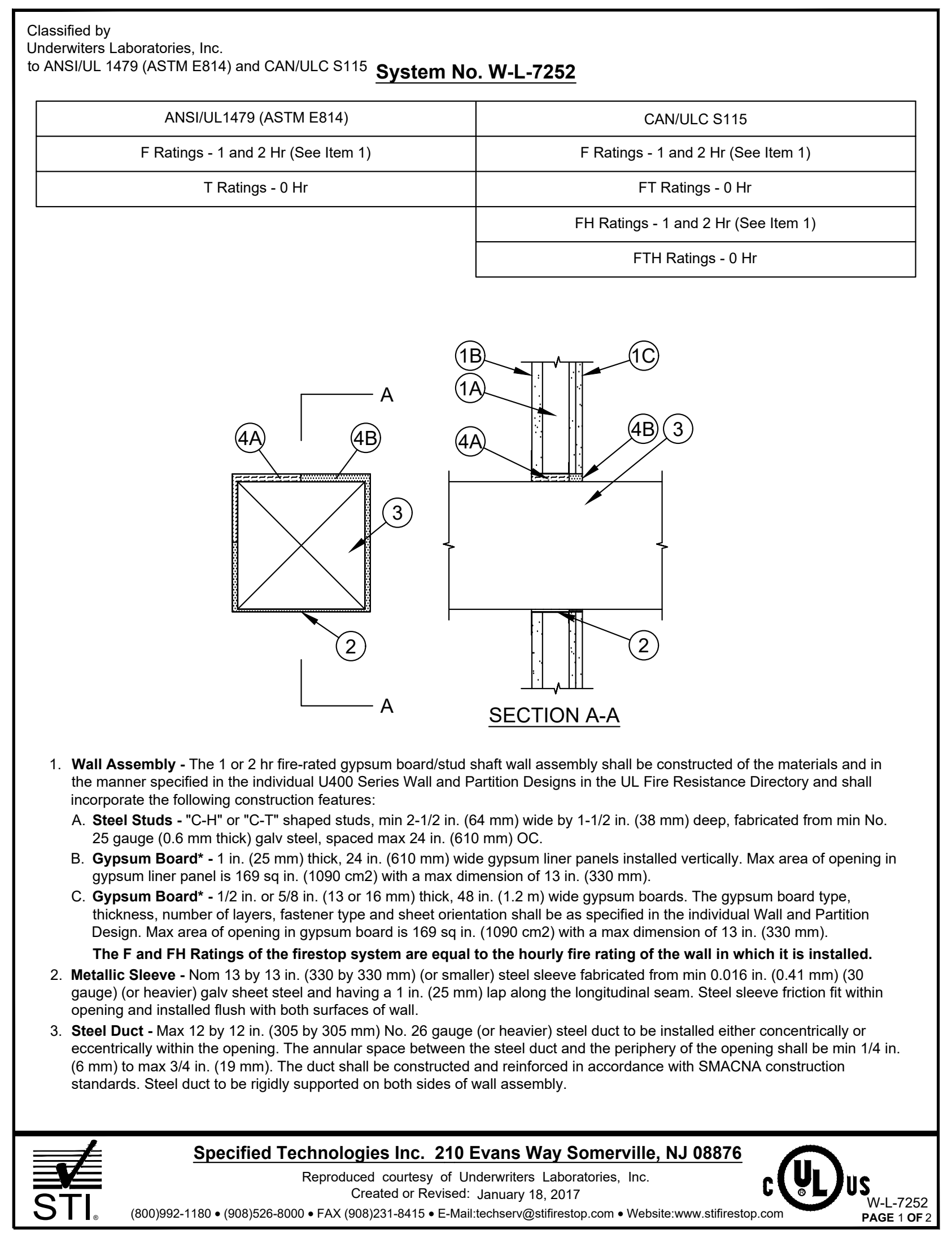

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-7252**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 0 Hr	FT Ratings - 0 Hr
	FH Ratings - 1 and 2 Hr (See Item 1)
	FTH Ratings - 0 Hr

1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud shaft wall assembly shall be constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
   A. **Steel Studs -** "C-H" or "C-T" shaped studs, min 2-1/2 in. (64 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from min No. 25 gauge (0.6 mm thick) galv steel, spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** 1 in. (25 mm) thick, 24 in. (610 mm) wide gypsum liner panels installed vertically. Max area of opening in gypsum liner panel is 169 sq in. (1090 cm2) with a max dimension of 13 in. (330 mm).
   C. **Gypsum Board* -** 1/2 in. or 5/8 in. (13 or 16 mm) thick, 48 in. (1.2 m) wide gypsum boards. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max area of opening in gypsum board is 169 sq in. (1090 cm2) with a max dimension of 13 in. (330 mm).

   The F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall in which it is installed.
2. **Metallic Sleeve -** Nom 13 by 13 in. (330 by 330 mm) (or smaller) steel sleeve fabricated from min 0.016 in. (0.41 mm) (30 gauge) (or heavier) galv sheet steel and having a 1 in. (25 mm) lap along the longitudinal seam. Steel sleeve friction fit within opening and installed flush with both surfaces of wall.
3. **Steel Duct -** Max 12 by 12 in. (305 by 305 mm) No. 26 gauge (or heavier) steel duct to be installed either concentrically or eccentrically within the opening. The annular space between the steel duct and the periphery of the opening shall be min 1/4 in. (6 mm) to max 3/4 in. (19 mm). The duct shall be constructed and reinforced in accordance with SMACNA construction standards. Steel duct to be rigidly supported on both sides of wall assembly.

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W-L-7252
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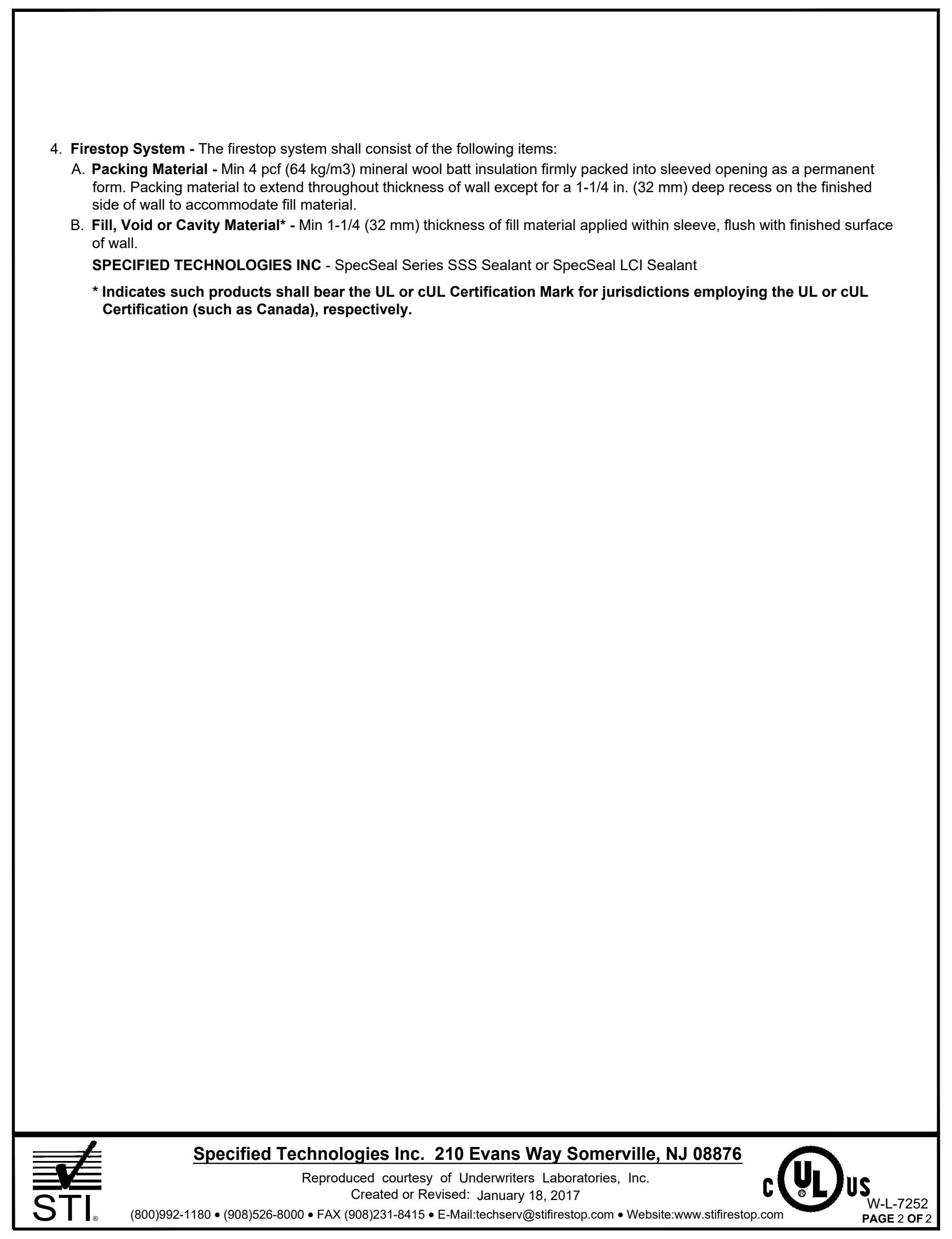

4. **Firestop System -** The firestop system shall consist of the following items:
   A. **Packing Material -** Min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into sleeved opening as a permanent form. Packing material to extend throughout thickness of wall except for a 1-1/4 in. (32 mm) deep recess on the finished side of wall to accommodate fill material.
   B. **Fill, Void or Cavity Material* -** Min 1-1/4 (32 mm) thickness of fill material applied within sleeve, flush with finished surface of wall.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant

   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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W-L-7252
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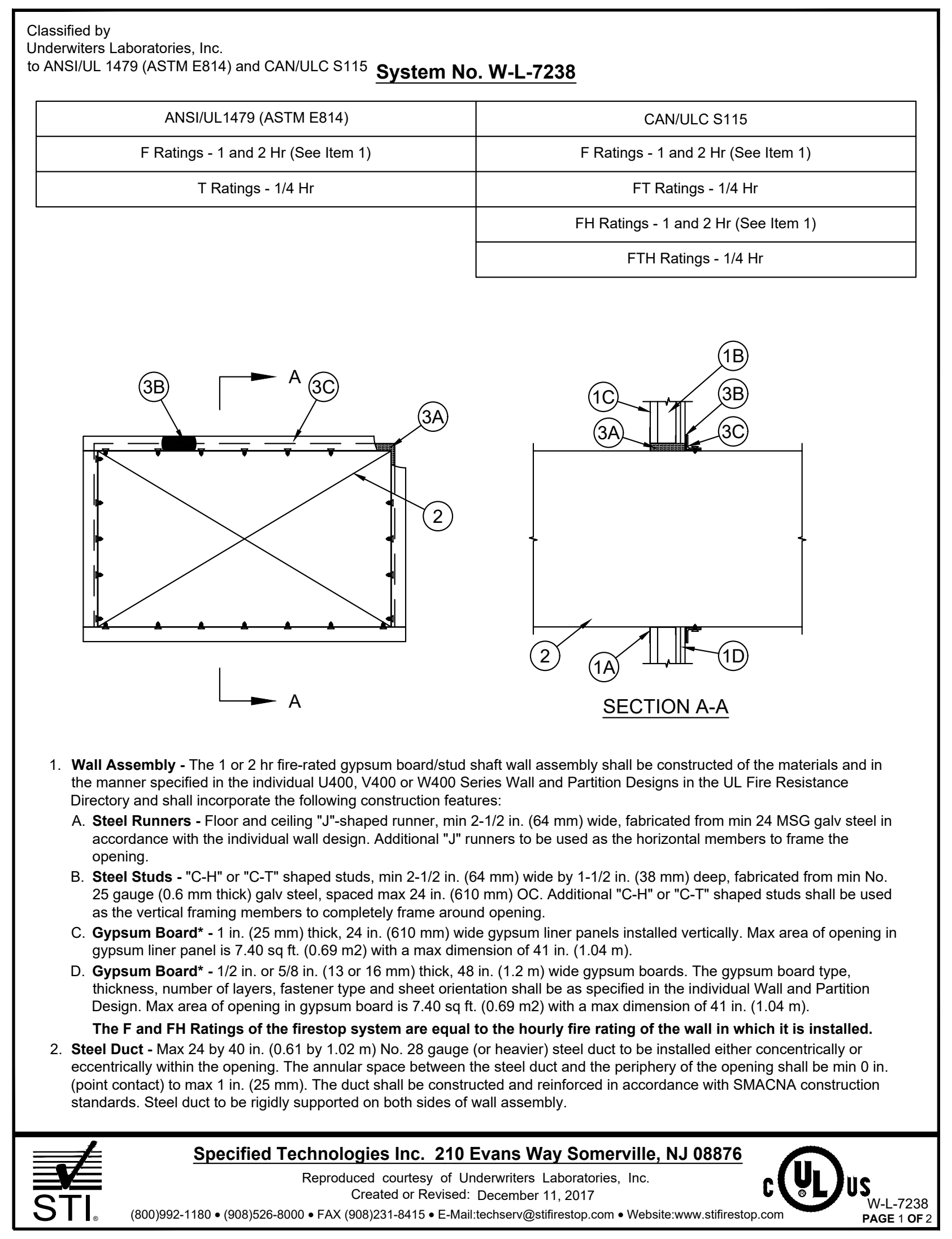

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-7238**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 1/4 Hr	FT Ratings - 1/4 Hr
	FH Ratings - 1 and 2 Hr (See Item 1)
	FTH Ratings - 1/4 Hr

1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud shaft wall assembly shall be constructed of the materials and in the manner specified in the individual U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
   A. **Steel Runners -** Floor and ceiling "J"-shaped runner, min 2-1/2 in. (64 mm) wide, fabricated from min 24 MSG galv steel in accordance with the individual wall design. Additional "J" runners to be used as the horizontal members to frame the opening.
   B. **Steel Studs -** "C-H" or "C-T" shaped studs, min 2-1/2 in. (64 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from min No. 25 gauge (0.6 mm thick) galv steel, spaced max 24 in. (610 mm) OC. Additional "C-H" or "C-T" shaped studs shall be used as the vertical framing members to completely frame around opening.
   C. **Gypsum Board* -** 1 in. (25 mm) thick, 24 in. (610 mm) wide gypsum liner panels installed vertically. Max area of opening in gypsum liner panel is 7.40 sq ft. (0.69 m2) with a max dimension of 41 in. (1.04 m).
   D. **Gypsum Board* -** 1/2 in. or 5/8 in. (13 or 16 mm) thick, 48 in. (1.2 m) wide gypsum boards. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max area of opening in gypsum board is 7.40 sq ft. (0.69 m2) with a max dimension of 41 in. (1.04 m).

   The F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall in which it is installed.
2. **Steel Duct -** Max 24 by 40 in. (0.61 by 1.02 m) No. 28 gauge (or heavier) steel duct to be installed either concentrically or eccentrically within the opening. The annular space between the steel duct and the periphery of the opening shall be min 0 in. (point contact) to max 1 in. (25 mm). The duct shall be constructed and reinforced in accordance with SMACNA construction standards. Steel duct to be rigidly supported on both sides of wall assembly.

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W-L-7238
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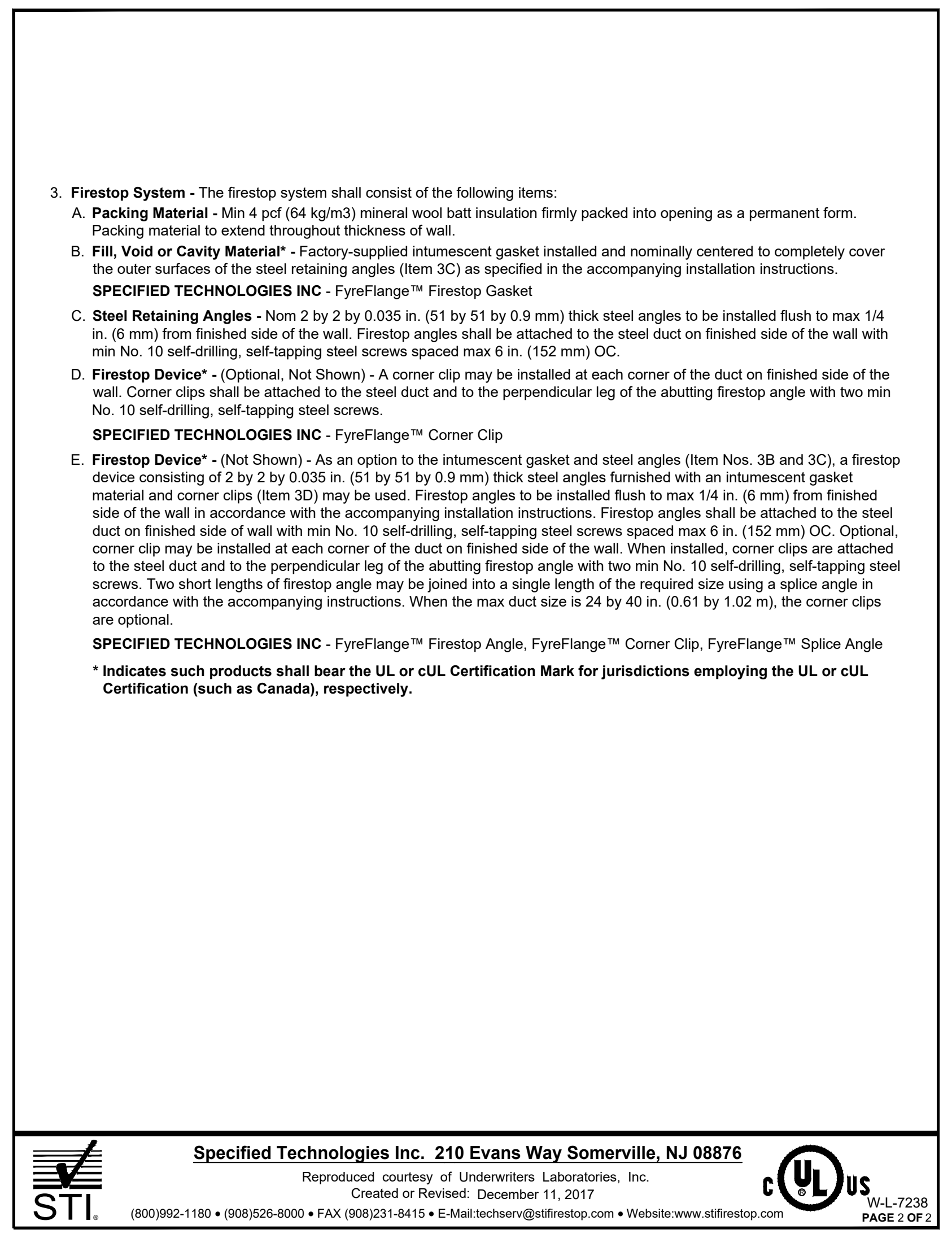

3. **Firestop System -** The firestop system shall consist of the following items:
   A. **Packing Material -** Min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to extend throughout thickness of wall.
   B. **Fill, Void or Cavity Material* -** Factory-supplied intumescent gasket installed and nominally centered to completely cover the outer surfaces of the steel retaining angles (Item 3C) as specified in the accompanying installation instructions.

   SPECIFIED TECHNOLOGIES INC - FyreFlange™ Firestop Gasket
   C. **Steel Retaining Angles -** Nom 2 by 2 by 0.035 in. (51 by 51 by 0.9 mm) thick steel angles to be installed flush to max 1/4 in. (6 mm) from finished side of the wall. Firestop angles shall be attached to the steel duct on finished side of the wall with min No. 10 self-drilling, self-tapping steel screws spaced max 6 in. (152 mm) OC.
   D. **Firestop Device* -** (Optional, Not Shown) - A corner clip may be installed at each corner of the duct on finished side of the wall. Corner clips shall be attached to the steel duct and to the perpendicular leg of the abutting firestop angle with two min No. 10 self-drilling, self-tapping steel screws.

   SPECIFIED TECHNOLOGIES INC - FyreFlange™ Corner Clip
   E. **Firestop Device* -** (Not Shown) - As an option to the intumescent gasket and steel angles (Item Nos. 3B and 3C), a firestop device consisting of 2 by 2 by 0.035 in. (51 by 51 by 0.9 mm) thick steel angles furnished with an intumescent gasket material and corner clips (Item 3D) may be used. Firestop angles to be installed flush to max 1/4 in. (6 mm) from finished side of the wall in accordance with the accompanying installation instructions. Firestop angles shall be attached to the steel duct on finished side of wall with min No. 10 self-drilling, self-tapping steel screws spaced max 6 in. (152 mm) OC. Optional, corner clip may be installed at each corner of the duct on finished side of the wall. When installed, corner clips are attached to the steel duct and to the perpendicular leg of the abutting firestop angle with two min No. 10 self-drilling, self-tapping steel screws. Two short lengths of firestop angle may be joined into a single length of the required size using a splice angle in accordance with the accompanying instructions. When the max duct size is 24 by 40 in. (0.61 by 1.02 m), the corner clips are optional.

   SPECIFIED TECHNOLOGIES INC - FyreFlange™ Firestop Angle, FyreFlange™ Corner Clip, FyreFlange™ Splice Angle

   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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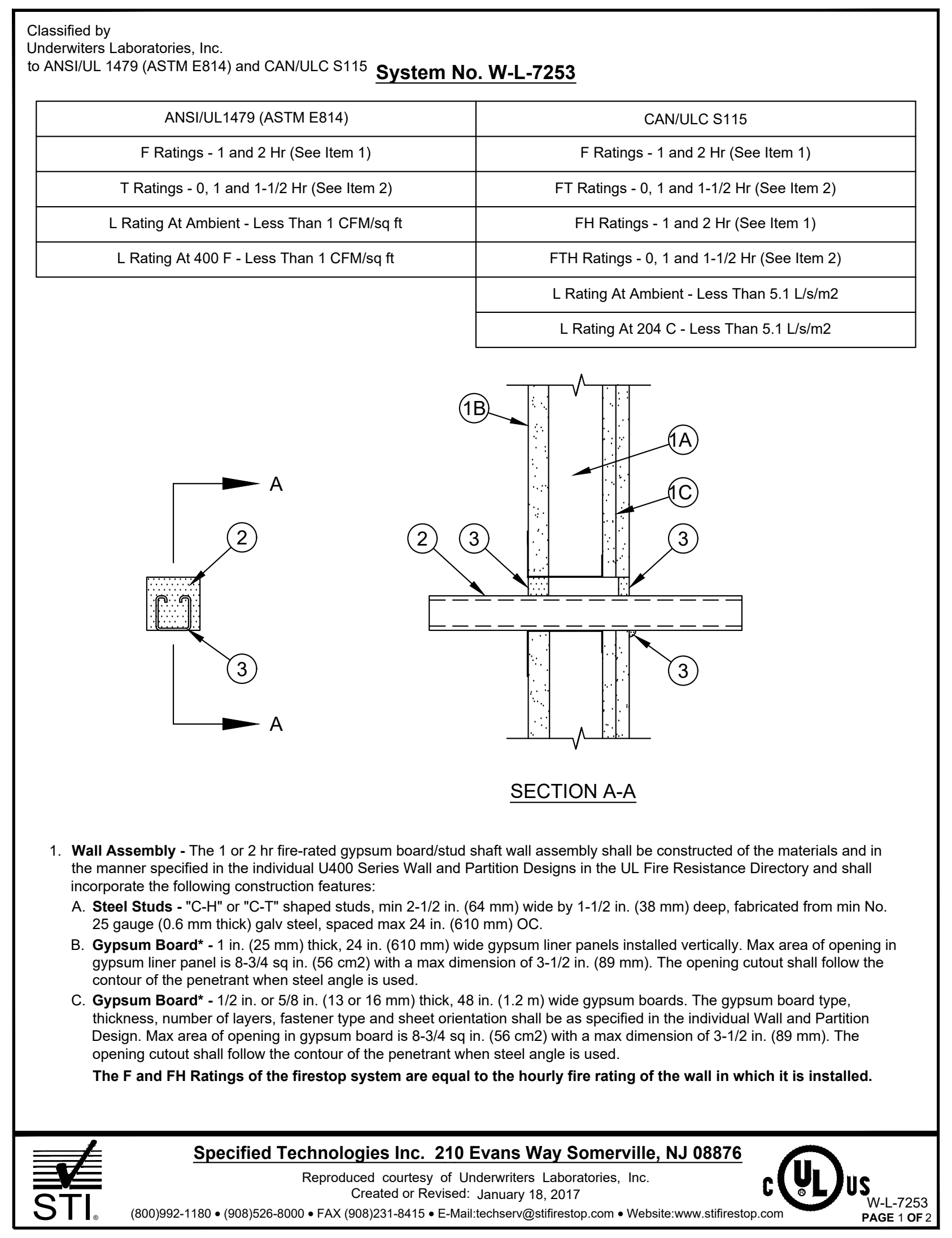

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-7253**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 0, 1 and 1-1/2 Hr (See Item 2)	FT Ratings - 0, 1 and 1-1/2 Hr (See Item 2)
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Ratings - 1 and 2 Hr (See Item 1)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Ratings - 0, 1 and 1-1/2 Hr (See Item 2)
	L Rating At Ambient - Less Than 5.1 L/s/m2
	L Rating At 204 C - Less Than 5.1 L/s/m2

1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud shaft wall assembly shall be constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
   A. **Steel Studs -** "C-H" or "C-T" shaped studs, min 2-1/2 in. (64 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from min No. 25 gauge (0.6 mm thick) galv steel, spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** 1 in. (25 mm) thick, 24 in. (610 mm) wide gypsum liner panels installed vertically. Max area of opening in gypsum liner panel is 8-3/4 sq in. (56 cm2) with a max dimension of 3-1/2 in. (89 mm). The opening cutout shall follow the contour of the penetrant when steel angle is used.
   C. **Gypsum Board* -** 1/2 in. or 5/8 in. (13 or 16 mm) thick, 48 in. (1.2 m) wide gypsum boards. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max area of opening in gypsum board is 8-3/4 sq in. (56 cm2) with a max dimension of 3-1/2 in. (89 mm). The opening cutout shall follow the contour of the penetrant when steel angle is used.

   The F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall in which it is installed.

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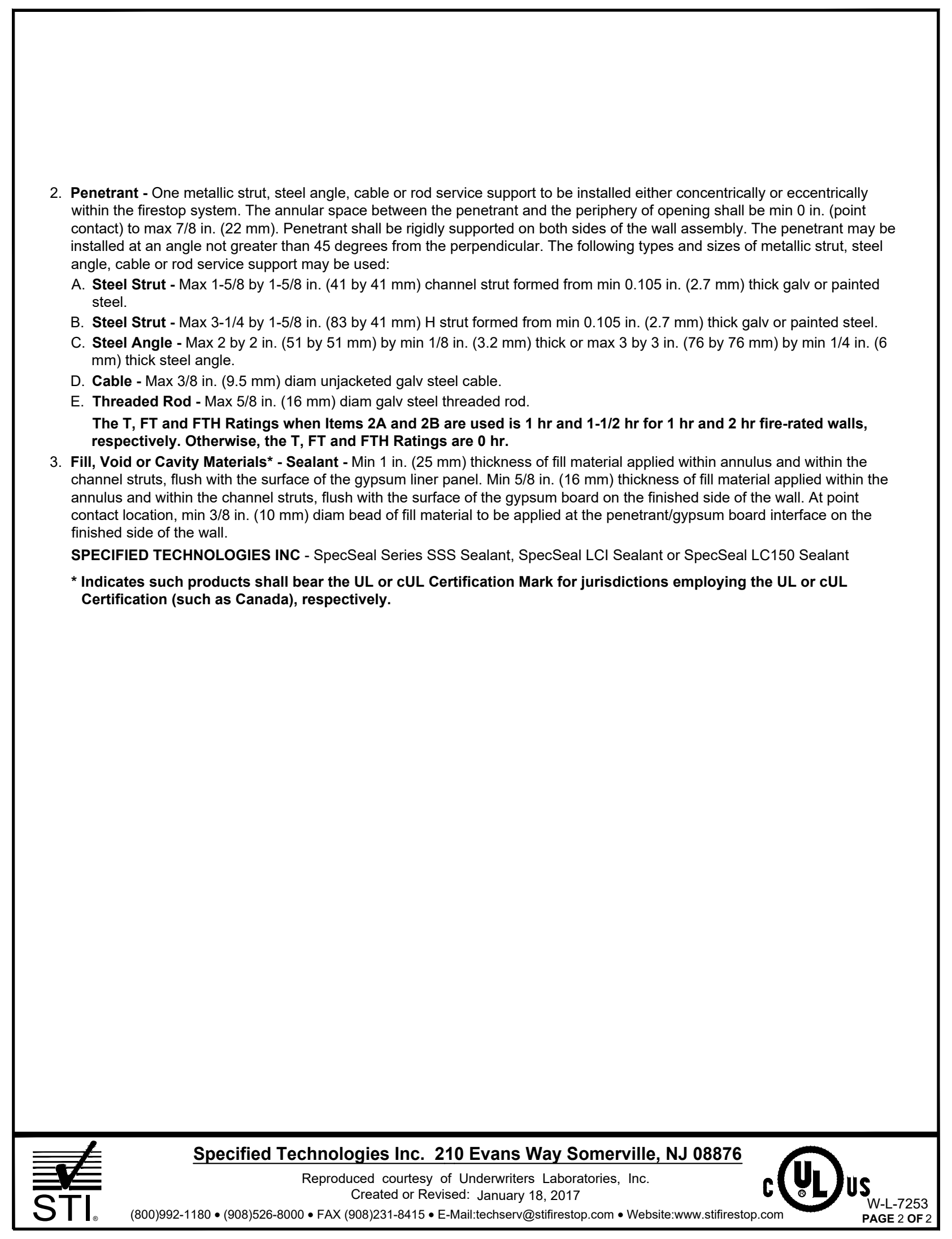

2. **Penetrant -** One metallic strut, steel angle, cable or rod service support to be installed either concentrically or eccentrically within the firestop system. The annular space between the penetrant and the periphery of opening shall be min 0 in. (point contact) to max 7/8 in. (22 mm). Penetrant shall be rigidly supported on both sides of the wall assembly. The penetrant may be installed at an angle not greater than 45 degrees from the perpendicular. The following types and sizes of metallic strut, steel angle, cable or rod service support may be used:
   A. **Steel Strut -** Max 1-5/8 by 1-5/8 in. (41 by 41 mm) channel strut formed from min 0.105 in. (2.7 mm) thick galv or painted steel.
   B. **Steel Strut -** Max 3-1/4 by 1-5/8 in. (83 by 41 mm) H strut formed from min 0.105 in. (2.7 mm) thick galv or painted steel.
   C. **Steel Angle -** Max 2 by 2 in. (51 by 51 mm) by min 1/8 in. (3.2 mm) thick or max 3 by 3 in. (76 by 76 mm) by min 1/4 in. (6 mm) thick steel angle.
   D. **Cable -** Max 3/8 in. (9.5 mm) diam unjacketed galv steel cable.
   E. **Threaded Rod -** Max 5/8 in. (16 mm) diam galv steel threaded rod.

   The T, FT and FTH Ratings when Items 2A and 2B are used is 1 hr and 1-1/2 hr for 1 hr and 2 hr fire-rated walls, respectively. Otherwise, the T, FT and FTH Ratings are 0 hr.
3. **Fill, Void or Cavity Materials* - Sealant -** Min 1 in. (25 mm) thickness of fill material applied within annulus and within the channel struts, flush with the surface of the gypsum liner panel. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus and within the channel struts, flush with the surface of the gypsum board on the finished side of the wall. At point contact location, min 3/8 in. (10 mm) diam bead of fill material to be applied at the penetrant/gypsum board interface on the finished side of the wall.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant or SpecSeal LC150 Sealant

   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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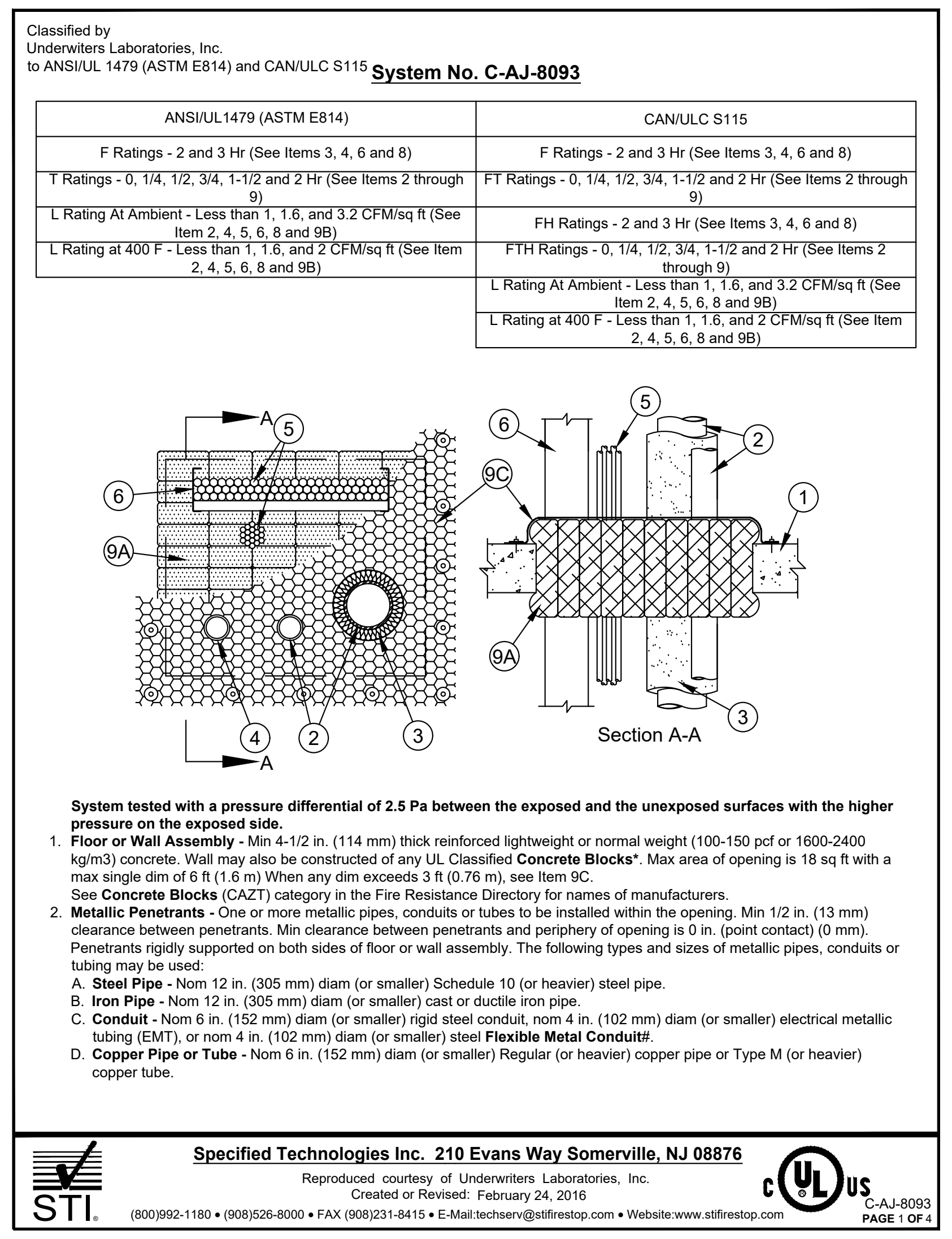

Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. C-AJ-8093**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 2 and 3 Hr (See Items 3, 4, 6 and 8)	F Ratings - 2 and 3 Hr (See Items 3, 4, 6 and 8)
T Ratings - 0, 1/4, 1/2, 3/4, 1-1/2 and 2 Hr (See Items 2 through 9)	FT Ratings - 0, 1/4, 1/2, 3/4, 1-1/2 and 2 Hr (See Items 2 through 9)
L Rating At Ambient - Less than 1, 1.6, and 3.2 CFM/sq ft (See Item 2, 4, 5, 6, 8 and 9B)	FH Ratings - 2 and 3 Hr (See Items 3, 4, 6 and 8)
L Rating at 400 F - Less than 1, 1.6, and 2 CFM/sq ft (See Item 2, 4, 5, 6, 8 and 9B)	FTH Ratings - 0, 1/4, 1/2, 3/4, 1-1/2 and 2 Hr (See Items 2 through 9)
	L Rating At Ambient - Less than 1, 1.6, and 3.2 CFM/sq ft (See Item 2, 4, 5, 6, 8 and 9B)
	L Rating at 400 F - Less than 1, 1.6, and 2 CFM/sq ft (See Item 2, 4, 5, 6, 8 and 9B)

System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.
1. **Floor or Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max area of opening is 18 sq ft with a max single dim of 6 ft (1.6 m) When any dim exceeds 3 ft (0.76 m), see Item 9C.
   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Metallic Penetrants -** One or more metallic pipes, conduits or tubes to be installed within the opening. Min 1/2 in. (13 mm) clearance between penetrants. Min clearance between penetrants and periphery of opening is 0 in. (point contact) (0 mm). Penetrants rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. **Steel Pipe -** Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Conduit -** Nom 6 in. (152 mm) diam (or smaller) rigid steel conduit, nom 4 in. (102 mm) diam (or smaller) electrical metallic tubing (EMT), or nom 4 in. (102 mm) diam (or smaller) steel **Flexible Metal Conduit#**.
   D. **Copper Pipe or Tube -** Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe or Type M (or heavier) copper tube.

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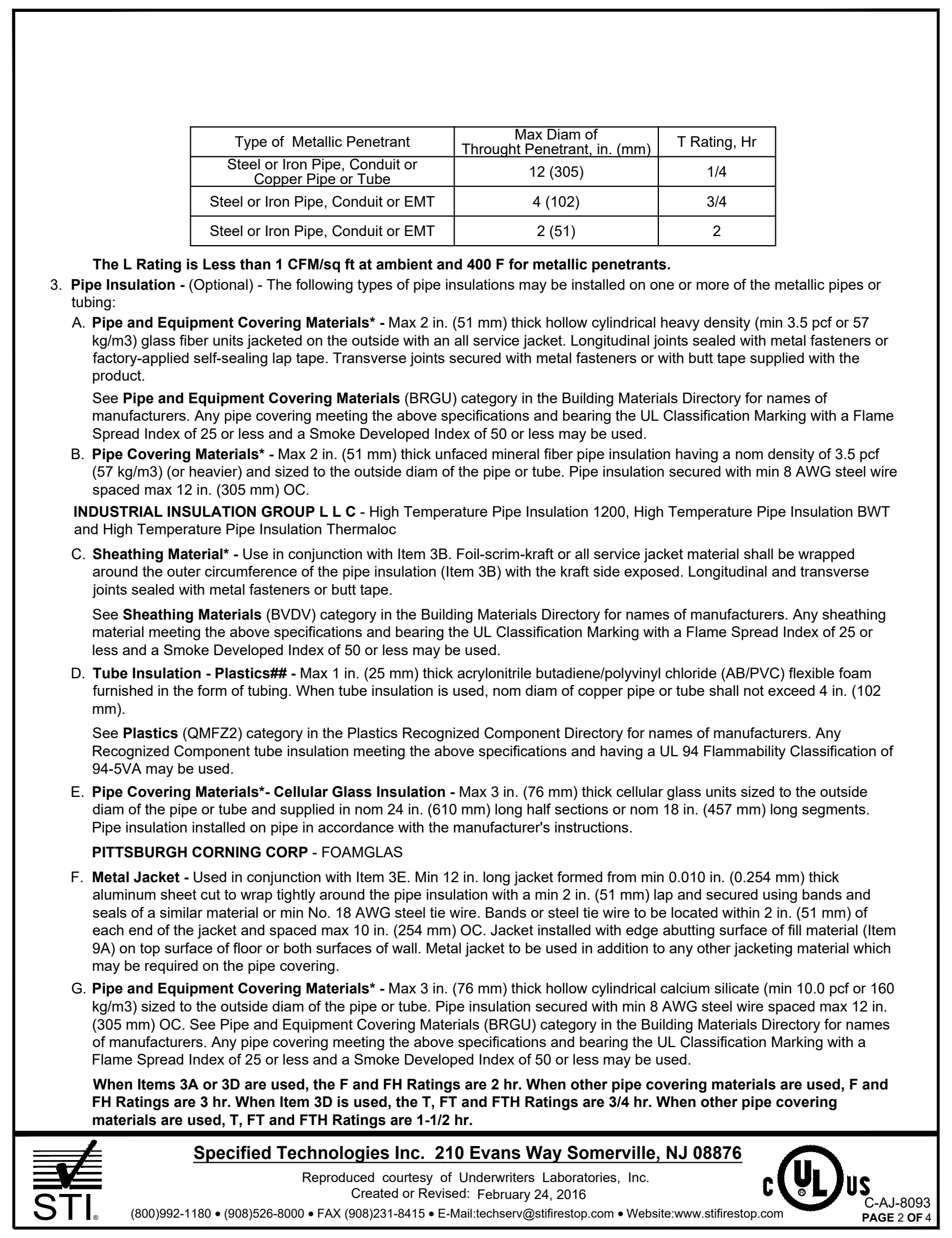

Type of Metallic Penetrant	Max Diam of Throught Penetrant, in. (mm)	T Rating, Hr
Steel or Iron Pipe, Conduit or Copper Pipe or Tube	12 (305)	1/4
Steel or Iron Pipe, Conduit or EMT	4 (102)	3/4
Steel or Iron Pipe, Conduit or EMT	2 (51)	2

The L Rating is Less than 1 CFM/sq ft at ambient and 400 F for metallic penetrants.

3. **Pipe Insulation -** (Optional) - The following types of pipe insulations may be installed on one or more of the metallic pipes or tubing:
   A. **Pipe and Equipment Covering Materials* -** Max 2 in. (51 mm) thick hollow cylindrical heavy density (min 3.5 pcf or 57 kg/m3) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product.

   See **Pipe and Equipment Covering Materials** (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
   B. **Pipe Covering Materials* -** Max 2 in. (51 mm) thick unfaced mineral fiber pipe insulation having a nom density of 3.5 pcf (57 kg/m3) (or heavier) and sized to the outside diam of the pipe or tube. Pipe insulation secured with min 8 AWG steel wire spaced max 12 in. (305 mm) OC.

   INDUSTRIAL INSULATION GROUP L L C - High Temperature Pipe Insulation 1200, High Temperature Pipe Insulation BWT and High Temperature Pipe Insulation Thermaloc
   C. **Sheathing Material* -** Use in conjunction with Item 3B. Foil-scrim-kraft or all service jacket material shall be wrapped around the outer circumference of the pipe insulation (Item 3B) with the kraft side exposed. Longitudinal and transverse joints sealed with metal fasteners or butt tape.

   See **Sheathing Materials** (BVDV) category in the Building Materials Directory for names of manufacturers. Any sheathing material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
   D. **Tube Insulation - Plastics## -** Max 1 in. (25 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. When tube insulation is used, nom diam of copper pipe or tube shall not exceed 4 in. (102 mm).

   See **Plastics** (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.
   E. **Pipe Covering Materials*- Cellular Glass Insulation -** Max 3 in. (76 mm) thick cellular glass units sized to the outside diam of the pipe or tube and supplied in nom 24 in. (610 mm) long half sections or nom 18 in. (457 mm) long segments. Pipe insulation installed on pipe in accordance with the manufacturer's instructions.

   PITTSBURGH CORNING CORP - FOAMGLAS
   F. **Metal Jacket -** Used in conjunction with Item 3E. Min 12 in. long jacket formed from min 0.010 in. (0.254 mm) thick aluminum sheet cut to wrap tightly around the pipe insulation with a min 2 in. (51 mm) lap and secured using bands and seals of a similar material or min No. 18 AWG steel tie wire. Bands or steel tie wire to be located within 2 in. (51 mm) of each end of the jacket and spaced max 10 in. (254 mm) OC. Jacket installed with edge abutting surface of fill material (Item 9A) on top surface of floor or both surfaces of wall. Metal jacket to be used in addition to any other jacketing material which may be required on the pipe covering.
   G. **Pipe and Equipment Covering Materials* -** Max 3 in. (76 mm) thick hollow cylindrical calcium silicate (min 10.0 pcf or 160 kg/m3) sized to the outside diam of the pipe or tube. Pipe insulation secured with min 8 AWG steel wire spaced max 12 in. (305 mm) OC. See Pipe and Equipment Covering Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

   When Items 3A or 3D are used, the F and FH Ratings are 2 hr. When other pipe covering materials are used, F and FH Ratings are 3 hr. When Item 3D is used, the T, FT and FTH Ratings are 3/4 hr. When other pipe covering materials are used, T, FT and FTH Ratings are 1-1/2 hr.

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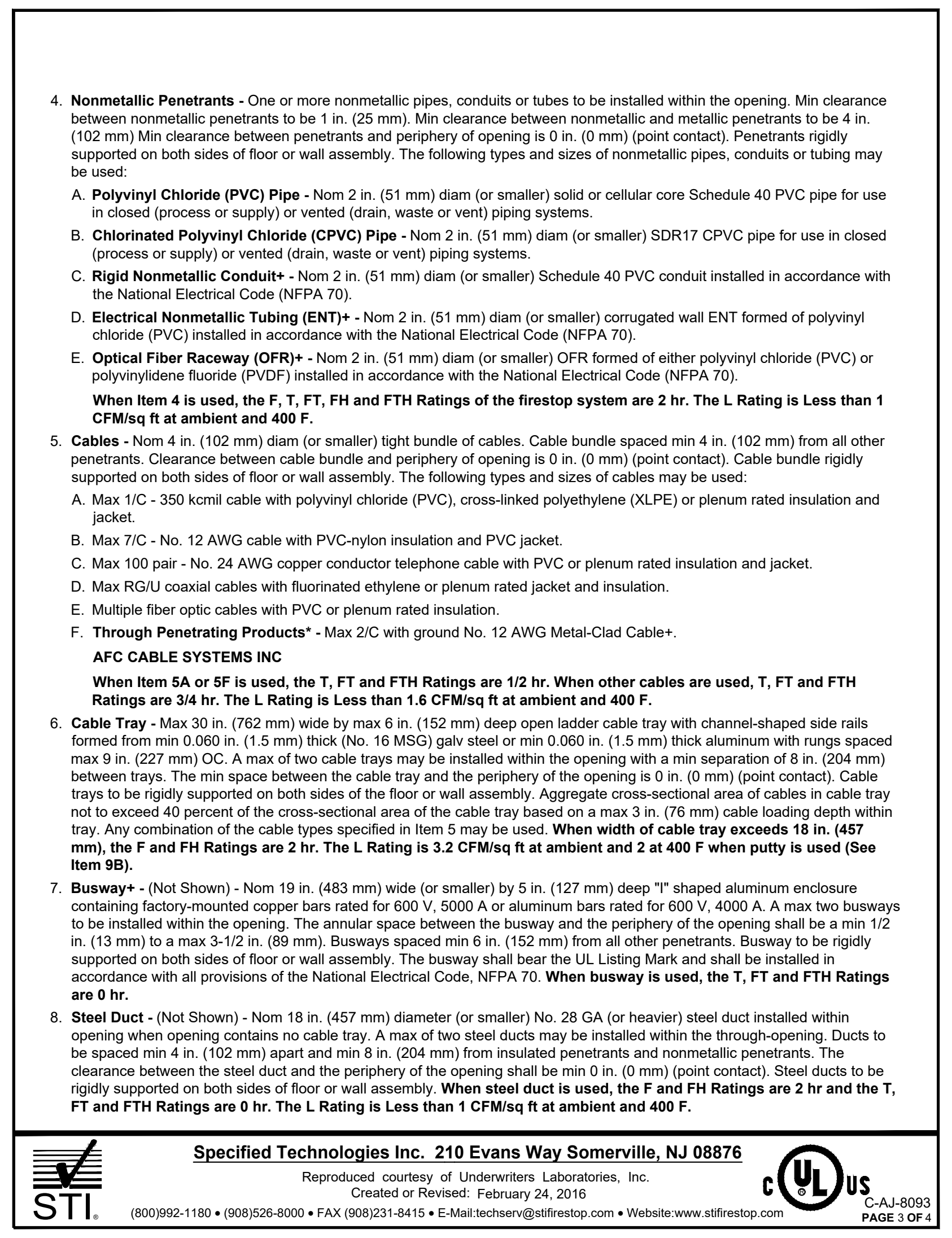

4. **Nonmetallic Penetrants -** One or more nonmetallic pipes, conduits or tubes to be installed within the opening. Min clearance between nonmetallic penetrants to be 1 in. (25 mm). Min clearance between nonmetallic and metallic penetrants to be 4 in. (102 mm) Min clearance between penetrants and periphery of opening is 0 in. (0 mm) (point contact). Penetrants rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes, conduits or tubing may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 2 in. (51 mm) diam (or smaller) solid or cellular core 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. (51 mm) diam (or smaller) SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   C. **Rigid Nonmetallic Conduit+ -** Nom 2 in. (51 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA 70).
   D. **Electrical Nonmetallic Tubing (ENT)+ -** Nom 2 in. (51 mm) diam (or smaller) corrugated wall ENT formed of polyvinyl chloride (PVC) installed in accordance with the National Electrical Code (NFPA 70).
   E. **Optical Fiber Raceway (OFR)+ -** Nom 2 in. (51 mm) diam (or smaller) OFR formed of either polyvinyl chloride (PVC) or polyvinylidene fluoride (PVDF) installed in accordance with the National Electrical Code (NFPA 70).

   When Item 4 is used, the F, T, FT, FH and FTH Ratings of the firestop system are 2 hr. The L Rating is Less than 1 CFM/sq ft at ambient and 400 F.
5. **Cables -** Nom 4 in. (102 mm) diam (or smaller) tight bundle of cables. Cable bundle spaced min 4 in. (102 mm) from all other penetrants. Clearance between cable bundle and periphery of opening is 0 in. (0 mm) (point contact). Cable bundle rigidly supported on both sides of floor or wall assembly. The following types and sizes of cables may be used:
   A. Max 1/C - 350 kcmil cable with polyvinyl chloride (PVC), cross-linked polyethylene (XLPE) or plenum rated insulation and jacket.
   B. Max 7/C - No. 12 AWG cable with PVC-nylon insulation and PVC jacket.
   C. Max 100 pair - No. 24 AWG copper conductor telephone cable with PVC or plenum rated insulation and jacket.
   D. Max RG/U coaxial cables with fluorinated ethylene or plenum rated jacket and insulation.
   E. Multiple fiber optic cables with PVC or plenum rated insulation.
   F. **Through Penetrating Products* -** Max 2/C with ground No. 12 AWG Metal-Clad Cable+.

   AFC CABLE SYSTEMS INC

   When Item 5A or 5F is used, the T, FT and FTH Ratings are 1/2 hr. When other cables are used, T, FT and FTH Ratings are 3/4 hr. The L Rating is Less than 1.6 CFM/sq ft at ambient and 400 F.
6. **Cable Tray -** Max 30 in. (762 mm) wide by max 6 in. (152 mm) deep open ladder cable tray with channel-shaped side rails formed from min 0.060 in. (1.5 mm) thick (No. 16 MSG) galv steel or min 0.060 in. (1.5 mm) thick aluminum with rungs spaced max 9 in. (227 mm) OC. A max of two cable trays may be installed within the opening with a min separation of 8 in. (204 mm) between trays. The min space between the cable tray and the periphery of the opening is 0 in. (0 mm) (point contact). Cable trays to be rigidly supported on both sides of the floor or wall assembly. Aggregate cross-sectional area of cables in cable tray not to exceed 40 percent of the cross-sectional area of the cable tray based on a max 3 in. (76 mm) cable loading depth within tray. Any combination of the cable types specified in Item 5 may be used. **When width of cable tray exceeds 18 in. (457 mm), the F and FH Ratings are 2 hr. The L Rating is 3.2 CFM/sq ft at ambient and 2 at 400 F when putty is used (See Item 9B).**
7. **Busway+ -** (Not Shown) - Nom 19 in. (483 mm) wide (or smaller) by 5 in. (127 mm) deep "I" shaped aluminum enclosure containing factory-mounted copper bars rated for 600 V, 5000 A or aluminum bars rated for 600 V, 4000 A. A max two busways to be installed within the opening. The annular space between the busway and the periphery of the opening shall be a min 1/2 in. (13 mm) to a max 3-1/2 in. (89 mm). Busways spaced min 6 in. (152 mm) from all other penetrants. Busway to be rigidly supported on both sides of floor or wall assembly. The busway shall bear the UL Listing Mark and shall be installed in accordance with all provisions of the National Electrical Code, NFPA 70. **When busway is used, the T, FT and FTH Ratings are 0 hr.**
8. **Steel Duct -** (Not Shown) - Nom 18 in. (457 mm) diameter (or smaller) No. 28 GA (or heavier) steel duct installed within opening when opening contains no cable tray. A max of two steel ducts may be installed within the through-opening. Ducts to be spaced min 4 in. (102 mm) apart and min 8 in. (204 mm) from insulated penetrants and nonmetallic penetrants. The clearance between the steel duct and the periphery of the opening shall be min 0 in. (0 mm) (point contact). Steel ducts to be rigidly supported on both sides of floor or wall assembly. **When steel duct is used, the F and FH Ratings are 2 hr and the T, FT and FTH Ratings are 0 hr. The L Rating is Less than 1 CFM/sq ft at ambient and 400 F.**

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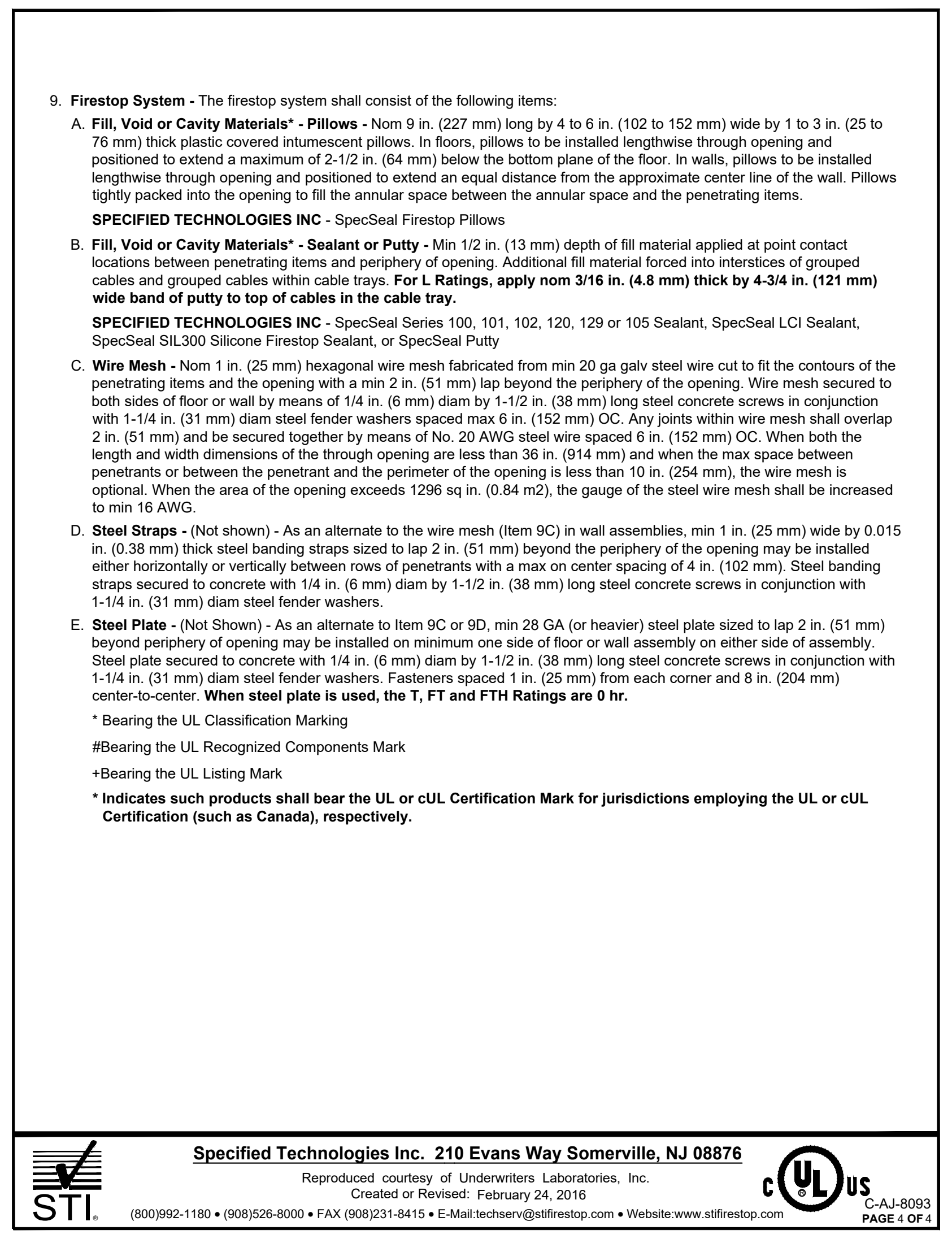

9. **Firestop System -** The firestop system shall consist of the following items:
   A. **Fill, Void or Cavity Materials* - Pillows -** Nom 9 in. (227 mm) long by 4 to 6 in. (102 to 152 mm) wide by 1 to 3 in. (25 to 76 mm) thick plastic covered intumescent pillows. In floors, pillows to be installed lengthwise through opening and positioned to extend a maximum of 2-1/2 in. (64 mm) below the bottom plane of the floor. In walls, pillows to be installed lengthwise through opening and positioned to extend an equal distance from the approximate center line of the wall. Pillows tightly packed into the opening to fill the annular space between the annular space and the penetrating items.

   SPECIFIED TECHNOLOGIES INC - SpecSeal Firestop Pillows
   B. **Fill, Void or Cavity Materials* - Sealant or Putty -** Min 1/2 in. (13 mm) depth of fill material applied at point contact locations between penetrating items and periphery of opening. Additional fill material forced into interstices of grouped cables and grouped cables within cable trays. **For L Ratings, apply nom 3/16 in. (4.8 mm) thick by 4-3/4 in. (121 mm) wide band of putty to top of cables in the cable tray.**

   SPECIFIED TECHNOLOGIES INC - SpecSeal Series 100, 101, 102, 120, 129 or 105 Sealant, SpecSeal LCI Sealant, SpecSeal SIL300 Silicone Firestop Sealant, or SpecSeal Putty
   C. **Wire Mesh -** Nom 1 in. (25 mm) hexagonal wire mesh fabricated from min 20 ga galv steel wire cut to fit the contours of the penetrating items and the opening with a min 2 in. (51 mm) lap beyond the periphery of the opening. Wire mesh secured to both sides of floor or wall by means of 1/4 in. (6 mm) diam by 1-1/2 in. (38 mm) long steel concrete screws in conjunction with 1-1/4 in. (31 mm) diam steel fender washers spaced max 6 in. (152 mm) OC. Any joints within wire mesh shall overlap 2 in. (51 mm) and be secured together by means of No. 20 AWG steel wire spaced 6 in. (152 mm) OC. When both the length and width dimensions of the through opening are less than 36 in. (914 mm) and when the max space between penetrants or between the penetrant and the perimeter of the opening is less than 10 in. (254 mm), the wire mesh is optional. When the area of the opening exceeds 1296 sq in. (0.84 m2), the gauge of the steel wire mesh shall be increased to min 16 AWG.
   D. **Steel Straps -** (Not shown) - As an alternate to the wire mesh (Item 9C) in wall assemblies, min 1 in. (25 mm) wide by 0.015 in. (0.38 mm) thick steel banding straps sized to lap 2 in. (51 mm) beyond the periphery of the opening may be installed either horizontally or vertically between rows of penetrants with a max on center spacing of 4 in. (102 mm). Steel banding straps secured to concrete with 1/4 in. (6 mm) diam by 1-1/2 in. (38 mm) long steel concrete screws in conjunction with 1-1/4 in. (31 mm) diam steel fender washers.
   E. **Steel Plate -** (Not Shown) - As an alternate to Item 9C or 9D, min 28 GA (or heavier) steel plate sized to lap 2 in. (51 mm) beyond periphery of opening may be installed on minimum one side of floor or wall assembly on either side of assembly. Steel plate secured to concrete with 1/4 in. (6 mm) diam by 1-1/2 in. (38 mm) long steel concrete screws in conjunction with 1-1/4 in. (31 mm) diam steel fender washers. Fasteners spaced 1 in. (25 mm) from each corner and 8 in. (204 mm) center-to-center. **When steel plate is used, the T, FT and FTH Ratings are 0 hr.**

   * Bearing the UL Classification Marking

   #Bearing the UL Recognized Components Mark

   +Bearing the UL Listing Mark

   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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GENERAL NOTES:

1. Refer to section 07 84 00 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
2. Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   - Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.
3. If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   - UL Fire Resistance Directory; Current Edition
   - NFPA 101 Life Safety Code
   - All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:

PROJECT_NAME:

PROJECT LOCATION:

PROJECT_LOCATION:

ARCHITECT/CONSULTANT:

ARCHITECT/CONSULTANT:

TITLE:

STI FIRESTOP SYSTEMS

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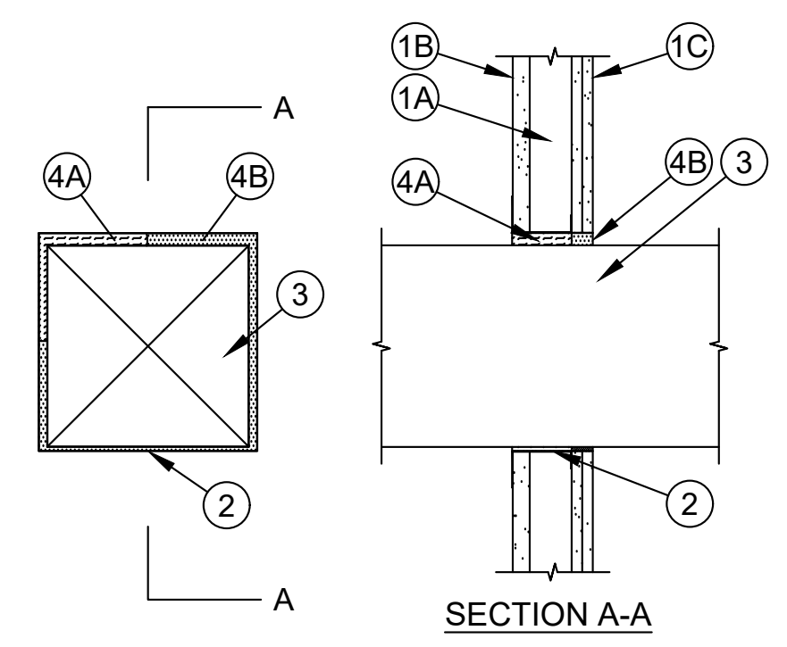
INDEX

Classified by
Underwiters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-7252**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 0 Hr	FT Ratings - 0 Hr
	FH Ratings - 1 and 2 Hr (See Item 1)
	FTH Ratings - 0 Hr



SECTION A-A

1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud shaft wall assembly shall be constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
   A. **Steel Studs -** "C-H" or "C-T" shaped studs, min 2-1/2 in. (64 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from min No. 25 gauge (0.6 mm thick) galv steel, spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** 1 in. (25 mm) thick, 24 in. (610 mm) wide gypsum liner panels installed vertically. Max area of opening in gypsum liner panel is 169 sq in. (1090 cm2) with a max dimension of 13 in. (330 mm).
   C. **Gypsum Board* -** 1/2 in. or 5/8 in. (13 or 16 mm) thick, 48 in. (1.2 m) wide gypsum boards. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max area of opening in gypsum board is 169 sq in. (1090 cm2) with a max dimension of 13 in. (330 mm).
   The F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall in which it is installed.
2. **Metallic Sleeve -** Nom 13 by 13 in. (330 by 330 mm) (or smaller) steel sleeve fabricated from min 0.016 in. (0.41 mm) (30 gauge) (or heavier) galv sheet steel and having a 1 in. (25 mm) lap along the longitudinal seam. Steel sleeve friction fit within opening and installed flush with both surfaces of wall.
3. **Steel Duct -** Max 12 by 12 in. (305 by 305 mm) No. 26 gauge (or heavier) steel duct to be installed either concentrically or eccentrically within the opening. The annular space between the steel duct and the periphery of the opening shall be min 1/4 in. (6 mm) to max 3/4 in. (19 mm). The duct shall be constructed and reinforced in accordance with SMACNA construction standards. Steel duct to be rigidly supported on both sides of wall assembly.

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4. **Firestop System -** The firestop system shall consist of the following items:
   A. **Packing Material -** Min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into sleeved opening as a permanent form. Packing material to extend throughout thickness of wall except for a 1-1/4 in. (32 mm) deep recess on the finished side of wall to accommodate fill material.
   B. **Fill, Void or Cavity Material* -** Min 1-1/4 (32 mm) thickness of fill material applied within sleeve, flush with finished surface of wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal LCI Sealant
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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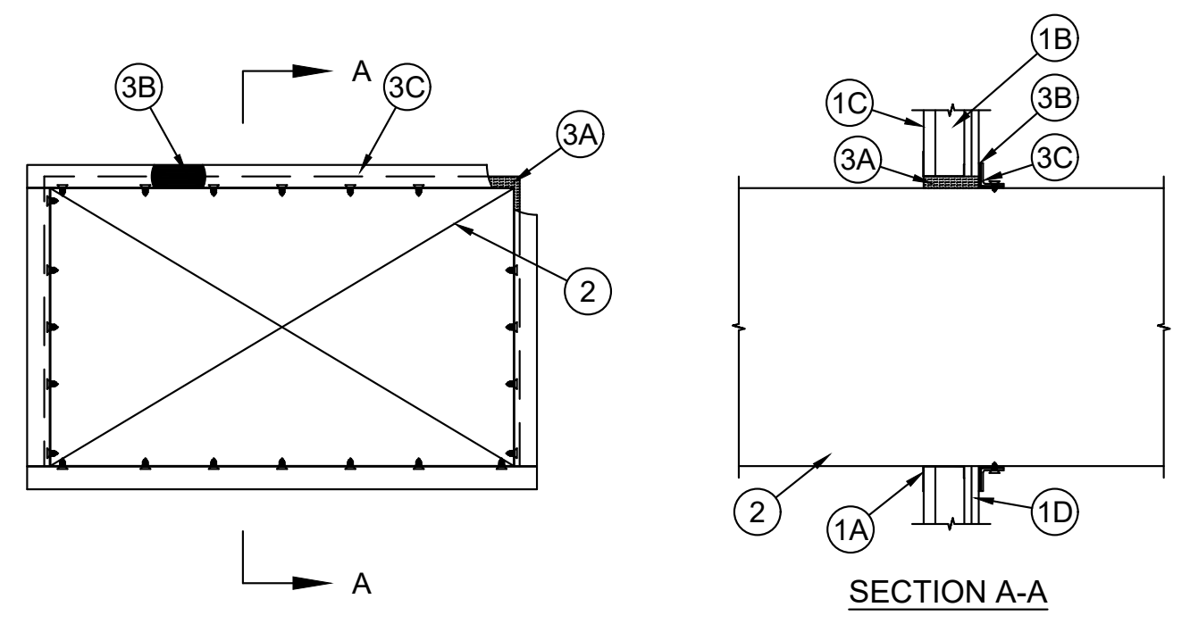
Underwiters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-7238**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 1/4 Hr	FT Ratings - 1/4 Hr
	FH Ratings - 1 and 2 Hr (See Item 1)
	FTH Ratings - 1/4 Hr



SECTION A-A

1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud shaft wall assembly shall be constructed of the materials and in the manner specified in the individual U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
   A. **Steel Runners -** Floor and ceiling "J"-shaped runner, min 2-1/2 in. (64 mm) wide, fabricated from min 24 MSG galv steel in accordance with the individual wall design. Additional "J" runners to be used as the horizontal members to frame the opening.
   B. **Steel Studs -** "C-H" or "C-T" shaped studs, min 2-1/2 in. (64 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from min No. 25 gauge (0.6 mm thick) galv steel, spaced max 24 in. (610 mm) OC. Additional "C-H" or "C-T" shaped studs shall be used as the vertical framing members to completely frame around opening.
   C. **Gypsum Board* -** 1 in. (25 mm) thick, 24 in. (610 mm) wide gypsum liner panels installed vertically. Max area of opening in gypsum liner panel is 7.40 sq ft. (0.69 m2) with a max dimension of 41 in. (1.04 m).
   D. **Gypsum Board* -** 1/2 in. or 5/8 in. (13 or 16 mm) thick, 48 in. (1.2 m) wide gypsum boards. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max area of opening in gypsum board is 7.40 sq ft. (0.69 m2) with a max dimension of 41 in. (1.04 m).
   The F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall in which it is installed.
2. **Steel Duct -** Max 24 by 40 in. (0.61 by 1.02 m) No. 28 gauge (or heavier) steel duct to be installed either concentrically or eccentrically within the opening. The annular space between the steel duct and the periphery of the opening shall be min 0 in. (point contact) to max 1 in. (25 mm). The duct shall be constructed and reinforced in accordance with SMACNA construction standards. Steel duct to be rigidly supported on both sides of wall assembly.

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3. **Firestop System -** The firestop system shall consist of the following items:
   A. **Packing Material -** Min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to extend throughout thickness of wall.
   B. **Fill, Void or Cavity Material* -** Factory-supplied intumescent gasket installed and nominally centered to completely cover the outer surfaces of the steel retaining angles (Item 3C) as specified in the accompanying installation instructions.
   SPECIFIED TECHNOLOGIES INC - FyreFlange™ Firestop Gasket
   C. **Steel Retaining Angles -** Nom 2 by 2 by 0.035 in. (51 by 51 by 0.9 mm) thick steel angles to be installed flush to max 1/4 in. (6 mm) from finished side of the wall. Firestop angles shall be attached to the steel duct on finished side of the wall with min No. 10 self-drilling, self-tapping steel screws spaced max 6 in. (152 mm) OC.
   D. **Firestop Device* -** (Optional, Not Shown) - A corner clip may be installed at each corner of the duct on finished side of the wall. Corner clips shall be attached to the steel duct and to the perpendicular leg of the abutting firestop angle with two min No. 10 self-drilling, self-tapping steel screws.
   SPECIFIED TECHNOLOGIES INC - FyreFlange™ Corner Clip
   E. **Firestop Device* -** (Not Shown) - As an option to the intumescent gasket and steel angles (Item Nos. 3B and 3C), a firestop device consisting of 2 by 2 by 0.035 in. (51 by 51 by 0.9 mm) thick steel angles furnished with an intumescent gasket material and corner clips (Item 3D) may be used. Firestop angles to be installed flush to max 1/4 in. (6 mm) from finished side of the wall in accordance with the accompanying installation instructions. Firestop angles shall be attached to the steel duct on finished side of wall with min No. 10 self-drilling, self-tapping steel screws spaced max 6 in. (152 mm) OC. Optional, corner clip may be installed at each corner of the duct on finished side of the wall. When installed, corner clips are attached to the steel duct and to the perpendicular leg of the abutting firestop angle with two min No. 10 self-drilling, self-tapping steel screws. Two short lengths of firestop angle may be joined into a single length of the required size using a splice angle in accordance with the accompanying instructions. When the max duct size is 24 by 40 in. (0.61 by 1.02 m), the corner clips are optional.
   SPECIFIED TECHNOLOGIES INC - FyreFlange™ Firestop Angle, FyreFlange™ Corner Clip, FyreFlange™ Splice Angle
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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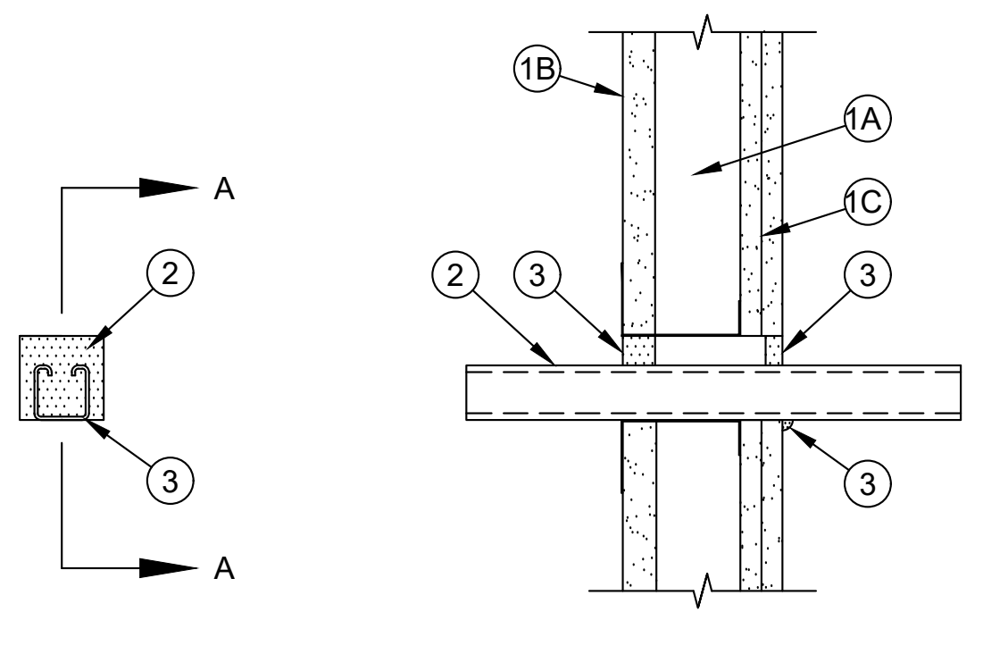
Underwiters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-7253**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 0, 1 and 1-1/2 Hr (See Item 2)	FT Ratings - 0, 1 and 1-1/2 Hr (See Item 2)
L Rating At Ambient - Less Than 1 CFM/sq ft	FH Ratings - 1 and 2 Hr (See Item 1)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Ratings - 0, 1 and 1-1/2 Hr (See Item 2)
	L Rating At Ambient - Less Than 5.1 L/s/m2
	L Rating At 204 C - Less Than 5.1 L/s/m2



SECTION A-A

1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud shaft wall assembly shall be constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
   A. **Steel Studs -** "C-H" or "C-T" shaped studs, min 2-1/2 in. (64 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from min No. 25 gauge (0.6 mm thick) galv steel, spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** 1 in. (25 mm) thick, 24 in. (610 mm) wide gypsum liner panels installed vertically. Max area of opening in gypsum liner panel is 8-3/4 sq in. (56 cm2) with a max dimension of 3-1/2 in. (89 mm). The opening cutout shall follow the contour of the penetrant when steel angle is used.
   C. **Gypsum Board* -** 1/2 in. or 5/8 in. (13 or 16 mm) thick, 48 in. (1.2 m) wide gypsum boards. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max area of opening in gypsum board is 8-3/4 sq in. (56 cm2) with a max dimension of 3-1/2 in. (89 mm). The opening cutout shall follow the contour of the penetrant when steel angle is used.
   The F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall in which it is installed.

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2. **Penetrant -** One metallic strut, steel angle, cable or rod service support to be installed either concentrically or eccentrically within the firestop system. The annular space between the penetrant and the periphery of opening shall be min 0 in. (point contact) to max 7/8 in. (22 mm). Penetrant shall be rigidly supported on both sides of the wall assembly. The penetrant may be installed at an angle not greater than 45 degrees from the perpendicular. The following types and sizes of metallic strut, steel angle, cable or rod service support may be used:
   A. **Steel Strut -** Max 1-5/8 by 1-5/8 in. (41 by 41 mm) channel strut formed from min 0.105 in. (2.7 mm) thick galv or painted steel.
   B. **Steel Strut -** Max 3-1/4 by 1-5/8 in. (83 by 41 mm) H strut formed from min 0.105 in. (2.7 mm) thick galv or painted steel.
   C. **Steel Angle -** Max 2 by 2 in. (51 by 51 mm) by min 1/8 in. (3.2 mm) thick or max 3 by 3 in. (76 by 76 mm) by min 1/4 in. (6 mm) thick steel angle.
   D. **Cable -** Max 3/8 in. (9.5 mm) diam unjacketed galv steel cable.
   E. **Threaded Rod -** Max 5/8 in. (16 mm) diam galv steel threaded rod.
   The T, FT and FTH Ratings when Items 2A and 2B are used is 1 hr and 1-1/2 hr for 1 hr and 2 hr fire-rated walls, respectively. Otherwise, the T, FT and FTH Ratings are 0 hr.
3. **Fill, Void or Cavity Materials* - Sealant -** Min 1 in. (25 mm) thickness of fill material applied within annulus and within the channel struts, flush with the surface of the gypsum liner panel. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus and within the channel struts, flush with the surface of the gypsum board on the finished side of the wall. At point contact location, min 3/8 in. (10 mm) diam bead of fill material to be applied at the penetrant/gypsum board interface on the finished side of the wall.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant, SpecSeal LCI Sealant or SpecSeal LC150 Sealant
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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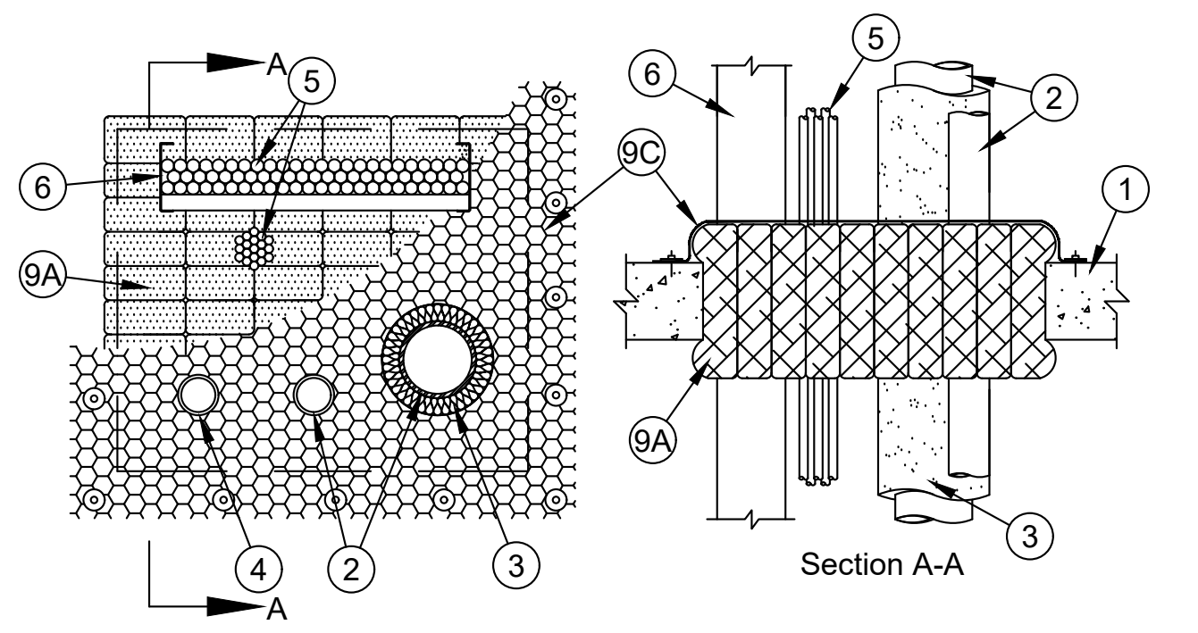
Underwiters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. C-AJ-8093**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 2 and 3 Hr (See Items 3, 4, 6 and 8)	F Ratings - 2 and 3 Hr (See Items 3, 4, 6 and 8)
T Ratings - 0, 1/4, 1/2, 3/4, 1-1/2 and 2 Hr (See Items 2 through 9)	FT Ratings - 0, 1/4, 1/2, 3/4, 1-1/2 and 2 Hr (See Items 2 through 9)
L Rating At Ambient - Less than 1, 1.6, and 3.2 CFM/sq ft (See Item 2, 4, 5, 6, 8 and 9B)	FH Ratings - 2 and 3 Hr (See Items 3, 4, 6 and 8)
L Rating at 400 F - Less than 1, 1.6, and 2 CFM/sq ft (See Item 2, 4, 5, 6, 8 and 9B)	FTH Ratings - 0, 1/4, 1/2, 3/4, 1-1/2 and 2 Hr (See Items 2 through 9)
	L Rating At Ambient - Less than 1, 1.6, and 3.2 CFM/sq ft (See Item 2, 4, 5, 6, 8 and 9B)
	L Rating at 400 F - Less than 1, 1.6, and 2 CFM/sq ft (See Item 2, 4, 5, 6, 8 and 9B)



Section A-A

System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

1. **Floor or Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max area of opening is 18 sq ft with a max single dim of 6 ft (1.6 m) When any dim exceeds 3 ft (0.76 m), see Item 9C.
   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Metallic Penetrants -** One or more metallic pipes, conduits or tubes to be installed within the opening. Min 1/2 in. (13 mm) clearance between penetrants. Min clearance between penetrants and periphery of opening is 0 in. (point contact) (0 mm). Penetrants rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. **Steel Pipe -** Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Conduit -** Nom 6 in. (152 mm) diam (or smaller) rigid steel conduit, nom 4 in. (102 mm) diam (or smaller) electrical metallic tubing (EMT), or nom 4 in. (102 mm) diam (or smaller) steel **Flexible Metal Conduit#**.
   D. **Copper Pipe or Tube -** Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe or Type M (or heavier) copper tube.

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Type of Metallic Penetrant	Max Diam of Throught Penetrant, in. (mm)	T Rating, Hr
Steel or Iron Pipe, Conduit or Copper Pipe or Tube	12 (305)	1/4
Steel or Iron Pipe, Conduit or EMT	4 (102)	3/4
Steel or Iron Pipe, Conduit or EMT	2 (51)	2

The L Rating is Less than 1 CFM/sq ft at ambient and 400 F for metallic penetrants.

3. **Pipe Insulation -** (Optional) - The following types of pipe insulations may be installed on one or more of the metallic pipes or tubing:
   A. **Pipe and Equipment Covering Materials* -** Max 2 in. (51 mm) thick hollow cylindrical heavy density (min 3.5 pcf or 57 kg/m3) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product.
   See **Pipe and Equipment Covering Materials** (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
   B. **Pipe Covering Materials* -** Max 2 in. (51 mm) thick unfaced mineral fiber pipe insulation having a nom density of 3.5 pcf (57 kg/m3) (or heavier) and sized to the outside diam of the pipe or tube. Pipe insulation secured with min 8 AWG steel wire spaced max 12 in. (305 mm) OC.
   INDUSTRIAL INSULATION GROUP L L C - High Temperature Pipe Insulation 1200, High Temperature Pipe Insulation BWT and High Temperature Pipe Insulation Thermaloc
   C. **Sheathing Material* -** Use in conjunction with Item 3B. Foil-scrim-kraft or all service jacket material shall be wrapped around the outer circumference of the pipe insulation (Item 3B) with the kraft side exposed. Longitudinal and transverse joints sealed with metal fasteners or butt tape.
   See **Sheathing Materials** (BVDV) category in the Building Materials Directory for names of manufacturers. Any sheathing material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
   D. **Tube Insulation - Plastics## -** Max 1 in. (25 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. When tube insulation is used, nom diam of copper pipe or tube shall not exceed 4 in. (102 mm).
   See **Plastics** (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.
   E. **Pipe Covering Materials*- Cellular Glass Insulation -** Max 3 in. (76 mm) thick cellular glass units sized to the outside diam of the pipe or tube and supplied in nom 24 in. (610 mm) long half sections or nom 18 in. (457 mm) long segments. Pipe insulation installed on pipe in accordance with the manufacturer's instructions.
   PITTSBURGH CORNING CORP - FOAMGLAS
   F. **Metal Jacket -** Used in conjunction with Item 3E. Min 12 in. long jacket formed from min 0.010 in. (0.254 mm) thick aluminum sheet cut to wrap tightly around the pipe insulation with a min 2 in. (51 mm) lap and secured using bands and seals of a similar material or min No. 18 AWG steel tie wire. Bands or steel tie wire to be located within 2 in. (51 mm) of each end of the jacket and spaced max 10 in. (254 mm) OC. Jacket installed with edge abutting surface of fill material (Item 9A) on top surface of floor or both surfaces of wall. Metal jacket to be used in addition to any other jacketing material which may be required on the pipe covering.
   G. **Pipe and Equipment Covering Materials* -** Max 3 in. (76 mm) thick hollow cylindrical calcium silicate (min 10.0 pcf or 160 kg/m3) sized to the outside diam of the pipe or tube. Pipe insulation secured with min 8 AWG steel wire spaced max 12 in. (305 mm) OC. See Pipe and Equipment Covering Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
   When Items 3A or 3D are used, the F and FH Ratings are 2 hr. When other pipe covering materials are used, F and FH Ratings are 3 hr. When Item 3D is used, the T, FT and FTH Ratings are 3/4 hr. When other pipe covering materials are used, T, FT and FTH Ratings are 1-1/2 hr.

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4. **Nonmetallic Penetrants -** One or more nonmetallic pipes, conduits or tubes to be installed within the opening. Min clearance between nonmetallic penetrants to be 1 in. (25 mm). Min clearance between nonmetallic and metallic penetrants to be 4 in. (102 mm) Min clearance between penetrants and periphery of opening is 0 in. (0 mm) (point contact). Penetrants rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes, conduits or tubing may be used:
   A. **Polyvinyl Chloride (PVC) Pipe -** Nom 2 in. (51 mm) diam (or smaller) solid or cellular core 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. (51 mm) diam (or smaller) SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   C. **Rigid Nonmetallic Conduit+ -** Nom 2 in. (51 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA 70).
   D. **Electrical Nonmetallic Tubing (ENT)+ -** Nom 2 in. (51 mm) diam (or smaller) corrugated wall ENT formed of polyvinyl chloride (PVC) installed in accordance with the National Electrical Code (NFPA 70).
   E. **Optical Fiber Raceway (OFR)+ -** Nom 2 in. (51 mm) diam (or smaller) OFR formed of either polyvinyl chloride (PVC) or polyvinylidene fluoride (PVDF) installed in accordance with the National Electrical Code (NFPA 70).
   When Item 4 is used, the F, T, FT, FH and FTH Ratings of the firestop system are 2 hr. The L Rating is Less than 1 CFM/sq ft at ambient and 400 F.
5. **Cables -** Nom 4 in. (102 mm) diam (or smaller) tight bundle of cables. Cable bundle spaced min 4 in. (102 mm) from all other penetrants. Clearance between cable bundle and periphery of opening is 0 in. (0 mm) (point contact). Cable bundle rigidly supported on both sides of floor or wall assembly. The following types and sizes of cables may be used:
   A. Max 1/C - 350 kcmil cable with polyvinyl chloride (PVC), cross-linked polyethylene (XLPE) or plenum rated insulation and jacket.
   B. Max 7/C - No. 12 AWG cable with PVC-nylon insulation and PVC jacket.
   C. Max 100 pair - No. 24 AWG copper conductor telephone cable with PVC or plenum rated insulation and jacket.
   D. Max RG/U coaxial cables with fluorinated ethylene or plenum rated jacket and insulation.
   E. Multiple fiber optic cables with PVC or plenum rated insulation.
   F. **Through Penetrating Products* -** Max 2/C with ground No. 12 AWG Metal-Clad Cable+.
   AFC CABLE SYSTEMS INC
   When Item 5A or 5F is used, the T, FT and FTH Ratings are 1/2 hr. When other cables are used, T, FT and FTH Ratings are 3/4 hr. The L Rating is Less than 1.6 CFM/sq ft at ambient and 400 F.
6. **Cable Tray -** Max 30 in. (762 mm) wide by max 6 in. (152 mm) deep open ladder cable tray with channel-shaped side rails formed from min 0.060 in. (1.5 mm) thick (No. 16 MSG) galv steel or min 0.060 in. (1.5 mm) thick aluminum with rungs spaced max 9 in. (227 mm) OC. A max of two cable trays may be installed within the opening with a min separation of 8 in. (204 mm) between trays. The min space between the cable tray and the periphery of the opening is 0 in. (0 mm) (point contact). Cable trays to be rigidly supported on both sides of the floor or wall assembly. Aggregate cross-sectional area of cables in cable tray not to exceed 40 percent of the cross-sectional area of the cable tray based on a max 3 in. (76 mm) cable loading depth within tray. Any combination of the cable types specified in Item 5 may be used. **When width of cable tray exceeds 18 in. (457 mm), the F and FH Ratings are 2 hr. The L Rating is 3.2 CFM/sq ft at ambient and 2 at 400 F when putty is used (See Item 9B).**
7. **Busway+ -** (Not Shown) - Nom 19 in. (483 mm) wide (or smaller) by 5 in. (127 mm) deep "I" shaped aluminum enclosure containing factory-mounted copper bars rated for 600 V, 5000 A or aluminum bars rated for 600 V, 4000 A. A max two busways to be installed within the opening. The annular space between the busway and the periphery of the opening shall be a min 1/2 in. (13 mm) to a max 3-1/2 in. (89 mm). Busways spaced min 6 in. (152 mm) from all other penetrants. Busway to be rigidly supported on both sides of floor or wall assembly. The busway shall bear the UL Listing Mark and shall be installed in accordance with all provisions of the National Electrical Code, NFPA 70. **When busway is used, the T, FT and FTH Ratings are 0 hr.**
8. **Steel Duct -** (Not Shown) - Nom 18 in. (457 mm) diameter (or smaller) No. 28 GA (or heavier) steel duct installed within opening when opening contains no cable tray. A max of two steel ducts may be installed within the through-opening. Ducts to be spaced min 4 in. (102 mm) apart and min 8 in. (204 mm) from insulated penetrants and nonmetallic penetrants. The clearance between the steel duct and the periphery of the opening shall be min 0 in. (0 mm) (point contact). Steel ducts to be rigidly supported on both sides of floor or wall assembly. **When steel duct is used, the F and FH Ratings are 2 hr and the T, FT and FTH Ratings are 0 hr. The L Rating is Less than 1 CFM/sq ft at ambient and 400 F.**

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9. **Firestop System -** The firestop system shall consist of the following items:
   A. **Fill, Void or Cavity Materials* - Pillows -** Nom 9 in. (227 mm) long by 4 to 6 in. (102 to 152 mm) wide by 1 to 3 in. (25 to 76 mm) thick plastic covered intumescent pillows. In floors, pillows to be installed lengthwise through opening and positioned to extend a maximum of 2-1/2 in. (64 mm) below the bottom plane of the floor. In walls, pillows to be installed lengthwise through opening and positioned to extend an equal distance from the approximate center line of the wall. Pillows tightly packed into the opening to fill the annular space between the annular space and the penetrating items.
   SPECIFIED TECHNOLOGIES INC - SpecSeal Firestop Pillows
   B. **Fill, Void or Cavity Materials* - Sealant or Putty -** Min 1/2 in. (13 mm) depth of fill material applied at point contact locations between penetrating items and periphery of opening. Additional fill material forced into interstices of grouped cables and grouped cables within cable trays. **For L Ratings, apply nom 3/16 in. (4.8 mm) thick by 4-3/4 in. (121 mm) wide band of putty to top of cables in the cable tray.**
   SPECIFIED TECHNOLOGIES INC - SpecSeal Series 100, 101, 102, 120, 129 or 105 Sealant, SpecSeal LCI Sealant, SpecSeal SIL300 Silicone Firestop Sealant, or SpecSeal Putty
   C. **Wire Mesh -** Nom 1 in. (25 mm) hexagonal wire mesh fabricated from min 20 ga galv steel wire cut to fit the contours of the penetrating items and the opening with a min 2 in. (51 mm) lap beyond the periphery of the opening. Wire mesh secured to both sides of floor or wall by means of 1/4 in. (6 mm) diam by 1-1/2 in. (38 mm) long steel concrete screws in conjunction with 1-1/4 in. (31 mm) diam steel fender washers spaced max 6 in. (152 mm) OC. Any joints within wire mesh shall overlap 2 in. (51 mm) and be secured together by means of No. 20 AWG steel wire spaced 6 in. (152 mm) OC. When both the length and width dimensions of the through opening are less than 36 in. (914 mm) and when the max space between penetrants or between the penetrant and the perimeter of the opening is less than 10 in. (254 mm), the wire mesh is optional. When the area of the opening exceeds 1296 sq in. (0.84 m2), the gauge of the steel wire mesh shall be increased to min 16 AWG.
   D. **Steel Straps -** (Not shown) - As an alternate to the wire mesh (Item 9C) in wall assemblies, min 1 in. (25 mm) wide by 0.015 in. (0.38 mm) thick steel banding straps sized to lap 2 in. (51 mm) beyond the periphery of the opening may be installed either horizontally or vertically between rows of penetrants with a max on center spacing of 4 in. (102 mm). Steel banding straps secured to concrete with 1/4 in. (6 mm) diam by 1-1/2 in. (38 mm) long steel concrete screws in conjunction with 1-1/4 in. (31 mm) diam steel fender washers.
   E. **Steel Plate -** (Not Shown) - As an alternate to Item 9C or 9D, min 28 GA (or heavier) steel plate sized to lap 2 in. (51 mm) beyond periphery of opening may be installed on minimum one side of floor or wall assembly on either side of assembly. Steel plate secured to concrete with 1/4 in. (6 mm) diam by 1-1/2 in. (38 mm) long steel concrete screws in conjunction with 1-1/4 in. (31 mm) diam steel fender washers. Fasteners spaced 1 in. (25 mm) from each corner and 8 in. (204 mm) center-to-center. **When steel plate is used, the T, FT and FTH Ratings are 0 hr.**
   * Bearing the UL Classification Marking
   #Bearing the UL Recognized Components Mark
   +Bearing the UL Listing Mark
   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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GENERAL NOTES:

1. Refer to section 07 84 00 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
2. Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   - Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.
3. If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   - UL Fire Resistance Directory; Current Edition
   - NFPA 101 Life Safety Code
   - All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

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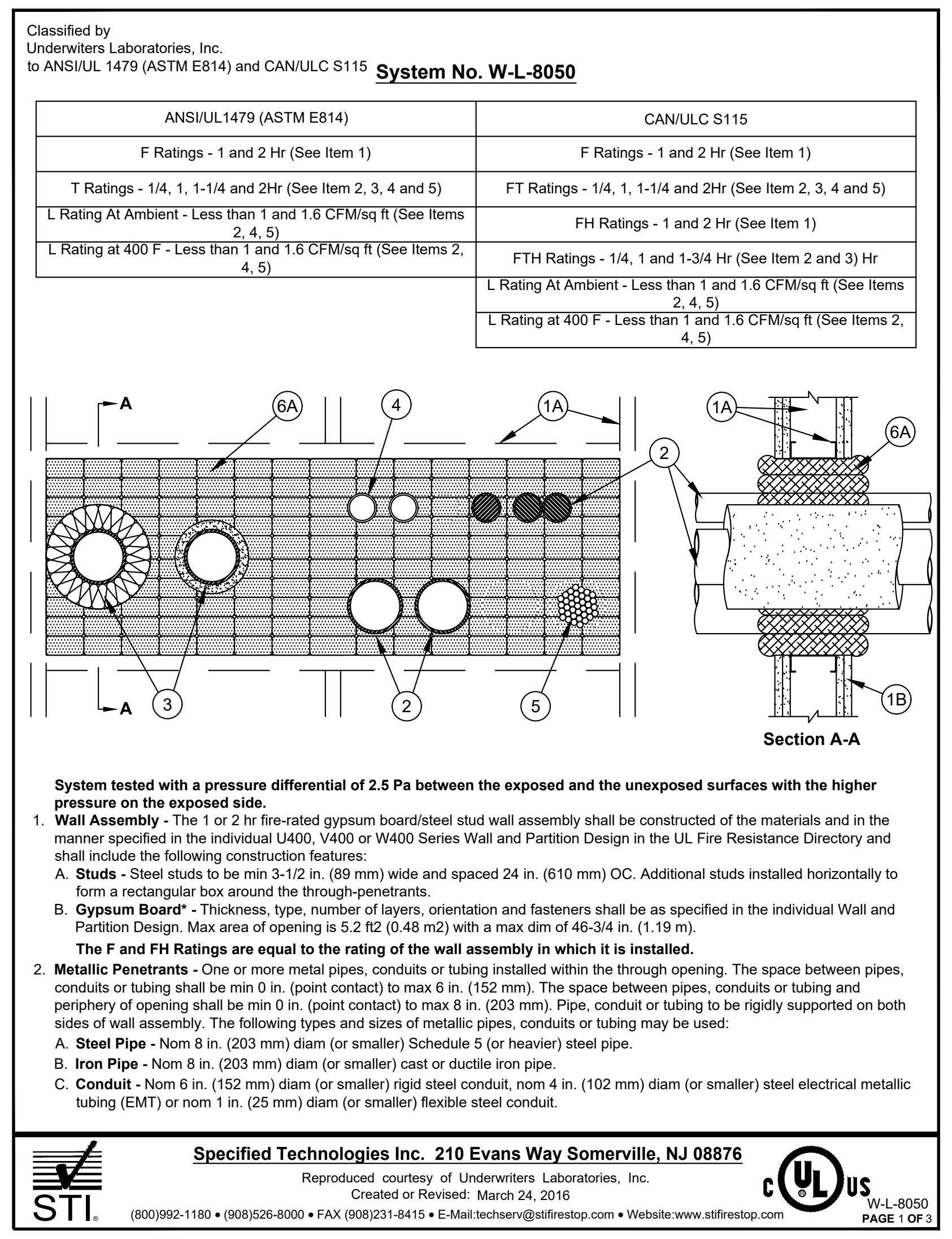
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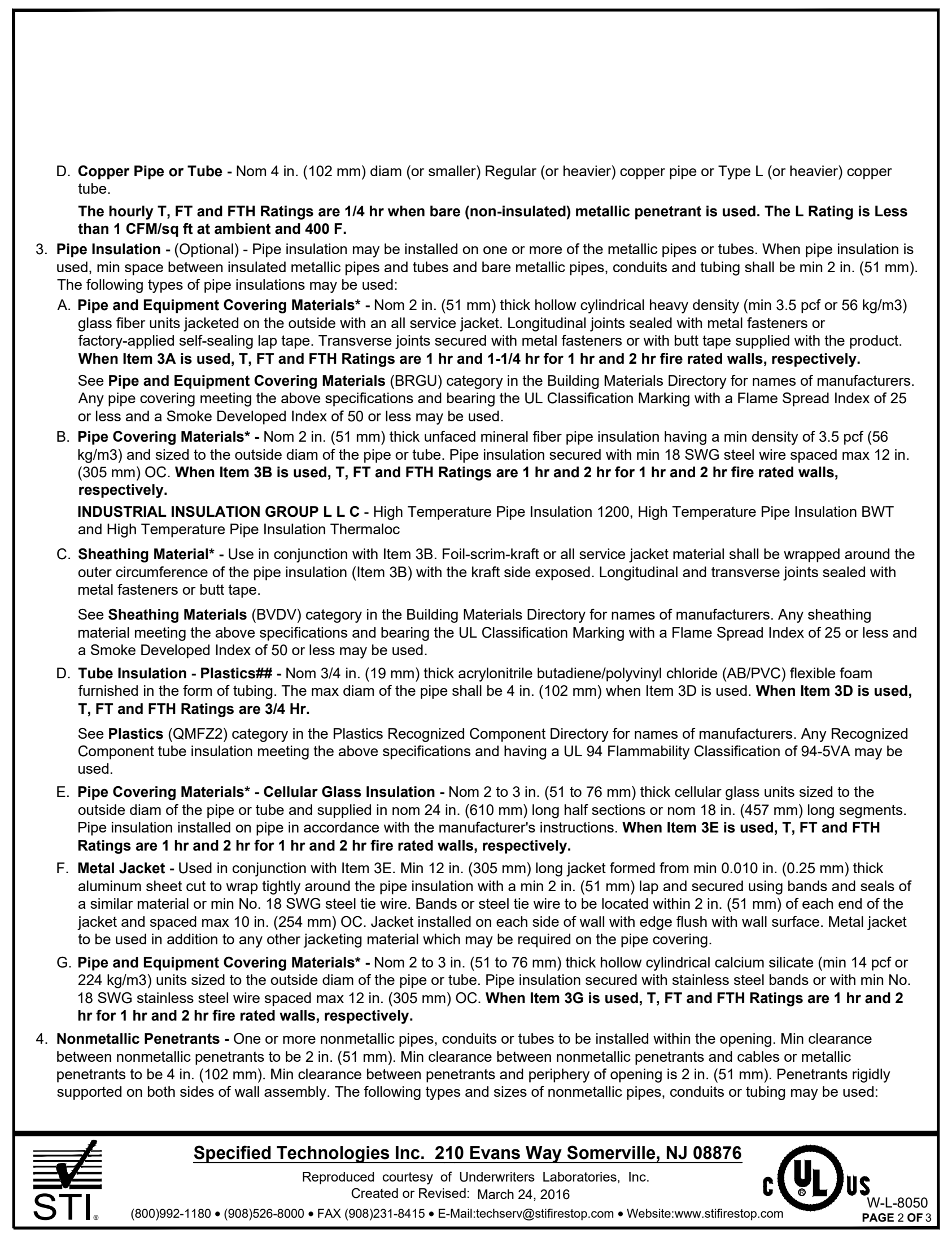

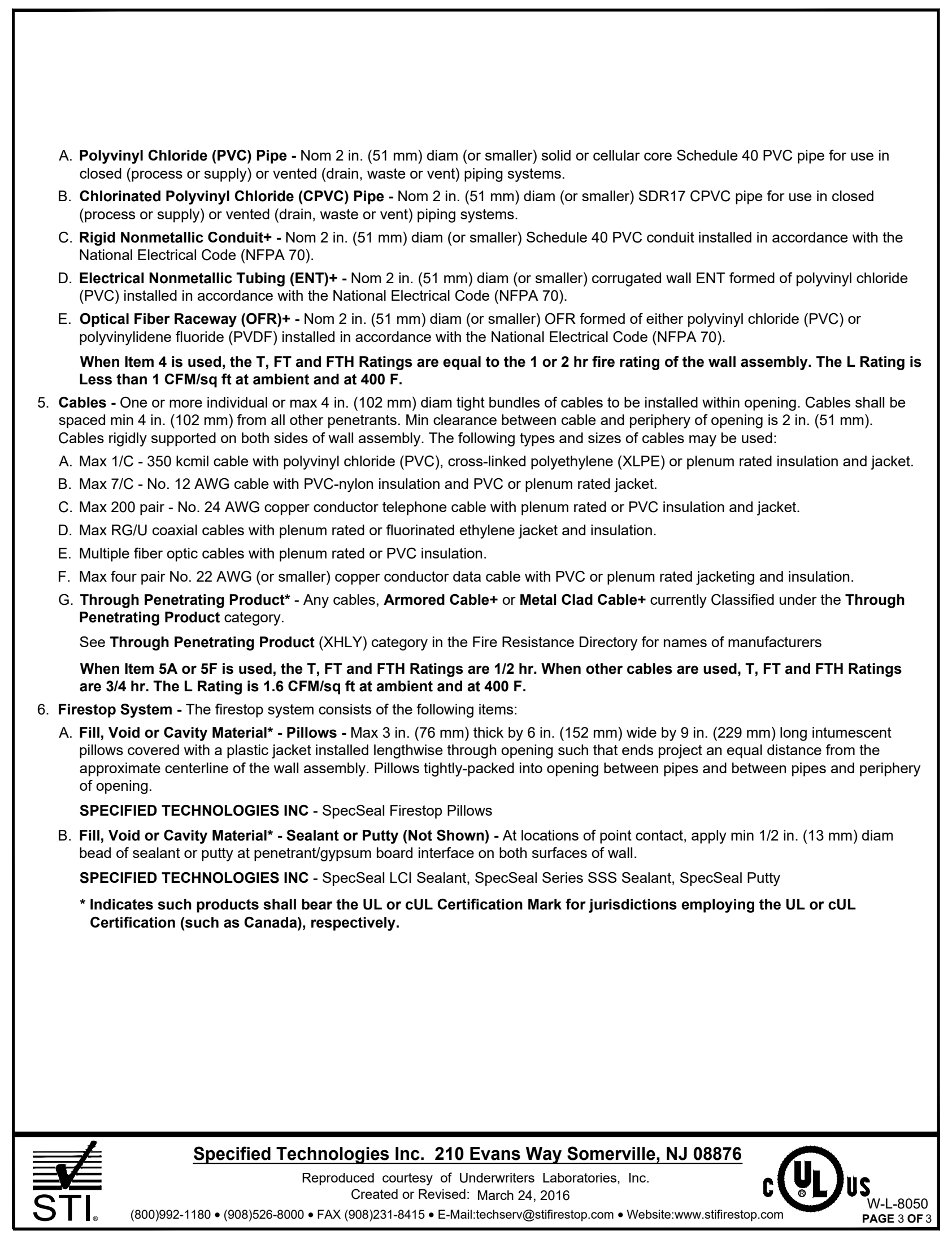

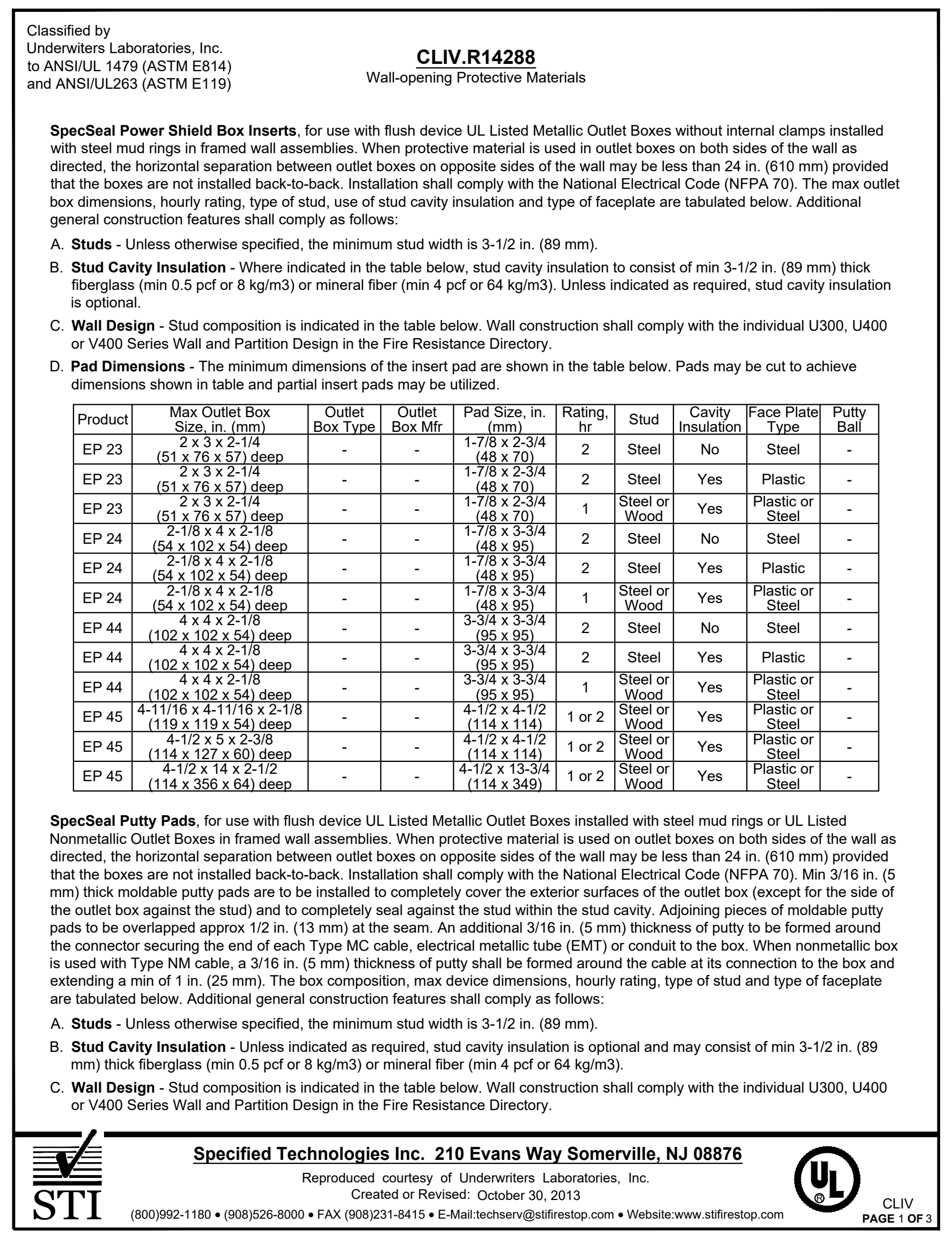
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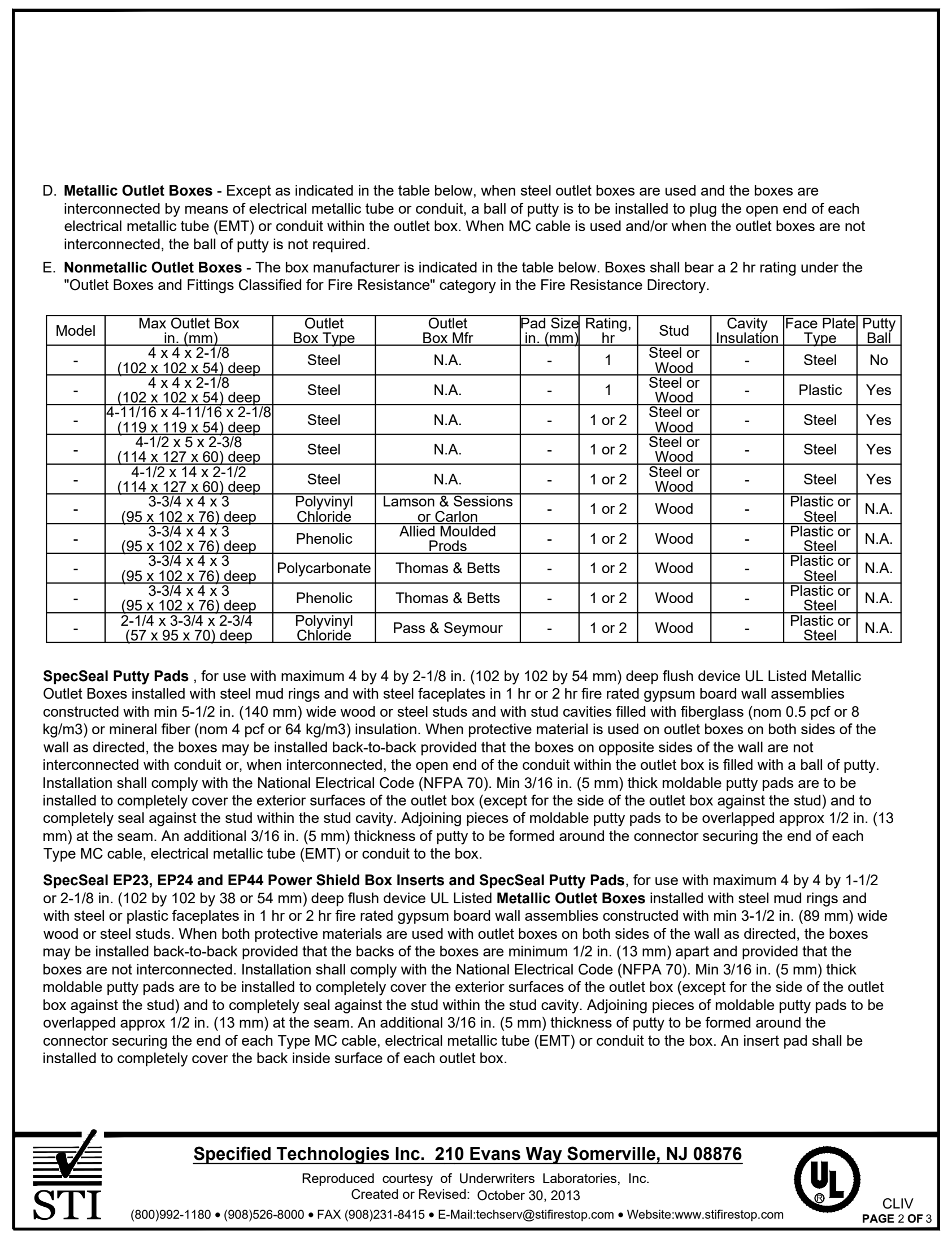

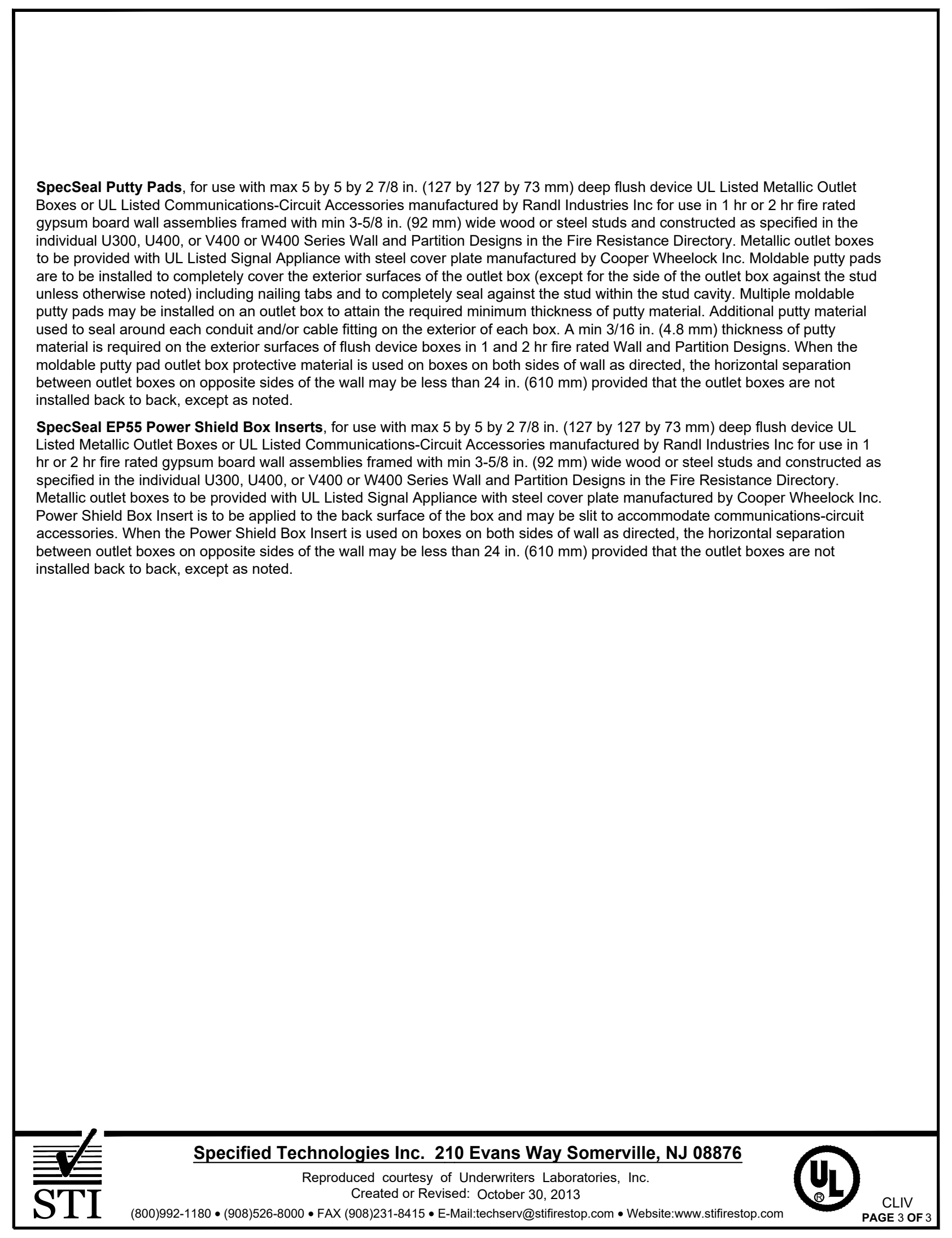

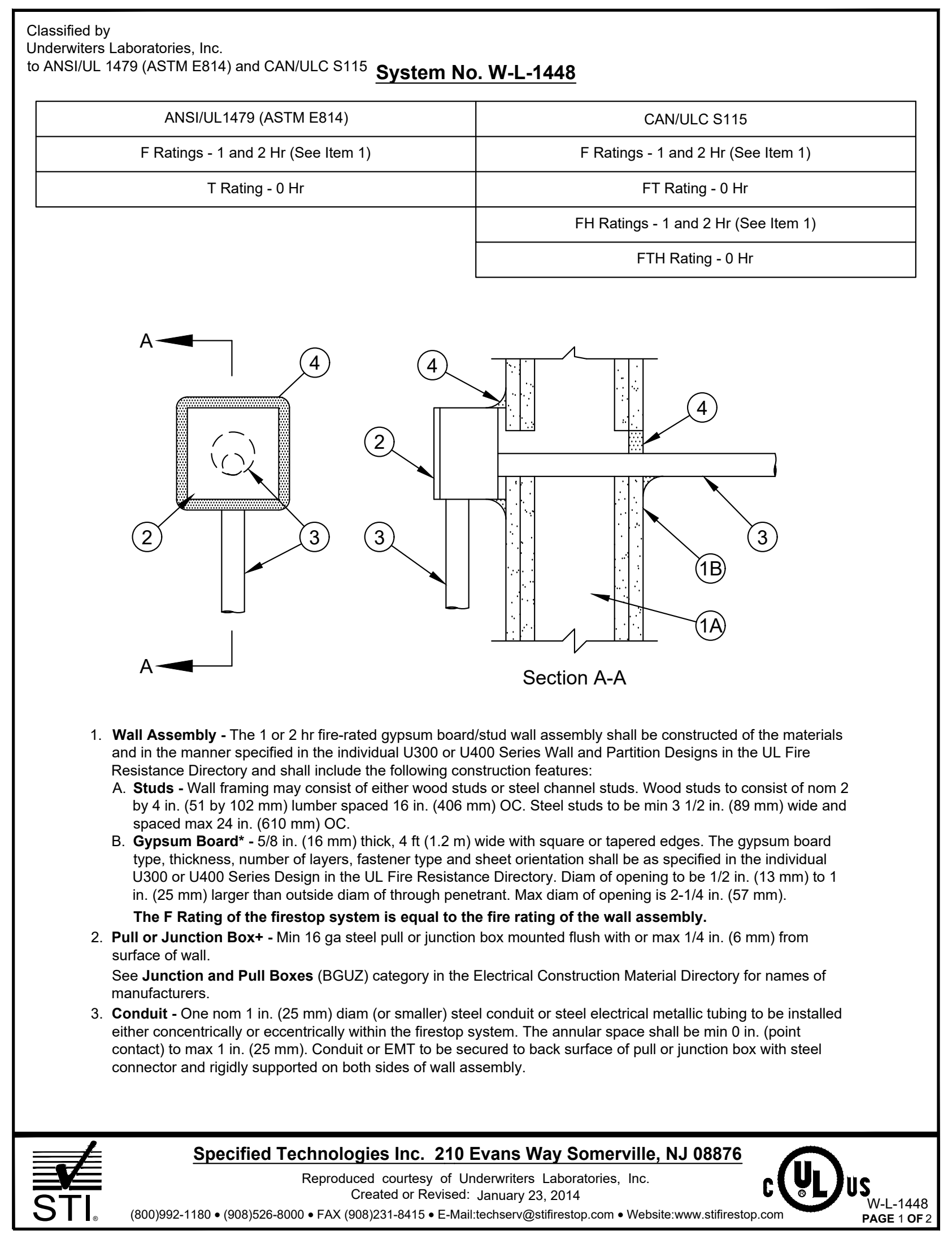
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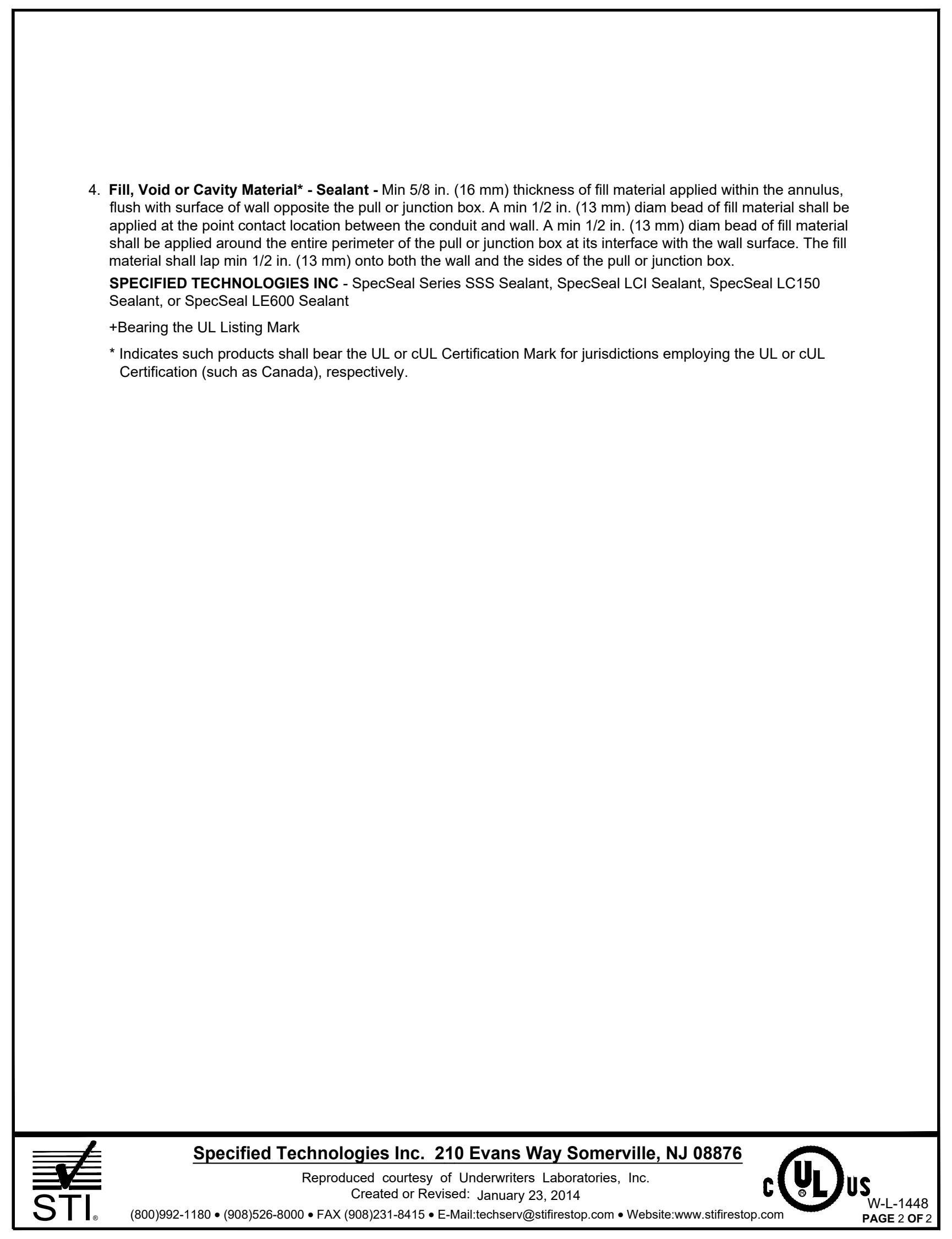

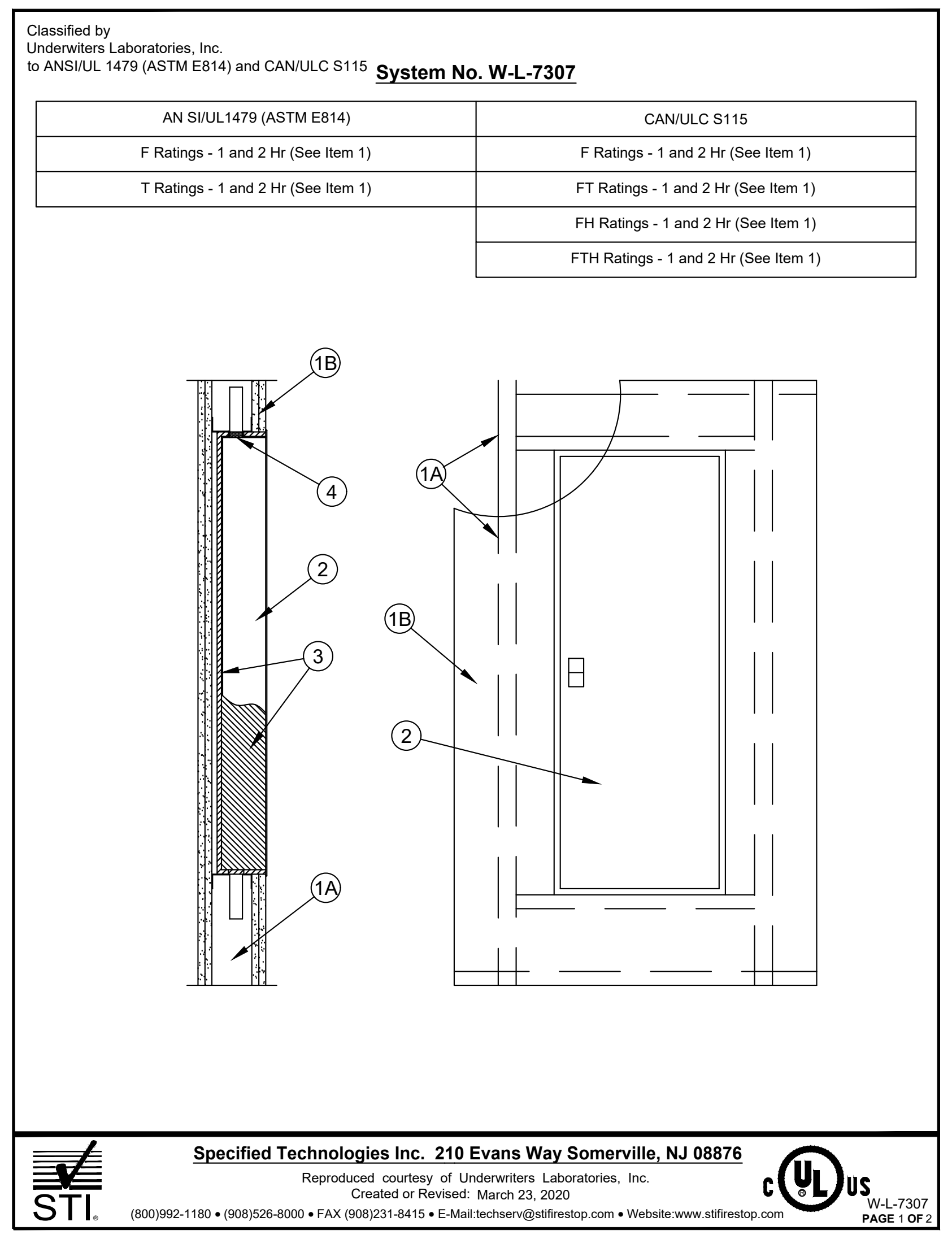
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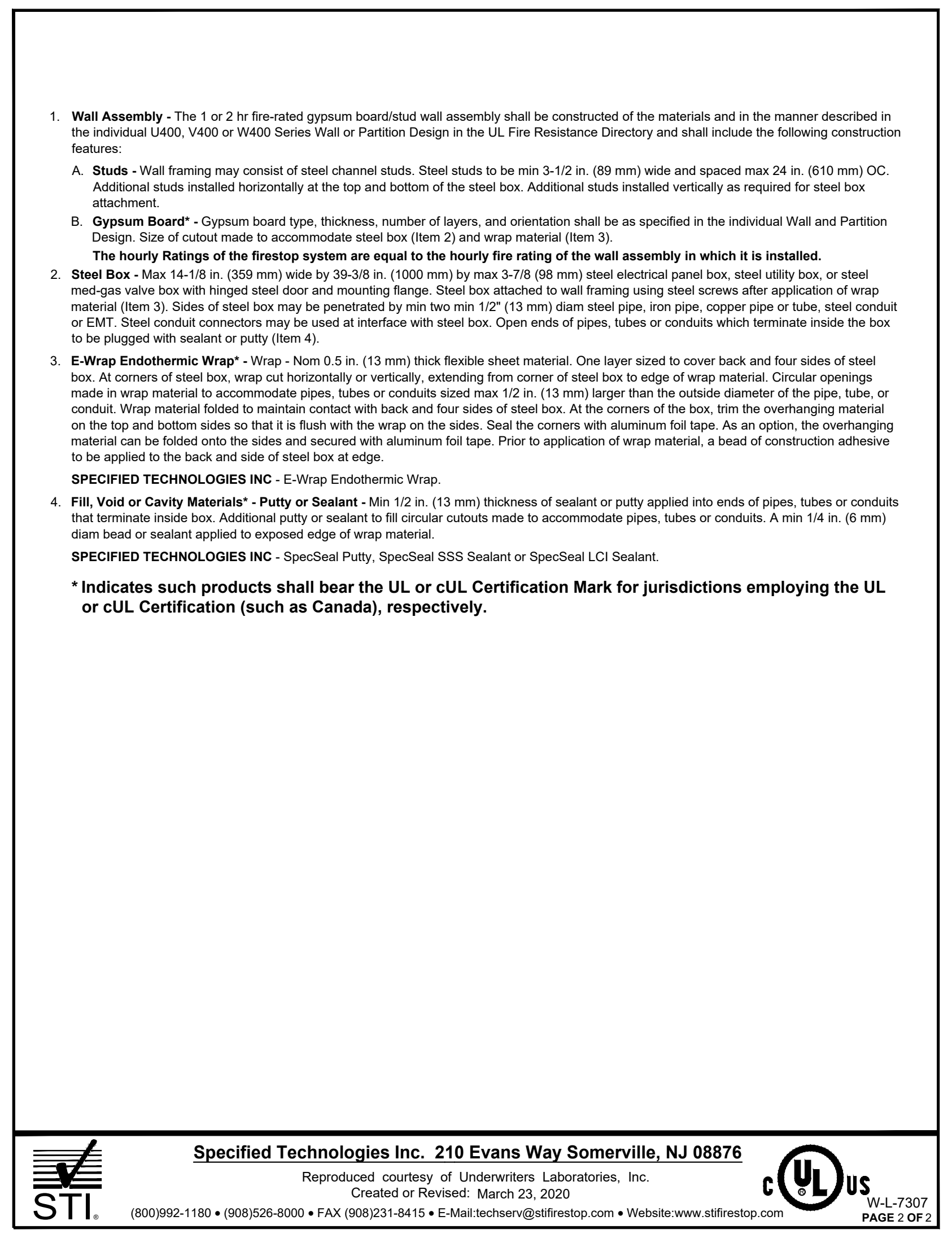

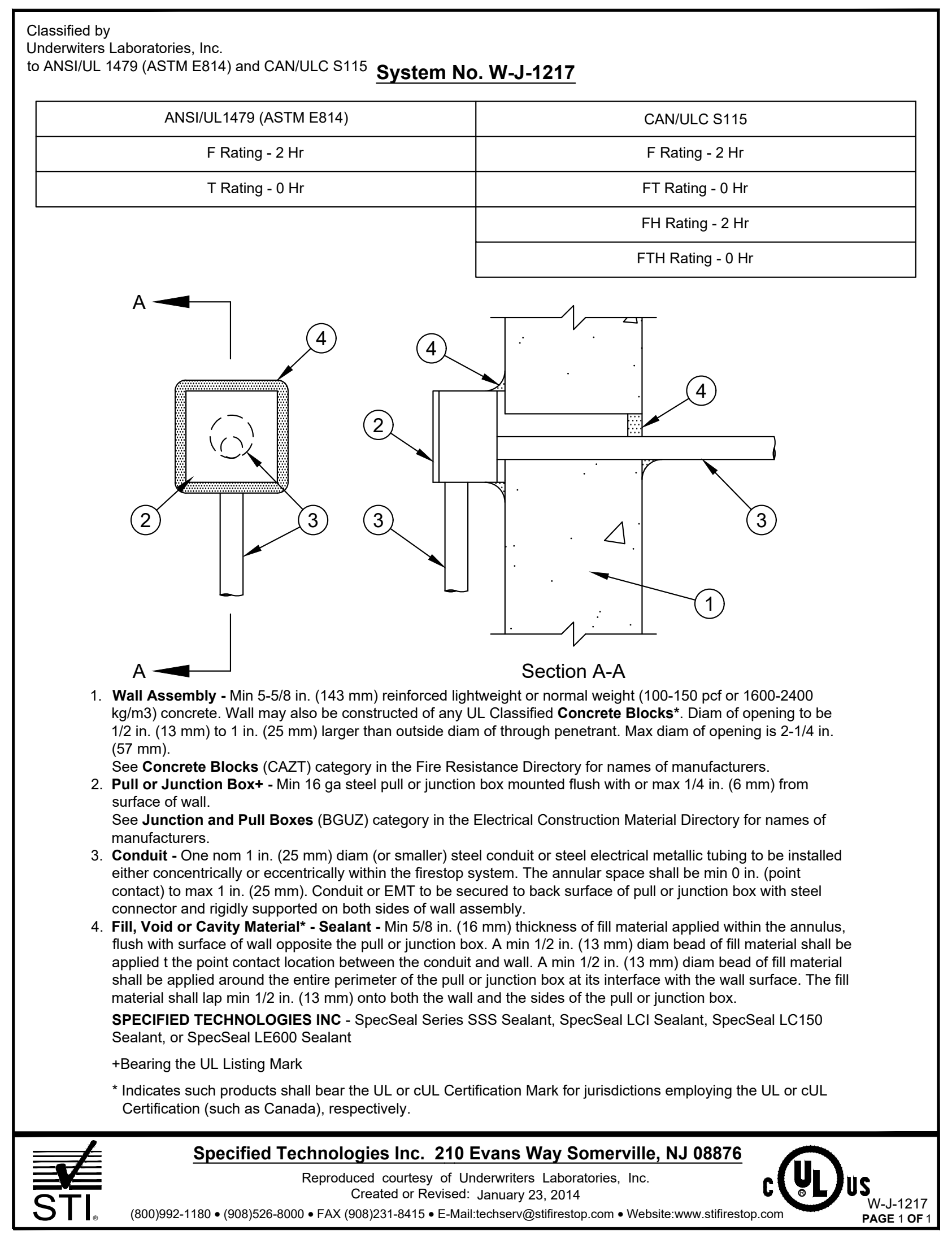
System No. W-J-1217

GENERAL NOTES:

1. Refer to section 07 84 00 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
2. Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   - Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.
3. If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   - UL Fire Resistance Directory; Current Edition
   - NFPA 101 Life Safety Code
   - All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
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PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
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ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

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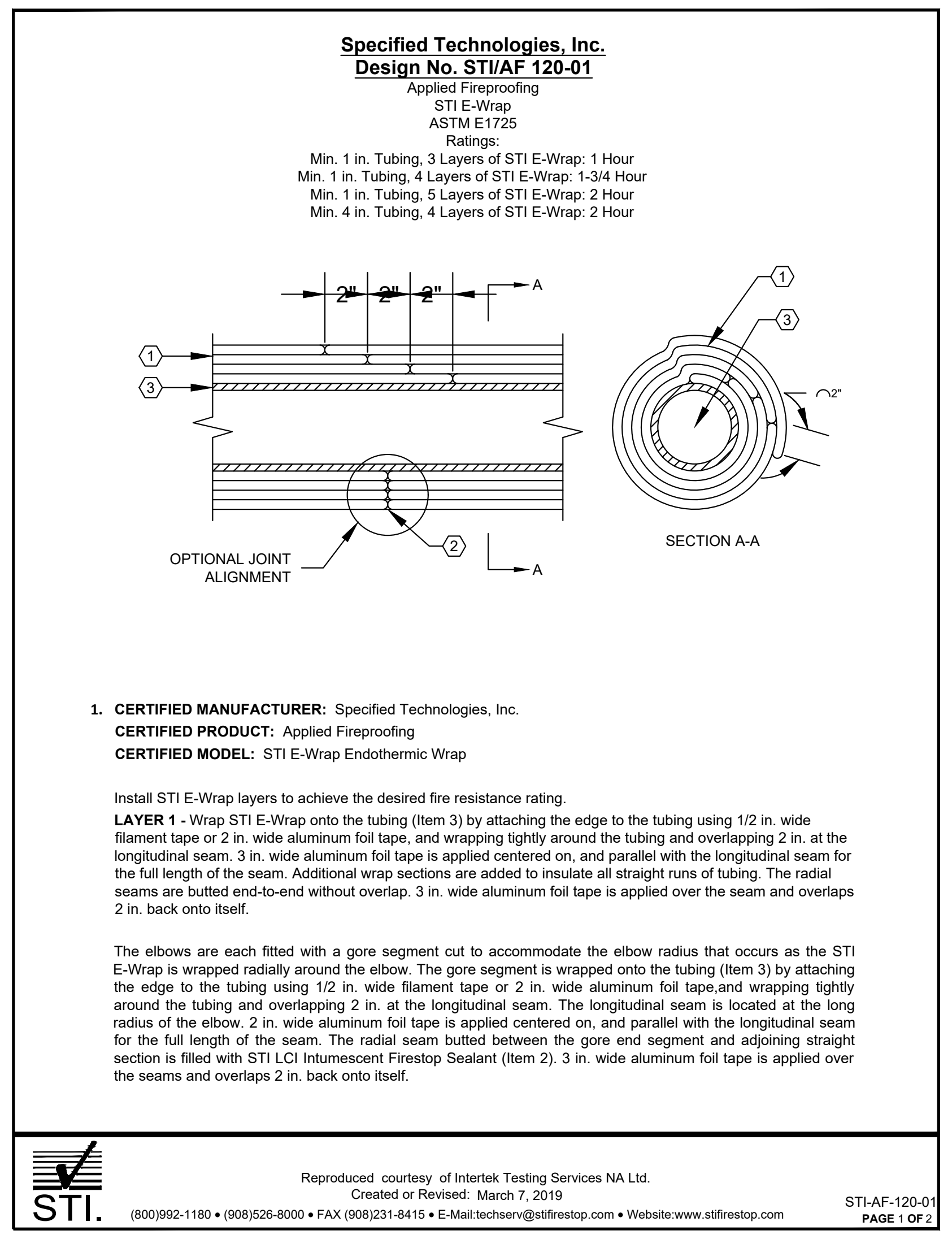

Specified Technologies, Inc.
Design No. STI/AF 120-01
Applied Fireproofing
STI E-Wrap
ASTM E1725
Ratings:
Min. 1 in. Tubing, 3 Layers of STI E-Wrap: 1 Hour
Min. 1 in. Tubing, 4 Layers of STI E-Wrap: 1-3/4 Hour
Min. 1 in. Tubing, 5 Layers of STI E-Wrap: 2 Hour
Min. 4 in. Tubing, 4 Layers of STI E-Wrap: 2 Hour

1. **CERTIFIED MANUFACTURER:** Specified Technologies, Inc.
   CERTIFIED PRODUCT: Applied Fireproofing
   CERTIFIED MODEL: STI E-Wrap Endothermic Wrap

   Install STI E-Wrap layers to achieve the desired fire resistance rating.

   LAYER 1 - Wrap STI E-Wrap onto the tubing (Item 3) by attaching the edge to the tubing using 1/2 in. wide filament tape or 2 in. wide aluminum foil tape, and wrapping tightly around the tubing and overlapping 2 in. at the longitudinal seam. 3 in. wide aluminum foil tape is applied centered on, and parallel with the longitudinal seam for the full length of the seam. Additional wrap sections are added to insulate all straight runs of tubing. The radial seams are butted end-to-end without overlap. 3 in. wide aluminum foil tape is applied over the seam and overlaps 2 in. back onto itself.

   The elbows are each fitted with a gore segment cut to accommodate the elbow radius that occurs as the STI E-Wrap is wrapped radially around the elbow. The gore segment is wrapped onto the tubing (Item 3) by attaching the edge to the tubing using 1/2 in. wide filament tape or 2 in. wide aluminum foil tape,and wrapping tightly around the tubing and overlapping 2 in. at the longitudinal seam. The longitudinal seam is located at the long radius of the elbow. 2 in. wide aluminum foil tape is applied centered on, and parallel with the longitudinal seam for the full length of the seam. The radial seam butted between the gore end segment and adjoining straight section is filled with STI LCI Intumescent Firestop Sealant (Item 2). 3 in. wide aluminum foil tape is applied over the seams and overlaps 2 in. back onto itself.

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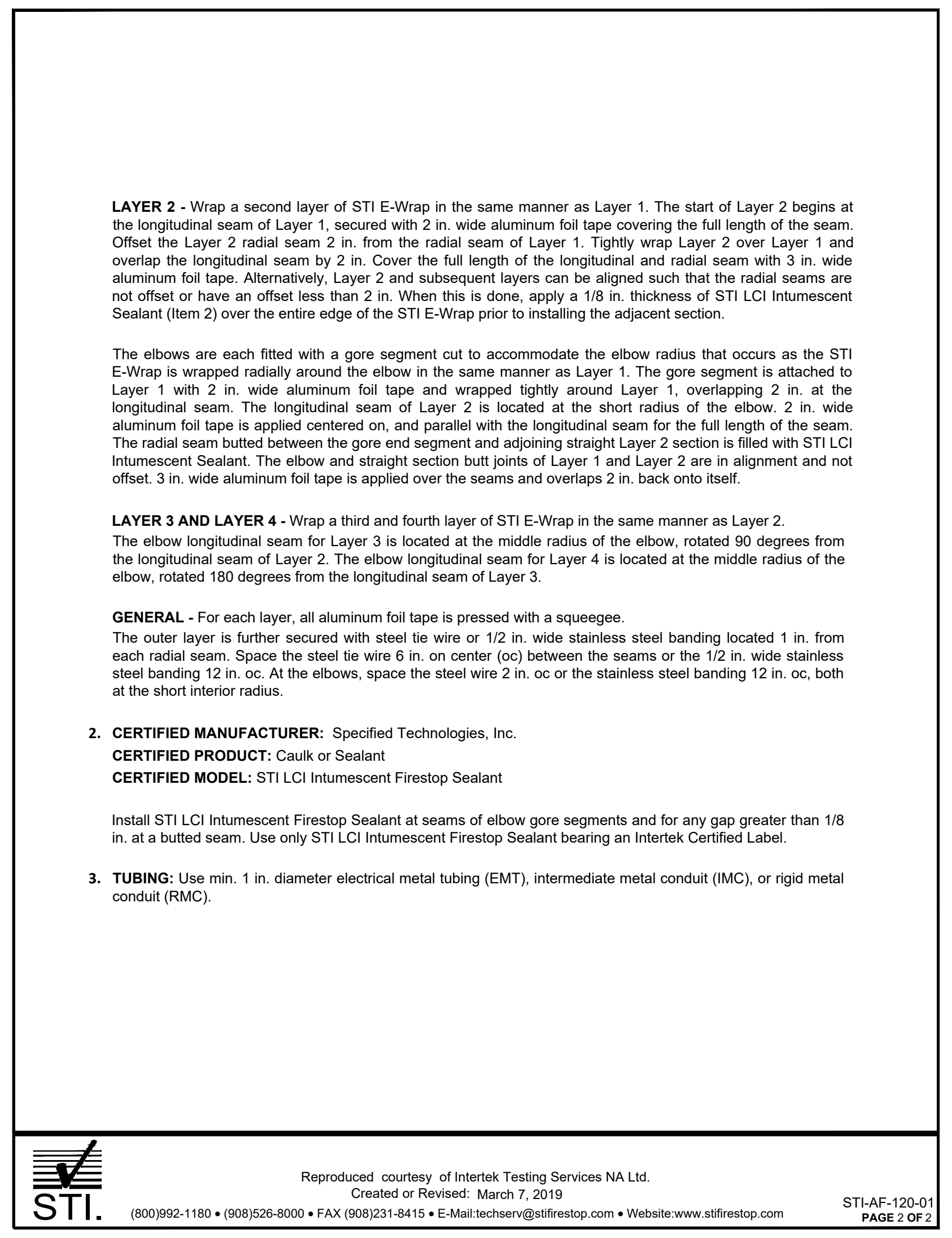

LAYER 2 - Wrap a second layer of STI E-Wrap in the same manner as Layer 1. The start of Layer 2 begins at the longitudinal seam of Layer 1, secured with 2 in. wide aluminum foil tape covering the full length of the seam. Offset the Layer 2 radial seam 2 in. from the radial seam of Layer 1. Tightly wrap Layer 2 over Layer 1 and overlap the longitudinal seam by 2 in. Cover the full length of the longitudinal and radial seam with 3 in. wide aluminum foil tape. Alternatively, Layer 2 and subsequent layers can be aligned such that the radial seams are not offset or have an offset less than 2 in. When this is done, apply a 1/8 in. thickness of STI LCI Intumescent Sealant (Item 2) over the entire edge of the STI E-Wrap prior to installing the adjacent section.

The elbows are each fitted with a gore segment cut to accommodate the elbow radius that occurs as the STI E-Wrap is wrapped radially around the elbow in the same manner as Layer 1. The gore segment is attached to Layer 1 with 2 in. wide aluminum foil tape and wrapped tightly around Layer 1, overlapping 2 in. at the longitudinal seam. The longitudinal seam of Layer 2 is located at the short radius of the elbow. 2 in. wide aluminum foil tape is applied centered on, and parallel with the longitudinal seam for the full length of the seam. The radial seam butted between the gore end segment and adjoining straight Layer 2 section is filled with STI LCI Intumescent Sealant. The elbow and straight section butt joints of Layer 1 and Layer 2 are in alignment and not offset. 3 in. wide aluminum foil tape is applied over the seams and overlaps 2 in. back onto itself.

LAYER 3 AND LAYER 4 - Wrap a third and fourth layer of STI E-Wrap in the same manner as Layer 2.
The elbow longitudinal seam for Layer 3 is located at the middle radius of the elbow, rotated 90 degrees from the longitudinal seam of Layer 2. The elbow longitudinal seam for Layer 4 is located at the middle radius of the elbow, rotated 180 degrees from the longitudinal seam of Layer 3.

GENERAL - For each layer, all aluminum foil tape is pressed with a squeegee.
The outer layer is further secured with steel tie wire or 1/2 in. wide stainless steel banding located 1 in. from each radial seam. Space the steel tie wire 6 in. on center (oc) between the seams or the 1/2 in. wide stainless steel banding 12 in. oc. At the elbows, space the steel wire 2 in. oc or the stainless steel banding 12 in. oc, both at the short interior radius.

2. **CERTIFIED MANUFACTURER:** Specified Technologies, Inc.
   CERTIFIED PRODUCT: Caulk or Sealant
   CERTIFIED MODEL: STI LCI Intumescent Firestop Sealant

   Install STI LCI Intumescent Firestop Sealant at seams of elbow gore segments and for any gap greater than 1/8 in. at a butted seam. Use only STI LCI Intumescent Firestop Sealant bearing an Intertek Certified Label.

3. **TUBING:** Use min. 1 in. diameter electrical metal tubing (EMT), intermediate metal conduit (IMC), or rigid metal conduit (RMC).

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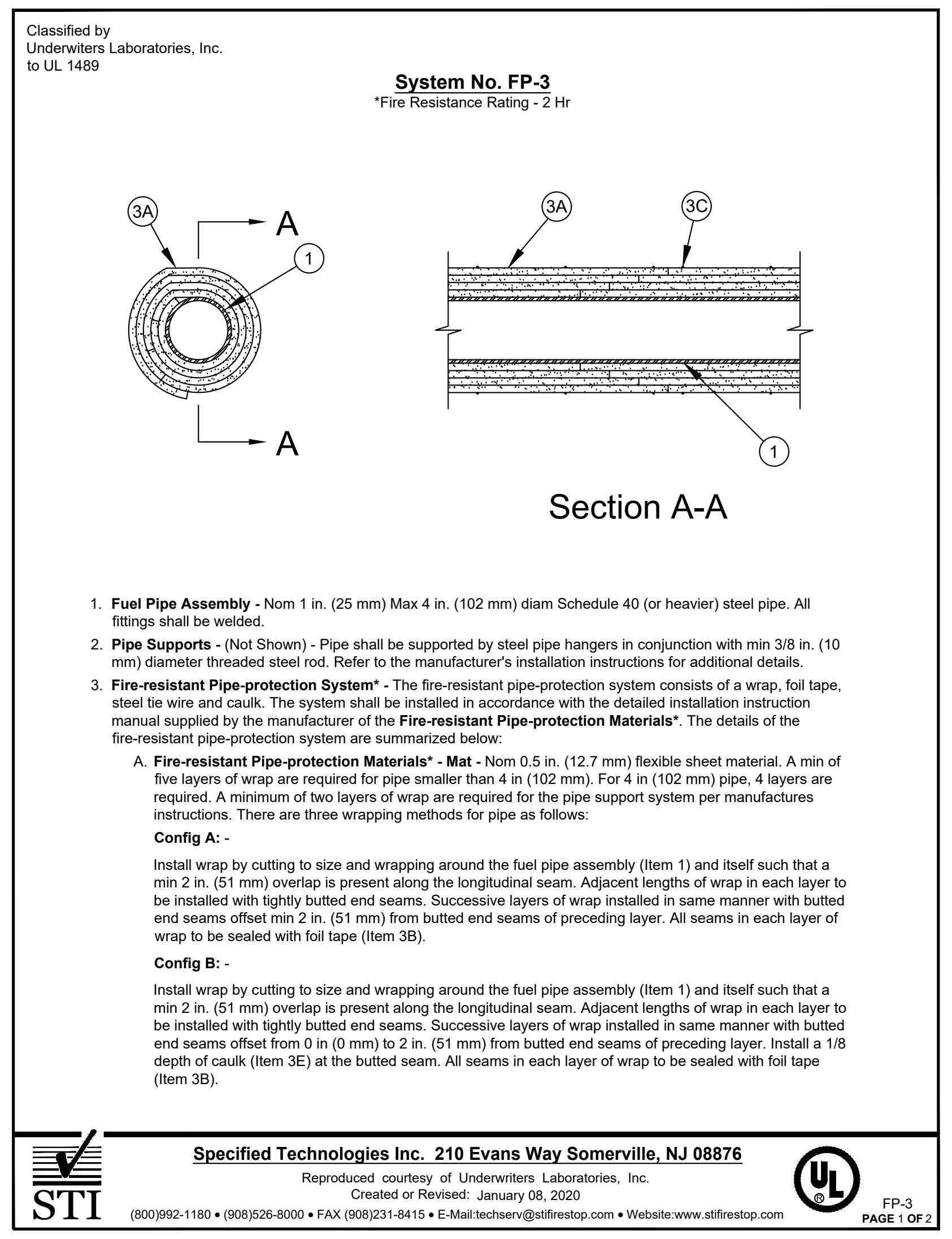

Classified by
Underwriters Laboratories, Inc.
to UL 1489

System No. FP-3
*Fire Resistance Rating - 2 Hr

Section A-A

1. **Fuel Pipe Assembly -** Nom 1 in. (25 mm) Max 4 in. (102 mm) diam Schedule 40 (or heavier) steel pipe. All fittings shall be welded.
2. **Pipe Supports -** (Not Shown) - Pipe shall be supported by steel pipe hangers in conjunction with min 3/8 in. (10 mm) diameter threaded steel rod. Refer to the manufacturer's installation instructions for additional details.
3. **Fire-resistant Pipe-protection System* -** The fire-resistant pipe-protection system consists of a wrap, foil tape, steel tie wire and caulk. The system shall be installed in accordance with the detailed installation instruction manual supplied by the manufacturer of the **Fire-resistant Pipe-protection Materials***. The details of the fire-resistant pipe-protection system are summarized below:
   A. **Fire-resistant Pipe-protection Materials* - Mat -** Nom 0.5 in. (12.7 mm) flexible sheet material. A min of five layers of wrap are required for pipe smaller than 4 in (102 mm). For 4 in (102 mm) pipe, 4 layers are required. A minimum of two layers of wrap are required for the pipe support system per manufactures instructions. There are three wrapping methods for pipe as follows:

   Config A: -

   Install wrap by cutting to size and wrapping around the fuel pipe assembly (Item 1) and itself such that a min 2 in. (51 mm) overlap is present along the longitudinal seam. Adjacent lengths of wrap in each layer to be installed with tightly butted end seams. Successive layers of wrap installed in same manner with butted end seams offset min 2 in. (51 mm) from butted end seams of preceding layer. All seams in each layer of wrap to be sealed with foil tape (Item 3B).

   Config B: -

   Install wrap by cutting to size and wrapping around the fuel pipe assembly (Item 1) and itself such that a min 2 in. (51 mm) overlap is present along the longitudinal seam. Adjacent lengths of wrap in each layer to be installed with tightly butted end seams. Successive layers of wrap installed in same manner with butted end seams offset from 0 in (0 mm) to 2 in. (51 mm) from butted end seams of preceding layer. Install a 1/8 depth of caulk (Item 3E) at the butted seam. All seams in each layer of wrap to be sealed with foil tape (Item 3B).

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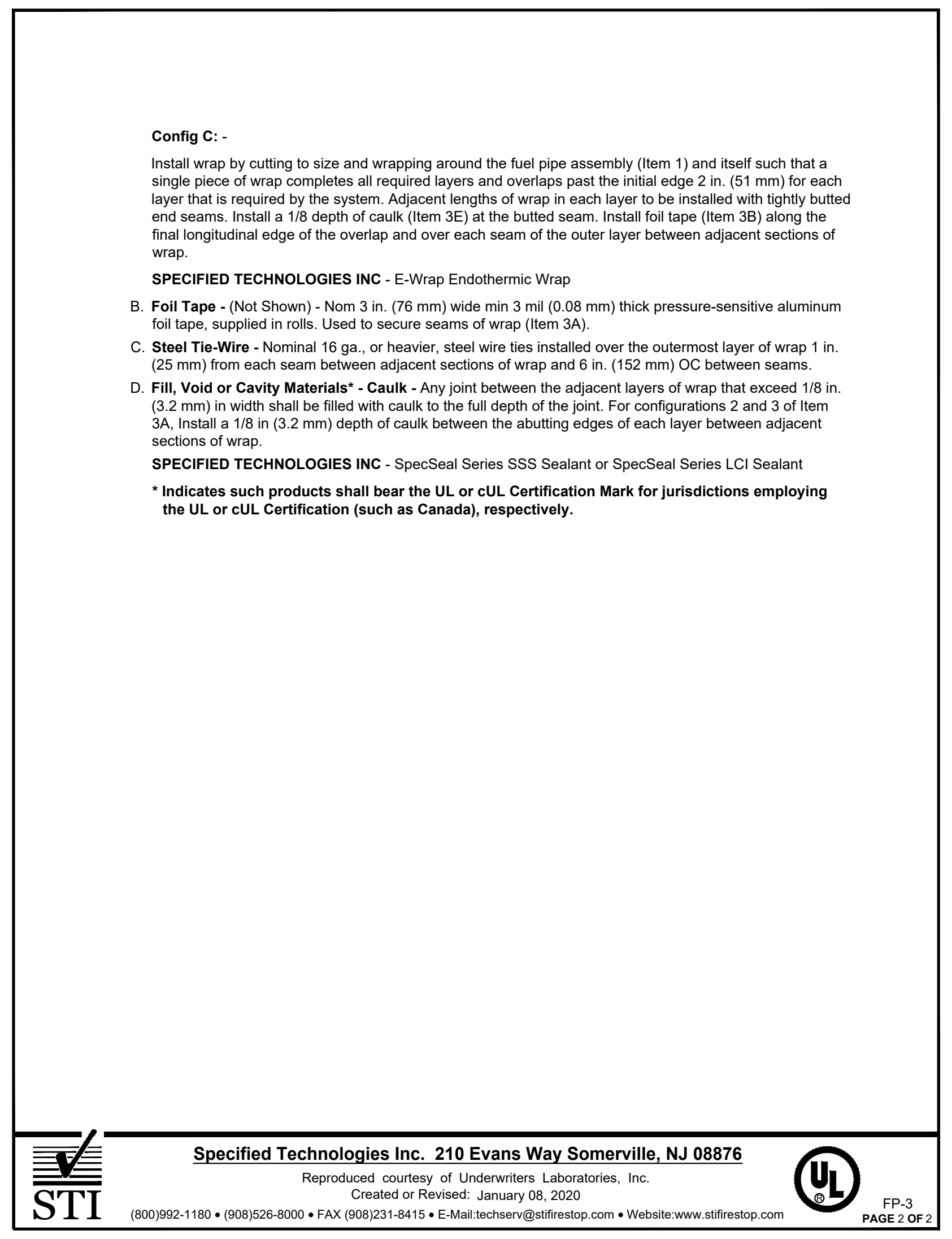

Config C: -

Install wrap by cutting to size and wrapping around the fuel pipe assembly (Item 1) and itself such that a single piece of wrap completes all required layers and overlaps past the initial edge 2 in. (51 mm) for each layer that is required by the system. Adjacent lengths of wrap in each layer to be installed with tightly butted end seams. Install a 1/8 depth of caulk (Item 3E) at the butted seam. Install foil tape (Item 3B) along the final longitudinal edge of the overlap and over each seam of the outer layer between adjacent sections of wrap.

SPECIFIED TECHNOLOGIES INC - E-Wrap Endothermic Wrap

B. **Foil Tape -** (Not Shown) - Nom 3 in. (76 mm) wide min 3 mil (0.08 mm) thick pressure-sensitive aluminum foil tape, supplied in rolls. Used to secure seams of wrap (Item 3A).
C. **Steel Tie-Wire -** Nominal 16 ga., or heavier, steel wire ties installed over the outermost layer of wrap 1 in. (25 mm) from each seam between adjacent sections of wrap and 6 in. (152 mm) OC between seams.
D. **Fill, Void or Cavity Materials* - Caulk -** Any joint between the adjacent layers of wrap that exceed 1/8 in. (3.2 mm) in width shall be filled with caulk to the full depth of the joint. For configurations 2 and 3 of Item 3A, Install a 1/8 in (3.2 mm) depth of caulk between the abutting edges of each layer between adjacent sections of wrap.
SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal Series LCI Sealant

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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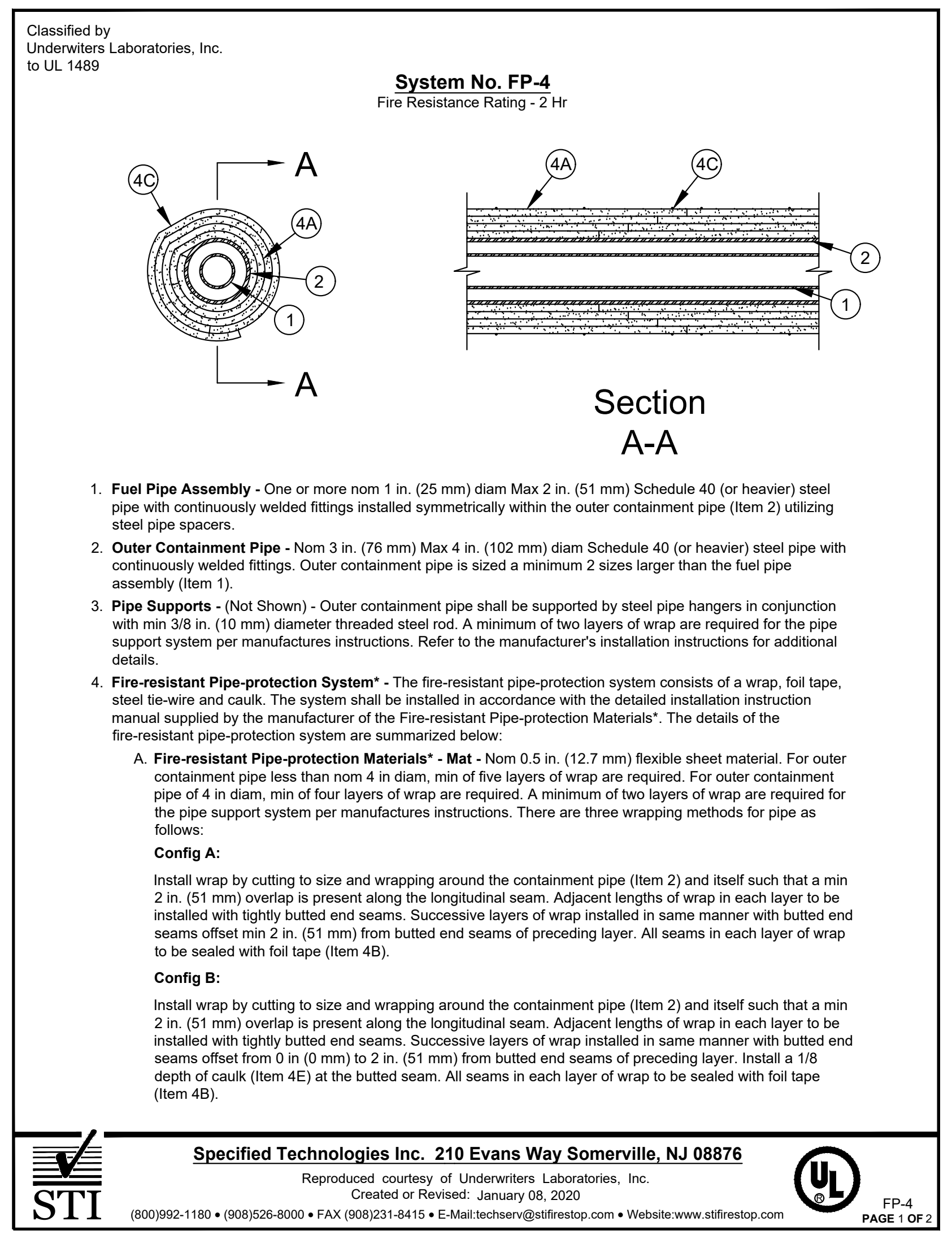

Classified by
Underwriters Laboratories, Inc.
to UL 1489

System No. FP-4
Fire Resistance Rating - 2 Hr

Section
A-A

1. **Fuel Pipe Assembly -** One or more nom 1 in. (25 mm) diam Max 2 in. (51 mm) Schedule 40 (or heavier) steel pipe with continuously welded fittings installed symmetrically within the outer containment pipe (Item 2) utilizing steel pipe spacers.
2. **Outer Containment Pipe -** Nom 3 in. (76 mm) Max 4 in. (102 mm) diam Schedule 40 (or heavier) steel pipe with continuously welded fittings. Outer containment pipe is sized a minimum 2 sizes larger than the fuel pipe assembly (Item 1).
3. **Pipe Supports -** (Not Shown) - Outer containment pipe shall be supported by steel pipe hangers in conjunction with min 3/8 in. (10 mm) diameter threaded steel rod. A minimum of two layers of wrap are required for the pipe support system per manufactures instructions. Refer to the manufacturer's installation instructions for additional details.
4. **Fire-resistant Pipe-protection System* -** The fire-resistant pipe-protection system consists of a wrap, foil tape, steel tie-wire and caulk. The system shall be installed in accordance with the detailed installation instruction manual supplied by the manufacturer of the Fire-resistant Pipe-protection Materials*. The details of the fire-resistant pipe-protection system are summarized below:
   A. **Fire-resistant Pipe-protection Materials* - Mat -** Nom 0.5 in. (12.7 mm) flexible sheet material. For outer containment pipe less than nom 4 in diam, min of five layers of wrap are required. For outer containment pipe of 4 in diam, min of four layers of wrap are required. A minimum of two layers of wrap are required for the pipe support system per manufactures instructions. There are three wrapping methods for pipe as follows:

   Config A:

   Install wrap by cutting to size and wrapping around the containment pipe (Item 2) and itself such that a min 2 in. (51 mm) overlap is present along the longitudinal seam. Adjacent lengths of wrap in each layer to be installed with tightly butted end seams. Successive layers of wrap installed in same manner with butted end seams offset min 2 in. (51 mm) from butted end seams of preceding layer. All seams in each layer of wrap to be sealed with foil tape (Item 4B).

   Config B:

   Install wrap by cutting to size and wrapping around the containment pipe (Item 2) and itself such that a min 2 in. (51 mm) overlap is present along the longitudinal seam. Adjacent lengths of wrap in each layer to be installed with tightly butted end seams. Successive layers of wrap installed in same manner with butted end seams offset from 0 in (0 mm) to 2 in. (51 mm) from butted end seams of preceding layer. Install a 1/8 depth of caulk (Item 4E) at the butted seam. All seams in each layer of wrap to be sealed with foil tape (Item 4B).

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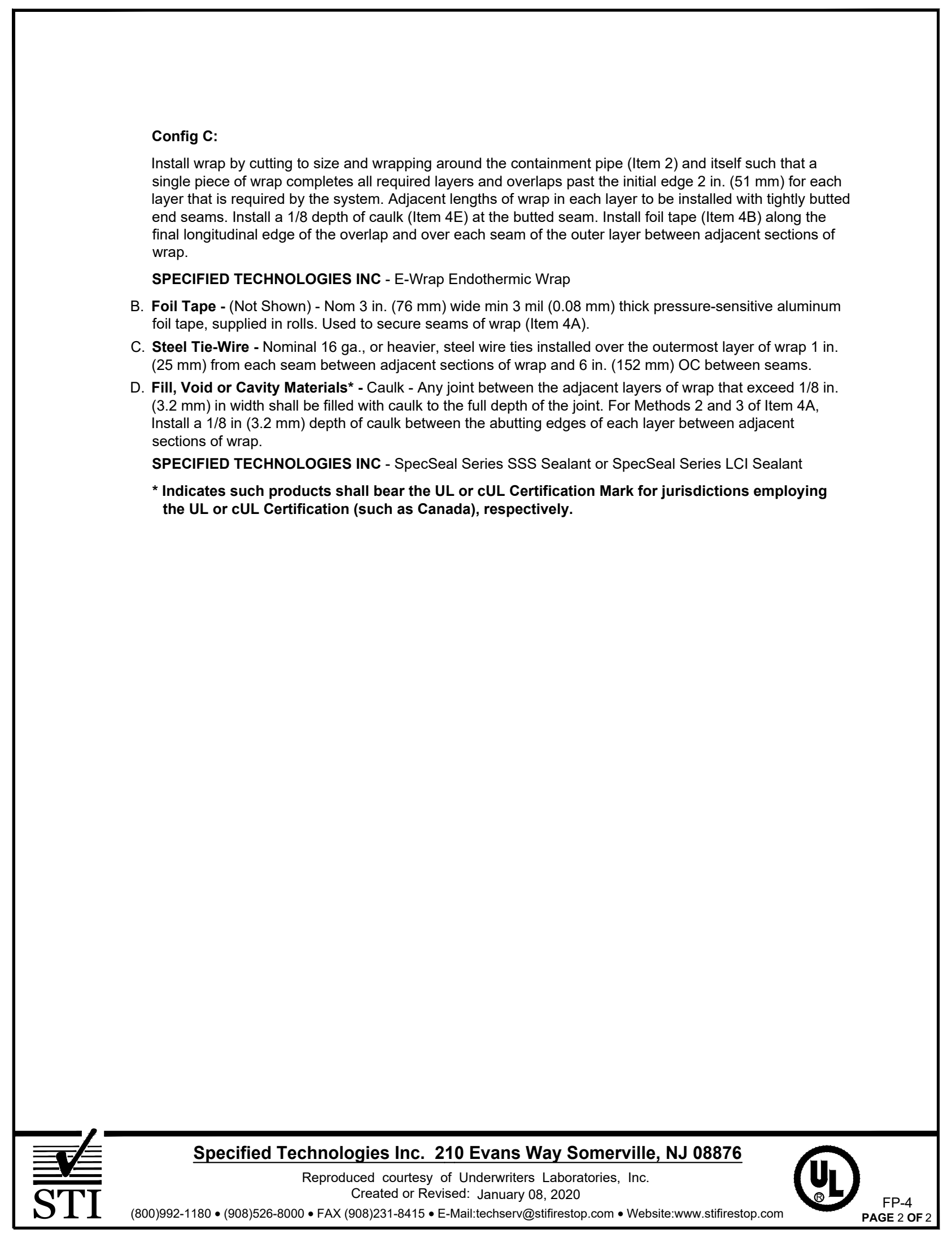

Config C:

Install wrap by cutting to size and wrapping around the containment pipe (Item 2) and itself such that a single piece of wrap completes all required layers and overlaps past the initial edge 2 in. (51 mm) for each layer that is required by the system. Adjacent lengths of wrap in each layer to be installed with tightly butted end seams. Install a 1/8 depth of caulk (Item 4E) at the butted seam. Install foil tape (Item 4B) along the final longitudinal edge of the overlap and over each seam of the outer layer between adjacent sections of wrap.

SPECIFIED TECHNOLOGIES INC - E-Wrap Endothermic Wrap

B. **Foil Tape -** (Not Shown) - Nom 3 in. (76 mm) wide min 3 mil (0.08 mm) thick pressure-sensitive aluminum foil tape, supplied in rolls. Used to secure seams of wrap (Item 4A).
C. **Steel Tie-Wire -** Nominal 16 ga., or heavier, steel wire ties installed over the outermost layer of wrap 1 in. (25 mm) from each seam between adjacent sections of wrap and 6 in. (152 mm) OC between seams.
D. **Fill, Void or Cavity Materials* -** Caulk - Any joint between the adjacent layers of wrap that exceed 1/8 in. (3.2 mm) in width shall be filled with caulk to the full depth of the joint. For Methods 2 and 3 of Item 4A, Install a 1/8 in (3.2 mm) depth of caulk between the abutting edges of each layer between adjacent sections of wrap.
SPECIFIED TECHNOLOGIES INC - SpecSeal Series SSS Sealant or SpecSeal Series LCI Sealant

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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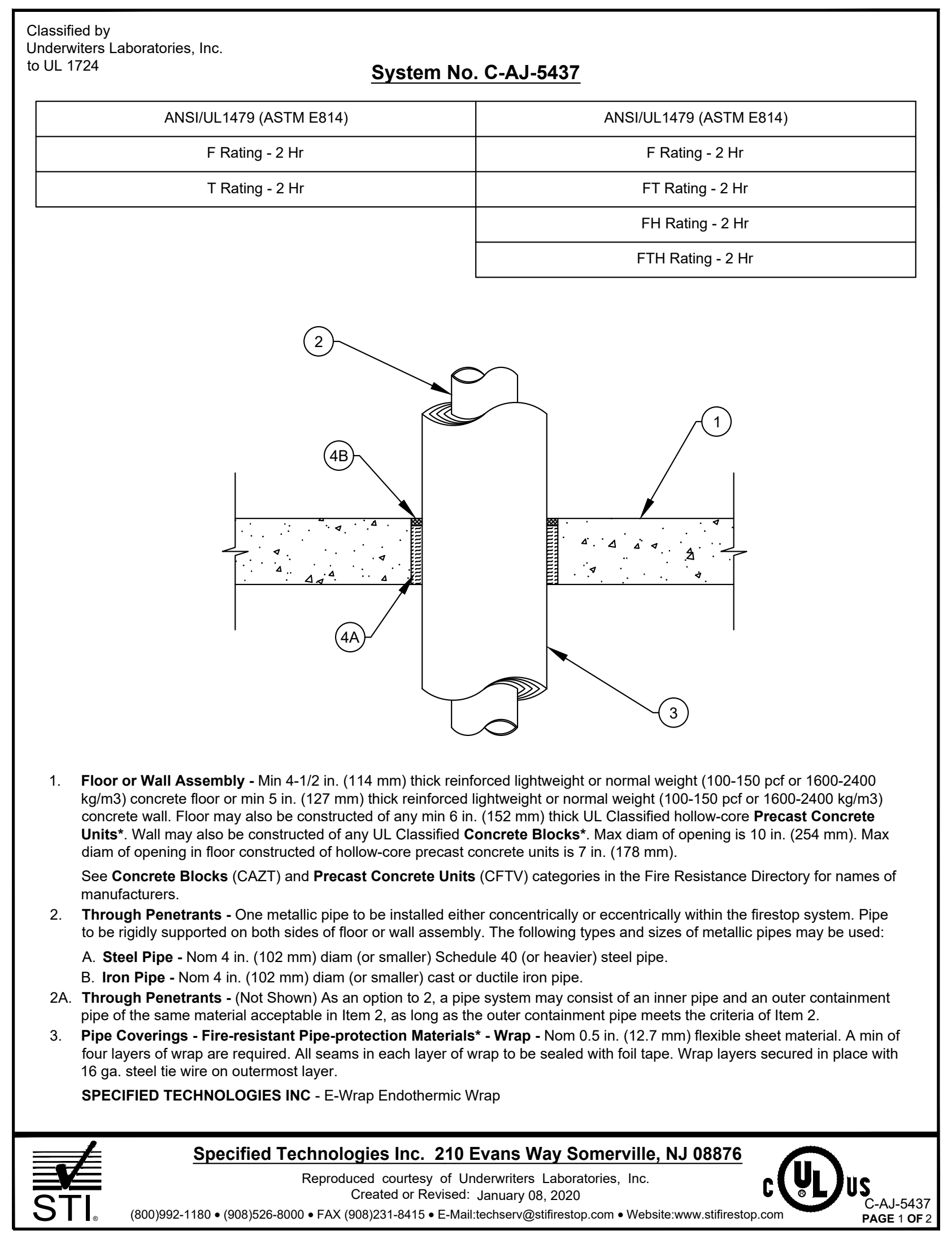

Classified by
Underwriters Laboratories, Inc.
to UL 1724

System No. C-AJ-5437

ANSI/UL1479 (ASTM E814)	ANSI/UL1479 (ASTM E814)
F Rating - 2 Hr	F Rating - 2 Hr
T Rating - 2 Hr	FT Rating - 2 Hr
	FH Rating - 2 Hr
	FTH Rating - 2 Hr

1. **Floor or Wall Assembly -** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete floor or min 5 in. (127 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete wall. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units***. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 10 in. (254 mm). Max diam of opening in floor constructed of hollow-core precast concrete units is 7 in. (178 mm).

   See **Concrete Blocks** (CAZT) and **Precast Concrete Units** (CFTV) categories in the Fire Resistance Directory for names of manufacturers.
2. **Through Penetrants -** One metallic pipe to be installed either concentrically or eccentrically within the firestop system. Pipe to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes may be used:
   A. **Steel Pipe -** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.
   B. **Iron Pipe -** Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe.

2A. **Through Penetrants -** (Not Shown) As an option to 2, a pipe system may consist of an inner pipe and an outer containment pipe of the same material acceptable in Item 2, as long as the outer containment pipe meets the criteria of Item 2.

3. **Pipe Coverings - Fire-resistant Pipe-protection Materials* - Wrap -** Nom 0.5 in. (12.7 mm) flexible sheet material. A min of four layers of wrap are required. All seams in each layer of wrap to be sealed with foil tape. Wrap layers secured in place with 16 ga. steel tie wire on outermost layer.
   SPECIFIED TECHNOLOGIES INC - E-Wrap Endothermic Wrap

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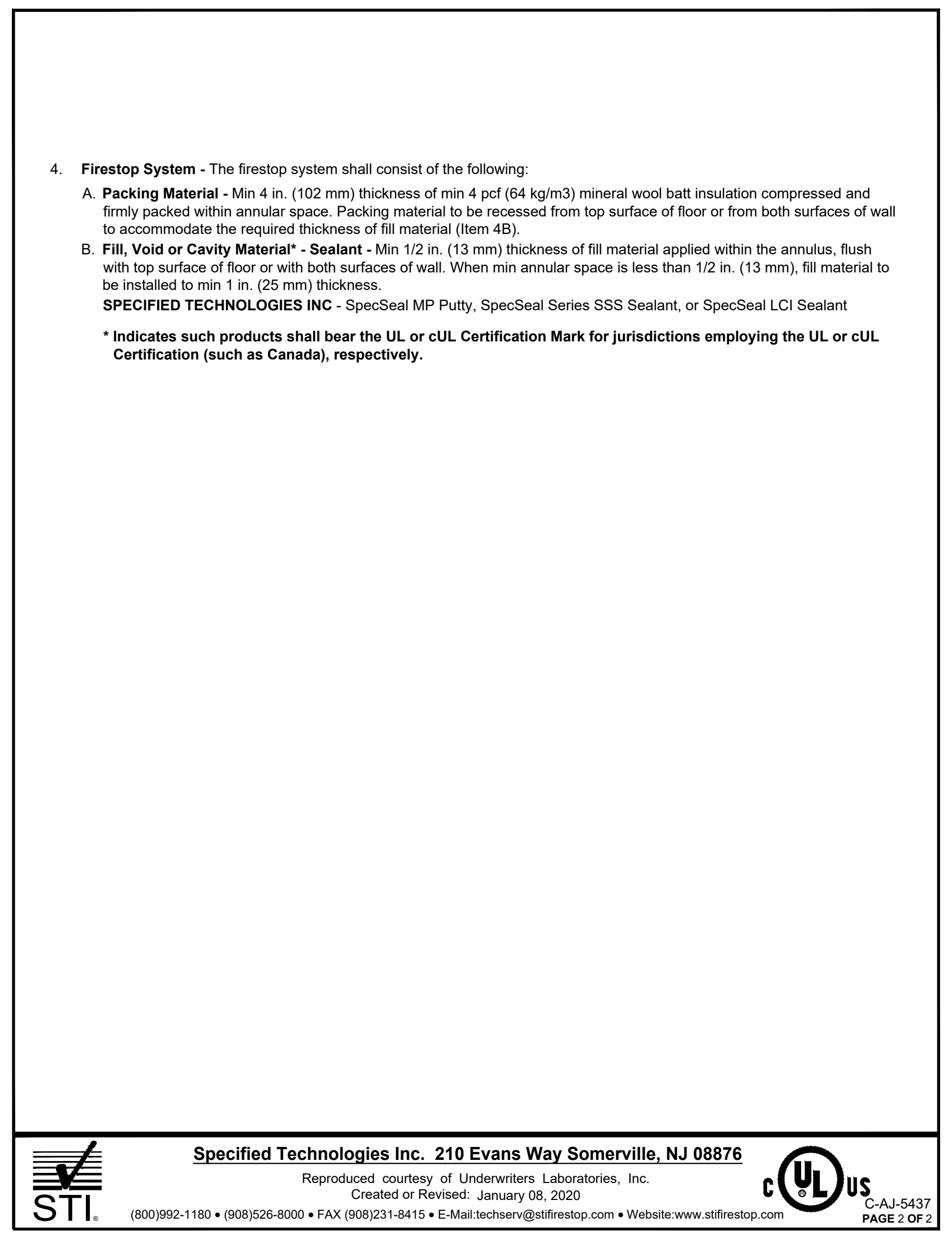

4. **Firestop System -** The firestop system shall consist of the following:
   A. **Packing Material -** Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation compressed and firmly packed within annular space. Packing material to be recessed from top surface of floor or from both surfaces of wall to accommodate the required thickness of fill material (Item 4B).
   B. **Fill, Void or Cavity Material* - Sealant -** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. When min annular space is less than 1/2 in. (13 mm), fill material to be installed to min 1 in. (25 mm) thickness.
   SPECIFIED TECHNOLOGIES INC - SpecSeal MP Putty, SpecSeal Series SSS Sealant, or SpecSeal LCI Sealant

   *** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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GENERAL NOTES:

1. Refer to section 07 84 00 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
2. Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   - Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.
3. If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Engineering Judgments shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   - UL Fire Resistance Directory; Current Edition
   - NFPA 101 Life Safety Code
   - All governing local and regional building codes
5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479), ASTM E1966 (UL 1479), ASTM 1966 (UL 2079), ASTM E2307, or ULC-S115 (as required) in tested assemblies that provide a fire rating equal to that of the surrounding construction.

DIVISION 4: Masonry
DIVISION 7: Thermal & Moisture Protection
DIVISION 9: Finishes
DIVISION 22: Plumbing
DIVISION 23: HVAC
DIVISION 26: Electrical
DIVISION 27: Communications

PROJECT NAME:
PROJECT_NAME:

PROJECT LOCATION:
PROJECT_LOCATION:

ARCHITECT/CONSULTANT:
ARCHITECT/CONSULTANT:

TITLE:
STI FIRESTOP SYSTEMS

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