UL LISTINGS FOR FIRE PROTECTION OF RATED WALLS AT PENETRATIONS

System No. W-L-1054

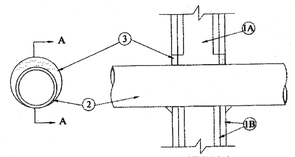
January 24, 2002

F Ratings — 1 and 2 Hr (See Items 1 and 3)

T Rating — 0 Hr

L Rating At Ambient — Less Than 1 CFM/Sq Ft

L Rating At 400 F — 4 CFM/Sq Ft



SECTION A-A

1. **Wall Assembly** The 1 or 2 hr fire-rated gypsum wall-board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw-attached to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. wider and 4 to 6 in. higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 5 in. clearance is present between the penetrating item and the framing on all four sides.

B. **Gypsum Board*** 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 32-1/4 in. for steel stud walls. Max diam of opening is 14-1/2 in. for wood stud walls.

The F Rating of the firestop system is equal to the fire rating of the wall assembly.

2. **Through-Penetrants** One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 in. to max 2-1/4 in. Pipe may be installed with continuous point contact. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:

A. **Steel Pipe** Nom 30 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.

B. **Iron Pipe** Nom 30 in. diam (or smaller) cast or ductile iron pipe.

C. **Conduit** Nom 4 in. diam (or smaller) steel electrical metallic tubing or 6 in. diam steel conduit.

D. **Copper Tubing** Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.

E. **Copper Pipe** Nom 6 in. diam (or smaller) regular (or heavier) copper pipe.

3. **Fill, Void or Cavity Material*** — **Sealant** Min 5/8 in. thickness of fill material applied within the annular, flush with both surfaces of wall. At the point or continuous contact locations between pipe and wall, a min 1/2 in. diam bead of fill material shall be applied at the pipe wall interface on both surfaces of wall.

HILTI CONSTRUCTION CHEMICALS, DIV OF

HILTI INC — FS-One Sealant

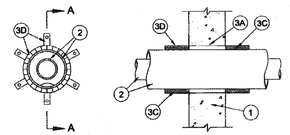
*Bearing the UL Classification Mark

System No. W-J-2053

February 09, 1999

F Rating — 2 Hr

T Rating — 2 Hr



Section A-A

1. **Wall Assembly** Min 6 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 8-1/4 in.

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

2. **Through Penetrants** One nonmetallic pipe concentrically installed within a second nonmetallic pipe and centered within the firestop system. The space between the outer pipe and the periphery of the opening shall be nom 13/16 in. Nonmetallic spacers shall be used to maintain the inner pipe within the center of the outer pipe at a distance no closer than 10 in. from both surfaces of the wall. Outer pipe to be rigidly supported on both sides of wall assembly. the following types and sizes of nonmetallic pipes described in Items A and B may be used for the outer pipe and the following types and sizes of nonmetallic pipes described in Items C and D may be used for the inner pipe:

A. Polypropylene (PP) Pipe — Nom 6 in. diam (or smaller) SDR32 PP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

B. Polyvinyl Chloride (PVC) Pipe — Nom 6 in. diam (or smaller) Schedule 40 PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

C. Polypropylene (PP) Pipe — Nom 3 in. diam (or smaller) SDR32 PP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

D. Polyvinyl Chloride (PVC) Pipe — Nom 3 in. diam (or smaller) Schedule 40 PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

3. **Firestop System** The firestop system shall consist of the following:

A. **Metallic Sleeve** Cylindrical sleeve fabricated from 0.0165 in. thick (26 gauge) galv sheet steel and having a 2 in. lap along the longitudinal seam. Length of steel sleeve to be 4 in. greater than 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 openings within the wall assembly. The ends of the sleeve shall extend 2 in. beyond each surface of the wall.

B. **Aluminum Foil Tape** (Not Shown) — Nom 3 mil thick pressure sensitive aluminum foil tape wrapped around the circumference of the outer pipe with a 1 in. wide overlap along its perimeter joint. Foil tape shall begin at the outer edge of the metallic sleeve (Item 3A) and extend 3 in. beyond the sleeve edge on both sides of the wall.

C. **Fill, Void or Cavity Materials*** — **Wrap Strip** Nom 3/16 in. thick intumescent material faced on both sides with a plastic film, supplied in 2 in. wide strips. Two stacks of three layers are individually wrapped around the outer pipe with the ends butted and held in place with masking tape. Butted ends in successive layers may be aligned or offset. Two stacks of wrap strips are required on each side of the wall.

Specified Technologies Inc. — SpecSeal BLU Wrap Strip

D. **Steel Collar** Collar fabricated from coils of precut 0.029 in. thick (No. 22 MSG) galv sheet steel available from wrap strip manufacturer. Collar shall be nom 4 in. deep with a nin of nir 1 in. wide by 2 in. long anchor tabs. Retainer tabs, 3/4 in. wide tapering down to 3/8 in. wide and located opposite the anchor tabs, are bent anward 90 deg to retain the wrap strips. Steel collars wrapped around wrap strips and ends of sleeve with 1 in. wide overlap along its perimiter joint. Steel collar tightened and secured with one stainless steel hose clamp located 3 in. from wall surface. Collar additionally secured to steel sleeve with four No. 8 hx 1/2 in. long sheet metal screws symmetrically located around the perimeter of the steel collar. Steel collars installed on both sides of the wall.

*Bearing the UL Classification Markong

System No. W-L-2079

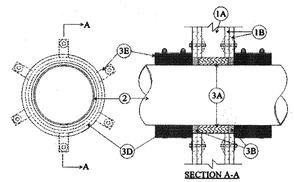
January 11, 1995

F Ratings — 1 and 2 Hr (See Item 1B)

T Rating — 0 Hr

L Rating At Ambient — 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 wall-board/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. OC with nom 2 by 4 in. lumber end plates and cross braces. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC.

B. **Gypsum Board*** 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 10 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 nonmetallic pipe to be centered within the firestop system. A nom annular space of 11/16 in. is required within the firestop system. Pipe to be rigidly supported on both sides of the wall assembly. The following types and sizes of nonmetallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe** Nom 8 in. diam (or smaller) Schedule 40 PVC pipe for use in closed (process or supply) vented (drain, waste, or vent) piping systems.

B. **Flame Retardant Polypropylene (FRPP) Pipe** Nom 8 in. diam (or smaller) Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

C. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** Nom 8 in. diam (or smaller) SDR 17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

3. **Firestop System** The firestop system shall consist of the following:

A. **Packing Material** Min 4 pcf mineral wool insulation cut to size to fill the annular within the opening and stud cavity. Mineral wool insulation wrapped around the outer circumference of the through penetrant and secured together by means of No. 24 AWG steel tie wire. Mineral wool insulation slid into annular of opening and recessed from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material*** — **Sealant** Min 1/2 in. thickness of fill material applied within the annular, flush with both surfaces of wall.

SPECIFIED TECHNOLOGIES INC — SpecSeal 100, 101 or 105 Sealant

C. **Aluminum Foil Tape** (Not Shown) — Nom 3 mil thick pressure sensitive aluminum foil tape wrapped around the outer circumference of the through penetrant with a 1 in. wide overlap along its perimeter joint. Foil tape shall abut against both surfaces of the wall and extend a min 5 in. beyond both surfaces of the wall.

D. **Fill, Void or Cavity Material*** — **Wrap Strip** Nom 3/16 in. thick intumescent material faced on both sides with a plastic film, supplied in 2 in. wide strips. Two stacks of wrap strips, each consisting of four wrap strips are individually wrapped around the through penetrant with ends butted and held in place with masking tape. Butted ends in successive layers may be aligned or offset. The edge of the wrap strips shall abut each surface of the wall. Two stacks of wrap strips are installed on each side of the wall.

SPECIFIED TECHNOLOGIES INC — SpecSeal BLU Wrap Strip

E. **Steel Collar** Collar fabricated from coils of precut 0.029 in. thick (No. 22 MSG) galv sheet steel available from wrap strip manufacturer. Collar shall be nom 4 in. deep with min six 1 in. wide by 2 in. long anchor tabs for securement to the wall. Retainer tabs, 3/4 in. wide tapering down to 3/8 in. wide and located opposite the anchor tabs, are folded 90 degrees toward through penetrant surface to maintain the annular space around the pipe and to retain the wrap strips. Steel collar wrapped around wrap strips and through penetrant with 1 in. wide overlap along its perimeter joint. Steel collar tightened around wrap strips and through penetrant using min 1/2 in. wide by 0.028 in. thick stainless steel hose clamp spaced 2 in. OC. Collar secured to wall with 1/8 in. diam by min 1-3/4 in. long steel molly bolts in conjunction with min 1/4 in. by 1-1/4 in. diam steel fender washers. Steel collars are installed on each side of wall.

*Bearing the UL Classification Marking

System No. W-J-1067

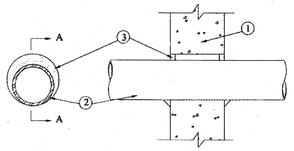
January 24, 2002

F Ratings — 1 and 2 Hr (See Items 1 and 3)

T Rating — 0 Hr

L Rating at Ambient—Less Than 1 CFM/Sq Ft

L Rating At 400 F—4 CFM/Sq Ft



SECTION A-A

1. **Wall Assembly** Min 3-3/4 in. and 5 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete for 1 and 2 h rated assemblies, respectively. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 32-1/4 in.

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

2. **Through—Penetrants** One metallic pipe, conduit or tubing to be centered within the firestop system. The annular space shall be min 0 in. to max 2-1/4 in. Pipe may be installed with continuous point contact. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:

A. **Steel Pipe** Nom 30 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.

B. **Iron Pipe** Nom 30 in. diam (or smaller) cast or ductile iron pipe.

C. **Conduit** Nom 4 in. diam (or smaller) steel electrical metallic tubing or 6 in. diam (or smaller) steel conduit.

D. **Copper Tubing** Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.

E. **Copper Pipe** Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.

3. **Fill, Void or Cavity Material*** Min 5/8 in. thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point or continuous contact locations between pipe and wall, a min 1/2 in. diam bead of fill material shall be applied at the pipe-wall interface on both surfaces of wall.

HILTI CONSTRUCTION CHEMICALS, DIV OF

HILTI INC — FS-One Sealant

*Bearing the UL Classification Mark

TYPICAL LIMITING HEIGHTS INTERIOR PARTITIONS

Stud width	Stud spacing	Allow. defl.	Partition, one layer	Partition, two layers	Furring, one layer
					
20 gauge stud (.0312 min.)					
2-1/2"	16"	L/120	17'4"l	17'11"l	16'6"d*
		L/240	13'10"d	16'1"d	13'0"d*
		L/360	12'0"d	14'0"d	11'6"d
	24"	L/120	14'7"l	14'7"l	14'6"d*
		L/240	12'0"d	13'5"l	11'6"d
		L/360	10'6"d	12'4"d	10'0"d
3-5/8"	16"	L/120	22'7"d	23'8"l	21'9"d*
		L/240	17'11"d	20'2"d	17'3"d*
		L/360	15'7"d	17'8"d	15'0"d*
	24"	L/120	19'4"l	19'4"l	19'0"d*
		L/240	15'7"d	17'8"l	15'0"d*
		L/360	13'8"d	15'6"d	13'3"d*
4"	16"	L/120	24'3"d	25'6"d	23'6"d*
		L/240	19'2"d	21'7"d	18'9"d*
		L/360	16'10"d	18'11"d	16'3"d*
	24"	L/120	20'9"l	20'9"l	20'6"d*
		L/240	16'10"d	18'11"d	16'3"d*
		L/360	14'8"d	16'6"d	14'3"d*
6"	16"	L/120	32'11"d	33'11"l	32'3"d*
		L/240	26'1"d	28'6"d	25'6"d*
		L/360	22'10"d	24'11"d	23'3"d*
	24"	L/120	25'3"l	25'3"l	28'0"d*
		L/240	22'10"d	24'11"d	22'3"d*
		L/360	19'11"d	21'10"d	19'6"d*

WALL TYPES GENERAL NOTES:

1.- THE STEEL STUDS OF ALL PARTITIONS SUPPORTING PLUMBING FIXTURES OR CABINETS, SHALL EXTEND FROM FLOOR TO STRUCTURE ABOVE AND SHALL BE RIGIDLY CONNECTED TOP AND BOTTOM.

2.- ALL WALLS ARE TO BE BRACED ABOVE THE FINISHED CEILING AS RECOMMENDED BY THE METAL STUD MANUFACTURER TO PREVENT LATERAL WALL MOVEMENT.

3.- ALL INTERIOR STEEL STUDS SHALL BE BRACED FOR MAXIMUM DEFLECTION OF L/360 AT (5) FIVE LB/FT. HORIZONTAL LOAD. CONTRACTOR SHALL SIZE STUD GAGE BASED ON MANUFACTURER'S STANDARD STUD PROPERTIES TABLES.

4.- ALL WALLS WICH SEPARATE A SPACE FROM AN UNCONDITIONED AREA SHALL HAVE R-5 MIN. KRAFT FACED FIBERGLASS BATT INSULATION FOR DRYWALL PARTITIONS AND R-5 MIN. FOIL KRAFT PAPER INSULATION FOR MASONRY WALLS.

5.- ALL STUDS 20 GAUGE AT 16" O.C. UNLESS OTHERWISE NOTED.

6.- ALL RATED WALL PENETRATIONS SHALL MAINTAIN INTEGRITY OF WALL ASSEMBLY.

7.- PROVIDE CONTROL JOINTS IN GYPSUM WALL BOARD PER MANUFACTURER'S RECOMMENDATIONS, INDUSTRY PRACTICE AND/OR AS INDICATED. COORDINATE WITH ARCHITECT.

8.- PROVIDE MOISTURE RESISTANT GYPSUM BOARD IN ALL RESTROOM WALLS AND OTHER WET WALLS.

IN ASSOCIATION WITH:
GORRILL-PALMER CONSULTING ENGINEERS
PERATROVICH, NOTTINGHAM, & DRAGE
WINTON SCOTT ARCHITECTS
HALEY & ALDRICH

BEA

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER 009215.00

PIN
009215.00

LICENSED ARCHITECT BRUNO E. RAMOS NO. 2644 STATE OF MAINE

PROJ. MANAGER PAUL POTTLE	BY	DATE
DESIGN-DETAILED		
CHECKED-REVIEWED		
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE

P. LICENCE NUMBER
ARC 2644

DATE
10/8/2004

CITY OF PORTLAND
OCEAN GATEWAY PHASE 1

UL LISTING

A-III

130 OF 288

Filename: \\Server1\projects\02-0818 Maine Int Ferry Terminal\PHASE 1\Architecture\FINAL CONSTRUCTION DOCUMENTS\TERMINAL BUILDING\20343802-T-All & III.dwg, Oct 07, 2004 - 6:25pm