O'Neill Walsh Community Builders **Submittal Form**

OWCB

AHSC

(Project)

Submittal No. 001

Description: Common HVAC Materials

Date: 10/27/17 **Return By:** 11/10/17

Division: 23

Section: 23 05 00

Andersen

Subcontract/Supplier:

The review by O'Neill Walsh Community Builders ("OWCB") of the above Submittal shall not relieve Subcontractor/Supplier from any of its obligations under the agreement with OWCB nor give rise to any claim in favor of the Subcontractor/Supplier or third parties against OWCB or Owner.

By: Logan Bright

O'Neill Walsh Community Builders

Notes:

ARCHITECT

Notes:

ENGINEER

No exception taken.

Checking is only for general conformance with the design concept of the project and general compliance with the information given in the contact documents. Any action shown is subject to the requirements of the plans and specfications. Contractor is responsible for: Dimensions, which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his work with that of all other trades; and the satisfactory performance of his work.

MFIA, Inc. Consulting Engineers

By: Takako Baker, Date:11/11/17

Notes:

ANDERSEN MECHANICAL, Inc.

"Your Green Heating & Cooling Professionals Dedicated to Serving You and Your Community."

HVAC Submittals

Yakima Clinic
9005 SE Foster Rd.
Portland, OR 97203

Submitted To:
O'Neill / Walsh Community Builders
2905 SW First Ave
Portland, OR 97201

Submitted By:
Andersen Mechanical
16285 SW 85th Ave, Suite 410
Tigard, OR 97224

23_05_00

Common HVAC Materials and Methods

Andersen Mechanical – 16285 SW 85th Ave, Suite 410 – Tigard, OR 97224 (503)992-6664
WA License ANDERH1936QL : OR CCB 168214 : OR Plumbing License PB1464
MBE Certification #8561

ELMDOR® ACCESS DOORS

MEMBER OF MORRIS GROUP INTERNATIONAL®

FR Series

Fire Rated Wall Access Doors

Doors are Fire Rated by Underwriters Laboratories Inc., for 1-1/2 hours, "B" Label, ANSI-UL 10B standard, and CAN/ULC S104 for 2 hours in walls. Door has a heavy duty spring closer to assure positive latching when panel closes. ***This door is for wall installation only.***

Door and Frame are fabricated from 16 gage, galvannealed steel with a white prime coat finish.

Door has a heavy duty spring to assure positive latching.

Frame is equipped with both masonry anchors and bolt holes to facilitate installation in all types of wall construction.

Concealed Hinge operates completely out of sight so that only the door and frame is visible.

Exterior Latch is recessed and is operated using a ring attached to the sliding bolt.

Interior Latch Release Slide is included enabling door to be opened from the inside.

Finish is a white prime coat suitable for painting.

Guide Specification

Provide Elmdor® FR Series, Fire Rated Access Doors (specify model number and options). Access door and frame shall be fabricated from 16 gage, galvannealed steel with a white prime coat finish. Hinge shall be concealed type. Door shall have a heavy duty spring to provide positive latching when closed and an interior latch release slide enabling door to be opened from the inside. Exterior latch shall be recessed and operated using ring attached to the sliding bolt. Finish shall be a white prime coat suitable for painting.

ELMDOR/STONEMAN • P.O. BOX 3527 • CITY OF INDUSTRY, CA 91744-0527 U.S.A. • TEL: (800) 591-9181 • (626) 968-8699 • FAX: (626) 333-4109
A Division of Acorn Engineering Company www.elmdorstoneman.com • E-mail: info@elmdorstoneman.com

MODEL NUMBER AND OPTIONS SELECTION

BASE MODEL NUMBER

❑ FR Fire Rated Access Door

Suffix Options

❑ -CL Cylinder Lock (one per door)

❑ -CLD Cylinder Lock with Dust Shutter (one per door)

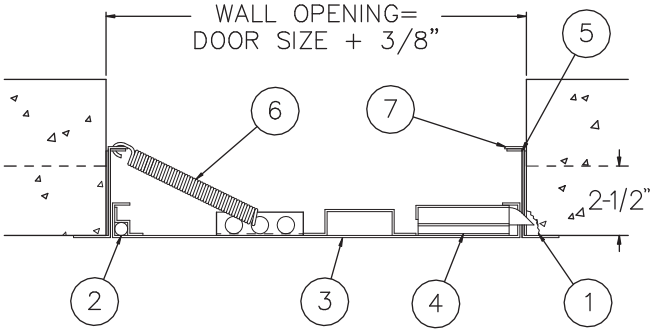
❑ -SS Stainless Steel Construction (Type 304 No. 4 Satin Finish)

STANDARD AVAILABLE SIZES

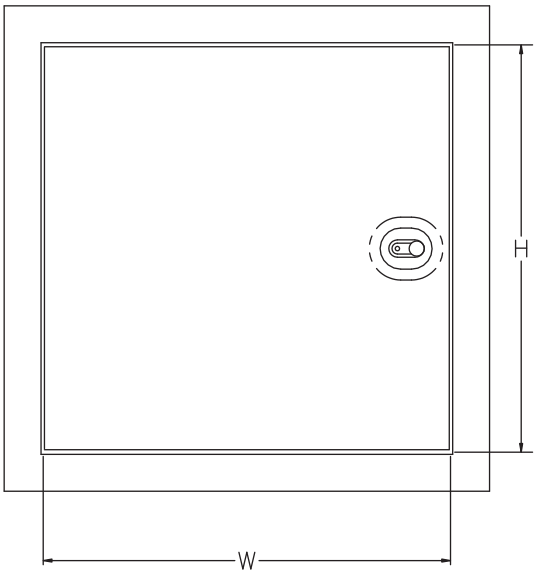
Special sizes available upon request.

NOMINAL DOOR SIZE (W X H)	WALL OPENING (minimum required)	LATCHES	WEIGHT
FR 8" x 8"	8-3/8" x 8-3/8"	1	6 lbs.
FR 10" x 10"	10-3/8" x 10-3/8"	1	7.5 lbs.
FR 12" x 12"	12-3/8" x 12-3/8"	1	9 lbs.
FR 12″ x 18"	12-3/8" x 18-3/8"	1	10.5 lbs.
FR 12" x 24"	12-3/8" x 24-3/8"	1	13 lbs.
FR 14" x 14"	14-3/8" x 14-3/8"	1	10 lbs.
FR 16" x 16"	16-3/8" x 16-3/8"	1	12.5 lbs.
FR 18" x 18"	18-3/8" x 18-3/8"	1	15 lbs.
FR 20" x 20"	20-3/8" x 20-3/8"	1	18 lbs.
FR 22" x 22"	22-3/8" x 22-3/8"	1	22 lbs.
FR 22" x 30"	22-3/8" x 30-3/8"	2	28 lbs.
FR 24" x 24"	24-3/8" x 24-3/8"	2	24.5 lbs.
FR 24" x 36"	24-3/8"x 36-3/8"	2	33 lbs.
FR 24" x 48"	24-3/8" x 48-3/8"	2	42 lbs.
FR 30" x 30"	30-3/8" x 30-3/8"	2	33.5 lbs.
FR 32" x 32"	32-3/8" x 32-3/8"	2	35 lbs.
FR 36" x 36"	36-3/8" x 36-3/8"	2	43 lbs.
FR 36" x 48"	36-3/8" x 48-3/8"	2	74 lbs.

NOTES:
1. CHIP OUT MASONRY TO CLEAR BOLT COVER
2. CONCEALED HINGE
3. DOOR
4. RECESSED LATCH
5. INTERIOR LATCH RELEASE SLIDE
6. CLOSING SPRING
7. FRAME



SIDE VIEW



FRONT VIEW

SELECTION SUMMARY & APPROVAL FOR MANUFACTURING

Model Number & Options_____ Quantity_____

Company_____ Date_____

Contact_____ Title_____

Approval for Manufacturing/Signature_____

FR *Revised: 10/25/16*

ELMDOR® ACCESS DOORS

MEMBER OF MORRIS GROUP INTERNATIONAL®

CFR Series

Ceiling Fire Resistant Access Doors

Doors are designed for use in a suspended dry wall ceiling as part of a fire rated ceiling assembly. The CFR Series door, itself**, is not fire rated.** However, the combination of steel and fire rated tile maintains the fire resistant quality of the ceiling assembly. Door is recessed 1-1/2" to accommodate dual layered ceiling tile.

Door is fabricated from 16 gage, galvannealed steel with a white prime coat finish.

Frame is fabricated from 18 gage, galvannealed steel with a white prime coat finish.

Hinge is a continuous piano type.

Latch is screwdriver operated.

Guide Specification

Provide Elmdor® CFR Series, ceiling fire resistant access doors (specify model number and options). Access door frame shall be fabricated from 16 gage steel. Access door panel shall be fabricated from 18 gage steel. Door shall be recessed 1-1/2" to accept ceiling tile. Hinge shall be continuous piano type. Latch shall be screwdriver operated.

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A Division of Acorn Engineering Company www.elmdorstoneman.com • E-mail: info@elmdorstoneman.com

MODEL NUMBER AND OPTIONS SELECTION

BASE MODEL NUMBER

❑ CFR Ceiling Fire Resistant Access Door

Suffix Options

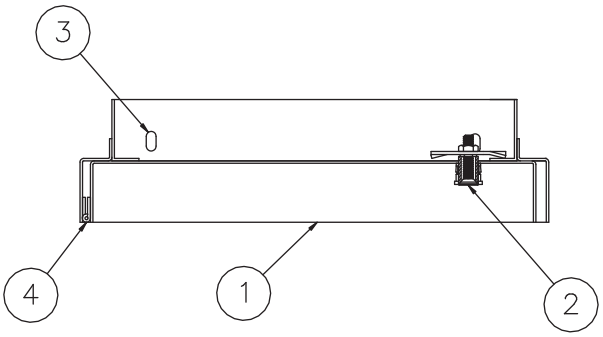
❑ -AKL	Allen Key Latch
❑ -CL	Cylinder Lock (one per door)
❑ -CLD	Cylinder Lock with Dust Shutter (one per door)
❑ -SS	Stainless Steel Construction (Type 304 No. 4 Satin Finish)

STANDARD AVAILABLE SIZES

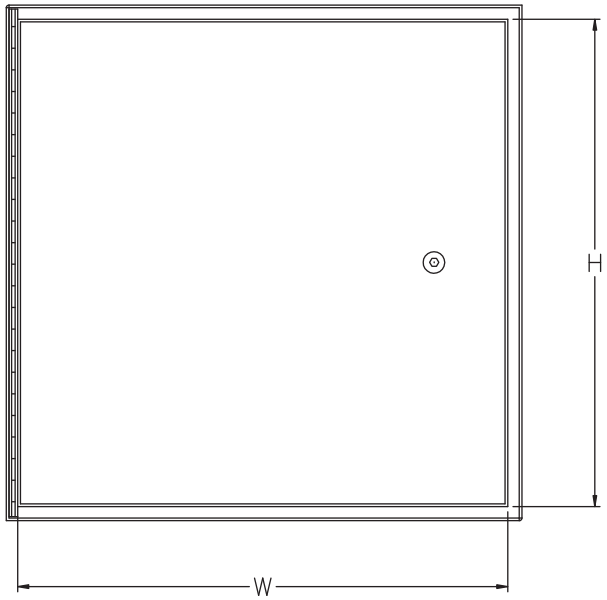
Special sizes available upon request.

NOMINAL DOOR SIZE (W X H)	CEILING OPENING	LATCHES	WEIGHT
CFR 12" x 12"	10-1/2" x 10-1/2"	1	7.3 lbs.
CFR 18" x 18"	16-1/2" x 16-1/2"	2	12.5 lbs.
CFR 24" x 24"	22-1/2" x 22-1/2"	2	21.8 lbs.
CFR 22" x 30"	20-1/2" x 28-1/2"	4	26.0 lbs.

NOTES:
1. DOOR
2. SCREWDRIVER OPERATED LATCH
3. MOUNTING HOLES
4. CONCEALED HINGE



SIDE VIEW



FRONT VIEW

SELECTION SUMMARY & APPROVAL FOR MANUFACTURING

Model Number & Options_____ Quantity_____

Company_____ Date_____

Contact_____ Title_____

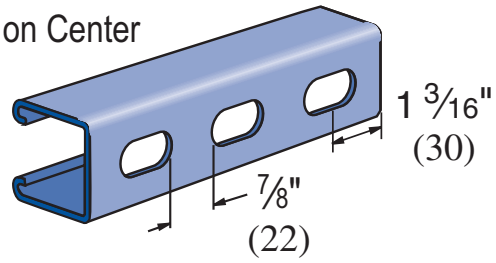
Approval for Manufacturing/Signature_____

CFR *Revised: 10/25/16*

P3000 T

Wt/100 Ft: 165 Lbs (246 kg/100 m)

Slots are
1⅛" (29) x ⅜" (14)
2" (51) on Center



Notes:

* Load limited by spot weld shear.

** $KL/r > 200$

NR = Not Recommended.

1. Above loads include the weight of the member. This weight must be deducted to arrive at the net allowable load the beam will support.
2. Long span beams should be supported in such a manner as to prevent rotation and twist.
3. Allowable uniformly distributed loads are listed for various simple spans, that is, a beam on two supports. If load is concentrated at the center of the span, multiply load from the table by 0.5 and corresponding deflection by 0.8.
4. For Pierced Channel, Beam Load Values in the tables are multiplied by the following factor:

   "T" Series ... 85%

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: PLAIN

12 Ga. (2.7 mm), 14 Ga.(1.9 mm) and
16 Ga. (1.5 mm) ASTM A1011 SS GR 33.

STEEL: PRE-GALVANIZED

12 Ga. (2.7 mm), 14 Ga. (1.9 mm) and
16 Ga. (1.5mm) ASTM A653 GR 33.

For other materials, see Special Metals or Fiberglass sections.

FINISHES

All channels are available in:

- Perma Green III (GR).
- Pre-galvanized (PG), conforming to ASTM A653 G90.
- Hot-dipped galvanized (HG), conforming to ASTM A123.
- Plain (PL).

Project: _____

Architect / Engineer: _____

Date: _____ **Phone:** _____

Contractor: _____

Address: _____

_____

Notes 1: _____

_____

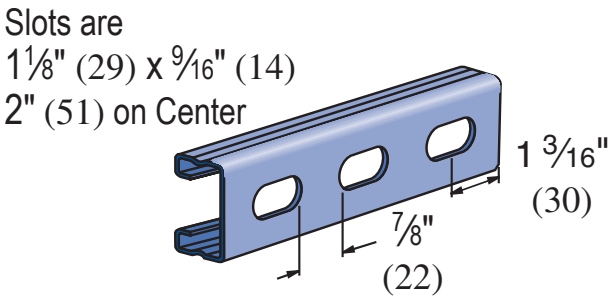
Notes 2: _____

_____

Approval Stamp:

P4000 T

Wt/100 Ft: 79 Lbs (118 kg/100 m)



Notes:

* Load limited by spot weld shear.

** $KL/r > 200$

1. Above loads include the weight of the member. This weight must be deducted to arrive at the net allowable load the beam will support.
2. Long span beams should be supported in such a manner as to prevent rotation and twist.
3. Allowable uniformly distributed loads are listed for various simple spans, that is, a beam on two supports. If load is concentrated at the center of the span, multiply load from the table by 0.5 and corresponding deflection by 0.8.
4. For Pierced Channel, Reduce Beam Load Values as Follows:

   "T" Series ... 85%

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: PLAIN

12 Ga. (2.7 mm), 14 Ga.(1.9 mm) and
16 Ga. (1.5 mm) ASTM A1011 SS GR 33.

STEEL: PRE-GALVANIZED

12 Ga. (2.7 mm), 14 Ga. (1.9 mm) and
16 Ga. (1.5mm) ASTM A653 GR 33.

For other materials, see Special Metals or Fiberglass sections.

FINISHES

All channels are available in:

- Perma Green III (GR).
- Pre-galvanized (PG), conforming to ASTM A653 G90.
- Hot-dipped galvanized (HG), conforming to ASTM A123.
- Plain (PL).

Project: _____

Architect / Engineer: _____

Date: _____ **Phone:** _____

Contractor: _____

Address: _____

_____

Notes 1: _____

_____

Notes 2: _____

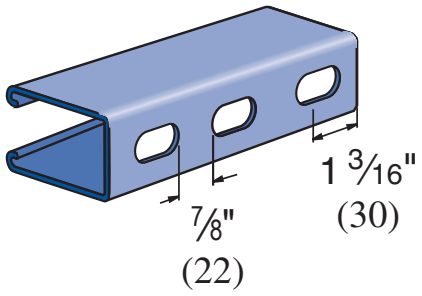
_____

Approval Stamp:

P5000 T

Wt/100 Ft: 300 Lbs (446 kg/100 m)

Slots are
1⅛" (29) x ⅜" (14)
2" (51) on Center



Notes:

* Load limited by spot weld shear.

** $KL/r > 200$

1. Above loads include the weight of the member. This weight must be deducted to arrive at the net allowable load the beam will support.
2. Long span beams should be supported in such a manner as to prevent rotation and twist.
3. Allowable uniformly distributed loads are listed for various simple spans, that is, a beam on two supports. If load is concentrated at the center of the span, multiply load from the table by 0.5 and corresponding deflection by 0.8.
4. For Pierced Channel, Beam Load Values in the tables are multiplied by the following factor:

   "T" Series ... 85%

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: PLAIN

12 Ga. (2.7 mm), 14 Ga.(1.9 mm) and
16 Ga. (1.5 mm) ASTM A1011 SS GR 33.

STEEL: PRE-GALVANIZED

12 Ga. (2.7 mm), 14 Ga. (1.9 mm) and
16 Ga. (1.5mm) ASTM A653 GR 33.

For other materials, see Special Metals or Fiberglass sections.

FINISHES

All channels are available in:

- Perma Green III (GR).
- Pre-galvanized (PG), conforming to ASTM A653 G90.
- Hot-dipped galvanized (HG), conforming to ASTM A123.
- Plain (PL).

Project: _____

Architect / Engineer: _____

Date: _____ **Phone:** _____

Contractor: _____

Address: _____

_____

Notes 1: _____

_____

Notes 2: _____

_____

Approval Stamp:

Submittal Data

LOOP

Wire rope with crimped loop

Gripple

Sizes
Gripple No.1-No.5

Safe Working Loads:

No.1	0 - 10kg
No.2	10 - 45kg
No.3	45 - 90kg
No.4	90 - 225kg
No.5	225 - 325kg

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Purlins, beams, roof trusses and other accessible building features.

Technical Data:
- All products carry a 5:1 safety factor
- SMACNA compliance - Tested and verified to be an acceptable hanger per the SMACNA, HVAC DUCT CONSTRUCTION STANDARDS MANUAL (1995). Full report available on request, or visit www.smacnatri.org, click on Testing Program.
- UL Listing - UL 1598 luminaire fitting sizes 1 - 5, UL 2289 Conduit and Cable Hardware sizes 2, 3 and 4.
- CSA - Class 3426-01 luminaire fittings.
- Other approvals include Lloyds Register, Apave, Tüv and Csiro.

Material Specification

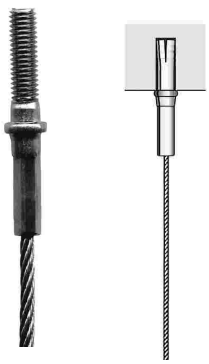
Gripple	Housing	Type ZA2 Zinc
	Wedge	Sintered steel hardened to min. 56 Rockwell C
	Spring	Stainless Steel (Type 302)
	End Cap	UV stabilised homopolymer propylene
Wire Rope	Grade	galvanised high tensile steel wire rope to EN12385
	Standard	lengths from 1m - 10m, other lengths can be made to order.

Wire Rope Specification	No.1	No.2	No.3	No.4	No.5
Diameter (mm)	1.5mm	2mm	3mm	4.75mm	6mm
Strand configuration	7 x 7	7 x 7	7 x 7	7 x 19	7 x 19
Min breaking load (kg)	180	260	580	1500	2160
Max. working load (kg)	10	45	90	225	325
Tensile strength (Nmm^2)	1770	1770	1770	1770	1770

Crimp/ferrule: Aluminium

STUD

Wire rope with crimped M6, M8 or M10 stud



Gripple

Sizes
M6 Gripple No.1-No.3
M8 Gripple No.2-No.3
M10 Gripple No.2-No.4

Safe Working Loads:

No.1	0 - 10kg
No.2	10 - 45kg
No.3	45 - 90kg
No.4	90 - 225kg

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Concrete ceilings, metal decking and pressed metal brackets (with nuts).

Technical Data:
- All products carry a 5:1 safety factor
- UL Listing - UL 1598 luminaire fitting sizes 1 - 5, UL 2289 Conduit and Cable Hardware sizes 2, 3 and 4.
- CSA - Class 3426-01 luminaire fittings.
- Other approvals include Lloyds Register, Apave and Tüv.

Material Specification

Gripple	Housing	Type ZA2 Zinc
	Wedge	Sintered steel hardened to min. 56 Rockwell C
	Spring	Stainless Steel (Type 302)
	End Cap	UV stabilised homopolymer propylene
Wire Rope	Grade	galvanised high tensile steel wire rope to EN12385
	Standard	lengths from 1m - 10m, other lengths can be made to order.

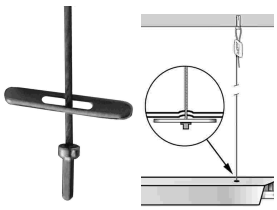
Wire Rope Specification	No.1	No.2	No.3	No. 4
Diameter (mm)	1.5mm	2mm	3mm	4.75mm
Strand configuration	7 x 7	7 x 7	7 x 7	7 x 19
Min breaking load (kg)	180	260	580	1500
Max. working load (kg)	10	45	90	225
Tensile strength (Nmm^2)	1770	1770	1770	1770

Stud end: M6 diameter zinc plated steel 20mm or 45mm thread length.
M8 diameter zinc plated steel 45mm thread length.
M10 diameter zinc plated steel 45mm thread length.

Submittal Data

TOGGLE

Wire rope crimped end stop with toggle plate



Gripple

Sizes
Gripple No.1-No.3

Safe Working Loads:

No.1	0 - 10kg
No.2	10 - 45kg
No.3	45 - 90kg

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Suitable for profile roof cladding, light fittings, luminaires and other cavities.

Technical Data:
- All products carry a 5:1 safety factor
- SMACNA compliance - Tested and verified to be an acceptable hanger per the SMACNA, HVAC DUCT CONSTRUCTION STANDARDS MANUAL (1995). Full report available on request, or visit www.smacnatri.org, click on Testing Program.
- UL Listing - UL 1598 luminaire fitting sizes 1 - 5, UL 2289 Conduit and Cable Hardware sizes 2, 3 and 4.
- CSA - Class 3426-01 luminaire fittings.
- Other approvals include Lloyds Register, Apave and Tüv.

Material Specification

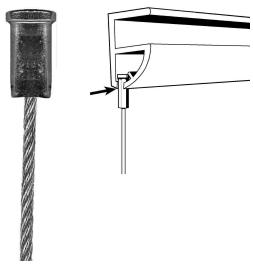
Gripple	Housing	Type ZA2 Zinc
	Wedge	Sintered steel hardened to min. 56 Rockwell C
	Spring	Stainless Steel (Type 302)
	End Cap	UV stabilised homopolymer propylene
Wire Rope	Grade	galvanised high tensile steel wire rope to EN12385
	Standard	lengths from 1m - 10m, other lengths can be made to order.

Wire Rope Specification	No.1	No.2	No.3
Diameter (mm)	1.5mm	2mm	3mm
Strand configuration	7 x 7	7 x 7	7 x 7
Min breaking load (kg)	180	260	580
Max. working load (kg)	10	45	90
Tensile strength (Nmm^2)	1770	1770	1770

Toggle plate and end stop: Zinc plated steel

END STOP

Wire rope with crimped end stop



Gripple

Sizes
Gripple No.1-No.3

Safe Working Loads:

No.1	0 - 10kg
No.2	10 - 45kg
No.3	45 - 90kg

Minimum channel width:

No.1	6mm
No.2	8mm
No.3	10mm

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Suitable for suspending from lighting channels, track and other channel fixtures.

Technical Data:
- All products carry a minimum 5:1 safety factor
- Tested and certified under Lloyds Register.

Material Specification

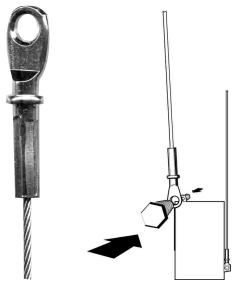
Gripple	Housing	Type ZA2 Zinc
	Wedge	Sintered steel hardened to min. 56 Rockwell C
	Spring	Stainless Steel (Type 302)
	End Cap	UV stabilised homopolymer propylene
Wire Rope	Grade	galvanised high tensile steel wire rope to EN12385
	Standard	lengths from 1m - 10m, other lengths can be made to order.

Wire Rope Specification	No.1	No.2	No.3
Diameter (mm)	1.5mm	2mm	3mm
Strand configuration	7 x 7	7 x 7	7 x 7
Min breaking load (kg)	180	260	580
Max. working load (kg)	10	45	90
Tensile strength (Nmm^2)	1770	1770	1770

End Stop: Zinc plated steel

EYELET

Wire rope with crimped eyelet



Gripple

Sizes
Gripple No.2-No.3

Safe Working Loads:
No.2 0 - 45kg
No.3 45 - 90kg

Hole size:
No.2 6.5mm
No.3 6.5mm

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Suitable for a variety of applications that require bolting to brackets or fixtures.

Technical Data:
- All products carry a 5:1 safety factor
- Tested and certified under Lloyds Register.

Material Specification

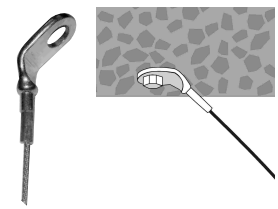
Gripple	Housing	Type ZA2 Zinc
	Wedge	Sintered steel hardened to min. 56 Rockwell C
	Spring	Stainless Steel (Type 302)
	End Cap	UV stabilised homopolymer propylene
Wire Rope	Grade	galvanised high tensile steel wire rope to EN12385
	Standard	lengths from 1m - 10m, other lengths can be made to order.

Wire Rope Specification	No.2	No.3
Diameter (mm)	2mm	3mm
Strand configuration	7 x 7	7 x 7
Min breaking load (kg)	260	580
Max working load (kg)	45	90
Tensile strength (Nmm^2)	1770	1770

Stud eyelet: Zinc plated steel

45º EYELET

Wire rope with crimped eyelet



Gripple

Sizes
Gripple No.2-No.3

Safe Working Loads:
No.2 0 - 45kg
No.3 45 - 90kg

Hole size:
No.2 11.2mm
No.3 11.2mm

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Suitable for a variety of applications that require bolting to brackets or fixtures.

Technical Data:
- All products carry a 5:1 safety factor
- Tested and certified under Lloyds Register.

Material Specification

Gripple	Housing	Type ZA2 Zinc
	Wedge	Sintered steel hardened to min. 56 Rockwell C
	Spring	Stainless Steel (Type 302)
	End Cap	UV stabilised homopolymer propylene
Wire Rope	Grade	galvanised high tensile steel wire rope to EN12385
	Standard	lengths from 1m - 10m, other lengths can be made to order.

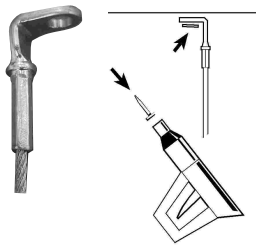
Wire Rope Specification	No.2	No.3
Diameter (mm)	2mm	3mm
Strand configuration	7 x 7	7 x 7
Min breaking load (kg)	260	580
Max. working load (kg)	45	90
Tensile strength (Nmm^2)	1770	1770

Eyelet: Zinc plated steel

Submittal Data

90º EYELET

Wire rope with crimped eyelet



Gripple

Sizes
Gripple No.1-No.3

Safe Working Loads:
No.1 0 - 10kg
No.2 10 - 45kg
No.3 45 - 90kg

Hole size:
No.1 7.3mm
No.2 7.3mm
No.3 7.3mm

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Designed for shot firing into concrete, steel and wood using gas or powder actuated tools.

Technical Data:
- All products carry a 5:1 safety factor
- Tested and certified under Lloyds Register.

Material Specification

Gripple	Housing	Type ZA2 Zinc
	Wedge	Sintered steel hardened to min. 56 Rockwell C
	Spring	Stainless Steel (Type 302)
	End Cap	UV stabilised homopolymer propylene
Wire Rope	Grade	galvanised high tensile steel wire rope to EN12385
	Standard	lengths from 1m - 10m, other lengths can be made to order.

Wire Rope Specification	No.1	No.2	No.3
Diameter (mm)	1.5mm	2mm	3mm
Strand configuration	7 x 7	7 x 7	7 x 7
Min breaking load (kg)	180	260	580
Max. working load (kg)	10	45	90
Tensile strength (Nmm^2)	1770	1770	1770

Eyelet: Zinc plated steel

LARGE 90º EYELET

Wire rope with crimped eyelet

Gripple

Sizes
Gripple No.3

Safe Working Loads:
No.3 0 - 90kg

Hole size:
No.3 11mm

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Suitable for a variety of applications that require bolting to brackets or fixtures.

Technical Data:
- All products carry a 5:1 safety factor
- Tested and certified under Lloyds Register.

Material Specification

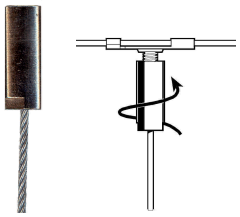
Gripple	Housing	Type ZA2 Zinc
	Wedge	Sintered steel hardened to min. 56 Rockwell C
	Spring	Stainless Steel (Type 302)
	End Cap	UV stabilised homopolymer propylene
Wire Rope	Grade	galvanised high tensile steel wire rope to EN12385
	Standard	lengths from 1m - 10m, other lengths can be made to order.

Wire Rope Specification	No.3
Diameter (mm)	3mm
Strand configuration	7 x 7
Min breaking load (kg)	580
Max. safe working load (kg)	90
Tensile strength (Nmm^2)	1770

Eyelet: Zinc plated steel

BARREL

Wire rope with crimped barrel



Gripple

Sizes
M6 Gripple No.1-No.2
M8 Gripple No.2-No.3

Safe Working Loads:
No.1 0 - 10kg
No.2 10 - 45kg
No.3 45 - 90kg

Barrel internal thread lengths:
M6 25mm
M8 25mm

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Fits onto any 6mm or 8mm male thread to give an aesthetically pleasing fixing method.

Technical Data:
• All products carry a 5:1 safety factor

Material Specification

Gripple	Housing	Type ZA2 Zinc
	Wedge	Sintered steel hardened to min. 56 Rockwell C
	Spring	Stainless Steel (Type 302)
	End Cap	UV stabilised homopolymer propylene
Wire Rope	Grade	galvanised high tensile steel wire rope to EN12385
	Standard	lengths from 1m - 10m, other lengths can be made to order.

Wire Rope Specification	No.1	No.2	No.3
Diameter (mm)	1.5mm	2mm	3mm
Strand configuration	7 x 7	7 x 7	7 x 7
Min breaking load (kg)	180	260	580
Max. working load (kg)	10	45	90
Tensile strength (Nmm^2)	1770	1770	1170

Barrel end: Zinc plated steel

MAGNETIC BARREL

Wire rope with crimped magnetic barrel

Gripple

Sizes
M6 Gripple No.1

Safe Working Loads:
No.1 0 - 8kg
2:1 safety factor

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Quick and easy suspension of lightweight services from metal surfaces.

Technical Data:
• All products carry a 2:1 safety factor at 2mm metal thickness.

Material Specification

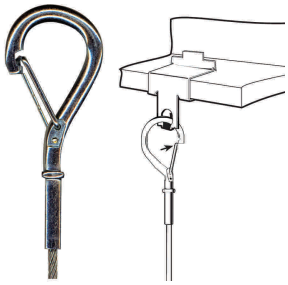
Gripple	Housing	Type ZA2 Zinc
	Wedge	Sintered steel hardened to min. 56 Rockwell C
	Spring	Stainless Steel (Type 302)
	End Cap	UV stabilised homopolymer propylene
Wire Rope	Grade	galvanised high tensile steel wire rope to EN12385
	Standard	lengths from 1m - 10m, other lengths can be made to order.

Wire Rope Specification	No.1
Diameter (mm)	1.5mm
Strand configuration	7 x 7
Min breaking load (kg)	180
Max. working load (kg)	8
Tensile strength (Nmm^2)	1770

Barrel end: Zinc plated steel
Magnetic pad: Strontium Magnetic Sheet and Extrusion
Neodymium Iron Baron magnet material

SNAP HOOK

Wire rope with crimped snap-on hook



Gripple

Sizes
Gripple sizes No.1-No.3

Safe Working Loads:
No.1 0 - 10kg
No.2 10 - 45kg
No.3 45 - 90kg

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Suitable for use on cable basket and ladder.

Technical Data:
- All products carry a 5:1 safety factor
- Tested and certified under Lloyds Register.

Material Specification

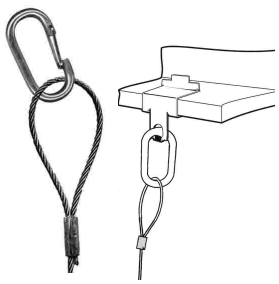
Gripple	Housing	Type ZA2 Zinc
	Wedge	Sintered steel hardened to min. 56 Rockwell C
	Spring	Stainless Steel (Type 302)
	End Cap	UV stabilised homopolymer propylene
Wire Rope	Grade	galvanised high tensile steel wire rope to EN12385
	Standard	lengths from 1m - 10m, other lengths can be made to order.

Wire Rope Specification	No.1	No.2	No.3
Diameter (mm)	1.5mm	2mm	3mm
Strand configuration	7 x 7	7 x 7	7 x 7
Min breaking load (kg)	180	260	580
Max. working load (kg)	10	45	90
Tensile strength (Nmm^2)	1770	1770	1770

Hook: Zinc plated steel

LINK HOOK

Wire rope with crimped loop and link hook



Gripple

Sizes
Gripple No.1-No.3

Safe Working Loads:
No.1 0 - 10kg
No.2 10 - 45kg
No.3 45 - 90kg

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Suitable for use on cable tray, basket and ladder.

Technical Data:
- All products carry a 3:1 safety factor.

Material Specification

Gripple	Housing	Type ZA2 Zinc
	Wedge	Sintered steel hardened to min. 56 Rockwell C
	Spring	Stainless Steel (Type 302)
	End Cap	UV stabilised homopolymer propylene
Wire Rope	Grade	galvanised high tensile steel wire rope to EN12385
	Standard	lengths from 1m - 10m, other lengths can be made to order.

Wire Rope Specification	No.1	No.2	No.3
Diameter (mm)	1.5mm	2mm	3mm
Strand configuration	7 x 7	7 x 7	7 x 7
Min breaking load (kg)	180	260	580
Max. working load (kg)	10	45	90
Tensile strength (Nmm^2)	1770	1770	1770

Link Hook and Ferrule: Zinc plated steel

Submittal Data

Y-FIT STUD

Y-fit with crimped M6 or M8 Studs

Gripple

Sizes
M6 Gripple No.1-No.3
M8 Gripple No.2-No.3

Safe Working Loads:

No.1	0 - 10kg
No.2	10 - 45kg
No.3	45 - 90kg

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Suitable for use on existing metal brackets.

Technical Data:
• All products carry a minimum 5:1 safety factor

Material Specification

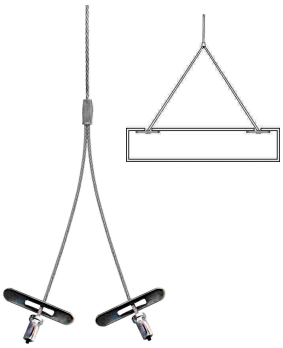
Gripple	Housing	Type ZA2 Zinc
	Wedge	Sintered steel hardened to min. 56 Rockwell C
	Spring	Stainless Steel (Type 302)
	End Cap	UV stabilised homopolymer propylene
Wire Rope	Grade	galvanised high tensile steel wire rope to EN12385
	Standard	lengths from 1m - 3m, other lengths can be made to order.

Wire Rope Specification	No.1	No.2	No. 3
Diameter (mm)	1.5mm	2mm	3mm
Strand configuration	7 x 7	7 x 7	7 x 7
Min breaking load (kg)	180	260	580
Max. working load (kg)	10	45	90
Tensile strength (Nmm^2)	1770	1770	1770

Stud ends: M6 diameter zinc plated steel 20mm or 45mm thread length.
M8 diameter zinc plated steel 45mm thread length.

Y-FIT TOGGLE

Y-fit crimped with end stops and toggle plates



Gripple

Sizes
Gripple No.1-No.3

Safe Working Loads:

No.1	0 - 10kg
No.2	10 - 45kg
No.3	45 - 90kg

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Suitable for light fittings, luminaires and other cavities.

Technical Data:
• All products carry a minimum 5:1 safety factor.

Material Specification

Gripple	Housing	Type ZA2 Zinc
	Wedge	Sintered steel hardened to min. 56 Rockwell C
	Spring	Stainless Steel (Type 302)
	End Cap	UV stabilised homopolymer propylene
Wire Rope	Grade	galvanised high tensile steel wire rope to EN12385
	Standard	lengths from 1m - 3m, other lengths can be made to order.

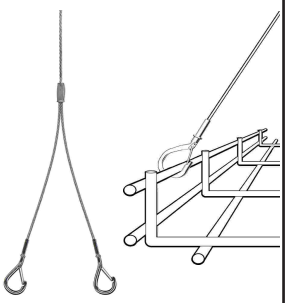
Wire Rope Specification	No.1	No.2	No.3
Diameter (mm)	1.5mm	2mm	3mm
Strand configuration	7 x 7	7 x 7	7 x 7
Min breaking load (kg)	180	260	580
Max. working load (kg)	10	45	90
Tensile strength (Nmm^2)	1770	1770	1770

Toggle plates and end stops: Zinc plated steel

Submittal Data

Y-FIT SNAP HOOK

Y-fit with crimped Snap Hooks



Gripple

Sizes
Gripple No.1-No.3

Safe Working Loads:

No.1	0 - 10kg
No.2	10 - 45kg
No.3	45 - 90kg

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Suitable for use on cable basket or ladder. Ideal for services that require maintenance.

Technical Data:
• All products carry a minimum 5:1 safety factor

Material Specification

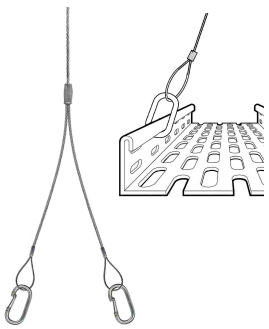
Gripple	Housing	Type ZA2 Zinc
	Wedge	Sintered steel hardened to min. 56 Rockwell C
	Spring	Stainless Steel (Type 302)
	End Cap	UV stabilised homopolymer propylene
Wire Rope	Grade	galvanised high tensile steel wire rope to EN12385
	Standard lengths from 1m - 3m, other lengths can be made to order.	

Wire Rope Specification	No.1	No.2	No.3
Diameter (mm)	1.5mm	2mm	3mm
Strand configuration	7 x 7	7 x 7	7 x 7
Min breaking load (kg)	180	260	580
Max. working load (kg)	10	45	90
Tensile strength (Nmm^2)	1770	1770	1770

Hooks: zinc plated steel

Y-FIT LINK HOOK

Y-fit with crimped loops and link hooks



Gripple

Sizes
Gripple No.1-No.3

Safe Working Loads:

No.1	0 - 10kg
No.2	10 - 45kg
No.3	45 - 90kg

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Suitable for light cable tray, basket or ladder. Ideal for services that require maintenance.

Technical Data:
• All products carry a minimum 5:1 safety factor.

Material Specification

Gripple	Housing	Type ZA2 Zinc
	Wedge	Sintered steel hardened to min. 56 Rockwell C
	Spring	Stainless Steel (Type 302)
	End Cap	UV stabilised homopolymer propylene
Wire Rope	Grade	galvanised high tensile steel wire rope to EN12385
	Standard lengths from 1m - 3m, other lengths can be made to order.	

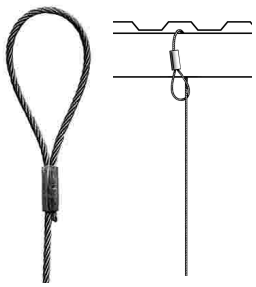
Wire Rope Specification	No.1	No.2	No.3
Diameter (mm)	1.5mm	2mm	3mm
Strand configuration	7 x 7	7 x 7	7 x 7
Min breaking load (kg)	180	260	580
Max. working load (kg)	10	45	90
Tensile strength (Nmm^2)	1770	1770	1770

Link Hooks and Ferrules: Zinc plated steel

Submittal Data

STAINLESS STEEL LOOP

Wire rope with crimped loop



Gripple

Sizes
Gripple No.2-No.3

Safe Working Loads:
No.2 0 - 45kg
No.3 45 - 90kg

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Purlins, beams, roof trusses and other accessible building features.

Technical Data:
- All products carry a 5:1 safety factor.

Material Specification

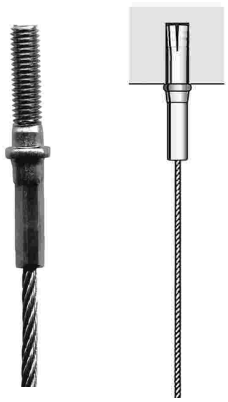
Gripple	Housing	Type 316/A4 Stainless Steel
	Wedge	Ceramic
	Spring	Type 302 Stainless Steel
	End Cap	Type 316/A4 Stainless Steel
Wire Rope		Type 316/A4 Stainless Steel Standard lengths from 1m - 10m, other lengths can be made to order.

Wire Rope Specifiction	No.2	No.3
Diameter (mm)	2mm	3mm
Strand configuration	7 x 7	7 x 7
Min breaking load (kg)	242	545
Max. safe working load (kg)	45	90
Tensile strength (Nm2)	1570	1570

Crimp/ferrule: 316/A4 Stainless Steel

STAINLESS STEEL STUD

Wire Rope with crimped M6 or M8 stud



Gripple

Sizes
M6 Gripple No.2-No.3
M8 Gripple No.2-No.3

Safe Working Loads:
No.2 0 - 45kg
No.3 45 - 90kg

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Concrete ceilings, metal decking and pressed metal brackets (with nuts).

Technical Data:
- All products carry a 5:1 safety factor
- SMACNA compliance - Tested and verified to be an acceptable hanger per the SMACNA, HVAC DUCT CONSTRUCTION STANDARDS MANUAL (1995). Full report available on request, or visit www.smacnatri.org, click on Testing Program.
- UL Listing - UL 1598 luminaire fitting sizes 1 - 5, UL 2289 Conduit and Cable Hardware sizes 2, 3 and 4.
- CSA - Class 3426-01 luminaire fittings.
- Other approvals include Lloyds Register, Apave, Tüv and DW144.

Material Specification

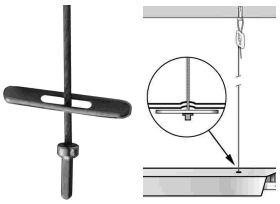
Gripple	Housing	Type 316/A4 Stainless Steel
	Wedge	Ceramic
	Spring	Type 302 Stainless Steel
	End Cap	Type 316/A4 Stainless Steel
Wire Rope		Type 316/A4 Stainless Steel Standard lengths from 1m - 10m, other lengths can be made to order.

Wire Rope Specification	No.2	No.3
Diameter (mm)	2mm	3mm
Strand configuration	7 x 7	7 x 7
Min breaking load (kg)	242	545
Max. safe working load (kg)	45	90
Tensile strength (Nmm2)	1570	1570

Stud end: M6 diameter type 304/A2 stainless steel 20mm thread length
M8 diameter type 304/A2 stainless steel 45mm thread length

STAINLESS STEEL TOGGLE

Wire rope with crimped end stop and toggle plate



Gripple

Sizes
Gripple No.2

Safe Working Loads:
No.2 0 - 45kg
5:1 safety factor

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Suitable for profile roof cladding, light fittings, luminaires and other cavities.

Technical Data:
5:1 safety factor.

Material Specification

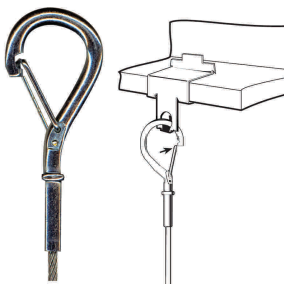
Gripple	Housing	Type 316/A4 Stainless Steel
	Wedge	Ceramic
	Spring	Type 302 Stainless Steel
	End Cap	Type 316/A4 Stainless Steel
Wire Rope		Type 304/A2 Stainless Steel
		Standard lengths from 1m - 10m, other lengths can be made to order.

Wire Rope Specifiction	No.2
Diameter (mm)	2mm
Strand configuration	7 x 7
Min breaking load (kg)	242
Max. safe working load (kg)	45
Tensile strength (Nmm2)	1570

Crimp/ferrule: 304L/A2 Stainless Steel

STAINLESS STEEL SNAP HOOK

Wire rope with crimped snap-on hook



Gripple

Sizes
Gripple sizes No.2

Safe Working Loads:
No.2 0 - 45kg
3:1 safety factor

Function:
Recommended for the suspension of HVAC, electrical and mechanical services in an indoor, stationary setting.

Applications:
Suitable for use on cable basket and ladder.

Technical Data:
3:1 safety factor

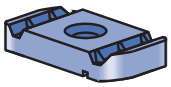
Material Specification

Gripple	Housing	Type 316/A4 Stainless Steel
	Wedge	Ceramic
	Spring	Type 302 Stainless Steel
	End Cap	Type 316/A4 Stainless Steel
Wire Rope		Type 304/A2 Stainless Steel
		Standard lengths from 1m - 10m, other lengths can be made to order.

Wire Rope Specification	No.2
Diameter (mm)	2mm
Strand configuration	7 x 7
Min breaking load (kg)	242
Max. working load (kg)	45
Tensile strength (Nmm^2)	1570

Hook: 304/A2 Stainless Steel

Channel Nut Without Springs



Part Number	Nut Size Thread		Wt/100 pcs Lbs *(kg)*	Use With
A3006-1420	¼"	-20	5 *(2.3)*	A1000, A3300, A4000, & A5000
A3007	5/16"	-18	5 *(2.3)*	
A3008	⅜"	-16	5 *(2.3)*	

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel.

STEEL: PLAIN

14 Gauge (1.9 mm), ASTM A1011 SS GR 33
19 Gauge (1.0 mm) ASTM A1008

STEEL: PRE-GALVANIZED

14 Gauge (1.9 mm) ASTM A653 GR 33,
19 Gauge (1.0 mm) ASTM A653 GR 33

Channel nuts are manufactured from mild steel bars conforming to ASTM A576, GR 1015, and are case hardened.

Fittings are made from hot rolled, pickled and oiled steel plate or strip and conform to ASTM A1011 SS GR 33.

Many framing channels are available in special metal on request. Consult factory for ordering information.

FINISHES

All channels and fittings are available in: Perma-Green III (GR), Pre-galvanized (PG), conforming to ASTM A653 GR 33 and plain (PL).

Nuts are available in plain or electro-galvanized (EG) finish.

Fittings are available in Perma-Green III (GR) or plain (PL).

Project: _____

Architect / Engineer: _____

Date: _____ **Phone:** _____

Contractor: _____

Address: _____

_____

Notes 1: _____

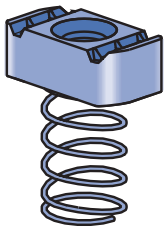
_____

Notes 2: _____

_____

Approval Stamp:

Channel Nut With Spring



Part Number	Nut Size Thread		Wt/100 pcs Lbs *(kg)*	Use With
A1006-1420	¼"	-20	6 *(2.7)*	A1000
A1007	5/16"	-18	6 *(2.7)*	
A1008	⅜"	-16	6 *(2.7)*	

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel.

STEEL: PLAIN

14 Gauge (1.9 mm), ASTM A1011 SS GR 33
19 Gauge (1.0 mm) ASTM A1008

STEEL: PRE-GALVANIZED

14 Gauge (1.9 mm) ASTM A653 GR 33,
19 Gauge (1.0 mm) ASTM A653 GR 33

Channel nuts are manufactured from mild steel bars conforming to ASTM A576, GR 1015, and are case hardened.

Fittings are made from hot rolled, pickled and oiled steel plate or strip and conform to ASTM A1011 SS GR 33.

Many framing channels are available in special metal on request. Consult factory for ordering information.

FINISHES

All channels and fittings are available in: Perma-Green III (GR), Pre-galvanized (PG), conforming to ASTM A653 GR 33 and plain (PL).

Nuts are available in plain or electro-galvanized (EG) finish.

Fittings are available in Perma-Green III (GR) or plain (PL).

Project: _____

Architect / Engineer: _____

Date: _____ **Phone:** _____

Contractor: _____

Address: _____

_____

Notes 1: _____

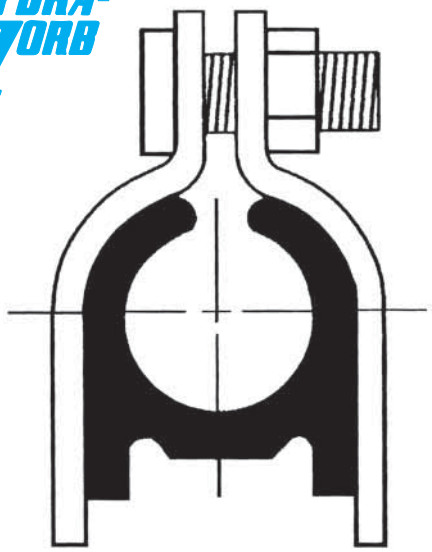
_____

Notes 2: _____

_____

Approval Stamp:

HYDRA-ZORB



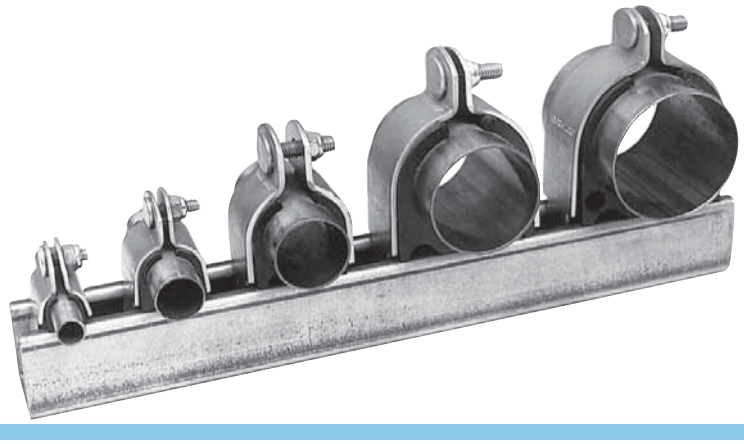
FS-1400 SERIES
HYDRA-ZORB CUSHION CLAMPS

Part No.	CT Size	Copper & Steel Tube O.D. Size
FS-1400-025	1/8"	1/4"
FS-1400-037	1/4"	3/8"
FS-1400-050	3/8"	1/2"
FS-1400-062	1/2"	5/8"
FS-1400-075	5/8"	3/4"
FS-1400-087	3/4"	7/8"
FS-1400-112	1"	1-1/8"
FS-1400-137	1-1/4"	1-3/8"
FS-1400-162	1-1/2"	1-5/8"
FS-1400-212	2"	2-1/8"
FS-1400-262	2-1/2"	2-5/8"
FS-1400-312	3"	3-1/8"
FS-1400-362	3-1/2"	3-5/8"
FS-1400-412	4"	4-1/8"

Contact Factory For Additional Sizes

Part No.	Nom. Pipe Size	Part No.	Nom. Pipe Size
FS-1400P-025	1/4"	FS-1400P-200	2"
FS-1400P-037	3/8"	FS-1400P-250	2-1/2"
FS-1400P-050	1/2"	FS-1400P-300	3"
FS-1400P-075	3/4"	FS-1400P-350	3-1/2"
FS-1400P-100	1"	FS-1400P-400	4"
FS-1400P-125	1-1/4"	FS-1400P-500	5"
FS-1400P-150	1-1/2"	FS-1400P-600	6"

Contact Factory For Additional Sizes

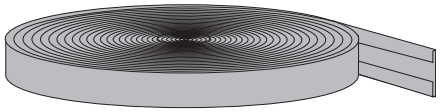


HYDRA-ZORB CUSHION CLAMP ASSEMBLIES FOR PIPES, TUBES, AND HOSES.

- Reduce noise, shock and vibration caused by fluid surges in tubes, pipes, and hoses used in the construction of stationery and mobile equipment.
- Eliminate metal to metal contact between fluid conductors and clamps.
- Resist most fuels, oils, gases, greases, solvents, mineral acids, etc.
- Allow fluid conductors to be added or removed from installations without disturbing adjacent conductors.
- Permit various fluid conductors to be mixed to suit installation.
- Allow center distances between fluid conductors to be variable and not critical for compact installation.
- Are usable to temperatures down to -65°F and up to 275°F.
- Provide fast and simple installation. Only one man and one tool needed for assembly after base channel is in place.

Standard Finish – electro-galvanized with yellow chromate rinse
Also available in stainless steel, 304 or 316, aluminum and hot dip galvanized.

FLEX-WRAP - FS-3792

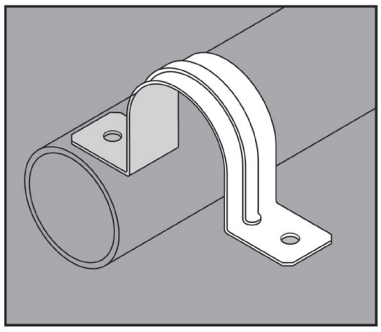


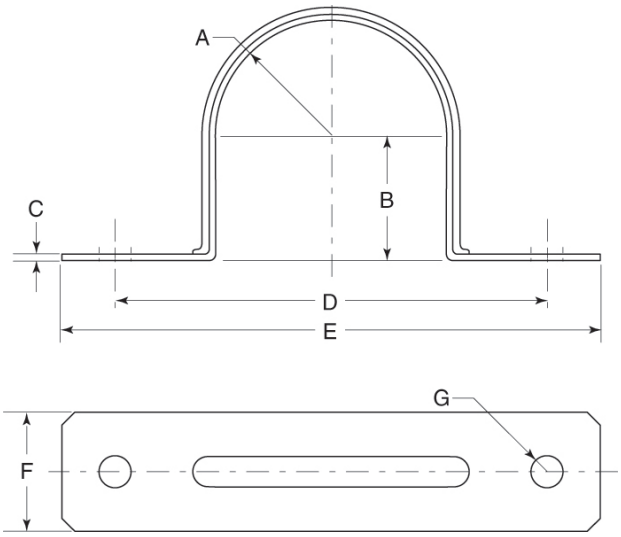
25 FT / Box

STAINLESS STEEL
TWO HOLE STRAPS

APPLICATION

- *Used to mount conduit systems flat against walls and other surfaces to provide extra support*
- *Manufactured in stainless steel to help prevent corrosion*
- *Can be installed using ordinary hand tools and require little maintenance or repair*
- *Provided in a bright, polished finish that does not require touch up or painting*





PRODUCT DETAILS

Material:
316 SS

Standards:
ASTM A240

Country of Origin:
100% Made in USA

Part Number	Pipe/Rigid Conduit Size	Weight/ 100 (lbs.)	Dimension (in.) A	B	C	D	E	F	G
3038-2	⅜ in.	2	0.35	0.32	.024 - .030	1.56	2.00	0.50	0.19
3050-2	½ in.	2	0.42	0.39	.024 - .030	1.78	2.25	0.56	0.19
3075-2	¾ in.	3	0.52	0.50	.024 - .030	2.18	2.62	0.62	0.19
3100-2	1 in.	4	0.65	0.62	.033 - .038	2.53	3.20	0.75	0.25
3125-2	1-¼ in.	6	0.83	0.80	.033 - .038	3.16	4.00	0.87	0.25
3150-2	1-½ in.	9	0.95	0.92	.043 - .050	3.37	4.20	0.93	0.25
3200-2	2 in.	11	1.18	1.15	.043 - .050	4.25	5.12	1.00	0.38
3250-2	2-½ in.	16	1.43	1.40	.053 - .060	4.95	5.87	1.00	0.38
3300-2	3 in.	20	1.75	1.70	.053 - .060	5.50	6.50	1.00	0.38
3350-2	3-½ in.	26	2.00	1.95	.068 - .075	6.18	7.12	1.00	0.44
3400-2	4 in.	29	2.25	2.20	.068 - .075	6.81	7.75	1.00	0.44

GIBSON STAINLESS® & SPECIALTY INC

PO BOX 847, GREENSBURG, PA 15601
PHONE: 1-800-945-4316 • FAX: 724-838-1544
WEB: GIBSONSTAINLESS.COM

FASTENERS
THREADED ROD

Threaded rod is used for general purpose fastening and installation. Used in any place that a long bolt is required, threaded rod can be cut to the exact desired length. Common applications include sprinkler systems, H.V.A.C., suspended ceilings, ductwork, lighting, electrical systems, and concrete form work.

Color Coded Labels & Tube End Caps

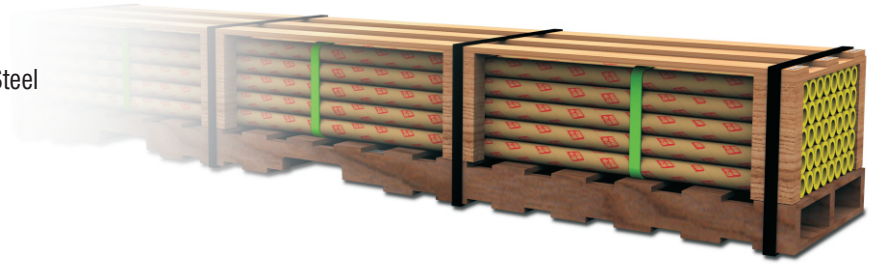
Bright Unplated

Hot Dipped Galvanized

Zinc Plated

Stainless Steel

- ☑ Right hand coarse thread
- ☑ Low carbon steel
- ☑ Conforms to ASTM A307
- ☑ Available in a wide variety of dimensions, lengths, and finishes
- ☑ Rolled thread to UNC Class 1A



Threaded Rod - Bright Unplated

Size	Threads per Inch	Weight per Piece	Pieces per Tube	Tubes per Pallet	Pallets per 20 ft. Container	SKU
3/8" x 6'	16	1.69 lb.	25	50	19	AT38072
3/8" x 10'	16	2.82 lb.	25	40	15	AT38120
3/8" x 12'	16	3.39 lb.	25	40	12	AT38144
1/2" x 6'	13	3.03 lb.	12	50	22	AT12072
1/2" x 10'	13	5.06 lb.	12	40	15	AT12120
1/2" x 12'	13	6.07 lb.	12	40	13	AT12144
5/8" x 6'	11	5.06 lb.	8	50	21	AT58072
5/8" x 10'	11	8.44 lb.	8	40	15	AT58120
5/8" x 12'	11	10.13 lb.	8	40	13	AT58144
3/4" x 6'	10	7.30 lb.	5	50	23	AT34072
3/4' x 10'	10	12.17 lb.	5	40	15	AT34120
3/4" x 12'	10	14.61 lb.	5	40	14	AT34144
7/8" x 6'	9	10.00 lb.	4	50	21	AT78072
7/8" x 10'	9	16.68 lb.	4	40	15	AT78120
7/8" x 12'	9	20.01lb.	4	40	13	AT78144
1" x 6'	8	13.13 lb.	3	50	21	AT1072
1" x 10'	8	21.89 lb.	3	40	15	AT1120
1" x 12'	8	26.26 lb.	3	40	13	AT1144
1-1/8" x 6'	7	20.84 lb.	2	50	25	AT118072
1-1/8" x 10'	7	34.73 lb.	2	40	15	AT118120
1-1/8" x 12'	7	41.70 lb.	2	40	15	AT118144
1-1/4" x 6'	7	21.39 lb.	2	50	20	AT114072
1-1/4" x 10'	7	35.64 lb.	2	40	15	AT114120
1-1/4" x 12'	7	42.77 lb.	2	40	12	AT114144
1-1/2" x 6'	6	30.31 lb.	1	50	27	AT112072
1-1/2" x 10'	6	50.52 lb.	1	40	15	AT112120
1-1/2" x 12'	6	60.62 lb.	1	40	15	AT112144

Threaded Rod - Hot Dipped Galvanized ASTM A153 or F2329

Size	Threads per Inch	Weight per Piece	Pieces per Tube	Tubes per Pallet	Pallets per 20 ft. Container	SKU
3/8" x 6'	16	1.69 lb.	25	50	19	ATHG38072
3/8" x 10'	16	2.82 lb.	25	40	15	ATHG38120
3/8" x 12'	16	3.39 lb.	25	40	12	ATHG38144
1/2" x 6'	13	3.03 lb.	12	50	22	ATHG12072
1/2" x 10'	13	5.06 lb.	12	40	15	ATHG12120
1/2" x 12'	13	6.07 lb.	12	40	13	ATHG12144
5/8" x 6'	11	5.06 lb.	8	50	21	ATHG58072
5/8" x 10'	11	8.44 lb.	8	40	15	ATHG58120
5/8" x 12'	11	10.13 lb.	8	40	13	ATHG58144
3/4" x 6'	10	7.30 lb.	5	50	23	ATHG34072
3/4' x 10'	10	12.17 lb.	5	40	15	ATHG34120
3/4" x 12'	10	14.61 lb.	5	40	14	ATHG34144
7/8" x 6'	9	10.00 lb.	4	50	21	ATHG78072
7/8" x 10'	9	16.68 lb.	4	40	15	ATHG78120
7/8" x 12'	9	20.01lb.	4	40	13	ATHG78144
1" x 6'	8	13.13 lb.	3	50	21	ATHG1072
1" x 10'	8	21.89 lb.	3	40	15	ATHG1120
1" x 12'	8	26.26 lb.	3	40	13	ATHG1144
1-1/8" x 6'	7	20.84 lb.	2	50	25	ATHG118072
1-1/8" x 10'	7	34.73 lb.	2	40	15	ATHG118120
1-1/8" x 12'	7	41.70 lb.	2	40	15	ATHG118144
1-1/4" x 6'	7	21.39 lb.	2	50	20	ATHG114072
1-1/4" x 10'	7	35.64 lb.	2	40	15	ATHG114120
1-1/4" x 12'	7	42.77 lb.	2	40	12	ATHG114144
1-1/2" x 6'	6	30.31 lb.	1	50	27	ATHG112072
1-1/2" x 10'	6	50.52 lb.	1	40	15	ATHG112120
1-1/2" x 12'	6	60.62 lb.	1	40	15	ATHG112144

FASTENERS
THREADED ROD

Threaded Rod - Zinc Plated ASTM F1941 FeZn3A

Size	Threads per Inch	Weight per Piece	Pieces per Tube	Tubes per Pallet	Pallets per 20 ft. Container	SKU
1/4" x 6'	20	0.71 lb.	50	50	23	ATZ14072
1/4" x 10'	20	1.18 lb.	50	40	15	ATZ14120
1/4" x 12'	20	1.41 lb.	50	40	14	ATZ14144
5/16" x 6'	18	1.21 lb.	35	50	20	ATZ516072
5/16" x 10'	18	2.02 lb.	35	40	15	ATZ516120
5/16" x 12'	18	2.43 lb.	35	40	12	ATZ516144
3/8" x 6'	16	1.69 lb.	25	50	19	ATZ38072
3/8" x 10'	16	2.82 lb.	25	40	15	ATZ38120
3/8" x 12'	16	3.39 lb.	25	40	12	ATZ38144
1/2" x 6'	13	3.03 lb.	12	50	22	ATZ12072
1/2' x 10'	13	5.06 lb.	12	40	15	ATZ12120
1/2" x 12'	13	6.07 lb.	12	40	13	ATZ12144
5/8" x 6'	11	5.06 lb.	8	50	21	ATZ58072
5/8" x 10'	11	8.44 lb.	8	40	15	ATZ58120
5/8" x 12'	11	10.13 lb.	8	40	13	ATZ58144
3/4" x 6'	10	7.30 lb.	5	50	23	ATZ34072
3/4" x 10'	10	12.17 lb.	5	40	15	ATZ34120
3/4" x 12'	10	14.61 lb.	5	40	14	ATZ34144
7/8" x 6'	9	10.00 lb.	4	50	21	ATZ78072
7/8" x 10'	9	16.68 lb.	4	40	15	ATZ78120
7/8" x 12'	9	20.01 lb.	4	40	13	ATZ78144
1" x 6'	8	13.13 lb.	3	50	21	ATZ1072
1" x 10'	8	21.89 lb.	3	40	15	ATZ1120
1" x 12'	8	26.26 lb.	3	40	13	ATZ1144
1-1/8" x 6'	7	20.84 lb.	2	50	25	ATZ118072
1-1/8" x 10'	7	34.73 lb.	2	40	15	ATZ118120
1-1/8" x 12'	7	41.70 lb.	2	40	15	ATZ118144
1-1/4" x 6'	7	21.39 lb.	2	50	20	ATZ114072
1-1/4" x 10'	7	35.64 lb.	2	40	15	ATZ114120
1-1/4" x 12'	7	42.77 lb.	2	40	12	ATZ114144
1-1/2" x 6'	6	30.31 lb.	1	50	27	ATZ112072
1-1/2" x 10'	6	51.52 lb.	1	40	15	ATZ112120
1-1/2" x 12'	6	60.62 lb.	1	40	15	ATZ112144

Threaded Rod - Stainless Steel

Size	Threads per Inch	Weight per Piece	Pieces per Tube	Tubes per Pallet	Pallets per 20 ft. Container	SKU
1/4" x 6'	20	0.78 lb.	50	50	23	ATSS14072
1/4" x 10'	20	1.30 lb.	50	40	15	ATSS14120
1/4" x 12'	20	1.56 lb.	50	40	14	ATSS14144
5/16" x 6'	18	1.28 lb.	35	50	20	ATSS516072
5/16" x 10'	18	2.13 lb.	35	40	15	ATSS516120
5/16" x 12'	18	2.56 lb.	35	40	12	ATSS516144
3/8" x 6'	16	1.86 lb.	25	50	19	ATSS38072
3/8" x 10'	16	3.10 lb.	25	40	15	ATSS38120
3/8" x 12'	16	3.73 lb.	25	40	12	ATSS38144
1/2" x 6'	13	3.34 lb.	12	50	21	ATSS12072
1/2' x 10'	13	5.56 lb.	12	40	15	ATSS12120
1/2" x 12'	13	6.67 lb.	12	40	13	ATSS12144
5/8" x 6'	11	5.57 lb.	8	50	20	ATSS58072
5/8" x 10'	11	9.28 lb.	8	40	15	ATSS58120
5/8" x 12'	11	11.14lb.	8	40	12	ATSS58144
3/4" x 6'	10	8.04 lb.	5	50	22	ATSS34072
3/4" x 10'	10	13.39 lb.	5	40	15	ATSS34120
3/4" x 12'	10	16.07 lb.	5	40	14	ATSS34144

Bent Threaded Rod

Size	Threads per Inch	Weight per Piece	Pieces per Tube	Tubes per Pallet	Pallets per 20 ft. Container	SKU
1/2" x 52"	8	2.74 lb.	15	50	21	BRTZ12528

Grip-Rite® threaded metal rods are distributed by PrimeSource Building Products, Inc.

PRIMESOURCE® BUILDING PRODUCTS, INC.

800-676-7777
www.grip-rite.com
www.primesourcebp.com

Vertigo™ *Rod Hangers*

PRODUCT DESCRIPTION

Vertigo is an all steel threaded fastening system for suspending steel threaded rod vertically overhead in pipe hanging, fire protection, electrical conduit and cable-tray applications. Vertigo are available in three versions which can be installed in a variety of base materials including steel purlins, bar joists and beams, wood frame columns and beams, as well as concrete ceilings, beams and columns.

Steel threaded rods in 1/4", 3/8" and 1/2" diameters can be vertically suspended with Vertigo. In wood and steel base materials, Vertigo is also offered in a side mount style for lateral installation of 1/4" and 3/8" diameter steel threaded rods onto joists, columns and overhead members. For all steel and wood Vertigo fasteners, a universal Vertigo Socket Driver is recommended to provide proper installation with a screw gun or hammer drill. Concrete Vertigo fasteners should be installed with the appropriate size standard drive sockets and adjustable torque, battery powered screw gun or hammer drill.

GENERAL APPLICATIONS AND USES

- Hanging Pipe and Sprinkler Systems
- Lighting Systems and Overhead Utilities
- Suspended Ceilings
- Suspending Conduit and Cable Trays
- HVAC Ductwork and Strut Channels
- Mounting Security Equipment

FEATURES AND BENEFITS

+ One system for all rod hanging applications in steel, wood and concrete
+ Ease and speed of overhead installation
+ Lower in-place cost, when compared to beam clamps, lag bolts and dropins
+ Steel and wood Vertigo can be installed with a screw gun or hammer drill
+ Concrete Vertigo can be installed with an adjustable torque, battery powered screw gun or hammer drill
+ Side mount versions available for steel and wood Vertigo
+ The universal socket can be used for the steel and wood Vertigo

APPROVALS AND LISTINGS

FM Approvals (FM) - (see listing for applicable sizes and types).

Pipe Hangers components for automatic sprinkler systems - File No. JI 3015153

Underwriters Laboratory (UL) - (see listing for applicable sizes and types).

Pipe Hangers - File No. EX 1289

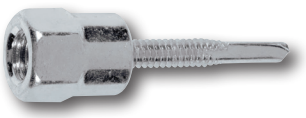
Luminaire - File No. E362339

GUIDE SPECIFICATIONS

CSI Divisions: 03 16 00 - Concrete Anchors, 05 05 19 - Post-Installed Concrete Anchors, 05 05 23 - Metal Fastenings and 06 05 23 - Wood, Plastic, and Composite Fastenings. Rod Hangers shall be Vertigo anchors as supplied by Powers Fasteners, Inc., Brewster, NY.

MECHANICAL ANCHORS

SECTION CONTENTS Page No.



Steel Vertigo

Wood Vertigo

Concrete Vertigo (Wedge-Bolt OT)

ANCHOR MATERIALS

Zinc Plated Carbon Steel

ANCHOR SIZE RANGE (TYP.)

1/4" to 1/2" for Steel
1/4" to 1/2" for Wood
1/4" to 1/2" for Concrete

SUITABLE BASE MATERIALS

Steel Purlins and Beams
Wood and Timber
Normal-Weight concrete
Structural Lightweight concrete
Hollow Core Concrete Plank

INSTALLATION SPECIFICATIONS

Steel Vertigo

Point Style	#3	#5
Self Drilling Range	0.036" (20 gauge) – 0.188" (3/16")	0.188" (3/16") – 0.500" (1/2")
Screw Size (UNC)	1/4-20 thread	1/4-20 thread
Root Diameter (in.)	13/64	13/64
Thread Length (in.)	1-3/16" (1-1/2"screw)	31/32" (1-1/2"screw)
Flange Thickness (in.)	1/16	1/16
Drill Speed (RPM)	500-1,500	500-1,500

Install with universal steel and wood socket.

Wood Vertigo

Screw Size	1/4" Thread Forming	5/16" Thread Forming
Pre-drill Diameter (in.) (if required)	1/8	1/8
Point Style	Type 17	Type 17
Root Diameter (in.)	3/16	7/32
Thread Length (in.)	Screw length less 5/16	Screw length less 5/16
Flange Thickness (in.)	1/16	1/16

Install with universal steel and wood socket.

Vertigo Couplings (Steel & Wood)

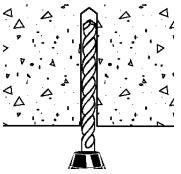
Screw Size	1/4"	3/8"	1/2"	1/4"	3/8"
Coupling Size and Type	Vertical	Vertical	Vertical	Side	Side
Thread Size (UNC)	1/4-20	3/8-16	1/2-13	1/4-20	3/8-16
Thread Depth (in.)	3/8	3/8	3/8	5/8 (through)	5/8 (through)
Width (flat to flat) (in.)	5/8	5/8	5/8	5/8	5/8
Height (in.)	13/16	13/16	13/16	13/16	13/16

Concrete Vertigo (Wedge-Bolt OT)

Rod Diameter/Anchor Size	1/4"	3/8"	1/2"
ANSI Drill Bit (in.)	1/4	1/4	3/8
Overall Screw Shank Length	1-1/4	1-1/2	2-3/4
Anchor Thread Length (in.)	1-1/8	1-3/8	2-1/2
Root Diameter (in.)	15/64	15/64	23/64
Coupling / Washer Height (in.)	27/64	9/16	53/64
Integral Washer O.D. (in.)	31/64	39/64	31/32
Coupling Thread Size (UNC)	1/4-20	3/8-16	1/2-13
Coupling Thread Depth (in.)	3/8	1/2	3/4
Socket Driver Size (in.)	3/8	1/2	11/16

Install with universal steel and wood socket.

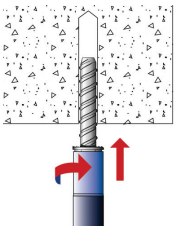
Installation Guidelines



When installing Vertigo fasteners, eye protection should be worn as a safety precaution.

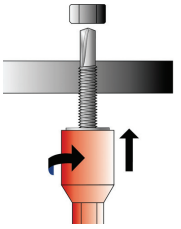
If pre-drilling is required (certain types of wood truss/wood joist and all concrete base materials), select the recommended drill bit type and diameter. For Concrete Vertigo only, drill to the appropriate embedment depth, adding at least one diameter (1/4" to 1/2") to the drilling depth to prevent the tip of the fastener from running into a dead end at the rear of the anchor hole.

Concrete



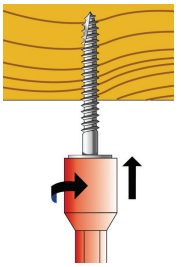
Select the appropriate socket driver for the anchor size and type to be installed and mount into chuck of installation tool. Insert the Vertigo fastener into the socket driver, and install perpendicular to the base material surface. Drive the fastener with a smooth steady motion until the coupling is firmly seated against the surface of the base material.

Steel



Thread the appropriate diameter steel threaded rod or threaded bolt into the coupling. The threaded rod or bolt should fully engage the thread length of the coupling on a vertical mount fastener. The threaded rod or threaded portion of the bolt can pass through coupling of a side mount fastener.

Wood



For UL and FM listings for Pipe Hangers, Steel Vertigo should be installed with a retaining nut.

MATERIAL SPECIFICATIONS

Steel and Wood Vertigo

Component	Component Material
Screw Body	AISI 1018-1022 (Case Hardened)
Coupling	AISI 1018-1022 (Case Hardened)
Zinc Plating	ASTM B633, SC1, Type III (Fe/Zn5)

Concrete Vertigo (Wedge-Bolt OT)

Component	Component Material
Anchor Body	Case Hardened 10B21 Carbon Steel
Zinc Plating	ASTM B633, SC1, Type III (Fe/Zn 5)

PERFORMANCE DATA

Steel Vertigo – Ultimate Tension Load Capacities when Installed in Minimum ASTM A 36 Steel (Beams) and ASTM A 572 Steel (Purlins)[1,2]

Anchor Size / Rod Diameter in. (mm)	Mount Direction	Screw Shank Size and Length	Minimum Steel Gauge (Thickness)						
			20 0.036" lbs. (kN)	18 0.048" lbs. (kN)	16 0.060" lbs. (kN)	14 0.075" lbs. (kN)	12 0.105" lbs. (kN)	3/16" 0.187" lbs. (kN)	1/4" 0.250" lbs. (kN)
1/4 (6.4)	Vertical	1/4-20 x 1" (w/nut)	1,550 (7.0)	1,550 (7.0)	1,775 (8.0)	1,775 (8.0)	2,050 (9.2)	3,850 (17.3)	-
	Vertical	1/4-20 x 1"	405 (1.8)	620 (2.8)	985 (4.4)	1,160 (5.2)	1,560 (7.0)	3,205 (14.4)	5,040 (22.7)
	Side	1/4-20 x 1" (w/nut)	1,550 (7.0)	1,550 (7.0)	1,775 (8.0)	1,775 (8.0)	2,050 (9.2)	3,850 (17.3)	-
3/8 (9.5)	Vertical	1/4-20 x 1" (w/nut)	1,550 (7.0)	1,550 (7.0)	1,775 (8.0)	1,775 (8.0)	2,050 (9.2)	3,850 (17.3)	-
	Side	1/4-20 x 1-1/2"(w/nut)	1,550 (7.0)	1,550 (7.0)	1,775 (8.0)	1,775 (8.0)	2,050 (9.2)	3,850 (17.3)	-
	Vertical	1/4-20 x 1-1/2"	405 (1.8)	620 (2.8)	985 (4.4)	1,160 (5.2)	1,560 (7.0)	3,205 (14.4)	-
	Side	1/4-20 x 1-1/2"	405 (1.8)	620 (2.8)	985 (4.4)	1,160 (5.2)	1,560 (7.0)	1,965 (8.8)	-
	Vertical	1/4-20 x 2" (w/nut)	1,550 (7.0)	1,550 (7.0)	1,775 (8.0)	1,775 (8.0)	2,050 (9.2)	3,850 (17.3)	-
1/2 (12.7)	Vertical	12-20 x 1-1/2"	495 (2.20	710 (3.2)	920 (4.1)	1,560 (7.0)	2,050 (9.2)	3,280 (14.8)	5,040 (22.7)
	Vertical	12-20 x 1-1/2"(w/nut)	1,550 (7.0)	1,550 (7.0)	1,775 (8.0)	1,775 (8.0)	2,050 (9.2)	3,850 (17.3)	-

1. For Steel Vertigo loaded perpendicular to threaded rod (shear) the ultimate load capacity for the anchor is 1,965 lbs in nominal 20 gage steel (0.036")

Wood Vertigo – Ultimate Tension Load Capacities when Installed in Wood Base Materials (Structural Wood and Timber)[1,2]

Anchor Size / Rod Diameter in. (mm)	Mount Direction	Screw Shank Size and Length	Embedment Depth in. (mm)	Wood Member (Type)		
				Fir lbs. (kN)	Pine lbs. (kN)	Spruce lbs. (kN)
1/4 (6.4)	Vertical	1/4 x 1"	1 (25.4)	685 (3.1)	650 (2.9)	650 (2.9)
	Side	1/4 x 2"	2 (50.8)	1,510 (6.8)	1,510 (6.8)	1,510 (6.8)
3/8 (9.5)	Vertical	1/4 x 1"	1 (25.4)	685 (3.1)	650 (2.9)	650 (2.9)
	Side	1/4 x 1"	1 (25.4)	685 (3.1)	650 (2.9)	650 (2.9)
	Vertical	1/4 x 2"	2 (50.8)	1,510 (6.8)	1,510 (6.8)	1,510 (6.8)
	Side	1/4 x 2"	2 (50.8)	1,800 (8.1)	1,800 (8.1)	1,800 (8.1)
	Vertical	1/4 x 3"	3 (76.2)	2,075 (9.3)	1,510 (6.8)	1,510 (6.8)
	Vertical	1/4 x 4"	4 (101.6)	2,075 (9.3)	1,510 (6.8)	1,510 (6.8)
	Vertical	5/16" x 2-1/2"	2-1/2 (63.5)	2,670 (12.0)	3,110 (14.0)	3,110 (14.0)
	Side	3/8" x 2-1/2"	2-1/2 (63.5)	1,450 (6.5)	1,530 (6.9)	1,380 (6.2)
1/2 (12.7)	Vertical	5/16" x 2-1/2"	2-1/2 (63.5)	2,670 (12.0)	3,110 (14.0)	3,110 (14.0)

1. Truss/joist manufacturers may require pre-drilled holes with wood depending on the location of the anchor installation. Consult with the truss/joist manufacturer for details.
2. Wood Vertigo are recommended to be installed with the Universal Steel & Wood Nut Driver.

PERFORMANCE DATA

Concrete Vertigo – Ultimate Load Capacities when Installed in Normal-Weight Concrete[1,2]

Anchor Size / Rod Diameter in. (mm)	Mount Direction	Screw Shank Size and Length	ANSI Drill Bit Diameter dbit in.	Embed. Depth h_v in. (mm)	Minimum Concrete Compressive Strength (f'_c)					
					2,000 psi (13.8 MPa)		4,000 psi (20.7 MPa)		6,000 psi (41.4 MPa)	
					Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	Vertical	1/4″ x 1-1/4″	1/4″	1-1/4 (31.8)	1,390 (6.3)	1,810 (8.1)	1,950 (8.8)	2,440 (11.0)	2,070 (9.3)	2,570 (11.6)
3/8 (9.5)	Vertical	1/4″ x 1-1/2″	1/4″	1-1/2 (38.1)	1,760 (7.9)	2,580 (11.6)	2,595 (11.7)	2,640 (11.9)	2,770 (12.5)	2,700 (12.2)
1/2 (12.7)	Vertical	3/8″ x 2-3/4″	3/8″	2-3/4 (69.9)	5,320 (23.9)	5,250 (23.6)	6,050 (27.2)	6,330 (28.5)	8,620 (38.8)	7,410 (33.0)

1. The values listed above are ultimate load capacities which should be reduced by a minimum safety factor of 4.0 or greater to determine the allowable working load.
2. Linear interpolation may be used to determine ultimate loads for intermediate compressive strengths.

Concrete Vertigo – Ultimate Load Capacities when Installed Through Metal Deck into Structural Lightweight Concrete[1,2,3,4]

Anchor Size / Rod Diameter d in. (mm)	Embedment Depth h_v in. (mm)	Lightweight Concrete Over Minimum 20 Ga. Metal Deck $f'c \geq 3{,}000$ psi (20.7 MPa)	
		Minimum 4 1/2″ Wide Deck	
		Tension lbs. (kN)	Load at 45° lbs. (kN)
1/4 (6.4)	1-1/4 (31.8)	800 (3.6)	1,140 (5.1)
3/8 (9.5)	1-1/2 (38.1)	1,780 (8.0)	1,500 (6.8)
1/2 (12.7)	2-3/4 (69.9)	3,880 (17.5)	2,920 (13.1)

1. The values listed above are ultimate and allowable load capacities for Vertigo rod hangers installed in sand-lightweight concrete.
2. The metal deck shall be minimum No. 20 gauge thick steel [0.035-inch base metal thickness (0.89 mm)] conforming to ASTM A 653/ A 653M.
3. The values listed above are ultimate load capacities which should be reduced by a minimum safety factor of 4.0 or greater to determine the allowable working load.
4. The tabulated load values are for anchors installed with a minimum flute edge distance of 1-1/2-inch.

Concrete Vertigo – Ultimate Tension Load Capacities when Installed in Hollow Core Concrete Plank[1,2]

Anchor Size / Rod Diameter in. (mm)	Mount Direction	Screw Shank Size and Length	ANSI Drill Bit Diameter d_{bit} in.	Embedment Depth h_v in. (mm)	Center of Web lbs. (kN)	Center of Core lbs. (kN)
1/4 (6.4)	Vertical	1/4″ x 1-1/4″	1/4″	1-1/4 (31.8)	2,775 (12.3)	1,920 (8.5)
3/8 (9.5)	Vertical	1/4″ x 1-1/2″	1/4″	1-1/2 (38.1)	3,700 (16.5)	2,570 (11.4)
1/2 (12.7)	Vertical	3/8″ x 2-3/4″	3/8″	2-3/4 (69.9)	8,240 (36.7)	3,480 (15.5)

1. Tabulated load values are for anchors installed in 8-inch-thick hollow core plank with minimum compressive strength of 5,000 psi at the time of installation. The 4′ x 6′ normal-weight concrete members features include 1-1/2″ cover above and below cores and a minimum web thickness of 1-1/2″.
2. The values listed above are ultimate load capacities which should be reduced by a minimum safety factor of 4.0 or greater to determine the allowable working load.

PERFORMANCE DATA

Steel Vertigo – Ultimate Load Capacities for Factory Mutual (FM Global) and Underwriter's Laboratories (UL) Listings for Pipe Hangers[1]

Cat. No.	Anchor Size / Rod Diameter in. (mm)	Mount Direction	Screw Shank Size and Length	Point Style	Maximum Pipe Size in. (mm)	UL Minimum Steel Thickness in. (mm)	UL Test Load lbs. (kN)	FM Minimum Steel Thickness in. (mm)	FM Test Load lbs. (kN)
7158	3/8 (9.5)	Vertical	1/4-20 x 1″	#3	4 (101.6)	0.060 (1.5)	1,500 (6.8)	0.096 (2.4)	1,475 (6.6)
7184		Side	1/4-20 x 1″	#3	4 (101.6)	0.060 (1.5)	1,500 (6.8)	0.096 (2.4)	1,475 (6.6)
7160		Vertical	1/4-20 x 1-1/2″	#3	4 (101.6)	0.060 (1.5)	1,500 (6.8)	0.096 (2.4)	1,475 (6.6)
7186		Side	1/4-20 x 1-1/2″	#3	4 (101.6)	0.060 (1.5)	1,500 (6.8)	0.096 (2.4)	1,475 (6.6)
7154		Vertical	12-20 x 1-1/2″	#5	4 (101.6)	0.060 (1.5)	1,500 (6.8)	0.096 (2.4)	1,475 (6.6)
7188		Side	1/4-20 x 2″	#3	4 (101.6)	0.060 (1.5)	1,500 (6.8)	0.096 (2.4)	1,475 (6.6)
7201		Side	12-20 x 1-1/2″	#5	4 (101.6)	0.060 (1.5)	1,500 (6.8)	0.096 (2.4)	1,475 (6.6)
7161	1/2 (12.7)	Vertical	12-20 x 1-1/2″	#5	8 (203.2)	0.250 (6.4)	4,050 (18.2)	0.250 (6.4)	3,800 (17.1)

1. Steel Vertigo anchors are recommended to be installed with the Universal Steel & Wood Nut Driver. For UL and FM listings, Steel Vertigo must be installed with a retaining nut.

Wood Vertigo – Ultimate Load Capacities for Factory Mutual (FM Global) and Underwriter's Laboratories (UL) Listings for Pipe Hangers[1]

Cat. No.	Anchor Size / Rod Diameter in. (mm)	Mount Direction	Screw Shank Size and Length	Embedment Depth in. (mm)	UL Maximum Pipe Size in. (mm)	UL Test Load lbs. (kN)	FM Maximum Pipe Size in. (mm)	FM Test Load lbs. (kN)
7165	3/8 (9.5)	Vertical	1/4 x 2″	2 (50.8)	3 (76.2)	1,050 (4.7)	-	-
7170		Side	1/4 x 2″	2 (50.8)	3 (76.2)	1,050 (4.7)	-	-
7167		Vertical	1/4 x 3″	3 (76.2)	3 (76.2)	1,050 (4.7)	-	-
7169		Vertical	1/4 x 4″	4 (101.6)	3 (76.2)	1,050 (4.7)	-	-
7162		Vertical	5/16″ x 2-1/2″	2-1/2 (63.5)	4 (101.6)	1,500 (6.8)	4 (101.6)	1,475 (6.6)
7156		Side	5/16″ x 2-1/2″	2-1/2 (63.5)	4 (101.6)	1,500 (6.8)	-	-

1. Wood Vertigo anchors are recommended to be installed with the Universal Steel & Wood Nut Driver. No pre-drilling was done in the wood base materials.

Concrete Vertigo – Ultimate Load Capacities for Factory Mutual (FM Global) Listings for Pipe Hangers[1]

Cat. No.	Anchor Size / Rod Diameter in. (mm)	Mount Direction	Screw Shank Size and Length	ANSI Drill Bit Diameter d_{bit} in.	Embedment Depth in. (mm)	FM Maximum Pipe Size in. (mm)	FM Test Load lbs. (kN)
7173	3/8 (9.5)	Vertical	1/4″ x 1-1/2″	1/4″	1-1/2 (38.1)	4 (101.6)	1,475 (6.6)
7175	1/2 (12.7)	Vertical	3/8″ x 2-3/4″	3/8″	2-3/4 (69.9)	4 (203.2)	3,800 (17.1)

1. Tabulated load values are for anchors installed in 8 inch thick hollow core plank with minimum compressive strength of 4,000 psi at the time of installation. The 4′ x 6′ normal-weight concrete

PERFORMANCE DATA

Steel Vertigo - Ultimate Load Capacities for Underwriter's Laboratories (UL) Listings - Luminaire[1]

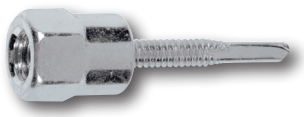
Catalog Number	Anchor Size/Rod Dia. In. (mm)	Mount Direction	Screw Shank Size and Length	Point Style	Mounting Surface	UL Test Load (lb.)
7155	1/4	Vertical	1/4-20 x 1	#3	16 Gauge Steel	45
7157	3/8	Vertical	1/4-20 x 2	#3	16 Gauge Steel	45
7158	3/8	Vertical	1/4-20 x 1	#3	16 Gauge Steel	45
7159	3/8	Vertical	1/4-20 x 1-1/2	#3	16 Gauge Steel	45
7160	1/4	Vertical	1/4-20 x 1-1/2	#3	16 Gauge Steel	45
7183	1/4	Side	1/4-20 x 1	#3	16 Gauge Steel	75
7184	3/8	Side	1/4-20 x 1	#3	16 Gauge Steel	75
7186	3/8	Side	1/4-20 x 1-1/2	#3	16 Gauge Steel	75
7188	3/8	Side	1/4-20 x 2	#3	16 Gauge Steel	75
7155	1/4	Vertical	1/4-20 x 1	#3	22 Gauge Steel	25
7157	1/4	Vertical	1/4-20 x 2	#3	22 Gauge Steel	25
7158	3/8	Vertical	1/4-20 x 1	#3	22 Gauge Steel	25
7159	3/8	Vertical	1/4-20 x 1-1/2	#3	22 Gauge Steel	25
7160	3/8	Vertical	1/4-20 x 1-1/2	#3	22 Gauge Steel	25
7183	1/4	Side	1/4-20 x 1	#3	22 Gauge Steel	45
7184	3/8	Side	1/4-20 x 1	#3	22 Gauge Steel	45
7186	3/8	Side	1/4-20 x 1-1/2	#3	22 Gauge Steel	45
7188	3/8	Side	1/4-20 x 2	#3	22 Gauge Steel	45

1. Steel Vertigo anchors are recommended to be installed with the Universal Steel & Wood Nut Driver. For UL Luminaire listing, Steel Vertigo does not require a retaining nut.

ORDERING INFORMATION

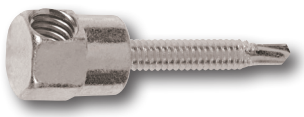
Steel Vertical Hanger (#3 for Purlins, #5 for Beams)

Cat. No.	Rod Dia.	Screw Shank Size and Length	Point Style	Self Drilling Range	Std. Box	Std. Ctn.
7155	1/4″	1/4″-20 x 1″	#3	0.036″ (20 gauge) to 0.188″ (3/16″)	100	500
7157	3/8″	1/4″-20 x 2″	#3		100	500
7158	3/8″	1/4″-20 x 1″ (w/nut)	#3		100	500
7159	3/8″	1/4″-20 x 1-1/2″ (w/nut)	#3		100	500
7160	3/8″	1/4″-20 x 1-1/2″ (w/nut)	#3		100	500
7152	1/4″	12″-20 x 1-1/2″	#5	0.188″ (3/16″) to 0.500″ (1/2″)	100	500
7154	3/8″	12″-20 x 1-1/2″ (w/nut)	#5		100	500
7161	1/2″	12″-20 x 1-1/2″ (w/nut)	#5		100	500



Steel Side Hanger (#3 for Purlins, #5 for Beams)

Cat. No.	Rod Dia.	Screw Shank Size and Length	Point Style	Self Drilling Range	Std. Box	Std. Ctn.
7183	1/4″	1/4″-20 x 1″	#3	0.036″ (20 gauge) to 0.188″ (3/16″)	100	500
7184	3/8″	1/4″-20 x 1″ (w/nut)	#3		100	500
7186	3/8″	1/4″-20 x 1-1/2″ (w/nut)	#3		100	500
7188	3/8″	1/4″-20 x 2″ (w/nut)	#3		100	500
7200	1/4″	12″-20 x 1-1/2″	#5	0.188″ (3/16″) to 0.500″ (1/2″)	50	300
7201	3/8″	12″-20 x 1-1/2″ (w/nut)	#5		100	600



Wood Vertical Hanger

Cat. No.	Rod Dia.	Screw Shank Size and Length	Point Style	Pre-Drill Diameter (If Required)	Std. Box	Std. Ctn.
7163	1/4″	1/4″ x 2″	Type 17	1/8″	100	500
7203	3/8″	1/4″ x 1″	Type 17		100	500
7165	3/8″	1/4″ x 2″	Type 17		100	500
7167	3/8″	1/4″ x 3″	Type 17		100	500
7169	3/8″	1/4″ x 4″	Type 17		100	500
7162	3/8″	5/16″ x 2-1/2″	Type 17		100	500
7164	1/2″	5/16″ x 2-1/2″	Type 17		100	500

Wood Side Hanger

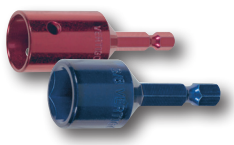
Cat. No.	Rod Dia.	Screw Shank Size and Length	Point Style	Pre-Drill Diameter (If Required)	Std. Box	Std. Ctn.
7185	1/4″	1/4″ x 1″	Type 17	1/8″	100	500
7205	3/8″	1/4″ x 1″	Type 17		100	500
7170	3/8″	1/4″ x 2″	Type 17		100	500
7156	3/8″	5/16″ x 2-1/2″	Type 17		100	500

Concrete Vertical Hanger

Cat. No.	Rod Dia.	Screw Shank Size and Length	Thread Style	Pre-Drill Diameter (If Required)	Std. Box	Std. Ctn.
7171	1/4″	1/4″ x 1-1/4″	Wedge-Bolt OT	1/4″ ANSI	100	500
7173	3/8″	1/4″ x 1-1/2″	Wedge-Bolt OT	1/4″ ANSI	100	500
7175	1/2″	1/4″ x 2-3/4″	Wedge-Bolt OT	3/8″ ANSI	50	250

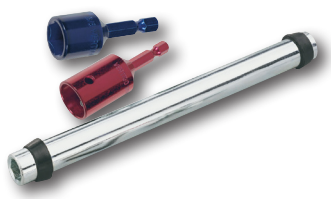
Drive Sockets and Pole Tool

Cat. No.	Description	RPM	Std. Box	Std. Ctn.
7166	6′-12′ Pole Tool (includes three Jaw Chuck)	N/A	1	1
7187	Universal Steel & Wood Socket (Red)	500 to 1500 RPM	5	25
7195	1/4″ Concrete Socket (Blue)	-	5	25
7197	3/8″ Concrete Socket (Blue)	-	5	25
7198	1/2″ Concrete Socket (Blue)	-	5	25



Concrete Vertigo Installation Accessories

Cat. No.	Description	Maximum Bit Length	Std. Box	Std. Ctn.
5864	Vertigo Installation Kit: 1/4″ and 3/8″ Concrete Drive Sockets (Blue) Universal Steel & Wood Socket (Red) (Sleeve Assembly (same as Cat# 5874)	6″	1	3/4
5874	Sleeve Assembly (5-3/4″)	6″	1	-
Cat. No.	**Description**	**Usable Length**	**Std. Tube**	**Wt./10**
5866	1/4″ x 6″ Hex Shank SDS Drill Bit	4″	1	1/2



SUBMITTAL RECORD_____
JOB _____
LOCATION_____
SUBMITTED TO_____
SUBMITTAL PREPARED BY_____
APPROVED BY_____
DATE_____

Submittal Form
Hanging Strap

Coiled Galvanized Duro Strap

- Coiled Duro Strap is manufactured from 16, 18, 22, 24, 26, 28 and 30 gauge steel
- Coiled straps make it convenient to carry and easy to cut without wasting material

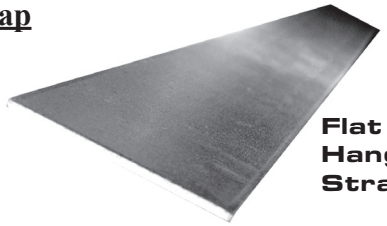
Item #	Code	Description	Length
13250	GS161-200	Galvanized Duro Strap-1in. - 16ga.	200ft.
13251	GS181-200	Galvanized Duro Strap-1in. - 18ga	200ft.
13252	GS221-200	Galvanized Duro Strap-1in. - 22ga.	200ft.
13253	GS241-200	Galvanized Duro Strap-1in. - 24ga.	200ft.
13254	GS261-200	Galvanized Duro Strap-1in. - 26ga.	200ft.
13285	GS221-100	Galvanized Duro Strap-1in. - 22ga.	100ft.
13291	GS241-100	Galvanized Duro Strap-1in. - 24ga.	100ft.
13292	GS261-100	Galvanized Duro Strap-1in. - 26ga.	100ft.
13281	GS281-100	Galvanized Duro Strap-1in. - 28ga.	100ft.
13166	GS301-100	Galvanized Duro Strap-1in. - 30ga.	100ft.
13286	GS2215-100	Galvanized Duro Strap-1-1/2in. - 22ga.	100ft.
13294	GS2415-100	Galvanized Duro Strap-1-1/2in. - 24ga.	100ft.
13295	GS2615-100	Galvanized Duro Strap-1-1/2in. - 26ga.	100ft.
13282	GS2815-100	Galvanized Duro Strap-1-1/2in. - 28ga.	100ft.
13167	GS3015-100	Galvanized Duro Strap-1-1/2in. - 30ga.	100ft.

Coiled Duro Strap

Flat Galvanized Hanging Strap

- Flat Hanging Strap is manufactured from 14, 16, 18, 20, 22, and 24 gauge steel
- Flat Hanging Strap is sold in pre-cut lengths

Item #	Code	Description	Length
13269	HS1410	14ga. Galvanized Hanging Strap-1in.	10ft.
13270	HS1610	16ga. Galvanized Hanging Strap-1in.	10ft.
13271	HS1810	18ga. Galvanized Hanging Strap-1in.	10ft.
13274	HS2010	20ga. Galvanized Hanging Strap-1in.	10ft.
13272	HS2210	22ga. Galvanized Hanging Strap-1in.	10ft.
13273	HS2410	24ga. Galvanized Hanging Strap-1in.	10ft.



Flat Hanging Strap

Perforated Scalloped Galvanized Hanging Strap

- For both HVAC and Plumbing markets.
- Manufactured from 24 gauge steel.
- Perforated with alternating different hole sizes to accommodate sheet metal screws as well as nut and bolt combinations.
- The strap has an hourglass shape with no sharp edges for the contractor to get cut or snagged on.

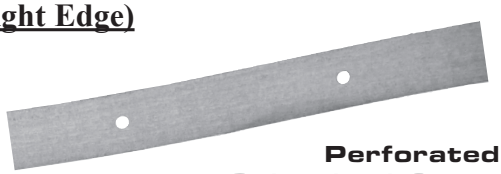
Item #	Code	Description	Length
13249	PGS24	Perforated Galvanized Strap - 3/4 in. - 24ga.	100ft.

Perforated Scalloped Galvanized Strap

Perforated Galvanized Hanging Strap (Straight Edge)

- Manufactured from 26, 28 and 30 gauge steel.
- Perforated with a 3/16" size hole sizes - 3-7/8" spacing between holes.

Item #	Code	Description	Length
13339	PGS261	Perforated Galvanized Strap - 1in. - 26ga.	100ft.
13343	PGS281	Perforated Galvanized Strap - 1in. - 28ga.	100ft.
13168	PGS301-100	Perforated Galvanized Strap - 1in. - 30ga.	100ft.
13169	PGS3015-100	Perforated Galvanized Strap - 1-1/2in. - 30ga.	100ft.



Perforated Galvanized Strap (Straight Edge)

Duro Dyne East Division, Bay Shore, NY 631-249-9000 Fax: 631-249-8346
Duro Dyne Midwest Division, Hamilton, OH 513-870-6000 Fax: 513-870-6005
Duro Dyne West Division, Fontana, CA 562-926-1774 Fax: 562-926-5778
Duro Dyne Canada, Lachine, Quebec, Canada 514-422-9760 Fax: 514-636-0328
www.durodyne.com E-mail: durodyne@durodyne.com

Printed in USA 3/22/17
BO050012

HEX NUT & WASHER

Product Data Sheet

Description

Hex Nut & Washer

Standard Construction

Hex Nut:

Manufactured from Low Carbon Steel
(1008 / 1010), meet ASTM A563 Grade A.
Dimensions: ASME/ANSI B18.2.2
Zinc Plating: Purchased to meet ASTM F1941 FeZn3A
Hot-Dip Galvanized: Meet ASTM A153.
HDG nuts are tapped oversize per ASTM A563.
Hardness: HRB 68 – HRC 32
Proof Load Strength: 90,000 PSI Minimum (68,000 PSI for HDG nuts)

Hex Nut Socket Sizes	
Bolt Size	Socket Size
1/4	7/16
5/16	1/2
3/8	9/16
3/8 Heavy Nut	11/16
1/2	3/4
5/8	15/16
3/4	1-1/8

Flat Washer:

Manufactured from Low Carbon Steel
Dimensions: ASME/ANSI B18.2.2, Table 1A, Size "W"
Zinc Plating: Purchased to meet ASTM F1941 FeZn3A
Hot-Dip Galvanized: Meet ASTM A153.
HDG nuts are tapped oversize per ASTM A563.

Flat Washer Dimensions			
Size	I.D	O.D.	Thickness
1/4	0.307-0.327	0.727-0.749	0.051-0.080
3/8	0.433-0.453	0.993-1.030	0.064-0.104
1/2	0.557-0.577	1.368-1.405	0.086-0.132
5/8	0.681-0.718	1.743-1780	0.108-0160
3/4	0.805-0842	1.993-2.030	0.122-0.177

Optional Construction

Hex Nut:
Heavy Nut
Stainless Steel 304
Stainless Steel 316
Aluminum
Nylon

Flat Washer:
Stainless Steel 304
Stainless Steel 316
Aluminum

Packaging

Size (in)	Qty Per Box (each)
1/4 Hex Nut	9,000 or 100
5/16 Hex Nut	4,000 or 100
3/8 Hex Nut	4,000 or 100
3/8 Heavy Hex Nut	2,000 or 100
1/2 Hex Nut	1,800 or 100
5/8 Hex Nut	1,000 or 100
3/4 Hex Nut	1,000 or 100

Size	Qty Per Box (lbs)
1/4" Flat Washers	50 or 5
3/8" Flat Washers	50 or 5
1/2" Flat Washers	50 or 5
5/8" Flat Washers	50 or 5
3/4" Flat Washers	50 or 5

Guarantee

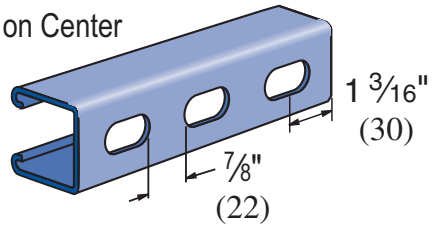
All Elgen products are guaranteed by Elgen Manufacturing against defective material.

Elgen Manufacturing
10 Railroad Ave, Closter NJ 07624
Tel: 800.503.9805 :: Fax: 201.964.9030
info@elgenmfg.com :: www.elgenmfg.com

P1000 T

Wt/100 Ft: 185 Lbs (275 kg/100 m)

Slots are
1⅛" (29) x ⅜" (14)
2" (51) on Center



Notes:
* Load limited by spot weld shear.
** KL/r > 200
NR = Not Recommended.

1. Above loads include the weight of the member. This weight must be deducted to arrive at the net allowable load the beam will support.
2. Long span beams should be supported in such a manner as to prevent rotation and twist.
3. Allowable uniformly distributed loads are listed for various simple spans, that is, a beam on two supports. If load is concentrated at the center of the span, multiply load from the table by 0.5 and corresponding deflection by 0.8.
4. For Pierced Channel, Beam Load Values in the tables are multiplied by the following factor:
   "T" Series 85%

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: PLAIN
12 Ga. (2.7 mm), 14 Ga.(1.9 mm) and
16 Ga. (1.5 mm) ASTM A1011 SS GR 33.

STEEL: PRE-GALVANIZED
12 Ga. (2.7 mm), 14 Ga. (1.9 mm) and
16 Ga. (1.5mm) ASTM A653 GR 33.

For other materials, see Special Metals or Fiberglass sections.

FINISHES

All channels are available in:

- Perma Green III (GR).
- Pre-galvanized (PG), conforming to ASTM A653 G90.
- Hot-dipped galvanized (HG), conforming to ASTM A123.
- Plain (PL).

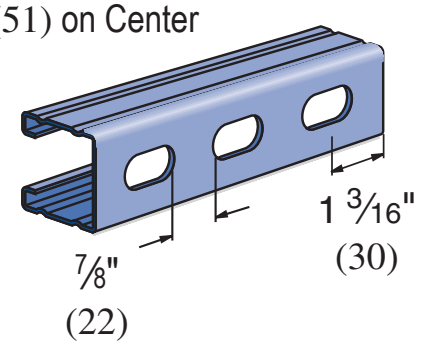
Project: _____
Architect / Engineer: _____
Date: _____ **Phone:** _____
Contractor: _____
Address: _____
_____
Notes 1: _____
_____
Notes 2: _____
_____

Approval Stamp:

P2000 T

Wt/100 Ft: 113 Lbs (168 kg/100 m)

Slots are
1⅛" (29) x ⅜" (14)
2" (51) on Center



Notes:

* Load limited by spot weld shear.

** $KL/r > 200$

NR = Not Recommended.

1. Above loads include the weight of the member. This weight must be deducted to arrive at the net allowable load the beam will support.
2. Long span beams should be supported in such a manner as to prevent rotation and twist.
3. Allowable uniformly distributed loads are listed for various simple spans, that is, a beam on two supports. If load is concentrated at the center of the span, multiply load from the table by 0.5 and corresponding deflection by 0.8.
4. For Pierced Channel, Beam Load Values in the tables are multiplied by the following factor:

"T" Series ... 85%

MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

STEEL: PLAIN

12 Ga. (2.7 mm), 14 Ga.(1.9 mm) and
16 Ga. (1.5 mm) ASTM A1011 SS GR 33.

STEEL: PRE-GALVANIZED

12 Ga. (2.7 mm), 14 Ga. (1.9 mm) and
16 Ga. (1.5mm) ASTM A653 GR 33.

For other materials, see Special Metals or Fiberglass sections.

FINISHES

All channels are available in:

- Perma Green III (GR).
- Pre-galvanized (PG), conforming to ASTM A653 G90.
- Hot-dipped galvanized (HG), conforming to ASTM A123.
- Plain (PL).

Project: _____

Architect / Engineer: _____

Date: _____ **Phone:** _____

Contractor: _____

Address: _____

_____

Notes 1: _____

_____

Notes 2: _____

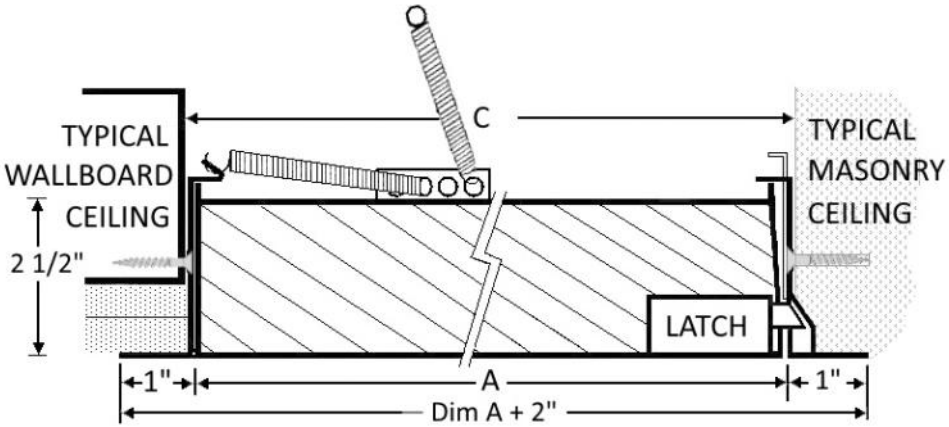
_____

Approval Stamp:

SUBMITTAL: FD & FDS SERIES - 1 HR COMBUSTIBLE CEILING FIRE RATED ACCESS DOORS

QTY FD	A MODEL SIZE IS DOOR SIZE WIDTH X HEIGHT		B OUTSIDE FRAME DIMENSIONS		C 1 HOUR COMBUSTIBLE CEILING OPENING		APPROXIMATE SHIPPING WEIGHT In Pounds		LATCH (ES)
	INCHES	mm	W	H	WIDTH	HEIGHT	FD	FDS	
	8" X 8"	203 x 203	10 "	10 "	8 3/8 "	8 3/8 "	6	6	1
	10" X 10"	254 x 254	12 "	12 "	10 3/8 "	10 3/8 "	8	8	1
	12" X 12"	305 x 305	14 "	14 "	12 3/8 "	12 3/8 "	10	10	1
	14" X 14"	356 x 356	16 "	16 "	14 3/8 "	14 3/8 "	12	12	1
	16" X 16"	406 x 406	18 "	18 "	16 3/8 "	16 3/8 "	15	15	1
	18" X 18"	457 x 457	20 "	20 "	18 3/8 "	18 3/8 "	17	18	1
	20" x 20"	508 x 508	22 "	22 "	20 3/8 "	20 3/8 "	21	22	1
	20" x 30"	508 x 762	22 "	32 "	20 3/8 "	30 3/8 "	28	29	1
	22" x 22"	559 x 559	24 "	24 "	22 3/8 "	22 3/8 "	26	27	1
	22" X 30"	559 x 762	24 "	32 "	22 3/8 "	30 3/8 "	29	30	2
	22" X 36"	559 x 914	24 "	38 "	22 3/8 "	36 3/8 "	36	37	2
	24" X 24"	610 x 610	26 "	26 "	24 3/8 "	24 3/8 "	27	28	1
	24" X 36"	610 x 914	26 "	38 "	24 3/8 "	36 3/8 "	37	38	2
Custom Sizes Available Upon Request - For Larger Sizes, See FD2 Series									

CEILING INSTALLATION (Side View)
Use "C" Dimension for Stud to Stud or Masonry Installation
Without Wallboard Liner



SEE SEPARATE SUBMITTALS FOR 3 HOUR CEILING, 2-3 HOUR WALLS OR DOUBLE LEAF DOORS

DRAWINGS ABOVE PROVIDED AS REFERENCE ONLY INSTALLATION CONDITIONS MAY VARY

JL INDUSTRIES

Sizes Shown in Bold Text in Chart Above Available for Quick Ship from One or More of our 10 Warehouses - Check Stock List

Optional Colors at Additional Cost - Samples Available			
G-Gray	**R**-Red	**BK**-Black/**FB** Flat	**SI** - Silver
S-Sand	**AB**-AMS Beige	**SB**-SC Flat Beige	**B**-Bronze

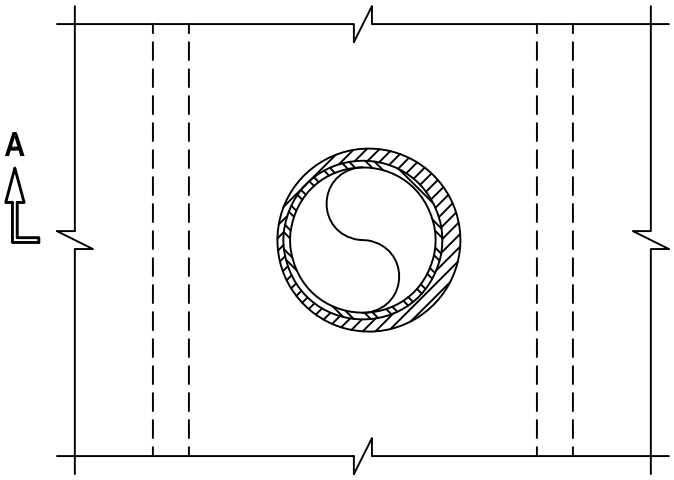
UL/cUL SYSTEM NO. F-C-1059

METAL PIPE THROUGH WOOD FLOOR/CEILING ASSEMBLY

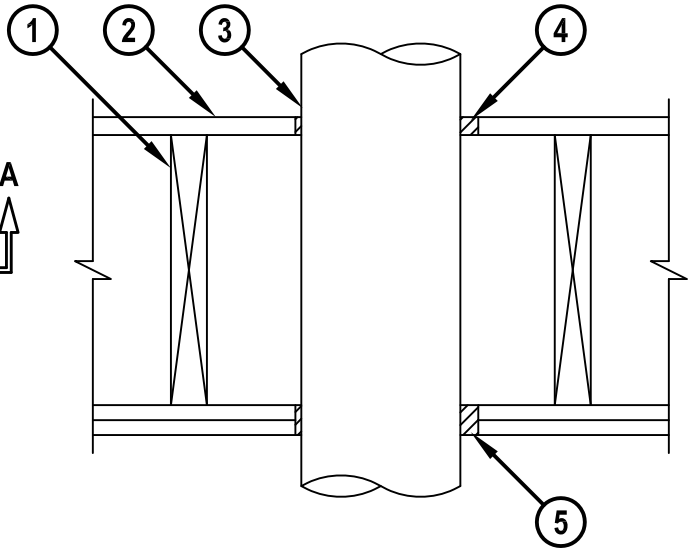
F-RATING = 1-HR. OR 2-HR.
T-RATING = 0-HR. OR 1/2-HR.

FC1059g.081108

TOP VIEW



SECTION A-A



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
   - A. MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 40 OR HEAVIER).
   - B. MAXIMUM 6" NOMINAL DIAMETER CAST IRON PIPE.
   - C. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
   - D. MAXIMUM 4" NOMINAL DIAMETER EMT.
   - E. MAXIMUM 2" NOMINAL DIAMETER FLEXIBLE STEEL CONDUIT.
4. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF SUBFLOOR OR SOLE PLATE.
5. HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTTOM SURFACE OF CEILING OR LOWER TOP PLATE :
   - A. MINIMUM 5/8" DEPTH OF SEALANT FOR A 1-HR. FIRE-RATING.
   - B. MINIMUM 1-1/4" DEPTH OF SEALANT FOR A 2-HR. FIRE-RATING.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 7-5/8".
2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 3/4".
3. CHASE WALL (NOT SHOWN, OPTIONAL) - THE THROUGH PENETRANT MAY BE ROUTED THROUGH A 1-HR. OR 2-HR. FIRE-RATED GYPSUM CHASE WALL ASSEMBLY.

Hilti Firestop Systems

HILTI, Inc.
Tulsa, Oklahoma USA (800) 879-8000

Sheet	1 of 1
Scale	1/8" = 1"
Date	Aug. 11, 2008

Drawing No.
FC 1059h

Saving Lives through Innovation and Education

UL/cUL SYSTEM NO. F-C-1106

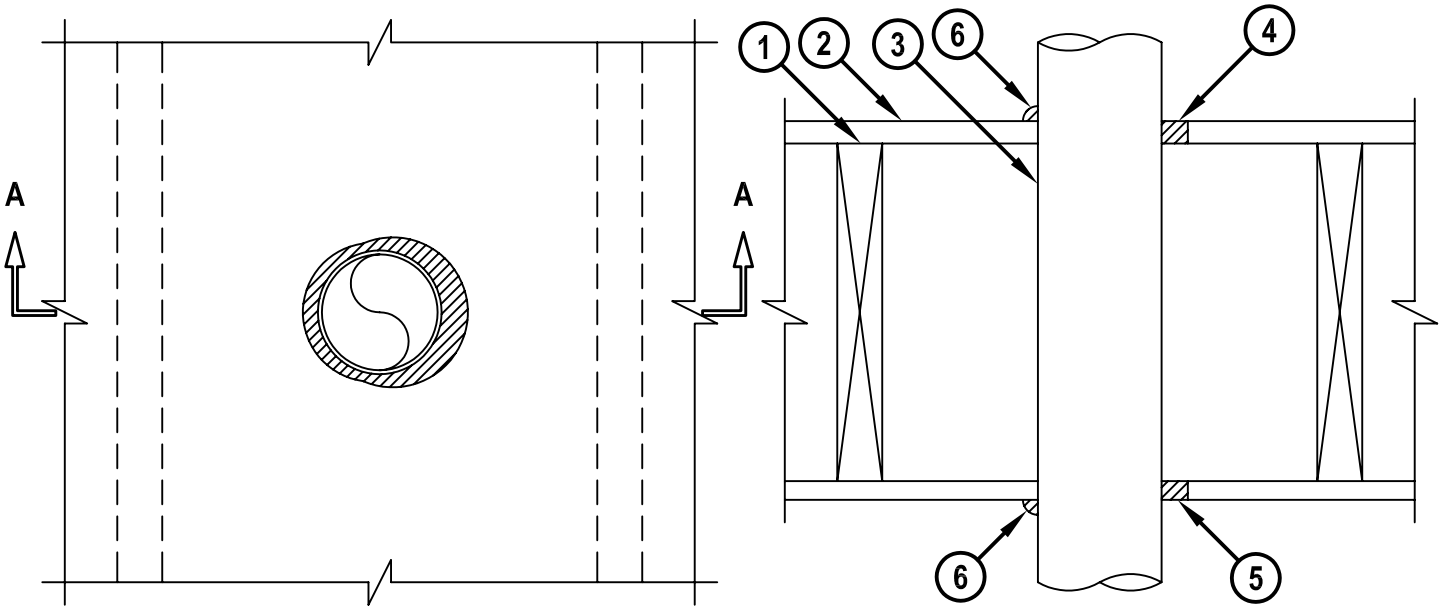
METAL PIPE THROUGH WOOD FLOOR ASSEMBLY

F-RATING = 1-HR.
T-RATING = 1/4-HR.

FC1106b.071204

TOP VIEW

SECTION A-A



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
   - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
   - B. MAXIMUM 4" NOMINAL DIAMETER CAST IRON OR DUCTILE IRON PIPE.
   - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR COPPER TUBING.
   - D. MAXIMUM 4" NOMINAL DIAMETER STEEL CONDUIT.
   - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. MINIMUM 3/4" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
5. MINIMUM 5/8" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
6. MINIMUM 1/2" BEAD HILTI CP 606 FLEXIBLE FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 7/8".
3. CHASE WALL (NOT SHOWN, OPTIONAL) - THE THROUGH PENETRANT MAY ROUTED THROUGH A 1-HR. FIRE-RATED GYPSUM CHASE WALL.

HILTI®
FIRESTOP SYSTEMS

HILTI, Inc.
Tulsa, Oklahoma USA (918) 252-6000

Sheet	1 of 1
Scale	5/32" = 1"
Date	July 12, 2004

Drawing No.
FC 1106b

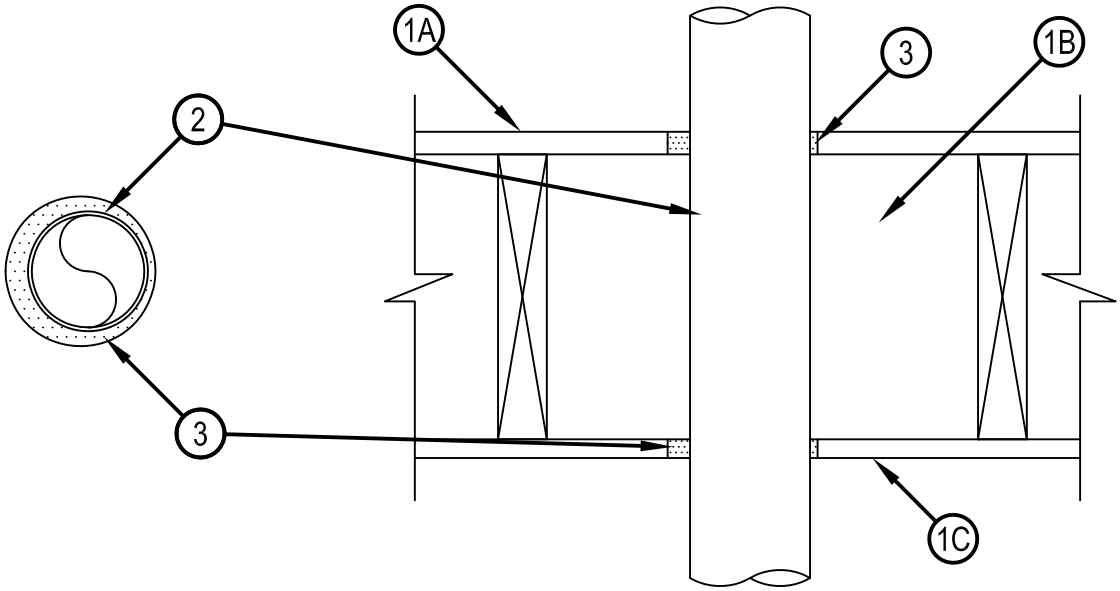
Saving Lives through Innovation and Education

Table Of Contents

System No. F-C-7013

Classified by Underwriters Laboratories, Inc. to UL 1479 and CAN/ULC-S115

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 1 Hr	F Rating — 1 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 1 Hr
	FTH Rating — 0 Hr



SECTION A-A

1. Floor-Ceiling Assembly — The 1 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction features of the floor-ceiling assembly are summarized below:
   A. Flooring System — Lumber or plywood subfloor with finish floor of lumber, plywood or Floor Topping Mixture* as specified in the individual Floor-Ceiling Design. Max diam of opening shall be 5-1/4 in. (133 mm).
   B. Wood Joist* — Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or Structural Wood Members* with bridging as required and with ends firestopped.
   C. Gypsum Board* — Nom 4 ft (1.2 m) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. Max diam of opening shall be 5-1/4 in. (133 mm).

1.1 Chase Wall — (Not shown, Optional) The through penetrants (Item 2) may be routed through a 1 hr fire-rated single, double or staggered wood stud/gypsum wallboard chase wall having a fire rating consistent with that of the floor-ceiling assembly. The chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Nom 2 by 6 in. (51 by 152 mm) lumber or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
   B. Sole Plate — Nom 2 by 6 in. (51 by 152 mm) lumber or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening shall be 5-1/4 in.
   C. Top Plate — The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) lumber plates or two sets of nom 2 by 4 in. (51 by 102 mm) lumber plates tightly butted. Max diam of opening is 5-1/4 in. (133 mm).
   D. Gypsum Board* — Thickness, type, number of layers and fasteners shall be as specified in individual Wall and Partition Design.

System No. F-C-7013

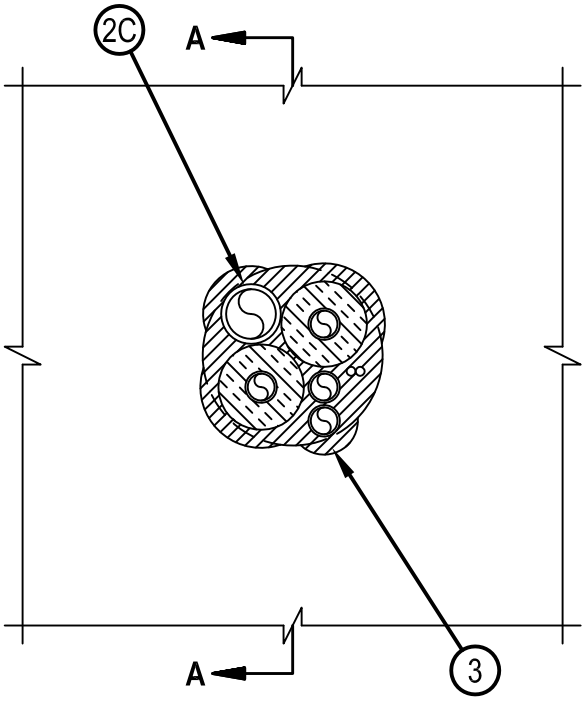
2. Steel Duct — Nom 4 in. (102 mm) diam (or smaller) No. 28 gauge (or heavier) steel duct to be installed either concentrically or eccentrically within the firestop system. The annular space between duct and periphery of opening shall be min of 1/4 in. (6 mm) to max 3/4 in. (19 mm). Steel duct to be rigidly supported on both sides of floor-ceiling assembly.
3. Fill, Void or Cavity Materials*-Sealant — Min 3/4 in. (19 mm) thickness of sealant applied within the annular space, flush with top surface of floor or sole plate. Min 5/8 in. (16 mm) thickness of sealant applied within annular space, flush with bottom surface of gypsum board or lower top plate. HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant

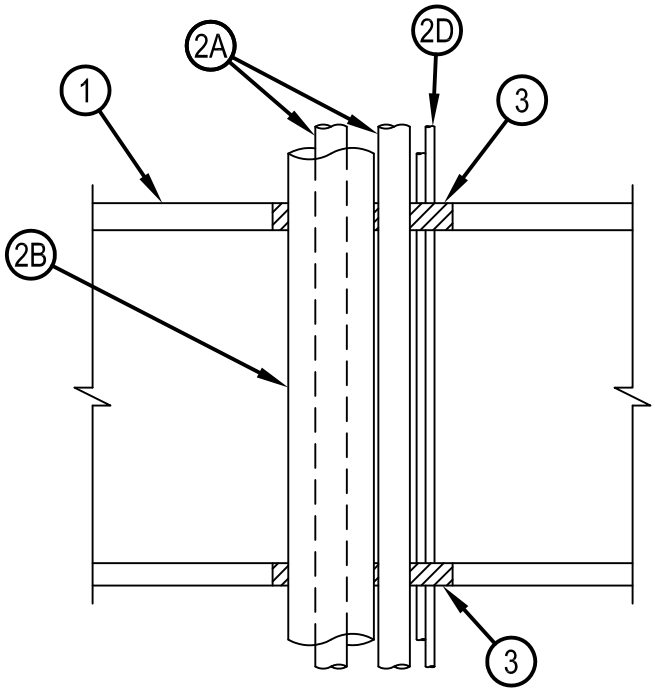
* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

System No. F-C-8026

Classified by Underwriters Laboratories, Inc. to UL 1479 and CAN/ULC-S115

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 1 Hr	F Rating — 1 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 1 Hr
	FTH Rating — 1 Hr





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-Ceiling Assembly — The 1 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction features of the floor-ceiling assembly are summarized below:
   A. Flooring System — Lumber or plywood subfloor with finish floor of lumber, plywood or Floor Topping Mixture* as specified in the individual Floor-Ceiling Design. Max diam of opening shall be 5 in. (127 mm).
   B. Wood Joists* — Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or Structural Wood Members* with bridging as required and with ends firestopped.
   C. Gypsum Board* — Nom 4 ft (122 cm) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. Gypsum board secured to wood joists or furring channels as specified in the individual Floor-Ceiling Design.

1A. Chase Wall — (Optional, Not Shown) - The through penetrants (Item 2) may be routed through a 1 hr fire rated single, double or staggered wood stud/gypsum board chase wall. Depth of chase wall stud cavity to be min 1/2 in. (13 mm) greater than diameter of opening cut in sole and top plates to accommodate the through penetrant (Item 2). The chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
   B. Sole Plate — Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm) or parallel 2 by 4 in.. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 5 in. (127 mm).
   C. Top Plate — The double top plate shall consist of two nom 2 by 4 in. (51 by 102 mm), two nom 2 by 6 in., (51 by 102 mm) or two sets of parallel 2 by 4 in.. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 5 in. (127 mm).
   D. Gypsum Board* — Thickness, type, number of layers and fasteners shall be as specified in the individual Wall and Partition Design.

System No. F-C-8026

2. Through Penetrants — One or more pipes, conduits, tubing and cables to be installed concentrically or eccentrically within the opening. The space between any penetrant, except nonmetallic pipes and uninsulated metallic pipes to be min 0 in. (point contact) to max 1 in. (25 mm). The space between any penetrants and the periphery of the opening shall be min 0 in. (point contact) to max 1 in. (25 mm). Pipes, conduits, tubing and cables to be rigidly supported on both sides of floor-ceiling assembly.
   A. Metallic Penetrants — One or more metallic pipes, conduits or tubing to be installed within the firestop system. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A1. Steel Pipe — Nom 3/4 in. (19 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   A2. Conduit — Nom 3/4 in. (19 mm) diam (or smaller) steel electrical metallic tubing (EMT) or 3/4 in. (19 mm) diam galv steel conduit.
   A3. Copper Tube — Nom 3/4 in. (19 mm) diam (or smaller) Type L (or heavier) copper tube.
   A4. Copper Pipe — Nom 3/4 in. (19 mm) diam (or smaller) Regular (or heavier) copper pipe.
   B. Tube Insulation - Plastics+ — Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. Tube insulation to be installed on one or more of the metallic pipes or tubes (Item 2A).
   See Plastics+ (QMFZ2) category in the Plastics 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.
   C. Nonmetallic Through Penetrants — One nonmetallic pipe to be installed within the firestop system. Pipe shall be spaced a min 1-1/2 in. (38 mm) from non-uninsulated metallic through penetrants. The following types and sizes of metallic pipes may be used:
   C1. Polyvinyl Chloride (PVC) Pipe — Nom 1-1/4 in. (32 mm) diam (or smaller) Schedule 40 solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   C2. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 1-1/4 in. (32 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
   D. Cables — Max of two 4 pair No. 18 AWG (or smaller) cable with PVC insulation and jacket materials.
3. Fill, Void or Cavity Materials* - Sealant — Min 3/4 in. (19 mm) thickness of sealant applied within the annulus flush with the top surface of the floor or sole plate and min 5/8 in. (16 mm) thickness of sealant applied within the annulus flush with the bottom surface of gypsum board or top plate. A min ¼ in. (6 mm) diameter bead of sealant applied at the bundle/subflooring or sole plate interface and the bundle/gypsum board or top plate interface at point contact locations.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE_MAX Intumescent Sealant

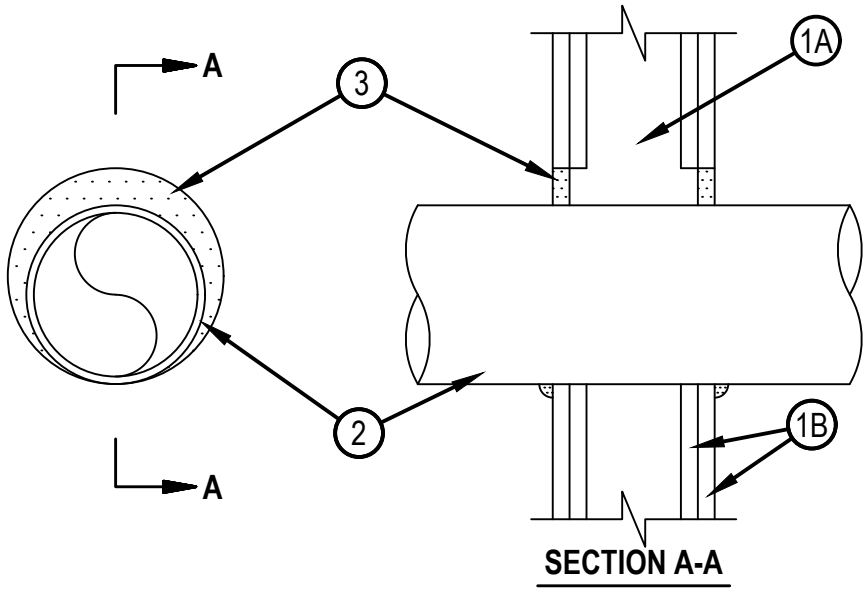
* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

+Bearing the UL Recognized Component Mark

System No. W-L-1054

Classified by
Underwriters Laboratories, Inc.
to UL 1479 and CAN/ULC-S115

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings —1 and 2 Hr (See Items 1 and 3)	F Ratings — 1 and 2 Hr (See Items 1 and 3)
T Rating — 0 Hr	FT Rating — 0 Hr
L Rating at Ambient — Less Than 1 CFM/sq ft	FH Ratings —1 and 2 Hr (See Items 1 and 3)
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



SECTION A-A

1. Wall Assembly — The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2-1/2 in. (64 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 (122 cm) 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. (819 mm) for steel stud walls. Max diam of opening is 14-1/2 in. (368 mm) for wood stud walls.

The F and FH Ratings of the firestop system are equal to the fire rating of the wall assembly.

System No. W-L-1054

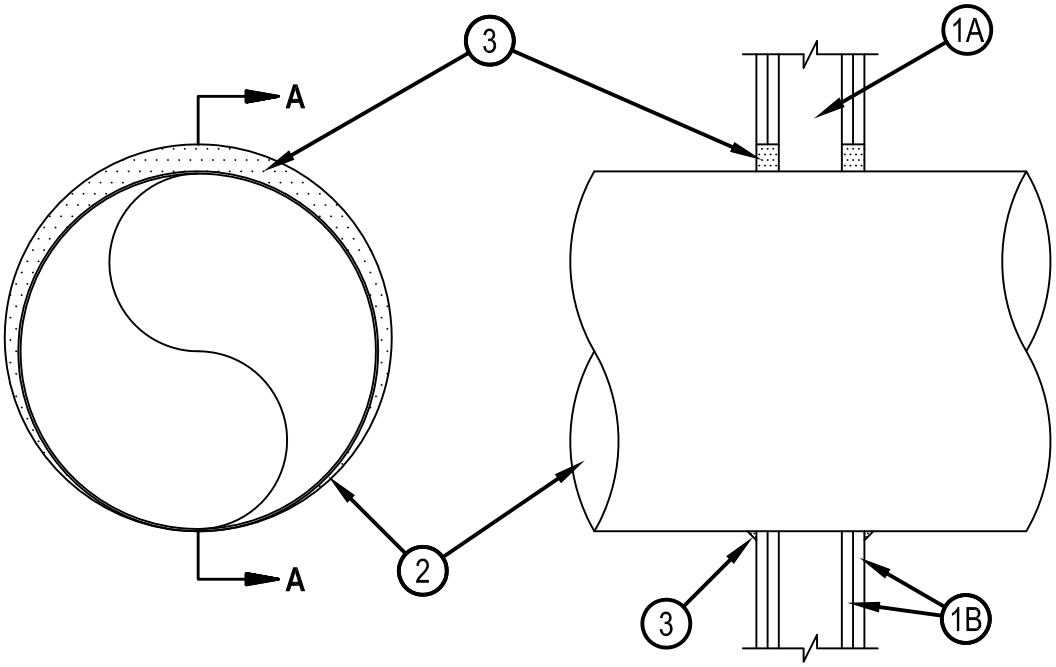
2. Through-Penetrants — One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 in. to max 2-1/4 in. (57 mm). Pipe may be installed with continuous point contact. Pipe, conduit or tubing to be rigidly supported 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. (762 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe — Nom 30 in. (762 mm) diam (or smaller) cast or ductile iron pipe.
   C. Conduit — Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing or 6 in. (152 mm) . diam 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 the annulus, flush with both surfaces of wall. At the point or continuous contact locations between pipe and wall, a min 1/2 in. (13 mm) 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 or FS-ONE MAX Intumescent Sealant

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

Classified by
Underwriters Laboratories, Inc.
to UL 1479 and CAN/ULC-S115

System No. W-L-7042

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Items 1 and 3)	F Ratings - 1 and 2 Hr (See Items 1 and 3)
T Rating - 0 Hr	FT Rating - 0 Hr
	FH Ratings - 1 and 2 Hr (See Items 1 and 3)
	FTH Rating - 0 Hr



SECTION A-A

1. Wall Assembly — The 1 or 2 hr fire rated wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 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. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced 24 in. (610 mm) OC.
   B. Gypsum Board* — For 1 hr assembly, one layer of min 5/8 in. (16 mm) thick wallboard as required in the individual Wall and Partition Design. For 2 hr assembly, two layers of min 5/8 in. (16 mm) thick wallboard as required in the individual Wall and Partition Design. Max diam of opening is 14-1/2 in. (368 mm) for wood stud walls and 21-3/4 in. (552 mm) for steel 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.
2. Through Penetrant — Galv steel duct to be installed concentrically or eccentrically within the firestop system. The annular space between the duct and periphery of opening shall be 0 in. (0 mm, point contact) and max 1-1/2 in. (64 mm) Duct to be rigidly supported on both sides of wall assembly.
   A. Spiral Wound HVAC Duct — Nom 20 in. (502 mm) diam (or smaller) No. 24 MSG (or heavier) galv steel spriral wound duct.
   B. Sheet Metal Duct — Nom 12 in. (305 mm) diam (or smaller) No. 28 MSG (or heavier) galv sheet steel duct.
3. Fill, Void or Cavity Material*—Sealant — Min 5/8 in. (16 mm) and 1-1/4 in. (32 mm) thickness of fill material applied within annulus, flush with both surfaces of wall assembly for 1 or 2 hr rated walls, respectively. At the point contact location between duct and wallboard, a min 1/2 in. (13 mm) diam bead of sealant shall be applied at the wallboard/duct interface on both surfaces of wall assembly.

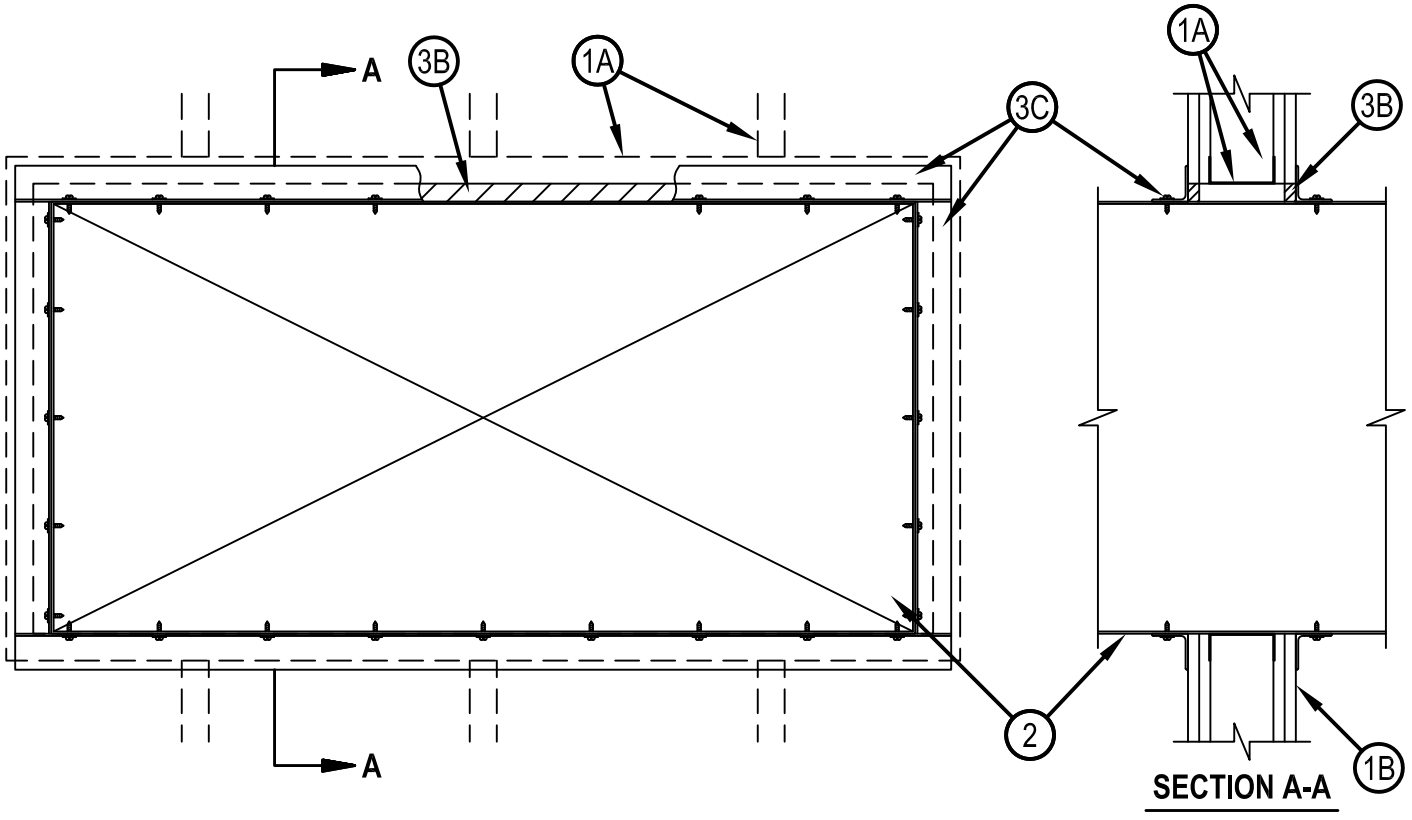
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP601S Elastomeric Firestop Sealant, FS-ONE Sealant, FS-ONE MAX Intumescent Sealant or CP606 Flexible Firestop Sealant

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

Classified by
Underwriters Laboratories, Inc.
to UL 1479 and CAN/ULC-S115

System No. W-L-7155

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
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 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 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 Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Wall framing shall consist of min 3-1/2 in. (89 mm) wide steel channel studs spaced max 24 in. (610 mm) OC. Additional steel studs shall be used to completely frame the opening.
   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 Wall and Partition Design in the UL Fire Resistance Directory. Max area of opening is 73.7 sq ft (6.85 m2) with a max dimension of 104 in. (2.64 m).

   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. Steel Duct — Max 100 in. by 100 in. (2.5 by 2.5 m) galv steel duct to be installed either concentrically or eccentrically within the firestop system. The duct shall be constructed and reinforced in accordance with SMACNA construction standards. The space between the steel duct and periphery of opening shall be min 0 in. (point contact) to max 2 in. (51 mm). Steel duct to be rigidly supported on both sides of the wall assembly.

System No. W-L-7155

2A1. Through-Pentrating Product* — As an alterate to Item 2. Fiber cement with galvanized steel facing, 3/8 in.(10 mm) thick composite metallic duct, with a max cross-sectional area of 43.0 sq ft, (4 m2) and a max individual dimension of 78 3/4 in. (2 m). Duct to be installed either concentrically or eccentrically within the firestop system such that the annular space is min 0 in. (point contact) to max 2 in. (51 mm). Duct to be rigidly supported on both sides of wall assembly. Refer to Ventilation Duct Assemblies in Vol. 2 of the Fire Resistance Directory.
DURASYSTEMS BARRIERS INC — Type DuraDuct HP.

2A2. Through-Pentrating Product* — As an alternate to Item 2. Fiber cement with galvanized steel facing, 1/4 in. (6 mm) thick, with a max cross-sectional area of 1764 sq in. (1.14 m2), and a max individual dimension of 42 in. (1067 mm). Duct to be installed either concentrically or eccentrically within the firestop system such that the annular space is min 0 in. (point contact) to max 2 in. (51 mm). Duct to be rigidly supported on both sides of wall assembly and installed in accordance. Refer to Ventilation Duct Assemblies in Vol. 2 of the Fire Resistance Directory.
DURASYSTEMS BARRIERS INC — Type DuraDuct SD.

2A3. Through-Pentrating Product* — As an alternate to Item 2. Galvanized steel faced duct panel, with a max cross-sectional area of 2450 sq in. (1.58 m2), and a max individual dimension of 49-1/2 in. (1258 mm) Duct to be installed either concentrically or eccentrically within the firestop system such that the annular space is min 0 in. (point contact) to max 2 in. (51 mm). Duct to be rigidly supported on both sides wall assembly. Refer to Ventilation Duct Assemblies in Vol. 2 of the Fire Resistance Directory.
DURASYSTEMS BARRIERS INC — Type DuraDuct GNX.

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

A. Packing Material — (Optional, Not Shown) — Polyethylene backer rod, mineral wool batt insulation or fiberglass batt insulation friction fitted into annular space. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

A1. Packing Material — Required as specified in Table below. Min 3-3/4 in. (95 mm) or 5 in. (127 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form for 1 and 2 hr rated assemblies, respectively. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

B. Fill, Void or Cavity Material* — Sealant — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. Min 1/4 in. (6 mm) diam bead of fill material shall be applied at the point contact location between the steel duct and the gypsum board.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CFS-S SIL GG Sealant, FS-ONE Sealant, FS-ONE MAX Intumescent Sealant or CP606 Flexible Firestop Sealant

C. Steel Retaining Angles — Min No. 16 gauge galv steel angles sized to lap steel duct a min of 2 in. (51 mm) and to lap wall surfaces a min of 1 in. (25 mm). When max duct dimension does not exceed 48 in. (122 cm) and duct area does not exceed 1300 in2 (8387 cm2), angles may be min No. 18 gauge galv steel. Angles attached to steel duct on both sides of wall with min No. 10 by 1/2 in. (13 mm) long steel sheet metal screws located a max of 1 in. (25 mm) from each end of steel duct and spaced a max of 6 in. (152 mm) OC. Steel angles are optional for those sides of duct that do not exceed the dimension specified in Table below, dependent on packing material, sealant and annular space as specified.

Max Duct Dimension	Duct Thickness	Annular Space	Packing Material	Angle (Item 3C) Required
24 in. (610 mm)	24 ga or heavier	1/2 in. min to 1 in. max (13 to 25 mm)	Item 3A1	No

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

Firestop Gun Grade Silicone Sealant CFS-S SIL GG

Product description

- A silicone based firestop sealant that provides maximum movement in fire-rated joints, and seals through-penetration applications

Product features

- Halogen and solvent free
- Asbestos free
- Simple to use and apply
- Good adhesion without use of a primer
- Smoke, fume, water and UV resistant
- Excellent movement capability, meets 500 cycle requirements (ASTM E 1966 and UL 2079)
- Meets Class I W-rating requirements
- Meets LEED™ requirements for indoor environmental quality credit 4.1 Low Emitting Materials, Sealants and Adhesives and 4.2 Paints and Coatings

Areas of application

- Sealing construction/expansion joints
- Top-of-wall joints
- Metal pipes
- Cable bundles
- HVAC penetrations

For use with

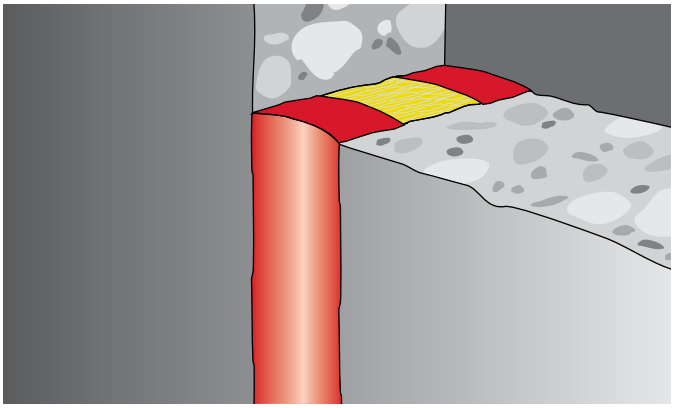
- Various base materials such as masonry, concrete, metal, etc.
- Wall and floor assemblies rated up to 4 hours

Examples

- Where a gypsum wall assembly meets the underside of a metal or concrete deck
- Sealing expansion joints to impede the passage of fire, smoke and toxic fumes
- Sealing around penetrations through fire-rated assemblies

Installation instructions

- Refer to what is included in the package, the MSDS, and the applicable listing.



Technical Data*	CFS-S SIL GG
Chemical basis	Neutral elastic silicone
Density	Approx. 1.4 g/cm³
Color	Available in red, white, and gray
Application temperature	40°F to 104°F (5°C to 40°C)
Skin-forming time	Approx. 15 min.
Curing time	Approx. 2 mm / 3 days
Volume shrinkage	Approx. 0 – 5%
Movement capability (UL 2079)	Approx. 33%
Temperature resistance	–40°F to 300°F (–40°C to 149°C)
Surface burning characteristics (ASTM E84-12)	Flame spread: 0 Smoke development: 25
Sound transmission classification (ASTM E 90-09)	59 (Relates to specific construction)
Tested in accordance with	UL 2079 ASTM E 814 ASTM E 1966 ASTM C 920 UL 1479 ASTM E 84 ASTM G21

*At 73°F (23°C) and 50% relative humidity

CLASSIFIED C UL US
FILL, VOID OR CAVITY MATERIAL
FOR USE IN THROUGH-PENETRATION
FIRESTOP SYSTEMS AND
JOINT SYSTEMS
SEE UL FIRE RESISTANCE DIRECTORY
5BP5

FM APPROVED

FBC SYSTEM COMPATIBLE
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FBC™ is a trademark of
the Lubrizol Corporation.

W rated SYSTEMS AVAILABLE

Hilti. Outperform. Outlast.

CERTIFICATE OF COMPLIANCE

Certificate Number	20131115-R13240
Report Reference	R13240
Issue Date	2013-November-15

Issued to: Hilti Construction Chemicals, Div of Hilti Inc.
5400 S 122nd East Ave
Tulsa, OK 74146

This is to certify that representative samples of Fill, Void or Cavity Materials
Fill, Void or Cavity Materials Certified for Canada CFS-S SIL GG and CFS-S SIL SL for use in Through-Penetration Firestop and Joint Systems in the UL Fire Resistance Directory and in the Products Certified for Canada Directory.

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety:
ANSI/UL 1479, "Fire Tests of Through-Penetration Firestops," – Edition 3 – Revision Date 2012/10/19
ANSI/UL 2079, "Tests for Fire Resistance of Building Joint Systems," – Edition 4 – Revision Date 2012/12/12
CAN/ULC-S115, "Standard Method of Fire Tests of Firestop Systems." – Edition 4 – Issue Date 2011/06/01

Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Classification Mark should be considered as being covered by UL's Classification and Follow-Up Service.

The UL Classification Mark includes: UL in a circle: with the word "CLASSIFIED" (as shown); a control number (may be alphanumeric) assigned by UL; a statement to indicate the extent of UL's evaluation of the product; and the product category name (product identity) as indicated in the appropriate UL Directory.

Look for the UL Classification Mark on the product.

William R. Carney, Director, North American Certification Programs

UL LLC

August 26, 2015

To Whom It May Concern:

Re: **Hilti CFS-S SIL GG Firestop Sealant - LEED Information**

Item Numbers:

2076729
2076881
2076882
2076883
2077322

The Hilti CFS-S SIL GG Firestop Sealant is manufactured in Toronto, Ontario.

There is no post-consumer or post-industrial content in CFS-S SIL GG and it cannot be recycled. The CFS-S SIL GG does not contain any Rapidly Renewable Materials. The VOC content for CFS-S SIL GG is 48.0 grams/liter.

CFS-S SIL GG is not regulated as a hazardous waste by the Federal EPA Standards. The regulations for the disposal of non-regulated industrial waste can vary from state to state and even city to city. For this reason, you should consult your local and state regulatory agencies for direction on disposal.

Please feel free to contact me at (918) 872-3704 if you have questions.

Sincerely,

Jerry Metcalf MPH, CHMM
Sr. Manager, Safety/Environmental
Hilti Inc.
918 872 3704
jerry.metcalf@hilti.com

Rev. Date: 8/14/15

The manufacturing plant location on this certificate has been provided for LEEDS reporting purposes only. It should never be used for Country of Origin certification or a representation of compliance/non-compliance with Buy American or Buy America requirements, as those requirements differ.

The manufacturing plant location(s) identified on the certificate represent standard Hilti catalog products only. “Specially” produced non-catalog Hilti products may have differing manufacturing plant locations.

Contact your Hilti representative in cases of “specially” produced products for a custom LEEDS certificates.

Flexible Firestop Sealant (CP 606)

Product description

- An acrylic based firestop sealant that provides movement capability in fire rated joints and seals through-penetrations applications

Product features

- Silicone free
- Halogen, asbestos and solvent free
- Paintable
- Tested up to 33% movement with 500 cycles in accordance to UL 2079 and ASTM 1966
- Smoke and fume resistant
- Easy clean up with water
- Single component systems available
- Meets LEED™ requirements for indoor environmental quality credit 4.1 Low Emitting Materials, Sealants and Adhesives and 4.2 Paints and Coatings

Areas of application

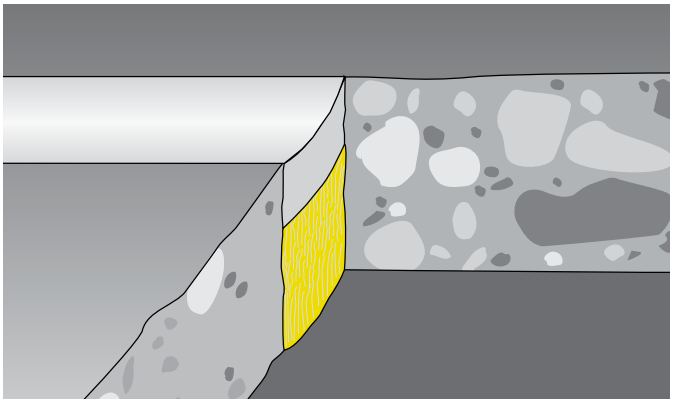
- Sealing construction/expansion joints
- Top-of-wall joints
- Metal pipes
- Cable bundles
- HVAC penetrations

For use with

- Various base materials such as masonry, concrete, gypsum, etc.
- Wall and floor assemblies rated up to 3 hours

Examples

- Where a gypsum wall assembly meets the underside of a metal or concrete deck
- Sealing expansion joints to impede the passage of fire, smoke and toxic fumes
- Sealing around HVAC penetrations through fire-rated assemblies



Technical Data*	CP 606
Chemical basis	Acrylic based firestop sealant
Color	Available in red, white and gray
Application temperature	40°F to 104°F (5°C to 40°C)
Skin-forming time	Approx. 15 min
Curing time	Approx. 3 mm / 3 days
Average volume shrinkage (ASTM C1241)	22.2%
Movement capability	Approx. 10%
Temperature resistance	–22°F to 176°F (–30°C to 80°C)
Surface burning characteristics (ASTM E 84-96)	Flame Spread: 10 Smoke Development: 0
Sound transmission classification (ASTM E 90-99)	56 (Relates to specific construction)
Tested in accordance with	• UL 2079 • ASTM E 814 • ASTM E 1966 • ASTM E 84 • UL 1479 • ASTM G21

*At 73°F (23°C) and 50% relative humidity

CLASSIFIED C UL US
FILL, VOID OR CAVITY MATERIAL
FOR USE IN THROUGH-PENETRATION
FIRESTOP SYSTEMS AND
JOINT SYSTEMS
SEE UL FIRE RESISTANCE DIRECTORY
66Y7

FM APPROVED

Installation instructions for CP 606

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information
- The use of backing material is recommended to control the sealant depth and help ensure assembly seal is complete

Opening

1. Clean the opening. Surfaces to which CP 606 will be applied should be cleaned of loose debris, dirt, oil, wax and grease. The surface should be moisture and frost free.

Application of firestop

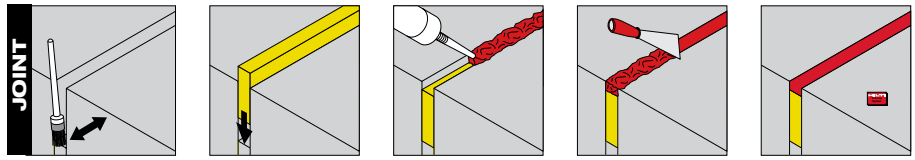
2. Insert fill of mineral wool or backer (as required).
3. Apply firestop over backer.
4. Smooth firestop sealant with a trowel before the skin forms. Once cured, CP 606 can only be removed mechanically.
5. For maintenance reasons, a penetration seal can be permanently marked with an identification plate and fastened in a visible position next to the seal.

Not for use

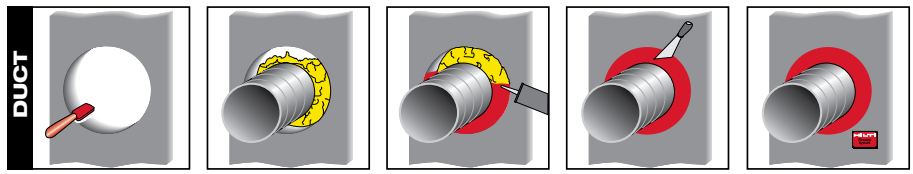
- On areas immersed in water

Storage

- Store only in the original packaging in a location protected from moisture at a temperature of 40°F to 77°F (5°C to 25°C)
- Observe expiration date on package



1. Clean opening | 2. Insert backing material compressed per UL System | 3. Apply CP 606 | 4. Smooth CP 606 | 5. Fasten identification plate (if required)



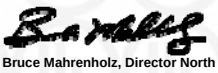
1. Clean opening | 2. Insert backing material | 3. Apply CP 606 | 4. Smooth CP 606 | 5. Fasten identification plate (if required)

CERTIFICATE OF COMPLIANCE

Certificate Number	20160930-R13240
Report Reference	R13240
Issue Date	2016-September-30
Issued to:	Hilti Construction Chemicals, Div of Hilti Inc. 5400 S 122nd East Ave Tulsa, OK 74146
This is to certify that representative samples of	Fill, Void or Cavity Materials Fill, Void or Cavity Materials Certified for Canada CP 606 Sealant for use in Through-Penetration Firestop, Joint in wall and partition Systems as currently decribed in the UL Fire Resistance Directory and in the Products Certified for Canada Directory.
	Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	ANSI/UL 1479, "Fire Tests of Through-Penetration Firestops," ANSI/UL 2079, "Tests for Fire Resistance of Building Joint Systems," CAN/ULC-S115, "Standard Method of Fire Tests of Firestop Systems."
Additional Information:	See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Certification Mark should be considered as being covered by UL's Certification and Follow-Up Service.

Look for the UL Certification Mark on the product.



Bruce Mahrenholz, Director North American Certification Program

UL LLC

February 26, 2010

To Whom It May Concern:

Re: Hilti CP 606 Flexible Firestop – LEEDs Info.

The Hilti CP 606 Flexible Firestop Sealant is manufactured in Germany.

The CP 606 pail is made of polyethylene and can be completely recycled. There is no post-consumer or post-industrial content in CP 606 and it cannot be recycled. The CP 606 does not contain any Rapidly Renewable Materials. The VOC content for CP 606 is 71.0 grams/liter.

CP 606 is not regulated as a hazardous waste by the Federal EPA Standards. The regulations for the disposal of non-regulated industrial waste can vary from state to state and even city to city. For this reason, you should consult your local and state regulatory agencies for direction on disposal.

Please feel free to contact me at (918) 872-3704 if you have questions.

Sincerely,

Jerry Metcalf MPH, CHMM
Safety/Environmental Manager
Hilti Inc.
918 872 3704
jerry.metcalf@hilti.com

Rev. Date: 2/26/10

Hilti, Inc.
5400 South 122nd East Avenue
Tulsa, OK 74146

1-800-879-8000
www.hilti.com

High-performance intumescent firestop sealant FS-ONE MAX

Applications

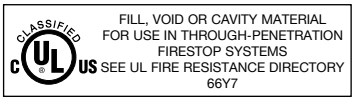
- For effectively sealing most common through penetrations in a variety of base materials
- For use on concrete, masonry and drywall
- Mixed and multiple penetrations
- Metal pipe penetrations: copper, steel and EMT
- Insulated metal pipe penetrations: steel and copper
- Plastic pipe penetrations: closed or vented

Advantages

- US-produced: “Buy American” compliant
- One product for a variety of common through penetrations
- Cost-effective, easy-to-use solution
- Water-based and paintable
- Industry-leading VOC results
- Ethylene glycol-free

Chemical resistant

Mold and mildew resistant



Technical data	
Chemical basis	Water-based acrylic dispersion
Approx. Density	84.3 lb/ft³
Color	Red
Application temperature range	41 - 104 °F
Approx. cure time[1)]	4 mm/3 days
Temperature resistance range	-4 to 212 °F
Mold and mildew performance	Class 0 (ASTM G21-96)
Mold and mildew resistance	Yes
Surface burning characteristics UL 723 (ASTM E84)	Flame spread: 0 Smoke development: 10
Tested in accordance with	UL 1479, ASTM E814, ASTM E84, CAN/ ULC-S115, ASTM G21, ASTM E90
California State fire marshal approval	CSFM Listing 4485-1200:0108 for FS-ONE MAX Intumescent Firestop Sealant
Expansion ratio (unrestricted, up to)	1:5

[1)] at 75°F/24°C, 50% relative humidity

Order Designation	Package Content	Item number
FS-ONE MAX 20oz foil (3 case + disp)	1x Foil pack dispenser manual CS 270-P1, 75x Firestop sealant FS-ONE MAX 20 oz foil	**3530252**
FS-ONE MAX 10oz tube (1 case)	12x Firestop sealant FS-ONE MAX 10 oz cartridge	**3530249**
FS-ONE MAX 5 gallon (18 pails)	18x Firestop sealant FS-ONE MAX 5 gallon pail	**3530263**
FS-ONE MAX 20oz foil (1 case)	25x Firestop sealant FS-ONE MAX 20 oz foil	**3530250**
FS-ONE MAX 20oz foil (3 cases)	75x Firestop sealant FS-ONE MAX 20 oz foil	**3530251**
FS-ONE MAX 20oz Foil-Pallet	600x FSONE-MAX 20 oz foil, 290x Bulk Shipping Condition	**3534713**
FS-ONE MAX 10 oz cartridge		**2101531**
FS-ONE MAX 5 gallon pail		**2101533**

Date: June 22, 2015

Subject: **Buy American Certification**

Product: Firestop sealant FS-ONE MAX 10.1OZ Cartridge (Item #2101531)
Firestop sealant FS-ONE MAX 20.0OZ Foil (Item #2101532)
Firestop sealant FS-ONE MAX 5GAL Pail (Item #2101533)

To Whom it May Concern:

Hilti, Inc. certifies that the above referenced product(s) as described on the Purchase Order identified above, is (are) a domestic end product (as defined in FAR Subpart 25.1, "Buy American Act--Supplies"), or satisfies the preference for domestic construction material (as defined in FAR Subpart 25.2, "Buy American Act--Construction Materials").

Sincerely,

Thomas M. Horan, QA Manager

Buyamericanfsonemax.doc

Hilti, Inc.
5400 South 122nd East Avenue
Tulsa, OK 74121 USA

T (918) 872-3000 I F 800-879-7000
www.hilti.com

August 26, 2015

To Whom It May Concern:

Re: **Hilti FS-ONE Max Firestop – LEED Info**.

Item Numbers:

2101531
2101532
2101533

The Hilti FS-ONE MAX Firestop is manufactured in the United States

There is no post-consumer or post-industrial content in FS-ONE MAX and it cannot be recycled. The VOC content for FS-ONE MAX is 9 grams/liter.

FS-ONE MAX is not regulated as a hazardous waste by the Federal EPA Standards. The regulations for the disposal of non-regulated industrial waste can vary from state to state and even city to city. For this reason, you should consult your local and state regulatory agencies for direction on disposal.

Please feel free to contact me at (918) 872-3704 if you have questions.

Sincerely,

Jerry Metcalf MPH, CHMM
Sr. Manager, Safety/Environmental
Hilti Inc
(918) 872 3704
jerry.metcalf@hilti.com

Rev. Date: 7/31/15

The manufacturing plant location on this certificate has been provided for LEEDS reporting purposes only. It should never be used for Country of Origin certification or a representation of compliance/non-compliance with Buy American or Buy America requirements, as those requirements differ.

The manufacturing plant location(s) identified on the certificate represent standard Hilti catalog products only. “Specially” produced non-catalog Hilti products may have differing manufacturing plant locations.

Contact your Hilti representative in cases of “specially” produced products for a custom LEEDS certificates.

Fire Containment Insulation

Thermafiber® Safing™

- Exceptional performance in Perimeter Fire Containment Systems
- Provides life saving fire protection in rated assemblies
- Fire resistant to temperatures above 2,000°F (1,093°C)
- Easy to fabricate for through penetrations and firestopping
- Conserves energy, reduces greenhouse gas emissions
- Resists moisture
- Controls noise and sound

LEED® v2009 Green Building Credits

Minimum 70% Recycled Content[1]	Energy & Atmosphere	Materials & Resources	Indoor Environmental Quality	Innovation in Design
	1	2.1, 2.2 4.1, 4.2 5.1, 5.2	9	1

Thermafiber Safing and FireSpan® insulation provide the critical components of the perimeter fire containment system in the 111 South Wacker Building in Chicago, IL. Thermafiber insulation also contributed to the building's LEED® Gold Rating.

Thermafiber® Safing™ is compression fitted between FireSpan® insulation and the concrete slab edge to create a perimeter fire containment system.

Owens Corning® Thermafiber®

Made in the USA

CLASSIFIED UL

Intertek

Thermafiber® Safing™ Insulation

Description:

THERMAFIBER Safing™ products are designed to provide life saving fire protection in perimeter fire containment systems, floor and wall penetrations, construction joints, and other firestopping applications. These products are noncombustible, moisture-resistant, noncorrosive, nondeteriorating, mildew-proof and vermin-proof. Thermafiber Safing provides thermal insulation, fire protection, and acoustical control in many different UL and Intertek (formerly OPL) listed fire containment assemblies of 1, 2, and 3-hr ratings.

Product Options:

- Safing 4.0 pcf, 2" or greater thickness, is available with or without a vapor retarding foil facing.
- Safing 6.0 pcf, 1.5" or greater thickness, is available with or without a vapor retarding foil facing.
- Recycled Content Options[1]:

  EPA Choice Fiber (US Government Buildings)..... Minimum 75%

  Standard Fiber..... 70%

  [1]Recycled content options other than Standard must be specified at time of order.

Installation:

All firestopping insulation should be installed per the architectural specification or system specific test description. All compressed Safing insulation should be installed per the listed assembly.

- Perimeter Installation: Safing™ insulation should be compression fitted between the slab edge and the FireSpan curtain wall insulation, leaving no voids.
- Penetration Application: Safing insulation should be cut slightly larger than the opening and compression fitted into the opening, leaving no voids.
- Construction Joint Application: Safing insulation should be compression fitted into the joint opening, leaving no voids.

Standard Sizes:

	Thickness*	Widths**	Lengths**
Safing 4.0 pcf	1"- 7"	16", 24", 36"	48", 60"
Safing 6.0 pcf	1"- 7"	16", 24", 36"	48", 60"
Tolerances	+1/4" - 1/8"	±1/8"	±1/2"

*Thicknesses are available in ½" increments. **Custom sizes are available upon request.

Technical Data:

		Tested to ASTM C 518		Tested to ASTM E 84			
				Unfaced		Foil Faced	
Product Designation	Actual Density	"k" @ 75° [24°C] BTU.in/hr.sq. ft. °F	"R" value per inch of thickness***	Flame Spread	Smoke Developed	Flame Spread	Smoke Developed
Safing	4.0 pcf	0.24	'R'= 4.2	0	0	25	0
Safing	6.0 pcf	0.24	'R'= 4.2	0	0	25	0

***R = thickness divided by 'k'

Fire-Containment Tests Per ASTM E 2307

Safing™ insulation is a critical component of any perimeter fire containment system. Thermafiber® has performed decades of testing in all of the containment systems listed below. For more complete test information, see SA707, THERMAFIBER Life-Safety Fire Containment Systems technical catalog or UL® and Intertek® (formerly OPL) Directories. For a full listing of containment systems visit www.thermafiber.com and click on Fire Rated Assemblies. UL Reference = TYPE SAF

- Aluminum Spandrel Curtain Wall Fire Containment
- Steel Stud-Framed/Gypsum Sheathing Curtain Wall Fire Containment
- Glass Spandrel Curtain Wall Fire Containment
- Granite Spandrel Curtain Wall Fire Containment
- Precast Concrete Spandrel

Standards Compliance:

Safing™ Insulation meets the following:

ASTM C 665	**Non-corrosive, Type I, III**
ASTM C 612	**Type IA, IB, II**
ASTM E 136	**Rated Non-combustible per NFPA Standard 220**
CAN/ULC S114	**Complies**
ASTM E 96	**Unfaced, 50 Perms as tested**
ASTM E 96	**Foil Faced, 0.02 Perms as tested**
ASTM C 1104	**Absorbs less than 1% by volume**
CAN/ULC S102	**Flame Spread 0, Smoke Developed 0**
ASTM E 814 or UL 1479	**Safing Insulation used in conjunction with an approved fill, void, or cavity material sealant or other approved material in through – penetration firestop systems - Complies**
UL 2079	**Safing Insulation used in conjunction with an approved fill, void or cavity material in construction joint systems - Complies**
CAN/ULC S115	**Complies**

Safing products are approved by: **New York City Board of Standards & Appeals** – (under BSA 39-74-SM & accepted by MEA-209-82-M, Vol. 4).

Thermafiber® Insolutions®:

Thermafiber offers industry leading technical and engineering assistance to architects, specifiers, and contractors. These services include CAD drawings, engineering judgments, LEED® Credit Information, product recommendations, and customized products. Contact our technical services department at 1-888-834-2371, or email technicalservice@owenscorning.com

For Further Information:

For additional information about these or other Thermafiber products contact us at 1-888-834-2371 or visit our website www.thermafiber.com.

Notice:

THERMAFIBER, Inc. shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. THERMAFIBER liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing within thirty (30) days from date it was or reasonably should have been discovered.

Submittal Approvals:

Job Name	
Contractor	Date

3711 Mill Street | Wabash, IN 46992 | 888-TFIBER1 [834-2371] | [260] 563-2111 | www.thermafiber.com

Underwriters Laboratories Inc.®

Northbrook Division
333 Pfingsten Road
Northbrook, IL 60062-2096 USA
www.ul.com
tel: 1 847 272 8800

CERTIFICATE OF COMPLIANCE

CERTIFICATE NUMBER: 20040809-R10905

ISSUE DATE: August 9, 2004 **Page 1 of 1**

Issued to: Thermafiber Inc.
3711 W Mill St Ext
Wabash, IN 46992

Report Reference: **R10905**

This is to Certify that representative samples of: Forming Material, designated as Type SAF mineral wool batts.

Have been investigated by Underwriters Laboratories Inc.® in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: ANSI/UL 1479, Fire Tests of Through-Penetration Firestops. ANSI/UL 2079, Test for Fires Resistance of Building Joint Systems. ASTM E2307-04, Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediae-Scale, Multi-story Test Apparatus

Additional Information: Type SAF mineral wool batts for use as a forming material for use in various Through-Penetration FireStop Systems, Joint Systems and Perimeter Fire Barrier Systems as Specified in UL's Fire Resistance Directory Volume 2.

Only those products bearing the UL Classification Marking should be considered as being covered by UL's Classification and Follow-Up Service.

The UL Classification Marking includes: UL in a circle symbol: with the word "CLASSIFIED" (as shown); a control number (may be alphanumeric) assigned by UL; a statement to indicate the extent of UL's evaluation of the product; and, the product category name (product identity) as indicated in the appropriate UL Directory.

LOOK FOR THE UL CLASSIFICATION MARKING ON THE PRODUCT

Engineer:
Mona Couloute
Underwriters Laboratories Inc.

Review Engineer:
Chris Johnson
Underwriters Laboratories Inc.

September 24, 2015

To Whom It May Concern:

Re: **Hilti Mineral Wool-LEED Information**

Item Number:

236993

The Hilti Mineral Wool is manufactured in Wabash, Indiana.

The post-consumer recycled content in the Hilti Mineral Wool is 0%. The pre-consumer recycled content in the Hilti Mineral Wool is 90%. There is no detectable VOC content in this product.

Hilti Mineral Wool is not regulated as a hazardous waste by the Federal EPA Standards. The regulations for the disposal of non-regulated industrial waste can vary from state to state and even city to city. For this reason, you should consult your local and state regulatory agencies for direction on disposal.

Please feel free to contact me at (918) 872-3704 if you have questions.

Sincerely,

Jerry Metcalf MPH, CHMM
Sr. Manager, Safety/Environmental
Hilti Inc.
918 872 3704
jerry.metcalf@hilti.com

Rev. Date: 9/24/15

The manufacturing plant location on this certificate has been provided for LEEDS reporting purposes only. It should never be used for Country of Origin certification or a representation of compliance/non-compliance with Buy American or Buy America requirements, as those requirements differ.

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Contact your Hilti representative in cases of “specially” produced products for a custom LEEDS certificates.

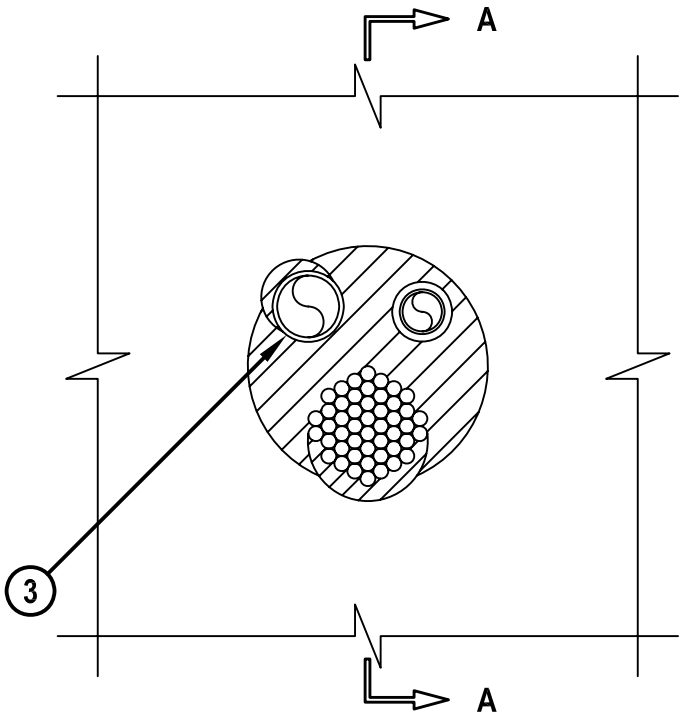
UL SYSTEM NO. W-L-8071

MULTIPLE PENETRANTS THROUGH GYPSUM WALL ASSEMBLY

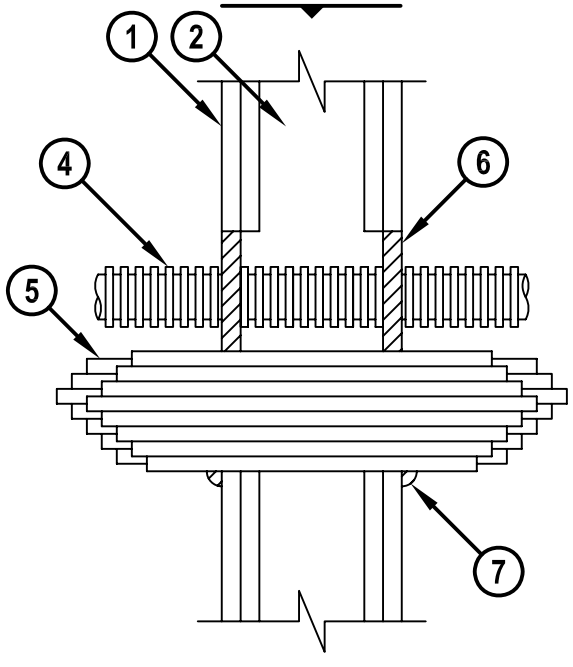
F-RATING = 1-HR. OR 2-HR.
T-RATING = 1/2-HR.

WL8071b.080106

FRONT VIEW



SECTION A-A



Hilti Firestop Systems	HILTI, Inc. Tulsa, Oklahoma USA (800) 879-8000	Sheet: 1 of 2 Scale: 5/32" = 1" Date: Aug. 01, 2006	Drawing No. WL 8071b

Saving Lives through Innovation and Education

UL SYSTEM NO. W-L-8071

MULTIPLE PENETRANTS THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.
T-RATING = 1/2-HR.

WL8071b.080106

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 3-1/2" WIDE.
3. ONE OR MORE OF THE FOLLOWING PIPES, CONDUITS OR TUBES MAY BE INSTALLED WITHIN THE OPENING :
   - A. MAXIMUM 2" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
   - B. MAXIMUM 2" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
   - C. MAXIMUM 2" NOMINAL DIAMETER STEEL CONDUIT OR EMT.
   - D. MAXIMUM 2" NOMINAL DIAMETER FLEXIBLE STEEL GAS PIPING (WITH OR WITHOUT PLASTIC COVERING) MANUFACTURED BY OMEGA FLEX, INC. OR WARD MFG., INC.
   - E. MAXIMUM 1" NOMINAL DIAMETER FLEXIBLE STEEL GAS PIPING (WITH OR WITHOUT PLASTIC COVERING) MANUFACTURED BY GASTITE, DIVISION OF TITEFLEX.
4. MAXIMUM 2" NOMINAL DIAMETER ENT.
5. MAXIMUM 4" DIAMETER CABLE BUNDLE TO CONSIST OF ANY OF THE FOLLOWING :
   - A. MAXIMUM 200 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
   - B. MAXIMUM 1/C NO. 500 KCMIL COPPER CONDUCTOR POWER CABLE WITH KLPE JACKET.
   - C. MAXIMUM 3/C (+GROUND) NO. 2/0 AWG ALUMINUM CONDUCTOR SER CABLE WITH PVC JACKET.
   - D. MAXIMUM 3/C NO. 8 AWG COPPER CONDUCTOR METAL CLAD CABLE.
   - E. MAXIMUM 4 PAIR NO. 24 AWG COPPER CONDUCTOR COMMUNICATION CABLE.
   - F. MAXIMUM RG/U COAXIAL CABLE WITH PVC JACKET.
6. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
7. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

ANNULAR SPACE	MINIMUM	MAXIMUM
BETWEEN METALLIC PENETRANTS AND PERIPHERY OF OPENING	0"	2"
BETWEEN METALLIC PENETRANTS, ENT AND CABLES	1/2"	1-1/2"
BETWEEN ENT AND PERIPHERY OF OPENING	1/4"	2"
BETWEEN CABLES AND PERIPHERY OF OPENING	0"	2"

NOTE : MAXIMUM DIAMETER OF OPENING = 8".

UL SYSTEM NO. W-L-8079

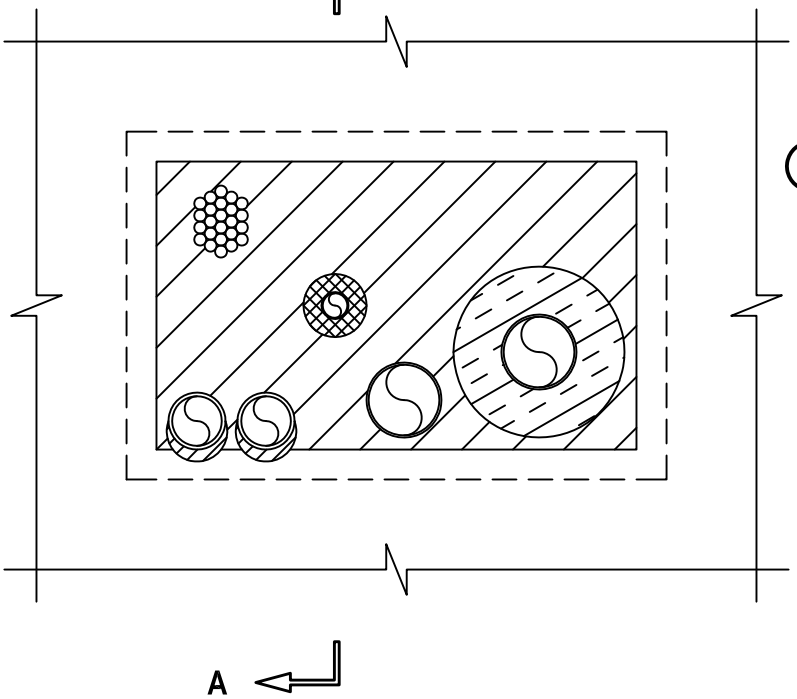
MULTIPLE PENETRATING ITEMS THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

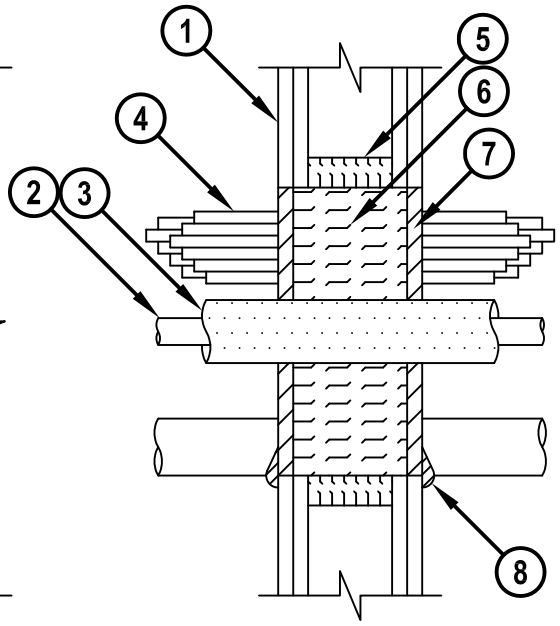
T-RATING = 0-HR., 1/2-HR., 3/4-HR., 1 1/2-HR., OR 2-HR.

WL8079b.021109

FRONT VIEW



SECTION A-A



1. GYPSUM WALL ASSEMBLY (UL CLASSIFIED U300, U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN) TO INCLUDE THE FOLLOWING CONSTRUCTION FEATURES :
   A. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER (SPACED MAXIMUM 16" OC). STEEL STUDS TO BE MINIMUM 3-1/2" WIDE (SPACED MAXIMUM 24" OC).
   B. NOMINAL 5/8" THICK GYPSUM WALLBOARD. TYPE, NUMBER OF LAYERS, AND SHEET ORIENTATION AS SPECIFIED IN THE INDIVIDUAL UL DESIGN.

UL SYSTEM NO. W-L-8079

MULTIPLE PENETRATING ITEMS THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR., 1/2-HR., 3/4-HR., 1 1/2-HR., OR 2-HR.

WL8079b.021109

2. ONE OR MORE OF THE FOLLOWING PIPES, AND IN ANY COMBINATION MAY BE INSTALLED WITHIN THE OPENING :
   - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCH 10 OR HEAVIER).
   - B. MAXIMUM 4" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
   - C. MAXIMUM 3" NOMINAL DIAMETER COPPER PIPE OR TUBING.
   - D. MAXIMUM 3" NOMINAL DIAMETER STEEL CONDUIT OR EMT.
   - E. MAXIMUM 2" NOMINAL DIAMETER PVC PLASTIC PIPE (SCH 40, CELLULAR OR SOLID CORE) (VENTED OR CLOSED PIPING SYSTEM).
   - F. MAXIMUM 2" NOMINAL DIAMETER CPVC PLASTIC PIPE (SDR 13.5) (CLOSED PIPING SYSTEM).
3. [OPTIONAL] ONE OR MORE METALLIC PIPES MAY BE INSULATED WITH THE FOLLOWING TYPES OF PIPE INSULATION :
   - A. MINIMUM 1" TO MAXIMUM 2" THICK GLASS-FIBER PIPE INSULATION (3.5 PCF DENSITY).
   - B. MINIMUM 1/2" TO MAXIMUM 3/4" THICK AB/PVC PIPE INSULATION.
4. ONE MAXIMUM 3" DIAMETER CABLE BUNDLE CONSISTING OF ANY OF THE FOLLOWING :
   - A. MAXIMUM 25 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
   - B. MAXIMUM 7/C NO. 12 AWG COPPER CONDUCTOR POWER CABLE WITH PVC JACKET.
   - C. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE WITH PVC JACKET.
   - D. MAXIMUM 3/C NO. 8 AWG, WITH BARE ALUMINUM GROUND, STEEL METAL CLAD CABLE.
   - E. MAXIMUM 3/C (WITH GROUND) NO. 8 AWG NONMETALLIC SHEATHED CABLE (ROMEX) WITH PVC JACKET.
   - F. MAXIMUM 1/2" DIAMETER RG/U COAXIAL CABLE WITH PVC JACKET.
   - G. MAXIMUM 3/4" DIAMETER COPPER GROUND CABLE WITH OR WITHOUT PVC JACKET.
   - H. MAXIMUM 1-1/4" DIAMETER SINGLE OR MULTI-CONDUCTOR MINERAL-INSULATED COPPER-CLAD CABLE.
5. MINIMUM 1-1/4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED AS A BACKER AROUND THE PERIMETER OF THE OPENING.
6. MINIMUM 3-1/2" OR 4-3/4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED FOR 1-HR. OR 2-HR. FIRE-RATING, RESPECTIVELY.
7. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
8. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES :
1. WITH STEEL STUDS, MAXIMUM AREA OF SQUARE, RECTANGULAR, OR CIRCULAR OPENING IS 240 SQ. IN. WITH A MAXIMUM DIMENSION OF 20".
2. WITH WOOD STUDS, MAXIMUM AREA OF SQUARE, RECTANGULAR, OR CIRCULAR OPENING IS 210 SQ. IN. WITH A MAXIMUM DIMENSION OF 14-1/2".
3. ANNULAR SPACE BETWEEN PENETRANTS AND PERIPHERY OF OPENING = MINIMUM 0", MAXIMUM 22".
4. ANNULAR SPACE BETWEEN PENETRANTS = MINIMUM 1", MAXIMUM 22".

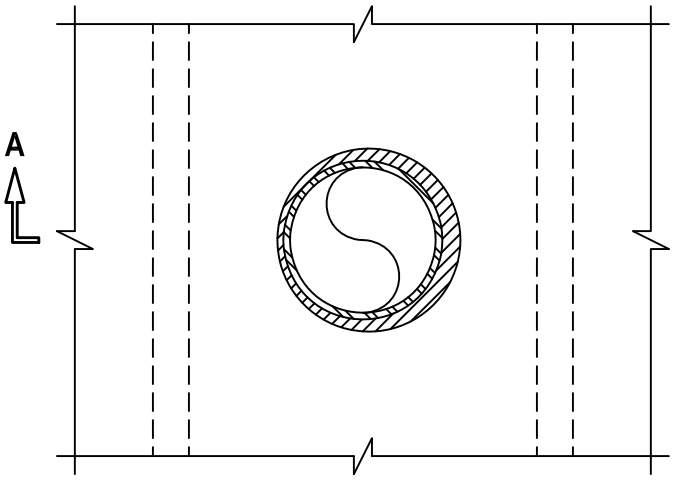
UL/cUL SYSTEM NO. F-C-1059

METAL PIPE THROUGH WOOD FLOOR/CEILING ASSEMBLY

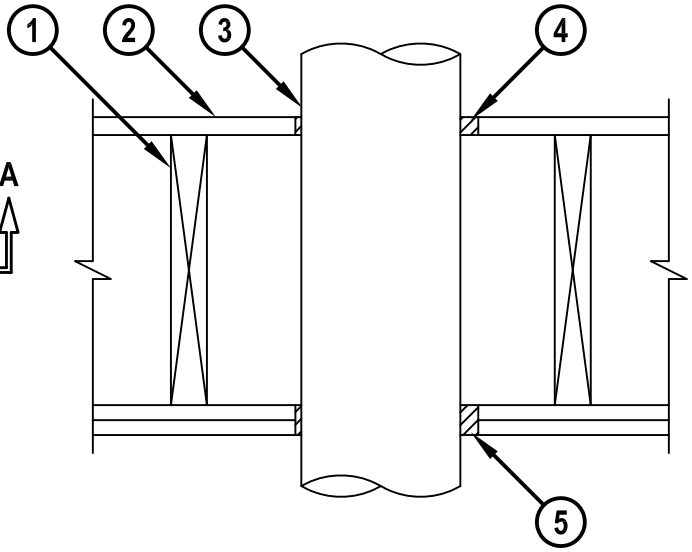
F-RATING = 1-HR. OR 2-HR.
T-RATING = 0-HR. OR 1/2-HR.

FC1059g.081108

TOP VIEW



SECTION A-A



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
   - A. MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 40 OR HEAVIER).
   - B. MAXIMUM 6" NOMINAL DIAMETER CAST IRON PIPE.
   - C. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
   - D. MAXIMUM 4" NOMINAL DIAMETER EMT.
   - E. MAXIMUM 2" NOMINAL DIAMETER FLEXIBLE STEEL CONDUIT.
4. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF SUBFLOOR OR SOLE PLATE.
5. HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTTOM SURFACE OF CEILING OR LOWER TOP PLATE :
   - A. MINIMUM 5/8" DEPTH OF SEALANT FOR A 1-HR. FIRE-RATING.
   - B. MINIMUM 1-1/4" DEPTH OF SEALANT FOR A 2-HR. FIRE-RATING.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 7-5/8".
2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 3/4".
3. CHASE WALL (NOT SHOWN, OPTIONAL) - THE THROUGH PENETRANT MAY BE ROUTED THROUGH A 1-HR. OR 2-HR. FIRE-RATED GYPSUM CHASE WALL ASSEMBLY.

Hilti Firestop Systems

HILTI, Inc.
Tulsa, Oklahoma USA (800) 879-8000

Sheet	1 of 1
Scale	1/8" = 1"
Date	Aug. 11, 2008

Drawing No.
FC 1059h

Saving Lives through Innovation and Education

UL/cUL SYSTEM NO. F-C-1106

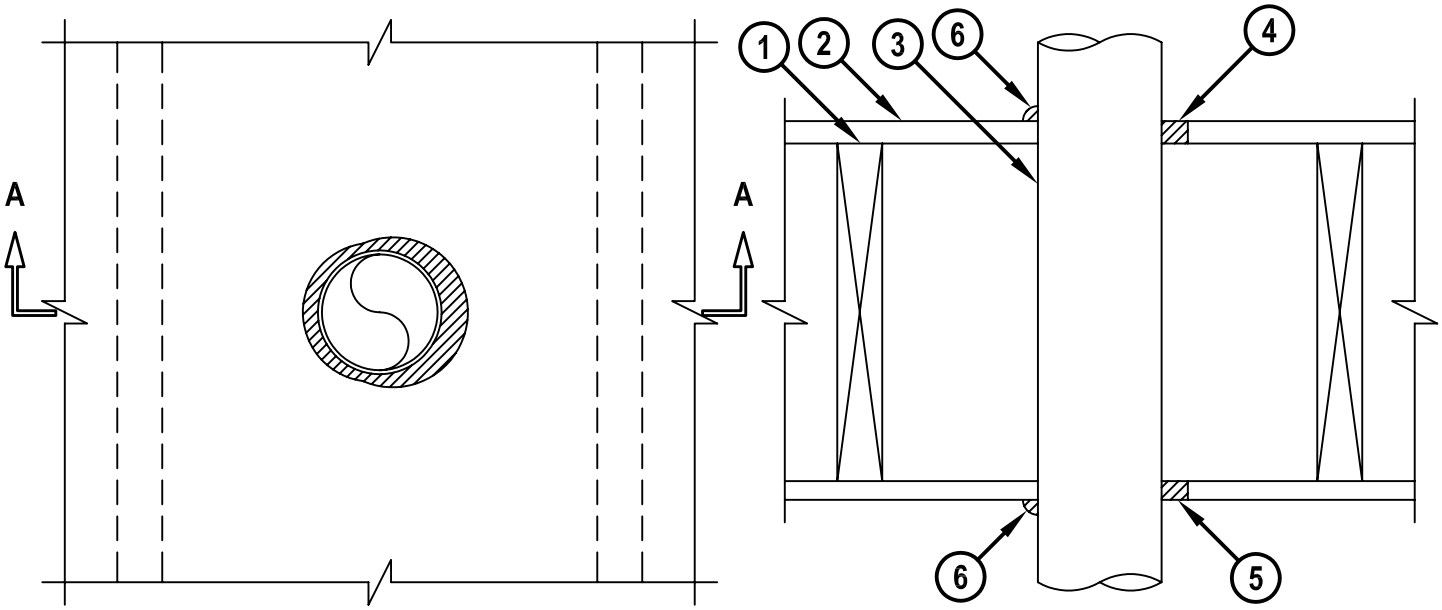
METAL PIPE THROUGH WOOD FLOOR ASSEMBLY

F-RATING = 1-HR.
T-RATING = 1/4-HR.

FC1106b.071204

TOP VIEW

SECTION A-A



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
   - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
   - B. MAXIMUM 4" NOMINAL DIAMETER CAST IRON OR DUCTILE IRON PIPE.
   - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR COPPER TUBING.
   - D. MAXIMUM 4" NOMINAL DIAMETER STEEL CONDUIT.
   - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. MINIMUM 3/4" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
5. MINIMUM 5/8" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
6. MINIMUM 1/2" BEAD HILTI CP 606 FLEXIBLE FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 7/8".
3. CHASE WALL (NOT SHOWN, OPTIONAL) - THE THROUGH PENETRANT MAY ROUTED THROUGH A 1-HR. FIRE-RATED GYPSUM CHASE WALL.

HILTI®
FIRESTOP SYSTEMS

HILTI, Inc.
Tulsa, Oklahoma USA (918) 252-6000

Sheet	1 of 1
Scale	5/32" = 1"
Date	July 12, 2004

Drawing No.
FC 1106b

Saving Lives through Innovation and Education

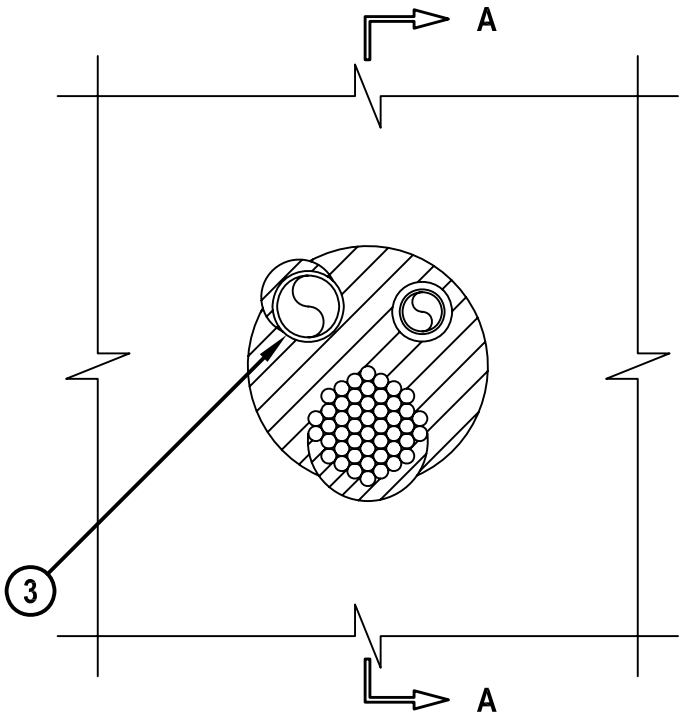
UL SYSTEM NO. W-L-8071

MULTIPLE PENETRANTS THROUGH GYPSUM WALL ASSEMBLY

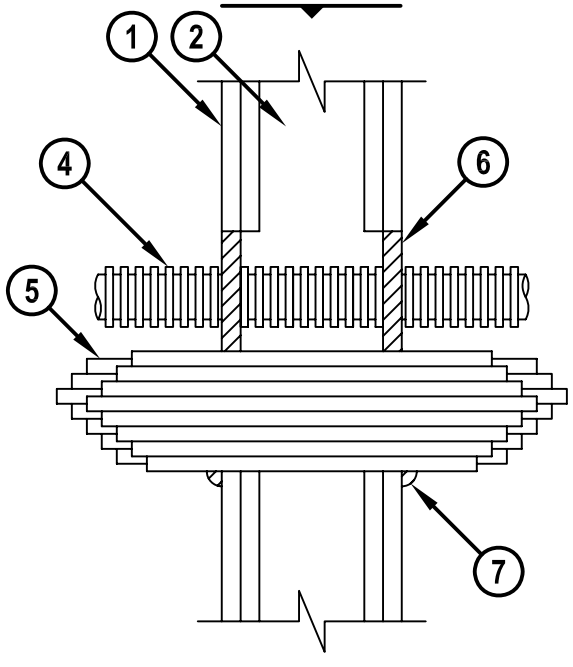
F-RATING = 1-HR. OR 2-HR.
T-RATING = 1/2-HR.

WL8071b.080106

FRONT VIEW



SECTION A-A



Hilti Firestop Systems	HILTI, Inc. Tulsa, Oklahoma USA (800) 879-8000	Sheet: 1 of 2 Scale: 5/32" = 1" Date: Aug. 01, 2006	Drawing No. WL 8071b

Saving Lives through Innovation and Education

UL SYSTEM NO. W-L-8071

MULTIPLE PENETRANTS THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.
T-RATING = 1/2-HR.

WL8071b.080106

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 3-1/2" WIDE.
3. ONE OR MORE OF THE FOLLOWING PIPES, CONDUITS OR TUBES MAY BE INSTALLED WITHIN THE OPENING :
   - A. MAXIMUM 2" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
   - B. MAXIMUM 2" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
   - C. MAXIMUM 2" NOMINAL DIAMETER STEEL CONDUIT OR EMT.
   - D. MAXIMUM 2" NOMINAL DIAMETER FLEXIBLE STEEL GAS PIPING (WITH OR WITHOUT PLASTIC COVERING) MANUFACTURED BY OMEGA FLEX, INC. OR WARD MFG., INC.
   - E. MAXIMUM 1" NOMINAL DIAMETER FLEXIBLE STEEL GAS PIPING (WITH OR WITHOUT PLASTIC COVERING) MANUFACTURED BY GASTITE, DIVISION OF TITEFLEX.
4. MAXIMUM 2" NOMINAL DIAMETER ENT.
5. MAXIMUM 4" DIAMETER CABLE BUNDLE TO CONSIST OF ANY OF THE FOLLOWING :
   - A. MAXIMUM 200 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
   - B. MAXIMUM 1/C NO. 500 KCMIL COPPER CONDUCTOR POWER CABLE WITH KLPE JACKET.
   - C. MAXIMUM 3/C (+GROUND) NO. 2/0 AWG ALUMINUM CONDUCTOR SER CABLE WITH PVC JACKET.
   - D. MAXIMUM 3/C NO. 8 AWG COPPER CONDUCTOR METAL CLAD CABLE.
   - E. MAXIMUM 4 PAIR NO. 24 AWG COPPER CONDUCTOR COMMUNICATION CABLE.
   - F. MAXIMUM RG/U COAXIAL CABLE WITH PVC JACKET.
6. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
7. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

ANNULAR SPACE	MINIMUM	MAXIMUM
BETWEEN METALLIC PENETRANTS AND PERIPHERY OF OPENING	0"	2"
BETWEEN METALLIC PENETRANTS, ENT AND CABLES	1/2"	1-1/2"
BETWEEN ENT AND PERIPHERY OF OPENING	1/4"	2"
BETWEEN CABLES AND PERIPHERY OF OPENING	0"	2"

NOTE : MAXIMUM DIAMETER OF OPENING = 8".

UL SYSTEM NO. W-L-8079

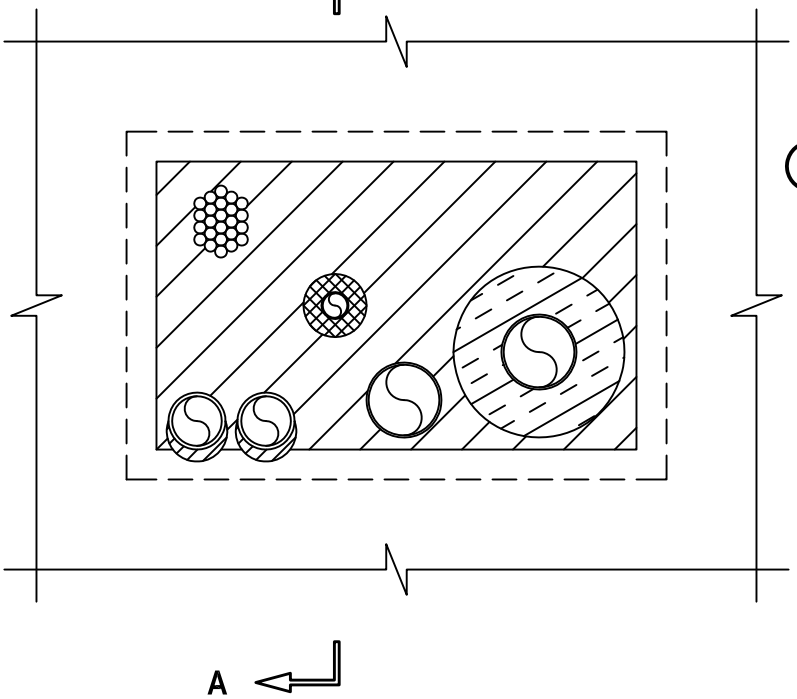
MULTIPLE PENETRATING ITEMS THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

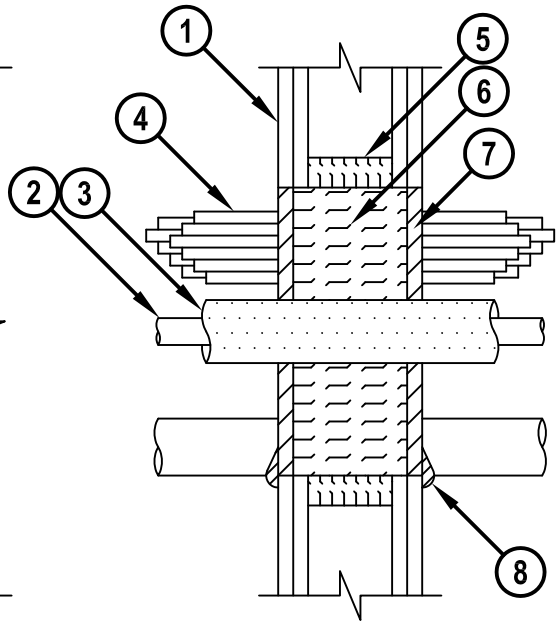
T-RATING = 0-HR., 1/2-HR., 3/4-HR., 1 1/2-HR., OR 2-HR.

WL8079b.021109

FRONT VIEW



SECTION A-A



1. GYPSUM WALL ASSEMBLY (UL CLASSIFIED U300, U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN) TO INCLUDE THE FOLLOWING CONSTRUCTION FEATURES :
   A. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER (SPACED MAXIMUM 16" OC). STEEL STUDS TO BE MINIMUM 3-1/2" WIDE (SPACED MAXIMUM 24" OC).
   B. NOMINAL 5/8" THICK GYPSUM WALLBOARD. TYPE, NUMBER OF LAYERS, AND SHEET ORIENTATION AS SPECIFIED IN THE INDIVIDUAL UL DESIGN.

UL SYSTEM NO. W-L-8079

MULTIPLE PENETRATING ITEMS THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR., 1/2-HR., 3/4-HR., 1 1/2-HR., OR 2-HR.

WL8079b.021109

2. ONE OR MORE OF THE FOLLOWING PIPES, AND IN ANY COMBINATION MAY BE INSTALLED WITHIN THE OPENING :
   - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCH 10 OR HEAVIER).
   - B. MAXIMUM 4" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
   - C. MAXIMUM 3" NOMINAL DIAMETER COPPER PIPE OR TUBING.
   - D. MAXIMUM 3" NOMINAL DIAMETER STEEL CONDUIT OR EMT.
   - E. MAXIMUM 2" NOMINAL DIAMETER PVC PLASTIC PIPE (SCH 40, CELLULAR OR SOLID CORE) (VENTED OR CLOSED PIPING SYSTEM).
   - F. MAXIMUM 2" NOMINAL DIAMETER CPVC PLASTIC PIPE (SDR 13.5) (CLOSED PIPING SYSTEM).
3. [OPTIONAL] ONE OR MORE METALLIC PIPES MAY BE INSULATED WITH THE FOLLOWING TYPES OF PIPE INSULATION :
   - A. MINIMUM 1" TO MAXIMUM 2" THICK GLASS-FIBER PIPE INSULATION (3.5 PCF DENSITY).
   - B. MINIMUM 1/2" TO MAXIMUM 3/4" THICK AB/PVC PIPE INSULATION.
4. ONE MAXIMUM 3" DIAMETER CABLE BUNDLE CONSISTING OF ANY OF THE FOLLOWING :
   - A. MAXIMUM 25 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
   - B. MAXIMUM 7/C NO. 12 AWG COPPER CONDUCTOR POWER CABLE WITH PVC JACKET.
   - C. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE WITH PVC JACKET.
   - D. MAXIMUM 3/C NO. 8 AWG, WITH BARE ALUMINUM GROUND, STEEL METAL CLAD CABLE.
   - E. MAXIMUM 3/C (WITH GROUND) NO. 8 AWG NONMETALLIC SHEATHED CABLE (ROMEX) WITH PVC JACKET.
   - F. MAXIMUM 1/2" DIAMETER RG/U COAXIAL CABLE WITH PVC JACKET.
   - G. MAXIMUM 3/4" DIAMETER COPPER GROUND CABLE WITH OR WITHOUT PVC JACKET.
   - H. MAXIMUM 1-1/4" DIAMETER SINGLE OR MULTI-CONDUCTOR MINERAL-INSULATED COPPER-CLAD CABLE.
5. MINIMUM 1-1/4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED AS A BACKER AROUND THE PERIMETER OF THE OPENING.
6. MINIMUM 3-1/2" OR 4-3/4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED FOR 1-HR. OR 2-HR. FIRE-RATING, RESPECTIVELY.
7. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
8. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES :
1. WITH STEEL STUDS, MAXIMUM AREA OF SQUARE, RECTANGULAR, OR CIRCULAR OPENING IS 240 SQ. IN. WITH A MAXIMUM DIMENSION OF 20".
2. WITH WOOD STUDS, MAXIMUM AREA OF SQUARE, RECTANGULAR, OR CIRCULAR OPENING IS 210 SQ. IN. WITH A MAXIMUM DIMENSION OF 14-1/2".
3. ANNULAR SPACE BETWEEN PENETRANTS AND PERIPHERY OF OPENING = MINIMUM 0", MAXIMUM 22".
4. ANNULAR SPACE BETWEEN PENETRANTS = MINIMUM 1", MAXIMUM 22".

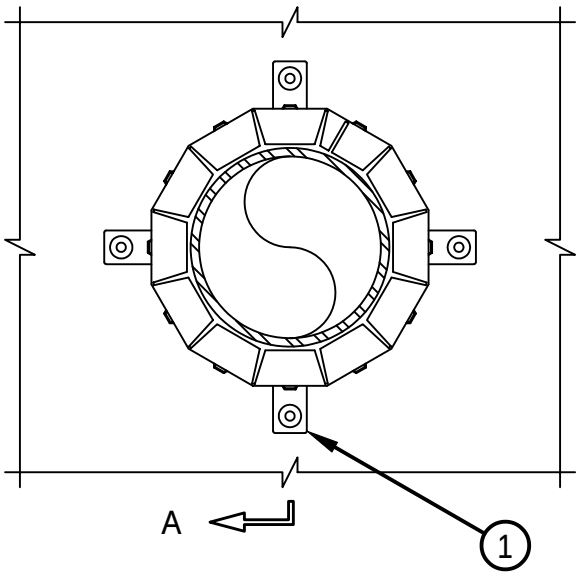
UL SYSTEM NO. W-L-2078

PLASTIC PIPE THROUGH 1-HR. OR 2-HR. GYPSUM WALL ASSEMBLY

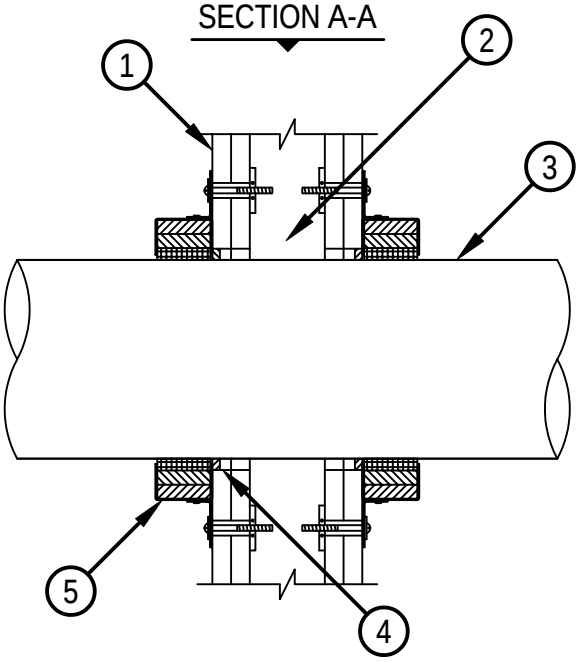
F-RATING = 1-HR. OR 2-HR.
T-RATING = 0, 1, OR 2-HR.
L-RATING AT AMBIENT = 3 CFM/SQ. FT.
L-RATING AT 400° F = LESS THAN 1 CFM/SQ. FT.

WL2078m.122804

FRONT VIEW



SECTION A-A



HILTI® FIRESTOP SYSTEMS	HILTI, Inc. Tulsa, Oklahoma USA (918) 252-6000	*Sheet* 1 of 2 *Scale* 1/8" = 1" *Date* Dec. 28, 2004	*Drawing No.* WL 2078m

UL SYSTEM NO. W-L-2078

PLASTIC PIPE THROUGH 1-HR. OR 2-HR. GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.
T-RATING = 0, 1, OR 2-HR.
L-RATING AT AMBIENT = 3 CFM/SQ. FT.
L-RATING AT 400° F = LESS THAN 1 CFM/SQ. FT.

WL2078m.122804

1. GYPSUM WALL ASSEMBLY (UL CLASSIFIED U300, U400, OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. (NOT SHOWN). WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING (ALSO SEE NOTE NO. 3 BELOW):
   - A. MAXIMUM 10" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
   - B. MAXIMUM 10" NOMINAL DIAMETER CPVC PLASTIC PIPE (CLOSED PIPING SYSTEM ONLY).
   - C. MAXIMUM 6" NOMINAL DIAMETER ABS PLASTIC PIPE (CELLULAR OR SOLID CORE).
   - D. MAXIMUM 6" NOMINAL DIAMETER FRPP PLASTIC PIPE.
   - E. MAXIMUM 4" NOMINAL DIAMETER PVDF PLASTIC PIPE.
4. HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT:
   - A. (OPTIONAL). MINIMUM 1/4" DEPTH OF SEALANT INSTALLED ON PIPES NOMINAL 6" AND SMALLER.
   - B. MINIMUM 1/2" DEPTH OF SEALANT INSTALLED ON PIPES LARGER THAN NOMINAL 6".
5. HILTI CP 643N OR CP 644 FIRESTOP COLLAR WITH FASTENING HOOKS (SEE TABLE BELOW).
6. ATTACH EACH FASTENING HOOK TO WALL ASSEMBLY WITH HILTI 3/16" TOGGLER BOLTS AND WASHERS.

NOMINAL PIPE DIAMETER	PRODUCT DESCRIPTION	NO. OF FASTENING HOOKS	MAXIMUM HOLE SIZE
1-1/2"	CP 643 50/1.5" N	2	2-1/8"
2"	CP 643 63/2" N	2	2-5/8"
3"	CP 643 90/3" N	3	4"
4"	CP 643 110/4" N	3	5"
6"	CP 643 160/6" N	4	7"
8"	CP 644 200/8"	10	9-1/2"
10"	CP 644 250/10"	12	11-1/2"

NOTES : 1. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1/2".
2. CLOSED OR VENTED PIPING SYSTEM. (PVC, ABS, AND FRPP = SCHEDULE 40, CPVC = SDR 13.5, AND PVDF = SDR 32.5).
3. L-RATINGS ONLY APPLY ON PIPES NOMINAL 6" AND SMALLER, WHEN HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS USED.