

General Application Fasteners 3.2.2

3.2.2.1 Product Description

X-U* Premium Series Universal high performance fastener designed for applications in both concrete and steel of either high strength or standard strength. Shank diameter is consistent through the fastener offering at 0.157". X-U fastener lengths range from 5/8" through 2-7/8" and are available as single fasteners (P8) or collated (MX) in strips of 10. Specific size single X-U fasteners can be pre-mounted with either 15 mm or 36 mm steel washers. There is also a metal "tophat" (TH) version as well for the 5/8", 3/4" and 1" lengths. All X-U fasteners have a unique twist knurling reaching 7/8" from the tip up the shank.

X-C Standard Series The X-C series of fasteners is a cost effective solution for applications in concrete and masonry and is best suited for concrete hardness less than or equal to 4000 psi. This fastener is not suited for fastening to steel base materials. Fastener lengths range from 3/4" through 2-7/8" with a shank diameter of 0.138". X-C fasteners are offered in a single (P8) fastener version as well as in collated (MX) strips of 10. Pre-mounted washers are also available in 23 mm and 36 mm diameters on specific length non-collated fasteners.

X-S13 Steel Fastener The X-S13 is a low cost fastener for steel. It has a 0.145" smooth shank diameter and is offered in a 1/2" length only. The X-S13 comes collated (MX) in strips of 10 or singly with a plastic "tophat" (THP). This fastener is ideally suited for fastening drywall track to standard strength steel and is discussed further in Section 3.2.6 Drywall Track Fastening Systems.

X-GN/X-GHP/X-EGN The collated fastener line for Hilti's gas-actuated tools. Designed for applications in Interior Finishing, Mechanical and Electrical Trades, these fasteners are used for fastenings in concrete and masonry (X-GN standard, X-GHP premium) and steel (X-EGN and X-GHP premium). For more details refer to Section 3.2.6 Drywall Track Fastening Systems.

DS/EDS Fastener Series The DS series fastener is a high performance fastener of 0.177" shank diameter suitable for both concrete and steel applications. It is offered in a single fastener version only with a 10 mm dome head design and a 10 mm guidance washer. Available lengths are 3/4" through 4-5/8". Knurling is offered on 3/4" and 7/8" lengths; designated as EDS and ideally suited for steel applications.

X-U 15 Steel Fastener The X-U 15 is a premium, high performance fastener designed specifically for attachments to steel (e.g. drywall track, tagging, etc.). It is offered in a 0.145" shank diameter and 5/8" length with a unique step shank design as either single fasteners with metal tophat or collated (MXSP) in strips of 10.

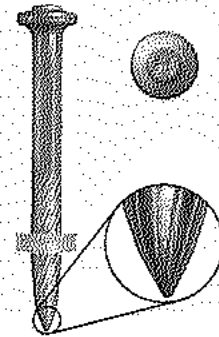
X-CR Fastener Series X-CR is a high performance, corrosion resistant fastener equivalent to SAE 316 stainless steel. This fastener is ideally suited for applications where corrosion is a concern whether on concrete or steel base materials. The X-CR is offered as a single (P8) fastener in lengths from 5/8" through 2-1/8". Shank diameter for these fasteners is 0.145" for shank lengths less than 1-3/4" and 0.157" for longer fasteners.

3.2.2.1 Product Description

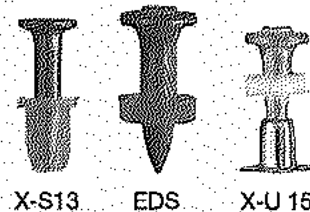
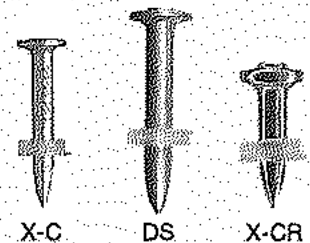
3.2.2.2 Material Specifications

3.2.2.3 Technical Data

3.2.2.4 Ordering Information



X-U Universal Fastener*



Listings/Approvals

ICC-ES (International Code Council)
ESR-2269 (X-U & X-U 15)
ESR-1663 (DS, X-C, EDS, X-AL-H & X-CR)

COLA (City of Los Angeles)
RR 25675 (X-U & X-U 15)
RR 25646 (DS, X-C, EDS, X-AL-H & X-CR)



* More details about the innovative X-U fastener can be found in Section 3.2.3.

3.2.2 General Application Fasteners

3.2.2.2 Material Specifications

Fastener Designation	Fastener Material	Fastener Plating ¹	Steel Washer or Clip Plating ^{1,2}	Washer or Clip Plating ^{1,2}
X-U*	Carbon Steel	5 µm Zinc	Carbon Steel	5 µm Zinc
DS/EDS	Carbon Steel	5 µm Zinc	N/A	N/A
X-C	Carbon Steel	5 µm Zinc	Carbon Steel	5 µm Zinc
X-CR ³	SAE 316	N/A	SAE 316	N/A
X-GN/X-GHP/X-EGN	Carbon Steel	2-8 µm Zinc	N/A	N/A
X-AL-H	Carbon Steel	5 µm Zinc	N/A	N/A
X-NK/ENK ⁴	Carbon Steel	5 µm Zinc	Carbon Steel	5 µm Zinc
X-CT Forming Nail	Carbon Steel	5 µm Zinc	N/A	N/A
BC X-C	Carbon Steel	5 µm Zinc	Carbon Steel	5 µm Zinc

1 The 5 µm zinc coating is in accordance with ASTM B 633, SC 1, Type III.

2 Most fasteners have a plastic washer for guidance when installing. Not all fastener lengths have a pre-mounted steel washer. Refer to Section 3.2.2.4 for more information on available fasteners.

3. The X-CR fastener material is a proprietary material, which provides a corrosion resistance equivalent to SAE 316 stainless steel. The steel washer material is SAE 316 stainless steel.

4. Available in Canada or by special order.

3.2.2.3 Technical Data

Allowable Loads in Normal Weight Concrete^{1,3}

Description	Fastener	Shank Diameter in. (mm)	Minimum Embedment in. (mm)	Concrete Compressive Strength					
				2000 psi		4000 psi		6000 psi	
				Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)
Universal Knurled Shank Fasteners	X-U*	0.157 (4.0)	3/4 (19)	100 (0.44)	125 (0.57)	100 (0.44)	125 (0.57)	105 (0.47)	205 (0.91)
			1 (25)	165 (0.73)	190 (0.85)	170 (0.76)	225 (1.00)	110 (0.49)	280 (1.25)
			1-1/4 (32)	240 (1.07)	310 (1.38)	280 (1.25)	310 (1.38)	180 (0.80)	425 (1.89)
			1-1/2 (38)	275 (1.22)	420 (1.87)	325 (1.45)	420 (1.87)	-	-
X-U 47 P8 with DX-Kwik	X-U ²	0.157 (4.0)	1-1/2 (38)	-	-	395 (1.76)	405 (1.80)	380 (1.60)	570 (2.54)
Standard Fastener	X-C	0.138 (3.5)	3/4 (19)	45 (0.20)	75 (0.33)	60 (0.27)	105 (0.47)	-	-
			1 (25)	85 (0.38)	150 (0.67)	90 (0.40)	200 (0.89)	-	-
			1-1/4 (32)	130 (0.58)	210 (0.93)	130 (0.58)	290 (1.29)	-	-
			1-1/2 (38)	175 (0.78)	260 (1.16)	245 (1.09)	360 (1.60)	-	-
Heavy Duty Fastener	DS	0.177 (4.5)	3/4 (19)	50 (0.22)	120 (0.53)	125 (0.56)	135 (0.60)	-	-
			1 (25)	130 (0.58)	195 (0.87)	155 (0.69)	240 (1.07)	-	-
			1-1/4 (32)	220 (0.98)	365 (1.71)	270 (1.20)	425 (1.89)	-	-
			1-1/2 (38)	300 (1.33)	405 (1.80)	355 (1.58)	450 (2.00)	-	-
Stainless Steel Fastener	X-CR	0.145 (3.7) & 0.157 (4.0)	3/4 (19)	30 (0.13)	40 (0.18)	65 (0.29)	40 (0.18)	-	-
			1 (25)	55 (0.24)	195 (0.87)	120 (0.53)	190 (0.85)	100 (0.44)	170 (0.76)
			1-1/4 (32)	110 (0.49)	290 (1.29)	125 (0.56)	300 (1.33)	120 (0.53)	440 (1.96)
			1-1/2 (38)	265 (1.18)	405 (1.80)	350 (1.58)	450 (2.00)	-	-
Gas Fastener	X-GN	0.118 (3.0)	3/4 (19)	95 (0.42)	120 (0.53)	95 (0.42)	120 (0.53)	-	-
			1 (25)	115 (0.51)	220 (0.98)	115 (0.51)	220 (0.98)	-	-
Premium Gas Fastener	X-GHP	0.118 (3.0)	5/8 (16)	-	-	50 (0.22)	120 (0.53)	50 (0.22)	90 (0.40)
High Performance Fastener	X-AL-H	0.177 (4.5)	3/4 (19)	65 (0.29)	70 (0.31)	90 (0.40)	95 (0.42)	120 (0.53)	125 (0.56)
			1 (25)	130 (0.58)	190 (0.85)	165 (0.73)	195 (0.87)	180 (0.80)	280 (1.25)
			1-1/4 (32)	135 (0.60)	265 (1.18)	240 (1.07)	270 (1.20)	240 (1.07)	440 (1.96)
			1-1/2 (38)	200 (0.89)	340 (1.51)	240 (1.07)	460 (2.05)	-	-
Knob Head Fastener	X-NK ⁴	0.145 (3.7)	1 (25)	95 (0.38)	165 (0.73)	145 (0.64)	215 (0.96)	-	-
Forming Fastener	X-CT 47 ⁵	0.145 (3.7)	1 (25)	60 (0.27)	65 (0.29)	-	-	-	-
	X-CT 62 ⁵	0.145 (3.7)	1 (25)	75 (0.33)	75 (0.33)	-	-	-	-

1 The tabulated allowable load values are for the low-velocity fasteners only, using a safety factor that is greater than or equal to 5.0, calculated in accordance with ICC-ES AC708. Wood or steel members connected to the substrate must be investigated in accordance with accepted design criteria.

2 Fastener installed with DX-Kwik drilled pilot hole installation found in Section 3.2.1.1.10.

3 Multiple fasteners are recommended for any attachment.

4 Available in Canada or by special order.

5 For temporary fastening of formwork only.

* More details about the innovative X-U fastener can be found in Section 3.2.3.

General Application Fasteners 3.2.2

Allowable Loads in Minimum $f'_c = 3000$ psi Structural Lightweight Concrete^{1,6}

Fastener Description	Fastener	Shank Diameter in. (mm)	Minimum Embedment in. (mm)	Fastener Location				
				Installed into Concrete		Installed Through 3" Deep Metal Deck into Concrete ^{2,3}		
				Tension lb (kN)	Shear lb (kN)	Tension lb (kN)		Shear lb (kN)
Universal Knurled Shank Fasteners	X-U*	0.157 (4.0)	3/4 (19)	125 (0.56)	115 (0.51)	130 (0.58)	95 (0.42)	245 (1.09)
			1 (25)	205 (0.91)	280 (1.16)	215 (0.96)	155 (0.69)	330 (1.47)
			1-1/4 (32)	315 (1.40)	435 (1.93)	295 (1.31)	200 (0.89)	375 (1.67)
			1-1/2 (38)	425 (1.89)	475 (2.11)	400 (1.78)	260 (1.16)	430 (1.91)
Standard Fastener	X-C	0.138 (3.5)	3/4 (19)	110 (0.49)	175 (0.78)	120 (0.53)	-	265 (1.18)
			1 (25)	135 (0.60)	180 (0.80)	215 (0.96)	145 (0.64)	315 (1.40)
			1-1/4 (32)	220 (0.98)	260 (1.16)	250 (1.11)	200 (0.89)	405 (1.80)
			1-1/2 (38)	285 (1.27)	315 (1.40)	285 (1.27)	210 (0.93)	415 (1.85)
Heavy Duty Fastener	DS ⁴	0.177 (4.5)	3/4 (19)	100 (0.44)	200 (0.89)	100 (0.44)	-	200 (0.89)
			1 (25)	180 (0.80)	360 (1.60)	180 (0.80)	180 (0.80)	405 (1.80)
			1-1/4 (32)	300 (1.33)	520 (2.31)	300 (1.33)	250 (1.11)	515 (2.29)
			1-1/2 (38)	450 (2.00)	680 (3.02)	450 (2.00)	325 (1.45)	625 (2.78)
Stainless Steel Fastener	X-CR	0.145 (3.7)	1 (25)	230 (1.02)	240 (1.07)	280 (1.02)	-	240 (1.07)
		0.157 (4.0)	1-1/4 (32)	320 (1.42)	400 (1.78)	320 (1.42)	-	400 (1.78)
			1-1/2 (38)	405 (1.80)	500 (2.22)	405 (1.80)	-	500 (2.22)
Gas Fastener	X-GN	0.118 (3.0)	3/4 (19)	115 (0.51)	140 (0.62)	75 (0.33)	85 (0.38)	175 (0.78)
			1 (25)	170 (0.76)	220 (0.98)	155 (0.69)	160 (0.71)	255 (1.13)
Premium Gas Fastener	X-GHP	0.118 (3.0)	5/8 (16)	60 (0.27)	140 (0.62)	60 (0.27)	80 (0.27)	175 (0.78)
High Performance Fastener	X-AL-H	0.177 (4.5)	3/4 (19)	115 (0.51)	155 (0.69)	115 (0.51)	-	155 (0.69)
			1 (25)	225 (1.00)	350 (1.56)	225 (1.00)	120 (0.53)	340 (1.51)
			1-1/4 (32)	330 (1.47)	475 (2.11)	330 (1.47)	195 (0.87)	385 (1.71)
			1-1/2 (38)	-	-	-	285 (1.27)	585 (2.60)
Knob Head Fastener	X-NK ⁶	0.145 (3.7)	1 (25)	175 (0.78)	185 (0.82)	175 (0.78)	-	185 (0.82)
			1-1/4 (32)	240 (1.07)	280 (1.25)	240 (1.07)	-	280 (1.25)
			1-1/2 (38)	300 (1.33)	295 (1.31)	300 (1.33)	-	295 (1.31)

- The tabulated allowable load values are for the low-velocity fasteners only, using a safety factor that is greater than or equal to 5.0, calculated in accordance with ICC-ES AC708. Wood or steel members connected to the substrate must be investigated in accordance with accepted design criteria.
- The steel deck profile is 3" deep composite floor deck with a thickness of 20 gauge (0.0358"). Figure 1 (Section 3.2.1.1.6) shows the nominal flute dimensions, fastener locations, and load orientations for the deck profile.
- Structural lightweight concrete fill above top of metal deck shall be a minimum of 3-1/4" deep.
- DS fasteners installed at 1-1/2" embedment through steel deck into the lower flute must be installed at a minimum distance of 6" from the edge of the floor deck.
- Multiple fasteners are recommended for any attachment.
- Available in Canada or by special order.

Allowable Loads Into Minimum $f'_c = 3000$ psi Structural Lightweight Concrete Over 1-1/2" Deep, B-Type Steel Deck^{1,4}

Fastener Description	Fastener	Shank Diameter in. (mm)	Minimum Embedment in. (mm)	Fastener Location		
				Installed Through Metal Deck Into Concrete ^{2,3}		Shear lb (kN)
				Upper Flute	Lower Flute	
Universal Knurled Shank Fastener	X-U*	0.157 (4.0)	3/4 (19)	95 (0.42)	95 (0.42)	370 (1.65)
			1 (25)	125 (0.56)	125 (0.56)	415 (1.85)
Standard Fastener	X-C	0.138 (3.5)	3/4 (19)	80 (0.36)	80 (0.36)	315 (1.40)
			1 (25)	205 (0.91)	205 (0.91)	445 (1.98)
Gas Fastener	X-GN	0.118 (3.0)	3/4 (19)	75 (0.33)	85 (0.38)	175 (0.78)
			1 (25)	155 (0.69)	160 (0.71)	255 (1.13)
Premium Gas Fastener	X-GHP	0.118 (3.0)	5/8 (16)	60 (0.27)	60 (0.27)	175 (0.78)

- The tabulated allowable load values are for the low-velocity fasteners only, using a safety factor that is greater than or equal to 5.0, calculated in accordance with ICC-ES AC708. Wood or steel members connected to the substrate must be investigated in accordance with accepted design criteria.
- Steel deck profiles are 1-1/2" deep, B-type deck with a thickness of 20 gauge (0.0358" thick steel). Fasteners may be installed through the metal deck into lightweight concrete having both nominal & inverted deck profile orientations with a minimum lower flute width of 1-3/4" or 3-1/2", respectively. Fasteners shall be placed at centerline of deck flutes. Refer to Figures 2 & 3 (Section 3.2.1.1.6) for additional flute dimensions, fastener locations, and load orientations for both deck profiles.
- Structural lightweight concrete fill above top of metal deck shall be a minimum 2-1/2" deep.
- Multiple fasteners are recommended for any attachment.

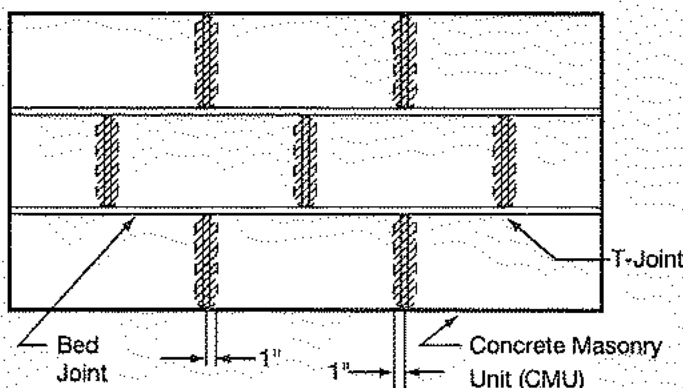
* More details about the innovative X-U fastener can be found in Section 3.2.3.

3.2.2 General Application Fasteners

Allowable Loads in Concrete Masonry Units^{1,2,3,4,5,10}

Fastener Description	Fastener	Shank Diameter in. (mm)	Min. Embed. in. (mm)	Hollow CMU				Grout Filled CMU							
				Face Shell ⁶		Mortar Joint		Face Shell ⁶		Mortar Joint		Top of Grouted Cell ⁶			
				Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)
Universal Knurled Shank Fasteners	X-U*	0.157 (4.0)	1 (25)	70 (0.31)	85 (0.38)	25 (0.11)	70 (0.31)	225 (1.00)	220 (0.98)	150 (0.67)	190 (0.85)	165 (0.73)	240 (1.07)		
Standard Fastener	X-C	0.138 (3.5)	3/4 (19)	40 (0.18)	85 (0.38)	25 (0.11)	50 (0.22)	100 (0.44)	105 (0.47)	45 (0.20)	80 (0.36)	115 (0.51)	175 (0.78)		
Gas Fastener	X-GN	0.118 (3.0)	3/4 (19)	90 (0.51)	115 (0.58)	65 (0.31)	55 (0.29)	95 (0.58)	120 (0.62)	70 (0.38)	85 (0.53)	65 (0.33)	90 (0.42)		
			1 (25)	115 (0.51)	130 (0.58)	70 (0.31)	65 (0.29)	130 (0.58)	140 (0.62)	85 (0.38)	120 (0.53)	75 (0.33)	85 (0.42)		
Premium Gas Fastener	X-GHP	0.118 (3.0)	5/8 (16)	40 (0.18)	80 (0.36)	15 (0.07)	40 (0.18)	90 (0.40)	100 (0.44)	40 (0.18)	80 (0.36)	60 (0.27)	85 (0.38)		
Knob Head Fastener	X-NK ¹¹	0.145 (3.7)	1 (25)	40 (0.18)	90 (0.40)	35 (0.16)	60 (0.27)	90 (0.40)	130 (0.58)	40 (0.18)	85 (0.29)	-	-		

- The tabulated allowable load values are for the low-velocity fastener only, using a safety factor of 5.0 or higher calculated in accordance with ICC-ES AC70. Wood or steel members connected to the substrate must be investigated in accordance with accepted design criteria.
- The tabulated allowable load values are for low-velocity fasteners installed in concrete masonry units conforming to ASTM C 90, Grade N, Type 1.
- The tabulated allowable load values are for low-velocity fasteners installed in concrete masonry units with mortar conforming to ASTM C 270, Type N or S.
- The tabulated allowable load values are for low-velocity fasteners installed in concrete masonry units with grout conforming to ASTM C 476, as coarse grout.
- Allowable load values based upon no more than one low-velocity fastener installed in an individual concrete masonry unit cell.
- Fastener can be located anywhere on the face shell or mortar joint as shown in the figure to the right.
- Shear direction can be horizontal or vertical (Bed Joint or T-Joint) along the CMU wall plane.
- Fastener located in center of grouted cell installed vertically.
- Shear can be in any direction.
- Multiple fasteners are recommended for any attachment.
- Available in Canada or by special order.



Acceptance Locations (NON-SHADED AREAS) for Power-Actuated Fasteners in CMU Walls

Allowable Tensile Pullover and Shear Bearing Load Capacities for Light Steel Framing with Power Driven Fasteners^{1,2,3,4}

Fastener Description	Fastener	Head Dia. in. (mm)	Sheet Steel Thickness													
			14 ga.		16 ga.		18 ga.		20 ga.		22 ga.		24 ga.		25/26 ga.	
			Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)
0.157" shank with or w/o plastic washers or MX collation	X-U*	0.322 (8.2)	825 (3.67)	1,085 (4.83)	685 (3.05)	720 (3.20)	490 (2.18)	525 (2.34)	360 (1.60)	445 (1.98)	300 (1.33)	330 (1.47)	205 (0.91)	255 (1.13)	120 (0.53)	145 (0.64)
0.145" shank with or w/o plastic washers or MX collation	X-C, X-CR	0.322 (8.2)	-	985 (4.38)	685 (3.05)	720 (3.20)	490 (2.18)	515 (2.29)	360 (1.60)	440 (1.96)	300 (1.33)	310 (1.38)	205 (0.91)	235 (1.05)	120 (0.53)	145 (0.64)
0.177" shank without washer	DS, EDS	0.390 (10.0)	965 (4.29)	1,085 (4.83)	810 (3.60)	815 (3.63)	625 (2.78)	535 (2.38)	460 (2.05)	465 (2.07)	360 (1.60)	350 (1.56)	300 (1.33)	260 (1.16)	240 (1.07)	180 (0.80)
0.145" shank with plastic top hat washers	X-S13 THP X-S16 TH	0.322 (8.2)	-	985 (4.38)	685 (3.05)	720 (3.20)	490 (2.18)	515 (2.29)	360 (1.60)	440 (1.96)	300 (1.33)	310 (1.38)	205 (0.91)	235 (1.05)	120 (0.53)	145 (0.64)
0.118" shank with MX collation	X-EGN, X-GN, X-GHP	0.276 (7.0)	-	-	-	-	325 (1.45)	390 (1.73)	265 (1.18)	335 (1.49)	250 (1.11)	235 (1.05)	170 (0.76)	185 (0.82)	100 (0.44)	125 (0.56)
0.177" shank without washer	X-AL-H	0.322 (8.2)	-	1,085 (4.83)	685 (3.05)	750 (3.34)	490 (2.18)	535 (2.38)	360 (1.60)	465 (2.07)	300 (1.33)	350 (1.56)	205 (0.91)	260 (1.16)	120 (0.53)	180 (0.80)

- Allowable load values are based on a safety factor of 3.0 in accordance with the AISI NASPEC, 2007 edition.
- Allowable pullover capacities of sheet steel should be compared to the allowable fastener tensile load capacities in concrete, steel, and masonry to determine controlling resistance load.
- Allowable shear bearing capacities of sheet steel should be compared to allowable fastener shear capacities in concrete, steel and masonry to determine controlling resistance load.
- Data is based on the following minimum sheet steel properties, $F_y = 33$ ksi, $F_u = 45$ ksi (ASTM A 653 material).

* More details about the innovative X-U fastener can be found in Section 3.2.3.

General Application Fasteners 3.2.2

Allowable Loads in Minimum ASTM A 36 ($F_y \geq 36$ ksi, $F_u \geq 58$ ksi) Steel^{1,2,6,7}

Fastener Description	Fastener	Shank Diameter In. (mm)	Steel Thickness (in.)											
			1/8 ⁵		3/16		1/4		3/8		1/2		≥3/4	
			Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)
Universal Knurled Shank	X-U ⁸	0.157 (4.0)	-	-	535 (2.38)	720 (3.20)	775 (3.45)	720 (3.20)	935 (4.16)	720 (3.20)	900 (4.00)	720 (3.20)	350 (1.56)	375 (1.67)
Stepped-Shank Knurling-Lengthwise	X-U 15 ⁹	0.145 (3.7)	-	-	155 (0.69)	395 (1.76)	230 (1.02)	395 (1.76)	420 (1.86)	450 (2.00)	365 (1.62)	500 (2.22)	365 (1.62)	400 (1.78)
Standard Smooth Shank	X-S13	0.145 (3.7)	140 (0.62)	300 (1.33)	300 (1.33)	450 (2.00)	300 (1.33)	450 (2.00)	300 (1.33)	450 (2.00)	-	-	-	-
Drywall Smooth Shank w/Metal Top Hat Washer	X-S16	0.145 (3.7)	-	-	225 (1.00)	420 (1.87)	225 (1.00)	430 (1.91)	225 (1.00)	430 (1.91)	225 (1.00)	430 (1.91)	-	-
Heavy Duty Knurled Shank	EDS ⁴	0.177 (4.5)	-	-	330 (1.47)	665 (2.96)	665 (2.96)	935 (4.16)	800 (3.56)	970 (4.31)	890 (3.96)	995 (4.43)	400 (1.78)	655 (2.91)
Heavy Duty Smooth Shank	DS	0.177 (4.5)	-	-	395 (1.76)	795 (3.54)	620 (2.76)	855 (3.80)	775 (3.45)	855 (3.80)	800 (3.56)	895 (3.98)	-	-
Stainless Steel Smooth Shank	X-CR	0.145 (3.7)	-	-	485 (2.16)	480 (2.14)	700 (3.11)	560 (2.49)	-	-	-	-	-	-
	X-CR ¹⁰	0.145 (3.7)	300 (1.33)	210 (0.93)	630 (2.80)	510 (2.27)	850 (3.78)	560 (2.49)	265 (1.18)	395 (1.76)	265 (1.18)	395 (1.76)	-	-
Drywall Track Smooth Shank	X-EGN ¹¹	0.118 (3.0)	140 (0.62)	270 (1.20)	220 (0.98)	275 (1.22)	225 (1.00)	320 (1.42)	280 (1.25)	375 (1.67)	-	-	-	-
	X-EGN ^{10,11}	0.118 (3.0)	-	-	220 (0.98)	315 (1.40)	260 (1.16)	375 (1.67)	280 (1.25)	400 (1.78)	-	-	-	-
Premium Gas Fastener	X-GHP	0.118 (3.0)	125 (0.56)	230 (1.02)	170 (0.76)	245 (1.09)	200 (0.89)	230 (1.02)	250 (1.11)	255 (1.13)	-	-	-	-
Heavy Duty Smooth Shank	X-AL-H ^{3,4}	0.145 (3.7)	140 (0.62)	295 (1.31)	-	-	-	-	-	-	-	-	-	-
		0.157 (4.0)	-	-	240 (1.07)	665 (3.05)	480 (2.14)	715 (3.18)	645 (2.87)	745 (3.31)	-	-	-	-
		0.177 (4.5)	-	-	-	-	-	-	-	-	685 (3.05)	970 (4.31)	145 (0.64)	600 (2.67)
Knob Head Nail Knurled Shank	X-ENK ¹²	0.145 (3.7)	-	-	225 (1.00)	555 (2.47)	535 (2.38)	620 (2.76)	620 (2.76)	660 (2.94)	590 (2.62)	605 (2.69)	-	-

- The tabulated allowable load values are for the low-velocity fasteners only, using a safety factor that is greater than or equal to 5.0, calculated in accordance with ICC-ES AC70. Wood or steel members connected to the substrate must be investigated in accordance with accepted design criteria.
- Low-velocity fasteners shall be driven to where the point of the fastener penetrates the steel base material in accordance with Section 3.2.1.2.3, except as noted in this table.
- X-AL-H testing was performed with $F_y = 50$ ksi base material. X-AL-H fasteners with a shank length of 5/8" have a shank diameter of 0.145". X-AL-H fasteners with shank lengths of 3/4" & 7/8" have shank diameters of 0.157". X-AL-H fasteners with shank lengths greater than or equal to 1" have a shank diameter of 0.177".
- X-AL-H and EDS fasteners installed into greater than 1/2" thick steel require 1/2" minimum penetration.
- Testing in 1/8" thick steel was performed with $F_y = 50$ ksi base material.
- Multiple fasteners are recommended for increased reliability.
- Refer to guidelines for fastening to steel, Section 3.2.1.2, for application limits.
- Tabulated allowable load values provided for 3/4" steel are based upon minimum point penetration of 1/2". If 1/2" point penetration is not achieved, but a point penetration of at least 3/8" is obtained, the tabulated tension value should be reduced by 20 percent and the tabulated shear load should be reduced by 8 percent.
- X-U 15 fasteners installed into greater than 3/8" thick steel require 15/32" minimum penetration.
- Based on testing with $F_y = 50$ ksi base material.
- X-EGN fasteners installed into 3/8" or thicker base steel require 0.320" minimum penetration depth.
- Available in Canada or by special order.

* More details about the innovative X-U fastener can be found in Section 3.2.3.

Shop Drawing Submittal Review

Transmitted To: Cannon Design

Date: August 26, 2016

Attention: stl-cac@cannondesign.com

Contact Person / WTA Field Inspector:
Patrick Garner

Project Name: Webster University-**ISB**

Reviewed by: Mark Schaefer

Project No. WT 14127.01

☐

UPS

☐

Courier

☒

Email

Copies	No.	Description
1 PDF	238800M03	(Submittal No.'s) (R&B CxSRC)
		(Cannon #238800-006) - (Paric #15051-0194) - (WES #607)
		• Ductwork Hangers and Supports

Remarks:

c: **Kelvin Patel**
Kpatel@cannondesign.com

☒

Furnish as Submitted

☐

Furnish as Noted

☐

Rejected

☐

Revise & Resubmit

☐

Reviewed

☐

Corrections or comments made on shop drawings during this review do not relieve contractor from compliance with requirements of drawings and specifications. This check is only for review of general conformance with the design concept of project and general compliance with information given in contract documents. Contractor is responsible for: confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades; and performing his work in a safe and satisfactory manner.

WTASHOP - Webster ISB - 23 8800-006

From: STL-CAC <STL-CAC@CANNONDESIGN.COM>
To: 'Patrick Garner' <pgarner@wmtao.com>, WTASHOP <wtashop@wmtao.com>
Date: 8/19/2016 1:06 PM
Subject: Webster ISB - 23 8800-006
Cc: "Patel, Kelvin" <kpatel@CANNONDESIGN.COM>
Attachments: 238800-006 Ductwork Hangers and Supports.pdf

Attached for review.

Melissa Pirtle
Construction Admin

CANNONDESIGN

1100 Clark Ave
St. Louis, Missouri 63102
T [314.425.8797](tel:314.425.8797) • M
cannondesign.com



77 Westport Plaza
Suite 250
St. Louis, MO 63146

TRANSMITTAL

No. 15051-0194

Paric Corporation

PROJECT: 15051-Webster University Interdisciplinary Science Building

DATE: 08/18/2016

TO: Cannon Design
1100 Clark Ave
St Louis MO 63102

RE: Ductwork Hangers and Supports

ATTN: Kelvin Patel

JOB: 15051

WE ARE SENDING:		SUBMITTED FOR:	ACTION TAKEN:
☐ Shop Drawings		☒ Approval	☐ Approved as Submitted
☐ Letter		☐ Your Use	☐ Approved as Noted
☐ Prints		☐ As Requested	☐ Returned After Loan
☐ Change Order		☐ Review and Comment	☐ Resubmit
☐ Plans			☐ Submit
☐ Samples		SENT VIA:	☐ Returned
☐ Specifications		☐ Attached	☐ Returned for Corrections
☒ Other: Product Data		☐ Separate Cover Via:	☐ Due Date:

Item	Package	Code	Rev.	Copies	Date	Description	Status
Submittal		238800-006	1		08/18/2016	Ductwork Hangers and Supports	Submitted

NOTES:

CC:

Signed: _____
Devin Gates



Mechanical

LETTER OF TRANSMITTAL

TO: Paric Corporation

77 West Port Plaza #250

St. Louis, MO 63146

ATTN: Jason Szachnieski, Devin Gates

DATE: 8/17/16

JOB #: 5768

RE: Webster ISB

We are sending you

☒

Shop drawings

☐ Attached

☐ Prints

☐ Under separate cover

☐ Plans

☐ Samples

☐ Specifications

☐ Copy of letter

☐ Change order

☐ Other

COPIES	DATE	NO.	DESCRIPTION
1	8/17/16	238800-2.5	Ductwork Hangers and Supports

These are transmitted as checked below:

☐ For signature

☐ For your use

☐ As requested

☐ For bids due

☒

For review and comment

☐ Approved as submitted

☐ Approved as noted

☐ Returned for corrections

☐ Prints returned after loan to us

☐ Other

☐ Resubmit

☒ Submit

☐ Return

☐ copies for approval

☐ copies for distribution

☐ corrected prints

Remarks: Please return by 8/24/16

Gripple Pending AHJ Approval. Verbal Approval given. Waiting on Formal Approval Document. Will Forward to Design Team Once in Hand.

COPY TO: file

SIGNED:

Alex Chambers



Mechanical

Webster University ISB Webster Groves, MO

Submittal #:

238800-2.5

Submittal Description:

Ductwork Hangers and Supports

Return By:

8/24/16

Please Note: To avoid scheduling delays and equipment release delays, please submit by the "Return By" date.

CHECKED BY:			
DESIGNER:		ENGINEER:	
☒	NO EXCEPTION TAKEN	☐	MAKE CORRECTIONS NOTED
☐	SUBMIT SPECIFIED ITEM	☐	REVISE AND RESUBMIT
☐	REJECTED	☐	
Checking is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Equipment supplier 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 satisfactory performance of his work.			
		Job #:	5768
		Date:	8/17/16
		By:	ARC