



The following excerpt are pages from the North American Product Technical Guide, Volume 1: Direct Fastening, Edition 15.

Please refer to the publication in its entirety for complete details on this product including data development, product specifications, general suitability, installation, corrosion and spacing and edge distance guidelines.

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US: 877-749-6337 or [HNATechnicalServices@hilti.com](mailto:HNATechnicalServices@hilti.com)

CA: 1-800-363-4458, ext. 6 or [CATechnicalServices@hilti.com](mailto:CATechnicalServices@hilti.com)

## General Application Fasteners 3.2.2

### 3.2.2.1 Product Description

**X-U\* Premium Series** This universal high performance fastener is designed for applications in concrete and high strength or standard strength steel. The 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. 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. 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.

**X-CR Fastener Series** The 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 1/2" through 2-1/8". Shank diameter for these fasteners is 0.145" for shank lengths less than 1-1/2" and 0.157" for longer fasteners.

**X-S Steel Fastener** The X-S is an economical fastener for steel. It has a 0.145" smooth shank diameter and is offered in a 1/2" and 5/8" length. The

X-S13 comes collated (MX) in strips of 10 or individually with a plastic "tophat" (THP). The X-S16 comes singly with a metal "tophat" (TH). This fastener is ideally suited for fastening drywall track to standard strength steel and is discussed further in Section 3.2.6.

**X-GN/X-GHP/X-EGN** These collated fastener lines for Hilti's gas-actuated tools are 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.

**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 2-1/2". Knurling is offered on 3/4" and 7/8" lengths; designated as EDS and ideally suited for steel applications.

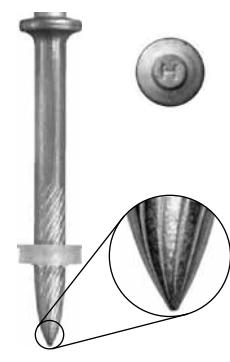
**X-U 15 Steel Fastener** The X-U 15 is a premium, high performance fastener designed specifically for attachments to steel (e.g. drywall track, tagging, etc.). It is offered in a 0.145" shank diameter and 5/8" length with a unique step shank design as either single fasteners with metal tophat or collated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

#### 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\*



X-C DS X-CR



X-S EDS X-U 15

### Listings/Approvals

#### ICC-ES (International Code Council)

ESR-2269 (X-U and X-U 15)

ESR-1663 (DS, X-C, EDS and X-CR)

#### COLA (City of Los Angeles)

RR 25675 (X-U and X-U 15)

RR 25646 (DS, X-C, EDS, and X-CR)



### 3.2.2.2 Material Specifications

Fastener Designation	Fastener Material	Fastener Plating <sup>1</sup>	Steel Washer or Clip Plating <sup>1,2</sup>	Washer or Clip Plating <sup>1,2</sup>
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 <sup>3</sup>	SAE 316	N/A	SAE 316	N/A
X-GN/X-GHP/X-EGN	Carbon Steel	2-10 µm Zinc	N/A	N/A
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. Refer to Section 2.3.3.1 for more information.

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.

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

## 3.2.2 General Application Fasteners

### 3.2.2.3 Technical Data

#### Allowable Loads in Normal Weight Concrete<sup>1,2</sup>

Fastener 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)	-	-
Standard Fastener	X-C (Black collated strip or guidance washer) <sup>3</sup>	0.138 (3.5)	3/4 (19)	45 (0.20)	75 (0.33)	65 (0.29)	105 (0.47)	95 (0.42)	195 (0.87)
			1 (25)	85 (0.38)	150 (0.67)	160 (0.71)	200 (0.89)	105 (0.47)	270 (1.20)
			1-1/4 (32)	130 (0.58)	210 (0.93)	270 (1.20)	290 (1.29)	165 (0.73)	325 (1.45)
			1-1/2 (38)	175 (0.78)	260 (1.16)	270 (1.20)	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)	385 (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)	185 (0.82)	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 (1.56)	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)
Forming Fastener	X-CT 47 <sup>4</sup>	0.145 (3.7)	1 (25)	60 (0.27)	65 (0.29)	-	-	-	-
	X-CT 62 <sup>4</sup>	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 AC70. Wood or steel members connected to the substrate must be investigated in accordance with accepted design criteria.

2 Multiple fasteners are recommended for any attachment.

3 Allowable load values are for X-C fasteners with black collated strips or guidance washers. IMPORTANT! For X-C fasteners with white collated strips or guidance washers, refer to the 2013 edition of the Hilti North American Product Technical Guide Volume 1: Direct Fastening.

4 For temporary fastening of formwork only.

#### Allowable Loads in Minimum $f'_c = 3000$ psi Structural Lightweight Concrete<sup>1,6</sup>

Fastener Description	Fastener	Shank Diameter in. (mm)	Minimum Embedment in. (mm)	Fastener Location					
				Installed into Concrete		Installed Through 3" Deep Metal Deck into Concrete <sup>2,3</sup>			
				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)	260 (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 (Black collated strip or guidance washer) <sup>4</sup>	0.138 (3.5)	3/4 (19)	120 (0.53)	175 (0.78)	120 (0.53)	95 (0.42)	265 (1.18)	
			1 (25)	180 (0.80)	260 (1.16)	215 (0.96)	155 (0.69)	485 (2.16)	
			1-1/4 (32)	225 (1.00)	400 (1.78)	250 (1.11)	200 (0.89)	500 (2.22)	
			1-1/2 (38)	285 (1.27)	400 (1.78)	285 (1.27)	210 (0.93)	555 (2.47)	
Heavy Duty Fastener	DS <sup>5</sup>	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) 0.157 (4.0)		3/4 (19)	1 (25)	230 (1.02)	240 (1.07)	230 (1.02)	-	240 (1.07)
			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)	60 (0.27)	175 (0.78)	

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 AC70. Wood or steel members connected to the substrate must be investigated in accordance with accepted design criteria.

2 The steel deck profile is 3" deep composite floor deck with a minimum 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.

3 Structural lightweight concrete fill above top of metal deck shall be a minimum of 3-1/4" deep.

4 Allowable load values are for X-C fasteners with black collated strips or guidance washers. IMPORTANT! For X-C fasteners with white collated strips or guidance washers, refer to the 2013 edition of the Hilti North American Product Technical Guide Volume 1: Direct Fastening.

5 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.

6 Multiple fasteners are recommended for any attachment.

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

## General Application Fasteners 3.2.2

**Allowable Loads Into Minimum  $f'_c$  = 3000 psi Structural Lightweight Concrete Over 1-1/2" Deep, B-Type Steel Deck<sup>1,5</sup>**

Fastener Description	Fastener	Shank Diameter in. (mm)	Minimum Embedment in. (mm)	Fastener Location			
				Installed Through Metal Deck into Concrete <sup>2,3</sup>			
				Tension lb (kN)		Shear lb (kN)	
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 <sup>4</sup>	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)	

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 AC70. Wood or steel members connected to the substrate must be investigated in accordance with accepted design criteria.

2 Steel deck profiles are 1-1/2" deep, B-type deck with a minimum thickness of 20 gauge (0.0358" thick steel). Fasteners may be installed through the metal deck into lightweight concrete having both nominal and 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 and 3 (Section 3.2.1.1.6) for additional flute dimensions, fastener locations, and load orientations for both deck profiles.

3 Structural lightweight concrete fill above top of metal deck shall be a minimum 2-1/2" deep.

4 Allowable load values apply to X-C fasteners with black or white collated strip or guidance washer.

5 Multiple fasteners are recommended for any attachment.

**Allowable Loads in Concrete Masonry Units<sup>1,2,3,4,5,11</sup>**

Fastener Description	Fastener	Shank Diameter in. (mm)	Min. Embed. in. (mm)	Hollow CMU				Grout Filled CMU			
				Face Shell <sup>6</sup>		Mortar Joint		Face Shell <sup>6</sup>		Mortar Joint	
				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 <sup>10</sup>	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) 95 (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)

1 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.

2 The tabulated allowable load values are for low-velocity fasteners installed in normal weight or lightweight concrete masonry units conforming to ASTM C90.

3 The tabulated allowable load values are for low-velocity fasteners installed in concrete masonry units with mortar conforming to ASTM C270, Type N or S.

4 The tabulated allowable load values are for low-velocity fasteners installed in concrete masonry units with grout conforming to ASTM C476, as coarse grout.

5 The tabulated allowable load values are for one low-velocity fastener installed in an individual masonry unit cell and at least 4" from the edge of the wall.

6 Fastener can be located anywhere on the face shell or mortar joint as shown in the figure to the right.

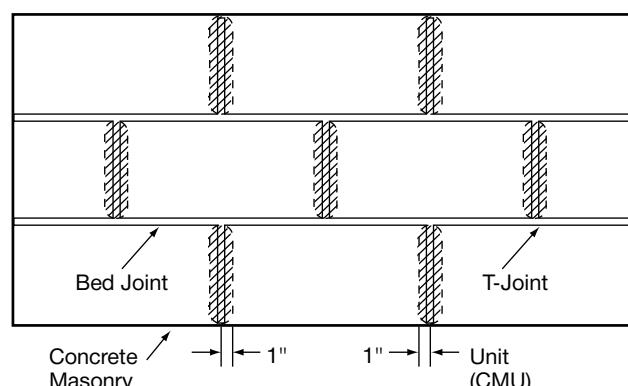
7 Shear direction can be horizontal or vertical (Bed Joint or T-Joint) along the CMU wall plane.

8 Fastener located in center of grouted cell installed vertically.

9 Shear can be in any direction.

10 Allowable load values apply to X-C fasteners with black or white collated strip or guidance washer.

11 Multiple fasteners are recommended for any attachment.



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

\* 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 Minimum ASTM A36 ( $F_y \geq 36$  ksi,  $F_u \geq 58$  ksi) Steel<sup>1,2,4,5</sup>

Fastener Description	Fastener	Shank Diameter in. (mm)	Steel Thickness (in.)											
			1/8		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 <sup>6</sup>	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 <sup>7</sup>	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 <sup>3</sup>	0.177 (4.5)	-	-	305 (1.36)	615 (2.67)	625 (2.78)	870 (3.87)	715 (3.18)	870 (3.87)	890 (3.96)	960 (4.27)	400 (1.78)	655 (2.91)
Heavy Duty Smooth Shank	DS	0.177 (4.5)	-	-	365 (1.62)	725 (3.22)	580 (2.58)	725 (3.22)	695 (3.09)	725 (3.22)	735 (3.27)	860 (3.83)	-	-
Stainless Steel Smooth Shank	X-CR	0.145 (3.7)	-	-	460 (2.05)	460 (2.05)	615 (2.74)	500 (2.22)	-	-	-	-	-	-
	X-CR <sup>8</sup>	0.145 (3.7)	300 (1.33)	190 (0.85)	615 (2.74)	495 (2.20)	760 (3.38)	500 (2.22)	220 (0.98)	325 (1.45)	225 (1.00)	335 (1.49)	-	-
Drywall Track Smooth Shank	X-EGN <sup>9</sup>	0.118 (3.0)	140 (0.62)	230 (1.02)	220 (0.98)	245 (1.09)	225 (1.00)	290 (1.29)	280 (1.25)	330 (1.47)	280 (1.25)	330 (1.47)	280 (1.25)	330 (1.47)
	X-EGN <sup>8,9</sup>	0.118 (3.0)	-	-	220 (0.98)	295 (1.31)	260 (1.16)	355 (1.58)	280 (1.25)	385 (1.71)	280 (1.25)	385 (1.71)	280 (1.25)	385 (1.71)
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)	-	-	-	-

- 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 AC70. Wood or steel members connected to the substrate must be investigated in accordance with accepted design criteria.
- 2 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.
- 3 EDS fasteners installed into greater than 1/2" thick steel require 1/2" minimum penetration.
- 4 Multiple fasteners are recommended for any attachment.
- 5 Refer to guidelines for fastening to steel, Section 3.2.1.2, for application limits.
- 6 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.
- 7 X-U 15 fasteners installed into greater than 3/8" thick steel require 15/32" minimum penetration.
- 8 Based on testing with  $F_y = 50$  ksi base material.
- 9 X-EGN fasteners installed into 3/8" or thicker base steel require 0.320" minimum penetration depth.

#### Allowable Tensile Pullover and Shear Bearing Load Capacities for Steel Framing with Power Driven Fasteners<sup>1,2,3,4</sup>

Fastener Description	Fastener	Head Dia. in. (mm)	Sheet Steel Thickness													
			14 ga.		16 ga.		18 ga.		20 ga.		22 ga.		24 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)		
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 <sup>5</sup> , 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	0.322 (8.2)	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)

- 1 Allowable load values are based on a safety factor of 3.0 in accordance with the AISI S100.
- 2 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.
- 3 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.
- 4 Data is based on the following minimum sheet steel properties,  $F_y = 33$  ksi,  $F_u = 45$  ksi (ASTM A653 material).
- 5 Allowable load values apply to X-C fasteners with black or white collated strip or guidance washer.

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

## General Application Fasteners 3.2.2

## 3.2.2.4 Ordering Information

## Carbon Steel Non-Collated (without pre-mounted steel washer)

Fastener Description	Shank Length in. (mm)	Shank Ø in. (mm)	Washer Ø
<b>Concrete, Masonry and Steel</b>			
X-U P8*	5/8 to 2-7/8 (16 to 72)	0.157 (4.0)	8 mm plastic
X-U P8 TH*	5/8, 3/4, 1 (16, 19, 27)	0.157 (4.0)	8 mm plastic and metal tophat
<b>Concrete and Masonry</b>			
DS P10	1 to 2-1/2 (27 to 62)	0.177 (4.5)	8 mm plastic
X-C P8	1 to 2-1/2 (19 to 62)	0.138 (3.5)	8 mm plastic
X-C THP	3/4 (20)	0.138 (3.5)	8 mm plastic tophat
<b>Steel</b>			
X-S13 THP	1/2 (13)	0.145 (3.7)	8 mm plastic tophat
X-S16 TH	5/8 (16)	0.145 (3.7)	8 mm plastic and metal tophat
EDS P10	3/4, 7/8 (19, 22)	0.177 (4.5)	10 mm plastic

## Carbon Steel Collated (without pre-mounted steel washer)

Fastener Description	Shank Length in. (mm)	Shank Ø in. (mm)	Washer Ø
<b>Concrete, Masonry and Steel</b>			
X-U MX*	5/8 to 2-7/8 (16 to 72)	0.157 (4.0)	Collated
<b>Concrete and Masonry</b>			
X-C MX	1 to 2-1/2 (27 to 62)	0.138 (3.5)	Collated
X-GN MX	3/4 to 1-1/4 (20 to 32)	0.118 (3.0)	Collated
X-GHP MX	11/16, 3/4 (18, 20)	0.118 (3.0)	Collated
<b>Steel</b>			
X-S13 MX	1/2 (13)	0.145 (3.7)	Collated
X-EGN MX	1/2 (14)	0.118 (3.0)	Collated
X-GHP MX	11/16, 3/4 (18, 20)	0.118 (3.0)	Collated

## Carbon Steel Non-Collated (with pre-mounted steel washer)

Fastener Description	Shank Length in. (mm)	Shank Ø in. (mm)	Washer Ø
<b>Concrete, Masonry and Steel</b>			
X-U P8 S15*	7/8, 1, 1-1/4 (22, 27, 32)	0.157 (4.0)	8 mm plastic and 15 mm steel
X-U P8 S36*	1-1/4, 2-7/8 (32, 72)	0.157 (4.0)	8 mm plastic and 36 mm steel
<b>Concrete and Masonry</b>			
X-C P8 S23	1 to 1-7/8 (27 to 47)	0.138 (3.5)	8 mm plastic and 23 mm steel
X-C P8 S36	1-1/2, 2, 2-1/2 (37, 52, 62)	0.138 (3.5)	8 mm plastic and 36 mm steel

## SAE 316 Stainless Steel Non-Collated (with and without pre-mounted steel washer)

Fastener Description	Shank Length in. (mm)	Shank Ø in. (mm)	Washer Ø
<b>Concrete, Masonry and Steel</b>			
X-CR P8	1/2 to 1-9/16 (14 to 39)	0.145 (3.7)	8 mm plastic
X-CR P8	1-3/4, 2-1/8 (44, 54)	0.157 (4.0)	8 mm plastic
X-CR P8 S12	1-9/16 (39)	0.145 (3.7)	8 mm plastic and 12 mm steel
X-CR P8 S12	1-3/4 (44)	0.157 (4.0)	8 mm plastic and 12 mm steel
<b>Steel</b>			
X-CR P8	9/16, 5/8 (14, 16)	0.145 (3.7)	8 mm plastic
X-CR S12	5/8 (16)	0.145 (3.7)	12 mm steel

## Carbon Steel Removable and Clip Fasteners

Fastener Description	Shank Length in. (mm)	Shank Ø in. (mm)	Washer Ø
<b>Forming Nail</b>			
X-CT 47MX, X-CT 62 MX, X-CT 62 DP8	1-7/8, 2-7/16 (47, 62)	0.145 (3.7)	Double 8 mm plastic
<b>Rebar Basket Clip</b>			
BC X-C P8T	1-7/8, 2-7/16 (47, 62)	0.145 (3.5)	8 mm plastic & rebar basket clip

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