

DATE: _____ PROJECT: _____

TO: _____ FROM: _____

SUBJECT: HILTI X-ENP-19 POWDER-ACTUATED FASTENER SUBSTITUTION REQUEST

SPECIFICATION TITLE: _____

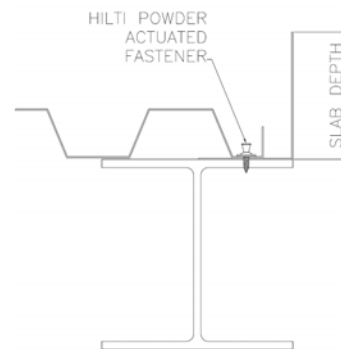
SECTION: _____ PAGE: _____ ARTICLE/PARAGRAPH: _____

DESCRIPTION: _____

DESIGN DETAIL NO.: _____

PROPOSED SUBSTITUTION: Use HILTI X-ENP-19 instead of fillet weld or arc spot puddle weld

PRODUCT DESCRIPTION: The Hilti X-ENP-19 Powder-Actuated Fasteners are designed as high performance solutions for attachment of cold-formed steel pourstops to structural steel supports as an alternative to welding. The Hilti powder-actuated fasteners come in single or collated configurations to maximize productivity.



SUBMITTED BY: _____

SUPPORTING DATA ATTACHED:

- HILTI PRODUCT TECHNICAL GUIDE 2015
- ICC EVALUATION SERVICE REPORT PAGES
- FASTENER LOAD COMPARISON TABLES
- SAMPLES
- TEST REPORTS
- PRICING INFORMATION

A/E REVIEW AND ACTION:

- SUBSTITUTION APPROVED
- SUBSTITUTION APPROVED AS NOTED
- SUBSTITUTION REJECTED

COMMENTS: _____

SIGNED BY: _____

DATE: _____

Table 1 - Allowable Weld Design Values Pounds Per Inch of Fillet Weld or Per Hilti X-ENP-19 Powder-Actuated Fastener

Pourstop Thickness (GA)	Pourstop Steel Fu (ksi)	Fillet Weld ¹	X-ENP-19	
		Tension or Shear	Pullover	Shear
20	45	689	755	640
18	45	919	875	840
16	45	1149	940	1050
14	45	1438	1125	1050
12	45	2013	1125	1050
10	45	2587	1125	1050
20	65	996	755	640
18	65	1328	875	840
16	65	1660	940	1050
14	65	2077	1125	1050
12	65	2906	1125	1050
10	65	3736	1125	1050

1.) Based upon AISI Manual for Cold-Formed Steel Design, 2008 Edition Table IV-1 assuming the transverse condition, which is the highest capacity.

Table 2 - Allowable Load Capacities for Hilti Powder-Actuated Fasteners from ICC-ES ESR-2776¹

Fastener Designation	Base Steel Thickness											
	1/8"		3/16"		1/4"		3/8"		1/2"		3/4"	
	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear
X-ENP-19	-	-	-	-	905	1050	1125	1050	1010	1050	965	1050

1.) Reference Tables 10 and 11 of ESR-2776 and Table 2 of ESR-2269 for complete details regarding the load values provided in this table.

Weld Length #1
Weld Length #2
Weld Length #3
Weld Length #4

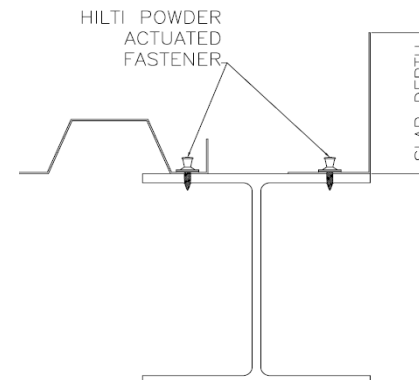
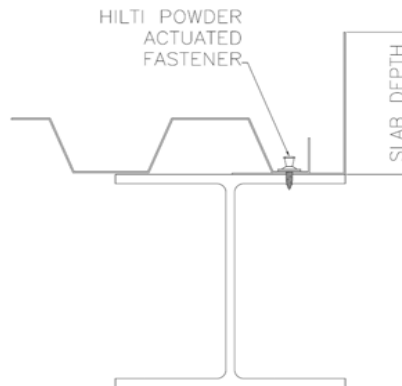
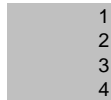


Table 3 - Hilti X-ENP-19 vs. Fillet Weld (Tension)^{1,2,3,4,5}

Pourstop Gauge (Fu)	Inch of Fillet Weld			
	1	2	3	4
# of X-ENP-19 fasteners in 1/8" thick base steel (Fy = 50.8 ksi)				
20 GA (45 ksi)	-	-	-	-
18 GA (45 ksi)	-	-	-	-
16 GA (45 ksi)	-	-	-	-
14 GA (45 ksi)	-	-	-	-
12 GA (45 ksi)	-	-	-	-
10 GA (45 ksi)	-	-	-	-
20 GA (65 ksi)	-	-	-	-
18 GA (65 ksi)	-	-	-	-
16 GA (65 ksi)	-	-	-	-
14 GA (65 ksi)	-	-	-	-
12 GA (65 ksi)	-	-	-	-
10 GA (65 ksi)	-	-	-	-
# of X-ENP-19 fasteners in 3/16" thick base steel (Fy = 36 ksi)				
20 GA (45 ksi)	-	-	-	-
18 GA (45 ksi)	-	-	-	-
16 GA (45 ksi)	-	-	-	-
14 GA (45 ksi)	-	-	-	-
12 GA (45 ksi)	-	-	-	-
10 GA (45 ksi)	-	-	-	-
20 GA (65 ksi)	-	-	-	-
18 GA (65 ksi)	-	-	-	-
16 GA (65 ksi)	-	-	-	-
14 GA (65 ksi)	-	-	-	-
12 GA (65 ksi)	-	-	-	-
10 GA (65 ksi)	-	-	-	-
# of X-ENP-19 fasteners in 1/4" thick base steel (Fy = 36 ksi)				
20 GA (45 ksi)	0.91	1.83	2.74	3.65
18 GA (45 ksi)	1.05	2.10	3.15	4.20
16 GA (45 ksi)	1.27	2.54	3.81	5.08
14 GA (45 ksi)	1.59	3.18	4.77	6.36
12 GA (45 ksi)	2.22	4.45	6.67	8.90
10 GA (45 ksi)	2.86	5.72	8.58	11.43
20 GA (65 ksi)	1.32	2.64	3.96	5.28
18 GA (65 ksi)	1.52	3.04	4.55	6.07
16 GA (65 ksi)	1.83	3.67	5.50	7.34
14 GA (65 ksi)	2.30	4.59	6.89	9.18
12 GA (65 ksi)	3.21	6.42	9.63	12.84
10 GA (65 ksi)	4.13	8.26	12.38	16.51

Pourstop Gauge (Fu)	Inch of Fillet Weld			
	1	2	3	4
# of X-ENP-19 fasteners in 3/8" thick base steel (Fy = 36 ksi)				
20 GA (45 ksi)	0.91	1.83	2.74	3.65
18 GA (45 ksi)	1.05	2.10	3.15	4.20
16 GA (45 ksi)	1.22	2.44	3.67	4.89
14 GA (45 ksi)	1.28	2.56	3.83	5.11
12 GA (45 ksi)	1.79	3.58	5.37	7.16
10 GA (45 ksi)	2.30	4.60	6.90	9.20
20 GA (65 ksi)	1.32	2.64	3.96	5.28
18 GA (65 ksi)	1.52	3.04	4.55	6.07
16 GA (65 ksi)	1.77	3.53	5.30	7.06
14 GA (65 ksi)	1.85	3.69	5.54	7.38
12 GA (65 ksi)	2.58	5.17	7.75	10.33
10 GA (65 ksi)	3.32	6.64	9.96	13.28
# of X-ENP-19 fasteners in 1/2" thick base steel (Fy = 36 ksi)				
20 GA (45 ksi)	0.91	1.83	2.74	3.65
18 GA (45 ksi)	1.05	2.10	3.15	4.20
16 GA (45 ksi)	1.22	2.44	3.67	4.89
14 GA (45 ksi)	1.42	2.85	4.27	5.70
12 GA (45 ksi)	1.99	3.99	5.98	7.97
10 GA (45 ksi)	2.56	5.12	7.68	10.25
20 GA (65 ksi)	1.32	2.64	3.96	5.28
18 GA (65 ksi)	1.52	3.04	4.55	6.07
16 GA (65 ksi)	1.77	3.53	5.30	7.06
14 GA (65 ksi)	2.06	4.11	6.17	8.23
12 GA (65 ksi)	2.88	5.75	8.63	11.51
10 GA (65 ksi)	3.70	7.40	11.10	14.80
# of X-ENP-19 fasteners in ≥ 3/4" thick base steel (Fy = 36 ksi)				
20 GA (45 ksi)	0.91	1.83	2.74	3.65
18 GA (45 ksi)	1.05	2.10	3.15	4.20
16 GA (45 ksi)	1.22	2.44	3.67	4.89
14 GA (45 ksi)	1.49	2.98	4.47	5.96
12 GA (45 ksi)	2.09	4.17	6.26	8.34
10 GA (45 ksi)	2.68	5.36	8.04	10.72
20 GA (65 ksi)	1.32	2.64	3.96	5.28
18 GA (65 ksi)	1.52	3.04	4.55	6.07
16 GA (65 ksi)	1.77	3.53	5.30	7.06
14 GA (65 ksi)	2.15	4.30	6.46	8.61
12 GA (65 ksi)	3.01	6.02	9.03	12.05
10 GA (65 ksi)	3.87	7.74	11.61	15.49

- 1.) X-ENP-19 fasteners installed into 1/2-inch or thicker steel require a 1/2-inch minimum penetration. All other steel thicknesses are based upon through penetration. In 1/2-inch or thicker steel, for an embedment less than 1/2-inch, but more than 3/8-inch, multiply the number of fasteners by 1.6.
- 2.) Comparisons between weld and powder-actuated fasteners are based upon the fasteners only and do not consider other failure modes (e.g. sheet steel failure)
- 3.) Loads are assumed to act about the centroid of the fastener group or weld length and do not consider prying forces.
- 4.) Fastener totals do not take into account the capacities of the pourstop itself and or the capability of the pourstop to have the number of fasteners provided installed through it. Minimum fastener spacing and edge distance without reduction in powder-actuated fastener performance is 1" and 1/2", respectively.
- 5.) Trial installations are recommended.

Table 4 - Hilti X-ENP-19 vs. Fillet Weld (Shear)^{1,2,3,4,5}

Pourstop Gauge (Fu)	Inch of Fillet Weld			
	1	2	3	4
# of X-ENP-19 fasteners in 1/8" thick base steel (Fy = 50.8 ksi)				
20 GA (45 ksi)	-	-	-	-
18 GA (45 ksi)	-	-	-	-
16 GA (45 ksi)	-	-	-	-
14 GA (45 ksi)	-	-	-	-
12 GA (45 ksi)	-	-	-	-
10 GA (45 ksi)	-	-	-	-
20 GA (65 ksi)	-	-	-	-
18 GA (65 ksi)	-	-	-	-
16 GA (65 ksi)	-	-	-	-
14 GA (65 ksi)	-	-	-	-
12 GA (65 ksi)	-	-	-	-
10 GA (65 ksi)	-	-	-	-
# of X-ENP-19 fasteners in 3/16" thick base steel (Fy = 36 ksi)				
20 GA (45 ksi)	-	-	-	-
18 GA (45 ksi)	-	-	-	-
16 GA (45 ksi)	-	-	-	-
14 GA (45 ksi)	-	-	-	-
12 GA (45 ksi)	-	-	-	-
10 GA (45 ksi)	-	-	-	-
20 GA (65 ksi)	-	-	-	-
18 GA (65 ksi)	-	-	-	-
16 GA (65 ksi)	-	-	-	-
14 GA (65 ksi)	-	-	-	-
12 GA (65 ksi)	-	-	-	-
10 GA (65 ksi)	-	-	-	-
# of X-ENP-19 fasteners in 1/4" thick base steel (Fy = 36 ksi)				
20 GA (45 ksi)	1.08	2.15	3.23	4.31
18 GA (45 ksi)	1.09	2.19	3.28	4.38
16 GA (45 ksi)	1.09	2.19	3.28	4.38
14 GA (45 ksi)	1.37	2.74	4.11	5.48
12 GA (45 ksi)	1.92	3.83	5.75	7.67
10 GA (45 ksi)	2.46	4.93	7.39	9.86
20 GA (65 ksi)	1.56	3.11	4.67	6.23
18 GA (65 ksi)	1.58	3.16	4.74	6.32
16 GA (65 ksi)	1.58	3.16	4.74	6.32
14 GA (65 ksi)	1.98	3.96	5.93	7.91
12 GA (65 ksi)	2.77	5.54	8.30	11.07
10 GA (65 ksi)	3.56	7.12	10.67	14.23

Pourstop Gauge (Fu)	Inch of Fillet Weld			
	1	2	3	4
# of X-ENP-19 fasteners in 3/8" thick base steel (Fy = 36 ksi)				
20 GA (45 ksi)	1.08	2.15	3.23	4.31
18 GA (45 ksi)	1.09	2.19	3.28	4.38
16 GA (45 ksi)	1.09	2.19	3.28	4.38
14 GA (45 ksi)	1.37	2.74	4.11	5.48
12 GA (45 ksi)	1.92	3.83	5.75	7.67
10 GA (45 ksi)	2.46	4.93	7.39	9.86
20 GA (65 ksi)	1.56	3.11	4.67	6.23
18 GA (65 ksi)	1.58	3.16	4.74	6.32
16 GA (65 ksi)	1.58	3.16	4.74	6.32
14 GA (65 ksi)	1.98	3.96	5.93	7.91
12 GA (65 ksi)	2.77	5.54	8.30	11.07
10 GA (65 ksi)	3.56	7.12	10.67	14.23
# of X-ENP-19 fasteners in 1/2" thick base steel (Fy = 36 ksi)				
20 GA (45 ksi)	1.08	2.15	3.23	4.31
18 GA (45 ksi)	1.09	2.19	3.28	4.38
16 GA (45 ksi)	1.09	2.19	3.28	4.38
14 GA (45 ksi)	1.37	2.74	4.11	5.48
12 GA (45 ksi)	1.92	3.83	5.75	7.67
10 GA (45 ksi)	2.46	4.93	7.39	9.86
20 GA (65 ksi)	1.56	3.11	4.67	6.23
18 GA (65 ksi)	1.58	3.16	4.74	6.32
16 GA (65 ksi)	1.58	3.16	4.74	6.32
14 GA (65 ksi)	1.98	3.96	5.93	7.91
12 GA (65 ksi)	2.77	5.54	8.30	11.07
10 GA (65 ksi)	3.56	7.12	10.67	14.23
# of X-ENP-19 fasteners in ≥ 3/4" thick base steel (Fy = 36 ksi)				
20 GA (45 ksi)	1.08	2.15	3.23	4.31
18 GA (45 ksi)	1.09	2.19	3.28	4.38
16 GA (45 ksi)	1.09	2.19	3.28	4.38
14 GA (45 ksi)	1.37	2.74	4.11	5.48
12 GA (45 ksi)	1.92	3.83	5.75	7.67
10 GA (45 ksi)	2.46	4.93	7.39	9.86
20 GA (65 ksi)	1.56	3.11	4.67	6.23
18 GA (65 ksi)	1.58	3.16	4.74	6.32
16 GA (65 ksi)	1.58	3.16	4.74	6.32
14 GA (65 ksi)	1.98	3.96	5.93	7.91
12 GA (65 ksi)	2.77	5.54	8.30	11.07
10 GA (65 ksi)	3.56	7.12	10.67	14.23

- 1.) X-ENP-19 fasteners installed into 1/2-inch or thicker steel require a 1/2-inch minimum penetration. All other steel thicknesses are based upon through penetration. In 1/2-inch or thicker steel, for an embedment less than 1/2-inch, but more than 3/8-inch, multiply the number of fasteners by 1.6.
- 2.) Comparisons between weld and powder-actuated fasteners are based upon the fasteners only and do not consider other failure modes (e.g. sheet steel failure)
- 3.) Loads are assumed to act about the centroid of the fastener group or weld length and do not consider prying forces.
- 4.) Fastener totals do not take into account the capacities of the pourstop itself and or the capability of the pourstop to have the number of fasteners provided installed through it. Minimum fastener spacing and edge distance without reduction in powder-actuated fastener performance is 1" and 1/2", respectively.
- 5.) Trial installations are recommended.

X-ENP-19 for Fastening Deck to Structural Steel 3.5.3

3.5.3.1 Product Description

The Hilti structural steel deck fastening system consists of powder-actuated tools which are primarily used with one fastener: the X-ENP-19 L15, which is available either collated or non-collated.

For most structural steel decking jobs, the tool of choice is the DX 860-ENP-L tool. This self-contained stand up decking tool is powered by 0.27 caliber long cartridges, which are loaded into the tool in strips of 40. The cartridges drive the X-ENP-19 L15 MXR fastener (collated version) into almost any type of steel deck and base steel thicknesses greater than or equal to 1/4". These

fasteners are available in collated strips of 10. Four of these strips are loaded into the DX 860-ENP-L tool along with the cartridge strip, and enable the operator to fasten at a rate of up to 1,000 quality fastenings per hour.

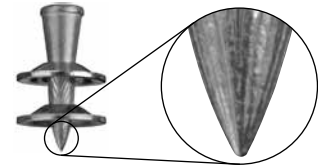
Other tools include the hand held DX 76-MX, a semi-automatic magazine tool. Other configurations of the DX 76 include a single fastener guide variation of the tool for miscellaneous use.

Hilti X-ENP-19 steel deck fasteners comply with ANSI/SDI RD1.0, C1.0 and NC1.0 standards.

- 3.5.3.1 Product Description
- 3.5.3.2 Material Specifications
- 3.5.3.3 Technical Data
- 3.5.3.4 Ordering Information



X-ENP-19 L15 MX and MXR



X-ENP-19 L15

3.5.3.2 Material Specifications

Fastener	Fastener material	Fastener plating	Nominal fastener hardness
X-ENP-19 L15	Carbon Steel	5 µm Zinc ¹	58 HRC

1 ASTM B633, SC 1, Type III. Reference Section 2.3.3.1 for more information.

3.5.3.3 Technical Data

Allowable pullout loads for attachments to steel base material lb (kN)^{1, 2, 3}

Fastener	Base material thickness (in.)			
	1/4	3/8	1/2 ⁴	≥ 5/8 ⁴
X-ENP-19 L15	905 (4.03)	1125 (5.00)	1010 (4.49)	965 (4.29)

- 1 These values represent testing performed in ASTM A36 plate steel.
- 2 The values must be compared with allowable tensile pullover values.
- 3 Allowable values based on safety factor of 5.0.
- 4 Allowable values are based on minimum 1/2" penetration depth through or into base steel. For 3/8" penetration depth into 1/2" and thicker steels, reduce the allowable load capacity to 635 lb (2.79 kN).

Allowable pullover and shear bearing loads for attaching steel deck^{1,2,3}

Fastener	Steel deck gauge (in.)											
	16 (0.0598)		18 (0.0474)		20 (0.0358)		22 (0.0295)		24 (0.0239)		26 (0.0179)	
	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)
X-ENP-19 L15	940 (4.14)	1050 (4.62)	875 (3.85)	840 (3.70)	755 (3.32)	640 (2.82)	665 (2.93)	535 (2.35)	400 (1.78)	440 (1.94)	185 (0.81)	335 (1.47)

- 1 Minimum base steel thickness must be greater than or equal to 1/4" (6 mm).
- 2 Allowable values are based on a safety factor of 3.0.
- 3 Loads based on ASTM A1008, or minimum ASTM A653 SQ33 steel deck.

Approvals/Listings

ICC-ES (International Code Council)
ESR-2776, ESR-2197, ESR-1116, ESR-1169, ESR-1414

COLA (City of Los Angeles)
RR 25877, RR 25296

FM (Factory Mutual)

For attaching Class 1 Steel Roof Decks with 1-60 and 1-90 wind uplift ratings. Listed for higher wind uplift ratings with FM Approved Lightweight Insulating Concrete Roof Deck Assemblies. Refer to FM RoofNav for specific assembly listings.

UL (Underwriters Laboratories)

Fasteners for attaching steel roof deck (uplift and fire classification)

ABS (American Bureau of Shipping)

