

Submittal / Substitution Request



SUBMITTED TO:

To: _____

Firm: _____

Project: _____

Submitted Product: **SIMPSON STRONG-TIE® POWDER-ACTUATED FASTENERS**

Specified Product: _____

Section: _____ Page: _____ Detail/Sheet No.: _____

Description of Application: _____

Attached information includes product description, installation instructions and pertinent technical data needed for evaluation of the submittal request.

SUBMITTED BY:

Name: _____ Signature: _____

Firm: _____

Address: _____

Phone: _____ Fax: _____

E-Mail: _____

Date of Submittal: _____

FOR ARCHITECT/ENGINEER USE:

Approved: _____ Approved As Noted: _____ Not Approved: _____

(Please briefly explain why not approved)

By: _____ Date: _____

Remarks: _____



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Product Information

ICC-ES ESR-2138

City of Los Angeles Research Report RR 25469

Factory Mutual (FM) Listing

Power-Driven Fasteners and Accessories Safety Data Sheet
Powder-Actuated Tools Lubricant Safety Data Sheet

Fasteners For Simpson Strong-Tie® Powder-Actuated Tools**.300" Headed Fasteners with .157" Shank Diameter****PDPA Drive Pins - For Structural Steel and Extra Hard Concrete**

- For A36 and A572 Grade 50 structural steel (red strip load recommended)
- .157 diameter for greater compressive strength
- Manufactured with tight tolerances for superior performance

Length (in.)	Model	Pack Qty	Carton Qty	Compatible Tools	
				Simpson Strong-Tie	Others
½	PDPA-50	100	1000	PTP-27L, PTP-27S, PT-27, PT-22P PT-22, PT-22GS, PT-22H, PT-27HD,	721**, D-60, U-2000, System 1, System 3 and most other low-velocity tools.
½ knurled	PDPA-50K	100	1000		
½ knurled	PDPA-50KM	1000	5000		
⅝ knurled	PDPA-62K	100	1000		
⅝ knurled	PDPA-62KM	1000	5000		
¾	PDPA-75	100	1000		
¾	PDPA-75M	1000	5000		
1	PDPA-100	100	1,000		
1 ¼	PDPA-125	100	1,000		
1 ½	PDPA-150	100	1,000		
1 ¾	PDPA-178	100	1,000		
2	PDPA-200	100	1,000		
2 ½	PDPA-250	100	1,000		
2 ¾	PDPA-278	100	1,000		

**PDPA****.300" Headed Fasteners with .145" Shank Diameter**

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
1	PDP-100	100	1,000	PTP-27L* PTP-27S** PT-27* PT-22 PT-22GS PT-22H	721**, D-60, U-2000, System 1, System 3 and most other low-velocity tools.
1 – BULK PACK	PDP-100M	–	1,000		
1 ¼	PDP-125	100	1,000		
1 ½	PDP-150	100	1,000		
1 ¾	PDP-175	100	1,000		
2	PDP-200	100	1,000		
2 ¼	PDP-225	100	1,000		
2 ½	PDP-250	100	1,000		
3	PDP-300	100	1,000		

**PDP**

See pages
208 – 210
and 213 for
load value
information.

.300" Headed Fasteners with .177" Shank Diameter

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
½	PDPH-50	100	1,000	PTP-27L* PTP-27S** PT-27* PT-22P PT-22 PT-22GS PT-22H	721**, D-60, U-2000, System 1, System 3 and most other low-velocity tools.
½ Knurled	PDPH-50K	100	1,000		
⅝ Knurled	PDPH-62K	100	1,000		
¾	PDPH-75	100	1,000		
1	PDPH-100	100	1,000		
1 ¼	PDPH-125	100	1,000		
1 ½	PDPH-150	100	1,000		
1 ¾	PDPH-175	100	1,000		
2	PDPH-200	100	1,000		
2 ½	PDPH-250	100	1,000		
3	PDPH-300	100	1,000		

**PDPH**

See pages
210 and 213
for load value
information.

316 Stainless Steel .300" Headed Fasteners with .145" Shank Diameter

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
½	PDP-50SS	100	1,000	PTP-27L* PTP-27S** PT-27* PT-22P PT-22 PT-22GS PT-22H	721**, D-60, U-2000, System 1, System 3 and most other low-velocity tools.
½ Knurled	PDP-50KSS	100	1,000		
⅝ Knurled	PDP-62KSS	100	1,000		
¾	PDP-75SS	100	1,000		
1	PDP-100SS	100	1,000		
1 ¼	PDP-125SS	100	1,000		
1 ½	PDP-150SS	100	1,000		
1 ¾	PDP-175SS	100	1,000		
2	PDP-200SS	100	1,000		
2 ½	PDP-250SS	100	1,000		
3	PDP-300SS	100	1,000		

**PDPSS**

See page 209
for load value
information.

*Up to 2½", ** Up to 1½"

*Up to 2½", ** Up to 1½"

Fasteners For Simpson Strong-Tie® Powder-Actuated Tools**.300" Headed Fasteners with .145" Shank Diameter – Mechanically Galvanized**

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
2	PDP-200MG	100	1,000	PTP-27L*, PTP-27S**, PT-27*	721**, D-60, U-2000, System 1, System 3 and most other low velocity tools.
2½	PDP-250MG	100	1,000	PT-22P	
3	PDP-300MG	100	1,000	PT-22GS, PT-22H	

Mechanical Galvanizing meets ASTM B695, Class 65, Type 1. *Up to 2½", **Up to 1½"

PDPMG

.300" Headed Fasteners with .145" Shank Diameter and ¾" Metal Washers

See pages 209 for load value information.

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
¾	PDPW-75	100	1,000	PTP-27L PTP-27S* PT-27 PT-22P PT-22 PT-22GS PT-22H	721*, D-60, U-2000, System 1, System 3 and most other low velocity tools.
1	PDPW-100	100	1,000		
1¼	PDPW-125	100	1,000		
1½	PDPW-150	100	1,000		
2	PDPW-200	100	1,000		
2½	PDPW-250	100	1,000		
3	PDPW-300	100	1,000		

*Up to 2"

PDPW

.300" Headed Fasteners with .145" Shank Diameter and 1" Metal Washers – Mechanically Galvanized with Protective Sleeve

- Provides added corrosion protection in preservative-treated lumber. Visit www.strongtie.com for corrosion information.
- Plastic sleeve protects and preserves coating during installation; washer will not scrape off coating.
- Plastic sleeve prevents washer slipping during installation.

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
2	PDPWL-200MG	100	1,000	PTP-27L PTP-27S* PT-27 PT-22P PT-22 PT-22GS PT-22H	721*, D-60, U-2000, System 1, System 3 and most other low velocity tools.
2½	PDPWL-250MG	100	1,000		
3	PDPWL-300MG	100	1,000		
3	PDPWLS-300MG	–	1,000		

Mechanical Galvanizing meets ASTM B695, Class 65, Type 1.

*PDPWLS has a square washer.

PDPWLMG
U.S. Patent
8,066,463

316 Stainless Steel .300" Headed Fasteners with .145" Shank Diameter and 1" Metal Washers*

See page 209 for load value information.

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
1	PDPWL-100SS	100	1,000	PTP-27L PTP-27S** PT-27 PT-22P PT-22 PT-22GS PT-22H	721**, D-60, U-2000, System 1, System 3 and most other low velocity tools.
1¼	PDPWL-125SS	100	1,000		
1½	PDPWL-150SS	100	1,000		
2	PDPWL-200SS	100	1,000		
2½	PDPWL-250SS	100	1,000		
3	PDPWL-300SS	100	1,000		
4	PDPWL-400SS	100	1,000		

PDPWL-SS

*Washers are 304 Stainless Steel, **Up to 2"

.300" Headed Fasteners with .177" Shank Diameter – Mechanically Galvanized

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
2	PDPH-200MG	100	1,000	PTP-27L PT-27HD PT-27	721*, D-60, U-2000, System 1, System 3 and most other low velocity tools.
2½	PDPH-250MG	100	1,000	PT-22P PT-22	
3	PDPH-300MG	100	1,000	PT-22GS PT-22H	

Mechanical Galvanizing meets ASTM B695, Class 65, Type 1. *Up to 2½", **Up to 1½"

PDPHMG

.300" Headed Fasteners with .145" Shank Diameter and 1" Metal Washers

See page 209 for load value information.

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
1	PDPWL-100	100	1,000	PTP-27L PTP-27S* PT-27 PT-22P PT-22 PT-22GS PT-22H	721*, D-60, U-2000, System 1, System 3 and most other low velocity tools.
1¼	PDPWL-125	100	1,000		
1½	PDPWL-150	100	1,000		
2	PDPWL-200	100	1,000		
2½	PDPWL-250	100	1,000		
3	PDPWL-300	100	1,000		
3	PDPWL-300M	–	1,000		
4	PDPWL-400	100	1,000		

*Up to 2"

PDPWL

.300" Headed Fasteners with 1" Metal Washers with .177" Shank Diameter

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
1	PDPHWL-100	100	1,000	PTP-27L PTP-27S PT-27 PT-27HD PT-22P PT-22 PT-22GS PT-22H	721*, D-60, U-2000, System 1, System 3 and most other low velocity tools.
1¼	PDPHWL-125	100	1,000		
1½	PDPHWL-150	100	1,000		
2	PDPHWL-200	100	1,000		
2½	PDPHWL-250	100	1,000		
3	PDPHWL-300	50	500		
4	PDPHWL-400	50	500		

*Up to 2"

PDPHWL

.300" Headed Fasteners with .145" Shank Diameter and 1¼" Metal Washers

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
1	PINW-100	50	500	PTP-27L PT-27 PT-22P PT-22 PT-22GS PT-22H	721, D-60, U-2000, System 1, System 3 and most other low velocity tools.
1¼	PINW-125	50	500		
1½	PINW-150	50	500		
1¾	PINW-175	50	500		
2	PINW-200	50	500		
2¼	PINW-225	50	500		
2½	PINW-250	50	500		
3	PINW-300	50	500		

PINW

Fasteners For Simpson Strong-Tie® Powder-Actuated Tools

See page 211 for load value information.

.300" Headed Fasteners with .145" Shank Diameter and 1 5/8" Plastic White Washers

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
1	PINWP-100W	50	500	PTP-27L* PT-27* PT-22P PT-22 PT-22GS PT-22H	721*, D-60, U-2000, System 1, System 3 and most other low-velocity tools.
1 1/4	PINWP-125W	50	500		
1 1/2	PINWP-150W	50	500		
1 3/4	PINWP-175W	50	500		
2	PINWP-200W	50	500		
2 1/2	PINWP-250W	50	500		
3	PINWP-300W	50	500		

**PINWP**

*Up to 2 1/2"

.300" Headed Tophat Fasteners with .145" Shank Diameter

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
1/2 Knurled	PDPT-50K	100	1,000	PTP-27L PTP-27S PT-27 PT-22 PT-22P PT-22GS PT-22H	721, D-60, U-2000, System 1, System 3 and most other low-velocity tools.
5/8 Knurled	PDPT-62K	100	1,000		
3/4	PDPT-75	100	1,000		
1	PDPT-100	100	1,000		

**PDPT****Highway Basket Clips – .300" Headed Fasteners with .145" Shank Diameter**

Description	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
Clip with 1 1/2" Pin	PHBC-150	100	1,000	PTP-27L, PT-27 PT-22P, PT-22 PT-22GS, PT-22H	DX-A41, Autofast
Clip with 2" Pin	PHBC-200	100	1,000		
Clip with 2 1/2" Pin	PHBC-250	50	1,000		

**PHBC****Pre-Assembled BX Cable Straps and Conduit Straps – .300" Headed Fasteners with .145" Shank Diameter**

Description	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
BX Cable Strap with 1" Pin	PBXDP-100	100	1,000	PTP-27L PTP-27S PT-27 PT-22P PT-22 PT-22GS PT-22H	D-60, 721, System 1, System 3, DX-350 and most other tools.
BX Cable Strap with 1 1/4" Pin	PBXDP-125	100	1,000		
Conduit Clip 1/2" EMT with 1" Pin	PCC50-DP100	100	1,000		
Conduit Clip 1/2" EMT with 1 1/4" Pin	PCC50-DP125	100	1,000		
Conduit Clip 3/4" EMT with 1" Pin	PCC75-DP100	50	500		
Conduit Clip 3/4" EMT with 1 1/4" Pin	PCC75-DP125	50	1,000		
Conduit Clip 1" EMT with 1" Pin	PCC100-DP100	50	500		
Conduit Clip 1" EMT with 1 1/4" Pin	PCC100-DP125	50	500		

**PBXDP****PCC****Pre-Assembled Ceiling Clips – .300" Headed Fasteners with .145" Shank Diameter**

Description	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
Compact Ceiling Clip - No Pin	PCL	100	1,000	PTP-27L PTP-27S PT-27 PT-22P PT-22 PT-22GS PT-22H	DX-350, System 1, 721 and most other tools.
Compact Ceiling Clip with 1" Pin	PECLDP-100	100	1,000		
Compact Ceiling Clip with 1" Pin - BULK PACK	PECLDP-100M	—	1,000		
Compact Ceiling Clip with 1 1/4" Pin	PECLDP-125	100	1,000		
Compact Ceiling Clip with 1 1/4" Pin - BULK PACK	PECLDP-125M	—	1,000		
Ceiling Clip with 1" Pin	PCLDP-100	100	1,000		
Ceiling Clip with 1 1/4" Pin	PCLDP-125	100	1,000		

See pages 210 and 212 for load value information.

**PCLDP**
(PCL similar without pin)

See page 212 for load value information.

**PECLDP****5/8" Headed Fasteners* with .177" Shank Diameter**

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
3/4 Knurled	PHV3-75K	100	1,000	PTP-27L PTP-27S PT-27 PT-22P PT-27HD PT-22 PT-22GS PT-22H	DX-451, DX-600, MD-380, DX-A41 I, R6000 and most other 5/8" barrel tools.
1	PHV3-100	100	1,000		
1 1/4	PHV3-125	100	1,000		
1 1/2	PHV3-150	100	1,000		
2	PHV3-200	100	1,000		
2 Knurled	PHV3-200K	100	1,000		
2 1/2	PHV3-250	100	1,000		
3	PHV3-300	100	1,000		

**PHV3**

*Not intended for use in high-velocity tools.

For alternate overhead fastening, see the Tie Wire wedge anchor on page 133 or Tie Wire Crimp anchor on page 168.

Fasteners For Simpson Strong-Tie® Powder-Actuated Tools

¼" – 20 Threaded Studs*

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
¼ - 20 Knurled (T-½, S-½)	PSLV4-5050K	100	1,000	PTP-27L PTP-27S PT-27 PT-22P PT-22 PT-22GS PT-22H	Most L.V. piston tools.
¼ - 20 (T-½, S-¾)	PSLV4-5075	100	1,000		
¼ - 20 (T-½, S-1)	PSLV4-50100	100	1,000		
¼ - 20 (T-½, S-1 ¼)	PSLV4-50125	100	1,000		
¼ - 20 (T-¾, S-¾)	PSLV4-7575	100	1,000		
¼ - 20 Knurled (T-¾, S-½)	PSLV4-7550K	100	1,000		
¼ - 20 (T-¾, S-1)	PSLV4-75100	100	1,000		
¼ - 20 (T-¾, S-1 ¼)	PSLV4-75125	100	1,000		
¼ - 20 (T-1, S-1)	PSLV4-100100	100	1,000		
¼ - 20 Knurled (T-1 ¼, S-½)	PSLV4-12550K	100	1,000		
¼ - 20 (T-1 ¼, S-1 ¼)	PSLV4-125125	100	1,000		

*Shank diameter is .150". NOTE: T = Thread Length, S = Shank Length.

See pages 211 and 214 for load value information.



PSLV4

¾" – 16 Threaded Studs* (Factory Mutual Listing-see below)

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
¾ - 16 Knurled (T-1 ¼, S-¾)	PSLV3-12575K	100	1,000	PT-27HD	Most other ¾" Barrel tools.
¾ - 16 (T-1 ¼, S-1)	PSLV3-125100	100	1,000		
¾ - 16 (T-1 ¼, S-1 ¼)	PSLV3-125125**	100	1,000		

*Shank diameter is .205". NOTE: T = Thread Length, S = Shank Length.

**Factory Mutual Listing 3031724

See pages 210, 211 and 214 for load value information.



PSLV3

Metric Fasteners
8MM Headed Fasteners with 3.68MM Shank Diameter

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
½ Knurled	PHN-14K	100	1,000	PTP-27L * PTP-27S ** PT-27 PT-22P PT-22 PT-22GS PT-22H	DX-350, DX-36, DX-400E, DX-A40, DX-460, DX-A41, System 1, DX-351 and 8mm tools.
⅝ Knurled	PHN-16K	100	1,000		
¾ Knurled	PHN-19K	100	1,000		
⅞	PHN-22	100	1,000		
1	PHN-27	100	1,000		
1 ¼	PHN-32	100	1,000		
1 ½	PHN-37	100	1,000		
1 ⅝	PHN-42	100	1,000		
1 ⅞	PHN-47	100	1,000		
2	PHN-52	100	1,000		
2 ¼	PHN-57	100	1,000		
2 ½	PHN-62	100	1,000		
2 ⅞	PHN-72	100	1,000		

*Up to 2 ½",

**Up to 1 ½"

See pages 209, 210 and 214 for load value information.



PHN

Fasteners For Simpson Strong-Tie® Powder-Actuated Tools**Metric Fasteners (Cont'd)****8MM Headed Fasteners with 3.68MM Shank Diameter and 1" Metal Washers**

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
1	PHNW-27	100	1,000	PTP-27L PTP-27S* PT-27 PT-22P PT-22 PT-22GS PT-22H	DX-350, DX-36, DX-400E, DX-A40, DX-A41, DX-460, System1, DX-351 and 8mm tools.
1¼	PHNW-32	100	1,000		
1½	PHNW-37	100	1,000		
1⅝	PHNW-42	100	1,000		
1⅞	PHNW-47	100	1,000		
2	PHNW-52	100	1,000		
2¼	PHNW-57	100	1,000		
2½	PHNW-62	100	1,000		
2⅞	PHNW-72	100	1,000		

*Up to 2"

See pages 209 and 214
for load value information.**6MM Headed Fasteners with 3.68MM Shank Diameter and 12MM Washers**

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools
7/8	PHK-22	100	1,000	DX-100L, DX-300, DX-400B, DX-450, DX-460, DX-451 and 12mm tools
1	PHK-27	100	1,000	
1¼	PHK-32	100	1,000	
1½	PHK-37	100	1,000	
1⅝	PHK-42	100	1,000	
2	PHK-52	100	1,000	
2½	PHK-62	100	1,000	
2⅞	PHK-72	100	1,000	

**8MM Headed Tophat Fasteners with 3.68MM Shank Diameter**

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
5/8 Knurled	PHNT-16K	100	1,000	PTP-27L, PTP-27S PT-27, PT-22P, PT-22 PT-22GS, PT-22H	DX-35, DX-351, and most 8mm tools
¾ Knurled	PHNT-19K	100	1,000		
7/8	PHNT-22	100	1,000		
1	PHNT-27	100	1,000		

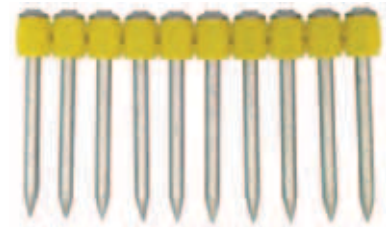
See pages 212–214 for
load value information.

Fasteners For Simpson Strong-Tie® Powder-Actuated Tools

Metric Fasteners (Cont'd)
Collated Fasteners - 8mm Headed with 3.68 MM Shank Diameter

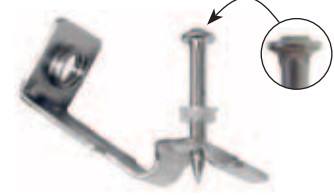
Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
½ Knurled	PHSNA-14K	100	1,000	PTP-27SMAGR (through 32mm) PTP-27LMAGR (through 72mm)	DX-A40 with magazine, DX-A41 with magazine, DX-351, DX-460 with magazine
⅝ Knurled	PHSNA-16K	100	1,000		
¾	PHSNA-19	100	1,000		
¾ Knurled	PHSNA-19K	100	1,000		
7⁄8	PHSNA-22	100	1,000		
1	PHSNA-27	100	1,000		
1 ¼	PHSNA-32	100	1,000		
1 ½	PHSNA-37	100	1,000		
1 ⅝	PHSNA-42	100	1,000		
1 7⁄8	PHSNA-47	100	1,000		
2	PHSNA-52	100	1,000		
2 ¼	PHSNA-57	100	1,000		
2 ½	PHSNA-62	100	1,000		
2 7⁄8	PHSNA-72	100	1,000		

See pages 209 and 214 for
load value information.


PHSNA
Threaded Rod Hangers - 8mm Headed with 3.68 MM Shank Diameter

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
1 ¼, 1 ½ - 20 Threaded Rod Hanger	PTRH4-HN32	50	500	PTP-27L, PTP-27S PT-27, PT-22P PT-22 PT-22GS, PT-22H	DX-351, DX-350, DX-36, DX-35, DX-A40
1 ¼, ¾ - 16 Threaded Rod Hanger	PTRH3-HN32	50	500		

See pages 210 and 212 for
load value information.


PTRH3
Concrete Forming Pin - .187" Headed with .145" Shank Diameter

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
¾ x 2 ½ Concrete Forming Pin	PKP-250	100	1,000	PTP-27L, PT-27 PT-22, PT-22GS PT-22H	DX-Series and 8mm tools


PKP

NOTE: Lengths in inches are for reference only and may not be exact.

Fasteners For Simpson Strong-Tie® Powder-Actuated Tools**Miscellaneous****1/4" Headed Hammer Drive Fastener with 3/8" Metal Washer**

Length (in.)	Model	Pack Qty.	Carton Qty.	Compatible Tools	
				Simpson Strong-Tie	Others
1/2	PHD-50	100	1,000	PHT-38	HT-38, R-260, R-375, XL-143, and other hammer drive tools
3/4	PHD-75	100	1,000		
1	PHD-100	100	1,000		
1 1/4	PHD-125	100	1,000		
1 1/2	PHD-150	100	1,000		
2	PHD-200	100	1,000		
2 1/2	PHD-250	100	1,000		
3	PHD-300	100	1,000		

**PHD**

**Manual Hammer
Tool (not for use with
powder loads)**

**PHT-38**

Warning: Do not use powder loads with this tool. This is a hammer drive tool only. Use of powder loads with this tool may result in injury or death.

Powder-Actuated Tool Repair and Maintenance Kits

Tool	Kit Model No.	Description	Contents
PT-27	PT-27PK1	Normal wear part replacement kit	5 Shear Clips (Part No. PT-301011)
			1 Annular Spring (Part No. PT-301014)
			1 Piston Stop (Part No. PT-301012)
			3 Ball Bearings (Part No. PT-301013)
			1 Piston (Part No. PT-301903)
			2 Piston Rings (Part No. PT-301208)
			1 Nosepiece (Part No. PT-301010)
All	PT-MK1	Tool cleaning kit	1 Cleaning Brush - Wire (Part No. BRUSH 125)
			1 Cleaning Brush 3/4" Diameter (Part No. BRUSH 25)
			1 Cleaning Brush 1/4" Diameter (Part No. BRUSH 75)
			1 PAT Tool Lubricant - 4 oz. spray bottle (Part No. PT-MTL4.0)
			(1) 1/8" Hex Wrench (Part No. MW-18)
			(1) 3/16" Hex Wrench (Part No. MW-316)
All	PT-MTL2.0	Tool lubricant	(1) 5mm Hex Wrench (Part No. MW-5)
			4 oz. spray bottle

ICC-ES Evaluation Report

ESR-2138*

Reissued February 2014

This report is subject to renewal March 1, 2015.

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DIVISION: 03 00 00—CONCRETE
Section: 03 16 00—Concrete Anchors
DIVISION: 04 00 00—MASONRY
Section: 04 05 19.16—Masonry Anchors
DIVISION: 05 00 00—METALS
Section: 05 05 23—Metal Fastenings
**DIVISION: 06 00 00—WOOD, PLASTICS AND
COMPOSITES**
**Section: 06 05 23—Wood, Plastic and Composite
Fastenings**
REPORT HOLDER:
**SIMPSON STRONG-TIE COMPANY INC.
5956 WEST LAS POSITAS BOULEVARD
PLEASANTON, CALIFORNIA 94588
(925) 560-9000**
www.strongtie.com
EVALUATION SUBJECT:
**SIMPSON STRONG-TIE® POWDER-ACTUATED
FASTENERS, THREADED STUDS AND ASSEMBLIES**

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2012, 2009 and 2006 *International Building Code*® (IBC)
- 2012, 2009 and 2006 *International Residential Code*® (IRC)

Property evaluated:

Structural

2.0 USES

The Simpson Strong-Tie® Powder-Actuated Fasteners and Threaded Studs are used to fasten building components, such as wood and steel, to normal-weight concrete, sand-lightweight concrete, steel deck with sand-lightweight concrete fill, structural steel, and hollow concrete masonry units (CMUs). The fasteners are alternatives to the cast-in-place anchors described in 2012 IBC Section 1908 (2009 and 2006 IBC Section 1911); the embedded anchors described in Section 2.1.4 of TMS 402/ACI 530/ASCE 5 (which is referenced in IBC Section 2107) for placement in grouted masonry; and the welds and bolts used to attach materials to structural steel, described in IBC Sections 2204.1 and 2204.2, respectively.

The Simpson Strong-Tie Ceiling Clip Assemblies are used to attach wire to concrete and the Simpson Strong-Tie Threaded Rod Hanger Assemblies are used to attach threaded steel rod to concrete.

The fasteners and assemblies may be used where an engineered design is submitted in accordance with IRC Section R301.1.3.

3.0 DESCRIPTION

3.1 Powder-Actuated Fasteners and Threaded Studs:

The fasteners and threaded studs are manufactured from steel complying with ASTM A510, Grades 1060 to 1065 or 10B60 to 10B65 and austempered to a Rockwell “C” core hardness of 51 to 56, except for PDPA headed fasteners, which are manufactured from steel complying with ASTM A510, Grade 1060, and austempered to a Rockwell “C” core hardness of 53 to 56. Unless otherwise noted in this report, the fasteners have a mechanically plated zinc finish complying with ASTM B695, Class 5, Type I. When installed with the powder-actuated fastening tool recommended by Simpson Strong-Tie®, the fasteners pierce the material being fastened and embed into the supporting concrete, structural steel or CMU substrate. See Table 1 for additional descriptions of the fasteners.

3.2 Powder-Actuated Assemblies:

Ceiling clip assemblies are comprised of a powder-actuated fastener and a steel angle (clip) which is mounted on the fastener at the manufacturing facility. The clip has a hole in the outstanding leg for attachment of ceiling wire.

Threaded rod hanger assemblies are comprised of a powder-actuated fastener and a steel bracket which is mounted on the fastener at the manufacturing facility. The bracket has a threaded hole in the outstanding leg for attachment of threaded rod.

See Table 1 for additional descriptions of the assemblies.

3.3 Substrate Materials:

3.3.1 Normal-weight Concrete: Normal-weight concrete must be stone-aggregate and comply with Chapter 19 of the IBC or Section R402.2 of the IRC, as applicable.

3.3.2 Sand-lightweight Concrete: Sand-lightweight concrete must comply with Chapter 19 of the IBC or Section R402.2 of the IRC, as applicable.

3.3.3 Concrete Masonry Units: Concrete masonry units (CMUs) must be minimum 8-inch-thick (203 mm) lightweight blocks complying with ASTM C90.

3.3.4 Structural Steel: Structural steel substrates must comply with the minimum requirements of ASTM A36 or ASTM A572, Grade 50, or ASTM A992, and have a thickness as noted in Table 3 of this report.

3.3.5 Steel Deck: Where fasteners are placed through a steel deck into sand-lightweight concrete in accordance

*Corrected June 2014

with Table 7, the steel deck must comply with the applicable reference standard and with the applicable footnotes to Table 7.

3.3.6 Sill Plates: Sill plates must be nominal 2-inch-thick naturally durable wood complying with the definition in 2012 IBC Section 202 (2009 and 2006 IBC Section 2302) or IRC Section R202, as applicable, or wood that has been preservative-treated in accordance with IBC Section 2303.1.8 or 2012 and 2009 IRC Section R317.1 (2006 IRC Section R319.1), as applicable.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: Allowable shear, tension (pullout) and oblique load values in the tables of this report are for use with allowable stress design, and are for fasteners driven into the materials specified in the tables and for the attachment of the premounted accessories to the fastener. Members fastened to the substrates must be designed in accordance with the applicable code and code-referenced standards. Oblique loads are applied at a 45-degree angle with respect to the axis of the fastener. The stress increases and load reductions described in IBC Section 1605.3 are not allowed for wind loads acting alone or combined with vertical loads. No adjustments are allowed for vertical loads acting alone.

Allowable tension, shear and oblique load values for Simpson Strong-Tie Powder-Actuated Fasteners, Threaded Studs and Assemblies driven into different base materials may be determined by referencing the applicable tables listed in Table 1.

Allowable loads for fasteners subjected to combined shear and tension loads may be calculated by the following equation:

$$(p/P_a) + (v/V_a) \leq 1.0$$

where:

- p = Actual tension load on fastener, lbf (N).
- P_a = Allowable tension load on fastener, lbf (N).
- v = Actual shear load on fastener, lbf (N).
- V_a = Allowable shear load on fastener, lbf (N).

4.1.2 Wood-to-Concrete Connections: Lateral design values for nails with diameters equal to or less than the diameter of the Simpson Strong-Tie® fasteners and penetration into the main member of 10 fastener diameters, determined in accordance with Part 11 and/or Table 11N of the ANSI/AF&PA NDS are applicable to the Simpson Strong-Tie fasteners. The wood element is the side member. The fastener bending yield strength must be limited to the value noted in the footnotes to Table 11N of ANSI/AF&PA NDS, based on the shank diameter of the Simpson Strong-Tie fasteners.

4.1.3 Sill Plate to Foundation Connections:

4.1.3.1 General: The fasteners listed in Tables 5 and 6 may be used to attach wood sill plates to the concrete foundation under the following conditions:

1. No cold joint exists, between the slab and foundation, below the sill plate.
2. The sill plate is not installed on slabs supported by masonry foundation walls.

4.1.3.2 Design: The fasteners listed in Table 5 may be used to attach wood sill plates to concrete for structural walls in areas classified as Seismic Design Category A or B. Table 5 specifies the allowable fastener shear and

tension loads for attachment of wood sill plates to concrete foundations. Bearing area and thickness of the washers, are also given in Table 5. For shear loads, spacing of fasteners must be determined considering the lesser of allowable shear load from Table 5 and allowable load on the wood sill plate, determined in accordance with the NDS, with a fastener bending yield strength, $F_{yb} = 90,000$ psi (621 MPa) and a concrete dowel bearing strength, $F_e = 7,500$ psi (52 MPa). For tension loads, spacing of fasteners must be determined considering the lesser of allowable tension load from Table 5 and pull through capacity of the wood sill plate, based on Section 3.10 of the NDS, using the washer bearing area from Table 5.

The fasteners listed in Table 6 may be used to attach wood sill plates to concrete for interior, nonstructural walls [maximum horizontal transverse load on the wall must not exceed 5 psf (0.24 kN/m²)] in Seismic Design Categories A through F, when installed as described in Table 6.

4.1.4 Seismic Considerations:

4.1.4.1 Use with Structural Components: Resistance to seismic loads is outside the scope of this report. Therefore, except as noted in Section 4.1.3.2, the suitability of the fasteners and assemblies for use with structural components that are subjected to seismic loads is outside the scope of this report.

4.1.4.2 Use with Nonstructural Components: Seismic load resistance is outside the scope of this report, except when used as described in Section 4.1.3.2 or when use is with architectural, mechanical and electrical components described in Section 13.1.4 of ASCE 7, and as follows:

- Concrete base materials: The fasteners and assemblies installed in concrete may be used to support acoustical tile or lay-in panel suspended ceiling systems, distributed systems and distribution systems where the service load on any individual fastener does not exceed the lesser of 90 lbf (400 N) or the published allowable load in Tables 2, 4 and 7, as applicable.
- Steel base materials: The fasteners and assemblies installed in steel may be used where the service load on any individual fastener does not exceed the lesser of 250 lbf (1112 N) or the published allowable load shown in Table 3.
- For interior, nonstructural walls that are not subject to sustained tension loads and are not a bracing application, the fasteners may be used to attach steel track to concrete or steel in all Seismic Design Categories. In Seismic Design Categories D, E, and F, the allowable shear load due to transverse pressure shall be no more than 90 pounds (400 N) when attaching to concrete; or 250 pounds (1,112 N) when attaching to steel. Substantiating calculations shall be submitted addressing the fastener-to-base-material capacity and the fastener-to-attached-material capacity. Interior nonstructural walls are limited to locations where bearing walls, shear walls or braced walls are not required by the approved plans. The design load on the fastener must not exceed the allowable load established in this report for the concrete or steel base material.

4.2 Installation:

The installation of fasteners requires a powder-actuated fastening tool, recommended by Simpson Strong-Tie, used in accordance with the manufacturer's published installation instructions. The fastener size, minimum penetration, minimum spacing, and edge distances must comply with Tables 2 through 8, as applicable. For

fasteners installed into concrete, the fasteners must not be driven until the concrete has reached the designated compressive strength.

5.0 CONDITIONS OF USE

The Simpson Strong-Tie® Powder-Actuated Fasteners, Threaded Studs and Assemblies described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Fasteners must be installed in accordance with this report and Simpson Strong-Tie published installation instructions. In the event of a conflict between this report and the Simpson Strong-Tie published installation instructions, this report governs.
- 5.2 Fasteners must not be used in preservative-treated wood or fire-retardant-treated wood, except for the mechanically galvanized fasteners (with MG in the designation), which may be used to attach preservative-treated wood to concrete.
- 5.3 Installation is limited to dry, interior environments.
- 5.4 See Section 4.1.4 for seismic considerations.
- 5.5 Allowable loads must comply with Section 4.1. Calculations demonstrating that the applied loads are less than the maximum allowable loads described in this report must be submitted to the code official. The calculations must be prepared by a registered design

professional where required by the statutes of the jurisdiction in which the project is to be constructed.

- 5.6 For fasteners installed into concrete, the minimum concrete thickness must be three times the fastener embedment in concrete, except where noted otherwise in this report.

- 5.7 Use in concrete is limited to uncracked concrete. Cracking occurs when $f_t > f_r$ due to service loads or deformations.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Fasteners Power-driven into Concrete, Steel and Masonry Elements (AC70), dated February 2013.

7.0 IDENTIFICATION

Containers of the fasteners are labeled with the Simpson Strong-Tie Company, Inc. name and address; the fastener product size and type; the evaluation report number (ESR-2138); and the manufacturing date and lot number. In addition, the fastener heads are identified with one of the following markings:



TABLE 1—SIMPSON STRONG-TIE® POWDER-ACTUATED FASTENERS AND ASSEMBLIES¹

FASTENERS (see Figure 1)					
FASTENER MODEL NUMBER	SHANK TYPE	SHANK DIAMETER (inch)	NOMINAL HEAD DIAMETER (inch, u.o.n.) ³	FASTENER GALVANIZATION	APPLICATION TABLES
PDP-XX	Smooth	0.145	0.300	ASTM B695 Class 5, Type 1	2, 3, 4, 8
PDP-XXK ²	Knurled	0.145	0.300	ASTM B695 Class 5, Type 1	3
PDP-XXMG	Smooth	0.145	0.300	ASTM B695 Class 65, Type 1	2, 3, 4, 8
PDPA-XX	Smooth	0.157	0.300	ASTM B695 Class 5, Type 1	2, 3, 7, 8
PDPA-XXK ²	Knurled	0.157	0.300	ASTM B695 Class 5, Type 1	3
PDPA-XXMG	Smooth	0.157	0.300	ASTM B695 Class 65, Type 1	2, 3, 7, 8
PDPH-XX	Smooth	0.177	0.300	ASTM B695 Class 5, Type 1	2, 3
PDPH-XXK ²	Knurled	0.177	0.300	ASTM B695 Class 5, Type 1	3
PHN-YY	Smooth	0.145	8 mm	ASTM B695 Class 5, Type 1	2, 3, 4
PHN-YYK ²	Knurled	0.145	8 mm	ASTM B695 Class 5, Type 1	3
FASTENERS WITH PREMOUNTED FLAT WASHERS (see Figure 2)					
ASSEMBLY MODEL NUMBER	FASTENER	WASHER DESCRIPTION	WASHER MATERIAL & GALVANIZATION	APPLICATION TABLES	
PDPAW-XX	PDPA-XX	³ / ₄ inch diameter, 0.070 inch thick	Carbon steel w/ electroplated zinc coating	2, 3, 7, 8	
PDPAWL-XX	PDPA-XX	1 inch diameter, 0.070 inch thick	Carbon steel w/ electroplated zinc coating	2, 3, 7, 8	
PDPW-300	PDP-300	³ / ₄ inch diameter, 0.070 inch thick	Carbon steel w/ electroplated zinc coating	5, 6	
PDPWL-300	PDP-300	1 inch diameter, 0.070 inch thick	Carbon steel w/ electroplated zinc coating	5, 6	
PDPWL-300MG	PDP-300MG	1 inch diameter, 0.055 inch thick	Carbon steel, ASTM B695 Class 65, Type 1	5, 6	
PDPWLS-300MG	PDP-300MG	1 inch square, 0.055 inch thick	Carbon steel, ASTM B695 Class 65, Type 1	5, 6	

TABLE 1—SIMPSON STRONG-TIE® POWDER-ACTUATED FASTENERS AND ASSEMBLIES¹ (Continued)

FASTENERS WITH PREMOUNTED FLAT WASHERS (see Figure 2)				
PDPAW-287	PDPA-287	$\frac{3}{4}$ inch diameter, 0.070 inch thick	Carbon steel w/ electroplated zinc coating	5, 6
PDPAWL-287	PDPA-287	1 inch diameter, 0.070 inch thick	Carbon steel w/ electroplated zinc coating	5, 6
PDPAWL-287MG	PDPA-287MG	1 inch diameter, 0.070 inch thick	Carbon steel, ASTM B695 Class 65, Type 1	5, 6
PDPAWLS-287	PDPA-287	1 inch square, 0.055 inch thick	Carbon steel w/ electroplated zinc coating	5, 6
PDPAWLS-287MG	PDPA-287MG	1 inch square, 0.055 inch thick	Carbon steel, ASTM B695 Class 65, Type 1	5, 6
PHNW-72	PHN-72	1 inch diameter, 0.070 inch thick	Carbon steel w/ electroplated zinc coating	5, 6
FASTENERS WITH PREMOUNTED TOPHAT WASHERS (see Figure 3)				
ASSEMBLY MODEL NUMBER	FASTENER	WASHER DESCRIPTION	WASHER MATERIAL & GALVANIZATION	APPLICATION TABLES
PDPT-XX	PDP-XX	Tophat	Aluminum	3, 7
PDPT-XXK ²	PDP-XXK	Tophat	Aluminum	3
PDPAT-XX	PDPA-XX	Tophat	Carbon steel w/ electroplated zinc coating	2, 3, 7
PDPAT-XXK ²	PDPA-XXK	Tophat	Carbon steel w/ electroplated zinc coating	3
PHNT-YY	PHN-YY	Tophat	Aluminum	3, 7
PHNT-YYK ²	PHN-YYK	Tophat	Aluminum	3
THREADED STUDS (see Figure 4)				
FASTENER MODEL NUMBER	SHANK TYPE	SHANK DIAMETER (inch) / THREADS	FASTENER GALVANIZATION	APPLICATION TABLES
PSLV3-XXZZ	Smooth / Threaded	0.205 / $\frac{3}{8}$ -16	ASTM B695 Class 5, Type 1	2, 3, 7
PSLV3-XXZZK ²	Knurled / Threaded	0.205 / $\frac{3}{8}$ -16	ASTM B695 Class 5, Type 1	3
PSLV4-XXZZ	Smooth / Threaded	0.150 / $\frac{1}{4}$ -20	ASTM B695 Class 5, Type 1	3, 7
CEILING CLIP ASSEMBLIES (see Figure 5)				
ASSEMBLY MODEL NUMBER	FASTENER	CLIP DESCRIPTION	CLIP MATERIAL & GALVANIZATION	APPLICATION TABLES
PCLDP-XX	PDPT-XX	0.075 inch thick, 90° clip angle	Carbon steel w/ electroplated zinc coating	7
PECLDP-125	PDP-125	0.075 inch thick, 120° clip angle	Carbon steel w/ electroplated zinc coating	7
PCLDPA-XX	PDPAT-XX	0.075 inch thick, 90° clip angle	Carbon steel w/ electroplated zinc coating	2, 7
PECLDPA-XX	PDPA-XX	0.075 inch thick, 120° clip angle	Carbon steel w/ electroplated zinc coating	2, 7
THREADED ROD HANGER ASSEMBLIES (see Figure 6)				
ASSEMBLY MODEL NUMBER	FASTENER	BRACKET DESCRIPTION	BRACKET MATERIAL & GALVANIZATION	APPLICATION TABLES
PTRH3-HN32	PHN-32	0.075 inch thick with $\frac{3}{8}$ -16 threaded eyelet	Carbon steel w/ electroplated zinc coating	2, 7
PTRH4-HN32	PHN-32	0.075 inch thick with $\frac{1}{4}$ -20 threaded eyelet	Carbon steel w/ electroplated zinc coating	2, 7
PTRHA3-XX	PDPA-XX	0.075 inch thick with $\frac{3}{8}$ -16 threaded eyelet	Carbon steel w/ electroplated zinc coating	2, 7
PTRHA4-XX	PDPA-XX	0.075 inch thick with $\frac{1}{4}$ -20 threaded eyelet	Carbon steel w/ electroplated zinc coating	2, 7

For SI: 1 inch = 25.4 mm.

¹The XX designation in the model number represents the fastener length expressed in inches multiplied by 100. The YY designation in the model number represents the fastener length expressed in mm. For threaded studs, the XX and ZZ designations represent the length of the threaded portion of the fastener and the length of the unthreaded portion of the fastener, expressed in inches multiplied by 100, respectively. The fastener must be long enough to provide for the minimum penetration or minimum embedment required in in Tables 2 through 8, as applicable.

²The K at the end of the designation denotes a knurled fastener.

³u.o.n. = unless otherwise noted

TABLE 2—ALLOWABLE LOADS IN NORMAL-WEIGHT CONCRETE (lbf)¹

FASTENER MODEL NUMBER	SHANK DIAMETER (inch)	MINIMUM PENETRATION (inches)	MINIMUM EDGE DISTANCE (inches)	MINIMUM SPACING (inches)	CONCRETE COMPRESSIVE STRENGTH									
					2,000 psi		2,500 psi		3,000 psi		4,000 psi		6,000 psi	
Load Direction for Fasteners and Threaded Rod Hanger Assemblies and Threaded Studs:					Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear
FASTENERS														
PDP-XX	0.145	1	3	4	45	120	70	140	100	165	150	205	150	205
		1¼	3	4	140	265	195	265	255	265	370	265	370	265
PHN-YY	0.145	¾	3	4	-	-	-	-	-	-	60	95	-	-
		1	3	4	45	120	70	140	100	165	150	205	150	205
		1¼	3	4	140	265	195	265	255	265	370	265	370	265
PDPA-XX PDPAT-XX PDPAW-XX PDPAWL-XX	0.157	¾	3.5	5	-	-	110	120	110	125	110	135	110	130
		1	3.5	5	-	-	210	285	240	290	310	310	160	350
		1¼	3.5	5	-	-	320	360	340	380	380	420	365	390
		1½	3.5	5	-	-	375	405	400	430	450	485	465	495
PDPH-XX	0.177	¾	3.5	5	30	50	30	65	30	80	30	110	115	195
		1¼	3.5	5	130	265	160	250	195	240	260	220	190	105
THREADED ROD HANGER ASSEMBLIES														
PTRH3- HN32	0.145	1	3	4	-	-	155	-	-	-	-	-	-	-
PTRH4- HN32	0.145	1	3	4	-	-	150	-	-	-	-	-	-	-
PTRHA3-106 PTRHA4-106	0.157	1	3.5	5	180	-	-	-	-	-	190	-	180	-
PTRHA3-131 PTRHA4-131		1¼	3.5	5	185	-	-	-	-	-	220	-	190	-
THREADED STUDS														
PSLV3- 125125	0.205	1¼	4	6	-	-	260	-	-	-	-	-	-	-
CEILING CLIP ASSEMBLIES														
Load Direction for Ceiling Clip Assemblies:					Tension	Oblique	Tension	Oblique	Tension	Oblique	Tension	Oblique	Tension	Oblique
PCLDPA-106	0.157	1	3.5	5	175	255	-	-	-	-	180	240	190	245
PCLDPA-131		1¼	3.5	5	210	250	-	-	-	-	210	265	190	265
PECLDPA- 131	0.157	1	3.5	5	180	225	-	-	-	-	155	230	180	255

For **SI**: 1 inch = 25.4 mm, 1 psi = 6.89 kPa, 1 lbf = 4.45 N.¹The fasteners must not be driven until the concrete has reached the designated minimum compressive strength, or the minimum compressive strength specified in the applicable code, whichever is greater.

TABLE 3—ALLOWABLE LOADS IN STEEL (lbf)¹

FASTENER MODEL NUMBER	SHANK DIAMETER (inch)	MINIMUM EDGE DISTANCE (inch)	MINIMUM SPACING (inches)	STEEL THICKNESS (inches)									
				³ / ₁₆		¹ / ₄		³ / ₈		¹ / ₂		³ / ₄	
Load Direction for Fasteners and Threaded Studs:				Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear
FASTENERS IN A36 STEEL													
PDP - XX PDP-XXK	0.145	0.5	1.0	155	395	—	—	-	-	-	-	-	-
PHN - YY PHN-YYK	0.145	0.5	1.0	155	395	—	—	-	-	-	-	-	-
PDPT - XX PDPT-XXK	0.145	0.5	1.0	290	660	340	700	-	-	-	-	-	-
PHNT - YY PHNT-YYK	0.145	0.5	1.0	50	620	250	620	-	-	-	-	-	-
PDPA-XX PDPA-XXK PDPAT-XX PDPAT-XXK PDPAW-XX PDPAWL-XX	0.157	0.5	1.0	260	410	370	365	380 ⁶	385 ⁶	530 ⁶	385 ⁶	195 ³	325 ³
PDPH - XX PDPH-XXK	0.177	0.5	1.0	340	790	520	870	-	-	-	-	-	-
FASTENERS IN A572 OR A992 STEEL													
PDPA-XX PDPA-XXK PDPAT-XX PDPAT-XXK PDPAW-XX PDPAWL-XX	0.157	0.5	1.0	305	420	335	365	355 ⁶	290 ⁶	485 ⁴	275 ⁴	170 ⁵	275 ⁵
THREADED STUDS IN A36 STEEL ²													
PSLV3-XXZZ	0.205	1.0	1.5	270	770	680	1120	-	-	-	-	-	-
PSLV3 -12575 K	0.205	1.0	1.5	270	930	870	1130	-	-	-	-	-	-
PSLV4 - XXZZ	0.150	0.5	1.0	200	630	420	690	-	-	-	-	-	-

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

¹The entire pointed portion of the fastener must penetrate through the steel to obtain the tabulated values, unless otherwise noted.

²The shank diameters are of the smooth or knurled shank portion of the threaded fastener. The smooth shank portion must be long enough to provide for the minimum penetration.

³Based upon a minimum penetration depth of 0.46 inch (11.7 mm).

⁴Based upon a minimum penetration depth of 0.58 inch (14.7 mm), which can be achieved due to deformation of the steel base material.

⁵Based upon a minimum penetration depth of 0.36 inch (9.1 mm).

⁶The fastener must be driven to where at least some of the point of the fastener penetrates through the steel.

TABLE 4—ALLOWABLE LOADS WHEN ATTACHING STEEL ANGLES AND CHANNELS TO NORMAL-WEIGHT CONCRETE (lbf)¹

FASTENER MODEL NUMBER	SHANK DIAMETER (inch)	PENETRATION (inches)	ATTACHED ITEM	CONCRETE COMPRESSIVE STRENGTH (psi)	TYPE OF LOAD	ALLOWABLE LOAD
PDP-125	0.145	¹ / ₈	Angle clip ²	2,000	Tension	25
PHN-32	0.145	¹ / ₈	Angle clip ²	2,000	Tension	25
PDP-150	0.145	¹ / ₄	Angle clip ²	2,000	Tension	85
PHN-32	0.145	¹ / ₄	Angle clip ²	2,000	Tension	85
PDP-100	0.145	⁷ / ₈	No. 20 gage ³ steel channel	2,000	Shear	160
PHN-22	0.145	⁷ / ₈	No. 20 gage ³ steel channel	2,000	Shear	160
PDP-100	0.145	⁷ / ₈	No. 18 gage ³ steel channel	2,000	Shear	135
PHN-22	0.145	⁷ / ₈	No. 18 gage ³ steel channel	2,000	Shear	135

For **SI**: 1 inch = 25.4 mm, 1 psi = 6.89 kPa, 1 lbf = 4.45 N.

¹The fasteners must not be driven until the concrete has reached the designated minimum compressive strength, or the minimum compressive strength specified in the applicable code, whichever is greater.

²The angle clip is used to attach wire to the supporting concrete. The angle clip must be formed from steel having a minimum base metal thickness of 0.080 inch, and must have a dimension from the center of the hole through which the fastener is installed to the outstanding leg of the angle of 1 inch or less. Values in the table are for the fastener only. Capacity of the angle clip is outside the scope of this report.

³The Nos. 18 and 20 gage steel channels (drywall tracks) must have minimum base-metal thicknesses of 0.0478 and 0.0377 inch, respectively, and must be formed from steel having a minimum specified yield stress of 33 ksi. Values in the table are for the fastener installed in concrete only. Capacity of the channels is outside the scope of this report.

TABLE 5—ALLOWABLE LOADS ON FASTENERS USED TO ATTACH WOOD SILL PLATES TO NORMAL-WEIGHT CONCRETE^{3,4,5,6}

FASTENER MODEL NUMBER ⁴	OVERALL LENGTH (inches)	NOMINAL HEAD DIAMETER (inch)	SHANK DIAMETER (inch)	WASHER THICKNESS (inch)	WASHER BEARING AREA (in ²)	ALLOWABLE LOAD (lbf)	
						Tension	Shear
PHNW-72 ¹	2 ⁷ / ₈	0.315	0.145	0.070	0.770	125	150
PDPW-300 ¹	3	0.300	0.145	0.070	0.426	100	100
PDPWL-300 ¹ , PDPWL-300MG ¹	3	0.300	0.145	0.070	0.770	100	100
PDPWLS-300MG ¹	3	0.300	0.145	0.055	0.970	100	100
PDPAW-287 ²	2 ⁷ / ₈	0.300	0.157	0.070	0.424	200	205
PDPAWL-287 ² PDPAWL-287MG ²	2 ⁷ / ₈	0.300	0.157	0.070	0.767	200	205
PDPAWLS-287 ² PDPAWLS-287MG ²	2 ⁷ / ₈	0.300	0.157	0.055	0.970	200	205

For **SI**: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lbf = 445 N, 1 psi = 6.89 kPa.

¹The fasteners must not be driven until the concrete has reached a minimum compressive strength of 2,000 psi, or the minimum compressive strength specified in the applicable code, whichever is greater.

²The fasteners must not be driven until the concrete has reached a minimum compressive strength of 2,500 psi, or the minimum compressive strength specified in the applicable code, whichever is greater.

³Minimum edge distance is 1³/₄ inches (44 mm).

⁴Wood members connected to the substrate must be investigated for compliance with the applicable code in accordance with referenced design criteria, for both lateral resistance and fastener pull-through.

⁵Only mechanically galvanized fasteners (with 'MG' in the designation) may be used to attach preservative-treated wood to concrete. Preservative-treated wood must be as described in IBC Section 2303.1.8 or IRC Section R317.1, as applicable.

⁶Minimum spacings shall be 4 inches on center or shall comply with Section 11.1.5 of the NDS to prevent splitting of the wood.

TABLE 6—LOAD AND SPACING REQUIREMENTS FOR WOOD SILL PLATE ANCHORAGE OF INTERIOR NONSTRUCTURAL WALLS^{3,4,6,7,9,10}

FASTENER TYPE	NOMINAL FASTENER SHANK LENGTH (inches)	NOMINAL FASTENER SHANK DIAMETER (inch)	EMBEDMENT	CONCRETE EDGE DISTANCE (inches)	FASTENER SPACING ^{5,8} (ft.)	MAXIMUM WALL HEIGHT (ft.)
PDPW-300 ¹ PDPWL-300 ¹ PDPWL-300MG ¹ PDPWLS-300MG ¹	3	0.145	Washer bearing on sill plate	1 ³ / ₄	2	14
PHNW-72 ¹	2 ⁷ / ₈	0.145		1 ³ / ₄	3	14
PDPAW-287 ² PDPAWL-287 ² PDPAWL-287MG ² PDPAWLS-287 ² PDPAWLS-287MG ²	2 ⁷ / ₈	0.157		1 ³ / ₄	4	14

For **SI**: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 psi = 6.89 kPa.

¹The fasteners must not be driven until the concrete has reached a minimum compressive strength of 2,000 psi, or the minimum compressive strength specified in the applicable code, whichever is greater.

²The fasteners must not be driven until the concrete has reached a minimum compressive strength of 2,500 psi, or the minimum compressive strength specified in the applicable code, whichever is greater.

³Interior nonstructural walls are limited to locations where bearing walls, shear walls or braced walls are not required by the approved plans.

⁴Fasteners shall be driven into the center of the nominally 2-inch-thick wood sill plate and be at least 1³/₄ inch from the concrete edge.

⁵Walls shall have fasteners placed at 6 inches from ends of sill plates with maximum spacing between, as shown in this table.

⁶Walls shall be laterally supported at the top and the bottom.

⁷Sill or bottom plates shall comply with IBC Section 2304 and be of lumber with a specific gravity of 0.50 or greater.

⁸Minimum spacings shall be 4 inches on center or shall comply with Section 11.1.5 of the NDS to prevent splitting of the wood.

⁹Only mechanically galvanized fasteners (with 'MG' in the designation) are suitable for use in contact with treated wood in accordance with IBC Section 2304.9.5 and IRC Section R317.3.

¹⁰The maximum horizontal transverse load on the wall, in accordance with IBC Section 1607.14, shall be 5 psf (0.24 kN/m²).

TABLE 7—ALLOWABLE LOADS IN MINIMUM 3,000 psi SAND-LIGHTWEIGHT CONCRETE AND SAND-LIGHTWEIGHT CONCRETE FILLED STEEL DECK (lb^f)¹

FASTENER MODEL NUMBER	SHANK DIAMETER (inch)	MINIMUM EMBEDMENT (inches)	INSTALLED DIRECTLY INTO CONCRETE ⁵		INSTALLED THROUGH LOWER FLUTE OF STEEL DECK INTO CONCRETE					
					3" Deep Deck with 3 1/4" Concrete Fill ²	3" Deep Deck with 2 1/2" Concrete Fill ³	1 1/2" Deep Deck with 2" Concrete Fill ⁴			
Load Direction for Fasteners and Threaded Studs:			Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear
FASTENERS										
PDPA-XX PDPAT-XX PDPAW-XX PDPAWL-XX	0.157	3/4	85	105	105	280	—	—	160	275
		1	150	225	145	280	—	—	210	370
		1 1/4	320	420	170	320	—	—	265	460
		1 1/2	385	455	325	520	—	—	—	—
PDPT-XX	0.145	7/8	85	250	40	275	—	—	—	—
PHNT-YY	0.145	7/8	185	275	165	400	—	—	—	—
THREADED STUDS										
PSLV4 - XXZZ	0.150	1	—	—	80	—	—	—	—	—
PSLV3 -125125	0.205	1 1/4	—	—	225	—	—	—	—	—
CEILING CLIP ASSEMBLIES										
Load Direction for Ceiling Clip Assemblies:			Tension	Oblique	Tension	Oblique	Tension	Oblique	Tension	Oblique
PCLDP -100; PCLDP-125	0.145	7/8	—	—	55	85	—	—	—	—
PCLDP -125	0.145	1	—	—	55	85	—	—	—	—
PECLDP -125	0.145	1	—	—	55	85	—	—	—	—
PCLDPA-106	0.157	1	—	—	—	—	140	175	160	240
PCLDPA-131		1 1/4	—	—	—	—	160	185	180	280
PECLDPA-131	0.157	1	—	—	—	—	120	145	135	175
THREADED ROD HANGER ASSEMBLIES										
Load Direction for Threaded Rod Hanger Assemblies:			Tension		Tension		Tension		Tension	
PTRH3 - HN32	0.145	1	—		140		—		—	
PTRH4 - HN32	0.145	1	—		140		—		—	
PTRHA3-106 PTRHA4-106	0.157	1	—		—		160		175	
PTRHA3-131 PTRHA4-131		1 1/4	—		—		160		175	

For **SI**: 1 lb^f = 4.448 N, 1 inch = 25.4 mm, 1 psi = 6.89 kPa.

¹Fasteners shall not be driven until the concrete has reached a minimum concrete compressive strength of 3,000 psi.

²The steel deck must have a minimum thickness of 20 gage (0.0359-inch-thick base-steel thickness) and a minimum yield strength of 38,000 psi. Figure 7 shows nominal flute dimensions, fastener locations, and tension and shear load orientations. Oblique loads are applied at a 45-degree angle to the fastener. The fastener must be a minimum of 1 1/2 inches from the edge of the deck web and 4 inches from the end of the deck. The minimum fastener spacing is 4 inches.

³The steel deck must have a minimum thickness of 20 gage (0.0359-inch-thick base-steel thickness) and a minimum yield strength of 38,000 psi. Figure 8 shows nominal flute dimensions, fastener locations, and tension and shear load orientations. Oblique loads are applied at a 45-degree angle to the fastener. The fastener must be a minimum of 1 1/2 inches from the edge of the deck web and 4 inches from the end of the deck. The minimum fastener spacing is 4 inches.

⁴The steel deck must have a minimum thickness of 20 gage (0.0359-inch-thick base-steel thickness) and a minimum yield strength of 38,000 psi. Figure 9 shows nominal flute dimensions, fastener locations, and tension and shear load orientations. Oblique loads are applied at a 45-degree angle to the fastener. The fastener must be a minimum of 7/8 inches from the edge of the deck web and 4 inches from the end of the deck. The minimum fastener spacing is 4 inches.

⁵Minimum edge distance must be 3 1/2 inches and minimum spacing must be 4 inches.

TABLE 8—ALLOWABLE LOADS IN HOLLOW CONCRETE MASONRY UNITS (CMUs)^{1,2,3,4}

FASTENER MODEL NUMBER	SHANK DIAMETER (inch)	MINIMUM CMU FACE SHELL THICKNESS (inches)	HOLLOW CMU	
			Face Shell	
			Tension (lbf)	Shear (lbf)
PDP - XX	0.145	1 ¹ / ₄	110	200
PDPA-XX PDPAW-XX PDPAWL-XX	0.157	1 ¹ / ₄	125	210

For **SI**: 1 lbf = 4.448 N, 1 inch = 25.4 mm.

¹The tabulated allowable load values are for fasteners installed in hollow lightweight CMUs conforming to ASTM C90. The minimum allowable nominal size of the CMU must be 8 inches high by 8 inches wide by 16 inches long, with a minimum, 1¹/₄-inch-thick face shell thickness.

²The tabulated allowable load values are for fasteners installed in the center of a hollow CMU face shell. Allowable loads for fasteners installed in mortar head and bed joints, or into the web of the CMU, are outside the scope of this report.

³The entire pointed portion of the fastener must penetrate through the thickness of the face shell to obtain the tabulated values.

⁴No more than one fastener may be installed in an individual hollow CMU cell.

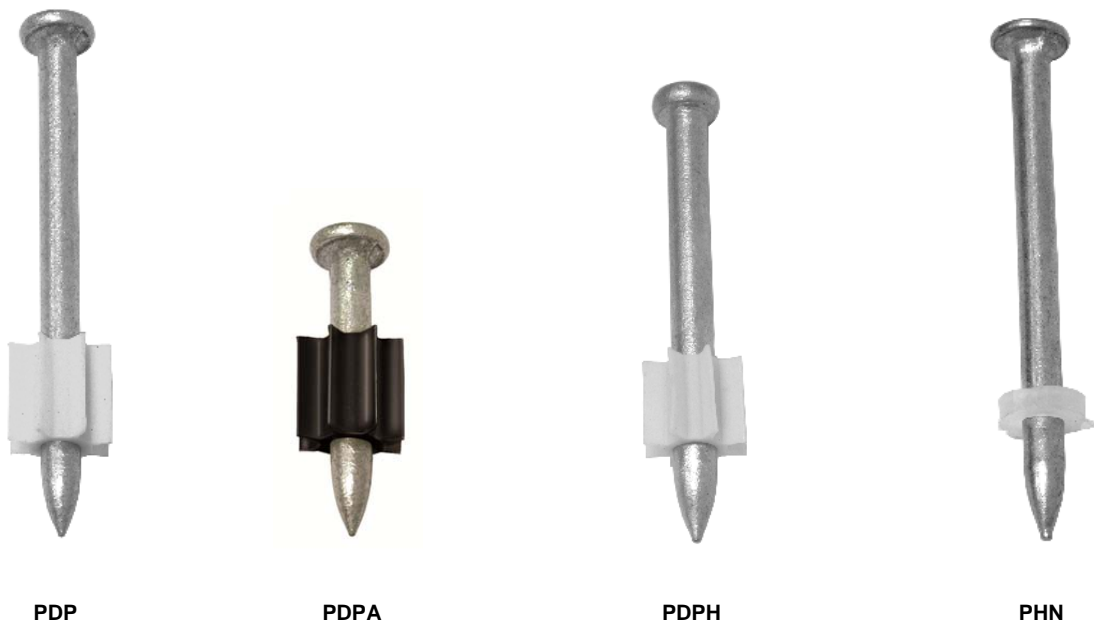


FIGURE 1—FASTENERS



FIGURE 2—FASTENERS WITH PREMOUNTED FLAT WASHERS



FIGURE 3—FASTENERS WITH PREMOUNTED TOPHAT WASHERS

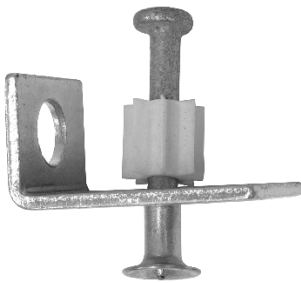


PSLV3

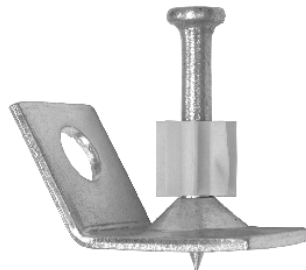


PSLV4

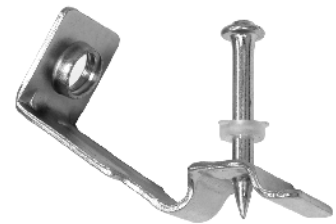
FIGURE 4—THREADED STUDS



PCLDP



PECLDP



PTRH3



PCLDPA



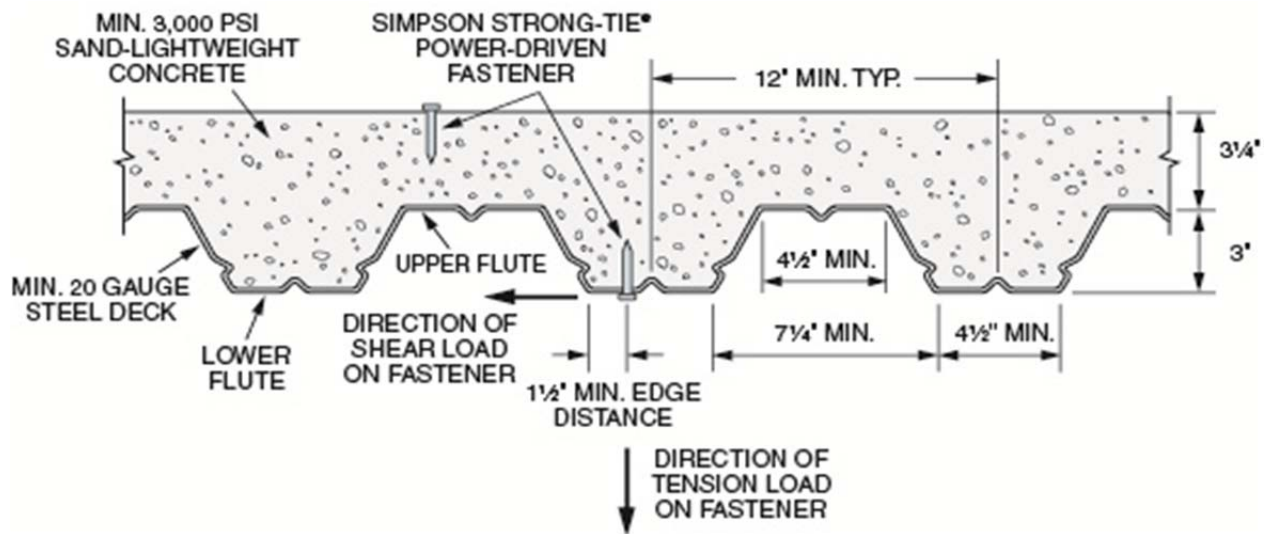
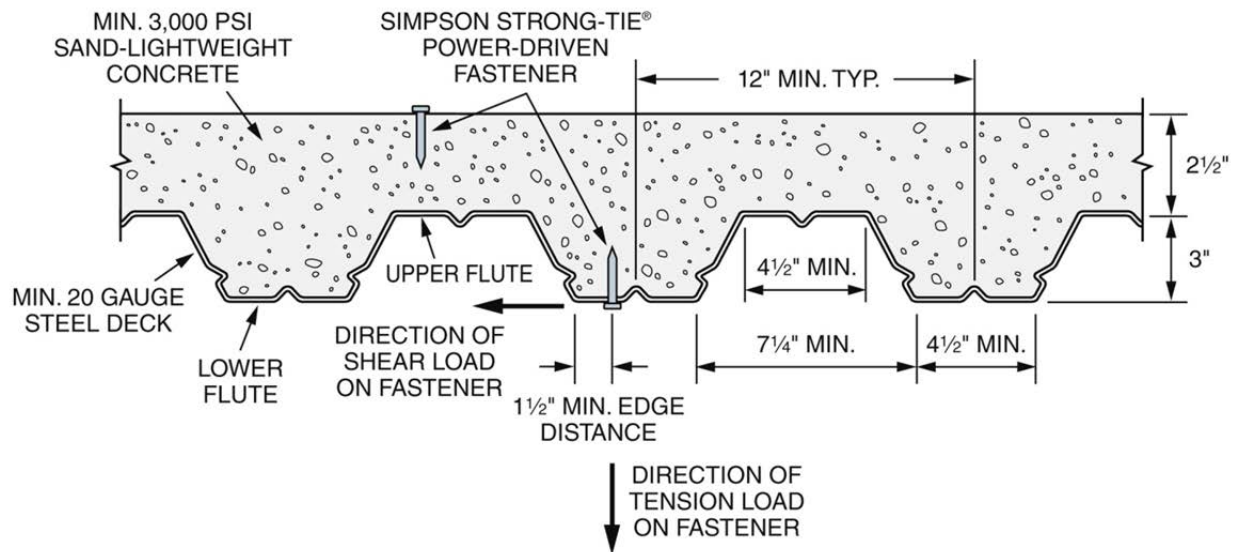
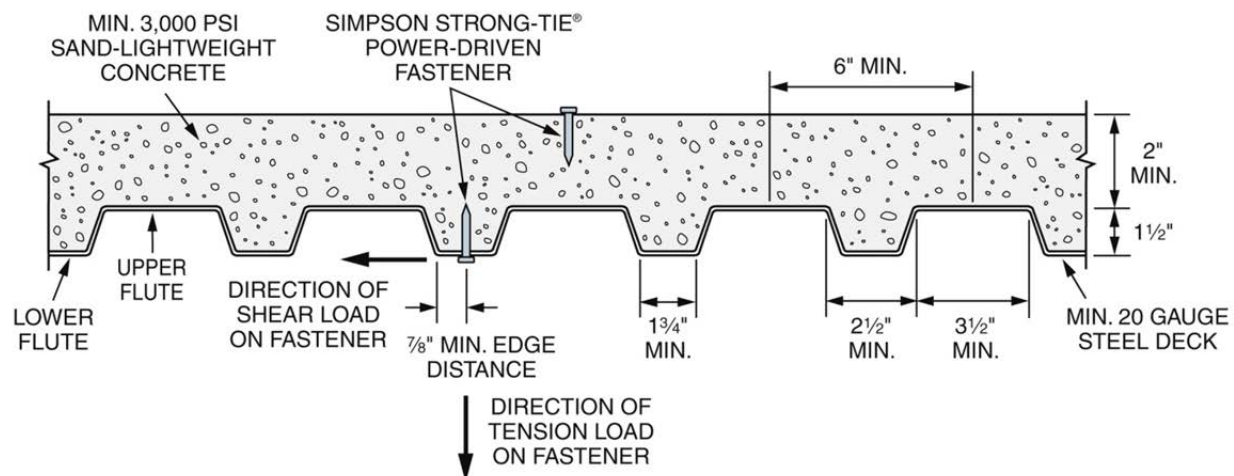
PECLDPA



PTRHA

FIGURE 5—CEILING CLIP ASSEMBLIES

FIGURE 6—THREADED ROD HANGER ASSEMBLIES

FIGURE 7—INSTALLATION IN 3¹/₄-INCH CONCRETE FILL OVER 3-INCH-DEEP STEEL DECKFIGURE 8—INSTALLATION IN 2¹/₂-INCH CONCRETE FILL OVER 3-INCH-DEEP STEEL DECKFIGURE 9—INSTALLATION IN 2-INCH CONCRETE FILL OVER 1¹/₂-INCH-DEEP STEEL DECK

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(714) 448-9143

RESEARCH REPORT: RR 25469
(CSI # 03150)

BASED UPON ICC ES EVALUATION
REPORT NO. ESR-2138

REEVALUATION DUE DATE:
December 1, 2016
Issued: March 1, 2014
Code: 2014 LABC

GENERAL APPROVAL – Reevaluation - Simpson Strong-Tie Powder-Driven Fasteners.

DETAILS

The above assemblies and/or products are approved when in compliance with the description, use, identification and findings of Report No. ESR- 2138, reissued February 1, 2014, of the ICC Evaluation Service, Incorporated. The report, in its entirety, is attached and made part of this general approval.

The parts of Report No. ESR- 2138 which are excluded on the attached copy have been removed by the Los Angeles City Building Department as not being included in this approval.

The approval is subject to the following conditions:

1. The fasteners shall not be used to resist seismic loads, except when used with architectural, electrical, or mechanical components as described in Section 13.1.4 of ASCE 7-10.
2. The use of the Powder-Driven Fasteners in this report shall be in accordance with the exceptions in section 13.4.5 of ASCE 7-10 or as approved in condition number 1 above.

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Page 1 of 3

3. Powder-Driven Fasteners must be installed in accordance with this report and Simpson Strong-Tie published installation instructions. A copy of the manufacturer's installation instructions shall be available at the job site.
4. Powder-Driven Fasteners must not be used in preservative-treated wood or fire-retardant-treated wood, except when the PDPWL-300MG and PDPWLS-300MG fasteners and washers, described in Section 3.1.3.2 of ESR-2138, are used to attach preservative-treated wood to concrete. Preservative-treated wood must be as described in Section 2303.1.8 of the 2014 City of Los Angeles Building Code.
5. Headed fasteners with washers shall not be used to attach wood sill plate to the foundation.
6. Installation is limited to dry, interior environments.
7. Calculations demonstrating that the applied loads are less than the maximum allowable loads must be submitted to the Plan Check Engineer. The calculations must be prepared by a California registered Civil or Structural Engineer.
8. For fasteners installed into concrete, the minimum concrete thickness must be three times the fastener embedment in concrete.
9. Use in concrete is limited to uncracked concrete.
10. For working values in steel, the fasteners shall have sufficient length so that the entire pointed portion of the shank pierces the steel plate.
11. The allowable values listed in the attached report and tables are for the fasteners only. Connected members shall be checked for their capacity (which may govern).
12. Fasteners used in structural light weight concrete filled steel deck applications are limited to installation in the lower flute or top surface as shown on Figure 2 of the ESR-2138.
13. No increase is permitted in the tabulated allowable load values for short duration loading.

DISCUSSION

The report is in compliance with the 2014 City of Los Angeles Building Code.

The approval is based on load tests.

This general approval will remain effective provided the Report is maintained valid and unrevised with the issuing organization. Any revisions to the report must be submitted to this Department for review with appropriate fee to continue the approval of the revised report.

Addressee to whom this Research Report is issued is responsible for providing copies of it, complete with any attachments indicated, to architects, engineers and builders using items approved herein in design or construction which must be approved by Department of Building and Safety Engineers and Inspectors.

This general approval of an equivalent alternate to the Code is only valid where an engineer and/or inspector of this Department has determined that all conditions of this Approval have been met in the project in which it is to be used.

ALLEN PEERY, Chief
Engineering Research Section
201 N. Figueroa St., Room 880
Los Angeles, CA 90012
Phone - 213-202-9812
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RJG
RR25469/MSW2010
R02/28/2014
5A1/5C2/23023.8/2308.6

Attachment: ICC-ES Report No.ESR-2138 (10 Pages).

ICC-ES Evaluation Report

ESR-2138

Reissued February 1, 2014

This report is subject to renewal March 1, 2015.

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**DIVISION: 06 00 00—WOOD, PLASTICS AND
COMPOSITES**
**Section: 06 05 23—Wood, Plastic and Composite
Fastenings**
REPORT HOLDER:
**SIMPSON STRONG-TIE COMPANY INC.
5956 WEST LAS POSITAS BOULEVARD
PLEASANTON, CALIFORNIA 94588
(925) 560-9000**
www.strongtie.com
EVALUATION SUBJECT:
**SIMPSON STRONG-TIE® POWDER-ACTUATED
FASTENERS, THREADED STUDS AND ASSEMBLIES**

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2012 *International Building Code*® (2012 IBC)
- 2012 *International Residential Code*® (2012 IRC)
- 2009 *International Building Code*® (2009 IBC)*
- 2009 *International Residential Code*® (2009 IRC)*
- 2006 *International Building Code*® (2006 IBC)*
- ~~2006 *International Residential Code*® (2006 IRC)*~~
- ~~2003 *International Building Code*® (2003 IBC)*~~
- * ■ ~~2003 *International Residential Code*® (2003 IRC)*~~
- ~~1997 *Uniform Building Code*™ (UBC)*~~

*Codes indicated with an asterisk are addressed in Section 8.0.

Property evaluated:

Structural

2.0 USES

The Simpson Strong-Tie® Powder-Actuated Fasteners and Threaded Studs are used to fasten building components, such as wood and steel, to normal-weight concrete, sand-lightweight concrete, steel deck with sand-lightweight concrete fill, structural steel, and hollow concrete masonry units (CMUs). The fasteners are alternatives to the cast-in-place anchors described in IBC Section 1908; the

embedded anchors described in Section 2.1.4 of TMS 402/ACI 530/ASCE 5 (which is referenced in IBC Section 2107) for placement in grouted masonry; and the welds and bolts used to attach materials to structural steel, described in IBC Sections 2204.1 and 2204.2, respectively.

The Simpson Strong-Tie Ceiling Clip Assemblies are used to attach wire to concrete and the Simpson Strong-Tie Threaded Rod Hanger Assemblies are used to attach threaded steel rod to concrete.

The fasteners and assemblies may be used where an engineered design is submitted in accordance with IRC Section R301.1.3.

3.0 DESCRIPTION

3.1 Powder-Actuated Fasteners and Threaded Studs:

The fasteners and threaded studs are manufactured from steel complying with ASTM A510, Grades 1060 to 1065 or 10B60 to 10B65 and austempered to a Rockwell “C” core hardness of 51 to 56, except for PDPA headed fasteners, which are manufactured from steel complying with ASTM A510, Grade 1060, and austempered to a Rockwell “C” core hardness of 53 to 56. Unless otherwise noted in this report, the fasteners have a mechanically plated zinc finish complying with ASTM B695, Class 5, Type I. When installed with the powder-actuated fastening tool recommended by Simpson Strong-Tie®, the fasteners pierce the material being fastened and embed into the supporting concrete, structural steel or CMU substrate. See Table 1 for additional descriptions of the fasteners.

3.2 Powder-Actuated Assemblies:

Ceiling clip assemblies are comprised of a powder-actuated fastener and a steel angle (clip) which is mounted on the fastener at the manufacturing facility. The clip has a hole in the outstanding leg for attachment of ceiling wire.

Threaded rod hanger assemblies are comprised of a powder-actuated fastener and a steel bracket which is mounted on the fastener at the manufacturing facility. The bracket has a threaded hole in the outstanding leg for attachment of threaded rod.

See Table 1 for additional descriptions of the assemblies.

3.3 Substrate Materials:

3.3.1 Normal-weight Concrete: Normal-weight concrete must be stone-aggregate and comply with Chapter 19 of the IBC or Section R402.2 of the IRC, as applicable.

3.3.2 Sand-lightweight Concrete: Sand-lightweight concrete must comply with Chapter 19 of the IBC or Section R402.2 of the IRC, as applicable.

3.3.3 Concrete Masonry Units: Concrete masonry units (CMUs) must be minimum 8-inch-thick (203 mm) lightweight blocks complying with ASTM C90.

3.3.4 Structural Steel: Structural steel substrates must comply with the minimum requirements of ASTM A36 or ASTM A572, Grade 50, or ASTM A992, and have a thickness as noted in Table 3 of this report.

3.3.5 Steel Deck: Where fasteners are placed through a steel deck into sand-lightweight concrete in accordance with Table 7 and Figure 7 of this report, the steel deck must comply with the applicable reference standard, have a minimum yield strength of 38 ksi (262 MPa), have a minimum No. 20 gage thickness [0.0359 inch (0.091 mm) base-steel thickness] and have a depth of 3 inches (76 mm).

3.3.6 Sill Plates: Sill plates must be nominal 2-inch-thick naturally durable wood complying with IBC Section 202 or IRC Section R202, as applicable, or wood that has been preservative-treated in accordance with IBC Section 2303.1.8 or IRC Section R317.1, as applicable.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: Allowable shear, tension (pullout) and oblique values in the tables of this report are for use with allowable stress design, and are for fasteners driven into the materials specified in the tables and for the attachment of the premounted accessories to the fastener. Members fastened to the substrates must be designed in accordance with the applicable code and code-referenced standards. The stress increases and load reductions described in IBC Section 1605.3 are not allowed for wind loads acting alone or combined with vertical loads. No adjustments are allowed for vertical loads acting alone.

Allowable tension, shear and oblique load values for Simpson Strong-Tie Powder-Actuated Fasteners, Threaded Studs and Assemblies driven into different base materials may be determined by referencing the applicable tables listed in Table 1.

Allowable loads for fasteners subjected to combined shear and tension loads may be calculated by the following equation:

$$(p/P_a) + (v/V_a) \leq 1.0$$

where:

- p = Actual tension load on fastener, lbf (N).
- P_a = Allowable tension load on fastener, lbf (N).
- v = Actual shear load on fastener, lbf (N).
- V_a = Allowable shear load on fastener, lbf (N).

4.1.2 Wood-to-Concrete Connections: Lateral design values for nails with diameters equal to or less than the diameter of the Simpson Strong-Tie® fasteners and penetration into the main member of 10 fastener diameters, determined in accordance with Part 11 and/or Table 11N of the ANSI/AF&PA NDS are applicable to the Simpson Strong-Tie fasteners. The wood element is the side member. The fastener bending yield strength must be limited to the value noted in the footnotes to Table 11N of ANSI/AF&PA NDS, based on the shank diameter of the Simpson Strong-Tie fasteners.

4.1.3 Sill Plate to Foundation Connections:

4.1.3.1 General: The fasteners listed in Tables 5 and 6 may be used to attach wood sill plates to the concrete foundation under the following conditions:

1. No cold joint exists, between the slab and foundation, below the sill plate.
2. The sill plate is not installed on slabs supported by masonry foundation walls.

4.1.3.2 Design: The fasteners listed in Table 5 may be used to attach wood sill plates to concrete for structural walls in areas classified as Seismic Design Category A or B. Table 5 specifies the allowable fastener shear and tension loads for attachment of wood sill plates to concrete foundations. Bearing area and thickness of the washers, are also given in Table 5. For shear loads, spacing of fasteners must be determined considering the lesser of allowable shear load from Table 5 and allowable load on the wood sill plate, determined in accordance with the NDS, with a fastener bending yield strength, $F_{yb} = 90,000$ psi (621 MPa) and a concrete dowel bearing strength, $F_e = 7,500$ psi (52 MPa). For tension loads, spacing of fasteners must be determined considering the lesser of allowable tension load from Table 5 and pull through capacity of the wood sill plate, based on Section 3.10 of the NDS, using the washer bearing area from Table 5.

The fasteners listed in Table 6 may be used to attach wood sill plates to concrete for interior, nonstructural walls [maximum horizontal transverse load on the wall must not exceed 5 psf (0.24 kN/m²)] in Seismic Design Categories A through F, when installed as described in Table 6.

4.1.4 Seismic Considerations:

4.1.4.1 Use with Structural Components: Resistance to seismic loads is outside the scope of this report. Therefore, except as noted in Section 4.1.3.2, the suitability of the fasteners and assemblies for use with structural components that are subjected to seismic loads is outside the scope of this report.

4.1.4.2 Use with Nonstructural Components: Seismic load resistance is outside the scope of this report, except when used as described in Section 4.1.3.2 or when use is with architectural, mechanical and electrical components described in Section 13.1.4 of ASCE 7, and as follows:

- Concrete base materials: The fasteners and assemblies installed in concrete may be used to support acoustical tile or lay-in panel suspended ceiling systems, distributed systems and distribution systems where the service load on any individual fastener does not exceed the lesser of 90 lbf (400 N) or the published allowable load in Tables 2, 4 and 7, as applicable.
- Steel base materials: The fasteners and assemblies installed in steel may be used where the service load on any individual fastener does not exceed the lesser of 250 lbf (1112 N) or the published allowable load shown in Table 3.
- For interior, nonstructural walls that are not subject to sustained tension loads and are not a bracing application, the fasteners may be used to attach steel track to concrete or steel in all Seismic Design Categories. In Seismic Design Categories D, E, and F, the allowable shear load due to transverse pressure shall be no more than 90 pounds (400 N) when attaching to concrete; or 250 pounds (1,112 N) when attaching to steel. Substantiating calculations shall be submitted addressing the fastener-to-base-material capacity and the fastener-to-attached-material capacity. Interior nonstructural walls are limited to locations where bearing walls, shear walls or braced walls are not required by the approved plans. The design load on the fastener must not exceed the allowable load established in this report for the concrete or steel base material.

4.2 Installation:

The installation of fasteners requires a powder-actuated fastening tool, recommended by Simpson Strong-Tie, used in accordance with the manufacturer's published installation instructions. The fastener size, minimum

penetration, minimum spacing, and edge distances must comply with Tables 2 through 8, as applicable. For fasteners installed into concrete, the fasteners must not be driven until the concrete has reached the designated compressive strength.

5.0 CONDITIONS OF USE

The Simpson Strong-Tie® Powder-Actuated Fasteners, Threaded Studs and Assemblies described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Fasteners must be installed in accordance with this report and Simpson Strong-Tie published installation instructions. In the event of a conflict between this report and the Simpson Strong-Tie published installation instructions, this report governs.
- 5.2 Fasteners must not be used in preservative-treated wood or fire-retardant-treated wood, except for the mechanically galvanized fasteners (with MG in the designation), which may be used to attach preservative-treated wood to concrete.
- 5.3 Installation is limited to dry, interior environments.
- 5.4 See Section 4.1.4 for seismic considerations.
- 5.5 Allowable loads must comply with Section 4.1. Calculations demonstrating that the applied loads are less than the maximum allowable loads described in this report must be submitted to the code official. The calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.6 For fasteners installed into concrete, the minimum concrete thickness must be three times the fastener embedment in concrete, except where noted otherwise in this report.
- 5.7 Use in concrete is limited to uncracked concrete. Cracking occurs when $f_t > f_r$ due to service loads or deformations.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Fasteners Power-driven into Concrete, Steel and Masonry Elements (AC70), dated February 2013.

7.0 IDENTIFICATION

Containers of the fasteners are labeled with the Simpson Strong-Tie Company, Inc. name and address; the fastener product size and type; the evaluation report number (ESR-2138); and the manufacturing date and lot number. In addition, the fastener heads are identified with the following marking:



8.0 OTHER CODES

8.1 Scope:

In addition to the 2012 IBC and IRC, the products in this report were evaluated for compliance with the requirements of the following codes:

- 2009 International Building Code® (2009 IBC)
- 2009 International Residential Code® (2009 IRC)
- 2006 International Building Code® (2006 IBC)
- * ■ ~~2006 International Residential Code® (2006 IRC)~~

- ~~2003 International Building Code® (2003 IBC)~~
- * ■ ~~2003 International Residential Code® (2003 IRC)~~
- ~~1997 Uniform Building Code™ (UBC)~~

8.2 Uses:

Simpson Strong-Tie Powder-Actuated Fasteners, Threaded Studs and Assemblies are used for general fastening of building components as described in Section 2.0. The fasteners are alternates to the cast-in-place anchors described in 2009 and 2006 IBC Sections 1911 and 1912, 2003 IBC Sections 1912 and 1913 and UBC Section 1923.1 for placement in concrete; the embedded anchors described in Section 2.1.4 of ACI 530 (which is referenced in 2009, 2006 and 2003 IBC Section 2107) and UBC Section 2107.1.5 for placement in grouted masonry; and the welds and bolts used to attach materials to structural steel, described in 2009, 2006 and 2003 IBC Sections 2204.1 and 2204.2, respectively and UBC Section 2205.11. The fasteners may be used where an engineered design is submitted in accordance with 2009, 2006 and 2003 IRC Section R301.1.3.

8.3 Description:

8.3.1 Fasteners: See Section 3.1.

8.3.2 Assemblies: See Section 3.2.

8.3.3 Substrate Materials:

8.3.3.1 Concrete: See Sections 3.3.1 and 3.3.2. Concrete must conform to UBC Chapter 19, as applicable.

8.3.3.2 CMUs: For the 2009, 2006 and 2003 IBC and IRC, see Section 3.3.3. For the UBC, CMUs must be minimum 8-inch-thick (203 mm) Grade N, Type II, lightweight blocks complying with UBC Standard 21-4.

8.3.3.3 Structural Steel: See Section 3.3.4.

8.3.3.4 Steel Deck: See Section 3.3.5.

8.3.3.5 Sill Plates: Sill plates must be nominal 2-inch-thick naturally durable wood complying with 2009, 2006 and 2003 IBC Section 2302, or 2009 and 2006 IRC Section R202; decay resistant wood complying with 2003 IRC Section R319.1; or untreated wood complying with UBC Section 2302, as applicable, or wood that has been preservative-treated in accordance with 2009, 2006 and 2003 IBC Section 2303.1.8, 2009 IRC Section R317.1, 2006 and 2003 IRC Section R319.1, or UBC Section 2303 Item 3, as applicable.

8.4 Design and Installation:

8.4.1 Design:

8.4.1.1 General: See Section 4.1. The stress increases described in Section 1612.3.2 of the UBC are not allowed for wind loads acting alone or when combined with vertical loads.

8.4.1.2 Wood to Steel, Concrete, or Masonry: For 2009, 2006 and 2003 IBC and 2009, 2006 and 2003 IRC, see Section 4.1.2. For UBC, design values for nails with diameters equal to or less than the diameter of the Simpson Strong-Tie® fasteners, determined in accordance with Section 2318.3 of the UBC, are applicable to Simpson Strong-Tie® fasteners. The wood element is the side member. The fastener bending yield strength must be limited to the value noted in the footnotes to UBC Tables 23-III-C-1 and 23-III-C-2, based on the diameter of the Simpson Strong-Tie® fasteners.

8.4.1.3 Sill Plate to Foundation Connections: See Section 4.1.3.

8.4.1.4 Seismic Considerations: See Section 4.1.4.

8.4.2 Installation: See Section 4.2.

8.5 Conditions of Use:

See Section 5.0.

8.6 Evidence Submitted:

See Section 6.0.

8.7 Identification:

See Section 7.0.

TABLE 1—SIMPSON STRONG-TIE® POWDER-ACTUATED FASTENERS AND ASSEMBLIES¹

FASTENERS (see Figure 1)					
FASTENER MODEL NUMBER	SHANK TYPE	SHANK DIAMETER (inch)	NOMINAL HEAD DIAMETER (inch, u.o.n.) ³	FASTENER GALVANIZATION	APPLICATION TABLES
PDP-XX	Smooth	0.145	0.300	ASTM B695 Class 5, Type 1	2, 3, 4, 8
PDP-XXK ²	Knurled	0.145	0.300	ASTM B695 Class 5, Type 1	3
PDP-XXMG	Smooth	0.145	0.300	ASTM B695 Class 65, Type 1	2, 3, 4, 8
PDPA-XX	Smooth	0.157	0.300	ASTM B695 Class 5, Type 1	2, 3, 7, 8
PDPA-XXK ²	Knurled	0.157	0.300	ASTM B695 Class 5, Type 1	3
PDPA-XXMG	Smooth	0.157	0.300	ASTM B695 Class 65, Type 1	2, 3, 7, 8
PDPH-XX	Smooth	0.177	0.300	ASTM B695 Class 5, Type 1	2, 3
PDPH-XXK ²	Knurled	0.177	0.300	ASTM B695 Class 5, Type 1	3
PHN-YY	Smooth	0.145	8 mm	ASTM B695 Class 5, Type 1	2, 3, 4
PHN-YYK ²	Knurled	0.145	8 mm	ASTM B695 Class 5, Type 1	3
FASTENERS WITH PREMOUNTED FLAT WASHERS (see Figure 2)					
ASSEMBLY MODEL NUMBER	FASTENER	WASHER DESCRIPTION	WASHER MATERIAL & GALVANIZATION	APPLICATION TABLES	
PDPW-300	PDP-300	³ / ₄ inch diameter 0.070-inch thick	Carbon steel w/ electroplated zinc coating	5, 6	
PDPWL-300	PDP-300	1 inch diameter 0.070-inch thick	Carbon steel w/ electroplated zinc coating	5, 6	
PDPWL-300MG	PDP-300MG	1 inch diameter 0.055-inch thick	Carbon steel, ASTM B695 Class 65, Type 1	5, 6	
PDPWLS-300MG	PDP-300MG	1 inch square 0.055-inch thick	Carbon steel, ASTM B695 Class 65, Type 1	5, 6	
PDPAW-287	PDPA-287	³ / ₄ inch diameter 0.070-inch thick	Carbon steel w/ electroplated zinc coating	5, 6	
PDPAWL-287	PDPA-287	1 inch diameter 0.070-inch thick	Carbon steel w/ electroplated zinc coating	5, 6	
PDPAWL-287MG	PDPA-287MG	1 inch diameter 0.070-inch thick	Carbon steel, ASTM B695 Class 65, Type 1	5, 6	
PDPAWLS-287	PDPA-287	1 inch square 0.055-inch thick	Carbon steel w/ electroplated zinc coating	5, 6	
PDPAWLS-287MG	PDPA-287MG	1 inch square 0.055-inch thick	Carbon steel, ASTM B695 Class 65, Type 1	5, 6	
PHNW-72	PHN-72	1 inch diameter 0.070-inch thick	Carbon steel w/ electroplated zinc coating	5, 6	
FASTENERS WITH PREMOUNTED TOPHAT WASHERS (see Figure 3)					
ASSEMBLY MODEL NUMBER	FASTENER	WASHER DESCRIPTION	WASHER MATERIAL & GALVANIZATION	APPLICATION TABLES	
PDPT-XX	PDP-XX	Tophat	Aluminum	3, 7	
PDPT-XXK ²	PDP-XXK	Tophat	Aluminum	3	
PDPAT-XX	PDPA-XX	Tophat	Carbon steel w/ electroplated zinc coating	2, 3, 7	
PDPAT-XXK ²	PDPA-XXK	Tophat	Carbon steel w/ electroplated zinc coating	3	
PHNT-YY	PHN-YY	Tophat	Aluminum	3, 7	
PHNT-YYK ²	PHN-YYK	Tophat	Aluminum	3	

TABLE 1—SIMPSON STRONG-TIE® POWDER-ACTUATED FASTENERS AND ASSEMBLIES¹ (Continued)

THREADED STUDS (see Figure 4)				
FASTENER MODEL NUMBER	SHANK TYPE	SHANK DIAMETER (inch) / THREADS	FASTENER GALVANIZATION	APPLICATION TABLES
PSLV3-XXZZ	Smooth / Threaded	0.205 / $\frac{3}{8}$ -16	ASTM B695 Class 5, Type 1	2, 3, 7
PSLV3-XXZZK ²	Knurled / Threaded	0.205 / $\frac{3}{8}$ -16	ASTM B695 Class 5, Type 1	3
PSLV4-XXZZ	Smooth / Threaded	0.150 / $\frac{1}{4}$ -20	ASTM B695 Class 5, Type 1	3, 7
CEILING CLIP ASSEMBLIES (see Figure 5)				
ASSEMBLY MODEL NUMBER	FASTENER	CLIP DESCRIPTION	CLIP MATERIAL & GALVANIZATION	APPLICATION TABLES
PCLDP-XX	PDPT-XX	0.075 inch thick, 90° clip angle	Carbon steel w/ electroplated zinc coating	7
PECLDP-125	PDP-125	0.075 inch thick, 120° clip angle	Carbon steel w/ electroplated zinc coating	7
THREADED ROD HANGER ASSEMBLIES (see Figure 6)				
ASSEMBLY MODEL NUMBER	FASTENER	BRACKET DESCRIPTION	BRACKET MATERIAL & GALVANIZATION	APPLICATION TABLES
PTRH3-HN32	PHN-32	0.075 inch thick with $\frac{3}{8}$ -16 threaded eyelet	Carbon steel w/ electroplated zinc coating	2, 7
PTRH4-HN32	PHN-32	0.075 inch thick with $\frac{1}{4}$ -20 threaded eyelet	Carbon steel w/ electroplated zinc coating	2, 7

For **SI**: 1 inch = 25.4 mm.

¹The XX designation in the model number represents the fastener length expressed in inches multiplied by 100. The YY designation in the model number represents the fastener length expressed in mm. For threaded studs, the XX and ZZ designations represent the length of the threaded portion of the fastener and the length of the unthreaded portion of the fastener, expressed in inches multiplied by 100, respectively. The fastener must be long enough to provide for the minimum penetration or minimum embedment required in in Tables 2 through 8, as applicable.

²The K at the end of the designation denotes a knurled fastener.

³u.o.n. = unless otherwise noted

TABLE 2—ALLOWABLE LOADS IN NORMAL-WEIGHT CONCRETE (lbf)¹

FASTENER MODEL NUMBER	SHANK DIAMETER (inch)	MINIMUM PENETRATION (inches)	MINIMUM EDGE DISTANCE (inches)	MINIMUM SPACING (inches)	CONCRETE COMPRESSIVE STRENGTH									
					2,000 psi		2,500 psi		3,000 psi		4,000 psi		6,000 psi	
					Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear
FASTENERS														
PDP-XX	0.145	1	3	4	45	120	70	140	100	165	150	205	150	205
		1 ¹ / ₄	3	4	140	265	195	265	255	265	370	265	370	265
PHN-YY	0.145	³ / ₄	3	4	-	-	-	-	-	-	60	95	-	-
		1	3	4	45	120	70	140	100	165	150	205	150	205
		1 ¹ / ₄	3	4	140	265	195	265	255	265	370	265	370	265
PDPA-XX PDPAT-XX	0.157	³ / ₄	3.5	5	-	-	110	120	110	125	110	135	110	130
		1	3.5	5	-	-	210	285	240	290	310	310	160	350
		1 ¹ / ₄	3.5	5	-	-	320	360	340	380	380	420	365	390
		1 ¹ / ₂	3.5	5	-	-	375	405	400	430	450	485	465	495
PDPH-XX	0.177	³ / ₄	3.5	5	30	50	30	65	30	80	30	110	115	195
		1 ¹ / ₄	3.5	5	130	265	160	250	195	240	260	220	190	105
THREADED ROD HANGER ASSEMBLIES														
PTRH3- HN32	0.145	1	3	4	-	-	155	-	-	-	-	-	-	-
PTRH4- HN32	0.145	1	3	4	-	-	150	-	-	-	-	-	-	-
THREADED STUDS														
PSLV3- 125125	0.205	1 ¹ / ₄	4	6	-	-	260	-	-	-	-	-	-	-

For **SI**: 1 inch = 25.4 mm, 1 psi = 6.89 kPa, 1 lbf = 4.45 N.

¹The fasteners must not be driven until the concrete has reached the designated minimum compressive strength, or the minimum compressive strength specified in the applicable code, whichever is greater.

TABLE 3—ALLOWABLE LOADS IN STEEL (lbf)¹

FASTENER MODEL NUMBER	SHANK DIAMETER (inch)	MINIMUM EDGE DISTANCE (inch)	MINIMUM SPACING (inches)	STEEL THICKNESS (inches)									
				³ / ₁₆		¹ / ₄		³ / ₈		¹ / ₂		³ / ₄	
				Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear
FASTENERS IN A36 STEEL													
PDP - XX PDP-XXK	0.145	0.5	1.0	155	395	—	—	-	-	-	-	-	-
PHN - YY PHN-YYK	0.145	0.5	1.0	155	395	—	—	-	-	-	-	-	-
PDPT - XX PDPT-XXK	0.145	0.5	1.0	290	660	340	700	-	-	-	-	-	-
PHNT - YY PHNT-YYK	0.145	0.5	1.0	50	620	250	620	-	-	-	-	-	-
PDPA-XX PDPA-XXK PDPAT-XX PDPAT-XXK	0.157	0.5	1.0	260	410	370	365	380 ⁶	385 ⁶	530 ⁶	385 ⁶	195 ³	325 ³
PDPH - XX PDPH-XXK	0.177	0.5	1.0	340	790	520	870	-	-	-	-	-	-
FASTENERS IN A572 OR A992 STEEL													
PDPA-XX PDPA-XXK PDPAT-XX PDPAT-XXK	0.157	0.5	1.0	305	420	335	365	355 ⁶	290 ⁶	485 ⁴	275 ⁴	170 ⁵	275 ⁵
THREADED STUDS IN A36 STEEL ²													
PSLV3-XXZZ	0.205	1.0	1.5	270	770	680	1120	-	-	-	-	-	-
PSLV3 -12575 K	0.205	1.0	1.5	270	930	870	1130	-	-	-	-	-	-
PSLV4 - XXZZ	0.150	0.5	1.0	200	630	420	690	-	-	-	-	-	-

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

¹The entire pointed portion of the fastener must penetrate through the steel to obtain the tabulated values, unless otherwise noted.

²The shank diameters are of the smooth or knurled shank portion of the threaded fastener. The smooth shank portion must be long enough to provide for the minimum penetration.

³Based upon a minimum penetration depth of 0.46 inch (11.7 mm).

⁴Based upon a minimum penetration depth of 0.58 inch (14.7 mm), which can be achieved due to deformation of the steel base material.

⁵Based upon a minimum penetration depth of 0.36 inch (9.1 mm).

⁶The fastener must be driven to where at least some of the point of the fastener penetrates through the steel.

TABLE 4—ALLOWABLE LOADS WHEN ATTACHING STEEL ANGLES AND CHANNELS TO NORMAL-WEIGHT CONCRETE (lbf)¹

FASTENER MODEL NUMBER	SHANK DIAMETER (inch)	PENETRATION (inches)	ATTACHED ITEM	CONCRETE COMPRESSIVE STRENGTH (psi)	TYPE OF LOAD	ALLOWABLE LOAD
PDP-125	0.145	¹ / ₈	Angle clip ²	2,000	Tension	25
PHN-32	0.145	¹ / ₈	Angle clip ²	2,000	Tension	25
PDP-150	0.145	¹ / ₄	Angle clip ²	2,000	Tension	85
PHN-32	0.145	¹ / ₄	Angle clip ²	2,000	Tension	85
PDP-100	0.145	⁷ / ₈	No. 20 gage ³ steel channel	2,000	Shear	160
PHN-22	0.145	⁷ / ₈	No. 20 gage ³ steel channel	2,000	Shear	160
PDP-100	0.145	⁷ / ₈	No. 18 gage ³ steel channel	2,000	Shear	135
PHN-22	0.145	⁷ / ₈	No. 18 gage ³ steel channel	2,000	Shear	135

For **SI**: 1 inch = 25.4 mm, 1 psi = 6.89 kPa, 1 lbf = 4.45 N.

¹The fasteners must not be driven until the concrete has reached the designated minimum compressive strength, or the minimum compressive strength specified in the applicable code, whichever is greater.

²The angle clip is used to attach wire to the supporting concrete. The angle clip must be formed from steel having a minimum base metal thickness of 0.080 inch, and must have a dimension from the center of the hole through which the fastener is installed to the outstanding leg of the angle of 1 inch or less. Values in the table are for the fastener only. Capacity of the angle clip is outside the scope of this report.

³The Nos. 18 and 20 gage steel channels (drywall tracks) must have minimum base-metal thicknesses of 0.0478 and 0.0377 inch, respectively, and must be formed from steel having a minimum specified yield stress of 33 ksi. Values in the table are for the fastener installed in concrete only. Capacity of the channels is outside the scope of this report.

TABLE 5—ALLOWABLE LOADS ON FASTENERS USED TO ATTACH WOOD SILL PLATES TO NORMAL-WEIGHT CONCRETE^{3,4,5}

FASTENER MODEL NUMBER ⁴	OVERALL LENGTH (inches)	NOMINAL HEAD DIAMETER (inch)	SHANK DIAMETER (inch)	WASHER THICKNESS (inch)	WASHER BEARING AREA (in ²)	ALLOWABLE LOAD (lbf)	
						Tension	Shear
PHNW-72 ¹	2 ⁷ / ₈	0.315	0.145	0.070	0.770	125	150
PDPW-300 ¹	3	0.300	0.145	0.070	0.426	100	100
PDPWL-300 ¹ , PDPWL-300MG ¹	3	0.300	0.145	0.070	0.770	100	100
PDPWLS-300MG ¹	3	0.300	0.145	0.055	0.970	100	100
PDPAW-287 ²	2 ⁷ / ₈	0.300	0.157	0.070	0.424	200	205
PDPAWL-287 ² PDPAWL-287MG ²	2 ⁷ / ₈	0.300	0.157	0.070	0.767	200	205
PDPAWLS-287 ² PDPAWLS-287MG ²	2 ⁷ / ₈	0.300	0.157	0.055	0.970	200	205

For **SI**: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lbf = 445 N, 1 psi = 6.89 kPa.

¹The fasteners must not be driven until the concrete has reached a minimum compressive strength of 2,000 psi, or the minimum compressive strength specified in the applicable code, whichever is greater.

²The fasteners must not be driven until the concrete has reached a minimum compressive strength of 2,500 psi, or the minimum compressive strength specified in the applicable code, whichever is greater.

³Minimum edge distance is 1³/₄ inches (44 mm).

⁴Wood members connected to the substrate must be investigated for compliance with the applicable code in accordance with referenced design criteria, for both lateral resistance and fastener pull-through.

⁵Only mechanically galvanized fasteners (with 'MG' in the designation) may be used to attach preservative-treated wood to concrete. Preservative-treated wood must be as described in IBC Section 2303.1.8 or IRC Section R317.1, as applicable.

TABLE 6—LOAD AND SPACING REQUIREMENTS FOR WOOD SILL PLATE ANCHORAGE OF INTERIOR NONSTRUCTURAL WALLS^{3,4,6,7,9,10}

FASTENER TYPE	NOMINAL FASTENER SHANK LENGTH (inches)	NOMINAL FASTENER SHANK DIAMETER (inch)	EMBEDMENT	CONCRETE EDGE DISTANCE (inches)	FASTENER SPACING ^{5,8} (ft.)	MAXIMUM WALL HEIGHT (ft.)
PDPW-300 ¹ PDPWL-300 ¹ PDPWL-300MG ¹ PDPWLS-300MG ¹	3	0.145	Washer bearing on sill plate	1 ³ / ₄	2	14
PHNW-72 ¹	2 ⁷ / ₈	0.145		1 ³ / ₄	3	14
PDPAW-287 ² PDPAWL-287 ² PDPAWL-287MG ² PDPAWLS-287 ² PDPAWLS-287MG ²	2 ⁷ / ₈	0.157		1 ³ / ₄	4	14

For **SI**: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 psi = 6.89 kPa.

¹The fasteners must not be driven until the concrete has reached a minimum compressive strength of 2,000 psi, or the minimum compressive strength specified in the applicable code, whichever is greater.

²The fasteners must not be driven until the concrete has reached a minimum compressive strength of 2,500 psi, or the minimum compressive strength specified in the applicable code, whichever is greater.

³Interior nonstructural walls are limited to locations where bearing walls, shear walls or braced walls are not required by the approved plans.

⁴Fasteners shall be driven into the center of the nominally 2 inch thick wood sill plate and be at least 1³/₄ inch from the concrete edge.

⁵Walls shall have fasteners placed at 6 inches from ends of sill plates with maximum spacing between, as shown in this table.

⁶Walls shall be laterally supported at the top and the bottom.

⁷Sill or bottom plates shall comply with IBC Section 2304 and be of lumber with a specific gravity of 0.50 or greater.

⁸Minimum spacings shall be 4 inches on center or shall comply with Section 11.1.5 of the NDS to prevent splitting of the wood.

⁹Only mechanically galvanized fasteners (with 'MG' in the designation) are suitable for use in contact with treated wood in accordance with IBC Section 2304.9.5 and IRC Section R317.3.

¹⁰The maximum horizontal transverse load on the wall, in accordance with IBC Section 1607.14, shall be 5 psf (0.24 kN/m²).

TABLE 7—ALLOWABLE LOADS IN MINIMUM 3,000 psi SAND-LIGHTWEIGHT CONCRETE AND SAND-LIGHTWEIGHT CONCRETE FILLED STEEL DECK¹

FASTENER MODEL NUMBER	SHANK DIAMETER (inch)	MINIMUM EMBEDMENT (inches)	INSTALLED DIRECTLY INTO CONCRETE		INSTALLED THROUGH LOWER FLUTE OF STEEL DECK INTO CONCRETE ^{2,3,4}		
			Tension (lbf)	Shear (lbf)	Tension (lbf)	Shear (lbf)	Oblique (lbf)
PDPA-XX ⁶ PDPAT-XX ⁶	0.157	$\frac{3}{4}$	85	105	105	280	—
		1	150	225	145	280	—
		$1\frac{1}{4}$	320	420	170	320	—
		$1\frac{1}{2}$	385	455	325	520	—
PDPT-XX	0.145	$\frac{7}{8}$	85	250	40	275	—
PHNT-YY	0.145	$\frac{7}{8}$	185	275	165	400	—
PTRH3 - HN32	0.145	1	—	—	140	—	—
PTRH4 - HN32	0.145	1	—	—	140	—	—
PCLDP -100; PCLDP-125	0.145	$\frac{7}{8}$	—	—	55	—	85
PCLDP -125	0.145	1	—	—	55	—	85
PECLDP -125	0.145	1	—	—	55	—	85
PSLV4 - XXZZ	0.150	1	—	—	80	—	—
PSLV3 -125125	0.205	$1\frac{1}{4}$	—	—	225	—	—

For **SI**: 1 lbf = 4.448 N, 1 inch = 25.4 mm, 1 psi = 6.89 kPa.

¹Fasteners shall not be driven until the concrete has reached a minimum concrete compressive strength of 3,000 psi.

²The steel deck must be 3 inches deep, and have a minimum thickness of 20 gage (0.0359-inch-thick base-steel thickness) and a minimum yield strength of 38,000 psi.

³The fasteners must be installed through the steel deck and into the concrete at the upper or lower flute as designated in the table. The fastener must be a minimum of $1\frac{1}{2}$ inches from the edge of the deck web and 4 inches from the end of the deck. The minimum fastener spacing is 4 inches.

⁴Sand-lightweight concrete fill above top of steel deck profiles must be a minimum of $3\frac{1}{4}$ inches thick. Figure 7 shows nominal flute dimensions, fastener locations, and tension and shear load orientations. Oblique loads are applied at a 45 degree angle to the fastener.

TABLE 8—ALLOWABLE LOADS IN HOLLOW CONCRETE MASONRY UNITS (CMUs)^{1,2,3,4}

FASTENER MODEL NUMBER	SHANK DIAMETER (inch)	MINIMUM CMU FACE SHELL THICKNESS (inches)	HOLLOW CMU	
			Face Shell	
			Tension (lbf)	Shear (lbf)
PDP - XX	0.145	$1\frac{1}{4}$	110	200
PDPA-XX	0.157	$1\frac{1}{4}$	125	210

For **SI**: 1 lbf = 4.448 N, 1 inch = 25.4 mm.

¹The tabulated allowable load values are for fasteners installed in hollow lightweight CMUs conforming to ASTM C90. The minimum allowable nominal size of the CMU must be 8 inches high by 8 inches wide by 16 inches long, with a minimum, $1\frac{1}{4}$ -inch-thick face shell thickness.

²The tabulated allowable load values are for fasteners installed in the center of a hollow CMU face shell. Allowable loads for fasteners installed in mortar head and bed joints, or into the web of the CMU, are outside the scope of this report.

³The entire pointed portion of the fastener must penetrate through the thickness of the face shell to obtain the tabulated values.

⁴No more than one fastener may be installed in an individual hollow CMU cell.

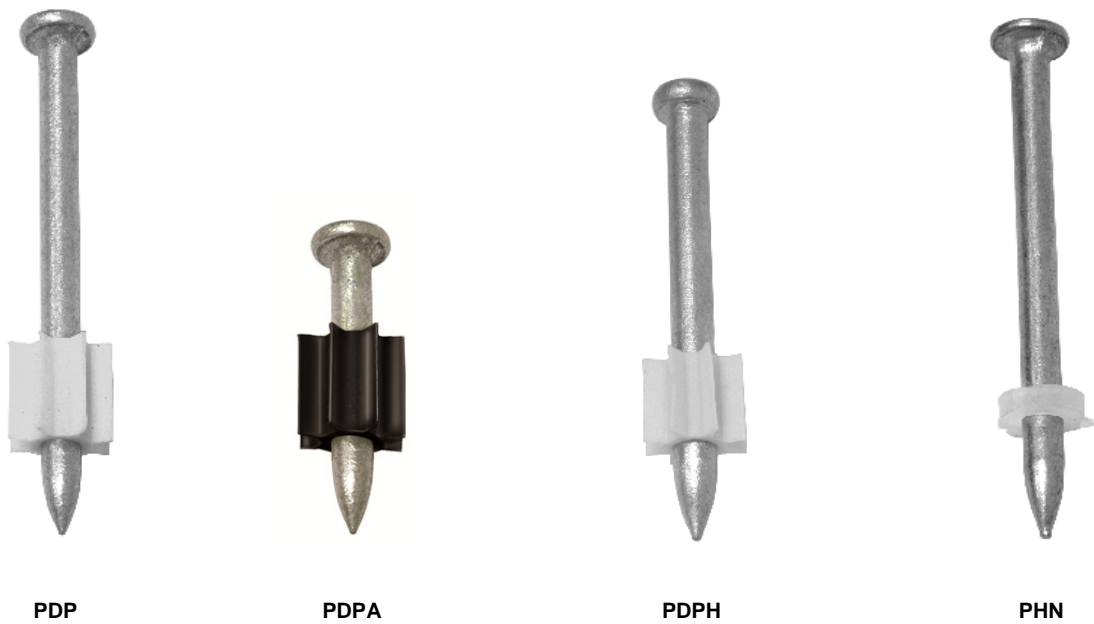


FIGURE 1—FASTENERS



FIGURE 2—FASTENERS WITH PREMOUNTED FLAT WASHERS



FIGURE 3—FASTENERS WITH PREMOUNTED TOPHAT WASHERS

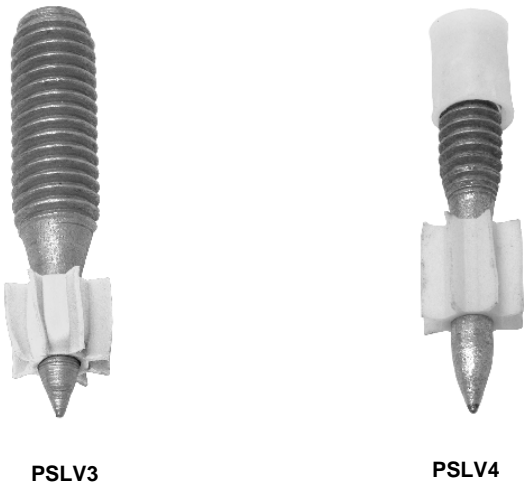


FIGURE 4—THREADED STUDS



FIGURE 5—CEILING CLIP ASSEMBLIES

FIGURE 6—THREADED ROD
HANGER ASSEMBLY

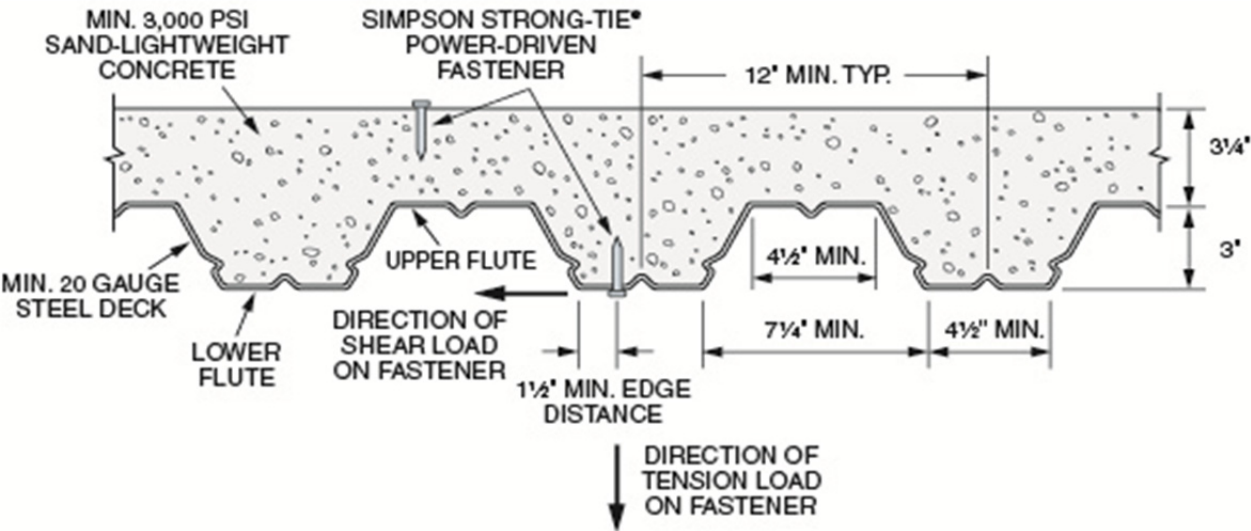


FIGURE 7—INSTALLATION IN CONCRETE FILL OVER STEEL DECK

Fasteners

Anchors, expansion shields, concrete inserts, explosive-driven fasteners and threaded head screws provide anchorage to building structural members for supporting pipe hangers. See PIPE HANGER listing for other components and minimum rod sizes. Unless specifically noted in the listing, the following fasteners are FM Approved for vertical installation only.

Explosive-Driven Fasteners

Explosive-driven fasteners provide anchorage to concrete or steel building members for supporting pipe hangers. The powder-actuated tool used for driving these fasteners may represent an ignition source; therefore, it should not be used in classified hazardous locations or near easily ignited materials. Fasteners should not be used for support of pipe hangers to structural members in Earthquake Zones 500 or less as defined by FM Global Property Loss Prevention Data Sheet 1-2.

A coupling and locknut are provided with each fastener for attaching a pipe hanger to the fastener.

Explosive-Driven Fasteners

<i>Model</i>	<i>Rod Size, in.</i>	<i>For Use In</i>	<i>Max Pipe Size, in. (mm)</i>
PSLV3-125125	3/8	Concrete	3/4 through 4

Company Name:	Simpson Strong-Tie Co Inc
Company Address:	5956 W Las Positas Blvd, Pleasanton, California 94588, USA
Company Website:	http://www.strongtie.com/
New/Updated Product Listing:	No
Listing Country:	United States of America
Certification Type:	FM Approved

1. IDENTIFICATION

Product Identifier: Powder-Driven Fasteners and Accessories
Recommended Use: For use with Simpson Strong-Tie® Powder-Actuated Tools
Use Restrictions: None known.
Company: Simpson Strong-Tie Company Inc.
Address: 5956 W. Las Positas Blvd.
Pleasanton, CA 94588, USA
Phone: 1-800-999-5099
Website: www.strongtie.com
Emergency: 1-800-535-5053 (US/Canada)
1-352-323-3500 (International)

For most current SDS, please visit our website at www.strongtie.com/sds

2. HAZARD IDENTIFICATION

As defined in the OSHA Hazard Communication Standard, 29 CFR 1910.1200, this product is considered an article and does not require an SDS. Although these products are not subject to the OSHA Standard or GHS labeling elements, Simpson Strong-Tie would like to disclose as much health and safety information as possible to ensure that this product is handled and used properly. This SDS contains valuable information critical to the safe handling and proper use of the product. In its manufactured and shipped state this product is considered to present a low hazard. Under normal use conditions this product is not expected to create any health or safety hazards. However, individual customer processes (welding, sawing, grinding, brazing, abrasive blasting) could result in the formation of fumes, dust, and/or particulate matter that may present the following hazards.



Physical Hazards:	Not Classified.	
Health Hazards	Skin Corrosion/Irritation	Category 3
	Serious Eye Damage/Irritation	Category 2
	Sensitization, Skin	Category 1
	STOT, Single Exposure	Category 3 (Respiratory Tract Irritation)
	STOT, Repeated Exposure	Category 2 (Lung)
Environmental Hazards:	Not Classified.	
Signal Word:	WARNING!	
Hazard Statements:	May cause mild skin irritation. May cause eye irritation. May cause an allergic skin reaction. May cause respiratory irritation. May cause damage to organs (lung) through prolonged or repeated exposure (inhalation of dust).	
Precautionary Statements:		
Prevention:	Observe good industrial hygiene practices. Wear protective gloves/clothing/eye protection/face protection. Wash thoroughly after handling. Avoid breathing dust.	
Response:	If on skin: Wash with plenty of water. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If inhaled: Remove victim to fresh air and keep in a position comfortable for breathing. If you feel unwell: Get medical advice/attention.	
Storage:	Store away from incompatible materials.	

Hazards not otherwise Classified (HNOC): Dust and/or powders may form explosive dust/air mixtures. Avoid generating dust. Do not allow dust to build up on work surfaces.

3. COMPOSITION INFORMATION

Various metals, ferrous and non-ferrous platings.

4. FIRST-AID MEASURES

Eye Contact:	Flush with large amounts of water to remove particles. If redness, burning, blurred vision, or swelling persists, consult a physician.
Skin Contact:	Wash affected area with soap and water. If a thermal burn has occurred, flush area with cold water and consult a physician.
Ingestion:	Not a probable route of industrial exposure, however, if ingested immediately consult a physician.
Inhalation:	For over-exposure to airborne dust or fumes, move patient to fresh air. Give oxygen or artificial respiration if needed. If patient continues to experience difficulty breathing, consult a physician.
Most Important Symptoms:	Irritant effects.
General Information:	Provide general supportive measures and treat symptomatically. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. If exposed or concerned: Get medical advice/attention.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:	This material is not combustible and will not burn. Choose extinguishing media suitable for surrounding materials.
Additional Information:	None known.
Hazards during Fire-Fighting:	Dusts may present a fire or explosion hazard under rare favoring conditions of particle size, dispersion and strong ignition source. However, this is not expected to be a problem under normal handling conditions.
Fire-Fighting Procedures:	Use standard fire-fighting procedures and consider the hazards of other involved materials. In case of fire and/or explosion do not breathe fumes. Self-contained breathing apparatus and full protective clothing must be worn. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:	Wear appropriate personal protective equipment. Avoid inhalation of dusts.
Clean-up Methods:	Solid articles do not represent a spill hazard. Avoid actions that cause dust to be generated. Collect dust generated during processing using a vacuum cleaner equipped with a HEPA filter. If not possible, gently moisten dust before collection with shovel, broom, or the like.
Environmental Precautions:	Avoid release of dust to the environment. Avoid discharge into drains, water courses or onto the ground.

7. HANDLING AND STORAGE

Handling:	Wear appropriate personal protective equipment. If grinding or cutting use work methods which minimize dust production. Avoid inhalation of dust. Ensure adequate ventilation. Wash thoroughly after handling. Observe good industrial hygiene practices.
Storage:	Store away from incompatible materials.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective Measure:	Protective coatings are used on most metal fasteners. Typically this will be commercial zinc, zinc plating with chromate conversion coating, hot dipped galvanizing, ceramic plating, or mechanically galvanized plating. This information should be considered when evaluating employee personal protective equipment.
Eye Protection:	Wear goggles or safety glasses to protect eyes from dust and other particles.
Hand Protection:	Gloves recommended.
Skin and Body Protection:	Wear long sleeve shirts/long pants and other clothing as required to minimize contact.
Respirator Protection:	Not required in properly ventilated areas.
General Hygiene:	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

Fasteners for Simpson Strong-Tie® Powder-Actuated Tools

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Engineering Controls: When using indoors good general ventilation should be used. Provide eyewash station.
Exposure Limits: No exposure limits noted for ingredients.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid	Freezing/Melting Point:	2600-2700°F (1426-1482°C)
Form:	Solid	Boiling Point:	N/A
Color:	Gray/Various Colors	Flash Point:	N/A
Odor:	None	Evaporation Rate:	N/A
Odor Threshold:	N/A	Specific Gravity:	N/A
pH:	N/A	VOC:	N/A
Flammability:	N/A	U/L Flammability:	N/A
Vapor Pressure:	N/A	Vapor Density:	N/A
Solubility:	N/A	Kow:	N/A
Decomposition:	N/A	Viscosity:	N/A

10. STABILITY AND REACTIVITY

Reactivity:	Stable.
Chemical Stability:	Stable.
Condition to Avoid:	None known.
Substances to Avoid:	Acids.
Hazardous Reactions:	Hazardous polymerization will not occur.
Decomposition Products:	Thermal oxidative decomposition of galvanized steel products can produce fumes containing oxides of zinc, iron, manganese, as well as other elements.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Ingestion:	Not expected to be an ingestion hazard. Do not place metal fasteners in mouth.
Inhalation:	May cause respiratory tract irritation if dust is inhaled.
Skin contact:	May cause mild skin irritation. Sharp pointed tip may puncture or pierce skin.
Eye contact:	May cause eye irritation. Particles can cause corneal abrasion.

Information on toxicological effects

Acute toxicity:	Not expected to be acutely toxic.
Skin corrosion/irritation:	May cause mild skin irritation. Sharp pointed tip may puncture or pierce skin.
Eye damage/eye irritation:	Particles can cause corneal abrasion.
Respiratory sensitization:	Not applicable.
Skin sensitization:	May cause an allergic skin reaction.
Germ cell mutagenicity:	No data available
Carcinogenicity:	This product is not a carcinogen. This product may contain small amounts of compounds which are listed carcinogens; these compounds are bound in the product and exposure to these compounds is highly unlikely during normal product use. Exposure to these compounds is possible only if the product is ground or cut, exposure to oxides of component metals is possible if product is welded or exposed to excessive heat. Ensure good work practice and use appropriate personal protective equipment as needed.
Reproductive toxicity:	No data available.
Aspiration hazard:	Not applicable.
Specific target organ toxicity:	
Single exposure	Inhalation of dust may cause respiratory irritation.
Repeated exposure	May cause damage to organs (lung) through prolonged or repeated exposure (inhalation of dust).

Further information: Toxicological, ecotoxicological, physical, and chemical properties may not have been fully investigated. Hazard data above is estimated based on best available information. Some workers with certain pre-existing medical conditions such as: asthma, allergies, or impaired pulmonary and/or liver functions, or who may be particularly susceptible to this material, may be affected by exposure to this material.

12. ECOLOGICAL INFORMATION

Ecotoxicity: The product is not classified as environmentally hazardous.
Persistence and degradability: Not applicable.
Bioaccumulative potential: Not applicable.
Mobility in soil: Not applicable.
Other adverse effects: No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption) are expected from this product.

13. DISPOSAL CONSIDERATIONS

Waste Disposal of Substance: Dispose of contents/container in accordance with local/regional/national/international regulations. Steel scrap should be recycled whenever possible.

14. TRANSPORTATION INFORMATION

DOT: Not regulated as a hazardous material by DOT.
IATA: Not regulated as a dangerous good.
IMDG: Not regulated as a dangerous good.
Special precautions for user: Read safety instructions, SDS and emergency procedures before handling.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not Applicable

15. REGULATORY INFORMATION

US federal regulations: This product is considered an article as defined by OSHA Hazard Communication Standard, 29 CFR 1910.1000

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D): Not regulated.
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050): Not listed.
CERCLA Hazardous Substance List (40 CFR 302.4): Not regulated.

SARA 302 Extremely hazardous substance: No
SARA 311/312 Hazardous chemical: No
SARA 313 (TRI reporting): Manganese and Zinc are subject to SARA 313 reporting requirements.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories:	Immediate Hazard	No
	Delayed Hazard	No
	Fire Hazard	No
	Pressure Hazard	No
	Reactivity Hazard	No

US. California Proposition 65: Components of this article are on the Prop 65 List of Chemicals known to cause cancer or reproductive harm. The nature of this product makes exposure to these chemicals very unlikely. **WARNING:** This product contains a chemical listed by the State of California as known to cause cancer, birth defects, or reproductive harm.

This product has been classified according to the hazard criteria of the CPR and the SDS contains all of the information required by the CPR.

16. OTHER INFORMATION

Date Prepared or Revised: June 2014
Supersedes: March 2012

This Safety Data Sheet (SDS) is prepared by Simpson Strong-Tie Co. in compliance with the requirements of OSHA 29 CFR Part 1910.1200. The information it contains is offered in good faith as accurate as of the date of this SDS. This SDS is provided solely for the purpose of conveying health, safety, and environmental information. No warranty, expressed or implied, is given. Health and Safety precautions may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations.

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PAT Tool Lubricant

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1. IDENTIFICATION

Product Identifier: PT-MTL2.0
Recommended Use: Powder-Actuated Tools Lubricant
Use Restrictions: None Known.
Company: Simpson Strong-Tie Company Inc.
Address: 5956 W. Las Positas Blvd.
Pleasanton, CA 94588 USA
Phone: 1-800-999-5099
Website: www.strongtie.com
Emergency: 1-800-535-5053 (US/Canada)
1-352-323-3500 (International)
For most current SDS, please visit our website at www.strongtie.com/sds

2. HAZARD IDENTIFICATION



Physical Hazards: Flammable Liquids Category 4
Health Hazard: Skin Corrosion/Irritation Category 2
Aspiration Hazard Category 2
STOT, Single Exposure Category 3 (Narcotic Effects)
STOT, Repeated Exposure Category 2
Environmental Hazards: Acute Aquatic Environmental Hazard Category 2
Signal Word: **WARNING!**
Hazard Statements: Combustible liquid. Causes skin irritation. May be harmful if swallowed and enters the lungs. May cause drowsiness or dizziness. May cause respiratory irritation. Toxic to aquatic life.
Precautionary Statements:
Prevention: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Wear protective gloves/protective clothing/eye protection/face protection. Avoid breathing mist or vapor. Use only outdoors or in a well-ventilated area. Wash thoroughly after handling. Avoid release to the environment.
Response: In case of fire: Use foam, carbon dioxide, dry powder or water fog for extinction. If exposed or concerned: Call a poison center/doctor. If Inhaled: Remove victim to fresh air and keep in a rest position comfortable for breathing. If experiencing respiratory symptoms: Call poison center/doctor. If swallowed: Do NOT induce vomiting. If on skin: Wash with plenty of water. If skin irritation or rash occurs: Get medical advice/attention. Take off contaminated clothing and wash before re-use. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. Collect Spillage.
Storage: Store in a well-ventilated place. Keep container tightly closed. Keep cool.
Disposal: Dispose of contents/container in accordance with local/regional/national regulations.

Hazards not otherwise Classified (HNOC): None known.

3. COMPOSITION INFORMATION

Chemical Name	CAS Number	Weight %
Distillates (petroleum), hydrogenated light	64742-47-8	60-70
Distillates (petroleum), solvent-refined heavy paraffinic	64741-88-4	10-20
Inhibitor Blend	N/A	5-15

Composition Note: This product is a mixture. Hazardous ingredients are listed above. May include other nonhazardous ingredients. May include other trace ingredients, see Section 15.

4. FIRST-AID MEASURES

Eye Contact:	Immediately flush eyes with plenty of cool water for at least 15 minutes while holding the eyes open. Remove contact lenses if present and easy to do. If redness, burning, blurred vision, or swelling persists, consult a physician.
Skin Contact:	Remove contaminated clothing and product, immediately wash affected area with soap and water. Do not apply greases or ointments. If rash or irritation persists consult a physician.
Ingestion:	Rinse mouth immediately. Do NOT induce vomiting. Consult a physician.
Ingestion Note:	This material is an aspiration hazard. Potential danger from aspiration must be weighed against possible oral toxicity when decided whether to induce vomiting. All treatments should be based on observed signs and symptoms of distress.
Inhalation:	Remove patient to fresh air. Give oxygen or artificial respiration if needed. If patient continues to experience difficulty breathing, consult a physician.
Most Important Symptoms:	Irritant effects. Symptoms include itching, burning, redness and tearing. Central nervous system depression (drowsiness, dizziness, weakness, fatigue).
General Information:	Provide general supportive measures and treat symptomatically. Symptoms may be delayed. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. If exposed or concerned: Get medical advice/attention. Wash contaminated clothing before reuse.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:	Extinguish with foam, carbon dioxide, dry powder, or water fog.
Additional Information:	None known.
Hazards during Fire-Fighting:	Hazardous gases/vapors produced are carbon monoxide, carbon dioxide, and smoke. Toxic and flammable vapors may be produced under combustion. Vapors are heavier than air and may travel to ignition sources and flash back.
Fire-Fighting Procedures:	Use standard fire-fighting procedures and consider the hazards of other involved materials. In case of fire and/or explosion do not breathe fumes. Self-contained breathing apparatus and full protective clothing must be worn. Move containers from fire area if you can do so without risk. Cool containers with flooding quantities of water until well after fire is out. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:	Keep unnecessary personnel away. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate personal protective equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Avoid inhalation of vapors or mists. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained.
Clean-up Methods:	Small spills: Wipe up with absorbent material (e.g. cloth, fleece). Place in leak-proof containers. Seal tightly for proper disposal. Clean surface thoroughly to remove residual contamination. Large spills: Stop the flow of material, if this is without risk. Dike far ahead of spill to contain material. Use a non-combustible material like vermiculite, sand or earth to soak up the product. Place in leak-proof containers. Seal tightly for proper disposal. Following product recovery, flush area with water. Prevent entry into waterways, sewer, basements or confined areas.
Environmental Precautions:	Avoid release to the environment. Contact local authorities in case of spillage to drain/aquatic environment. Prevent further leakage or spillage if safe to do so.

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7. HANDLING AND STORAGE

Handling: Mechanical ventilation or local exhaust ventilation is recommended. Keep away from open flames, hot surfaces and sources of ignition. Wear appropriate personal protective equipment. When using, do not eat, drink or smoke. Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. Observe good industrial hygiene practices.

Storage: Store away from incompatible materials(see section 10 of the SDS). Keep in original container, keep container tightly closed. Store in a cool, dry place out of direct sunlight. Keep away from heat and sources of ignition. Protect against physical damage. Keep out of the reach of children.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective Measure: Wear appropriate personal protective equipment.

Eye Protection: Wear chemical splash goggles or safety glasses with side shield.

Hand Protection: Wear chemical-resistant gloves such as: Nitrile, neoprene, butyl.

Skin and Body Protection: Wear long sleeve shirt/long pants and other clothing as required to minimize contact.

Respirator Protection: NIOSH or MSHA approved air-purifying respirators should be used in the context of respiratory protection program meeting the requirements of the OSHA respiratory protection standard [29 CFR 1910.134] to control exposures when ventilation or other controls are inadequate or discomfort or irritation is experienced.

General Hygiene: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

Engineering Controls: When using indoor good general ventilation should be used, use local exhaust or general dilution ventilation to control exposure. Provide eyewash station and emergency shower.

Exposure Limits:

Component	OSHA (PEL)	ACGIH (TLV)	Other
Distillates (petroleum), hydrogenated light (CAS 64742-47-8)	N/E	N/E	1200 mg/m ³ (manufacturer)
Distillates (petroleum), solvent-refined heavy paraffinic (CAS 64741-88-4)	5 mg/m ³	5 mg/m ³	N/E

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid	Freezing/Melting Point:	-105°F (-76°C)
Form:	Liquid	Boiling Point:	380°F (193°C)
Color:	Amber	Flash Point:	178°F (81°C)
Odor:	Pleasant	Evaporation Rate:	Slow
Odor Threshold:	N/E	Specific Gravity:	0.85
pH:	N/E	VOC:	321.4 g/L
U. Flammability:	5.0	L Flammability:	0.7
Vapor Pressure:	N/E	Vapor Density:	> 2 (Air=1)
Solubility:	Negligible	Kow:	N/E
Decomposition:	N/E	Viscosity:	N/E

10. STABILITY AND REACTIVITY

Reactivity: This product is stable and non-reactive under normal conditions.

Chemical Stability: Stable under normal storage conditions.

Condition to Avoid: High heat and open flame.

Substances to Avoid: Oxidizing agents.

Hazardous Reactions: Hazardous polymerization will not occur.

Decomposition Products: Carbon dioxide, carbon monoxide, oxides of nitrogen, and other organic compounds.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure:

Ingestion: Ingestion may cause irritation to the gastrointestinal tract. Aspiration hazard, do not induce vomiting if product is swallowed. Consult a physician.

Inhalation: Vapors have a narcotic effect and may cause headache, fatigue, dizziness and nausea. Prolonged inhalation may be harmful. May cause damage to organs by inhalation.

Skin contact: Causes skin irritation.

Eye contact: Causes eye irritation.

Information on toxicological effect:

Acute toxicity: Occupational exposure may have a damaging effect.

Product	Species	Test Result
PT-MTL2.0		
Acute, Oral, LD50	Rabbit	6164 mg/kg (estimated)
Acute, Dermal, LD50	Rat	2857 mg/kg (estimated)
Acute, Inhalation, LC50	Rat	7.85 mg/l (estimated)
Subchronic, Oral, LD50	Rat	782 mg/kg (14 day estimated)

Skin corrosion/irritation: Causes skin irritation.

Eye damage/eye irritation: Causes eye irritation.

Respiratory sensitization: No data available.

Skin sensitization: Not expected to be a skin sensitizer.

Germ cell mutagenicity: The available data does not indicate that any component present at greater than 0.1% is mutagenic or genotoxic.

Carcinogenicity: This product is not considered to be a carcinogen by IARC, NTP, ACGIH, or OSHA.

Reproductive toxicity: This product is not expected to cause reproductive or developmental effects.

Aspiration hazard: May be harmful if swallowed and enters the lungs.

Specific target organ toxicity:

Single exposure May cause drowsiness or dizziness. May cause respiratory irritation.

Repeated exposure Prolonged inhalation may be harmful. May cause damage to organs through prolonged or repeated exposure.

Further information: Toxicological, ecotoxicological, physical, and chemical properties may not have been fully investigated. Hazard data above is estimated based on best available information. Some workers with certain pre-existing medical conditions such as: asthma, allergies, or impaired pulmonary and/or liver functions, or who may be particularly susceptible to this material, may be affected by exposure to this material.

12. ECOLOGICAL INFORMATION

Ecotoxicity: Information given is based on data on the components and the ecotoxicology of similar products. The product is classified as toxic to aquatic life. Avoid release to the environment.

Component	Species	Test Result
Distillates (petroleum), hydrogenated light (CAS 64742-47-8)		
Aquatic, Fish, LC50	Bluegill Sunfish	2.2 mg/l, 96 Hours

Persistence and degradability: No data available.

Bioaccumulative potential: No data available.

Mobility in soil: No data available.

Other adverse effects: No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption) are expected from this product.

13. DISPOSAL CONSIDERATIONS

Waste Disposal of Substance: Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

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Container Disposal:

Empty containers or liners may retain some product residues; follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. TRANSPORTATION INFORMATION

United States Department of Transportation (USDOT): Not regulated for transport by DOT.
International Air Transportation Association (IATA): Not regulated as a hazardous material.
International Maritime Dangerous Goods Code (IMDG): Not regulated as a hazardous material.

Special precautions for user: Read safety instructions, SDS and emergency procedures before handling.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable.

This information does not cover all specific regulatory or operational requirements of this product. The classifications for transportation may vary by container volume or different regional or national regulations.

15. REGULATORY INFORMATION

US Federal Regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D) Not regulated.
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050) Not listed.
CERCLA Hazardous Substance List (40 CFR 302.4) Not Regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard	Yes
	Delayed Hazard	No
	Fire Hazard	Yes
	Pressure Hazard	No
	Reactivity Hazard	No



SARA 302 Extremely hazardous substance	No
SARA 311/312 Hazardous chemical	Yes
SARA 313 (TRI reporting)	None

This product does not contain known levels of any chemicals listed by the State of California as known to cause cancer or reproductive harm as per **California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)**.

US State Right-To-Know Lists

Chemical	Massachusetts RTK	New Jersey Work and Community RTK Act	Pennsylvania Worker and Community RTK Law	Rhode Island RTK
Distillates (petroleum), hydrogenated light			Listed	

This product has been classified according to the hazard criteria of the CPR and the SDS contains all of the information required by the CPR.

	
Class B-3: Combustible Liquid	Class D-2B: Material Causing other toxic effects

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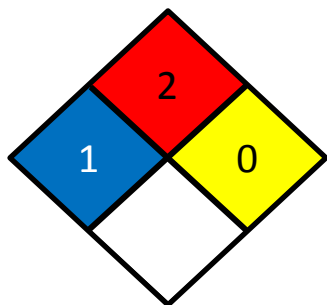
International Inventories

Country or Region	Inventory	On Inventory? (Yes/No)
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	Yes
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

16. OTHER INFORMATION

Date Prepared or Revised: June 2014

NFPA Ratings



HMIS Rating

HEALTH HAZARD	1
FLAMMABILITY HAZARD	2
PHYSICAL HAZARD	0
PERSONAL PROTECTION	B

Legend

ACGIH:	American Conference of Governmental Industrial Hygienists
CAS No.:	Chemical Abstract Service Registry Number
CERCLA:	Comprehensive Environmental Response, Compensation and Liability Act (U.S. EPA)
CPR:	Controlled Product Regulations (Canada)
DOT:	Department of Transportation (U.S.)
EPA:	Environmental Protection Agency (U.S.)
GHS:	Globally Harmonized System of Classification and Labeling of Chemicals
HEPA:	High-Efficiency Particulate Air
HMIS:	Hazardous Materials Identification System
IARC:	International Agency for Research on Cancer
IATA:	International Air Transport Association
IMDG:	International Maritime Dangerous Goods code
LPP:	Limité Permissible Ponderado (Chile)
NIOSH:	National Institute of Occupational Safety and Health (U.S.)
NFPA:	National Fire Protection Association (US)
NTP:	National Toxicology Program (US)
OSHA:	Occupational Safety and Health Administration (U.S.)
PEL:	Permissible Exposure Limit
SARA:	Superfund Amendments and Reauthorization Act (U.S. EPA)
SDS:	Safety Data Sheet
STEL:	Short Term Exposure Limit (15 minute Time Weighted Average)

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STOT: Specific Target Organ Toxicity (GHS Classification)
TLV: Threshold Limit Value
TSCA: Toxic Substances Control Act (U.S.)
TWA: Time Weighted Average (exposure for 8-hour workday)
U.S.: United States
VOC: Volatile Organic Compounds
WHMIS: Canadian Workplace Hazardous Materials Information System

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