

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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ICC-ES ESR-2138

City of Los Angeles Research Report 25469

PAT-PINS Material Safety Data Sheet

TENSION & SHEAR LOAD VALUES

For Simpson Strong-Tie® Fasteners



Code Reports: Reference ICC-ES ESR-2138, and City of L.A. RR25469 for code-listed fasteners and applications.



PDP Series Fasteners - Tension and Shear Loads in Normal-Weight Concrete

Model No.	Shank Diameter inches (mm)	Minimum Penetration inches (mm)	Minimum Edge Distance inches (mm)	Minimum Spacing inches (mm)	Allowable Tension Load ² - lbs. (kN)			Allowable Shear Load ² - lbs. (kN)		
					f'c ≥ 2000 psi (13.8 MPa) Concrete	f'c ≥ 3000 psi (20.7 MPa) Concrete	f'c ≥ 4000 psi (27.6 MPa) Concrete	f'c ≥ 2000 psi (13.8 MPa) Concrete	f'c ≥ 3000 psi (20.7 MPa) Concrete	f'c ≥ 4000 psi (27.6 MPa) Concrete
PDP	0.145 (3.7)	1 (25)	3 (75)	4 (100)	45 (0.2)	100 (0.44)	150 (0.67)	120 (0.53)	165 (0.73)	205 (0.91)
	0.145 (3.7)	1¼ (32)	3 (75)	4 (100)	140 (0.62)	255 (1.13)	370 (1.65)	265 (1.18)	265 (1.18)	265 (1.18)
PDP-SS	0.145 (3.7)	1 (25)	3 (75)	4 (100)	60 (0.27)	•	•	195 (0.87)	•	•

- The fasteners shall not be driven until the concrete has reached the designated compressive strength. Minimum concrete thickness is three times the fastener embedment into the concrete.
- The allowable tension and shear values are for the fastener only. Wood or steel members connected must be investigated in accordance with accepted design criteria.

The table applies to the following Simpson Strong-Tie fasteners where minimum penetration exists:

* See page 10 of the 2008 Simpson Strong-Tie Anchoring and Fastening Systems for Concrete and Masonry for an explanation of the load table icons

PDP*	PDPW*	PDPWL*
PDP-125	PDPW-125	PDPWL-125
PDP-150	PDPW-150	PDPWL-150
PDP-175	PDPW-175	PDPWL-175
PDP-200	PDPW-200	PDPWL-200
PDP-225	PDPW-225	PDPWL-225
PDP-250	PDPW-250	PDPWL-250
PDP-300	PDPW-300	PDPWL-300
		PDPWL-400

* Including stainless steel models.



PDP & PDP-SS



PDPW



PDPWL & PDPWL-SS

For more information on these fasteners go to pages 188 and 189 of the 2008 Anchoring and Fastening Systems catalog.

PHN Series Fasteners - Tension and Shear Loads in Normal-Weight Concrete



Model No.	Shank Diameter inches (mm)	Minimum Penetration inches (mm)	Minimum Edge Distance inches (mm)	Minimum Spacing inches (mm)	Allowable Tension Load ² - lbs. (kN)			Allowable Shear Load ² - lbs. (kN)		
					f'c ≥ 2000 psi (13.8 MPa) Concrete	f'c ≥ 3000 psi (20.7 MPa) Concrete	f'c ≥ 4000 psi (27.6 MPa) Concrete	f'c ≥ 2000 psi (13.8 MPa) Concrete	f'c ≥ 3000 psi (20.7 MPa) Concrete	f'c ≥ 4000 psi (27.6 MPa) Concrete
PHN	0.145 (3.7)	1 (25)	3 (75)	4 (100)	45 (0.2)	100 (0.44)	150 (0.67)	120 (0.53)	165 (0.73)	205 (0.91)
	0.145 (3.7)	1¼ (32)	3 (75)	4 (100)	140 (0.62)	255 (1.13)	370 (1.65)	265 (1.18)	265 (1.18)	265 (1.18)

- The fasteners shall not be driven until the concrete has reached the designated compressive strength. Minimum concrete thickness is three times the fastener embedment into the concrete.
- The allowable tension and shear values are for the fastener only. Wood or steel members connected must be investigated in accordance with accepted design criteria.

The table applies to the following Simpson Strong-Tie® fasteners where minimum penetration exists:

PHN	PHNW	PHSNA
PHN-27	PHNW-27	PHSNA-27
PHN-32	PHNW-32	PHSNA-32
PHN-37	PHNW-37	PHSNA-37
PHN-42	PHNW-42	PHSNA-42
PHN-47	PHNW-47	PHSNA-47
PHN-52	PHNW-52	PHSNA-52
PHN-57	PHNW-57	PHSNA-57
PHN-62	PHNW-62	PHSNA-62
PHN-72	PHNW-72	PHSNA-72



PHN



PHNW



PHSNA

For more information on these fasteners go to pages 191, 192 and 193 of the 2008 Anchoring and Fastening Systems catalog.

Spacing of PDP and PHN Fasteners for Attachment of Wood Sill Plates to Normal-Weight Concrete



Model No.	Overall Length inches (mm)	Head Diameter inches (mm)	Shank Diameter inches (mm)	Maximum Spacing inches (mm)		
				Interior Shear Walls ³	Interior Nonshear Walls ²	Exterior Shear Walls ³
PDPW-300 or PDPWL-300	3 (76)	5/16 (7.9)	0.145 (3.7)	12 (305)	24 (610)	12 (305)
PHNW-72	2 7/8 (73)	5/16 (7.9)	0.145 (3.7)	18 (457)	36 (914)	18 (457)

- Spacings are based upon the attachment of 2-inch (nominal thickness) wood sill plates, with specific gravity of 0.50 or greater, to concrete floor slabs or footings. For species of wood with specific gravity of 0.42 to 0.49, multiply required spacing of fasteners for shear walls by 0.81. For species of wood with specific gravity of 0.31 to 0.41, multiply the required spacing of fasteners for shear walls by 0.65.
- All walls shall have fasteners placed at 6 inches from ends of sill plates, with maximum spacing as shown in the table.
- Fasteners indicated shall have two pins placed 6 inches and 10 inches, respectively, from each end of sill plates, with maximum spacing as shown in the table.
- All fasteners must be installed with a minimum 3/4-inch-diameter, No. 16 gauge (0.0598 inch) steel washer.
- Fasteners shall not be driven until the concrete has reached a compressive strength of 2,000 psi. Minimum edge distance is 1¼ inches.
- The fasteners shall not be used for the attachment of shear walls having a unit shear in excess of 100 pounds per foot. Spacings shown are independent of the number of building stories.

TENSION & SHEAR LOAD VALUES

For Simpson Strong-Tie® Fasteners

PDPH Series Fasteners - Tension and Shear Loads in Normal Weight Concrete



PDPH

Model No.	Shank Diameter inches (mm)	Minimum Penetration inches (mm)	Minimum Edge Distance inches (mm)	Minimum Spacing inches (mm)	Allowable Tension Load - lbs. (kN)			Allowable Shear Load - lbs. (kN)		
					f'c ≥ 2000 psi (13.8 MPa) Concrete	f'c ≥ 4000 psi (27.6 MPa) Concrete	f'c ≥ 6000 psi (41.4 MPa) Concrete	f'c ≥ 2000 psi (13.8 MPa) Concrete	f'c ≥ 4000 psi (27.6 MPa) Concrete	f'c ≥ 6000 psi (41.4 MPa) Concrete
PDPH	0.177 (4.5)	3/4 (19)	3 1/2 (89)	5 1/8 (130)	30 (0.13)	30 (0.13)	110 (0.29)	50 (0.22)	110 (0.49)	190 (0.84)
		1 1/4 (32)	3 1/2 (89)	5 1/8 (130)	130 (0.58)	260 (1.15)	190 (0.84)	265 (1.18)	220 (0.98)	105 (0.47)

- The fasteners shall not be driven until the concrete has reached the designated compressive strength. Minimum concrete thickness is three times the fastener embedment into the concrete.
- The allowable tension values are for the fastener only. Connected members must be investigated separately in accordance with accepted design criteria.

* See page 10 of the 2008 Simpson Strong-Tie *Anchoring and Fastening Systems for Concrete and Masonry* for an explanation of the load table icons

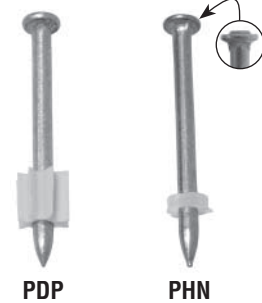
For more information on these fasteners go to page 188 of the 2008 Anchoring and Fastening Systems catalog.

PDP and PHN Fasteners Attaching Light Gauge Steel Channels - Shear Loads in Normal Weight Concrete



Model No.	Shank Diameter inches (mm)	Minimum Penetration inches (mm)	Light Gauge Steel Channel Thickness gauge	Allowable Shear Load lbs. (kN)
				f'c ≥ 2000 psi (13.8 MPa) Concrete
PDP	0.145 (3.7)	7/8 (22)	20	160 (0.71)
PHN	0.145 (3.7)	7/8 (22)	20	160 (0.71)
PDP	0.145 (3.7)	7/8 (22)	18	135 (0.60)
PHN	0.145 (3.7)	7/8 (22)	18	135 (0.60)

- The fasteners shall not be driven until the concrete has reached the designated compressive strength. Minimum concrete thickness is three times the faster embedment into the concrete.



PDP

PHN

For more information on these fasteners go to pages 188 and 191 of the 2008 Anchoring and Fastening Systems catalog.

PSLV Series Threaded Studs - Tension Loads in Normal Weight Concrete



Model No.	Shank Diameter inches (mm)	Minimum Penetration inches (mm)	Allowable Tension Load lbs. (kN)
			f'c ≥ 2500 psi (17.2 MPa) Concrete
PSLV3	0.205 (5.2)	1 1/4 (32)	260 (1.16)

See notes below.



PSLV3

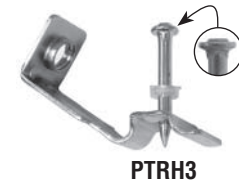
For more information on these fasteners go to page 191 of the 2008 Anchoring and Fastening Systems catalog.

PTRH Series Rod Hangers - Tension Loads in Normal Weight Concrete



Model No.	Shank Diameter inches (mm)	Minimum Penetration inches (mm)	Allowable Tension Load lbs. (kN)
			f'c ≥ 2500 psi (17.2 MPa) Concrete
PTRH3-HN32	0.145 (3.7)	1 (25)	150 (0.67)
PTRH4-HN32	0.145 (3.7)	1 (25)	150 (0.67)

- The fasteners shall not be driven until the concrete has reached the designated compressive strength. Minimum concrete thickness is three times the fastener embedment into the concrete.
- The allowable tension values are for the fastener only. Connected members must be investigated separately in accordance with accepted design criteria.



PTRH3

For more information on these fasteners go to page 193 of the 2008 Anchoring and Fastening Systems catalog.

PCLDP Series Ceiling Clips - Tension Loads in Normal Weight Concrete



Model No.	Shank Diameter inches (mm)	Minimum Penetration inches (mm)	Allowable Tension Load lbs. (kN)
			f'c ≥ 2000 psi (13.8 MPa) Concrete
PCLDP-125	0.145 (3.7)	1 1/8 (29)	25 (0.11)

- The fasteners shall not be driven until the concrete has reached the designated compressive strength. Minimum concrete thickness is three times the faster embedment into the concrete.



PCLDP

For more information on these fasteners go to page 190 of the 2008 Anchoring and Fastening Systems catalog.

TENSION & SHEAR LOAD VALUES

For Simpson Strong-Tie® Fasteners



PDPT Series Fasteners - Tension Loads in Lightweight Concrete over Metal Deck



Model No.	Shank Diameter inches (mm)	Minimum Penetration inches (mm)	Allowable Tension Load, lbs. (kN) (Installed in Concrete)	Allowable Tension Load, lbs. (kN) (Installed through Metal Deck)
			f'c ≥ 3000 psi (20.7 MPa) Concrete	f'c ≥ 3000 psi (20.7 MPa) Concrete
PDPT	0.145 (3.7)	7/8 (22)	90 (0.40)	40 (0.18)

See notes 1-5 below.

PDPT Series Fasteners - Shear Loads in Lightweight Concrete over Metal Deck



Model No.	Shank Diameter inches (mm)	Minimum Penetration inches (mm)	Allowable Shear Load, lbs. (kN) (Installed in Concrete)	Allowable Shear Load, lbs. (kN) (Installed through Metal Deck)
			f'c ≥ 3000 psi (20.7 MPa) Concrete	f'c ≥ 3000 psi (20.7 MPa) Concrete
PDPT	0.145 (3.7)	7/8 (22)	250 (1.11)	280 (1.24)

1. The fasteners shall not be driven until the concrete has reached the designated compressive strength. Minimum concrete thickness is three times the fastener embedment into the concrete.
2. The allowable tension and shear values are for the fastener only. Connected members must be investigated separately in accordance with accepted design criteria.
3. Metal deck must be minimum 20 gauge.
4. Shear values are for loads applied toward edge of flute.
5. The fasteners shall be installed 1½ inch from the edge of flute.



PDPT

For more information on these fasteners go to page 190 of the 2008 Anchoring and Fastening Systems catalog.

Tension Loads for ¼" - 20 Threaded Studs in Lightweight Concrete Over a Metal Deck



Model No.	Shank Diameter inches (mm)	Minimum Penetration inches (mm)	Allowable Tension Load, lbs. (kN) (Installed through Metal Deck)
			f'c ≥ 3000 psi (20.7 MPa) Concrete
PSLV4	0.150 (3.8)	1 (25)	80 (0.36)

* See page 10 of the 2008 Simpson Strong-Tie Anchoring and Fastening Systems for Concrete and Masonry for an explanation of the load table icons

1. The fasteners shall not be driven until the concrete has reached the designated compressive strength. Minimum concrete thickness is three times the fastener embedment into the concrete.
2. The allowable tension values are for the fastener only. Connected members must be investigated separately in accordance with accepted design criteria.
3. Metal deck must be minimum 20 gauge.
4. The fasteners shall be installed 1½ inch from the edge of flute.



PSLV4

For more information on these fasteners go to page 191 of the 2008 Anchoring and Fastening Systems catalog.

Tension Loads for ⅜" - 16 Threaded Studs in Lightweight Concrete over Metal Deck



Model No.	Shank Diameter inches (mm)	Minimum Penetration inches (mm)	Allowable Tension Load, lbs. (kN) (Installed through Metal Deck)
			f'c ≥ 3000 psi (20.7 MPa) Concrete
PSLV3	0.205 (5.21)	1¼ (32)	225 (1.00)

1. The fasteners shall not be driven until the concrete has reached the designated compressive strength. Minimum concrete thickness is three times the fastener embedment into the concrete.
2. The allowable tension values are for the fastener only. Connected members must be investigated separately in accordance with accepted design criteria.
3. Metal deck must be minimum 20 gauge.
4. The fasteners shall be installed 1½ inch from the edge of flute.



PSLV3

For more information on these fasteners go to page 191 of the 2008 Anchoring and Fastening Systems catalog.

TENSION & SHEAR LOAD VALUES

For Simpson Strong-Tie® Fasteners

PCL & PECL Series Ceiling Clips - Tension and Oblique Loads in Sand-Lightweight Concrete over Metal Deck



Model No.	Shank Diameter inches (mm)	Minimum Penetration inches (mm)	Allowable Tension Load, lbs. (kN) (Installed through Metal Deck)	Allowable Oblique Load, lbs. (kN) (Installed through Metal Deck)
			f'c ≥ 3000 psi (20.7 MPa) Concrete	f'c ≥ 3000 psi (20.7 MPa) Concrete
PCLDP-100	0.145 (3.7)	7/8 (22)	55 (0.24)	85 (0.38)
PECLDP-125	0.145 (3.7)	1 (25)	55 (0.24)	85 (0.38)
PCLDP-125	0.145 (3.7)	1 (25)	55 (0.24)	85 (0.38)
PECLHN-27	0.145 (3.7)	1 (25)	55 (0.24)	85 (0.38)
PCLHN-27	0.145 (3.7)	1 (25)	55 (0.24)	85 (0.38)

- The fasteners shall not be driven until the concrete has reached the designated compressive strength. Minimum concrete thickness is three times the fastener embedment into the concrete.
- The allowable tension and shear values are for the fastener only. Connected members must be investigated separately in accordance with accepted design criteria.
- Metal deck must be minimum 20 gauge.
- Oblique values are for loads applied toward edge of flute.
- The fasteners shall be installed 1½ inch from the edge of flute.



PCLDP



PECLDP

For more information on these fasteners go to page 190.

PTRH Series Threaded Rod Hangers - Tension Loads in Sand-Lightweight Concrete over Metal Deck



Model No.	Shank Diameter inches (mm)	Minimum Penetration inches (mm)	Allowable Tension Load, lbs. (kN) (Installed through Metal Deck)
			f'c ≥ 3000 psi (20.7 MPa) Concrete
PTRH3-HN32	0.145 (3.7)	1 (25)	140 (0.62)
PTRH4-HN32	0.145 (3.7)	1 (25)	140 (0.62)

*See page 10 for an explanation of the load table icons

- The fasteners shall not be driven until the concrete has reached the designated compressive strength. Minimum concrete thickness is three times the fastener embedment into the concrete.
- The allowable tension values are for the fastener only. Connected members must be investigated separately in accordance with accepted design criteria.
- Metal deck must be minimum 20 gauge.
- The fasteners shall be installed 1½ inch from the edge of flute.



PTRH3

For more information on these fasteners go to page 193.

PHNT Series Fasteners - Tension Loads in Sand-Lightweight Concrete Over Metal Deck



Model No.	Shank Diameter inches (mm)	Minimum Penetration inches (mm)	Allowable Tension Load, lbs. (kN) (Installed in Concrete)	Allowable Tension Load, lbs. (kN) (Installed through Metal Deck)
			f'c ≥ 3000 psi (20.7 MPa) Concrete	f'c ≥ 3000 psi (20.7 MPa) Concrete
PHNT	0.145 (3.7)	7/8 (22)	185 (0.82)	165 (0.73)

See notes 1-5 below.

PHNT Series Fasteners - Shear Loads in Sand-Lightweight Concrete Over Metal Deck



Model No.	Shank Diameter inches (mm)	Minimum Penetration inches (mm)	Allowable Shear Load, lbs. (kN) (Installed in Concrete)	Allowable Shear Load, lbs. (kN) (Installed through Metal Deck)
			f'c ≥ 3000 psi (20.7 MPa) Concrete	f'c ≥ 3000 psi (20.7 MPa) Concrete
PHNT	0.145 (3.7)	7/8 (22)	275 (1.22)	400 (1.78)

- The fasteners shall not be driven until the concrete has reached the designated compressive strength. Minimum concrete thickness is three times the fastener embedment into the concrete.
- The allowable tension and shear values are for the fastener only. Connected members must be investigated separately in accordance with accepted design criteria.
- Metal deck must be minimum 20 gauge.
- Shear values are for loads applied toward edge of flute.
- The fasteners shall be installed 1½ inch from the edge of flute.



PHNT

For more information on these fasteners go to page 192.

TENSION & SHEAR LOAD VALUES

For Simpson Strong-Tie® Fasteners



PDP Tension and Shear Loads in 8-inch Lightweight, Medium-Weight and Normal-Weight Hollow CMU



Model No.	Shank Diameter inches (mm)	Minimum Penetration inches (mm)	Minimum Edge Distance inches (mm)	Minimum End Distance inches (mm)	Minimum Spacing inches (mm)	8-inch Hollow CMU Loads Based on CMU Strength	
						Tension Load	Shear Load
						Allowable lbs. (kN)	Allowable lbs. (kN)
PDP	0.145 (3.7)	1¼ (44)	4 (100)	4½ (116)	4 (100)	135 (0.60)	240 (1.07)

- Values for 8-inch wide CMU Grade N, Type II, lightweight, medium-weight and normal weight concrete masonry units conforming to UBC Standard 21-4 or ASTM C90.
- The embedment depth is measured from the outside face of the concrete masonry unit and is based on the anchor being embedded an additional ½ inch through 1¼" thick face shell.
- Allowable loads may not be increased for short-term loading due to wind or seismic forces. CMU wall design must satisfy applicable design standards and be capable of withstanding applied loads.
- Allowable loads are based on a safety factor of 5.0.



PDP

For more information on these fasteners go to page 188 of the 2008 Anchoring and Fastening Systems catalog.

PDP Series Fasteners - Tension and Shear Loads in Steel



Model No.	Shank Diameter inches (mm)	Minimum Edge Distance inches (mm)	Minimum Spacing inches (mm)	Steel Thickness ³ inches (mm)	Allowable Tension Load ² lbs. (kN)	Allowable Shear Load ² lbs. (kN)
PDP	0.145 (3.7)	½ (12.7)	1 (25)	¾ (4.8)	155 (0.69)	395 (1.76)
PDP Knurled	0.145 (3.7)	½ (12.7)	1 (25)	¼ (6.4)	210 (0.93)	-

See notes below.

PDPH Series Fasteners - Tension and Shear Loads in Steel



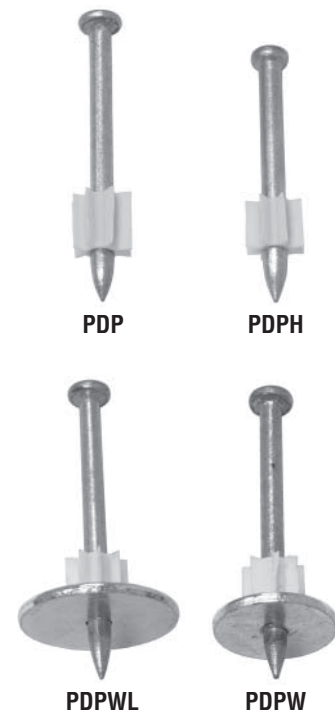
Model No.	Shank Diameter inches (mm)	Minimum Edge Distance inches (mm)	Minimum Spacing inches (mm)	Steel Thickness ³ inches (mm)	Allowable Tension Load ² lbs. (kN)	Allowable Shear Load ² lbs. (kN)
PDPH	0.177 (4.5)	½ (13)	1 (25)	¾ (5)	335 (1.49)	790 (3.51)
				¼ (6)	520 (2.31)	870 (3.87)

* See page 10 of the 2008 Simpson Strong-Tie Anchoring and Fastening Systems for Concrete and Masonry for an explanation of the load table icons

- The entire pointed portion of the fastener must penetrate through the steel to obtain the tabulated values.
- The allowable tension and shear values are for the fastener to steel only. Connected members must be investigated separately in accordance with accepted design criteria.
- Steel must conform to ASTM A36 specifications, with Fy = 36,000 psi, minimum.

The table applies to the following Simpson Strong-Tie fasteners where minimum penetration exists:

PDP	PDPW	PDPWL
PDP-50K	-	-
PDP-62K	-	-
PDP-100	PDPW-100	PDPWL-100
PDP-125	PDPW-125	PDPWL-125
PDP-150	PDPW-150	PDPWL-150
PDP-175	PDPW-175	PDPWL-175
PDP-200	PDPW-200	PDPWL-200
PDP-225	-	-
PDP-250	PDPW-250	PDPWL-250
PDP-300	PDPW-300	PDPWL-300



PDP

PDPH

PDPWL

PDPW

For more information on these fasteners go to pages 188 and 189 of the 2008 Anchoring and Fastening Systems catalog.

PDPT Series Fasteners - Tension and Shear Loads in Steel



Model No.	Shank Diameter inches (mm)	Minimum Edge Distance inches (mm)	Minimum Spacing inches (mm)	Steel Thickness ³ inches (mm)	Allowable Tension Load ² lbs. (kN)	Allowable Shear Load ² lbs. (kN)
PDPT	0.145 (3.7)	½ (13)	1 (25)	⅛ (3)	150 (0.67)	530 (2.36)
				¾ (5)	290 (1.29)	660 (2.93)
				¼ (6)	340 (1.51)	700 (3.11)

- The entire pointed portion of the fastener must penetrate through the steel to obtain the tabulated value.
- The allowable tension and shear values are for the fastener to steel only. Connected member must be investigated separately in accordance with accepted design criteria.
- Steel must conform to ASTM A36 specifications, with Fy = 36,000 psi, minimum.



PDPT

For more information on these fasteners go to page 190 of the 2008 Anchoring and Fastening Systems catalog.

TENSION & SHEAR LOAD VALUES

For Simpson Strong-Tie® Fasteners

PHN Series Fasteners - Tension and Shear Loads in Steel



Model No.	Shank Diameter inches (mm)	Minimum Edge Distance inches (mm)	Minimum Spacing inches (mm)	Steel Thickness ³ inches (mm)	Allowable Tension Load ² lbs. (kN)	Allowable Shear Load ² lbs. (kN)
PHN	0.145 (3.7)	1/2 (12.7)	1 (25)	3/16 (4.8)	155 (0.69)	395 (1.76)
PHN ⁴ Knurled	0.145 (3.7)	1/2 (12.7)	1 (25)	1/4 (6.4)	440 (2.0)	-

- The entire pointed portion of the fastener must penetrate through the steel to obtain the tabulated values.
- The allowable tension and shear values are for the fastener only. Wood or steel members connected must be investigated separately in accordance with accepted design criteria.
- Steel must conform to ASTM A 36 specifications, with Fy = 36,000 psi, minimum.
- PHN-16K or longer.

The table applies to the following Simpson Strong-Tie fasteners where minimum penetration exists:

PHN	PHNW	PHSNA
PHN-16K	-	-
PHN-19K	-	-
PHN-27	PHNW-27	PHSNA-27
PHN-32	PHNW-32	PHSNA-32
PHN-37	PHNW-37	PHSNA-37
PHN-42	PHNW-42	PHSNA-42
PHN-47	PHNW-47	PHSNA-47
PHN-52	PHNW-52	PHSNA-52
PHN-57	PHNW-57	PHSNA-57
PHN-62	PHNW-62	PHSNA-62
PHN-72	PHNW-72	PHSNA-72



PHN



PHNW



PHSNA

For more information on these fasteners go to pages 191, 192 and 193 of the 2008 Anchoring and Fastening Systems catalog.

PHNT Series Fasteners - Tension and Shear Loads in Steel



Model No.	Shank Diameter inches (mm)	Minimum Edge Distance inches (mm)	Minimum Spacing inches (mm)	Steel Thickness ³ inches (mm)	Allowable Tension Load ² lbs. (kN)	Allowable Shear Load ² lbs. (kN)
PHNT	0.145 (3.7)	1/2 (13)	1 (25)	1/8 (3)	40 (0.18)	440 (1.96)
				3/16 (5)	50 (0.22)	620 (2.76)
				1/4 (6)	250 (1.11)	620 (2.76)

- The entire pointed portion of the fastener must penetrate through the steel to obtain the tabulated value.
- The allowable tension and shear values are for the fastener to steel only.
- Steel must conform to ASTM A36 specifications, with Fy = 36,000 psi, minimum.

* See page 10 of the 2008 Simpson Strong-Tie Anchoring and Fastening Systems for Concrete and Masonry for an explanation of the load table icons



PHNT

For more information on these fasteners go to page 192 of the 2008 Anchoring and Fastening Systems catalog.

PSLV Series Threaded Studs - Tension and Shear Loads in Steel



Model No.	Shank Diameter inches (mm)	Minimum Edge Distance inches (mm)	Minimum Spacing inches (mm)	Steel Thickness ³ inches (mm)	Allowable Tension Load ² lbs. (kN)	Allowable Shear Load ² lbs. (kN)
PSLV3	0.205 (5.2)	1 (25)	1 5/8 (41)	3/16 (5)	270 (1.20)	770 (3.42)
				1/4 (6)	680 (3.02)	1,120 (4.98)
PSLV4	0.150 (3.8)	1/2 (13)	1 (25)	3/16 (5)	200 (0.89)	630 (2.80)
				1/4 (6)	420 (1.87)	690 (3.07)

- The entire pointed portion of the fastener must penetrate through the steel to obtain the tabulated value.
- The allowable tension and shear values are for the fastener to steel only. Connected member must be investigated separately in accordance with accepted design criteria.
- Steel must conform to ASTM A36 specifications, with Fy = 36,000 psi, minimum.



PSLV3



PSLV4

For more information on these fasteners go to page 191 of the 2008 Anchoring and Fastening Systems catalog.

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DIVISION: 03—CONCRETE
Section: 03151—Concrete Anchoring

DIVISION: 04—MASONRY
Section: 04081—Masonry Anchorage

DIVISION: 05—METALS
Section: 05090—Metal Fastenings

DIVISION: 06—WOOD AND PLASTICS
Section: 06090—Wood and Plastic Fastenings

REPORT HOLDER:

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EVALUATION SUBJECT:

POWER-DRIVEN FASTENERS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- # 2006 *International Building Code*® (2006 IBC)
- # 2003 *International Building Code*® (2003 IBC)
- # 2006 *International Residential Code*® (2006 IRC)
- # 2003 *International Residential Code*® (2003 IRC)
- # 1997 *Uniform Building Code*™ (UBC)

Property evaluated:

Structural

2.0 USES

2.1 General:

The Simpson Strong-Tie Company power-driven fasteners are used to fasten building components, such as wood and steel, to normal-weight concrete, steel decks with structural lightweight concrete fill, steel, and hollow concrete masonry units (CMUs).

2.2 Headed Fasteners:

2.2.1 PDP Headed Fasteners: PDP headed fasteners are used to fasten building components to normal-weight concrete, steel, and hollow CMUs, including fastening of steel channels and angle clips to normal-weight concrete.

2.2.2 PDPH Headed Fasteners: PDPH headed fasteners are used to fasten building components to normal-weight concrete and steel.

2.2.3 PHN Headed Fasteners: PHN headed fasteners are used to fasten building components to normal-weight concrete and steel, including connecting of wood sill plates to concrete foundations, and fastening of steel channels and angle clips to normal-weight concrete.

2.3 Headed Fasteners with Washers:

PDPW, PDPWL, PDPWLS and PHNW headed fasteners with washers are used to fasten wood sill plates to normal-weight concrete.

2.4 Headed Tophat Fasteners:

PDPT and PHNT headed tophat fasteners are used to fasten building components to steel decks with structural lightweight concrete fill, and to steel members.

2.5 Threaded Stud Fasteners:

2.5.1 PSLV3 Threaded Stud Fasteners: PSLV3 threaded stud fasteners are used to fasten building components to normal-weight concrete, steel, and steel decks with structural lightweight concrete fill.

2.5.2 PSLV4 Threaded Stud Fasteners: PSLV4 threaded stud fasteners are used to fasten building components to steel, and steel decks with structural lightweight concrete fill.

2.6 Preassembled Ceiling Clips:

PCLDP and PECLDP preassembled ceiling clips are used to fasten building components to steel decks with structural lightweight concrete fill.

2.7 Threaded Rod Hangers:

PTRH3 and PTRH4 threaded rod hangers are used to fasten building components to normal-weight concrete and steel decks with structural lightweight concrete fill.

3.0 DESCRIPTION

3.1 Fasteners:

3.1.1 General: The power-driven fasteners are installed with a low-velocity powder-actuated fastening tool recommended by Simpson Strong-Tie. The fasteners are manufactured from steel complying with ASTM A 510, Grades 1060 to 1065, and austempered to a Rockwell "C" core hardness of 51 to 56. Unless otherwise noted in this report, the fasteners have a mechanically plated zinc finish complying with ASTM B 695, Type I, Class 5. 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, steel or CMU substrate. See Figure 1 for fastener details.

3.1.2 Headed Fasteners:

3.1.2.1 PDP Headed Fasteners: PDP headed fasteners have a 0.145-inch-diameter (3.68 mm) smooth or knurled shank and a 0.30-inch-diameter (7.4 mm) head. They are

available in lengths from $\frac{1}{2}$ inch (13 mm) to 3 inches (76 mm).

3.1.2.2 PDPH Headed Fasteners: PDPH headed fasteners have a 0.177-inch-diameter (4.50 mm) smooth or knurled shank and a 0.30-inch-diameter (7.4 mm) head, and are available in lengths from $\frac{1}{2}$ inch (13 mm) to 3 inches (76 mm).

3.1.2.3 PHN Headed Fasteners: PHN headed fasteners have a 0.145-inch-diameter (3.68 mm) smooth or knurled shank and an 8-millimeter-diameter (0.315 inch) head, and are available in lengths from $\frac{1}{2}$ inch (13 mm) to $2\frac{7}{8}$ inches (72 mm).

3.1.3 Headed Fasteners with Washers:

3.1.3.1 PDPW-300 Headed Fasteners with Washers: PDPW-300 headed fasteners with washers consist of 0.145-inch-diameter (3.68 mm), 3-inch-long (76 mm), smooth shank PDP fasteners described in Section 3.1.2.1 of this report, with $\frac{3}{4}$ -inch-diameter (19 mm), 0.070-inch-thick (1.78 mm) washers premounted near the pointed end. The washer is manufactured from steel complying with ASTM A 1011, CS Type A, and has an electroplated zinc finish complying with ASTM B 633, SC1, Type I.

3.1.3.2 PDPWL-300, PDPWL-300MG and PDPWLS-300MG Headed Fasteners with Washers: PDPWL-300 headed fasteners with washers consist of 0.145-inch-diameter (3.68 mm), minimum 3-inch-long (76 mm), smooth shank PDP fasteners described in Section 3.1.2.1 of this report, with 1-inch-diameter (25 mm), 0.070-inch-thick (1.78 mm) washers premounted near the pointed end. The washer is manufactured from steel complying with ASTM A 1011, CS Type A, and has an electroplated zinc finish complying with ASTM B 633, SC1, Type I. The PDPWL-300MG is identical to the PDPWL-300, except that the PDPWL-300MG fasteners and washers have a mechanically plated zinc finish complying with ASTM B 695, Type I, minimum Class 55. The PDPWLS-300MG is identical to the PDPWL-300, except that the PDPWLS-300MG has a 1-inch (25 mm) square washer premounted near the pointed end.

3.1.3.3 PHNW-72 Headed Fasteners with Washers: PHNW-72 headed fasteners with washers consist of 0.145-inch-diameter (3.68 mm), $2\frac{7}{8}$ -inch-long (73 mm), smooth shank PHN fasteners described in Section 3.1.2.3 of this report, with 1-inch-diameter (25 mm), 0.070-inch-thick (1.78 mm) washers premounted near the pointed end. The washer is manufactured from steel complying with ASTM A 1011, CS Type A, and has an electroplated zinc finish complying with ASTM B 633, SC1, Type I.

3.1.4 Headed Tophat Fasteners:

3.1.4.1 PDPT Headed Tophat Fasteners: The PDPT headed tophat fasteners consist of the PDP headed fasteners described in Section 3.1.2.1 of this report, and a "tophat" that is manufactured from steel complying with ASTM A 1011, CS Type A, with an electroplated zinc finish complying with ASTM B 633, SC1, Type I. The fasteners are available in lengths from $\frac{1}{2}$ inch (13 mm) to 1 inch (25 mm).

3.1.4.2 PHNT Headed Tophat Fasteners: The PHNT headed tophat fastener consists of a PHN headed fastener described in Section 3.1.2.3 of this report, and a "tophat" that is manufactured from steel complying with ASTM A 1011, CS Type A, with an electroplated zinc finish complying with ASTM B 633, SC1, Type I. The fasteners are available in lengths from $\frac{5}{8}$ inch (16 mm) to 1 inch (25 mm).

3.1.5 Threaded Stud Fasteners:

3.1.5.1 PSLV3 Threaded Stud Fasteners: PSLV3 threaded stud fasteners consist of a 0.205-inch-diameter (5.2 mm),

smooth or knurled shank portion, and a $1\frac{1}{4}$ -inch-long (32 mm), 3/8-16 (9.5 mm - 6.30 threads/cm) threaded portion. The fasteners are supplied as PSLV3-12575K, with a $\frac{3}{4}$ -inch-long (19 mm) knurled shank portion; as PSLV3-125100, with a 1-inch-long (25 mm) smooth shank portion; and as PSLV3-125125, with a $1\frac{1}{4}$ -inch-long (32 mm) smooth shank portion.

3.1.5.2 PSLV4 Threaded Stud Fasteners: PSLV4 threaded stud fasteners consist of a 0.150-inch-diameter (3.81 mm) smooth shank portion and a $\frac{1}{4}$ -20 (6.4 mm - 7.87 threads/cm) threaded portion. The fasteners are supplied with various combinations of smooth shank and threaded portion lengths, each from $\frac{1}{2}$ to $1\frac{1}{4}$ inches (13 and 32 mm).

3.1.6 Preassembled Ceiling Clips:

3.1.6.1 PCLDP Preassembled Ceiling Clips: PCLDP preassembled ceiling clips consist of a 0.145-inch-diameter (3.68 mm), smooth-shank, PDPT headed tophat fastener described in Section 3.1.4.1 of this report, and a 0.075-inch-thick (1.91 mm), 90-degree angle clip that is premounted near the pointed end. The clip is manufactured from steel complying with ASTM A 1011, CS Type A, with an electroplated zinc finish complying with ASTM B 633, SC1, Type I. The PCLDP preassembled ceiling clips are supplied as PCLDP-100, with a 1-inch-long (25 mm) fastener, and as PCLDP-125, with a $1\frac{1}{4}$ -inch-long (32 mm) fastener.

3.1.6.2 PECLDP-125 Preassembled Ceiling Clips: PECLDP-125 preassembled ceiling clips consist of a 0.145-inch-diameter (3.68 mm), $1\frac{1}{4}$ -inch-long (32 mm), smooth-shank, PDP headed fastener described in Section 3.1.2.1 of this report, and a 0.075-inch-thick (1.91 mm), 45-degree angle clip that is premounted near the pointed end. The clip is manufactured from steel complying with ASTM A 1011, CS Type A, with an electroplated zinc finish complying with ASTM B 633, SC1, Type I.

3.1.7 Threaded Rod Hangers:

3.1.7.1 PTRH3-HN32 Threaded Rod Hangers: PTRH3 threaded rod hangers consist of a 0.145-inch-diameter (3.68 mm), $1\frac{1}{4}$ -inch-long (32 mm), smooth-shank, PHN headed fastener described in Section 3.1.2.3 of this report, and a premounted, embossed, 0.075-inch-thick (1.91 mm) clip that has two bends, one having a 45-degree angle and the other having a 30-degree angle. The 90-degree angle portion of the clip has a $\frac{3}{8}$ -16 (9.5 mm - 6.30 threads/cm) threaded eyelet. The clip is manufactured from steel complying with ASTM A 1011, CS Type A, with an electroplated zinc finish complying with ASTM B 633, SC1, Type I.

3.1.7.2 PTRH4-HN32 Threaded Rod Hangers: PTRH4 threaded rod hangers consist of a 0.145-inch-diameter (3.68 mm), $1\frac{1}{4}$ -inch-long (32 mm), smooth-shank, PHN headed fastener described in Section 3.1.2.3 of this report, and a premounted, embossed, 0.075-inch-thick (1.91 mm) clip that has one bend having a 30-degree angle and another bend having a 90-degree angle. The 90-degree angle portion of the clip has a $\frac{1}{4}$ -20 (6.4 mm - 7.87 threads/cm) threaded portion threaded eyelet. The clip is manufactured from steel complying with ASTM A 1011, CS Type A, with an electroplated zinc finish complying with ASTM B 633, SC1, Type I.

3.2 Materials:

3.2.1 Normal-weight Concrete: Normal-weight concrete must be stone-aggregate and comply with Section 1905 of the 2006 IBC or 2003 IBC, Section R402.2 of the 2006 IRC or 2003 IRC, or UBC Section 1905, as applicable.

3.2.2 Structural Lightweight Concrete: Structural lightweight concrete must be sand-lightweight and must comply with Section 1905 of the 2006 IBC or 2003 IBC,

Section R402.2 of the 2006 IRC or 2003 IRC, or UBC Section 1903, as applicable.

3.2.3 Concrete Masonry Units: The minimum allowable nominal size of the CMU must be 8 inches (203 mm) high by 8 inches (203 mm) wide by 16 inches (406 mm) long, and comply with ASTM C 90.

3.2.4 Steel: Structural steel substrates must comply with ASTM A 36 and must have a minimum yield strength of 36 ksi (248 MPa) and a thickness as noted in Table 2 of this report.

3.2.5 Steel Deck: Where fasteners are placed through a steel deck into structural sand-lightweight concrete in accordance with Table 5 and Figure 2 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).

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: Allowable shear and tension (pullout) values in the tables of this report are for use in allowable stress design, and are for fasteners driven into the materials specified in the tables. The stress increases and load reductions described in Section 1605.3 of the 2006 IBC or 2003 IBC, and the stress increases described in UBC Section 1612.3, are not allowed for wind loads acting alone or combined with vertical loads. No adjustments are allowed for vertical loads acting alone.

Seismic load resistance is outside the scope of this report, except for fasteners used under the 2006 IBC and 2006 IRC for attachment of architectural, electrical and mechanical components as described in the exceptions to Section 13.1.4 of ASCE/SEI 7-05, Minimum Design Loads for Buildings and Other Structures (American Society of Civil Engineers/Structural Engineering Institute).

Seismic load resistance is outside the scope of this report, except for fasteners used under the 2003 IBC and 2003 IRC for attachment of architectural, electrical and mechanical components as described in the exceptions to Section 9.6.1 of ASCE/SEI 7-02, Minimum Design Loads for Buildings and Other Structures (American Society of Civil Engineers/Structural Engineering Institute).

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

$$\left(\frac{P_s}{P_t} \right) + \left(\frac{V_s}{V_t} \right) \leq 1.0$$

where:

P_s = Applied service tension load, lbf (N).

P_t = Allowable service tension load, lbf (N).

V_s = Applied service shear load, lbf (N).

V_t = Allowable service shear load, lbf (N).

Members fastened to the substrates specified in this report must be designed in accordance with the applicable code and design criteria.

4.1.2 Wood-to-Concrete Connections: Lateral design values for Simpson fasteners must be based on lateral design values determined for headed, equal-or-lesser-diameter fasteners and headed, equal-or-lesser-diameter fasteners with washers used in wood-to-steel connections in accordance with Part 11 of the ANSI/AF&PA NDS-05 (2006

IBC), Part 11 of the ANSI/AF&PA NDS-01 (2003 IBC) or Part 12 of the ANSI/NF&PA NDS-91 (UBC), as applicable. The wood element must be the side member. The fastener bending yield strength must be the value noted for nails in the NDS-05, NDS-01 or NDS-91, as applicable, based on fastener shank diameter.

4.1.3 Sill Plate to Foundation Connections:

4.1.3.1 General: The PDPWL-300MG and PDPWLS-300MG fasteners and washers described in Section 3.1.3.2 of this report 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: Table 4 of this report specifies the allowable fastener spacings for attachment of wood sill plates to concrete in structures located in areas classified as Seismic Design Category A or B (2006 or 2003 IBC or 2006 or 2003 IRC), or Seismic Zones 0, 1, 2 and 3 (UBC), and in areas assigned basic wind speeds up to 100 mph (161 km/h) (3-second-gust wind speed) or 85 mph (137 km/h) (fastest mile wind speed). For sill plate connections in 105 mph (169 km/h) (3-second-gust wind speed) or 90 mph (145 km/h) (fastest mile wind speed) areas, an engineered design using allowable loads described in Table 1 of this report must be provided to the code official for approval.

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. Installation is limited to dry, interior environments. The fastener size, minimum penetration, minimum spacing, and edge distances must comply with Tables 1 through 7 of this report, as applicable. For fasteners installed into concrete, the fasteners must not be driven until the concrete has reached the designated compressive strength. Unless otherwise noted, the concrete must have a thickness of at least three times the fastener penetration.

5.0 CONDITIONS OF USE

The Simpson Strong-Tie power-driven fasteners 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 when the PDPWL-300MG and PDPWLS-300MG fasteners and washers, described in Section 3.1.3.2 of this report, are used to attach preservative-treated wood to concrete. Preservative-treated wood must be as described in IBC Section 2303.1.8.
- 5.3** Installation is limited to dry, interior environments.
- 5.4** Earthquake load resistance is outside the scope of this report, except as permitted in Sections 4.1.1 and 4.1.3.2.
- 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 October 2006.

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:



TABLE 1—ALLOWABLE LOADS IN NORMAL-WEIGHT CONCRETE (lbf)^{1,2,3,4}

FASTENER MODEL NUMBER	SHANK DIAMETER (inch)	MINIMUM PENETRATION (inches)	MINIMUM EDGE DISTANCE (inches)	MINIMUM SPACING (inches)	CONCRETE COMPRESSIVE STRENGTH							
					2,000 psi		3,000 psi		4,000 psi		6,000 psi	
					Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear
PDP-XX ⁶	0.145	1	3	4	45	120	100	165	150	205	150	205
		1 ¹ / ₄	3	4	140	265	255	265	370	265	370	265
PHN-XX ⁵	0.145	1	3	4	45	120	100	165	150	205	150	205
		1 ¹ / ₄	3	4	140	265	255	265	370	265	370	265
PDPH-XX ⁶	0.177	3 ³ / ₄	3.5	5	30	50	30	80	30	110	115	195
		1 ¹ / ₄	3.5	5	130	265	195	240	260	220	190	105

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. Concrete aggregate must comply with ASTM C 33. Minimum concrete thickness must be three times the fastener embedment into the concrete.

²The allowable shear and tension values are only for the fasteners in the concrete. Members connected to the concrete must be investigated in accordance with accepted design criteria.

³The stress increases and load reductions described in 2006 or 2003 IBC Section 1605.3, and the stress increases described in UBC Section 1612.3, are not allowed for wind loads acting alone or when combined with vertical loads. No adjustment is allowed for vertical loads acting alone.

⁴Earthquake load resistance is outside the scope of this report, except as noted in Sections 4.1.1 and 4.1.3.2 of this report.

⁵The XX designation in the model number is replaced with the length of the fastener expressed in millimeters. The fastener must be long enough to provide for the minimum penetration.

⁶The XX designation in the model number is replaced with the length of the fastener expressed in inches. The fastener must be long enough to provide for the minimum penetration.

TABLE 2—ALLOWABLE LOADS IN STEEL (lbf)^{1,2,3,4,5}

FASTENER MODEL NUMBER	SHANK DIAMETER (inch)	MINIMUM EDGE DISTANCE (inch)	MINIMUM SPACING (inches)	STEEL THICKNESS (inches)			
				3 ³ / ₁₆		1 ¹ / ₄	
				Tension	Shear	Tension	Shear
FASTENERS							
PDP - XX ⁷	0.145	0.5	1.0	155	395	—	—
PHN - XX ⁶	0.145	0.5	1.0	155	395	—	—
PDPT - XX ⁷	0.145	0.5	1.0	290	660	340	700
PHNT - XX ⁶	0.145	0.5	1.0	50	620	250	620
PDPH - XX ⁷	0.177	0.5	1.0	340	790	520	870
THREADED STUDS⁸							
PSLV3-XXYY ⁹	0.205	1.0	1.5	270	770	680	1120
PSLV3 -12575 K ¹⁰	0.205	1.0	1.5	270	930	870	1130
PSLV4 - XXYY ⁹	0.150	0.5	1.0	200	630	420	690

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

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

²The allowable tension and shear values are for the fastener only. Members connected to the steel must be investigated separately in accordance with accepted design criteria.

³Steel must conform to ASTM A 36 specifications, with $F_y = 36,000$ psi, minimum.

⁴The stress increases and load reductions described in 2006 or 2003 IBC Section 1605.3, and the stress increases described in UBC Section 1612.3, are not allowed for wind loads acting alone or combined with other loads. No adjustment is allowed for vertical loads acting alone.

⁵Earthquake load resistance is outside the scope of this report, except as noted in Sections 4.1.1 and 4.1.3.2 of this report.

⁶The XX designation in the model number is replaced with the length of the fastener expressed in millimeters. The fastener must be long enough to provide for the minimum penetration.

⁷The XX designation in the model number is replaced with the length of the fastener expressed in inches. The fastener must be long enough to provide for the minimum penetration.

⁸The shank diameters are of the smooth or knurled shank portion of the threaded fastener.

⁹The XX and YY designations in the model number are replaced with the lengths, expressed in inches, of the threaded shank and smooth shank portions, respectively. The smooth shank portion must be long enough to provide for the minimum penetration.

¹⁰The K designation in the model number denotes a knurled shank.

TABLE 3—ALLOWABLE LOADS WHEN ATTACHING STEEL ANGLES AND CHANNELS TO NORMAL-WEIGHT CONCRETE (lbf)^{1,2,3}

FASTENER MODEL NUMBER	SHANK DIAMETER (inch)	PENETRATION (inches)	ATTACHED ITEM	CONCRETE COMPRESSIVE STRENGTH (psi)	TYPE OF LOAD	ALLOWABLE LOAD (pounds)
PDP-125	0.145	1 ¹ / ₈	Angle clip ⁴	2,000	Tension	25
PHN-32	0.145	1 ¹ / ₈	Angle clip ⁴	2,000	Tension	25
PDP-150	0.145	1 ¹ / ₄	Angle clip ⁴	2,000	Tension	85
PHN-32	0.145	1 ¹ / ₄	Angle clip ⁴	2,000	Tension	85
PDP-100	0.145	7 ⁷ / ₈	No. 20 gage ⁵ steel channel	2,000	Shear	160
PHN-22	0.145	7 ⁷ / ₈	No. 20 gage ⁵ steel channel	2,000	Shear	160
PDP-100	0.145	7 ⁷ / ₈	No. 18 gage ⁵ steel channel	2,000	Shear	135
PHN-22	0.145	7 ⁷ / ₈	No. 18 gage ⁵ 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. Concrete aggregate must comply with ASTM C 33. Minimum concrete thickness must be three times the fastener embedment into the concrete.

²The stress increases and load reductions described in 2006 or 2003 IBC Section 1605.3, and the stress increases described in UBC Section 1612.3, are not allowed for wind loads acting alone or combined with other loads. No adjustment is allowed for vertical loads acting alone.

³Earthquake load resistance is outside the scope of this report, except as noted in Sections 4.1.1 and 4.1.3.2 of this report.

⁴The angle clip is formed from steel having a minimum base metal thickness of 0.080 inch.

⁵The Nos. 18 and 20 gage steel channels 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.

TABLE 4—ALLOWABLE FASTENER SPACING FOR ATTACHMENT OF WOOD PLATE TO CONCRETE FOOTING OR SLAB^{1,2,3,4,5}

FASTENER MODEL NUMBER ⁸	OVERALL LENGTH (inches)	HEAD DIAMETER (inch)	SHANK DIAMETER (inch)	MAXIMUM SPACING (feet)		
				Interior Shear Walls ⁶	Interior Nonshear Walls ⁷	Exterior Shear Walls ⁶
PHN-72 or PHNW-72	2 ⁷ / ₈	0.315	0.145	1.5	3.0	1.5
PDPW-300, PDPWL-300, PDPWL-300MG or PDPWLS-300MG ^{9,10}	3	0.300	0.145	1.0	2.0	1.0

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 psi = 6.89 kPa, 1 plf = 0.0146 N/m.

¹Spacings are based upon the attachment through the center of nominally 2-inch-thick wood sill plates, with specific gravity of 0.50 or greater, to concrete floor slabs or footings in accordance with 2006 or 2003 IBC Section 2308.6, 2006 or 2003 IRC Section R403.1.6 (for maximum two-story buildings), or UBC Sections 1806.6 and 2320.6 (for maximum two-story buildings), as applicable. For other species of lumber, the required spacings of fasteners require special calculations complying with 2006 or 2003 IBC Section 2306 and UBC Chapter 23, as applicable.

²Fasteners must not be driven until the concrete has reached a minimum concrete compressive strength of 2,000 psi, or the minimum compressive strength specified in the applicable code, whichever is greater. Minimum edge distance is 1³/₄ inches.

³Wall panels must be braced in accordance with 2006 or 2003 IBC Section 2308.9.3, 2006 or 2003 IRC Section R602.10, or UBC Section 2320.11.3, as applicable. Interior and nonbearing wall panels are not assumed to be braced.

⁴Fasteners must not be used to attach shear walls having a unit shear exceeding 100 pounds per foot to the other building elements.

⁵See Section 4.1.3 of this report for additional design and installation requirements.

⁶Walls must have two fasteners placed 6 inches and 10 inches, respectively, from each end of sill plates, with maximum spacing as noted in this table.

⁷Walls must have fasteners placed at 6 inches from ends of sill plates, with maximum spacing as noted in this table.

⁸All fasteners must be installed with minimum ³/₄-inch-diameter, No. 16 gage (0.06-inch-thick) steel washers.

⁹Fasteners indicated must have four fasteners placed at each end of sill plates with a length greater than 30 inches. The fasteners must be placed 3, 6, 9 and 12 inches, respectively, from the interior face of the end of studs. The spacing may be adjusted to avoid interference with intervening studs.

¹⁰Only the PDPWL-300MG or PDPWLS-300MG fasteners and washers shall be used to attach preservative-treated wood to concrete. Preservative-treated wood must be as described in IBC Section 2303.1.8.

TABLE 5—ALLOWABLE LOADS IN MINIMUM 3,000 psi STRUCTURAL LIGHTWEIGHT CONCRETE FILLED STEEL DECK^{1,2,3,4,5}

FASTENER MODEL NUMBER	SHANK DIAMETER (inch)	MINIMUM EMBEDMENT (inches)	INSTALLED DIRECTLY INTO CONCRETE		INSTALLED THROUGH LOWER FLUTE OF STEEL DECK INTO CONCRETE		
			Tension (lbf)	Shear (lbf)	Tension (lbf)	Shear (lbf)	Oblique (lbf)
PDPT-XX ⁶	0.145	$\frac{7}{8}$	85	250	40	275	—
PHNT-XX ⁷	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 - XXYY ⁸	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.

¹The tabulated allowable load values are for the fasteners only. Members connected to the concrete receiving elements must be designed in accordance with the applicable code and accepted design criteria.

²The steel deck must be 3 inches deep, and have a minimum thicknesses 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 $1\frac{1}{8}$ inches from the edge of the deck web and 4 inches from the end of the deck. The minimum fastener spacing is 4 inches.

⁴Structural sand-lightweight concrete fill above top of steel deck profiles must be a minimum of $3\frac{1}{4}$ inches thick. Figure 2 shows nominal flute dimensions, fastener locations, and load orientations for both floor deck profiles.

⁵The stress increases and load reductions described in 2006 or 2003 IBC Section 1605.3, and the stress increases described in UBC Section 1612.3, are not allowed for wind loads acting alone or combined with other loads. No adjustment is allowed for vertical loads acting alone.

⁶The XX designation in the model number is replaced with the length of the fastener expressed in inches. The fastener must be long enough to provide for the minimum embedment.

⁷The XX designation in the model number is replaced with the length of the fastener expressed in millimeters. The fastener must be long enough to provide for the minimum embedment.

⁸The XX and YY designations in the model number are replaced with the lengths, expressed in inches, of the threaded shank and smooth shank portions, respectively. The smooth shank portion must be long enough to provide for the minimum embedment.

TABLE 6—ALLOWABLE LOADS IN HOLLOW CONCRETE MASONRY UNITS (CMUs)^{1,2,3,4,5}

FASTENER MODEL NUMBER	SHANK DIAMETER (inch)	MINIMUM CMU FACE SHELL THICKNESS (inches)	HOLLOW CMU	
			Face Shell	
			Tension (lbf)	Shear (lbf)
PDP - XX ⁶	0.145	$1\frac{1}{4}$	110	200

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

¹The tabulated allowable load values are for the fasteners only. Members connected to the CMU receiving elements shall be designed in accordance with the applicable code and accepted design criteria.

²The tabulated allowable load values are for fasteners installed in hollow CMUs conforming to ASTM C 90. 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.

³The 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.

⁴The entire pointed portion of the fastener must penetrate through the thickness of the face shell to obtain the tabulated values.

⁵No more than one fastener may be installed in an individual hollow CMU cell.

⁶The XX designation in the model number is replaced with the length of the fastener expressed in inches. The fastener must be long enough to provide for the minimum penetration.

TABLE 7—ALLOWABLE LOADS IN MINIMUM 2500 psi NORMAL-WEIGHT CONCRETE (pounds)^{1,2,3}

FASTENER MODEL NUMBER	SHANK DIAMETER (inch)	MINIMUM PENETRATION (inches)	MINIMUM EDGE DISTANCE (inches)	MINIMUM SPACING (inches)	ALLOWABLE TENSION LOAD (pounds)
PTRH3 - HN32	0.145	1	3.0	4.0	155
PTRH4 - HN32	0.145	1	3.0	4.0	150
PSLV3 -125125	0.205	$1\frac{1}{4}$	4.0	6.0	260

For SI: 1 inch = 25.4 mm, 1 psi = 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. Concrete aggregate must comply with ASTM C 33. Minimum concrete thickness must be three times the fastener embedment into the concrete.

²The stress increases and load reductions described in 2006 or 2003 IBC Section 1605.3, and the stress increases described in UBC Section 1612.3, are not allowed for wind loads acting alone or combined with other loads. No adjustment is allowed for vertical loads acting alone.

³Earthquake load resistance is outside the scope of this report, except as noted in Sections 4.1.1 and 4.1.3.2 of this report.



PDP



PDPH



PHN



PDPW



PDPWL



PHNW



PDPT



PHNT

FIGURE 1—FASTENERS

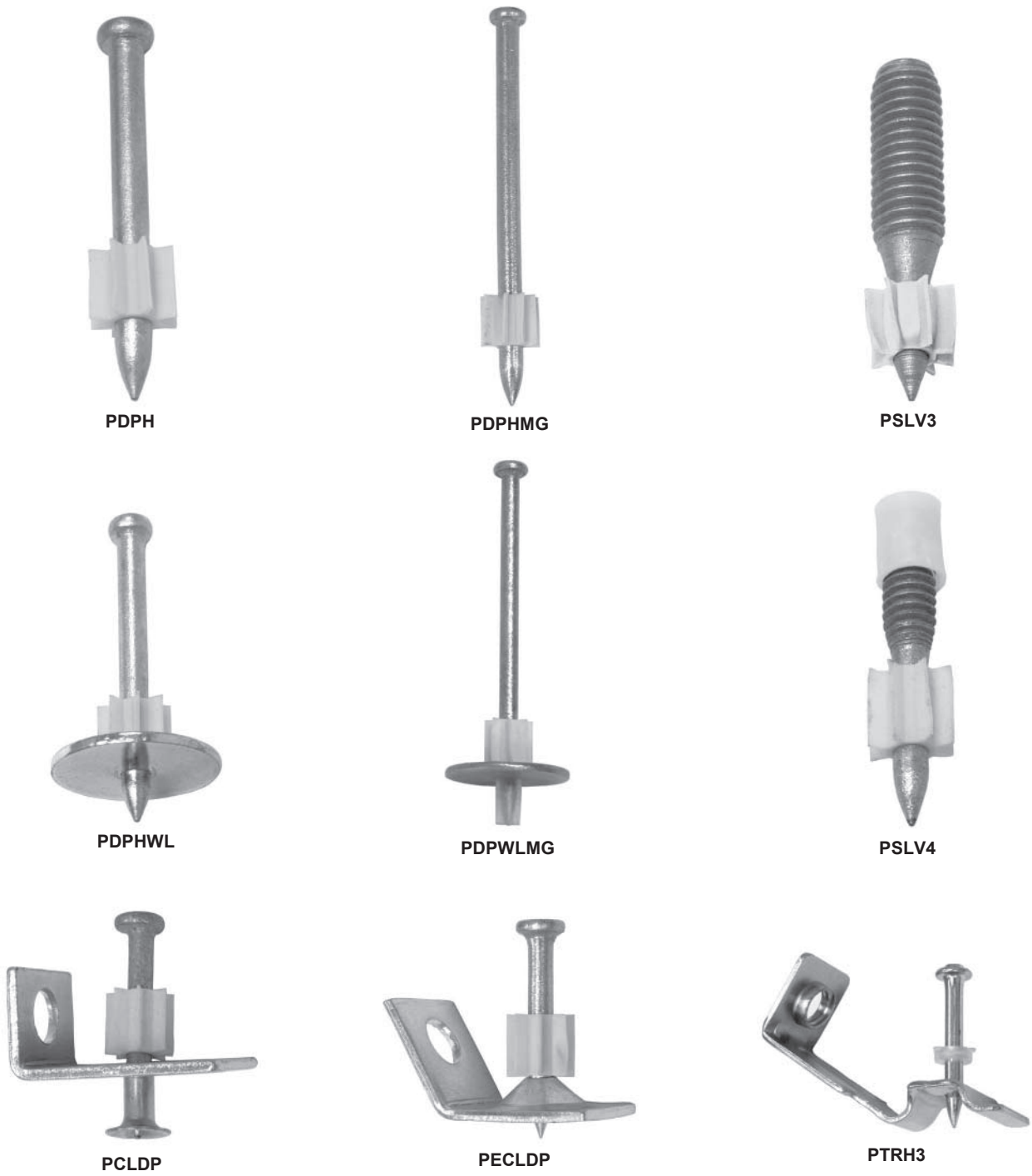


FIGURE 1—FASTENERS (Continued)

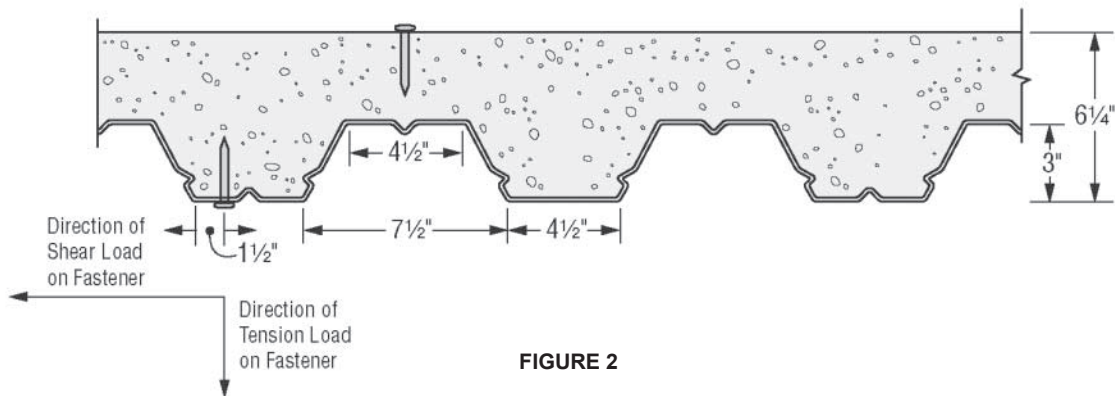


FIGURE 2

BOARD OF
BUILDING AND SAFETY
COMMISSIONERS

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PRESIDENT

PEDRO BIRBA
VICE-PRESIDENT

VAN AMBATIELOS
HELENA JUBANY
ELENORE A. WILLIAMS

CITY OF LOS ANGELES
CALIFORNIA



ANTONIO R. VILLARAIGOSA
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

ANDREW A. ADELMAN, P.E.
GENERAL MANAGER

RAYMOND CHAN
EXECUTIVE OFFICER

Simpson Strong-Tie Company, Inc.
5956 W. Las Positas boulevard
Pleasanton, CA 94588

Attn: Jeffrey J. Dunagan
(925) 560-9221

RESEARCH REPORT: RR 25469
(CSI #03150)

BASED UPON ICC ES
LEGACY REPORT NO. ER-4546

REEVALUATION DUE DATE:
December 1, 2008

GENERAL APPROVAL - Reevaluation/Clerical Modification - Simpson Strong-Tie Powder-Actuated Fasteners.

DETAILS

The above assemblies and/or products are approved when in compliance with the description, use, identification and findings of Legacy Report No. ER- 4546, dated April 1, 2001, of the ICC Evaluation Service, Incorporated. The report, in its entirety, is attached and made part of this general approval.

The parts of Legacy Report No.ER- 4546 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. For working values in steel, the fasteners shall have sufficient length so that the entire pointed portion of the shank pierces the steel plate.
2. 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).
3. Use of the low velocity fasteners to attach members to the underside of steel decks is limited to attachments on the recessed portion between the projecting ribs when a minimum of 3-1/2 inches of concrete cover over the fastener is available. Fasteners shall not be installed on the bottom of the projecting rib portions.

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Page 1 of 2

Simpson Strong-Tie Company, Inc.
RE: Simpson Strong-Tie Powder-Actuated Fasteners

4. No increase is permitted in the tabulated allowable load values for short duration loading.
5. The fasteners shall be installed per the manufacturer's instructions, a copy of which shall be available at each job site.

DISCUSSION

The clerical modification is to change the company address.

The approval is based on load tests.

This general approval will remain effective provided the Legacy 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.

The status of the referenced Legacy Report No. ER-4546 dated April 1, 2001, which is currently beyond its reexamination date is still valid. The validity of the evaluation report was verified with ICC ES.

YEUAN CHOU, Chief
Engineering Research Section
2319 Dorris Place
Los Angeles, CA 90031
Phone (213) 485-2376
Fax (213) 847-0985

RB:elcm
RR25469/wp8.0
R12/07/06
5A1/5C2/2311.5/2625/1806.6

Attachment: ICC ES Legacy Report No. ER-4546 (3 Pages).

RR 25469
Page 2 of 2



ICC Evaluation Service, Inc.
www.icc-es.org

Business/Regional Office ■ 5360 Workman Mill Road, Whittier, California 90601 ■ (562) 699-0543
Regional Office ■ 900 Montclair Road, Suite A, Birmingham, Alabama 35213 ■ (205) 599-9800
Regional Office ■ 4051 West Flossmoor Road, Country Club Hills, Illinois 60478 ■ (708) 799-2305

Legacy report on the 1997 Uniform Building Code™

DIVISION: 05—METALS
Section: 05090—Metal Fastenings

DIVISION: 06—WOOD AND PLASTICS
Section: 06090—Wood and Plastic Fastenings

POWDER-ACTUATED FASTENERS

SIMPSON STRONG-TIE COMPANY, INC.
4120 DUBLIN BOULEVARD, SUITE 400
DUBLIN, CALIFORNIA 94568

1.0 SUBJECT

Powder-actuated Fasteners.

2.0 DESCRIPTION

2.1 General:

The fasteners are drive pins having a smooth shank with a nominal diameter of 0.145 inch (3.6 mm) and a nominal head diameter of 5/16 inch (7.9 mm). The PDPW-300 fastener has a premounted 3/4-inch-diameter (19.1 mm) washer. The PDPWL-300 and PHNW-72 fasteners have premounted 1-inch-diameter (25.4 mm) washers. The fasteners are installed with a low-velocity powder-actuated fastening tool recommended by Simpson Strong-Tie. The pins pierce the material being fastened and embed themselves in concrete or steel. The powder-actuated fasteners are AISI 1060 to 1065 steel austempered to a Rockwell "C" hardness of 51 to 56 and zinc-plated. The fasteners have a minimum bending yield stress, Fyb, of 90,000 pounds per square inch (620 MPa).

2.2 Design:

2.2.1 Concrete and Steel Base Material: Allowable shear and tension values for fasteners driven into concrete and steel are set forth in Tables 1 and 2, respectively. The allowable shear and tension values for fasteners attaching steel channels to concrete and suspended ceiling angle clips to concrete, respectively, are set forth in Table 3.

Earthquake load resistance is beyond the scope of this report. The stress increases or load reductions described in Section 1612.3 of the 1997 Uniform Building Code™ (UBC) are not allowed for wind loads acting alone or when combined with other loads. No increase is allowed for vertical loads acting alone. The following equation shall be satisfied when fasteners are subjected to combined shear and tension loads:

(Ps/Pt) + (Vs/Vt) ≤ 1.0

where:

Ps = Applied service tension load, pounds (N).

Pt = Allowable service tension load, pounds (N).

Vs = Applied service shear load, pounds (N).

Vt = Allowable service shear load, pounds (N).

2.2.2 Wood-to-Concrete or Steel: Lateral design values presented in Table 12.3A or Table 12.3B Part XII of the NDS* referenced in Section 2316 of the UBC are permitted with powder-actuated fasteners of equal or greater diameters. The wood element is the side member.

2.3 Installation:

The installation of fasteners into concrete and steel requires a powder-actuated fastening tool recommended by Simpson Strong-Tie. Installation is limited to dry, interior environments. The fastener size, minimum penetration, minimum spacing, and edge distances shall comply with Tables 1 through 3.

2.4 Sill Plate to Foundation Connections:

* Wood plates, complying with Section 2306.4 of the UBC and having a 2-inch nominal thickness, are attached with Simpson Strong-Tie's PHN-72, PHNW-72, PDPW-300 or PDPWL-300 fasteners to normal-weight concrete with a minimum 2,000 psi (13.8 MPa) compressive strength, at time of installation. The maximum allowable fastener spacings are set forth in Table 4. A 3/4-inch-diameter (19.1 mm) washer must be used with the PHN-72 and PDP-300 fasteners.

Attachment of sill plates to the perimeter of concrete is allowed under the following conditions:

- 1. No cold joint exists, between the slab and foundation, below the plate.
2. No plate is installed on slabs supported by concrete-block foundation walls.

These sill plate connections are intended to satisfy the requirements of Section 1806.6 of the UBC. Usage is limited to Seismic Zones 0, 1, 2 and 3, and areas with basic wind speeds up to 80 mph (129 km/h). The allowable fastener spacings for attachment of wood plates to concrete footings or slabs are set forth in Table 4. For sill plate connections in Seismic Zone 4 or in 90 mph (145 km/h) and greater basic wind speed areas, an engineering design using allowable loads described in Table 1 is required.

2.5 Identification:

The fasteners are identified by the label on cartons bearing the Simpson Strong-Tie Company, Inc., name and address,



fastener size and type, and evaluation report number (ICBO ES ER-4546). Simpson Strong-Tie fastener heads are identified by the following markings:



3.0 EVIDENCE SUBMITTED

Data in accordance with the ICBO ES Acceptance Criteria for Power-driven Fasteners in Concrete, Steel and Masonry Elements (AC70), dated September 1995.

4.0 FINDINGS

That the powder-actuated fasteners described in this report comply with the 1997 *Uniform Building Code*TM, subject to the following conditions:

4.1 Fasteners are manufactured and identified in accordance with this report.

4.2 Fasteners are installed in accordance with this report and Simpson Strong-Tie Company, Inc., instructions.

4.3 Allowable loads are in accordance with Section 2.2 of this report. Calculations proving that the applied loads are less than the maximum allowable loads described in this report shall be submitted to the building official for approval.

4.4 Fastener attachment of wood sill plates to foundations complies with Section 2.4 of this report.

4.5 Minimum concrete thickness is three times the fastener embedment into the concrete.

4.6 Earthquake load resistance is beyond the scope of this report, except as permitted in Section 2.4.

This report is subject to re-examination in one year.

TABLE 1—ALLOWABLE DESIGN VALUES FOR LOW-VELOCITY FASTENERS INSTALLED IN STONE-AGGREGATE CONCRETE (pounds)^{1,2,5,6}

CATALOG NUMBER	SHANK DIAMETER (inch)	MINIMUM PENETRATION (inches)	MINIMUM EDGE DISTANCE (inches)	MINIMUM SPACING (inches)	CONCRETE COMPRESSIVE STRENGTH					
					2,000 psi		3,000 psi		4,000 psi	
					Tension	Shear	Tension	Shear	Tension	Shear
PHNXX Series ³	0.145	1	3	4	45	120	100	165	150	205
	0.145	1 ¹ / ₄	3	4	140	265	255	265	370	265
PDPXX Series ⁴	0.145	1	3	4	45	120	100	265	150	205
	0.145	1 ¹ / ₄	3	4	140	265	255	265	370	265

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

¹The fasteners shall not be driven until the concrete has reached the designated compressive strength. Minimum concrete thickness is three times the fastener embedment into the concrete.

²The allowable tension and shear values are for the fastener only. Wood or steel members connected must be investigated in accordance with accepted design criteria.

³The XX designation in the catalog number is replaced with the length of the fastener expressed in millimeters.

⁴The XX designation in the catalog number is replaced with the length of the fastener expressed in inches.

⁵The stress increases described in Section 1603.5 of the UBC are not allowed for wind loads acting alone or combined with other loads.

⁶Earthquake load resistance is beyond the scope of this report.

TABLE 2—ALLOWABLE DESIGN VALUES FOR LOW-VELOCITY FASTENERS IN STEEL (pounds)^{1,2,6,7}

CATALOG NUMBER	SHANK DIAMETER (inch)	MINIMUM EDGE DISTANCE (inch)	MINIMUM SPACING (inches)	STEEL THICKNESS ³ (inch)	TENSION (lbf)	SHEAR (lbf)
PHNXX Series ⁴	0.145	¹ / ₂	1 ¹ / ₂	³ / ₁₆	155	395
PDPXX Series ⁵	0.145	¹ / ₂	1 ¹ / ₂	³ / ₁₆	155	395

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

¹The entire pointed portion of the fastener must penetrate the steel to obtain the tabulated values.

²The allowable tension and shear values are for the fastener only. Wood or steel members connected must be investigated separately in accordance with accepted design criteria.

³Steel must conform to ASTM A 36 specifications, with $F_y = 36,000$ psi, minimum.

⁴The XX designation in the catalog number is replaced with the length of the fastener expressed in millimeters.

⁵The XX designation in the catalog number is replaced with the length of the fastener expressed in inches.

⁶The stress increases described in Section 1603.5 of the UBC are not allowed for wind loads acting alone or combined with other loads.

⁷Earthquake load resistance is beyond the scope of this report.

TABLE 3—ALLOWABLE DESIGN VALUES FOR LOW-VELOCITY FASTENERS ATTACHING VARIOUS ITEMS TO STONE-AGGREGATE CONCRETE (pounds)^{1,4,5}

CATALOG NUMBER	SHANK DIAMETER (inch)	PENETRATION (inches)	ATTACHED ITEM	CONCRETE COMPRESSIVE STRENGTH (psf)	TYPE OF LOAD	ALLOWABLE LOAD (pounds)
PHN-27	0.145	1 ¹ / ₈	Angle Clip ²	2,000	Tension	25
PDP-125	0.145	1 ¹ / ₈	Angle Clip ²	2,000	Tension	25
PHN-32	0.145	1 ¹ / ₄	Angle Clip ²	2,000	Tension	85
PDP-150	0.145	1 ¹ / ₄	Angle Clip ²	2,000	Tension	85
PHN-22	0.145	7 ⁷ / ₈	No. 20 gage ³ steel channel	2,000	Shear	160
PDP-100	0.145	7 ⁷ / ₈	No. 20 gage ³ steel channel	2,000	Shear	160
PHN-22	0.145	7 ⁷ / ₈	No. 18 gage ³ steel channel	2,000	Shear	135
PDP-100	0.145	7 ⁷ / ₈	No. 18 gage ³ steel channel	2,000	Shear	135

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

¹The fasteners shall not be driven until the concrete has reached the designated compressive strength. Minimum concrete thickness is three times the fastener embedment into the concrete.

²Angle clip is formed from steel having a minimum base metal thickness of 0.080 inch.

³The Nos. 18 and 20 gage steel channels must have minimum base metal thicknesses of 0.0478 and 0.0377 inch, respectively, and are formed from steel having a minimum specified yield stress of 33 ksi.

⁴The stress increases described in Section 1603.5 of the UBC are not allowed for wind loads acting alone or combined with other loads.

⁵Earthquake load resistance is beyond the scope of this report.

TABLE 4—ALLOWABLE FASTENER SPACING FOR ATTACHMENT OF WOOD PLATE TO CONCRETE FOOTING OR SLAB^{1,4,5,6,7}

CATALOG NUMBER	OVERALL LENGTH (inches)	HEAD DIAMETER (inch)	SHANK DIAMETER (inch)	MAXIMUM SPACING (feet)		
				Interior Shear Walls ³	Interior Nonshear Walls ²	Exterior Shear Walls ³
PHN-72 OR PHNW-72	2 ⁷ / ₈	5 ⁵ / ₁₆	0.145	1.5	3.0	1.5
PDPW-300 OR PDPWL-300 ^{7,8}	3	5 ⁵ / ₁₆	0.145	1.0	2.0	1.0

For **SI**: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 psi = 6.89 kPa, 1 plf = 0.0146 N/m.

¹Spacings are based upon the attachment of 2-inch (nominal thickness) wood sill plates, with specific gravity of 0.50 or greater, to concrete floor slabs or footings in accordance with Sections 1806.6 and 2306.4 of the UBC for maximum two-story buildings. For species of wood with specific gravity of 0.42 to 0.49, multiply required spacing of fasteners for shear walls by 0.81. For species of wood with specific gravity of 0.31 to 0.41, multiply the required spacings of fasteners for shear walls by 0.65.

²All walls shall have fasteners placed at 6 inches from ends of sill plates, with maximum spacing between as shown above.

³Fasteners indicated shall have two pins placed 6 inches and 10 inches, respectively, from each end of sill plates, with maximum spacing between as shown above.

⁴All fasteners must be installed with a minimum 3/4-inch-diameter, No. 16 gage (0.0598 inch) steel washer.

⁵Fasteners shall not be driven until the concrete has reached a minimum concrete compressive strength of 2,000 psi. Minimum edge distance is 1 3/4 inches.

⁶Shear walls are assumed to provide lateral bracing in accordance with Section 2320.11.3 of the UBC. Interior shear walls are assumed to provide no lateral bracing.

⁷The fasteners shall not be used for the attachment of shear walls having a unit shear in excess of 100 pounds per foot. Spacings shown are independent of the number of building stories.

⁸Fasteners indicated shall have four pins placed at each end of sill plates with a length greater than 30 inches. The pins shall be placed 3, 6, 9 and 12 inches, respectively, from the interior face of the end of studs. The spacing may be adjusted to avoid interference with intervening studs.



I. PRODUCT AND COMPANY IDENTIFICATION

Company: Simpson Strong-Tie Company, Inc.
Address: 5956 W. Las Positas Blvd.
Pleasanton, CA 94588

Product Name: PAT - PINS

Product Description: Powder Actuated Fasteners

Emergency Contact No.: 1-800-535-5053 USA
1-352-323-3500 International

Date Prepared or Revised: March 2008. For most current MSDS, please visit our web site at
www.simpsonanchors.com

II. COMPOSITION / INFORMATION ON INGREDIENTS

Various Metals, Ferrous and Non-Ferrous Platings.

III. HAZARD IDENTIFICATION**EMERGENCY OVERVIEW**

None known.

POTENTIAL HEALTH EFFECTS**ACUTE**

Eyes Contact: Beware of airborne particles during installation.
Skin Contact: Sharp pointed tip may puncture or pierce skin.
Inhalation: Not considered an inhalation hazard.
Ingestion: Not considered to pose an ingestion hazard.
Systemic Effects: None known.

IV. FIRE-FIGHTING MEASURES

Not Applicable.

V. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Not Applicable.
Environmental Precautions: Not Applicable.
Clean-up Methods: Not Applicable.

VI. EXPOSURE CONTROLS / PERSONAL PROTECTION

Protective Measure: Protective coatings are used on most metal fasteners. Typically this will be a commercial zinc, hot dipped galvanizing, or mechanically galvanized plating. This information should be considered when evaluating employee personal protective equipment and health risks during normal use.

Eye Protection: Avoid contact with eyes. Safety glasses required.

Skin and Hand Protection: Gloves recommended.

Ingestion: Do not ingest or place any metal fasteners in mouth.

Respirator Protection: Not required.

VII. PHYSICAL AND CHEMICAL PROPERTIES

Form: Solid
Appearance: Various diameters and lengths
Odor: None
Boiling Point: N/A
Melting Point: 2600-2700 °F
Vapor Pressure: N/A
Vapor Density: N/A
Solubility In Water: Insoluble

VIII. REACTIVITY DATA

Stability: Stable
Incompatibility: Acid
Hazardous Decomposition Products: None
Hazardous Polymerization: Will not occur

IX. DISPOSAL CONSIDERATIONS

Waste From Residues / Unused Products: This material is not a hazardous waste by RCRA criteria (40 CFR 261). Dispose of container and unused contents in accordance with federal, state, and local requirements.

X. TRANSPORTATION

US DOT (CFR): Not Regulated For Transport.
IATA: Not Regulated For Transport.
IMO: Not Regulated For Transport.

XI. REGULATORY INFORMATION

EPA SARA Title III Section 312 (40 CFR 370) Hazardous Classification:
None.

EPA SARA Title III Section 313 (40 CFR 372) Component(s) above 'de minimus' level:
None.

US. California "Safe Drinking Water and Toxic Enforcement Act" (Proposition 65):

This product contains small traces of the following chemicals that are known to the State of California to cause cancer and/or reproductive toxicity and other harm. None.

XII. OTHER INFORMATION

HMIS RATING

Health	Flammability	Physical Hazard
1	0	0

N/A – Not Applicable

This Material Safety Data Sheet (MSDS) 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 MSDS. This MSDS 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.