

Performance Characteristics of #6, #8, #9, #10, #14 SPAX® Construction Screws

CBI Listing



CL 2302-06

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Trade Secret Owner:

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DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

SECTION: 06 00 90 - Wood and Plastic Fastenings

SECTION: 06 05 23 - Wood, Plastic, and Composite Fastenings

1 Innovative Products Evaluated^{1,2}

1.1 #6, #8, #9, #10 and #14 SPAX® Construction Screws

1.1.1 The innovative products evaluated in this Listing are shown in Figure 1 through Figure 5, and Table 1 through Table 5.

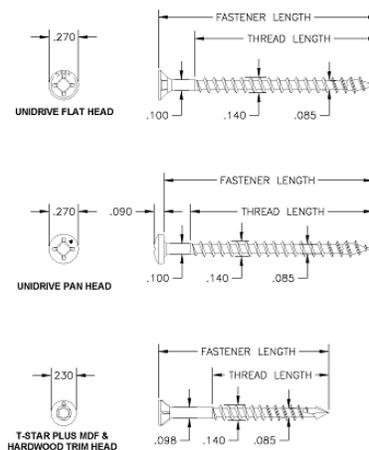


Figure 1. #6 SPAX® Construction Screws

¹ For more information, visit cbitest.com or call us at 608-310-6739.

² **Federal Regulation Definition.** 24 CFR 3280.2 "Listed or certified" means included in a list published by a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation that maintains periodic inspection of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner. **International Building Code (IBC) Definition of Listed.** Equipment, materials, products or services included in a list published by an organization acceptable to the building official and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose Listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. **IBC Definition of Labeled.** Equipment, materials or products to which has been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, approved agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-labeled items and whose labeling indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.

Table 1. #6 SPAX® Construction Screw Specifications⁵

Fastener Designation	Part Number	Head				Length (in)		Diameter (in)			TPI	Bending Yield Strength, ³ fyb (psi)	Allowable Steel Strength (lbs.)	
		Style	Drive System	Diameter (in)	Height (in)	Fastener ¹	Thread ²	Shank	Minor	Major			Tensile	Shear ⁴
Carbon Steel														
#6 x 3/4"	XFU06-0750	Flat	Unidrive (#2 Cross & #1 Square)	0.270	N/A	0.750	Full	0.100	0.085	0.140	12	198,000	310	265
#6 x 1"	XFU06-1000					1.000								
#6 x 1 1/4"	XFU06-1250					1.250								
#6 x 1 1/2"	XFU06-1500					1.500	1.575	0.100	0.085	0.140	12	198,000	310	265
#6 x 1 3/4"	XFU06-1750					1.750								
#6 x 2"	XFU06-2000					2.000								
#6 x 3/4"	XPU06-0750	Pan	Unidrive (#2 Cross & #1 Square)	0.270	0.090	0.750	Full	0.100	0.085	0.140	12	198,000	310	265
#6 x 1 1/2"	XMT06-1500	MDF/Hardwood Trim	T15 T-Star Plus	0.230	N/A	1.5	1.06	0.098	0.085	0.140	14	196,000	270	270

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 psi = 0.00689 MPa

1. Fastener length is measured from the topside of the head to the tip for flat and MDF/hardwood trim screws and from the underside of the head to the tip for the pan screws.
2. Thread length includes tapered tip (Figure 1).
3. Bending yield strength, F_{yb} , is determined in accordance with ASTM F1575 using minor thread diameter when fastener is tested in threaded section.
4. Shear strength is determined in accordance with AISI S904 using minor thread diameter when fastener is tested in threaded section.
5. Tabulated fastener dimensions are measured on uncoated fasteners. Finished dimensions are larger due to the proprietary coatings added.

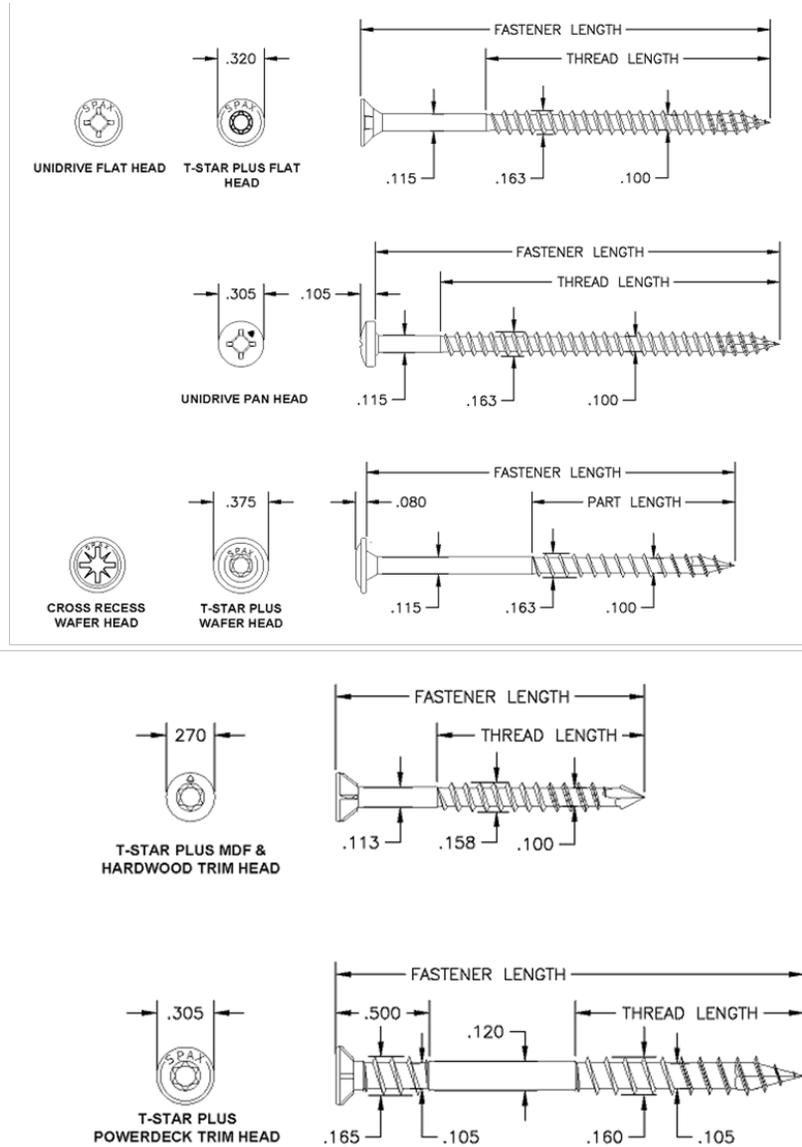


Figure 2. #8 SPAX® Construction Screws



Table 2. #8 SPAX® Construction Screw Specifications⁵

Fastener Designation	Part Number	Head				Length (in)		Diameter (in)			TPI	Bending Yield Strength, ³ f _{yb} (psi)	Allowable Steel Strength (lbs.)	
		Style	Drive System	Diameter (in)	Height (in)	Fastener ¹	Thread ²	Shank	Minor	Major			Tensile	Shear ⁴
Carbon Steel														
#8 x 1¼"	XFT08P-1250		T20 T-Star Plus	0.320	N/A	1.250	0.670	0.115	0.100	0.163	11	187,000	460	345
#8 x 1½"	XFT08P-1500					1.500	0.865							
#8 x 2"	XFT08P-2000					2.000	1.240							
#8 x 2½"	XFT08P-2500					2.500	1.340							
#8 x 1"	XFU08-1000	Flat	#2 Unidrive	0.320	N/A	1.000	Full	0.115	0.100	0.163	11	187,000	460	345
#8 x 1¼"	XFU08-1250					1.250								
#8 x 1½"	XFU08-1500					1.500								
#8 x 1¾"	XFU08-1750					1.750								
#8 x 2"	XFU08-2000					2.000								
#8 x 2½"	XFU08-2500					2.500								
#8 x 1"	XPU08-1000	Pan	#2 Unidrive	0.305	0.102	1.000	Full	0.115	0.100	0.163	11	187,000	460	345
#8 x 1¼"	XPU08-1250					1.250								
#8 x 1½"	XPU08-1500					1.500								
#8 x 2"	XPU08-2000					2.000								
#8 x 1¼"	XWP08-1250	Wafer	#2 Cross	0.375	0.080	1.250	Full	0.115	0.100	0.163	11	187,000	460	345
#8 x 1¼"	XWT08P-1250					1.250	0.670							
#8 x 1½"	XWT08P-1500		T20 T-Star Plus			1.500	0.875							
#8 x 2"	XWT08P-2000					2.000	1.250							
#8 x 2½"	XWT08P-2500					2.500	1.375							



Fastener Designation	Part Number	Head				Length (in)		Diameter (in)			TPI	Bending Yield Strength, ³ f _{yb} (psi)	Allowable Steel Strength (lbs.)	
		Style	Drive System	Diameter (in)	Height (in)	Fastener ¹	Thread ²	Shank	Minor	Major			Tensile	Shear ⁴
#8 x 1 ³ / ₄ "	XMT08-1750	MDF/ Hard- wood Trim	T20 T-Star Plus	0.270	N/A	1.750	1.160	0.113	0.100	0.158	12.5	171,000	340	305
#8 x 2 ¹ / ₂ "	XMT08-2500					2.500	1.495							
Stainless Steel														
#8 x 1 ⁵ / ₈ "	XDT08-SS	Power Deck Trim	T20 T-Star Plus	0.305	N/A	1.625	0.700	0.120	0.105	0.160	11	110,000	355	340

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 psi = 0.00689 MPa

1. Fastener length is measured from the topside of the head to the tip for flat, MDF/hardwood trim, and PowerDeck® screws and from the underside of the head to the tip for the pan and wafer screws.
2. Thread length includes tapered tip (Figure 2).
3. Bending yield strength, F_{yb}, is determined in accordance with ASTM F1575 using minor thread diameter when fastener is tested in threaded section.
4. Shear strength is determined in accordance with AISI S904 using minor thread diameter when fastener is tested in threaded section.
5. Tabulated fastener dimensions are measured on uncoated fasteners. Finished dimensions are larger due to the proprietary coatings added.

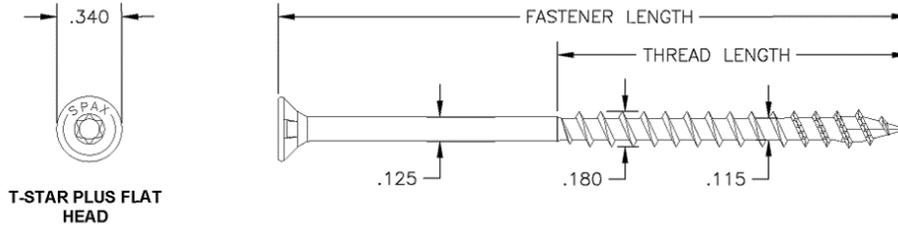


Figure 3. #9 SPAX® Construction Screws

Table 3. #9 SPAX® Construction Screw Specifications⁵

Fastener Designation	Part Number	Head				Length (in)		Diameter (in)			TPI	Bending Yield Strength, ³ f _{yb} (psi)	Allowable Steel Strength (lbs.)	
		Style	Drive System	Diameter (in)	Height (in)	Fastener ¹	Thread ²	Shank	Minor	Major			Tensile	Shear ⁴
Carbon Steel														
#9 x 2½"	XFT09P-2500	Flat	T20 T-Star Plus	0.340	N/A	2.500	1.655	0.125	0.115	0.180	9.5	201,000	540	435
#9 x 3¼"	XFT09P-3250					3.250	1.810							
Stainless Steel														
#9 x 1½"	XFT09-1500	Flat	T20 T-Star Plus	0.340	N/A	1.500	1.000	0.125	0.115	0.180	9.5	129,000	395	380
#9 x 2"	XFT09-2000					2.000	1.280							

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 psi = 0.00689 MPa

- Fastener length is measured from the top side of the head to the tip.
- Thread length includes tapered tip (Figure 3).
- Bending yield strength, F_{yb}, is determined in accordance with ASTM F1575 using minor thread diameter when fastener is tested in the threaded section.
- Shear strength is determined in accordance with AISI S904 using minor thread diameter when fastener is tested in the threaded section.
- Tabulated fastener dimensions are measured on uncoated fasteners. Finished dimensions are larger due to the proprietary coatings added.

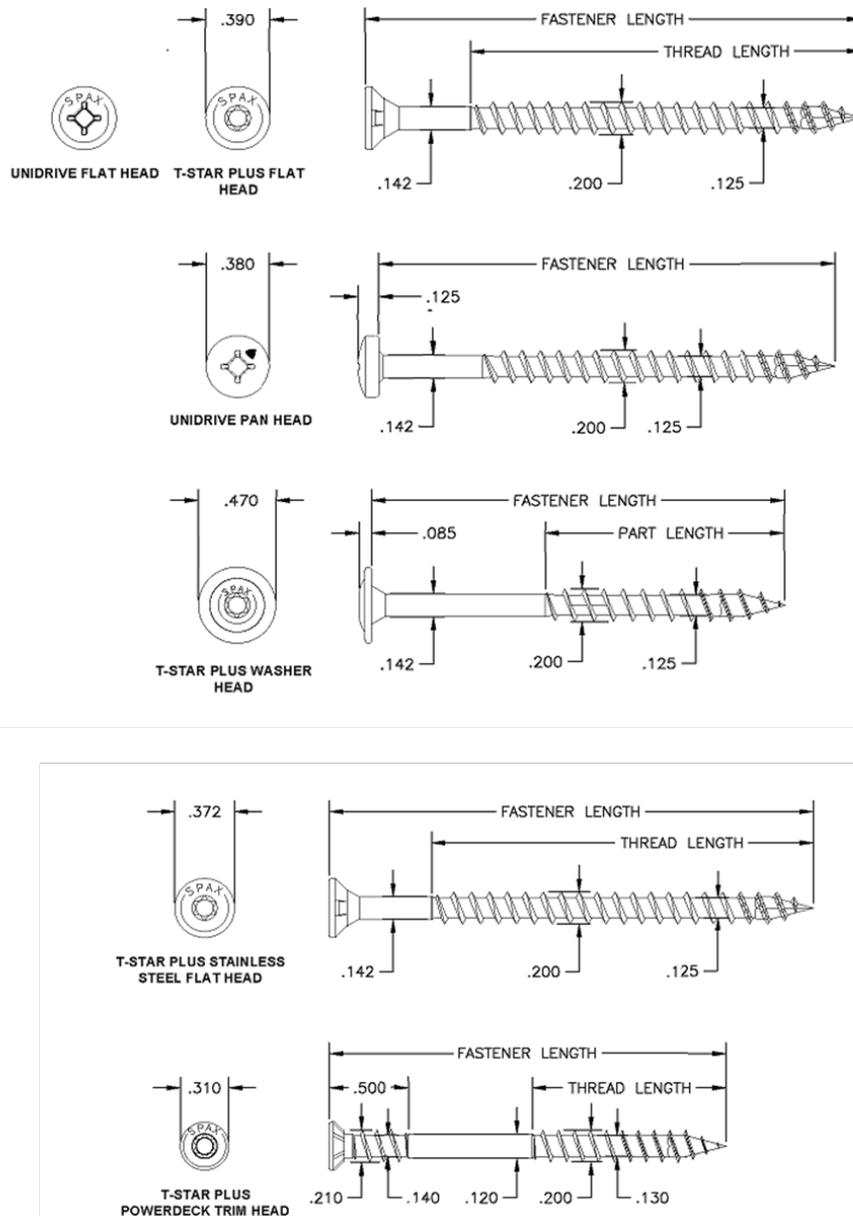


Figure 4. #10 SPAX® Construction Screws

Table 4. #10 SPAX® Construction Screw Specifications⁵

Fastener Designation	Part Number	Head				Length (in)		Diameter (in)			TPI	Bending Yield Strength, ³ f _{yb} (psi)	Allowable Steel Strength (lbs.)			
		Style	Drive System	Diameter (in)	Height (in)	Fastener ¹	Thread ²	Shank	Minor	Major			Tensile	Shear ⁴		
Carbon Steel																
#10 x 1½"	XFT10P-1250	Flat	T20 T-Star Plus	0.390	N/A	1.500	1.000	0.142	0.125	0.200	8.5	187,000	690	545		
#10 x 2"	XFT10P-2000					2.000	1.250									
#10 x 2½"	XFT10P-2500					2.500	1.600									
#10 x 2¾"	XFT10P-2750					2.750										
#10 x 3"	XFT10P-3000					3.000										
#10 x 3½"	XFT10P-3500					2.500	2.375									
#10 x 1"	XFU10-1000	Flat	#2 Unidrive	0.390	N/A	1.000	Full	0.142	0.125	0.200	8.5	187,000	690	545		
#10 x 1¼"	XFU10-1250					1.250										
#10 x 1½"	XFU10-1500					1.500										
#10 x 2"	XFU10-2000					2.000									2.375	
#10 x 2½"	XFU10-2500					2.500										2.275
#10 x 3"	XFU10-3000					3.000										
#10 x 3½"	XFU10-3500	3.500														
#10 x 5/8"	XPU10-0625	Pan	#2 Unidrive	0.380	0.125	0.625	Full	0.142	0.125	0.200	8.5	187,000	690	545		
#10 x 1"	XPU10-1000					1.000										
#10 x 2½"	XWT10-2500	Washer	T20 T-Star Plus	0.470	0.085	2.500	1.500	0.142	0.125	0.200	8.5	187,000	690	545		
#10 x 3"	XWT10-3000					3.000									1.625	
Stainless Steel																
#10 x 2½"	XFT10-2500-SS	Flat	T20	0.372	N/A	2.375	1.450	0.142	0.125	0.200	8.5	126,000	480	440		



Fastener Designation	Part Number	Head				Length (in)		Diameter (in)			TPI	Bending Yield Strength, ³ f _{yb} (psi)	Allowable Steel Strength (lbs.)	
		Style	Drive System	Diameter (in)	Height (in)	Fastener ¹	Thread ²	Shank	Minor	Major			Tensile	Shear ⁴
#10 x 3"	XFT10-3000-SS		T-Star Plus			3.000	1.600							
#10 x 2½"	XDT10-2500-SS	PowerDeck Trim	T20 T-Star Plus	0.310	N/A	2.500	1.260	0.155	0.130	0.200	8.5	129,000	485	455
#10 x 3"	XDT10-3000-SS					3.000	1.540							
#10 x 3½"	XDT10-3500-SS					3.500	1.610							

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 psi = 0.00689 MPa

1. Fastener length is measured from the topside of the head to the tip for flat and PowerDeck® screws and from the underside of the head to the tip for the pan and washer screws.
2. Thread length includes tapered tip (Figure 4).
3. Bending yield strength, F_{yb}, is determined in accordance with ASTM F1575 using minor thread diameter when fastener is tested in the threaded section.
4. Shear strength is determined in accordance with AISI S904 using minor thread diameter when fastener is tested in the threaded section.
5. Tabulated fastener dimensions are measured on uncoated fasteners. Finished dimensions are larger due to the proprietary coatings added.

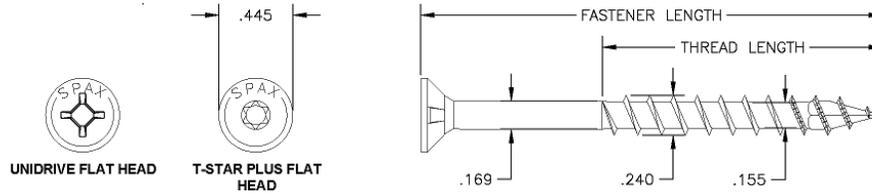


Figure 5. #14 SPAX® Construction Screws

Table 5. #14 SPAX® Construction Screw Specifications⁵

Fastener Designation	Part Number	Head				Length (in)		Diameter (in)			TPI	Bending Yield Strength, ³ f _{yb} (psi)	Allowable Steel Strength (lbs.)	
		Style	Drive System	Diameter (in)	Height (in)	Fastener ¹	Thread ²	Shank	Minor	Major			Tensile	Shear ⁴
Carbon Steel														
#14 x 1 ¹ / ₄ "	XFT14-1000	Flat	T30 T-Star Plus or Unidrive	0.445	N/A	1.25	0.925	0.169	0.155	0.240	7	160,000	990	750
#14 x 1 ¹ / ₂ "	XFT14-1500					1.5	1.240							
#14 x 2"	XFT14-2000					2	1.675							
#14 x 2 ¹ / ₂ "	XFT14P-2500					2.5	1.595							
#14 x 3"	XFT14P-3000					3								
#14 x 3 ¹ / ₂ "	XFT14P-3500					3.5	2.385							
#14 x 4"	XFT14P-4000					4								
#14 x 4 ³ / ₄ "	XFT14P-4750					4.75	2.660							

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 psi = 0.00689 MPa

1. Fastener length is measured from the top side of the head to the tip.
2. Thread length includes tapered tip (Figure 5).
3. Bending yield strength, F_{yb}, is determined in accordance with ASTM F1575 using minor thread diameter when fastener is tested in the threaded section.
4. Shear strength is determined in accordance with AISI S904 using minor thread diameter when fastener is tested in the threaded section.
5. Tabulated fastener dimensions are measured on uncoated fasteners. Finished dimensions are larger due to the proprietary coatings added.



1.2 Fastener Material

- 1.2.1 SPAX® Construction Screws are made of hardened carbon steel grade 10B18 wire conforming to ASTM A510 or stainless steel Grade 316 wire.

1.3 Corrosion Resistance

1.3.1 Interior Wood Applications:

- 1.3.1.1 The SPAX® PowerLags® series structural wood fasteners having the proprietary zinc, yellow zinc, ecote and WIROX® coatings are equivalent to the protection provided by code-approved hot-dipped galvanized coatings meeting ASTM A153, Class D when recognized for use by the American Wood Protection Association in untreated wood and above ground contact pressure treated wood for interior, dry/damp general construction applications (i.e., ABOVE GROUND AWPA UC1-UC2).

1.3.2 Exterior Wood Applications:

- 1.3.2.1 The SPAX® PowerLags® series structural wood fasteners having the proprietary HCR coatings are equivalent to the protection provided by code-approved hot-dipped galvanized coatings meeting ASTM A153, Class D when recognized for use by the American Wood Protection Association in untreated wood and above ground contact pressure treated wood for exterior, freshwater, general construction applications (i.e., GROUND CONTACT AWPA UC1 UC4A).

1.3.3 Stainless Steel Wood Applications:

- 1.3.3.1 The stainless steel SPAX® Construction Screws meet the material requirements in ASTM F1667 and are recognized for use in untreated, preservative treated, and fire-retardant-treated wood in interior and exterior applications.

1.3.4 Fire Retardant Treated (FRT) Wood Applications:

- 1.3.4.1 SPAX® Construction Screws proprietary coating systems designated as zinc, yellow zinc, HCR™, HCR-X™, and WIROX® are recognized for use in FRT lumber, provided the conditions set forth by the FRT lumber manufacturer are met, including appropriate strength reductions.

1.3.5 Wood Material

- 1.3.5.1 Wood main and side members must be solid-sawn lumber or OSB or plywood boards having an assigned specific gravity as given in the respective tables of this TER. Assigned specific gravity must be determined in accordance with NDS Table 12.3.3A.

2 Scope of Listing^{3,4}

- 2.1 #6, #8, #9, #10 and #14 SPAX® Construction Screws have been tested and/or evaluated in accordance with the following Standards and Referenced Documents for use as specified herein:

- 2.1.1 *AISI S904: Standard Test Methods for Determining the Tensile and Shear Strengths of Screws*
- 2.1.2 *ANSI/AWC NDS: National Design Specification (NDS) for Wood Construction*
- 2.1.3 *ASTM A153: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware*
- 2.1.4 *ASTM A510: Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel*
- 2.1.5 *ASTM B117: Standard Practice for Operating Salt Spray (Fog) Apparatus*
- 2.1.6 *ASTM D1761: Standard Test Methods for Mechanical Fasteners in Wood*

³ This Listing is a code defined [research report](#), which is also known as a [duly authenticated report](#), provided by an [approved agency](#) (see [IBC Section 1703.1](#)) and/or an [approved source](#) (see [IBC Section 1703.4.2](#)). An approved agency is “approved” as an [approved agency](#) when it is ANAB accredited. DrJ Engineering, LLC (DrJ) is listed in the [ANAB directory](#). A professional engineer is “approved” as an [approved source](#) when that professional engineer is properly licensed to transact engineering commerce. Where sealed by a professional engineer, it is also a duly authenticated report certified by an [approved source](#). (i.e., [Registered Design Professional](#)). DrJ is an ANAB accredited [product certification body](#).

⁴ Unless otherwise noted, all references in this Listing are from the 2021 version of the codes and the standards referenced therein. This material, product, design, service and/or method of construction also complies with the 2000-2021 versions of the referenced codes and the standards referenced therein.



- 2.1.7 *ASTM F1575: Standard Test Method for Determining Bending Yield Moment of Nails*
- 2.1.8 *ASTM G85: Standard Practice for Modified Salt Spray (Fog) Testing*
- 2.1.9 *DIN (Deutsches Institut für Normung E.V.) 1654: Cold Heading & Cold Extruding Steels; Technical Delivery Conditions for Stainless Steels*
- 2.1.10 *DIN 17440: Technical Delivery Conditions for Stainless Steel Plate, Hot Rolled Strip and bars for Pressure Purposes, Drawn Wire and Forgings*

3 Performance Evaluation

- 3.1 Tests, testing, test reports, research reports, duly authenticated reports and related engineering evaluations are defined as intellectual property and/or trade secrets and protected by Defend Trade Secrets Act 2016 (DTSA).⁵
- 3.2 Testing and/or inspections conducted for this TER were performed by CBI, ISO/IEC 17025 accredited testing laboratory,⁶ and ISO/IEC 17020 accredited inspection body,⁷ which are internationally recognized accreditations through International Accreditation Forum (IAF).
- 3.3 Independent testing and/or inspections conducted for this Listing were performed by an ISO/IEC 17025 accredited testing laboratory, ISO/IEC 17020 accredited inspection body, and/or a licensed Registered Design Professional (RDP).
- 3.4 SPAX® Construction Screws are used to attach wood framing members in conventional light-frame construction and provide resistance against head pull-through, withdrawal, and shear loads.
- 3.5 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.
- 3.6 *Design*
 - 3.6.1 Design of SPAX® Construction Screws is governed by the applicable code and the provisions for dowel type fasteners in NDS.
 - 3.6.2 Unless otherwise noted, adjustment of the design stresses for duration of load shall be in accordance with the applicable code.
- 3.7 *Head Pull-Through Design Values*
 - 3.7.1 Reference design values for head pull-through for SPAX® Construction Screws are specified in Table 6 for OSB and plywood, and Table 7 for sawn lumber.
 - 3.7.2 Reference design values for head pull-through for XFT14P-4000 fasteners are specified in Table 8.

⁵ <https://www.law.cornell.edu/uscode/text/18/part-11/chapter-90>. Given our professional duty to inform, please be aware that whoever, with intent to convert a trade secret (TS), that is related to a product or service used in or intended for use in interstate or foreign commerce, to the economic benefit of anyone other than the owner thereof, and intending or knowing that the offense will, injure any owner of that trade secret, knowingly without authorization copies, duplicates, sketches, draws, photographs, downloads, uploads, alters, destroys, photocopies, replicates, transmits, delivers, sends, mails, communicates, or conveys such information; shall be fined under this title or imprisoned not more than 10 years, or both. Any organization that commits any offense described in subsection (a) shall be fined not more than the greater of \$5,000,000 or 3 times the value of the stolen trade secret to the organization, including expenses for research and design and other costs of reproducing the trade secret that the organization has thereby avoided. The federal government and each state have a public records act. As the National Society of Professional Engineers states, "Engineers shall not disclose, without consent, confidential information concerning the business affairs or technical processes of any present or former client or employer, or public body on which they serve." Therefore, to protect intellectual property (IP) and TS, and to achieve compliance with public records and trade secret legislation, requires approval through the use of Listings, certified reports, technical evaluation reports, duly authenticated reports and/or research reports prepared by approved agencies and/or approved sources. For more information, please review this website: Intellectual Property and Trade Secrets.

⁶ Internationally recognized accreditations are performed by members of the International Accreditation Forum (IAF). Accreditation Body and Regional Accreditation Group Members of IAF are admitted to the IAF MLA only after a stringent evaluation of their operations by a peer evaluation team, which is charged to ensure that the applicant complies fully with both international standards and IAF requirements. Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope.

⁷ Ibid.



Table 6. Reference Pull-Through Design Values (P) for SPAX® Construction Screws – OSB and Plywood

Fastener Series	Head Style	Reference Pull-Through Design Value, ^{1,2,3} P (lbf)									
		Plywood Thickness (Specific Gravity)						OSB Thickness (Specific Gravity)			
		1/8" (0.33)	1/4" (0.39)	1 1/32" (0.39)	1 5/32" (0.39)	1 9/32" (0.39)	2 3/32" (0.50)	7/16" (0.50)	1 5/32" (0.50)	1 9/32" (0.50)	2 3/32" (0.50)
Carbon Steel											
#6	MDF/ Hardwood Trim	17	52	52	57	63	114	34	40	45	45
#8	Flat	21	59	74	120	120	212	65	68	78	110
	Wafer	28	76	88	146	190	319	62	86	110	131
	MDF/ Hardwood Trim	17	58	58	77	80	139	39	53	53	56
#9	Flat	22	59	78	125	145	258	65	68	78	110
#10	Flat	23	79	89	151	177	293	73	78	78	110
	Washer	28	95	103	183	246	322	73	87	126	131
Stainless Steel											
#8	PowerDeck® Trim	-	-	69	78	130	145	44	77	91	103
#9	Flat	-	-	69	78	130	145	44	77	91	103
#10	Flat	-	-	69	78	130	145	44	77	91	103
	PowerDeck® Trim	-	-	67	78	126	145	44	68	81	88

SI: 1 in = 25.4 mm, 1 lb = 4.45 N

- Minimum wood member thickness as specified
- Tabulated pull-through values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.
- For wood species with an assigned specific gravity between 0.33 and 0.39, use the tabulated values for specific gravity (SG) of 0.33. For wood species with an assigned specific gravity between 0.39 and 0.50, use the tabulated values for specific gravity of 0.39. For wood species with an assigned specific gravity greater than or equal to 0.50, use the tabulated values for specific gravity of 0.50.



Table 7. Reference Pull-Through Design Values (P) for SPAX® Construction Screws – Sawn Lumber

Fastener Series	Head Style	Reference Pull-Through Design Value, ^{1,2,3} P (lbf)												
		SPF (G = 0.42)					DF-L (G = 0.50)				SP (G = 0.55)			
		1/4"	3/8"	3/4"	1"	1 1/2"	3/8"	3/4"	1"	1 1/2"	3/8"	3/4"	1"	1 1/2"
Carbon Steel														
#6	Flat	-	-	-	125	-	-	-	150	-	-	-	179	
	MDF/ Hardwood Trim	33	48	48	-	-	51	48	-	-	58	82	-	
#8	Flat	54	79	79	-	123	95	104	-	157	95	138	-	157
	Wafer	59	85	201	-	268	118	201	-	297	118	250	-	335
	MDF/ Hardwood Trim	39	48	64	-	149	77	79	-	161	77	83	-	240
#9	Flat	59	79	95	-	177	114	188	-	211	114	188	-	303
#10	Flat	63	90	130	-	177	121	188	-	238	121	228	-	315
	Washer	59	112	249	-	338	133	251	-	387	133	265	-	461
Stainless Steel														
#8	PowerDeck® Trim	-	-	118	-	118	-	143	-	143	-	168	-	168
#9	Flat	-	-	118	-	118	-	143	-	143	-	168	-	168
#10	Flat	-	-	118	-	118	-	143	-	143	-	168	-	168
	PowerDeck® Trim	-	-	129	145	153	-	144	165	165	-	185	190	231

SI: 1 in = 25.4 mm, 1 lb = 4.45 N

1. Minimum wood member thickness as specified
2. Tabulated pull-through values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.
3. For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for specific gravity (SG) of 0.42. For wood species with an assigned specific gravity between 0.50 and 0.55, use the tabulated values for specific gravity of 0.50. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated values for specific gravity of 0.55.



Table 8. Head Pull-Through Design Values for XFT14P-4000 Fastener

Member Type (Specific Gravity) ^{1,2}	Member Description ³	Head Pull-Through Value ⁵ (lbs.)
SPF ² (0.42)	Dry	190
	Wet	135
SP ² (0.55)	Dry	240
	Wet	155
LVL (0.50) ⁴	Dry	350

SI: 1 in = 25.4 mm, 1 lb = 4.45 N

- For wood species with an assigned specific gravity between 0.42 and 0.55, use the tabulated values for specific gravity of 0.42. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated values for specific gravity of 0.55.
- Minimum thickness is 1.5".
- The dry service condition is defined as lumber with an in-service moisture content of less than or equal to 19%. The wet service condition is defined as lumber with an in-service moisture content of greater than 19%.
- LVL member minimum thickness is 1.5". Listed specific gravity is an equivalent specific gravity.
- Tabulated withdrawal values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.

3.7.3 Reference Withdrawal Design Values in Face Grain Applications

- 3.7.3.1 Reference withdrawal design values for SPAX® Construction Screws are specified in Table 9 for OSB and plywood, and Table 10 for sawn lumber.
- 3.7.3.2 Reference Withdrawal Design Values for XFT14P-4000 Fasteners are specified in Table 11.



Table 9. Reference Withdrawal Design Values (W) for SPAX® Construction Screws – OSB and Plywood

Fastener Series	Head Style	Reference Withdrawal Design Values, ^{1,2} W (lbf)						
		Plywood Thickness (Specific Gravity)			OSB Thickness (Specific Gravity)			
		15/32" (0.39)	19/32" (0.39)	23/32" (0.50)	7/16" (0.50)	15/32" (0.50)	19/32" (0.50)	23/32" (0.50)
Carbon Steel								
#6	Flat	51	83	134	26	29	36	52
	Pan							
	MDF/Hardwood Trim	46	73	144	29	36	41	41
#8	Flat	51	83	162	26	36	48	52
	Pan							
	Wafer							
	MDF/Hardwood Trim	68	75	179	29	37	41	64
#9	Flat	51	92	186	39	54	54	66
#10	Flat	90	92	186	39	54	54	66
	Pan							
	Washer							
Stainless Steel								
#8	PowerDeck® Trim	68	75	179	29	37	41	64
#9	Flat	51	92	186	39	54	54	66
#10	Flat	90	92	186	39	54	54	66
	PowerDeck® Trim							

SI: 1 in = 25.4 mm, 1 lb = 4.45 N

1. Applies to withdrawal from face grain only where the screw has full thread penetration in the board.
2. Tabulated withdrawal values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.
3. For wood species with an assigned specific gravity (SG) between 0.39 and 0.50, use the tabulated values for specific gravity of 0.39. For wood species with an assigned specific gravity greater than or equal to 0.50, use the tabulated values for specific gravity of 0.50.



Table 10. Reference Withdrawal Design Values (W) for SPAX® Construction Screws – Sawn Lumber

Fastener Series	Head Style	Reference Withdrawal Design Values, ^{1,2} W (lb/in)		
		Wood Species (Specific Gravity) ³		
		SPF (0.42)	DF-L (0.50)	SP (0.55)
Carbon Steel				
#6	Flat	105	133	140
	Pan			
	MDF/Hardwood Trim	64	108	124
#8	Flat	127	133	175
	Pan			
	Wafer			
	MDF/Hardwood Trim	106	114	124
#9	Flat	132	146	190
#10	Flat	144	176	190
	Pan			
	Washer			
Stainless Steel				
#8	PowerDeck® Trim	106	114	124
#9	Flat	132	146	190
#10	Flat	144	176	190
	PowerDeck® Trim			

SI: 1 in = 25.4 mm, 1 lb = 4.45 N

- Applies to withdrawal from face grain only.
- Tabulated withdrawal values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1. A minimum thread penetration of 1" (including the tip) is required to achieve the tabulated loads.
- Full withdrawal strength is calculated by multiplying the length of thread embedded in the main member by the tabulated reference withdrawal values.
- For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for specific gravity of 0.42. For wood species with an assigned specific gravity between 0.50 and 0.55, use the tabulated values for specific gravity of 0.50. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated values for specific gravity of 0.55.

Table 11. Reference Withdrawal Value for XFT14P-4000 Fastener in Face Grain

Member Type (Specific Gravity) ^{1,2}	Member Service Condition	Penetration ⁴ into Member (in)	Reference Withdrawal Value (lbs/in) ^{5,6}
SPF (0.42)	Dry	1	130
	Wet	1	95
SP (0.55)	Dry	1	205
		2	240
	Wet	1	140
		2	170
LVL (0.50) ³	Dry	1	180
		2	225

SI: 1 in = 25.4 mm, 1 lb = 4.45 N

- For wood species with an assigned specific gravity between 0.42 and 0.55, use the tabulated values for specific gravity of 0.42. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated values for specific gravity of 0.55.
- The dry service condition is defined as lumber with an in-service moisture content of less than or equal to 19%. The wet service condition is defined as lumber with an in-service moisture content of greater than 19%.
- Listed specific gravity is an equivalent specific gravity.
- Fastener penetration is the threaded length embedded in the wood member, including the tip.
- The full design withdrawal value (W) in pounds is equal to: $W = w_1 + [w_2 - (w_2 - w_1)] * (L_T - 1)$; where w_1 = reference withdrawal corresponding to 1" penetration, L_T = embedded thread length (minimum 1"), and w_2 = reference withdrawal corresponding to 2" penetration.
- Tabulated withdrawal values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.

3.7.4 Lateral Design Values

3.7.4.1 Reference lateral design values for shear load parallel and perpendicular to grain for SPAX® Construction Screws are specified in the following tables:

3.7.4.1.1 Solid sawn main member with OSB or Plywood side member:

- 3.7.4.1.1.1 #6 SPAX® Construction Screws: Table 12
- 3.7.4.1.1.2 #8 SPAX® Construction Screws: Table 13
- 3.7.4.1.1.3 #9 SPAX® Construction Screws: Table 14
- 3.7.4.1.1.4 #10 SPAX® Construction Screws: Table 15
- 3.7.4.1.1.5 #14 SPAX® Construction Screws: Table 16

3.7.4.1.2 Sawn lumber main and side members: Table 17

3.7.4.1.3 See Section 3.7.5 for lateral reference design values for the XFT14P-4000 fastener.

Table 12. #6 SPAX® Construction Screw Lateral Design Values – OSB and Plywood Side Member

Fastener Designation	Head Style	Minimum Main Member Penetration ² (in)	Minimum Side Member Thickness (in)	Reference Lateral Shear Value, ^{1,3,4} Z (lbf)	
				OSB ⁵ (0.50)	Plywood ⁵ (0.39)
Carbon Steel					
#6 x 1"	Flat or Pan	9/16	7/16	28	-
		17/32	15/32	28	22
#6 x 1 1/4"		13/16	7/16	35	-
		25/32	15/32	35	29
		21/32	19/32	36	28
#6 x 1 1/2"		17/32	23/32	38	29
		11/16	7/16	41	-
		11/32	15/32	42	35
		29/32	19/32	42	35
#6 x 1 3/4"		25/32	23/32	43	34
		15/16	7/16	41	-
		19/32	15/32	42	35
		15/32	19/32	46	37
#6 x 2"		11/32	23/32	50	40
	19/16	7/16	41	-	
	117/32	15/32	42	35	
	113/32	19/32	46	37	
#6 x 1 1/2"	19/32	23/32	51	40	
	11/16	7/16	41	-	
	11/32	15/32	42	35	
	29/32	19/32	42	35	
#6 x 1 1/2"	MDF/Hardwood Trim	25/32	23/32	43	34

SI: 1 in = 25.4 mm, 1 lbf = 4.45 N

- Reference lateral design values apply to two-member single shear connections where the side member is OSB or plywood, the main member is SPF (SG = 0.42), and the fastener is installed in the face of the member and oriented perpendicular to grain. The underside of the fastener head shall be installed flush with the surface of the side member.
- Penetration depth includes the length of tapered tip.
- Lateral design values apply to both perpendicular to grain (Z_⊥) and parallel to grain (Z_{||}) orientations.
- Tabulated lateral design values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.
- OSB shall comply with DOC PS 2 and have a minimum specific gravity of 0.50. Plywood shall comply with DOC PS 1 and have a minimum specific gravity of 0.39.



Table 13. #8 SPAX® Construction Screw Lateral Design Values – OSB and Plywood Side Member

Fastener Designation	Head Style	Minimum Main Member Penetration ² (in)	Minimum Side Member Thickness (in)	Reference Lateral Shear Value, ^{1,3,4} Z (lbf)	
				OSB ⁵ (0.50)	Plywood ⁵ (0.39)
Carbon Steel					
#8 x 1¼"	Flat, Pan, or Wafer	13/16	7/16	40	-
		25/32	15/32	40	33
		21/32	19/32	42	32
#8 x 1½"		11/16	7/16	51	-
		11/32	15/32	50	44
		29/32	19/32	49	41
#8 x 1¾"		25/32	23/32	51	39
		15/16	7/16	53	-
		19/32	15/32	54	46
		15/32	19/32	59	48
#8 x 2" #8 x 2½"		11/32	23/32	58	48
		19/16	7/16	53	-
	17/32	15/32	54	46	
	13/32	19/32	59	48	
#8 x 1¾"	19/32	23/32	64	51	
	15/16	7/16	51	-	
	19/32	15/32	52	44	
	15/32	19/32	57	46	
#8 x 2½"	11/32	23/32	59	48	
	21/16	7/16	51	-	
	21/32	15/32	52	44	
	129/32	19/32	57	46	
		125/32	23/32	63	49
Stainless Steel					
#8 x 15/8"	PowerDeck® Trim	13/16	7/16	48	-
		15/32	15/32	49	40
		11/32	19/32	55	43
		29/32	23/32	55	46

SI: 1 in = 25.4 mm, 1 lbf = 4.45 N

- Reference lateral design values apply to two-member single shear connections where the side member is OSB or plywood, the main member is SPF (SG = 0.42), and the fastener is installed in the face of the member and oriented perpendicular to grain. The underside of the fastener head shall be installed flush with the surface of the side member.
- Penetration depth includes the length of tapered tip.
- Lateral design values apply to both perpendicular to grain (Z_⊥) and parallel to grain (Z_{||}) orientations.
- Tabulated lateral design values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.
- OSB shall comply with DOC PS 2 and have a minimum specific gravity of 0.50. Plywood shall comply with DOC PS 1 and have a minimum specific gravity of 0.39.



Table 14. #9 SPAX® Construction Screw Lateral Design Values – OSB and Plywood Side Member

Fastener Designation	Head Style	Minimum Main Member Penetration ² (in)	Minimum Side Member Thickness (in)	Reference Lateral Shear Value, ^{1,3,4} Z (lbf)	
				OSB ⁵ (0.50)	Plywood ⁵ (0.39)
Carbon Steel					
#9 x 2½" #9 x 3¼"	Flat	2 ¹ / ₁₆	7 ₁₆	71	-
		2 ¹ / ₃₂	15 ₃₂	71	62
		1 ²⁹ / ₃₂	19 ₃₂	76	63
		1 ²⁵ / ₃₂	23 ₃₂	81	66
Stainless Steel					
#9 x 1½"	Flat	1 ¹ / ₁₆	7 ₁₆	57	-
		1 ¹ / ₃₂	15 ₃₂	57	50
		2 ⁹ / ₃₂	19 ₃₂	56	46
		2 ⁵ / ₃₂	23 ₃₂	59	45
#9 x 2"	Flat	1 ⁹ / ₁₆	7 ₁₆	59	-
		1 ¹⁷ / ₃₂	5 ₃₂	60	51
		1 ¹³ / ₃₂	19 ₃₂	66	53
		1 ⁹ / ₃₂	23 ₃₂	72	57

SI: 1 in = 25.4 mm, 1 lbf = 4.45 N

- Reference lateral design values apply to two-member single shear connections where the side member is OSB or plywood, the main member is SPF (SG = 0.42), and the fastener is installed in the face of the member and oriented perpendicular to grain. The underside of the fastener head shall be installed flush with the surface of the side member.
- Penetration depth includes the length of tapered tip.
- Lateral design values apply to both perpendicular to grain (Z_⊥) and parallel to grain (Z_{||}) orientations.
- Tabulated lateral design values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.
- OSB shall comply with DOC PS 2 and have a minimum specific gravity of 0.50. Plywood shall comply with DOC PS 1 and have a minimum specific gravity of 0.39.

Table 15. #10 SPAX® Construction Screw Lateral Design Values – OSB and Plywood Side Member

Fastener Designation	Head Style	Minimum Main Member Penetration ² (in)	Minimum Side Member Thickness (in)	Reference Lateral Shear Value, ^{1,3,4} Z (lbf)	
				OSB ⁵ (0.50)	Plywood ⁵ (0.39)
Carbon Steel					
#10 x 1¼"	Flat, Pan, or Washer	13/16	7/16	48	-
		25/32	15/32	48	40
#10 x 1½"		11/16	7/16	61	-
		11/32	15/32	60	53
		29/32	19/32	60	49
#10 x 2"		25/32	23/32	63	48
		19/16	7/16	80	-
		117/32	15/32	81	70
		113/32	19/32	85	72
#10 x 2½" #10 x 2¾" #10 x 3" #10 x 3½"		19/32	23/32	83	71
		21/16	7/16	80	-
		117/32	15/32	81	70
		129/32	19/32	85	72
			125/32	23/32	90
Stainless Steel					
#10 x 2½" #10 x 3"	Flat	21/16	7/16	68	-
		21/32	15/32	69	59
		129/32	19/32	74	61
		125/32	23/32	81	64
#10 x 2½" #10 x 3" #10 x 3½"	PowerDeck® Trim	21/16	7/16	79	-
		21/32	15/32	80	69
		129/32	19/32	85	71
		125/32	23/32	92	74

SI: 1 in = 25.4 mm, 1 lbf = 4.45 N

- Reference lateral design values apply to two-member single shear connections where the side member is OSB or plywood, the main member is SPF (SG = 0.42), and the fastener is installed in the face of the member and oriented perpendicular to grain. The underside of the fastener head shall be installed flush with the surface of the side member.
- Penetration depth includes the length of tapered tip.
- Lateral design values apply to both perpendicular to grain (Z_⊥) and parallel to grain (Z_{||}) orientations.
- Tabulated lateral design values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.
- OSB shall comply with DOC PS 2 and have a minimum specific gravity of 0.50. Plywood shall comply with DOC PS 1 and have a minimum specific gravity of 0.39.

Table 16. #14 SPAX® Construction Screw Lateral Design Values – OSB and Plywood Side Member

Fastener Designation	Head Style	Minimum Main Member Penetration ² (in)	Minimum Side Member Thickness (in)	Reference Lateral Shear Value ^{1,3,4} , Z (lbf)	
				OSB ⁵ (0.50)	Plywood ⁵ (0.39)
Carbon Steel					
#14 x 1½"	Flat	1 ¹ / ₁₆	7 ⁷ / ₁₆	73	-
		1 ¹ / ₃₂	15 ¹⁵ / ₃₂	72	63
#14 x 2"		1 ⁹ / ₁₆	7 ⁷ / ₁₆	110	-
		1 ¹⁷ / ₃₂	15 ¹⁵ / ₃₂	108	97
		1 ¹³ / ₃₂	19 ¹⁹ / ₃₂	103	91
		1 ⁹ / ₃₂	23 ²³ / ₃₂	100	85
#14 x 2½" #14 x 3" #14 x 3½" #14 x 4" #14 x 4½"		2 ¹ / ₁₆	7 ⁷ / ₁₆	112	-
		2 ¹ / ₃₂	15 ¹⁵ / ₃₂	113	97
		1 ²⁹ / ₃₂	19 ¹⁹ / ₃₂	117	101
		1 ²⁵ / ₃₂	23 ²³ / ₃₂	123	103

SI: 1 in = 25.4 mm, 1 lbf = 4.45 N

1. Reference lateral design values apply to two-member single shear connections where the side member is OSB or plywood, the main member is SPF (SG = 0.42), and the fastener is installed in the face of the member and oriented perpendicular to grain. The underside of the fastener head shall be installed flush with the surface of the side member.
2. Penetration depth includes the length of tapered tip.
3. Lateral design values apply to both perpendicular to grain (Z_⊥) and parallel to grain (Z_{||}) orientations.
4. Tabulated lateral design values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.
5. OSB shall comply with DOC PS 2 and have a minimum specific gravity of 0.50. Plywood shall comply with DOC PS 1 and have a minimum specific gravity of 0.39.



Table 17. SPAX® Construction Screw Lateral Design Values – Sawn Lumber Side Member

Fastener Designation	Head Style	Minimum Main Member Penetration ¹ (in)	Minimum Side Member Thickness (in)	Reference Lateral Shear Value ^{4,5,6} , Z (lbf)		
				Wood Species (Specific Gravity ^{2,3})		
				SPF/HF (0.42)	DF-L (0.50)	SP (0.55)
Carbon Steel						
#6 x 1½"	Flat	¾	¾	37	50	57
#6 x 1¾" #6 x 2"		1	¾	44	56	63
#6 x 1½"	MDF/Hardwood Trim	¾	¾	37	50	57
#8 x 1½"	Flat, Pan, Wafer	¾	¾	43	59	70
#8 x 1¾"		1	¾	50	69	80
#8 x 2"		1¼	¾	55	70	80
#8 x 2½"		1	1½	58	75	84
#8 x 1¾"	MDF/Hardwood Trim	1	¾	51	69	79
#8 x 2½"		1	1½	57	74	81
#9 x 2½"	Flat	1	1½	73	92	105
#9 x 3¼"		1¾	1½	90	106	116
#10 x 1½"	Flat, Washer	¾	¾	53	72	86
#10 x 2"		1¼	¾	73	99	112
#10 x 2½"		1	1½	81	101	115
#10 x 2¾"		1¼	1½	91	117	132
#10 x 3" #10 x 3½"		1½	1½	103	121	132
#14 x 2"	Flat	1¼	¾	88	121	145
#14 x 2½"		1	1½	109	134	151
#14 x 3"		1½	1½	133	171	187

Fastener Designation	Head Style	Minimum Main Member Penetration ¹ (in)	Minimum Side Member Thickness (in)	Reference Lateral Shear Value ^{4,5,6} , Z (lbf)		
				Wood Species (Specific Gravity ^{2,3})		
				SPF/HF (0.42)	DF-L (0.50)	SP (0.55)
#14 x 3 1/2" #14 x 4" #14 x 4 1/2"		2	1 1/2	146	172	187
Stainless Steel						
#8 x 1 5/8"	PowerDeck® Trim	7/8	3/4	49	65	71
#9 x 1 1/2"	Flat	3/4	3/4	49	67	78
#9 x 2"		1 1/4	3/4	62	79	91
#10 x 2 1/2"	Flat	1	1 1/2	72	92	106
#10 x 3"		1 1/2	1 1/2	84	99	108
#10 x 2 1/2"	PowerDeck® Trim	1	1 1/2	82	103	118
#10 x 3" #10 x 3 1/2"		1 1/2	1 1/2	100	117	128

SI: 1 in = 25.4 mm, 1 lbf = 4.45 N

1. Penetration depth includes the length of tapered tip.
2. The species applies to both the main and side members. Where the members are different specific gravities, use the lower of the two.
3. For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for specific gravity of 0.42. For wood species with an assigned specific gravity between 0.50 and 0.55, use the tabulated values for specific gravity of 0.50. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated values for specific gravity of 0.55.
4. The fastener shall be oriented perpendicular to grain, and the underside of the fastener head shall be installed flush with the surface of the side member.
5. Lateral design values apply to both perpendicular to grain (Z_⊥) and parallel to grain (Z_∥) orientations.
6. Tabulated lateral design values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.

3.7.5 Reference Lateral Design Values for XFT14P-4000 Fasteners:

3.7.5.1 Reference lateral design values (lbs) for shear load perpendicular and parallel to the side member grain for XFT14P-4000 fasteners are specified in Table 18.

3.7.5.2 Reference lateral design values in Table 18 apply to two-member single shear connections where:

- 3.7.5.2.1 The main member has an assigned specific gravity equal to or greater than 0.55
- 3.7.5.2.2 The main member is loaded parallel to grain
- 3.7.5.2.3 The fastener is oriented perpendicular to grain
- 3.7.5.2.4 The fastener penetrates the face of the side member and edge of the main member
- 3.7.5.2.5 The minimum edge distance in the main member is nominally 3/4". Care shall be taken not to split the wood. See Table 20 for other spacing, edge, and end distance requirements.

Table 18. Lateral Design Values For XFT14P-4000 Fastener^{4,5,6}

Main Member Species (Specific Gravity) ^{1,3}	Side Member Species (Specific Gravity) ^{2,3}	Reference Lateral Shear Value, Z (lbf)	
		Z _⊥	Z
SP (0.55)	SPF (0.42)	NT	180
	SP (0.55)	285	205
	LVL (0.50)	410	290

SI: 1 in = 25.4 mm, 1 lb = 4.45 N

1. Main member is loaded parallel to grain.
2. For side member wood species with an assigned specific gravity between 0.42 and 0.55, use the tabulated values for specific gravity of 0.42. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated values for specific gravity of 0.55.
3. Main member and side member minimum thickness is 1.5".
4. Z_⊥ = Lateral Design Values Perpendicular to Side Member Grain, Z_{||} = Lateral Design Values Parallel to Side Member Grain (see Figure 6).
5. Tabulated lateral design values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.
6. NT = Not Tested

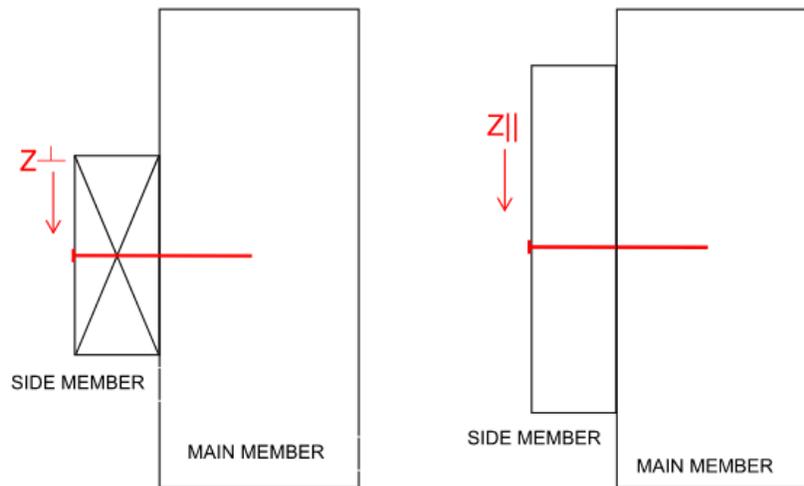


Figure 6. Lateral Load Directions

3.8 Any building code and/or accepted engineering evaluations (i.e., research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ Engineering, LLC (DrJ), an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDPs / approved sources. DrJ is qualified⁸ to practice product and code compliance services within its scope of accreditation and engineering expertise, respectively.

⁸ Qualification is performed by a legislatively defined Accreditation Body. ANSI National Accreditation Board (ANAB) is the largest independent accreditation body in North America and provides services in more than 75 countries. DrJ is an ANAB accredited product certification body.

4 Installation

- 4.1 Installation shall comply with the manufacturer installation instructions, this Listing, the approved construction documents, and the applicable building code.
- 4.2 SPAX® Construction Screws shall be installed using the driver bits specified in Table 1, Table 2, Table 3, Table 4, and Table 5 as applicable.
- 4.3 Fasteners shall not be struck with a hammer during installation.
- 4.4 Lead holes are not required for SPAX® Construction Screws.
- 4.5 The fastener head must be installed flush to the surface of the wood side member being connected. The fastener must not be overdriven.
- 4.6 Minimum main member penetration is 1½" unless otherwise stated in this listing.
- 4.7 Minimum requirements for fastener spacing, edge distance, and end distance shall be in accordance with Table 19.
 - 4.7.1 Minimum requirements for XFT14P-4000 fastener spacing, edge distance, and end distance are found in Figure 7 and Table 20.

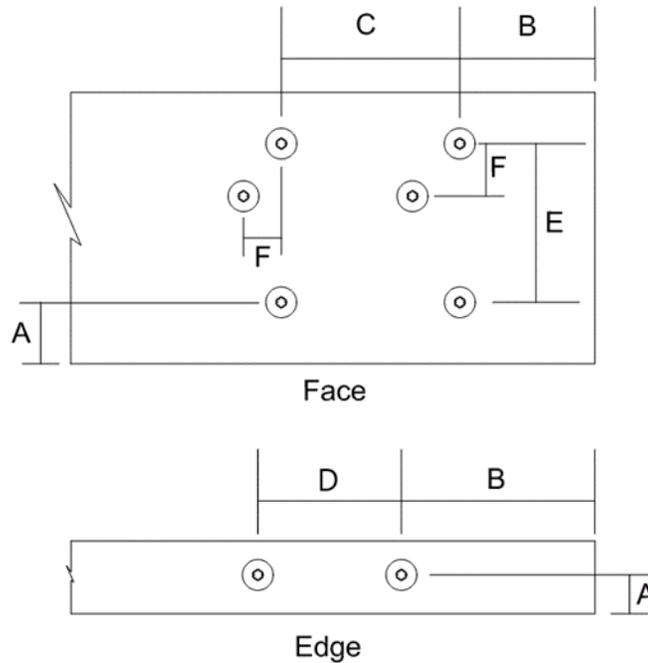


Figure 7. Fastener Spacing in Wood Reference Diagram

Table 19. Minimum Spacing, Edge Distance, and End Distance Requirements

Reference (from Figure 7)	Connection Geometry	Minimum Spacing/Distance ^{1,2} (in)					
		#6 Flat/Pan/ MDF/Hardwood Trim	#8 Flat/Pan/Wafer MDF/Hardwood Trim	#8 PowerDeck® Trim, #9 Flat	#10 Flat/Pan/Washer	#10 PowerDeck® Trim	#14 Pan
A	Edge Distance – Load in any direction	¼	¾	¾	¾	½	½
B	End Distance – Load parallel to grain, towards end	1½	1¾	17/8	2¼	2¾	25/8
	End Distance – Load parallel to grain, away from end	1	1¼	1¼	1½	15/8	1¾
	End Distance – Load perpendicular to grain	1	1¼	1¼	1½	15/8	1¾
C	Spacing between Fasteners in a Row – Parallel to grain	1½	1¾	17/8	2¼	2¾	25/8
D	Spacing between Fasteners in a Row – Perpendicular to grain	1	1¼	1¼	1½	15/8	1¾
E	Spacing between Rows of Fasteners – In-line	½	5/8	5/8	¾	7/8	7/8
F	Spacing between Rows of Fasteners – Staggered	¼	¾	¾	¾	½	½

SI: 1 in = 25.4 mm

- Edge distances, end distances, and spacing of fasteners shall be sufficient to prevent splitting of the wood or as shown in this table, whichever is the more restrictive.
- Values for “Spacing between Rows of Fasteners – Staggered” apply where the fasteners in adjacent rows are offset by one half of the “Spacing between Fasteners in a Row.”

Table 20. Minimum Spacing, Edge Distance, and End Distance Requirements – XFT14P-4000

Reference (from Figure 7)	Connection Geometry ^{1,2}	Minimum Spacing/Distance ^{1,2} (in)
A	Edge Distance – Load perpendicular to grain	1½
	Edge Distance – Load parallel to grain	¾
B	End Distance – Load parallel to grain, towards end	1¾
	End Distance – Load parallel to grain, away from end	¾
	End Distance – Load perpendicular to grain	¾
C	Spacing between Fasteners in a Row – Parallel to grain	1¾
D	Spacing between Fasteners in a Row – Perpendicular to grain	7/8
E	Spacing between Rows of Fasteners – In-line	½
F	Spacing between Rows of Fasteners – Staggered	½

SI: 1 in = 25.4 mm

- Edge distances, end distances, and spacing of fasteners shall be sufficient to prevent splitting of the wood or as shown in this table, whichever is the more restrictive.
- Values for “Spacing between Rows of Fasteners-Staggered” apply where the fasteners in adjacent rows are offset by one half of the “Spacing between Fasteners in a Row”



- 4.8 In the event of a conflict between the manufacturer installation instructions, this Listing, the approved construction documents and the applicable building code, the most restrictive shall govern.

5 Findings

- 5.1 As described in Section 3, #6, #8, #9, #10 and #14 SPAX® Construction Screws have performance characteristics that were tested and/or meet pertinent standards and is suitable for use pursuant to its specified purpose.
- 5.2 When used and installed in accordance with this Listing and the manufacturer installation instructions, #6, #8, #9, #10 and #14 SPAX® Construction Screws shall be approved for:
- 5.2.1 Provide resistance to head pull-through loads as shown in Table 6, Table 7, and Table 8.
- 5.2.2 Provide resistance to reference withdrawal loads as shown in Table 9, Table 10, and Table 11.
- 5.2.3 Provide resistance to lateral loads applied to the fastener in a wood connection as shown in Table 12, Table 13, Table 14, Table 15, Table 16, Table 17, and Table 18.
- 5.3 If #6, #8, #9, #10 and #14 SPAX® Construction Screws are to be used as a structural and/or building envelope component in the design of a specific building, the design shall be performed by an RDP.
- 5.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Altenloh, Brinck & Company U.S., Inc.
- 5.4.1 If not, Section 5.3 does not apply.
- 5.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10⁹ are similar) in pertinent part states:

104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.

- 5.6 **Approved:**¹⁰ Building codes require that the building official shall accept duly authenticated reports¹¹ or research reports¹² from approved agencies and/or approved sources (i.e., licensed RDP) with respect to the quality and manner of use of new products, materials, designs, services, assemblies, or methods of construction.
- 5.6.1 Acceptability of an approved agency, by a building official, is performed by verifying that the agency is accredited by a recognized accreditation body of the International Accreditation Forum (IAF).
- 5.6.2 Acceptability of a licensed RDP, by a building official, is performed by verifying that the RDP and/or their business entity is listed by the licensing board of the relevant jurisdiction.
- 5.7 CBI is an approved agency through its ISO/IEC 17025 testing and an ISO/IEC 17020 inspection accreditation. CBI employs RDPs and is accredited by ANAB.¹³ DrJ employs RDPs and is ANAB-Accredited.
- 5.8 Through ANAB accreditation and the IAF Multilateral Agreements, this TER can be used to obtain product approval in any jurisdiction or country that has IAF MLA Members & Signatories to meet the Purpose of the MLA – “*certified once, accepted everywhere.*” IAF specifically says, “*Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope.*”¹⁴

⁹ [2018 IFC Section 104.9](#)

¹⁰ Approved is an adjective that modifies the noun after it. For example, Approved Agency means that the Agency is accepted officially as being suitable in a particular situation. This example conforms to IBC/IRC/IFC [Section 201.4](#) where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.

¹¹ <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>

¹² <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2>

¹³ Please see the ANAB directories and search for Center for Building Innovation - <https://anab.ansi.org/laboratory-accreditation> and <https://anab.ansi.org/inspection-body-accreditation>

¹⁴ <https://iaf.nu/en/about-iaf-mla/#:~:text=required%20to%20recognise>



6 Conditions of Use

- 6.1 Performance characteristics are specified in Section 3.
- 6.2 As defined in Section 3, where material and/or engineering mechanics properties are created for load resisting design purposes, the resistance to the applied load shall not exceed the ability of the defined properties to resist those loads using the principles of accepted engineering practice.
- 6.3 As listed herein, #6, #8, #9, #10 and #14 SPAX® Construction Screws shall not be used:
 - 6.3.1 In wood main and side members that have a moisture content of greater than 19 percent (19%).
- 6.4 Where fasteners are installed in a wet service condition, the appropriate reduction factors shall be applied per NDS Table 11.3.1.
- 6.5 In cases where fastener metal capacity (instead of the wood member) controls the connection design, the allowable connection strength shall not be multiplied by the adjustment factors specified in NDS.
- 6.6 When required by adopted legislation and enforced by the building official, also known as the authority having jurisdiction (AHJ)¹⁵ in which the project is to be constructed:
 - 6.6.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice, and, when prepared by an approved source, shall be approved when requirements of adopted legislation are met.
 - 6.6.2 This Listing and the installation instructions shall be submitted at the time of permit application.
 - 6.6.3 These innovative products have an internal quality control program and a third-party quality assurance program.
 - 6.6.4 At a minimum, these innovative products shall be installed per Section 4 of this TER.
- 6.7 The approval of this TER by the AHJ shall comply with IBC Section 1707.1, where legislation states in pertinent part, *“the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in Section 104.11”, all of IBC Section 104, and IBC Section 105.4.*
- 6.8 These innovative products have an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.4, IBC Section 110.4, IBC Section 1703, IRC Section R104.4 and IRC Section R109.2.
- 6.9 The application of these innovative products in the context of this TER is dependent upon the accuracy of the construction documents, implementation of installation instructions, inspection as required by IBC Section 110.3, IRC Section R109.2 and any other regulatory requirements that may apply.
- 6.10 The actual design, suitability, and use of this Listing for any particular building is the responsibility of the owner or the owner’s authorized agent.
- 6.11 Any required design loads shall be provided by the building designer (i.e., owner or RDP) and/or determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed.
- 6.12 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies (i.e., ANAB accredited agencies), approved sources (i.e., RDPs), and/or professional engineering regulations. Accuracy of external test data and resulting analysis is relied upon.
- 6.13 Where pertinent, testing and/or engineering analysis is based upon state or local code and/or standard provisions that have been codified into law through legislation. The developers of the codes and standards are legally responsible for the accuracy of any legislatively adopted material properties and/or analytical methods. Any testing and/or engineering mechanics-based analysis may use legislatively and/or code adopted provisions as the control condition. The use of a control condition to compare to a test condition establishes equivalency to that prescribed in the adopted legislation with respect to quality, strength, effectiveness, fire resistance, durability, and safety.

¹⁵ Also known as the Authority Having Jurisdiction (AHJ)



- 6.14 The reliability of the attributes provided herein may be dependent upon published design properties by others. These properties are defined by the grade mark, grade stamp, mill certificate, Listings, certified reports, duly authenticated reports, and/or research reports prepared by approved agencies and/or approved sources furnished by suppliers of products, materials, designs, assemblies, and/or methods of construction. These are presumed to be minimum properties and relied upon to be accurate.
- 6.15 Testing and engineering analysis: The strength, rigidity and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.¹⁶
- 6.16 Where additional condition of use and/or code compliance information is required, please search for #6, #8, #9, #10 and #14 SPAX® Construction Screws on the DrJ Engineering website.

7 Identification

- 7.1 Labeling^{17,18} shall include, but not be limited to, the manufacturer name, manufacturing location/identifier, and the CBI Listing number.
- 7.2 Labeling may include, but not be limited to, the CBI mark and any other numerical designations related to layout locations for a given project.

8 Review Schedule

- 8.1 This Listing is subject to periodic review and revision. For the most recent version, visit cbitest.com.
- 8.2 For information on the status of this Listing, contact CBI.

9 Approved for Use Pursuant to US and International Legislation Defined in Appendix A

- 9.1 #6, #8, #9, #10 and #14 SPAX® Construction Screws are included in this list published by an approved agency that is concerned with evaluation of products or services, maintains periodic inspection of the production of listed materials or periodic evaluation of services, and whose TER Listing states either that the material, product, or service meets identified standards or has been tested and found suitable for a specified purpose. This TER meets the legislative intent and definition of being acceptable to the AHJ.

¹⁶ See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.

¹⁷ LABEL: An identification applied on a product by the manufacturer that contains the name of the manufacturer, the function and performance characteristics of the product or material and the name and identification of an approved agency, and that indicates that the representative sample of the product or material has been tested and evaluated by an approved agency (see IBC Section 1703.5, "Manufacturer designation" and "Mark").

¹⁸ LABELED: Equipment, materials or products to which has been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, approved agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-labeled items and whose labeling indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.



Appendix A

10 Legislation that Authorizes AHJ Approval

- 10.1 **Fair Competition:** State legislatures have adopted Federal regulations for the examination and approval of building code referenced and alternative products, materials, designs, services, assemblies and/or methods of construction that:
- 10.1.1 Advance Innovation,
 - 10.1.2 Promote competition so all businesses have the opportunity to compete on price and quality in an open market on a level playing field unhampered by anticompetitive constraints, and
 - 10.1.3 Benefit consumers through lower prices, better quality, and greater choice.
- 10.2 **Adopted Legislation:** The following local, state, and federal regulations affirmatively authorize #6, #8, #9, #10 and #14 SPAX® Construction Screws to be approved by AHJs, delegates of building departments, and/or delegates of an agency of the federal government:
- 10.2.1 Interstate commerce is governed by the Federal Department of Justice to encourage the use of innovative products, materials, designs, services, assemblies and/or methods of construction. The goal is to “protect economic freedom and opportunity by promoting free and fair competition in the marketplace.”
 - 10.2.2 Title 18 US Code Section 242 affirms and regulates the right of individuals and businesses to freely and fairly have new products, materials, designs, services, assemblies and/or methods of construction approved for use in commerce. Disapproval of alternatives shall be based upon non-conformance with respect to specific provisions of adopted legislation, and shall be provided in writing stating the reasons why the alternative was not approved, with reference to the specific legislation violated.
 - 10.2.3 The federal government and each state have a public records act. In addition, each state also has legislation that mimics the federal Defend Trade Secrets Act 2016 (DTSA)¹⁹ where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than 10 years²⁰ and/or a \$5,000,000 fine or 3 times the value of²¹ the Intellectual Property (IP) and Trade Secrets (TS).
 - 10.2.3.1 Compliance with public records and trade secret legislation requires approval through the use of listings, certified reports, Technical Evaluation Reports, duly authenticated reports and/or research reports prepared by approved agencies and/or approved sources.
 - 10.2.4 For new materials²² that are not specifically provided for in any building code, the design strengths and permissible stresses shall be established by tests, where suitable load tests simulate the actual loads and conditions of application that occur.
 - 10.2.5 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design using accepted engineering practice.²³
 - 10.2.6 The commerce of approved sources (i.e., registered PEs) is regulated by professional engineering legislation. Professional engineering commerce shall always be approved by AHJs, except where there is evidence, provided in writing, that specific legislation has been violated by an individual registered PE.
 - 10.2.7 The AHJ shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in IBC Section 104.11.²⁴

¹⁹ <http://www.drjengineering.org/AppendixC> and <https://www.law.cornell.edu/uscode/text/18/1832>

²⁰ <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=imprisoned%20not%20more%20than%2010%20years>

²¹ <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=Any%20organization%20that,has%20thereby%20avoided>

²² <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2>

²³ IBC 2021, Section 1706.1 Conformance to Standards

²⁴ IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General



- 10.3 **Approved²⁵ by Los Angeles:** The Los Angeles Municipal Code (LAMC) states in pertinent part that the provisions of LAMC are not intended to prevent the use of any material, device, or method of construction not specifically prescribed by LAMC. The Department shall use Part III, Recognized Standards in addition to Part II, Uniform Building Code Standards of Division 35, Article 1, Chapter IX of the LAMC in evaluation of products for approval where such standard exists for the product or the material and may use other approved standards, which apply. Whenever tests or certificates of any material or fabricated assembly are required by Chapter IX of the LAMC, such tests or certification shall be made by a testing agency approved by the Superintendent of Building to conduct such tests or provide such certifications. The testing agency shall publish the scope and limitation(s) of the listed material or fabricated assembly.²⁶ The Superintendent of Building roster of approved testing agencies is provided by the Los Angeles Department of Building and Safety (LADBS). The Center for Building Innovation (CBI) Certificate of Approval License is TA24945. Tests and certifications found in a CBI Listing are LAMC approved. In addition, the Superintendent of Building shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the California Building Code (CBC) Section 1707.1.²⁷
- 10.4 **Approved by Chicago:** The Municipal Code of Chicago (MCC) states in pertinent part that an Approved Agency is a Nationally Recognized Testing Laboratory (NRTL) acting within its recognized scope and/or a certification body accredited by the American National Standards Institute (ANSI) acting within its accredited scope. Construction materials and test procedures shall conform to the applicable standards listed in the MCC. Sufficient technical data shall be submitted to the building official to substantiate the proposed use of any product, material, service, design, assembly and/or method of construction not specifically provided for in the MCC. This technical data shall consist of research reports from approved sources (i.e., MCC defined Approved Agencies).
- 10.5 **Approved by New York City:** The NYC Building Code 2022 (NYCBC) states in pertinent part that an approved agency shall be deemed²⁸ an approved testing agency via ISO/IEC 17025 accreditation, an approved inspection agency via ISO/IEC 17020 accreditation, and an approved product evaluation agency via ISO/IEC 17065 accreditation. Accrediting agencies, other than federal agencies, must be members of an internationally recognized cooperation of laboratory and inspection accreditation bodies subject to a mutual recognition agreement²⁹ (i.e., ANAB, International Accreditation Forum (IAF), etc.).
- 10.6 **Approved by Florida:** Statewide approval of products, methods, or systems of construction shall be approved, without further evaluation, by 1) A certification mark or listing of an approved certification agency, 2) A test report from an approved testing laboratory, 3) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity; 4) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a professional engineer or architect, licensed in Florida. For local product approval, products or systems of construction shall demonstrate compliance with the structural wind load requirements of the Florida Building Code (FBC) through one of the following methods; 1) A certification mark, listing, or label from a commission-approved certification agency indicating that the product complies with the code; 2) A test report from a commission-approved testing laboratory indicating that the product tested complies with the code; 3) A product-evaluation report based upon testing, comparative or rational analysis, or a combination thereof, from a commission-approved product evaluation entity which indicates that the product evaluated complies with the code; 4) A product-evaluation report or certification based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a Florida professional engineer or Florida registered architect, which indicates that the product complies with the code; 5) A statewide product approval issued by the Florida Building Commission. The Florida Department of Business and Professional Regulation (DBPR) website provides a listing of companies certified as a Product Evaluation Agency (i.e., EVLMiami 13692), a Product Certification Agency (i.e., CER10642), and as a Florida Registered Engineer (i.e., ANE13741).

²⁵ See Section 5 for the distilled building code definition of Approved.

²⁶ Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES

²⁷ https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1

²⁸ New York City, The Rules of the City of New York, § 101-07 Approved Agencies

²⁹ New York City, The Rules of the City of New York, § 101-07 Approved Agencies



- 10.7 **Approved by Miami-Dade County (i.e., Notice of Acceptance [NOA]):** A Florida statewide approval is an NOA. An NOA is a Florida local product approval. By Florida law, Miami Dade shall accept the statewide and local Florida Product Approval as provided for in Florida legislation § 553.842 and § 553.8425.
- 10.8 **Approved by New Jersey:** Pursuant to Building Code 2018 of New Jersey in IBC Section 1707.1 General,³⁰ it states: “In the absence of approved rules or other approved standards, the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the administrative provisions of the Uniform Construction Code (N.J.A.C. 5:23)”.³¹ Furthermore N.J.A.C 5:23-3.7 states: Municipal approvals of alternative materials, equipment, or methods of construction. **(a) Approvals:** Alternative materials, equipment, or methods of construction shall be approved by the appropriate subcode official provided the proposed design is satisfactory and that the materials, equipment, or methods of construction are suitable for the intended use and are at least the equivalent in quality, strength, effectiveness, fire resistance, durability and safety of those conforming with the requirements of the regulations.
1. A field evaluation label and report or letter issued by a nationally recognized testing laboratory verifying that the specific material, equipment, or method of construction meets the identified standards or has been tested and found to be suitable for the intended use, shall be accepted by the appropriate subcode official as meeting the requirements of (a) above.
2. Reports of engineering findings issued by nationally recognized evaluation service programs, such as, but not limited to, the Building Officials and Code Administrators (BOCA), the International Conference of Building Officials (ICBO), the Southern Building Code Congress International (SBCCI), the International Code Council (ICC), and the National Evaluation Service, Inc., shall be accepted by the appropriate subcode official as meeting the requirements of (a) above. The New Jersey Department of Community Affairs has confirmed that technical evaluation reports, from any accredited entity listed by ANAB, meets the requirements of item 2 given that the listed entities are no longer in existence and/or do not provide “reports of engineering findings”.
- 10.9 **Approved by the Code of Federal Regulations Manufactured Home Construction and Safety Standards:** Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14³² and Part 3280,³³ “*the Department encourages innovation and the use of new technology in manufactured homes*” and the design and construction of a manufactured home shall conform with the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow: 1) “*All construction methods shall be in conformance with accepted engineering practices*”, 2) “*The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur.*”, and 3) “*The design stresses of all materials shall conform to accepted engineering practice.*”
- 10.10 **Approved by US, Local, and State Jurisdictions in General:** In all other local and state jurisdictions, the adopted building code legislation states in pertinent part that:
- 10.10.1 For new materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests.³⁴
- 10.10.2 For innovative alternative products, materials, designs, services and/or methods of construction, in the absence of approved rules or other approved standards...the building official shall accept duly authenticated reports (i.e., listing and/or research report) from approved agencies with respect to the quality and manner of use of new materials or assemblies.³⁵ A building official approved agency is deemed to be approved via certification from an accreditation body that is listed by the International Accreditation Forum³⁶ or equivalent.

³⁰ https://up.codes/viewer/new_jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1

³¹ <https://www.nj.gov/dca/divisions/codes/codreg/ucc.html>

³² <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14>

³³ <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>

³⁴ IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials. Adopted law pursuant to IBC model code language 1706.2.

³⁵ IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General. Adopted law pursuant to IBC model code language 1707.1.

³⁶ Please see the ANAB directory for building official approved agencies.



- 10.10.3 The design strengths and permissible stresses of any structural material...shall conform to the specifications and methods of design of accepted engineering practice performed by an approved source.³⁷ An approved source is defined as a PE subject to professional engineering laws, where a research and/or a technical evaluation report certified by a PE, shall be approved.
- 10.11 **Approved by International Jurisdictions:** The USMCA and GATT agreements provide for approval of innovative materials, products, designs, services, assemblies and/or methods of construction through the Technical Barriers to Trade agreements and the International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA), where these agreements state in relevant part:
- 10.11.1 Permit participation of conformity assessment bodies located in the territories of other Members (defined as GATT Countries) under conditions no less favourable than those accorded to bodies located within their territory or the territory of any other country.
- 10.11.2 Conformity assessment procedures (i.e., ISO/IEC 17020, 17025, 17065, etc.) are prepared, adopted, and applied so as to grant access for suppliers of like products originating in the territories of other Members under conditions no less favourable than those accorded to suppliers of like products of national origin or originating in any other country, in a comparable situation.
- 10.11.3 Conformity assessment procedures are not prepared, adopted, or applied with a view to or with the effect of creating unnecessary obstacles to international trade. This means that conformity assessment procedures shall not be more strict or be applied more strictly than is necessary to give the importing Member adequate confidence that products conform to the applicable technical regulations or standards.
- 10.11.4 **Approved:** The purpose of the IAF MLA is to ensure mutual recognition of accredited certification and validation/verification statements between signatories to the MLA, and subsequently acceptance of accredited certification and validation/verification statements in many markets based on one accreditation for the timely approval of innovative materials, products, designs, services, assemblies and/or methods of construction. Accreditations granted by IAF MLA signatories are recognised worldwide based on their equivalent accreditation programs, therefore reducing costs and adding value to businesses and consumers.

³⁷ IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards Adopted law pursuant to IBC model code language 1706.1.