Listing and Technical Evaluation Report™

A Duly Authenticated Report from an Approved Agency

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CAMO® Series Structural Wood Screw Properties

Trade Secret Report Holder:

National Nail® Corporation dba CAMO®

Phone: 800-968-6245 Website: www.nationalnail.com or www.camofasteners.com

CSI Designations:

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]

1.1 CAMO Series Structural Wood Screws:

1.1.1 Framing Screws

1.1.2 Truss Screws

1.1.3 1/4" Structural Flat and Hex Head Screws

1.1.4 5/16" Structural Flat and Hex Head Screws

2 Product Description and Materials

2.1 CAMO Series Structural Wood Screws are threaded fasteners manufactured using a standard cold-forming process, then are subsequently heat-treated and coated.

2.1.1 CAMO Series Structural Wood Screws are available with a variety of coatings including proprietary coating systems designated as PROTECH Ultra 4, PROTECH, and Easy Inspection Hi-Vis Pink coatings.

2.2 CAMO Series #14 x 6" Structural Wood Screws are available with a tan-colored, PROTECH Ultra 4 and Easy Inspection Hi-Vis Pink coatings, and CAMO Series #14 x 4 1/2" Structural Wood Screws are available with a black-colored, PROTECH coating.

2.3 The innovative products evaluated in this report are shown in **Figure 1** through **Figure 10**, illustrating some of the available coating varieties, styles, and drive systems.

Figure 1 . CAMO #12 Framing Screw - PROTECH Ultra 4

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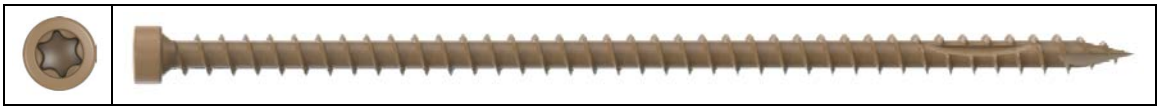

Figure 2. CAMO Series #14 x 6" Truss Screw - PROTECH Ultra 4 with Tan Coloration

Figure 3. CAMO Series #14 x 4$^{1}/_{2}$" Truss Screw, PROTECH Black Coloration

Figure 4. CAMO Series #14 x 6" Truss Screw, Easy Inspection Hi-Vis Pink Coloration

Figure 5. CAMO $^{1}/_{4}$" Flat Head Screw - PROTECH Ultra 4

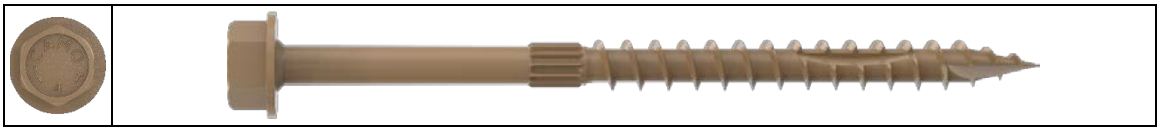

Figure 6. CAMO $^{1}/_{4}$" Hex Head Screw - PROTECH Ultra 4

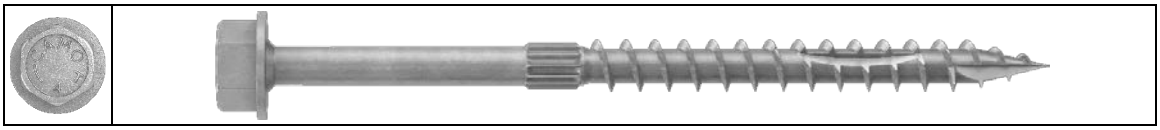

Figure 7. CAMO $^{1}/_{4}$" Hex Head Screw - Hot-Dip Galvanized

Figure 8. CAMO $^{5}/_{16}$" Flat Head Screw - PROTECH Ultra 4

Figure 9. CAMO $^{5}/_{16}$" Hex Head Screw - PROTECH Ultra 4

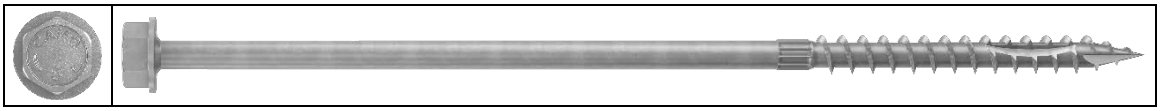

Figure 10. CAMO $^{5}/_{16}$" Hex Head Screw - Hot-Dip Galvanized

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2.4 *Fastener Material*

2.4.1 CAMO Series Structural Wood Screws are made of hardened carbon steel grade 10B18, 1022, or 10B21 wire conforming to ASTM A510 and/or Grade 17MnB3 or 19MnB4 wire conforming to DIN 1654.

2.4.2 Fasteners are then heat-treated and coated with PROTECH Ultra 4, PROTECH, Easy Inspection Hi-Vis Pink, or hot-dip galvanized with a coating weight in compliance with ASTM A153, Class D.

2.4.3 Specifications for the fasteners evaluated in this report are set forth in **Table 1** and **Table 2**.

Table 1. Fastener Specifications - PROTECH Ultra 4, PROTECH, and Easy Inspection Hi-Vis Pink Coated[1,7]

Fastener Designation	Head[6]				Length (in)		Diameter (in)			Bending Yield,[4] F_{yb} (psi)	Allowable Steel Strength (lbf)	
	Style	Drive System	Diameter (in)	Height (in)	Fastener[2]	Thread[3]	Shank	Minor	Major		Tensile	Shear[5]
#12 x 2 1/2"	Flat Head	T25 Star Drive	0.472	0.079	2.500	1.398	0.159	0.144	0.215	172,000	865	655
#12 x 3"					3.000	1.516						
#14 x 4 1/2"	Cylinder Head	T30 Star Drive	0.335	0.163	4.500	Full	0.156	0.156	0.241	189,000	1,175	820
#14 x 6"					6.000							
1/4" x 3"	Flat Head	T30 Star Drive	0.622	0.079	3.000	1.500	0.191	0.177	0.254	172,000	1,355	965
1/4" x 4"					4.000	2.370						
1/4" x 6"					6.000	2.752						
1/4" x 8"					8.000	2.752						
1/4" x 10"					10.000	2.752						
1/4" x 1 1/2"	Hex Head	3/8" Hex Head	0.335	0.103	1.441	1.250	0.191	0.177	0.254	172,000	1,310	1,005
1/4" x 3"					2.941	1.500						
1/4" x 4"					3.941	2.370						
1/4" x 6"					5.941	2.752						
5/16" x 2 7/8"	Flat Head	T40 Star Drive	0.738	0.079	2.875	1.437	0.220	0.197	0.307	175,000	1,580	1,150
5/16" x 3 1/2"					3.500	2.000						
5/16" x 4"					4.000	2.370						
5/16" x 4 1/2"					4.500	2.370						
5/16" x 5"					5.000	2.752						
5/16" x 6"					6.000	2.752						
5/16" x 6 3/4"					6.750	2.752						
5/16" x 8"					8.000	2.752						
5/16" x 10"					10.000	2.752						
5/16" x 8"	Hex Head	7/16" Hex Head	0.415	0.147	7.941	2.752	0.220	0.197	0.307	175,000	1,510	1,245
5/16" x 10"					9.941	2.752						
5/16" x 12"					11.921	2.752						

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Table 1. Fastener Specifications - PROTECH Ultra 4, PROTECH, and Easy Inspection Hi-Vis Pink Coated[1,7]

Fastener Designation	Head[6]				Length (in)		Diameter (in)			Bending Yield,[4] F_{yb} (psi)	Allowable Steel Strength (lbf)	
	Style	Drive System	Diameter (in)	Height (in)	Fastener[2]	Thread[3]	Shank	Minor	Major		Tensile	Shear[5]

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

1. Tabulated nominal fastener dimensions are measured on uncoated fasteners. Finished dimensions are different due to proprietary coatings applied.
2. Lengths of the cylinder head and flat head screws are measured from the topside of the head to the tip. Length of the hex head screws are measured from the underside of the head to the tip.
3. Thread length includes tapered tip.
4. Bending yield strength, F_{yb}, is determined in accordance with ASTM F1575 using minor thread diameter when fastener is tested in the threaded section.
5. Shear strength is determined in accordance with AISI S904 using minor thread diameter when fastener is tested in the threaded section.
6. The 1/4" Flat Head and Hex Head screw outer diameter is equivalent to a #15 screw. The 5/16" Flat Head and Hex Head screw outer diameter is equivalent to a #19 screw.
7. Fasteners with the PROTECH Ultra 4, PROTECH, and Easy Inspection Hi-Vis Pink coatings are approved for use in pressure-treated wood (alkaline copper quaternary [ACQ], copper azole type B [CA-B], and micronized copper azole [MCA]) in exterior, ground contact, and general use applications (American Wood Protection Association [AWPA] UC1 through UC4A).

Table 2. Fastener Specifications - Hot-Dip Galvanized[1]

Fastener Designation	Head				Length (in)		Diameter (in)			Bending Yield,[4] F_{yb} (psi)	Allowable Steel Strength (lbf)	
	Style	Drive System	Diameter (in)	Height (in)	Fastener[2]	Thread[3]	Shank	Minor	Major		Tensile	Shear[5]
1/4" x 1 1/2"	Hex Head	3/8" Hex Head	0.335	0.103	1.441	1.250	0.191	0.169	0.254	124,000	900	755
1/4" x 3"					2.941	1.500						
1/4" x 4"					3.941	2.370						
1/4" x 6"					5.941	2.752						
5/16" x 8"	Hex Head	7/16" Hex Head	0.415	0.147	7.941	2.752	0.220	0.197	0.307	124,000	995	855
5/16" x 10"					9.941	2.752						
5/16" x 12"					11.921	2.752						

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

1. Tabulated nominal fastener dimensions are measured on uncoated fasteners. Finished dimensions are different due to the coatings applied.
2. The length of the Hex Head Screws is measured from the underside of the head to the tip.
3. Thread length includes tapered tip.
4. Bending yield strength, F_{yb}, is determined in accordance with ASTM F1575 using minor thread diameter when fastener is tested in the threaded section.
5. Shear strength is determined in accordance with AISI S904 using minor thread diameter when fastener is tested in the threaded section.

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2.5 *Corrosion Resistance*

2.5.1 CAMO Series Structural Wood Screws may be used where screws are required to exhibit corrosion resistance when exposed to adverse environmental conditions and/or in chemically treated wood, which are subject to the limitations of this report and are alternatives to hot-dip galvanized screws with a coating weight in compliance with ASTM A153, Class D.

2.5.2 CAMO Series Structural Wood Screws have a proprietary PROTECH Ultra 4, PROTECH, and Easy Inspection Hi-Vis Pink coating, which are equivalent to the protection provided by code-approved hot-dip galvanized coatings meeting ASTM A153, Class D (IBC Section 2304.10.6 and IRC Section R304.3[2]) when recognized for use by the American Wood Protection Association (AWPA) in untreated wood and Ground Contact – General Use pressure treated wood for exterior, freshwater, general construction applications (i.e., Ground Contact – General Use AWPA UC1 through UC4A).

2.5.3 CAMO Series Structural Wood Screws, with the proprietary PROTECH Ultra 4, PROTECH, and Easy Inspection Hi-Vis Pink, also meet the requirements for use in chemically treated wood in accordance with ASTM G198.

2.6 *Pressure-Preservative Treated (PPT) Wood Applications*

2.6.1 CAMO Series Structural Wood Screws, with the proprietary coating, are recognized for use in PPT lumber, provided the conditions set forth by the PPT lumber manufacturer be met, including appropriate strength reductions.

2.7 *Fire-Retardant Treated (FRT) Wood Applications*

2.7.1 CAMO Series Structural Wood Screws, with the proprietary coating, are recognized for use in FRT lumber provided the conditions set forth by the FRT lumber manufacturer be met, including appropriate strength reductions.

2.8 *Wood Material*

2.8.1 Solid sawn wood main and side members connected using CAMO Series Structural Wood Screws shall consist of lumber species or species combinations having an assigned specific gravity as given in the respective tables of this report.

2.8.2 Structural composite lumber, SCL (e.g., LVL, LSL, PSL, etc.), connected using CAMO Series Structural Wood Screws shall be recognized in evaluation reports having published equivalent specific gravities for dowel-bearing strength and withdrawal resistance.

2.9 As needed, review material properties for design in **Section 6** and the regulatory evaluation in **Section 8**.

3 Definitions[3]

3.1 New Materials[4] are defined as building materials, equipment, appliances, systems, or methods of construction, not provided for by prescriptive and/or legislatively adopted regulations, known as alternative materials.[5] The design strength and permissible stresses shall be established by tests[6] and/or engineering analysis.[7]

3.2 Duly authenticated reports[8] and research reports[9] are test reports and related engineering evaluations that are written by an approved agency[10] and/or an approved source.[11]

3.2.1 This report utilizes intellectual property and/or trade secrets to create public domain material properties for commercial end-use.

3.2.1.1 This report protects confidential Intellectual Property and trade secrets under the regulation, 18.US.Code.90, also known as Defend Trade Secrets Act of 2016 (DTSA).[12]

3.3 An approved agency is *"approved"* when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is accredited and listed in the ANAB directory.

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3.4 An approved source is *"approved"* when a professional engineer (i.e., Registered Design Professional, hereinafter RDP) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.[13]

3.5 Testing and/or inspections conducted for this duly authenticated report were performed by an ISO/IEC 17025 accredited testing laboratory, an ISO/IEC 17020 accredited inspection body, and/or a licensed RDP.

3.5.1 The Center for Building Innovation (CBI) is ANAB[14] ISO/IEC 17025 and ISO/IEC 17020 accredited.

3.6 The regulatory authority shall enforce[15] the specific provisions of each legislatively adopted regulation. If there is a non-conformance, the specific regulatory section and language of the non-conformance shall be provided in writing[16] stating the nonconformance and the path to its cure.

3.7 The regulatory authority shall accept duly authenticated reports from an approved agency and/or an approved source with respect to the quality and manner of use of new materials or assemblies as provided for in regulations regarding the use of alternative materials, designs, or methods of construction.[17]

3.8 ANAB is an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory. Therefore, recognition of certificates and validation statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope shall be approved.[18] Thus, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent,[19] and can be used in any country that is an MLA signatory found at this link: https://iaf.nu/en/recognised-abs/

3.9 Approval equity is a fundamental commercial and legal principle.[20]

4 Applicable Local, State, and Federal Approvals; Standards; Regulations[21]

4.1 *Local, State, and Federal*

4.1.1 Approved in all local jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes, but is not limited to, the following featured local jurisdictions: Austin, Baltimore, Broward County, Chicago, Clark County, Dade County, Dallas, Detroit, Denver, DuPage County, Fort Worth, Houston, Kansas City, King County, Knoxville, Las Vegas, Los Angeles City, Los Angeles County, Miami, Nashville, New York City, Omaha, Philadelphia, Phoenix, Portland, San Antonio, San Diego, San Jose, San Francisco, Seattle, Sioux Falls, South Holland, St. Louis County, Texas Department of Insurance, and Wichita.[22]

4.1.2 Approved in all state jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes, but is not limited to, the following featured states: California, Florida, New Jersey, Oregon, New York, Texas, Washington, and Wisconsin.[23]

4.1.3 Approved by the Code of Federal Regulations Manufactured Home Construction: Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14[24] and Part 3280[25] pursuant to the use of ISO/IEC 17065 duly authenticated reports.

4.1.4 Approved means complying with the requirements of local, state, or federal legislation.

4.2 *Regulations*

4.2.1 *IBC – 18, 21, 24: International Building Code®*

4.2.2 *IRC – 18, 21, 24: International Residential Code®*

4.2.3 *FBC-B – 20, 23: Florida Building Code[26] – Building (FL41741)*

4.2.4 *FBC-R – 20, 23: Florida Building Code[26] – Residential (FL41741)*

4.2.5 *LABC – 20, 23: Los Angeles Building Code[27]*

4.2.6 *LARC – 20, 23: Los Angeles Residential Code[27]*

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4.3 *Standards*

4.3.1 *AISI S904: Standard Test Methods for Determining the Tensile and Shear Strength of Screws*

4.3.2 *ANSI/AWC NDS: National Design Specification (NDS) for Wood Construction*

4.3.3 *ASTM A153: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware*

4.3.4 *ASTM A510: Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel*

4.3.5 *ASTM B117: Standard Practice for Operating Salt Spray (Fog) Apparatus*

4.3.6 *ASTM D1761: Standard Test Methods for Mechanical Fasteners in Wood and Wood-Based Materials*

4.3.7 *ASTM F1575: Standard Test Method for Determining Bending Yield Moment of Nails*

4.3.8 *ASTM G85: Standard Practice for Modified Salt Spray (Fog) Testing*

4.3.9 *ASTM G198: Standard Test Method for Determining the Relative Corrosion Performance of Driven Fasteners in Contact with Treated Wood*

4.3.10 *DIN 1654: Cold Heading and Cold Extruding Steels, Technical Delivery Conditions*

5 Listed[28]

5.1 Equipment, materials, products, or services included in a List published by a nationally recognized testing laboratory (e.g., CBI), an approved agency (e.g., CBI and DrJ), and/or an approved source (e.g., DrJ), or other organization(s) concerned with product evaluation (e.g., DrJ), that maintains periodic inspection (e.g., CBI) 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.

6 Tabulated Properties Generated from Nationally Recognized Standards

6.1 CAMO Series Structural Wood Screws are dowel-type threaded and self-drilling screws used for wood-to-wood connections.

6.2 *Design*

6.2.1 The design of CAMO Series Structural Wood Screws is governed by the applicable code and the provisions for dowel-type fasteners in the NDS.

6.2.2 Unless otherwise noted, adjustment of the design stresses for duration of load shall be in accordance with the applicable code.

6.3 *Reference Lateral Design Values (Z)*

6.3.1 Reference lateral design values for shear load perpendicular to grain and parallel to grain for CAMO Series Structural Wood Screws are specified in **Table 3** for PROTECH Ultra 4, PROTECH, and Easy Inspection Hi-Vis Pink coated screws. See **Table 4** for Hot Dip Galvanized screws ASTM A153, Class D.

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Table 3. Reference Lateral Design Values (Z) for Connections in Lumber
PROTECH Ultra 4, PROTECH, and Easy Inspection Hi-Vis Pink Coated Screws (lbf)[1,3,4]

Fastener Designation	Minimum Side Member Thickness (in)	Minimum Main Member Penetration[5] (in)	Wood Species[2] (Specific Gravity)			
			HF/SPF (0.42)		DF-L (.50)	
			$Z_\perp$	$Z_\parallel$	$Z_\perp$	$Z_\parallel$
#12 x 2.5"	1.5	1.0	230	225	320	315
#12 x 3"	1.5	1.5				
#14 x 4 1/2"	1.5	1.5	150	150	190	190
#14 x 6"	3.0	3.0	335	270	475	420
1/4" x 3" Flat	1.5	1.5	125	205	155	235
1/4" x 4" Flat	1.5	2.5	455	410	640	510
1/4" x 6" Flat	1.5	2.5				
1/4" x 8" Flat	1.5	2.5				
1/4" x 10" Flat	1.5	2.5				
1/4" x 3" Hex	1.5	1.5	125	205	155	235
1/4" x 4" Hex	1.5	2.5	435	410	620	560
1/4" x 6" Hex	1.5	2.5				
5/16" x 2 7/8" Flat	1.5	1.4	330	380	420	435
5/16" x 3 1/2" Flat	1.5	1.5				
5/16" x 4" Flat	1.5	1.5				
5/16" x 4 1/2" Flat	1.5	1.5				
5/16" x 5" Flat	1.5	3.0	590	550	765	660
5/16" x 6" Flat	1.5	3.0				
5/16" x 6 3/4" Flat	1.5	3.0				
5/16" x 8" Flat	1.5	3.0				
5/16" x 10" Flat	1.5	3.0				
5/16" x 8" Hex	1.5	3.0	455	460	750	600
5/16" x 10" Hex	1.5	3.0				
5/16" x 12" Hex	1.5	3.0				

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

1. Reference lateral values apply to two-member single shear connection where both members are of the same specific gravity and the fastener is oriented perpendicular to grain.
2. 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 greater than or equal to 0.50, use the tabulated values for specific gravity of 0.50. Tabulated values may also be used for engineered wood products with a corresponding equivalent specific gravity for dowel bearing.
3. Tabulated lateral design values (Z) shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1 for Allowable Stress Design (ASD) only.
4. $Z_\perp$ = Lateral Design Values Perpendicular to Grain (lb), $Z_\parallel$ = Lateral Design Values Parallel to Grain (lb)
5. Fastener main member penetration is the length embedded in the main member, including the tip.

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Table 4. Reference Lateral Design Values (Z) for Connections in Lumber
Hot-Dip Galvanized ASTM A153 Class D, lbf[1,3,4]

Fastener Designation	Minimum Side Member Thickness (in)	Minimum Main Member Penetration[5] (in)	Wood Species[2] (Specific Gravity)			
			HF/SPF (0.42)		DF-L (0.50)	
			$Z_\perp$	$Z_\parallel$	$Z_\perp$	$Z_\parallel$
1/4" x 3" Hex	1.5	1.5	115	180	140	200
1/4" x 4" Hex	1.5	2.5	125			
1/4" x 6" Hex	1.5	2.5				
5/16" x 8" Hex	1.5	3.0	130	220	160	240
5/16" x 10" Hex	1.5	3.0				
5/16" x 12" Hex	1.5	3.0				

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

1. Reference lateral values apply to two-member single shear connection where both members are of the same specific gravity and the fastener is oriented perpendicular to grain.
2. 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 greater than or equal to 0.50, use the tabulated values for specific gravity of 0.50. Tabulated values may also be used for engineered wood products with a corresponding equivalent specific gravity for dowel bearing.
3. Tabulated lateral design values (Z) shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1 for ASD only.
4. $Z_\perp$ = Lateral Design Values Perpendicular to Grain (lb), $Z_\parallel$ = Lateral Design Values Parallel to Grain (lb)
5. Fastener main member penetration is the length embedded in the main member, including the tip.

6.4 *Reference Withdrawal Design Values (W) and Head Pull-Through Design Values (P)*

6.4.1 Reference withdrawal design values for CAMO Series Structural Wood Screws are provided in **Table 5**.

Table 5. Reference Withdrawal Values (W) – Side Grain Applications, lbf/in

Fastener Designation	Penetration[2] (in)	Withdrawal Design Value,[1,3] W (lbf/in)	
		Wood Species[4] (Specific Gravity)	
		HF/SPF (0.42)	DF-L (0.50)
#12 Framing	1	240	355
	> 1	275	400
#14 Truss	1	240	325
	> 1	265	510
1/4" Structural Flat and Hex Head	1	220	310
	> 1	325	495
5/16" Structural Flat and Hex Head	1	215	270
	> 1	355	540

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 lb/in = 0.175 kN/m

1. Tabulated withdrawal values (W) shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1 for ASD only.
2. Minimum fastener penetration into main member of 1" is required. Fastener penetration is the threaded length embedded in the main member, including the tip.
3. The design withdrawal value in pounds is equal to $w_1 + (L_T - 1) \cdot w_2$; where w_1 = the reference withdrawal value corresponding to 1" penetration, L_T = embedded thread length (minimum of 1" and maximum of thread length corresponding selected screw's thread length, as listed in Table 1 and Table 2), and w_2 = reference withdrawal value corresponding to > 1" penetration.
4. 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 greater than or equal to 0.50, use the tabulated values for specific gravity of 0.50. Tabulated values may also be used for engineered wood products with a corresponding equivalent specific gravity for withdrawal.

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6.4.2 Reference head pull-through design values (lbf) for CAMO Series Structural Wood Screws are specified in **Table 6**.

Table 6. Reference Pull-Through Design Values (P), lbf

Fastener Designation	Wood Side Member Thickness (in)	Pull-Through Design Value,[1] P (lbf)	
		Wood Species[2] (Specific Gravity)	
		HF/SPF (0.42)	DF-L (0.50)
#12 Framing	1.5	510	620
#14 Truss		470	710
1/4" Structural Flat Head		810	1,085
1/4" Structural Hex Head		545	720
5/16" Structural Flat Head		1,075	1,220
5/16" Structural Hex Head		670	870

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 lb/in = 0.175 kN/m

1. Tabulated head pull-through values (P) shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1 for ASD only.
2. 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 greater than or equal to 0.50, use the tabulated values for specific gravity of 0.50. Tabulated values may also be used for engineered wood products with a corresponding equivalent specific gravity for withdrawal.

6.4.3 **Table 7** provides the required fastener thread length embedment in the main where head pull-through begins to control (i.e., where the main member embedment is greater than or equal to the tabulated value, head pull-through controls the design).

Table 7. Main Member Embedment Where Head-Pull through Controls

Fastener Designation	Wood Side Member Thickness (in)	Thread Length Embedded in Main Member[1] (in)	
		Wood Species[2] (Specific Gravity)	
		HF/SPF (0.42)	DF-L (0.50)
#12 Framing	1.5	2.0	1.7
#14 Truss		1.9	1.8
1/4" Structural Flat Head		2.0	1.8
1/4" Structural Hex Head		2.8	2.6
5/16" Structural Flat Head		2.3	2.1
5/16" Structural Hex Head		3.4	2.8

SI: 1 in = 25.4 mm

1. Thread length embedded in main member includes the fastener tip.
2. 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 greater than or equal to 0.50, use the tabulated values for specific gravity of 0.50. Tabulated values may also be used for engineered wood products with a corresponding equivalent specific gravity for withdrawal.

6.5 Alternative techniques shall be permitted in accordance with accepted engineering practice and experience. These provisions for the use of alternative materials, designs, and methods of construction are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed herein. This includes, but is not limited to, the following areas of engineering: mechanics of materials, structures, building science, and fire science.

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7 Certified Performance[29]

7.1 All construction methods shall conform to accepted engineering practices to ensure durable, livable, and safe construction and shall demonstrate acceptable workmanship reflecting journeyman quality of work of the various trades.[30]

7.2 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.[31]

8 Regulatory Evaluation and Accepted Engineering Practice

8.1 CAMO Series Structural Wood Screws comply with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:

8.1.1 CAMO Series Structural Wood Screws were tested and evaluated to determine their structural resistance properties, which were used to develop reference design values for Allowable Stress Design (ASD). The following properties were evaluated:

8.1.1.1 Bending yield in accordance with ASTM F1575

8.1.1.2 Shear strength in accordance with AISI S904

8.1.1.3 Tensile strength in accordance with AISI S904

8.1.1.4 Lateral resistance in accordance with ASTM D1761 and NDS

8.1.1.5 Withdrawal resistance in accordance with ASTM D1761

8.1.1.6 Head pull-through in accordance with ASTM D1761

8.1.1.7 Corrosion resistance in accordance with ASTM B117, ASTM G85, and ASTM G198

8.2 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this report.

8.3 Any code compliance issues not specifically addressed in this section are outside the scope of this report.

8.4 For reference design values for CAMO Series Structural Wood Screws, specifically the $^{5}/_{16}$" CAMO structural screws in ledger connection applications see Report Number 2102-02.

8.5 For reference design values for CAMO Series Structural Wood Screws, specifically the CAMO Truss Screw in truss to top plate and bottom plate to rim board connection applications see Report Number 2102-03.

8.6 For reference design values for CAMO Series Structural Wood Screws, specifically the $^{5}/_{16}$" CAMO Structural Screws in multi-ply beam connection applications see Report Number 2102-04.

8.7 Any building code, regulation and/or accepted engineering evaluations (e.g., research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ, which is an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP or approved sources. DrJ is qualified[32] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise,[33] respectively.

8.8 Engineering evaluations are conducted with DrJ's ANAB accredited ICS code scope of expertise, which is also its areas of professional engineering competence.

9 Installation

9.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this report, and the applicable building code.

9.2 In the event of a conflict between the manufacturer installation instructions and this report, contact the manufacturer for counsel on the proper installation method.

9.3 Fasteners shall be installed with a $^{1}/_{2}$" (12.7 mm), low rpm/high torque electric drill (450-rpm).

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9.4 Fasteners shall be installed with manufacturer-supplied bits.

9.5 Fasteners shall be installed with the underside of the head flush to the surface of the wood member. Fasteners shall not be overdriven.

9.6 Lead holes are not required but may be used where lumber is prone to splitting.

9.7 Where used, the size of lead holes shall be in accordance with the provisions in NDS Chapter 12.

9.8 Minimum requirements for screw spacing, edge distance, and end distance shall be in accordance to **Table 8**.

Table 8. Screw Spacing, Edge Distance, and End Distance Requirements[1]

Connection Geometry	Minimum Spacing/Distance (in)			
	#12 Framing Screw	#14 Truss Screw	1/4" Flat or Hex	5/16" Flat or Hex
Edge Distance – Load in any Direction	1/2			5/8
End Distance – Load in any Direction	2 1/2	2 3/8	2 7/8	3 3/8
Spacing between Fasteners in a Row – Parallel to Grain	2 1/2	2 3/8	2 7/8	3 3/8
Spacing between Fasteners in a Row – Perpendicular to Grain	1 5/8		2	2 1/4
Spacing between Rows of Fasteners – In-line	7/8		1	1 1/8
Spacing between Rows of Fasteners – Staggered[2]	1/2			5/8

SI: 1 in = 25.4 mm

1. 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.
2. Values for *"Spacing between Rows or Fasteners-Staggered"* apply where the screws in adjacent rows are offset by one-half of the "*Spacing between Fasteners in a Row*".

10 Substantiating Data

10.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:

10.1.1 Bending yield testing in accordance with ASTM F1575

10.1.2 Shear strength testing in accordance with AISI S904

10.1.3 Tensile strength testing in accordance with AISI S904

10.1.4 Lateral connection testing in accordance with ASTM D1761

10.1.5 Withdrawal testing in accordance with ASTM D1761

10.1.6 Head pull-through testing in accordance with ASTM D1761

10.1.7 Corrosion resistance testing in accordance with ASTM B117, ASTM G85, and ASTM G198

10.2 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies, approved sources, and/or an RDP. Accuracy of external test data and resulting analysis is relied upon.

10.3 Where applicable, testing and/or engineering analysis are based upon provisions that have been codified into law through state or local adoption of regulations and standards. The developers of these regulations and standards are responsible for the reliability of published content. DrJ's engineering practice may use a regulation-adopted provision as the control. A regulation-endorsed control versus a simulation of the conditions of application to occur establishes a new material as being equivalent to the regulatory provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.

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10.4 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate, or duly authenticated reports from approved agencies and/or approved sources provided by the supplier. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this duly authenticated report, may be dependent upon published design properties by others.

10.5 *Testing and Engineering Analysis*

10.5.1 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.[34]

10.6 Where additional condition of use and/or regulatory compliance information is required, please search for CAMO Series Structural Wood Screws on the DrJ Certification website.

11 Findings

11.1 As outlined in **Section 6**, CAMO Series Structural Wood Screws have performance characteristics that were tested and/or meet applicable regulations. In addition, they are suitable for use pursuant to its specified purpose.

11.2 When used and installed in accordance with this duly authenticated report and the manufacturer installation instructions, CAMO Series Structural Wood Screws shall be approved for the following applications:

11.2.1 To provide resistance to lateral loads applied to the fastener in a wood-to-wood connection as shown in **Table 3** and **Table 4**.

11.2.2 To provide resistance to reference withdrawal loads as shown in **Table 5**.

11.2.3 To provide resistance to head pull-through loads as shown in **Table 6**.

11.3 Unless exempt by state statute, when CAMO Series Structural Wood 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.

11.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from National Nail Corporation or CAMO.

11.5 IBC Section 104.2.3[35] (IRC Section R104.2.2[36] and IFC Section 104.2.3[37] are similar) in pertinent part state:

> 104.2.3 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, provided that any such alternative is not specifically prohibited by this code and has been approved.

11.6 **Approved:**[38] Building regulations require that the building official shall accept duly authenticated reports.[39]

11.6.1 An approved agency is *"approved"* when it is ANAB ISO/IEC 17065 accredited.

11.6.2 An approved source is *"approved"* when an RDP is properly licensed to transact engineering commerce.

11.6.3 Federal law, Title 18 US Code Section 242, requires that, where the alternative product, material, service, design, assembly, and/or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved. Denial without written reason deprives a protected right to free and fair competition in the marketplace.

11.7 DrJ is a licensed engineering company, employs licensed RDPs and is an ANAB Accredited Product Certification Body – Accreditation #1131.

11.8 Through the IAF Multilateral Arrangement (MLA), this duly authenticated report can be used to obtain product approval in any jurisdiction or country because all ANAB ISO/IEC 17065 duly authenticated reports are equivalent.[40]

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12 Conditions of Use

12.1 As defined in **Section 6**, 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.

12.2 As listed herein, CAMO Series Structural Wood Screws shall be used:

12.2.1 Where wood main and side members have a moisture content equal to or less than nineteen percent (19%).

12.2.1.1 Where fasteners are installed in wet service condition, the appropriate reduction factors shall be applied per NDS Table 11.3.1.

12.3 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this report.

12.4 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 the NDS.

12.5 When required by adopted legislation and enforced by the building official, also known as the Authority Having Jurisdiction (AHJ) in which the project is to be constructed:

12.5.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice and, when prepared by an approved source, shall be approved when signed and sealed.

12.5.2 This report and the installation instructions shall be submitted at the time of permit application.

12.5.3 At a minimum, these innovative products shall be installed per **Section 9**.

12.5.4 The review of this report by the AHJ shall comply with IBC Section 104.2.3.2 and IBC Section 105.3.1.

12.5.5 These innovative products have an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.7.2, IBC Section 110.4, IBC Section 1703, IRC Section R104.7.2, and IRC Section R109.2.

12.5.6 The application of these innovative products in the context of this report 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.

12.6 The approval of this report by the AHJ shall comply with IBC Section 1707.1, where legislation states in part, *"the building official shall make, or cause to be made, the necessary tests and investigations; or 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 104.2.3"*, all of IBC Section 104, and IBC Section 105.3.

12.7 Design loads shall be determined in accordance with the regulations adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (i.e., owner or RDP).

12.8 The actual design, suitability, and use of this report for any particular building, is the responsibility of the owner or the authorized agent of the owner.

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13 Identification

13.1 CAMO Series Structural Wood Screws (Framing Screws, Truss Screws, 1/4" Structural Flat and Hex Head Screws, and 5/16" Structural Flat and Hex Head Screws), as listed in **Section 1.1**, are identified by a label on the board or packaging material bearing the manufacturer name, product name, this report number, and other information to confirm code compliance.

13.2 Additional technical information can be found at www.nationalnail.com or www.camofasteners.com .

14 Review Schedule

14.1 This report is subject to periodic review and revision. For the latest version, visit www.drjcertification.org.

14.2 For information on the status of this report, please contact DrJ Certification.

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Issue Date: July 15, 2022
Supplement Revision Date: August 19, 2025
Subject to Renewal: October 1, 2027

FBC Supplement to Report Number 2102-01

REPORT HOLDER: National Nail® Corporation

1 Evaluation Subject

1.1 CAMO Series Structural Wood Screws:

1.1.1 Framing Screws

1.1.2 Truss Screws

1.1.3 $^{1}/_{4}$" Structural Flat and Hex Head Screws

1.1.4 $^{5}/_{16}$" Structural Flat and Hex Head Screws

2 Purpose and Scope

2.1 Purpose

2.1.1 The purpose of this Report Supplement is to show CAMO Series Structural Wood Screws, recognized in Report Number 2102-01, have also been evaluated for compliance with the codes listed below as adopted by the Florida Building Commission.

2.2 *Applicable Code Editions*

2.2.1 *FBC-B – 20, 23: Florida Building Code – Building (FL41741)*

2.2.2 *FBC-R – 20, 23: Florida Building Code – Residential (FL41741)*

3 Conclusions

3.1 CAMO Series Structural Wood Screws, described in Report Number 2102-01, comply with the FBC-B and FBC-R and are subject to the conditions of use described in this supplement.

3.2 Where there are variations between the IBC and IRC and the FBC-B and FBC-R applicable to this report, they are listed here:

3.2.1 FBC-B Section 104 is reserved.

3.2.2 FBC-B Section 110.4 is reserved and replaces IBC Section 110.4.

3.2.3 FBC-B Section 104.6 is reserved and replaces IBC Section 104.4.

3.2.4 FBC-B Section 104.11 replaces IBC Section 104.2.3 and Section 104.2.3.2.

3.2.5 FBC-B Section 105.3 replaces IBC Section 105.3.

3.2.6 FBC-B Section 105.3.1 replaces IBC Section 105.3.1.

3.2.7 FBC-B Section 110.3 replaces IBC Section 110.3.

3.2.8 FBC-B Section 1707.1 replaces IBC Section 1707.1.

3.2.9 FBC-B Section 2304.10.5 replaces IBC Section 2304.10.6.

3.2.10 FBC-B Section 2306.1 replaces IBC Section 2306.1.

3.2.11 FBC-B Section 2306.3 replaces IBC Section 2306.3.

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3.2.12 FBC-R Section R104 and Section R109 are reserved.

3.2.13 FBC-R Section R317.3 replaces IRC Section R304.3.

4 Conditions of Use

4.1 CAMO Series Structural Wood Screws, described in Report Number 2102-01, must comply with all of the following conditions:

4.1.1 All applicable sections in Report Number 2102-01.

4.1.2 The design, installation, and inspections are in accordance with additional requirements of FBC-B Chapter 16 and Chapter 17, as applicable.

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Issue Date: July 15, 2022
Supplement Revision Date: August 19, 2025
Subject to Renewal: October 1, 2027

LABC and LARC Supplement to Report Number 2102-01

REPORT HOLDER: National Nail® Corporation

1 Evaluation Subject

1.1 CAMO Series Structural Wood Screws:

1.1.1 Framing Screws

1.1.2 Truss Screws

1.1.3 $^{1}/_{4}$" Structural Flat and Hex Head Screws

1.1.4 $^{5}/_{16}$" Structural Flat and Hex Head Screws

2 Purpose and Scope

2.1 Purpose

2.1.1 The purpose of this Report Supplement is to show CAMO Series Structural Wood Screws, recognized in Report Number 2102-01 have also been evaluated for compliance with the codes listed below as adopted by the Los Angeles Department of Building and Safety (LADBS).

2.2 *Applicable Code Editions*

2.2.1 *LABC—23, 25: Los Angeles Building Code*

2.2.2 *LARC—23, 25: Los Angeles Residential Code*

3 Conclusions

3.1 CAMO Series Structural Wood Screws, described in Report Number 2102-01, comply with the LABC and LARC and are subject to the conditions of use described in this supplement.

3.2 Where there are variations between the IBC and IRC and the LABC and LARC applicable to this report, they are listed here:

3.2.1 LABC Section 104.2 replaces IBC Section 104.

3.2.2 LABC Section 104.2.3 replaces IBC Section 104.4.

3.2.3 LABC Section 104.2.6 replaces IBC Section 104.2.3 and Section 104.2.3.2.

3.2.4 LABC Section 106.3.1 replaces IBC Section 105.3.

3.2.5 LABC Section 108.1 replaces IBC Section 110.4.

3.2.6 LABC Section 108.5 replaces IBC Section 110.3.

3.2.7 LABC Section 1707.1 replaces IBC Section 1707.1.

3.2.8 LABC Section 2304.10.6 replaces IBC Section 2304.10.6.

3.2.9 LABC Section 2306.3 replaces IBC Section 2306.3.

3.2.10 LARC Section 104.2.6 replaces IRC Section R104.2.2.

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3.2.11 LARC Section 108.1 replaces IRC Section R109.2.

3.2.12 LARC Section R317.3 replaces IRC Section R304.3.

4 Conditions of Use

4.1 CAMO Series Structural Wood Screws, described in Report Number 2102-01, must comply with all of the following conditions:

4.1.1 All applicable sections in Report Number 2102-01.

4.1.2 The design, installation, and inspections are in accordance with additional requirements of LABC Chapter 16 and Chapter 17, as applicable.

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Notes

1 For more information, visit drjcertification.org or call us at 608-310-6748.

2 2021 IRC Section R317.3

3 Capitalized terms and responsibilities are defined pursuant to the applicable building code, applicable reference standards, the latest edition of TPI 1, the NDS, AISI S202, US professional engineering law, Canadian building code, Canada professional engineering law, Qualtim External Appendix A: Definitions/Commentary, Qualtim External Appendix B: Project/Deliverables, Qualtim External Appendix C: Intellectual Property and Trade Secrets, definitions created within Design Drawings and/or definitions within Reference Sheets. Beyond this, terms not defined shall have ordinarily accepted meanings as the context implies. Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

4 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1702

5 Alternative Materials, Design and Methods of Construction and Equipment: The provisions of any regulation code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by a regulation. Please review https://www.justice.gov/atr/mission and https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.2.3

6 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1706.2:~:text=the%20design%20strengths%20and%20permissible%20stresses%20shall%20be%20established%20by%20tests

7 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design of accepted engineering practice. https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1706.1:~:text=Conformance%20to%20Standards-,The%20design%20strengths%20and%20permissible%20stresses,-of%20any%20structural

8 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1:~:text=the%20building%20official%20shall%20make%2C%20or%20cause%20to%20be%20made%2C%20the%20necessary%20tests%20and%20investigations%3B%20or%20the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies%20in%20respect%20to%20the%20quality%20and%20manner%20of%20use%20of%20new%20materials%20or%20assemblies%20as%20provided%20for%20in%20Section%20104.2.3.

9 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1703.4.2

10 https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#approved_agency

11 https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#approved_source

12 https://www.law.cornell.edu/uscode/text/18/1832 (b) 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. To follow DTSA and comply state public records and trade secret legislation requires approval through ANAB ISO/IEC 17065 accredited certification bodies or approved sources. For more information, please review this website: Intellectual Property and Trade Secrets.

13 https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional AND https://apassociation.org/list-of-engineering-boards-in-each-state-archive/

14 https://www.cbitest.com/accreditation/

15 https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.1:~:text=directed%20to%20enforce%20the%20provisions%20of%20this%20code

16 https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.2.3 AND https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#105.3.1

17 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1

18 https://iaf.nu/en/about-iaf-mla/#:~:text=Once%20an%20accreditation%20body%20is%20a%20signatory%20of%20the%20IAF%20MLA%2C%20it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%2C%20with%20the%20appropriate%20scope

19 True for all ANAB accredited product evaluation agencies and all International Trade Agreements.

20 https://www.justice.gov/crt/deprivation-rights-under-color-law AND https://www.justice.gov/atr/mission

21 Unless otherwise noted, the links referenced herein use un-amended versions of the 2024 International Code Council (ICC) 2024 International Code Council (ICC) model codes as foundation references. Mississippi versions of the IBC 2024 and the IRC 2024 are un-amended. This material, product, design, service and/or method of construction also complies with the 2000-2012 versions of the referenced codes and the standards referenced therein. As pertinent to this technical and code compliance evaluation, CBI and/or DrJ staff have reviewed any state or local regulatory amendments to assure this report is in compliance.

22 See Adoptions by Publisher for the latest adoption of a non-amended or amended model code by the local jurisdiction. https://up.codes/codes/general

23 See Adoptions by Publisher for the latest adoption of a non-amended or amended model code by state. https://up.codes/codes/general

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

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

26 All references to the FBC-B and FBC-R are the same as the 2024 IBC and 2024 IRC unless otherwise noted in the Florida Supplement at the end of this report.

27 All references to the LABC and LARC are the same as the 2024 IBC and 2024 IRC unless otherwise noted in the Los Angeles Supplement at the end of this report.

28 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#p-3280.2(Listed%20or%20certified); https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#listed AND https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#labeled

29 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1703.4

30 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=All%20construction%20methods%20shall%20be%20in%20conformance%20with%20accepted%20engineering%20practices%20to%20insure%20durable%2C%20livable%2C%20and%20safe%20housing%20and%20shall%20demonstrate%20acceptable%20workmanship%20reflecting%20journeyman%20quality%20of%20work%20of%20the%20various%20trades

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[31] https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=The%20strength%20and%20rigidity%20of%20the%20component%20parts%20and/or%20the%20integrated%20structure%20shall%20be%20determined%20by%20engineering%20analysis%20or%20by%20suitable%20load%20tests%20to%20simulate%20the%20actual%20loads%20and%20conditions%20of%20application%20that%20occur

[32] 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.

[33] https://anabpd.ansi.org/Accreditation/product-certification/AllDirectoryDetails?prgID=1&orgID=2125&statusID=4#:~:text=Bill%20Payment%20Date-,Accredited%20Scopes,-13%20ENVIRONMENT.%20HEALTH

[34] See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition: https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280

[35] 2021 IBC Section 104.11

[36] 2021 IRC Section R104.11

[37] 2018: https://up.codes/viewer/wyoming/ifc-2018/chapter/1/scope-and-administration#104.9 AND 2021: https://up.codes/viewer/wyoming/ibc-2021/chapter/1/scope-and-administration#104.11

[38] 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 (https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#201.4) where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.

[39] https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1

[40] Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.

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