



Designation: F1667/F1667M – 21a

# Standard Specification for Driven Fasteners: Nails, Spikes, and Staples<sup>1</sup>

This standard is issued under the fixed designation F1667/F1667M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.  
*The Commercial and Government Entity (Cage) Code for ASTM: 81346.*

## 1. Scope\*

1.1 This specification covers nails, spikes, staples, and other driven fasteners, as listed in [Table 1](#).

NOTE 1—Fastener ductility information is presented in [Table 2](#) and dimensional information in Tables 3–63.

1.2 Fasteners described in this specification are driven by hand tool, power tool, or mechanical device in single or multiple strikes and are positioned by hand, tool, or machine.

1.3 This specification is applicable in either inch-pounds (F1667) or SI units [F1667M]. Values stated in SI are a mathematical conversion to two significant digits and are shown in brackets [ ].

1.4 Fasteners in this specification are sold in bulk (loose) form and are collated for loading into the magazine of an application tool. Other than as covered in Section 9, Workmanship, cohering materials (including, but not limited to, plastic, adhesive bond, paper tape, plastic strip, plastic carrier, wire, etc.) and relative orientation of collated fasteners are not within the scope of this standard.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee F16 on Fasteners and is the direct responsibility of Subcommittee F16.05 on Driven and Other Fasteners.

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## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

[A153/A153M Specification for Zinc Coating \(Hot-Dip\) on Iron and Steel Hardware](#)

[A641/A641M Specification for Zinc-Coated \(Galvanized\) Carbon Steel Wire](#)

[B695 Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel](#)

[C514 Specification for Nails for the Application of Gypsum Board](#)<sup>3</sup>

[C1063 Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster](#)<sup>4</sup>

[C1861 Specification for Lathing and Furring Accessories, and Fasteners, for Interior and Exterior Portland Cement-Based Plaster](#)<sup>4</sup>

[F547 Terminology of Nails for Use with Wood and Wood-Base Materials](#)

[F592 Terminology of Collated and Cohered Fasteners and Their Application Tools \(Withdrawn 2017\)](#)<sup>5</sup>

[F680 Test Methods for Nails](#)

[F1575/F1575M Test Method for Determining Bending Yield Moment of Nails](#)

[F3359/F3359M Test Method for Determining Bending Yield Moment of Staples](#)

## 3. Terminology

3.1 *Definitions*—The definitions used in this specification are those of common commercial acceptance and usage and also appear in Terminologies [F547](#) and [F592](#).

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Additional material and dimensional tolerance for nails used in Gypsumboard are addressed in [C514](#).

<sup>4</sup> Nails addressed in Table 23 are referenced for use in [C1063](#) and [C1861](#).

<sup>5</sup> The last approved version of this historical standard is referenced on [www.astm.org](http://www.astm.org).

\*A Summary of Changes section appears at the end of this standard

**TABLE 1 Classification and Identification Index**

Type	Style	Style Identification	Table	
I—Nails (NL)	1. Brads	BR	3	
	2. Barrel	BL	4	
	3. Box A	BXA	5	
	Box B	BXB	6	
	4. Broom	BM	7	
	5. Casing	CN	8	
	6. Cooler	CL	9	
	7. Sinker	SK	10	
	8. Corker	CK	11	
	9. Aluminum	CMA	12	
	Common			
	Copper	CMC	13	
	Common			
	Steel	CMS	14	
	Common			
	Power-tool			
	Driven	CMP	15	
	Common			
	10. Concrete	CTS/CTM	16	
	11. Double-headed (Duplex)	DH	17	
	12. Finish	FH	18	
	13. Flooring	FL	19	
	14. Lath	LHF	20	
	Lath	LHH	21	
	15. Masonry	MR/MRH	22	
	Masonry Stub Nail	MRST	23	
	16. Pallet	PL	24	
	17. Gypsum wallboard	GW	25	
	18. Aluminum	RFA	26	
	Roofing			
	Steel	RFS	27	
	Roofing			
	Copper-Clad	RFC	28	
	Roofing			
	Umbrella	RFL	29	
	Head			
	Roofing			
	Steel	RFR	30	
	Reinforced			
	Roofing			
	Cap Nail	MRH/PRH	31	
	Hand Driven			
	Roofing			
	Cap Nail	MRP/PRP	32	
	Power-Tool Driven			
Roofing				
Washed	RFNS/RFND	33		
Aluminum				
Roofing				
Washed	RFE	34		
Steel				
Roofing				
19. Shingle	SHAD/SHAS	35		
Steel Shingle	SHSS/SHSR	36		
20. Siding	SDF/SDC/SDK	37		
21. Slating	SLA/SLC/SLS	38		
22. Rubber heel	RH	39		
23. Underlayment	UL	40		
24. Square-barbed	SB	41		
25. Masonry drive	MD	42		
26. Escutcheon	ES	43		
27. Glulam rivet	GR	44		
28. Post frame	PFRS	45		
Ring Shank				
Roof Sheathing Ring	RSRS	46		
Shank				
Standard Ring Shank	SRS	47		
29. Metal	MHS/MHR	48		
Hardware				
Nails				
II—Cut nails (CN)	1. Common	CM	49	
	2. Basket	BK	50	
	3. Clout	CL	51	

**TABLE 1 Continued**

Type	Style	Style Identification	Table
III—Spikes (SP)	1. Common	CM	52
	2. Gutter	GRF/GRO	53
	3. Round	RDC/RDF	54
IV—Staples (ST)	1. Fence	FN	55
	2. Poultry netting	PN	56
	3. Flat top crown	FC	57
	Flat top crown	FCC	58
	4. Round or V crown	RC	59
	5. Preformed	PC	60
	6. Electrical	PE	61
	7. Preformed hoop	PH	62
8. Cap	STC	63	

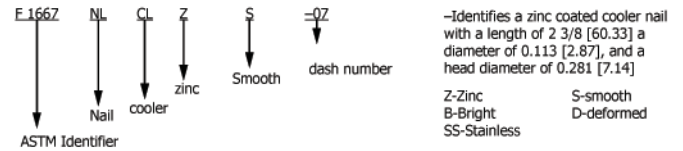
**TABLE 2 Bend Angles for Fasteners Using the Test Methods  
F680 Bend Test**

Fastener Material	Bend Angle, °
1. Steel wire: (low-carbon, medium-low carbon, medium-carbon) (unhardened)	180
2. Stainless steel wire	180
3. Hardened steel fasteners	20
4. Sheet steel for cut nails, Type II, and cut spikes, Type III	90
5. Copper (min 98 %)	180
6. Copper clad wire (min 20 %)	180
7. Aluminum alloy wire	90
8. Brass wire	180

**4. Classification**

4.1 The fasteners and their Table 1 classification are identified as follows:

NOTE 2—The identification of fasteners, classified by style and type (alpha indicators) followed by a dash number (numerical code) based on Tables 3–63, identifies dimensions specifically and establishes a PIN (part identifying number) system when preceded by the F1667 ASTM designation of this specification. For example:



4.2 The trade designation, S, pennyweight, used in commercial practice is referenced in Tables 3–48 wherever it applies.

**5. Ordering Information**

5.1 Orders for driven fasteners under this specification shall include the following information:

- 5.1.1 Quantity;
- 5.1.2 Part identifying number (PIN) or product description (see 4.1 and appropriate table);
- 5.1.3 Special material requirements, if specified, including coatings or finishes;
- 5.1.4 ASTM designation;
- 5.1.5 Packaging requirements;
- 5.1.6 A producer’s or supplier’s certification that the material and the finished fastener are in compliance with this specification, furnished only when specified in the purchase order;

5.1.7 Supplementary requirements, if any; and

5.1.8 Any additions agreed upon between the purchaser and the supplier.

## 6. Material Requirements

6.1 Steel wire used in the manufacture of driven fasteners shall be of low carbon, medium-low carbon, or medium-high carbon.

6.2 Stainless steel wire used in the manufacture of driven fasteners shall be of Types 302, 304, 305, or 316.

6.3 Carbon steel wire for the manufacture of hardened steel nails shall be suitable for heat treatment to a minimum hardness of 37 HRC.

6.4 Sheet steel used in the manufacture of cut nails (Type II) and cut spikes (Type III) shall be a medium-carbon sheet steel.

6.5 Copper used in the manufacture of driven fasteners shall contain a minimum of 98 % pure copper.

6.6 Copper-clad steel wire used in the manufacture of driven fasteners shall contain not less than 20 % copper by weight. The average thickness of copper on the steel wire shall be not less than 10 % of the radius of the clad wire; the minimum thickness of copper on the steel wire shall be not less than 8 % of the radius of the clad wire.

6.7 Aluminum alloy wire used in the manufacture of fasteners shall conform to Alloy 2024, 5056, 6061, or 6110 and have a minimum ultimate tensile strength of 60 000 psi [413.69 MPa].

NOTE 3—Smooth shank nails are sometimes chemically treated to remove grease, oil, and foreign matter and to roughen the surface microscopically. Mechanically deformed nails are sometimes cleaned to remove grease and foreign matter.

6.8 Brass wire used in the manufacture of fasteners shall be of good commercial quality suitable for the purpose.

## 7. Physical Properties

7.1 *Ductility*—The fasteners shall be sufficiently ductile to withstand cold bending without fracture, as specified in [Table 2](#) for various materials used in the manufacture of fasteners utilizing the conventional bend test described in Test Methods [F680](#). Mandrel diameter used in this test shall not exceed nail/wire diameter. The cold bend test shall not apply to unhardened nails with deformed shanks.

7.2 *Tensile Strength*—Finished driven fasteners are not normally subject to tension testing. However, the wire or sheet used to manufacture the fastener is tested as required for control in the production process during manufacture.

## 8. Dimensions and Tolerances

8.1 Nominal dimensions of nails and spikes shall be as shown in Tables 3–53. The following dimensional designations shall apply:

*S* = trade designation (reference in penny weight),  
*L* = length, in. [mm],  
*H* = head diameter or width, in. [mm],  
*D* = shank diameter, in. [mm],

*D\** = measured shank diameter, in [mm] (Tables 45–47),  
*T1* = measure crest diameter of deformed portion on nail shank in, [mm] (Tables 45–47),  
*T1-D\** = measured crest diameter minus the measured shank diameter in, [mm] (Tables 45–47),  
*TL* = length of threaded section of nail shank, [mm] (Tables 45–47),  
*P* = pitch or spacing of rings on a ring shank nail [mm] (Tables 45–47), and  
*B* = head separation, in. [mm] (Table 17).

8.1.1 The lengths, *L*, of nails and spikes with flat heads or parallel shoulders under the head shall be measured from under the head or shoulder to the tip of the point. All other nails and spikes shall be measured overall.

8.1.2 The diameter, *D*, of smooth shank nails and spikes shall be measured away from the gripper marks. The diameter, *D*, of deformed shank nails shall be measured before deformation, or when available, the smooth section of the shank away from any gripper marks. All diameter dimensions shall be taken prior to the application of or after the removal of any coatings or finish.

### 8.2 Tolerances on Nominal Dimensions for Nails and Spikes:

8.2.1 Length tolerances shall be:

8.2.1.1  $\pm 1/32$  in. [0.79 mm] for lengths up to and including 1 in. [25.40 mm];

8.2.1.2  $\pm 1/16$  in. [1.59 mm] for lengths over 1 in., [25.40 mm] up to and including 2 1/2 in. [63.50 mm];

8.2.1.3  $\pm 3/32$  in. [2.38 mm] for lengths over 2 1/2 in. [63.50 mm], up to and including 7 in. [177.80 mm];

8.2.1.4  $\pm 1/8$  in. [3.18 mm] for all lengths over 7 in. [177.80 mm].

NOTE 4—Tolerance for the length of any shank deformation shall be the same as the length of the nail shank.

8.2.2 Shank diameter tolerances shall be:

8.2.2.1  $\pm 0.002$  in. [0.05 mm] for diameters smaller than 0.076 in. [1.93 mm], and

8.2.2.2  $\pm 0.004$  in. [0.10 mm] for diameters 0.076 in. [1.93 mm] and larger.

8.2.3 *Head Diameter Tolerances:*

8.2.3.1 *Hand Driven*—Tolerances on concentric round head diameters shall be  $\pm 10$  % of the nominal head diameter (individual measurement). The difference in diameter across the long axis shall not exceed that across the short axis by more than 10 %. A fillet shall be provided under the head if not otherwise specified.

8.2.3.2 *Power-Tool Driven*—Tolerances on head dimensions of power-tool driven nails shall comply with the nail manufacturer's specifications and shall be suitable for use in the make and model of the tool specified.

8.3 Nominal dimensions of staples shall be as shown in Tables 55–61, and the following dimensional designations shall apply:

8.3.1 *Hand Tool–Driven Nominal Dimensions:*

*L* = leg length, inside, in. [mm],  
*D* = round leg diameter, in. [mm],