

Fastener Overview — Nails

Nail Sizes

A common method used to represent nail sizes is the penny size, which is a length designation. The size is written with a number and the abbreviation “d” for “denarius” which is Latin for “penny.” While referring to penny size and type designations such as “box” or “common” is a typical method for calling out nails, it is more accurate and reduces potential confusion if the nail is called out by diameter and length.

Note: Box, common and sinker nails may have the same length designation, but they have different diameters. See the American Wood Council, NDS 2018, Appendix L for diameters and lengths for structural nails of each type.

Construction Nails

Nail Type	Dimensions (inches and mm) ^{2,3}														
	Feature	6d		7d		8d ¹		10d ¹		12d		16d ¹		20d	
	Pennyweight	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
Common	Length	2.000	51.0	2.250	57.0	2.500	63.0	3.000	76.0	3.250	82.0	3.500	89.0	4.000	101.0
	Diameter	0.113	2.8	0.113	2.8	0.131	3.3	0.148	3.7	0.148	3.7	0.162	4.1	0.192	4.8
	Head	0.266	6.6	0.266	6.7	0.281	7.1	0.312	7.9	0.312	7.9	0.344	8.7	0.406	10.3
Box	Length	2.000	51.0	2.250	57.0	2.500	63.0	3.000	76.0	3.250	82.0	3.500	89.0	4.000	101.0
	Diameter	0.099	2.5	0.990	25.1	0.113	2.8	0.128	3.2	0.128	3.2	0.135	3.4	0.148	3.7
	Head	0.266	6.7	0.266	6.7	0.297	7.5	0.312	7.9	0.312	7.9	0.344	8.7	0.375	9.5
Sinker	Length	1.875	47.0	2.125	53.0	2.375	60.0	2.875	73.0	3.125	79.0	3.250	82.0	3.750	95.0
	Diameter	0.092	2.3	0.099	2.5	0.113	2.8	0.120	3.0	0.135	3.4	0.148	3.7	0.177	4.4
	Head	0.234	5.9	0.250	6.3	0.266	6.7	0.281	7.1	0.312	7.9	0.344	8.7	0.375	9.5
Metal Hardware Nails ⁴	Length	—	—	—	—	1.500	38.0	1.500	38.0	2.500	63.0	2.500	63.0	—	—
	Diameter	—	—	—	—	0.131	3.3	0.148	3.7	0.148	3.7	0.162	4.1	—	—
	Head	—	—	—	—	0.285	7.2	0.285	7.2	0.285	7.2	0.285	7.2	—	—

See footnotes below.

Construction Nails (cont.)

Nail Type	Dimensions (inches and mm) ^{2,3}									
	Feature	30d		40d		50d		60d		
	Pennyweight	in.	mm	in.	mm	in.	mm	in.	mm	
Common	Length	4.500	114.0	5.000	127.0	5.500	139.7	6.000	152.4	
	Diameter	0.207	5.2	0.225	5.7	0.244	6.1	0.263	6.6	
	Head	0.438	11.1	0.469	11.9	0.500	12.7	0.531	13.4	
Box	Length	4.500	114.0	5.000	127.0	—	—	—	—	
	Diameter	0.148	3.7	0.162	4.1	—	—	—	—	
	Head	0.375	9.5	0.406	10.3	—	—	—	—	
Sinker	Length	4.250	107.0	4.750	120.6	—	—	5.750	146.0	
	Diameter	0.192	4.8	0.207	5.2	—	—	0.244	6.1	
	Head	0.406	10.3	0.438	11.1	—	—	0.500	12.7	
Metal Hardware Nails ⁵	Length	—	—	—	—	2.500	63.0	—	—	
	Diameter	—	—	—	—	0.250	6.3	—	—	
	Head	—	—	—	—	0.500	12.7	—	—	

1. Collated Strong-Drive® SCN Smooth-Shank and SCNR Ring-Shank Connector nails have a 0.285"-diameter head for 8d, 10d and 16d sizes.

2. Dimensions for box, common and sinker nails per AWC/NDS, Table L4.

3. Diameter is shank diameter.

4. Dimensions per ASTM F1667.

5. Tolerances are specified in ASTM F1667.

6. Per Simpson Strong-Tie specifications.

Steel Wire Gauge/Diameter

Gauge	in.	mm
3	0.259	6.57
4	0.238	6.05
6	0.203	5.16
8	0.162	4.12
9	0.148	3.76
10	0.131	3.33
11	0.120	3.05
12	0.113	2.85
13	0.092	2.34
14	0.083	2.11
15	0.072	1.83
16	0.065	1.65
18	0.049	1.25
23	0.026	0.66

1. Table based on Birmingham or Stub's Iron Wire Gauge.

Fastener Overview — Nails

Nail Types

Box: Bright, coated, plain-shank nail or regular stock steel with flat round head and medium diamond point. Shank diameter is smaller than common nails of the same penny weight.

Brads: A common term used for nails less than 1¼" in length with a head slightly larger than the shank. These nails can be easily concealed by countersinking below the work surface.

Casing: A wire nail with a head that is only slightly larger head than a finish nail, often used for flooring.

Common: Bright plain-shank nail of regular stock steel with flat round head and medium diamond point. Shank diameter is larger than box nails of the same penny size.

Connector: A wire nail with a concentric, full, round head and diamond point. The shank can be either deformed with annular rings or smooth.

Finishing: A wire nail with a head that is only slightly larger than the shank and medium diamond point. These nails can be easily concealed by countersinking below the work surface.

Post-Frame Ring Shank: A wire nail with a concentric, full, round head and 2.25 to 3 inches of shank length that is deformed with annular rings. The annular rings have over-shank diameter of 0.005 to 0.010 inch and the pitch is 20 rpi.

Roofing: A nail used for attaching paper or shingles to roof battens or sheathing; usually with a large flat head.

Roof Sheathing Ring Shank: A wire nail with a concentric, full, round head and at least 1.5 inches of shank length deformed with annular rings. The annular rings have over-shank diameter of 0.005 to 0.012 inch and the pitch is 13 to 20 rpi.

Siding: A wire nail with a shank that is typically 0.099" or less in diameter and a smaller head than other nails of the same size to help conceal the fastener after installation.

Sinker: A 16d sinker is a 0.148" x 3¼" coated framing nail.

Nail Shank Types

Smooth Shank: There are no deformations on the shank, making nails with a smooth shank the easiest to drive. Smooth shank nails offer the least pull-out resistance when compared with spiral and ring shanks.

Spiral Shank: A spiral "thread" on the shank causes the nail to spin during installation, creating a thread-like interlock with the wood, which increases withdrawal capacity. Spiral-shank nails are designed to drive easier into harder woods and dense materials while still providing increased withdrawal resistance.

Annular Ring Shank: Annular threads or "rings" are formed on the shank to increase withdrawal capacity. The "rings" create an interlock between the shank of the nail and the wood, providing superior holding power. Generally considered the nail type with the best withdrawal resistance.



Nail Head Types

