Standard Specification for

Turnbuckles and Shackles

AASHTO Designation: M 269-96 (2018)

Technical Subcommittee: 4d, Safety Devices

Release: Group 2 (June)

AASHTO

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1. SCOPE

1.1. *Scope*—This specification covers forged turnbuckles, with and without jam nuts, and shackles for guardrail, sign supports, and similar uses. These items are considered to be available commercially. Not all classes, styles, and types of turnbuckles and shackles that are available commercially are covered by this specification.

1.2. *Classification*:

1.2.1. *Turnbuckles*:

1.2.1.1. *Type*—Turnbuckles covered by this specification shall be forged and of the design specified by the purchaser.

1.2.1.2. *Sizes*—Turnbuckles covered by this specification shall be of the sizes listed in Table 2, as specified.

1.2.2. *Shackles*:

1.2.2.1. Shackles shall be one of the classes in Table 1, as specified by the purchaser.

Table 1—Classes of Shackles

Class 1—Screw-pin anchor shackles
Class 2—Screw-pin chain shackles
Class 3—Oval-pin chain shackles
Class 4—Round-pin anchor shackles
Class 5—Round-pin chain shackles
Class 6—Bolt-type anchor shackles

1.3. The values stated in SI units are to be regarded as the standard.

2. REFERENCED DOCUMENTS

2.1. *AASHTO Standards*:

- M 102M/M 102, Steel Forgings, Carbon and Alloy, for General Industrial Use
- M 169, Steel Bars, Carbon and Alloy, Cold-Finished
- M 232M/M 232, Zinc Coating (Hot-Dip) on Iron and Steel Hardware

- T 65M/T 65, Mass [Weight] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings

2.2. *National Institute of Standards and Technology (NIST) Standard*:

- Handbook H28, Screw Thread Standards for Federal Services

2.3. *ANSI/ASME Standard*:

- B18.2.2, Heavy Hex Jam Nuts

2.4. *Military Standard*:

- MIL-P-21035, Paint, High Zinc Dust Content, Galvanizing Repair (Metric)

3. MATERIALS AND MANUFACTURE

3.1. *Materials*:

3.1.1. *Turnbuckles*—Unless otherwise specified, material for turnbuckles and end pulls shall comply with M 102M/M 102 and be of a grade that will meet the requirements of Table 2.

Table 2—Breaking Strength of Forged Turnbuckles (Complete with End Pulls)

Size, Nominal Outside Diameter of Thread, mm (in.)	Breaking Strength, kN (lb) Min	Recommended Working Loads, kN (lb)
	Eye or Stub End Pulls, kN (lb)	Eye or Stub End Pulls, kN (lb)
19.0 ($^3/_4$)	89.0 (20,000)	17.8 (4,000)
22.2 ($^7/_8$)	129.0 (29,000)	25.8 (5,800)
25.4 (1)	169.0 (38,000)	33.8 (7,600)
31.8 ($1^1/_4$)	266.9 (60,000)	53.4 (12,000)
34.9 ($1^3/_8$)	320.3 (72,000)	64.0 (14,400)
38.1 ($1^1/_2$)	378.1 (85,000)	75.6 (17,000)
44.4 ($1^3/_4$)	511.5 (115,000)	102.3 (23,000)
50.8 (2)	667.2 (150,000)	133.4 (30,000)
57.2 ($2^1/_4$)	876.3 (197,000)	175.2 (39,400)

3.1.2. *Shackles*—Each shackle, together with its pin or bolt, shall be forged at elevated temperature for final shape and size, in conformance with M 102M/M 102, Class AH.

3.2. *Construction*:

3.2.1. *Turnbuckles*:

3.2.1.1. *Method*—Each turnbuckle body and each end pull shall be forged at elevated temperature to final shape and size.

3.2.1.2. *Size*—Turnbuckles covered by this specification shall be furnished in the sizes shown in Table 3, clear opening between heads, as specified. The size of turnbuckle bodies shall be the nominal major diameter of the threads in the heads and the clear opening between heads (which is approximately equal to the take-up); thus, for a 19-by-152-mm ($^3/_4$-by-6-in.) turnbuckle body, the heads shall be threaded for a 19-mm ($^3/_4$-in.) nominal major-diameter end pull, and the clear opening between heads shall be 152 mm (6 in.). The difference between the actual clear opening in the turnbuckle body and the nominal value given in Table 4 for the size specified shall not exceed 5 percent of the nominal value.