

FED. SUPPLY CLASS

5340

1. SCOPE

1.1 This specification covers heavy-duty and shock absorbing, precision, rigid and swivel casters.

2. APPLICABLE DOCUMENTS

2.1 Government documents

2.1.1 Specifications and standards. Unless otherwise specified (see 6.2), the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation, form a part of this specification to the extent specified herein.

SPECIFICATIONS

Federal

QPL-ZZ-T-410 Tire, Pneumatic, Industrial
PPP-B-576 Box, Wood, Cleated, Veneer, Paper Overlaid
PPP-B-585 Box, Wood, Wirebound
~~PPP-B-591 Boxes, Shipping Fiberboard, Wood Cleated~~
~~PPP-B-601 Boxes, Wood, Cleated Plywood~~
~~PPP-B-621 Boxes, Wood, Nailed and Lock Corner~~
~~PPP-T-60 Tape, Packaging Waterproof~~

Military

MIL-STD-2073/1 Standard Practice for Military Packaging
MIL-PRF-121 Barrier Material, Greaseproofed, Waterproofed, Flexible
~~MIL-F-3541 Fitting, Lubrication~~
~~MIL-W-8005 Wheels and Hubs for Industrial Pneumatic Tires~~
MIL-L-10547 Liners, Case, and Sheet, Overwrap, Water-Vaporproof or Waterproof, Flexible
MIL-PRF-10924 Grease, Automotive and Artillery

STANDARDS

Military

A-A-59494 Wheels and Hubs for Industrial Pneumatic Tires
MIL-STD-129 Marking For Shipment and Storage
MIL-STD-130 Identification Marking of U.S. Military Property
MIL-HDBK-808 Finish, Protective and Codes for Finishing Schemes for Ground and Ground Support Equipment
MIL-STD-810 Environmental Test Methods
MIL-HDBK-831 Preparation of Test Reports
MIL-STD-889 Dissimilar Metals
MIL-STD-970 Standards and Specifications, Order of Preference for the Selection of
MIL-STD-1186 Cushioning, Anchoring, Bracing, Blocking And Waterproofing, with Appropriate Test Methods
MS27149 Caster, Rigid and Swivel, Precision Heavy-Duty

Copies can be obtained from the Department of Defense Single Stock Point (DODSSP). <http://dodssp.daps.dla.mil>

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THE INITIAL RELEASE OF THIS DOCUMENT SUPERSEDES MIL-C-4751, REVISION D, AMENDMENT 3.

THIRD ANGLE PROJECTION	CUSTODIAN NATIONAL AEROSPACE STANDARDS COMMITTEE	REVISION 1
PROCUREMENT SPECIFICATION NONE	TITLE CASTERS, RIGID AND SWIVEL, PRECISION HEAVY DUTY AND SHOCK ABSORBING ①	CLASSIFICATION SPECIFICATION NAS 4751

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2.1.1.1 Other publications. The following document(s) form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

American Society for Quality

ANSI/ASQ Z1.4 Sampling Procedures and Tables for Inspection by Attributes

Copies can be obtained from the American Society for Quality, 600 North Plankinton Ave., Milwaukee, WI 53203.
www.asq.org

ASTM International

ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
ASTM D429 Standard Test Methods for Rubber Property—Adhesion to Rigid Substrates
ASTM D2240 Standard Test Method for Rubber Property — Durometer Hardness
ASTM D3951 Standard Practice for Commercial Packaging
ASTM D6880 Boxes, Wood, Nailed and Lock-Corner
ASTM D5486/D5486M Tape, Packaging Waterproof
ASTM D6251/D6251M Boxes, Wood, Cleated-Plywood

Copies can be obtained from ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959. www.astm.org

Aerospace Industries Association

NASM24373 Caster, Rigid and Swivel, Precision, Pneumatic Tired
NASM24374 Caster, Rigid and Swivel, Precision, Spring Mounted

Copies can be obtained from the Aerospace Industries Association, 1000 Wilson Blvd., Suite 1700, Arlington, VA 22209. www.aia-aerospace.org

SAE International

AS8090 Mobility, Towed Aerospace Ground Equipment, General Requirements For
AS35411 Fitting, Lubrication

Copies can be obtained from SAE International, 400 Commonwealth Dr., Warrendale, PA 15096-0001. www.sae.org

ASME

ASME Y14.100 Engineering Drawing Practices

Copies can be obtained from ASME, Three Park Ave., New York, NY 10016-5990. www.asme.org

2.1.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Components. The casters shall consist of the following major components. In addition, each swivel-type caster shall contain steering provisions, when applicable, and a swivel lock, kingpin, and swivel bearings.

- a. Mounting plate
- b. Horn assembly
- c. Wheel
- d. Tire
- e. Wheel bearings
- f. Bearing seals

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- 3.2 Selection of specifications and standards. Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with MIL-STD-970.
- 3.3 Materials
- 3.3.1 Metals. Unless suitably protected to resist corrosion during normal service life, metals shall be of the corrosion-resistant type.
- 3.3.1.1 Dissimilar metals. Unless protected against electrolytic corrosion, dissimilar metals shall not be used in intimate contact with each other. Dissimilar metals are defined in MIL-STD-889.
- 3.3.2 Protective treatment. Materials used in the construction of the casters shall be protected against deterioration arising from environmental conditions of use, storage, and exposure. The protective media shall be stable and durable (shall not crack, chip, flake, powder, or scale) and shall not interfere with the performance characteristics required by this specification.
- 3.4 Design. The casters shall be single or dual wheeled, sprung or unsprung, rigid or swivel mounted, pneumatic or solid rubber tired in accordance with applicable part numbers specified in NASM24373, NASM24374 or MS27149. The casters shall be designed for the types of mobility specified in Table I.
- 3.5 Construction. The casters shall be so constructed that no parts will work loose in service. They shall be designed to withstand the strains, jars, vibration, and other conditions incident to shipping, storage, installation, and service.
- 3.6 Performance. Unless otherwise specified, the casters shall operate satisfactorily under the following conditions:
- Temperatures ranging from -20° to +120 °F
 - Relative humidity up to 100 percent, including conditions wherein condensation takes place in the form of both water and frost
 - Exposure to salt fog
 - Sand and dust particles as will be encountered in desert areas.

TABLE I – MOBILITY AND TERRAIN CHARACTERISTICS

Wheel Diameter (Inches) or Tire Size	Type of Mobility (AS8090)	Rated Speed (MPH)	Terrain
Solid-tired casters			
8, 10, and 12	Type I, Class 1	2 1/2	Level paved surfaces
16	Type I, Class 2	5	Level paved surfaces
Pneumatic-tired casters			
3:50 x 6	Type I, Class 1	2 1/2	Level paved surfaces
4:00 x 8	Type I, Class 2	5	Level paved surfaces
6:00 x 9	Type II	20	Level paved surfaces Graded gravel roads
7:50 x 10	Type II	20	Level paved surfaces Graded gravel roads

- 3.6.1 Strength. All casters, less only the rubber tread or tires, shall withstand for 1 minute a static load applied through the top plate to the caster unit equal to 5 times the rated load of the casters. The rated loads are specified on NASM24373, NASM24374, and MS27149.
- 3.6.1.1 All spring-mounted casters shall withstand the strength requirements specified in 3.6.1 when all of the shock-absorbing mechanisms are disengaged.

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- 3.6.1.2 Deflection limits. Spring-mounted casters shall have equal heights under rated loads within the limitations as specified on NASM24374 and, when under a static rated load, the amount of deflection shall be within the limits of a minimum of 20 percent and a maximum of 50 percent of the total amplitude of deflection. Casters, less only the rubber tread or tire, shall have a range of deflection in accordance with the applicable MS/NASM standard while withstanding static loads up to 5 times the rated load.
- 3.6.1.3 Shock loads. Casters, less only the rubber tread or tire, shall withstand shock loads imposed by dropping the caster under rated load as specified on NASM24374, a distance of 3 inches upon a concrete or steel surface. Casters shall not hit mechanical stops or the maximum point of deflection under the loads specified.
- 3.6.2 Operation. When operating under no load or rated load, the caster wheel shall rotate freely. In swivel casters, the horn assembly shall swivel freely. There shall be no indication of binding or unnecessary looseness in the caster.
- 3.6.2.1 When operating under no load or rated load, spring-mounted casters shall operate as specified in 3.6.2 when the deflection mechanisms are disengaged.
- 3.6.3 Load capacities. The casters shall support the rated loads specified on NASM24373, NASM24374, and MS27149 at the rated speed specified in Table I without showing any permanent deformation or excessive wear.
- 3.7 Mounting plate. The mounting plate shall be made of steel, caster iron, malleable iron, aluminum, or magnesium alloy.
- 3.8 Horn assembly. The horn assembly shall be made of steel plate, cast or forged steel, aluminum, or magnesium alloy. The design and quality of the horn assembly shall be adequate to insure rugged and rigid construction. The horn legs shall be either an integral part of the horn plate or welded thereto. The horn assembly of swivel casters shall be assembled to the mounting plate to permit independent rotation around the vertical axis.
- 3.9 Miscellaneous bushings. Miscellaneous bushings shall be made of a material suitable for the intended purpose. This requirement is intended to cover nonrotating bearing surfaces peculiar to shock-mount linkages only.
- 3.10 Lubrication. Wheel and swivel bearings shall be adequately lubricated upon assembly with greases as specified in AS8090. The bearings shall be furnished with readily accessible, pressure-type lubrication fittings conforming to ~~MIL-F-3541~~ AS35411. The fittings shall be so mounted that the bearings can be lubricated with a standard grease gun. Use of permanent lifetime lubrication bearings is prohibited.
- 3.11 Bearing seals. Bearing seals shall be designed to permit the cleaning of bearings by purging and regreasing through use of a standard grease fitting and gun without disassembly or danger of seal blowout. Seals shall be made of oil-resistant material of lip-type or other suitable design provided they meet the above requirements when used with any grease normally applied through use of a grease fitting. Seals shall be provided for all bearings and shall be so designed as to exclude water and foreign materials which would adversely affect the performance and life of the bearings. Seals on the wheel bearings shall conform to the dimensions specified in ~~MIL-W-8005~~ A-A-59494, as applicable to the wheel size and caster.
- 3.12 Additional components for swivel-type casters
- 3.12.1 Kingpin. The kingpin for the swivel casters shall be made of hardened steel so secured that in swiveling it will not rotate in frictional contact with component members of the swivel bearing assembly. Kingpin and swivel assemblies shall be designed to permit fine adjustment of the swivel bearings.
- 3.12.2 Swivel assembly bearings. The main thrust load swivel bearing shall be a replaceable, precision type of ball or roller design. The secondary thrust load (counterthrust) swivel bearing shall be a tapered roller unit assembly. All single or dual-wheel swivel bearing units shall be completely replaceable as a unit and shall have a commercial average life rating of 2,500 hours at 50 rpm under offset and rated load for dual wheel casters.

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