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OO-S-2797  
November 13, 1992  
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SUPERSEDING  
MIL-S-29174B  
24 February 1987

FEDERAL SPECIFICATION

SWEEPER, PERMANENT MAGNET, ROAD, TOWED

This specification is approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE

1.1 Scope. This specification covers towed, permanent magnet type, two-wheel mounted, road sweeper with not less than 2.4 meters sweeping width.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

Federal Specifications

- PPP-B-601 - Boxes, Wood, Cleated-Plywood
- PPP-B-621 - Boxes, Nailed and Lock-Corner

Federal Standards

- FED-STD-123 - Marking for Shipment (Civil Agencies)
- FED-STD-595 - Colors Used in Government Procurement

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\*Beneficial comments (recommendations, additions, deletions) and any pertinent\*  
 \*data which may be of use in improving this document should be addressed to: \*  
 \*Commanding Officer (Code 156), Naval Construction Battalion Center, \*  
 \*621 Pleasant Valley Road, Port Hueneme, CA 93043-4300, by using the \*  
 \*Standardization Document Improvement Proposal (DD Form 1426) appearing at \*  
 \*the end of this document or by letter. \*  
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FSC 3830

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#### Military Specifications

- MIL-C-104 - Crates, Wood: Lumber and Plywood Sheathed, Nailed and Bolted
- MIL-P-116 - Preservation, Methods of
- MIL-B-121 - Barrier Material, Greaseproofed, Waterproofed, Flexible
- MIL-B-22191 - Barrier Material, Transparent, Flexible, Heat Sealable

#### Military Standards

- MIL-STD-129 - Marking for Shipment and Storage
- MIL-STD-130 - Identification Marking of U.S. Military Property
- MIL-STD-209 - Slinging and Tiedown Provisions for Lifting and Tying Down Military Equipment

(Unless otherwise indicated, copies of federal and military specifications and standards are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Non-Government publications. The following document(s) form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of the documents not listed in the DODISS are the issues of the documents which are current on the date of the solicitation (see 6.2).

#### ASTM

- ASTM E380 - Practice for Use of the International System of Units (SI)

(Application for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103.)

#### SOCIETY OF AUTOMOTIVE ENGINEERS, INC. (SAE)

- SAE J534 - Lubrication Fittings
- SAE J594 - Reflex Reflectors

(Application for copies should be addressed to the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.)

#### TIRE AND RIM ASSOCIATION, INC. (TRA)

- TRA Yearbook

(Applications for copies should be addressed to the Tire and Rim Association, Inc., 175 Montrose West Avenue, Suite 150, Copley, OH 44321.)

(Non-Government standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

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2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 Description. The sweeper shall be a self-contained unit complete with magnet assembly, retainer pans, tow bar with parking stand, wheels, and tires.

3.2 First article. When specified in the contract or purchase order (see 6.2), a sample shall be subjected to first article inspection (see 4.2.1 and 6.2).

3.3 Standard commercial product. The sweeper shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this specification but which are a part of the manufacturer's standard commercial product, shall be included in the sweeper being furnished. A standard commercial product is a product which has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer's catalogs, or brochures, and represents the latest production model.

3.4 Materials. Materials used shall be free from defects which would adversely affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in commercial practice. Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this specification are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specified.

3.5 Interchangeability. All units of the same classification furnished with similar options under a specific contract shall be identical to the extent necessary to insure interchangeability of component parts, assemblies, accessories, and spare parts.

3.6 Design and construction.

3.6.1 Environmental and storage conditions. The sweeper shall be capable of satisfactory performance when stored or operated in any ambient temperature from -31 degrees Centigrade to +51 degrees Centigrade.

3.6.2 Dissimilar metals. The use of dissimilar metals in intimate contact with each other shall be avoided in order to minimize galvanic corrosion between these metals.

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3.6.3 Wheels, rims, and tires. The sweeper shall be mounted on two pneumatic-tired wheels. Wheels shall have ball or roller bearings and shall be demountable at the hub or rim. Rim and tire ratings shall conform to TRA recommendations for the type and size tires furnished. Tires shall be of the tubeless type, with highway tread. When specified (see 6.2), tires shall be filled with urethane foam.

3.6.4 Dimensions. The overall dimensions shall not exceed 2.14 meters in length, 3.3 meters in width, and 1.17 meters in height.

3.6.5 Tow bar. The tow bar shall have a lunette type towing ring with a 76 millimeters inside diameter eye and be fabricated from 42 millimeters diameter round steel bar stock. The sweeper shall be designed with its center of gravity forward of the wheel axle center line placing a weight load on the towing ring of not more than 45 kilograms or not less than 23 kilograms. Provisions shall be made for adjusting the height of the tow bar from 50 centimeters to 76 centimeters to match the height of the towing vehicle hitch.

3.6.6 Safety chain(s). The sweeper shall be coupled with a safety chain(s) to the towing vehicle. The end of the chain(s) shall be furnished with grabhooks, S-hooks, or anchor shackles and of such length so that if the hitch fails, the tow bar shall not hit the ground. Each chain shall have an ultimate strength at least equal to the gross weight of the load being towed.

3.6.7 Safety reflectors. At least four red colored circular light reflectors, conforming to SAE J594, having a reflecting surface not less than 76 millimeters in diameter, shall be mounted one on each side of the front, and one on each side of the rear portion of the sweeper. The reflectors shall be visible at night between 30 and 180 meters to the rear of the sweeper when illuminated by the low beam of an oncoming motor vehicle headlight. The reflectors shall be securely fastened to the sweeper by screws, rivets, or bolts.

3.6.8 Magnet assembly. The magnet assembly shall consist of one or more permanent magnets rigidly fastened within an enclosed metal housing with a stainless steel cover plate used as the sweeping face. The effective sweeping width shall be not less than 2.4 meters, a depth from front to back of not less than 230 millimeters. The metal housing shall be so designed to prevent the entrance of water and dust inside the assembly. When in the sweeping position, the magnet's operating height shall be set to 75 millimeters, measured from level flat ground to the horizontal face of the magnet's cover plate. Throughout the life of the sweeper, the magnet shall not show evidence of loss of magnetic strength. The ground clearance, while in the travel position, shall be not less than 125 millimeters.

3.6.9 Retainer pan(s). The onboard retainer pan(s) shall be furnished with handles to be capable of being easily removed and lifted by one person from their mountings for emptying purposes. The pan(s) shall be mounted such that the metal debris collected on the magnet cover plate shall be readily discharged into the retainer pan(s). The retainer pan(s) shall be provided with means to drain any accumulated rainwater when the sweeper is stored outside.

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3.6.10 Shock and vibration. The magnet assembly shall be of rugged construction, suitable for its intended use. It shall not release the attracted metals due to mechanical shock or vibration encountered over rough, unpaved ground containing rocks, bumps, potholes, debris, or other obstructions.

### 3.7 Performance

3.7.1 Travel speed. The sweeper shall be capable of being towed safely at any speed to 88 kilometers per hour (kph) on asphalt or concrete public highway.

The sweeper shall not shift or sway more than 76 millimeters to left or right and shall not show evidence of binding or cramping when the towing vehicle makes varying turns down to minimum of 7 meters turning radius.

3.7.2 Sweeper pickup capability. When tested in accordance with 4.4.2, the sweeper, traveling at 8 kph, shall in one pass, pick up and retain all the test materials.

3.8 Lubrication. Unless otherwise specified (see 6.2), means for lubrication shall be in accordance with the manufacturer's standard practice. The lubricating points shall be easily visible and accessible. Hydraulic lubrication fittings shall be in accordance with SAE J534. Where use of high-pressure lubricating equipment, 70 kilograms per square centimeter or higher, will damage grease seals or other parts, a suitable warning shall be affixed to the equipment in a conspicuous location. The unit shall be lubricated prior to delivery with type of lubricant specified in the operator's manual and grade of lubricant recommended for ambient temperature at the delivery point. The unit shall be conspicuously tagged to identify the lubricants and their temperature range.

3.9 Cleaning, treatment, and painting. Surfaces normally painted in good commercial practice shall be cleaned, treated, and painted as specified herein. The color of the finish coat, conforming to FED-STD-595, shall be as specified (see 6.2). Surfaces to be painted shall be cleaned and dried to ensure that they are free from contaminants such as oil, grease, welding slag and spatter, loose mill scale, water, dirt, corrosion product, or any other contaminating substances. As soon as practicable after cleaning, and before any corrosion product or other contamination can result, the surfaces shall be prepared or treated to insure the adhesion of the coating system. The painting shall consist of at least one coat of primer and one finish coat of acrylic-based enamel. The primer shall be applied to a clean, dry surface as soon as practicable after cleaning and treating. Painting shall be with manufacturer's current materials according to manufacturer's current processes and the total dry film thickness shall be not less than 0.0635 millimeter over the entire surface. The paint shall be free from runs, sags, orange peel, or other defects. The end item, allied equipment, and attachments shall be same color.

3.10 Instruction plates. The sweeper shall be equipped with instruction plates or decals suitably located, describing any special or important procedures to be followed in operating and servicing the equipment. Plates or decals shall be of a material which will last and remain legible for the life of the equipment.

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3.11 Identification plate. An identification plate, conforming to MIL-STD-130, shall be furnished by the contracting officer or by the contractor as specified (see 6.2) for each sweeper. The contractor shall stamp all necessary data in the blank spaces of the plate provided for that purpose, and securely affix a plate to each sweeper in a conspicuous place with nonferrous screws, rivets, or bolts not less than 3 millimeters in diameter. The applicable nomenclature contained in the contract item description shall be placed in the top blank.

3.12 Lifting and tiedown attachments. When specified (see 6.2), the sweeper shall be equipped with lifting and tiedown attachments. Lifting and tiedown attachments shall conform to type II or type III of MIL-STD-209. A nonferrous transportation plate shall be provided and mechanically attached to the sweeper. Transportation plates shall be inscribed with a diagram showing the lifting attachments and lifting slings, the capacity of each attachment, and the required length and size of each sling cable. A silhouette of the item furnished showing the center of gravity shall be provided on the transportation plate. Tiedown attachments may be identified by stenciling or other suitable marking. Tiedown marking shall clearly indicate that the attachments are intended for the tiedown of the sweeper to the carrier when shipped.

### 3.13 Workmanship.

3.13.1 Steel fabrication. The steel used in fabrication shall be free from kinks, sharp bends, and other conditions which would be deleterious to the finished product. Manufacturing processes shall not reduce the strength of the steel to a value less than intended by the design. Manufacturing processes shall be done neatly and accurately. All bends shall be made by controlled means to insure uniformity of size and shape.

3.13.2 Bolted connections. Boltholes shall be accurately punched or drilled and shall have the burrs removed. Washers or lockwashers shall be provided in accordance with good commercial practice, and all bolts, nuts, and screws shall be tight.

3.13.3 Riveted connections. Rivet holes shall be accurately punched or drilled and shall have the burrs removed. Rivets shall be driven with pressure tools and shall completely fill the holes. Rivet heads, when not countersunk or flattened, shall be of approved shape and of uniform size for the same diameter of rivet. Rivet heads shall be full, neatly made, concentric with the rivet holes, and in full contact with the surface of the member.

3.13.4 Welding. Welding procedures shall be in accordance with a nationally recognized welding code. The surface of parts to be welded shall be free from rust, scale, paint, grease, or other foreign matter. Welds shall be of sufficient size and shape to develop the full strength of the parts connected by the welds. Welds shall transmit stress without permanent deformation or failure when the parts connected by the weld are subjected to proof and service loadings.

3.14 Measurement systems. Unless otherwise specified (see 6.2), the manufacturer's standard commercial practice of measurement system shall be used in the design and construction of the equipment. In this specification, all measurements, dimensions, sizes, and capacities are given in the International

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System of Units (metric). These measurements may be converted to U.S. Customary Systems of Units (inch-pound) through the use of the conversion factors and methods specified in ASTM E380.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 Component and material inspection. Components and materials shall be inspected in accordance with all the requirements specified herein and in applicable referenced documents.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.2.1).
- b. Quality conformance inspection (see 4.2.2).

4.2.1 First article inspection. The first article inspection shall be performed on a sweeper when a first article is required (see 3.2 and 6.4). This inspection shall include the examination of 4.3 and the tests of 4.4. The first article may be either a first production item or a standard production item from the supplier's current inventory provided the item meets the requirements of the specification and is representative of the design, construction, and manufacturing technique applicable to the remaining items to be furnished under the contract.

4.2.2 Quality conformance inspection. The quality conformance inspection shall include the examination of 4.3, and the preparation for delivery inspection of 4.5.

4.3 Examination. Each sweeper shall be examined for compliance with the requirements specified in section 3 of this specification. Any redesign or modification of the contractor's standard product to comply with specified requirements, or any necessary redesign or modification following failure to meet specified requirements shall receive particular attention for adequacy and

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suitability. This element of inspection shall encompass all visual examinations and dimensional measurements. Noncompliance with any specified requirements or presence of one or more defects preventing or lessening maximum efficiency shall constitute cause for rejection.

4.4 Tests. Failure to pass any of the following tests shall be cause for rejection.

4.4.1. Road test. The sweeper shall be road tested for not less than five miles on asphalt or concrete public highway and around curves of varying radii of curvature to determine conformance to 3.7.1.

4.4.2 Sweeper pickup capability test. Select a paved asphalt or concrete site and measure 2 meters wide by 6 meters long test area. Using the width centerline as the reference point, create a grid pattern of 5 rows (450 millimeters apart) along the width and 11 rows (600 millimeters apart) along the length of the course. Place 28 pieces of 12.7 millimeters diameter by 75 millimeters long carbon steel machine bolts in such a manner that no two objects are closer than 750 millimeters from each other. (Example: 3 bolts in row number 1, then 2 bolts in row number 2, then 3 bolts in row number 3, and so on.) With the magnet cover plate positioned at 75 millimeters from the ground, tow the sweeper through the middle of the course at 8 kph. The sweeper shall pick up all objects.

4.4.3 Shock and vibration test. After completing the test of 4.4.2, continue on to conduct this test to verify conformance to 3.6.10. Place a road obstruction measuring 100 millimeters high by 100 millimeters wide in such a manner that both tires shall pass over it. With the same test material in the same position as attracted or picked up in 4.4.2, tow the sweeper through the obstruction at 8 kph. The sweeper shall not release any of the test material.

4.5 Preparation for delivery inspection. The preservation, packing, and marking of the item shall be inspected to verify conformance to the requirements of section 5.

## 5. PREPARATION FOR DELIVERY

5.1 Preservation. Preservation shall be level A or commercial as specified (see 6.2).

### 5.1.1 Level A.

5.1.1.1 Methods of preservation. Cleaning processes, drying procedures, preservatives, and methods of preservation are listed in MIL-P-116 and shall conform to the requirements of MIL-P-116 and any applicable specifications.

5.1.1.2 Disassembly. Disassembly shall be the minimum necessary to protect parts subject to damage or loss, and to accomplish reduction in cube. Removed bolts, nuts, pins, screws, and washers shall be reinstalled in mating parts and secured to prevent their loss.

5.1.1.3 Matchmarking. Parts removed and mating parts on the equipment and attachments shall be matchmarked to facilitate reassembly. Parts and accessories removed, and mating parts on the equipment, shall be identified with



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weatherproof tags attached to mating parts and locations. Marking shall be applied to the tags with a waterproof material.

5.1.1.4 Cleaning and drying. Prior to the application of preservative compounds or paints, surfaces shall be cleaned by process C-1 and dried by any applicable procedure of MIL-P-116.

5.1.1.5 Unprotected surfaces. Unprotected exterior surfaces requiring the application of a contact preservative in accordance with MIL-P-116 and not specifically provided for herein shall be preserved as follows:

5.1.1.5.1 Unfinished (not machined) surfaces. Unfinished exterior metal surfaces shall be coated with type P-1 preservative.

5.1.1.5.2 Machined surfaces. Exposed machined surfaces shall be coated with type P-6 or P-11 preservative and wrapped or covered, as applicable, with barrier material conforming to MIL-B-121, type I, grade A, class 2 or MIL-B-22191, type II. The material shall be secured in place with waterproof tape.

5.1.2 Commercial. The equipment shall be preserved in accordance with the contractor's standard practice in a manner to prevent deterioration and damage.

5.2 Packing. Packing shall be level A, B, or commercial as specified (see 6.2).

5.2.1 Level A. The sweeper shall be shipped in a crate conforming to MIL-C-104. Disassembled components and tools for each sweeper shall be packed in containers conforming to PPP-B-601, overseas type or PPP-B-621, class 2. The contents shall be cushioned, blocked, and braced to prevent movement within the boxes. Boxes shall be secured to the equipment with appropriate strapping. Arrangement and location on the equipment shall be such so as not to interfere with lifting or mobility of the equipment.

5.2.2 Level B. The sweeper shall be the same as level A except containers conforming to PPP-B-601, domestic type, or PPP-B-621, class 1 shall be used.

5.2.3 Commercial. The equipment shall be prepared for shipment in a manner which will ensure arrival at destination in a satisfactory condition. Preparation for delivery shall comply with applicable carrier rules and regulations.

5.3 Marking.

5.3.1 Military agencies. Shipments to military agencies shall be marked in accordance with MIL-STD-129.

5.3.2 Civil agencies. Shipments to civil agencies shall be marked in accordance with FED-STD-123.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

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6.1 Intended use. Permanent magnet road sweepers are used for picking up ferrous metal objects from runways, roads, and maintenance areas.

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Issue of DoDISS to be cited in the solicitation, and if required, specific issue of individual documents referenced (see 2.1.1, 2.2).
- c. When a first article is required for inspection and approval (see 3.2).
- d. When tires shall be filled with urethane foam (see 3.6.3).
- e. When lubrication is other than specified (see 3.8).
- f. Color of paint finish coat (see 3.9).
- g. When identification plate shall be furnished by the contracting officer or by the contractor (see 3.11).
- h. When lifting and tiedown attachment is required (see 3.12).
- i. When the measurement system of units shall be manufacturer's standard practice, metric only or in-pound only (see 3.14).
- j. Level of preservation and level of packing required (see 5.1 and 5.2).

6.3 Data requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (CDRL), incorporated into the contract. When the provisions of DoD Federal Acquisition Regulations (FAR) Supplement, Part 27, Sub-Part 27.475-1 (DD Form 1423) are invoked and the DD Form 1423 is not used, the data should be delivered by the contractor in accordance with the contract or purchase order requirements.

6.4 First article. When a first article inspection is required, the item will be tested and should be a first production item or it may be a standard production item from the contractor's current inventory as specified in 4.2.1. The first article should consist of one unit. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examination, test, and approval of the first article.

6.5 Supersession data. This specification replaces military specification MIL-S-29174B dated 24 February 1987.

6.6 Subject term (key word) listing.

Magnetic  
Retainer pan  
Tow bar  
Wheels

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MILITARY INTERESTS:

Custodians

Navy - YD  
Air Force - 99

Review Activities

Air Force - 84  
DLA - CS

User Activity

Navy - MC

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA - FSS

PREPARING ACTIVITY:

Navy - YD

(Project 3830-0173)

Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein.