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KKK-R-2800  
November 22, 1993  
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SUPERSEDING  
MIL-R-23314F  
8 August 1986

FEDERAL SPECIFICATION

RAILWAY CAR SPOTTER, SELF-PROPELLED, GED OR DED

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 a gasoline or diesel-engine-driven vehicle, with railway car couplers or a vehicle towing clevis, designed for operation on rails or on paved surfaces.

1.2 Classification. The railway car spotter shall be of the following type and class as specified (see 6.2.1).

- Type I - Locomotive rail car
- Type II - Truck-tractor

- Class 1 - Gasoline engine driven
- Class 2 - Diesel engine driven
- Class 3 - Diesel engine driven, 30,000 pounds (lb) (13 608 kilograms (kg)), draw bar pull

2. APPLICABLE DOCUMENTS

2.1 Government documents.

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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, 1000 23rd Avenue, Port Hueneme, CA 93043-4301, 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 2210

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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

Federal Specification

W-B-131 - Battery Storage, (Vehicular, Ignition, Lighting, and Starting)

Federal Standard

FED-STD-123 - Marking For Shipment (Civil Agencies)

Military Specification

MIL-P-53044 - Painting and Marking: Freight and Maintenance Cars, Railway Motive Power and Work Equipment

Military Standard

MIL-STD-129 - Marking For Shipment and Storage

2.1.2 Other Government documents and publications. The following other Government documents and publications form a part of this specification to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

Code of Federal Regulations (CFR)  
Department of Transportation (DoT)

- 49 CFR 223 - Safety Glazing Standards--Locomotive, Passenger Cars and Caboose
- 49 CFR 229 - Railroad Locomotive Safety Standards
- 49 CFR 231 - Railroad Safety Appliance Standards
- 49 CFR 390 - Federal Motor Carrier Safety Regulations: General

(Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

2.2 Other 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 specified in the solicitation. Unless otherwise specified, the issues of the documents not listed in the DODISS shall be the issue of the non-Government documents which is current on the date of the solicitation.

Association of American Railroads (AAR)

Manual of Standards and Recommended Practices  
Outline Diagram for Single Loads Without End Overhang, on Open-top Cars

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(Application for copies should be addressed to the Association of American Railroads, 50 F Street, N.W., Washington, DC 20001)

Society of Automotive Engineers, Inc. (SAE)

SAE J405 - Chemical Compositions of SAE Wrought Stainless Steels  
SAE J517 - Hydraulic Hose  
SAE J534 - Lubrication Fittings  
SAE J185 - Access Systems for Off-Road Machines

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

(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.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 Description. The railway car spotter shall be either a locomotive railcar type or a truck-tractor type vehicle equipped with a minimum of four flanged rail wheels for operation on 56-1/2 inch (1435.1 millimeters (mm)) gauge trackage, and four pneumatic-tired wheels for operation on unimproved and paved road surfaces and rails as required. The spotter shall be ready for operation after routine servicing, and shall be complete with engine, service and parking brakes, railway car air brake operating system and connections, two railway car couplers or one coupler and one bumper (as specified in 6.2.1), rail sanding system to both sides of each wheel, road vehicle towing pintle, lights for operation on rails, lights for operation on roads and in yards, air or vacuum horn, and an all-weather cab with seats, one for the operator and one for the helper.

3.2 Standard commercial product. The spotter shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer's standard commercial product and shall have been marketed and in commercial field use for at least one year prior to the date of bid opening. Product improvements are acceptable. When specific requirements are not stated herein all items listed as standard equipment in the contractor's published specification brochures and catalogs, or normally furnished to commercial customers as standard equipment shall be furnished. The spotter shall be equipped with optional equipment as specified herein. Optional equipment is defined as equipment not standard with the spotter but which has been furnished to the commercial customer, for the purpose intended such as special features or allied equipment. The spotter shall be equipped with all components necessary to enable it to function reliably and efficiently in sustained operation. The spotter shall conform to all federal laws and regulations applicable to the

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manufacture governing safety and pollution standards which are in effect for this type of equipment at time of manufacture. Upon the request of the contracting officer, the offerer/contractor shall provide sales data to verify that the basic configuration offered under this solicitation has been sold on the commercial market and meets the definition set forth in FAR 11.001 for a "commercial-type" product. In addition, the contracting officer may require submission of published specifications in order to verify conformance of equipment to the specification requirements of this solicitation.

3.3 First article. When specified, the contractor shall furnish one railway car spotter for first article inspection and approval (see 4.2.1 and 6.2.1).

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 are 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 Performance. Unless otherwise specified (see 6.2.1), the spotter shall be capable of the following performance with the rail drive wheels in contact with the upper rail surface only and with all rail cars connected to the front coupler or all rail cars connected to the rear coupler.

- a. Crossing over semi-exposed rails, and transferring from road to rail operation, where the running surface of the trackage is above the adjacent surface 2 inches (50.8 mm) or less.
- b. Pulling or pushing railway cars on rails, with a starting tractive effort of not less than 13,000 lb (5897 kilograms (kg)) for class 1 and 2, and 30,000 lb (13 608 kg) for class 3 without drive wheel's spinning.
- c. On a dry level surface moving three or more railway cars having a minimum distributed gross weight of 500 tons (454 t) for classes 1 and 2, and for class 3, eight or more cars having a minimum distributed gross weight of 1,500 tons (1361 t) or more as recommended by the manufacturer.
- d. Maintaining at a constant speed for not less than 1/2 mile (0.8 kilometer (km)) at not less than 5 miles per hour (mph) (8.05 (kilometers per hour (km/h)) single 50-foot (15.2 meter (m)) railway car having a minimum gross weight of 125 tons (113 t) for classes 1 and 2, and 10 mph (16.1 km/h) with three or more railway cars having a minimum gross weight of 450 tons (408 t) for class 3.

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- e. Moving the car(s) in either direction over switches and crossings, and unless otherwise specified (see 6.2.1), on curved trackage having a maximum 35 degree (o) radius.
- f. Attaining a speed not less than 12 mph (19.3 km/h) without connected load, for classes 1 and 2, and 20 mph (32.2 km/h) for class 3 in either direction of travel on rails; 7 mph (11.3 km/h) for classes 1 and 2, and 10 mph (16.1 km/h) for class 3 forward on level paving.
- g. Moving by means of the towing clevis, a trailer grossing 1-1/2 tons, (1.36 t) with a starting tractive effort on average paved surfaces of not less than 3,000 lb (1361 kg) for classes 1 and 2.

There shall be no sign of instability, and no loss of control with any combination of loading and motion, and no sign of damage or permanent distortion after operation at maximum capacity. Application of a 4,000 lb (1814 kg) line pull on the towing pintle through an angle of 45o from either side of the spotter's line of travel, shall not cause damage or upset. To insure control in all positions during raiing or derailing, brake and power application shall be effective under all conditions when the running surfaces of the road wheels on the locomotive type spotter are lower than those of the rail wheel. Maximum application of the lowering control of the rail-guide wheels of the truck-tractor type spotter shall not cause slippage of the driving wheels at maximum torque or derailing at switches and crossings.

3.7 Design and construction. The design of the spotter shall be in accordance with the current engineering practice for this type of equipment. All moving or high temperature parts that are of such a nature or so located as to become a hazard to operating or maintenance personnel, shall be fully enclosed or properly guarded. Exhaust shall be directed away from the cab. The spotter shall be equipped with a minimum of two switching steps, one per side, which are in compliance with 49 CFR-231.30. The switching steps shall be illuminated. A deadman control feature shall be provided. Upon release, the deadman control shall cause the spotter to release power and apply the spotter and train brakes. A 10-second delay shall be incorporated whereby reapplication of the control within this time period shall nullify the signal. The spotter shall be rigidly constructed to provide support for all operating subassemblies and maintain them in proper alignment. Handholds, platforms, and railings shall be provided where needed for operating personnel riding on the outside of the machine. Horizontal end handholds shall be included. All platforms shall be completely guarded by railings with upper and lower horizontal safety bars and in conformance with 49 CFR part 229 and 231, and SAE J185 regulations. All parts shall be shaped and assembled to function as an automotive-locomotive unit. Provision shall be made to determine from the operator's seat when the locomotive type rail-drive wheels, or the truck-tractor type rail-guide wheels are accurately located for lowering onto the rails. All controls and instruments shall be grouped, for convenient operation and observation about the operator's seat, to provide for one-man control of: Operation on road and rails; positioning, opening, and closing the coupling device; raising and lowering the road wheels on locomotive type spotter and the rail-guide wheels on truck-tractor type spotter; engine speed; road operation brakes, rail operation brakes; and horn. All controls and gauges shall be labeled in English text. A 12 volt (V) direct current radio outlet shall be provided. A speed indicator for both road and rail operation shall be provided.

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Maximum use shall be made of ball or roller bearings. When bronze bushings are used, means shall be provided to prevent misalignment of the lubricant channels. Loads shall not be applied at the caps of joints of split-half bearings.

3.7.1 Locomotive rail car type. The locomotive type spotter shall consist of a powered four-wheel drive railway truck with pneumatic tired road wheels mounted on hydraulic ram powered retraction arms to provide for alternative trackage and road operation. For road operation, the spotter shall have two hydraulic powered steerable wheels and a two-wheel drive on a truck type "no spin" differential axle, or hydrostatic drive. The road wheel supporting arms, through the hydraulic rams, shall have sufficient resiliency to provide the necessary spring and shock absorbing effect for control and safety when crossing trackage and when placing the rail drive wheels on the track for transfer from road to rail operation. For rail operation, the rail wheels shall be 4-wheel drive and 4-wheel braking and not less than 18 inches (457 mm) in diameter, conforming to the AAR standards applicable for profile and the gross operating loads. The under clearance when on rail wheels shall be not less than 4-1/2 inches (114 mm). Bearings and supports shall conform to general railroad practice. The coupling device may incorporate a hydraulic jacking device capable of exerting a minimum lifting force of 40,000 lb (18 144 kg) through the connected railway car coupler, without tendency to tip on application of maximum drive wheel torque in either direction of rail travel. Maximum elevation shall be set to provide full and continuous weight transfer to the rail truck frame of the spotter, without causing derailment during switching operations. A stop shall be provided to limit the rise of the jack to an elevation which will not lift the car free of the bolster collar. All parts of the wheel suspension shall be designed for the total spotter gross operating weight, combined with a maximum of transferred load through the coupling jack, but in no case less than a total gross static load of 52,000 lb (23 587 kg) distributed on the rail wheels. Factors of safety applicable to switch engines shall be used. The rear retraction arms shall be provided with a mechanism to disconnect the drive shaft automatically when the road wheels are fully retracted. The road wheels shall not rotate in the retracted position except in cases where the road wheels form part of the rail drive system. In this case steerable wheels utilized for rail drive shall be provided with a positive mechanical lock-out device to prevent accidental steering during rail operation.

3.7.2 Truck-tractor type. The truck-tractor type spotter shall be a four-wheel driven vehicle, with either truck type powered steering, or tractor type powered differential steering, designed for crossing and mounting exposed railway trackage. Hydraulically raised and lowered flanged rail-guide wheels shall be provided to maintain the spotter in position during operation on rails. The rail-guide wheels shall be designed to prevent derailing at switches and crossings, and shall not exert a lifting effort which might tend to significantly reduce traction of the four driving wheels on the rail surface. A mechanical locking device shall be provided to prevent accidental steering during rail operation.

3.7.3 Clearances. The height and width on rails shall not exceed the limits of the AAR outline diagram. The maximum width for road travel shall not exceed 96 inches (2438 mm) unless otherwise specified (see 6.2.1). Projections under the chassis shall have ample clearance to prevent interference when mounting or crossing rails 2 inches (51 mm) or less (see 3.6).

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3.7.4 Safety standards. The railway car spotter shall conform to the applicable requirements specified in the Railroad Safety Standards of 2.1.2.

3.8 Railway car coupler(s) and bumper. The coupler(s) shall be either a standard fully operating AAR coupler, or a coupling device designed to mate with railway car couplers conforming to the requirements of the AAR. The coupler(s) shall be power positioned and self-centering on contact. When one coupler and one bumper are provided, the bumper plate shall be located on the side or end opposite the coupling device, and shall be placed and sized for safe bearing against the couplers of railroad cars, in any position of swing on trackage of normal curvatures. Air brake connection hose assembly(s) shall be installed with the coupler(s). The couplers shall have a powered release remotely controlled from the cab. The car spotter when required shall have full capability to couple and uncouple rail cars from either end.

3.9 Vehicle towing pintle on classes 1 and 2. A towing pintle, suitable for attaching towing tongues with commercial clevis type and military lunette ring attachment devices, shall be centrally located for road service on the rear of the spotter. The pintle shall not be loosened or damaged by a test pull of 4,000 lb (1814 kg) applied through a swing from 45° left to 45° right from the line of spotter travel.

3.10 AAR railway air brake operating system. An AAR railway car air braking system, complete with air hose connections shall be provided, so that one or more moving cars can be brought to a stop without assistance from the spotter braking system. For class 3, the air compressor-air reservoir system shall be sized so that with 13 railcars connected to the spotter automatic air brake system and fully charged with air, full recovery time for the thirteenth car shall not exceed one minute after application and release of the emergency stop position of the control valve. Front and rear brake pipe air hose cut off valves shall be installed on the operator's side of the spotter. Each air hose shall be arranged to pass beneath the coupler from right to left facing the machine. The air compressor shall be provided with an air intake filter, and shall be powered by an air cooled gasoline engine with electric starting motor, or by a power takeoff from the spotter engine, or by means of a hydraulic motor. The air braking system shall be complete with after-cooler, receiver (air reservoir), safety valve, control piping, and drain. The air brake control valve shall have service application and emergency application positions in the same control handle. An automatic brake valve, with air pressure gauge for railcar brake control, shall be located in the cab. Heat radiation piping between the air compressor and the receiver shall run in exposed protected channels. The air piping shall be arranged to drain condensate into the reservoir, and when such arrangement is impracticable, a suitable centrifugal dirt and moisture collector shall be applied to all points where dirt and moisture collect. Air leakage shall not exceed 1 pound force per square inch (psi) per minute (6.9 kilopascals (kPa)) on spotter units.

3.11 Service and parking brakes. The spotter shall be equipped with foot actuated service brakes and parking brakes, for both rail and road use. On rails, the stopping distance from 5 mph (8.05 km/h) to a dead standstill, without railway car loading, shall not exceed 50 feet (15.2 m). The road service brakes shall conform to the DoT Federal Motor Carrier Safety

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Regulations, sections 393.40 through 393.43, and 393.45 through 393.47. The parking brake shall hold on either road or rails against a horizontal line pull not less than 4,000 lb (1814 kg).

3.12 Sanding system. The sanding system shall be complete with weatherproof steel sandboxes, piping, and electric or air-operated valves, for sanding the rails in front and back of each wheel in either direction of travel on rails. The sandboxes shall have a capacity for not less than 8 hours operation or 90 lb (41 kg), whichever is greater shall be arranged for convenient filling, and shall be furnished with a silica-gel bag or other dampness control.

3.13 Lights and signals. The spotter shall be provided with a minimum of two sealed beam automotive type headlights and backup lights, suitably located to permit night raiing and derailling operations without the aid of auxiliary lights. The road driving lights and reflectors shall conform to DoT Federal Motor Carrier Safety Regulations, sections 393.14, 393.20, 393.22, 393.23, 393.25 through 393.29, 393.32 and 393.33 as applicable. The turn signal operating unit shall be self-canceling, with visible and audible flash indicators. For rail operation, headlights shall be located near the center at each end or side of the spotter body as suitable for use when operating on railroad tracks. The instrument panel shall be adequately illuminated and one light shall be installed in the ceiling with switch inside the cab. An independently controlled spotlight, aimed at the coupling device, shall be provided.

3.14 All-weather cab. The spotter shall have an enclosed operating cab provided with safety glass and vandal-proof windows. When specified the safety glass shall meet the requirements of 49 CFR 223 (see 6.2.1). The door(s) shall have a keylock(s) and weather seals. The windshield shall be provided with automatic wipers. The cab shall be heated by means of a heater and defroster with air circulation fan(s). Heating facilities shall have adequate capacity and direction control to defrost and de-ice not less than 75 percent of the cab window areas in an ambient temperature of -10o Fahrenheit (F) (-23o Celsius), and shall maintain the temperature in the cab at not less than 50oF. Metal framed, upholstered seats with upholstered back rests shall be furnished. The upholstery shall be of a serviceable, weather-resistant material. The seats shall be located and provided with mirrors, for unobstructed view along the side of coupled freight car(s) and as required for the safe performance of all intended functions. There shall be sufficient seating capacity for the operator and at least one crew member. The cab door shall be located so that the crew member has free and open entry-exit capability without disturbing the operator.

3.15 Engine. The class 1 and 2 spotter shall be powered by an industrial four-cycle type gasoline engine, or by a two- or four-cycle type diesel engine. The class 3 shall be powered by a two- or four-cycle type diesel engine, at the option of the manufacturer. The engine shall be of a commercial design that has proven to be satisfactory in extensive use, and shall be one for which service parts are readily obtainable. The intermittent brake horsepower and speed rating shall be in excess of that required to meet the operational requirements of the spotter. The engine shall be complete with the accessories normally furnished, including not less than the following:



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- a. A 12V electrical system including either an electric or hydraulic starting system, either battery charging generator of not less than 50-ampere (A) rating or an alternator of not less than 50A rating, voltage regulator, ammeter, and dry charged battery without electrolyte or, when specified (see 6.2.1), a maintenance-free type battery conforming to W-B-131.
- b. An engine housing.
- c. A fuel tank of sufficient capacity for 8 hours of normal operation.
- d. A fuel filter.
- e. A speed governing system with provision for adjusting the speed setting, a quick release floor throttle and a fixed position hand throttle shall be provided.
- f. An engine hour meter.
- g. A fuel-level gauge.
- h. A lubricating-oil pressure gauge.
- i. A cooling-liquid temperature indicator.
- j. An air cleaner of either dry or oil bath.
- k. When specified (see 6.2.1), a 115V electrical immersion type heater shall be installed to maintain operating water temperature during outdoor terminal storage.
- l. Muffler and spark arrester.

3.15.1 Positive crankcase ventilation. The engine (gas or diesel) shall be furnished with a positive crankcase ventilation system. Intake air shall be passed through an air filter prior to entry into the crankcase and intake manifold. Metering shall be provided to regulate air flow under all conditions of engine operation. All moving parts shall be constructed from corrosion-resistant material.

3.15.2 Transmission and torque converter. The transmission shall be provided with three selective driving ranges in each direction for rail travel, and not less than three forward speeds and one reverse for road travel, or hydrostatic drive. The torque converter shall have an adequate multiplication to handle power demands. The drive chains or shafts, differentials, and axle shafts shall be matched to and compatible with engine, and shall have a torque capacity exceeding the maximum delivered engine torque developed through the intervening gear reductions and torque multiplications.

3.16 Hydraulic system. A constant pressure hydraulic system with a pump, directly driven by or from the engine, shall be provided. The system shall be complete with all necessary parts including pump, relief valve, fluid reservoir (accumulator), gauges, control valves, and piping for the operation of: Road and rail-guide wheel raising and lowering rams, railway car coupling positioner(s), coupling jack on locomotive type spotters, brake booster, steering control booster, and any other hydraulically operated equipment. The capacity of the system shall be adequate for continuous operation of all connected equipment at maximum operating efficiency. Hydraulic hoses, tubing, components, and parts shall be of material and size to permit the free flow of hydraulic fluid with a line velocity limit not to exceed 20 feet per second (6.1 m/s). Provisions shall be made for bleeding the system at all necessary points. Tubing of corrosion-resistant steel conforming to SAE J405, alloys 30303 through 30310 shall be used for hydraulic lines when flexing is not required. Where flexing is required, hydraulic hose shall conform to SAE J517, size, type, and pressure rating as required. The hose shall be protected

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against damage at all points of wear. Reusable straight thread swivel fittings in sizes up to, but not including, 1-inch (25 mm) nominal size and larger shall be utilized. Full-flow filters shall be furnished and located between the hydraulic tank suction intake and the pump. The filters shall have a reusable corrosion-resistant element that will prevent passage of all particles of a size larger than 50 microns. The system shall withstand a maximum pressure of not less than 1-1/2 times the normal operating pressure required for operation of the spotter without leaks, deformation, or breakage.

3.17 Wheels and tires. The road wheels shall be a commercial, pneumatic heavy-duty tractor type, selected for the impact loading of crossing exposed railroad tracks. Tires shall be of the tubeless type, and shall have individual rate load-carrying capacities equal to the maximum individual tire loading imposed by the operation. The tires shall be a low pressure type to provide for safe operation over rails at ungraded crossings. Normal operating air pressure shall be as recommended by the manufacturer.

3.18 Toolbox. When specified (see 6.2.1), means shall be provided to carry such tools and accessories as are required to operate the spotter. Toolbox, when furnished to hold tools and accessories, shall be made of steel, not less than 0.075-inch (1.91 mm) nominal thickness. The toolbox shall have a hinged lid and a trunk drawbolt of a type that will keep the lid closed when the toolbox is subjected to vibration, and shall be provided with padlock and steel chain. The toolbox shall be securely fastened to the spotter in a protected and accessible location.

3.19 Instruction plates. The spotter shall be equipped with instruction plates suitably located, describing any special or important procedures to be followed in operating and servicing the equipment. Plates shall be of a material which will last and remain legible for the life of the equipment. Plates shall be securely affixed to the equipment with nonferrous screws or bolts of not less than 1/8-inch (3.18 mm) diameter.

3.20 Treatment and painting. Unless otherwise specified (see 6.2.1), the portions of the railway car spotter and its components and parts normally painted shall be cleaned, treated, and painted in accordance with MIL-P-53044.

3.21 Lubrication. Unless otherwise specified (see 6.2.1), means for lubrication shall be in accordance with the manufacturer's standard practice. The lubricating points shall be easily visible and accessible. All parts requiring lubrication shall be lubricated as specified in 3.22. Hydraulic lubrication fittings shall be in accordance with SAE J534. Where use of high pressure lubricating equipment, 1,000 psi (6895 kPa) or higher, will damage grease seals or other parts, a suitable warning shall be affixed to the equipment in a conspicuous location.

3.22 Servicing and adjusting. Prior to acceptance of the spotter by the Government, the contractor shall service and adjust the spotter for immediate operational use as required in the operator's manual. The servicing and adjusting shall include at least the following:

- a. Inflation of all tires.
- b. Adjustment of brakes.
- c. Proper functioning of all lighting and electrical systems.

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- d. Wheel alignment.
- e. Adjustment of engine to include tune-up.
- f. Complete lubrication with grades of lubricants recommended for ambient temperature at the delivery point.
- g. Cooling system filled to capacity with a clean solution of equal parts by volume of water and antifreeze (ethylene glycol).

The spotter shall be conspicuously tagged to identify the lubricants and their temperature range.

3.23 Service parts, maintenance tools, and accessories. Such service parts, maintenance tools, and accessories as are specified (see 6.2.1), shall be furnished.

3.24 Maintenance manuals. When specified (see 6.2.1), the manufacturer shall furnish to the Government maintenance manuals normally furnished in commercial practice.

3.25 Workmanship.

3.25.1 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.

3.25.2 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.

3.25.3 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.

3.25.4 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.

3.25.5 Castings. All castings shall be sound and free from patching, misplaced coring, warping, or any other defect which reduces the casting's ability to perform its intended function.

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#### 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 one railway car spotter when a first article is required (see 3.3 and 6.2.1). 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, the tests of 4.5, and the packaging inspection of 4.7.

4.3 Examination. Each spotter 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 suitability. This element of inspection shall encompass all visual requirements, or presence of one or more defects preventing or lessening maximum efficiency shall constitute cause for rejection.

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4.4 First article tests. When a first article is required, the first article shall be tested as specified in 4.4.2 through 4.4.3. Failure to pass any phase of the required tests shall be cause for the Government to refuse acceptance of all spotters until corrective action has been taken.

4.4.1 Test conditions. The test site selected shall be as agreed to by the manufacturer and the Government. The test site shall include a mile (1.6 km) of straight level track, with 1/2 mile (.80 km) marked for timespeed observations, a yard spur switch, a finished grade crossing and a level approach with ungraded surface below the running surface of the rails. The track upper surface shall be above the grade level no less than 6 inches (152 mm). The manufacturer shall make available for testing purposes the following equipment:

- a. For classes 1 and 2, a string of three or more freight cars with a gross load of not less than 500 tons (454 t).
- b. For class 3, a string of eight or more freight cars with a gross load of not less than 1,500 tons (1361 t).
- c. For class 1 and 2, a single 50-foot (15.2 m) railway car with a gross load of not less than 125 tons (113 t).
- d. For class 3, a string of three 50-foot (15.2 m) railroad cars with a gross load of not less than 450 tons (408 t).

The test shall be conducted in dry mild weather. Before starting the tests, the engine shall be warmed up to operating temperature. The proper air pressure for braking, and the proper hydraulic system fluid pressure shall be indicated on the gauges prior to starting tests. Tire pressure and all lubrication points shall be checked prior to tests. All operating controls and all accessories shall be checked for proper functioning prior to tests.

4.4.2 Rail performance test for classes 1 and 2. To determine conformance to 3.6 the following test shall be performed. From a starting equipment arrangement, with the single car and the loaded string of cars on the same side of the switch, the spotter shall move the single car to the other end of the loaded string of cars by shuttling the single, and the loaded string of cars across the switch. All cars shall then be moved onto the siding and spotter switched to the straight track. The spotter, without load, shall be accelerated on the straightaway through the shift range to top high gear speed, clocked, and braked to an emergency stop, to determine maximum speed, operation of sanders, and stopping distance. To determine stability and control, not less than three crossings during shuttling of the cars, shall be made at a point where the running surface of the rails are on a plane with the adjacent surface. The loaded string of cars shall then be moved to the straight track and accelerated to reach top low gear speed at the first of the marks of the measured course. The spotter, with load, shall traverse the measured distance and be timed to determine full load continuous operating speed. Stopping shall be accomplished by means of the railway car air braking system without use of the brakes on the spotter. Starting tractive effort shall be measured by means of a dynamometer line of load cells in series between the spotter and the loaded string of cars with railway car brakes set. The parking brake shall be tested by means of a measured pull of not less than 4,000 lb (1814 kg) in either direction of travel on rails. Noncompliance with any of the aforementioned tests shall constitute cause for rejection.

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4.4.2.1 Rail performance test for class 3. To determine conformance to 3.6 the following test shall be performed. From a starting equipment arrangement, with the loaded string of eight cars coupled on the same side of the switch, the spotter shall move one end car to the other end of the loaded string of cars by shuttling the single, and the loaded string of cars, across the switch and utilizing the spur track. All cars shall then be moved onto the siding and spotter switched to the straight track. The spotter, without load, shall be accelerated on the straightaway through the shift range to top high gear speed, clocked, and braked to an emergency stop, to determine maximum speed, operation of sanders, and stopping distance. To determine stability and control, not less than three mountings from road to rails during shuttling of the cars, shall be made at a point where the running surface of the rails are between 2 and 3 inches (51 and 76 mm) above the adjacent surface. The loaded string of eight cars shall then be moved to the straight track and accelerated to reach top low gear speed at the first of the marks of the measured course, the spotter with load, shall traverse the measured distance and be timed to determine full load continuous operating speed. Stopping shall be accomplished by means of the railway car air braking system, without use of the spotter brakes. Starting tractive effort shall be measured by means of a dynamometer between the spotter and loaded string of cars. The parking brake shall be tested by means of a measured pull of not less than 4,000 lb (1814 kg) in either direction of travel on rails. Noncompliance with any of the aforementioned tests shall constitute cause for rejection.

4.4.3 Road performance test. The spotter shall be driven across exposed rails and transferred from road to rail operation for a minimum of two times to determine steering control and road clearance as specified in 3.6. The road service and parking brakes shall be tested to verify conformance to 3.11. Any road tests conducted concurrently with the rail tests of 4.4.2 need not be repeated. To determine the towing performance of the spotter, as specified in 3.6, the towing pintle on class 1 and 2 shall be connected to a trailer weighing approximately 1-1/2 tons (1.36 t) and shall be observed for secure functioning and freedom from binding while towing around a block or equivalent paved area, or shall be subjected to simulated test loading of 4,000 lb (1814 kg) at various angles. Top speeds in high gear shall be observed when operating without a trailer. The spotter shall be driven on level paved road to determine the maximum practical speed, and braked to an emergency stop to determine stopping distance. Proper steering control shall be observed. The parking brakes shall be tested to verify conformance to 3.11.

4.5 Production unit operational test. Each spotter shall be completely assembled, adjusted, lubricated, or otherwise serviced for operation. The engine shall be started and subjected to a warmup period as recommended by the manufacturer. The spotter shall be given a run-in test and all controls shall be operated a sufficient number of times to ascertain that components and mechanisms actuated by the controls operate promptly, fully, and without restriction of malfunction. Hydraulically actuated components shall be observed for evidence of lurching, bending, or leaking of fluids. Failure to pass any phase of these tests, shall be cause for rejection.

4.6 Production sample. Upon acceptance of the first production vehicle, it shall remain at the manufacturing facility as a production sample, and shall be the last vehicle shipped on the contract. The contractor shall maintain the vehicle in a serviceable condition for the duration of the contract.

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

## 5. PREPARATION FOR DELIVERY

5.1 Preservation, packing, labeling, and marking. Unless otherwise specified, the complete railway car spotter, including tools, parts, and publications, shall be preserved and packed in accordance with the contractor's standard commercial practice and shall assure acceptance by common carrier and provide product protection against deterioration, loss, and damage during multiple shipments, handling, and storage. The shipping containers shall be in compliance with the National Motor Freight Classification and Uniform Freight Classification. Labeling and marking shall be as specified below, unless otherwise specified in the contract or purchase order.

## 5.2 Marking.

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

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

## 6. NOTES

6.1 Intended use. The spotter is intended for use in and around railroad yards and dock shipping areas for locating and moving railway equipment where areas about the track are not suitable for truck traffic, and the use of a locomotive switcher would require needless shuttling. The mobility of the spotter on rails, unimproved, and paved surfaces, makes it suitable for moving any type of wheeled equipment where and as desired.

## 6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Type and class of spotter required (see 1.2).
- c. When two railway car couplers are required (see 3.1).
- d. When a first article railway car spotter is to be furnished for inspection and approval (see 3.3, 4.2.1, and 6.3).
- e. When the performance requirements are other than as specified (see 3.6).
- f. When moving a car on curved trackage having a radius greater than 350 is required (see 3.6).
- g. When width of machine shall be greater than 96 inches (see 3.7.3).
- h. When 49 CFR 223 safety glass is required (see 3.14).
- i. When storage battery shall be dry charged and moisture sealed (see 3.15).
- j. When an electrical immersion type heater is required (see 3.15).
- k. When means for carrying tools and accessories shall be provided (see 3.18).

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- l. If treatment and painting is other than specified (see 3.20).
- m. When lubrication is other than the manufacturer's standard practice (see 3.21).
- n. Repair parts, maintenance tools, and accessories required (see 3.23).
- o. Maintenance publications required (see 3.24).
- p. When preservation and packing is other than specified (see 5.1).
- q. When the marking requirements are other than as specified (see 5.1 and 5.2).

6.3 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 complete railcar spotter. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examination, test, and approval of the first article.

6.4 Subject (keyword) list.

Locomotive  
Railcar coupler  
Road or track

6.5 Supersession data. This specification replaces military specification MIL-R-23314F dated 8 August 1986.

MILITARY INTERESTS:

Custodians

Army - ME  
Navy - YD1  
Air Force - 99

PREPARING ACTIVITY:

Navy - YD1  
(Project 2210-0036)

Review Activities

Army - MT  
Air Force - 84