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SUPERSEDING
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 5 November 1987

FEDERAL SPECIFICATION

CONCRETE PLANT, MOBILE, SEMITRAILER MOUNTED, VOLUMETRIC PROPORTIONING AND CONTINUOUS MIXING

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

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers mobile, semitrailer mounted concrete plant, consisting of a volumetric proportioning concrete mixer and material transporter with sufficient volume to deliver and mix the specified amount of concrete at the job site.

1.2 Classification. The concrete plant will be of the following sizes as specified (see 6.2).

Size 4 - Material capacity for 4 cubic meters (m3) or 5.23 cubic yards (yd3) of concrete with a production rate of 23 m3 (30 yd3) of concrete per hour.

Size 6 - Material capacity for 6 m3 (7.84 yd3) of concrete with a production rate of 45 m3 (59 yd3) of concrete per hour.

 *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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2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks 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

- W-B-131 - Battery, Storage, Vehicular, Ignition, Lighting, and Starting
- TT-P-664 - Primer Coating, Alkyd, Corrosion-Inhibiting, Lead and Chromate Free, VOC-Compliant
- PPP-P-40 - Preservation and Packing of Hand Tools; Tools and Tool Accessories for Power Driven, Metal and Woodworking Machinery
- PPP-T-60 - Tape: Packaging, Waterproof
- PPP-B-1055 - Barrier Material, Waterproof, Flexible

Federal Standards

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

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-S-196 - Support Items, Accessories, and Kits, Mechanical; Packaging of
- MIL-C-4556 - Coating Kit, Epoxy, for Interior of Steel Fuel Tanks
- MIL-C-3774 - Crates, Wood; Open 12,000- and 16,000-Pound Capacity
- MIL-E-10062 - Engines: Preparation for Shipment and Storage of
- MIL-T-22085 - Tapes, Pressure-Sensitive, Adhesive, Preservation and Sealing
- MIL-V-62038 - Vehicle, Wheeled: Preparation for Shipment and Storage of

Military Standards

- MIL-STD-129 - Marking for Shipment and Storage
- MIL-STD-209 - Slings and Tiedown Provisions for Lifting and Tying Down Military Equipment
- MIL-STD-1186 - Cushioning, Anchoring, Bracing, Blocking and Waterproofing; with Appropriate Test Methods

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

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

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

49 CFR 393 - Parts and Accessories Necessary for Safe Operation
49 CFR 570 - Vehicle in Use Inspection Standards
49 CFR 571 - Federal Motor Vehicle Safety Standards

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

Code of Federal Regulations (CFR)
Environmental Protection Agency (EPA):

40 CFR 86 - Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines: Certification and Test Procedures

(Application for copies should be addressed to the Public Affairs Office, Environmental Protection Agency, Rockville, MD 20852; or CFR, Title 40 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.

American Society of Mechanical Engineers (ASME)

ASME Section VIII, Division 1 - Rules for Construction of Pressure Vessels

(Application for copies should be addressed to the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, NY 10017.)

ASTM

ASTM C143 - Test Method for Slump of Hydraulic Cement Concrete
ASTM C685 - Concrete Made by Volumetric Batching and Continuous Mixing
ASTM D3953 - Specification for Strapping, Flat Steel and Seals

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

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Society of Automotive Engineers, Inc. (SAE)

- SAE J318 - Air Brake Gladhand Service (Control) and Emergency (Supply) Line Couplers - Trucks, Truck-Tractors, and Trailers
- SAE J534 - Lubrication Fittings
- SAE J560 - Seven-Conductor Electrical Connector for Truck-Trailer Jumper Cable
- SAE J588 - Turn Signal Lamps for Use on Motor Vehicles Less Than 2032 mm in Overall Width
- SAE J700 - Upper Coupler Kingpin-Commercial Trailers and Semitrailers

(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

(Application 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.)

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 mobile concrete plant shall include, but not be limited to, storage bins with applicable vibrators, diesel fuel powered engine, water tank(s), mix conveyor, admixture proportioning system (when applicable), main drive train, compressed air system, cement bin loading system, and operating controls. All plant components shall be mounted on a tandem axle semitrailer.

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 6.4).

3.3 Standard commercial product. The equipment 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 equipment being furnished. A standard commercial product is a product which has

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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 Safety. All rotating or reciprocating parts that are hazardous to operating or maintenance personnel shall be enclosed or properly guarded.

3.5 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.

3.6 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.

3.7 Performance.

3.7.1 Operation and production. When given the type of mix (volumetric ratio, individual material weight, or compressive strength of concrete), including the required slump, the concrete plant shall automatically proportion, thoroughly mix all the required materials, and continuously deliver mixed concrete at a variable production rate up to the minimum production rate for the required size. The plant shall function as a complete delivery and production system capable of producing various design mix concrete in accordance with ASTM C143. The size 4 plant shall be capable of producing concrete at a minimum rate of 23 m³ (30 yd³) per hour, and the size 6 plant shall be capable of producing concrete at a minimum rate of 45 m³ (59 yd³) per hour, with design mix concrete requiring as much as 450 kilograms of cement per cubic meter or 760 pounds of cement per cubic yard. The plant shall be capable of continuous or intermittent mixing and delivery as required, and shall be capable of operating and producing concrete in accordance with ASTM C685.

3.7.2 Towing speed. The mixing plant shall be capable of being safely towed at speeds as great as 16 kilometers per hour (kph) or 10 miles per hour (mph) over unimproved roads (dirt or gravel road) and 89 kph (55 mph) over a paved highway. The towing test shall be accomplished with the storage bins and water tanks empty, and also tested fully loaded.

3.7.3 Turning ability. The semitrailer shall be capable of assuming a 90 degree (o) angle to the coupled towing vehicle without cramping, sideslipping, or damage to the semitrailer or the towing vehicle.

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3.8 Design and construction. The semitrailer, including all accessories, shall be designed and constructed to comply with the provisions of DoT 49 CFR 393, 49 CFR 570, and 49 CFR 571, as applicable, in effect on date of manufacture. The semitrailer mounted concrete plant shall conform to ASTM C685.

3.8.1 Semitrailer component.

3.8.1.1 Semitrailer. The concrete plant shall be mounted on a drop deck, fixed gooseneck, tandem axle semitrailer designed to withstand shock loads incumbent with performance requirements specified herein. The semitrailer shall be equipped with full air service brakes controlled from the towing vehicle. Service brakes, lighting reflectors, and associated equipment shall conform to DoT regulations as specified herein. The upper fifth wheel plate shall be designed for coupling to a 1372 millimeter (mm) +/- 26 mm height (54 inches +/- 1-inch), full oscillating fifth wheel of 914 mm (36 inches) diameter and shall conform to DoT 49 CFR 393.70(b), (e), and (h). The kingpin shall conform to SAE J700. Support jacks shall be provided to support the semitrailer in the operating position when unhooked from the towing vehicle. The unhooked semitrailer shall remain stable on the support jacks when any combination of mix component bins or tanks are either full, partially full, or empty. Under no circumstances shall the semitrailer become unstable when unhooked from the towing vehicle. Axle and suspension ratings shall be at least equal to the imposed loads. Adequate fender clearance shall be provided such that when the semitrailer is fully loaded and traveling over paved highways or unimproved roads, the tires shall not contact the fenders. There shall be adequate ground clearance to allow a fully loaded semitrailer to ascend and descend a 305 mm (12 inches) curb with the mixing auger in either the operating or stowed position. The mixing auger shall not come in contact with the curb or the ground.

3.8.1.2 Braking system. The semitrailer unit braking system shall be full air brakes and shall conform to DoT regulations as specified herein. The braking system shall include breakaway features, manual or automatic slack adjusters, piping, hose connections, gladhands, spring loaded dustcovers or dummy gladhands equipped with security chains, and all other components required for a complete air-brake system. The braking system shall be installed in a manner which provides road clearance for travel over uneven terrain and protection against damage caused by objects striking components. No part of the braking system shall extend below the bottom wheel rims. Gladhands shall conform to SAE J318. The parking brakes shall be spring applied or air-diaphragm type. The brakes shall hold the semitrailer with rated payload on a 20-percent grade despite the depletion of the compressed air supply. The brakes shall be automatically applied upon discontinuation of the emergency air line and under emergency conditions.

3.8.1.3 Wheels and tires. Wheels shall be disc type. Wheels and tires shall be wide base, single, of the same size, and be identical to ensure interchangeability between axles. Tires shall be wide base tubeless with highway tread. Wheels and tires shall conform to TRA recommendation. A spare tire mounted on a wheel shall be provided. When specified (see 6.2), dual wheels and tires shall be provided.

3.8.1.4 Spare wheel carrier. A spare wheel carrier shall be provided and installed in a readily accessible location. Means shall be provided for securing the spare wheel to prevent accidental loss.

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3.8.1.5 Electrical system. The electrical/lighting system shall be sealed type, 12-volt potential. The lighting system shall conform to DoT 49 CFR 393.11, 393.20, 393.22, 393.25 through 393.29, 393.32, and 393.33. All lights and reflectors shall be protected from operational hazards by mounting in recessed or otherwise guarded locations. Lights and reflectors shall not be mounted on vertical surfaces of the rub rails. Clearance lights shall have replaceable lamps with twist or snap-on lenses. Turn signal lamps shall conform to SAE J588. The front of the semitrailer shall be equipped with a 12-volt, 7 contact receptacle conforming to SAE J560, with the receptacle located and the conductors connected and color coded. Unless otherwise specified (see 6.2), the battery(s) furnished with the diesel engine shall be dry charged in accordance with W-B-131, without electrolyte, with sealed caps to prevent the intrusion of atmospheric moisture. Two adjustable position flood lights shall be conveniently located at the rear section to illuminate the rear area during night operation.

3.8.1.6 Rear wheel splash and stone throw protection. Rear wheels shall have mud flaps or splash and stone throw protection.

3.8.1.7 Toolbox. A toolbox shall be provided. The toolbox shall be large enough to store all tools required for field service or maintenance, but shall not have external closed dimensions less than 356 mm (14 inches) in length, 152 mm (6 inches) in width, and 152 mm (6 inches) in height. The toolbox shall be of nominal 1.88 mm (0.074 inch or US revised standard gage No. 14) thick steel, with a hinged lid and a trunk drawbolt to keep the lid secure when vibrated. The toolbox shall be mounted in a protected accessible location.

3.8.2 Concrete plant components.

3.8.2.1 Storage bins. The plant shall be capable of transporting sufficient unmixed material (bulk cement, sand, crushed stone or gravel, and water) to the job site to produce not less than the listed quantities of concrete based on design formulas requiring as much as eight 42.7 kg (94 lb) bags of cement, 0.4 m³ (0.523 yd³) of fine aggregate and 0.6 m³ (0.78 yd³) of coarse aggregate not exceeding 38 mm (1.5 inches) size per cubic meter (cubic yard) of mixed concrete. Bins and water tank shall have the following minimum capacities:

Size	Cement Bin	Sand Bin	Stone Bin	Water Tank
Size 4	1.20 m ³ (1.57 yd ³)	2.46 m ³ (3.22 yd ³)	3.53 m ³ (4.62 yd ³)	1010 liters (267 gallons)
Size 6	1.80 m ³ (2.35 yd ³)	3.70 m ³ (4.84 yd ³)	5.30 m ³ (6.93 yd ³)	1515 liters (400 gallons)

The sand, stone, and cement bins shall be mounted on the semitrailer chassis and shall be of all welded steel construction, braced, and gusseted for adequate strength and rigidity. The bin side plates and divider plates shall be designed to prevent bridging and clogging of aggregates. The bin divider plates shall be of sufficient height to prevent intermixing of sand and aggregate during the loading process. Each bin shall have a wide top opening for loading by front end loader, conveyor, or other means generally used for loading open top bins or truck bodies with dry, granular material. A hydraulically controlled system of adjustable gates shall be provided to regulate the flow of aggregate. The

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adjustable gates shall be provided with a position locking device to independently lock the gates in the desired position. A gage, divided into numbered increments, shall be provided on each gate to indicate the position of gate opening for regulating material flow for the required mix. The numbered increments shall be clearly stamped or engraved into the surface of the gage and shall not be made of decals, stick-on labels, or painted on. The sand bin shall be provided with not less than two pneumatic vibrators on the outside of the bin to ensure against bridging and provide a continuous, uniform flow of material. The cement bin shall be of similar construction as the sand and stone bin. The bin shall be top loading with weathertight steel cover, with an opening large enough to allow loading with cement bags or bulk cement by conveyor, bucket elevator, auger, overhead bin, or any other method generally used for loading of dry cement. The cement bin door opening shall also be equipped with a removable bag-breaking device for use during manual charging with cement bags. The bag breaking device shall be equipped with an integrated metal grid that allows cement to freely pass through but will prevent bag material from entering the cement bin. The bin shall be equipped with not less than four external pneumatic vibrators as well as an internal, hydraulically driven, mechanical stirring device to prevent the bridging of cement and ensure a continuous, uniform flow. A cement register, with totalizer, shall be provided to indicate the amount of cement introduced into the mix at any time during production and to record total cement discharge of all deliveries.

3.8.2.1.1 Cement bin loading system. The unit shall be provided with a cement bin loading system which shall enable the operator to load the cement bin from the ground. The system shall incorporate a hopper with debagger and utilizing a manufacturer's design or methods as specified in 3.8.2.1. The loading system shall be located in the general proximity of the operator's working station.

3.8.2.2 Mixing system. The mixing system shall consist of a mix conveyor auger of welded steel construction with replaceable wear plates, a sand/stone feeder conveyor with multiple design cover construction for abrasion resistance, and manufacturer's standard cement feeder auger system. The up-and-down and side-to-side motion of the mix conveyor auger shall be hydraulically operated. The conveyor shall be mechanically or hydraulically driven from the plant drive engine. The sand and stone feeder conveyor, cement feeder, and water controls shall be independently controllable to allow one or all mix components to be turned off for the purpose of equipment calibration. Each component shall be able to be independently calibrated with all others bypassed.

3.8.2.3 Delivery chutes. Two delivery chutes shall be provided to give a minimum horizontal delivery distance of 3.6 meter (m) or 12 feet, including the mix conveyor. With both delivery chutes installed, and the mix conveyor elevated to the proper mixing position, delivery chute slope shall be such that concrete mix flows down the chute with no external assistance. Delivery chutes shall provide not less than 170o horizontal movement.

3.8.2.4 Water system. A pressurized water system shall be provided for the mix water component and shall include water tank(s), water level gage, pump, flowmeter, flow control valve, strainers, and drainage valves. The flow control valve shall be a needle type valve that provides constant water control per valve revolution. The valve shall be easily calibrated and shall be equipped with permanent numerical gage or scale that indicates the number of

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turns the valve is opened for repeatable water settings. An independent, pressurized, water source shall be provided at the rear of the mixer for cleaning purposes. The pressurized water source shall include a pump, strainer, flow control valve, and washout hose that is independent of the mix water system. The pressurized water source need not have an independent water storage tank, provided the mix water tank is of sufficient volume. The steel water tank's(s) interior surfaces shall be coated with material conforming to MIL-S-4556 to prevent corrosion. The level gage, flowmeter, and flow control valve shall be calibrated in liters per minute. Strainers shall be provided to remove extraneous materials from the water and to protect pumps and metering devices. Strainers shall be able to be easily removed for servicing and have reusable filters or screens. The water tank(s) shall be equipped with a vent in addition to the fill location to prevent the formation of a partial vacuum during mixing operations. Adequate drain valves shall be provided to ensure complete drainage of the water system for protection in subfreezing weather. When specified (see 6.2), the manufacturer's standard additive tanks and proportioning system shall be furnished. A water hose, not less than 7.6 m (25 feet) long, of rubberized material and pistol-grip type, high pressure nozzle shall be provided.

3.8.2.5 Air system. An air system of not less than 0.35 m³ (12.36 cubic feet) per minute of air shall be provided. The air system shall consist of continuous duty air compressor, air receiver, lubricator, heavy-duty air hoses, and all necessary valves. A weather protected air cleaner with precleaner and replaceable dry-type filter element shall be provided. The plant air compressor pressure vessel shall be equipped with an independent, pre-set, factory sealed, ASME stamped pressure relief valve certifying conformance to ASME Section VIII, Division 1, in addition to any other unloader valve. The pressure relief valve set pressure shall be properly matched to the pressure vessel's maximum working pressure.

3.8.2.6 Controls. All controls required to automatically proportion, mix, and deliver concrete shall be located at or near the left rear corner of the unit and shall be within easy reach of the operator while standing on the ground. All controls shall be clearly identified for their intended function with permanently affixed identification plates made of corrosion-resistant material.

3.8.2.6.1 Instruction plates. The equipment 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 shall be securely affixed to the equipment with nonferrous screws or bolts of not less than 3 mm (1/8-inch) diameter.

3.8.2.7 Engine. The engine used to power the plant shall be a diesel engine having power, torque, and speed characteristics to satisfactorily meet all the requirements specified herein. The diesel engine shall start in any temperature from -20 to +120° Fahrenheit (F) or -29 to +49° Celsius (C). Starting aids shall be either electric glow plug or ether primer. When an ether primer system is provided, it shall be of the measured shot type with storage capacity of not less than 12 fluid ounces (375 milliliter (mL)). The engine shall be furnished complete with accessories as follows:

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- a. Fuel tank with sufficient capacity for 8 hours operation.
- b. A 12-volt electric cranking system.
- c. A generator or alternator with a rating of not less than 17 amperes.
- d. Governor.
- e. A weather protected air cleaner with precleaner and replaceable type filter element.
- f. Control panel with starter switch, ammeter, oil pressure gage, cooling liquid temperature gage (if liquid-cooled engine is provided), hour meter capable of registering not less than 9,999 hours of engine operating time, and hydraulic oil temperature gage.
- g. High liquid temperature and low oil pressure shutdown.

3.9 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 gun with 6,895 kilopascals (kPa) (1,000 pounds per square inch gage) or higher will damage grease seals or other parts, a suitable warning shall be affixed to the equipment in a conspicuous location.

3.10 Servicing and adjustment. Prior to acceptance of the concrete plant assembly by the government, the contractor shall service and make adjustments 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. Proper functioning of all hydraulic and metering systems.
- c. Wheel balancing.
- d. Adjustment of engine to include tune-up.
- e. Complete lubrication with grades of lubricants recommended for ambient temperature at the delivery point.

3.11 Cleaning, treatment, and painting. Surfaces shall be painted according to manufacturer's standard practice and shall be cleaned, treated, and painted with procedure and finish color as specified herein. Surfaces to be painted shall be cleaned and dried to insure that they are free from contaminants such as oil, grease, welding slag and spatter, loose mill scale, water, dirt, corrosion product, or any other interfering substances. As soon as practicable, after cleaning, and before any corrosion product or other coating interfering material can result, the surface 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 or polyurethane enamel. The primer shall be applied to a clean, dry surface as soon as practicable after cleaning and treating. Painting shall conform to manufacturer's current factory level requirements for material and quality. The total dry film thickness shall be not less than 0.06 mm (2.5 mils) over the entire surface. The paint shall be free from runs, sags, orange peel, or other defects. Unless otherwise specified (see 6.2), the color of the finish coat shall be green, No. 14064, conforming to FED-STD-595. The end item, allied equipment, and attachments shall be the same color. The semitrailer wheels can be painted black, No. 17038 as an optional alternative. When repainting is required to provide the green No. 14064 finish color, the base color shall not be visible at any location. The repaint coating material shall be compatible with the original paint material.

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3.12 Lifting and tiedown attachments. The unit 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 unit. 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 unit on the carrier when shipped. Lifting attachments shall be designed to exclude the use of spreader bar(s).

3.13 Identification plate. The contracting officer will furnish to the Government inspector the required identification plates. The contractor will be required to stamp the necessary data in the blank spaces thereon and securely affix said plates in a conspicuous place on each unit, assembly or subassembly, and parts, as directed by the Government inspector. Nonferrous screws, rivets, or bolts of not less than 3 mm (1/8-inch) in diameter shall be used to affix the plates. Nomenclature shall be "CONCRETE PLANT, MOBILE, SEMITRAILER MOUNTED, VOLUMETRIC PROPORTIONING AND CONTINUOUS MIXING."

3.14 Workmanship.

3.14.1 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.

3.14.2 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.

3.14.3 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.

3.14.4 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.

3.14.5 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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3.15 Air transportability requirements. This item is subject to air transportability requirements and shall not exceed 2591 mm (102 inches) in height and 2667 mm (105 inches) in width in a reduced configuration. In addition, the mixer shall not exceed 5897 kg (13,000 lb) per single axle, or 9072 kg (20,000 lb) per tandem axle in a reduced configuration. Achieving a reduced configuration shall be limited to the removal of mechanically fastened (non-welded) components and shall not affect the required capacity, capability, or transportability of the mixer, which includes the ability to negotiate, without interference, a ramp 4.6 m (15 feet) in length at an angle of 17° between two horizontal surfaces. Removal, relocation, or reinstallation time of all components required to achieve the reduced configuration shall not exceed 4 manhours. Components which require removal or relocation to achieve the reduced configuration and the removal, relocation, reinstallation process shall be described in the equipment manuals provided by the manufacturer. All components removed to achieve the reduced configuration shall be capable of being placed in the mixer bins, or secured with fixtures to ensure the removed components are shipped in one complete assembly. The mixers shall not be in the reduced configuration when delivered to the government.

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).

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4.2.1 First article inspection. The first article inspection shall be performed on one concrete plant when a first article is required (see 3.2 and 6.2). 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. When a first article test is specified by the contract and the contractor desires to deliver the test unit as a contract item, it shall be delivered, only at the contractor's own cost and expense, completely clean, devoid of foreign material, reconditioned, or overhauled, making such replacements and modifications thereto as required to make the unit acceptable as a contract item.

4.2.1.1 Certificate of compliance. The contractor shall submit for approval of the contracting officer or his authorized representative, a certificate of compliance to the first article test requirements cited in 4.4.1 through 4.4.4. The Government reserves the right to examine and require a retest to determine the validity of the certification.

4.2.2 Quality conformance inspection. The quality conformance inspection shall include the examination of 4.3, the tests of 4.4.6, and the preparation for delivery inspection of 4.5.

4.3 Examination. Each plant 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 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 Brake test. The service, emergency or parking brakes (including the grade holding capability at 20 percent grade) shall be tested in accordance with the applicable sections of DoT 49 CFR 570 and 49 CFR 571 (see 4.2.1.1).

4.4.2 Air pollution control test. The plant diesel engine's exhaust emission shall be tested in accordance with the applicable sections of EPA 40 CFR 86 (see 4.2.1.1).

4.4.3 Lifting and tying down attachment tests. The lifting and tying down attachments shall be tested to verify conformance to 3.12 (see 4.2.1.1).

4.4.4 Road test. Hook the semitrailer unit, loaded with rated payload, to a truck-tractor. The tractor/trailer combination shall be driven a distance of not less than 32 kilometers (20 miles), both on an unimproved road and on a public highway at 16 kilometers per hour (km/h) (10 mph) and 89 kph (55 mph)

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respectively. The trailer shall trail the towing vehicle by not more than 76 mm (3 inches) from either side. Continue to test on public road by making a sharp 90o turn to verify conformance to 3.7.3 (see 4.2.1.1).

4.4.5 Ground clearance test. In lieu of this test, the contractor shall submit calculations together with the first article test report to show the ability to meet the requirements of 3.8.1.1. The report shall include, but not limited to, blue print type drawing(s) which shall also show, when applicable, the plant's ability to meet the air transportability requirements.

4.4.6 Operation and production test. Fill all storage tanks and bins to capacity with required materials. Operate the plant using a mix ratio as specified by government inspector. Repeat operation five more times with different mix ratio. Observe plant operation to verify conformance to 3.7.1.

4.5 Preparation for delivery inspection. The preservation, packaging, 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 specified in the following paragraphs 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 weatherproof tags, attached to mating parts and locations. Markings 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 paint, 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 metal 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.

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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. The material shall be secured in place with waterproof tape conforming to PPP-T-60.

5.1.1.6 Drive belts and pulleys. Drive belts shall be removed or released from tension. Removed belts shall be preserved method IC-1 or IC-3. Unpainted surfaces shall be coated with primer conforming to TT-P-664. A weatherproof tag shall be attached in a conspicuous location indicating: "Belts have been (removed or released from tension). (Install or tension) prior to operation." Markings shall be applied to the tags with a waterproof material.

5.1.1.7 Gears.

5.1.1.7.1 Exposed gears. All unpainted surfaces of exposed gears shall be coated with type P-1 preservative or with primer conforming to TT-P-664.

5.1.1.7.2 Enclosed gears. Enclosed gears shall be filled to the operating level with the approved lubricant required for operation. Gear mechanism shall be operated to insure coating of all interior surfaces with preservative. The gear housing shall be identified with a weatherproof tag to indicate, "This housing is filled to the operating level with lubricant required for operation. Do not drain until first required lubrication change." Markings shall be applied to the tags with a waterproof material. The tags shall be attached in a conspicuous location.

5.1.1.8 Hydraulic systems. The hydraulic fluid supply tanks shall be filled to the operating level with hydraulic fluid required for operation. The pistons shall be retracted as far as practicable into the cylinders and secured. When the pistons cannot be fully retracted, the exposed portions of the piston rods (camshafts) shall be coated with type P-6 or P-11 preservative and the coated surfaces wrapped or covered with barrier material conforming to MIL-B-121, type I, grade A, class 2, extending the wraps approximately 50 mm (2 inches) onto the ram cylinders. The wraps shall be secured in place with PPP-T-60 waterproof tape. When the pistons can be fully retracted, any remaining uncoated surfaces of the piston rods shall be coated with type P-1 preservative, with no wrapping required. The hydraulic control valves shall be secured in the neutral position and preserved as specified herein for piston rods. Hoses shall not be disconnected. A weatherproof tag shall be attached to the control lever indicating: "The hydraulic supply tank is filled to the operating level with fluid required for operation. Do not drain." Markings shall be applied to the tag with a waterproof material.

5.1.1.9 Maintenance tools. Maintenance tools shall be preserved in accordance with level A preservation and packaging requirements of PPP-P-40.

5.1.1.10 Technical publications. Technical publications for each piece of equipment shall be preserved method IC-1 or IC-3.

5.1.1.11 Instruments. The dial glass of instruments not protected by a metal housing shall be covered individually or in groups with a fitted piece of plywood secured with tape conforming to PPP-T-60, type IV or MIL-T-22085, type II.

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5.1.1.12 Vehicle bodies. The vehicle body and chassis shall be preserved as specified in MIL-V-62038 for level A (mobile) requirements.

5.1.1.13 Lubrication. Lubricate all grease fittings with type P-11 preservative to include universal joints, chassis suspension and steering linkage, fifth wheels, propeller shaft, and parking brake cable. Wheel bearings requiring a NLGI No. 2 grade shall be lubricated with type P-11 preservative. Lubricate control mechanisms, linkage, hinges, fasteners, and all pivot points with P-10.

5.1.1.14 Rubber tires. Tires mounted on the wheels (road tires) of the vehicle shall be inflated to 69 kPa (10 pounds per square inch gage) above pressure value recommended for maximum load. Tires mounted on rims (spare tires) shall be inflated to two-thirds of the specified operating pressure.

5.1.1.15 Radiator fronts and engine hoods. When specified (see 6.2), radiator fronts and engine hood openings of uncrated mixers shall be covered or sealed as specified herein. Radiator fronts of uncrated mixers shall be covered with waterproofed barrier conforming to PPP-B-1055, class E-2 or M-1. The barriers shall be secured with tape conforming to PPP-T-60, type IV, or MIL-T-22085, type II. All vents, louvers, and other openings of engine hoods shall be sealed with tape specified herein.

5.1.1.16 Service parts. The preservative application criteria and applicable methods of preservation of MIL-P-116 shall be used to preserve service parts. When specified (see 6.2), the service parts shall be preserved in accordance with level A requirements of MIL-S-196, or when parts are not specifically covered in MIL-S-196, an applicable submethod of preservation of MIL-P-116 shall be used.

5.1.1.17 Engines. Engines, engine components, and accessories shall be preserved in accordance with level A requirements of MIL-E-10062, type I, method I or type II, method I as applicable.

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. The equipment shall be lubricated for operational services as specified in the operator's manual.

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

5.2.1 Level A.

5.2.1.1 Crated mixers. Unless otherwise specified (see 5.2.1.2 and 6.2), each complete mixer shall be packed in a crate conforming to MIL-C-104, type II, class 1, style a. When specified (see 6.2) the crate shall conform to type I. Anchoring, cushioning, blocking, and bracing of the contents shall be in accordance with the applicable box or crate specification and MIL-STD-1186. Strapping for the boxes or crates shall conform to ASTM D 3953, type I, finish B, grade 1.

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5.2.1.2 Uncrated (mobile) mixers. When specified (see 6.2), each complete mixer shall be prepared for mobile shipment in accordance with applicable carrier rules and regulations. Consolidation containers shall be secured on the mixer in a manner not to increase cubage or interfere with towing or lifting the mixer with slings. Support legs (landing gears) shall be used for packing and storage only. For shipment, the trailer front shall be secured and supported by the use of wood cribbing or blockings, as applicable. Openings to the loader and drum shall be sealed with barrier material conforming to PPP-B-1055, class E-2, N-5, N-1 or L-4; or MIL-B-121, type I, grade A, to prevent the entry of water.

5.2.2 Level B.

5.2.2.1 Crated mixers. Unless otherwise specified (see 5.2.2.2 and 6.2), each complete mixer shall be packed in a crate conforming to MIL-C-3774, type II, style A. Anchoring, cushioning, blocking, and bracing of the contents shall be in accordance with the applicable box or crate specification and MIL-STD-1186. In addition, for items packed in a crate, contents shall be waterproofed with a full shroud in accordance with the crate specification.

5.2.2.2 Uncrated (mobile) mixers. When specified (see 6.2), each complete mixer shall be prepared for mobile shipment as specified for level A.

5.2.3 Commercial. Concrete plant shall be packed for shipment in a manner which will insure 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.)

6.1 Intended use. The mobile concrete plant will be used on construction projects where concrete will be mixed and delivered on the job site. When unhooked from the truck-tractor, the unit will be operated as a stationary continuous mixing concrete plant.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification
- b. Size of concrete plant required (see 1.2)
- c. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1)

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- d. When first article is required for inspection and approval (see 3.2 and 4.2.1)
- e. When dual wheels and tires are required (see 3.8.1.3)
- f. When battery(s) is other than as specified (see 3.8.1.5)
- g. When manufacturer's standard additive tanks and proportioning system is required (see 3.8.2.4)
- h. When lubrication is other than as specified (see 3.9)
- i. When color of finish coat is other than as specified (see 3.11)
- j. Level of preservation and packing required (see 5.1 and 5.2)
- k. When radiator fronts and engine hood openings of uncrated mixers shall be covered and sealed (see 5.1.1.15)
- l. When repair parts are to be preserved in accordance with level A requirements of MIL-S-196 (see 5.1.1.16)
- m. When type I crate is required (see 5.2.1.1 or 5.2.2.1)
- n. When mixers are to be shipped mobile (see 5.2.1.2 or 5.2.2.2)

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 (DD Form 1423) incorporated into the contract. When the provisions of DoD Federal Acquisition Regulations (FAR) Supplement, Part 27, Sub-Part 27.475-1 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, approval of the first article, or the approval of the certificate of compliance.

6.5 Supersession data. This specification replaces military specification DOD-P-28682(YD), dated 5 November 1987.

6.6 Subject term (keyword listing).

Aggregate
Cement

CIVIL AGENCY COORDINATING ACTIVITY:

GSA - FSS

PREPARING ACTIVITY:

Navy - YD1

(Project 3895-0351)