[INCH-POUND]
OO-M-2888
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SUPERSEDING
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FEDERAL SPECIFICATION

MIXERS, CONCRETE, WHEEL MOUNTED, ENGINE DRIVEN

The General Services Administration has authorized the use of this federal specification, by all federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers self-contained engine driven, wheel mounted, non-tilting rotating drum, end delivery, skipload concrete mixers.

1.2 Classification. The mixers shall be one of the following types and sizes, as specified, (see 6.2).

Type I - Diesel engine driven
Type II - Gasoline engine driven

Size 11S - 11 cubic feet (ft^3) or .3 cubic meter (m^3) batch capacity, two wheel mounted
Size 16S - 16 ft^3 (.45 m^3) batch capacity, four wheel mounted

2. APPLICABLE DOCUMENTS

2.1 Government publications. The following documents, of the issues in effect on the date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data which may improve this document should be sent to: Commanding Officer (Code 156), Naval Construction Battalion Center, 1000 23rd Avenue, Port Hueneme, CA 93043-4301.

AMSC N/A FSC 3895

Federal Standard

FED-STD-595 - Color Used in Government Procurement

Military Standard

MIL-STD-209 - Slinging and Tiedown Provisions for Lifting and Tying down Military Equipment

Department of Labor
Occupational Safety and Health Administration (OSHA)

29 CFR 1926 - Safety and Health Regulation for Construction

(The code of Federal Regulation (CFR) are for sale on a subscription basis from the Superintendent of Documents, US Government Office, Washington DC 20402.)

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

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

C143 - Concrete, Slump of Hydraulic Cement, Standard Test Method for
C172 - Concrete, Sampling Freshly Mixed

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

SOCIETY OF AUTOMOTIVE ENGINEERS, INC. (SAE)

J88 - Machinery, Earthmoving, Sound Measurement, Exterior.
J534 - Fittings, Lubrication.
J537 - Storage Batteries
J551 - Limits and Methods of Measurement of Radio Interference Characteristics of Vehicles and Devices (20-1000 MHZ).
J847 - Tow Bar Eye, Full Trailer.

(Application for copies should be addressed to SAE, 400 Commonwealth Drive, Warrendale, PA 15096)

3. **REQUIREMENTS**

3.1 Description. The concrete mixer consist basically of non-tilting steel mixing drum with an end discharge chute, water measuring tank, water pump, skip loader, engine drive, operating controls, and a towable wheeled steel frame.

3.2 First article. When specified (see 6.2), the contractor shall furnish a complete mixer for first article inspection and approval (see 4.2.1 and 6.3).

3.3 Standard commercial product. The mixer shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer's commercial product (see 6.4). Additional or better performance 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 mixer being furnished.

3.4 Safety. All rotating or reciprocating parts, and parts subject to high temperature, that are so located to be a hazard to operating personnel shall be insulated, enclosed, or 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 (see 6.4) to the maximum extent possible without jeopardizing the intended use. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification.

3.6 Maintainability. The mixer design shall permit ready accessibility to all items requiring periodic maintenance service in the field.

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

3.8 Environmental condition. The mixer shall be capable of being stored, started, and perform normal operation at any ambient temperature between 32 and 125 degrees Fahrenheit (0 and 52 degrees Celsius).

3.9 Mixing drum. The mixing drum shall be fabricated from steel with sufficient thickness to provide an estimated service life of not less than 4,000 hours of continuous operation. The drum shall provide for easy replacements of mixing blades.

3.10 Water measuring tank. The water measuring tank capacities shall be not less than 18 and 26 gallons (68 and 98 liters) for size 11S and 16S respectively. The tank shall be equipped with

controls which shall automatically discharge a measured amount of water into the charging side of the mixing drum. The tank shall be equipped with an indicator, calibrated in gallons or liters, to indicate the quantity of water used per batch. The indicator shall be easily visible to the operators normal operating location.

3.11 Water pump. Mixers shall be furnished with a self-priming centrifugal pump for filling the water measuring tank, from a water source not less than 5 feet (1.5 m) below the pump centerline. The water pump shall be furnished with 25 feet (7.62 meters) of wire reinforced suction hose with a nominal inside diameter the same size as the pump inlet. One end of the suction hose shall be equipped with a removable strainer.

3.12 Skip loader. The skip loader shall be of the closed end type with capacity of at least 10 percent greater than the batch capacity of the mixer. The hoist clutch shall automatically disengage when the skip loader reaches the fully raised position. The loader shall be capable of being held stationary at any position anywhere from ground level to the fully raised position without slipping. The loader shall hold its position in case of accidental engine shutdown and shall be able to be lowered safely to the ground manually. Means of securing the loader in an upright position when being transported shall be provided. A mechanical shaker shall automatically operate when the loader discharges the batch load into the drum mixer. The shaker shall clear the skiploader of all aggregates while in the dump cycle.

3.13 Discharge chute. The discharge chute shall be fabricated from steel with sufficient thickness to provide an estimated service life of not less than 4,000 hours of continuous operation. The chute shall be self-locking when in the mixing or discharging cycle.

3.14 Engine. The engine shall be the manufacturer's standard air or liquid cooled gasoline or diesel engine for the mixer size as specified herein. Engine shall be protected with metal cover. Engine accessories shall include, but not limited to, the following:

a. Fuel tank, with level indicator, providing capacity for not less than 6-hours continuous operation with diesel engines and 3 hours with gasoline engines.
b. An instrument and control panel including a starter switch, an hour meter, and a coolant temperature for liquid cooled engine.
c. A corrosion resistant exhaust system, designed to prevent rain intrusion.

3.14.1 Electric cranking system. The engine cranking shall be from a 12-volt battery. When specified (see 6.2), the battery shall be dry charged type, conforming to SAE J537, without electrolyte, with sealed caps to prevent moisture intrusion. Battery shall be enclosed in a weather-proof metal enclosure.

3.15 Operating controls. Operating controls for aggregate loading, adding water, and discharging operation shall be located on the same side of the mixer.

3.16 Power transmission. Power transmission from engine to mixing drum (reduction gears, chain drives, clutches) shall be safety protected in conformance to OSHA 29 CFR 1926.

3.17 Towing. The mixer shall be capable of being towed safely on a public highway at speed of not less than 35 miles per hour (mph) or 56 kilometers per hour (kph). The towbar eye shall be in accordance with SAE J847.

3.18 Tires and wheels. Tires and wheels shall conform to TRA recommendation. Tires shall be tubeless with highway tread. Wheels shall be disc type.

3.19 Toolbox. A lockable metallic tool box, size to hold all tools required for routine maintenance shall be provided.

3.20 Lubrication. Means for lubrication shall be in accordance with the manufacturer's standard practice. The lubricating points shall be easily visible and accessible. Hydraulic lubrication fittings shall be in accordance with SAE J534. Where use of high pressure lubricating equipment (1,000 pound-force per square inch gauge (6895 kilopascals)) or higher will damage grease seals or other parts, a suitable warning shall be affixed to the equipment in a conspicuous location.

3.21 Servicing and adjusting. The contractor shall service and adjust the mixer for immediate operational use and shall include the following: inflation of all tires, antifreeze 50/50 by volume (for liquid cooled engine), and complete lubrication with grades of lubricants recommended for ambient temperature at delivery point. The mixer shall be conspicuously tagged to identify the lubricants and their temperature range.

3.22 Lifting and tiedown attachments. When specified (see 6.2), the mixer 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, which shall last and remain legible for the life of the mixer, shall be provided and mechanically attached to the mixer with nonferrous screws or bolts at least 1/8-inch (3mm) in diameter. Transportation plates shall be inscribed with diagram showing the lifting attachments and lifting slings, the capacity of each attachment, and the required length and size of each 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 tiedown of the mixer on the carrier when shipped.

3.23 Air Transportability When specified (see 6.2), the mixer shall be air transportable. Mixers subject to air transportability shall meet specified dimensions and weight limits with the fuel tank 1/2 full. If necessary, dimensions and weight limits may be achieved with the mixer in a reduced configuration. Dimensions shall not exceed 105 inches (2667 mm) in width and 102 inches (2591 mm) in height. Weight of the mixer shall not exceed 13,000 pounds (5896 kg) per single axle. Achieving a reduced configuration shall be limited to the removal or relocation of mechanically attached (non-welded) components and shall not affect the transportability of the item, including the ability to negotiate, without interference, a 15-foot (4.57 m) ramp at an angle of 17 degrees between two horizontal planes. Components which require removal or relocation to achieve the reduce configuration and the removal, relocation, reinstallation process shall be

described in the equipment manual(s) delivered. When delivered to the government, the item(s) shall not be in the reduced configuration.

3.24 Electromagnetic interference characteristics. When specified (see 6.2), the mixer shall conform to the electromagnetic interference requirements and test limits for equipment as specified in SAE J551.

3.25 Noise level. With the mixer in the normal skiploading, mixing, or discharging cycle, the noise level at the operators normal operating location shall not exceed 84 db(A) when measured in accordance with SAE J88.

3.26 Cleaning, treatment, and painting. Surfaces normally painted in the manufacturer's commercial practice shall be cleaned, treated, and painted as specified herein. Surfaces to be painted shall be cleaned and dried to ensure that they are free from contaminants such as oil, grease, welding slag and spatter, loose mill scale, water, dirt, corrosion products, or any other interfering substances. As soon as practicable, after cleaning and before any corrosion product or other interfering material can result, the surface shall be prepared or treated to ensure the adhesion of the coating system. The painting shall consist of at least one coat of primer and one finish coat of acrylic-based enamel. The primer shall be applied to a clean, dry surface as soon as practicable after cleaning and treating. Painting shall be with manufacturer's current materials according to manufacturer's current processes for commercial mixers and the total dry film thickness shall be not less than 2.5 mils (.06 mm) over the entire surface. The paint shall be free from runs, sags, orange peel, or other defects. Color of finish coat, conforming to FED-STD-595, shall be as specified (see 6.2). The end item, allied equipment, and attachments shall be the same color.

3.27 Instruction plates. The mixer 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, and shall be securely affixed thereto with nonferrous screws or bolts of not less than 1/8-inch (3 mm) diameter.

3.28 Identification plate. When specified (see 6.2), an identification plate shall be furnished by the contracting officer for each mixer. The contractor shall stamp all necessary data in the blank spaces of the plate provided for that purpose, and securely affix to each mixer in a conspicuous place with nonferrous screws or bolts, not less than 1/8-inch (3 mm) diameter. The applicable nomenclature contained in the contract item description shall be placed in the top blank.

3.29 Workmanship

3.29.1 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 process shall not reduce the strength of the steel to the value less than intended by the design. Manufacturing processes shall be done neatly and accurately. All bends shall be made by controlled means to ensure uniformity of size and shape.

3.29.2 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 remain tight during normal operation and while being towed.

3.29.3 Riveted connections. Rivet holes shall be accurately punched or drilled and shall have all 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.

3.29.4 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 parts connected by the weld are subjected to proof and service loading.

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

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, 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 that supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of section 3 and 5. The inspection set forth in this document shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in this document, shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the government for acceptance, comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the government to accept defective material.

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 mixer 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 suppliers 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 mixers to be furnished under the contract.

4.2.2 Quality conformance inspection. The quality conformance inspection shall include the examination of 4.3 and the operational test of 4.4.1.

4.3 Examination. Each mixer 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 Test. Failure to pass any test shall constitute cause for rejection.

4.4.1 Operational test. The empty mixer shall be operated for not less than thirty (30) minutes. Operation shall include actuation of all mixer's operating controls.

4.4.2 Water indicator accuracy test. Fill the water measuring tank using the supplied water pump and intake hose. Water source shall be lower than the pump inlet. The accuracy of the calibrated indicator shall be determined by discharging a measured quantity of water to the drum mixer. Use ten (10) different settings to cover the full range of the indicator. The discharged water for each setting, shall be collected and compared to the volume indicated by the indicator.

4.4.3 Concrete mixing test. The skip loader shall be filled with the manufacturer's recommended mix proportions of cement, sand and 1-inch (25mm) rock, to equal a full mixer load. The load shall be dumped into the drum and mixed with water, resulting in a completed mixture within 5 minutes of mixing time. This procedure shall be repeated 10 more times. The water measuring device shall be set to produce concrete with slump not to exceed 2 inches (51mm). The mix design shall be verified in accordance with ASTM C143 and C172.

4.4.4 Road test. The mixer shall be towed for 25 miles (40 km) on a public highway at speed of 35 mph (56 kph). The trailer shall not sway more than 3 inches (76 mm) on either side. The mixer shall be inspected for structural damage upon completion of test.

4.4.5 Lifting and tiedown attachments test. The mixer shall be lifted using the lifting and tiedown attachments. Check for structural damage after 10 minutes.

4.4.6 Test for electromagnetic interference suppression. This test shall be conducted in accordance with SAE J551 to verify conformance to 3.24.

4.4.7 Noise level test. This test shall be conducted in accordance with SAE J88. Noise level shall not exceed 84 db(A). Engine manufacturer's certification of conformance to maximum 84 db(A) may be substituted in lieu of actual test.

5. PACKAGING

5.1 Packaging requirements. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2).

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 mixers covered by this specification are intended for use in mixing concrete.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Type and size required (see 1.2).
c. When a first article is required for inspection and approval (see 3.2).
d. When battery shall be dry charged conforming to SAE J537 (see 3.14.1)
e. When lifting and tiedown attachments are required (see 3.22).
f. When air transportability is required (see 3.23).
g. When electromagnetic interference suppression is required (see 3.24).
h. Color of finish coat (see 3.26).
i. Packaging requirements (see 5.1).

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

6.4 Definition.

a. Standard commercial product. A standard commercial product is a product which has been sold or offered for sale for not less than two years on the commercial market, through

advertisements, manufacturer's catalogs, or brochures, and represents the latest production model.

b. Recovered materials. 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.

6.5 Classification cross reference. Cross reference of classification changes between this specification and the superseded military specification is as follows:

MIL-M-686H	OO-M-2888
Not indicated	Type I
Not indicated	Type II
Style 2E	Not indicated
Style 4E	Not indicated
Size 11S	Size 11S
Size 16S	Size 16S

6.6 Part Identification Number (PIN). The following PIN is for government purposes and does not constitute a requirement for the contractor:

PIN designation

OO-M-2888 - X - X

- First X: PIN code for size
  - A = Size 11 S
  - B = Size 16 S
- Second X: PIN code for type
  - 1 = Type I
  - 2 = Type II
- OO-M-2888: Specification Number

6.7 Subject term (key word) listing.

Chute
Drum

Loader
Non-tilting
Rotating

MILITARY INTEREST:

Custodians:
Army -AT
Navy -YD1
Air Force - 99

Review Activity:
Navy - MC, CG
Air Force - 84
DLA - CS

CIVIL AGENCY COORDINATING ACTIVITY:

GSA/FSS

Preparing Activity
Navy - YD1

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