

**SPECIFICATION  
FOR  
TRACTORS, AGRICULTURAL, BIODIESEL**

(This specification is released for procurement purposes until revised or rescinded.)

**SCOPE**

This specification is not intended to include all available types of the commodity as indicated in the title of this specification, but is intended to include only those types generally used by state agencies. This specification is for use by these parties in the procurement of agricultural tractors. Use for any other purpose is not intended. Use for promotional purposes is specifically prohibited.

**I. CLASSIFICATION**

This specification covers biodiesel agricultural tractors. Fifteen classes of agricultural tractor are specified. Within each class, several user-specified options are allowed. These options are identified herein, under section VIII, ORDERING DATA. Tractors covered by this specification shall be classified within the classes listed in Table 1. The requirements given below are minimum, requirements except as noted, and in accordance with applicable standards.

Table 1. Agricultural Tractor Classes

Class	PTO (hp)	Hitch Category	Fuel Capacity (gal)	Lift Capacity, @24" Aft of Hitch (lbs)	Number of travel speeds (forward/reverse)	Operating Weight (lbs)
1.	24	I	7	1500	Hydrostatic	2500
2.	35	I	12	2200	Hydrostatic	3200
3.	45	II	13	3300	8F/3R	4600
4.	55	II	19	3300	8F/3R	5000
5.	65	II	25	3900	8F/3R + creeper gear	6000
6.	75	II	30	5700	12F/12R + creeper gear	6000
7.	85	II	30	5700	12F/12R + creeper gear	6000
8.	95 (DOT Specific)	III	35	7000	16F/4R + creeper gear	9500
9.	100	III	35	7000	16F/4R +creeper gear	9000
10.	105 (DOT Specific)	III	35	7000	16F/4R + creeper gear	9500
11.	125	III	65	12,000	16F/4R + creeper gear	12,000

12.	150	III	105	12,000	16F/4R + creeper gear	12,000
13.	175	IV	170	14,000	16F/4R + creeper gear	19,100
14.	200	IV	170	14,000	16F/4R + creeper gear	19,100
15.	225	IV	170	14,000	16F/4R + creeper gear	19,100

**II. APPLICABLE STANDARDS AND REFERENCES**

The following documents shall form a part of this specification to the extent described herein under "Requirements." The issue or revision for the respective document which is in effect on date of bid opening shall apply, except where specifically otherwise called for.

- 29 CFR 1910.145 Specifications for Accident Prevention Signs and Tags
- 29 CFR 1926.52 Occupational Noise Exposure
- 29 CFR 1926.600 Equipment
- 29 CFR 1926.602 Material Handling Equipment
- 29 CFR 1926.1000 Rollover Protective Structures (ROPS) are required. If cab is requested by user, the cab shall have integral ROPS.
  
- ASABE S217.12 Three-Point Free-Link Attachment for Hitching Implements to Agricultural Wheel Tractors
- ASABE S276.6 Slow Moving Vehicle Identification Emblem (SMV Emblem)
- ASABE S383.1 Roll-Over Protective Structures (ROPS) for Wheeled Agricultural Tractors
- ASABE S412.1 Ladders, Cages, Walkways and Stairs
- ASABEAD6489-3 Drawbars--Agricultural Wheel Tractors
- ASABE S613-1 Agricultural Cabs--Environmental Air Quality. Part 1: Definitions, Test Methods, and Safety Practices
- Agricultural Cabs--Environmental Air Quality. Part 2: Pesticide Vapor Filters--Test Procedure and Performance Criteria
  
- Environmental Protection Agency emissions criteria
  
- ISO 730-1 Agricultural wheeled tractors – Rear-mounted three-point linkage
  
- Nebraska Test and Organization for Economic Co-Operation and Development (OECD) Test Reports
  
- SAE J167 Overhead Protection for Agricultural Tractors--Test Procedures and Performance Requirements
- SAE J283 Test Procedure for Measuring Hydraulic Lift Capacity on Agricultural Tractors Equipped with Three-Point Hitch
- SAE J386 Operator Restraint System for Off-Road Work Machines
- SAE J930 Storage Batteries for Off-Road Work Machines
- SAE J994 Alarm-Backup-Electric Laboratory Performance Testing
- SAE J1041 Brake Test Procedures and Brake Performance Criteria for Agricultural Equipment
- SAE J1105 Horn - Forward Warning - Electric - Performance, Test, and Application
- SAE J1166 Sound Measurement--Off-Road Self-Propelled Work Machines Operator-Work Cycle

Technology and Maintenance Council (TMC) Vehicle Maintenance Reporting Standards (VMRS)

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Code of Federal Regulations (CFR) documents may be obtained from:

U.S. Department of Labor  
Occupational Safety & Health Administration  
200 Constitution Avenue  
Washington, D.C. 20210 or online at <http://www.osha.gov/>

ASABE/ASAE documents may be obtained from:  
American Society of Agricultural and Biological Engineers  
2950 Niles Road  
St. Joseph, MI 49085 or online at <http://www.ASABE.org/>

Environmental Protection Agency emissions criteria may be obtained from:  
U.S. Environmental Protection Agency  
Ariel Rios Building  
1200 Pennsylvania Avenue, N.W.  
Washington DC 20460 or online at <http://www.osha.gov/>

International Organization for Standards documents may be obtained from: <http://www.iso.org/>  
or American National Standards Institute, Inc.  
Attn.: Customer Service Department  
25 W. 43<sup>rd</sup> Street, 4<sup>th</sup> Floor  
New York, NY 10036 or online at <http://www.ansi.org/>

Test Reports may be obtained from:  
Nebraska Tractor Test Laboratory  
35 & East Campus Loop  
P.O. Box 830832  
Lincoln, NE 68586-0832 or online at <http://tractortestlab.unl.edu/>

Society of Automotive Engineers documents may be obtained from:  
SAE World Headquarters  
400 Commonwealth Drive  
Warrendale, PA 15096-0001 USA or online at <http://www.sae.org/>

TMC Standards may be obtained from:  
American Trucking Associations Headquarters  
950 North Glebe Road, Suite 210  
Arlington, VA 22203-4181 or online at <http://www.truckline.com/>

### III. REQUIREMENTS

#### A. GENERAL

This specification covers biodiesel powered agricultural tractors and attachments of conventional design and heavy-duty construction. The agricultural tractor is to be furnished complete with all necessary operating accessories customarily furnished by the manufacturer whether stipulated herein or not, including but not limited to all equipment shown as standard in the manufacturer's current published literature intended for the general public. This literature is to be included in the bid.

##### 1. STANDARD PRODUCT

The machine offered shall be new and the latest production model as represented in the manufacturer's current published literature intended for the general public. Machines, which are offered, otherwise may be rejected.

2. USE CONDITIONS

Design and construction shall be such that the agricultural tractor will withstand extremely hard usage in service, such as digging, lifting, mowing, transporting, and operating over rough terrain and storage and operation in the open air under all weather conditions for extended periods of time. Components, particularly of the electrical, fuel, hydraulic, and exhaust systems, shall be so designed as to resist any harmful effects of dust or water.

3. EASE OF MAINTENANCE

The design of the agricultural tractor shall permit ready access for servicing, replacement, and adjustment of component parts and accessories with minimum disturbance of other elements.

4. FRAME

The frame shall be designed to withstand maximum stress under normal operating conditions and in addition, provide adequate support for attaching any device approved by the agricultural tractor manufacturer for use in combination with the tractor. The frame shall provide for front axle oscillation in each direction from horizontal.

5. OPERATING WEIGHT

Operating weight shall include the agricultural tractor, operating device, tires as specified in the operating weight equipment list in the manufacturer's current published literature available to the general public, a 175 lb operator, the ROPS protection, fuel, oil, coolant, lubricants, and all standard advertised equipment. The operating weight shall not include any optional counterweights or tire hydroinflation. Note that the above list may differ from the equipment required herein. The minimum operating weight for each class of tractor is specified in Table 1.

A placard shall indicate the maximum gross vehicle weight allowed for the tractor.

6. THREE POINT HITCH

Unless otherwise specified by the user, the 3-point hitch shall be of proper category for the tractor class as specified in Table 1. The hitch shall comply with ISO 730-1 and ASABE S217.12.

7. OCCUPATIONAL SAFETY AND HEALTH ACT

The agricultural tractor shall be furnished with all applicable equipment and accessories as required by the occupational safety and health act (U. S. Department of Labor and N. C. Department of Labor), including the following:

29 CFR 1926.52 – Occupational Noise Exposure

The agricultural tractor shall be constructed and assembled so that the noise at ear level of the seated operator, with all doors, windows and vents opened and when measured in accordance to SAE J1166 Work Cycle Test shall not exceed the permissible noise exposure limits of this regulation for 8 hours operator exposure.

29 CFR 1926.600 – Equipment

Safety glass shall be used when an enclosed cab is requested.

29 CFR 1926.602 – Material Handling Equipment

Seat belts, brakes, fenders, and horn are required for all classes.

29 CFR 1926.1000 – Rollover Protective Structures (ROPS) are required. If user requests cab, the cab shall have integral ROPS.

29 CFR 1910.145 – Specifications for Accident Prevention Signs and Tags  
Slow moving vehicle (SMV) emblem to be provided unless otherwise indicated by written request of user. The SMV emblem shall comply with ASAE S276.6.

## 8. OPERATING AND DIMENSIONAL REQUIREMENTS

The tractor shall meet the minimum requirements given in Table 1 plus requirements in accordance with applicable ASAE standards.

## B. **ENGINE**

### 1. DIESEL ENGINE

The engine shall be of the compression ignition type, liquid cooled and designed for operation on commercial Ultra-Low sulphur diesel fuel or B5 biodiesel. However, Class 8 and 10, which are DOT Specific, shall have the ability to operate on B20 biodiesel. The engine shall be equipped with an adequate and efficient fuel injection mechanism, heavy-duty fuel filter system, and maximum available capacity full flow type lubricating oil filter. Engines in class 5 through class 15 machines shall be turbocharged.

Air filters shall be heavy-duty dry type, dual stage (primary and safety elements). Air cleaner hose shall be of metal or heavy-duty flexible, non-collapsible type (wire reinforced hose not acceptable), and with metal or molded rubber elbows. All air cleaner hose connections must be banded. Exhaust pipe shall be of the deflector type and rigidly mounted to prevent vibration.

All tractors must meet the US EPA emissions CRITERIA for the tier applicable at the time of delivery. The use of averaging, banking, or trading (ABT)/Flex credits and the use of after treatment devices to meet the US EPA regulations is NOT sufficient to meet this specification. Written verification of compliance with this requirement is to be provided to the State or the using agency upon its request and in the manner specified, such as by copy of the certification.

### 2. ENGINE STARTING SYSTEM

The manufacturer's standard electric starting system with heavy-duty battery (in accordance with SAE J930) shall be acceptable for cranking heavy-duty batteries (single or dual). The engine starting system shall be capable of cranking the engine for starting in an ambient temperature of -20°F. The battery shall be specifically designed to withstand the shock, vibration, and dusty environment encountered in off-road work machines. A shock resistant battery mount is not an acceptable substitute for the type of battery required, though such mount may be furnished in addition to the proper battery.

### 3. ENGINE COOLING SYSTEM

The tractor engine shall be liquid cooled with a radiator and blade type fan. The cooling system shall be protected to a minimum of -20°F.

### 4. ENGINE LUBRICATING SYSTEM

The manufacturer's current standard production lubricating system is acceptable.

**C. FUEL TANK**

The minimum fuel tank requirements are listed on Table 1. Fuel tanks will be located so as not to be affected by heat from the engine exhaust pipe or muffler.

**D. POWER TRAIN**1. TRANSMISSION

The agriculture tractors shall have hydraulic power reversing with the minimum number of forward and reverse speeds specified in Table 1 in paragraph I. All size classes, except for the single smallest size class, the tractors offered must be provided with rear axle 2WD and the option for 4WD (open or cab) which is engageable and disengageable by the operator.

2. AXLES

Rear axle shall be equipped with a differential lock. The tractor shall have the option of rear axle extensions.

**E. STEERING**

The agricultural tractor shall have power steering. Secondary steering ability, i.e., manual steering, shall be furnished in the event of power steering failure.

**F. BRAKING SYSTEMS**

The service brakes shall be foot controlled and have the wet disc type. A secondary braking system and a parking brake system shall be provided. The service brake, secondary brake and parking brake systems shall conform to the requirements of SAE J1041.

**G. TIRES**

Tires shall be the standard size, brand, and model as stated in the manufacturers' current published literature intended for the general public unless otherwise specified in the Invitation For Bid. Tire requirements for class 8 and 10 are specified in paragraph III. N.

**H. HYDRAULIC SYSTEM**

Hydraulic cylinders shall operate the lift mechanisms. Hydraulic pump shall be on a live drive from the engine or torque converter and shall provide adequate pressure for all operations. Ample pump and reservoir capacity shall be furnished for continuous duty operating cycles without overheating. A system relief valve and spin on replaceable oil filter shall be provided.

The tractor shall meet the minimum requirements given in Table 1 in accordance with SAE J283.

**I. ROLLOVER PROTECTIVE STRUCTURE (ROPS)**

All tractors shall have either a ROPS cab or ROPS canopy, as specified in the Invitation for Bid. The operator's seat shall be located within easy reach of all operating controls and allow a good view of the work areas. The seat shall be adjustable bucket type, foam rubber cushioned, upholstered, with armrests, backrest, and seatbelt. Seatbelt shall be in accordance with SAE J386.

Where necessary for safe and convenient ingress and egress of the operator, to and from the ROPS cab or ROPS canopy, handholds, handrails, and/or steps shall be provided. Where such are provided they shall be in accordance with ASABE S412.1.

The ROPS cab shall conform to ASABE 2194 and be completely enclosed. Door(s) with fasteners to secure in the open position and keyed locks to secure in the closed position shall be furnished. Tinted safety glass windows shall be furnished and are to be mounted to withstand the effect of shock and vibration encountered during use. When ROPS cab is furnished, air conditioning, heavy-duty heater, defroster, and windshield wipers (front and rear) shall be included.

**J. FALLING OBJECT PROTECTIVE STRUCTURE (FOPS)**

The FOPS frame or cab enclosure tractors shall meet all the requirements herein for ROPS tractors. The tractor shall include additional support for protection from falling objects. FOPS tractors shall conform to SAE J167.

**K. ENVIRONMENTAL CAB**

The environmental cab shall meet all the requirements herein for ROPS tractors and shall be pressurized. If specified in the Invitation for Bid, a chemical spray protection package shall conform to ASABE S613-1 and shall consist of at least three separate filtration components: (1) a coarse pre-filter for filtering large particulates and large droplets; (2) a pleated glass fiber element for filtering small particulates and fine spray and (3) a layer of activated carbon for adsorbing vapors responsible for odors.

**L. PAINT**

All exposed metal parts of the tractor shall be cleaned of all mill scale, rust, grease, etc. then primed and undercoated with a rust resistant paint in accordance with acceptable shop practice.

The finish coat shall be the manufacturer's standard color(s). Interior of the cab shall be a non-glare color.

Class 8 and 10 and all units purchased for North Carolina Department of Transportation shall be painted with a lead free, "North Carolina Department of Transportation Safety Yellow" which shall be visually inspected for suitable match in the following manner: Prior to the finish painting of equipment, the successful bidder will be provided a paint chip by the North Carolina Department of Transportation (DOT) which has been prepared utilizing a minimum of one (1) mil thickness of lead-free gray primer and a minimum of two (2) mil thickness of lead-free Dupont Centari # 54701A, ALT 2. The successful bidder shall be required to return the DOT paint chip and furnish two (2) 3 1/2" x 8" painted panels representing the finished color for approval. If approved, one panel will be returned to contractor and the other will be retained by State for color comparison; color of equipment then must match the color-approved panel. With the submitted color chips, the vendor must furnish a copy of the current MSDS sheet for the paint used which indicates that the paint is lead free. "North Carolina Department of Transportation Safety Yellow" finish coat shall be DuPont # 93-54701AK lead free, Moline MPM 11-Y169-A lead free, or an acceptable equivalent. Interior of the cab shall be a non-glare color. The backhoe buckets and attachments, other than swivel, shall be manufacturer's standard color. Cab window framing, and fenders and bumpers either of which are made of composite or plastic material, do not have to be painted with the above safety yellow finish. If a backhoe bucket swivel device is required, it is to be painted with the above safety yellow finish.

**M. INSTRUMENTS AND GAUGES**

The instrument panel shall be located in view of the seated operator. The manufacturer's standard instrumentation shall be furnished unless otherwise specified in the Invitation For Bid.

**N. EQUIPMENT**

The following equipment shall be furnished with the agricultural tractor unless otherwise specified in the Invitation For Bid:

1. Minimum of three hydraulic remotes (class 3 through 15 only)
2. Independent power takeoff
3. Standard drawbar as specified in manufacturer's current published literature per ASABEAD6489-3
4. 3-point hitch of proper category as indicated in Table 1
5. Standard stabilizer as specified in manufacturer's current published literature
6. Automatic draft control (class 3 through 15 only)
7. Fire extinguisher, BC type, 5-lb size, mounted in a location easily accessible to seated operator
8. Front and rear windshield wipers (all classes for full cab tractors only)
9. Interior rear view mirror and right and left exterior mirrors (all classes for cab tractors only)
10. Right hand and left hand exterior telescoping 5" by 8" mirror (class 8 and 10 only)
11. Manufacturer's standard AM/FM radio (only when cab is specified)
12. Hour meter
13. Two 18.4-34 R1 rear radial tires and two front tires 11L-16 F3 12 ply rating bias (class 8 and 10 only)
14. Heat and factory air conditioning (all classes for cab tractors only)
15. Cold weather starting package (1200 CCA battery and 110V engine coolant heater) (class 8 and 10 only)
16. Backup alarm per SAE J994
17. Fuel/water separator
18. Air cleaner restriction indicator of the proper size and setting, visible from the operator's station per ASABE S613-1 (all classes for cab tractors only)
19. Radiator guard
20. Slow moving vehicle emblem per ASABE S276.6
21. Horn per SAE J1105
22. Two (2) sets of keys
23. Vandalism protection kit (including full cover lockable hood, engine shield, fuel cap, transmission oil cap, and tool box, all with locks) (class 8 and 10 only)

**O. NEBRASKA TEST OR OECD**

All tractors with the exception of Class 1 must be identified and properly reported in the current Nebraska Test Report or the current OECD. The Nebraska Test Report, the OECD test, and the manufacturer's current literature, will be used to verify product attributes. If the product attributes do not meet the requirements of this specification in any of these reports, the product will be rejected. Horsepower requirements herein are for rated continuous PTO horsepower, not peak, "power bulge," or any other rating of temporarily available or intermittent duty horsepower.

The State, at its option, may consider current publications other than the two identified above to verify claimed PTO horsepower. This option may be considered only in instances where the tractor is not listed in either of the two cited publications. In such case the bidder must submit an unaltered copy of such other current publication, which however may not be considered unless the State can satisfy itself that its use of such publication does not compromise the integrity of the bid. Criteria such as general level of availability of the publication, confirmed independence from all interests of the concerned bidder and manufacturer, and any other factor the State deems necessary and proper may be used to determine acceptability of such other publication.

However, the State is under no obligation whatsoever to consider such other publications, and furthermore is free to immediately reject any bid or item offered that is not listed in the two referenced publications.

Its respective model number in the manufacturer's current published literature intended for the general public must specifically identify each model offered. This publication must be attached to the submitted bid document.

**P. ENGLISH REQUIREMENT**

All written documentation including safety placards, manuals, labels, and other such written communication on or about this equipment shall be supplied in English.

**IV. WARRANTY**

The contractor warrants to the owner that all equipment furnished under this specification will be new and of good material and workmanship and agrees to replace promptly any part or parts which by reason of defective material or workmanship shall fall under normal use free of negligence or accident for a minimum of 2000 hours of operation. Such replacement shall include all parts, labor, and transportation costs to and from the location where equipment is down, free of any charge to the owner or his representative.

Under same and all conditions as above, the power train (engine, transmission, torque converter, and final drive) and structural members shall be so warranted for a period of 3000 hours. Any periodic inspections, which may be performed by the contractor or his representative, shall be without charge to the owner.

Any portion of manufacturer's standard warranty that exceeds the above warranty requirements shall be in effect on the contract.

**V. INSTRUCTION, MANUALS, AND LINE SETTING SHEET**

The contractor shall furnish a qualified representative to instruct the owner's operator(s) in the operation, maintenance, and safety of the equipment immediately upon delivery at user's site or as otherwise specified in the Invitation For Bid.

Two (2) sets of the operator's manual shall be provided. A shop manual, complete parts book, and line setting sheet shall be furnished with each unit. Additional manuals and parts books and line setting sheets shall be furnished when specified in the Invitation For Bid.

The vendor specifically agrees that such material supplied under this section may be copied or reproduced in any manner for use by the State.

**VI. ACCEPTANCE EVALUATION AND QUALITY ASSURANCE**

Upon receipt of each agricultural tractor(s) at the receiving point, the purchaser or his authorized representative may arrange for an acceptance inspection for compliance with the provisions of this specification.

Any deviation from the specification referenced herein (e.g. SAE, OSHA) which is in effect on date of opening of the Invitation For Bid must be rectified by the contractor at no cost to the user, regardless of when during the period of ownership by the original purchaser the deviation is discovered.

**VII. DELIVERY AND PAYMENT**

Delivery of and payment for agricultural tractors under this specification shall be in accordance with the terms and conditions in the Invitation For Bid. The contractor shall be responsible for any packing, packaging, or protection required to insure delivery in an undamaged condition.

Agricultural tractors shall be completely serviced and ready for operation when delivered.

**VIII. ORDERING DATA (FOR PURCHASER'S USE ONLY)**

Purchaser should exercise any desired option offered herein and should specify the following:

- A. Title, number, and date of this specification
- B. Size (class) of machine: 1, 2, 3, ... 15
- C. Turbocharged or standard engine
- D. Tractor width and height limits, i.e., high clearance
- E. Rear axle extensions
- F. Additional remote control valves
- G. Attachments and components as required
- H. Additional manuals, parts books, and line setting sheets, if required
- I. Specify quantity and quality of training by a technician in the operation, maintenance, and safety of the tractor, if required
- J. If required, contractor shall furnish a pilot model for examination, tests, and possible modification and/or adjustment of attachments in accordance with this specification
- K. Special instruments and/or gauges
- L. Tires, if other than manufacturer's standard
- M. Specify either ROPS canopy or ROPS cab
- N. DC outlet for cell phone plug in
- O. Minimum side mirror size
- P. Vandalism protection kit (including full cover lockable hood, engine shield, fuel cap, transmission oil cap, and tool box, all with locks and two (2) sets of keys)
- Q. Cold weather starting package (1200 CCA battery and 110V engine coolant heater)
- R. Environmental cab for chemical spray applications
- S. Backup lights
- T. If additions, deletions or changes are required to the list of equipment in paragraph III. N.

**\*\*\*\*\*END OF SPECIFICATION\*\*\*\*\***