



**MISSOURI DEPARTMENT OF TRANSPORTATION  
DIVISION OF GENERAL SERVICES  
EXTRA HEAVY DUTY ARTICULATED  
MOTORGRADER  
MINIMUM SPECIFICATIONS**

ENGINE – Diesel, Dual/Variable HP inline 6 cylinder, turbo-charged, electronically controlled with 110 volt block style heater rated at minimum of 750 watts, electrically heated intake air cold start system, and heavy-duty two-stage, dual element, dry type air cleaner with service indicator. A hinged or bolt-on removable guard should protect the radiator. Engine side panels should be lockable and keyed alike. The engine shall have mounts between engine and frame to help reduce noise and vibration. Must meet Tier III emission requirements.

TRANSMISSION – 8-speed forward, 4-speed reverse, direct drive power shift with front and rear transmission guards. The transmission shall have mounts between transmission and frame to help reduce noise and vibration.

HYDRAULICS – Closed center system, load sensing with hydraulic tank, locking cap and check valves in all hydraulic cylinders with spin on filtering system having a 10 micron rating or better.

DIFFERENTIAL LOCK - Tandem drive train differential with manual lock/unlock control switch. Must provide positive control of the lock/unlock capability in the cab. No-Spin or Limited Slip Differential is not acceptable.

BRAKES, POWER - Minimum performance criteria in accordance with SAE Standard J1152 APR80.  
Service - Four-wheel hydraulic power boosted wet disc with foot pedal, operator warning system, and reserve power assist. Air brakes are acceptable only if an air dryer system is included.  
Parking – Hand or electronically activated, disc type, mounted on the output shaft of the transmission with both audio and visual warning systems. Must be capable of holding stopped vehicle in stationary position.  
Emergency - Manual application from operator's position.

NOTE: The above brake system may use common components.

ARTICULATED FRAME - Hydraulically articulated frame with in-cab controls.

MOLDBOARD, HYDRAULICALLY OPERATED – 14' x 24" (or 25" is acceptable) x 3/4" moldboard with replaceable end bits, constructed of high-carbon steel. The moldboard shall be equipped with a hydraulically operated side shift to the right and left of center position. Moldboard controls shall provide a float position. Power tilt moldboard shall be furnished with a minimum of 44° total tilt range. Minimum blade down pressure shall be 16,500 pounds. Minimum blade pull pressure shall be 20,500 pounds. Circle rotation drive shall be protected with a slip clutch, relief valve, or other suitable device.

FRONT LIFT GROUP CAPABILITY - Unit shall have all necessary plumbing to the front of motorgrader to operate attachments. Lift group brackets are to be mounted in front of front wheels with brackets properly mounted to the unit to accommodate a vendor supplied mounting bracket or plate to allow the attachment to work with a department owned V-plow; a front mount class 1 parallel J hook style lift group front lift group (comparable to a Rybind MG1 or Cat/Balderson front lift group). Vendors must also supply one set of female pin-loc J-Hook adapters for existing MoDOT attachments. Hydraulic system to the front lift group shall have float capabilities.

WEIGHT – Minimum operating weight (without attachments) 30,000 lbs.

CONTROLS - Full hydraulic, variable speeds, positive hand levers in cab.



STEERING – Hydraulic powered, front wheel with hydraulic booster AUDIBLE ALARM SYSTEM - In accordance with OSHA Standards listed in Federal Register Volume 37, Number 243, Subpart 0, Section 1926.602, Paragraph 9. The sound shall be distinguishable from surrounding noise level and the horn switch shall be mounted within easy reach of operator, it shall have an independently controlled reverse signal alarm horn with automatic noise level that sounds when grader is shifted into reverse gear.

ELECTRICAL SYSTEM - 24 VOLT - Not less than 100 amp heavy-duty alternator, internal voltage regulator, and two 12 volt, number 4D BCI dimensional group size batteries with at least 170 ampere hours and minimum of 800 CCA per battery with a battery master disconnect switch. A 24-volt to 12-volt converter with isolators with a minimum 25-amp output is to be supplied by the vendor.

LIGHTS AND SIGNALS - Complete set of electric lights (10 standard to include 2 front, 2 rear, 2 mid-mount, 2 lower cab, and 2 top of cab in the front), including clearance lights, headlights with dimmer switch, moldboard work light, rear flood lights, red stop and taillights, inside cab dome light and instrument dash lights. Extra front work light for use with plow. If available, lights shall be LED.

BEACON WIRING/SWITCH – Unit shall have factory installed beacon switch and circuit protection with wiring harness routed to the rear of the cab roof to facilitate later installation of warning lights. If available, unit shall have a folding style beacon bracket.

INSTRUMENTATION – Gauges shall include coolant temperature, engine oil pressure, fuel, hour meter, and air cleaner service indicator.

TIRES AND WHEELS - 1400 X 2400 Radial ply Michelin XTLA or approved equivalent tubeless tires, front and rear (lug type). Wheels to be 10" multi-piece rims, front and rear. If available, a spare tire and wheel is to be included.

TOW HITCHES - Front and rear.

CAB AND ROLLOVER PROTECTIVE STRUCTURE - ROPS minimum performance criteria in accordance with SAE J396A Standards. Fully enclosed, all-weather, insulated, sound-suppressed, steel cab with shatter-proof glass, all-around visibility, roll-over protective structure, heavy-duty electric windshield wipers (front, rear and lower front with washer), dual fan heavy-duty hot water heater and factory installed air conditioning, all-metal adjustable defroster fan front and rear with safety guard, inside cab mounted rearview mirror, dome light, floor mat, manufacturer's best available adjustable suspension upholstered operators seat with arm rests, retractable seat belt and door locks. AM/FM radio. The cab will have a minimum of one full access left-hand door with a minimum of one emergency exit (pop out window or 2<sup>nd</sup> door) besides the left-hand door. The cab shall have mounts between cab and frame to help reduce noise and vibration. It shall meet OSHA 90 DBA sound level requirements for eight hours. ROPS enclosure must be certified and labeled. Five pound fire extinguisher shall be included. NOTE: Optional left and right outside rear view mirrors would be preferred but are not mandatory.

FUEL TANK – Minimum 90 gallon capacity.

COLOR - Color to be manufacturer's standard safety or industrial yellow over a prime coat.

MISCELLANEOUS - The unit to be furnished shall have the following: muffler, leaning wheel front axle, foot accelerator, and locking caps on the fuel tank, and radiator. Any additional or optional equipment not specified above and supplied with the unit should only be that which is regularly furnished by the motorgrader manufacturer.

Complete machine must be manufactured in accordance with the latest adopted OSHA or SAE Standards and amendments thereto except where otherwise specified.

Decals and all other forms of Dealer Advertisements are to be left off units delivered to the department. Any dealer advertisements larger than 12 square inches must be removed or covered. Mounting brackets wiring and switchgear for cab mounted strobe or LED.