Knuckle Boom Crane/Flatbed Body – 48-Foot Reach - Truck Mounted

Articulating crane ("Knuckle Boom"), flat-bed body, truck mounted, new and of current model, equipped as advertised by the manufacturer, to **meet or exceed the following MINIMUM** specifications:

Proposed Crane: Make: _____ Model: _____

Proposed Flat-bed body: Make: _____ Model: _____

Proposed Truck: Make: _____ Model: _____

Non-Restrictive Clause: Any use of brand name or equal within this specification is to be considered a reference for the purpose of describing the standard of quality, performance, and characteristics desired. It is not intended to limit or restrict competition.

The bidder must respond to each of the following statements. Specifications listed are **minimum** requirements that must be met for a bidder to qualify for an award. A "YES" response means the bidder guarantees that they meet or exceed the requirement. A "NO" response means the bidder cannot meet the requirement and will not be considered. The bidder must supply printed literature that shows compliance with each requirement of the Specifications and, if on inspection, an item is found not to comply, the Knuckle Boom will be rejected.

Descriptive literature shall be furnished to substantiate the details specified throughout this bid.

SPECIFICATIONS

Crane:

Overall Dimensions: 34 inches (depth) x 96 inches (width) x 87 inches (height)

Depth (inches): _____ Width (inches): _____ Height (inches): _____

Comply Yes/No: _____

Lifting Capacity:
The minimums are as follows:

- 9,000 at a reach of 14 feet
- 6,300 at a reach of 20 feet 6 inches
- 4,500 at a reach of 27 feet
- 3,500 at a reach of 33 feet 6 inches
- 2,800 at a reach of 40 feet
- 2,400 at a reach of 47 feet

Comply Yes/No: _____

Lifting Moment: 160,000-pound minimum

Comply Yes/No: _____

Boom: To have a 5-section hydraulic boom that can reach a minimum of 48 feet. Shall be one piece of high-strength steel six-sided with one welded seam. One individual cylinder for each section shall be provided. Shall be internally ported to supply oil to the next extension. Pipes shall connect one extension cylinder to the next. The extension boom section shall be sequenced where required. One individual cylinder for each section shall be provided. Shall be internally ported to supply oil to the next extension. Pipes shall connect one extension cylinder to the next. The

extension boom section shall be sequenced where required. The extension system shall utilize the return oil for increased boom extension speeds. Extension cylinders shall be mounted at each end of the cylinder barrel to minimize rod deflection. The extension system shall have self-lubricating guide pads that do not require greasing. Extension cylinder guides shall have self-lubricating guide blocks that do not require greasing. The main and outer boom shall be equipped with a linkage system. The outer boom shall lock in the transport position. The main boom shall set in boom rest in the transport position. The crane shall have a 17,640-pound roller-bearing load hook. Boom and outrigger shall be equipped with a transport position check switch, wired to the acoustical alarm in the cab, to sound an in-cab alarm if PTO is disengaged and the boom is not in proper stow position.

Comply Yes/No: _____

Rotation: Shall have 400° degrees of rotation. The net rotation torque shall be no less than 16,750 pounds. Rotation shall be via rack and pinion system. Crane shall have slew angle monitoring that allows capacity limitations based on the position of the rotation. The crane shall be equipped with soft-stop slewing.

Rotation (degrees): _____

Comply Yes/No: _____

Hydraulics: Working pressure shall operate at 4,200 Pounds per square inch (PSI) and pump capacity of 12-27 Gallons Per Minute (GPM). A control valve system shall be located at the base of the crane. A full capacity curve load chart shall be provided for specific boom versions. Steel lines shall be used. All hoses on the column shall be routed through a flexible covering. Load-holding valves shall be incorporated into the rotation, main boom lift, outer boom lift, and extension boom systems. The oil tank capacity shall be no less than 24 gallons and the crane shall be equipped with return and high-pressure filters. Crane shall operate via a fixed displacement, DIN shaft piston pump. Truck transmission shall be provided with specific Hot shift PTO.

Comply Yes/No: _____

Overload protection system (OPS): Crane must have an electronic OPS that will disable all load moment-increasing functions at the control valve when an overload condition is reached. An electronic OPS shall disable all load moment-increasing functions at the control valve when an overload condition is reached. The crane shall stop at the position at which the overload condition was encountered and only crane functions that would reduce the operating radius would be available until the overload condition is removed. The display on the RRC handset shall show the progression of capacity. At 90 percent of capacity, an audible intermittent alarm shall sound. When 100 percent of capacity is reached, an audible steady alarm shall sound, and all load-moment-increasing movements shall be blocked. An additional lead will advise the operator on what condition is creating the overload condition. (Main lift cylinder, rotation limit, etc.). A diagnostics read-out shall be provided on the crane to show the operator and maintenance personnel information on the crane's operation. System information shall be stored in history for maintenance personnel. An override of the overload protection system shall be provided for false overload situations only and will only be allowed for a maximum of 1.5 seconds of operation to reduce pressure in the main lift cylinder. A 30-second delay between OPS override activation shall limit frequent re-use.

Comply Yes/No: _____

Remote Control: Crane shall be equipped with a factory-approved and installed paddle-type wireless fully proportional remote control with a capacity alert meter. The remote control shall be equipped with multiple settings for speed control. Each direction of each function shall have adjustable full-stroke control on all speed channels. Remote shall have an integral capacity alert meter to show the percentage of capacity being lifted. Battery charger shall be mounted inside the cab. Two rechargeable batteries shall be provided. A backup connection wire (50 feet minimum) shall be provided to supply the transmitter with power and eliminate radio signals in the event of battery failure or radio interference.

Comply Yes/No: _____

Outriggers: Crane outriggers shall have a hydraulic extension to a total spread of 24 feet 3 inches. The outrigger beam system shall have adjustable side guides in the crane base. Crane outrigger legs shall have 9-inch stabilizer plates with 10-degree tilting capability in all directions and remain fixed to the leg for transport. Leg cylinder hoses shall be routed on top of the beams for maximum protection. Outrigger legs shall be equipped with pilot-operated check valves. An electric diverter shall isolate the crane and outrigger controls from simultaneous operation. A bubble level equipped with a visibility mirror shall be installed at each outrigger control station. Crane outrigger legs shall have a wraparound L.E.D. warning light. Outriggers to be equipped with High-Performance Stability Control (HPSC) or equivalent. HPSC is a capacity limitation related to the positioning of crane supports. Positions of outrigger beams and stabilizers are recorded at crane set-up. LED display of system settings at outrigger control valves. Lifting capacities are adjusted according to conditions set within crane electronics upon commissioning.

Comply Yes/No: _____

Auxiliary Outriggers: The truck shall have two (2) hydraulically operated dropdown outriggers located on each side of the truck at the rear. There shall be an indicator light on the truck dash to indicate that the outriggers are in the un-stowed position.

Comply Yes/No: _____

Mounting: The crane shall be attached to the chassis using four (4) mounting points. The crane base shall have a mounting balance to distribute force on both chassis frame rails. Crane shall be mounted behind the cab of the truck on top of a 6 by 4 by 3/8 tube subframe with cross members every 26-28 inches. The installed unit shall have spacers installed between the truck chassis flanges to avoid crushing or distorting the frame rails. Means shall be provided to assure that the frame rail spacers do not fall out in case the mounting studs loosen up.

Comply Yes/No: _____

Flatbed Body: The operator's platform, if provided shall be coated in skid resistance. The bed deck shall be 25 feet long. The bed deck shall have a usable deck width of 102 inches. The bed decking shall be made of hardwood flooring and 2 inches thick. Bed cross members are to be constructed of 3-inch structural channel steel spaced on 12-inch centers. Bed frame to be constructed of 5-inch by 3-inch by 1/4-inch angle steel. Bed to have underside sliding winch/ratchet/binders track on driver side with eight (8) sliding winches with 4-inch by 27 feet straps. Bed to have underside ½ inch by 3-inch flat bar steel on the passenger side to serve as a grab point for J-hook straps from the sliding winch side. Bed to have a sleeve for storage of winch rod. Bed-long sills shall be constructed of 1 by 3-inch flat bars. The bed shall be primed and painted gloss black enamel. Bed shall have a headboard that is 27 inches tall by 102 inches wide, framed in a 2.5-inch by 2.5-inch tube, and covered with a 3/16-inch treadplate. The area between the subframe and main frame rails at the rear of the truck shall be covered by 3/8-inch plate steel. The truck shall have an ICC-compliant rear bumper.

Comply Yes/No: _____

Crane Subframe: Subframe long sills shall be constructed of 6 inches by 4 inches by 3/8 inches tube and run the length of the truck frame from immediately behind the truck cab to the end of the frame**.** The subframe shall have cross members constructed of 6 inches by 4 inches by 3/8 inches tubes spaced every 24 inches to 28 inches over the entire length of the subframe**.** Subframe long sills shall be capped at both ends, with a 45-degree angle on the subframe end towards the back of the truck cab and a flat end at the back of the truck. The subframe shall be undercoated for rust prevention.

Comply Yes/No: _____

Crane Hydraulic and Electric Setup: Crane to be wired to PTO power to come on and off when PTO is engaged/disengaged. Bodybuilder to supply weatherproof junction box with DIN rail mounted resettable mini breakers for crane powers and centralized grounding terminal through which all crane and accessory wiring is fused.

Two audible alarms in the cab wired to boom stow/outrigger stow alarm and radio remote stow alarm on radio remote control bracket. Crane radio remote control battery charger to be mounted inside the truck cab. In-cab stow bracket for radio remote wired to audible in-cab alarm that sounds if radio not stowed, and PTO is disengaged.

Comply Yes/No: _____

Compressor: Truck shall have a screw-type air compressor that shall provide 80 CFM maximum @ 150 PSI. The compressor shall be mounted on the passenger side of the truck, Department to specify the exact location.

Comply Yes/No: _____

Lights: Standard required DOT lighting package, LED. All additional lighting is to be supplied by MDOT.

Comply Yes/No: _____

Accessories: Truck shall have one (1) 60 inches long, 24 inches deep, 24 inches tall steel toolbox, mount location to be determined by MDOT. All steel fabrication, unless otherwise specified in this specification, is to be primed and painted gloss back enamel.

Comply Yes/No: _____

Truck:

GVWR: 58,000 pounds

GVWR (pounds): _____

Comply Yes/No: _____

Dimensions: 370 inches of clear frame rail from the back of the cab to the end of the frame or 260-inch CT (cab to tandem)

CT (inches): _____

Comply Yes/No: _____

Engine: 12.8-liter, 470-horsepower by 1,800 RPM, water-cooled, diesel, 1,650 feet pounds torque by 1,000 RPM, meeting all current federal and EPA emission requirements

Make: _____ Model: _____

Displacement (liters): _____ Power (horsepower): _____

Torque (pound-feet): _____

Comply Yes/No: _____

Engine Protection: Truck shall have an automatic shutdown system to include oil pressure, oil temperature, and coolant temperature.

Comply Yes/No: _____

Cooling System: Heavy-duty, high-capacity radiator, silicone hoses, designed for vocational-duty application.

Comply Yes/No: _____

Exhaust: Vertically mounted, 90-degree tip facing rear to protect from rain and debris

Comply Yes/No: _____

Transmission: Heavy-duty, fully automatic transmission; hot-shift PTO, designed for on-road/off-road operations, minimum rear axle gear ratio must be geared for highway speeds up to a minimum top speed of 75 miles per hour (MPH) with fully loaded truck. Allison brand 4,000 series automatic transmission or equivalent.

Make: _____ Model: _____

Type: _____ Speeds: _____

Rear axle gear ratio: _____

Comply Yes/No: _____

Brakes: Full air disc, ABS with 6 channel/6 sensor/6 modulator configuration for front and rear axle compatibility, sized to meet all applicable state and federal safety standards for size, weight and application of truck. Mechanical spring-set rear axle parking brakes.

Manufacturer: _____ Type: _____

Style: _____ ABS configuration: _____

Comply Yes/No: _____

Axle Rating and Suspension:

Front: 18,000-pound, multi-leaf springs with shock absorbers, setback configuration, disc brake compatible hubs

Manufacturer: _____

Axle type: _____ Weight rating (pounds): _____

Suspension type: _____ Weight rating (pounds): _____

Rear: 40,000-pound, to comply with requirements of rear axle, air bag type, in-cab pressure control release valve, with inter-axle differential lock and full locking wheel differential (anti-spin device), disc brake compatible hubs

Manufacturer: _____

Axle type: _____ Weight rating (pounds): _____

Suspension type: _____ Weight rating (pounds): _____

Comply Yes/No: _____

Electrical: One (1) 12-volt, 160-amp alternator. Three (3) 12-volt maintenance free batteries, 625 CCA, combined total 1,875 CCA. Batteries to be contained in a battery box.

Alternator:

Manufacturer: _____

Amp rating: _____

Battery:

Power (CCA per battery/total CCA): _____

Comply Yes/No: _____

Frame: All grade 8 bolts and hardware (preferred) or Huck bolts for assembly. High strength, low alloy steel section modulus, 2,500,000 RBM.

Section Modulus: _____ RBM: _____

Comply Yes/No: _____

Fuel System: 130-gallon tank capacity, single tank, dual-stage fuel filters

Capacity (gallons): _____

Comply Yes/No: _____

DEF Tank: 20-gallon tank, frame-mounted

Capacity (gallons): _____

Comply Yes/No: _____

Steering: Power – integral

Comply Yes/No: _____

Driveline: Heavy-duty main u-joint with inter-axle

Comply Yes/No: _____

Tires: All tires must be rated equal to or higher than axle and suspension weight specifications Steel radial, highway tread, high mileage steer axle type front; all seasons, on-road/off-road, high mileage rear drive axle type duals and spare.

Front:

Manufacturer: _____ Size: _____

Rear:

Manufacturer: _____Size: _____

Comply Yes/No: _____

Wheels: Must be rated equal to or higher than axle and suspension weight specifications, disc brake compatible

Front: Pilot 22.5 by 9, 10-hole disc, steel, hub piloted

Manufacturer: _____ Size: _____

Rear: Pilot 22.5 by 8.25, 10-hole disc, steel, hub piloted.

Manufacturer: _____Size: _____

Comply Yes/No: _____

Back-up Alarm: Smart, self-adjusting alarm system which is activated upon engagement of the reverse gear of the vehicle, is audible above normal outdoor sounds, and meets FMVSS requirements. The backup warning alarm shall be mounted on the rearmost part of the vehicle, be protected from water and road spray and meet a minimum 82 dB up to 107 dB depending on surrounding ambient noise levels.

Comply Yes/No: _____

Cab and Equipment: Conventional-type, steel or aluminum construction with fiberglass front hood and fender assembly, tilting hood and fender assembly with fixed grill, equipped with door pads and back of cab pads for sound deadening and insulation.

All standard equipment including, but not limited to:

- Five (5) cab-mounted marker lights
- Stainless steel cab-mounted exterior sun visor
- Exterior assist handles on both sides (if the exhaust is in the way, then an interior assist handle will be acceptable for the side affected)
- Power and heated RH and LH C-frame or pedestal exterior mirrors with convex auxiliary mirrors
- Power windows and door locks
- Deluxe high-back air-suspended driver and passenger seats with armrests
- Sun Visor (RH and LH),
- Two (2) cup holders
- High-visibility orange safety belts
- Factory air conditioning and heater with defroster
- All dash switches, including spares shall be functional.
- Warning lights and buzzers for air pressure, oil pressure, and water temperature
- Direct reading gauges for oil pressure, water temperature, and air pressure
- Tachometer
- 12-volt accessory dash-mounted power outlet
- AM/FM Bluetooth stereo radio with a hands-free option
- Dual air horns
- Tinted glass all around
- Multi-speed electric windshield wipers and washers with intermittent mode
- Tilt steering column
- Cruise Control
- Front tow hooks
- Heavy-duty front bumper
- Holder for operator's manuals
- Hand control valve and tractor protection valve
- Black undercoating applied to the underside of the body.
- Triangle reflector kit
- U/L approved 2 ½ pound BC dry chemical fire extinguisher shall be installed in the truck cab.

- Axle air bladder dump valve
- High visibility rear window on the cab

Comply Yes/No: _____

Paint: Manufacturer's standard white.

Comply Yes/No: _____

ADDITIONAL REQUIREMENTS

Service: The Knuckle Boom shall be delivered fully assembled and ready to operate. Factory-trained dealer representative is to inspect the Knuckle Boom upon delivery and provide receiving MDOT equipment manager with information on operational, service, and maintenance requirements.

Bidder shall maintain a representative inventory of replacement parts and service facilities as well as all necessary diagnostic tools/equipment/software and software licenses needed for diagnosis, repair, service, and maintenance.

Acknowledge Yes/No: _____

Warranty: Clearly stated terms and conditions of all manufacturer warranties shall be included with the bid package. All materials, specialty equipment, or accessories that prove defective in normal operation within the warranty period shall be replaced or repaired by the manufacturer free of all cost to MDOT, including all material, labor, and transportation costs. Warranty replacement and/or repairs shall be furnished promptly by the successful bidder within a time not to exceed thirty (30) calendar days. **The bidder shall provide written assurance with the bid package regarding warranty repairs.**

The delivering dealer will have sole warranty responsibility (**all components**) for the first ninety (90) calendar days after acceptance of equipment.

The manufacturer shall provide, with the bid package, a list of warranty service locations within the State of Mississippi for all components of the Knuckle Boom (body, chassis, electrical, etc.) which may need warranty repair beyond the first ninety (90) calendar days.

Acknowledge Yes/No: _____

Workmanship: Workmanship throughout shall conform to the highest standard of commercially accepted practice for the class of work and shall result in a neat and finished appearance. The design which the manufacturer proposes must be of substantial and durable construction in all respects.

All parts shall be new. Used, reconditioned, or obsolete parts will not be accepted.

Acknowledge Yes/No: _____

Parts Availability: Dealer name and contact information located closest to the point of delivery:

Dealer Name: _____

Telephone: _____

Street Address: _____

City, State, ZIP: _____

Acknowledge Yes/No: _____

Tests and Testing: The complete Knuckle Boom and all working and moving parts and operating devices shall be thoroughly tested and put in operating condition by the manufacturer.

Prior to acceptance by MDOT, the manufacturer shall service and adjust the Knuckle Boom for operation.

Acknowledge Yes/No: _____

Literature:

Technical manuals: Operator's manual, service/maintenance manual, and parts book are to be made available in both hard copy and electronic (PDF file format on USB flash drive) versions. One set of technical manuals shall be provided with each Knuckle Boom upon delivery. Additional manuals may be ordered later.

Technical service bulletins: Successful bidder shall provide TSBs (technical service bulletins) for each Knuckle Boom(s) delivered to MDOT as they are published, regardless of the date of delivery. TSBs may be furnished in paper or electronic format and shall be updated regularly.

The following additional information shall be provided by the vendor at time of delivery (electronically if possible):

- Manufacturer's recommended service/preventive maintenance intervals
- Recommended fluids, lubricants, and their SAE equivalents

Two (2) copies of descriptive literature shall be furnished to substantiate the details specified in the bid.

Acknowledge Yes/No: _____

Certification: The manufacturer(s) shall furnish certification that the Knuckle Boom meets or surpasses current U.S. Department of Labor Occupational Safety and Health Administration (OSHA) Regulations, U.S. Department of Transportation Federal Motor Vehicle Safety Standards (FMVSS), and any other applicable Federal regulations.

Acknowledge Yes/No: _____

NOTE: The Mississippi Department of Transportation is exempt, by way of contractual purchases, from Regulation Eleven and the protections provided by the Mississippi Motor Vehicle Commission. A written notice, established by public hearing on April 21, 2010, at 10:00 a.m., is on file with the Mississippi Motor Vehicle Commission, 1755 Lelia Drive, Suite 200, Jackson, MS 39216.

As a second stage or "specialty vehicle" manufacturer, you are not required to hold a Mississippi Manufacturer or Dealers' License and if you choose, may sell the finished motor vehicle directly to the Mississippi Department of Transportation.

Acknowledge Yes/No: _____

Vehicle Title or Certificate of Origin:

Assignment: State of Mississippi/DFA – 941

Mailing address: Mississippi Department of Transportation, 9301
P.O. Box 1850

Jackson, MS 39215

Acknowledge Yes/No: _____

Lienholder: Upon award, **if** MDOT issues a **Notice to Proceed** instead of a **Purchase Order**, the Knuckle Boom is being purchased through the State's Master Lease Purchase Program and the specified financial institution must be listed as Lienholder.

Acknowledge Yes/No: _____