

U.S. Army Type II Heavy Crane Purchase Description (PD)

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U.S. Army Type II Heavy Crane Purchase Description

FORWARD

This Purchase Description is approved for use by all Departments and Agencies of the Department of Defense. This Purchase Description entails the technical requirements and the means for verification for the Family of All-Terrain Crane Type II. Comments, suggestions, or questions regarding this document may be addressed to TARDEC CE Engineer Doris Strong, 6501 E. 11 Mile Rd, Warren MI 48397, Mail Stop; 21, email address; Doris.strong@us.army.mil, telephone; 586-282-6291.

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1. SCOPE.

- 1.1. Scope. This Purchase Description #2408 includes the Family of All Terrain Crane Type II, hereon referred to as the Type II Heavy Crane. This Purchase Description entails the technical description and technical requirements which apply to the Type II Heavy Crane.
- 1.2. Armor Considerations. All criteria shall be met in the armor A-Kit configuration (see 3.1.4). Except where noted, all criteria shall also be met with the Crew Protection Kit (CPK) installed (see 3.1.4).

2. APPLICABLE DOCUMENTS.

- 2.1. The following list of applicable documents include specifications, standards and handbooks for which the Type II Heavy Crane shall comply, per the specific details shown in Section IV and V of the Requirements Table.
- 2.2. The following specifications, standards and handbooks form a part of this document to the extent specified herein. These documents may be listed in the Department of Defense Index of Specifications and Standards (DoDISS) which indicates the latest version.

SPECIFICATIONS

A-A-50271	Plate Identification
A-A-52624	Antifreeze, Multi-Engine Type

FEDERAL

FED-STD 595	Colors Used in Government Procurement
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MILITARY

MIL-DTL-3976	Lights, Marker, Clearance (Service and Blackout) General specification For
MIL-DTL-32361	Composite Light, Tail Stop, Turn and Marker
MIL-DTL-53072	CARC System Application Procedures and Quality Control Inspection
MIL-DTL-83133	Turbine Fuel, Aviation, Kerosene Type, JP-8 (NATO F-34), NATO F-35, and JP-8+100 (NATO F-37)
MIL-HDBK-1791	Designing for Internal Aerial Delivery in Fixed Wing Aircraft
MIL-PRF-2104	Lubricating Oil, Internal Combustion Engine Combat/Tactical Service
MIL-PRF-10924	Grease, Automotive Artillery
MIL-PRF-11021	Switch, Vehicular Lights, 24-volt, DC, Waterproof
MIL-PRF-46170	Hydraulic Fluid, Rust Inhibited, Fire-Resistant, Synthetic Hydrocarbon Base, NATO Code No. H-544 MIL-PRF-46176 Brake Fluid, Silicone, Automotive All-Weather, Operational and Preservative
MIL-STD-130	Identification Marking of U.S. Military Property
MIL-STD-209	Slinging and Tie-down Provisions for Lifting and Tying Down Military Equipment
MIL-STD-461	Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
MIL-STD-464	Electromagnetic Environmental Effects Requirements for Systems
MIL-STD-810	Environmental Engineering Considerations and Laboratory Tests
MIL-STD-889	Dissimilar Metals
MIL-STD-1366	Material Transportation System Dimensional and Weight Constraints

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MIL-STD-1472	Human Factors
MS1113	Switch, Vehicular Lights, 24-volt, DC, Waterproof
MS52126	Composite Light, Front, Turn, Park and Marker
SDDC TEA Pam 70-1	Transportability for Better Deploy-ability

OTHER GOVERNMENT DOCUMENTS

2.2.1. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

DEPARTMENT OF LABOR (DOL)

29CFR 1910	Occupational Safety and Health Standards (OSHA)
29CFR 1926	Safety and Health Regulations for Construction (OSHA)

DEPARTMENT OF TRANSPORTATION (DOT)

49CFR 393	DOT Federal Motor Carrier Safety Regulations (FMSCR)
49CFR 571	DOT Federal Motor Vehicle Safety Standards (FMVSS)

(Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, 732 North Capitol Street, NW, Washington, DC 20402, or at www.dol.gov or at www.dot.gov, respectively).

NON-GOVERNMENT PUBLICATIONS

2.2.2. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents, which are DOD adopted, are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

Z535.1	Safety Color Code
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(Applications for copies should be addressed to the American National Standards Institute, Inc., 25 West 43rd Street, New York, NY 10036, or at www.ansi.org).

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, INC. (ASME)

B30.5	Safety Code for Crawler, Locomotive and Truck Cranes.
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(Application for copies should be addressed to the American Society of Mechanical Engineers, Inc., 345 East 42nd Street, New York, NY 10017.)

ASSOCIATION OF AMERICAN RAILROADS (AAR)

General Rules Governing the Loading of Commodities on Open-Top Cars

(Application for copies should be addressed to IRF, 525 School St., Washington, D.C. 20024)

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AMERICAN WELDING SOCIETY, INC. (AWS)

AWS D1.1	Structural Welding Code-Steel
AWS D1.2	Structural Welding Code-Aluminum
AWS D1.3	Structural Welding Code- Sheet Steel
AWS D14.3	Earthmoving and Construction Equipment Welding, Section 5

(Application for copies should be addressed to the American Welding Society, Inc., 550 NW LeJune Road, Miami, FL 33126)

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 2631	Mechanical vibration and shock Evaluation of human exposure to whole-body vibration
ISO 3411	Earth-Moving Machinery – Human Physical Dimensions of Operators and Minimum Operator Space Envelope
ISO 3449	Earth-moving machinery -- Falling-object protective structures -- Laboratory tests and performance requirements
ISO 3471	Earth-moving machinery -- Roll-over protective structures -- Laboratory tests and performance requirements
ISO 5010	Earth-moving machinery — Rubber-tyred machines — Steering requirements
ISO 6682	Earth-Moving Machinery - Zones of Comfort and Reach for Controls (CEN EN ISO 6682: 1995) - Second Edition; Amendment 1: 1989
ISO 7752	Cranes-Control and characteristics

(Application for copies should be addressed to the International Organization for Standardization, 1, rue de Varembe, CH-1211 Geneva 20, Switzerland or contact by email at sales@iso.org).

NORTH ATLANTIC TREATY ORGANIZATION (NATO) STANDARDIZATION AGREEMENT (STANAG)

NATO STANAG 4074	
-Type I	Auxiliary Power Unit Connections for Starting Tactical Land Vehicles ED 2 AMD 0
NATO STANAG 4478	Emergency Towing and Recovery Facilities for Tactical land Vehicles

SOCIETY OF AUTOMOTIVE ENGINEERS, INC (SAE)

J10	Automotive and Off-Highway Air Brake Reservoir Performance and Identification Requirements
J88	Sound Measurement - Earthmoving Machinery – Exterior
J159	Crane Load Moment System
J318	Air Brake Glad-hand Service (Control) and Emergency (Supply) Line Couplers - Trucks, Truck-Trailers, and Trailers
J375A	Radius-of-Load and Boom Angle Measuring System
J376	Load Indicating Devices in Lifting Crane Service

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J514	Hydraulic Tube Fittings
J534	Lubrication Fittings
J674	Safety Glazing Materials - Motor Vehicles
J712	Industrial and Agricultural Disc Wheels R (1999)
J753	Maintenance Interval Chart
J765	Crane Load Stability Test Code
J899	Operator's Seat Dimensions for Off-Road self-propelled Machine
J919	Sound Measurement - Earthmoving Machinery Operator Singular Type
J931	Hydraulic Power Circuit Filtration
J994	Alarm- Backup- Electric Laboratory Performance Testing
J1013	Measurement of Whole Body Vibration of the Seated Operator of Off-Highway Work Machines
J2360	Lubricating Oil, Gear Multipurpose (Metric) Military Use
J1176	External Leakage Classifications for Hydraulic Systems, Recommended Practice
J1180	Telescopic Boom Length Indicating System
J1305	Two-Block Warning and Limit Systems in Lifting Crane Service
J1308	Fan Guards for Off-Road Machines
J1503	Performance Test for Air- Conditioned, Heated and ventilated Off-Road Self- Propelled Work Machines
J1614	Wiring Distribution Systems for Off-Road, Self-Propelled Work Machines
J1908	Electrical Grounding Practice, Standard

(Application for copies should be addressed to the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096, or at www.sae.org).

TIRE AND RIM ASSOCIATION, INC.

T & RA Yearbook

(Application for copies should be addressed to the Tire and Rim Association, Inc., 175 Montrose Ave, Suite 150, Copley, OH 44321, or at www.us-tra.org/)

2.3 Order of precedence.

In the event of a conflict between the text of this specification and the references cited herein, requirements shall be followed by the below listed order of precedence:

1. Contract Document and associated contract clauses.
2. Type II Heavy Crane Performance Specification
3. Government Standards, specifications or handbooks.
4. Non-government standards, specifications or handbooks.

2.3.1 Compliance with Laws & Regulations.

The requirements and specifications contained in the above documents shall not be interpreted as a waiver or allowance to supersede any law or regulation unless a specific exemption has been obtained.

3. Technical Requirements

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TABLE I consist of Section 3.0 Technical Requirements and Section 4.0 Verification Requirements for which the Type II Heavy Crane shall comply. Section 3.0 contains the capability description and technical parameters thereof. It covers both the performance characteristics and the associated specifications for which the Type II Heavy Crane shall meet.

4. Verification Requirements

Section 4.0 in TABLE I consists of the methods used to verify the product meets the requirements shown in Section 3.0. Sections 3.0 and 4.0 show a one for one relationship, requirements to the means of verification. All tests and test parameters are clearly defined in Section 4.0. Conformance with Section 3 requirements shall be verified as defined in Section 4.0, through one or more of the following methods, as identified in the matrix chart: Inspection, Test, Certification and Analysis.

- 4.1. Inspection (I). Inspections shall constitute those activities conducted by the contractor or Government Quality Assurance Representative (QAR) to verify systems attributes and characteristics against the Section 3 requirements of the Type II Heavy Crane Purchase Description. Verification shall be accomplished by visual or physical examination of the end item, subsystems and/or components, and may include but are not limited to recording measurements, evaluating physical characteristics and interfaces with respect to form, fit, and function, and reviewing descriptive documentation. Inspection also includes **Quality Conformance Inspection (QCI)**. The QCI will entail each Type II Heavy Crane undergoing a complete final inspection by the contractor and Government including all Section 3 and 4 requirements. The QCI shall be conducted and documented utilizing a Government approved Final Inspection Record (FIR).
- 4.2. Test (T). Testing will be a First Article Test (FAT) and shall be conducted by the Government at a Government test site, and shall be accomplished through the systematic physical operation of the Type II Heavy Crane, its subsystems or components, under appropriate and specified conditions, with or without instrumentation, and the collection, analysis, and evaluation of resulting data.
 - 4.2.1. First Production Unit Inspection (FPUI). FPUI shall be conducted by the contractor and shall take place at the manufacturer's facility, with the purpose of verifying product conformance.
 - 4.2.2. Production Verification Test (PVT). PVT will be conducted by the government and shall take place at the government test site, with the purpose of verifying production capability, durability and performance characteristics.
 - 4.2.3. Quality Conformance Inspection (QCI). QCI shall be conducted by the contractor and shall take place at the manufacturer's facility, with the purpose of verifying product conformance during and after fabrication
 - 4.2.4. Follow-on Production Test (FPT). FPT will be conducted by the government and shall take place at a government test site, with the purpose of verifying continuous product quality conformance and performance.
 - 4.2.5. Control Test (CT). CT shall be conducted by the contractor and shall take place at the manufacturer's facility, with the purpose of verifying product quality and process controls.

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- 4.3. Certification (C). Certifications are defined as contractor-furnished documents certifying conformance with specific Section 3 requirement criteria. Certifications shall be signed by the contractor's certifying official or responsible party, and shall include all supporting data (e.g. test/ performance, material data, dimensional analysis, etc). As directed by the Government, certifications may be used in lieu of additional verification methods.
- 4.4. Analysis (A). Analyses shall be conducted by the contractor and shall consist of technical or mathematical evaluations, mathematical models, simulations, algorithms, charts, diagrams, representative data, or other appropriate means to demonstrate conformance with the Section 3 requirement.
- 4.5. Test Conditions. All tests shall be conducted under climatic conditions specified by the Type II Heavy Crane Purchase Description or as specified in the applicable Test Operating Procedures (TOPs). All performance tests for the Type II Heavy Crane shall be conducted using JP-8 fuel (MIL-DTL-83133).
- 4.6. First Article Test (FAT). When required by the contract, a First Article Test (FAT) shall be conducted consisting of a First Production Unit Inspection (FPUI) and Production Verification Test (PVT), as specified in Table 1. Unless otherwise specified in the contract, the FAT shall comprise of complete inspections and tests of the Heavy Crane to verify product conformance and performance. Failure of the FAT shall be cause for rejection and shall require root cause corrective action and retest of the EMM-WD system, until all production characteristics have satisfied ATPD 2408 and contract.
- 4.6.1 First Production Unit (FPUI). The contractor shall conduct a complete first production unit inspection, as part of a FAT. The FPUI shall be conducted prior to the PVT and shall serve to verify production capability and system performance. The FPUI, conducted at the place of manufacture of the Heavy Crane, shall start during fabrication of the Heavy Crane and continue through integration and assembly and final assembly. During fabrication of the first production unit, in-process test and inspection shall be performed by the contractor. The government may witness or participate in all or any part of the FPUI.
- 4.6.2 Production Verification Test (PVT). The PVT will be conducted as described in Table 1 Section 3 and 4. The Heavy Crane shall be completed inspected during the limited technical vehicle inspection at start of the PVT. Failure of any performance characteristics (and test) shall require root cause corrective action by the contractor and retest of the Heavy Crane.
- 4.6.3 Follow-on Production Test (FPT). The Government may randomly select Heavy Cranes at any time during the production contact period and subject these units to all applicable tests referenced in Table I. The FPT is a test of the end item, similar to the PVT, but more limited in scope, to assess continued conformance to requirements and production capability.

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TABLE 1: Technical and Verification Requirements

KEY: C: Certification, A: Analysis, D: Demonstration, E: Examination, T: Test

3.0 REQUIREMENTS	FPU	PVT	QCI	CT	FPT	4.0 VERIFICATION
<p>3.1 General Description and Requirements The Type II Heavy Crane must be all terrain, self deployable (operation and travel under its own power) and road legal with permits (adheres to Title 23 of the Code of Federal Regulations (CFR) part 658) in 50 states. The Type II Heavy Crane shall be a pneumatic-tired, diesel engine-driven vehicle, with a continuously revolving superstructure and cabs, hydraulically-powered, telescoping boom, attachments, main and auxiliary winch with wire rope and hook block. It shall be configured with all components or accessories necessary to be connected and operate at full capacity all attachment required herein to include the pile driver and adaptor plates for interface connections for the pile driver. The R& M and durability inherent in the commercial version of the Type II Heavy Crane is acceptable to the Government.</p>	C	I				<p>Initial Inspection. The crane and supporting equipment will be inventoried and visually inspected. Test Operations Procedure (TOP) 2-2-505, TOP 2-2-500, TOP 2-2-800, TOP 2-2-801, MIL-STD-1366E, and SAE J1100 will be used to complete inspection.</p> <p>The contractor shall provide a compliance certification supported by objective evidence of Conformance IAW ANSI/ASME B30.5 and requirements stated here within.</p>
<p>3.1.1 Crane Offering. The Type II Heavy Crane shall be equipped with all components necessary to enable the cranes to function reliably and efficiently in accordance with requirements stated herein.</p> <p>Manufacturer decals, logos and model numbers shall be limited to non-distracting or reflective displayed in flat black color on the cranes. The Type II Heavy Crane shall conform to all Federal Law and regulations governing safety, noise levels and pollution, which are in effect on the date of proposal or publicly known to be scheduled for implementation during the performance of the contract.</p>	C					<p>The contractor shall furnish certified test reports to prove compliance with the crane offering requirement of 3.1.1. If certified test reports are not available, these requirements shall be demonstrated.</p>
<p>3.1.2 Materials. The crane(s) shall not contain Class I or Class II ozone-Depleting Substances. Asbestos, cadmium (electroplating processes), hexavalent chromium (electroplating and coatings processes), or other highly toxic or carcinogenic materials as defined</p>	C		I			<p>Materials Certification. The contractor shall furnish certified test reports to prove compliance with the materials requirement of 3.1.2. If certified test reports are not available, these requirements shall be</p>

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3.0 REQUIREMENTS	FPU	PVT	QCI	CT	FPT	4.0 VERIFICATION
in 29 CFR1910.1200 shall not be used without Governmental approval. Materials used shall be free from defects which would adversely affect the performance or maintainability and safety of individual components or the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in commercial practice.						demonstrated.
3.1.3 Dissimilar metals shall not be used in intimate contact with each other unless protected against galvanic corrosion. Dissimilar metals and methods of protection are defined and detailed in MIL-STD-889	C		I			Dissimilar metal s non-contact certification. The contractor shall furnish certified test reports to prove compliance with the dissimilar metals requirement of 3.1.3. If certified test reports are not available, these requirements shall be demonstrated..
3.1.4 Supplemental Armor Set/Crew Protection Kit. See Attachment 0037-CLASSIFIED ANNEX 01 TO PD 2408		T				Armor Protection Evaluation. See Attachment 0037-CLASSIFIED ANNEX 01 TO PD 2408
3.1.5 Winch Assembly. The Type II Heavy Crane shall be provided with two variable speed hoist winches capable of providing sufficient line pull to support the maximum rated load (T). The winch shall operate with both drop hammer type and diesel engine driven pile drivers in the current ARMY inventory as well as the pile driver required within this document. An auxiliary winch shall be provided.	C	T	I			Winch . The contractor shall furnish certified test reports to prove compliance with the winch assembly requirement of 3.1.5. If certified test reports are not available, these requirements shall be demonstrated. Winch operation shall be tested following procedures in the contractor's manual. Inability of the winch to support operation of the pile driver and/ meet the requirements of 3.1.5 shall constitute failure of this test. Test Operations Procedure (TOP) 2-2-712 will be used to complete test.
3.1.6 Hydraulic Hose Reel. Type II Heavy Crane must have a hydraulic hose reel with adequate hose length with quick disconnects to operate attachments.	C	I	I			Hydraulic Hose Reel. The contractor shall furnish certified test reports to prove compliance with the hydraulic hose reel requirement of 3.1.6. If certified

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3.0 REQUIREMENTS	FPUJ	PVT	QCI	CT	FPT	4.0 VERIFICATION
						<p>test reports are not available, these requirements shall be demonstrated</p> <p>The cranes shall be inspected to verify hose has adequate length and quick disconnects to operate each attachment.</p>
<p>3.1.7 ATTACHMENTS. Each crane shall be configured with all interface components or accessories necessary to connect to and operate each attachment at full capacity. All hydraulically actuated functions shall be controlled from the operator's station. All attachments shall be provided with tie-down provisions. All attachments must be able to accompany the Type II Heavy Crane for embarkation or travel. All attachments (excluding the sling sets) will be transported separately.</p>		T				<p>Attachments. The crane shall be tested to show the capability to install and operate the attachment in the allotted time frame specified in 3.1.7. Each attachment will undergo 8 hours of testing. For the purpose of this test, a failure is defined as any malfunction which precludes the crane from performing its intended mission as described herein, and could not be corrected within 30 minutes by the operator using only on-board tools.</p>
<p>3.1.7.1 Attachment Interchangeability. The Type II Heavy Crane must be ready to accept and operate all of the attachments (listed within) without any major modifications. The Type II Heavy Crane must be able to be reconfigured with all attachment and fully operational within two hours (seven hours for the pile driver) by no more than 2 Soldiers (3 Soldiers for the pile driver) with standard tools or BII (T).</p>		T				<p>Attachments. All attachments shall conform to 3.1.7.1. Each attachment supplied during PVT will be installed on the crane and perform a function test. Inability to function as designed and/or to be reconfigured as identified in 3.1.7. shall constitute failure of this test.</p>
<p>3.1.7.2 Four (4) Leg Sling Set. A 20 ton sling, 40 ton sling and a maximum heavy lift sling set with a lift capacity equal to or greater than the total lift capacity of the crane (T) shall be provided. The heavy lift sling set has to be able to lift the maximum amount of weight that the Type II Heavy Crane can lift in four leg configuration. The all three sets shall be reconfigurable to a one, two, three, and four leg configuration based on the load and weight of the load; a minimum of 25 feet in length; and be able to be reduced in size to meet different load configurations. A heavy container lifting and loading device (spreader bar) shall be provided (T). The spreader bar and sling set must be stored on the Type II Heavy Crane, positioned in a place that will not interfere in operations or maintenance.</p>	C	T				<p>Sling Set. The contractor shall furnish certified test reports to prove compliance with the sling set requirement of 3.1.7.2. If certified test reports are not available, these requirements shall be demonstrated.</p> <p>4 leg sling set shall be tested following procedures in the contractor's manual. Inability of the sling to support operation lifts of the crane and/ meet the requirements of 3.1.7.2 shall constitute failure of this test.</p>

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3.0 REQUIREMENTS	FPUJ	PVT	QCI	CT	FPT	4.0 VERIFICATION
<p>3.1.7.3 Pile Driver. A pile driver of appropriate size for the crane, capable of driving wood, concrete, and steel piles (T) shall be provided. The crane shall operate with a diesel engine driven type pile drivers and leads. The Heavy Type II crane shall also have the ability to integrate and operate the Army's current pile driver (NSN 3895-01-523-0365; TM 5-3810-307-10 or TM 5-3810-307 -24-1-1 or TM 5-3810-307 -24-1-2). An adaptor plate shall be fabricated for the interface connection between the crane boom tip and the top of the pile driving lead. Plates shall be attached to the outer edges of the lead.</p> <p>A permanent container shall be included to house the pile driver. The container shall be designed to provide weather protection and security with the four container pins permanently tethered to the frame at all times. The container full with attachment must be sling-loadable and transportable per paragraph 3.4.5 and have the lift and tie-down provisions of paragraph 3.4.6</p>	C	T				<p>Pile Driver. The contractor shall furnish certified test reports to prove compliance with the pile driver requirement of 3.1.7.3. If certified test reports are not available, these requirements shall be demonstrated.</p> <p>The pile driver shall be tested following procedures in the contractor's manual. Inability of the pile driver to be configured and complete a functional performance test and/ meet the requirements of 3.1.7.3 shall constitute failure of this test.</p>
<p>3.1.7.4 Clamshell. The clamshell shall be a hydraulically operated general purpose bucket, 2 cubic yard capacity, with teeth, controlled from the operator's station. A combination hose reel and tagline reel or a single reel which utilizes the hydraulic operating hose for the tagline function shall be attached to the crane to control and actuate the bucket.</p>	C	T				<p>Clamshell. The contractor shall furnish certified test reports to prove compliance with the clamshell requirement of 3.1.7.4. If certified test reports are not available, these requirements shall be demonstrated.</p> <p>The clamshell bucket shall be tested following procedures in the contractor's manual. Inability of the clamshell bucket to function as designed and/ meet the requirements of 3.1.7.2 shall constitute failure of this test.</p>
<p>3.1.7.5 Concrete Barrier Lifter. The Type II Heavy Crane shall be provided with an attachment for the lifting of concrete T-walls and other concrete barriers weighing 4,000 lbs – 16,000 lbs with widths of 4 - 12 inches. Barrier grapples with automatic actuators can lift, latch, emplace and unlatch automatically without the assistance of a secondary.</p>	C	T				<p>Concrete Barrier. The contractor shall furnish certified test reports to prove compliance with the concrete barrier requirement of 3.1.7.5. If certified test reports are not available, these requirements shall be demonstrated.</p> <p>The concrete barrier lifter shall be tested following</p>

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3.0 REQUIREMENTS	FPUJ	PVT	QCI	CT	FPT	4.0 VERIFICATION
						procedures in the contractor's manual. Inability of the lifter to function as designed and/ meet the requirements of 3.1.7.5 shall constitute failure of this test.
3.1.7.6 Concrete bucket. When specified a 2.0 cubic yard concrete bucket with a tether material release lever operated by personnel on the ground shall be provided.		T				<p>Concrete Bucket The contractor shall furnish certified test reports to prove compliance with the concrete bucket requirement of 3.1.7.6. If certified test reports are not available, these requirements shall be demonstrated.</p> <p>The concrete bucket shall be tested following procedures in the contractor's manual. Inability of the clamshell bucket to function as designed and/ meet the requirements of 3.1.7.6 shall constitute failure of this test.</p>
3.1.8 Boom The boom shall be a hydraulically operated, telescoping type, consisting of a base section and sliding section(s). The boom shall be capable of elevation from the horizontal to a vertical angle of not less than 70 degrees. The Type II Heavy Crane Type II shall have a reach of at least 100ft (minimum 80ft boom with jib or 100 ft boom) (T).	C	T				<p>Boom. The contractor shall furnish certified test reports to prove compliance with the boom requirement of 3.1.8. If certified test reports are not available, these requirements shall be demonstrated.</p> <p>The boom shall be tested following procedures in the contractor's manual. Inability of the boom to function as designed and/ meet the requirements of 3.1.8 shall constitute failure of this test.</p>
3.1.9 Load moment system. The crane shall be equipped with a load moment Indicating/limiter system. Criteria specified in this document shall follow normal commercial industry practices for LMI systems. The LMI shall use existing crane electrical power system and shall operate within all climatic conditions specified in this purchase description. The system shall meet the recommended requirements specified in SAE J159.	C	T	I			<p>LMI. The LMI system shall be tested in accordance with SAE recommended practices and requirements. Nonconformance to SAE J1305, J1180, J375A, J159, and J376 shall constitute failure.</p>
3.1.10 Hook Block. The running block and hook shall have adequate weight to insure payout of cable without load on the hook, with the hook block and boom in any position when reeved for the load which is to be	C	T				<p>Hook Block. The contractor shall furnish certified test reports to prove compliance with the hook block requirement of 3.1.10. If certified test reports are not</p>

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3.0 REQUIREMENTS	FPUJ	PVT	QCI	CT	FPT	4.0 VERIFICATION
lifted at the given radius. The hook shall be a swivel type with an ultimate breaking strength at least four times the maximum rated capacity of the crane and shall include a safety latch.						<p>available, these requirements shall be demonstrated.</p> <p>The hook block shall be tested following procedures in the contractor's manual. Inability of the hook block to function as designed and/ meet the requirements of 3.1.10 shall constitute failure of this test.</p>
3.1.11 Anti-two block hoist limits system. This system shall conform to ANSI/ASME B30.5.5-1.9.9. The system shall incorporate a Control Lock Out feature in accordance with SAE J1305	C	I	I			<p>Anti-two block hoist limits The contractor shall furnish certified test reports to prove compliance with the Anti-two block system requirement of 3.1.11. If certified test reports are not available, these requirements shall be demonstrated.</p> <p>The hook block shall be inspected for compliance with ANSI/ASME B30.5.5-1.9. Non compliance shall constitute failure of this inspection.</p>
3.1.12 Boom angle/radius and length indicator. A boom angle and length indicator shall be provided and be visible to the operator throughout the full range of boom elevations and extensions. The boom shall be match marked in length increments corresponding to load capacity charts. The boom length indicator feature shall meet or exceed the recommended requirements as specified in SAE J1180 and the boom angle/radius feature shall meet or exceed the recommended practices of SAE J375A. This feature shall be equipped with adjustable working range set points having visual and/or audible warning signals.	C	I	I			<p>Boom angle/radius and length indicator. The contractor shall furnish certified test reports to prove compliance with the boom angle/radius and length indicator requirement of 3.1.12. If certified test is not available, these requirements shall be demonstrated.</p> <p>The indicator shall be inspected for compliance with 3.1.12. Non compliance shall constitute failure of this inspection.</p>
3.1.13 Wind Speed Indicator. The cranes shall be equipped with a wind speed indicator attached to the boom tip and alarm system in the operator's cab to alert of high wind conditions.		I	I			<p>Wind Speed Indicator. The Type II Heavy Crane shall be inspected to verify the required wind speed indicator is provided with the Type II Heavy Crane and function and designed. Non-compliance shall constitute failure to meet requirement.</p>
3.1.14 Outriggers. Not less than four hydraulically powered independent outriggers equipped with removable outrigger pads, capable of being extended not less than 8 inches below ground level shall be furnished. Devices to accurately determine when the crane		I/T				<p>Outriggers. The Type II Heavy Crane will be inspected to insure the correct number of outriggers is supplied with system. The leveling device shall complete a function/ performance test. Nonconformance to</p>

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3.0 REQUIREMENTS	FPU	PVT	QCI	CT	FPT	4.0 VERIFICATION
is level shall be installed in a position convenient to the outrigger controls						3.1.14 shall constitute failure of this test/inspection.
3.1.15 Cribbing/Work pads. The cranes shall be provided with work pads made of composite material for each outrigger that will support the maximum load of the cranes. The work pads shall be equipped with lifting handles and will not exceed a two person lift. Storage for the work pads shall be available on the crane when not in use, that is easily accessible to the crew.		I				Cribbing Support. The Type II Heavy Crane will be inspected to verify the required amount of cribbing has been supplied with the system. Nonconformance to 3.1.15 shall constitute failure of this inspection
3.1.16 Crew Protection Kit Transportation. The CPK shall be delivered and stored in a container that is new, weatherproof, non-collapsible, lockable, repairable, and suitable for repeated use. The container shall be stackable to two-high (that is one base container with one container on top) when fully loaded to container rated gross weight without damage or permanent deformation. The container shall be configured such that all components of the armor kit are protected during shipment, and to facilitate quick inventory of the contents. When the armor kit is installed on a crane, the container shall store all items removed from the crane to facilitate armor installation. The container shall have forklift pockets that conform to STANAG 2828 that allow the container to be fork lifted from all four sides. The containers IAW MIL-STD-209 shall be capable of being transported by military and commercial vehicles, trailers, trains, marine vessels, aircraft, dolly sets and shall withstand the impact forces encountered in shipment without damage or permanent deformation. The containers shall be capable of being transported by C-130, C-5, and C-17 with or without supporting equipment existing in the DoD system. Container shall be externally transportable by CH-47. The container shall be painted the same color as the armor kit contained within, in accordance with 3.3.20. For container types existing in the DoD inventory, the modifications performed for this effort shall not void existing certifications.		I/T				CPK Container. The container shall be inspected to insured that it is meet the requirements of 3.1.16. The container will be subject to a rail impact test. And damage or permanent deformation result from testing shall constitute failure of test.

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3.0 REQUIREMENTS	FPUJ	PVT	QCI	CT	FPT	4.0 VERIFICATION
3.2 Performance Requirements.						4.2 Performance Verification
<p>3.2.1 Lift Capacity. The Type II Heavy Crane with and without CPK shall be capable of lifting a minimum of 100,000 pounds at a 10 ft. radius.</p> <p>The crane shall be able to transverse the load a minimum of 270 degrees (45 to 315 azimuth using zero (0) as straight ahead) load with outriggers fully extended. The load shall not pass over any part of the crane to include the outriggers.</p> <p>Type II Heavy Crane with and without CPK shall be able to lift straight up and down (no transverse required) a load 323" long, 106" wide, 156" high, weighing 80,000 lbs (40 Tons) from the rear, and sides with a 2 ft. horizontal clearance from the crane and outriggers. The load must be able to be lifted high enough to back the family of M870 trailers under the load.</p>	C	T				<p>Lift Capacity test. The contractor shall furnish certified test reports to prove compliance with the lift capacity indicator requirement of 3.2.1. If certified test is not available, these requirements shall be demonstrated.</p> <p>The crane shall complete a 40 ton lift test of a load with dimension identified in 3.2.1, following procedures in the contractor's manual and IAW with SAE J1063. Inability of the crane to complete the lift and/ meet the requirements of 3.2.1 shall constitute failure of this test.</p>
<p>3.2.2 Travel Speed. The crane with and without CPK, without load, shall be capable of achieving and maintaining an average on-road travel speed (primary and secondary roads) of 40 mph (T), 55 mph (O).</p> <p>System shall be able to achieve an average off-road (cross-country) of 15 mph (T); 40 mph (O).</p>	C	T				<p>Speed test. Speed test shall be taken over a minimum 1 percent grade and not to exceed a 2 percent grade on a paved road. Time shall be recorded with a stopwatch accurate to 1 second. The average speed shall be recorded for the crane. Maximum average speed shall not be less than that specified herein</p> <p>Road test. The crane shall be given a road test over primary roads for a distance of not less than 80 miles at various speeds up to its maximum (or legal speed limits); 90 miles over secondary roads at not less than 15 MPH, and 30 miles over unpaved or unprepared surfaces composed of sandy or loose soil, or both, at maximum safe speeds TOP 1-1-010; TOP 2-2-602; TOP 2-2-619</p>

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3.0 REQUIREMENTS	FPU1	PVT	QCI	CT	FPT	4.0 VERIFICATION
<p>3.2.3 Stability. The Type II Heavy Crane with CPK install on paved surface shall negotiate 15% side slopes and 15% longitudinal slopes without either wheels losing contact with the ground. Crane shall be equipped with imbedded electronic inclinometer. All moving parts shall maintain desired lubrication levels when the crane is operating under these conditions. No loss of hydraulic power to the crane control system shall be present. The fuel system shall maintain operating pressure when operating on these slopes.</p>		T				<p>Stability. The stability of the Type II Heavy Crane shall be tested to prove conformance to 3.2.3 without attachments and applied loads. Nonconformance to the requirements of 3.2.3 shall constitute failure of this test.</p>
<p>3.2.4 Brakes. Independently actuated service and parking brakes shall be provided in accordance with applicable FMVSS standards. The crane carrier shall be provided with the manufacturer's standard foot controlled service brakes applied to all wheels. The service brakes with and without CPK installed shall be capable of bringing the crane to a complete, safe stop on a 15 percent slope, in both forward and reverse directions. A parking brake with and without CPK, capable of holding the crane on a longitudinal slope of not less than 15 percent, for a period of one (1) minute without slippage, shall be provided. If air service brakes are provided, air brake service and emergency line couplings conforming to SAE J10 and J318 shall be provided on the rear of the carrier. A relay emergency valve and an air dryer shall also be provided. The crane shall be able to stop in a distance equivalent to the tractor trailer vehicles of the same class, as defined by FMCSR standards.</p>	C	T	I			<p>Braking. Testing will be conducted in accordance with Aberdeen Test Center (ATC) Test Operating Procedure (TOP) 2-2-608 and (TOP) 2-2-610</p> <p>Service brake test. The service brakes shall be applied bringing the crane to a complete halt. Immediately after the crane comes to a halt, this test cycle shall be repeated for four additional cycles. All brake components, where there is indication of damage, shall be disassembled and examined.</p> <p>Parking brake test. Inability to hold the crane on required slope shall constitute failure of test.</p>
<p>3.2.5 Fording. Type II Heavy Crane Type II shall start and operate during fording operations in fresh/salt water up to a depth of 30 inches without breather tube extensions (T) and with no preparation. Type II Heavy Crane with breather tube extension shall ford to a depth of 48 inches (T). Fording, including wave action, shall be accomplished without damage or leakage of water into reservoirs containing lubricants and/or fluids.</p>		T				<p>Fording. The fording ability of the Type II Heavy Crane shall be measured to prove conformance to 3.2.5. The fording test shall be completed in still water. Inability for the system to ford a minimum depth of 30 inches shall constitute failure of this test.</p>
<p>3.2.6 Steering /Operation. Power assist steering for the front and rear wheels shall be provided. The crane shall be equipped with three mode steering: front wheel, all wheel and crab, with controls and indicators in the cab(s). Emergency steering conforming to ISO 5010 shall be</p>		T				<p>Steering/Operation. The Type II Heavy Crane shall be tested to demonstrate that all modes of steering can be accomplished. System inability to perform each mode of steering shall constitute failure of this test.</p>

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3.0 REQUIREMENTS	FPU	PVT	QCI	CT	FPT	4.0 VERIFICATION
provided for retaining steering control in the event of engine failure or steering power source failure when traveling at any speed.						
<p>3.2.7 Operating Temperature. The Type II Heavy Crane shall be capable of starting within 5 minutes and operating within 15 minutes of starting in hot and basic climate regions (+120°F to -25°F) (Threshold). No cold weather starting aid may be used which rely upon external support such as an electrical power source. Hand-held aerosol cans or non-metered starting fluid devices are not permitted.</p>		T				<p>Low Temperature Test. The crane shall be cold soaked to attain a stabilized temperature no warmer than -25°F. Temperature stabilization shall be measured at the Following locations:</p> <ul style="list-style-type: none"> a. In the two centers cells of each battery between the plates and at mid-depth of the electrolyte. b. In the center of the hydraulic system reservoir c. In the engine oil system d. In the engine coolant <p>The crane shall start within 5 minutes of initial attempt. Smooth engine running without continued control manipulation shall be attained within 15 minutes after starting. After the engine operation has stabilized and the hydraulic fluid has been allowed to reach proper operating temperature, all crane functions shall be operated. Failure to start at -25°F within 5 minutes, failure to obtain a smooth running engine within 15 minutes, inability to operate or perform any crane function or evidence of damage, deformation, breakage, or leakage of fluid, shall constitute failure of this test. See 3.3.12</p>
<p>3.2.8 Recovery. The Type II Heavy Crane Type II shall be capable of retracting its boom and stabilizing outriggers when disabled due to a mechanical failure, loss of engine power and/or loss of hydraulic pressure within 1 hour (T.) A hand crank will not be acceptable as a</p>	C	T				<p>Recovery. The Type II Heavy Crane shall be tested to prove conformance to 3.2.8. Inability to recovery Nonconformance shall constitute failure of this test.</p>

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3.0 REQUIREMENTS	FPUJ	PVT	QCI	CT	FPT	4.0 VERIFICATION
primary solution. In the event of a hydraulic failure, as mean to bleed (release pressure) shall be provided.						
3.3 System Requirements.						4.3 Material Verification
3.3.1 CAB. Windows shall be safety type glass conforming to the guidelines of SAE J674. Seat belts in each cab shall be adjustable to accommodate operation by 5th percentile female through 95th percentile male personnel wearing environmental protective clothing (i.e. Arctic and Mission-Oriented Protective Posture (MOPP) IV) in accordance with SAE J899. The cabs shall be equipped with all manufacturers' commercial features, to include as a minimum: air conditioner, heater, defroster and electrically operated windshield wiper(s). An electric or air horn shall be provided. Space shall be available within the Type II Heavy Crane cab to stow Load Bearing Equipment (LBE), Mission-Oriented Protective Posture (MOPP) and Chemical Protective Over-garment (CPOG). Crane operation shall be achieved through use of joystick controls. The vehicle cab must be weather and dust tight/sealed both with and without CPK installed.	C	T, I				Weather Testing. The crane cab will be tested per MIL-STD-810, rain method 5.6.4, procedure 1 and dust method 5.10.4, procedure 1. Non compliance with 3.6 shall constitute failure of test
3.3.1.1 Visibility. Operators must have visibility to the sides and rear of the machine while seated in either operator compartment (T) to include the bottom of outriggers and boom. This shall be accomplished with and without CPK installed.		I				Visibility Testing. While seated in the operator cab, the test shall verify that sides and rear of the machine are visible to include the bottom of the outriggers and boom. Non-compliance shall constitute failure to meet requirement.
3.3.1.2 Air Conditioner. The air conditioning system shall be tested IAW SAE J1503 (with solar load) at ambient temperature of 120°F with interior temperature requirement of 80°F. The system shall use an environmentally friendly refrigerant (R-134a or equivalent). Cabs with and without armor kit installed, shall also meet this requirement (T).		T				Air Conditioner. The air conditioner shall be tested in accordance with SAE J1503. The crane's air conditioner shall be tested to 120°F with the solar load. Nonconformance to 3.3.12 shall constitute failure of this test.
3.3.1.3 Heater. The heater shall be capable of warming the cab from -25°F to +40°F within an hour after starting the crane when the exterior ambient temperature is at -25°F. The heater shall meet the		T				Heater. The crane shall be cold soaked below -25°F for 24 hours or until stabilization. The temperature of the chamber shall be held at -25°F throughout testing.

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3.0 REQUIREMENTS	FPUJ	PVT	QCI	CT	FPT	4.0 VERIFICATION
heating requirements of SAE J1503.						The crane shall be started and the heater turned on. Failure to reach 41°F inside the cab within one hour after start of crane shall constitute failure of this test.
3.3.1.4 Emergency. CPK cranes shall be equipped with a separate, emergency egress (in case of vehicle rollover) for both cabs. The emergency egress shall allow escape in the event that the cab door is inaccessible or inoperable using standard tools that would be available in an emergency situation (e.g., mounted or stored on vehicle). An egress window or hatch is acceptable. If a hatch is provided, the emergency escape hatch shall be a fall away round design with approximately a 28" opening and 30" hatch diameter		I	I			Emergency Egress. The Type II Heavy Crane shall be inspected to determine the egress meets the dimensional requirements of 3.3.1.4. Non-compliance shall constitute failure of this inspection.
3.3.1.5 Combat Lock. For up-armored cranes, doors shall incorporate a device that allows the door to be secured from the inside. The combat lock shall prevent the door from being opened from the outside by enemy attack. An override shall be provided so that emergency personnel outside the cab can open the door. The Contractor shall not introduce any new tools to override the combat lock.		I	I			Combat Lock Test. The Type II Heavy Crane shall be inspected to verify a suitable combat locks is installed that meet the requirements of 3.3.1.5. Nonconformance shall constitute failure of inspection.
3.3.2 Human Factors Engineering. The cranes shall be operable and maintainable in accordance with the recommended practices by 5 th percentile female through 95 th percentile male military personnel (as defined by ISO 3411) dressed in environmental protective clothing [i.e. Arctic and Mission-Oriented Protective Posture (MOPP) IV]. Induced vibrations to the operator shall be measured in accordance with ISO 2361.		T,I	I			HFE Testing. The Type II Heavy Crane will be evaluated for operation and maintenance by 5 th percentile female through 95 th percentile male military personnel (as defined by ISO 3411) dressed in environmental protective clothing (i.e. body armor and in Mission-Oriented Protective Posture (MOPP) IV) as specified in 3.3.2. Testing will be conducted IAW ATC TOP 1-2-610
3.3.3 Tires and Wheels. All tire and wheel ratings and dimensions shall conform to the Tire and Rim Association (T&RA) or the European Tire and Rim Technical Organization (ETRTO) Standards Manual at the maximum speed of the vehicle. Tires and wheels shall	C	I				Tires and Wheels Inspection. The contractor shall furnish certification to prove compliance with the tires and wheels requirement of 3.3.3. If certified test is not available, these requirements shall be

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3.0 REQUIREMENTS	FPU	PVT	QCI	CT	FPT	4.0 VERIFICATION
<p>conform to FMVSS 571.119 and FMVSS 571.120. Tires shall be radial type design with tread suitable for both on-highway and off-road conditions. Tires and wheels rated capacity shall be at least equal to the maximum load with armor kit imposed on each tire, measured at each wheel at the ground. Wheel shall be tested in accordance with SAEJ267 or SAEJ1992 and pass dynamic cornering and radial fatigue tests at its rated load times an accelerated test factor. Tire size, manufacturer, design and ply rating shall be the same for all tires on the vehicle. Tires shall be of the same or similar performance and durability characteristics as those that are listed on the Cooperative Approved Tire List CATL-1922 Group 3 January 2011 version. Tires when supplied shall not exceed 18 months from date of tire manufacture. The recommended tire pressure for each wheel shall be stenciled "TP (specify) LBS" in 1 inch block letters on the vehicle above or near each tire. A spare wheel/tire assembly shall be provided.</p> <p>Wheels: Hub piloted steel wheels shall be furnished. Wheel load and pressure shall be equal or greater than the tire capacity. Wheel size shall be the same for all wheels on vehicle.</p> <p>Valves: Tire valves shall be in accordance with CID A-A-52611, shall be readily accessible for manual inflation, and shall be provided with sealing valve cap.</p>						<p>demonstrated.</p> <p>The Type II Heavy Crane tires and wheels shall be inspected to verify proper labeling and set pressure. Non-conformance, as specified in 3.3.3 shall constitute failure of inspection.</p>
<p>3.3.4 CONTROLS. All hoist and crane controls, lockouts and indicators shall be located in accordance with ISO 7752 and ISO 6682. The controls shall be within easy reach of the operator in the both the front (driver) and side (operator) cab and shall be readily accessible under all conditions of operation. All controls shall be clearly marked. A positive swing lock for traveling shall be provided. Controls shall be provided in the crane operator's cab to permit remote control of the steering, braking and travel functions of the carrier in and around the job site. Mechanical push-pull remote controls, when furnished, shall</p>		I	I			<p>Travel control test. To demonstrate workability of the carrier travel controls, the crane shall be operated to demonstrate compliance with stated requirements.</p>

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3.0 REQUIREMENTS	FPUJ	PVT	QCI	CT	FPT	4.0 VERIFICATION
be waterproof, heat-resistant, and anti-friction. A single keyless engine switch shall be provided.						
3.3.4.1 Instrumentation. The instrument panel shall contain at a minimum the manufacturer's standard array of controls and instrumentation including those necessary to operate options and attachments. Protection from weather elements shall also be provided.	I	I				Instrumentation. The instrument panel will be inspected to verify controls are in place to operate attachments and are protection from weather elements. Nonconformance to 3.3.4.1 shall constitute failure to meet this requirement.
3.3.5 SURVIVABILITY The Type II Heavy Crane will be High Altitude Electromagnetic Pulse (HEMP)/Near Strike Lightning (NSL)/Electromagnetic Environmental Effects (E3) and electronic warfare/information warfare survivable. This survivability is defined as: the crane will be capable of all critical driving and loading operations, in a degraded mode of operation. Operation through a HEMP or NSL event is not required and re-cycling power to restore mission critical functions is acceptable. The design shall conform to the requirements of MIL-STD-461F and MIL-STD-464A	C	T				Survivability. The cranes will be evaluated for compliance with all survivability requirements. The crane with Soldier participation (if available) shall be tested to ensure operation with personnel in full protective ensemble (MOPP level IV). The Contractor shall demonstrate that the cranes meet minimum requirements for NBC contamination and clean up, E3, HEMP and armor protection. The cranes shall be tested in accordance with procedures outlined within MIL-STD- 461F and MIL-STD-464A
3.3.5.1 High-Altitude Electromagnetic Pulse (HEMP). Powered-Up or powered-down, the Type II Heavy Crane shall be capable of operation after exposure to the high altitude electromagnetic environment as defined in MIL-STD-461F and MIL-STD- 464A, with component replacement, within 12 hours. A basic design environment can be found in unclassified form in MIL-STD-464, section 5.5. Verification shall be demonstrated through design, analysis, and/or test. Parts required for making the system operational after a HEMP event shall be identified in the technical manuals	C	T				HEMP. Nonconformance to 3.3.5.1 shall constitute failure of this test
3.3.5.2 Nuclear, Biological, and Chemical (NBC) Contamination. The Type II Heavy Crane components shall be able to operate in an		A				NBC. The Type II Heavy Crane NBC will have an analysis completed by Dugway Proving Grounds

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3.0 REQUIREMENTS	FPUJ	PVT	QCI	CT	FPT	4.0 VERIFICATION
NBC environment and survive decontamination. Materials, particularly those used externally, shall be resistant to chemical and biological agents and to the decontaminators used to neutralize these agents. For operator protection, a cab overpressure system is desired. NBC decals NSN 7690-01-474-3533 shall be adhered to the air filter. The Type II Heavy Crane shall be compatible for use by Soldiers in MOPP IV						(DPG) to determine which parts on the crane can be decontaminated and which parts require replacement. Items identified as requirement place shall be noticed in systems technical manuals.
3.3.5.3 Electromagnetic Environmental Effects (E3). The system shall be electromagnetically compatible within itself such that the system operational performance requirements are met. Individual subsystems and equipment shall meet interference control requirements (such as conducted emissions, radiated emissions, conducted susceptibility and radiated susceptibility requirements of MIL-STD-461F) such that the overall system complies with MIL-STD-464A.	C	T				E3. The Type II Heavy Crane will be exposed to the interference controls identified in 3.3.5.3 while power on and operating varies systems/sub systems of the crane. The crane electromagnetic signature will be record. Results exceed the max reading IAW 3.3.5.3 shall constitute failure of this test.
3.3.5.4 Near Strike Lightning (NSL). The crane is required to survive a nearby lightning strike having the characteristics provided in MIL-STD-464 (using TABLE 2B), that occurs at a distance of 10m.	C	T				NSL. Nonconformance to 3.3.5.4 shall constitute failure of this test
3.3.5.5 Natural Environment Threat. The crane shall be capable of operating in hot, humid tropical environments, in dry, dusty environments and in moderate to cold climate from -25° F to +120° F.	C	T				Environment Effect. The Type II Heavy Crane will be tested to determine how well it cabs with stand exposure to blowing dust and blowing rain without extensive dust or rain intrusion into cab. Dust, sand or water intrusion shall constitute failure of this test.
3.3.6 SAFETY. The crane shall comply with applicable OSHA 29 CFR 1910 and OSHA 29 CFR 1926 regulations, DOT 49 CFR 393 and 49 CFR 571. All rotating or reciprocating parts and all parts subject to high operational temperatures, that are of such nature or are so located as to be or become a hazard to the operating or attending personnel, shall be substantially guarded, or insulated, to the extent necessary to eliminate the hazard. The principal platform walking surfaces shall be of an anti-skid type. Ladders, steps and hand holds shall be provided in such	C	I/T	I			Safety. The Type II Heavy Crane system shall be inspected and tested to verify conformance, as specified. Testing will be conducted IAW ATC TOP 1-1-060 The contractor shall provide compliance certification, supported by objective evidence, of conformance. (3.3.6).

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3.0 REQUIREMENTS	FPU	PVT	QCI	CT	FPT	4.0 VERIFICATION
quantity and of such size on the sides of the crane cab or superstructure that entrance to and exit from may be unhampered and nonhazardous. Engine cooling fans shall have a heavy grille or enclosed guard conforming to SAE J1308. Electrical equipment shall be effectively guarded and grounded to protect personnel from electrical shock hazard. The crane operator shall have a means (including visual) to determine when the minimum number of cable wraps left remain on the drum.						
3.3.6.1 Overhead Power lines. A warning placard shall be placed in the crane superstructure cab that warns the operator of unsafe operating conditions in regard to overhead electrical power lines per 29CFR 1926.550 and ANSI/ASME B30.5.		I	I			Overhead Power Line Warning. The Type II Heavy Crane II shall be inspected to verify warning placard is installed in the cab, visible to operator. Non-compliance shall constitute failure of this inspection
3.3.6.2 Noise Limits. The exterior sound level of the plant and operator station shall be measured in accordance with SAE J88 and SAE J919. If the sound level in an area occupied by the operator is 85db(A) or greater, or surrounding area, a warning plate in accordance with ANSI Z535.1 shall be permanently affixed to each major unit in a conspicuous protected location. Discussion of noise hazards shall be addressed in the operators' technical manual and shall include the type of hearing protection required for the noise levels experienced.	C	T				Noise limits testing. Noise limits shall be measured in accordance with SAE J88 and J919. Failure to comply with the requirements shall constitute failure of this test. An exchange of 3 dB, in lieu of 5 dB, increase in sound level for halving of the time period shall be applied to the sound level data. Testing will be conducted IAW ATC TOP 1-2-608.
3.3.6.3 Falling Object Protective Structure (FOPS). The driver's cab, in A-Kit configuration, shall be equipped with FOPS conforming to ISO 3449. Quick disconnect fittings (electric, etc.) shall be provided as applicable to facilitate canopy removal (if required). Slings eyes and tie downs eyes conforming to MIL-STD 209 shall be provided to facilitate removal of FOPS as required. The protective canopy IAW 1910.266(f) (3) (viii) (A), shall be constructed to protect at a minimum, the operator from injury due falling trees or other objects.	C					FOPS Test. The contractor shall furnish certified test reports to prove compliance with the FOPS requirement of 3.3.6.3. If certified test is not available, these requirements shall be demonstrated.
3.3.6.4 Backup alarm. A backup alarm shall be provided and conform to SAE J994 and is inactivated during use of blackout	C	T				Backup Alarm Testing. A functional test will be complete on the back up alarm. Inability to sound or

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3.0 REQUIREMENTS	FPU1	PVT	QCI	CT	FPT	4.0 VERIFICATION
lighting system.						become inactive during blackout operation shall constitute failure of this test
3.3.6.5 Fire Extinguisher. A fire extinguisher with a minimum rating of 10 B: C shall be securely installed in a location readily accessible to both operator and driving positions. A fire extinguisher bracket (similar in size and type to NSN 4210-00-775-0127) shall be provided and mounted in the operator compartment	C	I				<p>Fire Extinguisher Inspection. The contractor shall furnish certified test reports to prove compliance with the fire extinguisher requirement of 3.3.6.5. If certified test is not available, these requirements shall be demonstrated.</p> <p>The cranes shall be inspected to verify fire extinguisher is in place and compliance with 3.3.6.5. Non compliance shall constitute failure of this inspection.</p>
3.3.6.6 Emergency Braking. A differential locking type mechanism shall be provided in the drive line for all driven axles and shall be engaged on demand by the operator using a cab mounted switch. The driveline shall be of the torque proportioning transfer type. The drive line system shall be designed so the operator may engage or disengage the front axles without damage to the driveline or other components.	C		I			<p>Emergency Brake. The contractor shall furnish certified test reports to prove compliance with the emergency braking requirement of 3.3.6.6. If certified test is not available, these requirements shall be demonstrated.</p>
<p>3.3.7 ELECTRICAL SYSTEM. The Crane shall be equipped with the Contractor's standard commercial 24-volt negative ground electrical system in accordance with SAE J1614 and J1908. The electrical circuitry, including all components and connections, except as specified below, shall be protected from the effects of fungus growth and moisture:</p> <ul style="list-style-type: none"> a. Components or circuit elements that are inherently fungus and moisture resistant or which are hermetically sealed need not be treated. b. Components or circuit elements whose functions will be adversely affected by fungus preventative and moisture coating shall not be treated. 	C	I	I			<p>Electrical System. The contractor shall furnish certified test reports to prove compliance with the electrical system requirement of 3.3.7. If certified test is not available, these requirements shall be demonstrated.</p> <p>The electrical system shall be inspected to verify compliance with SAE J1614 and J1908</p>

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3.0 REQUIREMENTS	FPU1	PVT	QCI	CT	FPT	4.0 VERIFICATION
<p>3.3.7.1 Slave Receptacle. The Type II Heavy Crane shall be equipped with a 24-Volt slave receptacle conforming to NATO STANAG- 4074, Type 1. The slave receptacle shall permit charging of the batteries and slave starting of the engine from an external power source and shall also provide a power source for charging and slaving other equipment. The receptacle shall be installed near the battery enclosure and shall be accessible to personnel standing on the ground. The receptacle shall be labeled "SLAVE 24 VOLTS DC" with one inch black lettering.</p>		T	I			<p>Slave Receptacle. The slave receptacle of the Type II Heavy Crane shall be tested to verify its ability to slave start an engine from an external power source and charging of batteries. Nonconformance constitutes failure of this test.</p>
<p>3.3.7.2 Batteries and Cables. The batteries shall have sufficient cold cranking amperage to start the Crane(s) at -25°F. Battery cables shall be furnished with insulated terminal covers. Positive and negative cable terminals shall be identified with a red sleeve labeled "+" and a black sleeve labeled "-", respectively. Corrosion resistant bolts and nuts shall be used. There shall be a warning plate, attached by screws, bolts, or rivets in a conspicuous protected location, on the box to warn of the presence of toxic fumes and the explosive hazards. The batteries shall be easily accessible without the use of tools.</p>	C	I/T	I			<p>Batteries and Cables. The contractor shall provide material and test certifications as objective quality evidence of conformance. If certification is not available, these requirements shall be demonstrated.</p> <p>The Batteries and Cables shall be visually inspected and tested to verify conformance as specified in 3.3.7.2.</p>
<p>3.3.7.3 Work Light. The Type II Heavy Crane shall be furnished with manufacturer's standard commercial working lights. As a minimum, two overhead lights shall be mounted on the front and two on the rear. All work lights shall be brush-guard protected. They shall be adjustable and located to illuminate maximum work area, to include lights for the outriggers. The lights shall allow safe movement at night and in limited visibility conditions. No more than 25% degradation of mission time during limited visibility/night is required.</p>		I/T	I			<p>Work Lights. The work lights on the Type II Heavy Crane shall be tested to prove conformance to 3.3.7.3. The crane will be inspected to verify the required amount of lights are installed on the cranes and have brush guards. Functional testing will be completed to verify lights are operational. Nonconformance shall constitute failure of this test.</p>
<p>3.3.7.4 Blackout lighting. One blackout headlight conforming to military drawing 12360910 shall be mounted as close to the extreme left of the vehicle as practical and positioned to provide illumination</p>		I/T				<p>Blackout Lights. The blackout lights shall be inspected for conformance, including functional, operational, characteristics, location, and completeness.</p>

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with minimum obstruction. Two blackout composite stop/turn and marker lights conforming to MIL-DTL-32361 and two composite front turn/park and marker lights conforming to MS52126 shall be mounted in recesses, or provided with guards. The blackout lights shall be controlled by an interior switch conforming to MIL-PRF-11021 in the carrier cab. All other exterior/interior lights and the backup alarm shall be made inoperable automatically when the blackout lights are switched on. A separate wiring harness may be provided for the blackout lights. All warning lights, to include high coolant temperature and low oil pressure, shall remain active when the blackout lights are switched on. All warning lights shall be designed to restrict emissions to the visible portion of the electromagnetic spectrum between 380 and 700 nanometers. Peak emissions in the infrared region between 700 and 1200 nanometers shall be restricted to less than one percent relative to that measured in the visible region.						
<p>3.3.8 TRANSMISSION. The crane carrier shall be equipped with a full power shift or full automatic transmission. The transmission shall be equipped with a neutral safety start switch. The transmission shall provide adequate gearing for all performance conditions specified in this document and operation at any speed up to the maximum speed. The transmission shall be protected from damage when the operator moves or attempts to move the directional control to the opposite direction while the crane is in motion. The transmission shall operate without degradation on oil specified herein. The transmission system shall be furnished with filter(s) having replaceable elements. The filter shall be replaceable</p> <p>Transfer case. If an automatic transmission is provided, the crane shall be equipped with a two-speed transfer case. The transfer case shall be multi-speed, torque proportioning</p>		T/I				<p>Transmission. The Type II Heavy Crane will be inspected to verify the transmission is equipped with a neutral safety switch. The transmission will be tested to verify the system provides adequate gearing for all performance condition herein and operates without degradation on oil specified herein. Nonconformance to 3.3.8 shall constitute failure of this test.</p>
<p>3.3.9 Hydraulic system. The hydraulic system shall include, in addition to normal system components, a full flow filter and control</p>	C	T				<p>Hydraulic performance. The contractor shall furnish certified test reports to prove compliance with</p>

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3.0 REQUIREMENTS	FPU	PVT	QCI	CT	FPT	4.0 VERIFICATION
valves to insure positive control of boom hoist, boom telescope, rope hoist and outriggers in all operations in event of loss of hydraulic power due to ruptured hoses or loss of engine power. Hydraulic line circuit and filtration shall be in accordance with SAE J931. The pump(s) shall be driven by the crane engine and shall have sufficient capacity to operate all hydraulically powered components. Hydraulic oil shall conform to the requirements of MIL-PRF-46170. All rods which will be exposed during operation shall have a hard chromium or similar plating. Hydraulic tank oil temperature shall not exceed 200 degree F with an ambient temperature of 120 degree F while performing repetitive craning operations. All hydraulic hoses shall be enclosed or routed to preclude external damage. The hydraulic tank fill port shall be equipped with a removable filter screen.						<p>hydraulic system requirement of 3.3.9. If certified test is not available, these requirements shall be demonstrated.</p> <p>Inability of the pump to provide sufficient capacity to operate all hydraulically powered components shall constitute failure of this test.</p>
<p>3.3.10 LUBRICATION AND FLUIDS. A centralized lubrication system shall be provided for all moving parts requiring lubrication. Type II Heavy Crane shall be operable using military lubricants (as specified below) with limited impact to durability. Initial fill lubricants shall be fully compatible to the following requirements:</p> <ul style="list-style-type: none"> a. Engine and Hydraulic Systems: MIL-PRF-2104 and MIL-PRF-46170 b. General lubrication: MIL-PRF-10924 c. Axles: SAE J2360. d. Brakes: MIL-PRF-46176 Silicone Brake Fluid. e. Cooling Systems: CID A-A-52624. 	C	I	I			<p>Lubrication and Fluids. The Type II Heavy Crane lubricants and fluids shall be inspected to verify conformance, as specified in 3.3.10</p> <p>The contractor shall provide a compliance certification, supported by objective quality evidence, of conformance (3.3.10). If certification is not available, these requirements shall be demonstrated</p>
<p>3.3.10.1 Oil Sampling Valves. Oil sampling valves shall be provided on the engine, transmission and hydraulic system. The valves shall be manually operated and shall automatically close when released. It shall be made of material resistant to corrosion such that it will not contaminate the sample. The discharge port of the valve shall be covered with a captive chain cap conforming to MIL-V-81940/1B and SAE J514. The valve shall be located in such a way as to ensure that</p>		I/T	I			<p>Oil Sampling Valves Inspection. The Type II Heavy Crane will be inspected to verify the required amounts of oil sampling valves are installed. The oil valves will be tested by manually operation and verifying automatic close release function. Nonconformance to 3.3.10.1 shall constitute failure of this test.</p>

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3.0 REQUIREMENTS	FPU1	PVT	QCI	CT	FPT	4.0 VERIFICATION
the personnel will not be exposed to danger.						
3.3.10.2 Lubrication Data Plates. A lubrication data plate shall be provided on each unit of the Type II Heavy Crane (attached by screws, bolts, or rivets in a conspicuous protected location) and conform to SAE J753. The plate shall identify military lubricants and all lubrication points.		I				Lubrication Data Plates Inspection. The Type II Heavy Crane system shall be inspected to verify the lubrication data plates displays the accuracy data and is install/located as required. Non-conformance to the lubrication data plates, as specified in 3.3.10.2 shall constitute failure of inspection.
3.3.10.3 Lubrication Fittings. All surfaces requiring lubrication shall be provided with accessible lubrication fittings in accordance with SAE J534. A lubrication fitting shall be located at each point where two moving surfaces are in contact under pressure. Lubrication fittings shall be located in a protected position and be accessible to a grease gun with a flexible 10-inch extension. Accessibility shall be provided without removal or adjustment of accessories or parts.	I	I	I			Lubrication Fitting Inspection. The Type II Heavy Crane will be inspected to verify the required amounts of lubrication fittings are installed, located in a protected position and are accessible to a grease gun with a flexible 10-inch extension. Nonconformance to 3.3.10.3 shall constitute failure of this test.
3.3.11 External Leakage. The degree of external hydraulic system leakage allowable on all cranes shall not exceed class 3 of SAE J1176 for dust free conditions and class 3D of SAE J1176 for dusty conditions. The degree of external leakage allowable on drive-train components such as engine, axles, transmission, transfer cases, and gearboxes shall not exceed class 2 of SAE J1176 for dust free conditions and class 2D of SAE J1176 for dusty conditions. No evidence of fluid leakage shall be permitted in fuel, cooling or hydraulic brake systems.		I	I			External Leakage Inspection. During crane operation/testing the system will subject to visual inspection. Any external leakage exceeding class shall constitute failure of this inspection. The crane shall be inspected throughout the duration of testing to ensure compliance with 3.3.11.
3.3.12 ENGINE. The Type II Heavy Crane shall be supplied with a diesel engine, capable of meeting the performance specified herein while operating with turbine fuel in accordance with MIL-DTL-83133 (JP-8) as the primary fuel (or MIL-DTL-5624, JP-5) and military lubricants without impact to commercial MTBF, reliability, and maintainability. Pollution control technologies that are affected by the sulfur level of JP-8 fuel either in maintenance or life expectancy shall not be used, e.g., Exhaust Gas Recirculation (EGR), NOX traps,	C	T				Engine. Failure to start at either -25°F within 5 minutes or failure to obtain a smooth running engine within 15 minutes shall constitute failure of this test. Testing will conducted IAW ATC TOP 2-2-650 The contractor shall furnish certified test reports to prove compliance with engine requirement of 3.3.12. If certified test is not available, these requirements

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3.0 REQUIREMENTS	FPU	PVT	QCI	CT	FPT	4.0 VERIFICATION
catalytic converts, etc. The Crane is not subject to EPA non-road emissions standards since the cab will contain permanent armor. This determination is IAW 40CFR, sections 89.908 and 1068.225. The Contractor shall ensure National Security Exemption labeling requirements are met IAW EPA regulations. The engine provided must be of the latest technology and meet all performance requirements specified in this PD. The diesel engine shall have the capability for an unassisted -25°F cold start and operate with MIL-DTL-83133 (JP-8) as the primary fuel (or MIL-DTL-5624, JP-5).						shall be demonstrated.
3.3.12.1 Engine air induction system. The air induction system shall include a pre cleaner or dust scavenger, a heavy-duty dry type air cleaner and a restriction indicator. Manufacturer's standard system may be provided if air quality to the engine is equal to or exceeds this system.	C		I			Air Induction. The contractor shall furnish certified reports to prove compliance with engine requirement of 3.3.12.1. If certification is not available, these requirements shall be demonstrated.
3.3.12.2 Fuel Tank It is required that the fuel tank has sufficient capacity for 10 hours of continuous normal operation for all specified fuels. The fuel line shall be equipped with a commercial fuel/water separator. The tank shall be equipped with a means for draining water and sediment from the bottom of the tank. The fuel tank interior surface shall be permanently protected from corrosion. The fuel type shall be stenciled near the fuel cap in black letters not less than one inch in height. The fuel tank filler necks shall have a removable screen. The fuel-tank filler cap shall be chain retained to the tank.		T				Fuel Tank. The Type II Heavy Crane with full tank of gas will be operated for a minimum of 10 hours. Failure to rest 10 operating hours prior to required refueling shall constitute failure of this test.
3.3.13 Lock Out Device. The Type II Heavy Crane must have a key operated locking device in all operator compartments that either locks the steering wheel in place or locks the transmission selector control lever in place rendering the machine inoperable until unlocked.		I	I			Lockout. The Type II Heavy Crane will be inspected to verify the lock out device required in 3.3.13 is installed and located in required places. Nonconformance to 3.3.13 shall constitute failure of this inspection.
3.3.14 Anti-Vandalism Protection. The crane shall be equipped with lockable caps to secure the following:		I	I			Anti-Vandalism Protection The Type II Heavy Crane will be inspected to verify the anti-vandalism kit required in 3.3.14 is installed. Nonconformance to

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3.0 REQUIREMENTS	FPU	PVT	QCI	CT	FPT	4.0 VERIFICATION
<p>a. Fuel tank filler cap. b. Hydraulic oil tank filler cap. c. Engine oil filler cap and dipstick. d. Transmission oil filler cap and dipstick. e. Radiator filler cap. f. Toolbox. g. Battery box h. Dashboard.</p> <p>When lockable cab doors, lockable engine hoods or side panels secure any of the above items; individual locking caps are not required. Those cab doors, engine hoods or side panels and tool box(es), battery box(es), dashboard panel, engine ignition, other access hoods or panels, shall be able to be locked using a padlock eye with a minimum internal diameter of 0.375 inches.</p>						3.3.14 shall constitute failure of this inspection.
<p>3.3.15 Tools. The Type II Heavy Crane will be provided with all nonstandard, special tools and Basic Issue Items (BII) required for equipment operation and operator maintenance of the machine, these items should be kept to a minimum (T).</p>		I	I			<p>Tools. The Type II Heavy Crane will be inspected to verify the tools required in 3.3.15 are supplied. Nonconformance to 3.3.15 shall constitute failure of this inspection.</p>
<p>3.3.16 Toolbox. A permanent weatherproof, lockable tool/storage box of sufficient size to hold all non-standard tools, special tools and BII (T) shall be provided on each crane. The box cover shall be secured using a padlock eye minimum size of 0.375 inches internal diameter. A means for draining the box shall be provided.</p>		I	I			<p>Toolbox Inspection. The Type II Heavy Crane will be inspected to verify the toolbox required in 3.3.16 is supplied and met the size required. Nonconformance to 3.3.16 shall constitute failure of this inspection.</p>
<p>3.3.17 Storage. The crane shall have sufficient storage space for Additional Authorization List (AAL) publications, stowage of protective mask, Mission-Oriented Protective Posture (MOPP) gear and Load Bearing Vest (LBV) (T). FM 3-11.4 may be used as a reference.</p>		I	I			<p>Storage Inspection. The Type II Heavy Crane will be inspected to verify the storage required in 3.3.17 is available and met the size required. Nonconformance to 3.3.17 shall constitute failure of this inspection</p>
<p>3.3.18 Weapon Bracket/Storage. All Type II Heavy Crane operator compartments must be provided with a weapons mount able to</p>		I	I			<p>Bracket Fit Up Inspection. The Type II Heavy Crane will be inspected and tested fitted to verify the</p>

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3.0 REQUIREMENTS	FPU1	PVT	QCI	CT	FPT	4.0 VERIFICATION
accept the M16, M4 series weapons with and without the M203 grenade launcher that secures the weapon during operations and provides the operator with unrestricted access to the weapon. Weapons mount shall be able to accept the M240B light Machine Gun and M249 Squad Automatic Weapon (T).						weapon bracket installed in the cab will storage the M16, M4 series weapons with and without the M203 grenade launcher. Nonconformance to 3.3.18 shall constitute failure of this inspection/test.
3.3.19 At-Platform and Embedded Diagnostic Equipment. The Type II Heavy Crane shall have at-platform diagnostics IAW 3.3.19.1 and embedded diagnostics in IAW 3.3.19.2. The Type II Heavy Crane shall have the diagnostic capability (e.g. check engine lights, blinking / flashing lights etc.) to identify major electronically-controlled system LRU failures		T				At-Platform and Embedded Diagnostic capability. A non-destructive fault (approved by the government) will be inserted for each electronically controlled system (engine, transmission, ABS, etc...). Failure to retrieve error codes/DTC will constitute failure of this test. Error code/DTC and informational data retrieved must relate to the non-destructive fault inserted and clearly identify the component and/or circuit that failed, incorrect or unrelated DTC/information shall constitute failure of this test.
3.3.19.1. At-Platform Diagnostics. The Type II Heavy Crane must be compatible with current U. S. Army Standard Unit Level Test Equipment which is presently the MSDV3 (Maintenance Support Device version 3), with the auxiliary MSDV3-WICE (Wireless Internal Combustion Engine) test hardware. Diagnostic connector and circuits must be compatible with current standard Army test equipment. Diagnostic connector/connectors shall be easily accessible, environmentally protected, and hard mounted inside the cab. The diagnostic connectors shall be equipped with a cover, which shall prevent entrance of moisture and contaminants. The Type II Heavy Crane shall feature either a single data bus network (as specified by SAE J1939 or SAE J1708), or a multiple data bus network in accordance with J1939, which defines the interface between SAE J1708 and SAE J1939. The Type II Heavy Crane data bus shall have built in sensors that provide fault isolation capability sufficient to identify failures of major components of each system monitored by the data bus. Diagnostic outputs shall be transmitted to the vehicle mounted J1939 female 9 pin Deutsch Connector, which shall conform	T	T				At-Platform Diagnostics. The contractor will demonstrate via testing with current U.S. Army Unit Level Test Equipment (MSD-ICE) to determine that the vehicle's ECM / ECU diagnostic outputs are transmitted to the vehicle mounted J1939-13 female 9 pin Deutsch connector. Error Code/DTC and informational data must be displayed on the MSD. Nonconformance to 3.3.19.1 shall constitute failure of this test.

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<p>to SAE J1939-13 'Off-board Diagnostic Connector' dated October 2011. The Heavy Crane shall utilize the Type 1 diagnostic connector as specified in the SAE J 1939-13 specification dated October 2011. Software shall be capable of displaying operator / maintainer informational data associated with each error code/diagnostic trouble code (DTC). Software shall run on a Windows 7, 64 bit version and shall be RP1210 compliant.</p>						
<p>3.3.19.2. Embedded Diagnostics. The Type II Heavy Crane shall have all OEM embedded diagnostic capabilities available on the commercial version of the vehicle. Embedded software shall be capable of displaying operator / maintainer informational data associated with each error code/DTC.</p>	C	T				<p>Embedded Diagnostics. The contractor shall furnish certified test reports to prove compliance with the embedded diagnostics requirement of 3.3.19.2. If certified test is not available, these requirements shall be demonstrated.</p> <p>A function test will be completed during testing to verify embedded diagnostics function as design and communicates informational data to the operator. Non compliance shall constitute failure of this test.</p>
<p>3.3.20 Treatment and Paint. All external surfaces of the Type II Heavy Crane suitable for painting, except those that reach a temperature of 400 °F. shall be cleaned, treated and CARC painted IAW MIL-DTL-53072, with either a top coat color of 34094 green 383 or 33446 tan 686 (see 6.2) conforming to FED-STD-595</p> <p>Those surfaces that reach 400 °F during operation shall be coated with a high temperature resistant paint of limited reflectivity. Surfaces not suitable for painting shall be treated to or inherently provide a surface of limited reflectivity, as shall interior components visible from the exterior. Other internal components may be finished with the manufacturer's standard colors and paint, plating, or treatment.</p> <p><u>Base Color.</u> As specified in the production order the color shall be green, color no. 34094 of FED-STD-595 or tan, color no. 33446 of FED-STD-595.</p>	C	I	I			<p>Treatment and Paint. The contractor shall furnish certified test reports to prove compliance with the treatment and paint requirement of 3.3.20. If certified test is not available, these requirements shall be demonstrated.</p> <p>The paint finish shall be inspected for compliance with 3.3.20. Non compliance shall constitute failure of this inspection.</p>

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3.0 REQUIREMENTS	FPUJ	PVT	QCI	CT	FPT	4.0 VERIFICATION
<p>3.3.21 Welding. Welding procedures and welder qualification shall be in accordance with AWS D1.1, AWS D1.2, AWS D1.3 and AWS D14.3</p>	C	I	I			<p>Weld Inspection. The Type II Heavy Crane shall be inspected to verify conformance to all welding requirements, as specified in 3.3.21. Non-destructive testing (NDT) of welds shall be conducted by qualified (by certification) personnel (NAS 410).</p> <p>The contractor shall provide compliance certification, supported by training/personnel welder certification, test data and inspection data, as objective quality evidence, of conformance.</p>
<p>3.4 TRANSPORTABILITY The crane(s) shall have the capability of being transportable worldwide by rail, marine, highway, and air modes as specified here in. Guidance on transportability criteria is defined in MIL-STD-1366 and SDDCTEA Pamphlet 70-1. Preparation and tie-down for all modes of transport shall be completed in 4 hours or less with 3 soldiers or less.</p>	C	T,I				<p>The Type II Heavy Crane shall be inspected (by examination and demonstration) to verify conformance, as specified in 3.4. The physical dimensions and weight shall be tested for conformance to all transport mode requirements of 3.4. Testing will be conducted IAW ATC TOPs 1-2-500 and 1-2-504</p>
<p>3.4.1 Air Transportability. The Type II Heavy Crane Type II in drive-on drive-off configuration (under its own power) with operator in the driver's seat shall be capable of transport by C-5 and C-17 aircraft (T). MIL-HDBK-1791 is available for guidance. The Type II Heavy Crane vehicles shall be air transportable while filled to a minimum 25 percent, up to a maximum 75 percent, fuel capacity.</p>		T				<p>Air Transportability Test. The Type II Heavy Crane and CPK Transport containers shall first be inspected and calculations provided for meeting the aircraft shipping configurations. The crane shall be loaded, tied down, and unloaded with Soldier participation (if available) into a C-5 or C-17 aircraft to determine conformance with 3.3.4. The CPK Transportation Kit with Soldier participation (if available) shall be loaded, tied down, and unloaded in a C-5 or C-17 aircraft to determine conformance with 3.3.9. The inability to be loaded, tied down in the aircraft(s) and unloaded, or inability to be disassembled or reassembled in 60 minutes shall constitute failure of test</p>

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3.0 REQUIREMENTS	FPU	PVT	QCI	CT	FPT	4.0 VERIFICATION
<p>3.4.2 Marine Transport The Type II Heavy Crane shall be marine transportable on LCU-2000 class and larger vessels/ships. Weight, dimensions, and drive-on, drive-off abilities shall conform to MIL-STD-1366 for each transportable unit.</p>						<p>Marine Transport Verification. To determine conformance with 3.3.2, the Type II Heavy Crane shall be tested to determine conformance with the dimensions and weight limitation for transport on breakbulk, RORO, barge-carrying ships, and the LARC-LX lighterage. Inability to be transported by break-bulk, RORO, barge-carrying ships, or LARC-LX lighterage, without disassembly and in accordance with MIL-STD-1366, shall constitute failure of this verification</p>
<p>3.4.3 Rail Transport The crane(s) shall be rail transportable in CONUS. Reference MIL-STD- 810, MIL-STD-1366 and SDDCTEA Pamphlet 70-1. The crane(s) shall be capable of withstanding shock loads resulting from rail impact testing without failure, damage, or permanent deformation. The Type II Heavy Crane shall be capable of being loaded and tied down to DODX series flatcars using SDDCTEA approved tie-down provisions and procedures. When secured and mounted on rail cars, the Type II Heavy Crane shall meet the dimensional requirements of the DOD clearance profile for the Strategic Rail Corridor Network (STRACNET) Outline Diagram for Single Loads, Without End Overhang, on Open-Top Cars. This diagram applies to standard gauge rail lines in the Continental United States (CONUS). Cranes shall be transportable by rail with disassembly in 4 hour or less by the unit and component removal shall be done with equipment organic to the unit. Tie-down patterns for each DODX series flatcar shall be provided by the contractor along with mathematical analysis proving the sufficiency of the tie-down pattern.</p>		T,I				<p>Rail Impact Test. The Type II Heavy Crane and CPK shall be tested in accordance with 3.4.6 prior to the rail impact test. The Type II Heavy Crane and CPK shall be tested for compliance with the dimensions of the DOD diagram, and shall be subjected to the rail impact test. This test shall be conducted in accordance with MIL-STD-810 by mounting the test item on a rail car in its rail shipment configuration and then performing a series of at least four impacts. The first three impacts shall be at 6.4, 9.7, and 13 km/h (4, 6, and 8 mph), respectively, in the same direction. The fourth shall be conducted at 13 km/h (8 mph) in the reverse direction. All four impacts shall have a tolerance of +0.8, -0.0 km/h. After each impact, the cranes shall be inspected for spillage of lubricants, fuel, water and structural damage. Electrical shorts and normal operations and performance shall be checked and tested following the completion of the test. Performance degradation or permanent deformation of any part is considered a deficiency and a failure. Spillage of lubricants, fuel or water; structural damage; or electrical shorts shall also</p>

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3.0 REQUIREMENTS	FPUJ	PVT	QCI	CT	FPT	4.0 VERIFICATION
						constitute failure of this test
3.4.4 Highway Transportability. The Heavy Type II cranes shall be road legal (with permits). The maximum axle loads shall meet minimum requirements for highway transport within the continental U.S.	C	T				
3.4.5 Slinging Provisions. The slinging provisions shall conform to MIL-STD-209. The provisions shall enable the individual component units to be lifted in their normal transport configuration. The provisions shall be located so that not less than 1-inch clearance is maintained between slings and all exterior parts. The provisions shall be fastened to members that will withstand stresses in the amount and direction of pull specified for the provisions without weld failure, permanent deformation, cracking, loosening, or breaking of the provision or its connecting structural components. When required a spreader bar shall be an integral part of the design of the equipment. Slinging provisions may be used as tie-down provisions when such provisions meet the requirements specified herein. All slinging and tie-down provisions shall be labeled "LIFT", "TIEDOWN", or "LIFT/TIEDOWN", as applicable, in 1-inch (2.54-cm) high letters. The slinging provisions shall satisfactorily complete the pull testing as specified herein without weld failure, permanent deformation, and cracking, loosening, or breaking of the provision or its connecting structural component.		T				Provision Testing. The Type II Heavy Crane shall be inspected and tested to verify conformance, as specified in 3.4.5 and 3.4.6. Lifting and tie-down provisions shall be tested to verify conformance to MIL-STD-209. All lifting and tie-down provisions shall be statically tested to assure that the provisions and the connecting structural members meet the criteria of MIL-STD-209. Test results that do not meet the requirements of MIL-STD-209 shall constitute failure of this test (3.13.2 and 3.13.3). Testing will be conducted IAW ATC TOPs 1-2-500
3.4.6 Tie-Down Provisions. The tie-down provisions shall conform to MIL-STD-209. The tie-down provisions shall satisfactorily complete the pull testing as specified herein without weld failure, permanent deformation, cracking, loosening, or breaking of the provision or its connecting structural component. All slinging and tie-down provisions shall be labeled "LIFT", "TIEDOWN", or "LIFT/TIEDOWN", as applicable, in 1-inch (2.54-cm) high letters.		T				Tie-down Provisions. To determine conformance to 3.4.6, tie-down provisions shall be tested for conformance with MIL-STD-209. All tie-down provisions shall be statically tested to ensure that the provisions and the connecting structural members meet the criteria of the MIL-STD-209. Test results that show the provisions do not meet the criteria of

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3.0 REQUIREMENTS	FPUI	PVT	QCI	CT	FPT	4.0 VERIFICATION
						MIL-STD-209 shall constitute failure of this test
3.4.7 Towing. Tow hooks or other suitable means of attaching a tow cable or tow bar shall be provided on the front and rear of the Type II Heavy Crane (T). Tow bar lugs shall be compatible with NATO STANAG 4478. The Type II Heavy Crane must be able to be towed by a like Type II Heavy Crane at an average speed of 15 mph on a level paved surface.		T				Towing Lugs. The towing lugs shall be tested for strength as required in paragraph 3.3.8. Any weld failure, permanent deformation, cracking, loosening, or breaking of the lug or its connecting structural component shall constitute failure of this test.
3.4.8 Identification and Marking. Each Type II Heavy Crane shall be furnished with an identification plate showing the Contractor's model number, NSN, USA registration number, vehicle identification number, weight, date of manufacture and date of delivery. The identification plate shall be permanently affixed to the Type II Heavy Crane in a readily accessible and conspicuous location. Plates shall conform to A-A-50271 or Contractor's standard plates subject to the approval of the Contracting Officer. All attachments or components removed or disassembled for shipment shall be match marked for proper re-assembly in accordance with the Contractor's standard method. All required identification, instruction, shipping, and warranty plates must be visible both with and without CPK installed. If a required plate is covered when the CPK is installed, a plate with the appropriate information for the configuration shall be permanently affixed to a visible portion of the CPK. If the information provided on a plate differs between the armored and unarmored conditions (i.e. shipping data), both conditions must be displayed on the plate, or the unarmored configuration plate must be covered and replaced when the CPK is installed.	I	I	I			Identification /Marking inspection. The Type II Heavy Crane system shall be inspected to verify conformance for identification and marking, as specified in 3.4.8
3.4.8.1 Instruction Plates. The Type II Heavy Crane shall be equipped with instruction plates, or diagram plates Type II Heavy Crane, describing procedures to be followed for operating, servicing, and lubrication. Plates describing safety measures, cautions or warnings against operations detrimental to the crane shall be in accordance with A-A-50271. The plates shall be attached by screws,		I	I			Instruction Plates Inspection. The Type II Heavy Crane system shall be inspected to verify the instruction plates describe procedures to follow for operating, servicing and lubrication the crane. Non-conformance for instruction plates, as specified in 3.4.8.1 shall constitute failure of inspection

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3.0 REQUIREMENTS	FPU	PVT	QCI	CT	FPT	4.0 VERIFICATION
bolts, or rivets and affixed to the crane in a location that is protected and conspicuous. Instructions for cab size reduction or cab removal and installation or any other transportability issue(s) shall be provided in the operator's manual and on cards, approximately 8 1/2 inches by 11 inches and encased in laminated plastic. One set of these cards shall be furnished with each Type II Heavy Crane tractor as applicable.						
3.4.8.2 Shipping Data Plate. Each crane shall be furnished with a shipping data plate. All shipping data plates shall show a silhouette of the crane in its transport configuration indicating the shipping weight, center of gravity and the location and capacity of the slinging and tie-down provisions. The plate shall be attached by screws, bolts or rivets and affixed to the crane in a place that is protected and conspicuous.						Shipping Data Plate Inspection. The Type II Heavy Crane system shall be inspected to verify shipping data plate display accuracy shipping instruction to include of the silhouette of the crane. Non-conformance for shipping data plates, as specified in 3.4.8.2 shall constitute failure of inspection
3.4.8.3 Warranty Data Plate. Each Crane shall be furnished with a warranty data plate. The plate shall contain the Following information: <ul style="list-style-type: none"> a. Date the warranty commences. b. Warranty period. c. Contract Number. d. Manufacturer's Name. e. Date of Manufacture. <p>The plate shall be attached by screws, bolts or rivets and affixed to the crane in a place that is protected and conspicuous.</p>						Warranty Data Plate Inspection. The Type II Heavy Crane system shall be inspected to verify the warranty data plates display accurate information and is located in a protection space on the crane. Non-conformance to the warranty data plate, as specified in 3.4.8.3 shall constitute failure of inspection.
3.4.8.4 Military Load Classification (MLC) Identification. A classification number for the crane shall be displayed with 3.5 inch gothic black numerals centered within a 9 inch diameter, 1/4 inch thick black ring. This sign is displayed on the front (curbside) (with and without CPK installed) of the vehicle and below the driver's line of vision. The sign may be painted on the vehicle or placed on a plate						Military Load Classification (MLC) Identification. The Type II Heavy Crane system shall be inspected to verify the MLC id sign displays the accuracy MLC for the vehicle configuration and is install/located as required. Non-conformance to the MLC, as specified in 3.4.8.4 shall constitute failure of inspection.

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3.0 REQUIREMENTS	FPU	PVT	QCI	CT	FPT	4.0 VERIFICATION
permanently mounted to the vehicle. The sign shall be visible at ground level at a distance of 20 feet from the left front of the crane. The Government will assign the weight classification number.						
3.4.8.5 Unique Identification Marking (UID). Any assembly, subassembly, component, repairable, or serially managed part with a Government acquisition cost of \$5,000.00 or more, shall be marked in accordance with MIL-STD-130. Marking will be permanent in nature and located in an area which is easily identified. The main structural frame(s) need not have this marking.						UID Inspection. Prior to vehicle delivery to Government testing facility, the Type II Heavy Crane shall be inspected to verify each UID label is readable. Non-conformance to the unique identification marking (UID), as specified in 3.4.8.5 shall constitute failure of inspection.

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5. PACKAGING

For acquisition and logistical purposes the packaging and marking requirements shall be specified in the contract or purchase order. When actual packaging of procured material shall be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products or by contacting the responsible packaging activity.

6. NOTES

6.1 Intended use. The intended use of the Type II Heavy Crane, is to support combat missions for use in typical missions such as the maintenance of roads; performing concrete placement, pile driving and extraction; supporting horizontal construction for structural engineers; maintaining airfields and heliports, logistics support and medical facilities, and protective shelters.

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, Number and Date of the purchase description
- b. Quantity of First Article Test (FAT) Type II Heavy Crane required
- c. First Article Test (FAT) – Government conducted
- d. Certifications
- e. Welding procedures
- f. Paint and Pre-treatment
- g. Government Furnished Property
- h. Special tools and equipment

6.3 Definitions. For the purpose of this purchase description, the following definitions apply.

6.3.1 Compliance certification. A written description of how compliance to a requirement was achieved.

6.3.2 Non-serviceable part. Any part that can no longer be reconditioned to meet the minimum OEM standards.

6.3.3 Paint, corrosion and rust removal. Process entails removal of paint to allow for a thorough inspection and proper sanding, repainting and the removal of all corrosion and rust.

6.3.4 Non-destructive Test (NDT). The process used for finding defective items (when visual inspection is insufficient to detect defects), while not destroying good parts. Common NDT inspection methods include liquid penetrant, magnetic particle, radiographic, ultrasonic, eddy current, hardness testing and other NDT methods.

6.3.5 Primary roads. Primary roads is defined as two or more lanes, all-weather, maintained, hard surface roads with good driving visibility used for heavy and high density traffic. These roads have lanes with a

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minimum width of 2.7 m (9 ft.) and the legal maximum GV/gross combined weight for the country or state is assured for all bridges. Surface roughness values less than 0.2 RMS.

6.3.7 Secondary roads. Secondary roads is defined as two lane, all weather, occasionally maintained, hard or loose surface (paved, crushed rock, gravel) roads intended for medium-weight, low density traffic. These roads have lanes with a minimum width of 2.4 m (8 ft.) and no guarantee that the legal maximum GVW/ gross combined weight for the country or state is assured for all bridges. Surface roughness values ranges from 0.2 inch RMS to 0.6 inch RMS

6.3.8 Off-Road. Off-road is defined as operations over virgin terrain which has no previous traffic (cross-country), and over combat and pioneer trails. Surface roughness values ranges from 0.6 inch RMS to 3.0 inch RMS.

6.3.9 Vehicle overspray. The following items shall not be painted/ over sprayed:

- a. Data plates
- b. Brake caging bolts
- c. Tires
- d. Tail lights
- e. Reflectors
- f. Sight indicators for fluid levels
- g. Hydraulic hoses
- h. Air hoses and air lines
- i. Engine exhaust ducting
- j. Tow bars
- k. Air connections (Glad Hands)
- l. Electrical connectors (includes switches)
- m. Light lens, lens, mirrors, and glass
- n. Oil filter cartridges
- o. Axle air vent valves
- p. 20 ton sling, 40 ton sling

All sections exposed (at anytime) of the boom and outriggers shall be painted. Manufacturer standard paint and treatment of non exposed section is acceptable, as long as the section does not become visible.

Custodian:
Army – AT

Preparing activity:
Army – AT