

INCH-POUND

A-A-59506

02 July 2004

COMMERCIAL ITEM DESCRIPTION

AIR CONDITIONING UNIT, DIESEL ENGINE DRIVEN, TRAILER MOUNTED

The General Services Administration has authorized the use of this commercial item description by all federal agencies.

1. **SCOPE.** This commercial item description (CID) covers a wheel-mounted, diesel-engine-driven, single-pass air conditioning unit of not less than 110 tons nominal cooling capacity (DAC110).

2. **PRECEDENCE.**

2.1 Precedence. The DAC110 shall comply with the requirements of this document and shall comply with the applicable requirements of ASHRAE Standard 52.2; Federal Acquisition Regulations; FED-STD 595; NFPA 70 (Class 1, Division II, Group D hazardous area); OSHA; SAE AIR 1375, SAE ARP1247, SAE ARP1801, SAE ARP5374, SAE AS8090, (Type II, Group C), SAE AS38386, SAE J447 and SAE J551 in effect at the time of manufacture, unless otherwise stated. Unless otherwise stated, this document has precedence over a referenced document. Where referenced documents may conflict in characteristic or performance, the more stringent requirement shall establish the minimum.

3. **SALIENT CHARACTERISTICS.**

3.1 Description. The DAC110 shall selectively operate as an air conditioning unit, a ventilation unit, or a heating unit. The DAC110 shall consist of a diesel engine primary power source, a vapor cycle air conditioning system, an air delivery and distribution system, and the necessary controls, wiring, piping, instrumentation, and housing with wheel-mounted fully suspended undercarriage, as specified herein. The DAC110 shall deliver not less than 600 pounds per minute (ppm) of conditioned air to military aircraft through three 12-inch diameter flexible supply air ducts. The DAC110 shall be designed; to operate in any mode for not less than eight continuous hours, to not require less than 200 hours between service maintenance, to operate not less than 2000 hours per year, and for a service life of 20 years. Major component rebuilds shall not be required more frequently than every 10,000 hours operation.

Comments, suggestions, or questions on this document should be addressed to WR-ALC/LGEC, 480 Richard Way Blvd. Suite 200, Robins AFB, GA 31098-1640 or emailed to bob.yohe@robins.af.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at www.dodssp.daps.mil.

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3.1.1 Performance. The DAC110 shall be capable of storage, and start and operation under the following environmental conditions:

- a. Storage temperature range from -60°F to +165°F.
- b. Operating temperatures range from 0°F to +125°F.
- c. Exposure to relative humidity up to 100 percent.
- d. Exposure to salt fog consistent with a seaside environment.
- e. Exposure to blowing sand and dust particles as encountered in desert areas.

3.1.1.1 Cooling. The DAC110 shall deliver not less than 1,320,000 British Thermal Units (BTU)s of cooling, as measured by air enthalpy method of SAE ARP5374, at entering ambient air conditions of 97°F dry-bulb and 85°F wet-bulb. Cooling mode shall operate between ambient conditions of +40°F and +125°F. Leaving air conditions in cooling mode shall be manually resettable down to +50°F. System controls shall maintain discharge temperature setting automatically, up to total system cooling capacity. Exceeding system capacity shall only cause a loss of set-point control.

3.1.1.2 Heating. The DAC110 shall deliver not less than 750,000 BTUs of reverse cycle cooling at entering ambient conditions of 47°F. Cooling mode shall operate between ambient conditions of +20°F and +70°F. Leaving air temperature shall be manually resettable up to 100°F. System controls shall maintain discharge temperature setting automatically, up to total system heating capacity. Exceeding system capacity shall only cause a loss of set-point control.

3.1.1.3 Booster coil heating. The DAC110 shall utilize rejected heat from the diesel engine to add heat to the air stream. Booster coil activation shall be interlocked to operate only with ventilation or heating mode settings. Leaving air conditions shall be manually adjustable up to 100°F. System controls shall maintain discharge temperature setting automatically, up to the total allowable heat rejection capacity of the engine. Booster coil heating shall be the first stage of heating.

3.2 Standard commercial product. The DAC110 shall, as a minimum, be in accordance with the requirements of this CID and shall be the manufacturer's standard commercial product. Additional or better features, not specifically prohibited by this CID, but which are a part of the manufacturer's standard commercial product, shall be included in the air conditioner furnished.

3.3 Interchangeability. All delivered DAC110 units shall be identical to the extent necessary to ensure interchangeability of component parts.

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3.4 Engine. The DAC110 shall be driven by a liquid cooled diesel engine of a size providing not less than 120% of the worse case total load requirement (not necessarily the design load point requirement) while operating on JP-8 fuel at 3000 foot altitude. Instruments and gauges specified in 3.4.1 shall be of a type recommended by the engine manufacturer. The air intake shall include a paper element filter, and shall include an air restriction gauge to indicate service replacement point. The exhaust routing shall not provide a direct gravity path for water back to the engine. The exhaust outlet shall be protected from intrusion of water. The engine shall be equipped with a system capable of starting the engine at any temperature above zero (0)°F within 5 minutes, without any supplemental external power requirement. Starting aids such as glow plugs or ether priming may be used. Ether priming must be of the measured shot type. The engine shall be ready for full load operation within 15 minutes of starting. Restoration of engine starting energy shall not require more than 30 minutes of engine operation. The connection between the engine and the driven components of the vapor cycle and air distribution systems shall be releasable, without disassembly of mechanical connections. Safety controls shall shut down the engine on loss of oil pressure, coolant overheating, or for other causes published by the manufacturer.

3.4.1 Engine instruments and controls. Engine instruments and controls shall be grouped together on the DAC control panel. As a minimum, the following engine instruments and controls shall be furnished:

- a. Control, engine starter
- b. Control, engine speed (see 3.4.1.1)
- c. Control, engine shutdown
- d. Control, engine emergency shutdown (see 3.4.1.2)
- e. Control, engine-starting aid (if required)
- f. Gauge, tachometer
- g. Gauge, oil pressure
- h. Gauge, coolant temperature
- i. Gauge, battery condition indicator
- j. Gauge, fuel, with warning light for less than 1/4 tank full
- k. Hour meter, registering not less than 9,999.9 engine hours total.

3.4.1.1 Control engine speed. An operator controlled throttle shall be provided for regulation of engine speed. The throttle shall include a lockable fine adjustment feature, limited by the governed speed of the engine or the maximum rpm limit of a driven component, and shall include a quick return to idle feature.

3.4.1.2 Emergency engine shutdown switch. An emergency engine emergency shutoff switch shall provide for an immediate and complete shutdown of the engine at any operating condition without the use of any other control. The switch shall be marked by a red circle at least one inch in diameter. A reference to possible system(s) damage resulting from this action shall appear in the operator's manual.

3.5 Reversible vapor-cycle system. The DAC110 vapor-cycle system shall operate on a single-phase refrigerant that is neither a Class I or Class II Ozone Depleting Substance/Compound (ODS/ODC). The DAC110 reversible vapor-cycle system shall include compressor(s), condenser and evaporator coil(s), ambient air fan(s), expansion valve(s) and operational controls. The compressor manufacturer

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shall coordinate on the system configuration and the engagement method. The compressor shall not be a piston type design. Motor driven components shall be vibration isolated from the housing and connected systems. Controls shall maintain discharge air quality below saturation and shall maintain temperature within $\pm 3^{\circ}$ F from the set point, while operating within total system design capacity. Coil defrost shall be automatically controlled. Controls shall isolate at least 95% of the system refrigerant during normal shut-down sequence. Should the vapor-cycle system be shut-down by a safety device or emergency action, upon re-establishment of power, the controls shall start and complete a normal shut-down sequence prior to re-starting vapor-cycle operation in accordance with controls settings. Safety features shall shut down the system, if any set-point limit for temperatures, fluid levels, flows, or pressures are exceeded.

3.6 Air delivery and distribution system. The air delivery system design point shall be 600 ppm at an external static pressure of not less than 40 inches water column. Total air delivery volume shall be adjustable between 300 and 700 ppm. Air shall be routed through three 12 inch discharge outlets with individual duct volume controls. Discharge outlets shall include mating connections for attachment of 12 inch female air duct hose connectors in accordance with SAE AS38386/2. Discharge outlets shall have female style lock-on metal caps, retained to the housing with chains or cables. Volume controls shall include a lockable fine adjustment feature. Total flow and individual duct flow shall be adjustable and monitored from the control panel. The air intake shall incorporate a serviceable filter media certified to meet ASHRAE Standard 52.2, with a Minimum Efficiency Reporting Value of 13, or a dust spot efficiency of 80 percent. The filter shall be serviceable through either an access door or through the intake air grille. A gauge on the control panel (see 3.10.1) shall show filter restriction and shall identify the service requirement point.

3.6.1 Air delivery ducts and adapters. The DAC110 shall be equipped with six (6) twelve inch diameter by 25 foot insulated flexible duct assemblies in accordance with SAE AS38386. Each duct assembly shall include one 12-inch diameter male and one 12 inch diameter female connection in accordance with SAE AS 38386. The DAC110 shall be equipped with three reducing duct adapters, having one 12-inch diameter female end connector in accordance SAE AS38386/2 and one 8-inch diameter male end in accordance with MS33562.

3.7 Booster coil system. The booster coil system shall consist of a coil located in the air delivery system supplied by rejected heat from the diesel engine. When manually activated, a portion of the engine coolant shall bypass the engine radiator and flow through the air delivery system coil. The engine coolant pump shall provide circulation flow through the air deliver system coil. Coolant flow to the air delivery coil shall be limited by the engine manufacturer's defied acceptable return water temperature. Coolant volume shall be regulated by the discharge temperature setting on the control panel.

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3.8 Storage battery(s). DAC110 electrical power shall be provided by commercially available 12-volt absorbed glass matt storage battery(s). Recharging of the battery(s) shall be provided by the diesel engine. All DAC110 system electrical requirements, not including mobility lighting, shall be provided by the storage battery(s).

3.9 Housing. A housing shall enclose the engine, the vapor cycle system, and the air delivery and distribution system. The housing shall provide a weather-resistant enclosure for all components. Hinged doors shall provide protection for the air intake(s), air discharge(s), ambient air coil(s), ambient air fan(s), engine radiator, and the control panel. Hinged doors or hinged access panels shall be provide for operational inspection and servicing. All major components shall be replaceable through either the service access doors or through removable panels specifically provided for the purpose. All air openings shall be protected from bird and plant matter infiltration by a rigid mesh. Condenser coil intake air shall be protected from dust and dirt particle build-up. Conditioned air intake(s) shall not pull design conditions rainfall into the air delivery system. Conditioned air discharge connections shall have removable caps, secured by a cable or chain.

3.9.1 Duct storage compartment. The housing shall include weather-resistant compartment(s) for the storage of six 12 inch diameter duct assemblies and three duct adapters (see 3.6.1). All ducts and adapters shall be accessible while standing on the ground without the use of a reach-extending device.

3.10 Piping and instrumentation. All systems piping materials and controls components shall be selected for the applications and pressures consistent with applicable law, published commercial guidelines, and safety factors. All piping shall be secured to structure to prevent chaffing and vibration during any mode of operation or mobility. Switches, controls, and gauges specified in 3.10.1 shall be of a type recommended by the manufacturer for the application.

3.10.1 Operator's control panel. An operators control panel shall be located on the side of the DAC110. The control panel shall be fully illuminated for night servicing operations. All components on the panel shall be weather proof. The panel shall contain as a minimum the following components:

- a. Switch, mode selector (cooling-ventilation-heating)
- b. Gauge, ambient air filter restriction (see 3.6)
- c. Gauge, discharge air temperature
- d. Gauge, discharge air pressure
- e. Gauges, total airflow rate and (3) individual discharge outlet air flow rates
- f. Controller, total discharge airflow
- g. Controller, (3) individual discharge duct air-flow
- h. Controller, cooling mode discharge temperature
- i. Controller, heating mode discharge temperature
- j. Engine controls (see 3.4.1)

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3.11 Undercarriage. The DAC110 undercarriage shall be separately mounted to or integral with the housing (see 3.10). The undercarriage shall be of a two or three axle design, including; hinged tow bar with lunette-coupler; suspended axles; defense department standardized wheels fitted with transport type pneumatic tires; inertia brakes; manually applied parking brakes; and lighting in accordance with the defined Group and Type performance requirements of SAE AS8090.

3.12 Lifting and tiedown attachments. The DAC110 shall be equipped with lifting/tiedown rings. The rings shall be located such that, four equal length cables to a single hook can hoist the DAC110 without more than a 10 degrees tilt from horizontal in any plane. Spreader bars shall not be required and cables shall not be deflected by the housing structure. Clearance shall be provided for tiedown chains or straps. A lifting and tiedown instruction plate (see 3.15) shall be attached to the DAC110.

3.13 Sound and electromagnetic interference.

3.13.1 Operational sound levels. The maximum A-weighted sound level produced by the DAC110 shall not exceed 84 dBA, when measured in accordance with SAE ARP1801.

3.13.2 Electromagnetic interference (EMI). The DAC110 shall comply with all applicable requirements of SAE J551-1 for electromagnetic radiation and susceptibility. Susceptibility testing shall be in accordance with the requirements of SAE J551-11. Test severity levels shall be as referenced, except all Class C functions shall fall within Region I.

3.14 Cleaning, treatment, and painting. Unless otherwise specified, the DAC110 outer surfaces and the interior surface of hinged doors and access panels shall be painted forest green, color number 24052 of FED-STD-595, with polyurethane paint. The undercarriage may be painted black. The engine and other major components may remain the manufacturer's original colors.

3.15 Identification and instruction nameplates. Identification and operating instruction shall be inscribed on aluminum nameplates. Inscriptions shall tolerate exposure to oil, dirt, sunlight, and detergent solutions without fading or becoming illegible. Nameplates shall be mechanically attached (no adhesives). Chained on metal tags or decals shall not be used. DAC110 nameplates shall be as follows.

3.15.1 Identification. Functional system components, valves, gauges, and switches shall be marked for identification. An end item identification plate shall be mounted on the exterior of the DAC110, with the following information inscribed. The serial number and date of delivery shall be stamped.

Make and Model
National Stock Number
Contract Number
Oil, Engine SAE Grade
Serial Number
Date of Delivery

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3.15.2 Control markings. All controls, valves, gauges, switches, and indicators used in the operation of the systems shall be identified.

3.15.3 Diagrams. Schematic diagrams of the piping and electrical systems shall be provided. Each control, valve, gauge, and switch identified on the diagrams shall correspond to the markings on like parts of the systems.

3.15.4 Operating instructions. Operating and precautionary instructions shall be permanently affixed near the appropriate system control panel. Instructions shall be clear, concise, and enable safe operation of the DAC110 without damage to the equipment or injury to personnel. Each control, valve, gauge, and switch identified on the operating instructions shall correspond to the markings on like parts of the systems.

3.15.5 Lubrication plate. A lubrication plate shall show a location for all lubrication points. The plate shall identify type and grade of lubricant, frequency of application or change, and differences based on operational temperatures.

3.16 Workmanship.

3.16.1 Materials. Materials shall be selected for the application based on defined purpose, survivability, exposure, and service life. Components shall perform within their published ratings. Magnesium alloys, wood products, asbestos, Class I or Class II Ozone Depleting Substance/Compound (ODS/ODC) shall not be used. Coatings subject to failure due to environmental and operational extremes shall not be used. Materials used shall not be nutrients for fungi. Contact between metals widely separated in galvanic series, as defined by SAE J447, shall be avoided.

3.16.2 Welding. Welding procedures shall be in accordance with a nationally recognized code. Copies of welder qualification records shall be on file and available for review. Surfaces to be welded shall be free of rust, scale, or foreign material. Welds shall be of a size and shape capable of transmitting the design load without deformation or failure. Weld areas shall be cleaned of scale and spatter prior to application of protective coatings.

3.16.3 Fasteners. Threaded fasteners shall include features to prevent the loss of torque, while allowing for disassembly. Tapped threads into aluminum shall be in accordance with a published standard. Permanently fastened overlapping surfaces shall be sealed. Rivet selection shall be for a minimum joint strength. Rivet heading shall be consistent with published data for a matching application. Adhesive supports for wiring or other components shall not be used.

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4. REGULATORY REQUIREMENTS.

4.1 Materials. The contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation. Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this CID are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term "recovered materials" means materials which have been collected from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. Unless otherwise specified, none of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this CID.

5. QUALITY ASSURANCE PROVISIONS.

5.1 Product Conformance. The product provided shall meet the salient characteristics of this CID, conform to the producer's own drawings, specifications, standards, and quality assurance practices, and be substantially the same product offered for sale in the commercial market.

5.2 Contractor requirements. The contractor shall provide the purchaser 30 days notice of verification reviews and demonstrations (see 5.3). Reviews and demonstrations shall be referenced to the salient characteristics or performance requirements of this or a referenced document. The contractor shall provide the purchaser copies of the DAC110 operational, service and maintenance, and parts breakdown technical manuals for review 60 days prior to the time of verification. The contractor's parts manual shall list part numbers for contractor manufactured components and source part numbers for purchased sub-level components and whole components. The contractor shall provide a product familiarization video tape that verbally and visually provides all operational and safety controls information and routine service requirements.

5.3 Verification. Prior to delivery of the first DAC110, the contractor, at his facility, shall review all salient characteristics and shall demonstrate individual performance requirements of the CID or the referenced applicable documents with the purchaser. Where specific certifications are required, copies shall be provided. Performance demonstrations shall be conducted where visual reference cannot establish compliance. Data generated by any performance demonstration shall directly prove the requirement or shall be sufficient for extrapolation to the requirement.

5.4 Reconfiguration Criteria. Failure to verify the requirements of this CID, reference applicable documents, shall be cause for reconfiguration and re-verification. Causes for reconfiguration shall include: incorrect configuration, inability to meet performance requirement, inability to maintain settings, activation of a system safety device, conditions presenting a safety hazard to a user or a maintainer, component interference, structural failure, misalignments, instability during movement, spillage of fluids (other than water), or overheating.

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5.5 Delivery test. Each DAC110 shall be cycled through each mode of operation and shall demonstrate a positive response to the manipulation of all controls. There shall be no sharp edges, no misalignments, no failures in the paint finish, no over-spray, and no leaks. All latches shall function and all lights shall work.

6. PACKAGING. The preservation, packing, and marking shall be as specified in the contract.

7. NOTES.

7.1 Source of documents.

7.1.1 Copies of Federal documents are available from: Superintendent of Documents, U.S. Government Printing Office, Washington DC 20402.

7.1.2 ASHRE documents are available from: American Society of Heating, Refrigerating and Air-Conditioning Engineers Inc., 1791 Tullie Circle N.E., Atlanta GA 30329

7.1.3 NFPA documents are available from: National Fire Protection Association, Battery March Park, Quincy MA 02269.

7.1.4 SAE documents are available from: Society of Automotive Engineers, 400 Commonwealth Dr., Warrendale PA 15096.

7.2 Ordering data. The purchaser shall specify the following at the time of purchase:

- a. Title, number, and revision letter, and date of this document.
- b. Packaging requirements (see 5).

7.3 Subject term (key word) listing.

Cooling
Heating
Mobile
JP-8

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Custodians:

Air Force - 99

Army – AV

Navy - SH

Preparing activity:

Air Force – 84

Agent:

Air Force – 99

Civil Agency Coordinating Activity:

GSA – 7FLE

FSC 4120

(Project 4120-1051)

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