

**NAVFAC
SPECIFICATION**

**WO 6733967
Replace 450 Ton Chiller
B-4390**

**NHC
MCAS Cherry Point, NC**

AMENDMENT #01

IMPORTANT

This amendment should be acknowledged when your proposal is submitted. Failure to acknowledge the amendment may constitute grounds for rejection of the proposal.

If your proposal has been submitted prior to the receipt of this amendment, acknowledgement should be made by telegram, which should state whether the price contained in your proposal is to remain unchanged, is to be decreased by an amount, or is to be increased by an amount. The acknowledgement must be received prior to proposal opening time.

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT		1. CONTRACT ID CODE	PAGE 1	OF PAGES
2. AMENDMENT/MODIFICATION NO. 0001	3. EFFECTIVE DATE 06/18/2019	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)	
6. ISSUED BY CG MCAS Cherry Point FACILITIES, ROICC B-163, CURTIS ROAD PSC BOX 8006 CHERRY POINT, NC 28533		Code N40085	7. ADMINISTERED BY (If other than item 6.) Code	
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) AMENDMENT MUST BE ACKNOWLEDGED WITH YOUR PROPOSAL		<input checked="" type="checkbox"/>	9A. AMENDMENT OF SOLICITATION 6733967 Replace 450 Ton Chiller, B-4390	
			9B. DATED (SEE ITEM 11)	
		<input type="checkbox"/>	10A. MODIFICATION OF CONTRACT/ORDER NO.	
			10B. DATED (SEE ITEM 13)	
CODE	FACILITY CODE			

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers is extended is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing items 8 and 15, and returning 1 copy of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (if required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS,
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

<input type="checkbox"/>	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14. ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
<input type="checkbox"/>	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATION CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103 (b).
<input type="checkbox"/>	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
<input type="checkbox"/>	D. OTHER: (specify type of modification and authority)

E. IMPORTANT: Contractor is not is required to sign this document and return **original** to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
6733967 Replace 450 Ton Chiller, B-4390, NHC, Marine Corps Air station, Cherry Point, North Carolina 28533

The purpose of this amendment is:

1. Provide responses to RFI's 1&2.

SEE ADDENDUM SHEET

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
15B. CONTRACTOR/OFFEROR (Same as Item 8)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY _____	16C. DATE SIGNED
_____ (Signature of person authorized to sign)		_____ (Signature of Contracting Officer)	

Amendment 01
WO 6434190, Repair Exterior Doors, B-137
MCAS, Cherry Point, NC

RFI Responses:

1. The Water Chiller Schedule (Note #1) on drawing M-001, calls for a centrifugal water-cooled chiller. Spec section 23 64 10 outlines an air-cooled scroll chiller. Please provide correct specs and/or chiller schedule.

Response: The chiller is a Water-Cooled chiller. Corrections made to the chiller schedule on drawing sheet M-001 and updated copy attached with Amendment. Also corrected Spec. section 23 64 10 for the Water-Cooled Chiller and a copy attached with this Amendment.

2. The chiller schedule indicates a mag bearing centrifugal chiller; however, the specifications seem to indicate an air-cooled scroll compressor chiller. Please clarify the intention.

Response: The chiller is a Water-Cooled chiller. Correction made on drawing sheet M-001.

SECTION 23 64 10

WATER CHILLERS, VAPOR COMPRESSION TYPE

11/16

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ANSI/ASHRAE 15 & 34 (2013; Addenda A 2014; ERTA 1 2014; Addenda A-T AND SUPP 2015; ERTA 2 2015; INT 1 2015; ERTA 3 2015; ERTA 4 2016; INT 2-3 2016) ANSI/ASHRAE Standard 15-Safety Standard for Refrigeration Systems and ANSI/ASHRAE Standard 34-Designation and Safety Classification of Refrigerants

AMERICAN WELDING SOCIETY (AWS)

AWS Z49.1 (2012) Safety in Welding and Cutting and Allied Processes

ASTM INTERNATIONAL (ASTM)

ASTM A307 (2014) Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength

ASTM B117 (2016) Standard Practice for Operating Salt Spray (Fog) Apparatus

ASTM D520 (2000; R 2011) Zinc Dust Pigment

ASTM F104 (2011) Standard Classification System for Nonmetallic Gasket Materials

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA MG 1 (2016) Motors and Generators

NEMA MG 11 (1977; R 2012) Energy Management Guide for Selection and Use of Single Phase Motors

1.2 SUBMITTALS

Government approval is required for all submittals. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Water Chiller

Verification of Dimensions
System Performance Tests
Demonstrations
Water Chiller - Field Acceptance Test Plan

SD-06 Test Reports

Field Acceptance Testing
Water Chiller - Field Acceptance Test Report
System Performance Tests

SD-07 Certificates

Refrigeration System

SD-08 Manufacturer's Instructions

Water Chiller - Installation Instructions

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals

SD-11 Closeout Submittals

Energy Efficient Equipment for Chillers
Ozone Depleting Substances

1.3 SAFETY REQUIREMENTS

Exposed moving parts, parts that produce high operating temperature, parts which may be electrically energized, and parts that may be a hazard to operating personnel must be insulated, fully enclosed, guarded, or fitted with other types of safety devices. Safety devices must be installed so that proper operation of equipment is not impaired. Welding and cutting safety requirements must be in accordance with AWS Z49.1.

1.4 DELIVERY, STORAGE, AND HANDLING

Stored items must be protected from the weather, humidity and temperature variations, dirt and dust, or other contaminants. Proper protection and care of all material both before and during installation will be the Contractor's responsibility. Any materials found to be damaged must be replaced at the Contractor's expense. During installation, piping and similar openings must be capped to keep out dirt and other foreign matter.

1.5 PROJECT REQUIREMENTS

1.5.1 Verification of Dimensions

The Contractor must become familiar with all details of the work, verify all dimensions in the field, and advise the Contracting Officer of any discrepancy before performing any work.

PART 2 PRODUCTS

2.1 PRODUCT SUSTAINABILITY CRITERIA

For products in this section, where applicable and to extent allowed by

performance criteria, provide and document the following:

2.1.1 Energy Efficient Equipment for Chillers

Provide chillers meeting the efficiency requirements as stated within this section.

2.1.2 Ozone Depleting Substances

Chillers must not use CFC-based refrigerants, and must have an Ozone Depletion Potential (ODP) no greater than 0.0 in conformance with this section.

2.2 STANDARD COMMERCIAL PRODUCTS

Materials and equipment will be standard Commercial cataloged products of a manufacturer regularly engaged in the manufacturing of such products, which are of a similar material, design and workmanship. These products must have a two year record of satisfactory field service prior to bid opening. The two year record of service must include applications of equipment and materials under similar circumstances and of similar size. Products having less than a two year record of satisfactory field service will be acceptable if a certified record of satisfactory field service for not less than 6000 hours can be shown. The 6000 hour service record must not include any manufacturer's prototype or factory testing. Satisfactory field service must have been completed by a product that has been, and presently is being sold or offered for sale on the commercial market through the following copyrighted means: advertisements, manufacturer's catalogs, or brochures.

2.3 MANUFACTURER'S STANDARD NAMEPLATES

Nameplates are required on major components if the manufacturer needs to provide specific engineering and manufacturing information pertaining to the particular component. Should replacement of this component be required, nameplate information will insure correct operation of the unit after replacement of this component.

2.4 ELECTRICAL WORK

- a. Provide motors, controllers, integral disconnects, contactors, and controls with their respective pieces of equipment. Provide electrical equipment, including motors and wiring, as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Manual or automatic control and protective or signal devices required for the operation specified and control wiring required for controls and devices specified, but not shown, must be provided. For packaged equipment, the manufacturer must provide controllers including the required monitors and timed restart.
- b. For single-phase motors, provide high-efficiency type, fractional-horsepower alternating-current motors, including motors that are part of a system, in accordance with NEMA MG 11.
- c. For polyphase motors, provide squirrel-cage medium induction motors, including motors that are part of a system, and that meet the efficiency ratings for premium efficiency motors in accordance with NEMA MG 1.
- d. Provide motors in accordance with NEMA MG 1 and of sufficient size to

drive the load at the specified capacity without exceeding the nameplate rating of the motor. Motors must be rated for continuous duty with the enclosure specified. Motor duty requirements must allow for maximum frequency start-stop operation and minimum encountered interval between start and stop. Motor torque must be capable of accelerating the connected load within 20 seconds with 80 percent of the rated voltage maintained at motor terminals during one starting period. Provide motor starters complete with thermal overload protection and other necessary appurtenances. Motor enclosure type may be either TEAO or TEFC.

- e. Provide inverter duty premium efficiency motors for use with variable frequency drives.

2.5 SELF-CONTAINED WATER CHILLER, VAPOR COMPRESSION TYPE

Unless necessary for delivery purposes, units must be assembled, leak-tested, charged (refrigerant and oil), and adjusted at the factory. In lieu of delivery constraints, a chiller may be assembled, leak-tested, charged (refrigerant and oil), and adjusted at the job site by a factory representative. Unit components delivered separately must be sealed and charged with a nitrogen holding charge. Parts weighing 50 pounds or more which must be removed for inspection, cleaning, or repair, such as motors, gear boxes, cylinder heads, casing tops, condenser, and cooler heads, must have lifting eyes or lugs. Chiller must be provided with a single point wiring connection for incoming power supply. Chiller's condenser and water cooler must be provided with standard water boxes with flanged or welded connections.

2.6 CHILLER COMPONENTS

2.6.1 Refrigerant and Oil

Refrigerants must be one of the fluorocarbon gases. Refrigerants must have number designations and safety classifications in accordance with ANSI/ASHRAE 15 & 34. CFC-based refrigerants are prohibited. Refrigerants must have an Ozone Depletion Potential (ODP) no greater than 0.0, with the exception of R-123. Provide SDS sheets for all refrigerants.

2.6.2 Structural Base

Chiller and individual chiller components must be provided with a factory-mounted structural steel base (welded or bolted) or support legs. Chiller and individual chiller components must be isolated from the building structure by means of molded neoprene isolation pads. Vibration isolators must have isolation characteristics as recommended by the manufacturer for the unit supplied and the service intended.

2.6.3 Chiller Refrigerant Circuit

Chiller refrigerant circuit must be completely piped and factory leak tested in accordance with ANSI/ASHRAE 15 & 34. For multicompressor units, not less than 2 independent refrigerant circuits must be provided. Circuit must include as a minimum a combination filter and drier, combination sight glass and moisture indicator, an electronic or thermostatic expansion valve with external equalizer or float valve, charging ports, compressor service valves for field-serviceable compressors, and superheat adjustment.

2.6.4 Controls Package

Provide chillers with a complete factory-mounted, microprocessor based operating and safety control system. Controls package must contain as a minimum a digital display, an on-auto-off switch, power wiring, and control wiring. Controls package must provide operating controls, monitoring capabilities, programmable setpoints, safety controls, and BAS interfaces as defined below.

2.6.4.1 Operating Controls

Chiller must be provided with the following adjustable operating controls as a minimum.

- a. Leaving chilled water temperature control
- b. Adjustable timer or automated controls to prevent a compressor from short cycling
- c. Automatic lead/lag controls (adjustable) for multi-compressor units
- d. Load limiting
- e. System capacity control to adjust the unit capacity in accordance with the system load and the programmable setpoints. Controls must automatically re-cycle the chiller on power interruption.
- f. Startup and head pressure controls to allow system operation at all ambient temperatures down to zero degrees F.
- g. Fan sequencing for air-cooled condenser

2.6.4.2 Monitoring Capabilities

During normal operations, the control system must be capable of monitoring and displaying the following operating parameters. Access and operation of display must not require opening or removing any panels or doors.

- a. Entering and leaving chilled water temperatures
- b. Self diagnostic
- c. Operation status
- d. Operating hours
- e. Number of starts
- f. Compressor status (on or off)
- g. Compressor load (percent)
- h. Refrigerant discharge and suction pressures
- i. Oil pressure

2.6.4.3 Configurable Setpoints

The control system must be capable of being configured directly at the unit's interface panel. The programmable setpoints must include the following as a minimum:

- a. Leaving Chilled Water Temperature

2.6.4.4 Safety Controls with Manual Reset

Chiller must be provided with the following safety controls which

automatically shutdown the chiller and which require manual reset.

- a. Low chilled water temperature protection
- b. High condenser refrigerant discharge pressure protection
- c. Low evaporator pressure protection
- d. Chilled water flow detection
- e. High motor winding temperature protection
- f. Low oil flow protection if applicable
- g. Motor current overload and phase loss protection

2.6.4.5 Safety Controls with Automatic Reset

Chiller must be provided with the following safety controls which automatically shutdown the chiller and which provide automatic reset.

- a. Over/under voltage protection
- b. Chilled water flow interlock
- c. Phase reversal protection

2.6.4.6 Building Automation System (BAS) Interface

Provide a Building Automation System (BAS) interface. The interface must provide all system operating conditions, capacity controls, and safety shutdown conditions as network points. In addition, the following points must be overridable via the network interface:

- a. Unit Start/Stop
- b. Leaving Chilled Water Temperature Setpoint

2.6.5 Compressor(s)

2.6.6 Compressor Driver, Electric Motor

Components such as motors, starters, variable speed drives and wiring must be in accordance with paragraph ELECTRICAL WORK. Motor starter or variable frequency drive must be unit mounted as indicated with starter or variable frequency drive type, wiring, and accessories coordinated with the chiller manufacturer.

2.6.7 Compressor Driver Connections

Each machine driven through speed-increasing gears must be so designed as to assure self-alignment, interchangeable parts, proper lubrication system, and minimum unbalanced forces. Bearings must be of the sleeve or roller type. Gear cases must be oil tight. Shaft extensions must be provided with seals to retain oil and exclude all dust.

2.6.8 Water Cooler (Evaporator)

Cooler must be of the shell-and-coil or shell-and-tube type design. Cooler shell must be constructed of seamless or welded steel. Coil bundles must be totally removable and arranged to drain completely. Tubes must be seamless copper, plain, integrally finned with smooth bore or integrally finned with enhanced bore. Each tube must be individually replaceable. Tubes must be installed into carbon mild steel tube sheets by rolling. Tube baffles must be properly spaced to provide adequate tube support and cross flow. Performance must be based on a water velocity not less than 3 fps nor more than 12 fps and a fouling factor per AHRI 550/590 I-P.

Brazed plate heat exchanger must be constructed of 304 or 316 stainless steel, designed to a refrigerant-side working pressure of 430 psig and a waterside working pressure of 150 psig. Evaporator must be factory tested at 1.1 times maximum allowable refrigerant side working pressure and 1.5 times maximum allowable water side working pressure. Provide cooler with factory-installed flow switches. All water connections must use flanged connections. Factory insulate all cold surfaces.

2.6.9 Air-Cooled Condenser Coil

Condenser coil must be of the extended-surface fin-and-tube type and must be constructed of seamless copper tubes with compatible copper or aluminum fins. Fins must be soldered or mechanically bonded to the tubes and installed in a metal casing. Coils must be circuited and sized for a minimum of 5 degrees F subcooling and full pumpdown capacity. Coil must be factory leak and pressure tested after assembly in accordance with ANSI/ASHRAE 15 & 34. The condenser coil must be of the microchannel heat exchanger technology (MCHX) type consisting of a series of flat tubes containing a series of multiple, parallel flow microchannels layered between the refrigerant manifolds in a two-pass arrangement. Provide coils constructed of aluminum alloys for fins, tubes, and manifolds. Coil must be factory leak and pressure tested after assembly in accordance with ANSI/ASHRAE 15 & 34.

Coil must be entirely coated in accordance with the requirements of paragraph COIL CORROSION PROTECTION.

2.7 ACCESSORIES

2.7.1 Gaskets

Gaskets must conform to ASTM F104 - classification for compressed sheet with nitrile binder and acrylic fibers for maximum 700 degrees F service.

2.7.2 Bolts and Nuts

Bolts and nuts, except as required for piping applications, must be in accordance with ASTM A307. The bolt head must be marked to identify the manufacturer and the standard with which the bolt complies in accordance with ASTM A307.

2.8 FABRICATION

2.8.1 Factory Coating

Unless otherwise specified, equipment and component items, when fabricated from ferrous metal, must be factory finished with the manufacturer's standard finish, except that items located outside of buildings must have weather resistant finishes that will withstand 500 hours exposure to the salt spray test specified in ASTM B117 using a 5 percent sodium chloride solution. Immediately after completion of the test, the specimen must show no signs of blistering, wrinkling, cracking, or loss of adhesion and no sign of rust creepage beyond 1/8 inch on either side of the scratch mark. Cut edges of galvanized surfaces where hot-dip galvanized sheet steel is used must be coated with a zinc-rich coating conforming to ASTM D520, Type I.

2.8.2 Factory Applied Insulation

Chiller must be provided with factory installed insulation on surfaces subject to sweating including the water cooler, suction line piping, economizer, and cooling lines. Insulation on heads of coolers may be field applied, however it must be installed to provide easy removal and replacement of heads without damage to the insulation. Where motors are the gas-cooled type, factory installed insulation must be provided on the cold-gas inlet connection to the motor per manufacturer's standard practice. Factory insulated items installed outdoors are not required to be fire-rated. As a minimum, factory insulated items installed indoors must have a flame spread index no higher than 75 and a smoke developed index no higher than 150. Factory insulated items (no jacket) installed indoors and which are located in air plenums, in ceiling spaces, and in attic spaces must have a flame spread index no higher than 25 and a smoke developed index no higher than 50. Flame spread and smoke developed indexes must be determined by ASTM E84. Insulation must be tested in the same density and installed thickness as the material to be used in the actual construction. Material supplied by a manufacturer with a jacket must be tested as a composite material. Jackets, facings, and adhesives must have a flame spread index no higher than 25 and a smoke developed index no higher than 50 when tested in accordance with ASTM E84.

2.8.3 Coil Corrosion Protection

Provide coil with a uniformly applied epoxy electrodeposition, phenolic, or vinyl type coating to all coil surface areas without material bridging between fins. Submit product data on the type coating selected, the coating thickness, the application process used, the estimated heat transfer loss of the coil, and verification of conformance with the salt spray test requirement. Coating must be applied at either the coil or coating manufacturer's factory. Coating process must ensure complete coil encapsulation. Coating must be capable of withstanding a minimum 1,000 hours exposure to the salt spray test specified in ASTM B117 using a 5 percent sodium chloride solution.

2.9 SUPPLEMENTAL COMPONENTS/SERVICES

2.9.1 Chilled and Condenser Water Piping and Accessories

Chilled and condenser water piping and accessories must be provided and installed in accordance with Section 23 64 26 CHILLED WATER PIPING SYSTEMS.

2.9.2 Temperature Controls

Chiller control packages must be fully coordinated with and integrated into the existing air-conditioning system.

PART 3 EXECUTION

3.1 INSTALLATION

Installation of water chiller systems including materials, installation, workmanship, fabrication, assembly, erection, examination, inspection, and testing must be in accordance with the manufacturer's written installation instructions, including the following:

- (1) Water chiller - installation instructions

3.1.1 Installation Instructions

Provide manufacturer's standard catalog data, at least 2 weeks prior to the purchase or installation of a particular component, highlighted to show features such as materials, dimensions, options, performance and efficiency. Data must include manufacturer's recommended installation instructions and procedures. Data must be adequate to demonstrate compliance with contract requirements.

3.1.2 Vibration Isolation

If vibration isolation is specified for a unit, vibration isolator literature must be included containing catalog cuts and certification that the isolation characteristics of the isolators provided meet the manufacturer's recommendations.

3.1.3 Verification of Dimensions

Provide a letter including the date the site was visited, conformation of existing conditions, and any discrepancies found.

3.1.4 System Performance Test Schedules

Provide a schedule, at least 2 weeks prior to the start of related testing, for the system performance tests. The schedules must identify the proposed date, time, and location for each test.

3.1.5 Certificates

Where the system, components, or equipment are specified to comply with requirements of AGA, NFPA, ARI, ASHRAE, ASME, or UL, proof of such compliance must be provided. The label or listing of the specified agency must be acceptable evidence. In lieu of the label or listing, a written certificate from an approved, nationally recognized testing organization equipped to perform such services, stating that the items have been tested and conform to the requirements and testing methods of the specified agency may be submitted. When performance requirements of this project's drawings and specifications vary from standard ARI rating conditions, computer printouts, catalog, or other application data certified by ARI or a nationally recognized laboratory as described above must be included. If ARI does not have a current certification program that encompasses such application data, the manufacturer may self certify that his application data complies with project performance requirements in accordance with the specified test standards.

3.1.6 Operation and Maintenance Manuals

Provide three complete copies of an operation manual in bound 8 1/2 by 11 inch booklets listing step-by-step procedures required for system startup, operation, abnormal shutdown, emergency shutdown, and normal shutdown at least 2 weeks prior to the first training course. The booklets must include the manufacturer's name, model number, and parts list. The manuals must include the manufacturer's name, model number, service manual, and a brief description of all equipment and their basic operating features. Three complete copies of maintenance manual in bound 8 1/2 by 11 inch booklets listing routine maintenance procedures, possible breakdowns and repairs, and a trouble shooting guide. The manuals must include piping and equipment layouts and simplified wiring and control diagrams of the system as installed.

3.1.7 Connections to Existing Systems

Notify the Contracting Officer in writing at least 15 calendar days prior to the date the connections are required. Obtain approval before interrupting service. Furnish materials required to make connections into existing systems and perform other incidental labor as required. Furnish labor and tools for making actual connections to existing systems.

3.1.8 Refrigeration System

3.1.8.1 Equipment

Refrigeration equipment and the installation thereof must conform to ANSI/ASHRAE 15 & 34. Necessary supports must be provided for all equipment, appurtenances, and pipe as required, including frames or supports for compressors, pumps, condensers, water coolers, and similar items. Compressors must be isolated from the building structure. If mechanical vibration isolators are not provided, vibration absorbing foundations must be provided. Each foundation must include isolation units consisting of machine and floor or foundation fastenings, together with intermediate isolation material. Other floor-mounted equipment must be set on not less than a 6 inch concrete pad doweled in place. Isolators must be selected and sized based on load-bearing requirements and the lowest frequency of vibration to be isolated. Equipment must be properly leveled, aligned, and secured in place in accordance with manufacturer's instructions.

3.1.8.2 Field Refrigerant Charging

- a. Initial Charge: Upon completion of all the refrigerant pipe tests, the vacuum on the system must be broken by adding the required charge of dry refrigerant for which the system is designed, in accordance with the manufacturer's recommendations. Contractor must provide the complete charge of refrigerant in accordance with manufacturer's recommendations. Upon satisfactory completion of the system performance tests, any refrigerant that has been lost from the system must be replaced. After the system is fully operational, service valve seal caps and blanks over gauge points must be installed and tightened.
- b. Refrigerant Leakage: If a refrigerant leak is discovered after the system has been charged, the leaking portion of the system must immediately be isolated from the remainder of the system and the refrigerant must be pumped into the system receiver or other suitable container. The refrigerant must not be discharged into the atmosphere.
- c. Contractor's Responsibility: The Contractor must, at all times during the installation and testing of the refrigeration system, take steps to prevent the release of refrigerants into the atmosphere. The steps must include, but not be limited to, procedures which will minimize the release of refrigerants to the atmosphere and the use of refrigerant recovery devices to remove refrigerant from the system and store the refrigerant for reuse or reclaim. At no time must more than 3 ounces of refrigerant be released to the atmosphere in any one occurrence. Any system leaks within the first year must be repaired in accordance with the specified requirements including material, labor, and refrigerant if the leak is the result of defective equipment, material, or installation.

3.1.8.3 Oil Charging

Except for factory sealed units, two complete charges of lubricating oil for each compressor crankcase must be furnished. One charge must be used during the performance testing period, and upon the satisfactory completion of the tests, the oil must be drained and replaced with the second charge.

3.1.9 Field Applied Insulation

Field installed insulation must be as specified in Section 23 07 00 THERMAL INSULATION FOR MECHANICAL SYSTEMS, except as defined differently herein.

3.2 MANUFACTURER'S FIELD SERVICE

The services of a factory-trained representative must be provided for 3 days. The representative shall advise on the following:

a. Hermetic machines:

- (1) Testing hermetic water-chilling unit under pressure for refrigerant leaks; evacuation and dehydration of machine to an absolute pressure of not over 300 micrometers.
- (2) Charging the machine with refrigerant.
- (3) Starting the machine.

3.3 CLEANING AND ADJUSTING

Equipment must be wiped clean, with all traces of oil, dust, dirt, or paint spots removed. System must be maintained in this clean condition until final acceptance. Bearings must be properly lubricated with oil or grease as recommended by the manufacturer. Belts must be tightened to proper tension. Control valves and other miscellaneous equipment requiring adjustment must be adjusted to setting indicated or directed. Fans must be adjusted to the speed indicated by the manufacturer to meet specified conditions. At least one week before the official equipment warranty start date, all condenser coils on water-cooled chiller must be cleaned in accordance with the chiller manufacturer's instructions. This work covers two coil cleanings. The condenser coils must be cleaned with an approved coil cleaner by a service technician, factory trained by the chiller manufacturer. The condenser coil cleaner must not have any detrimental affect on the materials or protective coatings on the condenser coils. Testing, adjusting, and balancing must be as specified in Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC.

3.4 FIELD ACCEPTANCE TESTING

3.4.1 Test Plans

a. Manufacturer's Test Plans: Within 60 calendar days after contract award, submit the following plans:

- (1) Water chiller - Field Acceptance Test Plan

Field acceptance test plans must be developed by the chiller manufacturer detailing recommended field test procedures for that particular type and size of equipment. Field acceptance test plans developed by the installing Contractor, or the equipment

sales agency furnishing the equipment, will not be acceptable.

The Contracting Officer will review and approve the field acceptance test plan for each of the listed equipment prior to commencement of field testing of the equipment. The approved field acceptance tests of the chiller and subsequent test reporting.

- b. Coordinated testing: Indicate in each field acceptance test plan when work required by this section requires coordination with test work required by other specification sections.
- c. Prerequisite testing: Chillers for which performance testing is dependent upon the completion of the work covered by Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC must have that work completed as a prerequisite to testing work under this section. Indicate in each field acceptance test plan when such prerequisite work is required.
- d. Test procedure: Indicate in each field acceptance test plan each equipment manufacturers published installation, start-up, and field acceptance test procedures. Include in each test plan a detailed step-by-step procedure for testing automatic controls provided by the manufacturer.

Each test plan must include the required test reporting forms to be completed by the Contractor's testing representatives. Procedures must be structured to test the controls through all modes of control to confirm that the controls are performing with the intended sequence of control.

Controller must be verified to be properly calibrated and have the proper set point to provide stable control of their respective equipment.

- e. Performance variables: Each test plan must list performance variables that are required to be measured or tested as part of the field test.

Include in the listed variables performance requirements indicated on the equipment schedules on the design drawings. Chiller manufacturer must furnish with each test procedure a description of acceptable results that have been verified.

Chiller manufacturer must identify the acceptable limits or tolerance within which each tested performance variable must acceptably operate.

- f. Job specific: Each test plan must be job specific and must address the particular cooling towers and particular conditions which exist in this contract. Generic or general preprinted test procedures are not acceptable.
- g. Specialized components: Each test plan must include procedures for field testing and field adjusting specialized components, such as hot gas bypass control valves, or pressure valves.

3.4.2 Testing

- a. Each water chiller system must be field acceptance tested in compliance

with its approved field acceptance test plan and the resulting following field acceptance test report submitted for approval:

(1) Water chiller - Field Acceptance Test Report

- b. Manufacturer's recommended testing: Conduct the manufacturer's recommended field testing in compliance with the approved test plan. Furnish a factory trained field representative authorized by and to represent the equipment manufacturer at the complete execution of the field acceptance testing.
- c. Operational test: Conduct a continuous 24 hour operational test for each item of equipment. Equipment shutdown before the test period is completed shall result in the test period being started again and run for the required duration. For the duration of the test period, compile an operational log of each item of equipment. Log required entries every two hours. Use the test report forms for logging the operational variables.
- d. Notice of tests: Conduct the manufacturer's recommended tests and the operational tests; record the required data using the approved reporting forms. Notify the Contracting Officer in writing at least 15 calendar days prior to the testing. Within 30 calendar days after acceptable completion of testing, submit each test report for review and approval.
- e. Report forms: Type data entries and writing on the test report forms. Completed test report forms for each item of equipment must be reviewed, approved, and signed by the Contractor's test director. The manufacturer's field test representative must review, approve, and sign the report of the manufacturer's recommended test. Signatures must be accompanied by the person's name typed.
- f. Deficiency resolution: The test requirements acceptably met; deficiencies identified during the tests must be corrected in compliance with the manufacturer's recommendations and corrections retested in order to verify compliance.

3.5 SYSTEM PERFORMANCE TESTS

Three copies of the report must be provided in bound 8 1/2 by 11 inch booklets.

3.5.1 General Requirements

Before each refrigeration system is accepted, tests to demonstrate the general operating characteristics of all equipment must be conducted by the manufacturer's approved start-up representative experienced in system start-up and testing, at such times as directed. Tests must cover a period of not less than 48 hours for each system and must demonstrate that the entire system is functioning in accordance with the drawings and specifications. Corrections and adjustments must be made as necessary and tests must be re-conducted to demonstrate that the entire system is functioning as specified. Prior to acceptance, service valve seal caps and blanks over gauge points must be installed and tightened. Any refrigerant lost during the system startup must be replaced. If tests do not demonstrate satisfactory system performance, deficiencies must be corrected and the system must be retested. Tests must be conducted in the presence of the Contracting Officer. Water and electricity required for the tests

will be furnished by the Government. Any material, equipment, instruments, and personnel required for the test must be provided by the Contractor. Field tests must be coordinated with Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC.

3.5.2 Test Report

The report must document compliance with the specified performance criteria upon completion and testing of the system. The report must indicate the number of days covered by the tests and any conclusions as to the adequacy of the system. The report must also include the following information and must be taken at least three different times at outside dry-bulb temperatures that are at least 5 degrees F apart:

- a. Date and outside weather conditions.
- b. The load on the system based on the following:
 - (1) The refrigerant used in the system.
 - (2) Condensing temperature and pressure.
 - (3) Suction temperature and pressure.
 - (4) Running current, voltage and proper phase sequence for each phase of all motors.
 - (5) The actual on-site setting of all operating and safety controls.
 - (6) Chilled water pressure, flow and temperature in and out of the chiller.

3.6 DEMONSTRATIONS

Contractor must conduct a training course for the operating staff as designated by the Contracting Officer. The training period must consist of a total 8 hours of normal working time and start after the system is functionally completed but prior to final acceptance tests. The training course must cover all of the items contained in the approved operation and maintenance manuals as well as demonstrations of routine maintenance operations.

Provide a schedule, at least 2 weeks prior to the date of the proposed training course, which identifies the date, time, and location for the training.

-- End of Section --

WATER-COOLED CHILLER SCHEDULE

MARK	LOCATION	SERVICE	NOMINAL CAPACITY TONS	REFRIGERANT TYPE	EVAPORATOR		CONDENSER		FOULING FACTOR	MINIMUM CAPACITY STEPS	ELECTRICAL POWER		REMARKS				
					TEMP - F	DRIP PRESSURE FT. H ₂ O	TEMP - F	DRIP PRESSURE FT. H ₂ O			TOTAL KW	COMPRESSOR KW		VOLTS	PHASE	MCA/ MOP	KW/TON
CHJ 3	RM 1455	CHILLED WATER	400	R-134A	1848.10	10.34	2167.90	10.0	0.000250	1	219.70	460	3	367/600	5493	.3253	1,2

1. THE BASIS OF DESIGN FOR THE NEW CHILLER IS BASED ON A TRANE CENTRIFUGAL WATER-COOLED AGILITY CHILLER MODEL# HDWA0400.
 2. THE NEW WATER-COOLED AGILITY CHILLER SHALL HAVE A HARMONIC FILTER INSTALLED. THE HARMONIC FILTER SHALL BE IEEE519 COMPLIANT OF LESS THAN 5% THD.

MECHANICAL LEGEND

NOTE: HEAVY LINE WEIGHT INDICATES NEW EQUIPMENT OR EQUIPMENT TO BE REMOVED. LIGHT LINE WEIGHT INDICATES EQUIPMENT WHICH IS EXISTING TO REMAIN

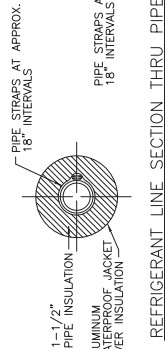
HOT WATER SUPPLY PIPING
 HOT WATER RETURN PIPING
 CHILLED WATER SUPPLY PIPING
 CHILLED WATER RETURN PIPING
 REFRIGERANT LIQUID PIPING
 REFRIGERANT SUCTION PIPING
 CONDENSATE DRAIN PIPING
 BACKFLOW PREVENTER
 BALANCING VALVE (GLOBE VALVE/SQUARE HEAD COCK)
 BALL VALVE
 CHECK VALVE
 BUTTERFLY VALVE
 STRAINER WITH BLOW DOWN VALVE
 3-WAY AUTO CONTROL VALVE
 PRESSURE REDUCING VALVE
 2-WAY AUTO CONTROL VALVE
 THERMOMETER
 FLEXIBLE PIPING CONNECTION
 PRESSURE GAUGE SHUT-OFF COCK
 AUTOMATIC AIR VENT
 UNION

PIPE SLOPE (DOWN IN ARROW DIRECTION)
 FLOW CONTROL BALANCING VALVE WITH PRESSURE TAPS (GPM NOTED)
 GAS SHUT-OFF COCK
 RELIEF VALVE
 ECCENTRIC PIPE REDUCER
 PIPE CAP
 DIRECTION OF FLOW
 THERMOMETER WELL
 PIPE ANCHOR
 SUPPLY DUCT SECTION
 EXHAUST DUCT SECTION
 RETURN DUCT SECTION
 BOILER EMERGENCY SHUT-OFF SWITCH
 FIRE DAMPER WITH ACCESS DOOR
 THERMOSTAT/SENSOR MOUNT 60° ABOVE FLOOR
 ELBOW WITH TURNING VANES
 MANUAL BALANCING DAMPER WITH LOCKING QUADRANT
 FLEXIBLE DUCT CONNECTION

MOTORIZED CONTROL DAMPER
 POINT OF DEMOLITION TERMINATION
 PUMP MARK - SEE SCHEDULE
 EXHAUST FAN MARK - SEE SCHEDULE
 AIR HANDLING UNIT MARK - SEE SCHEDULE
 VARIABLE AIR VOLUME BOX MARK - SEE SCHEDULE
 BOILER MARK - SEE SCHEDULE
 CONDENSING UNIT MARK - SEE SCHEDULE
 DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE
 GRILLE OR DIFFUSER MARK - SEE SCHEDULE OR SPECIFICATION (CFM NOTED)
 NEW WORK NOTE MARK
 DEMOLITION WORK NOTE MARK
 FLEXIBLE DUCT CONNECTION WITH BALANCING DAMPER
 EMERGENCY BOILER SHUT-OFF SWITCH
 CONTROL VALVE
 LOW PRESSURE SUPPLY OR RETURN DUCT WORK
 MEDIUM PRESSURE SUPPLY DUCT WORK

GENERAL NOTES

- SCOPE OF WORK INCLUDES PROVIDING A FIRST CLASS WORKING SYSTEM IN COMPLIANCE WITH THESE DRAWINGS AND SPECIFICATIONS, TESTED READY FOR OPERATION COMPLETE WITH LABOR, MATERIALS, APPARATUS, TRANSPORTATION, AND TOOLS REQUIRED FOR THE INSTALLATION.
- COORDINATE WORK WITH THAT OF OTHER TRADES. INSTALL THE NEW EQUIPMENT IN THE EXACT LOCATIONS OF THE EXISTING CEILING MOUNTED DEVICES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MODIFICATIONS, CHANGES, ETC. FOR THE EQUIPMENT HE PROVIDES, EVEN IF APPROVED AS AN EQUAL.
- MISCELLANEOUS ITEMS NOT SHOWN ON THE PLANS BUT NECESSARY FOR A COMPLETE OPERABLE SYSTEM, SHALL BE SUPPLIED AND INSTALLED.
- INSTALL EQUIPMENT PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. MAINTAIN ALL RECOMMENDED CLEARANCES.
- REPAIR ANY MATERIAL OR WORK WHICH THE CONTRACTOR HAS DAMAGED.
- BALANCE AIR AND WATER SYSTEMS WITHIN ±5% OF THE VALUES INDICATED.
- TEST THE ENTIRE SYSTEM IN ALL MODES OF OPERATION TO INSURE PROPER OPERATION.
- FURNISH AND INSTALL ALL EQUIPMENT AND MATERIALS FOR A COMPLETE INSTALLATION IN ALL TRADES, MATERIALS, AND MANUFACTURER'S RECOMMENDATIONS. INITIATE, MAINTAIN AND SUPERVISE ALL SAFETY PRECAUTIONS AND PROCEDURES.



REFRIGERANT LINE SECTION THRU PIPE

FINAL DESIGN

MARINE CORPS AIR STATION, CHERRY POINT, N.C.
 PROJECT NO. 4390
 REVISIONS: AS SHOWN
 DATE: 12/7/09

MECHANICAL DETAILS, LEGEND AND SCHEDULES

REPLACE 450 TON CHILLER (#5) IN , BLDG. 4390

MARINE CORPS AIR STATION, CHERRY POINT, N.C.

PROJECT NO. 4390
 REVISIONS: AS SHOWN
 DATE: 12/7/09

ABBREVIATIONS

AD	ACCESS DOOR	ANGLE	INSIDE DIAMETER
AFF	ABOVE FINISHED FLOOR	AW	WATER SUPPLY
AFC	ABOVE FINISHED GRADE	AW-1	WATER RETURN
AFD	ABOVE FINISHED DECK	AW-2	WATER RETURN
APPROX	APPROXIMATE	AW-3	WATER RETURN
AS-1	AIR SEPARATOR MARK - SEE SCHEDULE	AW-4	WATER RETURN
B	BALANCING DAMPER	AW-5	WATER RETURN
BD	BACK DRAFT DAMPER	AW-6	WATER RETURN
BFD	BACKFLOW PREVENTER	AW-7	WATER RETURN
CFM	CUBIC FEET PER HOUR	AW-8	WATER RETURN
CFM	CUBIC FEET PER MINUTE	AW-9	WATER RETURN
CHL-1	CHILLER MARK - SEE SCHEDULE	AW-10	WATER RETURN
CO	COEFFICIENT OF PERFORMANCE	AW-11	WATER RETURN
CU-1	CONDENSING UNIT MARK - SEE SCHEDULE	AW-12	WATER RETURN
CWR	CHILLED WATER RETURN	AW-13	WATER RETURN
CWS	CHILLED WATER SUPPLY	AW-14	WATER RETURN
DD	DOWN LESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-15	WATER RETURN
DS-1	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-16	WATER RETURN
DSS	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-17	WATER RETURN
DSS-1	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-18	WATER RETURN
DSS-2	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-19	WATER RETURN
DSS-3	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-20	WATER RETURN
DSS-4	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-21	WATER RETURN
DSS-5	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-22	WATER RETURN
DSS-6	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-23	WATER RETURN
DSS-7	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-24	WATER RETURN
DSS-8	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-25	WATER RETURN
DSS-9	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-26	WATER RETURN
DSS-10	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-27	WATER RETURN
DSS-11	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-28	WATER RETURN
DSS-12	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-29	WATER RETURN
DSS-13	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-30	WATER RETURN
DSS-14	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-31	WATER RETURN
DSS-15	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-32	WATER RETURN
DSS-16	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-33	WATER RETURN
DSS-17	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-34	WATER RETURN
DSS-18	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-35	WATER RETURN
DSS-19	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-36	WATER RETURN
DSS-20	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-37	WATER RETURN
DSS-21	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-38	WATER RETURN
DSS-22	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-39	WATER RETURN
DSS-23	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-40	WATER RETURN
DSS-24	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-41	WATER RETURN
DSS-25	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-42	WATER RETURN
DSS-26	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-43	WATER RETURN
DSS-27	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-44	WATER RETURN
DSS-28	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-45	WATER RETURN
DSS-29	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-46	WATER RETURN
DSS-30	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-47	WATER RETURN
DSS-31	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-48	WATER RETURN
DSS-32	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-49	WATER RETURN
DSS-33	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-50	WATER RETURN
DSS-34	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-51	WATER RETURN
DSS-35	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-52	WATER RETURN
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DSS-38	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-55	WATER RETURN
DSS-39	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-56	WATER RETURN
DSS-40	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-57	WATER RETURN
DSS-41	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-58	WATER RETURN
DSS-42	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-59	WATER RETURN
DSS-43	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-60	WATER RETURN
DSS-44	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-61	WATER RETURN
DSS-45	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-62	WATER RETURN
DSS-46	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-63	WATER RETURN
DSS-47	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-64	WATER RETURN
DSS-48	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-65	WATER RETURN
DSS-49	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-66	WATER RETURN
DSS-50	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-67	WATER RETURN
DSS-51	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-68	WATER RETURN
DSS-52	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-69	WATER RETURN
DSS-53	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-70	WATER RETURN
DSS-54	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-71	WATER RETURN
DSS-55	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-72	WATER RETURN
DSS-56	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-73	WATER RETURN
DSS-57	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-74	WATER RETURN
DSS-58	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-75	WATER RETURN
DSS-59	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-76	WATER RETURN
DSS-60	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-77	WATER RETURN
DSS-61	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-78	WATER RETURN
DSS-62	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-79	WATER RETURN
DSS-63	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-80	WATER RETURN
DSS-64	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-81	WATER RETURN
DSS-65	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-82	WATER RETURN
DSS-66	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-83	WATER RETURN
DSS-67	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-84	WATER RETURN
DSS-68	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-85	WATER RETURN
DSS-69	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-86	WATER RETURN
DSS-70	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-87	WATER RETURN
DSS-71	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-88	WATER RETURN
DSS-72	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-89	WATER RETURN
DSS-73	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-90	WATER RETURN
DSS-74	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-91	WATER RETURN
DSS-75	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-92	WATER RETURN
DSS-76	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-93	WATER RETURN
DSS-77	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-94	WATER RETURN
DSS-78	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-95	WATER RETURN
DSS-79	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-96	WATER RETURN
DSS-80	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-97	WATER RETURN
DSS-81	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-98	WATER RETURN
DSS-82	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-99	WATER RETURN
DSS-83	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	AW-100	WATER RETURN

ALL EQUIPMENT AND ASSOCIATED COMPONENTS SCHEDULED OR OTHERWISE INDICATED IN DRAWINGS BY MANUFACTURER'S NAME AND ASSOCIATED MODEL NUMBER SHALL BE THE BASIS OF DESIGN AND ARE INTENDED TO SHOW THE GENERAL SIZE, CONFIGURATION, LOCATION, CONNECTIONS, AND/OR SUPPORT FOR EQUIPMENT OR SYSTEMS SPECIFIED WITH RELATION TO THE DRAWINGS. CONTRACTOR SHALL VERIFY ALL SCHEDULED LIMIT COMPETITION. SEE SPECIFICATIONS FOR TECHNICAL REQUIREMENTS PERTAINING TO THE PRODUCTS.