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USACE / NAVFAC / AFCESA / NASA | **UFGS-11 41 11 (January 2008)**

Preparing Activity: NAVFAC | **Superseding**
UFGS-11 40 00.00 20 (April 2006)
UFGS 11 46 01.00 10 (April 2006)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated January 2012
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SECTION TABLE OF CONTENTS

DIVISION 11 - EQUIPMENT

SECTION 11 41 11

REFRIGERATED AND FROZEN FOOD STORAGE EQUIPMENT

01/08

-- End of Section Table of Contents --

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SECTION 11 41 11

REFRIGERATED AND FROZEN FOOD STORAGE EQUIPMENT
01/08

****
NOTE: This guide specification covers the requirements for refrigerated and frozen food and drink storage cases, walk-in coolers, and walk-in freezers.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable items(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).
****
NOTE: Coordinate this section and use in conjunction with the following sections:

11 05 40 COMMON WORK RESULTS FOR FOODSERVICE EQUIPMENT
11 06 40.13 FOODSERVICE EQUIPMENT SCHEDULE
****

PART 1 GENERAL

1.1 REFERENCES

****
NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date,

and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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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	(2010; Addenda a, b, c, d, e, f, g, h, I, j, k, l, n and o; Errata 2011) ANSI/ASHRAE Standard 15-Safety Standard for Refrigeration Systems and ANSI/ASHRAE Standard 34-Designation and Safety Classification of Refrigerants

NSF INTERNATIONAL (NSF)

NSF Food Equipment	(2005) NSF Product Listings of Food Equipment and Related Products, Components and Materials
NSF/ANSI 2	(2010) Food Equipment
NSF/ANSI 6	(2009) Dispensing Freezers
NSF/ANSI 7	(2009) Commercial Refrigerators and Freezers

UNDERWRITERS LABORATORIES (UL)

UL 1598	(2008; Reprint Jan 2010) Luminaires
UL 207	(2009) Refrigerant-Containing Components and Accessories, Nonelectrical
UL 471	(2010; Reprint Sep 2011) Commercial Refrigerators and Freezers

1.2 GENERAL REQUIREMENTS

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NOTE: Indicate the configuration and layout for all refrigerated and frozen food and drink storage cases, walk-in coolers, and walk-in freezers on the floor plans, with interior elevations and equipment

identified by number. Show "Food Service Equipment Schedule" on the drawings using the same identification numbers[as indicated on the current US Army Quartermaster Center and School equipment schedule]. Ensure that all Contractor built-to-order items, per Food Service Equipment Schedule", are shown and coordinated with the specifications.

Designer must coordinate with other sections, including 11 05 40 COMMON WORK RESULTS FOR FOODSERVICE EQUIPMENT and 11 06 40.13 FOODSERVICE EQUIPMENT SCHEDULE for general requirements and final connection of equipment.

NOTE: Details of particular equipment and installations are provided on Naval Food Service Division drawings. Use these NAVFSD drawings as a basis for the project details. Contact NAVFSD at commercial telephone (717) 790-7580 or DSN 430-7580.

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Refer to section 11 05 40 COMMON WORK RESULTS FOR FOODSERVICE EQUIPMENT for general requirements. Refer to section 11 06 40.13 FOODSERVICE EQUIPMENT SCHEDULE for detailed requirements.

1.3 DESCRIPTION OF WORK

The work includes [furnishing and] [installing] [and modifying existing] [refrigerated][and frozen] food service equipment and related work. Verify all existing dimensions, contract drawings, product data and all related conditions prior to commencing rough-in work. Include coordination of delivery through existing finished opening and vertical handling limitations within the building. Advise the Contracting Officer of all discrepancies prior to ordering equipment. Submit Contractor's Field Verification Data prior to the preconstruction meeting.

Provide rough-in and connect utilities to equipment in accord with requirements specified in other sections of this specification and in accord with the physical dimensions, capacities, manufacturer's instructions, and other requirements of the equipment furnished.

1.3.1 Design Requirements

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NOTE: On the drawings, show:

1. A 1:50 1/4 inch scale floor plan with layout of all food service equipment and Naval Equipment Symbols.

2. Food Service Equipment Schedule laid out in accord with NAVFSSOcurrent US Army Quartermaster Center and School equipment schedule specified design requirements, including Energy Star qualified model list.

3. Floor, wall, and ceiling penetrations.

4. Raised bases, retainer curbs, or depressions.

5. Recessed, grated floor drains required for equipment.

6. Insulated floors, including under-floor perforated drains and vent pipes.

7. Disconnect switches.

8. Electrical chases and raceways and plumbing chases.

9. Remote compressors and refrigeration systems.

10. Utility connections to building water, sanitary, electrical, and other utility systems. Convenience outlets at point of use for plug-in equipment.

11. All Contractor built-to-order items, per Food Service Equipment Schedule, shown and coordinated with the specifications.

****

Submit detail drawings as stated in section 11 05 40 COMMON WORK RESULTS FOR FOODSERVICE EQUIPMENT for[refrigerated][and frozen][food][and drink][storage cases][.][, walk-in coolers][walk in freezers]. Drawings must be 1:50 1/4 inch scale minimum.

1.4 SUBMITTALS

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NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project.

The Guide Specification technical editors have designated those items that require Government approval, due to their complexity or criticality, with a "G". Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item, if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

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Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.][for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Contractor's Field Verification Data[; G][; G, [_____]]

SD-02 Shop Drawings

Detail Drawings[; G][; G, [_____]]
Custom fabricated equipment[; G][; G, [_____]]
Installation Instructions and Diagrams[; G][; G, [_____]]
Detail drawings, as specified,including insulation and utility requirements.

SD-03 Product Data

frozen food and drink storage cases
refrigerated food and drink storage cases
Walk-in refrigerators[; G][; G, [_____]]
Walk-in freezers[; G][; G, [_____]]

SD-05 Design Data

Manufacturer's descriptive and technical literature[; G][; G, [_____]]

SD-06 Test Reports

Manufacturer's Test Data[; G][; G, [_____]]
Field Test Reports[; G][; G, [_____]]

SD-07 Certificates

NSF Certification[; G][; G, [_____]]
UL Certification[; G][; G, [_____]]
Energy Star Qualified

SD-08 Manufacturer's Instructions

Manufacturer's Instructions[; G][; G, [_____]] for shipping, handling, storage, installation, and start-up.

1.5 QUALITY ASSURANCE

Refer to section 11 05 40 COMMON WORK RESULTS FOR FOODSERVICE EQUIPMENT.

1.5.1 Pre-Installation Conference

Thirty [_____] days prior to the commencement of work, notify the Contracting Officer that the following items are prepared and ready for review:

a. Shop Drawings, product data and installation instructions

(1) Detail Drawings
[(2) Custom fabricated equipment
Submit custom fabricated equipment drawings after approval of food service equipment drawings.]
(3) Installation Instructions and Diagrams

c. Product Data:

[(1) frozen food and drink storage cases]
[(2) refrigerated food and drink storage cases]
[(3) Walk-in refrigerators]
[(4) Walk-in freezers]

e. Design Data

(1) Manufacturer's descriptive and technical literature
(2) Manufacturer's Test Data
(3) Energy Star Qualified

f. Manufacturer's Instructions

Manufacturer's Instructions for shipping, handling, storage, installation, and start-up.

PART 2 PRODUCTS

2.1 MATERIALS

Comply with EPA sustainable acquisition (SA) requirements in accordance with Section 01 62 35 RECYCLED / RECOVERED MATERIALS; regarding insulation materials for all equipment designated within this section. Other materials must conform to the requirements as stated in section 11 05 40 COMMON WORK RESULTS FOR FOODSERVICE EQUIPMENT.

2.2 LIST OF EQUIPMENT

****
NOTE: Carefully edit the master Foodservice Equipment Schedule in section 11 06 40.13 FOODSERVICE EQUIPMENT SCHEDULE; retain items of equipment used for the project. The Equipment List is intended to be edited and included in the project Specification. List the information contained on the Equipment List on the Contract Drawings.
****

Submit detailed Food Service Equipment List as specified in section 11 06 40.13 FOODSERVICE EQUIPMENT SCHEDULE.

2.3 CONSTRUCTION OF FABRICATED EQUIPMENT

Construction and finish of fabricated equipment must conform to the specifications as stated in section 11 05 40 COMMON WORK RESULTS FOR FOODSERVICE EQUIPMENT.

2.4 PREFABRICATED WALK-IN REFRIGERATORS AND FREEZERS

****

NOTE: Provide floor panel walk-in refrigerators and freezers, or floorless walk-in refrigerators and freezers installed over insulated floors, as directed. For floorless units, provide insulated floors under each walk-in refrigerator and freezer as if each unit were a freezer. Material for floors and surrounding areas should be quarry tile or other suitable material.

NOTE:NOTE: Use floorless design where possible. When refrigerators are provided in existing buildings or over crawl spaces, floors must be prefabricated insulated floor panels. Note on the drawings that the exterior panel surfaces of prefabricated assemblies in contact with concrete needs to be treated to prevent deterioration caused by corrosion or chemical reaction of dissimilar materials. Indicate type and size of units on drawings and schedule.

****

Provide walk-in units manufactured for food service use conforming to NSF/ANSI 7 UL 207, and UL 471.[Floorless, with insulated floor screeds, installed over insulated floors's.][Floor panel walk-in refrigerators and freezers with appropriate insulated floor assembly and [polished aluminum][galvanized skin][_____] finish floor.]

Prefabricated dispensing freezers must conform to the requirements of NSF/ANSI 6.

2.4.1 Panel Construction

Interchangeable, 1200 mm 4 feet maximum width, 100 mm 4 inch thick, filled with insulation. Provide preformed corner panels extending not less than 300 mm 12 inches in each direction. Panels to have tongue and groove edges or flush joints with double seal serrated neoprene rubber gaskets to assure air and vapor tight joints. [Provide panels for separating sections.]

a. Insulation: 100 mm 4 inch minimum foamed-in-place polyurethane with manufacturer's rated "K" factor of not more than 0.15, free rise density of not less than 27 kg per cu meter 1.7 pounds per cubic foot, or in-place density of not less than 32 kg per cu meter 2 pounds per cubic foot. Provide floor screeds with minimum of 63 mm 2 1/2 inches of foamed insulation.

b. Closures: Close the exposed exterior of the walk-in unit adjacent to walls and ceiling with panels of same material as used for exterior of walk-in unit panels.

c. I-Beam Supports: Wherever compartment dimension exceeds the clear-span

ability of ceiling panels, provide I-beam supports on the exterior of the ceiling or supported by spline-hangers. Install thirteen mm half inch diameter steel rods through beam/hangers and secure to the structure above. Beams or posts within compartments are not be acceptable.

d. Finish:

(1) Exterior: [Stainless steel on all exposed surfaces and doors, aluminum on unexposed surfaces.][Aluminum with two coats of white, baked-on enamel paint.][High impact reinforced fiberglass panels, color selected by Contracting Officer.]

(2) Interior:[Stainless steel][Aluminum with two coats of white, baked-on enamel paint][High impact reinforced fiberglass panels, color selected by Contracting Officer].

2.4.2 Prefabricated Floor Panels

Provide prefabricated floor panels of the same construction as wall/ceiling except with 1.9 mm 14 gauge galvanized skin, sealed watertight.[Field apply one hard-alloy aluminum tread plate, 5 mm 3/16 inch thick, with all joints caulked.][Provide nonskid floor strips 100 by 900 mm 4 by 36 inch and field apply at 300 mm 12 inch spacing in all aisles.] Provide prefabricated floor panels which are [laid on] [recessed], with[sloping interior floor ramps at exterior entrance doors][panels flush with surrounding building floor]. Furnish two sets of erection tools, compatible with fasteners, with each unit.

2.4.3 Floorless Refrigerator Floors

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NOTE: Designer must determine appropriate insulation thickness, subfloor thickness subject to existing geographical and soil conditions.
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Make floorless refrigerator floors flush with the surrounding building floor. Provide the built-in floor with [two][three][four][_____] layers of[50 mm 2 inch][_____ mm_____ inch] thick polyurethane board insulation with staggered joints set in mastic or other thickness of insulation as recommended by the manufacturer and subject to geographical climate and soil conditions. In addition, provide a watertight seal formed by[0.152 mm 6 mil][_____ mm_____ mil] polyethylene sheets with all joints lapped 150 mm 6 inch and sealed, on the surface of the subfloor which will support the insulation and the refrigeration floor. Provide a 6.8 kg 15 pound felt slip sheet over insulation with 150 mm 6 inch lapped joints flashed up the height of finished floor base. The subfloor and [walk-in refrigerator][walk-in freezer] floor must each be not less than a 100 mm 4 inch thickness of reinforced concrete with the insulation sandwiched between. Provide drain holes inn subfloor to drain water seepage. Beneath the floor screeds at refrigerator walls and partitions, extend the insulation with a thickness down to the insulation sandwiched between the subfloor and the refrigerator floor. The insulation beneath the door must be as recommended by the manufacturer. Support the subfloor on a fill of 50 mm 2 inch clean rock aggregate having a minimum depth of 375 mm 15 inch. In addition, embed the perimeter within the gravel fill to allow for air circulation.

2.4.4 Doors

****
NOTE: Designer should configure refrigerator and freezer to allow possible access to freezer directly from refrigerator unit where possible for energy conservation measures.
****

Provide [one] [two] per [unit] [section], with 100 mm 4 inch thickness, filled with insulation. Provide vinyl hanging strips, able to be replaced individually and anchored at head. Provide each door panel with an outside pilot light, a light switch and a remote bulb sensor with exterior flush-mounted, waterproof thermometer for registering box inside temperature. Provide anti-condensing strip heaters around perimeter of door panel jambs. Provide top and each side of door with a resilient, non-magnetic or thermoplastic with magnetic steel core gasket installed. On bottom edge of door, provide a replaceable, adjustable rubber or vinyl wiper gasket.

a. Hardware [Polished Stainless Steel][_____]: Provide two self-closing, spring-loaded hinges for each door. Include plated steel pin and cam-lift type bearing. Provide door latch with cylinder lock and with provisions for padlock. Include safety-release handle to permit opening from inside when locked.

b. Door Stops: Provide door stops where necessary, to prevent walk-in refrigerator and freezer doors from striking adjacent walls, plumbing fixtures or food service equipment when door is open.

c. Protective Bumpers: Equip the exterior sides of refrigerator that are not installed against each other or against a wall with protective bumpers.[Fabricate bumpers from either 1.5 mm 0.059 inch thick galvanized steel or stainless steel channel or from solid rubber or rubber-like materials having a durometer A-hardness of 75+ 5.]

d. Gasket: Provide either natural or synthetic rubber gaskets and conform to NSF/ANSI 2. Where frames are used, the panels must fit together with gaskets that are designed for 50 percent compression.

2.4.5 Air-flow Inhibiting Strip Curtains

Provide transparent flexible vinyl reinforced strip curtains anchored at top and able to be replaced individually. Strips must be a minimum of 200 mm 8 inch in width and 2 mm 0.08 inch thick.

2.4.6 Lights

Provide high-efficiency rated two-tube fluorescent lamps in vapor-proof fixtures with safety shields. Lighting must conform to UL 1598. Provide diffuser and ballast capable of operating in minus 23 degrees C 10 degree F temperature. Lights must run full length of walk-in unit starting 600 mm 2 feet from front panel and extending within 600 mm 2 feet of back panel. Run[between shelf rows][as indicated].

2.4.7 Identification Signs

Mount engraved phenolic plastic compartment identification signs 300 by 50 mm 12 by 2 inch high in selected color with 25 mm 1 inch high letters on

door above view window.

2.4.8 Pressure Relief Port

Provide pressure relief port [in each section], heated electrically and insulated.

2.5 REFRIGERATION UNIT SYSTEMS

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NOTE: Refrigeration units may be located inside or outside, but if units are to be located outside in a cold climate they should have winter controls, heaters, and enclosed compressor housings.
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NOTE: Indicate, on the drawings, the location and heights of the refrigerator coil and the condensate drain lines. Locate all coils and drain lines so as not to restrict the full utilization of the food storage racks. Indicate on drawings and in specifications that the condensate drain lines are to be insulated. Locate on the drawings the funnel floor drain for the condensate drain. Floor drains and drain lines must not protrude onto the walking surface or produce a tripping hazard.

Locate thermometer on the plans, mounted outside the refrigerator, in a location that will preclude vibration, not interfere with the operation of the door, provide protection from damage, and allow easy reading. Locate the sensor part to measure the air temperature in the warmest part of the refrigerator. Do not locate thermometer on the door panel.
****

Conform to ANSI/ASHRAE 15 & 34. Provide pre-assembled remote condensing unit assembly with all necessary components factory-installed and wired including electrical box, time clock, drier, sight glass,[winter control and crankcase heater][enclosed compressor housing,] and compressor rack.[Set meat chiller to operate at minus one degree C 30 degrees F and other refrigerators to operate at one degree C 33 degrees F; set freezers to operate at minus 18 degrees C 0 degrees F.] Mercury is prohibited for use in thermometers.

Refrigerant compressors, packaged compressors and condenser units, and refrigerant condensers must be as specified in Division 23.

****
NOTE: Select the first statement for NAVFAC projects, or the second statement for USACE.
****

Refrigeration system equipment for cold storage must be as specified under Section 23 69 00.00 20 REFRIGERATION EQUIPMENT FOR COLD STORAGE.

Refrigeration system equipment for cold storage must be as specified under

Section 23 63 00.00 10 COLD STORAGE REFRIGERATION SYSTEMS.

2.5.1 Monitoring Alarm System

Provide an electronic monitoring and alarm system for[each section of] each unit. Alarm is to warn of abnormally low and high temperatures.

a. System components: Detecting thermostat, master control panel, interconnecting wiring,[remote, labeled, and audible alarm,] and defrost compensator. Provide dials showing temperatures and pilot lights, warning lights, switches, transformer, and buzzer, all as a part of the master control panel. Locate master control panel [and remote audible alarm] as indicated. Provide power fuse to protect system components.

b. System operation: Set alarms at 5 degrees C 10 degrees Fabove and below specified operating temperatures.

2.5.2 Personnel Alarm

For each unit, provide separate audible alarm system operable from inside unit, for use of personnel unable to exit unit. Locate remote audible alarm where indicated.

2.6 FACTORY TESTS AND CERTIFICATIONS

Submit [_____] copies of all Manufacturer's Test Data and certifications, including NSF Certification; UL Certification, and Energy Star Qualified data to the Contracting Officer prior to the commencement of any installation work.

PART 3 EXECUTION

3.1 INSTALLATION

Prior to commencement of installation, perform a complete walk down of the facility with the Contracting Officer to verify readiness for installation.

Provide adequate protection of all finished surfaces, fixtures,[furnishings] and other equipment to prevent any damage during the installation work.

Conduct installation procedures conforming to ANSI/ASHRAE 15 & 34, NSF Food Equipment and UL standards stated herein, and the manufacturer's instructions.[Set floor mounted equipment on 150 mm 6 inches thick concrete housekeeping pads, complete with anchor bolts and grouting. Finish housekeeping pads with two coats of oil-resistant epoxy polyamide coating.]

3.1.1 Equipment Connections

Complete equipment connections for all utilities. Unless otherwise specified, provide [chromium-plated copper alloy] [stainless steel] exposed piping.

3.1.2 Plumbing Work

Tag all plumbing final connection points of equipment, indicating item number, name of devices or components, and type of utility (water, gas,

steam, drain). Provide extensions of indirect waste fitting to open-sight hub drain, floor sink or floor drains from food service equipment.

3.2 TESTS

Perform the tests and provide everything required. Notify the Contracting Officer, in writing, [10][_____] days before performing tests. Perform tests in the presence of[a manufacturer's representative][and Contracting Officer].

3.2.1 Initial Start-Up and Operational Test

Provide all lubricants and accessories before initial start-up. Start and operate all equipment. Follow the manufacturer's procedures and place the systems under all modes of operation. Supplement initial charges of lubricating oil to assure maximum operating capacity. Adjust all safety and automatic control instruments. Record manufacturer's recommended readings hourly. Operational tests must cover a period of not less than [3][5][_____] days. Refer to section 11 05 40 COMMON WORK RESULTS FOR FOODSERVICE EQUIPMENT for detailed Operation and Maintenance Manuals requirements.

Upon completion of start-up and operational tests submit a list of authorized local service and repair entities.

3.2.2 Test Reports

Submit the final field test reports for each system tested, describing test apparatus, instrumentation calculations, and equipment data based on industry standard forms or reasonable facsimiles thereof. Include in data: compressor suction and discharge pressure; refrigerant charge pump, compressor and air moving device ampere readings; power supply characteristics, including phase imbalance, with 1/2 percent accuracy; thermostatic expansion valve superheat-value as determined by field test; subcooling; high and low refrigerant temperature switch set-points; low oil pressure switch set-point; [defrost system timer and thermostat set-points;] moisture content; ambient, condensing and coolant temperatures; capacity control set-points; field data and adjustments which affect unit performance and energy consumption. Where final adjustments and settings cannot be permanently marked or drilled and pinned as an integral part of device, include adjustment and setting data in test report.

3.3 MANUFACTURER'S WARRANTY.

Submit all manufacturers' signed warranties to Contracting Officer prior to final commissioning and acceptance.

3.4 CONTRACTOR'S WARRANTY for INSTALLATION

Submit contractor's warranty for installation to the Contracting Officer prior to final commissioning and acceptance.

-- End of Section --