

SECTION 236100 – REFRIGERANT COMPRESSORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes reciprocating, scroll and rotary-screw compressors.

1.3 SUBMITTALS

- A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories. Include equipment dimensions, weights and structural loads, required clearances, method of field assembly, components, and location and size of each field connection.
- B. Field quality-control test reports.
- C. Operation and Maintenance Data: For condensing units to include in emergency, operation, and maintenance manuals.
- D. Warranty: Special warranty specified in this Section.
- E. LEED Submittal:

Retain subparagraph below for LEED-NC Credit EA 4; coordinate with requirements selected in Part 2 for refrigerants.

- 1. Product Data for Credit EA 4: Documentation required by Credit EA 4 indicating that equipment and refrigerants comply.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Fabricate and label refrigeration system according to ASHRAE 15, "Safety Code for Mechanical Refrigeration."

LEED-NC Prerequisite EA 2 requires minimum efficiency equal to requirements in ASHRAE/IESNA 90.1-2004.

- C. ASHRAE/IESNA 90.1-2004 Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6 - "Heating, Ventilating, and Air-Conditioning."

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of condensing units that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Compressor failure.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 COMPRESSORS - GENERAL REQUIREMENTS

- A. Provide with one or more of the following devices for protection against abnormal conditions and to comply with various codes.
 - 1. High-pressure protection as required by UL and per ARI standards and ANSI/ASHRAE Standard 15.
 - 2. High temperature control devices to protect against overheating and oil breakdown.
 - 3. Low-pressure protection.
 - 4. Time delay or lockouts with manual resets.
 - 5. Low voltage and phase loss or reversal protection.
 - 6. Suction line strainer.

2.3 OPEN TYPE RECIPROCATING COMPRESSORS

- A. Manufacturers:
 - 1. Dunham Bush.
 - 2. Trane.
 - 3. York.
- B. Description: Multi-cylinder type having cam ground automotive type pistons. Mount compressor and motor on a common heavy steel base.

C. Construction:

1. Aluminum pistons and connecting rods.
2. Pistons: Fitted with two compression rings and one oil ring.
3. Valves: Non-flexing ring plate type. Surface treated for extra long life. Locate valve mechanism such that it can be inspected or replaced by removing cylinder heads.
4. Cylinder liners: Precision ground and individually replaceable.
5. Force feed lubrication by a reversible, positive displacement oil pump. Oil filtered through a strainer.
6. Crankcase heaters.
7. Controls:
 - a. Oil pressure actuated unloaded start.
 - b. Refrigerant pressure actuated capacity control.
 - c. Low oil pressure protection.
 - d. High pressure and low pressure cut-out with automatic reset.
8. Motor: Cast iron "U"-frame type. Directly connected to the compressor through a flexible coupling protected by a coupling guard.

2.4 SEMI-HERMETIC RECIPROCATING COMPRESSORS

A. Manufacturers:

1. Copeland.
2. Trane.
3. York.

B. Description: Multi-cylinder type having cam ground automotive type pistons.

C. Construction:

1. Pistons and connecting rods: Aluminum or steel.
2. Valve mechanism: Located such that it can be inspected or replaced by removing cylinder heads.
3. Compressors 5 hp and larger: Force feed lubrication by a reversible positive displacement oil pump.
4. Low oil pressure protection.
5. Oil filtered through a strainer.
6. Crankcase heaters.

2.5 HERMETIC RECIPROCATING COMPRESSORS

A. Manufacturers:

1. Copeland.
2. Tecumseh.
3. Trane.

B. Description: Compressors shall be of sealed, non-serviceable, can type.

C. Construction:

1. Protect motor windings against excessive heat by internal thermostats.
2. Crankcase heaters.
3. Vibration isolators.

2.6 ROTARY-SCREW COMPRESSORS

A. Manufacturers:

1. Bohn.
2. Dunham-Bush.
3. Hitachi.
4. Trane.

B. Description: Semi-hermetic type with integral lubrication system utilizing compressor pressure differential and capacity control slide valve.

C. Construction:

1. Cast iron rotor.
2. High strength iron casting casing with reinforced double wall construction to provide a rigid structure and minimize transmission of noise.
3. Roller bearings to support the rotors and absorb the radial loads. Ball bearings to position the rotors and to absorb the axial thrust.
4. Motor: Two-pole hermetic squirrel cage type wound for all three phase operation.
5. Connection terminals: Contain in a dust-proof terminal box, located in an accessible location on the compressor.
6. Reinforced stainless steel strainer at the suction of the compressor.
7. Removable stainless steel oil strainer.
8. Electric crankcase oil heater.

2.7 SCROLL COMPRESSORS

A. Manufacturers:

1. Copeland.
2. Trane.

B. Description: Direct drive, hermetic type, and fixed compression.

C. Construction:

1. Motor: Suction gas-cooled, hermetically sealed, two pole, squirrel cage induction.
2. Speed: 3600 rpm.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instruction or recommendations.
- B. Maintain manufacturer's recommended clearances for service and maintenance.
- C. Loose Components: Install electrical components, devices, and accessories that are not factory mounted.

3.2 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. Perform electrical test and visual and mechanical inspection.
 - 2. Leak Test: After installation, charge systems with refrigerant and oil and test for leaks. Repair leaks, replace lost refrigerant and oil, and retest until no leaks exist.
 - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation, product capability, and compliance with requirements.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.3 STARTUP SERVICE

- A. Complete installation and startup checks according to manufacturer's written instructions.

END OF SECTION 236100