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SPECIFICATIONS
ROOTS EasyAir®8000 STANDARD FACTORY DESIGNED PACKAGE SPECIFICATON with 4" and 6" gear diameter RAM WHISPAIR™ BLOWERS

Part I – GENERAL

1.01 THE REQUIREMENT

A: The contractor shall furnish, test, install and place in satisfactory operation in the manner shown on the contract plans, EasyAir®8000 ROOTS package with a RAM™ WHISPAIR™ frame size _____ rotary positive displacement air blower(s) as manufactured by Dresser Roots, Dresser, Inc.

B: ALL equipment specified in this section shall be designed and furnished by the blower manufacture, Dresser ROOTS, Dresser Inc., who shall be responsible for the suitability and compatibility of all included equipment.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A: Division 1 (all sections)

B: Equipment general provisions.

C: Acoustical insulation for air piping.

D: Electric motors.

E: Starters for main drive motors.

F: Instrumentation.

1.03 MANUFACTURE

A: The ROOTS blower/motor assemblies, all accessories, controls and other accessories shall be supplied by a single manufacture who is fully experienced, reputable and qualified in the supply of the equipment specified. The manufacture of the blower shall have at least ten (10) installations of the ROOTS rotary lobe blower in operation for at least five years.

1.04 TESTING (Optional)

A: A 1 PSI slip test shall be performed on each blower to verify flow and horsepower +/-4%. Blower manufacture's certification shall be provided.

B: A package mechanical run test at contract speed and pressure shall be performed on each blower. Blower manufacture's certification shall be provided.

C: A package noise certified readings which includes the mechanical run test and calculated to a free field environment. Test to be measured to CAGI-PNEUROP test code with +/- 3 dBa tolerance. Blower manufacture's certification shall be provided.

1.05 SUBMITTAL & IO & M MANUALS

A: Submittals shall be provided prior to constructions as shall include, but not limited to the following:

1: Blower data sheet.
2: Blower octave band analysis.
3: V-belt drive data.
4: General arrangement drawing.
5: Motor data sheet.
6: PRV sizing data sheet.
7: Instrumentation data sheets.

1.06 START-UP AND TRAINING (Optional)

A: The manufacturer or their representative shall furnish experienced start-up/service personnel to inspect the final installation and, if needed, supervise the field start-up of the equipment.

1.07 TOOLS AND SPARE PARTS (Optional)

A: The manufacturer shall furnish all special tools and appliances necessary to service, repair and adjust the equipment. The following spare parts shall be furnished.

1: (1) Blower repair kit including bearings, seal and gaskets for each blower supplied.
2: (3) Spare filter elements.
3: (1) Spare set of v-belts for each blower.
4: (1) Gallon ROOTS Synthetic oil 2"-4", (2) Gallons ROOTS Synthetic 5"-6"

PART 2 -- PRODUCTS

2.01 CONFIGURATION

The air blower(s) shall be of the rotary positive displacement type, and shall be constructed with inlet and discharge connections oriented as shown on the contract drawings. Each blower shall be equipped with detachable rugged steel mounting feet for mounting in horizontal configuration.

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2.02 DESIGN CONDITIONS

- Minimum inlet volume _____ ACFM (at blower inlet connection) +/-4%.
- Inlet temperature _____ ºF
- Relative humidity _____ %
- Barometer _____ PSIA
- Inlet pressure _____ PSIA (at blower inlet connection)
- Discharge pressure _____ PSIA (at blower discharge connection)
- Maximum rated pressure rise _____ PSI
- Maximum blower speed _____ RPM
- Maximum gear tip speed _____ fpm
- Maximum BHP at blower shaft _____
- Minimum motor HP _____
- Maximum discharge temperature _____ ºF
- Minimum bearing B-10 life _____ hrs
- Maximum free field noise level _____ dba at 1 meter with noise enclosure

2.03 CONSTRUCTION

A: Casing: The blower casing shall be one piece utilizing a wrap-around plenum to control pressure equalization, with separate head plates, and shall be made of ASTM A48 Class 30B close-grained cast iron. Each head plate shall incorporate a vent to atmosphere. In a pressure application this vent prevents pressurization of the oil chambers. In a vacuum application the vent prevents oil carry over to the air stream.

B: Impellers-Shaft Assembly: Each impeller-shaft assembly shall be made from high-strength ASTM A395-60-45-15 ductile iron. The shafts are cast integrally with the impellers. The impellers shall be of the straight, two-lobe involute type, and shall operate without rubbing, liquid seals or lubrication. The assembly shall be dynamically balanced by removing metal from the impeller body, and shall be center-timed to permit rotation in either direction. Each shaft is fitted with a cast iron ASTM A48 Class 30B sleeve and ductile iron piston ring, SAEJ929. The piston ring seal is located on the shaft at the point where the shaft passes through the head plate.

C: Bearings: Each impeller and shaft assembly shall be supported by oversized anti-friction bearings engineered for long service life and fixed to control the axial location of the impeller/shaft in the unit. A cylindrical roller bearing shall be provided at all four (4) locations. A wavy washer shall be installed on the gear end of both shafts between the bearing and bearing clamp to absorb axial thrust loading.

D: Timing Gears: The impellers shall be timed by a pair of SAE 8620 carburized and hardened steel spur gears. The gears shall be hardened to 58-62 Rockwell hardness and mounted on the shafts with a tapered fit and secured by a locknut.

E: Fasteners: All fasteners shall be SAE Grade 5, high strength material as a minimum.

F: Lubrication: Each bearing housing shall include a positive lip type Viton oil seal designed to prevent lubricants from entering the air stream. A Viton lip seal shall be installed on the drive end of the drive shaft. The bearings timing gears are splash lubricated with a disc slinger.

G: The blower will be a ROOTS WHISPAIR™ as manufactured by Dresser ROOTS, Dresser Inc.

2.04 INLET FILTER/SILENCER

System shall include an inlet filter silencer for pressure applications. The inlet filter silencer shall be mounted within eight (8) inches of the blower inlet suction. Inlet filter/silencer for blowers with threaded inlet/outlets shall be mounted directly to the blower suction. Inlet filter/silencer for blowers with flanged inlet shall be mounted directly to the blower. The inlet/filter silencer shall be carbon steel with paper filter elements. 3" through 6" inlet filters shall have lateral access for element access. Filter shall be 99% removal efficiency on 2 micron. Vacuum filters, if required, to be installed outside of the noise enclosure. Dresser ROOTS, Dresser Inc shall supply the inlet/filter silencer.

2.05 COMBINATION BASE

Base shall be a combination type with discharge silencer. 2" through 5" shall be constructed with NPT connections and 6" and larger will have 125/150# drilled flat face flange connections. The base/discharge silencer shall be manufactured using either A-569 or A-1011carbon steel. The base/discharge silencer will have a connection for a pressure relief valve built into the silencer. The base/ discharge silencer will be supplied by Dresser ROOTS, Dresser Inc.

2.06 DRIVE SYSTEM

A v-belt drive will be provided. The v-belt drive system must incorporate a ROOTS patented v-belt tension system. A minimum service factor of 1.4 shall be applied on all v-belt systems. Drive selection program shall be supplied to verify 1.4 minimum drive service factor. For v-belt drives on 75 HP motors and above banded belts are required. Drive shall be selected to insure overhung load limits of motor and blower is not exceeded.

2.07 BELT GUARD

Guard shall be designed into the noise enclosure and meet OSHA standards.

2.08 DRIVE MOTOR

The motor shall be sized for appropriate horsepower, RPM and other appropriate electrical characteristics as determined for the application. The brake horsepower

requirement with relief valve fully open shall not exceed the motor nameplate horsepower rating with service factor. Motors to be horizontal foot mounted, ball bearings, heavy-duty steel or cast iron frame, gasketed conduit boxes and manufactured to NEMA or IP standards. Motors to be as manufactured by WorldWide Electric Corp.

- Motor Horsepower _____.
- Motor RPM 1800.
- Motor Type TEFC.
- Motor Electrical 3 Phase, 60 Hertz, 230-460 or 460V only.
- Motor Service Factor 1.15.
- Motor Full Load Efficiency per EPACT minimum.
- Motor Full Load Amps _____.
- Motor Space Heater _____ Phase _____ Voltage (Optional)

2.09 STANDARD ACCESSORIES

A: Blower oil drain manifold.

B: The blower package shall include pressure/vacuum gauges, each with a throttle plug on both the suction and discharge of the blower. Gauges mounted on the noise enclosure. All gauges shall be supplied by Dresser ROOTS, Dresser Inc. as manufactured by Ashcroft model 1009SW with 2.5" dial.

C: The blower package will include a discharge temperature gauge mounted on the noise enclosure. The discharge temperature gauge shall be supplied by Dresser Roots, Dresser Inc. as manufactured by Weiss model 25UB3-5131 with 2.5" dial.

D: Blower package shall include an inlet filter gauge mounted on the noise enclosure to indicate filter change requirement. The inlet filter gauge shall be supplied by Dresser Roots, Dresser Inc. as manufactured by Dwyer model 2-5040 Minihelic II with 2.5" dial.

E: A spring type large nozzle design bronze relief valve shall be included. The relief valve shall be located in the discharge silencer for pressure applications and in the suction piping on blowers for vacuum application. The relief valve shall be supplied by Dresser ROOTS, Dresser Inc. as manufactured by Kunkle model 337 for pressure service and 215V for vacuum service.

F: Check valves shall be supplied for pressure and vacuum applications. The check valve shall have threaded connections, NPT, for 5" diameter and below and wafer style for 6" and above. Check valve shall be split disc type and valve body shall be cast iron or carbon steel with silicone seal and stainless steel spring. Check valve ratings shall be 150 PSI and 500° F. The blower manufacture must insure the valve is of suitable for the application. Check valve to be supplied by Dresser ROOTS, Dresser Inc. as manufactured by U.S. Valve.

G: Vibration mounts shall be supplied. Vibration mounts to be supplied by Dresser ROOTS, Dresser Inc. The blower manufacture must insure proper selection for the specific blower system offered.

H: An 80 dBA or less free field guaranteed noise enclosure should be provided for each blower system. The enclosure must be suitable for outdoor installation, 20 lb per square foot snow load and 70 MPH wind speed. The enclosure shall include a vent system and (3) removable panels for easy access and maintenance. The noise enclosure shall be provided with 1" foam and the foam shall comply with UL94-HF 1 for flammability. The noise enclosure shall provide up to 22-dba attenuation, free field. The enclosure finish coat shall be power coat texture using DuPont Blue PFKY2. The noise enclosure must be supplied by Dresser ROOTS, Dresser Inc.

2.10 OPTIONAL ACCESSORIES

A: The blower package may include a NEMA 4 discharge pressure switch. Switch to be shipped loose to be installed by others. Manufacture shall be Dresser Instruments, Dresser Inc. Ashcroft Type 400, B-Series model B424V or approved equal.

B: The blower package may include a NEMA 4 discharge temperature switch. The blower package may include a NEMA 4 discharge temperature switch. Switch to be shipped loose to be installed by others. The switch shall be direct mount type or remote mount type. Remote mount type includes 10 feet of 316 SS capillary with 75W SS well. Manufacture shall be Dresser Instruments, Dresser Inc Ashcroft Type 400, B-Series model T424T10-303 or approved equal.

C: Butterfly valves, if required by the purchaser, shall be cast iron with locking lever. Threaded valves for 4" and below shall be supplied. Wafer style shall be supplied for valves 6" and above. Butterfly valves shall be rated for 80 PSI and higher with a temperature rating of 450° F. Materials of construction shall be cast iron disc and body with 416 SS shaft. And Viton™ O-ring or graphite Teflon® braid packing. The butterfly valves to be supplied by Dresser ROOTS, Dresser Inc. as manufactured by Process Development & Controls Inc.

D: Unloading valves, if required by the purchaser, shall be the ROOTS patent pending mechanical unloading type as manufacture by Dresser ROOTS, Dresser Inc.

E: UL Listed Control Panel including:
- NEMA 4 or 12, Fiberglass or Steel Enclosure.
- Contact with overload relay.
- H-O-A Selector Switch.
- (4) Aux's for fans.
- (2) Push to test Pilot Lights.
- Control transformers with Primary and Secondary Fusing.
- Circuit Control Relays.

PART 3 INSTALLATION

3.1 All equipment will be factory painted in accordance with the manufacture's standard procedures.

3.2: The contractor, in accordance with the manufacture's instructions, shall install the blower package and appurtenances.

PART 4 WARRANTIES AND SERVICE

Blower equipment supplier shall also be a factory authorized warranty and repair center. Supplier's service center shall be within 100 miles of equipment site. The blower package, less blower and consumables (i.e. lubrication, belts and filter element), shall come with a full eighteen (18) months from date of original package start-up or twenty-four (24) months from date of original shipment, whichever occurs first. Reference Dresser Roots document WP-5020 for the **blower only** warranty.

END of Specification
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