

SECTION 11372 - BLOWERS, CENTRIFUGAL, MULTISTAGE

City of San Diego, CWP Guidelines

PART 1 -- GENERAL

1.1 WORK OF THIS SECTION

- A. The WORK of this Section includes providing [] centrifugal multistage blowers with accessories, tools, drives, piping, fittings, valves, connectors, safety devices and controls.

1.2 RELATED SECTIONS

- A. The WORK of the following Sections applies to the WORK of this Section. Other Sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.

- 1. Section 11370 Blowers, Compressors and Vacuum Pumps, General

1.3 SERVICES OF MANUFACTURER

- A. **Inspection, Startup and Field Adjustment:** An authorized service representative of the manufacturer shall visit the site for not less than [2] days to furnish the indicated services.
- B. **Instruction of OWNER'S Personnel:** The authorized service representative shall also furnish the indicated services for instruction of the OWNER'S personnel for not less than [] days.

1.4 FACTORY INSPECTION AND TESTING

- A. The CONTRACTOR shall be responsible for all costs associated with inspection and testing of materials, products, or equipment at the place of manufacture. This shall include costs for travel, meals, lodging, and car rental for two OWNER-designated inspectors for [] days required to complete such inspections or observations exclusive of travel days, if the place of manufacture, fabrication and factory testing is more than fifty (50) miles outside the geographical limit of the City. The CONTRACTOR shall not be responsible for salary or salary-related costs of the inspectors. The CONTRACTOR shall comply with the requirements of Section 01400.

PART 2 -- PRODUCTS

2.1 GENERAL

- A. **Identification:** The following centrifugal blowers shall be provided:

- 1. Name of equipment - []
- 2. Identification number - []
- 3. Quantity - []
- 4. Location - []
- 5. Service - []
- 6. Elevation above sea (ft) - []

- B. **Design Criteria:**

1. Capacity at 14.7 psia, 68 degrees F, and 36 percent RH (scfm) - []
2. Inlet temperature (degrees F) max - []
3. Inlet temperature (degrees F) min - []
4. Outside air temperature (degrees F) max - []
5. Outside air temperature (degrees F) min - []
6. Relative humidity (percent) max - []
7. Relative humidity (percent) min - []
8. Barometric pressure (mm-Hg) max - []
9. Barometric pressure (mm-Hg) min - []
10. Sound pressure level at 3 feet (dBA max) - []
11. Suction pressure - atm minus 0.2 psi
12. Discharge pressure (psig) - []
13. Blower speed, max (rpm) - []
14. Motor size, min (hp) - []
15. Motor speed, max (rpm) - []
16. Suction flange size (in) - []
17. Discharge flange size (in) - []
18. Flange rating (psi) - []

C. **Design Requirements:** Centrifugal blowers shall be of the multi-stage type, designed for continuous operation 24 hours per day. When volumetric capacity is reduced by at least 30 percent, blowers under indicated inlet conditions shall:

1. Develop at least 0.5 psi pressure above indicated discharge pressure,
2. Not be in surge.

D. **Basis:** Blower characteristics shall be based upon data previously established by tests in accordance with the latest edition of the ANSI/ASME Performance Test Code for Centrifugal Compressors.

E. **Driver:** The driver shall be an electric heavy duty high efficiency motor with direct drive, 3600 rpm, complying with Section 16040 and suitable for 460V, 3-phase, 60 Hz.

F. **Accessories:** Each blower shall be provided with the following:

1. Suitable, flanged, reinforced, flexible connections designed to fit standard steel pipe for both inlet and outlet.
2. Flanged, cast-iron lever operated butterfly valves for inlet and outlet.
3. Flanged, spring-loaded, cast-iron check valve designed for low pressure air discharge.
4. Dry type inlet air filter silencer designed for 120 percent of design volume. Filter elements shall be cleanable and replaceable.
5. Ammeter calibrated in both cfm and amps, with current transformer, mounted at blower.
6. Bearing temperature monitoring unit with NEMA 12 STD enclosure, heat sensitive switches on bearing housing, gages, power reset, on-off switch and complete circuitry.

7. Heavy-duty, restrained, spring type vibration isolators complying with manufacturer's recommendations.
8. Vibration detector and safety shut-off.

G. Equipment Construction: Construction of blowers shall comply with the following:

1. Casing and diffusers - cast-iron or steel
2. Impellers - cast aluminum, dynamically balanced
3. Shaft, balanced - heavy, ground steel shaft
4. Bearings - outboard mounted anti-friction type, L-10 life of [50,000] [100,000] hours
5. Max impeller tip speed - 475 fps
6. Baseplate - common steel or cast-iron base
7. Coupling - flexible coupling with guard
8. Mountings - heavy-duty spring type vibration isolators with galvanized anchor bolts
9. Lubrication - grease lubrication

H. Alternative Casing Construction: Casings constructed of welded, reinforced, heavy-gage sheet steel shall comply with the following:

1. Shafts shall be balanced to a maximum (peak-to-peak) vibration of 1.0 mils at design speed.
2. Maximum rotor tip speed shall be 400 fps.

I. Manufacturers: Blowers, of the model indicated, shall be manufactured by one of the following (or equal):

1. Hoffman (Clarkson Industries, Inc.), model []
2. Lamson (Diebold, Inc.), model []
3. Spencer Turbine Company, model []
4. Sutorbilt (Fuller Company), model []

PART 3 -- EXECUTION

3.1 INSTALLATION

A. Installation shall comply with Part 3 of Section 11370.

** END OF SECTION **