

SECTION 11194 - DIAPHRAGM PUMPS

City of San Diego, CWP Guidelines

PART 1 - GENERAL

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NTS: This Section of the Specifications covers several types of diaphragm pumps as follows:

A. The ODS type single diaphragm pump furnished by:

1. **Dorr-Oliver**, air-operated, base-mounted, with or without spring-or air-assisted suction stroke, with various accessories.
2. **Gorman-Rupp**, operated by electric motor, gasoline engine, or diesel engine, base- or trailer-mounted, with spring-assisted suction stroke, and various accessories.

B. The air-operated double diaphragm pump, base-mounted, as furnished by:

1. **Warren Rupp Houdaille (Sand PIPER);**
2. **ITT Marlow;**
3. **Wilden Pump and Engineering Co.;**
4. and other manufacturers

This pump comes in many different materials (metals and plastics), with various accessories, produces a smoother flow, and is often used for dewatering purposes, chemicals, food, etc.

The single diaphragm pump has a good track record for sanitary sludge, heavy-duty applications. It is, generally, more expensive, quite simple, and has less moving parts.

The specifier must select one of the basic pumps from Part 2 and the materials and accessories to suit the process.

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1.1 WORK OF THIS SECTION

- A. The WORK of this Section includes providing diaphragm pumps with appurtenant work and equipment indicated herein.

1.2 RELATED SECTIONS

- A. The WORK of the following Section 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 11175 Pumps, General

1.3 SERVICES OF MANUFACTURER

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

PART 2 - PRODUCTS

2.1 PUMP NAME: [] (P-[] through P-[])

A. **General:**

- 1. Number of pumping units - []
- 2. Location - []
- 3. Service - []
- 4. Operation (hours per day) - []
- 5. Drive (constant-variable speed) - []

B. **Operating Conditions:**

- 1. Capacity, maximum (gpm) - []
- 2. Pump head, maximum (TDH ft) - []
- 3. Suction condition (ft) - [lift/head]
- 4. Liquid to be pumped - []
- 5. Specific gravity of liquid - []
- 6. Liquid temperature (degrees F) - []
- 7. pH of liquid - []
- 8. Viscosity of liquid - []
- 9. Maximum pump speed (spm) - []
- 10. Maximum sphere to pass (in. dia.) - []
- [11. Available air pressure (psi) - []]

C. **Pump Dimensions:**

- 1. Suction (in.-I.D.) - []
- 2. Discharge (in.-I.D.) - []
- [3. Flange rating (psi) - []]
- [4. Air connection (inches) - []]

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NTS: The specifier must select one of the two following paragraphs covering the two types of diaphragm pumps.

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[2.2 PUMP CONSTRUCTION

A. **General:** The pump shall be of the [spring-assisted] single diaphragm type and conform to the following requirements:

- 1. Pump base - [cast iron] [trailer-mounted]
- 2. Pump casing - cast iron [hypalon-lined]
- 3. Pump cover, flanged - cast iron [hypalon-lined]
- 4. Diaphragm - [hypalon] [neoprene]
- 5. Check valves - swing checks with flanged access cover
- [6. Plunger spring - stainless steel]
- [7. Plunger shaft - stainless steel]
- [8. Gear box - oil-lubricated with eccentric output shaft and helical-ground gears]
- [9. Drive]
 - [electric heavy-duty [] rpm [TEFC] motor, []-hp, []-volt, []-phase, []-Hz, trailer-mounted]
 - [trailer-mounted gasoline engine, model No. [], []-hp at [] rpm]
 - [trailer-mounted diesel engine, model No. [], []-hp at [] rpm]
 - [air-operated, base-plate mounted]

[2.3 PUMP CONSTRUCTION

A. **General:** The pump shall be of the air-operated double diaphragm type and conform to the following requirements:

1. Pump base - [cast iron] [steel] [aluminum]
2. Pump casing (wetted) - [cast iron] [aluminum]
[316 stainless steel]
[Hastelloy C] [Teflon]
[Polypropylene] [PVDF]
3. Pump casing (dry) - [cast iron] [aluminum]
[316 stainless steel] [brass]
[Polypropylene]
4. Pump construction - [flanged] [clamped]
5. Diaphragms - [Hypalon] [Neoprene] [Buna N]
[Viton] [Nordel] [Teflon]
[EPR] [Polyurethane] [EPDM]
6. Check valves - [ball checks] [swing checks]
7. Check valve material - [Polyurethane] [Teflon]
[Neoprene] [Buna N]
[Nordel] [Delrin] [EPDM]
[Viton]
8. Valve seats - [316 stainless steel] [Buna N]
[Neoprene] [Delrin] [EPDM (Nordel)]
9. Pump shaft - [416 stainless steel]
[nitrided carbon steel]
10. Air control valve - self-lubricated or oil-lubricated]

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NTS: The specifier must select all the applicable, necessary, and desired accessories from the following paragraph.

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2.4 ACCESSORIES

A. Each diaphragm pump shall be supplied with the following accessories and controls:

- [1.]-inch air shut-off ball valve.]
- [2.]-inch air strainer.]
- [3.]-inch air filter, 5 micron.]

- [4.]-inch air pressure regulator.]
- [5.]-inch solenoid valve, 3-way.]
- [6.]-inch air muffler.]
- [7. Combination pressure/vacuum gauge.]
- [8. Electronic solid-state timer with [5]-minute maximum frequency.]
- [9. Discharge timing cycle.]
- [10. Pacing and dosing control timer for 4-20 mA signal with []-minute maximum frequency, in a hinged cover enclosure.]
- [11. Heavy-duty suction and discharge air chambers.]
- [12. Magnetic motor starter.]
- [13. Disconnect switch.]

2.5 SPARE PARTS

- A. In addition to the spare parts indicated in Section 11175, the CONTRACTOR shall furnish the following spare parts for each pump:

- [1. Two ball and seat sets.]
2. One set of diaphragms.
- [3. One 3-way solenoid valve.]
- [4. Two 5-micron replacement air filters.]

2.6 MANUFACTURERS

- A. Products shall be manufactured by one of the following (or equal):

- [1. Dorr-Oliver, model]
- [2. Gorman-Rupp Co., model]
- [3. ITT Marlow Pumps, model]
- [4. Warren Rupp, Inc., (Houdaille), model]
- [5. Wilden Pump and Engineering Co., model]

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Pumping equipment shall be installed in accordance with approved procedures submitted with the shop drawings and as indicated, unless otherwise approved.
- B. General installation requirements shall be as indicated in Section 11175.

** END OF SECTION **