

# Hydra-Cell® Installation Guidelines

## General Installation

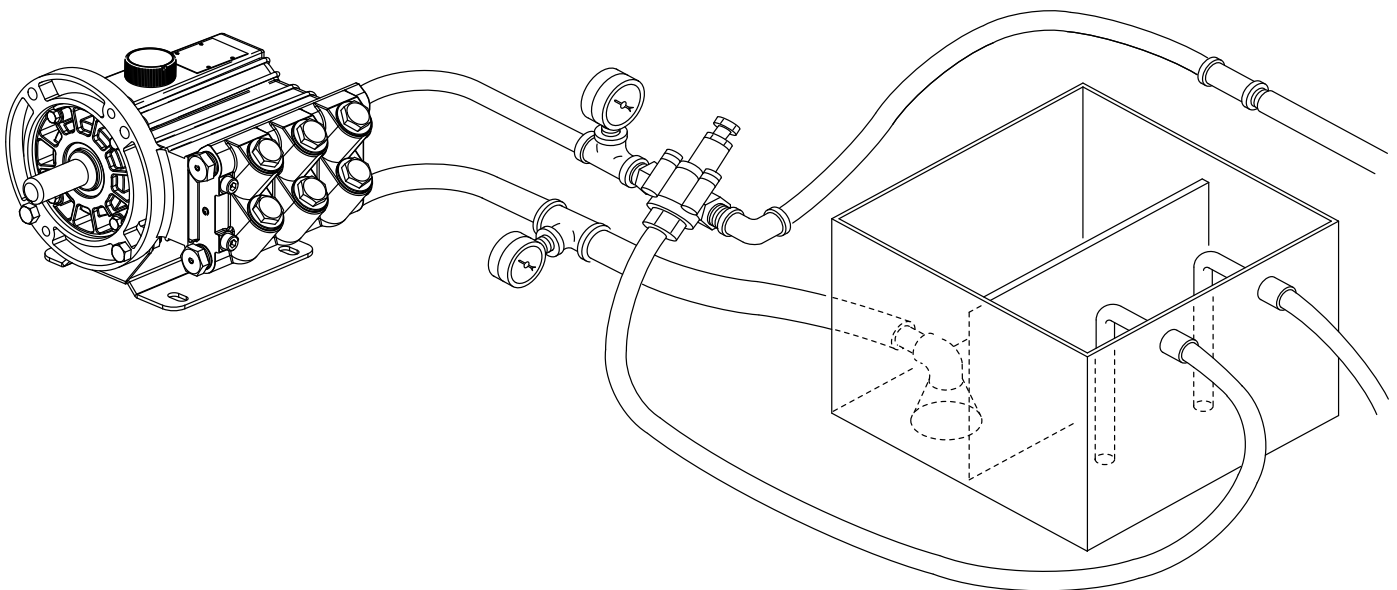
1. Read and follow all instructions and safety warnings in the Hydra-Cell IOM Manual.
2. Do not exceed the manufacturer's recommended maximum rpm or pressure.
3. Follow all codes and regulations regarding installation and operation of the pumping system.
4. For safety and easier servicing, provide adequate work space around the pump. Allow room for checking the oil level, changing the oil, and removing the valve plate and manifold.
5. To prevent vibration, mount the pump and motor securely to a rigid, level base.
6. Be sure the inlet system provides NPSHa that exceeds the sum of NPSHr of the pump, all friction losses and acceleration head.
7. Do not exceed the manufacturer's recommended maximum inlet pressure. Install an inlet pressure regulator if necessary.
8. On a belt-drive system, align the belts and pulleys accurately, and follow the manufacturer's specifications for belt tension.
9. On a direct-drive system, align shafts properly.
10. Install adequate safety guards on all belts and couplings.
11. Install drains in all low points of the system to allow draining in freezing conditions.

## Supply Tank Guidelines

1. Use a supply tank that is large enough to provide time for any entrapped air in the fluid to escape.
2. Isolate the pump and motor stand from the supply tank and support them separately.
3. Where possible, install a separate inlet line from the supply tank to each pump. Alternatively, target 1 ft/sec (0.3 m/sec) manifold velocity.
4. Install the inlet and bypass lines so that they empty into the supply tank below the lowest water level, on the opposite side of the baffle from the pump inlet line.
5. If a line strainer is used in the system, install it in the inlet line to the supply tank.
6. Install a completely-submerged baffle plate in the supply tank to separate the incoming and outgoing liquid so as to reduce aeration and turbulence.
7. Install a vortex breaker in the supply tank over the outlet port to the pump.
8. Place a cover on the supply tank to prevent foreign objects from falling into it.

## Calculating Pulley Size

$$\frac{\text{motor pulley OD}}{\text{pump rpm}} = \frac{\text{pump pulley OD}}{\text{motor rpm}}$$



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## Inlet Piping Guidelines

1. Size the suction line so that the velocity will not exceed 1 to 3 ft./sec (0.3 to 0.91 m/sec).  
For imperial units: ID in inches  
 $[V = \text{gpm} \times (0.408 \div \text{pipe I.D.}^2)]$   
For metric units: I.D. in mm  
 $[V = \text{lpm} \times (21.221 \div \text{pipe I.D.}^2)]$   
Multiple pump installations require 1 ft./sec (0.3 m/sec).
2. Keep the suction line as short and straight as possible, without any obstructions (e.g., valves, elbows, tees) within 10 pipe diameters of the pump inlet.
3. Use flexible, non-collapsible suction hose and/or expansion joints to absorb vibrations, expansions and contractions.
4. If possible, keep suction line level. Have no high points to collect vapor unless these high points are vented. Install drain cocks at any low points of the suction line to permit draining in freezing conditions.
5. Provide for permanent or temporary installation of a vacuum gauge to monitor the inlet suction.
6. It is recommended not to supply more than one pump from the same inlet line.
7. To reduce turbulence and resistance, do not use 90° elbows. If turns are necessary in the suction line, use 45° elbows (within 10 pipe diameters of the pump inlet) or arrange sweeping curves in the inlet hose.
8. If a block valve is used, be sure it is full-opening so that the flow to the pump is not restricted. The opening should be at least the same diameter as the inlet plumbing I.D.
9. It is recommended that a line strainer or filter not be used in the suction line unless regular maintenance is assured. If used, it should have a free-flow area at least three times the free-flow area of the inlet.
10. Install piping supports where necessary to relieve strain on the inlet line and to minimize vibration.

## Discharge Line Guidelines

1. Size the discharge line so that the velocity will not exceed 8 to 10 ft./sec (2.4 to 3.0 m/sec).
2. Use flexible hose between the pump and hard piping to absorb vibrations, expansions or contractions.
3. Install a pressure gauge between the pump and the pressure regulator, and as close as possible to the pump outlet.
4. Install a pressure regulator, unloader valve, or another safety relief valve in the discharge line.
5. Never install a shut-off valve in the discharge line between the pump and the regulator, or in the bypass line.

## Pressure Regulator (Relief Valve) Guidelines

1. Size the pressure regulator valve so that when fully open, it will be large enough to relieve the full capacity of the pump without excessive over-pressurizing of the system.
2. Locate the valve as close to the pump as possible and ahead of any other valves.
3. Adjust the pressure regulating valve to no more than 10% over the maximum working pressure of the system. Do not exceed the manufacturer's pressure rating for the pump and/or regulator.