



## FACTS TO CONSIDER ON HYDRAULIC RESERVOIRS

### SIZING

Folklore rules of thumb proclaim that the reservoir should be from 2 to 5 times the size of the pump GPM. For example: a 20 GPM pump should have a reservoir of 40 to 100 gallon capacity. However, this rule of thumb may not necessarily be true, especially if heat exchangers are used. With a heat exchanger the reservoir could be as small as one times the size of the pump GPM. Some closed loop systems require virtually no reservoir at all.

The accurate method for sizing a reservoir is to determine the heat balance for your hydraulic system. Try to accurately determine the amount of heat that will be generated through lost work, then determine the reservoir space available and how much heat can be dissipated in that space. From these calculations the necessity and size of the heat exchanger and the proper size of the reservoir can be determined.

### INDOOR or OUTDOOR

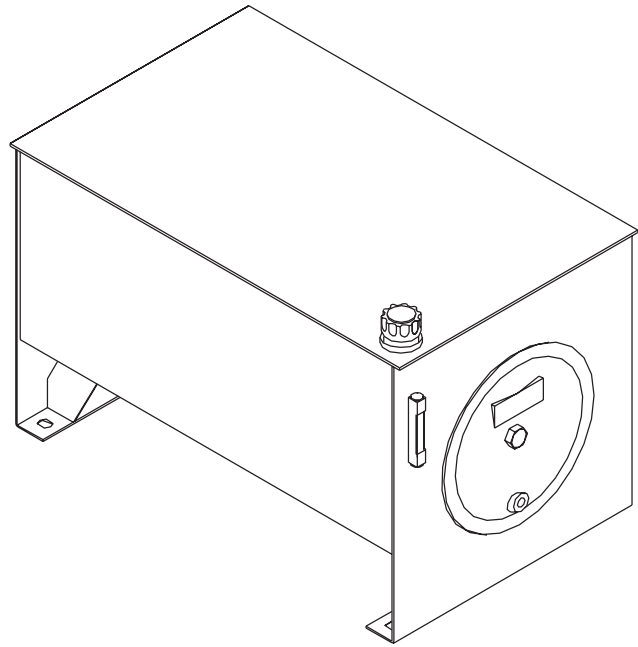
Reservoirs for indoor service usually have rubber grommets in the top plates for sealing suction and return lines. These grommets are not water tight. For outdoor reservoirs, welded couplings are used to seal the suction and return lines from weather and foreign fluids. For reservoirs requiring wash downs, welded couplings should also be used to prevent wash fluids from entering the tank.

Tank heaters are essential in cold climates. The most common heaters used are electrical immersion heaters. Most of them require a welded coupling in the tank side for installation. Sizing of the immersion heaters falls into two categories.

1. Sizing the immersion heater for maintaining the oil temperature when the pump is not running.

*For sizing the immersion heater to maintain the oil temperature, calculate the total surface area of the tank (include all four sides plus top and bottom) in square feet. Then use the following approximate formula for heat transfer between a steel surface and surrounding air:*

$$WATTS = 0.01 \times \text{AREA OF TANK (SQUARE FEET)} \times \text{TEMPERATURE DIFFERENCE(°F)}$$



2. Sizing the immersion heater to heat the hydraulic oil to pump suction temperature requirements in a given time.

*For sizing the immersion heater to heat the hydraulic oil. Use the following rule of thumb:*

*ONE WATT WILL HEAT ONE GALLON ONE °F IN ONE HOUR*

Location of the reservoir is important. Adequate air circulation should be provided. For outdoor location, shield the tank from direct sun radiation and protect it from weather, if possible. For indoor location shield the tank from furnace and steam lines and other radiation. The reservoir can be painted white to help reflect radiant heat or painted black to help radiate heat from tank to atmosphere.

You will note that no discussion of the sizing of cooling heat exchangers is given here. Most full line hydraulic manufacturers and distributors have complete data for sizing. If you require information for your specific needs and cannot obtain assistance, contact us and we will help you.