

RESERVOIRS

Function

The reservoir or tank performs a number of functions in the hydraulic system:

- fluid storage
- separation of air
- dissipation of heat
- settling of contaminants

Sizing

Recommended reservoir fluid volume is 3 to 5 times the pump(s) output flow per minute with a 10% air cushion, expressed by the following formula:

$$V = 3 \times Q \times 1.1$$

Where

V = reservoir volume in gallons or litres

Q = flow rate of pump(s) in gallons per minute or litres per minute

The volume chosen for a particular application will be influenced by available space and weight considerations, which are typically more critical in mobile applications than in industrial applications. The unequal displacement of cylinders must also be considered, so that the minimum oil level with all cylinders extended is sufficient to prevent a vortex at the pump suction outlet and reservoir volume can accommodate returning oil with all cylinders retracted.

Construction

Where possible, the profile of the reservoir should be deep and narrow rather than shallow and broad. This reduces the possibility of vortex effects and improves heat dissipation.

Suction and return lines should be separated by a baffle plate inside the tank. This assists in cooling, settling and de-aerating return oil prior to recirculation through the system. The baffle plate should extend to 75% of the maximum oil level and have the bottom corners cut diagonally, giving a sufficient opening to allow the oil level to equalise on both sides of the baffle.

The pump suction penetration should be located above the bottom of the tank to prevent settled contaminants entering the pump. Return and case drain penetrations should be located near the top of the tank and fitted with drop pipes inside the tank that extend below the minimum oil level, to prevent aeration of return oil as it passes through the air space inside the tank. Return oil should be filtered to 25 micron absolute or better before the reservoir. Refer to our Technical Library document titled [Filters](#) for more information.

Inspection covers should be incorporated to facilitate periodic servicing and cleaning. A sight gauge, oil filler and air breather (on vented reservoirs) are essential accessories. The air breather should include a filter of 5 micron or better and be of sufficient airflow capability to prevent either a negative or positive pressure in the reservoir, as the working oil volume changes.

Installation

Ideally, the reservoir should be located above the pump so that the pump inlet is always flooded. This improves pump suction conditions, reducing the possibility of vortex flows and cavitation. Locating the tank in a well-ventilated area will improve heat dissipation, although in practice the heat load dissipated from the tank is relatively small. For more information refer our Technical Library document titled [Cooling and Heating](#).

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