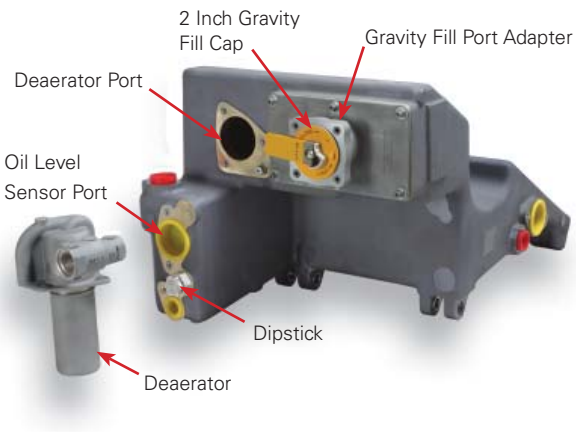
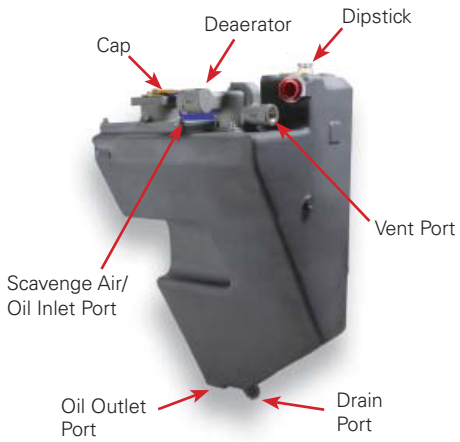
Eaton Leadership In Lube Tank Technology & Testing





Eaton is a leader in the design and production of oil reservoirs/tanks and systems for scavenge lube oil applications found on gas turbine engines and APUs.

Aerospace scavenge lube systems are designed to minimize the amount of oil required to perform proper lubricating functions by providing a means to recycle the oil. These systems minimize sliding and rolling resistance on gears and bearings and remove the frictional heat resulting from contact resistance.

The Eaton Lube Oil Reservoir (Tank) is a pressure vessel designed to store, condition (remove air), and supply lubrication oil to the aircraft engine bearings and gearbox. Air separation is the most important feature since entrained air at the lube pump's suction port causes cavitation and reduces the oil flow to the bearings and gears.

Lube oil leaving the reservoir can normally contain as much as 5% air by volume, based on the reservoir's oil outlet port pressure and temperature. 'Deaeration' (the removal of air) is typically handled via a cyclonic separator or deaerator either cast into, or mounted to the tank. These cyclonic type separators have no moving parts, function at any attitude and maintain high separation efficiencies throughout engine flight.

Eaton also integrates the complete lube systems. The system typically consists of a pump, an oil reservoir with a deaerator, a filter, and a fuel cooled oil cooler or heat exchanger (FCOC). In addition to tank design and manufacturing, Eaton also provides technical project and program management, supply chain management activities, and design and qualification of the complete lube system.

Currently, Eaton is furnishing a completely integrated lube tank system that will provide deaerated oil to the Rolls-Royce LiftFan® for the F-35B STOVL version aircraft.

Testing

Oil tank testing requires a specialized rig to simulate flight conditions at all attitudes and altitudes. A custom designed 'three phase' test rig, located at the Eaton Bethel, Connecticut facility, has been built for development testing and final qualification of oil tanks and sub-systems. The primary function of the testing rig is to verify the tank's performance under various oil and air flows, temperatures and altitudes. The 'three phases' refer to the three parameters to be controlled in scavenge oil systems — oil, air and debris. Additionally, verification of dual axis (pitch and roll) performance and static stress is possible with this unique test fixture. The rig is monitored by data acquisition software that runs simultaneous calculations on the fly, allowing for faster verification.

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Eaton
Aerospace Group
Electrical Sensing & Controls
15 Durant Avenue
Bethel, CT 06801-1901
USA
tel: (203) 796-6000
fax: (203) 796-6313

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