

Oil Reservoir for Hydraulic System Equipped with Return Line with Easy Gas Separation

Dr. Yongbum Lee
Department of Reliability Assessment
T. +82 - 42 - 868 - 7151
E. lyb662@kimm.re.kr

⇒ Technology for easy discharge of air and gas in oil by installing a tilted return line that enables easy gas separation in the oil reservoir attached to the construction machine

Client / Market

- Construction machine (excavator, crane, etc.) manufacturer, hydraulic power unit and test apparatus manufacturer

Necessity of this Technology

- Oil in the hydraulic system contains about 9% of air dissolved in pressured air. This air could have entered through the throttling part and the hydraulic pump or have occurred because the return line is incorrectly connected to the reservoir, the oil has stayed in the reservoir for too shortly, or the air and hydraulic oil have not been sufficiently separated.
- When air content in oil is high, cavitation happens in the pump, which is a phenomenon where very fine particles are separated from the surface of a substance. This usually occurs at the control edge of the hydraulic pump or valve. This becomes the cause of loud noise (max. 110 dBA at 420 bar) and erodes the product. Such phenomenon is caused by local peak pressure and a high temperature.
- This technology allows for easy gas separation, a simple structure and reliability.

Technical Differentiation

- Realizes low noise and high efficiency
- Can reduce the noise from cavitation by 15% or higher as it allows for easy gas separation
- Minimizes the gas content in oil and improves the volumetric efficiency by 50%
- Existing oil reservoir has the return line fixed on the bottom, so it takes time for the gas to travel to the top, and gas is contained in the flow in the pump and makes noise. With a new oil reservoir structure design, the return line is tilted to stay most closely to the surface of the oil to realize easy air and gas discharge.
- Achieved low noise and high efficiency with a simple structural change of adding a tilted return line joint to existing oil reservoir

Excellence of Technology

- An oil reservoir with a tilted return line for easy gas separation was produced for testing and is in the testing. (The noise was reduced by 7.4 dBA from 86.4 dBA to 77.6 dBA.)



DESIRED PARTNERSHIP

Technology transfer

Licensing

Joint Research

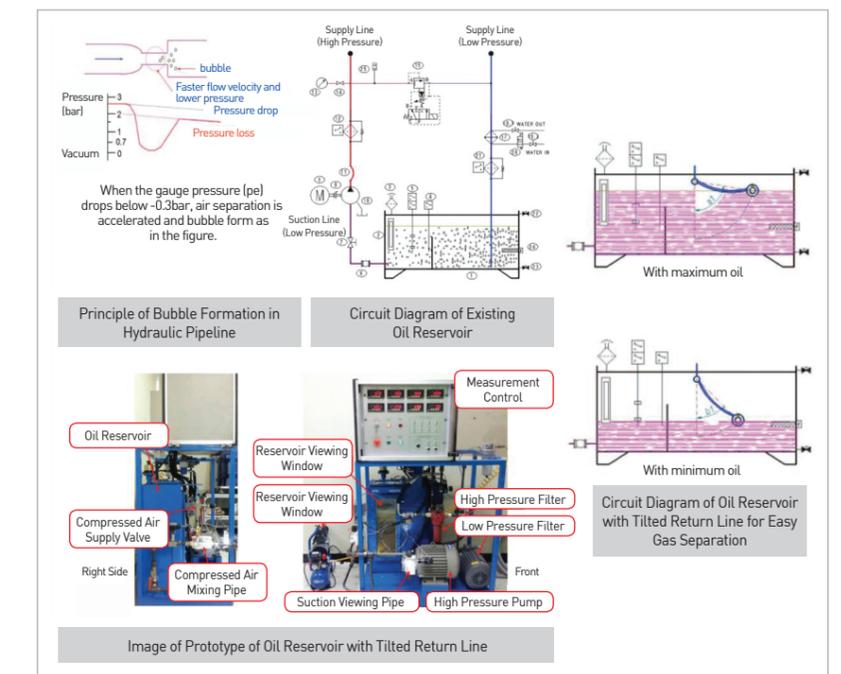
Other



TECHNOLOGY READINESS LEVEL [TRL]

Research, basic explanation | Project concept or idea development | Technology idea verification | Prototype development | Trial product production/ evaluation in similar environment | Pilot field demonstration | Development and optimization of commercial model | Commercial product demonstration | Mass production and initial market launch

- Paper: Modeling & Simulation of the Hydraulic Servo Actuator Cushion for Power Plant (Korean Tribology Society Fall Symposium)
- Paper: Simulation and Modeling of Integrated System for Machinery, Fluid and Electricity (Machinery and Material)
- Award: 2012 Ministry of Knowledge Economy Citation (Man of Merit in Industrial Technology Promotion)
- Career of developer: Working as a research engineer specializing in the hydraulic field from July 1987 to present



Current Intellectual Property Right Status

PATENT

- Oil Reservoir for Hydraulic System using Return Line for Gas or Air Separation (KR1422809, PCT/KR2013/003740, JP2014-529628)