**Horizontal Longitudinal Flow Separator**

NATCO separation technology with custom designs for specific applications

**APPLICATIONS**
- Production separator
- Test separator
- Wellhead separator
- Slug catcher
- Freewater knockout
- Degassing drum

**Robust, versatile three-phase separation**
The horizontal longitudinal flow (HLF) separator incorporating NATCO* separation technology is one of the most popular and versatile separators in the industry. Designed with a wide range of internal components specific to each application, it is suitable for a full range of gas/oil ratios, pressures, and flow rates. The horizontal design provides the advantage of large gas/liquid and oil/water interfacial areas to speed the separation process.

**How it works**
Like all separators, the HLF separator must perform four distinct functions: inlet momentum control, vapor demisting, liquid retention, and liquid outlet control. Typically, the inlet is on one end of the horizontal separator and the gas and liquid outlets are on the opposite end. As fluid enters, bulk separation occurs at the inlet device. The phases separate within the liquid retention section and flow to their respective outlets. Demisting and coalescing devices assist in the phase separation, and vortex breakers prevent the reentrainment of phases.

**Inlet momentum control**
In the horizontal separator, several alternatives are available for controlling inlet momentum. NATCO technology splash plates, dished heads, and the PORTA-TEST REVOLUTION* separator internals are available. The inlet device controls the inlet momentum by redirecting the inlet stream and dissipating the energy of the inlet fluid. Additionally, the PORTA-TEST REVOLUTION internals use the energy of the incoming fluid to eliminate foam.

**Vapor demisting**
Options are available for vapor demisting. Wire mesh, serpentine vanes, and the NATCO PERFORMAX* horizontal high-efficiency phase separator can be used for removing liquid droplets from the flowing gas stream. The PERFORMAX separator and serpentine vanes normally are installed vertically (perpendicular to flow) in the gas phase across the vessel diameter. The tortuous flow path of the devices creates an inertial separation mechanism. Wire mesh can be installed in a horizontal position at the gas outlet for final cleanup. Wire mesh relies on droplet impingement and coalescence as the separation mechanism.

![Typical production separator.](image-url)
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Liquid retention
In three-phase designs, oil and water separate in the liquid retention section. PERFORMAX separator elements are employed to speed the liquid/liquid coalescing process. Sizing of the liquid section is normally based on retention time. The retention time required is heavily influenced by the crude oil gravity, operating temperature, and required outlet for bottom solids and water (BS&W). Sand jet systems also can be added in this section to enable sand removal from the vessel during operation.

Liquid outlet control
The purpose of the outlet control section is to prevent reentrainment of the separated phases. The variety of alternative configurations available assures the most-effective arrangement of the three-phase outlets: bucket and weir, bucket and riser, fixed weir, spillover weir, and standpipe. Liquid and gas outlet vortex breakers also are typically included in this section to prevent vortices from occurring.

Performance
Horizontal separator performance is determined by the characteristics of the fluid being separated, size of the vessel, and type of internal components installed. In general, liquid carryover in the effluent gas stream does not exceed 0.1 galUS of particles larger than 10 um per million standard cubic feet (MMcf/d) of gas if serpentine vanes are used for gas demisting. Performance is further enhanced if wire mesh is used.

To enhance oil/water separation in three-phase separators, PORTA-TEST REVOLUTION separator internal components, perforated baffles, and PERFORMAX separator coalescing sections can all be added. BS&W content in the outlet oil stream can be reduced significantly with the inclusion of one or a combination of these components.