

Vertical Surge Tank

Store liquid hydrocarbons after separation

APPLICATIONS

- Onshore and offshore exploration and development oil and gas well testing
- Production wells

ADVANTAGES

- Liquid flow rate, shrinkage factor, and meter factor measurement
- Large-volume dead oil sampling
- Constant backpressure maintenance when used as a second-stage separator
- Single or double compartment
- Sight glasses or magnetic level indicators
- High- and low-level alarm system on each compartment
- Automatic pressure controlled valve that is open on gas outlet
- Diverter, vortex breaker, and stiffening rings
- Bypass manifold that allows isolating the surge tank from the flow process
- Sampling points and pressure and temperature ports
- Overpressure protection by relief valves
- Shock-protection frame

The vertical surge tank (VST) is an H₂S service vessel designed to store liquid hydrocarbons after separation. The VST is used to measure liquid flow rates and the combined shrinkage and meter factor. It can also be used as a second-stage separator and can hold a constant backpressure by using its automatic pressure control valve on the gas outlet.

The VST usually consists of either a single- or a double-compartment vessel and a level-measuring system with sight glasses or magnetic levels. Dual-compartment VSTs provide a way to empty one tank compartment while filling another. To prevent overpressure and overfilling, the VST is fitted with a pressure-relief valve and a high- and low-level alarm system. The VST is designed with a diverter, a vortex breaker, and stiffening rings capable of withstanding a vacuum in the vessel. It is also fitted with sampling, pressure, and temperature ports, and a bypass manifold is included.

All VSTs are shock protected by a frame, and the latest models are designed to the Det Norske Veritas (DNV) 2.7-1 standard. VSTs operate in the vertical position, but they are transported in a horizontal position.

All surge tanks are manufactured under Type Approval or Design Verification Review and are provided with a Certificate of Conformity and full quality file.



Vertical surge tank.

Vertical Surge Tank

Specifications

Model	Vessel Capacity, bbl [m ³]	Oil Capacity, bbl [m ³]	Working Pressure, psi [kPa]	Temperature Range, degF [degC]	Maximum Gas Flow Rate, Mcf/d [m ³ /d] [†]	Level Measurement System	Safety Valves	DNV Rating 2.7-1
VST-A	1 × 80 [1 × 12.7]	46.5 [7.4]	50 [345]	32 to 212 [0 to 100]	4,500 [127,425]	Sight glass	1	No
VST-B	1 × 80 [1 × 12.7]	46.5 [7.4]	50 [345]	-4 to 212 [-20 to 100]	4,500 [127,425]	Sight glass	1	No
VST-D	2 × 50 [2 × 7.95]	58 [9.2]	150 [1,034]	32 to 212 [0 to 100]	10,000 [283,168]	Magnetic level	2	No
VST-BB	1 × 80 [1 × 12.7]	46.5 [7.4]	50 [345]	32 to 212 [0 to 100]	4,500 [127,425]	Magnetic level	2	Yes
VST-FA	2 × 50 [2 × 7.95]	58 [9.2]	150 [1,034]	-4 to 212 [-20 to 100]	10,000 [283,168]	Magnetic level	2	Yes
VST-FAC [‡]	2 × 50 [2 × 7.95]	58 [9.2]	150 [1,034]	-4 to 212 [-20 to 100]	10,000 [283,168]	Magnetic level	2	Yes
VST-FB	2 × 50 [2 × 7.95]	58 [9.2]	150 [1,034]	32 to 212 [0 to 100]	10,000 [283,168]	Magnetic level	2	Yes
VST-FC	2 × 50 [2 × 7.95]	58 [9.2]	150 [1,034]	32 to 212 [0 to 100]	10,000 [283,168]	Sight glass and magnetic level	2	Yes
VST-FW (winterized)	2 × 50 [2 × 7.95]	58 [9.2]	150 [1,034]	-4 to 212 [-20 to 100]	10,000 [283,168]	Magnetic level	2	Yes

Specifications and Codes

Model	Connections					Dimensions (L × W × H), ft [m]	Weight, lbm [kg]	Applied Codes
	Oil Inlet	Gas Outlet	Oil Outlet	Water Outlet	Pressure Safety Valve			
VST-A	3-in Fig 602 Female	4-in Fig 602 Male	3-in Fig 602 Male	3-in Fig 602 Male	4-in Fig 602 Male	8.04 × 7.87 × 20.0 [2.45 × 2.4 × 6.1]	13,420 [6,100]	ASME [§] VIII Div. 1, ASME/ANSI ^{††} B31.3, H ₂ S (NACE MR0175)
VST-B	3-in Fig 602 Female	4-in Fig 602 Male	3-in Fig 602 Male	3-in Fig 602 Male	4-in Fig 602 Male	8.04 × 7.87 × 20.0 [2.45 × 2.4 × 6.1]	13,420 [6,100]	ASME VIII Div. 1, ASME/ANSI B31.3, H ₂ S (NACE MR0175)
VST-D	3-in Fig 602 Female	4-in Fig 602 Male	3-in Fig 602 Male	3-in Fig 602 Male	4-in Fig 602 Male	8.53 × 7.87 × 24.27 [2.6 × 2.4 × 7.4]	24,765 [11,400]	ASME VIII Div. 1, ASME/ANSI B31.3, H ₂ S (NACE MR0175)
VST-BB	3-in Fig 602 Female	4-in Fig 602 Male	3-in Fig 602 Male	3-in Fig 602 Male	4-in Fig 602 Male	8.04 × 7.87 × 20.0 [2.45 × 2.4 × 6.1]	13,420 [6,100]	ASME VIII Div. 1, ASME/ANSI B31.3, H ₂ S (NACE MR0175)
VST-FA	3-in Fig 602 Female	4-in Fig 602 Male	3-in Fig 602 Male	3-in Fig 602 Male	4-in Fig 602 Male	8.53 × 7.87 × 24.27 [2.6 × 2.4 × 7.4]	27,000 [12,000]	ASME VIII Div. 1, ASME/ANSI B31.3, H ₂ S (NACE MR0175)
VST-FAC [‡]	3-in Fig 1,502 Female	4-in Fig 602 Male	3-in Fig 602 Male	3-in Fig 602 Male	4-in Fig 602 Male	8.53 × 7.87 × 24.27 [2.6 × 2.4 × 7.4]	28,660 [13,000]	ASME VIII Div. 1, ASME/ANSI B31.3, H ₂ S (NACE MR0175)
VST-FB	3-in Fig 602 Female	4-in Fig 602 Male	3-in Fig 602 Male	3-in Fig 602 Male	4-in Fig 602 Male	8.53 × 7.87 × 24.27 [2.6 × 2.4 × 7.4]	27,000 [12,000]	ASME VIII Div. 1, ASME/ANSI B31.3, H ₂ S (NACE MR0175)
VST-FC	3-in Fig 602 Female	4-in Fig 602 Male	3-in Fig 602 Male	3-in Fig 602 Male	4-in Fig 602 Male	8.53 × 7.87 × 24.27 [2.6 × 2.4 × 7.4]	29,762 [13,500]	ASME VIII Div. 1 (U-Stamp), ASME/ANSI B31.3, H ₂ S (NACE MR0175), DNV 2.7-1
VST-FW (winterized)	3-in Fig 602 Female	4-in Fig 602 Male	3-in Fig 602 Male	3-in Fig 602 Male	4-in Fig 602 Male	8.53 × 7.87 × 24.27 [2.6 × 2.4 × 7.4]	29,762 [13,500]	ASME VIII Div. 1 (U-Stamp), ASME/ANSI B31.3, H ₂ S (NACE MR0175), DNV 2.7-1

[†] For reference only and should be confirmed using ArchiTest[™] well test design and methodology software

[‡] No bypass manifold—oil inlet rated to 1,440 psi

[§] American Society of Mechanical Engineers

^{††} American National Standards Institute

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