

Vertical Surge Tank

Vertical surge tank.



Description

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, as well as the combined shrinkage and meter factor. It can also be used as a second stage separator and hold a constant backpressure by using its automatic pressure control valve on the gas outlet.

The VST usually consists of a single- or double-compartment vessel and a level-measuring system with sight glasses or magnetic levels. To prevent overpressure and overflowing, the VST is fitted with a pressure-relief valve and a high- and low-level alarm system.

VSTs are designed with a diverter, a vortex breaker, and stiffening rings capable of withstanding a vacuum in the vessel. They are fitted with sampling, pressure, and temperature ports. A bypass manifold is also 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.

Applications

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

Benefits

- Measures liquid flow rates, shrinkage factor, and meter factors
- Allows for sampling large volumes of dead oil
- Keeps a constant backpressure when used as second-stage separator

Features

- Single- or dual-compartment
- Dual-compartment VSTs provide a means to empty one tank compartment while filling another
- Sight glasses or magnetic level indicators
- High- and low-level alarm on each compartment
- Automatic pressure-control valve normally open on gas outlets
- Diverter, vortex breaker, and stiffening rings
- Bypass manifold allows isolating surge tank from flow process
- Fitted with sampling points and pressure and temperature ports
- Protected against overpressure by relief valves
- Shock-protected by a frame
- Compliant with ASME[†] VIII, Div. 1, H₂S (NACE[‡] MR0175)

[†] American Society of Mechanical Engineers

[‡] National Association of Corrosion Engineers International

Vertical Surge Tank Specifications

Model	Vessel Capacity, m ³ [bbl]	Oil Capacity, m ³ [bbl]	Working Pressure, kPa [psi]	Temperature Range, degC [degF]	Maximum Gas Flow Rate, m ³ /d [Mcf/d]	Level Measurement System	Safety Valves	DNV Rating 2.7-1	Part Number
VST-A	1 × 12.7 [1 × 80]	7.4 [46.5]	345 [50]	0 to 100 [32 to 212]	93,446 [3,301]	Sight glass	1	No	M809957
VST-B	1 × 12.7 [1 × 80]	7.4 [46.5]	345 [50]	-20 to 100 [-4 to 212]	93,446 [3,301]	Sight glass	1	No	M839544
VST-D	2 × 7.95 [2 × 50]	9.2 [58]	1,034 [150]	0 to 100 [32 to 212]	134,789 [4,760]	Magnetic level	2	No	M872885
VST-BB	1 × 12.7 [1 × 80]	7.4 [46.5]	345 [50]	0 to 100 [32 to 212]	93,446 [3,301]	Magnetic level	1	Yes	P775910
VST-FA	2 × 7.95 [2 × 50]	9.2 [58]	1,034 [150]	-20 to 100 [-4 to 212]	134,789 [4,760]	Magnetic level	2	Yes	P776600
VST-FB	2 × 7.95 [2 × 50]	9.2 [58]	1,034 [150]	0 to 100 [32 to 212]	134,789 [4,760]	Magnetic level	2	Yes	P776601
VST-FC	2 × 7.95 [2 × 50]	9.2 [58]	1,034 [150]	0 to 100 [32 to 212]	134,789 [4,760]	Sight glass and magnetic level	2	Yes	100200983
VST-FW (Winterized)	2 × 7.95 [2 × 50]	9.2 [58]	1,034 [150]	-20 to 100 [-4 to 212]	134,789 [4,760]	Magnetic level	2	Yes	100083158

Vertical Surge Tank Specifications and Codes

Model	Connections					Dimensions, (L × W × H), m [ft]	Weight, kg [lbm]	Applied Codes
	Oil Inlet	Gas Outlet	Oil Outlet	Water Outlet	PSV Outlet			
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	2.45 × 2.4 × 6.1 [18.04 × 7.87 × 20.0]	6,100 [13,420]	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	2.45 × 2.4 × 6.1 [18.04 × 7.87 × 20.0]	6,100 [13,420]	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	2.6 × 2.4 × 7.4 [8.53 × 7.87 × 24.27]	11,400 [24,765]	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	2.45 × 2.4 × 6.1 [18.04 × 7.87 × 20.0]	6,100 [13,420]	ASME VIII Div. 1, ASME/ANSI B31.3, H ₂ S (NACE MR0175), DNV [†] 2.7-1
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	2.6 × 2.4 × 7.4 [8.53 × 7.87 × 24.27]	12,000 [27,000]	ASME VIII Div. 1, ASME/ANSI B31.3, H ₂ S (NACE MR0175), DNV 2.7-1
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	2.6 × 2.4 × 7.4 [8.53 × 7.87 × 24.27]	12,000 [27,000]	ASME VIII Div. 1, ASME/ANSI B31.3, H ₂ S (NACE MR0175), DNV 2.7-1
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	2.6 × 2.4 × 7.4 [8.53 × 7.87 × 24.27]	13,500 [29,762]	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	2.6 × 2.4 × 7.4 [8.53 × 7.87 × 24.27]	13,500 [29,762]	ASME VIII Div. 1, ASME/ANSI B31.3, H ₂ S (NACE MR0175), DNV 2.7-1

[†] Det Norske Veritas