RH-1 Gas-Lift Valve

Provides enhanced flow performance to maximize the production rate and reduce nonproductive time

Applications

- Wells that require wireline-retrievable equipment
- Wells with high injection pressures that require gas-lift valves to have dome charges of up to 2,200 psi (152 bar) and differential-submergence pressures up to 6,000 psi (413 bar)
- Wells that require high injection rates to maximize production rates
- High-profile wells with high intervention costs

Features and Benefits

- Empirical test data can be used to predict gas-passage characteristics, which provide gas-lift design accuracy and ensure maximum well productivity.
- Positive bellows protection—which reduces operational failures, nonproductive time (NPT), and operating costs—is activated by two means: when a mechanical stop prevents bellows over-travel, and when a non-compressible silicon fluid supports the bellows as high differential submergence pressures are applied to the valve.
- A viscous dampening fluid prevents bellows fatigue by decreasing stem pounding and chatter.
- Lapped and matched tungsten-carbide seats provide a robust and resilient seal, which reduces chances of damaging the seal during the unloading phase and ensures efficient well operation.
- High-volume integral reverse-flow check valves, which have been tested to API 19G2 V-1 standards, provide a barrier for tubing-to-casing communication and ensure well containment.
- An aerodynamic check valve ensures maximum gas passage and erosion resistance, which increases the overall production rate.
- The check valve includes a combination modified PTFE non-elastomeric seal to maintain sealing integrity in low- and high-pressure situations.
- Optimized stem travel and tightly controlled manufacturing tolerances maximize gas passage and provide a longer lifecycle, which prevents failures and nonproductive time.
- Manufacturing specifications include submergence pressure testing and a specific bellows type, which maximizes the tool lifecycle, prevents failures, and reduces nonproductive time.
- When specified, packing seals can meet API 19G2 requirements, which ensures a proper seal that isolates tubing and casing and prevents well-containment issues.
- The valve is compatible with gas-lift mandrels from all manufacturers that meet API 19G1 standards, which provides operational flexibility.

Cutaway of the RH-1 valve.

Weatherford®

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- The valve can be manufactured from a wide range of materials and can be customized for use in corrosive well conditions.
- The larger dome reduces the load rate and improves flow characteristics, which enables optimal production.

Tool Description

The Weatherford RH-1 gas-lift valve is a premium 1-in. nominal outside diameter (OD), wireline-retrievable, injection-pressure-operated (IPO) gas-lift valve specifically designed for deepwater or other high-profile well applications. The high dome-charge capacity of 2,200 psi (152 bar) and differential-pressure rating of 6,000 psi (413 bar) enables the valve to perform in high-pressure injection systems and achieve deeper points of injection.

The valve features a bellows protection system that prevents bellows deformation when exposed to high differential pressures. The check valve can be equipped with a combination modified polytetrafluoroethylene (PTFE) non-elastomeric seal, which has been designed by applying computation of flow-dynamics analysis and physical testing to maximize gas-passage capability and erosion resistance.

The RH-1 gas-lift valves can meet American Petroleum Institute (API) 19G2 V-1 certification.

Specifications

Valve Series Model	Valve Model Number	Latch Type	Valve OD		Effective Bellows Area (Ab)		Port Size		Area of Port (Ap)		Ap/Ab# Ratio	1–Ap/Ab)	PPEF* Ap/Ab 1–Ap/Ab)
			(in.)	*(mm)*	($in.^2$)	*(mm^2)*	(in.)	*(mm)*	($in.^2$)	*(mm^2)*			
RH-1	0136-XXX	BK-2	1.0	*25.4*	0.31	*200.0*	1/8	*3.18*	0.013	*8.4*	0.054	0.946	0.057
							5/32	*3.97*	0.021	*13.55*	0.069	0.931	0.074
							3/16	*4.76*	0.029	*18.71*	0.099	0.901	0.110
							1/4	*6.35*	0.052	*33.55*	0.162	0.838	0.193
							5/16	*7.94*	0.080	*51.61*	0.252	0.748	0.337

#Ap/Ab values are obtained from open/close test data and are not calculated using the actual geometric values.

*PPEF = Production Pressure Effect