

APL SUPER HPHT PACKER

Annulus-pressure-set, straight-pull-release retrievable packer for HPHT testing



APL Super HPHT Packer.

DESCRIPTION

The APL packer is a retrievable test packer that is set by annulus hydraulic pressure and released by a straight pull. It combines the run-and-retrieve convenience of a conventional retrievable packer with the sealing performance of a hydraulic permanent packer. A built-in sliding seal assembly compensates for string contraction and expansion and reduces the number of tools in the string. Especially suited to HPHT, deep and highly deviated wells. Available in 10K and 15K versions.

OPERATION

With the string on depth, annulus pressure breaks the rupture disc and hydrostatic pressure drives the setting mechanism down: the bypass closes, the two-way slips expand and the elements pack off, and the packer locks set. The insert mandrel then unlocks from the packer body and strokes freely in the telescopic housing. To release, pick up the string: the limit pin shears, the bypass opens, the elements relax and the slips retract.

FEATURES

- Set, unset and retrieved in a single trip
- Rupture-disc setting by annulus pressure: no string manipulation, no ball drop
- Few seal points once set give permanent-packer sealing reliability in HPHT tests
- Built-in insert seal works as a slip joint / expansion joint, removing slip joints, jars, safety joints and drill collars from the string
- Bypass across the elements while running and pulling reduces swabbing
- High-strength cylindrical slips hold pressure from above and below and high tensile load
- Subsea tree and guns positioned before setting; setting does not move the guns. Compatible with large-hole guns
- Optional AP circulating valve below the packer for more effective well kill, especially in gas wells

SPECIFICATIONS

Casing size, in [mm]	7 [177.8]; 32–38 lb/ft	Setting	Annulus pressure, rupture disc
Working pressure, psi [MPa]	10,000 [70] 15,000 [105]	Release	Straight pull (shear)
Temperature rating, °F [°C]	400 [204] 430 [220]	Stroke compensation	Built-in insert seal
Bore ID, in [mm]	2.25 [57.2]	Qualification	API 11D1, V3-H
Service	H ₂ S service, NACE MR0175	Connection	3% in CAS, box × pin

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Technical data – 7-in, 15,000 psi, 430 °F, full H₂S version

TECHNICAL SPECIFICATIONS

Parameter	Room temperature	At temperature
Casing size, in [mm]	7 [177.8]: 32 lb/ft 35 lb/ft 38 lb/ft	
Casing ID, in [mm]	5.907 [150.04] 5.817 [147.75] 5.733 [145.62]	
Bore ID, in [mm]	2.25 [57.2]	
Working pressure, psi [MPa]	15,000 [105]	
Annulus pressure before setting (compr. yield), psi [MPa]	18,520 [127.7]	17,230 [118.8] at 450 °F [232 °C]
Annulus pressure after setting, psi [MPa]	Without AP circulating valve: annulus-to-tubing differential ≤ 15,000 [105]; up to 24,950 [172] with load-booster device With AP circulating valve below packer: 23,000 [159]	
Tubing pressure after setting, psi [MPa]	Without AP circulating valve: annulus-to-tubing differential ≤ 15,000 [105] With AP circulating valve below packer: 23,000 [159]	
Min. setting pressure (hydrostatic + applied), psi [MPa]	7,500 [52]	
Max. setting pressure (hydrostatic + applied), psi [MPa]	15,000 [103.5]	13,788 [95] at 450 °F [232 °C]
Tensile yield after shear release, lbf [kN]	224,970 [1,000.7]	191,220 [850.6] at 450 °F [232 °C]
Tensile break after shear release, lbf [kN]	245,540 [1,092.2]	208,710 [928.4] at 450 °F [232 °C]
Insert mandrel assembly tensile yield, lbf [kN]	162,920 [724.7]	151,510 [674.0] at 450 °F [232 °C]
Shear-release force, lbf [kN]	101,950 ± 4,050 [453.5 ± 18]	95,090 ± 4,720 [423 ± 21] at 350 °F [177 °C]
Contingency insert-mandrel release, lbf [kN]	101,160 [450] overpull	
Rated temperature range, °F [°C]	195 to 430 [90 to 220]; maximum 430 [220]	
Service	Full H ₂ S at all temperatures, meets NACE MR0175	
Connection	3% in CAS, box × pin	
Qualification	API 11D1, V3-H	
AP circulating valve below packer	Optional	

PACKER LENGTH AND STROKE

Configuration	Telescopic housing, ft	Upper spacer A, ft [mm]	Lower spacer B, ft [mm]	Extension stroke, ft [mm]	Contraction stroke, ft [mm]
20-0-10	20	0 [0]	10 [3,048]	4.00 [1,219.5]	14.87 [4,531]
20-2-8		2 [609.6]	8 [2,438.4]	6.00 [1,829.1]	12.87 [3,921.4]
20-4-6		4 [1,219.2]	6 [1,828.8]	8.00 [2,438.7]	10.87 [3,311.8]
20-6-4		6 [1,828.8]	4 [1,219.2]	10.00 [3,048.3]	8.87 [2,702.2]
25-0-16	25	0 [0]	16 [4,876.8]	4.00 [1,219.5]	20.87 [6,359.8]
25-2-14		2 [609.6]	14 [4,267.2]	6.00 [1,829.1]	18.87 [5,750.2]
25-4-12		4 [1,219.2]	12 [3,657.6]	8.00 [2,438.7]	16.87 [5,140.6]
25-6-10		6 [1,828.8]	10 [3,048]	10.00 [3,048.3]	14.87 [4,531]
25-8-8	30	8 [2,438.4]	8 [2,438.4]	12.00 [3,657.9]	12.87 [3,921.4]
30-0-20		0 [0]	20 [6,096]	4.00 [1,219.5]	24.87 [7,579]
30-2-18		2 [609.6]	18 [5,486.4]	6.00 [1,829.1]	22.87 [6,969.4]
30-4-16		4 [1,219.2]	16 [4,876.8]	8.00 [2,438.7]	20.87 [6,359.8]
30-6-14	40	6 [1,828.8]	14 [4,267.2]	10.00 [3,048.3]	18.87 [5,750.2]
30-8-12		8 [2,438.4]	12 [3,657.6]	12.00 [3,657.9]	16.87 [5,140.6]
40-0-30		0 [0]	30 [9,144]	4.00 [1,219.5]	34.87 [10,627]
40-2-28		2 [609.6]	28 [8,534.4]	6.00 [1,829.1]	32.87 [10,017.4]
40-4-26	40	4 [1,219.2]	26 [7,924.8]	8.00 [2,438.7]	30.87 [9,407.8]
40-6-24		6 [1,828.8]	24 [7,315.2]	10.00 [3,048.3]	28.87 [8,798.2]
40-8-22		8 [2,438.4]	22 [6,705.6]	12.00 [3,657.9]	26.87 [8,188.6]

Configuration = telescopic housing length – upper spacer A – lower spacer B (ft). Select the configuration to suit the expected string expansion and contraction for the job.

CONTINGENCY RELEASE

If the packer does not release, an overpull of 101,160 lbf [450 kN] releases the insert mandrel, and the mandrel and string above it are pulled out. A dedicated APL retrieving tool is then run and latched into the tie-back fishing neck on top of the setting mechanism; the packer can be picked up and jarred. The retrieving tool is released from the packer by right-hand rotation of the string.