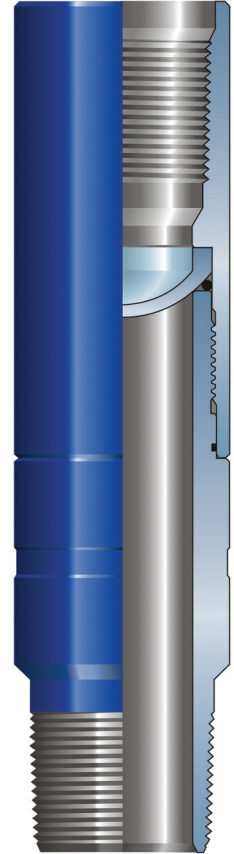


Purpose

The **Underbalancing Pressure Sub** is used in a perforating system to provide an economical method of achieving an underbalanced condition between the tubing and wellbore formation. The tool incorporates a high strength ceramic dome which prevents communication between tubing and tubing / casing annulus until a detonating bar is dropped from surface. This tool can be used in other applications where the operator requires the formation to be surged after or during a stimulation. This tool should not be used for snubbing operations.

Operation

The non-ported underbalancing pressure sub is installed in the tubing string normally above a packer to create the desired underbalanced condition. This tool prevents fluid from entering the tubing string above the packer, tubing maybe run completely dry or partly filled. When the operator is ready to detonate and fire the perforating the guns, a drop bar is released into the tubing from surface thus passing through the tool which shatters the ceramic dome, the drop bar continues on down the tubing string to fire the perforating gun(s) exposing the wellbore to this underbalanced condition.



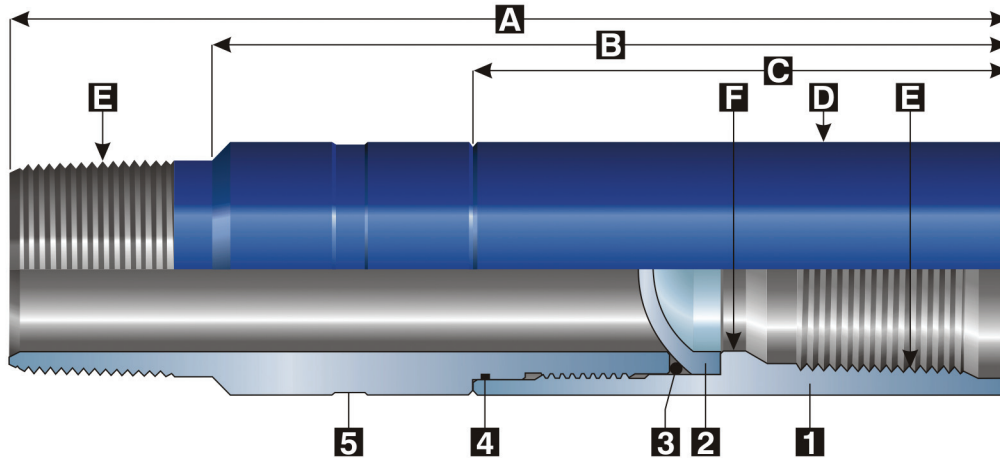
Specifications

Underbalancing Pressure Sub - Non-ported (Product N° 31-21)				
Thread Size and Type	2 3/8" EUE Pin (60.33 mm)	2 7/8" EUE Pin (73.0 mm)	3 1/2" EUE Pin (88.9 mm)	4 1/2" EUE Pin (114.3 mm)
Assembly Number	31-2106041-00	31-2107341-00	31-2108941-00	31-2111441-00
Pressure Rating	10,000 psi (69 mPa)	10,000 psi (69 mPa)	10,000 psi (69 mPa)	4,000 psi (27 mPa)
Tensile Strength	Manufactured from P-110 / L-80 for H2S applications / API Material			
Maximum Temperature	400°F (204°C) with 90 Durometer Viton O-rings			
Minimum ID	1.99" (50.54 mm)	2.44" (61.97 mm)	2.995" (76 mm)	4.00" (101.6 mm)
Maximum OD	3.04" (77.23 mm)	3.66" (92.96 mm)	4.50" (114.3 mm)	5.75" (146 mm)
Length	12.4" (314 mm)	12.9" (327 mm)	13" (330 mm)	54" (1371 mm)
Shipping Weight	14 lbs (6.35 kg)	21.2 lbs (9.63 kg)	32.3 lbs (14.68 kg)	65 lbs (29.5 kg)
Redress Kit Number	31-2206040-99	31-2207340-99	31-2208940-99	31-2211440-99

*NOTE: Standard EUE connections, premium thread connections available on request.

31-21 Underbalancing Pressure Sub - Non-ported, Dimentional Data

Dim	31-2106041-00		31-2107341-00		31-2108941-00		31-2111441-00	
	In	mm	In	mm	In	mm	In	mm
A	8.0	203.2	12.82	325.6	12.9	327.6	54	1371
B	9.89	251.2	10.18	258.5	10.11	256.7	49	1244.6
C	6.65	168.9	6.75	171.4	7.25	184.1	27	685.8
D	3.04	77.2	3.66	92.2	4.50	114.3	4.50	114.3
E	2 ³ / ₈ " EUE	60.33 EUE	2 ⁷ / ₈ " EUE	73.0 EUE	3 ¹ / ₂ " EUE	89.9 EUE	4 ¹ / ₂ " EUE	114.3 EUE
F	1.995	50.6	2.44	62.0	3.00	76.2	4.00	101.6



31-21 Underbalancing Pressure Sub - Non-ported, Parts List

Item	Description	31-2106041-00	31-2107341-00	31-2108941-00	31-2111441-00
		Part Number			
1	Top Sub	31-2106001-03	31-2107301-03	31-2108901-03	31-2111401-03
2	Ceramic Dome	31-2106000-01	31-2107300-01	31-2108900-01	31-2111400-01
3	O-Ring 90 Durometer Viton	81-0330000-04	81-0334000-04	81-0338000-04	81-0347000-04
4	O-Ring 90 Durometer Viton	81-0229000-04	81-0234000-04	81-0239000-04	81-0349000-04
5	Bottom Sub Non-Ported	31-2106001-02	31-2107301-02	31-2108901-02	31-2111401-02