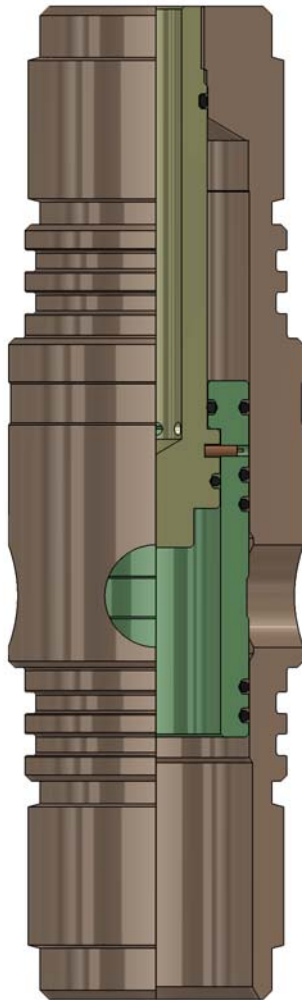


Description

The Underbalance Perforating System is used when an underbalance wellbore environment is desired after gun detonation and it is not possible to purge fluids from the wellbore.

The explosive pressure created by the gun detonation shears two pins and releases a piston which opens a ported sub. This allows borehole fluids to rush into empty carriers connected below the fired gun creating an underbalance situation in the wellbore which helps to clean out the perforation channels. The number of empty carriers required is determined by the well and operator requirements.



Features and Benefits

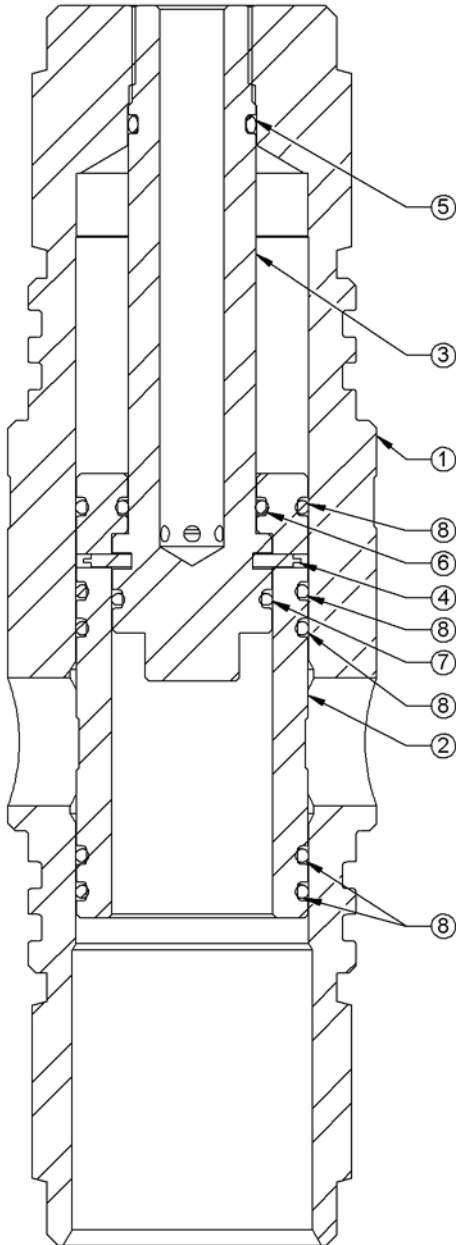
- Comes in 2-3/4", 2-7/8", 3-1/8", 3-3/8", 4" and 4-1/2" sizes.
- Upward moving piston to prevent accidental opening.
- The piston locks into place making this a one-time use only tool.
- Multiple empty carriers can be attached to create a larger cavity using specially designed thru subs.
- Large bore thru subs decrease restriction between the empty carriers.

Specifications

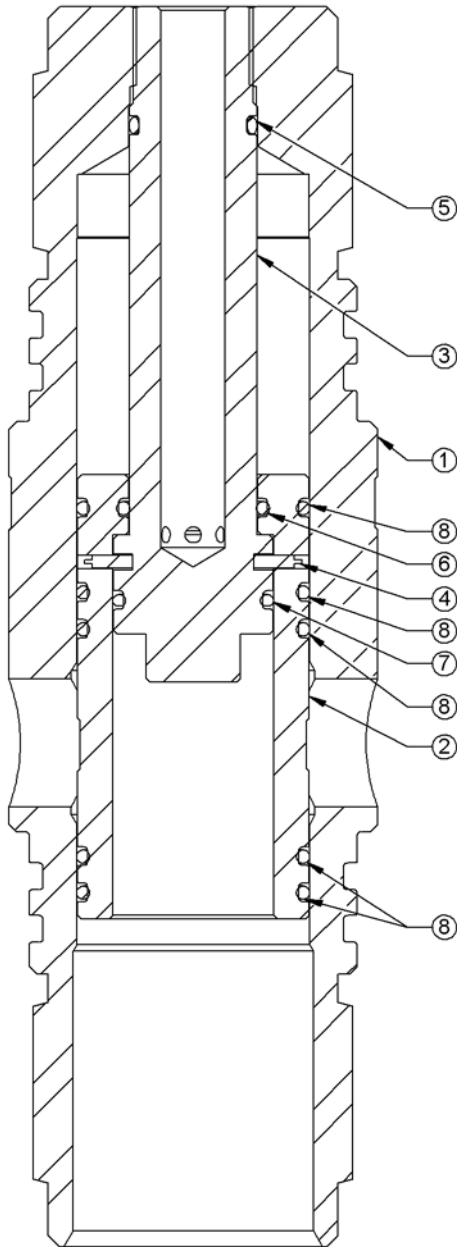
O.D.	2-3/4" (70 mm)	2-7/8" (73 mm)	3-1/8" (79 mm)
Make-Up Length	3.20" (81.3 mm)	3.20" (81.3 mm)	3.58" (90.9 mm)
Max. Temperature ¹	250°F (121°C)		
Max. Hydrostatic	22,500 psi (155.1 MPa)	18,890 psi (130.2 MPa)	19,385 psi (133.7 MPa)
Tensile Strength	119,900 lbf. (53,330 daN)	113,100 lbf. (50,309 daN)	159,279 lbf. (70,851 daN)
Flow Area After	3.14 in ² (20.3 cm ²)	3.14 in ² (20.3 cm ²)	3.14 in ² (20.3 cm ²)
Top Connection	2.355" - 6 TPI Acme	2.495" - 6 TPI Acme	2.745" - 6 TPI Acme
Bottom Connection	2.355" - 6 TPI Acme	2.495" - 6 TPI Acme	2.745" - 6 TPI Acme
Product Number	TC-083-2750-200	TC-083-2875-200	TC-083-3125-200

O.D.	3-3/8" (86 mm)	4" (101 mm)	4-1/2" (114 mm)
Make-Up Length	3.58" (90.9 mm)	3.20" (81.3 mm)	2.95" (74.9 mm)
Max. Temperature ¹	250°F (121°C)		
Max. Hydrostatic	20,465 psi (141.1 MPa)	18,315 psi (126.3 MPa)	18,960 psi (130.7 MPa)
Tensile Strength	157,525 lbf. (70,071 daN)	216,225 lbf. (96,182 daN)	375,875 lbf. (167,198 daN)
Flow Area After	3.14 in ² (20.3 cm ²)	4.71 in ² (30.4 cm ²)	4.71 in ² (30.4 cm ²)
Top Connection	2.808" - 6 TPI Acme	3.435" - 6 TPI Acme	3.933" - 6 TPI Acme
Bottom Connection	2.808" - 6 TPI Acme	3.435" - 6 TPI Acme	3.933" - 6 TPI Acme
Product Number	TC-083-3375-200	TC-083-4000-200	TC-083-4500-200

¹The maximum temperature can be increased to 450° (230°C) by substituting the 90 durometer Nitrile O-rings with 90 durometer Viton O-rings. Refer to the Time vs Temperature chart for Explosives to confirm any explosives requirements



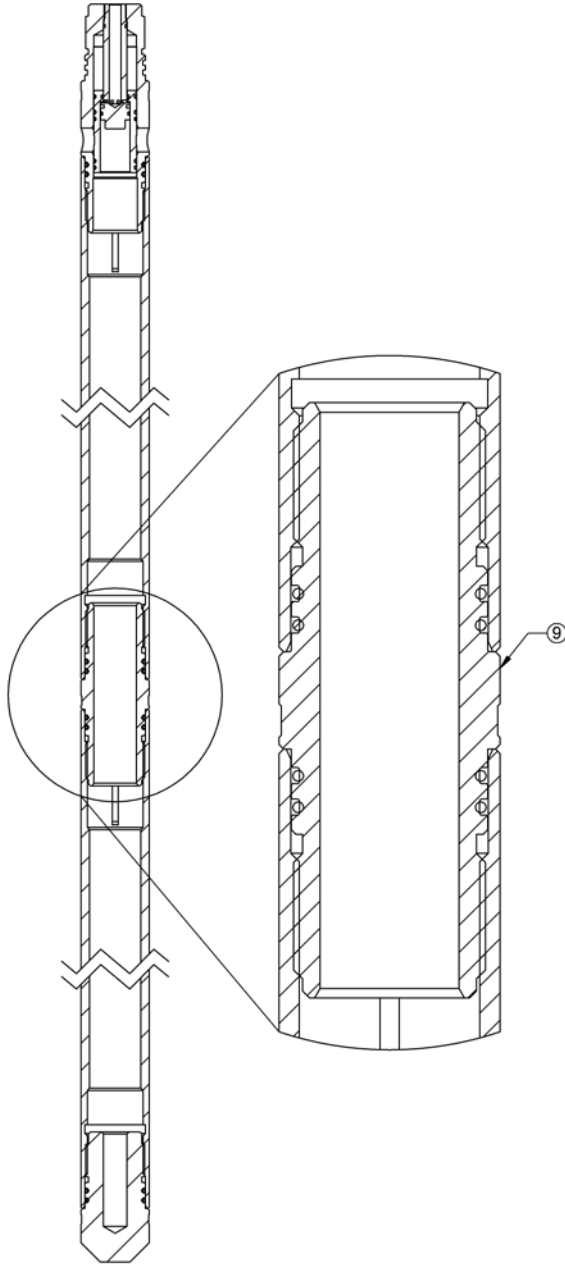
Item	Part Number	Qty	Description
--	TC-083-2750-200	--	2.750" Underbalance Perforating System
1	TC-083-0214-000	1	2-3/4" Underbalance Sub
2	TC-083-0215-000	1	2-3/4" Venting Piston
3	TC-083-0216-000	1	2-3/4" Mandrel
4	SF-010-0100-038	2	Shear Pin, 0.100" OD X 0.380" LG
5	OOO-N569-115	1	O-Ring 90 Durometer Nitrile (Mandrel)
6	OOO-N569-118	1	O-Ring 90 Durometer Nitrile (Piston)
7	OOO-N569-119	1	O-Ring 90 Durometer Nitrile (Mandrel)
8	OOO-N569-128	5	O-Ring 90 Durometer Nitrile (Piston)
Item	Part Number	Qty	Description
--	TC-083-2875-200	--	2.875" Underbalance Perforating System
1	TC-083-0201-000	1	2-7/8" Underbalance Sub
2	TC-083-0202-000	1	2-7/8" Venting Piston
3	TC-083-0203-000	1	2-7/8" Mandrel
4	SF-010-0100-038	2	Shear Pin, 0.100" OD X 0.380" LG
5	OOO-N569-117	1	O-Ring 90 Durometer Nitrile (Mandrel)
6	OOO-N569-120	1	O-Ring 90 Durometer Nitrile (Piston)
7	OOO-N569-121	1	O-Ring 90 Durometer Nitrile (Mandrel)
8	OOO-N569-130	5	O-Ring 90 Durometer Nitrile (Piston)
Item	Part Number	Qty	Description
--	TC-083-3125-200	--	3.125" Underbalance Perforating System
1	TC-083-0204-000	1	3-1/8" Underbalance Sub
2	TC-083-0205-000	1	3-1/8" Venting Piston
3	TC-083-0206-000	1	3-1/8" Mandrel
4	SF-010-0100-038	2	Shear Pin, 0.100" OD X 0.380" LG
5	OOO-N569-120	1	O-Ring 90 Durometer Nitrile (Mandrel)
6	OOO-N569-123	1	O-Ring 90 Durometer Nitrile (Piston)
7	OOO-N569-124	1	O-Ring 90 Durometer Nitrile (Mandrel)
8	OOO-N569-133	5	O-Ring 90 Durometer Nitrile (Piston)



Item	Part Number	Qty	Description
--	TC-083-3375-200	--	3.375" Underbalance Perforating System
1	TC-083-0207-000	1	3-3/8" Underbalance Sub
2	TC-083-0205-000	1	3-1/8" Venting Piston
3	TC-083-0206-000	1	3-1/8" Mandrel
4	SF-010-0100-038	2	Shear Pin, 0.100" OD X 0.380" LG
5	OOO-N569-120	1	O-Ring 90 Durometer Nitrile (Mandrel)
6	OOO-N569-123	1	O-Ring 90 Durometer Nitrile (Piston)
7	OOO-N569-124	1	O-Ring 90 Durometer Nitrile (Mandrel)
8	OOO-N569-133	5	O-Ring 90 Durometer Nitrile (Piston)

Item	Part Number	Qty	Description
--	TC-083-4000-200	--	4.000" Underbalance Perforating System
1	TC-083-0208-000	1	4" Underbalance Sub
2	TC-083-0209-000	1	4" Venting Piston
3	TC-083-0210-000	1	4" Mandrel
4	SF-010-0130-045	2	Shear Pin, 0.130" OD X 0.450" LG
5	OOO-N569-128	1	O-Ring 90 Durometer Nitrile (Mandrel)
6	OOO-N569-131	1	O-Ring 90 Durometer Nitrile (Piston)
7	OOO-N569-133	1	O-Ring 90 Durometer Nitrile (Mandrel)
8	OOO-N569-144	5	O-Ring 90 Durometer Nitrile (Piston)

Item	Part Number	Qty	Description
--	TC-083-4500-200	--	4.500" Underbalance Perforating System
1	TC-083-0211-000	1	4-1/2" Underbalance Sub
2	TC-083-0212-000	1	4-1/2" Venting Piston
3	TC-083-0213-000	1	4-1/2" Mandrel
4	SF-010-0130-045	2	Shear Pin, 0.130" OD X 0.450" LG
5	OOO-N569-133	1	O-Ring 90 Durometer Nitrile (Mandrel)
6	OOO-N569-136	1	O-Ring 90 Durometer Nitrile (Piston)
7	OOO-N569-137	1	O-Ring 90 Durometer Nitrile (Mandrel)
8	OOO-N569-148	5	O-Ring 90 Durometer Nitrile (Piston)



Item	Part Number	Qty	Description
--	--	--	Underbalance Perforating System Thru Subs
9	TC-083-0034-000	Opt. *	2-3/4" Underbalance Thru Sub
	TC-083-0022-000		2-7/8" Underbalance Thru Sub
	TC-083-0025-000		3-1/8" Underbalance Thru Sub
	TC-083-0027-000		3-3/8" Underbalance Thru Sub
	TC-083-0029-000		4" Underbalance Thru Sub
	TC-083-0032-000		4-1/2" Underbalance Thru Sub

NOTE: Each Sub must be purchased separately

*Number of thru subs required depends on number of empty carriers run to achieve required underbalance. Total needed is one less than the number of empty carriers