

# Surge Tool, Underbalance Sub

**TC-090-2375-000**

**TC-090-2375-200**

**TC-090-2875-000**

**TC-090-2875-200**

**MAN-TC-090 (R02)**

## OWEN OIL TOOLS

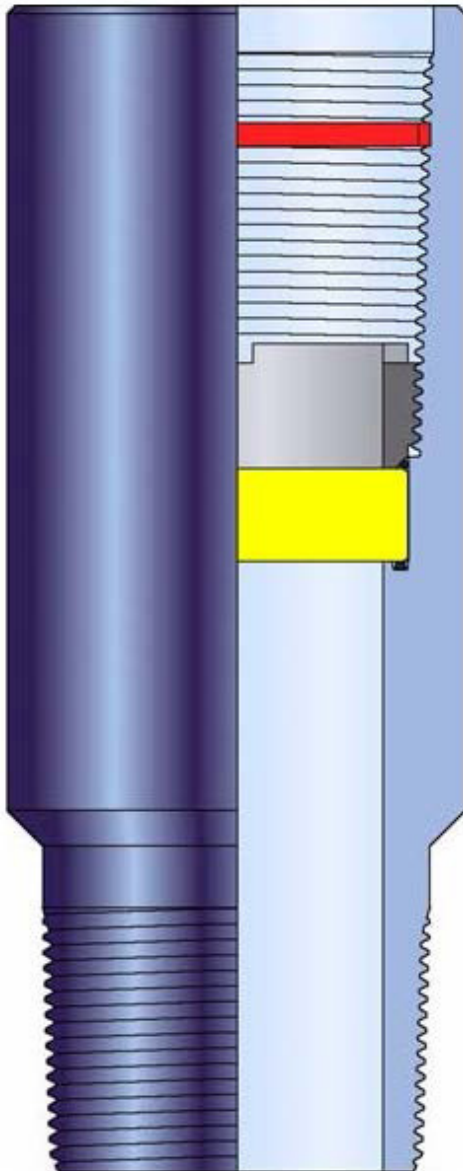
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## Underbalance Sub



### DESCRIPTION

The Underbalance Sub may be run in a TCP string to achieve a differential pressure between the formation and tubing string to establish an underbalance condition for perforating. This tool uses a thick glass disk sealed inside the housing as a pressure barrier.

Once a Drop Bar has been released from surface to strike a Mechanical (Percussion) Firing Head, it also impacts the Surge Tool, breaking the glass disk, this impact causes the glass disk to shatter, thereby destroying the pressure barrier and allowing fluids to rush into the tubing from the formation after detonation of the guns. Since the reservoir is under pressure and the tubing is essentially dry, this underbalanced condition removes debris that has settled in the perforation tunnels.

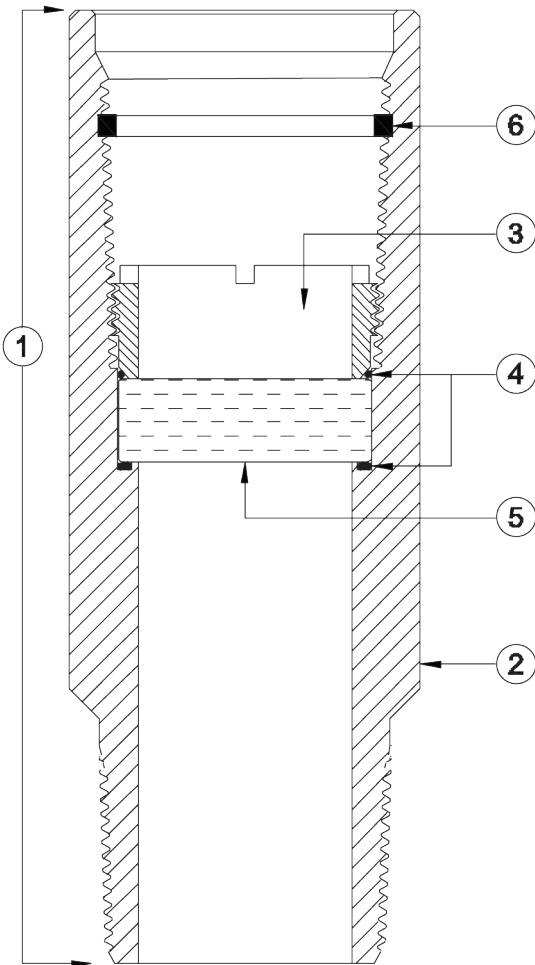
### FEATURES AND BENEFITS

- Inexpensive way of achieving underbalance
- Two pressure ratings available
- Simple hookup for both permanent and shoot and pull applications
- Can be run above or below the packer depending on underbalance desired

### SPECIFICATIONS

Thread Connection	2-3/8 in EUE		2-7/8 in EUE	
	O.D.	3.13 in	79 mm	3.68 in
I.D.	1.90 in	48 mm	2.35 in	60 mm
Make-up Length	6.63 in	168 mm	7.25 in	184 mm
1/2" Glass	TC-090-2375-000		TC-090-2875-000	
Max Differential	3,500 psi	24 MPa	2,500 psi	17.2 MPa
3/4" Glass	TC-090-2375-200		TC-090-2875-200	
Max Differential	7,000 psi	48 MPa	4,000 psi	27.6 MPa

## BOM and Schematic with 3/4 inch Glass Disc



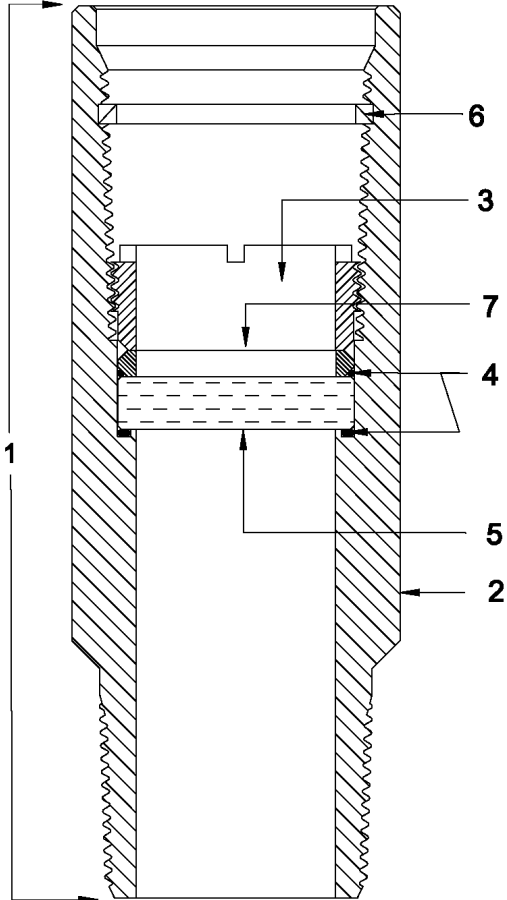
Underbalance w/ 3/4" glass

ITEM	PART NUMBER	DESCRIPTION
1	TC-090-2375-200	2-3/8 Underbalance Assy. with 3/4" Glass
	TC-090-2875-200	2-7/8 Underbalance Assy. with 3/4" Glass
2	TC-090-0000-000	2-3/8 Body
	TC-090-0003-000	2-7/8 Body
3	TC-090-0001-000	2-3/8 Glass Retainer
	TC-090-0004-000	2-7/8 Glass Retainer
4	OOO-N569-137	O-Ring, N-90 (Qty. 2), 2-3/8 Assembly
	OOO-N569-145	O-Ring, N-90 (Qty. 2), 2-7/8 Assembly
5	MI-200-2250-075	2-3/8 Glass Disc, 2-1/4 Dia. x 3/4
	MI-200-2750-075	2-7/8 Glass Disc, 2-3/4 Dia. x 3/4
6	MI-305-2375-000	2-3/8 API Seal
	MI-305-2875-000	2-7/8 API Seal
--	TC-090-0006-000	2-3/8 Retainer Wrench (sold separately)
--	TC-090-0007-000	2-7/8 Retainer Wrench (sold separately)
--	TC-090-2375-299	Redress Kit 2-3/8 w/3/4" Glass
--	TC-090-2875-299	Redress Kit 2-7/8 w/3/4" Glass
--	MAN-TC-090	Operating Manual, Assemblies

ITEM	PART NUMBER	DESCRIPTION
--	TC-090-2375-299	Redress Kit 2-3/8 w/3/4" Glass
4	OOO-N569-137	O-Ring, N-90 (Qty. 2), 2-3/8 Assembly
5	MI-200-2250-075	2-3/8 Glass Disc, 2-1/4 Dia. x 3/4
6	MI-305-2375-000	2-3/8 API Seal

ITEM	PART NUMBER	DESCRIPTION
--	TC-090-2875-299	Redress Kit 2-7/8 w/3/4" Glass
4	OOO-N569-145	O-Ring, N-90 (Qty. 2), 2-7/8 Assembly
5	MI-200-2750-075	2-7/8 Glass Disc, 2-3/4 Dia. x 3/4
6	MI-305-2875-000	2-7/8 API Seal

## BOM and Schematic with 1/2 inch Glass Disc

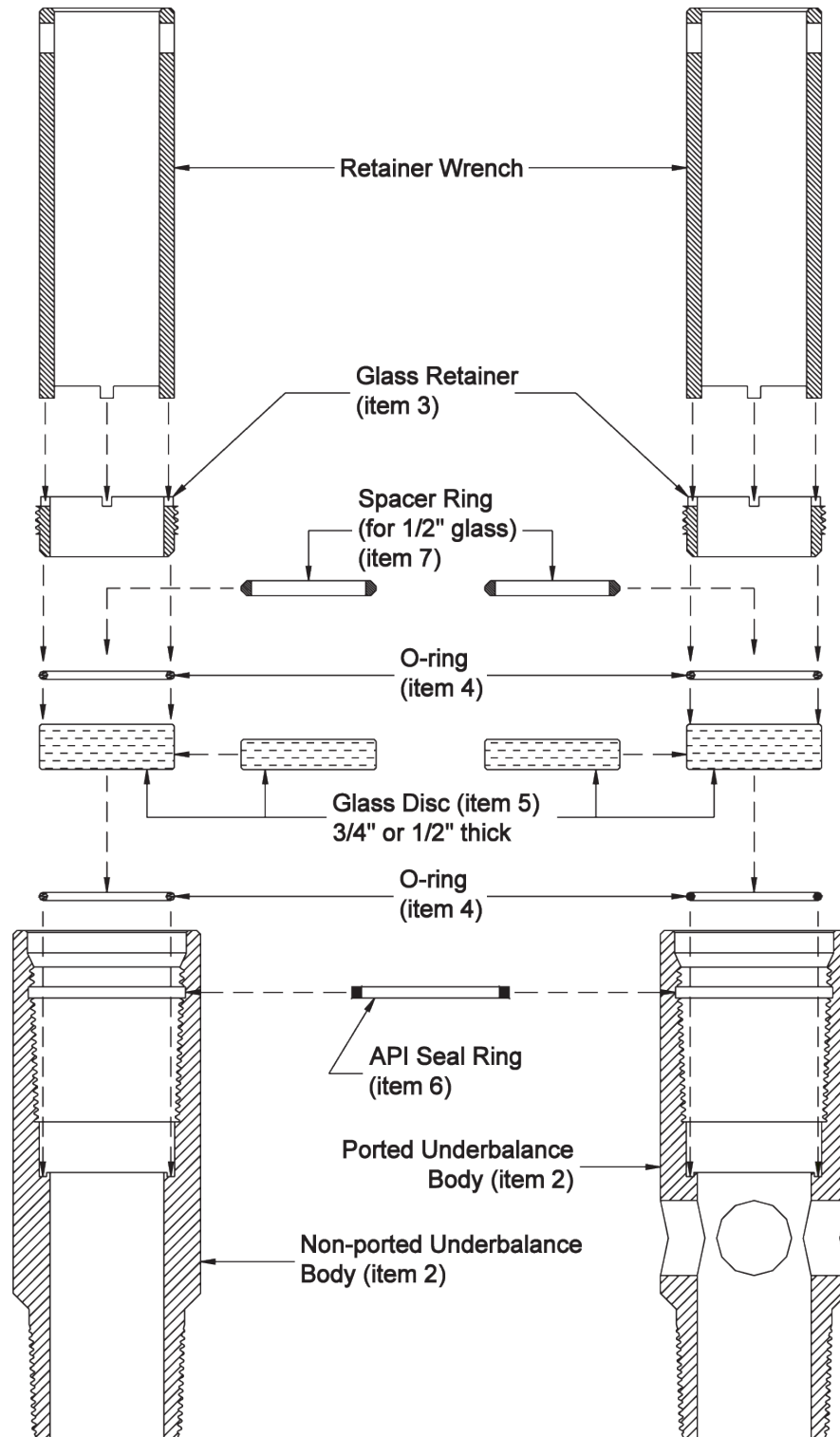


ITEM	PART NUMBER	DESCRIPTION
	TC-090-2375-000	2-3/8 Underbalance Assy. with 1/2" Glass
	TC-090-2875-000	2-7/8 Underbalance Assy. with 1/2" Glass
2	TC-090-0000-000	2-3/8 Body
	TC-090-0003-000	2-7/8 Body
3	TC-090-0001-000	2-3/8 Glass Retainer
	TC-090-0004-000	2-7/8 Glass Retainer
4	OOO-N569-137	O-Ring, N-90 (Qty. 2), 2-3/8 Assembly
	OOO-N569-145	O-Ring, N-90 (Qty. 2), 2-7/8 Assembly
5	MI-200-2250-050*	2-3/8 Glass Disc, 2-1/4 Dia. x 1/2
	MI-200-2750-050*	2-7/8 Glass Disc, 2-3/4 Dia. x 1/2
6	MI-305-2375-000	2-3/8 API Seal
	MI-305-2875-000	2-7/8 API Seal
7	TC-090-0002-000	2-3/8 Spacer Ring for 1/2 Glass
	TC-090-0005-000	2-7/8 Spacer Ring for 1/2 Glass
--	TC-090-0006-000	2-3/8 Retainer Wrench (sold separately)
	TC-090-0007-000	2-7/8 Retainer Wrench (sold separately)
	TC-090-2375-099	Redress Kit 2-3/8 w/1/2" Glass
	TC-090-2875-099	Redress Kit 2-7/8 w/1/2" Glass
--	MAN-TC-090	Operating Manual, Assemblies

ITEM	PART NUMBER	DESCRIPTION
	TC-090-2375-099	Redress Kit 2-3/8 w/1/2" Glass
4	OOO-N569-137	O-Ring, N-90 (Qty. 2), 2-3/8 Assembly
5	MI-200-2250-050*	2-3/8 Glass Disc, 2-1/4 Dia. x 1/2
6	MI-305-2375-000	2-3/8 API Seal

ITEM	PART NUMBER	DESCRIPTION
	TC-090-2375-099	Redress Kit 2-3/8 w/1/2" Glass
4	OOO-N569-137	O-Ring, N-90 (Qty. 2), 2-3/8 Assembly
5	MI-200-2250-050*	2-3/8 Glass Disc, 2-1/4 Dia. x 1/2
6	MI-305-2375-000	2-3/8 API Seal

## Exploded View





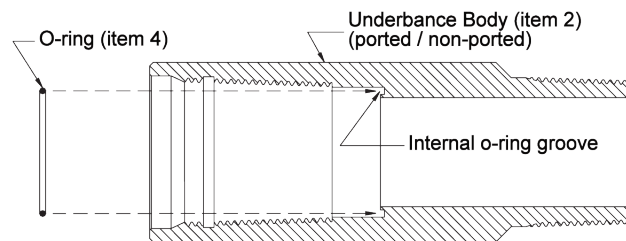
**Note:** Check all items against the parts list to be sure of having the correct parts and quantities.



**Note:** Check for any damage to the parts which would prevent the part from being assembled correctly, easily and safely.

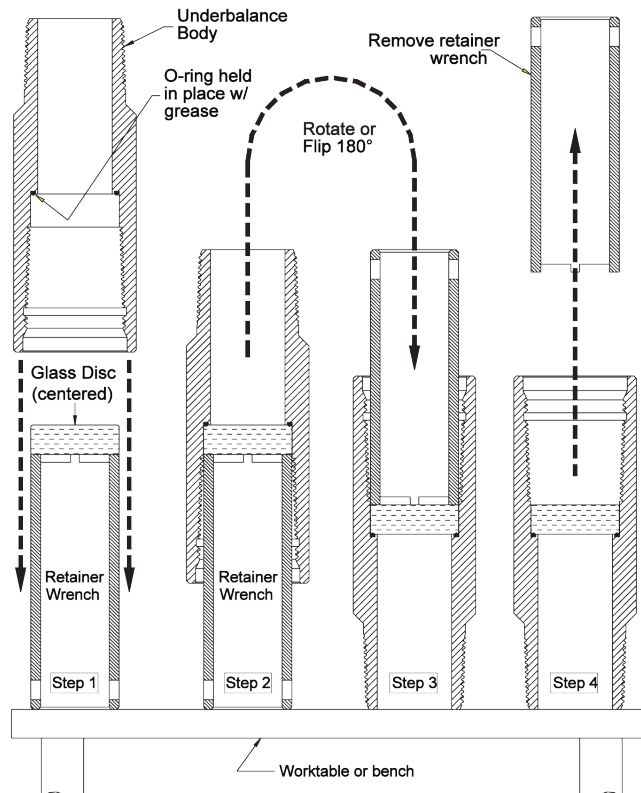
## 1.0 Assembly and Installation of 3/4 inch Glass Disc

- 1.1 Inspect the Underbalance Assembly Body (item #2) for any damage, then install one (1) of the O-rings (item #4) in the internal groove of the body. Apply a small amount of grease in the groove to help retain the O-ring during assembly.

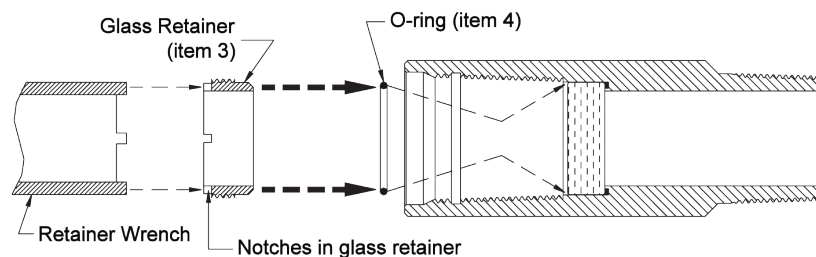


- 1.2 This step covers the installation of the Glass Disc (item #5) into the Underbalance Body. This must be done with care because of the fragile nature of the glass. Do not drop the Glass Disc down into the body, because it might chip or damage the glass.

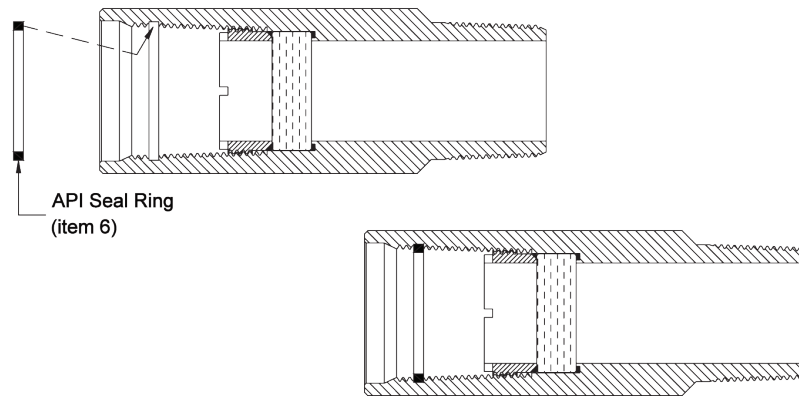
Stand the Retainer Wrench on a workbench, then center and place the Glass Disc on top of it. Next, carefully lower the Underbalance Body w/ O-ring over the Glass Disc/ Retainer Wrench. Once the glass is in contact with the O-ring, hold pressure on the wrench, keeping the glass against the O-ring and rotate 180°. Finally, remove the Retainer Wrench from the body.



- 1.3 After the Glass Disc has been properly installed against the O-ring, install the second O-ring (item #4) on top of the Glass Disc. Then, insert the Retainer Wrench into the notches of the Glass Retainer (item #3) and thread it into the body. Tighten the glass retainer by using approximately 40ft-lb of torque. This will be enough to properly compress both the O-rings. Overtightening can cause damage to the glass.

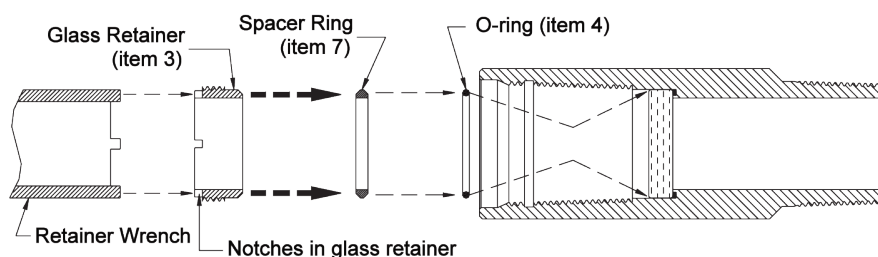


- 1.4 Install the API Seal Ring (item #6) into the groove of the box threads. With that done, the Underbalance Assembly is now complete.



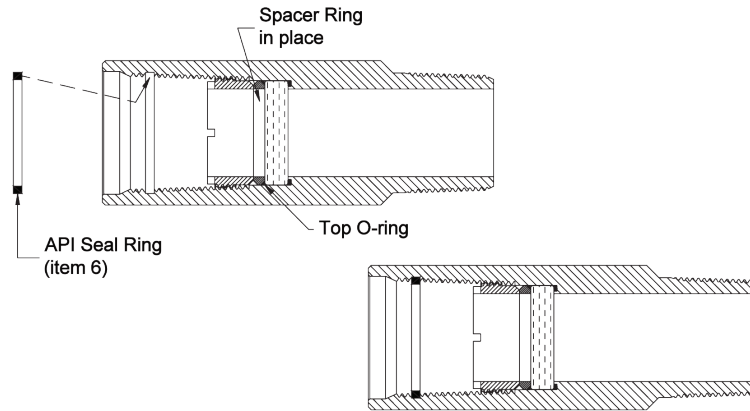
## 2.0 Assembly and Installation of 1/2 inch Glass Disc

- 2.1 Inspect the Underbalance Assembly Body (item #2) for any damage, then install one (1) of the O-rings (item #4) in the internal groove of the body. Apply a small amount of grease in the groove to help retain the O-ring during assembly.
- 2.2 To install the 1/2 in. glass into the underbalance body, use the same method as the 3/4 in. glass as demonstrated in step 1.2. After installing the second O-ring (item #4) on top of the Glass Disc, a Spacer Ring (item #7) is placed on top of the second O-ring to make up for the difference in glass thickness. Once the Spacer Ring has been seated, thread in the Glass Retainer using the Retainer Wrench. Tighten only enough to compress the O-rings against the glass. Remember overtightening can cause damage to the glass.





- 2.3 Install the API Seal Ring (item #6) into the groove of the box threads. With that done, the Underbalance Assembly w/ 1/2" glass is now complete.



**Note:** Remember these procedures are the same for both the ported and non-porting Underbalance assemblies