INSTALLATION PROCEDURE FOR 13-5/8" NOM "MBS" MULTIBOWL SYSTEM

	TITLE	NAME	SIGNATURE	DATE
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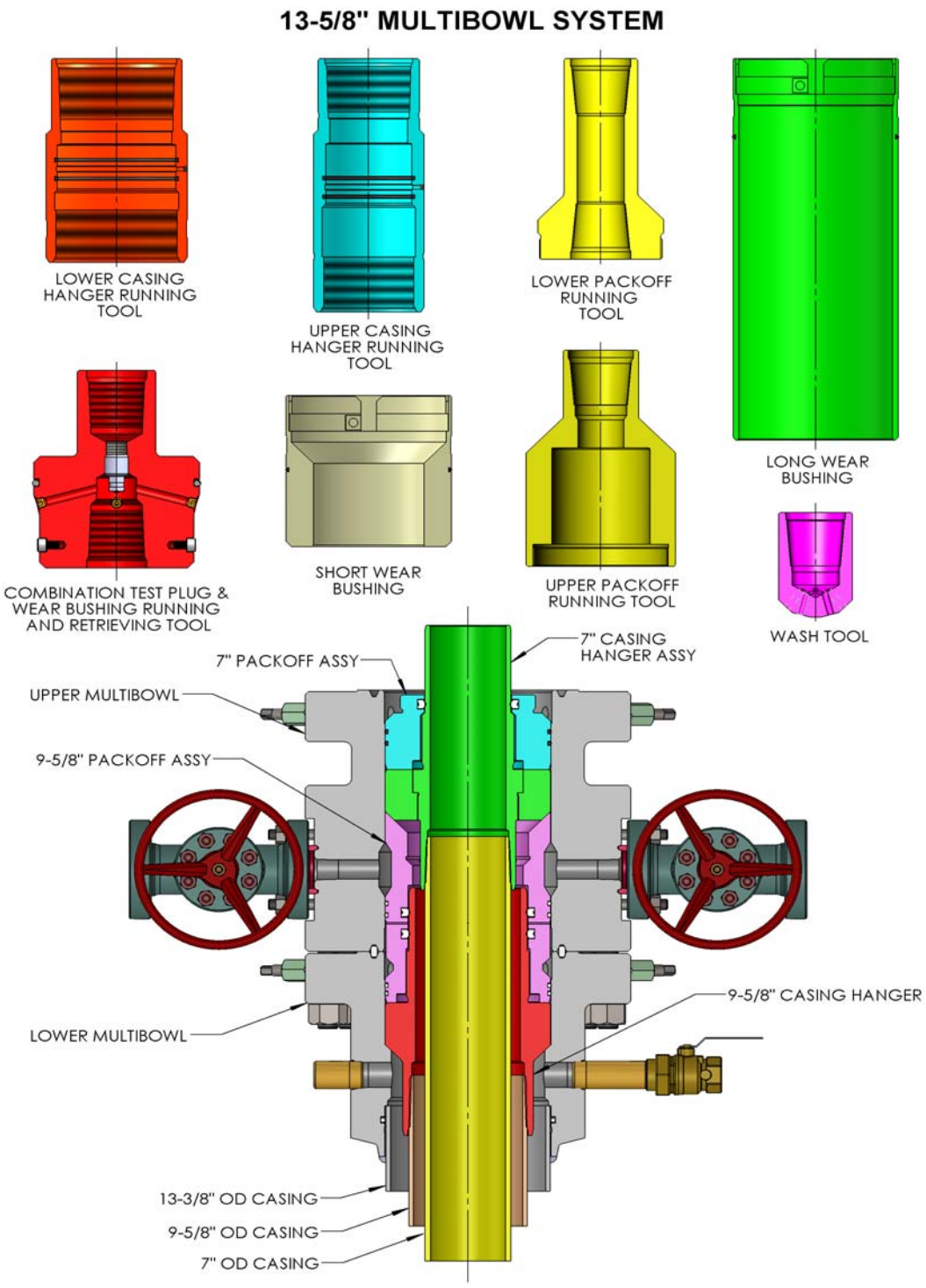
CAUTION: NEVER REPLACE OR REMOVE LOCKSCREW, PIPE PLUG, AND TEST/INJECTION FITTING UNDER PRESSURE.

1.0 STACKUP LAYOUT



2.0 INSTALLATION OF PRIMARY EQUIPMENT

2.1 INSTALLATION OF MULTIBOWL ASSEMBLY

13-5/8” 3K X 13-5/8” 3K Equipment List			
Part	**Description**	**Part Number**	**Qty**
LOWER	CASING HEAD ASSY, MBS, 13-5/8" 3K X 13-3/8" SOW WITH ORING TWO 2" LPO	01-90-03-0000	1
UPPER	CASING SPOOL ASSY, MBS, UPPER, 13-5/8" 3K RX-57 STD BTM X 13-5/8" 3K FLG TOP TWO 2-1/16" 5K SSO	03-90-90-0004	1

13-5/8” 3K X 13-5/8” 5K Equipment List			
Part	**Description**	**Part Number**	**Qty**
LOWER	CASING HEAD ASSY, MBS, 13-5/8" 3K X 13-3/8" SOW WITH ORING TWO 2" LPO	01-90-03-0000	1
UPPER	CASING SPOOL ASSY, MBS, UPPER, 13-5/8" 3K STD BTM X 13-5/8" 5K FLG TOP TWO 2-1/16" 5K SSO	03-90-90-0002	1

13-5/8” 5K X 13-5/8” 5K Equipment List			
Part	**Description**	**Part Number**	**Qty**
LOWER	CASING HEAD ASSY, MBS, 13-5/8" 5K X 13-3/8" SOW ORING TWO 2" LPO	01-91-05-0002	1
LOWER	CASING HEAD ASSY, MBS, 13-5/8" 5K X 13-3/8" SOW ORING TWO 2-1/16" 5K SSO	01-90-05-0007	1
UPPER	CASING SPOOL ASSY, MBS, UPPER, 13-5/8" 5K STD BTM X 13-5/8" 5K FLG TOP 2-1/16" 5K SSO	03-90-05-0001	1
UPPER	CASING SPOOL ASSY, MBS-BP, UPPER, 13-5/8" 5K STD BTM X 13-5/8" 5K FLG TOP TWO 2-1/16" 5K SSO	03-71-05-0002	1

13-5/8” 5K X 13-5/8” 10K Equipment List			
Part	**Description**	**Part Number**	**Qty**
LOWER	CASING HEAD ASSY, MBS, 13-5/8" 5K X 13-3/8" SOW ORING TWO 2" LPO	01-91-05-0002	1
LOWER	CASING HEAD ASSY, MBS, 13-5/8" 5K X 13-3/8" SOW ORING TWO 2-1/16" 5K SSO	01-90-05-0007	1
UPPER	CASING SPOOL ASSY, MBS, UPPER, 13-5/8" 5K STD BTM X 13-5/8" 10K FLG TOP TWO 1-13/16" 10K SSO	03-90-90-0001	1

Recommended Spares			
No.	**Description**	**Part Number**	**Qty**
1	O-RING, 13-3/8" ID X 1/2" CS 70 DURO	88-10-90-0040	1

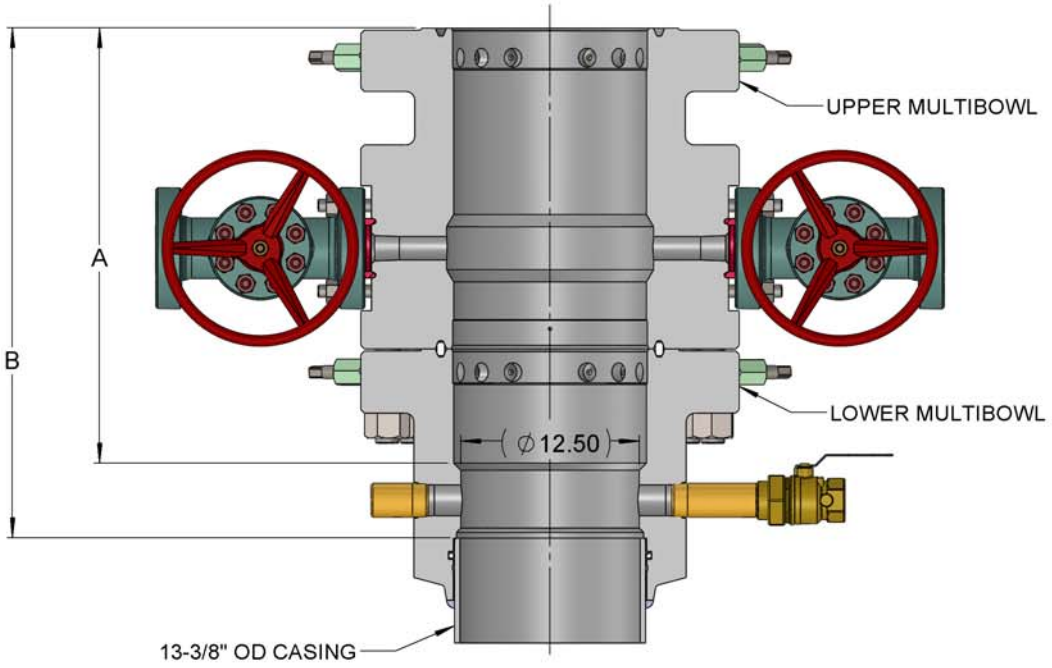
PREPARATION

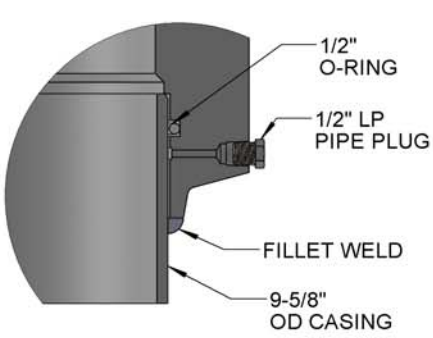
1. Check and record Multibowl Assembly part number and serial number.
2. Inspect Multibowl's upper and lower bowl. Ensure that seal areas are in good condition and free from any damage.
3. Inspect ring groove for burrs and damage. Should there be any burrs present, redress using emery cloth.
4. Ensure SOW o-ring is in good condition. Replace if necessary.

INSTALLATION

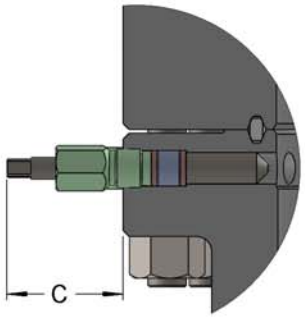
1. Determine the 13-3/8" casing cutoff height. Cut and bevel accordingly.
2. Clean any scale off the casing OD.
3. Pickup Multibowl with a certified wire rope harness and lower carefully over the casing sub. Ensure the Multibowl is level and outlet orientation will match the flow lines. Remove 1/2" NPT pipe plug from bottom of lower head. ***Note:*** *The Multibowl approximate weight is 1.6 tons*
4. Tack weld the Multibowl SOW to the casing at four points. Recheck level. ***Note:*** *Do Not use HOT HEADS, or similar methods of preheating, as it may damage seals and packing.*
5. Preheat the casing and Multibowl to specifications, 3 inches on either side of the weld areas. Use heat sensitive crayons to monitor temperature limits.
6. Complete the external weld. Perform post weld heat treatment. ***Note:*** *Steps 4 to 6 are to be done by operator's authorized welder only. See Section 4.0 for field welding procedure.*
7. When weld is cool enough, test the weld to 80% of casing collapse rating for at least 15 minutes. Use only water and do not use oil as test fluid.
8. Bleed off pressure after successful test. Replace pipe plug.
9. Install outlet accessories as required.

13-5/8" MULTIBOWL SYSTEM





SLIP-ON WELD DETAIL



LOCKSCREW
RETRACTED POSITION

FLANGE CONNECTION SIZE & PRESSURE RATING	DIMENSION A	DIMENSION B	DIMENSION C (LOWER HEAD)	DIMENSION C (UPPER HEAD)
13-5/8" 3K X 13-5/8" 3K	30.07	36.70	4.88	4.88
13-5/8" 5K X 13-5/8" 5K	30.51	35.77	4.88	4.88
13-5/8" 3K X 13-5/8" 5K	30.51	37.14	4.88	4.88
13-5/8" 5K X 13-5/8" 10K	32.57	37.83	4.88	4.63

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2.2 RUNNING AND RETRIEVING COMBO BOP TEST PLUG & R/R TOOL

Equipment List			
No.	**Description**	**Part Number**	**Qty**
1	COMBINATION TEST PLUG ASSY, R&R TOOL, MBS, 13-5/8" X 4-1/2" X-HOLE BOX BTM X TOP 1.900" SHARP VEE THD 1/2" ORING WITH CAP SCREWS	18-40-90-0004	1
1	COMBINATION TEST PLUG ASSY, R&R TOOL, MBS, 13-5/8" X 4-1/2" IF BOX X BOX 1.900" SHARP VEE 1/2" ORING	018-00001-1358-ASSY	1

Recommended Spares			
No.	**Description**	**Part Number**	**Qty**
1	O-RING, .500" C/S X 12.50" ID NITRILE 70 DURO	88-10-90-0030	1
2	CAP SCREW, SOCKET HD 3/4" 10UNC X 1.0" LG ALLOY STEEL	19-30-0001-1300	4

PREPARATION

1. Check and record the Combination Test Plug Assy, R&R Tool part number and serial number.
2. Inspect the test plug's LP threads and Tool Joint threads for any damage. Ensure o-ring and cap screws are in good condition.

RUNNING

1. Install a new ring gasket on top of the Multibowl's top connection ring groove and nipple up Blowout Preventer (BOP) stack.

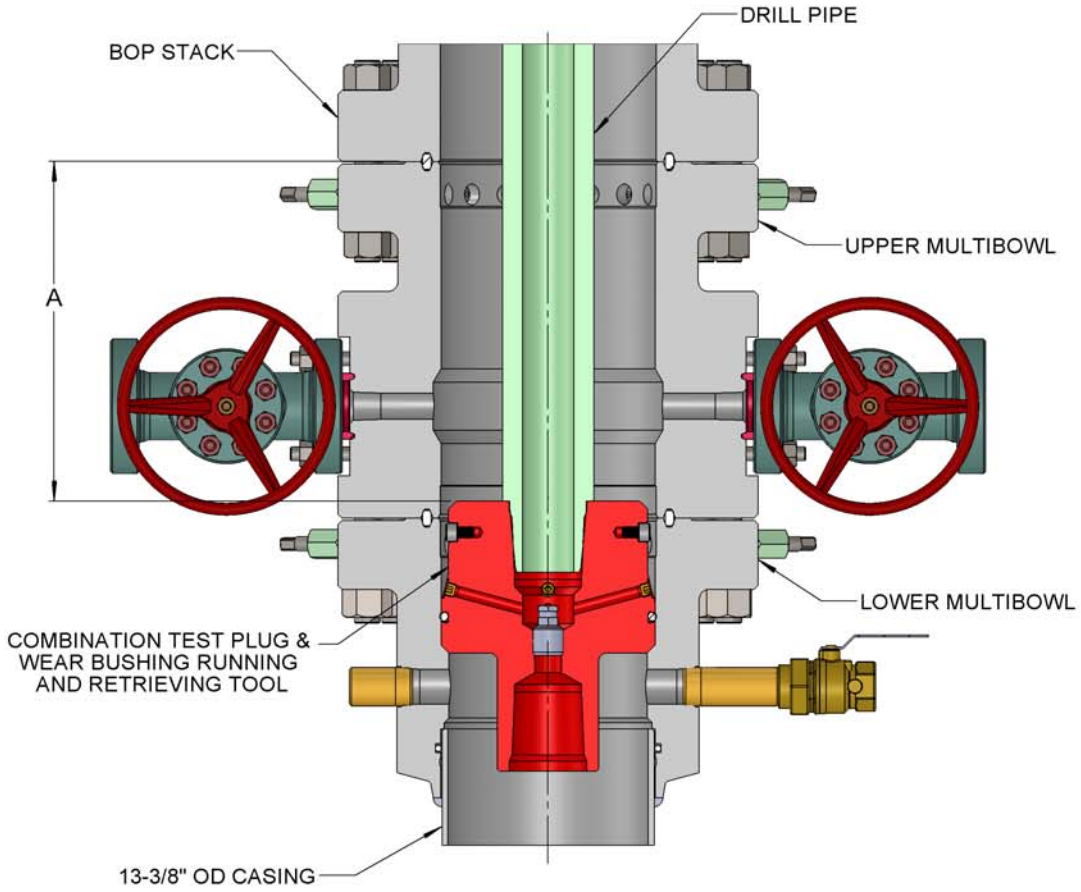
Flange Connection Size & Pressure Rating	*Ring Gasket*	*Stud & Nut Size*	*Recommended Torque (ft-lbf)*
13-5/8" 3K	*RX-57*	*1-3/8"*	*739*
13-5/8" 5K	*BX-160*	*1-5/8"*	*1,226*
13-5/8" 10K	*BX-159*	*1-7/8"*	*1,890*

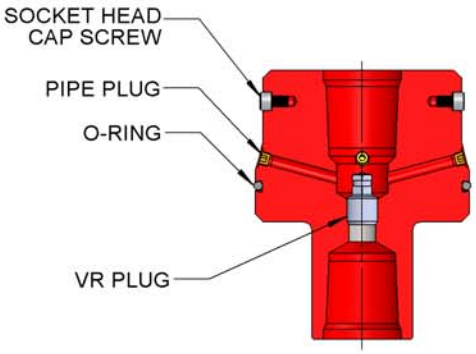
2. Make up a joint of drill pipe to the test plug. Ensure the o-ring is down and the cap screws up.
   Note: *If it is intended to test by pumping through the drill pipe, make sure that the four 1/2" LP pipe plugs are removed. However, if the test is to be done by pressurizing through the choke or kill line, the four 1/2" LP pipe plugs should be installed and the drill pipe must be properly torqued to the test plug.*
3. Verify all the lockscrews are fully retracted.
4. Open the Multibowl's lower outlet valve to check for leakage past the test plug during BOP test.
5. Lightly oil test plug's o-ring.
6. Lower the test plug through the BOP and riser stack until it lands on Multibowl's load shoulder in the lower head.
7. Test the BOP stack per operator's requirements. Never exceed connection's maximum working pressure.
   Monitor any leakage through the open lower outlet valve.

RETRIEVING

1. After a successful test, release pressure and open BOP rams.
2. Drain the fluid from BOP stack.
3. Pull and retrieve the test plug slowly to avoid damage.
4. Close the Multibowl's lower outlet valve.
5. Inspect the test plug for any damage. Replace o-ring if necessary. Clean, grease, and store.

13-5/8" MULTIBOWL SYSTEM





COMBINATION TEST PLUG
& WEAR BUSHING
RUNNING AND RETRIEVING TOOL

FLANGE CONNECTION SIZE & PRESSURE RATING	DIMENSION A
13-5/8" 3K X 13-5/8" 3K	21.01
13-5/8" 5K X 13-5/8" 5K	21.45
13-5/8" 3K X 13-5/8" 5K	21.45
13-5/8" 5K X 13-5/8" 10K	23.51

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2.3 RUNNING AND RETRIEVING OF LONG WEAR BUSHING

Equipment List			
No.	**Description**	**Part Number**	**Qty**
1	WEAR BUSHING ASSY, MBS, NOM 13-5/8" 32.85" LG X 12.50" ID	03-92-15-0003	1
2	COMBINATION TEST PLUG ASSY, R&R TOOL, MBS, 13-5/8" X 4-1/2" X-HOLE BOX BTM X TOP 1.900" SHARP VEE THD 1/2" ORING WITH CAP SCREWS	18-40-90-0004	1
2A	COMBINATION TEST PLUG ASSY, R&R TOOL, MBS, 13-5/8" X 4-1/2" IF BOX X BOX 1.900" SHARP VEE 1/2" ORING	018-00001-1358-ASSY	1

Recommended Spares			
No.	**Description**	**Part Number**	**Qty**
1	O-RING, 2-455, 12.975" ID X .275" C/S NITRILE 80 DURO	88-10-90-0042	1
2	CAP SCREW, SOCKET HD 3/4" 10UNC X 1.0" LG ALLOY STEEL	19-30-0001-1300	4

PREPARATION

1. Check and record Long Wear Bushing and Combination Test Plug Assy, R&R Tool part numbers and serial numbers.
2. Inspect Long Wear Bushing ensuring the bore is clean, stop lug is secure, and J-slots are clean.

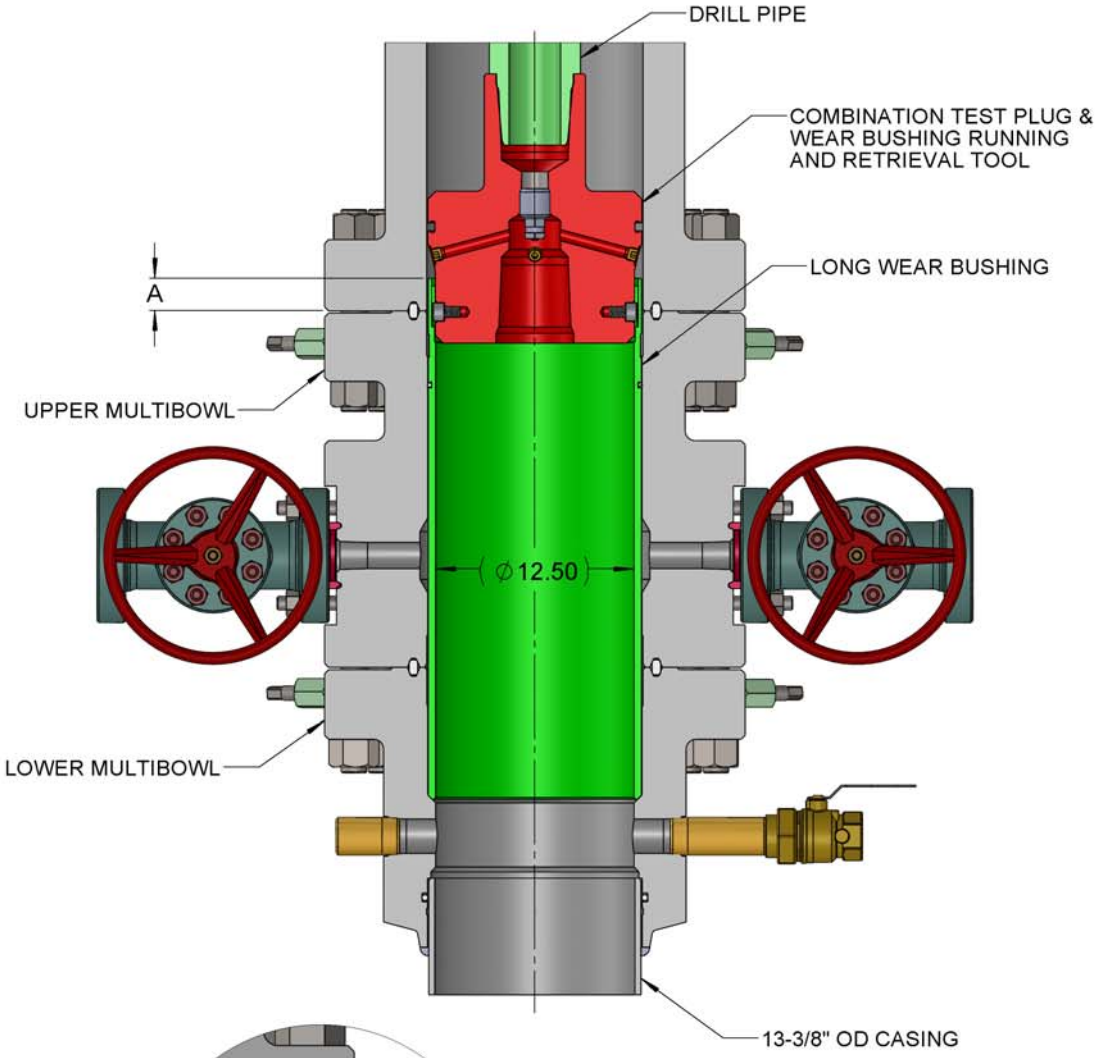
RUNNING

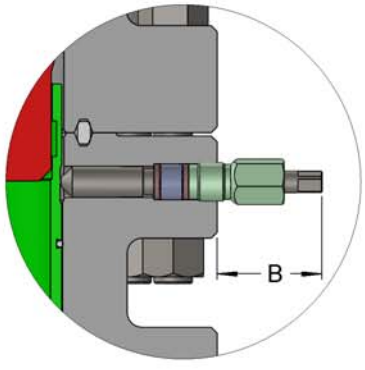
1. Make up a joint of drill pipe to the top of the Running Tool. Ensure the cap screws are down.
2. Lower the Running Tool into the Long Wear Bushing and rotate 1/4 turn clockwise to lock in position.
3. Verify all the lockscrews in the Multibowl heads are fully retracted.
4. Slowly lower the assembly through the BOP stack until it lands on the Multibowl's load shoulder.
5. Run in two lockscrews snug tight, 180 deg apart, located at the top flange of the Multibowl.
6. Remove the Running Tool from Long Wear Bushing by rotating the drill pipe counter-clockwise 1/4 turn and slowly lifting it straight up. ***Note:*** *While retrieving the tool, monitor the weight indicator to ensure the tool is properly disengaged.*
7. Inspect the Running Tool for any visible damage.
8. Proceed with drilling for next casing size.

RETRIEVING

1. Make up a joint of drill pipe to the top of the Running Tool. Ensure the cap screws are down.
2. Slowly lower the Running Tool through the BOP stack until it lands on the Long Wear Bushing.
3. Rotate the tool until it drops approximately 3". This indicates the cap screws have aligned with the j-slots of the Long Wear Bushing.
4. Slack off all weight to make sure the tool is down.
5. Rotate the tool clockwise 1/4 turn to fully engage the cap screws in the Long Wear Bushing.
6. Fully retract all lockscrews and pull straight up to retrieve the Long Wear Bushing.
7. Inspect the Running Tool and Wear Bushing for any damage. Clean, grease, and store.
8. Proceed to running the next casing.

13-5/8" MULTIBOWL SYSTEM





LOCKSCREW ENGAGED POSITION

FLANGE CONNECTION SIZE & PRESSURE RATING	DIMENSION A	DIMENSION B
13-5/8" 3K X 13-5/8" 3K	2.50	4.41
13-5/8" 5K X 13-5/8" 5K	2.06	4.41
13-5/8" 3K X 13-5/8" 5K	2.06	4.41
13-5/8" 5K X 13-5/8" 10K	0.00	4.22

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2.4 INSTALLATION OF 9-5/8" MANDREL CASING HANGER

Equipment List			
No.	**Description**	**Part Number**	**Qty**
1	CASING HANGER, MBS, MANDREL FLUTED, 13-5/8" X 9-5/8" 53.5# LTC BTM 10.000"-4SA-2G-LH	07-01-15-0001	1
2	RUNNING TOOL ASSY, MBS, MANDREL CASING HANGER, 13-5/8", 10.00"-4STUB ACME-2G LH BOX BTM X 9-5/8" LC BOX TOP	18-71-15-0002	1

Recommended Spares			
No.	**Description**	**Part Number**	**Qty**
1	O-RING, 2-448, 9.475" ID X .275" C/S 70 DURO	88-10-90-0050	2
2	PLUG, PIPE 1/8" LP .25" OAL SOCKET FLUSH TYPE	20-50-90-0002	1

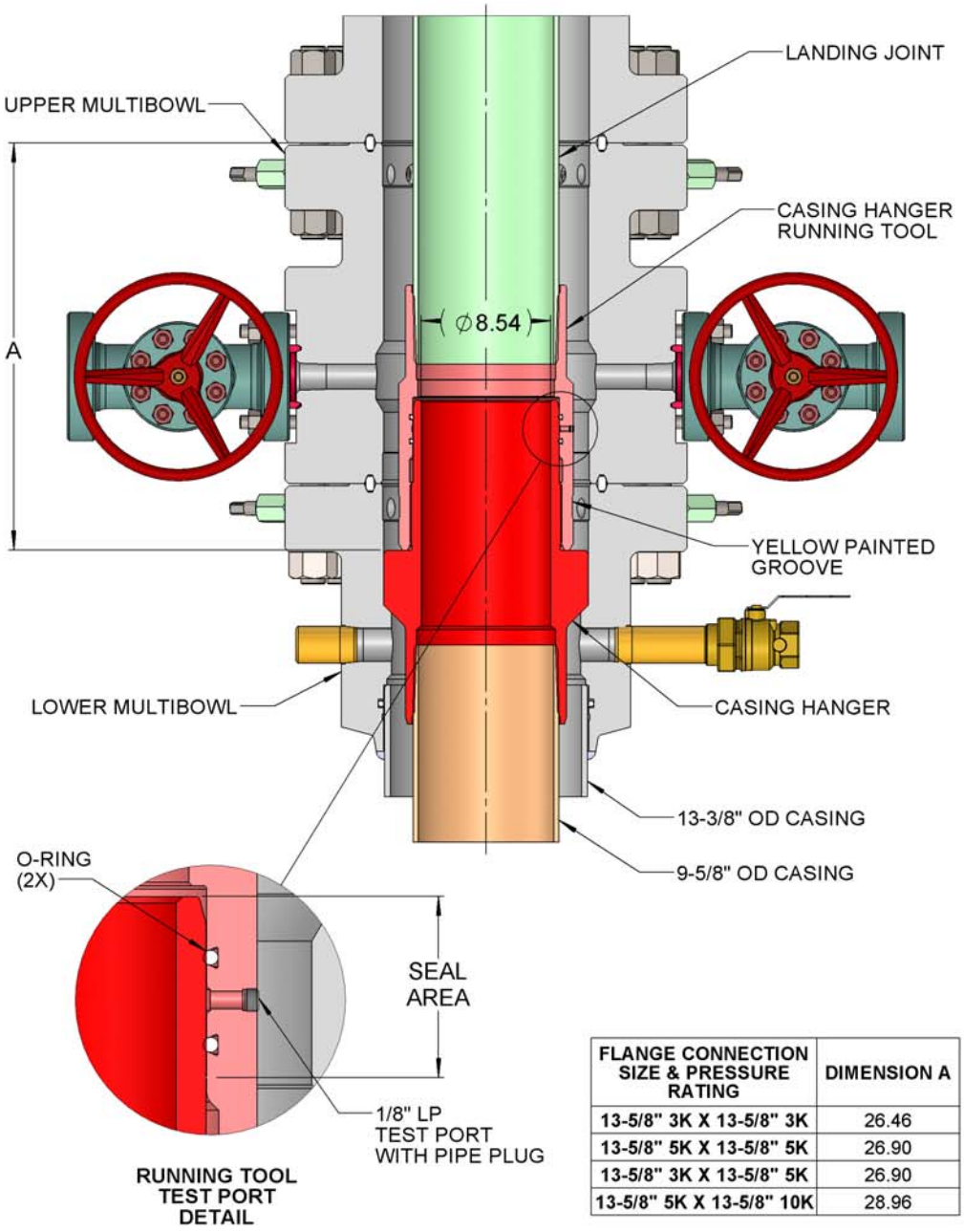
PREPARATION

1. Check and record Mandrel Casing Hanger and Running Tool part number and serial number.
2. Inspect the Mandrel Casing Hanger's casing thread and ACME running threads for any damage. Ensure the neck seal area is clean and in good condition.
3. Inspect the Running Tool's casing thread and running thread for any damage. Ensure bore and o-ring is clean and in good condition.
4. Verify that the Running Tool's visual indicator groove is painted with fluorescent yellow.

INSTALLATION

1. Make up a landing joint to the Running Tool. Ensure to power tight the landing joint to the Running Tool per API thread's specification.
2. Lightly oil the Hanger's neck OD and running threads.
3. Make up the Running Tool to the Hanger by rotating counter-clockwise 15 to 16 turns until it bottoms out on the Hanger. ***Note:*** *Do not torque to hanger.*
4. Pressure test the Running Tool's seal through the 1/8 LP test port for at least 15 minutes. Do not exceed 5,000psi test pressure.
5. After a successful test, release pressure. Replace plug.
6. Lower the Hanger onto the last joint of casing run. Make up the connection to the API thread's recommended optimum torque.
7. Verify all lockscrews are fully retracted.
8. Slowly and carefully lower the Hanger through the BOP and land it in the Multibowl.
9. Slack off all weight on the casing.
10. Visually verify the yellow paint marking on the Running Tool is in the center of the upper-most outlet of the Multibowl indicating that the Hanger is properly landed. ***Note:*** *Ensure that the well is safe and there is no pressure before opening the uppermost outlet valve. Close the outlet after visual inspection.*
11. Cement as required.
12. Back off the Running Tool by rotating clockwise until the thread jump can be felt.
13. Retrieve the landing joint and running tool to the rig floor.
14. Inspect the running tool for any damage. Clean, grease, and store.
15. Proceed to next operation.

13-5/8" MULTIBOWL SYSTEM



FLANGE CONNECTION SIZE & PRESSURE RATING	DIMENSION A
13-5/8" 3K X 13-5/8" 3K	26.46
13-5/8" 5K X 13-5/8" 5K	26.90
13-5/8" 3K X 13-5/8" 5K	26.90
13-5/8" 5K X 13-5/8" 10K	28.96

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2.5 INSTALLATION OF 9-5/8" PACKOFF SUPPORT BUSHING

Equipment List			
No.	**Description**	**Part Number**	**Qty**
1	PACKOFF SUPPORT BUSHING ASSY, MBS, NOM 13-5/8" X 9-5/8", 10.0"-4SA-LH WITH SEAL GROOVES	03-91-10-0002	1
2	RUNNING TOOL BODY, MBS, FOR 13-5/8" X 9-5/8" PACKOFF 4-1/2" X-HOLE BOX TOP & BTM X 10.000-4SA-2G-LH PIN BTM 12" TONG NECK	18-71-90-0009	1
3	WASH TOOL, 4-1/2" X-HOLE 6.0" OD TWELVE 0.5" PORTS	18-60-15-0001	1

Recommended Spares			
No.	**Description**	**Part Number**	**Qty**
1	FS SEAL, 9-5/8" NOM PN FS1000-9.625 85HNBR	88-30-90-0001	2
2	SPRINGSELE, JAMES WALKER 13.500" OD JW449-455-1B1 HNBR EOL101	88-20-90-0012	4

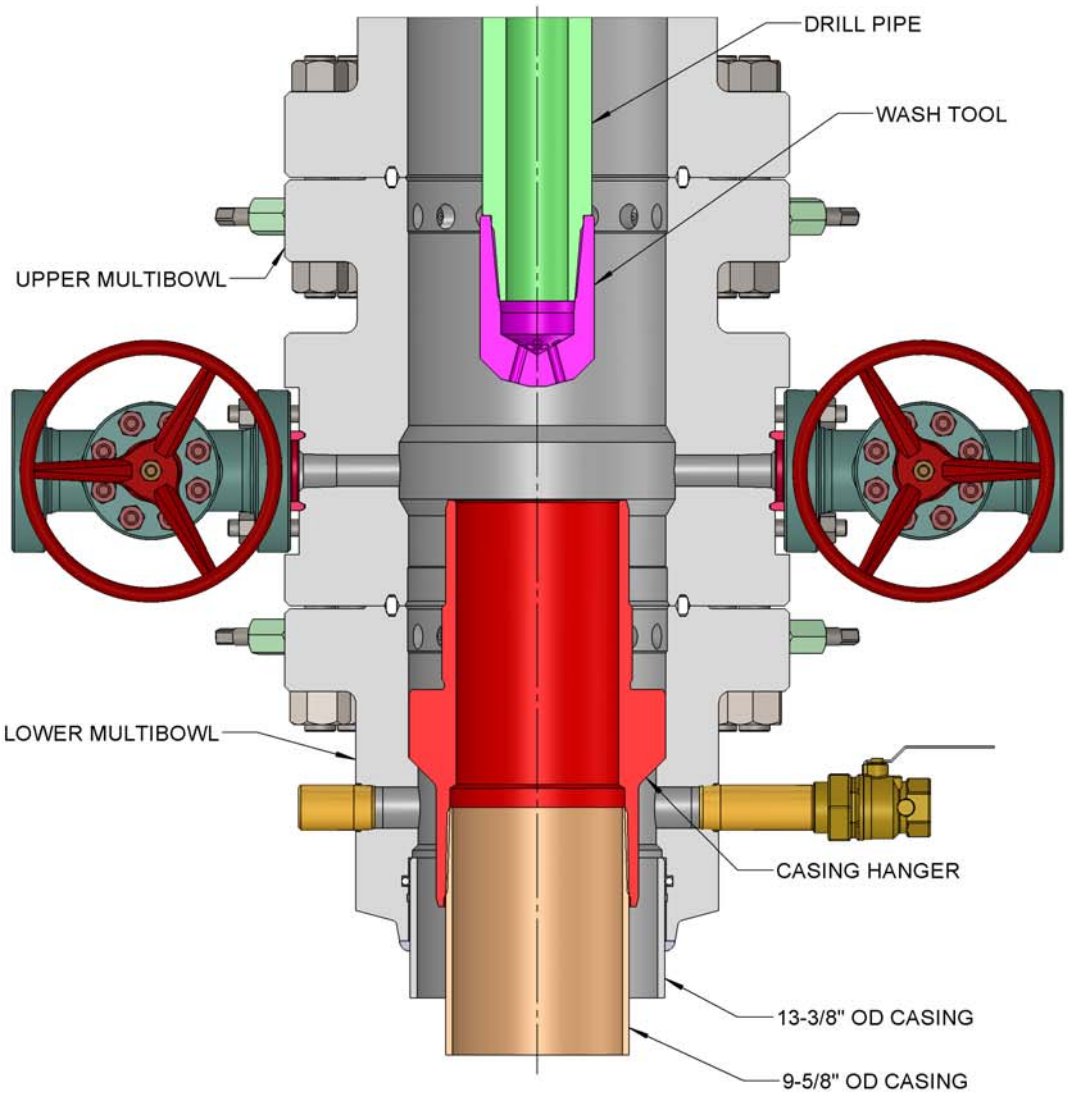
PREPARATION

1. Check and record Packoff Support Bushing and Running Tool part number and serial number.
2. Inspect the Packoff's elastomeric seals, bore, and OD for any damage. Ensure that all are clean and in good condition.
3. Inspect the Running Tool's thread for any damage. Ensure all are clean and in good condition.
4. Wash out Multibowl and top of casing hanger landing flutes and open lower valves in lower head. *NOTE: Washing can be done manually using pressurized hose or with a wash tool.*

INSTALLATION

1. Make up a landing joint to the Running Tool. Ensure to power tight the landing joint to the Running tool per API thread's specification.
2. Lightly oil the Packoff's elastomeric seals and running threads.
3. Make up the running tool to the packoff by rotating counterclockwise 7 to 8 turns until it bottoms out on the packoff. Do not tighten.
4. Verify all Lockscrews are fully retracted.
5. Slowly and carefully lower the Packoff through the BOP and land it on the Hanger inside the Multibowl. ***Note:*** *Heavy drill pipe or drill collar might be required as additional weight to push down the Packoff into its landing position.*
6. Verify that the Packoff has landed properly by making measurement on its setting depth.
7. Run Lockscrews in pairs, 180 degrees apart, at the lower Multibowl. Tighten gland nuts to 350 ft-lbs and LDS to 450 ft-lbs.
8. Pull the Running Tool to 2,000 lbs to confirm that the Packoff has been successfully locked down.
9. Slack off tension.
10. Locate the two FLG Test Ports on the upper Multibowl and remove the test cap from each of the fittings.
11. Attach a bleeder tool to one of the fittings and open the tool.
12. Attach a hydraulic test pump to the other fitting and pump hydraulic fluid until a continuous stream flows from the bleeder tool. Close the bleeder tool.
13. Perform pressure test to 5,000psi for at least 15 minutes. ***Note:*** *In case of testing against a casing, do not exceed 80% of casing collapse.*
14. After a successful test, release pressure. Replace test caps.
15. Back off the running tool by rotating the drill pipe clockwise until the running tool disengages from the packoff. Note: *While retrieving the tool, monitor the weight indicator to ensure the tool is properly disengaged.*
16. Retrieve the Running Tool to the rig floor.
17. Inspect the Running Tool for any damage. Clean, grease, and store.
18. Proceed to next operation.

13-5/8" MULTIBOWL SYSTEM



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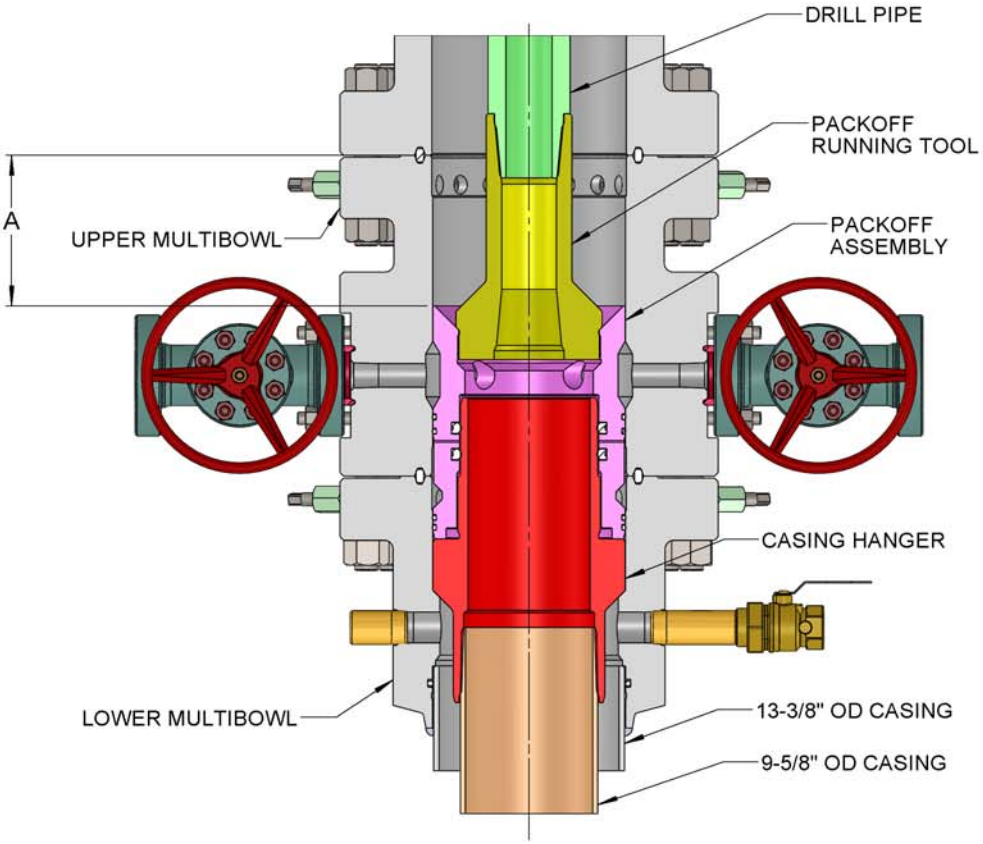
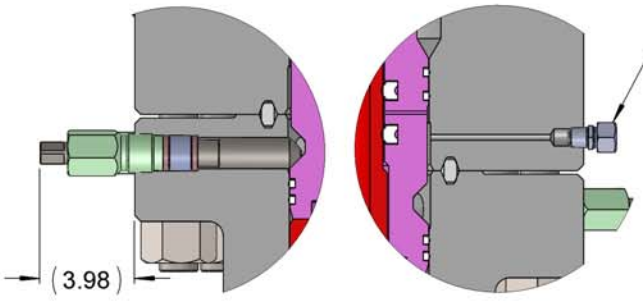
13-5/8" MULTIBOWL SYSTEM





FLANGE CONNECTION SIZE & PRESSURE RATING	DIMENSION A
13-5/8" 3K X 13-5/8" 3K	10.12
13-5/8" 5K X 13-5/8" 5K	10.56
13-5/8" 3K X 13-5/8" 5K	10.56
13-5/8" 5K X 13-5/8" 10K	12.62

LOCKSCREW DETAIL ENGAGED POSITION

TEST PORT DETAIL

DWG-5

2.6 RUNNING AND RETRIEVING COMBO BOP TEST PLUG & R/R TOOL

Equipment List			
No.	**Description**	**Part Number**	**Qty**
1	COMBINATION TEST PLUG ASSY, R&R TOOL, MBS, 13-5/8" X 4-1/2" X-HOLE BOX BTM X TOP 1.900" SHARP VEE THD 1/2" ORING WITH CAP SCREWS	18-40-90-0004	1

Recommended Spares			
No.	**Description**	**Part Number**	**Qty**
1	O-RING, C21, .500" C/S X 12.50" ID NITRILE 70 DURO	88-10-90-0030	1

PREPARATION

1. Check and record the Combination Test Plug Assy, R&R Tool part number and serial number.
2. Inspect the test plug's LP threads and tool joints threads for any damage. Ensure o-ring and cap screws are in good condition.

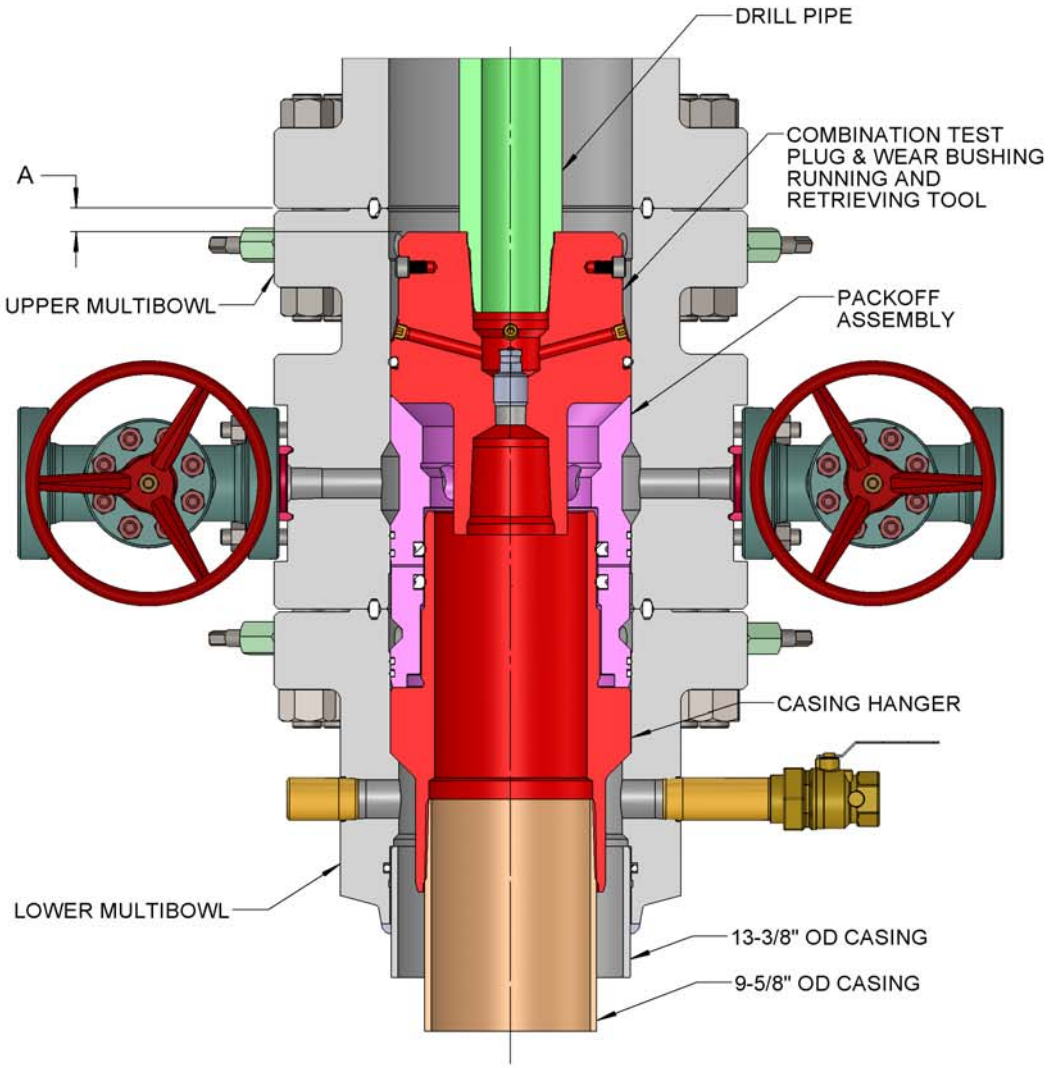
RUNNING

1. Make up a joint of drill pipe to the test plug. Ensure the o-ring is down and the cap screws are up.
   Note: *If it is intended to test by pumping through the drill pipe, make sure that the four 1/2" LP pipe plugs are removed. However, if the test is to be done by pressurizing through the choke or kill line, the four 1/2" LP pipe plugs should be installed and the drill pipe must be properly torqued to the test plug.*
2. Verify lockscrews in the top flange are fully retracted.
3. Open the Multibowl's upper outlet valve to check for leakage past the test plug during BOP test.
4. Lightly oil test plug's o-ring.
5. Lower the test plug through the BOP and riser stack until it lands on top of the Packoff Support Bushing.
6. Test the BOP stack per operator's requirements. Never exceed the connection’s maximum working pressure. Monitor any leakage through the open lower outlet valve.

RETRIEVING

1. After a successful test, release pressure and open BOP rams.
2. Drain the fluid from BOP stack.
3. Pull and retrieve the test plug slowly to avoid damage.
4. Close the Multibowl's upper outlet valve.
5. Inspect test plug for any damage. Replace o-ring if necessary. Clean, grease, and store.

13-5/8" MULTIBOWL SYSTEM



FLANGE CONNECTION SIZE & PRESSURE RATING	DIMENSION A
13-5/8" 3K X 13-5/8" 3K	.92
13-5/8" 5K X 13-5/8" 5K	1.36
13-5/8" 3K X 13-5/8" 5K	1.36
13-5/8" 5K X 13-5/8" 10K	3.42

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2.7 RUNNING AND RETRIEVING OF SHORT WEAR BUSHING

Equipment List			
No.	**Description**	**Part Number**	**Qty**
1	WEAR BUSHING ASSY, MBS, NOM 13-5/8" SHORT 9.00" ID	03-92-15-0004	1
2	COMBINATION TEST PLUG ASSY, R&R TOOL, MBS, 13-5/8" X 4-1/2" X-HOLE BOX BTM X TOP 1.900" SHARP VEE THD 1/2" ORING WITH CAP SCREWS	18-40-90-0004	1
2A	COMBINATION TEST PLUG ASSY, R&R TOOL, MBS, 13-5/8" X 4-1/2" IF BOX X BOX 1.900" SHARP VEE 1/2" ORING	018-00001-1358-ASSY	1

Recommended Spares			
No.	**Description**	**Part Number**	**Qty**
1	O-RING, 2-455, 12.975" ID X .275" C/S NITRILE 80 DURO	88-10-90-0042	1
2	CAP SCREW, SOCKET HD 3/4" 10UNC X 1.0" LG ALLOY STEEL	19-30-0001-1300	4

PREPARATION

1. Check and record Short Wear Bushing and Combination Test Plug Assy, R&R Tool part numbers and serial numbers.
2. Inspect Short Wear Bushing ensuring the Bore is clean, stop lugs are secure, and J-slots are clean.

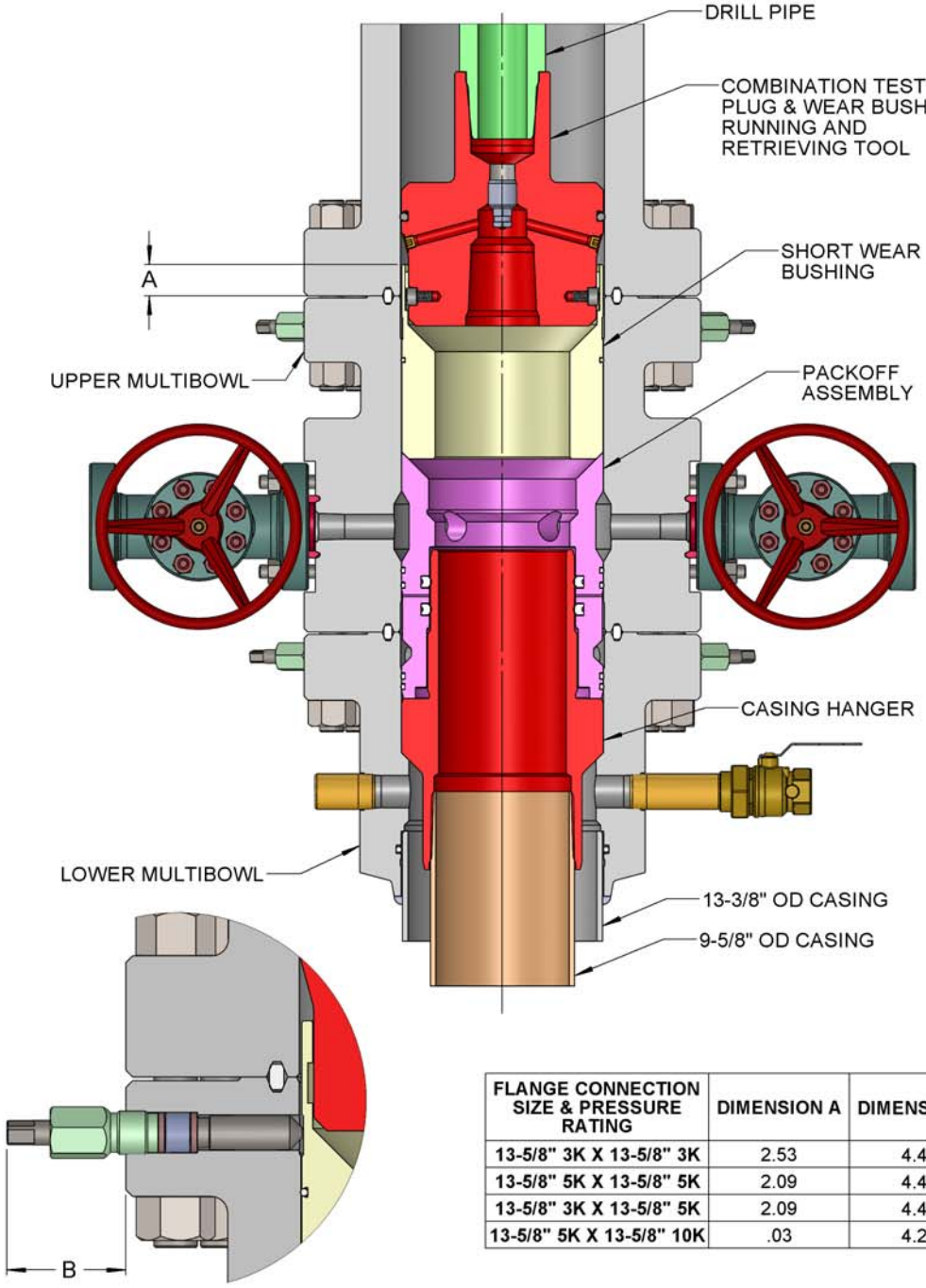
RUNNING

1. Make up a joint of drill pipe to the top of the Running Tool. Ensure the cap screws are down.
2. Lower the Combination Tool into the Short Wear Bushing and rotate 1/4 turn clockwise to lock position.
3. Verify all lockscrews in the top flange of Multibowl are fully retracted.
4. Slowly lower the assembly through the BOP stack until it lands on top of the Packoff Support Bushing.
5. Run in two lockscrews snug tight, 180 deg apart, located at the upper portion of the Multibowl.
6. Remove the Combination Tool from Short Wear Bushing by rotating the drill pipe counter-clockwise 1/4 turn and slowly lifting straight up. ***Note:*** *While retrieving the tool, monitor the weight indicator to ensure the tool is properly disengaged.*
7. Inspect the Combination Tool for any visible damage.
8. Proceed with drilling for next casing size.

RETRIEVING

1. Make up a joint of drill pipe to the top of the Combination Tool. Ensure the cap screws are down and the o-ring is up.
2. Slowly lower the Running Tool through the BOP stack until it lands on the Short Wear Bushing.
3. Rotate the tool until it drops approximately 3". This indicates the cap screws have aligned with the J-slots of the Short Wear Bushing.
4. Slack off all weight to make sure the tool is down.
5. Rotate the tool clockwise 1/4 turn to fully engage the cap screws in the Short Wear Bushing.
6. Fully retract all lockscrews in the top flange of the Multibowl and pull straight up to retrieve the Short Wear Bushing.
7. Inspect the Combination Tool and Wear Bushing for any damage. Clean, grease, and store.
8. Proceed to running the next casing.

13-5/8" MULTIBOWL SYSTEM



FLANGE CONNECTION SIZE & PRESSURE RATING	DIMENSION A	DIMENSION B
13-5/8" 3K X 13-5/8" 3K	2.53	4.41
13-5/8" 5K X 13-5/8" 5K	2.09	4.41
13-5/8" 3K X 13-5/8" 5K	2.09	4.41
13-5/8" 5K X 13-5/8" 10K	.03	4.22

LOCKSCREW ENGAGED POSITION

DWG-7

2.8 INSTALLATION OF 7" MANDREL CASING HANGER

5,000 PSI Equipment List			
No.	**Description**	**Part Number**	**Qty**
1	CASING HANGER ASSY, MANDREL MBS 13-5/8" X 7" 29# LTC BTM 7.5000-4 LH STUB ACME THD 5K	07-01-90-0001	1
2	RUNNING TOOL ASSY, MBS, MANDREL CASING HANGER, 7.500"-4STUB ACME-2G LH BOX BTM X 7" LC BOX TOP FOR 5K/10K	18-70-90-0002	1

10,000 PSI Equipment List			
No.	**Description**	**Part Number**	**Qty**
1	CASING HANGER ASSY, MANDREL MBS 13-5/8" X 7" 29# LTC BTM 7.5000-4 LH STUB ACME THD 10K	07-01-90-0007	1
2	RUNNING TOOL ASSY, MBS, MANDREL CASING HANGER, 7.500"-4STUB ACME-2G LH BOX BTM X 7" LC BOX TOP FOR 5K/10K	18-70-90-0002	1

Recommended Spares			
No.	**Description**	**Part Number**	**Qty**
1	ORING, 2-441 6.975" ID X .275 C/S 70 DURO	88-10-90-0056	2
2	PLUG, PIPE 1/8" LP .25" OAL SOCKET FLUSH TYPE	20-50-90-0002	1

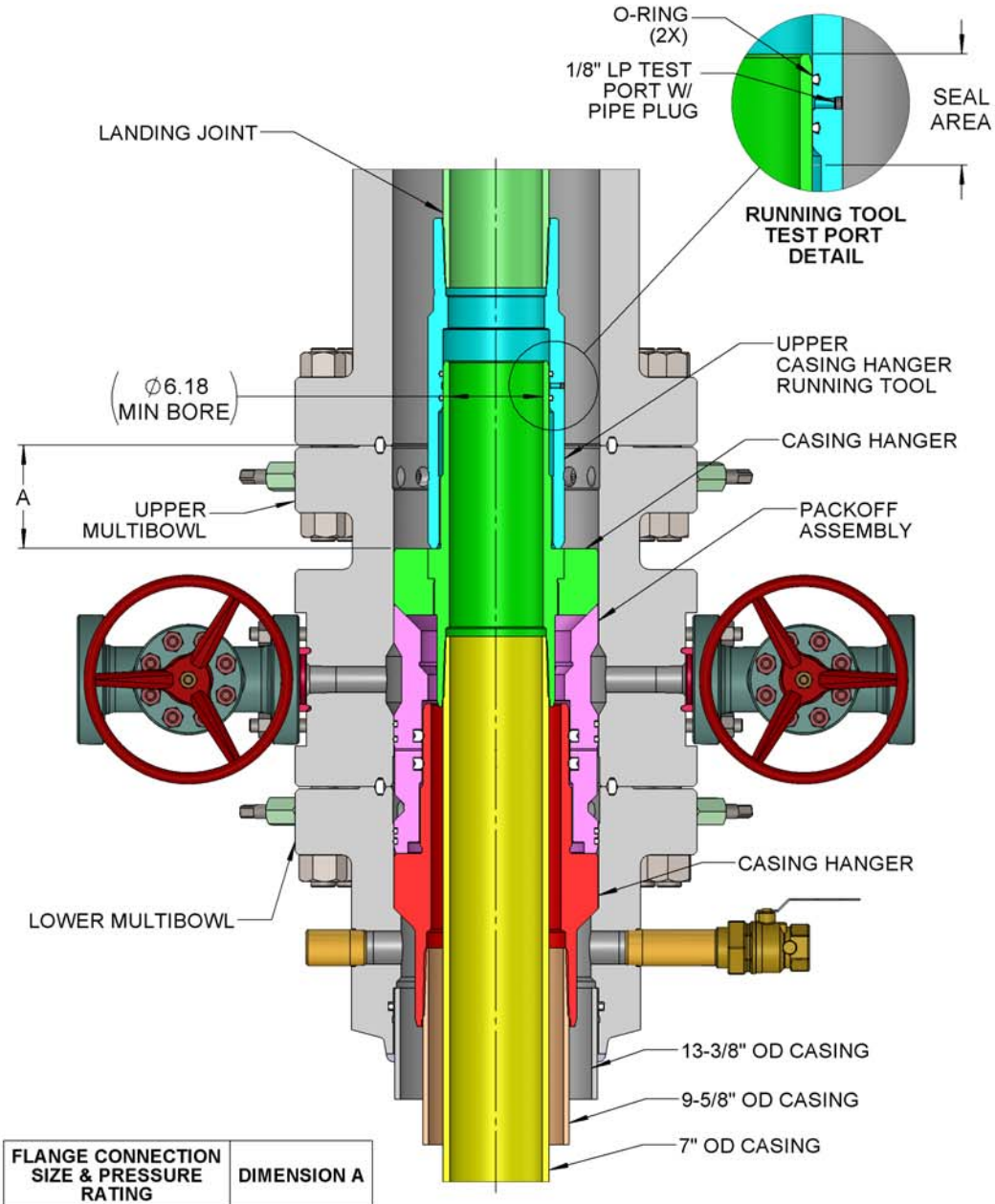
PREPARATION

1. Check and record Mandrel Casing Hanger and Running Tool part number and serial number.
2. Ensure the Casing Hanger's Support Ring is fully made up to the Casing Hanger's body.
3. Inspect the Mandrel Casing Hanger's casing thread and ACME running threads for any damage. Ensure the neck seal area is clean and in good condition.
4. Inspect the Running Tool's casing thread and running thread for any damage. Ensure bore and o-ring is clean and in good condition.

INSTALLATION

1. Make up a landing joint to the Running Tool. Ensure to power tight the landing joint to the Running Tool per API thread's specification.
2. Lightly oil the Hanger's neck OD and running threads.
3. Make up the Running Tool to the Hanger by rotating counter-clockwise 16 to 17 turns until it bottoms out on the Hanger. ***Note:*** *Do not torque to hanger.*
4. Pressure test the Running Tool's seal through the 1/8 LP test port for at least 15 minutes. Do not exceed the hanger's maximum pressure rating.
5. After a successful test, release pressure. Replace plug.
6. Lower the Hanger onto the last joint of casing run. Make up the connection to the API thread's recommended optimum torque.
7. Verify all lockscrews on the upper portion of the Multibowl are fully retracted.
8. Slowly and carefully lower the Hanger through the BOP and land it on top of the Packoff Support Bushing.
9. Slack off all weight on the casing.
10. Verify that the Casing Hanger has landed properly by making measurement on its setting depth.
11. Cement as required.
12. Back off the Running Tool by rotating clockwise until the thread jump can be felt.
13. Retrieve the landing joint and running tool to the rig floor.
14. Inspect the Running tool for any damage. Clean, grease, and store.
15. Proceed to next operation.

13-5/8" MULTIBOWL SYSTEM



FLANGE CONNECTION SIZE & PRESSURE RATING	DIMENSION A
13-5/8" 3K X 13-5/8" 3K	6.38
13-5/8" 5K X 13-5/8" 5K	6.82
13-5/8" 3K X 13-5/8" 5K	6.82
13-5/8" 5K X 13-5/8" 10K	8.88

DWG-8

2.9 INSTALLATION OF 7" PACKOFF ASSEMBLY

Equipment List			
No.	**Description**	**Part Number**	**Qty**
1	PACKOFF ASSY, UPPER MBS, NOM 13-5/8" X 7" 11.000"-4SA-LH THDS	07-04-90-0006	1
2	PACKOFF RUNNING TOOL BODY, MBS, 13-5/8" X 7" 11.000"-4SA-2G-LH BOX BTM X 4-1/2" X-HOLE BOX TOP FOR 5K/10K, W/ 12" LG TONG NECK	18-71-90-0011	1
3	WASH TOOL, 4-1/2" X-HOLE 6.0" OD TWELVE 0.5" PORTS	18-60-15-0001	1

Recommended Spares			
No.	**Description**	**Part Number**	**Qty**
1	FS SEAL, 7" JAMES WALKER P/N JW-1015-07000	88-30-90-0006	1
2	SPRINGSELE, JAMES WALKER 13.500" OD JW449-455-1B1 HNBR EOL101	88-20-90-0012	2

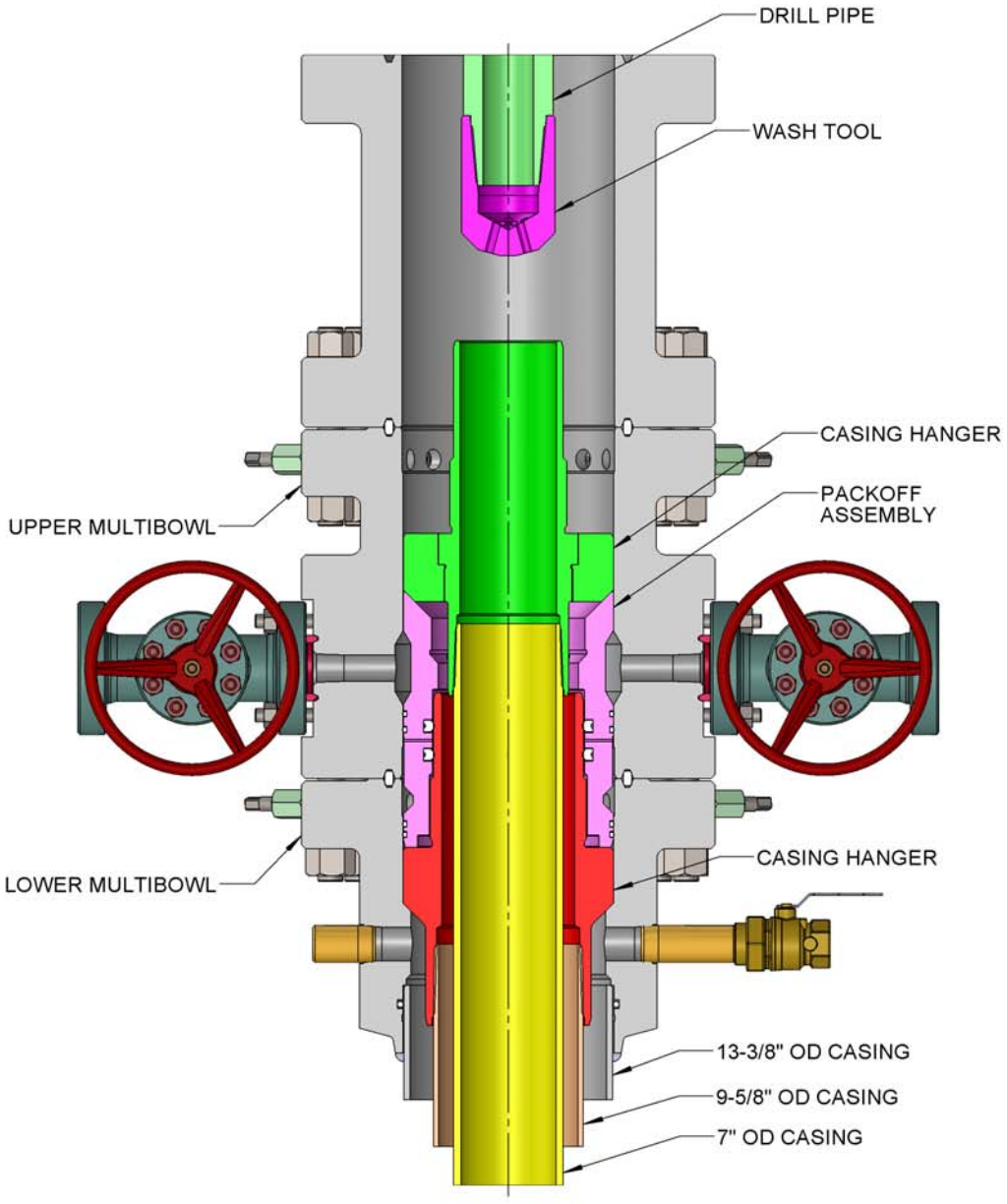
PREPARATION

1. Check and record Packoff Assembly and Running Tool part number and serial number.
2. Inspect the Packoff's elastomeric seals, ACME running thread, bore and OD for any damage. Ensure that all are clean and in good condition.
3. Inspect the Running Tool's threads for any damage. Ensure all are clean and in good condition.
4. Wash out Multibowl and top of casing hanger landing flutes and open valves in upper head. *NOTE: Washing can be done manually using pressurized hose or with a wash tool.*

INSTALLATION

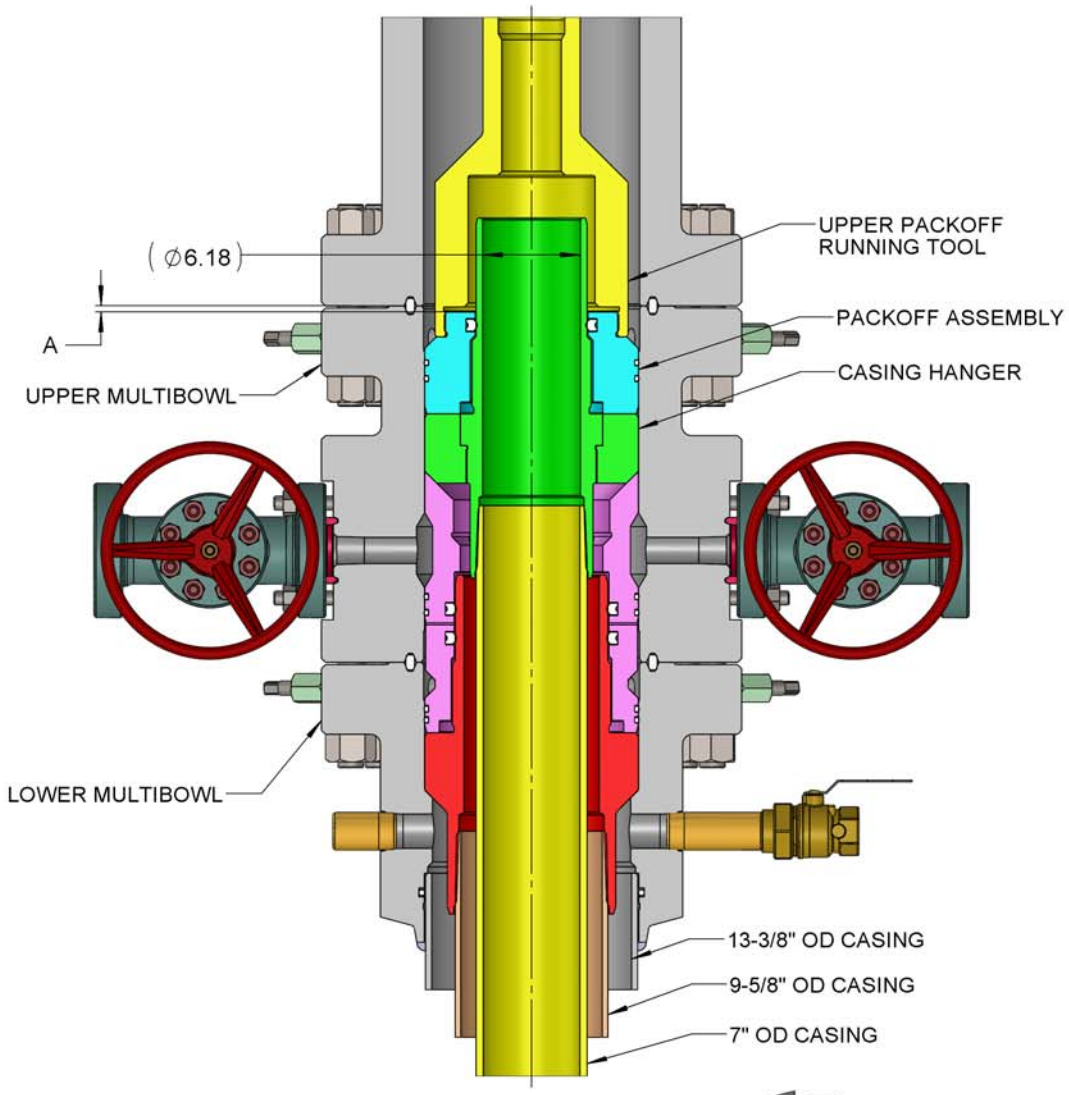
1. Make up a landing joint to the Running Tool. Ensure to power tight the landing joint to the Running Tool per API thread's specification.
2. Lightly oil the Packoff's elastomeric seals and running threads.
3. Make up the Running Tool to the Packoff by rotating clockwise 5 to 6 turns until it bottoms out on the Packoff. Do not tighten.
4. Verify all lockscrew are fully retracted.
5. Slowly and carefully lower the Packoff through the BOP and land it on the Hanger inside the Multibowl. ***Note:*** *Heavy drill pipe or drill collar might be required as additional weight to push down the Packoff into its landing position.*
6. Verify that the Packoff has landed properly by making measurement on its setting depth.
7. Run lockscrews in pairs, 180 degrees apart, at the lower Multibowl. Tighten gland nuts to 350 ft-lbs and Lockscrews to 450 ft-lbs.
8. Pull the Running Tool to 2,000 lbs to confirm that the Packoff has been successfully locked down.
9. Slack off tension.
10. Back off the Running Tool by rotating clockwise until the Running Tool disengages from the Packoff.
11. Retrieve the Running Tool to the rig floor.
12. Inspect the Running Tool for any damage. Clean, grease, and store.
13. Proceed to next operation.

13-5/8" MULTIBOWL SYSTEM

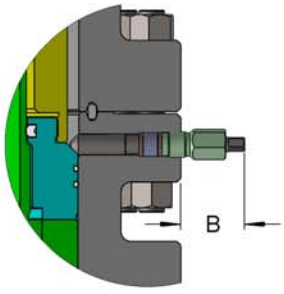


DWG-8a

13-5/8" MULTIBOWL SYSTEM



FLANGE CONNECTION SIZE & PRESSURE RATING	DIMENSION A	DIMENSION B
13-5/8" 3K X 13-5/8" 3K	.05 above top of the flange	4.01
13-5/8" 5K X 13-5/8" 5K	.39	4.01
13-5/8" 3K X 13-5/8" 5K	.39	4.01
13-5/8" 5K X 13-5/8" 10K	2.45	3.75



LOCKSCREW DETAIL ENGAGED

DWG-9

3.0 INSTALLATION OF EMERGENCY EQUIPMENT

NOTE: The following procedure is only applicable in case of stuck casing in hole.

3.1 INSTALLATION OF 9-5/8" SLIP CASING HANGER

Equipment List			
No.	**Description**	**Part Number**	**Qty**
1	CASING HANGER ASSY, C21 13-5/8" X 9-5/8"	07-10-90-0001	1

Recommended Spares			
No.	**Description**	**Part Number**	**Qty**
-	-	-	-

PREPARATION

1. Check and record Slip Casing Hanger Assembly part number and serial number.
2. Inspect the Slip Casing Hanger's segment for any damage. Ensure all screws are in place.

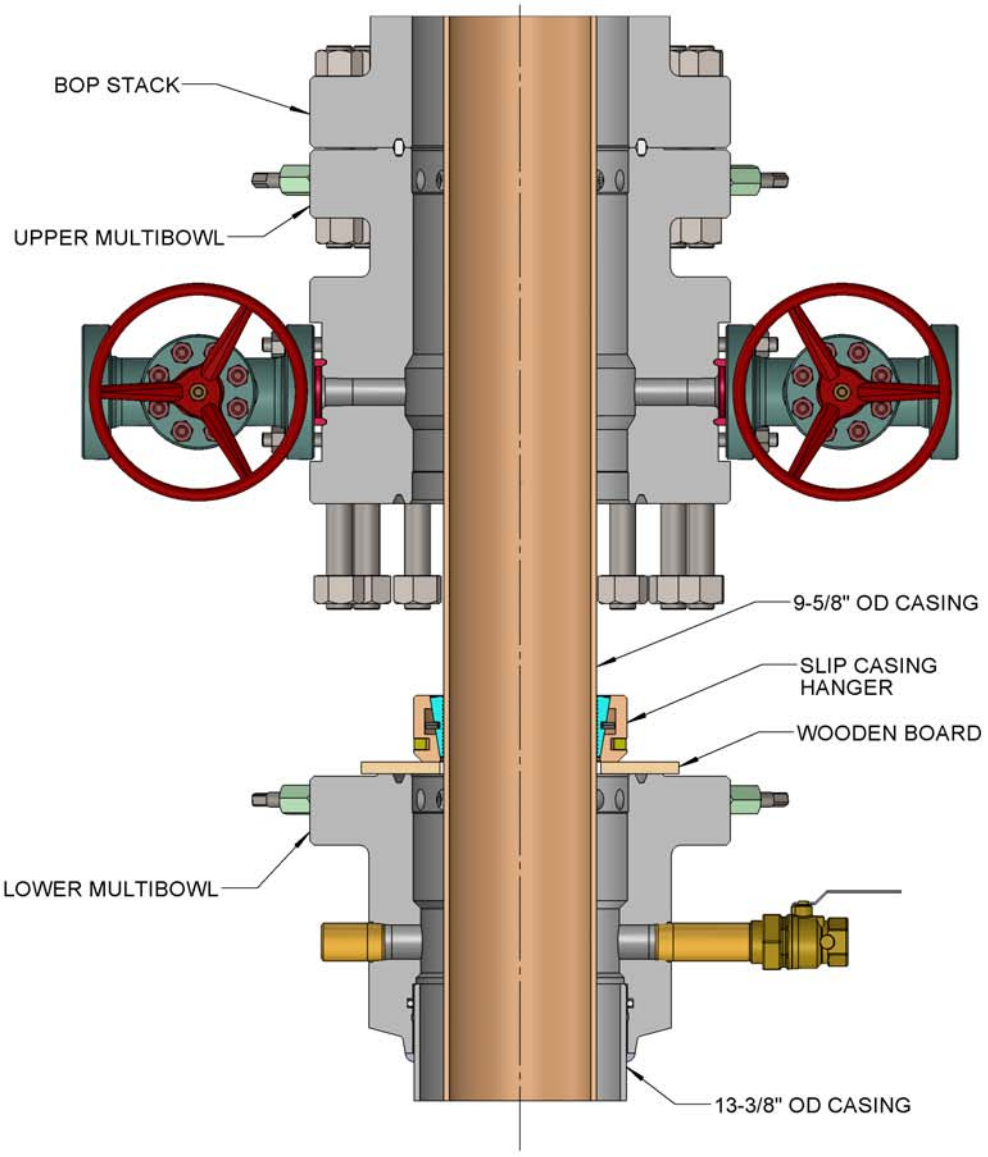
INSTALLATION

1. Cement the casing as required.
2. Drain the bowl through the side outlet valve on the Multibowl.
3. Separate the Upper Multibowl from the Lower Head. ***Note:*** *Ensure that the well is safe and there is no pressure before breaking the connection.*
4. Lift the Upper Multibowl and suspend it above the Lower Head high enough to install the Slip Casing Hanger.
5. Washout the Lower Head's bowl as necessary.
6. Remove the slip bowl latch screw (not the slip retainer screws) to open the Hanger.
7. Place two boards on the Lower Head's top flange against the casing.
8. Wrap the Hanger around the casing using the boards for support.
9. Replace the latch screw.
10. Grease the Hanger's body and remove the slip retaining screws.
11. Remove the boards and allow the Hanger to drop into the Lower Head's bowl. ***Note:*** *Ensure to center the casing as much as possible using a catline.*
12. Ensure that Hanger is properly seated by tapping down on the slip bowl.
13. Engage slip segments by hammering down on top of the segments with a soft bar. It is important that the slips be engaged evenly around the casing.
14. Pull tension on the casing to the desired hanging weight and slowly slacken off tension to load the casing weight onto Hanger. ***Note:*** *Weight suspended on the hanger is the weight which the weight indicator registers a sharp decrease. If the desired weight has not been achieved, lift the casing load and repeat the procedure.*
15. Rough cut the casing approximately 12" above the Lower Head's top flange.
16. Final cut the casing at 5-1/2" +/- 1/8" above the top flange and bevel cut the stub to specifications. ***Note:*** *Ensure the stub is properly beveled without any rough edges that could damage the Packoff's seals.*
17. Verify the mating ring grooves of the Upper Multibowl and Lower Head are clean and in good condition.
18. Install new ring gasket onto Lower Head's top ring groove. Re-install the Upper Multibowl.

Flange Connection Size & Pressure Rating	*Ring Gasket*	*Stud & Nut Size*	*Recommended Torque (ft-lbf)*
13-5/8" 3K	*RX-57*	*1-3/8"*	*739*
13-5/8" 5K	*BX-160*	*1-5/8"*	*1,226*

20. Proceed to installation of 9-5/8" Packoff Support Bushing. Refer to Section 2.5 for the detailed instruction.

13-5/8" MULTIBOWL SYSTEM



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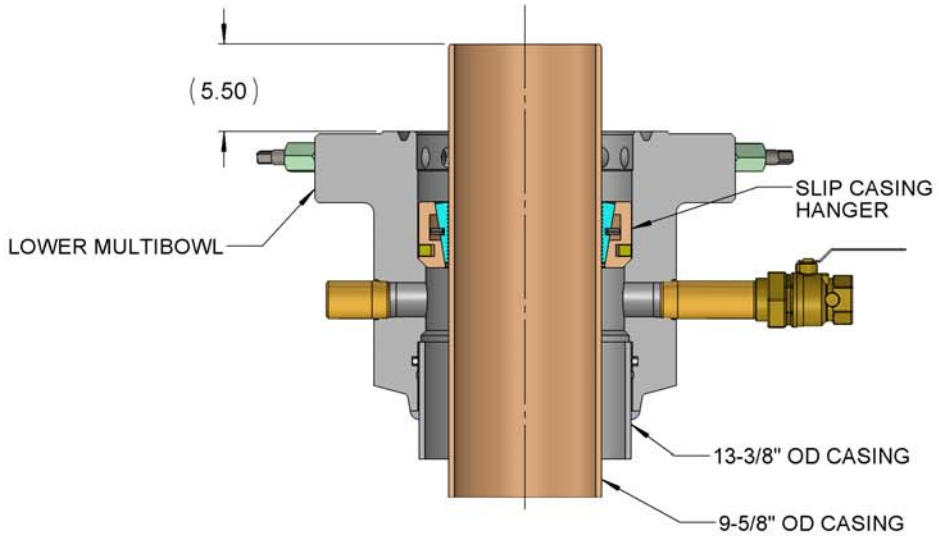
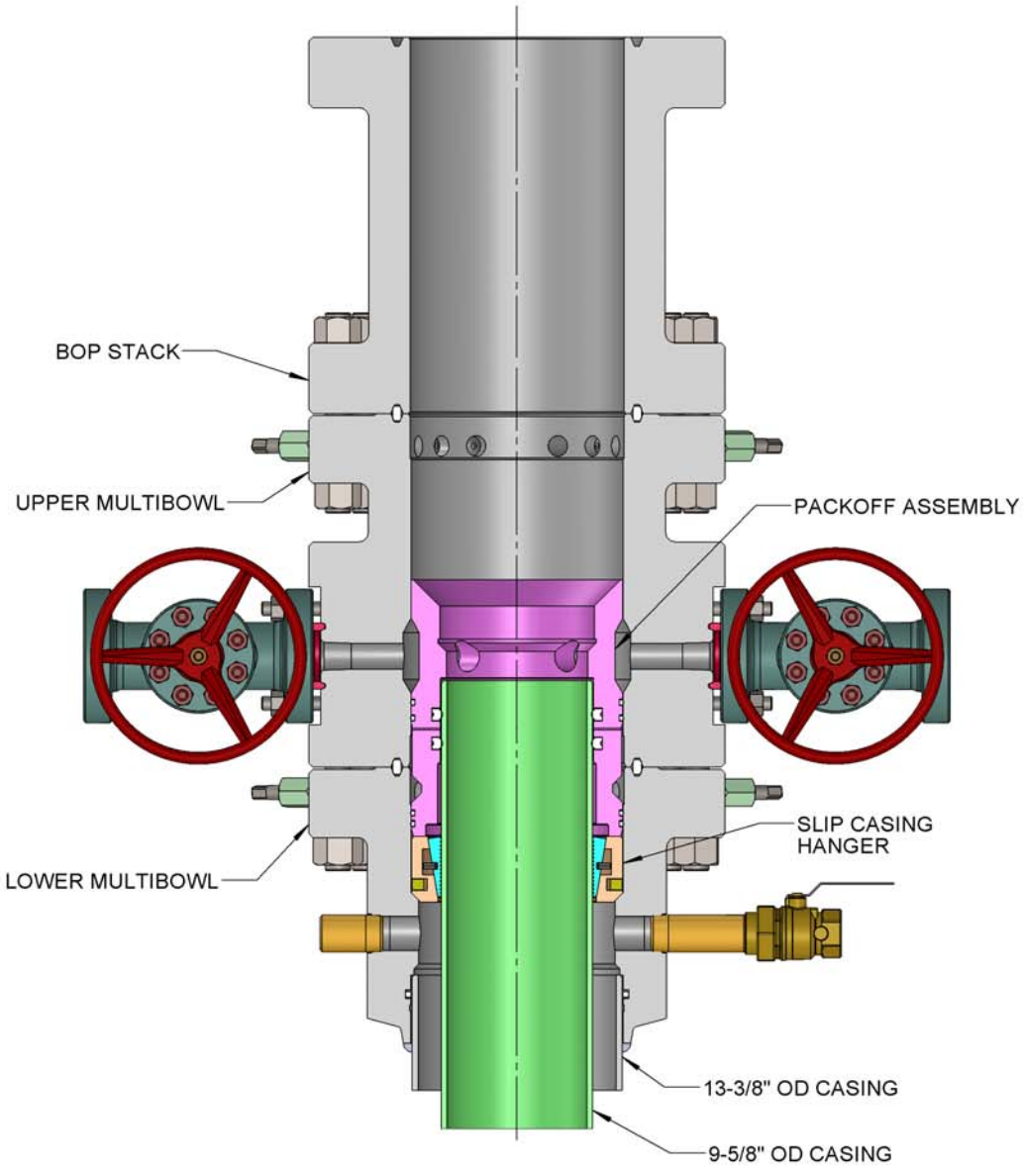
13-5/8" MULTIBOWL SYSTEM



DWG-11

13-5/8" MULTIBOWL SYSTEM



DWG-12

3.2 INSTALLATION OF 7" SLIP CASING HANGER

Equipment List			
No.	**Description**	**Part Number**	**Qty**
1	CASING HANGER ASSY, C21 13-5/8" X 7"	07-10-90-0002	1

Recommended Spares			
No.	**Description**	**Part Number**	**Qty**
-	-	-	-

PREPARATION

1. Check and record Slip Casing Hanger Assembly part number and serial number.
2. Inspect the Slip Casing Hanger's segment for any damage. Ensure all screws are in place.

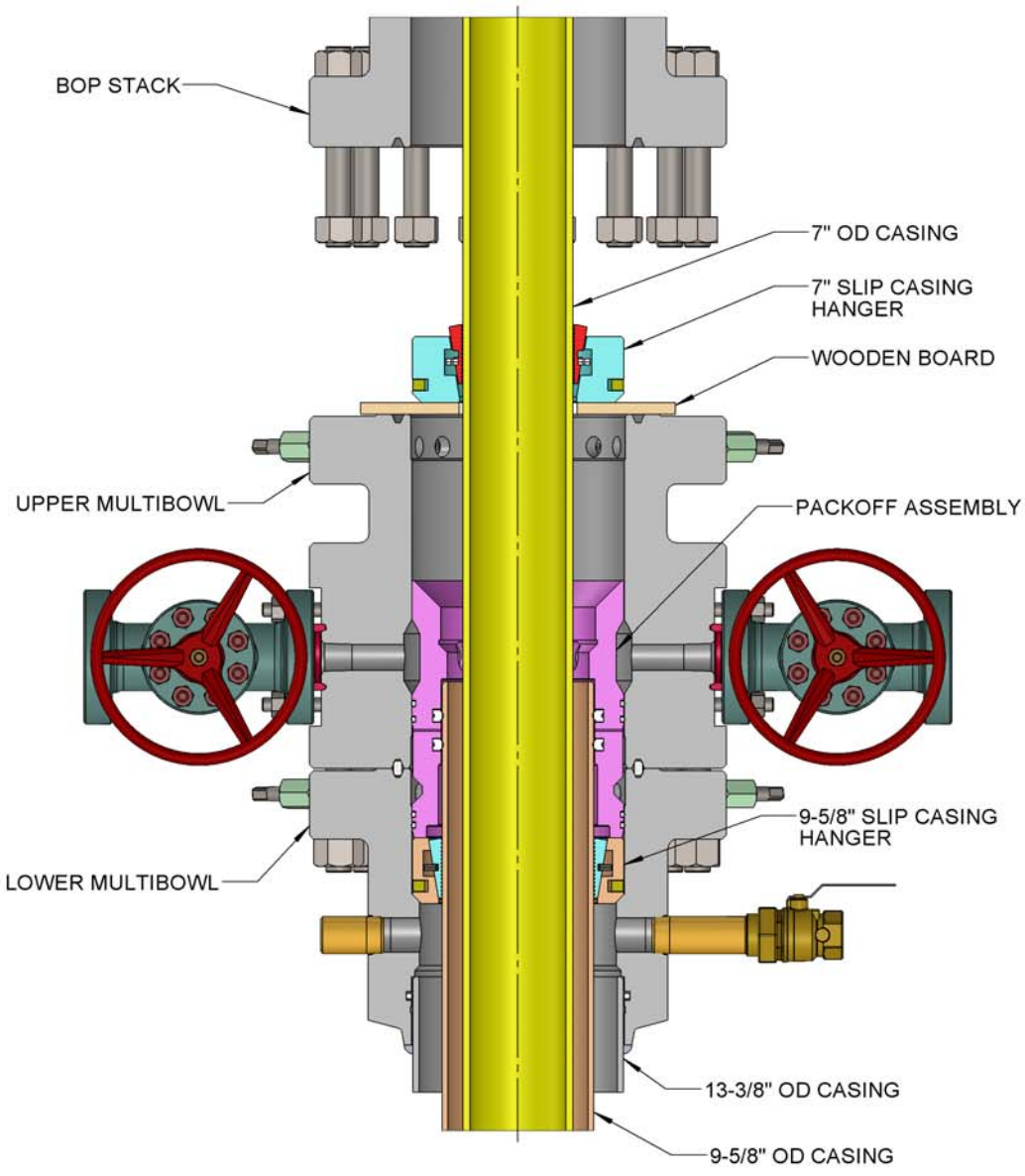
INSTALLATION

1. Cement the casing as required.
2. Drain the bowl through the side outlet valve on the Multibowl.
3. Nipple down the BOP stack. ***Note:*** *Ensure that the well is safe and there is no pressure before breaking the connection.*
4. Lift the BOP Stack and suspend it above the Multibowl high enough to install the Slip Casing Hanger.
5. Washout the Multibowl's bowl as necessary.
6. Remove the slip bowl latch screw (not the slip retainer screws) to open the Hanger.
7. Place two boards on the Multibowl's top flange against the casing.
8. Wrap the Hanger around the casing using the boards for support.
9. Replace the latch screw.
10. Grease the Hanger's body and remove the slip retaining screws.
11. Remove the boards and allow the Hanger to drop on top of the Packoff Support Bushing. ***Note:*** *Ensure to center the casing as much as possible using a catline.*
12. Ensure that Hanger is properly seated by tapping down on the slip bowl.
13. Engage slip segments by hammering down on top of the segments with a soft bar. It is important that the slips be engaged evenly around the casing.
14. Pull tension on the casing to the desired hanging weight and slowly slacken off tension to load the casing weight onto Hanger. ***Note:*** *Weight suspended on the hanger is the weight which the weight indicator registers a sharp decrease. If the desired weight has not been achieved, lift the casing load and repeat the procedure.*
15. Rough cut the casing approximately 12" above the Multibowl's top flange.
16. Final cut the casing at 5-1/2" +/- 1/8" above the top flange and bevel cut the stub to specifications. ***Note:*** *Ensure the stub is properly beveled without any rough edges that could damage the Packoff's seals.*
17. Verify the mating ring grooves of the Upper Multibowl and BOP riser flange are clean and in good condition.
18. Install new ring gasket onto Upper Head's top ring groove.
19. Nipple up the BOP stack.

Flange Connection Size & Pressure Rating	*Ring Gasket*	*Stud & Nut Size*	*Recommended Torque (ft-lbf)*
13-5/8" 5K	*BX-160*	*1-5/8"*	*1,226*
13-5/8" 10K	*BX-159*	*1-7/8"*	*1,890*

20. Proceed to install the 7" Packoff Support Bushing. Refer to Section 2.9 for the detailed instruction. ***Note:*** *(Optional) Packoff Bushing can be manually installed without running through BOP Stack after Step 16 (casing cutting).*

13-5/8" MULTIBOWL SYSTEM



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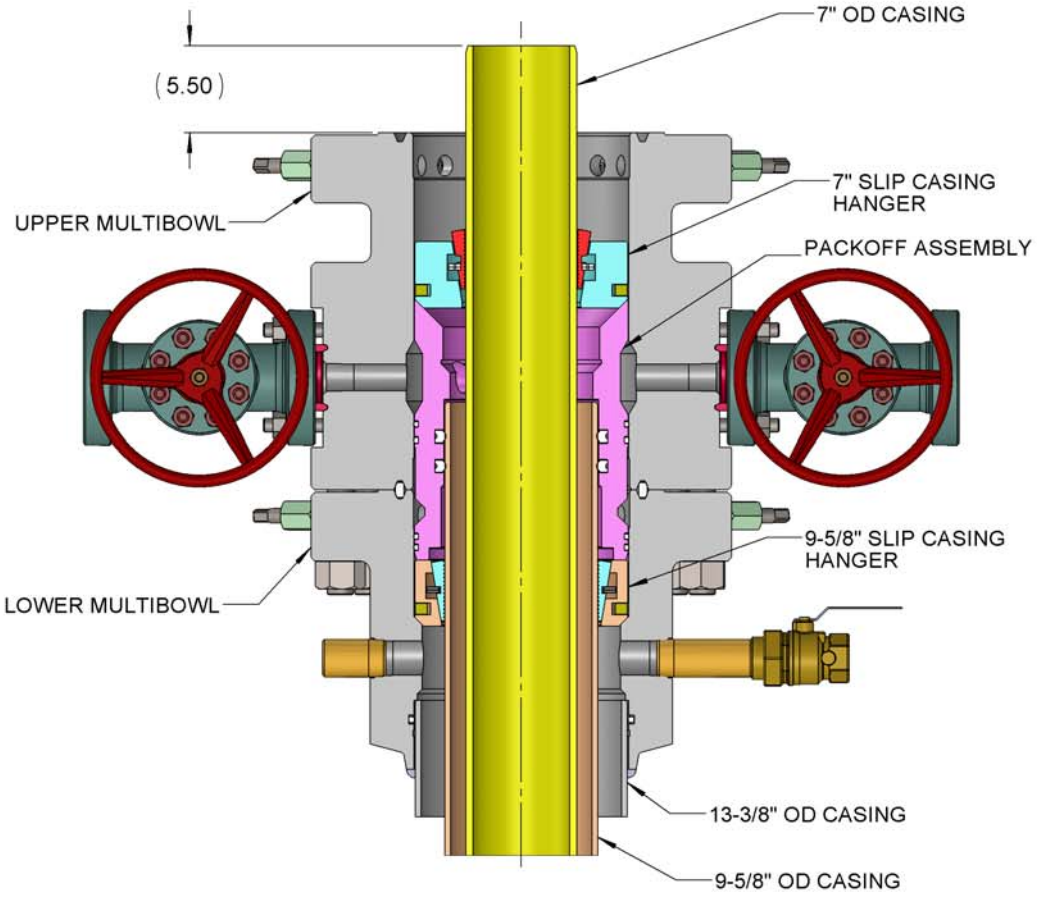
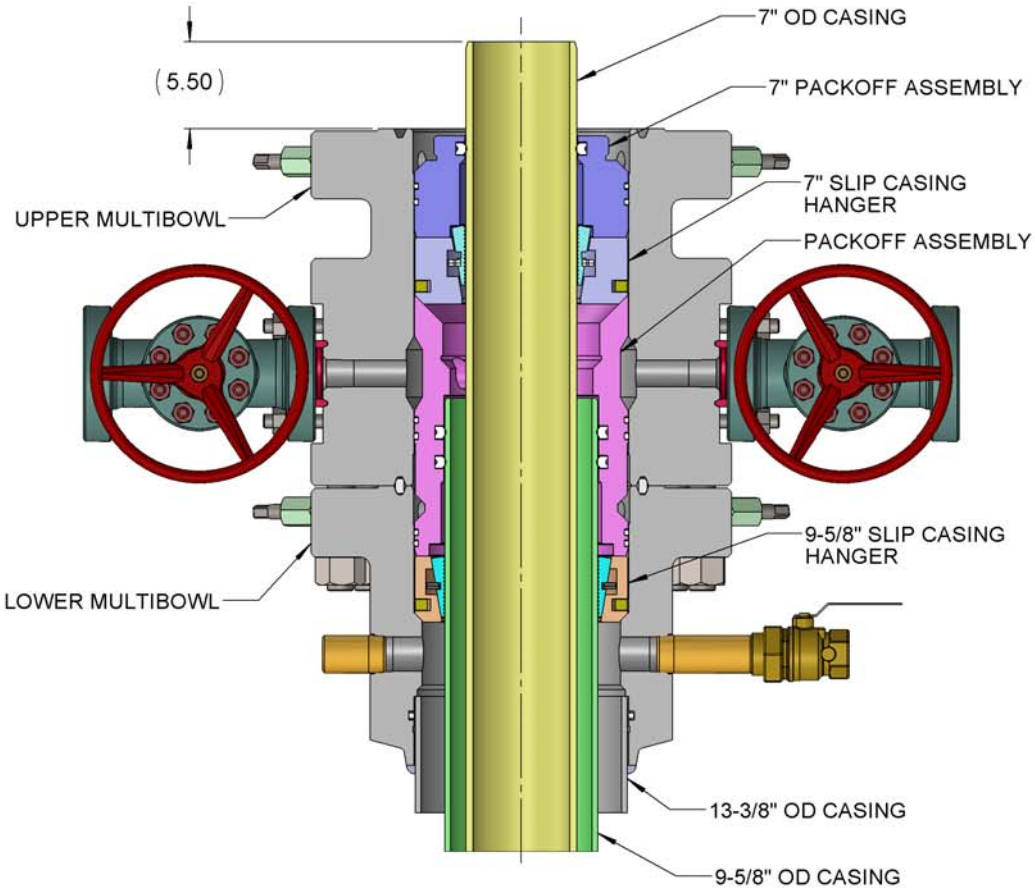
13-5/8" MULTIBOWL SYSTEM



DWG-14

13-5/8" MULTIBOWL SYSTEM



DWG-15

4.0 RECOMMENDED PROCEDURE FOR FIELD WELDING PIPE TO WELLHEAD PARTS FOR LOW PRESSURE SEAL

The following procedure is a direct extraction (except for the numeric, footnote designators) from the Fourteenth Edition of the API 6A. Editorial footnotes have been added to provide additional information that may be of benefit when developing procedures for specific field welding applications. The recommended procedure and footnotes are for general information purposes and it should be mentioned that WDi is not responsible for determining or administering any field welding practices. The organization performing the welding should qualify their welding procedure(s) and welder(s) in accordance with applicable codes and standards. The success of any field weld should be verified by subsequent hydrostatic test at the direction of the customer.

4.1 Introduction and Scope - The following recommended procedure has been prepared with particular regard to attaining pressure-tight welds when attaching casing heads, flanges, etc., to casing. Although most of the high strength casing used (such as P-110) is not normally considered field weldable, some success may be obtained by using the following or similar procedures. ***CAUTION:*** *In some wellheads, the seal weld is also a structural weld and can be subjected to high tensile stresses. Consideration must therefore be given by competent authority to the mechanical properties of the weld and its heat affected zone.*

a. The steels used in wellhead parts and in casing are high strength steels that are susceptible to cracking when welded. It is imperative that the finished weld and adjacent metal be free from cracks. The heat from welding also affects the mechanical properties. This is especially serious if the weld is subjected to service tension stresses.

b. This procedure is offered only as a recommendation. The responsibility for welding lies with the user and results are largely governed by the welder's skill. Weldability of thee several makes and grades of casing varies widely, thus placing added responsibility on the welder. Transporting a qualified welder to the job, rather than using a less-skilled man who may be at hand, will, in most cases, prove economically. The responsible operating representative should ascertain the welder's qualifications and if necessary, assure himself by instruction or demonstration, that the welder is able to perform the work satisfactorily.

4.2 Welding Conditions - Unfavorable welding conditions must be avoided or minimized in every way possible, as even the most skilled welder cannot successfully weld steels that are susceptible to cracking under adverse working conditions, or when the work is rushed. Work above the welder on the drilling floor should be avoided. The weld should be protected from dripping mud, water, and oil and from wind, rain, or other adverse weather conditions. The drilling mud, water, or other fluids must be lowered in the casing and kept at a low level until the weld has properly cooled. It is the responsibility of the user to provide supervision that will assure favorable working conditions, adequate time, and the necessary cooperation of the rig personnel.

4.3 Welding - The welding should be done by the shielded metal-arc or other approved process.

4.4 Filler Metal - After the root pass, low hydrogen electrodes or filler wires of a yield strength equal to the casing yield strength should be used. The low hydrogen electrodes include classes EXX15, EXX16, EX18, EXX28 of AWS A5.1 (latest edition): *Mild Steel Covered Arc-Welding Electrodes** and AWS A5.5 (latest edition): *Low Alloy Steel Covered Arc-Welding Electrodes**. Low hydrogen electrodes should not be exposed to the atmosphere until ready for use. Electrodes exposed to atmosphere should be dried 1 to 2 hours at 500 to

600ºF (*260 to 316ºC)* just before use. *Available from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

4.5 Preparation of Base Metal - The area to be welded should be dry and free of any paint, grease, scale, rust, or dirt.

4.6 Preheating - Both the casing and the wellhead member should be preheated to 250-400ºF (*121 to 204ºC*) for a distance of at least 3 inches (*76.2mm*) on either side of the weld location, using a suitable preheating torch. Before applying preheat, the fluid should be bailed out of the casing to a point several inches (*mm*) below the weld location. The preheat temperature should be checked by the use of heat sensitive crayons. Special attention must be given to preheating the thick sections of wellhead parts to be welded, to insure uniform heating and expansion with respect to the relatively thin casing. ***Note:*** *Preheating may have to be modified because of the effect of temperature on adjacent packing elements which may be damaged by exposure to temperatures 200ºF (93ºC) and higher. Temperature limitations of the packing materials should be determined before the application of preheat.*

4.7 Welding Technique - Use a 1/8" or 5/32" *(3.2 or 4.0mm)* E6010 electrodes and step weld the first beat (root pass); that is, weld approximately 2 to 4 inches *(50 to 100mm)* and then move diametrically opposite this point and weld 2 to 4 inches *(50 to 100mm).* Then weld 2 to 4 inches (*50 to 100mm)* halfway between the first two welds, more diametrically opposite this weld, and so on until the first pass is completed. The second pass should be make with 5/32" *(4.0mm)* low hydrogen electrode of the proper strength and may be continuous. The balance of the welding groove may then be filled with continuous passes without back stepping or lacing, using a 3/16" *(4.8mm)* low hydrogen electrode. All beads should be stringer beads with good penetration, and each bead after the root pass should be thoroughly peened before applying the next bead. There should be no undercutting and welds shall be workmanlike in appearance.

a. Test ports should be open when welding is performed to prevent pressure build-up within the test cavity.

b. During welding the temperature of the base metal on either side of the weld should be maintained at 250ºF *(121ºC)* minimum.

c. Care should be taken to insure that the welding cable is properly grounded to the casing, but ground wire should not be welded to the casing or the wellhead. Ground wire should be firmly clamped to the casing, the wellhead, or fixed in position between pipe slips. Bad contact may cause sparking, with resultant hard spots beneath which incipient cracks may develop; The welding cable should not be grounded to the steel derrick, nor to the rotary-table base.

4.8 Cleaning - All slag or flux remaining on any welding bead should be removed before laying the next bead. This also applies to the completed weld.

4.9 Defects - Any cracks or blow holes that appear on any bead should be removed to sound metal by chipping or grinding before depositing the next bead.

4.10 Postheating - For the removal of all brittle areas on high strength steel casing, a post heat temperature of 1050-1100ºF *(566 to 593ºC)* is desirable. It is recognized, however, that this temperature is difficult or impossible to obtain in the field, and that the mechanical properties of the wellhead parts and the pipe may be considerably reduced by these temperatures. As a practical matter, the temperature range of 500-900ºF *(260-482ºC)* has been used with satisfactory results.

4.11 Cooling - Rapid cooling must be avoided. To assure slow cooling, welds should be protected from extreme weather conditions (cold, rain, high winds, etc.). By the use of a blanket made from suitable insulating material. Particular attention should be given to maintaining uniform cooling of the thick sections of the wellhead parts and the relatively thin casing will pull away from the head or hanger if allowed to cool more rapidly. The welds should cool in air to 250ºF *(121ºC)* (measured with a heat sensitive crayon) prior to permitting the mud to rise in the casing.