

**OPERATING INSTRUCTIONS FOR PETERSEN® 151-SERIES HIGH LIFT FLANGE
TEST & WELD PLUGS**

SIZES 10" TO 24"

These operating instructions give step by step instructions on the use of High Lift Flange Weld Test Plugs. These plugs can be used in two different configurations as a testing plug and a welding plug. The test plug configuration allows the flange to pipe weld to be tested after welding. The weld plug configuration aids in the welding of the flange to pipe while monitoring upstream pressure and also allows the weld to be tested after welding. Follow steps labeled **TP** for test plug configuration, **WP** for weld plug configuration and **TP WP** for both.

WARNING!

- **PRESSURE TESTING IS INHERENTLY DANGEROUS. STRICT ADHERENCE TO THESE OPERATION INSTRUCTIONS AND INDUSTRY SAFETY PRACTICES COULD PREVENT INJURY TO PERSONNEL.**
- **ALL PERSONNEL MUST BE CLEAR OF TEST PLUG WHEN PRESSURE TESTING.**
- **FOR SAFETY, AN INCOMPRESSIBLE LIQUID SUCH AS WATER SHOULD BE USED AS THE TEST MEDIUM, RESIDUAL AIR OR GAS IS TO BE EVACUATED FROM THE PIPE PRIOR TO TESTING.**

PRIOR TO USE

- Verify marking on seal with o-ring and replacement washer is equivalent to the pipe size being tested. They should be marked with the flange size and pipe schedule. The seal and the washer OD is sized approximately ½" smaller than the pipe ID. *Replacement washers are required on all sizes except the smallest schedule available. The following sizes do **NOT** have replacement washers. 10" schedule 100, 12" schedule 80, 14" schedule 140, 16" schedule 120, 18" schedule 120, 20" schedule 100 and 24" schedule 120*
- Inspect the raised face (gasket surface) of the Flange Plug and mating flange to be tested. Damage or surface imperfections may result in leakage and should be repaired prior to testing.
- Clean and dry the pipe ID. Remove all moisture, debris, and excessive scale.

STEP 1

TP ATTACHMENT OF TEST PLUG TO MATING FLANGE

- Any weld droop or spatter that protrudes into pipe ID more than the clearance listed in table 1 must be removed to allow plug installation.
- Apply gasket to mating flange face and position Flange Plug against mating flange. Rotate plug as required locating purge vent at highest point and installing flange bolts. Tighten bolts in a cross-like pattern to properly seal the flange gasket.

WP ATTACHMENT OF WELDING PLUG SET-UP TO MATING FLANGE

- Locate the flange to be welded on the pipe using an alignment tool (*The Flange Test & Welding Plug is not designed to support to position flange to be welded.*) Apply gasket to mating flange

face and insert the flange plug into the flange and pipe with the inert gas purge ports oriented at the top and bottom of the flange. Tighten bolts in a cross-like pattern to properly seal the flange gasket.

STEP 2

TP WP TIGHTENING AND EXPANSION OF SEAL ELEMENT

- Correct tightness of hex nut is critical to the operation of the Flange Test & Welding Plug, a leak of the seal is usually an indication the hex nuts were not adequately tightened. The normal torque listed in table 1 should be adequate for most installations, however due to variations within pipe ID finishes the torque may need to be increased up to the maximum torque value listed in table 1. If at the maximum torque the plus still leaks, verify the correct seal and washers are being used. Verify that the seal O-ring is seated correctly in the groove on seal and that the O-ring is not damaged, (10" and 12" plugs only).
- Tighten hex nuts in a cross-like pattern in approx. 100ft/lbs (135.6N-m) increments using an impact wrench until torque specified in Connect hydro-pump to fill port on Flange. Slowly begin to fill the plug until water flows from the vent. Discontinue water input and install plug leak tight.

STEP 3

WP PREPARATION FOR WELDING

- Make connection to upstream monitor port that will clearly indicate an increase of pressure or the presence of dangerous gases. In addition, upstream vapors may be vented by attaching approximately 50 ft. (15.2m) of hose to the vent port, and locating the end of the hose downwind from the weld area.

For normal conditions where Inert Gas Purge is not required:

- Remove pipe plugs from fill and vent plugs on the flange or make connections to fill and vent ports as required by welding safety procedures.

If Inert gas purge is required:

- Remove pipe plugs from the fill and vent ports on the flange.
- Connect Inert Gas supply to fill port. Make connections to vent port as required to monitor or regulate the flow of inert gas.
- Initiate Inert Gas purge and adjust Inert Gas pressure regulator as required to maintain a slight positive pressure during welding. As welding proceeds, adjust Inert Gas flow as needed to insure weld quality.

STEP 4

WP WELDING

- **NOTE: Do not let the weld protrude into the pipe ID by more than the values listed in Table 1 or grinding of the pipe ID may be required for plug removal.**
- Begin welding the flange to the pipe while monitoring upstream pressure. Stop welding immediately if the upstream pressure increases which indicates flow in the line. During welding the pipe at the seal location must not become too hot to touch by hand. Should the pipe in the seal location become too hot to touch by hand, discontinue welding and allow pipe to cool.

STEP 5

TP WP HYDROSTATIC PRESSURE TEST

- **WARNING! NEVER ATTEMPT TO ADJUST THE FLANGE TEST & WELDING PLUG WHILE UNDER PRESSURE. NEVER EXCEED THE TEST PRESSURES IN TALBE 2**
- Remove the vent plug. Connect hydropump to fill port on Flange. Slowly begin to fill the plug until water flows from the vent. Discontinue water input and install the vent plug leak tight. Refer to Table 2 for the maximum test pressure for the Flange Test Plug. The test pressure must never exceed the strength of the weakest component in the system being tested. Slowly introduce the test pressure. If a pressure decay test will be conducted, hold at desired pressure with pump for a minimum of 5 minutes prior to closing isolation valve. This will allow parts to settle. Continue holding the desired pressure to meet testing requirements. If pressure drops off a large amount or a leak between seal and tube ID is detected, tighten the hex nut until leak is sealed. (*Do not exceed maximum installation torque*). After the test is completed, release all pressure. Remove the fill and vent plugs to drain water. Remove all testing equipment. Loosen the hex nuts to fully relax seal. Loosen and remove hex nuts and flange mounting bolts. Withdraw the Flange Test Plug from the pipe.

INSPECT PLUG AFTER EACH USE Surface imperfections on the flange face should be fixed prior to further testing. Replace worn or damaged seals and O-rings. Clean and dry prior to storage. Store these instructions with plug.

TABLE 1 High Lift Flange Weld Test Plug Clearance and Suggested Installation Torque Values

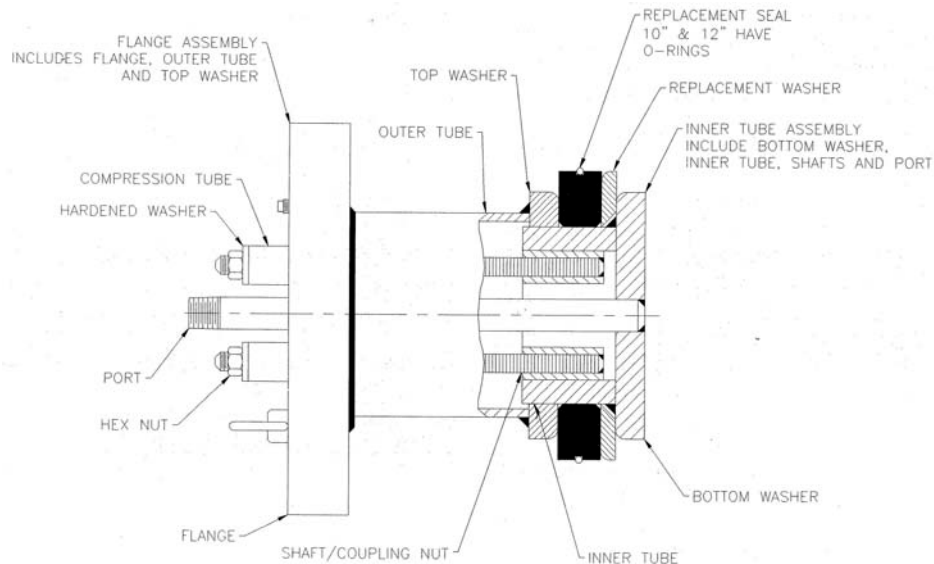
| Flange Size | ANSI Flange Class | Clearance Between Seal OD and Pipe In (mm) | Normal Installation Torque Ft-lbs (N-m) | Maximum Installation Torque Ft-lbs (N-m) |
|-------------|-------------------|--|---|--|
| 10" DN250 | 150 | 1/2" (12.7) | 150 (203.4) | 600 (813.5) |
| 10" DN250 | 300 | 1/2" (12.7) | 200 (271.2) | 600 (813.5) |
| 10" DN250 | 600 | 1/2" (12.7) | 300 (406.8) | 600 (813.5) |
| 12" DN300 | 150 | 1/2" (12.7) | 200 (271.2) | 600 (813.5) |
| 12" DN300 | 300 | 1/2" (12.7) | 250 (339.0) | 600 (813.5) |
| 12" DN300 | 600 | 1/2" (12.7) | 300 (406.8) | 600 (813.5) |
| 14" DN350 | 150 | 1/2" (12.7) | 200 (271.2) | 600 (813.5) |
| 14" DN350 | 300 | 1/2" (12.7) | 300 (406.8) | 600 (813.5) |
| 14" DN350 | 600 | 1/2" (12.7) | 300 (406.8) | 600 (813.5) |
| 16" DN400 | 150 | 1/2" (12.7) | 200 (271.2) | 600 (813.5) |
| 16" DN400 | 300 | 1/2" (12.7) | 300 (406.8) | 600 (813.5) |
| 16" DN400 | 600 | 1/2" (12.7) | 300 (406.8) | 600 (813.5) |
| 18" DN450 | 150 | 1/2" (12.7) | 250 (339.0) | 600 (813.5) |
| 18" DN450 | 300 | 1/2" (12.7) | 350 (474.5) | 600 (813.5) |
| 18" DN450 | 600 | 1/2" (12.7) | 350 (474.5) | 600 (813.5) |
| 20" DN500 | 150 | 1/2" (12.7) | 250 (339.0) | 600 (813.5) |
| 20" DN500 | 300 | 1/2" (12.7) | 350 (474.5) | 600 (813.5) |
| 20" DN500 | 600 | 1/2" (12.7) | 350 (474.5) | 600 (813.5) |
| 24" DN600 | 150 | 1/2" (12.7) | 300 (406.8) | 600 (813.5) |
| 24" DN600 | 300 | 1/2" (12.7) | 400 (542.3) | 600 (813.5) |
| 24" DN600 | 600 | 1/2" (12.7) | 400 (542.3) | 600 (813.5) |

TABLE 2 High Lift Flange Weld Test Plug Maximum Test Pressuers

| Flange Size | ANSI Flange Class | Maximum Test Pressure PSI (Bar) |
|-----------------------|-------------------|------------------------------------|
| 10" DN250 – 24" DN600 | 150 | 450 (31.0) |
| 10" DN250 – 24" DN600 | 300 | 1125 (77.6) |
| 10" DN250 – 12" DN300 | 600 | 2250 (155.1) |
| 14" DN350 – 24" DN600 | 600 | 1125 (77.6) |

REPLACEMENT SEAL & WASHER PROCEDURE

1. Remove hex nuts, hardened washers & compression tubes, if present, from Flange Test Plug.
2. Remove the flange assembly from the inner tube assembly.]
3. The seal may now be removed from the inner tube assembly. (The 10" and 12" size seals have O-rings)
4. Verify marking on seal and replacement washer is equivalent to the pipe size being tested. They should be marked with the flange size and pipe schedule. *Replacement washers are required on all sizes except the smallest schedule available. The following sizes do **NOT** have replacement washers. 10" schedule 100, 12" schedule 80, 14" schedule 140, 16" schedule 120, 18" schedule 120, 20" schedule 100 and 24" schedule 120.*
5. Install the replacement washer so the radius on outside edge is towards the seal. The replacement washer has an internal chamber for weld clearance. Ensure this is installed correctly. Install the seal.
6. Place the flange assembly back onto the inner tube assembly.
7. Install the compression tubes, if present, the hardened washers and the hex nuts.
8. The Flange Test Plug is ready for testing.



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