

## HL2 STANDARD 6"-24" HIGH LIFT FLANGE WELD TEST PLUG OPERATING INSTRUCTIONS

These operating instructions give step by step instructions on the use of the High Lift Flange Weld Test Plug. 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 OPERATING 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 DISPLACED FROM THE PIPE PRIOR TO TESTING.**

### **PRIOR TO USE:**

- ◆ Verify marking on seal with O-Ring is equivalent to the pipe size being tested. They should be marked with the flange size and pipe schedule. The seal OD is sized approximately 1/2" smaller than the pipe ID
- ◆ **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 or 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 nuts are 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 plug still leaks, verify the correct seal is 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 increments using an impact wrench until torque specified in Table 1 has been reached. Verify this torque with a calibrated torque wrench.

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## 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 hose to the upstream 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 TABLE 2**
- Install plug as outlined in STEP 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 max. 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 incrementally 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-Ring's. Clean and dry prior to storage. Store these instructions with plug. See Table 3 for replacement parts list

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**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	NORMAL INSTALLTION TORQUE	MAXIMUM INSTALLATION TORQUE	HEX NUT WRENCH SIZE
		in (mm)	Ft-lbs (N-m)	Ft-lbs (N-m)	(in)
6" DN150	150	1/2 (12.7)	35 (47.5)	80 (108.5)	3/4
6" DN150	300	1/2 (12.7)	45 (61.0)	80 (108.5)	3/4
6" DN150	600	1/2 (12.7)	50(67.8)	80 (108.5)	3/4
8" DN200	150	1/2 (12.7)	60 (81.3)	155(210.2)	1-1/16
8" DN200	300	1/2 (12.7)	70 (94.9)	155(210.2)	1-1/16
8" DN200	600	1/2 (12.7)	80 (108.5)	155(210.2)	1-1/16
10" DN250	150	1/2 (12.7)	150 (203.4)	600 (813.5)	1-5/8
10" DN250	300	1/2 (12.7)	200 (271.2)	600 (813.5)	1-5/8
10" DN250	600	1/2 (12.7)	300 (406.8)	600 (813.5)	1-5/8
12" DN300	150	1/2 (12.7)	150 (203.4)	600 (813.5)	1-5/8
12" DN300	300	1/2 (12.7)	250 (339.0)	600 (813.5)	1-5/8
12" DN300	600	1/2 (12.7)	300 (406.8)	600 (813.5)	1-5/8
14" DN350	150	1/2 (12.7)	200 (271.2)	600 (813.5)	1-5/8
14" DN350	300	1/2 (12.7)	300 (406.8)	600 (813.5)	1-5/8
14" DN350	600	1/2 (12.7)	300 (406.8)	600 (813.5)	1-5/8
16" DN 400	150	1/2 (12.7)	200 (271.2)	600 (813.5)	1-5/8
16" DN 400	300	1/2 (12.7)	300 (406.8)	600 (813.5)	1-5/8
16" DN 400	600	1/2 (12.7)	300 (406.8)	600 (813.5)	1-5/8
18" DN450	150	1/2 (12.7)	250 (339.0)	600 (813.5)	1-5/8
18" DN450	300	1/2 (12.7)	350 (474.5)	600 (813.5)	1-5/8
18" DN450	600	1/2 (12.7)	350 (474.5)	600 (813.5)	1-5/8
20" DN500	150	1/2 (12.7)	250 (339.0)	600 (813.5)	1-5/8
20" DN500	300	1/2 (12.7)	350 (474.5)	600 (813.5)	1-5/8
20" DN500	600	1/2 (12.7)	350 (474.5)	600 (813.5)	1-5/8
24" DN600	150	1/2 (12.7)	300 (406.8)	600 (813.5)	1-5/8
24" DN600	300	1/2 (12.7)	400 (542.3)	600 (813.5)	1-5/8
24" DN600	600	1/2 (12.7)	400 (542.3)	600 (813.5)	1-5/8

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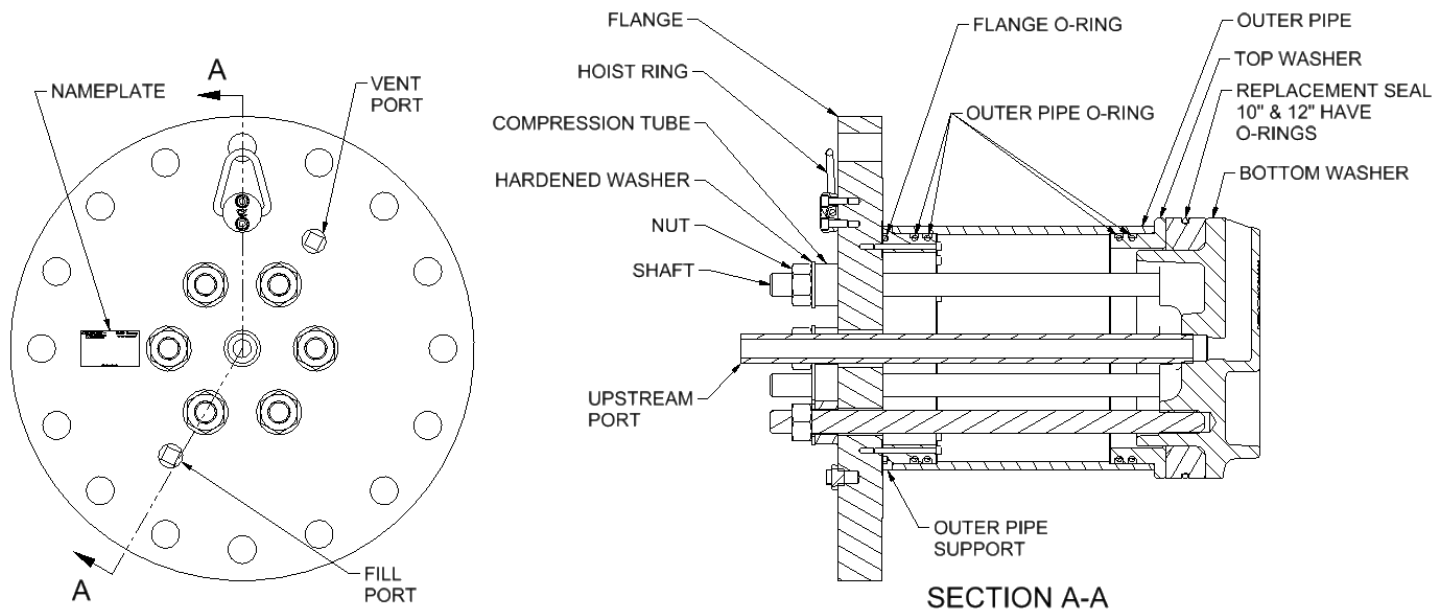
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**TABLE 2. High Lift Flange Weld Test Plug Maximum Test Pressures**

FLANGE SIZE	ANSI FLANGE CLASS	MAXIMUM TEST PRESSURE
		PsiG (BarG)
6" DN150 - 24" DN600	150	450 (31.0)
6" DN150 - 24" DN600	300	1125 (77.6)
6" DN150 - 24" DN600	600	2250 (155)

**REPLACEMENT SEAL PROCEDURE**

1. Remove hex nuts, hardened washers & compression tubes, if present, from Flange Test Plug.
2. Remove the flange/outer pipe/top washer.
3. The seal may now be removed from the bottom washer. (The 10" and 12" size seals have O-Ring's)
4. Install the seal.
5. Place the top washer, outer pipe, flange/outer pipe support back onto the bottom washer
6. Install the compression tubes, if present, the hardened washers and the hex nuts.
7. The Flange Test Plug is ready for testing.



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TABLE 3. Replacement Part List

REPLACEMENT PART LIST				REPLACEMENT PART LIST			
PIPE SIZE	PIPE SCHEDULE	REPLACEMENT SEAL PART NUMBER	O-RING DASH NUMBER	PIPE SIZE	PIPE SCHEDULE	REPLACEMENT SEAL PART NUMBER	O-RING DASH NUMBER
6	sch160	HLS-6P160-RS	N/A	14	sch 140	HL-14P140-RS	N/A
6	sch 120	HLS-6P120-RS	N/A	14	sch 120	HL-14P120-RS	N/A
6	sch 80	HLS-6P80-RS	N/A	14	sch 100	HL-14P100-RS	N/A
6	sch 40	HLS-6P40-RS	N/A	14	sch 80	HL-14P80-RS	N/A
6	sch 10	HLS-6P10-RS	N/A	14	sch 60	HL-14P60-RS	N/A
6	sch 5	HLS-6P5-RS	N/A	14	sch xs	HL-14PXS-RS	N/A
8	sch 160	HLS-8P160-RS	N/A	14	sch 40	HL-14P40-RS	N/A
8	sch XXS	HLS-8PXXS-RS	N/A	14	sch 30/std	HL-14PSTD-RS	N/A
8	sch 140	HLS-8P140-RS	N/A	14	sch 20	HL-14P20-RS	N/A
8	sch 120	HLS-8P120-RS	N/A	14	sch 10/10s/5	HL-14P10-RS	N/A
8	sch 100	HLS-8P100-RS	N/A	16	sch 120	HL-16P120-RS	N/A
8	sch 80	HLS-8P80-RS	N/A	16	sch 100	HL-16P100-RS	N/A
8	sch 60	HLS-8P60-RS	N/A	16	sch 80	HL-16P80-RS	N/A
8	sch 40	HLS-8P40-RS	N/A	16	sch 60	HL-16P60-RS	N/A
8	sch 30	HLS-8P30-RS	N/A	16	sch 40/xs	HL-16P40-RS	N/A
8	sch 20	HLS-8P20-RS	N/A	16	sch 30/std	HL-16PSTD-RS	N/A
8	sch 10	HLS-8P10-RS	N/A	16	sch 20	HL-16P20-RS	N/A
8	sch 5	HLS-8P5-RS	N/A	16	sch 10/10s/5	HL-16P10-RS	N/A
10	sch 100	HL-10P100-RS	-445	18	sch 120	HL-18P120-RS	N/A
10	sch 80	HL-10P80-RS	-446	18	sch 100	HL-18P100-RS	N/A
10	sch 60/xs	HL-10PXSR	-446	18	sch 80	HL-18P80-RS	N/A
10	sch 40/std	HL-10P40-RS	-447	18	sch 60	HL-18P60-RS	N/A
10	sch 30	HL-10P30-RS	-447	18	sch 40	HL-18P40-RS	N/A
10	sch 20	HL-10P20-RS	-447	18	sch xs	HL-18PXS-RS	N/A
10	sch 10s	HL-10P10S-RS	-448	18	sch 30	HL-18P30-RS	N/A
10	sch 5	HL-10P5-RS	-448	18	sch std	HL-18PSTD-RS	N/A
12	sch 80	HL-12P80-RS	-449	18	sch 20	HL-18P20-RS	N/A
12	sch 60	HL-12P60-RS	-450	18	sch 10/10s/5	HL-18P10-RS	N/A
12	sch xs	HL-12PXS-RS	-450	20	sch 100	HL-20P100-RS	N/A
12	sch 40/std	HL-12P40-RS	-451	20	sch 80	HL-20P80-RS	N/A
12	sch 30	HL-12P30-RS	-451	20	sch 60	HL-20P60-RS	N/A
12	sch 20	HL-12P20-RS	-451	20	sch 40	HL-20P40-RS	N/A
12	sch10s/ 5	HL-12P10S-RS	-452	20	sch 30/xs	HL-20PXS-RS	N/A
				20	sch 20/std	HL-20PSTD-RS	N/A
				20	sch 10	HL-20P10-RS	N/A
				24	sch 120	HL-24P120-RS	N/A
				24	sch 100	HL-24P100-RS	N/A

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