

Petersen® 129-Series Multi-Flex™ Line Stop Plug Installation (Hot Tap)
Generic Instruction Summary (Air Inflation)

Warning!

Read and understand before using Petersen® Plugs. Failure to comply may result in property damage, serious injury or death!

SAFETY IS EVERYONE'S RESPONSIBILITY!

*Very high forces are involved in many pipeline-plugging situations. Forces increase dramatically as pressure and pipe diameter increase. Extreme care must be taken to assure the safe use of any Pipe Plug or Flusher. Maximum inflation pressure and backpressure limits for Plugs are affected by many factors including pipeline debris, fluid and surface condition. If you do not understand these instructions or how to calculate the forces involved, consult a qualified professional engineer to advise you. **These instructions must be available to all Petersen® Plug users. All workers on the job must be trained for proper use.***

1. Hot Tap Plugging Components:

- 1.1. **The Plug Launch Cylinder** must be somewhat longer than the Multi-Flex™ Line Stop Plug with all its attachments. A Packing Gland is attached to one end to provide a seal around the Inflation Ram as it pushes the Multi-Flex™ Plug into the pipeline.
- 1.2. **The Inflation Ram** is a tube that makes a mechanical connection to the Plug and is used for both inflation and positioning of the Plug.
- 1.3. **Inflation Ram Anchor lugs** allow the Inflation Ram to be anchored to prevent it from being pushed out by pipeline or inflation pressure.
- 1.4. **The Tapping Saddle** for the pipeline to be plugged is available for any style pipe and can be supplied by Petersen or others.
- 1.5. **The Tapping Valve** must have a full port to allow drilling the hot tap and inserting the Plug through the valve.
- 1.6. **Hot Tapping Equipment** is used to make the hot tap after a nozzle or saddle and valve are installed and pressure tested. Petersen has Hot Tap Drilling Equipment for up to 6" diameter. Larger sizes are available from others.

2. Making the Hot Tap:

- 2.1. **Attach a Tapping Saddle** to the pipeline to be tapped or weld on a nozzle.
- 2.2. **Attach a "full port" Tapping Valve** to the hot tap sleeve or nozzle.
- 2.3. **Test** for leaks through the test port on the hot tap sleeve or nozzle. If there is no test port, test through the valve before drilling into the pipeline.
- 2.4. **Attach the Hot Tapping Drilling Equipment** to valve.
- 2.5. **Open the valve** completely.
- 2.6. **Open the Chip Valve** on the hot tap drilling machine to allow drilling chips to be washed out and to provide a differential pressure to help capture the coupon.
- 2.7. **Drill the Hot Tap Hole** into the pipeline and retract the drill.
- 2.8. **Close the Hot Tap Valve** and check for leaks.
- 2.9. **Remove the Hot Tapping Drilling Equipment.**

3. Pipeline Insertion of Hot Tap Plug:

- 3.1. **Examine the Plug and Launch Equipment** to assure they are in good order.
- 3.2. **Tighten the Inflation Port Flange Nuts.** 3/8" - 33 ft. lbs, 1/2" 80 ft. lbs, 3/4" 282 ft. lbs.
- 3.3. **Assemble the Inflation Ram** and torque the set screws to maintain section orientation. (1/4"- 73 in lbs, 3/8" - 300 in lbs)
- 3.4. **Install the Inflation Ram** through the Packing Seal if not installed. Take care not to damage the O-ring Packing Seal. Install entire assembly into Launch Cylinder and secure Packing Gland to Launch Cylinder. Use two Anchor Lugs provided in place of bolts on opposite ends of Flange.
- 3.5. **Fold the Plug** to have the same amount of material on each side of the Inflation Ram. Rubber bands or light string that will easily break during inflation may be used to keep Plug folded. Heavy rubber bands do not allow the Plug to

- open evenly.
- 3.6. **Attach the Plug to the Inflation Ram.** Hold the Plug Inflation Port securely to prevent damage to the Plug at the Inflation Connection.
 - 3.6.1. **FLANGE-Style Connection:**
 - 3.6.1.1. Examine and clean flanges, bolts, nuts and washers.
 - 3.6.1.2. Lightly lubricate bolt and nut threads.
 - 3.6.1.3. Install flange gasket.
 - 3.6.1.4. Install raised face flange.
 - 3.6.1.5. Install flat washers.
 - 3.6.1.6. Pre-tighten all hex nuts.
 - 3.6.1.7. Sequence torque in a circular cross – pattern: 1, 3, 2, 4 etc...
 - 3.6.1.8. Orient the Plug length in line with the pipeline and mark orientation on the Inflation Ram.
 - 3.6.2. **PIPE-THREAD-Style Connection:**
 - 3.6.2.1. Wrap Teflon tape or apply Teflon pipe dope to threaded end of Inflation Ram.
 - 3.6.2.2. Screw Plug securely onto end of Inflation Ram.
 - 3.6.2.3. Mark orientation of Plug length onto inflation end of Inflation Ram.
 - 3.7. **Pull the Multi-Flex™ Plug** into the Launch Cylinder with the Inflation Ram.
 - 3.8. **Mark the Inflation Ram** with the plug orientation and maintain this orientation as the plug is pushed into the pipeline so plug inflates in line with pipeline.
 - 3.9. **Position the Stop Collar** on the Inflation Ram to set the insertion distance to position the bottom of the Plug Inflation Port just below the wall of the pipeline. The flange should hold the plug below any burrs or sharp edges on the tapped hole.
 - 3.10. **Attach the Plug Launch Cylinder** to the Hot Tap Valve.
 - 3.10.1. **Attach the Inflation Pressure Hose** to the Inflation Ram but **do not apply pressure to the Plug.**
 - 3.11. **Open the Hot Tap Valve** and allow the pipeline pressure to equalize in the Launch Cylinder and tapped pipeline.
 - 3.12. **Stop the flow** in the pipeline.
 - 3.12.1. **Push the Multi-Flex™ Line Stop Plug into the pipeline** with the Inflation Ram to the preset collar stop position **Maintain the proper plug orientation** with the pipeline as the Plug is inserted.
 - 3.12.2. **When inserting a plug into a pipeline** it may be necessary to partially inflate then deflate the plug several times to unfold and orientate the plug to allow the Inflation Ram Positioning Collar to be pushed to correct position. This is especially necessary for plugs under 8" dia inserted through a tight hot tap. Do not inflate over 10% of the maximum inflation pressure until the Inflation Ram is locked into its correct position.
 - 3.13. **Anchor the Inflation Ram** to Anchor Lugs to prevent the pipeline and inflation pressure from pushing the Inflation Ram back out of the Launch Cylinder.
 - 3.13.1. **Calculate the forces** on the Inflation Ram in advance to determine the anchoring requirements.
4. **Plug Inflation:** Never exceed the Maximum Plug Inflation Pressure
 - 4.1. **Air Inflation:** Use a bleeding type pressure regulator and relief valve to maintain the correct pressure with changing temperature and head pressure.
 - 4.1.1. **Pressure Monitoring:** It is especially important to monitor the internal inflation pressure when inflating the Plug.
 5. **Removal of Multi-Flex™ Plug:**
 - 5.1. **Equalize the head pressure** on both sides of the Plug.
 - 5.2. **Deflate the Plug.**
 - 5.3. **Pull the Plug back** into the Launch Cylinder after it is deflated completely. The Purge Valve on the Launch Cylinder may be opened to relieve pressure and help move the Plug back into the Launch Cylinder. It may be helpful to use a vacuum pump or a shop vacuum to deflate the Plug and a winch to pull the Inflation Ram.
 - 5.4. **Close the Hot Tap Valve.**
 - 5.5. **Remove the Plug Launch Cylinder** and Multi-Flex™ Line Stop Plug.