

Petersen[®] Hydraulic Sewer Flushers Operation and Maintenance Instructions

Warning!

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

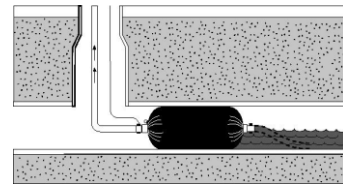
SAFETY IS EVERYONE'S RESPONSIBILITY!

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 and Flusher users. All workers on the job must be trained for proper use.

I. General Instructions:

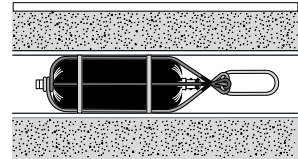
- A. **Standard Multi-Flex™ Pipe Plugs:** Petersen[®] Multi-Flex™ Plugs are made of materials with a very high tensile strength to provide high flexibility, strength, and excellent long term durability. The plugs without a by-pass have a large inflation port to allow inflating with air, nitrogen or water. The by-pass style plugs allow the flow to continue and still have great flexibility. The Multi-Flex™ Plug will provide long service by following industry safety standards and the below specific instructions. Plugs may be connected and inflated in series.
- B. **Keep out of area in line with plug ends during use.** This is any area near a line of sight to any part of the plug. Petersen[®] Inflatable Plugs are not approved pressure vessels and there are many unknown variables that determine pressure characteristics in the pipeline and plug including pipeline debris, temperature, and coefficient of friction of pipe surfaces, especially when slippery substances are involved. Never use where failure may result in injury or property damage. Inflation with water is normally much safer than inflation with compressed air.
- C. **Inspect the product before and after each use.** Fabric must not be torn, frayed or abraded. End clamps must not protrude over the end of fabric. No structural damage should be apparent. Test air retention by inflating plug inside a pipe. A large diameter plug may be tested in a much smaller diameter pipe.
- D. **Insert plugs completely into the pipeline.** The maximum inflation and backpressure on the pressure ratings assume plugs are fully inserted in a clean pipe and are only estimates. Pressures are influenced by many factors including the pipe diameter, fluid in the pipe, temperature, and the condition of the pipe surface.
- E. **Always position the plug where there are no sharp edges or protrusions** that may puncture the plug. **Completely enclose** the plug within the pipe so the entire plug surface area is supported. When not supported in a pipe, the plug will rupture at a much lower pressure.
- F. **Before installing under water** it may be necessary to first inflate the plug slightly (never more than 10% of the rated inflation pressure) to drive out air between the plies and then to pull a vacuum on the plug. This is sometimes necessary to reduce buoyancy and allow the plug to sink in water.



- G. **Inflate the plug using a relieving style pressure regulator** or pressure relief valve to maintain proper inflation pressure. Never inflate more than the maximum pressure rating for the pipe diameter listed in the Product Specification Table for the plug style used. Changes in temperature, pipeline pressure, atmospheric pressure, and fabric stretching can dramatically change the plug pressure. Check the calibration of the pressure gauge before using. A relieving style pressure regulator and/or pressure relief valve must compensate for these factors and prevent over-inflation that could rupture the plug. When a pressure source is removed, check the pressure at least every fifteen minutes the first hour and every two hours thereafter. **Use an approved back-flow preventive device** when a potable water source is used as an inflation pressure source. An optional dual hose adapter is available for inflation and pressure monitoring to more accurately monitor the plug inflation pressure during inflation. After inflation, the pressure reading on both hoses should be the same.



- H. **Provide a mechanical blocking system** to prevent slippage when plugging a pressurized pipeline. Calculate pressures involved to estimate securing requirements. The coefficient of friction will vary with different pipe materials and also with fluids and debris inside the pipe.



- I. **Use rope, chain or cable attached to pull rings** when positioning, securing or removing to prevent damage to inflation hose. These or straps are not for anchoring the plug against head pressure.

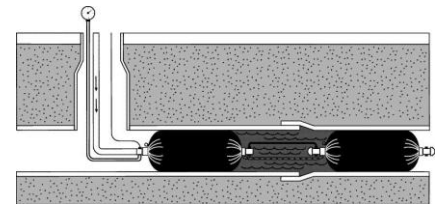
- J. **An optional Petersen® Anchoring Harness** is available for anchoring.

- K. **Use an inflation hose** long enough to allow inflation from a safe area. An optional Lift Hose assembly is available.

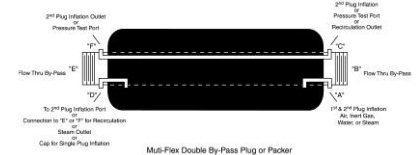
- L. **Deflate the plug after the backpressure is relieved.** If a plug is deflated while under pipeline head pressure, the head pressure will propel it down the pipeline with tremendous force if not securely anchored.

II. Pipeline Segment Testing:

- A. The by-pass allows flow through the plug by gravity or pumping while it is inflated. There is a NPT by-pass and NPT inflation port on both ends of the plug to allow two or more plugs to be connected and inflated in series for testing a pipeline segment. The by-pass may be plugged with a standard NPT pipe plug or cap when the plug is simply used for blocking.



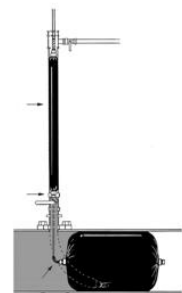
- B. Testing a pipe segment is accomplished by using two plugs with the inflation ports connected and pressurized in series. The by-pass on the second plug is plugged and the pipe segment is pressurized and tested through the by-pass on the first plug. An optional Double By-pass is also available on larger plugs.



- C. If a Multi-Flex™ Plug is to be used for testing, it will have a suffix “T” to designate sealing rings. Standard Multi-Flex™ Plugs are flexible and have a small deflated diameter, but may not always make a total air tight seal. If used for air testing, some sizes may need optional sealing rings.

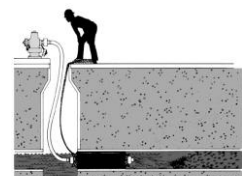
III. Hot Tap Plug Insertion:

- A. The small deflated diameter allows the Multi-Flex™ Plug to be inserted through hot (live) tap. If possible, position the plug downstream from a hot tap and secure the plug to prevent slipping. The Hot Tap Plug options include an internal Anchor Harness, Bow Stiffener, Directional Shoe, and Removal Cone to help navigate the plug around a 90 degree bend into the tapped pipeline. The Petersen® Hot Tap Plug Insertion System is available to help facilitate the insertion. Contact Petersen for specific instructions.



IV. Pipeline Flushing:

- A. Instructions and warnings are similar to Pipe Plugs. Read above instructions carefully.



- B. 114 and 124-Series Multi-Flex™ Plugs without a by-pass may be used for flushing a pipeline. Remove the pipe cap on non-by-pass plugs opposite the inflation end and direct the flow of water through the plug. The internal backpressure created by the flow will inflate the bladder to force water into the pipeline.
- C. **Connect a hose between the water source and Petersen® Flusher.** The inside diameter of the water source and the hose must be larger than the Petersen® Flusher outlet size. Remove any pipe cap from the outlet and if necessary, reduce the outlet size with a reducing coupling to speed inflation if used with a low flow water source.
- D. **Installation:** Insert in pipeline to be cleared where no open branches or outlets are between the Petersen® Flusher and blockage. If necessary, simultaneously block any branches with Petersen® Plugs.
- E. **Flushing:** Turn on the water full force to provide jet action and water volume to flush the sewer clear. In large diameter pipelines, it may be necessary to direct the flushing action upstream to fill the pipeline. Then, when the water to the Flusher is turned off, the large reservoir of water is released to flush out the stoppages and debris. Never fill the upstream pipeline enough to back up water into connected facilities. Hot water works best for clearing sludge, grease, paraffin, etc. If a by-pass plug is used for flushing, inflate the plug and direct the flow of water through the by-pass.

V. Temperature and Fluid Compatibility:

- A. **Do not use Standard Plugs or Flushers with temperatures over 180°F or with chemicals that may attack nylon, neoprene or polyurethane.** Contact Petersen for custom configurations to meet specific temperature or chemical requirements.

VI. Maintenance and Care:

- A. **Clean with detergent and water** after each use, disinfect if necessary. Never clean with solvents or petroleum products!
- B. **Carefully inspect before and after each use** for abrasions, tears, movement of clamps, air leaks or any other sign of deterioration or defect. Large plugs may be leak-tested in smaller diameter pipes.
- C. **Repair small leaks and cuts with Petersen® Repair Kits** or return to Petersen for repair. Destroy the product if there are more than minor punctures, tears or abrasions that are not easily repairable.
- D. **For maximum durability, store in clean dry area,** away from direct sunlight and in a manner that allows plug to remain dry.

Contact Petersen with any questions or suggestions relating to the use of any Petersen product.

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