

Pipe Plug Safety: *Don't Let the Pressure Get to You*

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The importance of pipe plugs has increased significantly. For years pipe plugs were viewed as only occasionally used, either to stop a pipe's flow or for conducting a pressure test. Today, plugs are essential tools in infrastructure and maintenance activities—whether for flood abatement, environmental-spill protection, rescue work, sanitary-sewer or storm-sewer cave-ins, or for mandatory pressure tests.

A mechanical or pneumatic plug typically offers the most cost-effective and reliable solution for pipe-stopping needs. Each is designed to handle specific pressures, and the type of pressure is critical.

Air or liquid are typically the media being held back. While pressure is pressure, regardless of the media, air back-pressure is much more volatile—and dangerous. Because air is compressible, plug discharge can be very dangerous. Compressed air can turn a plug into a missile, while liquid typically will not result in abrupt plug movement. Even low back-pressure can create enormous pressure on a plug. A 36" plug, for example, holding back 5 pounds per square inch (PSI), is actually holding 5,000 pounds of force!

TAKE THE CORRECT STEPS

There are several specific steps in selecting and using the correct plug:

- 1. Maximum Back Pressure**—Determine the maximum possible back-pressure. Back-pressure can be calculated in either feet-of-head or PSI.
- 2. Pipe Inside Diameter**—Determine the inside diameter of the pipe to be sealed. And remember: On larger pipe (ductile iron, for example), the outside diameter does not always indicate the actual inside diameter.
- 3. Access Opening**—Determine the diameter of the access opening where the plug will be inserted. Underground and industrial piping does not always have equal-sized access points, often limiting the choice of usable pipe plugs.
- 4. Length of Time in Place**—Determine the length of time the plug will be in position, and in use. Extended use requires regular inflation-pressure monitoring, or use of a permanent mechanical plug.
- 5. Solutions in Contact & Temperature Requirements**—Non-traditional plug needs often require that the plug come in contact with caustic chemicals and/or hot and cold temperatures. Determine all caustic solutions that the plug will contact, as well as extreme temperature requirements.

Once you have determined these variables, you can choose the correct plugs. To make the correct choice, you **must** have accompanying performance data for all plugs you are considering.

You must first decide whether to use a **mechanical** or **pneumatic** plug. Mechanical plugs are permanent—after tightening and drawing the two plates together, the plug should stay expanded as long as needed. Also, mechanical plugs:

- Often handle higher back-pressures,
- Have narrow body widths (and, therefore, sealing contact with the pipe wall), which aide in certain usage restrictions,
- Cannot be over inflated (ruptured),
- Cannot be easily cut,
- Typically only require hand tightening (not exact PSI inflation pressure).

Pneumatic plugs, on the other hand, are available in multi-size configurations, as well as single-size designs. Also, pneumatic pipe plugs:

- Are small when deflated, compared to the diameter of the pipe to be sealed. That can make access much easier.
- Can be inflated and deflated—and today even inserted—without the user being directly in front of the insertion point, making a pneumatic plug safer.
- Inflate and mold to the inside shape of the pipe, helping insure a tight seal.
- Can be inflated with water to aide in overcoming buoyancy.

SAFETY INSTRUCTIONS

Once you have chosen the plug(s), usage instructions **must** be followed.

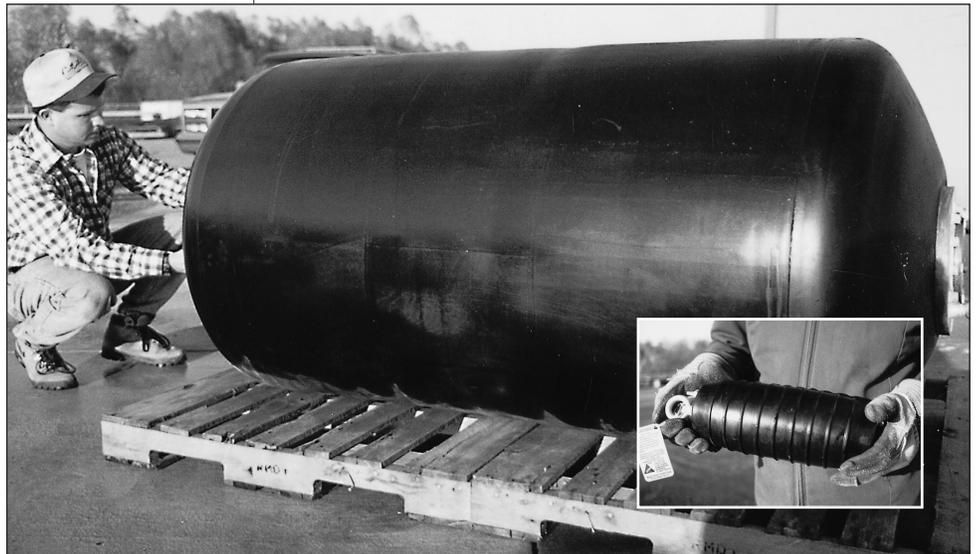
For maximum safety, at least 15 steps must be followed when using pneumatic plugs (see box on next page).

A couple of additional items to keep in mind: When using a plug in corrugated pipe, standard back-pressure performance ratings should be cut in half.

Also, when you need to plug an oval pipe, some standard pneumatic plugs can be used. Measure the overall circumference of the oval to determine the plug that will seal the pipe.

When storing a plug—mechanical or pneumatic—you should take special care as follows:

- A minimal amount of air should be kept in a pneumatic plug so that it retains the shape the plug had when it came out of its original box.
- A silicone-like “rejuvenator” can be applied to help eliminate dry rot.
- Larger plugs should be hung so that none of the rubber comes in contact with the ground.
- Plugs should be stored inside, away from ultraviolet light.



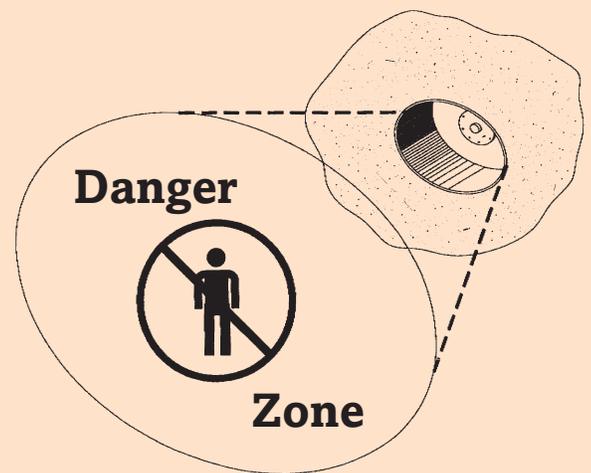
This is the largest pneumatic plug in TrenchSafety's extensive rental inventory. TrenchSafety stocks pneumatic plugs from 6" (inset photo) to 60" for virtually any application. If the particular plug you need is not in stock, we will do everything possible to get it and deliver it to your jobsite when you need it.

ATTENTION TO THE DETAILS

When the proper steps are followed, there is no better way to seal a pipe than with a carefully designed mechanical or pneumatic pipe plug. Engineered plugs are built to handle the extreme pressures that can develop. Having the assurance that the right plug is being used, and that the usage instructions are understood and applied, will mean that your job is safer, easier, and is completed as quickly as possible.

General Safety & Usage Instructions for Pneumatic Plugs

1. Always inspect plug(s) for dry rot, cuts and abrasions. Always check for worn areas before and after each use.
2. Never exceed the manufacturer's stated performance data for the plug(s) being used.
3. Do not exceed recommended maximum allowable back-pressure (refer to the safety instruction manual)
4. A pneumatic plug's inflation pressure should be checked every four (4) hours, or the plug must be connected to a constant regulated air source.
5. Workers should **never** use an air source—whether a hand pump or a compressor—that does not have a working pressure gauge. The only correct way to determine if a plug is inflated properly is with a gauge, not by pulling on the plug or by simply looking at the plug in the line.
4. Never use a plug in a pipe size different from recommended usage range (refer to safety instruction manual).
5. Death, bodily injury, and/or property damage may result if plug falls for any reason.
6. Always read and understand all safety instruction manuals before using plug.
7. Do not stand in front of, to the side of, or over the top of a plug(s) when it is in use.
7. Always wear safety glasses and a hard hat around plugs that are in use.
9. Do not enter the “danger zone” when plug is in use.
10. Measure pipe diameter before selecting the plug.
11. Always attach an inflation extension hose so plug can be inflated and deflated from outside the “danger zone.”
12. Never remove the inflation hose until all back-pressure is released and the plug is deflated.
13. Always inflate plug to the pressure shown on plug.
14. Always use properly calibrated pressure gauges.
15. Always release back-pressure from the pipe first, before deflating plug.



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This information provides a brief overview of certain safety regulations and systems. It is not intended to provide specific legal or engineering advice. Please refer to OSHA CFR 29, Part 1926, Subpart P, “Excavation and Trenches,” to other governmental regulations, and to manufacturers’ instructions for specific information.