

STEMAR EQUIPMENT & SUPPLY CO., INC.

Serving Underground Construction Since 1922

IMPORTANT PIPE PLUG SAFETY AND OPERATING INSTRUCTIONS SUPPLEMENT FOR

HIGH PRESSURE PLUG USERS (#700)

1. READ “A GUIDE TO SAFER USE” (“ORANGE” PAGE).
2. YOU MUST BLOCK PLUG SECURELY, SO IT CAN’T MOVE EVEN A ¼”.
3. YOU MUST BRACE THE METAL AND RUBBER PARTS OF THE PLUG SO THAT THEY WILL BE UNABLE TO MOVE BECAUSE OF THE TEST PRESSURE OR ANY OTHER FORCES, DURING THE PLUGS USE.
4. IF A PLUG IS NOT PROPERLY RESTRAINED AND DAMAGE TO THE PLUG DOES OCCUR, USUALLY WITH THE RUBBER PEELING OFF OF THE STEEL, YOU WILL BE RESPONSIBLE FOR REPAIRS.
5. DUE TO THE NATURE OF THIS TYPE OF PLUG, (built to test 150 psi) THE DAMAGE REPAIRS NORMALLY AMOUNT TO 60% OF THE REPLACEMENT COST OR MORE.
6. REMEMBER YOU ARE DEALING WITH HIGH PRESSURES! PLEASE SEE THE FOLLOWING HIGH PRESSURE TESTING & POUNDS OF FORCE PLUG SAFETY SHEET.

LIABILITY & GUARANTEE FOR ALL PLUGS

STEMAR GUARANTEES THAT THE PLUGS, LINES AND GAUGES HAVE BEEN PRESSURE TESTED AND ARE IN PROPER WORKING ORDER BEFORE LEAVING OUR FACILITY. IT IS THE CUSTOMERS RESPONSIBILITY TO INSURE PROPER USE AND CARE OF EQUIPMENT WHILE IN THEIR POSSESSION.

STEMAR IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, WITHOUT LIMITATION, AND STEMAR’S LIABILITY IN ALL INSTANCES SHALL BE LIMITED TO THE ACTUAL RENTAL OR PURCHASE PRICE.

IN NO EVENT SHALL STEMAR BE LIABLE FOR DAMAGE CAUSED BY IMPROPER OR UNREASONABLE USE OR ABUSE, LACK OF ADEQUATE BLOCKING/BRACING, MAINTENANCE OR THE LIKE.

-----MANUFACTURING AND WHOLESALE CONSTRUCTION EQUIPMENT-----

SALE • RENTAL • SERVICE

353 SOUTH CENTRAL AVENUE • LOS ANGELES, CA 90013-1784

(213) 625-0185 • (800) 992-0100 • 24 HR. FAX (213) 625-0826

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PIPE PLUG SAFETY AND OPERATING INSTRUCTIONS

HIGH PRESSURE TESTING & POUNDS OF FORCE

1. How much **FORCED PRESSURE** are you really dealing with?
2. The question of actual **POUNDS OF FORCE** should be answered before beginning your job. It will help the Competent Person, Supervisor, or Certified Engineer, determine how much, and what kind of blocking material, must be used.
3. **POUNDS OF FORCE** is calculated as follows:

$$IIr^2 \times \text{PSI} \quad \text{Where: } II = 3.14 \text{ (II is pronounced PIE)}$$

$r = \frac{1}{2}$ the diameter of the pipe

$$r^2 = r \times r$$

PSI = pounds per square inch*

*If you are water testing, multiply .434 X feet of head = PSI

4. **Example:** 24" pipe, Air Test at 150 PSI

$$IIr^2 \times \text{PSI} = \text{Total Pounds of Force}$$

$$3.14 \times 12 \times 12 \times 150 = 67,824. \text{ Pounds of Force}$$

$$II \times r \times r \times \text{PSI}$$

5. **Example:** 72" pipe, Air Test at 150 PSI

$$IIr^2 \times \text{PSI} = \text{Total Pounds of Force}$$

$$3.14 \times 36 \times 36 \times 150 = 610,416. \text{ Pounds of Force}$$

$$II \times r \times r \times \text{PSI}$$

In example #4, there is the equivalent of 67,824 pounds on each plug in your test. Or, 453 people who weigh 150 Lb. each.

In example #5, there is the equivalent of 610,416 pounds on each plug in your test. Or, 4,070 people who weigh 150Lbs. each.

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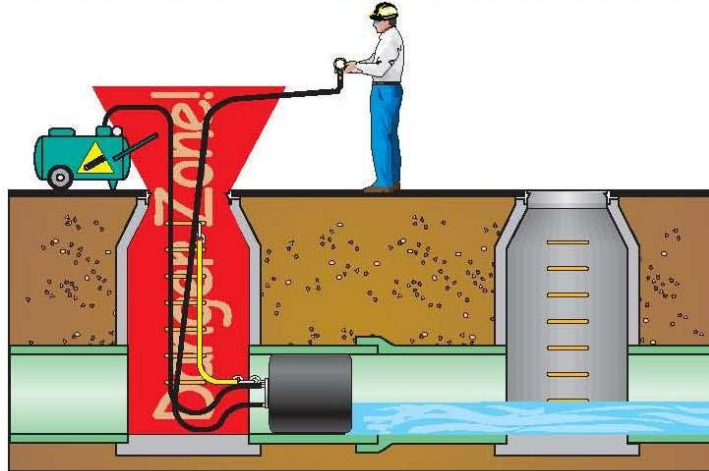
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**STAND CLEAR OF THE DANGER ZONE!
DEATH OR SERIOUS BODILY INJURY MAY RESULT!**

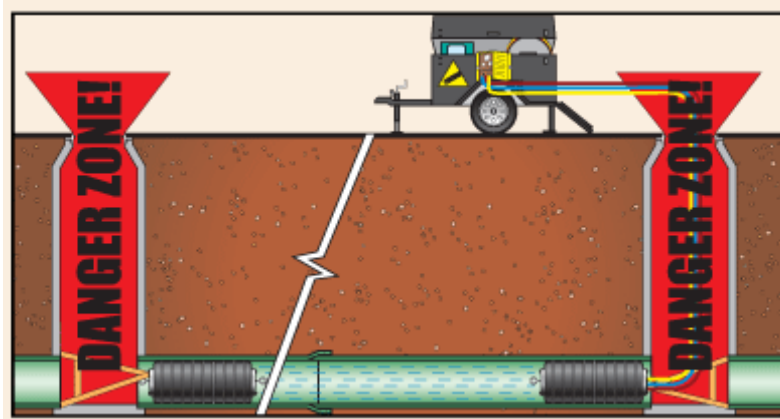


Not complying with guidelines in our accompanying Safety Instructions, not using a Safety Rope and Inflation Hose with Pressure Monitoring Gauge, removal or tampering with any safety devices on these products shall release Stemar, Inc. from all liability that may result from Injury, Death or Property Damage and void any product warranty.

User shall determine the suitability of this product for this intended use and assumes all risk and liability.

PUNCTURES ARE NOT WARRANTED!

ALWAYS BLOCK PLUGS WHEN CONDUCTING AIR TESTS!



HOW TO CALCULATE PIPELINE FORCES AND PRESSURES. 1) Determine the inside diameter of the pipeline in inches. 2) Determine the maximum backpressure. 3) Calculate the pipe area in square inches. 4) Calculate the force the plug must withstand.

Example with 36" pipe: $18'' \times 18'' \times 3.14 \times 5 \text{psi} = 5087 \text{ POUNDS OF FORCE!}$

Calculating pounds of force aid in building plug blocking systems. It also illustrates the tremendous force generated by a sewer air test.

SPECIAL NOTE:

Pressures being exerted on a plug, regardless of the medium (liquid, water or air) are the same. Ten (10) PSI water is the same as ten (10) PSI air. However, **AIR IS A COMPRESSIBLE MEDIA.** Therefore, extreme caution should be observed when air testing.

Air back-pressure ratings reflect absolute back-pressure capabilities. Common engineering standards have been used to convert head pressure to PSI. **IT IS IMPERATIVE TO BLOCK PLUGS** when performing air-pressure tests and to ensure no one is in the zone of danger when a plug is in use. (Please see our Pipe Plug Safety and Operating Instructions Manual for complete details).

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PIPE PLUG SAFETY AND OPERATING INSTRUCTIONS

A GUIDE TO SAFER USE

PIPE PLUG SAFETY IS A PARTNERSHIP. STEMAR'S DEDICATION TO SAFETY MUST WORK IN CONJUNCTION WITH YOUR SAFE USE OF OUR PRODUCTS. YOU MUST THINK AND PRACTICE SAFETY WHENEVER USING A PIPE PLUG.

AN INHERENT DANGER EXISTS WITH ALL INFLATABLE PRODUCTS. IF ANY CONDITIONS WITH THIS EQUIPMENT EXIST THAT MAY JEOPARDIZE YOU, OR YOUR CO-WORKERS SAFETY, OR OTHERS, DO NOT USE IT. CONTACT YOUR COMPETENT PERSON OR SUPERVISOR FOR INSTRUCTIONS. FAILURE TO COMPLY WITH THESE SAFETY INSTRUCTIONS, OR THOSE OF O.S.H.A., MAY RESULT IN PROPERTY DAMAGE, SERIOUS BODILY INJURY OR DEATH.

1. DO NOT DRAG PLUGS; THE SAFETY INFLATION LINE AND GAUGE LINE ARE NOT DESIGNED FOR RESTRAINING OR PULLING. THE SUPPLIED RESTRAINING BRIDLES AND/OR EYEBOLTS ARE USED FOR LIFTING & LOWERING THE PLUG ONLY.
2. BE SURE THE PIPE IS CLEAN & DRY WHERE THE PLUG COMES IN CONTACT WITH THE PIPE. DO NOT USE THE PLUG WHERE OIL, GASOLINE, OR CAUSTIC CHEMICALS MAY BE FOUND.
3. BE SURE THAT THERE ARE NO SHARP OBJECTS OR EDGES IN THE PIPE WHICH COULD PUNCTURE THE PLUG WHEN INFLATED. NEVER USE A PLUG THAT HAS BEEN DAMAGED OR THAT YOU SUSPECT MAY BE DAMAGED. DON'T MODIFY OR ATTEMPT TO REPAIR IN ANYWAY.
Please note: If a plug needs to be patched, or in some way is damaged and determined by Stemar, Inc. to no longer be in rentable condition, the plug will be purchased by the entity that was responsible for the damage.
4. INFLATE THE PLUG TO THE *EXACT* MAXIMUM INFLATION PRESSURE INDICATED ON THE PLUG. DO NOT UNDERINFLATE. **NEVER EXCEED THE MAXIMUM INFLATION PRESSURE!**
5. **BRACING/BLOCKING MUST BE USED** TO PREVENT THE MOVEMENT OR COMPLETE DISLODGING OF THE PIPE PLUG. BRACE EACH PLUG, SO THAT IF AIR PRESSURE IS LOST IN THE PLUG, THE PLUG WILL NOT MOVE *AT ALL*. USE OF A CERTIFIED ENGINEER FOR THE DESIGN, CONSTRUCTION, & MAINTENANCE OF A CONTAINMENT SYSTEM IS RECOMMENDED. EYEBOLTS ARE DESIGNED *ONLY* FOR LIFTING AND LOWERING OF THE PLUG.
6. **AVOID THE "DANGER ZONE"**, WHICH IS IN FRONT OF PLUG, IN THE PIPE, IN THE MANHOLE, AND JUST OUTSIDE THE MANHOLE. AVOID THE "DANGER ZONE" WHILE PRESSURIZING, TESTING, OR DEPRESSURIZING THE TEST SPACE AND WHILE INFLATING AND DEFLATING THE PLUG.
7. NEVER INFLATE THE PLUG OVER AN UNRESTRAINED AREA OR A VOID IN THE PIPE, SUCH AS A LATERAL. THE PLUG MUST HAVE FULL CONTACT WITH THE PIPE AT ALL TIMES. USE PNEUMATIC PLUGS ONLY IN PIPE AND PIPE SIZE FOR WHICH THEY WERE DESIGNED.
8. DURING THE TESTING PERIOD, YOU MUST MONITOR THE INFLATION PRESSURE IN THE PLUG, WITH A PROPERLY CALIBRATED GAUGE. VARIOUS LENGTHS, OF REMOTE INFLATION LINES WITH GAUGES, ARE AVAILABLE.
9. FOR MORE INFO. ON INFLATION/TEST PRESSURES, OR FOR TABULATED DATA, CALL STEMAR AT 1-800- 992-0100.
10. WASH PLUGS WITH WATER & A MILD DETERGENT AFTER USE. RINSE WELL AND LET DRY. STORE IN A COOL DRY AREA. INSPECT THOROUGHLY BEFORE USING.

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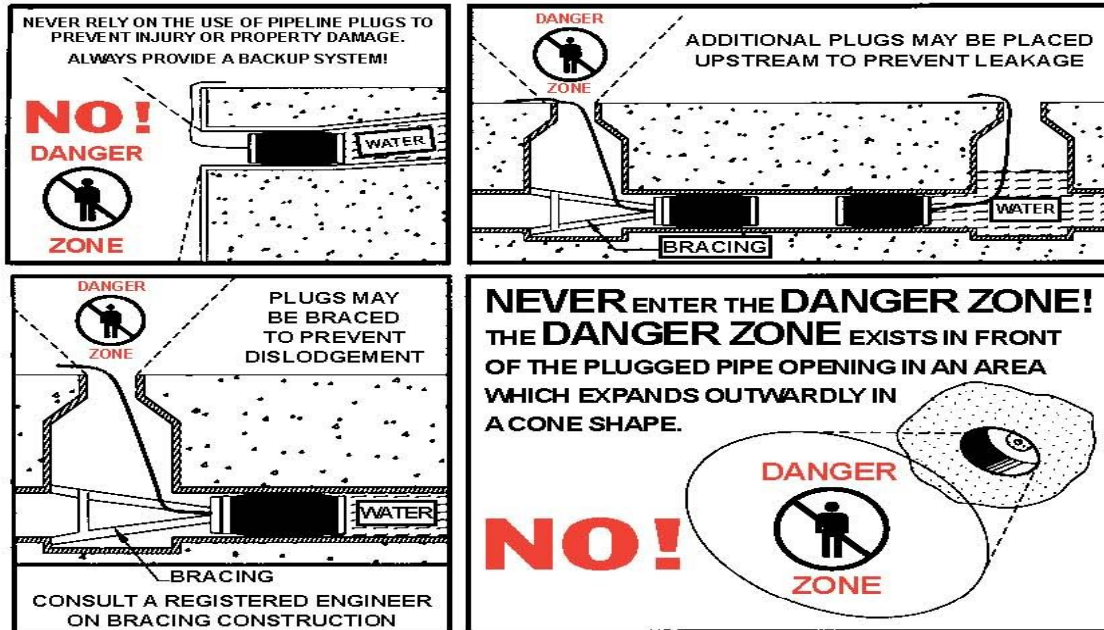
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PROVIDE A BACKUP SYSTEM FOR SAFETY

NEVER RELY ON PIPELINE PLUGS AS THE ONLY MEANS TO PREVENT INJURY OR PROPERTY DAMAGE. NEVER ENTER THE DANGER ZONE DURING USE.



WARNING NEVER ATTEMPT TO USE THE EYEBOLTS, INFLATION HOSE, OR CARRYING HANDLE OF A PNEUMATIC PLUG AS A SAFETY TETHER OR AS MEANS TO RESTRAIN THE PLUG IS ITS IS DEFLATED WHILE HOLDING BACK PRESSURE! Safety bracing properly designed and constructed to withstand the tremendous forces involved is required. Eye bolts and carrying handles on pneumatic plugs are designed only for carrying, lifting and lowering pneumatic plugs. They are NOT designed to withstand the large forces encountered when plugs are deflated when restraining back pressure. The carrying handles, eye bolts or their attachment to the pneumatic plug may fail, thereby damaging the plug itself and may result in unsafe conditions. THIS MAY CAUSE PLUG FAILURE WHICH MAY RESULT IN DEATH, SEIOUS BODILY INJURY AND/OR PROPRETY DAMAGE!

DANGER A FULLY OPERATIONAL BACKUP SYSTEM MUST BE USED IF THE PLUG IS USED IN ANY ENVIRONMENT WHERE PLUG LEAKAGE, FAILURE OR DISLODGEEMENT FOR ANY REASON, COULD RESULT IN LIFE ENDANGERMENT, BODILY INJURY OR PROPERTY DAMAGE! The backup system must be designed to safety stop a dislodged plug and the pipeline media that will discharge upon plug failure. Consult a registered professional engineer for proper construction and maintenance of such a system. FAILURE TO PROVIDE A BACKUP SYSTEM MAY RESULT IN DEATH, SERIOUS BODILY INJURY AND/OR PROPERTY DAMAGE!

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HIGH PRESSURE PLUG BLOCKING

Pipe Plug Testing

PIPE PRESSURE TESTS FROM 25 PSI TO 150 PSI

IMPORTANT: READ "A GUIDE TO SAFER USE"



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PIPE PLUG PRESSURE GUIDE-for most types of pipe

ALWAYS INFLATE PNEUMATIC PLUG TO EXACT RECOMMENDED INFLATION PRESSURE. PROPER INFLATION PRESSURE IS CLEARLY MARKED ON EACH PRODUCT. OVER-INFLATION MAY CAUSE PLUG RUPTURE. UNDER-INFLATION MAY CAUSE THE PLUG TO DISLodge FROM PIPELINE WHEN BACK PRESSURE IS APPLIED. IMPORTANT: READ "PIPE PLUG SAFETY SHEET".

Please consult information tag attached to plug for proper inflation pressure and maximum test/back pressure!

ATTENTION HIGH PRESSURE PLUG USER
PLEASE READ SAFETY INSTRUCTIONS BEFORE USING. YOU MUST STAND CLEAR WHILE IN USE. (NOTE: SEE BELOW) MAXIMUM TEST/INFLATION PRESSURES:

TEST PRESSURE: 150 PSI

***INFLATION PRESSURE: 200 PSI or 225 PSI depending on MFG**

ATTENTION HIGH PRESSURE USER

PLEASE READ the supplied pipe safety sheet before using.

You **MUST BLOCK** these plugs securely! So that the metal and rubber parts of the plug will not move due to the test pressure or any other forces.

If the plug is not properly restrained and damage occurs (usually with the rubber peeling off the steel) you are liable for damages. Damages can easily be 1/2 the cost of the entire plug or more.

REMEMBER, YOU ARE DEALING WITH HIGH PRESSURE!

If you need a professional engineering firm to consult with regard to Blocking, Bracing, Restraining a Pipe Plug for any application:

D.H. Charles Engineering, Inc.
Santa Rosa, CA

Contact: Luke Griffins, P.E., S.E. - General Manager
Phone: (707) 537-8282

Email: luke@charlesengineering.com

J.M. Turner Engineering, Inc.
Santa Rosa, CA

Contact: Hans J. Vermeulen, P.E. – Sr. Engineer / Owner
Phone: (707) 528-4503

Email: hans@jmteng.com

*You MUST consult STEMAR, INC for proper inflation pressure for your test pressure and/or if the plug information tag has been removed.

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TEN COMMANDMENTS

Of Safe Pipe Plug Operation

1. Always stay out of danger zone, and block plug.
2. Always wear safety glasses & a hard hat.
3. Always use properly calibrated pressure gauge.
4. Never exceed plug inflation or pipe back pressure ratings.
5. Always release back pressure from the pipe **FIRST BEFORE** deflating plug.
6. Always inspect plugs for damage and clean before and after every use.
7. Only use properly sized product for pipe. Do not exceed rated pressures.
8. Always use the properly specified plug for the job.
9. Always use proper length extension hose(s).
10. Always completely install plugs in a clean, dry pipe.

LOS DIEZ MANDAMIENTOS

Para el manejo seguro de tapones inflables

1. Siempre bloquear el tapon y permanezca fuera de la zona de peligro.
2. Ponerse siempre gafas de seguridad y casco duro.
3. Emplear siempre medidores de presion debidamente calibrados.
4. Jamas exceder las medidas de inflacion de los tapones o de las contrapresiones de la tuberia.
5. ANTES DE desinflar el tapon, es necesario PRIMERO liberar la presion acumulada de la tuberia.
6. Inspeccionar siempre los tapones antes de usarlos para ver que no esten dañados y limpiarlos antes y despues de usarlos.
7. Usar solamente los tapones de tamaño apropiado para la tuberia y no exceder los niveles de presion permitidos.
8. Utilice siempre el tapon con las especificaciones necesarias para el trabajo.
9. Utilizar siempre manguera(s) de extension de la longitud adecuada.
10. Instalar siempre los tapones en una tuberia limpia y seca.