



GRIPSAFE®

INSTALLATION MANUAL



Small Double Block and Bleed (DBB) Plug

Manufactured Exclusively by USA Industries, Inc.
an ISO 9001:2015 Certified Company

Patents & Trademarks

- US PATENTS: 9,927,058 | 9,810,364 | D894,349 | 10,746,339
- CANADIAN PATENT: 3,004,787
- CANADIAN INDUSTRIAL DESIGN: CA 186293
- EUROPEAN PATENT: 3,377,797 B1
- EUROPEAN PATENT [Germany]: 602016051864.3
- EUROPEAN UNION DESIGN REGISTRATION: 00628264-001
- INTERNATIONAL TRADEMARK REGISTRATION: 1550298
- Other US and Foreign Patents Pending

www.USAIndustries.com

(713) 941-3797 • (800) 456-8721

315 State Street • S. Houston, TX 77587

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1. Introduction

USA Industries, Inc. thanks you for choosing GripSafe pipe plugging technology. This manual covers the proper use of this technology to ensure safe operating conditions.



WARNING:

Do not use GripSafe equipment before fully reading and comprehending this manual. Failure to follow this manual in full may result in injury and/or damage to equipment.

All necessary sockets, wrenches and lifting device to install this equipment are available for rental or purchase from USA Industries, Inc. See **Section 4, Table 2** for sockets and check valves and **Table 4** for lifting device.

The information in this manual is for the use of a GripSafe plug in metallic piping. If the intended use of this plug is for any piping other than metallic piping, please contact USA Industries, Inc.'s Customer Service Department for technical support.

2. Safety

- ⚠ Failure to follow proper safety requirements may result in the GripSafe plug failing, which could lead to injury, material loss, and/or damage to equipment.
- ⚠ Wear proper Personal Protective Equipment (PPE) when performing any task with the GripSafe plug as defined by site safety rules. Always follow site procedure for safely lifting and operating equipment.
- ⚠ Never install the GripSafe plug in a position where the *Gripping Wedge* would be located over weld droop or ridge.
- ⚠ Never install the *Seals* or *Gripping Wedge* over a section of pipe that is missing its interior wall; i.e. weldolet, tee, etc.
- ⚠ Pressure testing can be a hazardous operation and safety precautions are important. Never stand or pass in front of a test plug during installation, testing, and removal.
- ⚠ Do not make adjustments to the plug, safety equipment, or vessel while the plug is under pressure.
- ⚠ Do not exceed rated pressure stamped on the plug. Plugs are rated for holding pressure in one direction; never apply pressure on the non-rated side of the plug.
- ⚠ Backpressure rating on the references the plugs ultimate holding capacity. Never exceed the pressure capacity of the weakest component in a pressurized system. Study your system's components prior to beginning a pressure test to ascertain and confirm that the maximum test pressure of your system is subjected to is in accordance with all applicable industry and site-specific standards.
- ⚠ We recommend using Water as the test medium. Before pressurizing the system, vent all gases from the vessel.
- ⚠ If pneumatic testing, all attempts to limit potential damage to personnel or equipment is critical. USA Industries, Inc. recommends Nitrogen as the medium for pneumatic testing as it does not support combustion. Follow provisions outlined in ASME PCC-2 Repair of Pressure Equipment and Piping when testing pneumatically.
- ⚠ Carefully observe the location of the pipe where the *Wedge Grippers* make contact when performing a hydro test. If you observe any deformation or swelling of the pipe, stop immediately and slowly release the pressure from the system. **Contact USA Industries, Inc. for further assistance.**
- ⚠ If you hear a popping or clicking sound at any time during a hydro test, **STOP IMMEDIATELY** and slowly release the pressure from the system. Popping or clicking sounds during hydro testing may be a sign of the *Wedge Gripper* slipping, cracking, or one of the plug components failing. Remove the plug from the pipe or fitting and inspect for damage. **Contact USA Industries, Inc. for further assistance.**
- ⚠ Make sure the plug is clean of debris and contaminants. Each *Wedge Gripper* should freely slide up and down in its slot with a full range-of-motion, and incur no resistance. If you experience impeded movement due to debris, dirt or contaminants, the plug may not grip the pipe's ID securely, which can cause plug ejection under pressure, potentially leading to injury, death, material loss, and/or damage.
- ⚠ **For any questions or concerns, contact USA Industries, Inc. for technical assistance.**

3. Parts (This manual references the part numbers identified below throughout the document)

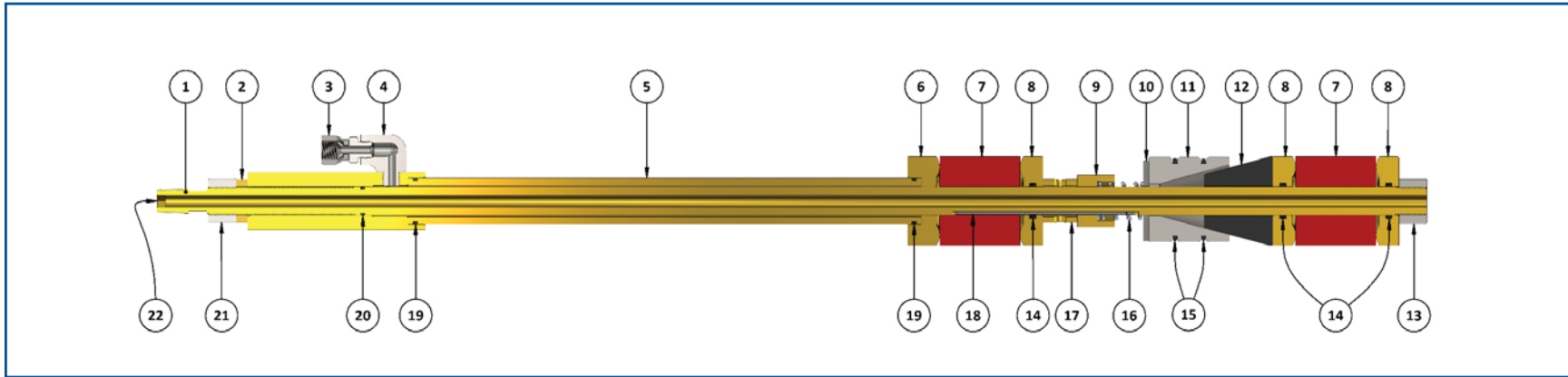


Figure 1: GripSafe Mid-Grip DBB Diagram

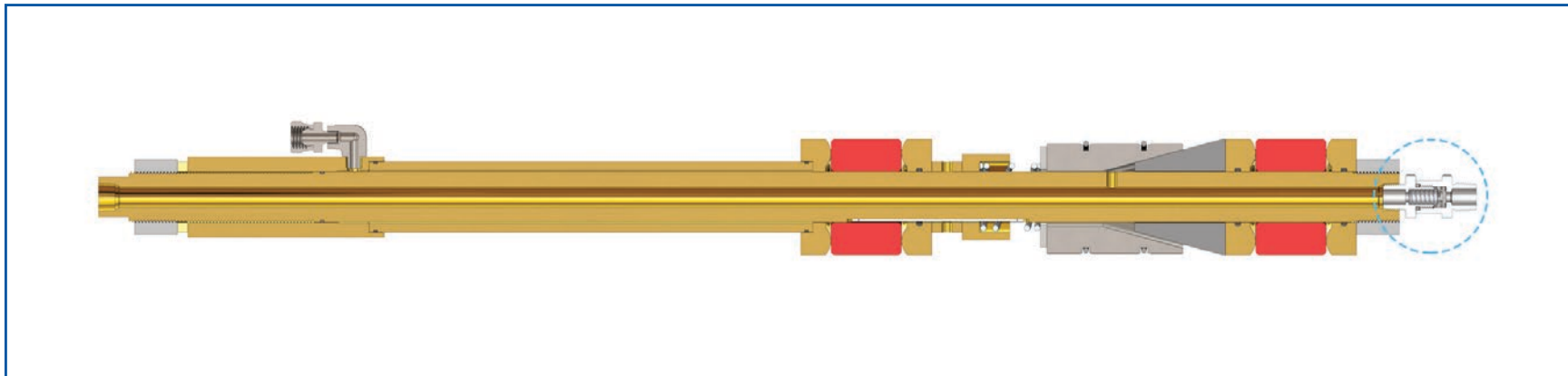


Figure 2: With Optional Valve and Port for Cooling (*Upon Request*)



Table 1: GripSafe Bill of Materials

Nominal Pipe Size (in)	Schedule	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳	㉑	㉒
		Shaft	Thrust Washer	Swivel Pipe Union Fitting	Street Elbow Fitting	Compression Tube	Sealing Compression Ring	Seal	Compression Ring	Spring Cup	Wedge Gripper Washer	Wedge Gripper	Wedge Cone	Rear Compression Hex Nut	Compression Ring O-Ring	Retraction Band	Compression Spring	Ported Spacer	Fill Port Insert	Compression Tube O-Ring	Shaft O-Ring	Compression Hex Nut	Vent Port
3/4	40,STD,40S	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	80,XS,80S	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
1	10	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	40,STD,40S	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	80,XS,80S	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	160	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
1-1/4	10	1	2	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	40,STD,40S	1	2	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	80,XS,80S	1	2	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	160	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
1-1/2	XXH	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	10	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	40,STD,40S	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	80,XS,80S	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
2	160	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	XXH	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	10	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	40,STD,40S	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
2-1/2	80,XS,80S	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	160	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	XXH	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	10	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
3	40,STD,40S	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	80,XS,80S	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	160	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	XXH	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
3-1/2	10	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	40,STD,40S	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	80,XS,80S	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	XXH	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
4	10	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	40,STD,40S	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	80,XS,80S	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	120	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
	160	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1
XXH	1	1	1	1	1	1	2	3	1	1	3	1	2	3	2	1	1	1	2	1	1	1	

4. Specifications

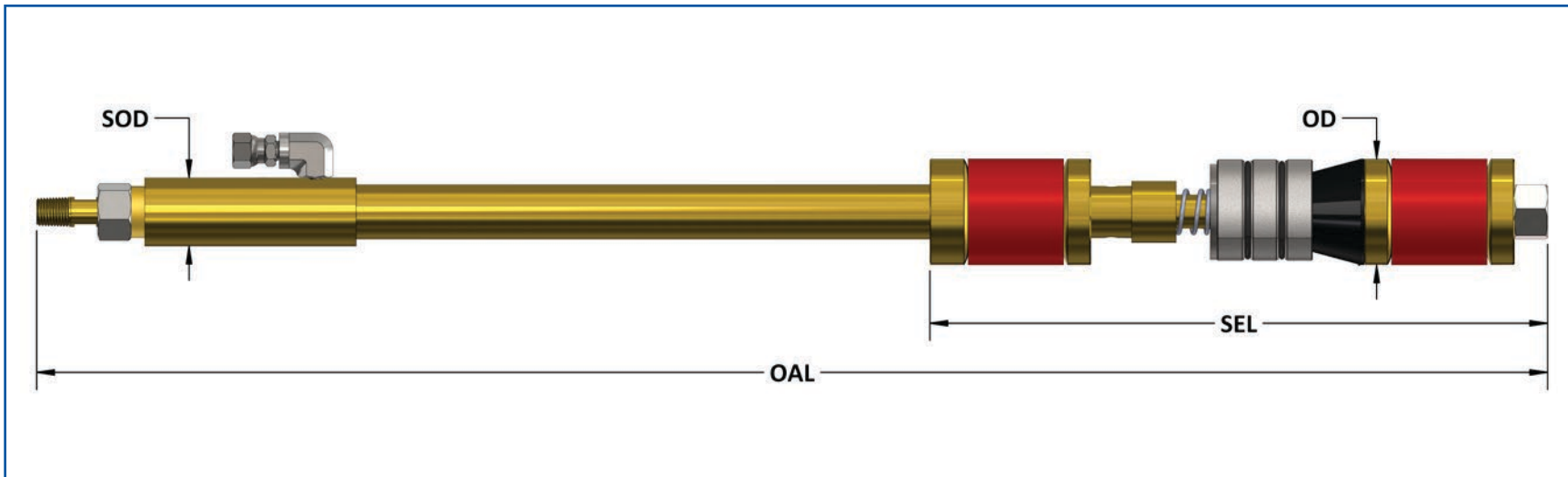


Figure 2: GripSafe DBB Dimensions Diagram

Table 2: GripSafe DBB Specifications

Nominal Pipe Size (in)	Schedule	Part Number	Tool Diameter (in)	Rec. ID Range (in)	Nominal Pipe ID Clearance (in)	Approx. Tool Weight (lbs)	Tool Length (in)	Torque Range (ft-lbs)		Comp. Hex Nut Socket Size (in)	Backup Wrench Size (in)	Fill Port Thread	Back Pressure Vent Thread	Back Pressure Rating (PSI)	Between the Seal Test Pressure (PSI)
								Norm	Max.						
3/4	40,STD,40S	GS-D-S-0075-040	0.79	0.81 - 0.91	0.035	2.5	25.38	3.0	5.0	9/16	1/4 Open End	1/4" FNPSM	1/16 MNPT	10000	2500
	80,XS,80S	GS-D-S-0075-080	0.71	0.73 - 0.80	0.035	2.4	25.38	2.0	3.5	9/16	1/4 Open End	1/4" FNPSM	1/16 MNPT	10000	2500
1	10	GS-D-S-0100-010	0.99	1.01 - 1.15	0.103	2.8	25.38	5.5	8.5	9/16	1/4 Open End	1/4" FNPSM	1/16 MNPT	2825	2500
	40,STD,40S	GS-D-S-0100-040	0.99	1.02 - 1.15	0.055	2.7	25.38	5.5	8.5	9/16	1/4 Open End	1/4" FNPSM	1/16 MNPT	10000	2500
	80,XS,80S	GS-D-S-0100-080	0.90	0.93 - 1.04	0.055	2.6	25.38	1.5	7.0	9/16	1/4 Open End	1/4" FNPSM	1/16 MNPT	10000	2500
	160	GS-D-S-0100-160	0.78	0.80 - 0.90	0.035	2.5	25.38	3.0	5.0	9/16	1/4 Open End	1/4" FNPSM	1/16 MNPT	10000	2500
1-1/4	10	GS-D-S-0125-010	1.31	1.35 - 1.49	0.130	6.0	27.75	10	20	15/16	7/16 Open End	1/4" FNPSM	1/4 MNPT	2350	2500
	40,STD,40S	GS-D-S-0125-040	1.31	1.35 - 1.49	0.068	6.0	27.75	10	20	15/16	7/16 Open End	1/4" FNPSM	1/4 MNPT	10000	2500
	80,XS,80S	GS-D-S-0125-080	1.21	1.25 - 1.37	0.065	5.7	27.75	10	20	15/16	7/16 Open End	1/4" FNPSM	1/4 MNPT	10000	2500
	160	GS-D-S-0125-160	1.11	1.14 - 1.26	0.055	3.0	25.38	7.0	11.0	9/16	1/4 Open End	1/4" FNPSM	1/16 MNPT	10000	2500
1-1/2	XXH	GS-D-S-0125-XXH	0.85	0.87 - 0.98	0.045	2.5	25.38	4.0	6.0	9/16	1/4 Open End	1/4" FNPSM	1/16 MNPT	10000	2500
	10	GS-D-S-0150-010	1.53	1.58 - 1.73	0.157	6.7	27.75	20	30	15/16	7/16 Open End	1/4" FNPSM	1/4 MNPT	2125	2500
	40,STD,40S	GS-D-S-0150-040	1.53	1.58 - 1.73	0.085	6.7	27.75	20	30	15/16	7/16 Open End	1/4" FNPSM	1/4 MNPT	10000	2500
	80,XS,80S	GS-D-S-0150-080	1.42	1.47 - 1.62	0.085	6.3	27.75	20	30	15/16	7/16 Open End	1/4" FNPSM	1/4 MNPT	10000	2500
2	160	GS-D-S-0150-160	1.27	1.31 - 1.45	0.068	5.9	27.75	10	20	15/16	7/16 Open End	1/4" FNPSM	1/4 MNPT	10000	2500
	XXH	GS-D-S-0150-XXH	1.05	1.08 - 1.20	0.055	2.8	25.38	6.0	10.0	9/16	1/4 Open End	1/4" FNPSM	1/16 MNPT	10000	2500
	10	GS-D-S-0200-010	1.94	2.00 - 2.25	0.220	8.2	27.75	30	50	15/16	7/16 Open End	1/4" FNPSM	1/4 MNPT	1825	2500
	40,STD,40S	GS-D-S-0200-040	1.94	2.00 - 2.25	0.130	8.2	27.75	30	50	15/16	7/16 Open End	1/4" FNPSM	1/4 MNPT	10000	2500
2-1/2	80,XS,80S	GS-D-S-0200-080	1.81	1.87 - 1.99	0.130	7.7	27.75	30	50	15/16	7/16 Open End	1/4" FNPSM	1/4 MNPT	10000	2500
	160	GS-D-S-0200-160	1.60	1.65 - 1.81	0.085	6.9	27.75	25	35	15/16	7/16 Open End	1/4" FNPSM	1/4 MNPT	10000	2500
	XXH	GS-D-S-0200-XXH	1.42	1.47 - 1.62	0.088	6.3	27.75	15	25	15/16	7/16 Open End	1/4" FNPSM	1/4 MNPT	10000	2500
	10	GS-D-S-0250-010	2.34	2.40 - 2.64	0.291	22.8	32.25	60	100	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	1975	2500
3	40,STD,40S	GS-D-S-0250-040	2.34	2.40 - 2.64	0.125	22.8	32.25	60	100	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	8000	2500
	80,XS,80S	GS-D-S-0250-080	2.20	2.26 - 2.41	0.125	21.8	32.25	60	100	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	8000	2500
	160	GS-D-S-0250-160	2.00	2.06 - 2.21	0.125	20.8	32.25	55	85	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	8000	2500
	XXH	GS-D-S-0250-XXH	1.69	1.74 - 1.89	0.085	7.2	27.75	25	40	15/16	7/16 Open End	1/4" FNPSM	1/4 MNPT	8000	2500
3-1/2	10	GS-D-S-0300-010	2.88	2.97 - 3.16	0.385	27.8	32.25	150	200	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	1725	2500
	40,STD,40S	GS-D-S-0300-040	2.88	2.97 - 3.16	0.193	27.8	32.25	150	200	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	8000	2500
	80,XS,80S	GS-D-S-0300-080	2.71	2.80 - 3.01	0.190	26.4	32.25	125	175	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	8000	2500
	160	GS-D-S-0300-160	2.50	2.56 - 2.74	0.125	25.0	32.25	80	140	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	8000	2500
4	XXH	GS-D-S-0300-XXH	2.18	2.24 - 2.39	0.125	21.8	32.25	60	100	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	8000	2500
	10	GS-D-S-0350-010	3.34	3.44 - 3.67	0.416	32.5	32.25	200	325	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	1575	2500
	40,STD,40S	GS-D-S-0350-040	3.34	3.44 - 3.67	0.204	32.5	32.25	200	325	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	6000	2500
	80,XS,80S	GS-D-S-0350-080	3.16	3.26 - 3.45	0.208	31.0	32.25	180	290	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	6000	2500
4	XXH	GS-D-S-0350-XXH	2.60	2.66 - 2.84	0.125	25.8	32.25	115	165	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	6000	2500
	10	GS-D-S-0400-010	3.81	3.92 - 4.21	0.454	37.9	32.25	220	340	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	1500	2500
	40,STD,40S	GS-D-S-0400-040	3.81	3.92 - 4.21	0.220	37.9	32.25	200	300	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	6000	2500
	80,XS,80S	GS-D-S-0400-080	3.61	3.72 - 3.93	0.220	35.3	32.25	155	245	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	6000	2500
	120	GS-D-S-0400-120	3.42	3.52 - 3.72	0.205	32.7	32.25	250	350	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	6000	2500
160	GS-D-S-0400-160	3.23	3.33 - 3.53	0.205	32.7	32.25	200	325	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	6000	2500	
XXH	GS-D-S-0400-XXH	2.95	3.01 - 3.20	0.205	30.5	32.25	175	275	1-7/8	1 Box End	1/4" FNPSM	3/8 FNPT	6000	2500	

5. Preparing the GripSafe DBB Plug for Installation

- 5.1 The GripSafe DBB plug should be in the relaxed position from the factory. There are two methods of insertion of the plug.

Method 1: Auto-Locking, the preferred method, allows the *Wedges* (11) to immediately conform and engage to the pipe ID ensuring the plug is immediately incapable of being pushed out of the pipe in the event of accidental discharge of pressure, i.e. when the *Wedges* (11) are fully inserted into the pipe.

Method 2: Free Insertion is used when the plug is met with an obstruction in the pipe that is not allowing free entry of the plug into the pipe, i.e. weld droop or other pipe interior discontinuity.

5.2 Method 1: Auto-Locking for immediate gripping upon insertion

- Expand the *Wedge Grippers* (11) to the end of the *Wedge Cone* (12) by advancing the *Compression Hex Nut* (21) (see Figure 3). At this point, the *Wedge Grippers* (11) expanded outside diameter will be larger than the ID of the pipe.
- The plug is ready to be installed, continue to Section 6.

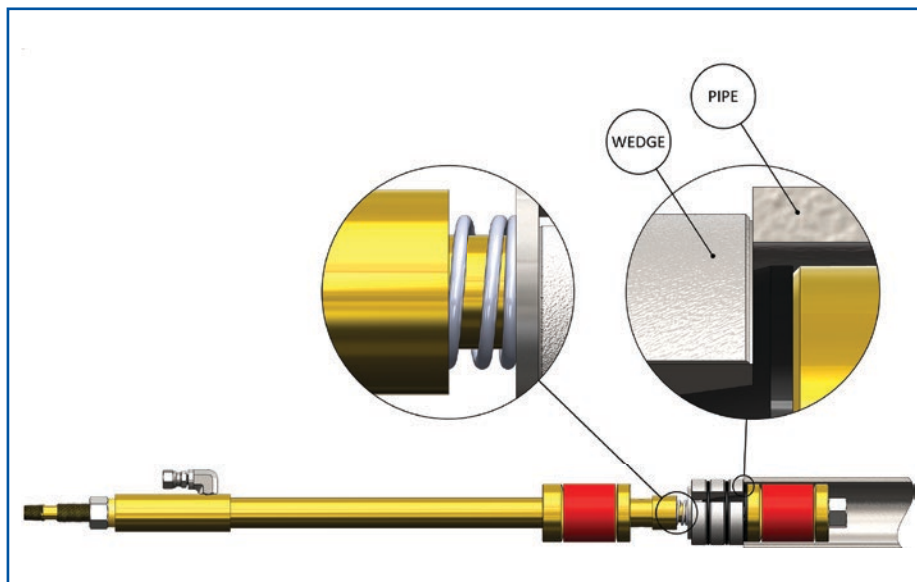


Figure 3: Immediate Gripping Upon Insertion

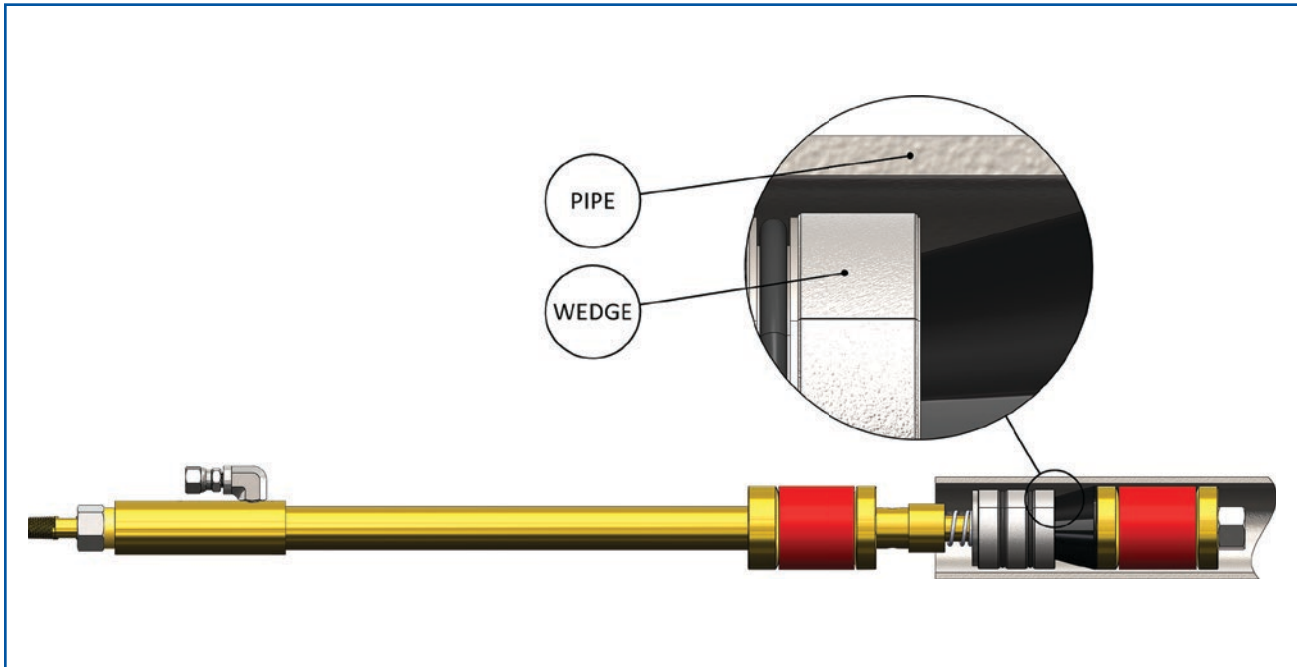


Figure 4: No Immediate Gripping Upon Insertion

5.3 Method 2: Free Insertion for free entry into the pipe or fitting

- Ensure the plug is in the relaxed position (see **Figure 4**).
- The *Compression Hex Nut*® should be finger tight.
- The *Wedge Grippers*® should be fully retracted under the bodyline of the plug's OD and should fit inside the pipe (see **Figure 4**).
- The plug is ready to be installed, continue to **Section 6**.

6. Installing the GripSafe DBB Plug



CAUTION: Ensure pipe I.D. is clean, and loose debris is removed to the deepest point the plug will be installed into. If the pipe is lined or has an irremovable product, **STOP** and **contact USA Industries, Inc. for support before proceeding**. Failure to do so may impede the wedges ability to grip and cause the plug to eject under pressure. Be sure to wear proper PPE and follow all site guidelines.

TEMPERATURE NOTE:



If welding is to occur while the plug is inside the pipe then the *Sealing Compression Ring* (6) must be at least 12 inches into the pipe beyond the location welding is to occur. USA Industries *Urethane Seals (Tri-Ply™)* can withstand 225° Fahrenheit for short durations. If high temperature seals are needed contact USA Industries for alternative sealing solutions.

6.1 Method 1: Auto-Locking (see Step 5.2) – immediate gripping upon insertion installation

- See *Table 2* for clearance requirements, and to ensure the pipe ID falls within the **Internal Diameter Range**.
- Slowly push the plug into the pipe, the *Compression Spring* (16) shown in **Figure 3** will compress into the *Spring Cup* (9) and allow the *Wedge Grippers* (11) to retract forward, decreasing its expanded outside diameter until they match the ID of the pipe.
- Once the *Wedge Grippers* (11) contact the ID of the pipe, they will automatically grip; removal of the plug at this point is not possible. See **Section 8** for plug removal if necessary.
- A slight rocking motion may assist installation.
- Ensure that the *Test Port* is oriented to the top of the GripSafe DBB when installing.
- Insert plug to the desired depth. The *Sealing Compression Ring* (6) must be inserted flush with the pipe, or fitting face at a minimum.
- If insertion into the pipe proves problematic in this orientation use *Method 2*.
- Continue to **Step 6.3**.

6.2 Method 2 (see Step 5.3) – Free entry into a pipe or fitting installation



CAUTION: In this orientation, it is important to note that the plug will not immediately grip the pipe upon insertion. Only after tightening the *Compression Hex Nut* (13) to advance the *Wedge Grippers* (11) will the plug engage the pipe ID and be able to withstand backpressure.

- See *Table 1* for clearance requirements, and to ensure the pipe ID falls within the **Internal Diameter Range**.
- Insert plug to the desired depth. The *Sealing Compression Ring* (6) must be inserted flush with the pipe or fitting face at a minimum.
- Continue to **Step 6.3**.

6.3 Tighten the *Compression Hex Nut* (21)

- Use a crow's foot attached to a torque wrench to turn the *Compression Hex Nut* (21) while holding the backup hex or wrench flats on the *Shaft* (1), stationary with a mechanic's end wrench.
- Continue tightening until the **Minimum Compression Torque** (see *Table 2*) is met.

6.4 Verify integrity of the *Seals*⑦.

- If the plug is being used for pressure testing, use proper fittings to install a hydro test pump to the *Backpressure Vent Port*②; otherwise, install a cap to seal off the system or a backpressure monitoring tee.
- Use proper fittings to install a manual hydro test pump to the *Swivel Pipe Union Fitting*③.
- Pressurize to 25% of target pressure or 150 psig, whichever is less. Observe seal integrity by visually inspecting for leaks. A drop in pressure may not be an indication of leakage. GripSafe *Seals*⑦ will creep under pressure until they are fully seated. This creep will increase the pressure test volume. Depending on the test volume size this may be by such a trivial amount it will not be seen on a gauge. For relatively small test volumes, a noticeable gradual loss in pressure may be observed during this creep phase. Seating the *Seals*⑦ is obtained by reapplying pressure until the pressure becomes stable. This seal creep may also be observed when the system is subjected to the full pressure. Resolution to the creep is the same at high pressure and while verifying integrity.

6.5 The GripSafe DBB plug is now safely installed to accept rated hydro test and backpressure pressures.

- It may be desirable to attach a gauge and vent hose assembly, backpressure monitoring tee to the *Backpressure Vent Port*② to bleed off any backpressure. The hose should be long enough to redirect vapor coming out of the vessel to a safe location, away from personnel that may be in the area. A valve can be attached to this port to allow safe backpressure removal during plug removal (see **Section 8**). If using a backpressure monitoring tee, it may be useful to have a pressure gauge on the branch side of the tee while connecting the run side to the *Backpressure Vent Port*② and a ball valve. Further advantages can be made by attaching a hose to the ball valve on the monitoring tee and running the hose to a safe location away from workers that may be in the area.



CAUTION: Fast flowing gases or liquids through hosing can cause hose whip. Take caution to avoid this, as failure to do so may result in injury and/or equipment damage.



CAUTION: Do not stand directly in front of the GripSafe DBB at any time. Installed plugs should always be treated in this manner irrespective of if the plug has backpressure or not.



CAUTION: If backpressure develops, constant observation of pressure is necessary to ensure safety to personnel and equipment using the attached gauge and physical observation of pipe integrity. Any bulging, enlargement, or tapering of the pipe is an indication of over pressuring. The backpressure rating listed in *Table 1* is for the pressure holding capability of the GripSafe plug and could be well beyond the systems design limitations that it is being used to test.

7. Positioning for Between the Seal Hydro Testing



CAUTION: Never install the GripSafe plug in a position where the *Gripping Wedge* would be located over weld droop or ridge.

7.1 If using the plug to hydrostatically test a weld, ensure proper Depth of Insertion by using the following method:

1. Measure the *Weld Zone Depth Distance* from the pipe or fitting end to the center of weld area to be tested.
2. Obtain the *Ported Spacer Center* from *Table 3*, distance from the top of the *Compression Hex Nut* ⑳ to the center of the *Ported Spacer* ⑰. The plug should be in the desired installation orientation (*Method 1* or *Method 2*, see *Section 5, Steps 5.2* and *5.3*) while measuring this distance.
3. Subtract the *Weld Zone Depth* from the *Ported Spacer Center*.
4. Insert the plug while measuring from the pipe or fitting end to the top of the *Compression Hex Nut* ⑳ and stop inserting when the reading on the measuring tape matches the difference found - **Step 3**.

Example:

Testing a weld on a 2” Class 600 Weld Neck Flange

- Ported Spacer Center 18.58”
- Weld Zone Depth 2.88”
- Ported Spacer Center – Weld Zone Depth = 18.58” – 2.88” = 15.70”

From the calculation and shown in **Figure 5**, the plug should be inserted into the fitting until the distance from the top of the *Compression Hex Nut* ⑳ to the end of the fitting is 15.70”.

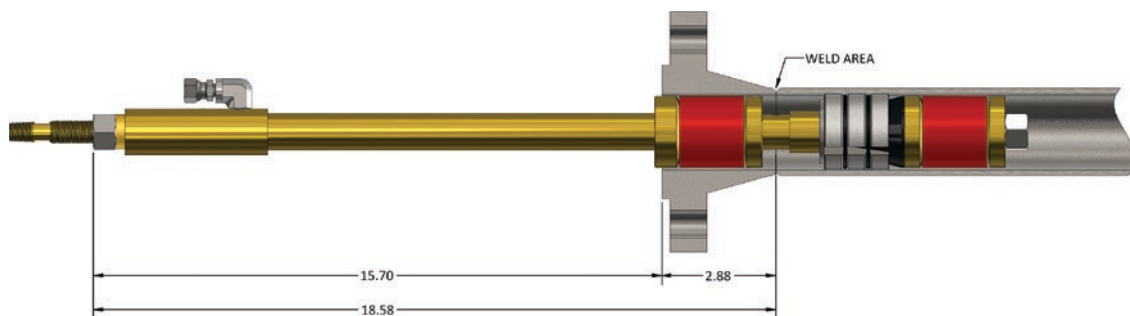


Table 3: GripSafe DBB Ported Spacer Center

Nominal Plug Size	0.75	1	1.25	1.5	2	2.5	3	3.5	4
Ported Spacer Center (in)	19.63	19.63	18.80	18.80	18.58	20.38	20.13	20.13	20.13

8. Instructions for “Optional” Cooling Flow Between the Seals

- 8.1. When using the plug to cool the pipe during welding, ensure the check valve is free from dirt or debris.
- 8.2. Remove any plug/cap from the front of the shaft, if installed, to allow water to flow freely.
- 8.3. Use any of the installation methods mentioned in the sections above to install the plug.
 - a. Place plug as far into pipe as possible while still allowing access to the *Fill Port*.



TEMPERATURE NOTE:

If welding is to occur while the plug is inside the pipe then the *Sealing Compression Ring* ⑥ must be at least 12 inches into the pipe or the max allowable beyond the location welding is to occur. USA Industries *Urethane Seals* can withstand 225° Fahrenheit for short durations. USA Industries’ offers extended reach plugs if a longer length is needed for your application.

- b. Install and torque the plug (see **Section 6**).
- c. Connect a water pump to the *Fill Port / Swivel Pipe Union Fitting* ③.
- d. Water Return and Drain options:
 1. Allow the water to drain freely from the *Return / Drain Port* (see **Figure 7**). This is only recommended when the plug isn’t subjected to backpressure resulting from chemical vapors originating beyond the check valve of the vessel that the plug is installed in. *(These vapors can flow by the Check Valve if enough pressure is generated behind the plug to create a 1/3 psi positive-pressure-differential originating in the vessel beyond the Check Valve. Under this condition, the result could expose workers to hazardous chemicals inadvertently from the vented return water).*
 2. Attach a hose to the *Return / Drain Port* (see **Figure 7**) to direct water into a safe collection container. The hose should be long enough, and the container located far enough away, that any redirected hazardous vapors exiting the vessel, which may potentially flow by the *Check Valve* due to positive-pressure-differential, do not pose any risk to personnel that may be in the area.
 3. Use a closed loop water chiller to recirculate chilled water. The chiller system must be designed to be used safely with any chemicals that may end up in the recirculation loop because of the possibility of positive-pressure-differential flowing by the *Check Valve*. The tank of such chiller must be able to vent pressure buildup resulting from flow by of the check valve.



CAUTION: Mixing of chemicals or vapors into the cooling water may occur if the pressure differential is greater on the back of the plug vs the internal pressure created by the flowing fluid by 1/3 psi. It may be necessary to contain and discard the water in a method that is in accordance to site and EPA recommendations.



NOTE: This optional configuration will not allow the user to control the backpressure independent of the pressure between the seals. Pressure may be introduced between the seals without increasing the backpressure on the plug. However, any positive-pressure-differential between the backpressure and the pressure between the seals will cause the *Check Valve* to open and allow the fluid and pressure behind the seals into the area between the seals. For example, if the pressure between the seals is at 50 psi and the vessel generates a back pressure of 100 psi then the check will open and balance the two zones thereby elevating the pressure between the seals to 100 psi. This configuration is intended only to pump cooling water through the plug to help slow the heat transfer through the pipe in order to help preserve the front seal closest to the weld.

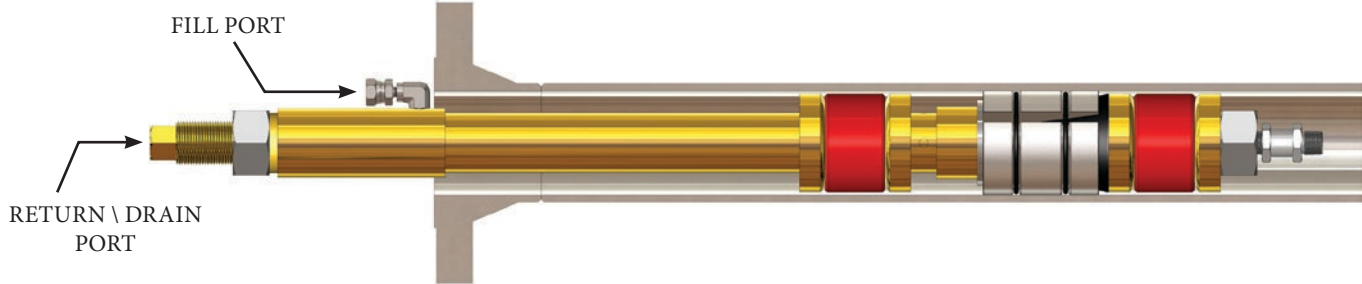


Figure 7: Fill and drain ports on the plug

9. GripSafe DBB Plug Removal

9.1 Depressurize system using the pressure bleed-off valve on the hydro test pump.

9.2 Remove hydro test equipment from the *Swivel Pipe Union Fitting* (3).



NOTE: Use caution to ensure the *Swivel Pipe Union Fitting* (3) does not become unthreaded or loosened during removal of the hydro testing equipment when testing is complete. Failure to do so may cause leaks when the plug is used again. Use appropriately fixed sized wrenches, not adjustable wrenches.

9.3 Ensure there is no backpressure on the GripSafe DBB plug.



CAUTION: SLOWLY open *Vent Port* (2) to relieve back pressure. If any back pressure was introduced to the vessel, care must be taken when opening valves or loosening fittings. Failure to do so may result in hazardous pressure flow and/or fittings becoming hazardous projectiles that may damage personnel and/or equipment. If utilizing a backpressure monitoring tee, fast flowing gases or liquids through hosing can cause hose whip. Take caution to avoid this, failure to do so may result in injury to personnel or equipment.

9.4 Loosen the *Compression Hex Nut* (21).

- Once the seal has broken free from the pipe ID, water may flow out from the pipe. Be prepared to capture this if desired. Continue loosening the *Compression Hex Nut* (21) until the wedges are fully relaxed.



NOTE: Do not remove the *Compression Nut* (21) from the *Shaft* (1). If this happens, immediately reinstall the component.

9.5 Remove the GripSafe isolation plug from the pipe.

- Completely back the *Compression Hex Nut* (21) up to the end of the threads. This will allow the *Wedge Grippers* (11) to fully retract and ensure the *Retraction Bands* (15) do not become permanently set in shape to the extended position, rendering them incapable of retracting the *Wedge Grippers* (11) in the relaxed state.
- Clean and store for later use or return to USA Industries, Inc.
- Store away from direct sunlight, and in an area not exposed to 150°F. UV. Excessive heat will cause seal degradation over time.
- The *Wedge Gripper* (11) gripping texture (*Gritlock*™) may become packed with pipe scale and rust over time from several uses of the plug. Inspection of *Gritlock* after use is necessary to ensure the gripping strength of the *Gripping Wedges* remain at peak performance. To clean, simply use a mild dishwashing soap and a stiff stainless steel bristled brush, such as a welding brush. If pipe scale is persistent, use of a household rust remover along with a stiff, stainless steel bristled brush should be sufficient. Rinse plug thoroughly with tap water to remove residual chemicals and dry thoroughly.



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