



# GRIPSAFE®

## INSTALLATION MANUAL



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### Small Inboard Insertion Blocking (IIB) Reverse Pressure Plug

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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

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## 1. Introduction

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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.

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.

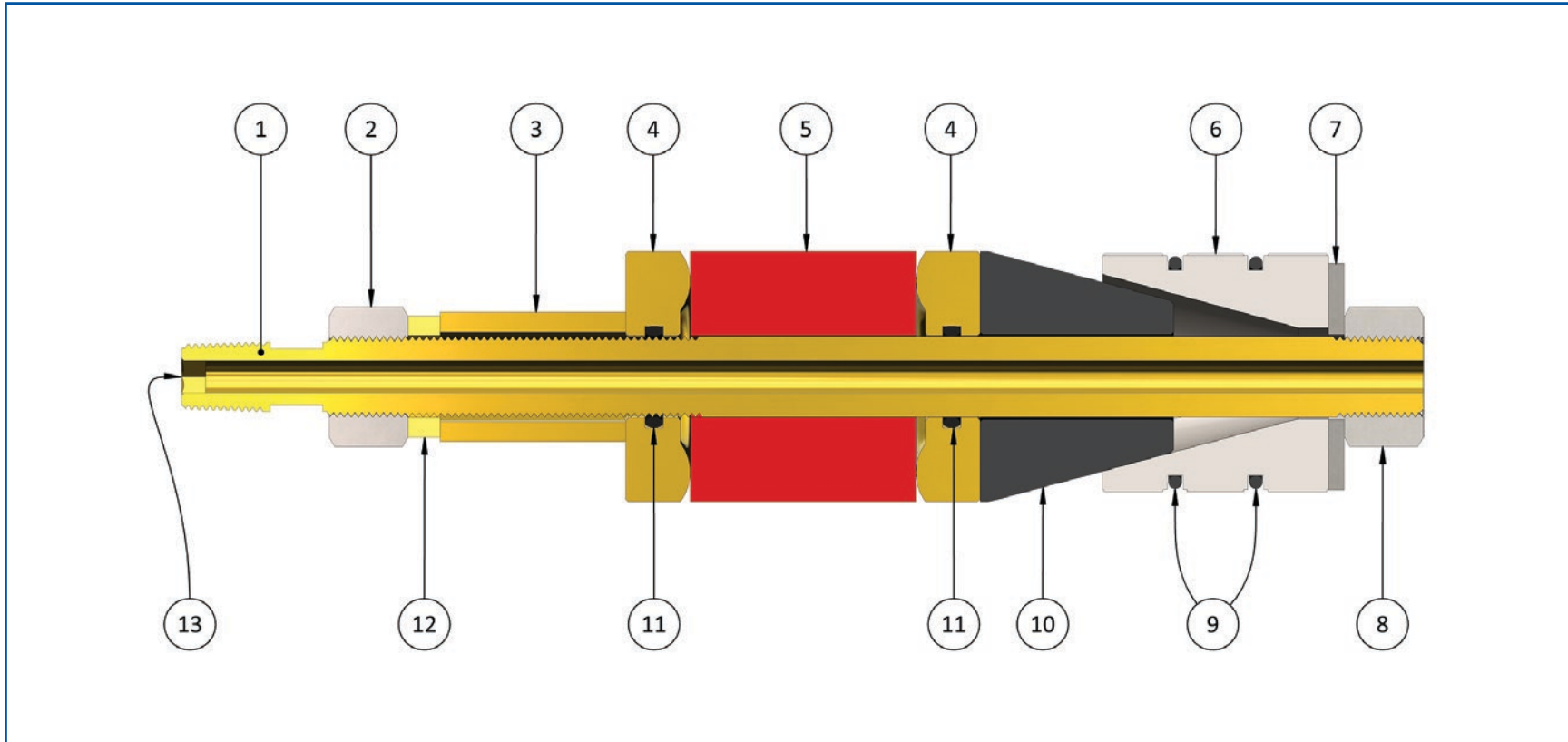
## 2. Safety

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- ⚠ 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.
- ⚠ Use care when handling the *Wedge Studs*. Never beat, hammer, or pry on the *Wedge Studs*. Never remove the nut located on the *Wedge Studs*.
- ⚠ 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.**
- ⚠ The Inboard Insertion Blocking GripSafe plug is designed to hold pressure originating from the installation side only.
- ⚠ 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)*

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**Figure 1: GripSafe IIB Parts Diagram**

**Table 1: GripSafe Bill of Materials**

Nominal Pipe Size (in)	Schedule	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬
		Shaft	Compression Hex Nut	Compression Spacer	Compression Ring	Seal	Wedge Gripper	Wedge Gripper Washer	Rear Hex Nut	Retraction Band	Wedge Cone	Compression Ring O-Ring	Thrust Washer	Vent Port
3/4	40,STD,40S	1	1	1	2	3	1	1	1	2	1	2	1	1
	80,XS,80S	1	1	1	2	3	1	1	1	2	1	2	1	1
1	10	1	1	1	2	3	1	1	1	2	1	2	1	1
	40,STD,40S	1	1	1	2	3	1	1	1	2	1	2	1	1
	80,XS,80S	1	1	1	2	3	1	1	1	2	1	2	1	1
	160	1	1	1	2	3	1	1	1	2	1	2	1	1
1-1/4	10	1	1	1	2	3	1	1	1	2	1	2	1	1
	40,STD,40S	1	1	1	2	3	1	1	1	2	1	2	1	1
	80,XS,80S	1	1	1	2	3	1	1	1	2	1	2	1	1
	160	1	1	1	2	3	1	1	1	2	1	2	1	1
1-1/2	XXH	1	1	1	2	3	1	1	1	2	1	2	1	1
	10	1	1	1	2	3	1	1	1	2	1	2	1	1
	40,STD,40S	1	1	1	2	3	1	1	1	2	1	2	1	1
	80,XS,80S	1	1	1	2	3	1	1	1	2	1	2	1	1
2	160	1	1	1	2	3	1	1	1	2	1	2	1	1
	XXH	1	1	1	2	3	1	1	1	2	1	2	1	1
	10	1	1	1	2	3	1	1	1	2	1	2	1	1
	40,STD,40S	1	1	1	2	3	1	1	1	2	1	2	1	1
2-1/2	80,XS,80S	1	1	1	2	3	1	1	1	2	1	2	1	1
	160	1	1	1	2	3	1	1	1	2	1	2	1	1
	XXH	1	1	1	2	3	1	1	1	2	1	2	1	1
	10	1	1	1	2	3	1	1	1	2	1	2	1	1
3	40,STD,40S	1	1	1	2	3	1	1	1	2	1	2	1	1
	80,XS,80S	1	1	1	2	3	1	1	1	2	1	2	1	1
	160	1	1	1	2	3	1	1	1	2	1	2	1	1
	XXH	1	1	1	2	3	1	1	1	2	1	2	1	1
3-1/2	10	1	1	1	2	3	1	1	1	2	1	2	1	1
	40,STD,40S	1	1	1	2	3	1	1	1	2	1	2	1	1
	80,XS,80S	1	1	1	2	3	1	1	1	2	1	2	1	1
	XXH	1	1	1	2	3	1	1	1	2	1	2	1	1
4	120	1	1	1	2	3	1	1	1	2	1	2	1	1
	160	1	1	1	2	3	1	1	1	2	1	2	1	1
	XXH	1	1	1	2	3	1	1	1	2	1	2	1	1

## 4. Specifications

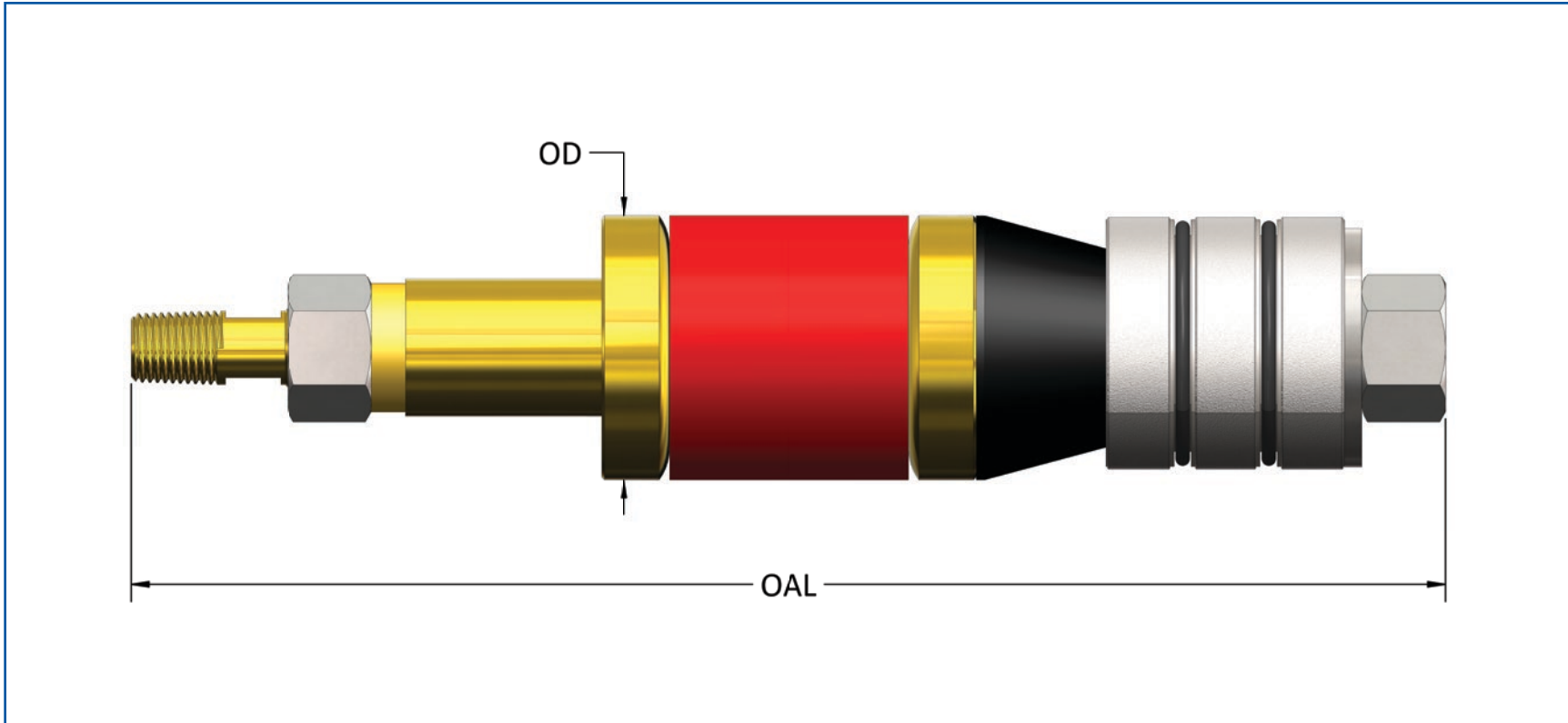


Figure 2: GripSafe IIB Dimensions Diagram



## Table 2: GripSafe IIB 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)		Compr Hex Nut Socket Size (in)	Backup Wrench Size (in)	Back Pressure Vent Thread	Test Pressure Rating (PSI)*
								Norm	Max.				
3/4	40,STD,40S	GS-I-R-0075-040	0.79	0.81 - 0.91	0.035	0.3	5.88	3.0	5.0	9/16	1/4 Open End	1/16 MNPT	10000
	80,XS,80S	GS-I-R-0075-080	0.71	0.73 - 0.80	0.035	0.3	5.88	2.0	3.5	9/16	1/4 Open End	1/16 MNPT	10000
1	10	GS-I-R-0100-010	0.99	1.01 - 1.15	0.103	0.5	5.88	5.5	8.5	9/16	1/4 Open End	1/16 MNPT	2825
	40,STD,40S	GS-I-R-0100-040	0.99	1.02 - 1.15	0.055	0.5	5.88	5.5	8.5	9/16	1/4 Open End	1/16 MNPT	10000
	80,XS,80S	GS-I-R-0100-080	0.90	0.93 - 1.04	0.055	0.4	5.88	1.5	7.0	9/16	1/4 Open End	1/16 MNPT	10000
	160	GS-I-R-0100-160	0.78	0.80 - 0.90	0.035	0.3	5.88	3.0	5.0	9/16	1/4 Open End	1/16 MNPT	10000
1-1/4	10	GS-I-R-0125-010	1.31	1.35 - 1.49	0.130	1.8	9.38	10	20	15/16	7/16 Open End	1/4 MNPT	2350
	40,STD,40S	GS-I-R-0125-040	1.31	1.35 - 1.49	0.068	1.8	9.38	10	20	15/16	7/16 Open End	1/4 MNPT	10000
	80,XS,80S	GS-I-R-0125-080	1.21	1.25 - 1.37	0.065	1.7	9.38	10	20	15/16	7/16 Open End	1/4 MNPT	10000
	160	GS-I-R-0125-160	1.11	1.14 - 1.26	0.055	0.6	5.88	7.0	11.0	9/16	1/4 Open End	1/16 MNPT	10000
	XXH	GS-I-R-0125-XXH	0.85	0.87 - 0.98	0.045	0.4	5.88	4.0	6.0	9/16	1/4 Open End	1/16 MNPT	10000
1-1/2	10	GS-I-R-0150-010	1.53	1.58 - 1.73	0.157	2.3	9.38	20	30	15/16	7/16 Open End	1/4 MNPT	2125
	40,STD,40S	GS-I-R-0150-040	1.53	1.58 - 1.73	0.085	2.3	9.38	20	30	15/16	7/16 Open End	1/4 MNPT	10000
	80,XS,80S	GS-I-R-0150-080	1.42	1.47 - 1.62	0.085	2.1	9.38	20	30	15/16	7/16 Open End	1/4 MNPT	10000
	160	GS-I-R-0150-160	1.27	1.31 - 1.45	0.068	1.8	9.38	10	20	15/16	7/16 Open End	1/4 MNPT	10000
	XXH	GS-I-R-0150-XXH	1.05	1.08 - 1.20	0.055	0.5	5.88	6.0	10.0	9/16	1/4 Open End	1/16 MNPT	10000
2	10	GS-I-R-0200-010	1.94	2.00 - 2.25	0.220	3.4	9.38	30	50	15/16	7/16 Open End	1/4 MNPT	1825
	40,STD,40S	GS-I-R-0200-040	1.94	2.00 - 2.25	0.130	3.4	9.38	30	50	15/16	7/16 Open End	1/4 MNPT	10000
	80,XS,80S	GS-I-R-0200-080	1.81	1.87 - 1.99	0.130	3.1	9.38	30	50	15/16	7/16 Open End	1/4 MNPT	10000
	160	GS-I-R-0200-160	1.60	1.65 - 1.81	0.085	2.5	9.38	25	35	15/16	7/16 Open End	1/4 MNPT	10000
	XXH	GS-I-R-0200-XXH	1.42	1.47 - 1.62	0.085	2.1	9.38	15	25	15/16	7/16 Open End	1/4 MNPT	10000
2-1/2	10	GS-I-R-0250-010	2.34	2.40 - 2.64	0.291	9.7	12.88	60	100	1-7/8	1 Box End	3/8 FNPT	1975
	40,STD,40S	GS-I-R-0250-040	2.34	2.40 - 2.64	0.125	9.7	12.88	60	100	1-7/8	1 Box End	3/8 FNPT	8000
	80,XS,80S	GS-I-R-0250-080	2.20	2.26 - 2.41	0.125	9.0	12.88	60	100	1-7/8	1 Box End	3/8 FNPT	8000
	160	GS-I-R-0250-160	2.00	2.06 - 2.21	0.125	8.5	12.88	55	85	1-7/8	1 Box End	3/8 FNPT	8000
	XXH	GS-I-R-0250-XXH	1.69	1.74 - 1.89	0.085	3.0	9.38	25	40	15/16	7/16 Open End	1/4 MNPT	8000
3	10	GS-I-R-0300-010	2.88	2.97 - 3.16	0.385	13.6	12.88	150	200	1-7/8	1 Box End	3/8 FNPT	1725
	40,STD,40S	GS-I-R-0300-040	2.88	2.97 - 3.16	0.193	13.6	12.88	150	200	1-7/8	1 Box End	3/8 FNPT	8000
	80,XS,80S	GS-I-R-0300-080	2.71	2.80 - 3.01	0.190	12.5	12.88	125	175	1-7/8	1 Box End	3/8 FNPT	8000
	160	GS-I-R-0300-160	2.50	2.56 - 2.74	0.125	11.7	12.88	80	140	1-7/8	1 Box End	3/8 FNPT	8000
	XXH	GS-I-R-0300-XXH	2.18	2.24 - 2.39	0.125	9.0	12.88	60	100	1-7/8	1 Box End	3/8 FNPT	8000
3-1/2	10	GS-I-R-0350-010	3.34	3.44 - 3.67	0.416	17.2	12.88	200	325	1-7/8	1 Box End	3/8 FNPT	1575
	40,STD,40S	GS-I-R-0350-040	3.34	3.44 - 3.67	0.204	17.2	12.88	200	325	1-7/8	1 Box End	3/8 FNPT	8000
	80,XS,80S	GS-I-R-0350-080	3.16	3.26 - 3.45	0.208	15.8	12.88	180	290	1-7/8	1 Box End	3/8 FNPT	8000
	XXH	GS-I-R-0350-XXH	2.60	2.66 - 2.84	0.125	12.1	12.88	115	165	1-7/8	1 Box End	3/8 FNPT	8000
4	120	GS-I-R-0400-120	3.42	3.52 - 3.72	0.205	17.8	12.88	220	340	1-7/8	1 Box End	3/8 FNPT	8000
	160	GS-I-R-0400-010	3.23	3.33 - 3.53	0.205	17.2	12.88	200	300	1-7/8	1 Box End	3/8 FNPT	8000
	XXH	GS-I-R-0400-XXH	2.95	3.01 - 3.20	0.205	15.6	12.88	155	245	1-7/8	1 Box End	3/8 FNPT	8000



## 5. Preparing the GripSafe IIB Plug for Installation

5.1 The GripSafe IIB plug should be in the “Ready to Install” position from the factory.

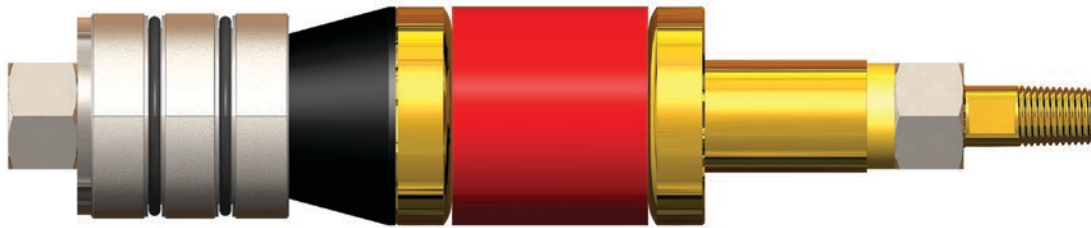


Figure 3: “Ready to Install” (Retracted)

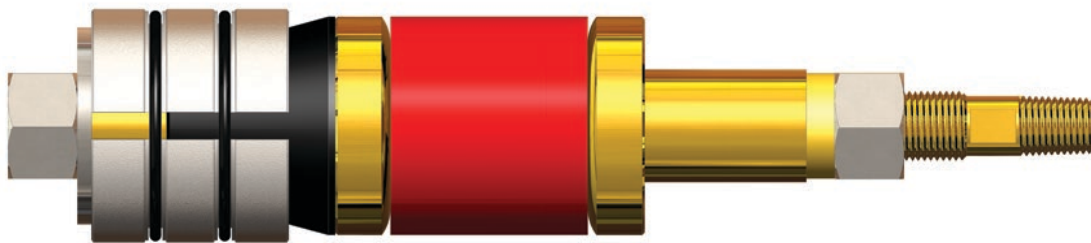


Figure 4: “Not Ready to Install” (Energized)

- Ensure the *Compression Hex Nut* ② is not tightened and the GripSafe plug is in the “Retracted” state (see **Figure 3**).
- In the “Not Ready to Install” state (see **Figure 4**) the GripSafe plug’s *Wedge Grippers* ⑥ will obstruct insertion into the pipe.
- In the “Ready to Install” state (see **Figure 5**) the GripSafe plug will not immediately grip the pipe upon insertion. Only after tightening the *Compression Hex Nut* ② while the plug is in the pipe, to expand the *Wedge Grippers* ⑥ and make contact with the pipe ID, will the plug be securely gripping the pipe.
- If the plug is being used for pressure testing, install a cap or plug on the *Vent Port* ⑬ to seal the system.



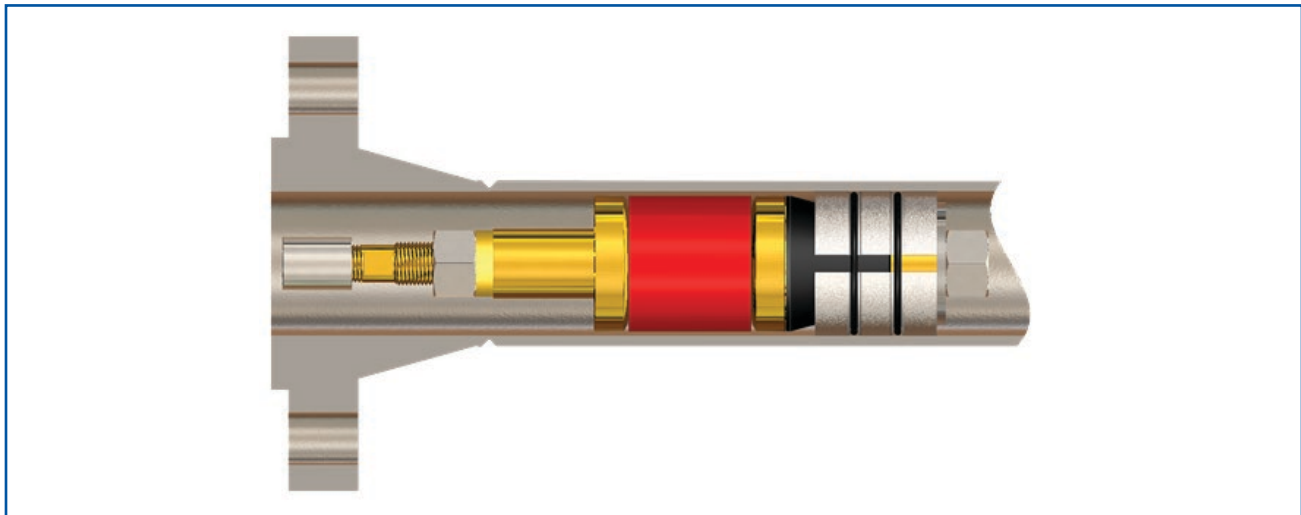
## 6. Installing the GripSafe IIB Plug



**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.

### 6.1. Insert the GripSafe IIB plug into the pipe or fitting.

- See *Table 2* for Operational ID Range and clearance.
- Insert the GripSafe IIB plug into the pipe, *Wedge Gripper* ⑥ side first (see **Figure 5**).
- When testing a Weld Neck Flange weld, the *Compression Ring* ④ must be inserted past the weld droop and the end of the *Shaft* ① must be at least 0.5” away from the face of the Weld Neck Flange (see **Figure 5**).



**Figure 5:** Minimum Insertion Depth



**Caution:** The GripSafe IIB plug is designed to hold pressure originating from the installation side only. If pressure is anticipated on the other side of the plug, **contact USA Industries for possible solution** (see **Figure 8**). Disregarding this caution may result in the GripSafe IIB plug ejecting, which could lead to injury, material loss, and/or equipment damage.



**Caution:** In the “Ready to Install” state, it is important to note the plug will not be immediately gripping the pipe upon insertion. Only after tightening the *Compression Hex Nut* ② while the plug is in the pipe, to expand the *Wedge Grippers* ⑥ and make contact with the pipe ID, will the plug be securely gripping the pipe.

- Continue installing with **Step 6.2**.

### TEMPERATURE NOTE:



°F If welding is to occur while the plug is inside the pipe, we recommend that the end of the end of the *Shaft* ① must be at least 12” 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.** Monitoring of pipe temperature at seal location is recommended to prevent *Seal* ⑤ failure.

### 6.2. Tighten the *Compression Hex Nut* ②

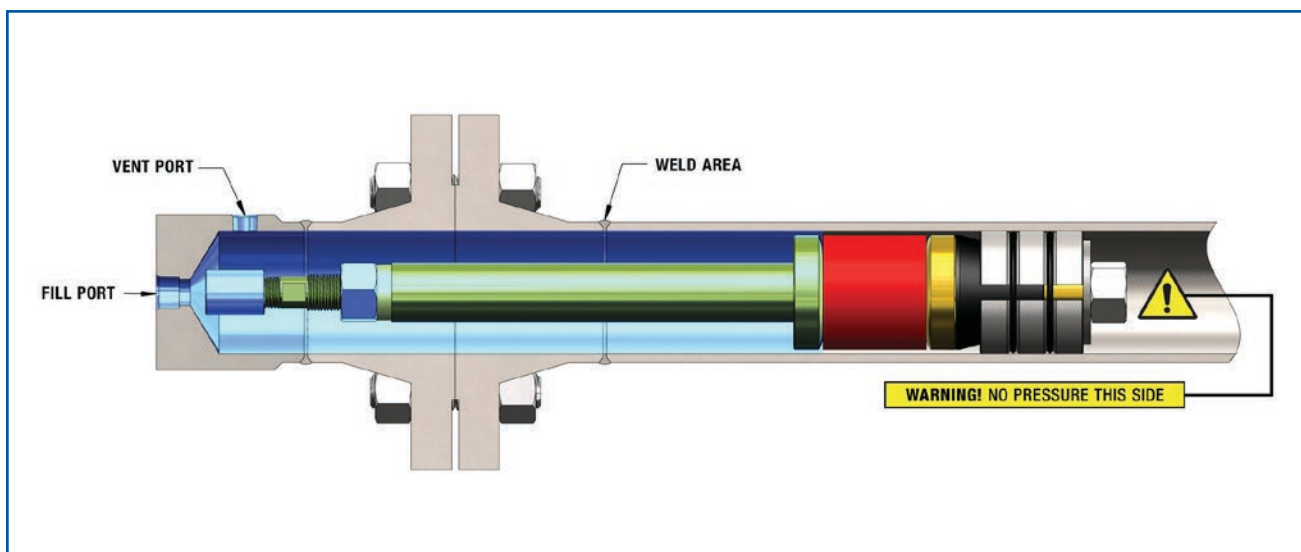
- Use a crow’s foot attached to a torque wrench to turn the *Compression Hex Nut* ② while holding the backup hex or flats on the *Shaft* ① stationary with a box end wrench.
- If the *Compression Hex Nut* ② is inside the fitting or pipe, and if the *Shaft* ① cannot be held stationary, use an impact wrench with the right socket (see *Table 2*) to tighten the *Compression Hex Nut* ②.
- Continue tightening until the **Minimum Compression Torque** (see *Table 2*) is reached.



**Caution:** When using an impact wrench, care must be taken not to over tighten the *Compression Hex Nut* ② which could lead to thread galling to the *Shaft* ①.

### 6.3. Install Gasket and IIB Blind Flange

- Use in-house procedures to install the appropriate Gasket and IIB Blind Flange for the application.
- Follow Gasket manufacturer’s torque and installation procedure or use an approved in-house procedure.



**Figure 6:** GripSafe Weld Neck Flange Hydro Testing

#### 6.4. Pressurize system through the *Flange Ports* and verify the integrity of the *Seal*⑤.

- Attach the hydro pump's hose to the *NPT Fill Port* of the Blind Flange.
- Bleed off air by pumping water into the system while keeping the *NPT Vent Port* open.
- Once air has been purged, plug the *NPT Vent Port*.
- Increase pressure to 20% of target pressure or 100 psig, whichever is less. A drop in pressure may not be an indication of leakage. USA Industries' *Seals* 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 *Seal*⑤ 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.

## 7. GripSafe IIB Plug Removal

- 7.1. Depressurize system using the pressure bleed-off valve on the hydro test pump equipment.
- 7.2. Remove the hydro pump's hose from the *NPT Fill Port* to bleed water out of the system.
- 7.3. Use in-house procedures to remove the Gasket and IIB Blind Flange from the system.



**CAUTION:** SLOWLY open the cap or plug on *Vent Port*⑬ to relieve gas build up or hazardous fluid at the back of the plug.

#### 7.4. Loosen the *Compression Hex Nut*②.

- 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*② until the *Wedges* are fully relaxed.



**NOTE:** Do not remove the *Compression Nut*② from the *Shaft*①. If this happens, immediately reinstall the component.

#### 7.5. Remove the GripSafe IIB plug from the pipe.

- Completely back the *Compression Hex Nut*② up to the end of the threads. This will allow the *Wedge Grippers*⑥ to retract fully and ensure the *Rubber Retraction Bands*⑨ do not become permanently set in shape to the extended position, rendering them incapable of retracting the *Wedge Grippers*⑥ in the relaxed state.
- Clean and store for later use or return to USA Industries, Inc.

- Store out of direct sunlight and in an area not exposed to above 150°F. UV. Excessive heat will cause seal degradation over time.
- The *Wedge Gripper*® gripping texture (*Gritlock*™) may become packed with pipe scale and rust through after several uses of the plug. Inspection of this surface after use is necessary to keep the gripping strength of the *Gripping Wedges* at peak performance. To clean, simply use a mild dishwashing soap and a stiff stainless steel bristled brush such as a welding brush. If packing is persistent, use of a household rust remover along with a stiff stainless steel bristled brush should be sufficient. Rinse plug clean of any residual chemicals with tap water.



GripSafe is a registered trademark of USA Industries, Inc.