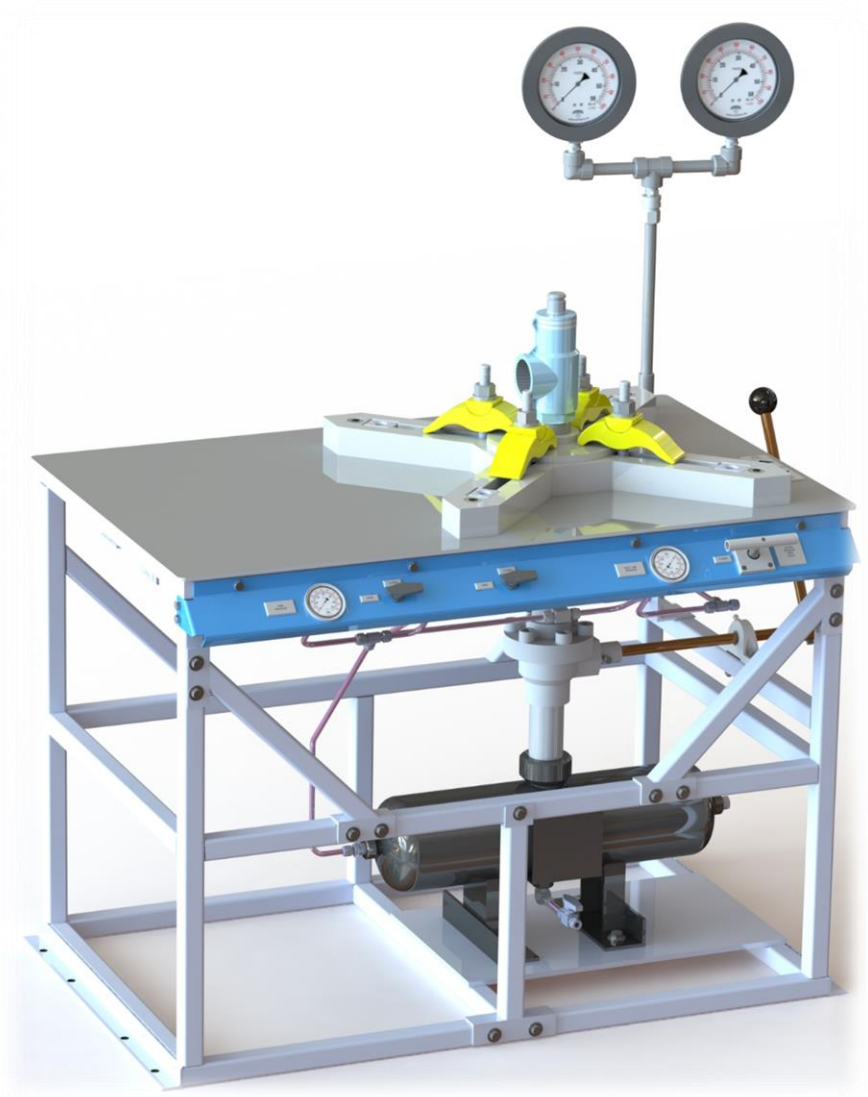
MERCER VALVE CO., INC.®
"AUTO SEAT TECHNOLOGY"®

ENG-511001 & ENG-659001

3000 psig
PRESSURE RELIEF VALVE TEST STAND

INSTALLATION, OPERATION, & MAINTENANCE MANUAL



MERCER VALVE

Before utilization of Mercer Valve Co., Inc. Pressure Relief Valve Test Stand, all sections of this document and all regulatory authority codes must be read and understood. Failure to do so voids all warranties.

REV.	ECN	DATE
D	2932	14-Dec-2017

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1. Purpose

This document establishes the assembly, hookup, and operating procedure for the Mercer Valve Model No. ENG-511001 & ENG-659001 Valve Test Stand, represented in Figure 1. This document should be read and understood before the test stand is used. Failure to do so can result in improper operation that could result in damage to equipment or affect the safety of individuals around the equipment. The recommendations in this document should be used in conjunction with all regulatory bodies and all end-user company's policies.

Figure 1: ENG-511001 Mercer Valve's Test Stand

1.1. Scope

This procedure describes in detail the requirements to successfully assemble, setup, and operate the test stand.

The Mercer 3000 PSI Test Stand has been designed to provide the user maximum flexibility to test threaded and flanged pressure relief valves (PRV) quickly and safely within a factory, warehouse or container setting. The Maximum Allowable Working Pressure (MAWP) of the test stand is 3000 psi. Each valve orifice will have its own pressure limitations. These limitations are based on the reaction forces created by the valves and the required pressures to pop them. The pressure limitations shown in Table 1 were determined from Mercer's actual orifice sizes.

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Table 1: Test Stand Pressure Limits

ORIFICE SIZE	SET PRESSURE LIMIT psig (barg)	
	Spring Operated PRVs	*Pilot Operated PRVs
B	2500 (172)	-
C	2500 (172)	-
D	2500 (172)	2500 (172)
E	2400 (165)	2500 (172)
F	2400 (165)	2500 (172)
G	2000 (138)	2500 (172)
H	2000 (138)	2500 (172)
J	1800 (124)	2500 (172)
K	1500 (103)	2220 (153)
L	1250 (86)	2220 (153)
M	1000 (69)	2220 (153)
N	-	2220 (153)
P	-	2220 (153)
***WARNING**: *Pilot Operated PRV are tested with the small volume selected*		

Additional information on PRV testing can be found in the following specifications. These specifications should be used in addition to this document but are not limited by it.

American Petroleum Institute:
API STD 527 – Seat Tightness of Pressure Relief Valves
API RP 576 – Inspection of Pressure-Relieving Devices
API STD 598 – Valve Inspection and Testing

American Society of Mechanical Engineers:
ASME PTC 25 – Pressure Relief Devices
ASME Boiler and Pressure Vessel Code Section VIII, Division 1 – Unfired Pressure Vessels
ASME B16.5 – Pipe Flanges and Flanged Fittings

National Board of Boiler Inspectors:
NB-18 – Pressure Relief Valve Certifications
NB-23 – National Board Inspection Code

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1.2. Test Stand Features

The features of this PRV Test Stand are described in the following:

1.2.1. Physical Size and Construction

There are two versions of the test stand, ENG-511001 and ENG-659001. Both versions have the same functionality and identical design. The only difference is that ENG-511001 has a larger tabletop.

- ENG-511001 tabletop measures 30'' wide x 60'' long x 35'' high.
- ENG-659001 tabletop measure 30'' wide x 48'' long x 35'' high.
- The test stand framework is made from steel plate, square tubing, and angle iron.
- System Gauges that show the incoming pressure and the tank pressure are located on the control panel. See Figure 15.
    - Additional gauges (not provided) are used for test results. These gauges will be installed on the gauge arms. See Figure 5.

These test stands use a universal flange that supports a range of PRV body sizes to be affixed and tested. Test stands that are revision (Rev.) F and newer utilize a different universal flange design than older versions. This design has longer t-nut slots that enable the t-nuts to be closer to the center of the universal flange.

1.2.2. Range of Testing

- 0 to 2500psig set pressure
- Gas/Vapor service PRVs only
    - Uses nitrogen (N_2) or air pressure source (source is not provided)
- Threaded PRV testing capability up to 3" NPT
- Flanged PRV testing capability: ½", ¾", 1", 1 ½", 2", 3", and 4" ASME B16.5 flange sizes

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2. Responsibilities

It is the responsibility of the Assembler and Operator to read over all the reference materials, to diligently follow the assembly, hookup and operating procedures, to visually inspect all components and connections on a regular basis for safety, and to provide proper maintenance. It is also the responsibility of the user to properly connect each valve to the test stand so that all forces applied to the valve and produced during the testing are braced for. Some valves may require additional bracing. It is the user's responsibility to determine when additional bracing is required. The user is responsible to ensure that all proper personal protective equipment are worn and used during all testing. Routine maintenance must be performed. All fastening hardware must be inspected monthly to insure there are no problems. Parts must be replaced when found to be worn prior to resuming testing.

CAUTION:
WEAR ADEQUETE EYE and HEARING PROTCTION WHILE OPERATING THIS TEST STAND

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3. Procedures

3.1. Unpacking, Uncrating, and Setup

3.1.1. Uncrate the Stand and Tooling

Verify all parts are present and undamaged. A list of all individual parts is found in section 5.1. If there are any missing pieces, please contact Mercer Valve at **sales@mercervalve.net** or, within the USA, at (405) 495-6533.

3.1.2. Removing the Tooling

Remove the contents and carefully set aside for storage and use later.

3.1.3. Locate the Stand

The test stand must be anchored to the floor. In addition, it is recommended that the stand be installed in its own room to help attenuate the noise produced from testing the valves.

Move it to a suitable area that will attenuate the valve's discharge noise; see section 3.2. Position the stand and install concrete anchors through its mounting feet and into a concrete floor. See Figure 2. Anchors are not provided. The anchors used must be sufficient to withstand all reaction forces produced while the stand is in service. They must be structural anchors intended for solid concrete. The anchors used should be ½" diameter with a minimum of 4½" length. The concrete floor must also be able to withstand the reaction forces and be able to hold the test stand in place while testing.

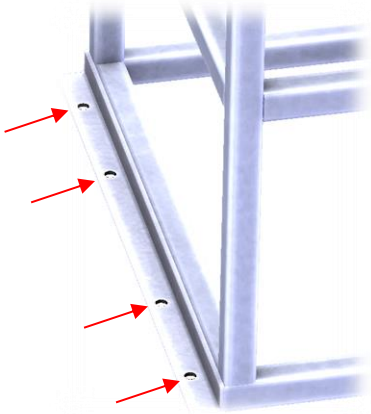

Figure 2: Mounting Feet

Follow the anchor manufacturer's procedures for proper installation. See Figure 21 for a reference of an anchor manufacturer's instructions. The instructions of the actual anchor used should be followed instead of the instructions found in Figure 21. It is recommended that eight concrete anchors with a minimum tensile strength of 4660 psi are used.

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3.2. Fabrication Discharge Ducting

This manual does not address the design of the discharge ducting. This is the responsibility of the user of the test stand to develop proper discharge ducting for the area that the valve is to be used in. Discharge ducting will be in the form of an exhaust pipe to vent and muffle the "popping" noise associated with setting pressure relief valves. This should be vented through an outside wall, ceiling, or some other suitable area away from the workplace. See Figure 3 for an example. Ear protection is required, even with the discharge ducting in place.

Figure 3: Typical Discharge Venting and Test Room Interior

3.3. Assembly and Hookup Procedure

Before assembling, make sure the test stand is securely anchored to the floor. Also make sure that the removable frame braces have been installed. See Figure 4.These braces are designed to help withstand reaction forces. The braces on the back of the stand are welded in place. The removable braces allow for maintenance. The test stand should never be used without these braces installed.

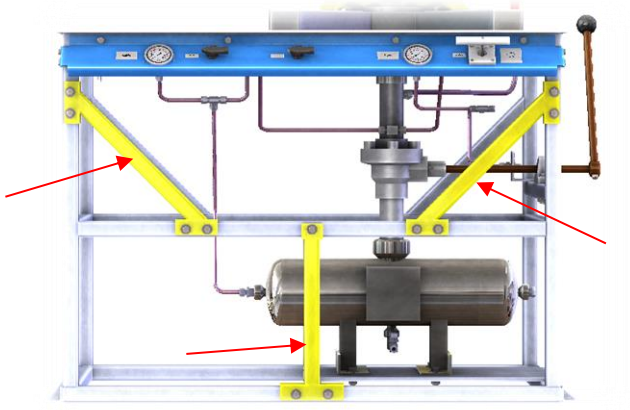

Figure 4: Frame Braces (Highlighted)

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1. Attach the gauge arm to the test stand. See Figure 5.
    a. The gauge arm comes in two pieces. The lower arm is threaded to the ½" NPT on the top of the table.
    b. Use PTFE tape to the ½" NPT threads to help with sealing before installing the lower arm.
    c. The upper arm clips into the quick disconnect at the top of the lower arm. Make sure the quick disconnect is fully engaged and securely holding the two arms together. The upper arm should be able to swivel on the quick disconnect.

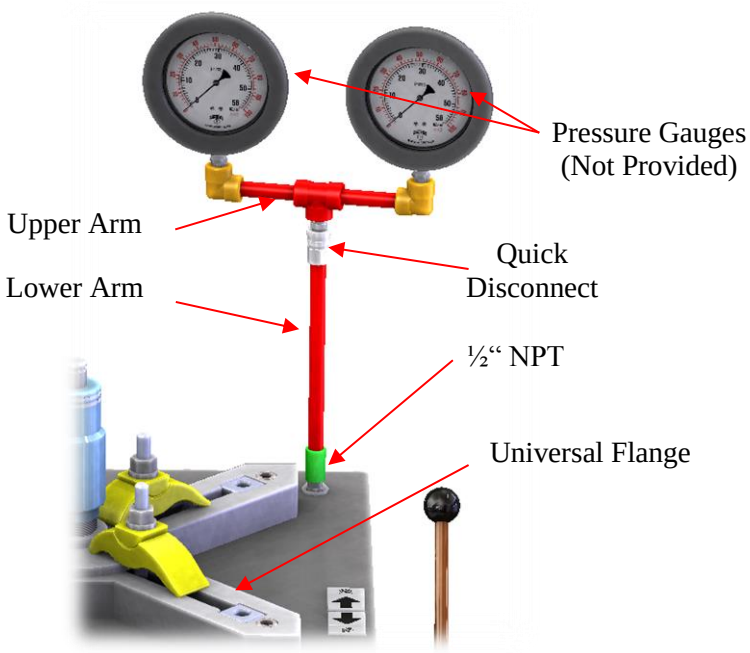

Figure 5: Gauge Arm

2. Install the four t-nuts into the grooves of the universal flange.
    a. The t-nuts and studs will arrive preassembled. See Figure 6.
        i. The stud will be fully threaded into the t-nut and retained by a set screws.
        ii. The t-nut, stud, and set screw must **never be disassembled**.
        iii. If these parts are worn or loose, the whole assembly must be replaced.

Figure 6: T-Nut Assembly

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b. On the ENG-659001 Rev. F test stand the t-nut assemblies are installed through the top of the test stand flange. See Figure 7.

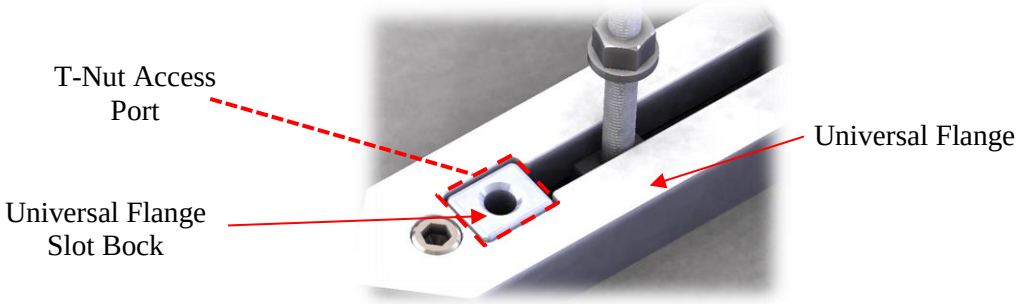

Figure 7: ENG-659001 Rev. F T-Nut Slot

c. In prior versions, the t-nuts are installed through the bottom of the test stand and into the universal flange slots. See Figure 8. There are four access points, one for each slot on the universal flange.

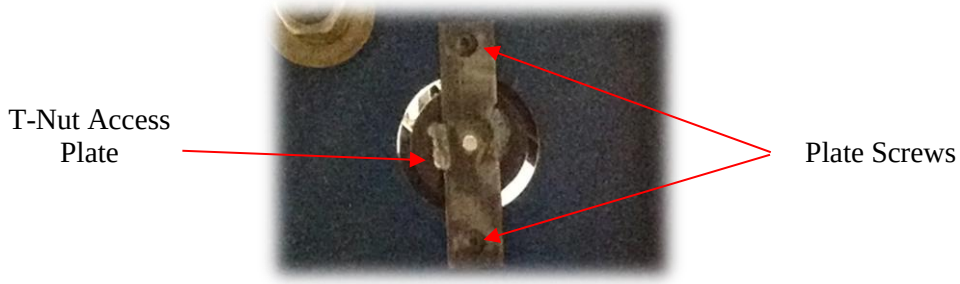

Figure 8: ENG-511001 T-Nut Access Port (Underneath Table Top)

d. Slide the t-nut toward the center of the universal flange.
e. The t-nut must be aligned with the groove in the flange to fit properly.

3. After the t-nuts are installed, complete the following.
   a. For the ENG-659001 Rev. F test stand, install the Universal Flange Slot Blocks. See Figure 7.
   b. For prior version, install the t-nut access plates.
      i. These plates are installed on the bottom of the test stand.
      ii. Secure these to the test stand's top plate by two screws.
4. Make sure both vent valves are open and the supply valve is closed. See Figure 15.
5. Connect a pressure source, either N_2 or high pressure air, controlled at no greater than 3000 psi (206.8 bar), to the inlet connection on the side of the test stand. See Figure 9.

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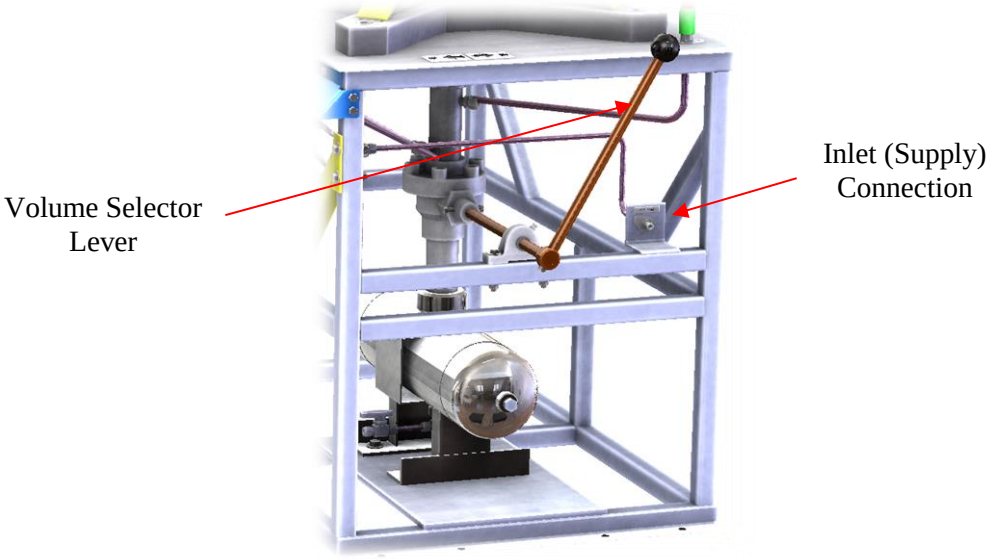

Figure 9: Right Side View

6. A pressure relief device set at 3000 psi (206.8 bar) should be installed on the incoming line to the test stand to protect the test stand from excessive pressure.
    a. The device should be sized based on the input source to the test stand.
    b. In addition, a shut off valve should be installed between the test stand and the pressure source. The shut off valve allows the user to safely disconnect the system and to completely vent the pressure on the test stand when not in service.
7. Connect the vent line on the side of the test stand to the vent stack or to another safe discharge place. See Figure 10.

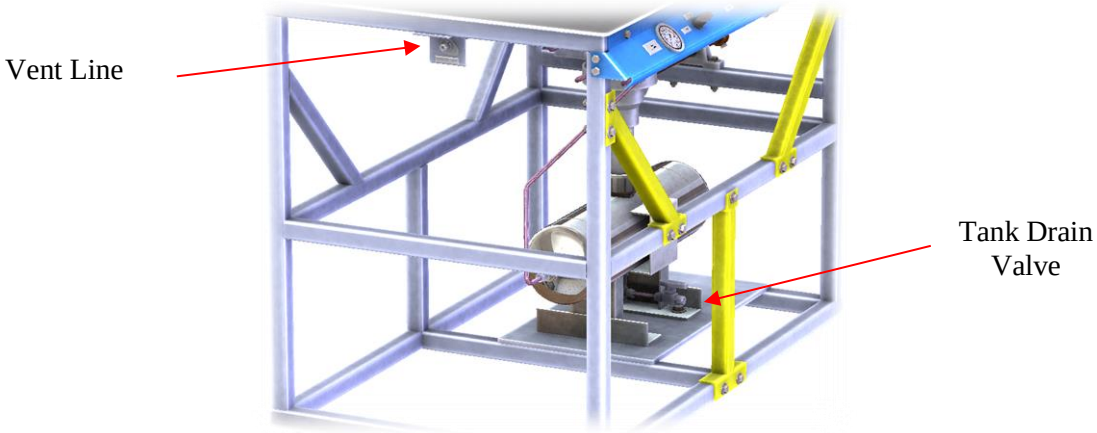

Figure 10: Left Side View

8. Assembly is complete.

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3.4. Operating Procedure

3.4.1. Installing Flanged PRV

1. Choose the correct adapter plate for the valve that needs to be tested. Consult Figure 17 for the correct plate.
    a. ENG-788001, the flange riser, can be used beneath an adapter plate. See Figure 11.
        i. ENG-788001 increases the height of the plate to help the clamps fit on the flange.
        ii. ENG-788001 should only be used when the stud or clamp contacts the valve's body and clamping is inhibited.
    b. The ENG-659001-34 t-nut assembly, which is 7" tall, must be used with flanged valves.

Figure 11: Flange Riser Utilization

2. Check to make sure that the studs are still securely installed into the t-nuts.
    a. Trying to turn the studs by hand can check this.
    b. If they are found to be loose they must be replaced.
3. On ENG-659001 Rev. F version of test stand, make sure the Universal Flange Slot Blocks are installed.
4. Make sure that the o-rings are correctly installed onto the plate and that they are in good condition.
    a. If an o-ring is missing or in poor condition, replace it before continuing.
5. Make sure that the feed valve is closed and the vent valves are open. See Figure 15.
6. Install the adapter plate onto the universal flange.
7. Center the valve onto the adapter plate by aligning the inlet flange to the proper o-ring for the flange size.
    a. Make sure the PRV's outlet is facing the side of the test stand and the direction of discharged flow is to a safe place.
    b. The direction of the valve's outlet should never be in line with the user or other personnel.
8. Select and install the appropriate clamps that fit for clamping down the PRV's flange.
    a. Remove the flange nuts from t-nut assembly.
    b. Install clamps on the studs.

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c. The clamps should slide over the studs and down to the universal flange.
    i. There are six clamps provide, four 751S and two 750L. The 751S are smaller than the 750L.
    ii. The 751S clamps are used for most valves however sometimes not all four 751S clamps fit. In these cases one or two of these clamps may be replaced with the 750L clamps.
    iii. Use the 750L clamps only when necessary, otherwise default to using four 751S clamps. **If four clamps do not fit, then the valve cannot be tested with this universal flange design.**

CAUTION:
FOUR CLAMPS MUST BE USED AT ALL TIMES

9. Reinstall flange nuts onto the studs. These nuts will be used to tighten the clamps onto the valve.
10. Install the clamps onto the valve's flange.
    a. The clamps should be positioned so that it has full contact with the valve inlet flange and the universal flange.
    b. The clamps should be as close to the valve as possible with still having proper contact. See Figure 12.

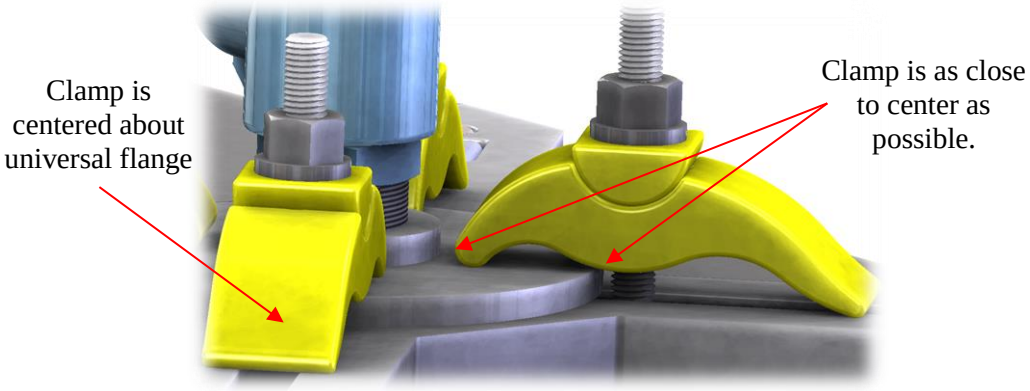

Figure 12: Flange Clamps

11. Tighten the flange nuts.
    a. The flange nuts should be tightened in a manner that results in even torque on each stud.
    b. This is accomplish by equally tightened each flange nut in stages.
        i. Initially each flange nut should be hand tightened.
        ii. Then the flange nuts should be tightened 1 to 2 turns on each nut in a cross pattern. See Figure 13 for this depiction.

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iii. Each nut should continue to be tightened 1 to 2 turns in the cross pattern until each is tightened to 150 lbf-ft (200 N-m).

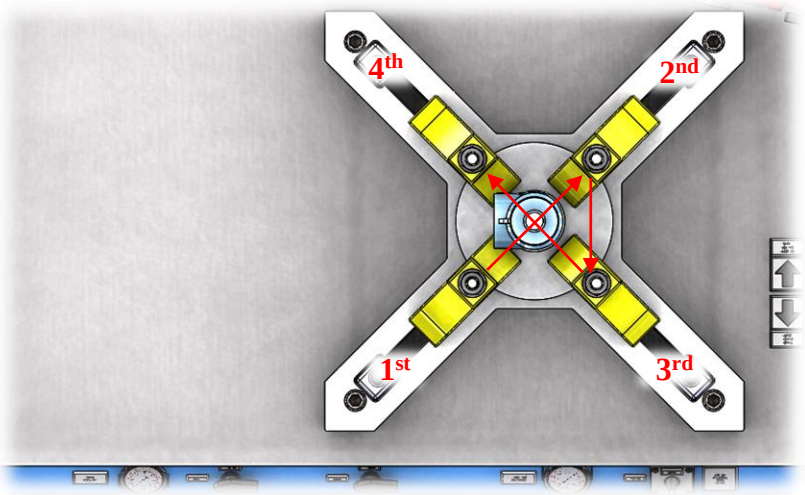

Figure 13: Top View with Tightening Order

12. The PRV is now ready to be tested.

3.4.2. Installing Threaded PRV

1. Select the correct plate for the test stand and thread size. See Figure 18.
    a. The ENG-617001 adapter plate can be used on any test stand model and uses ENG-659001-34 t-nut (7" tall) t-nut assembly.
    b. ENG-886001 is only used on ENG-659001 Rev. F and newer test stand models and uses ENG-659001-38 (4" tall) t-nut assemblies
2. Check to make sure that the studs are still securely installed into the t-nuts.
    a. Trying to turn the studs by hand can check this.
    b. If they are found to be loose they must be replaced.
3. Make sure that the feed valve is closed and the vent valves are open. See Figure 15.
4. Remove the flange nuts from the t-nut assemblies.
5. Install the adapter plate onto the universal flange.
    a. The ENG-659001 Rev. F stand will be used without clamps.
        i. The ENG-659001-38 (4" tall) t-nut assemblies are used in the bolt holes as depicted in Figure 14.

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Figure 14: Utilization of ENG-886001

b. For prior version, the ENG-659001-34 t-nut assemblies, 7" tall, will be used with the 751S clamps.
    i. The clamps should be positioned so that it has full contact with the valve inlet flange and the universal flange.
    ii. The clamps should be as close to the valve as possible with still having proper contact. See Figure 12.

CAUTION:
FOUR CLAMPS MUST BE USED AT ALL TIMES

6. Tighten the flange nuts.
    a. The flange nuts should be tightened in a manner that results in even torque on each stud.
    b. This is accomplish by equally tightened each flange nut in stages.
        i. Initially each flange nut should be hand tightened.
        ii. Then the flange nuts should be tightened 1 to 2 turns on each nut in a cross pattern. See Figure 13 for this depiction.
        iii. Each nut should continue to be tightened 1 to 2 turns in the cross pattern until each is tightened to 150 lbf-ft (200 N-m).
7. Use PTFE tape to seal all NPT threads
8. Install any required bushings into the adapter plate to accommodate your thread size and type.
9. Thread in the valve.
    a. Tighten the valve 2-3 turns past hand tight for NPT threads.
    b. Make sure the PRV's outlet is facing the side of the test stand and the direction of discharged flow is to a safe place.
    c. The direction of the valve's outlet should never be in line with the user or other personnel.
10. The PRV is now ready to be tested.

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3.4.3. Testing a PRV

This test stand has many different functions for testing a PRV. The set pressure can be verified, a set pressure can be adjusted, or the valve can be leak checked. Because each type of valve may have different procedures, this document will not indicate how to test the valve but instead how to increase and decrease the pressure in the system.

1. Familiarize yourself with the controls and gauges of the test stand. Review Figure 15.

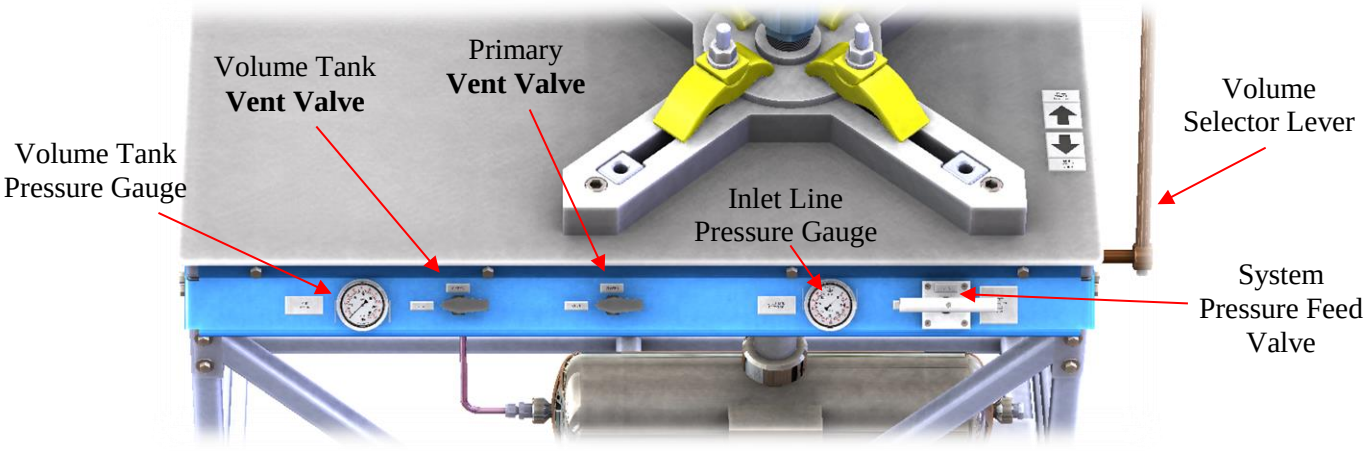

Figure 15: Test Stand Controls

2. Complete either section 3.4.1 for flanged valves or section 3.4.2 for threaded valves.
3. Install two pressure test gauges onto the gauge arm.
    a. Mercer Valve recommends using one digital gauge and one analog gauge.
    b. Both gauges should have at least 0.25% accuracy across full scale.
        i. Each gauge should be routinely calibrated for accuracy.
        ii. For the analog gauge, only the middle ½ scale or less should be used to insure accuracy in the readings.
        iii. The digital gauge tolerance should not be significant compared to the PRV's set pressure tolerance.
    c. Using two gauges allows the user to verify that each gauge is displaying proper readings. Both gauges should be recalibrated if they do not give identical readings.
4. Make sure that the feed valve is closed and the vent valves are open.
5. Make sure the line feeding the test stand has been opened. The system pressure gauge on the gauge panel should indicate how much pressure is incoming to the test stand.
6. If attempting to examine or adjust the PRV's set pressure, open or close the volume selection valve that is the appropriate for the PRV.
    a. The large volume is selected when the selector lever is pulled towards the control panel. It is closed when the lever is pushed towards the back of the stand.
    b. At times testing can require a large volume of pressure upstream of the PRV to get an accurate set pressure reading while others do not.

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c. Typically the larger the orifice, the more volume will be required.
d. Configurations that exhibit a heavy warn will need the large volume selected.
e. One shouldn't have to quickly open the feed valve to get the PRV to pop open, this will lead to an inaccurate set pressure reading.

7. Close the vent valves.
8. At this time the test stand is ready to use.
9. To increase the pressure in the testing volume slowly open the system feed valve.
    a. This pressure increase will be indicated on the two test gauges on the gauge arm.
    b. The valve is turned clockwise.
        i. The valve has a ¼ turn movement from closed to fully open.
        ii. This type of control valve is used for testing PRVs so that adequate flow rate to the PRV's inlet is realized. Needle valves may not have enough flow rate to accurately test a PRV.
10. To decrease the pressure in the testing volume, close the feed valve and open the vent valves to release pressure.
    a. There are two vent valves. One of them is to vent the pressure in the tank and the other is to vent the pressure above the volume ball valve.
    b. If the volume selector ball valve is open, large volume is selected, both vents will vent the system.
    c. This pressure decrease should be indicated on the two test gauges on the gauge arm.
11. Once testing is completed, the test stand must be shut down to remove the PRV.

WARNING:
DO NOT ATTEMPT TO REMOVE A PRV WHILE THE TEST STAND IS PRESSURIZED

3.5. Shutdown and Maintenance

3.5.1. Shutdown

1. Close the system feed valve.
2. Open the two vent valves.
3. Check the system gauges to make sure all pressure is removed from the test volume. They should read zero.
4. Remove the valve from the test stand.
    a. Unscrew for threaded connections.
    b. Loosen clamps for flanged connections.
5. If another PRV is going to be tested, the user may refer back to 3.4, otherwise continue with the following for complete shutdown of the test stand.
6. Remove any adapter plates that may be installed on the test stand.
    a. Make sure all the o-rings are present on the adapter plates upon removal.

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b. Properly store the adapter plates and o-rings.

7. Close the valve feeding the test stand. This would be the control valve between the pressure supply source and the test stand's feed valve.
8. Slowly open the system feed valve to vent any remaining pressure in the feed line. The pressure will vent out the vent line and from the universal flange.
9. Close the system feed valve.
10. At this point the test stand is completely depressurized.

3.5.2. Maintenance

Make sure the test stand is properly cleaned. All moisture and dirt should be removed from the test stand. The test stand's bare metal should be wiped down with a rust inhibitor cleaning agent to prevent rusting.

The test stand must be inspected to make sure that it is safe to operate. If any parts are found to be damaged, they should be replaced or repaired. The test stand must not be used until the parts have been put back into working order. Table 2 describes the required inspections and their frequency.

Table 2: Maintenance Schedule

Item Inspected	Inspection Frequency		Required Replacement
	Every Use	Monthly	
Anchored Mounting Bolts		X	
Ball Valves		X	
Braces		X	
Clamps	X		Yearly
Draining Volume Tank		X	
Feed Valve Handle		X	
Frame		X	
Gauge Arm		X	
T-Nut Assemblies	X		Yearly
Tubing		X	
Universal Flange		X	

Listed below are descriptions of the examinations for each item that requires an inspection:

- **Anchored Mounting Bolts** – The mounting bolts should be inspected to make sure the test stand is securely installed. If these bolts become loose, the test stand will not be attached to the ground and will allow movement during operation. If these bolts are found loose, they must be properly tightened or replaced before operation can continue.
- **Ball Valves** – The feed valve, volume selection valve, tank drain valve, and vent valves should be checked to see if they properly function and if they are leaking. If these valves are found to be leaking or not functioning properly, they should be replaced or repaired.

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- **Braces** – The bracing on the test stand should be inspected to make sure that they are still tightly attached to the test stand. If the bracing is found loose, the bolts should be tightened. If any damage is found on the bolts or bracing they should be replaced
- **Clamps** – The clamps must be checked every time they are used. They are examined for cracks and excessive wear. A damaged clamp will cause the clamping mechanism to fail. If a clamp is found to be damaged, it should be immediately replaced. Clamps should be replaced once a calendar year, never to exceed 13 months, regardless if any damage has been found.
- **Drain Volume Tank –** Regular draining of the test volume will prevent corrosion and possible inaccuracies during testing. While both vent vales are open, open the tank drain valve, see Figure 10, to enable draining of accumulated liquid. Close the drain valve once completed.
- **Feed Valve Handle** – The handle on the feed valve can become loose. When it becomes loose it can cause the valve to fail early. When the handle is found to be loose the set screws should be tightened.
- **Frame** – The frame should be inspected to see if there is any damage. The welded connections should be examined. If any of the parts are found damaged, the test stand is inoperable until it is repaired.
- **Gauge arm** – The gauge arm should be check to make sure that it is not loose from the test stand. If it is found loose, the nut should be tightened on the bulkhead fitting.
- **T-Nut Assemblies** – The t-nut assembly must be checked every time they are used. If any damage is found to the t-nut or stud the assembly should be replaced. The assembly should also be inspected to insure that the stud and t-nut are securely tightened together. If they are found loose, assembly should be replaced. The t-nut assembly should be replaced once a calendar year, never to exceed 13 months regardless if any damage has been found.
- **Tubing** – All of the tubing lines on the test stand should be inspected to see if there are any leaks between the tubing and the fittings and to see if any of the tubing has been damaged. If there are loose fittings they should be tightened to the tube manufacturer's recommendation. If any tubing or fittings are found to be damaged they should be replaced with new.
- **Universal Flange** – The universal flange should be inspected for damage and secure attachment. If any damage is found to the flange it must be repaired or replaced. If its mounting bolts are found loose, they should be tightened.

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4. Spare Parts

The following list of spare parts are recommended:

- O-Rings for the Flange Plates (see ENG-659001-31)
- Bessey® Clamp 750L (QTY 2)
- Bessey® Clamp 751S (QTY 4)
- T-nut Assembly ENG-659001-34 (QTY 4)
- T-nut Assembly ENG-659001-38 (QTY 4) {ENG-659001 Rev. F only}
- Vent Valve 95-149001 (QTY 1)
- Feed Valve ENG-511001-19 (QTY 1)

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5. Parts List

5.1. Supplied Parts

Table 3: List of Supplied Parts

Part Number	Part Description	Quantity	Where Used
750L CLAMP	Bessey® 750L Clamps	2	All
751S CLAMP	Bessey® 751S Clamps	4	All
90630A121	3/8”-16 Nylon Locknut	11	All
91257A633	3/8”-16 x 2 1/4” Hex Head Bolt	11	All
98023A031	3/8” Flat Washer	11	All
ENG-511001 or ENG-659001	Test Bench	1	-
ENG-659001-22	Angle Support	2	All
ENG-659001-26	Vertical Support Bracket	1	All
ENG-659001-31 CHART	O-Rings	-	All
ENG-659001-32	Lower Gauge Arm	1	All
ENG-659001-33	Upper Gauge Arm	1	All
ENG-659001-34	T-nut Assembly (7” Long)	4	All
ENG-659001-38	T-nut Assembly (4” Long)	4	Rev. F only
ENG-659001-41	Universal Flange Slot Block	4	Rev. F only
ENG-886001	2” NPT Adapter Plate (ID Seal)	1	Rev. F only
ENG-924001	½”, ¾”, & 1” Flange Adapter Plate (ID Seal)	1	Rev. F only
ENG-925001	1”, 1½”, & 2” Flange Adapter Plate (ID Seal)	1	Rev. F only
ENG-926001	3”, & 4” Flange Adapter Plate (ID Seal)	1	Rev. F only

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5.2. Additional Parts

Table 4: List of Additional Parts

Part Number	Part Description	Where Used
ENG-717001	Threaded Adapter Plate for mounting up to 3" NPT	All
ENG-614001	1”, 1½”, & 2” Flange Adapter Plate (Face Seal)	*
ENG-615001	3”, & 4” Flange Adapter Plate (Face Seal)	*
ENG-617001	2” NPT Adapter Plate (Face Seal)	*
ENG-635001	½”, ¾”, & 1” Flange Adapter Plate (Face Seal)	*
ENG-788001	Universal Flange Height Adapter	All
ENG-927001	Threaded Adapter Plate for mounting up to 3" NPT	Rev. F
More adapter plates are available for additional sizes and connection types.		
*Parts were supplied for models prior to Rev. F buy can still be used on Rev. F model		

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6. Reference Figures

ENG-788001
Used to Adjust Flange Height

Figure 16: Flange Height Adapter

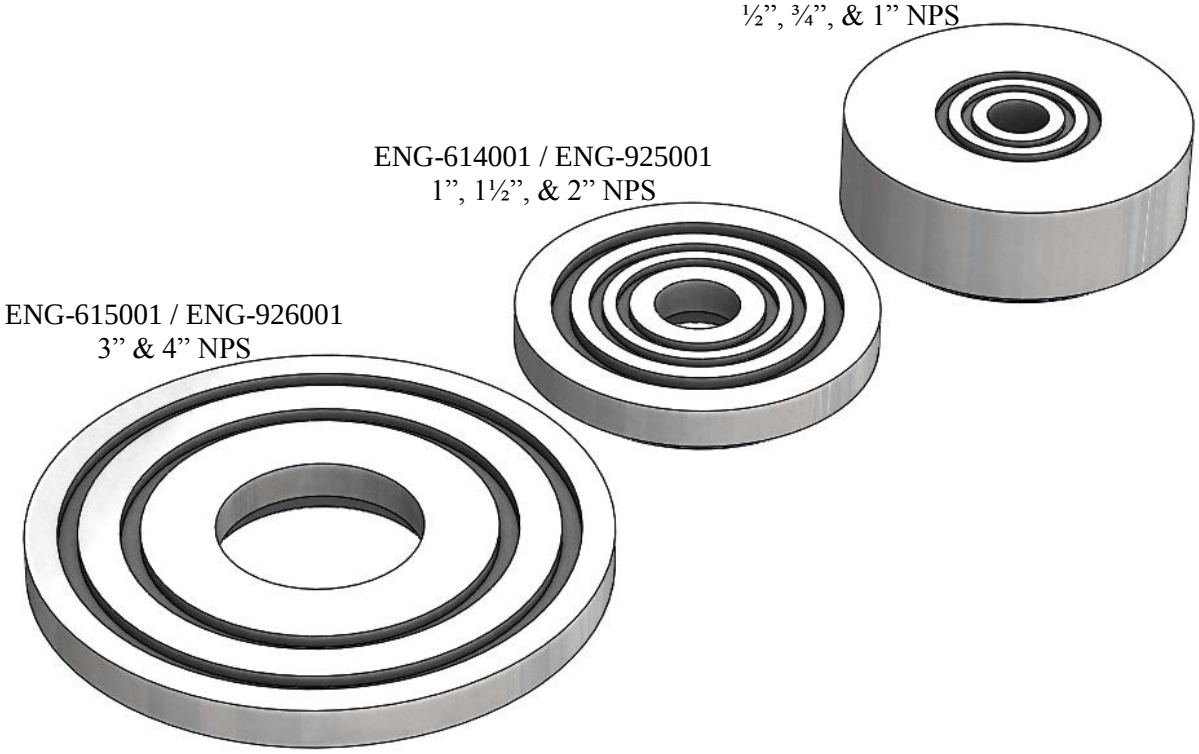

Figure 17: Flange Valve Adapter Plates

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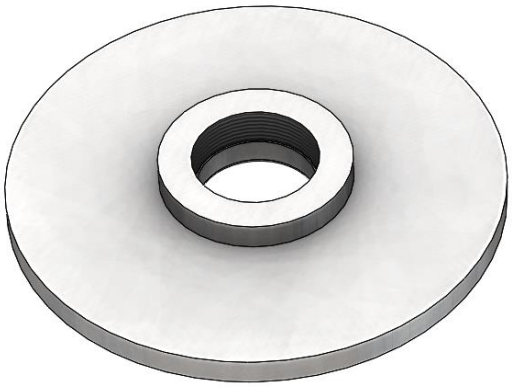
ENG-617001
2” NPT



ENG-886001
2” NPT
(Used with ENG-659000 Rev. F)

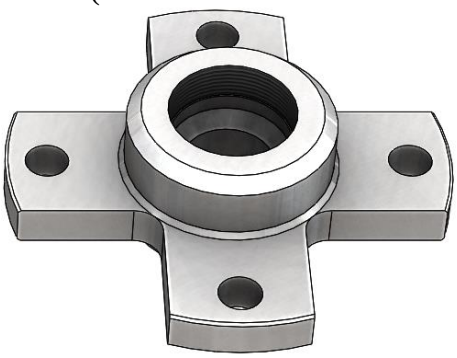


Figure 18: Threaded Valve Adapter Plates

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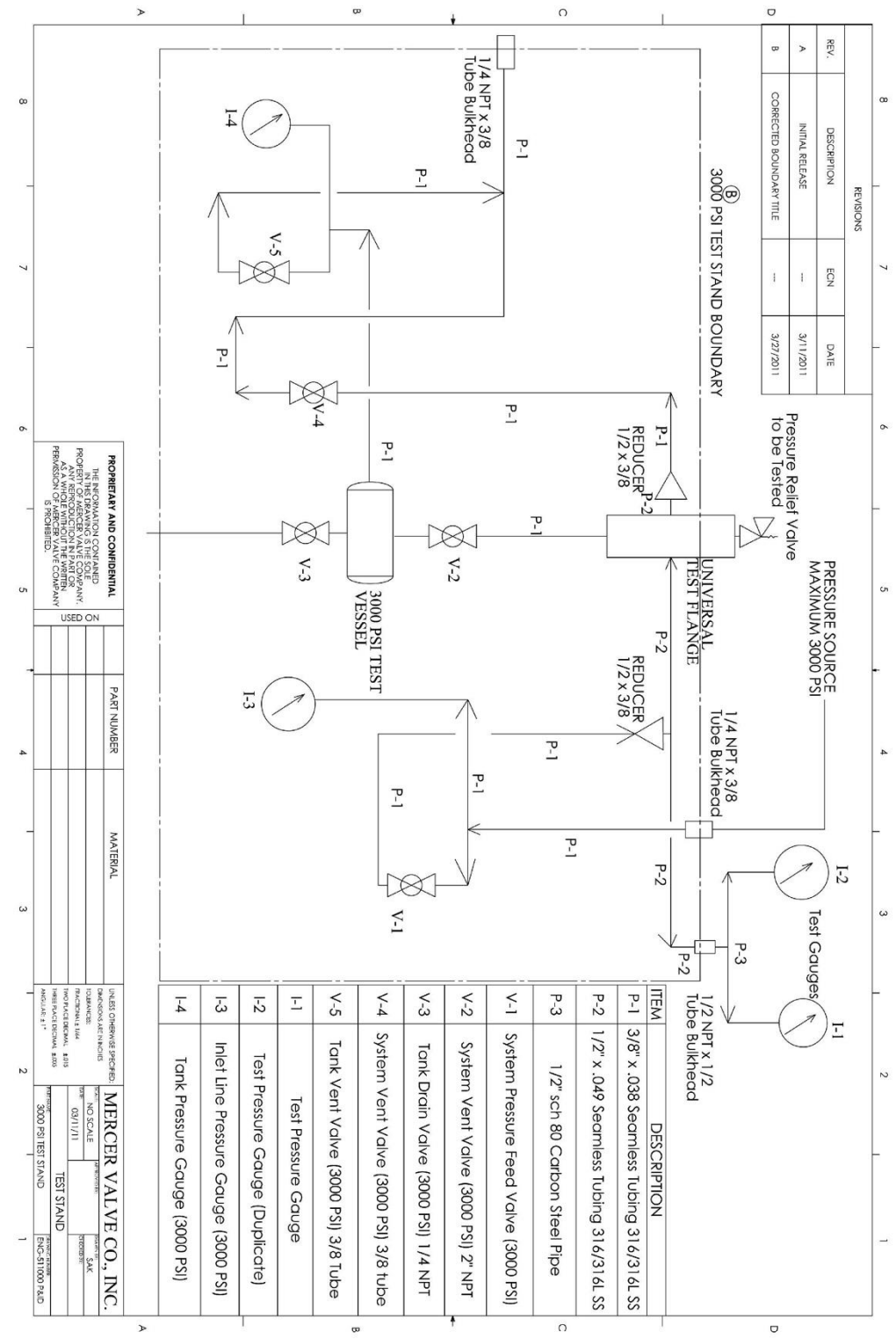

Figure 19: Piping and Instrumentation Diagram

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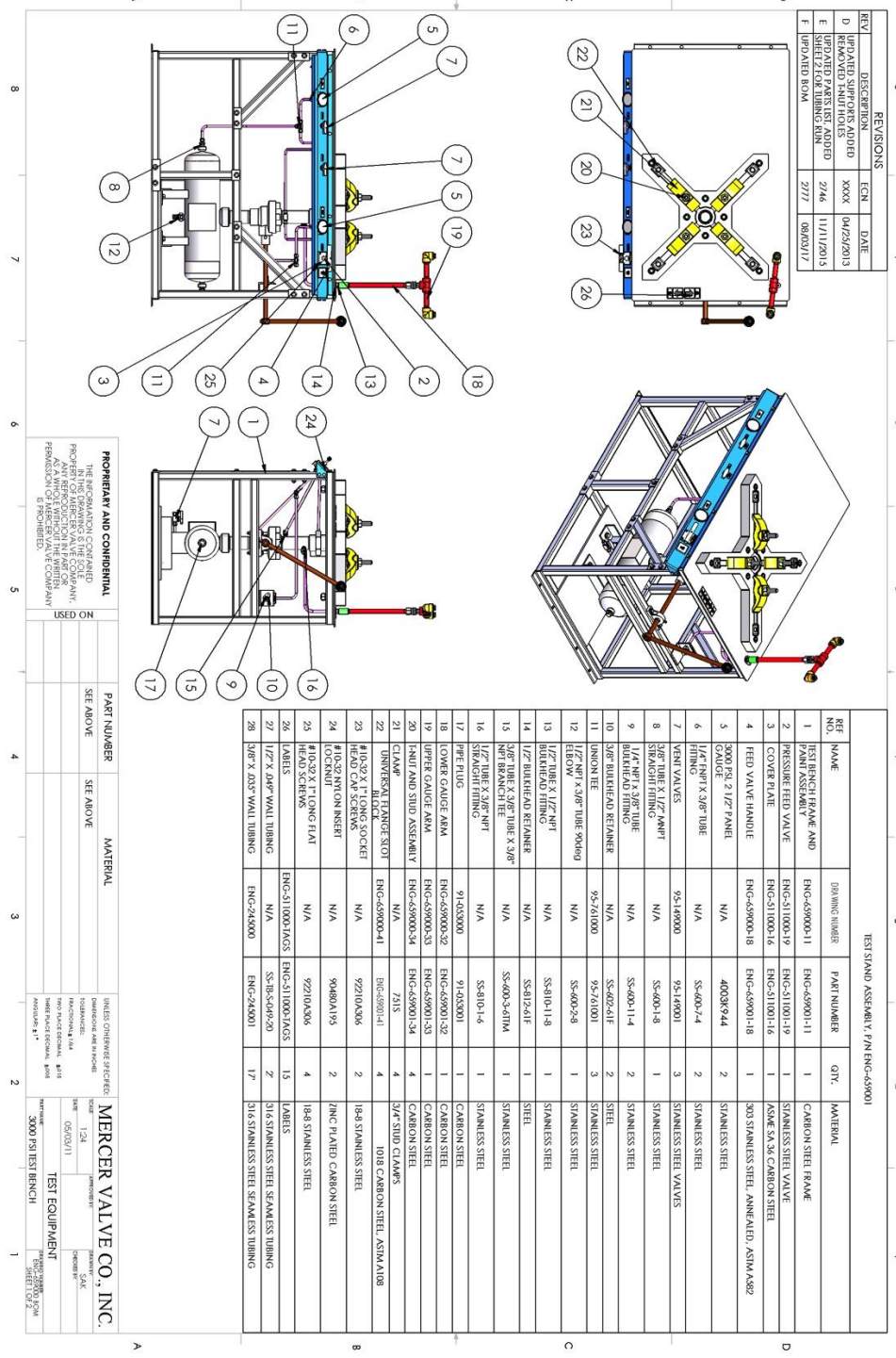

Figure 20: Assembly Drawing

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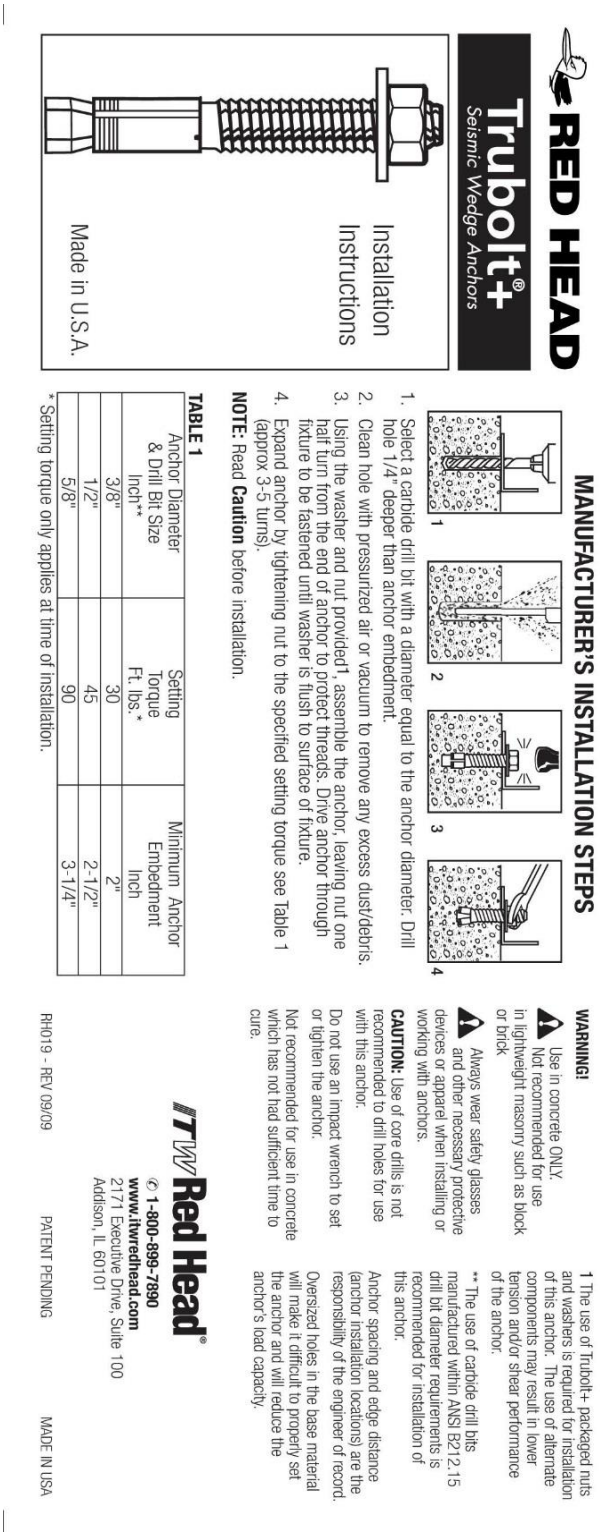

RED HEAD

Trubolt+
Seismic Wedge Anchors

Installation Instructions

Made in U.S.A.

MANUFACTURER'S INSTALLATION STEPS

1 2 3 4

1. Select a carbide drill bit with a diameter equal to the anchor diameter. Drill hole 1/4" deeper than anchor embedment.
2. Clean hole with pressurized air or vacuum to remove any excess dust/debris.
3. Using the washer and nut provided1, assemble the anchor, leaving nut one half turn from the end of anchor to protect threads. Drive anchor through fixture to be fastened until washer is flush to surface of fixture.
4. Expand anchor by tightening nut to the specified setting torque see Table 1 (approx 3-5 turns).

NOTE: Read **Caution** before installation.

TABLE 1

Anchor Diameter & Drill Bit Size Inch**	Setting Torque Ft. lbs.*	Minimum Anchor Embedment Inch
3/8"	30	2"
1/2"	45	2-1/2"
5/8"	90	3-1/4"

*Setting torque only applies at time of installation.

WARNING!

- Use in concrete ONLY. Not recommended for use in lightweight masonry such as block or brick
- Always wear safety glasses and other necessary protective devices or apparel when installing or working with anchors.

CAUTION: Use of core drills is not recommended to drill holes for use with this anchor.

Do not use an impact wrench to set or tighten the anchor.

Not recommended for use in concrete which has not had sufficient time to cure.

1 The use of Trubolt+ packaged nuts and washers is required for installation of this anchor. The use of alternate components may result in lower tension and/or shear performance of the anchor.

** The use of carbide drill bits manufactured within ANSI B212.15 drill bit diameter requirements is recommended for installation of this anchor.

Anchor spacing and edge distance (anchor installation locations) are the responsibility of the engineer of record.

Oversized holes in the base material will make it difficult to properly set the anchor and will reduce the anchor's load capacity.

ITW Red Head®

✆ 1-800-899-7890
www.itwredhead.com
2171 Executive Drive, Suite 100
Addison, IL 60101

RH019 - REV 09/09 PATENT PENDING MADE IN USA

Figure 21: Concrete Anchor Installation Instruction Example

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