MUELLER

PERMASEAL™ INSTALLATION INSTRUCTIONS

H-2361 Resilient Wedge Gate Valve (4″ - 12″)

TABLE OF CONTENTS

EXCAVATION

1. Dimensions for excavation are shown in **Figure 1** and **Table 1**.
2. Excavation width (DIM W) should be centered on the water main.
3. Plan for insertion valve location to be offset on length of pipe, to provide adequate space for isolation knife valve during the installation process.
4. Excavation depth should be a minimum 1ft below the main (DIM B).

WARNING ⚠ : Trenching and excavation present serious hazards. Follow all applicable guidelines, including OSHA guidelines on Trenching and Excavation Safety. Ensure that a competent person inspects excavation site at appropriate times. Failure to follow guidelines and precautions could result in equipment damage, serious injury, or death.

WARNING ⚠ : When "high" flow conditions (8-16 ft/s) exist, it is recommended that a nearby upstream hydrant is opened/flushed. This is to relieve excess pressure in the network during the cutting operation which temporarily restricts the water way.

SELECTING THE LOCATION OF THE VALVE

1. Where possible, locate valve on a straight run section of water main without bell ends or obstructions for a distance of 12″ on each side (DIM C) of the valve.

PREPARING THE MAIN

1. Clean main thoroughly for a distance of 6″ longer than the valve on each side by removing all dirt, rust, and corrosion from the main and finishing with a brush.

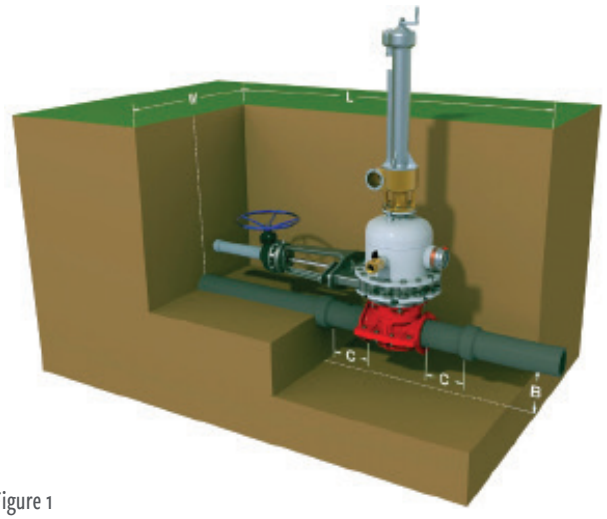


Figure 1

Table 1: Excavation Dimensions

Nominal Valve Size	Recommended (L)	(W)
4″- 8″	8′	4′
10″ - 12″	12′	6′

WARNING:

Wear applicable PPE at all times including safety shoes, hard hat, safety glasses, safety vest and work gloves. Failure to do so could result in serious injury or death.

MOUNTING VALVE CASING ON THE WATER MAIN

1. If NPT plugs exist on the underside of the bottom casing, esure they are tight and thread sealant is present. If found loose, tighten plugs at this time.
2. Insert side gaskets into the bottom casing as shown in **Figure 2**.
3. Insert alignment bushings into the counterbores of bottom case as shown in **Figure 3**.
4. Place bottom casing on main, use proper support/ blocking under bottom case.

WARNING ⚠ : Based on the soil conditions adequate blocking must support combined total weight of insertion valve and installation equipment (water weight included). Refer to the **Exhibit 1** of Appendix.

5. Place and align top casing onto bottom casing.
6. Apply anti-seize and hand tighten casing bolts. Fasten two sleeves together by progressively tightening the bolts to 220 ft-lbs. in the order shown in the **Exhibit 2** of Appendix and **Figure 4**.
7. Trim protrusions of the side gaskets at the mechanical joint (MJ) and valve body sealing surfaces to approximately 1/8″ (0.125) beyond level of casting surface as shown in **Figures 5A & 5B**.
8. Install split mechanical joint (MJ) gasket and gland on both ends of the assembled sleeve, per the gasket and split gland manufacturer recommendations. Reference **Figure 6**.

CAUTION: Make sure the split of the mechanical gland does NOT align with that on the casings nor with the split in the gasket. Do NOT twist-off gripper nuts until after the assembly pressure testing in case the glands need to be adjusted or retorqued.

9. Apply anti-seize and start angular bolts into the top casing as shown in **Figure 7**.

CAUTION: Angular bolts must NOT protrude past the inside wall of the top casing to avoid interference with the cutter and valve body.

Figure 2

Figure 3

Figure 4

Figure 5A

Figure 5B

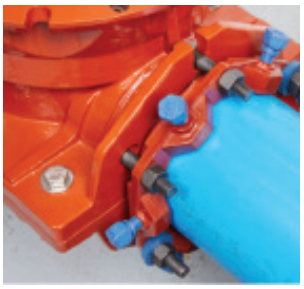


Figure 6

Figure 7

PRESSURE TESTING THE CASING ASSEMBLY

1. Assemble packing rings on to the test plate.
2. Tighten angular bolts into the test plate to the torque values and order shown in the **Exhibit 3** of Appendix.
3. Perform **water** pressure test to the lesser of valve or pipe pressure rating, using the ports provided on the test plate as shown in **Figure 8**.
4. Upon completion of the pressure test, back out all angular bolts until flush with the inside wall of the top casing (Figure 7).
5. Disassemble packing rings from the test plate and set aside.

WARNING ⚠ : Mechanical gland gripper nuts may be twisted off at this time.

Figure 8

PREPARING FOR INSTALL

Install pour cover onto top casing

6. Pour concrete footer one foot outside of valve casing and covering the top of the casing flanges as shown in **Figure 9**.

Figure 9

PREPARING FOR THE CUT

1. Remove concrete pour cover.
2. Ensure angular bolts are present and flush to the inside wall of top casing.
3. Place O-ring into the gland of top casing as shown in **Figure 10**.
4. Install flange adapter onto the top casing as shown in **Figure 11**.

NOTE:

1. Orient fasteners with the nut on top of the flange.
2. Verify O-ring is inserted into the gland on top surface of the flange adapter.
3. Ensure positioning pin in flange adapter is aligned with counter bore in top casing.

5. Install the knife valve, seat-side up, onto the flange adapter, noting the additional clearance required to operate the knife valve as shown in **Figure 12**.

NOTE: Refer to **Exhibit 7** to determine which bolts are used for the blind holes vs. the thru holes on the knife valve.

6. Assemble the drilling machine onto the short adapter, with the supplied flat gasket in between as shown in **Figure 13**.

NOTE: 4″, 6″ and 8″ insertion valves can be installed with either Mueller CL-12 or C1-36 machines.
10″ - 12″ insertion valves can only be installed with C1-36 machines.

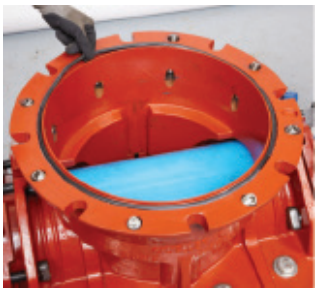


Figure 10

Figure 11

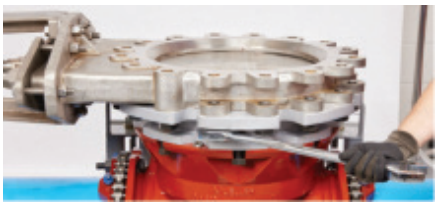


Figure 12

Figure 13

7. Fasten the shell cutter to the appropriate cutter hub using the supplied socket head cap screws, then fasten the pilot drill to the cutter hub and tighten. The cutter is now assembled as shown in Figure 14.

NOTE: If pilot drill inserts or shell cutter teeth are dull or damaged, replace. Check pilot drill retaining wires for free movement.

Figure 14

8. Advance the boring bar, attach cutter assembly, then fully retract into the short adapter as shown in **Figures 15A & 15B**.

9. Lubricate the cutter teeth and pilot drill generously with cutting grease (Mueller Part Number: 88366 for pint or 83486 for gallon)

NOTE: Verify O-ring is inserted in the underside gland of the short adapter.

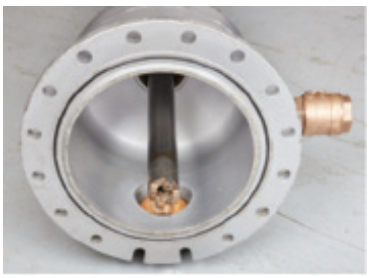


Figure 15A

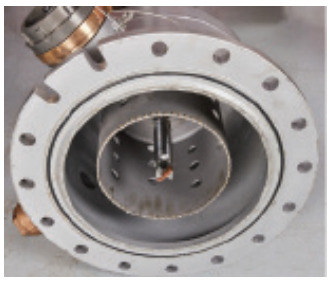


Figure 15B

10. Assemble short adapter/drilling machine assembly onto the knife valve as shown in **Figure 16**.

NOTE: Refer to **Exhibit 7** to determine if washers are used and which bolts are used for the blind holes vs. the thru holes on the knife valve.

Figure 16

11. Open ¼″ air bleed valve on top of the short adapter as shown in **Figure 17**.

12. Fully open the knife valve as shown in **Figure 18**.

CAUTION: Failure to open the knife valve fully will result in damage to the knife valve and cutter.

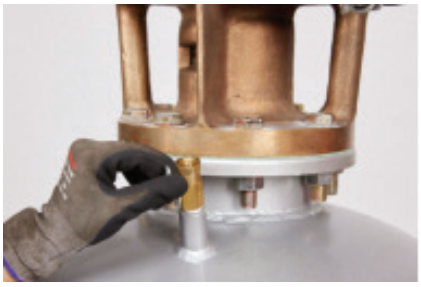


Figure 17

Figure 18

ESTABLISHING BASELINE AND MAKING THE CUT

CAUTION: User must understand the operation of the drilling machine to be used. Read drilling machine operating instructions/manual: CL-12 (Form # 8895) and C1-36 (Form # 8513).

1. Manually lower the cutter and stop when pilot drill contacts the main (resistance is felt). Retract cutter one full turn of the drilling machine's hand crank rotation.
2. Determine total cut distance by measuring the diameter of the main and adding it to the Pilot Drill Offset dimension as referenced in the **Exhibit 4** of Appendix.
3. Put drilling machine into the Auto Feed mode and set the cut distance (as determined in prior step). Begin the cut.
4. Once fully vented, close the ¼″ air bleed ball valve on top of the short adapter, as shown in **Figure 17.**

NOTE: Please see Exhibit 10 for clearance between pipe and bottom casing interior.

5. Once the cut distance has been achieved, STOP the drilling machine.
6. Fully retract cutter into the short adapter.
7. Close the knife valve. Do not over tighten
8. Open the 2″ drain valve on the short adapter to depressurize and drain the water, as shown in **Figure 19**.

NOTE: Prior to disassembly, visual identification of the coupon can be made through the 4″ Storz inspection port.

9. Disassemble the short adapter/drilling machine assembly from the knife valve, as shown in **Figure 20**.

Figure 19

Figure 20

EVACUATING THE CHIPS

1. Insert the chip evacuation rod through the chip evacuation plate, then attach the retainer nut to the end of the rod as shown in **Figure 21**.

NOTE: Verify O-ring is inserted in the gland of the chip evacuation plate.

2. Attach the chip evacuation plate to the knife valve as shown in **Figure 22**.

NOTE: Refer to **Exhibit 7** to determine which bolts are used for the blind holes vs. the thru holes on the knife valve.

CAUTION: Attach the lanyards to the assembly as shown in **Figure 22** to aid in holding the pipe down.

3. Fully open the knife valve and vent and push the probe to the bottom of the casing assembly and open the release valve to begin the flushing process.

NOTE: Attach supplied hose if flushing outside of ditch is neccessary.

4. In sweeping motions, maneuver the rod across the floor of the casing assembly flushing chips and debris. View progress through the sight glass on the chip evacuation plate, continue until the floor of bottom casing is free of chips and debris.
5. Once clean, fully retract the chip evacuation probe to clear the knife valve. Keep the probe ball valve open and shut the knife valve.
6. Disassemble the chip evacuation plate from the knife valve.

Figure 21

Figure 22

INSERTING THE VALVE BODY ASSEMBLY

1. Assemble packing rings onto the valve body and gasket as shown in **Figure 23**.
2. Check the cartridge gasket for a secure seal before staging the cartridge. If the gasket is loose, please reseal the gasket using Loctite 480.

Figure 23

CAUTION: Ensure all stainless-steel packing ring inserts are secure in place. Replace if found loose or missing.

CAUTION: Ensure the valve is fully open so that the waterway remains open.

3. Remove the operating nut.
4. Assemble the valve guide assembly and valve guide bracket to the bonnet using the bolts, with the valve guide perpendicular to the waterway as shown in **Figure 24**.

NOTE: 4″ - 8″ uses shoulder bolts. 10″ - 12″ uses hex head bolts.

NOTE: Ensure that the valve guide is oriented with the welded on spacer facing towards the stuffing box.

5. Grease the valve body seal strap
6. Stage the valve body and bracket assembly onto the long adapter as shown in **Figure 25**.

NOTE: Ensure valve body seal is clear of debris before staging.

NOTE: Verify O-ring is inserted in the underside gland of the long adapter.

7. Assemble the long adapter (with valve in it) to the knife valve as shown in **Figure 26**.

CAUTION: Valve guide channels in the long adaptor must be perpendicular to the main.

WARNING ⚠ : DO NOT assemble short adapter to long adaptor before installing long adaptor to knife valve.

NOTE: Use the same bolts that were used to assemble the short adapter to the knife gate.

8. Advance the boring bar and remove the shell cutter assembly. Refer to **Exhibit 5** of Appendix for coupon removal instructions.

Figure 24

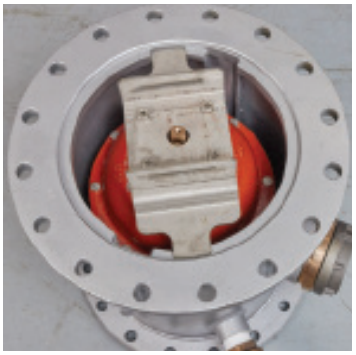


Figure 25

Figure 26

NOTE: If pilot drill inserts or shell cutter teeth are dull or damaged, replace. Check pilot drill retaining wires for free movement. Refer to **Exhibit 8** for replacing wires

9. Attach the locking rod to the boring bar as shown in **Figure 27** and fully retract.

CAUTION: Block the short adapter assembly when installing a 4″, 6″, or 10″ valve. These locking rods are proud of the short adapter flange when fully retracted, so blocking will avoid damage to the boring bar or locking rod.

10. Assemble the short adapter/drilling machine assembly onto the long adapter as shown in **Figure 28A & 28B**.

NOTE: Refer to **Exhibit 9** for the height of the installation equipment (pipe centerline to top of machine) when using a C1-36 drilling machine.

CAUTION: The locking rod must be oriented to fit between the slots of valve guide bracket to avoid damage to locking rod or valve guide.

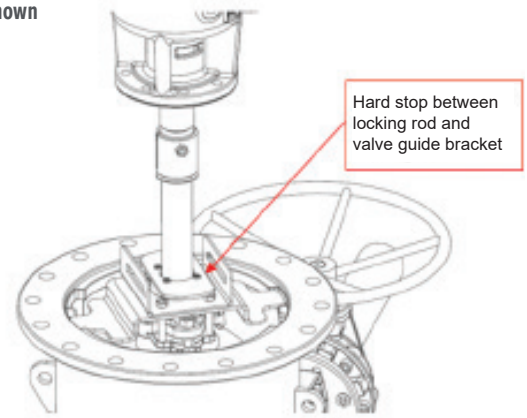
11. Manually lower the locking rod until it touches the valve guide bracket (resistance is felt) as shown in **Figure 29A**.
12. Rotate locking rod clockwise by 90 degrees to engage with the valve guide bracket (resistance is felt) as shown in **Figure 29B**.
13. Lift the valve body assembly up off the staged position (resistance is felt) as shown in **Figure 29C**.
14. Rotate clockwise into alignment with the valve guide tracks of long adapter (resistance is felt) as shown in **Figure 29D**.

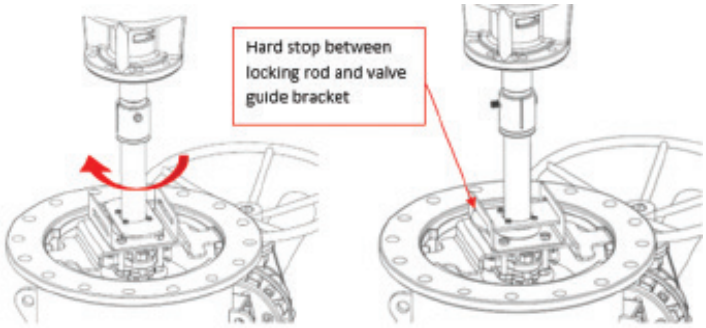
Figure 27

Figure 28A

Figure 28B

***Short adapter not shown**
Figure 29A





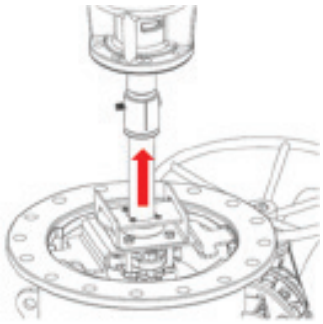
***Short adapter not shown**
Figure 29B

NOTE: Prior to opening the knife valve, the 4" storz inspection port on the short adapter can be used for visual verification that the valve guide is in the tracks in the long adapter.

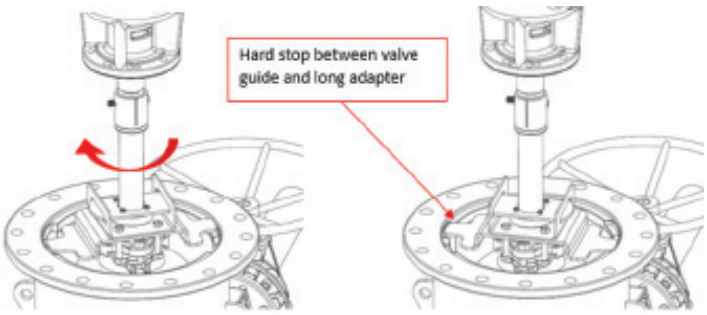
15. Verify 2″ drain valves and 4″ Storz inspection ports on both adapters are closed.
16. Open the ¼″ air bleed valve on top of the short adapter.
17. Fully open the knife valve.
18. Once fully vented close the ¼″ air bleed valve on top of the short adapter.
19. Manually lower the valve body assembly until seated, compressing the valve body seal. Reference **Exhibit 6** of Appendix for an approximate number of hand crank turns.
20. Rotate locking rod counter clockwise by 90 degrees to disengage from the valve guide bracket, as shown in figure 31A & 31B.

WARNING ⚠ : DO NOT retract the locking rod at this time so that the valve remains compressed and does not move out of position.

21. Advance angular bolts into the packing rings until resistance is felt, as shown in **Figure 30**.



***Short adapter not shown**
Figure 29C



***Short adapter not shown**
Figure 29D

Figure 30

NOTE: Tighten angular bolts into the valve packing ring to the torque values and order shown in the **Exhibit 3** of Appendix.

22. Retract boring bar

CAUTION: DO NOT attempt to close the knife valve at this time as it will interfere with the valve guide and valve.

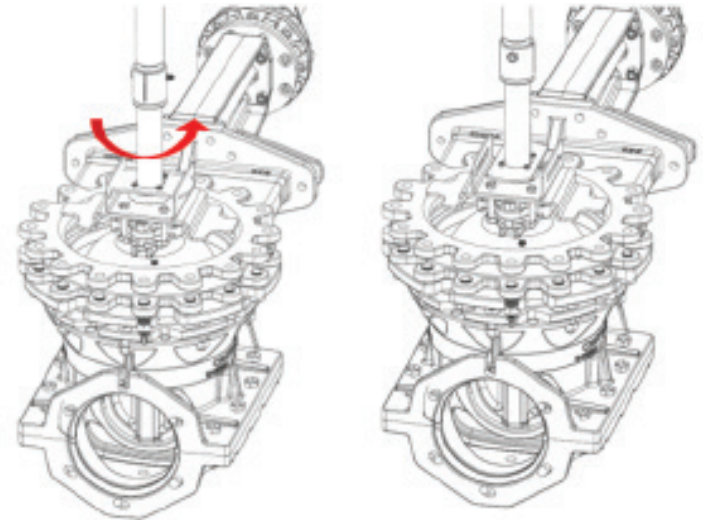
23. Open the 2″ drain valve(s) on the short and long adapters to depressurize and drain the water (**Figure 19**).

24. Disassemble and remove short, then long adapter from the knife valve as shown in **Figure 32A & 32B**.

WARNING ⚠ : DO NOT remove short and long adaptor together.

25. Remove the valve guide bracket and valve guide as shown in **Figure 33**.

26. Remove the knife valve and adapter as shown in **Figure 34 A & B**.



***Short adapter and long adapter not shown**
Figure 31A

Figure 32A

Figure 32B

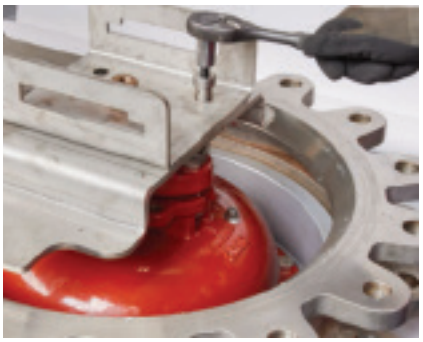


Figure 33

27. Reinstall the operating nut onto the valve stem.

28. Wait a minimum of 15 minutes from originally tightening the angular bolts to the required torque values, then re-torque bolts to values shown in **Exhibit 3**.

29. Install the finishing gasket and plate as shown in **Figure 35**.

30. See **Exhibit 11** for the cartridge offset to visually verify valve is seated fully.

31. Operate valve fully to ensure proper installation and full functionality of the Permaseal Insertion Valve.

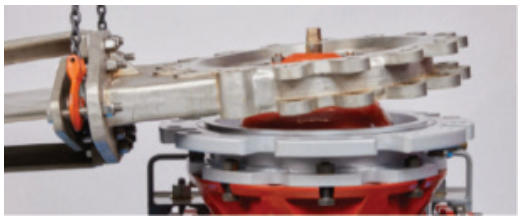


Figure 34A

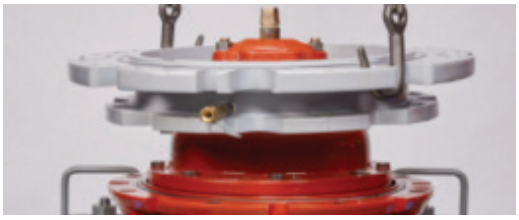


Figure 34B

Figure 35

APPENDIX

EXHIBIT 1

Combined weight of the valve and installation equipment (water weight included)

Size	Weight
4″	2250 lbs.
6″	2450 lbs.
8″	2650 lbs.
10″	5600 lbs.
12″	6050 lbs.

EXHIBIT 2

Casing bolt pattern

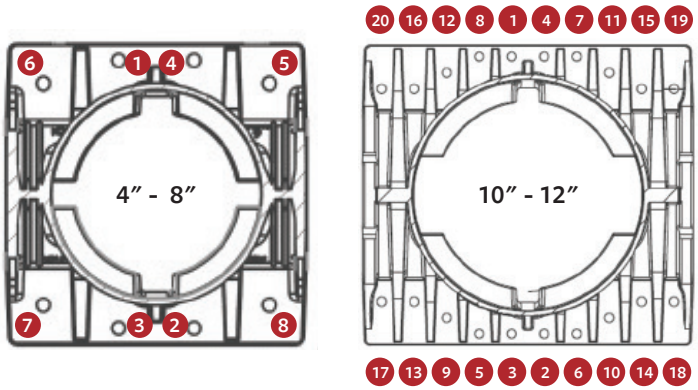


EXHIBIT 3

Angular Bolt Torque Values

Size	*Values (ft-lbs.)
4″	80
6″	80
8″	80
10″	130
12″	130

*Retorque as necessary

Angular Bolt Torque Pattern

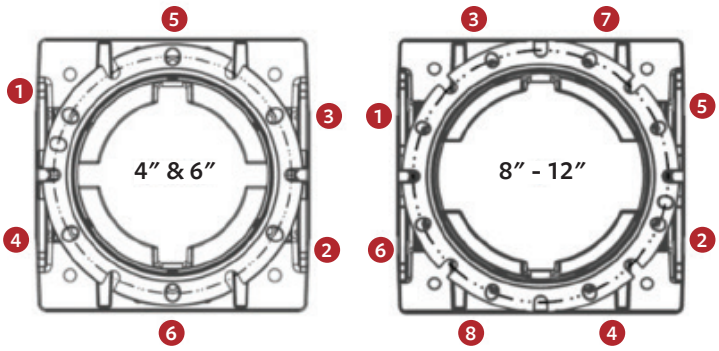


EXHIBIT 4

Pilot Drill Offset

Nominal	Pilot Drill Offset
4″-8″	0.75″
10″ - 12″	1″

EXHIBIT 5

Pipe Coupon Removal

1. Push pipe coupon into the shell cutter, revealing wrench flats on the tip of the pilot drill.
2. Lock machine boring bar rotation and unscrew the pilot drill.

EXHIBIT 6

Approximate Number of Turns to Set Valve Body

	C-36 (8:1)	C1-36 (6:1)	CL-12 (5:1)
4″ RWIV	173-185	129-139	108-116
6″ RWIV	167-179	125-135	104-112
8″ RWIV	189-202	141-151	118-126
10″ RWIV	250-263	187-197	N/A
12″ RWIV	259-272	194-204	N/A

EXHIBIT 7

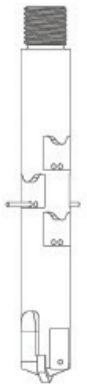
Size	Kit Number	Description	Blind Length (in)	Thru Length (in)
4″ - 8″	550399	FA to KV	1.75	2.125
	550135	KV to SA	1.75	2.125
	551638	KV to CE	2.25	2.5
	550135	KV to LA	1.75	2.125
10″ - 12″	550134	FA to KV	2	2.5
	550137	KV to SA	3	3.25
	551641	KV to CE	3	3
	550137	KV to LA	3	3.25

* Bolt lengths and washer requirements for fastening parts to the knife valve based on if the hole is blind or thru.
* FA = flange adapter, KV = knife valve, SA = short adapter, CE = chip evacuation, LA = long adapter

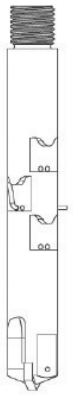
EXHIBIT 8

Pilot Drill Wire Replacement

1. Insert wire.



2. Use a hammer to bend wire and then cut to size if necessary.



3. Bend other side and repeat. Ensure all of the wires can move freely and cannot pass the dividers.

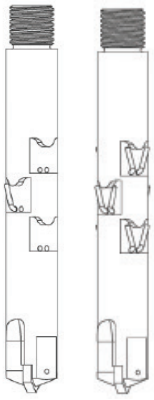


EXHIBIT 9

Maximum Height of Install Equipment

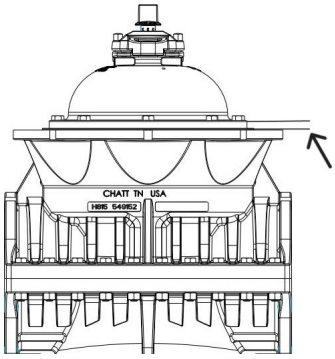
Size	Height
4″	112″
6″	110″
8″	112″
10″	134″
12″	135″

EXHIBIT 10

Casing	MIn OD (In)	Clearance
H819	5.65	0.46
H815	5.08	0.75
H819	7.68	0.39
H815	7.18	0.64
H819	9.87	0.45
H815	9.33	0.71
H819	12.27	0.77
H816	11.55	1.13
H815	11.22	1.29
H819	14.55	1.23
H816	13.62	1.69
H815	13.32	1.84

EXHIBIT 11

Valve Size	Cartridge Offset (In)
4″	-5/16″
6″	1/2″
8″	5/8″
10″	0″
12″	13/16”



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