

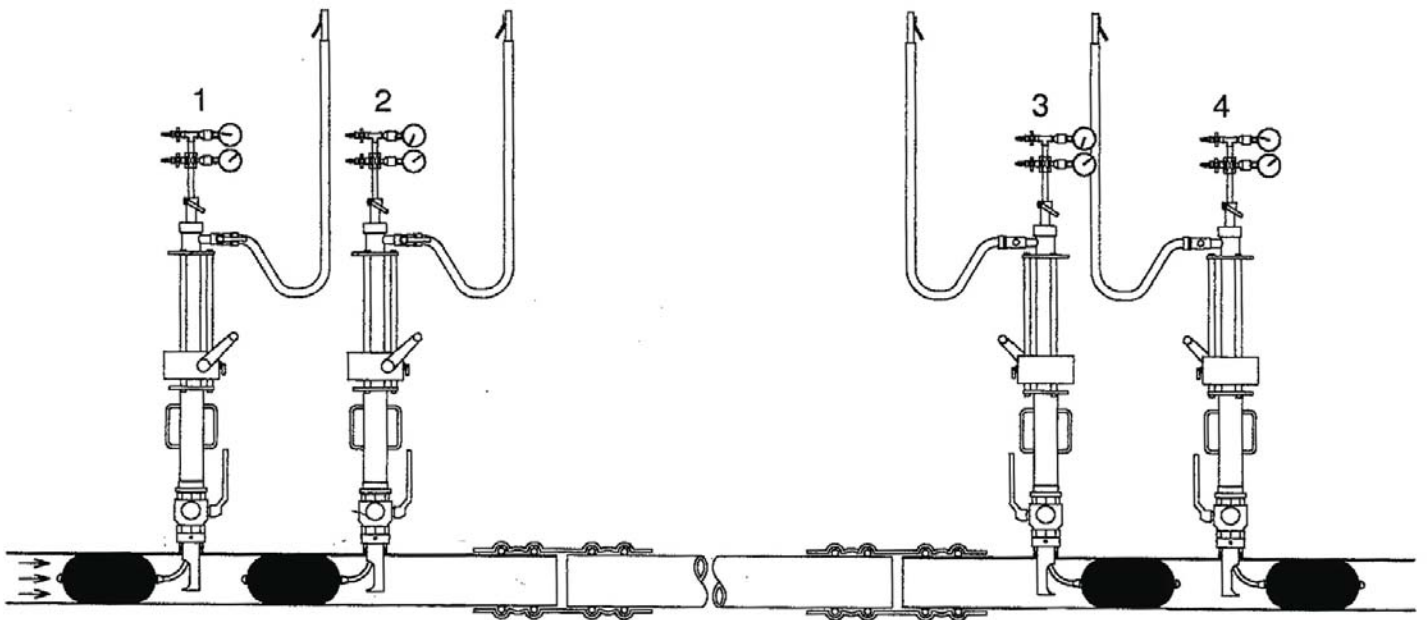


844-FLO-STOP | sales@mainlinecs.com | www.MainlineControlSystems.com

Mainline
Control Systems

Kleiss MCS60-38 System Manual

Flow Stopping System / 3" - 8" up to 60 psi





Kleiss MCS60-38 System Overview

The Kleiss inflatable stopping systems meet the needs of the North American Natural Gas LDCs by providing a flow control system that is easy to use and effective at stopping off flow in various pipe materials and a wide range of pipe diameters.

The Kleiss MCS60-38 System consists of four major components:

1) fitting to access the pipe, 2) tapping / completion tool, 3) inflatable stopper, and 4) stopping tool.

The Kleiss MCS60-38 System (all tools) has a maximum operating pressure of 60 psi. The inflatable stoppers have a design safety factor of 3. The balance of the tools have a design safety factor of 2.5.

The Kleiss MCS60-38 System is designed to handle flow control on pipe sizes 3” to 8” on all pipe material – cast iron, polyethylene, and steel pipes. To accommodate the various pipe materials and sizes the tapping tool and stopping tool are outfitted with the appropriate fitting, cutter, chute, and stopper. See the Sizing Table in Section 4.0 to identify and install the correct components before operating the equipment.

The basic operation of the equipment is the same for all pipe materials. When working on non-metallic pipe materials, make sure the equipment is grounded per your company operating practices.

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1.0 General Safety Information:

NOTE: Before using the Kleiss MCS60-38 System make certain you read the instruction manual completely and are comfortable and familiar with the operation of the tools. If you have any questions, concerns or feel there is conflicting information, please contact Mainline Control Systems (MCS) before proceeding at 844-FLO-STOP.

NOTE: The purpose of the Kleiss MCS60-38 System is to tap and stop flow in natural gas lines sizes 3” through 8” operating at a maximum of 60 psi. Review and follow your company safety procedures for operations involving tapping and stopping live natural gas lines.

NOTE: When operating the Kleiss MCS60-38 System on polyethylene lines (non-metallic lines) please follow company procedures for grounding equipment for discharge of any static electricity.

2.0 System Specifications:

2.1 General

- A) Pipe diameter between 3” and 8”
- B) Pipe material of cast iron, steel, or polyethylene
- C) Maximum operating pressure of 60 psi
- D) Tool to fitting connection of 2-1/2” BSP threads

2.2 Tapping Tool and Completion Tool Kit Specifications

- A) Maximum operating pressure of 60 psi
- B) Cutters available
 - a) 2.2” (56.5 mm) steel and cast iron [Part #13200140]
 - b) 2.2” (56.5 mm) polyethylene [Part #1310080]
- C) 1/4” (6.3 mm) pilot drill used for all materials [Part #14300060]
- D) Air motor with 90 psi minimum pressure required with a maximum of 120 psi
- E) Oiler / separator required to be used to extend the life of the air motor
 - a) Use standard pneumatic oil in tool
- F) Weights
 - a) Tapping tool with cutter = 23 lbs.
 - b) Completion tool without completion plug attached = 13 lbs.
 - c) Air motor = 11 lbs.
 - d) Shipping weight in case = 65 lbs.
- G) Dimensions
 - a) Tapping tool height with cutter = 29”
 - b) Completion tool height without completion plug attached = 17”
 - c) Storage case = 38” length x 18” width x 6” height

2.3 Stopping Tool Kit Specifications

- A) Maximum operating pressure of 60 psi
- B) Weights
 - a) Stopping tool = 46 lbs.
 - b) Ball valve = 8 lbs.
 - c) Shipping weight in case = 94 lbs.

- C) Dimensions
 - a) Stopping tool height with gauge rod completely extended = 7 feet
 - b) Stopping tool height with stopper set = 4 feet
 - c) Storage case = 56" length x 16" width x 12" height
- D) By-pass / vent port
 - a) 3/4" tap size in tool
 - b) 1" camlock male coupling

2.4 MDS Inflatable Stopper Specifications

- A) Sizes
 - a) 2.75" - 3.5" (70 - 90 mm) Pipe ID [Part #23100353]
 - b) 3.5" - 4.75" (80 - 120 mm) Pipe ID [Part #23100354]
 - c) 4.75" - 6.25" (120 - 160 mm) Pipe ID [Part #23100355]
 - d) 6.25" - 8.5" (160 - 215 mm) Pipe ID [Part #23100356]
- B) Inflation pressure of 2x system pressure and/or 120 psi maximum

Note: If the condition of the interior of the pipe being stopped is unknown, it is a recommended practice to inflate the stopper to the maximum inflation pressure to obtain the best stop off possible.
- C) Design burst pressure of 350 psi
- D) Operating temperature range of 5° F (- 15° C) to 140° F (60° C)
- E) Maximum temperature range of 158° F (70° C) for up to 30 minutes
- F) Recommended distance from stopper to steel weld is 6x nominal pipe size or 6D
(Example: 6" steel = 6.625" OD and recommended distance is 6 x 6" = 36")

2.5 Vent Stack Specifications

- A) Height assembled = 112"
- B) 1" camlock male coupling
- C) Air hose to venturi connection
- D) Hose (standard) of 10 m, 1" camlock connection F x F
- E) Ground rod included
- F) Weight (less hose) = 27 lbs.

2.6 Hand Pump (Pressure and Vacuum Pump)

- A) 1 positive pressure connection
- B) 1 negative pressure (vacuum) connection
- C) 10 foot air hose with quick disconnects included
- D) Weight = 12 lbs.

2.7 Maximum Flow Rates

- A) Maximum design flow rate = 22 ft/sec (7 m/sec)
- B) For reducing speed, use by-pass / vent port

Note: The system is designed to be used in controlled stop off applications, and is not intended to be used to stop flows in severely ruptured pipes. Flow should be reduced before attempting stop off.

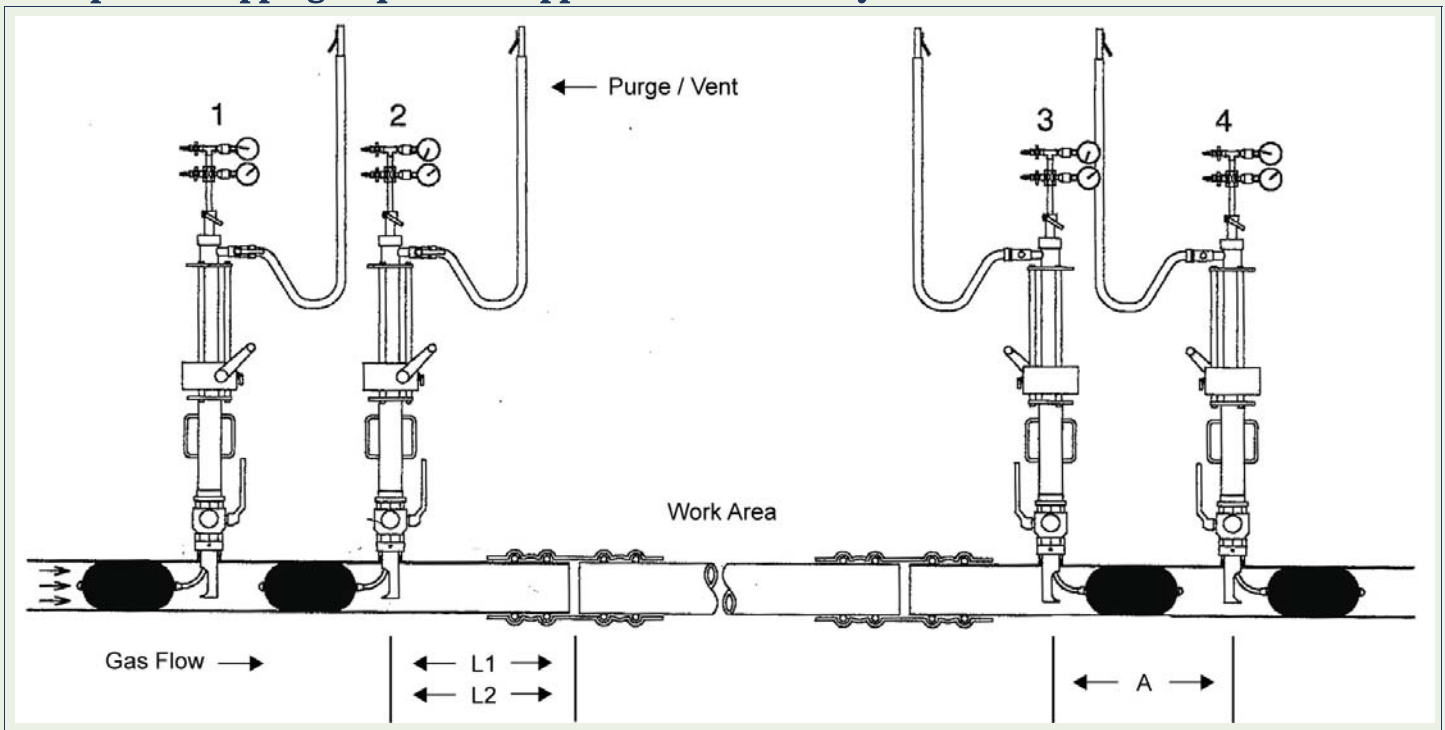
3.0 Typical Site Set Up and Sequence:

It is important to understand the MCS stopping tools and their operation completely. It is also important to understand the complete job and sequence of steps to perform a safe stop. Safety of the operators on the job site is the most important factor so pre-plan the whole job including the stopping and retrieval sequences.

The following examples are typical installations. Example I (green background) illustrates all stoppers positioned away from the work area. Example II (blue background) illustrates all stoppers positioned in the same direction. Both configurations work equally well.

Remember to consider the ancillary steps like purging / venting the area to be worked on and back pressuring stoppers for removal. The features of the MCS60-38 offer options to make these processes efficient.

Example I – Stopping Sequence: Stoppers Positioned Away from Work Area



STOPPING TOWER DISTANCES

Nominal Pipe Size	A	L1 = Steel Welding	L2 = PE, CI, and Mechanical
3"	18"	18"	9"
4"	24"	24"	12"
6"	36"	36"	18"
8"	48"	48"	24"

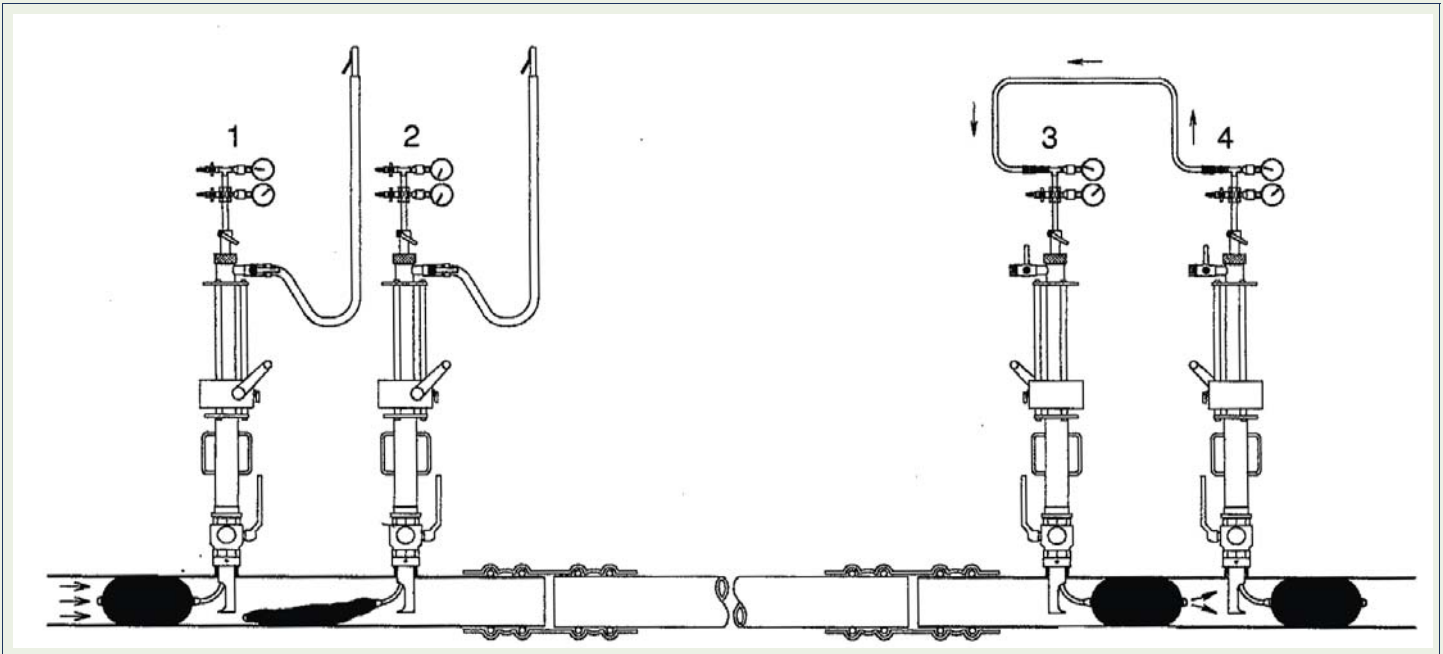
A = minimum distance between towers | L1 & L2 = minimum distance from stopper/tower to work area

- 1) Always insert first inflatable stopper WITH the flow of gas.
- 2) Always inflate the stopper as quickly as practical.
- 3) Suggested stopper setting sequence is tower #3, #4, #2, #1. Set all 4 stoppers.
- 4) First inflated stopper is now in a no flow condition. Reset stopper for best possible seal (deflate, reposition gauge rod, inflate).
- 5) Always allow stoppers to settle for 10 minutes prior to beginning pipeline work. This allows the stopper to acclimate to internal pipe conditions. Verify system pressures, inflation pressures, and any bleed-by before starting pipeline work. Adjust as necessary.

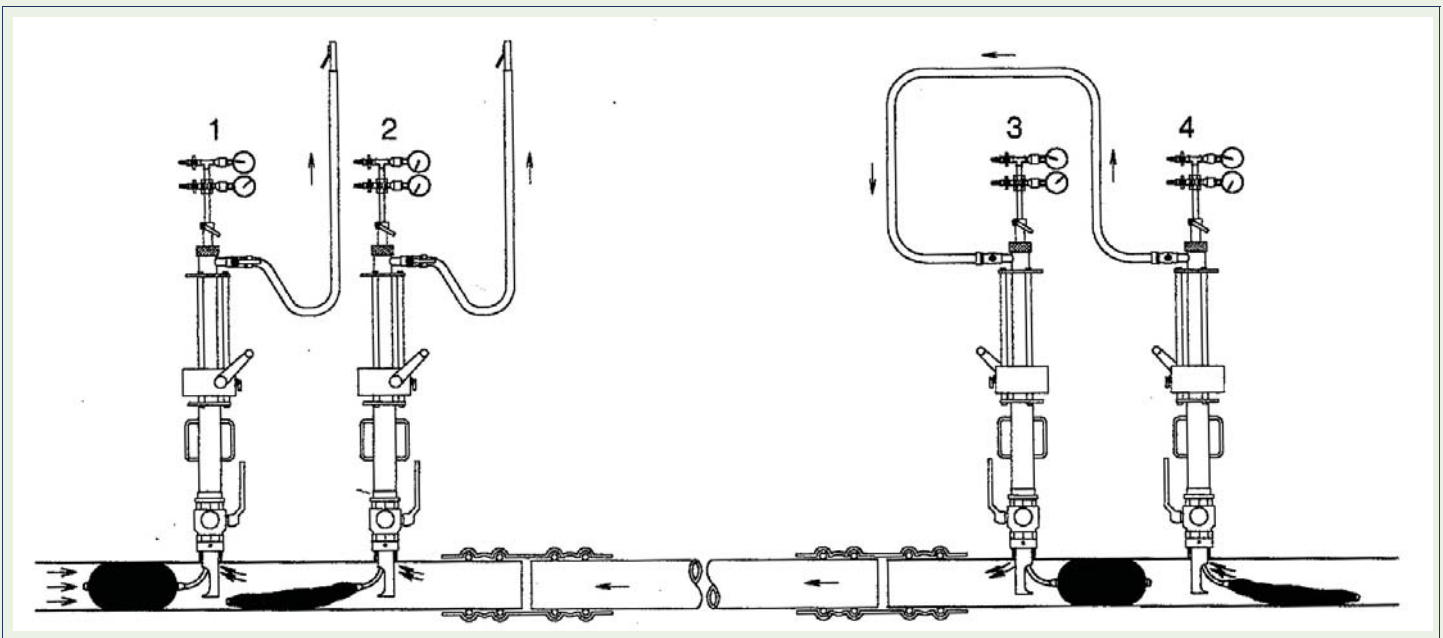
- 6) Keep by-pass / vent ports on towers #1 and #4 open to atmosphere during work to keep gas away from the work area. Follow company procedures for venting and purging gas.
- 7) Use the by-pass / vent port on tower #2 or #3 to purge the work area. Utilize the MCS vent stack to assist in evacuating the work area. These connections can also be used to inject nitrogen into the work zone.

Example I – Stopper Retraction Sequence: Stoppers Positioned Away from Work Area

NOTE: Always equalize pressure on both sides of the stopper before deflation or removal. This makes the retraction operation easier and prolongs the life of the stoppers.

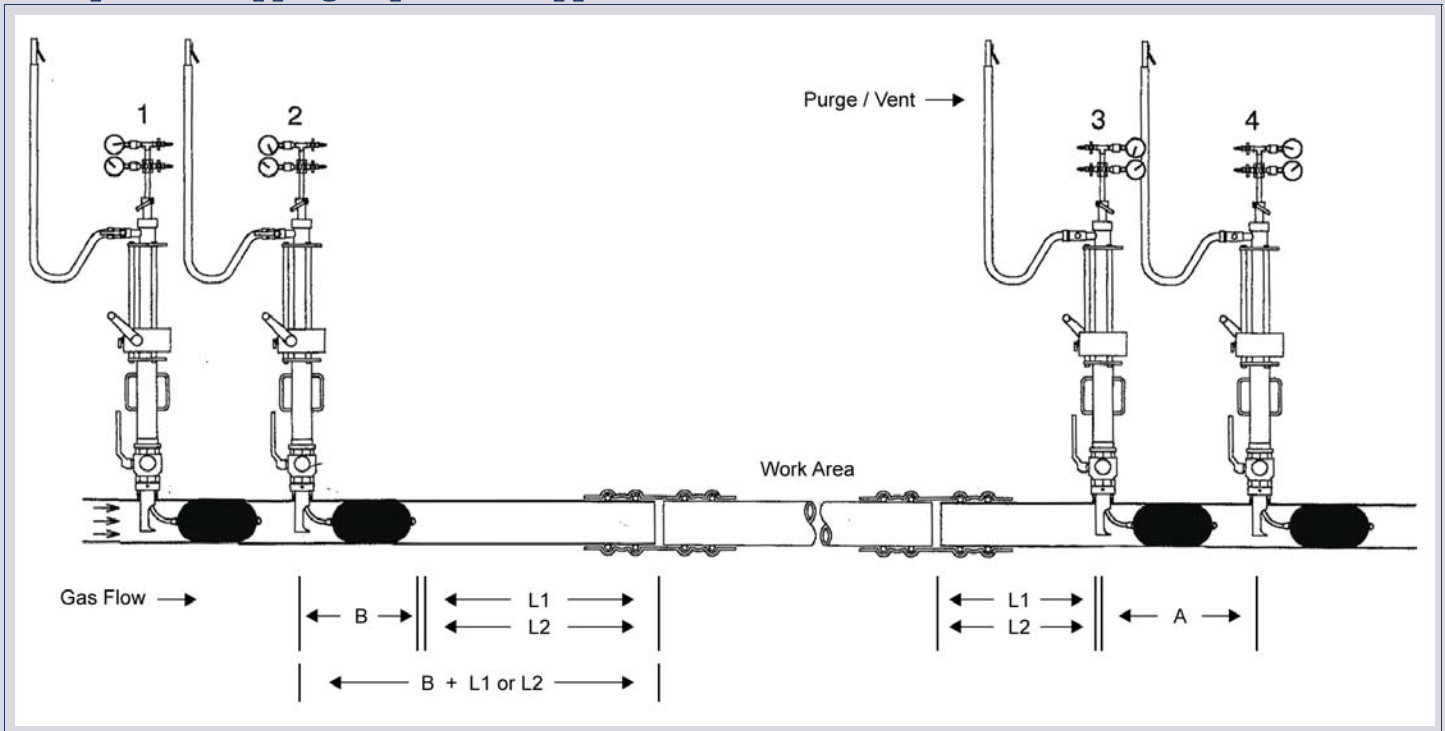


- 1) Back pressure stopper #4 through the system pressure ports in towers #3 and #4.
- 2) Deflate stopper #2.



- 3) Deflate stopper #4.
- 4) Equalize pressure on stoppers #1 and #3 through the by-pass / vent port between towers #3 and #4.
- 5) Use the by-pass / vent port in tower #1 or #2 to purge air from repaired area.
- 6) Use system pressure gauge on tower #1 or #2 to determine stoppers are equalized.
- 7) Deflate and remove stoppers.
- 8) Remove tools and install completion plugs.

Example II – Stopping Sequence: Stoppers Positioned in Same Direction



STOPPING TOWER DISTANCES

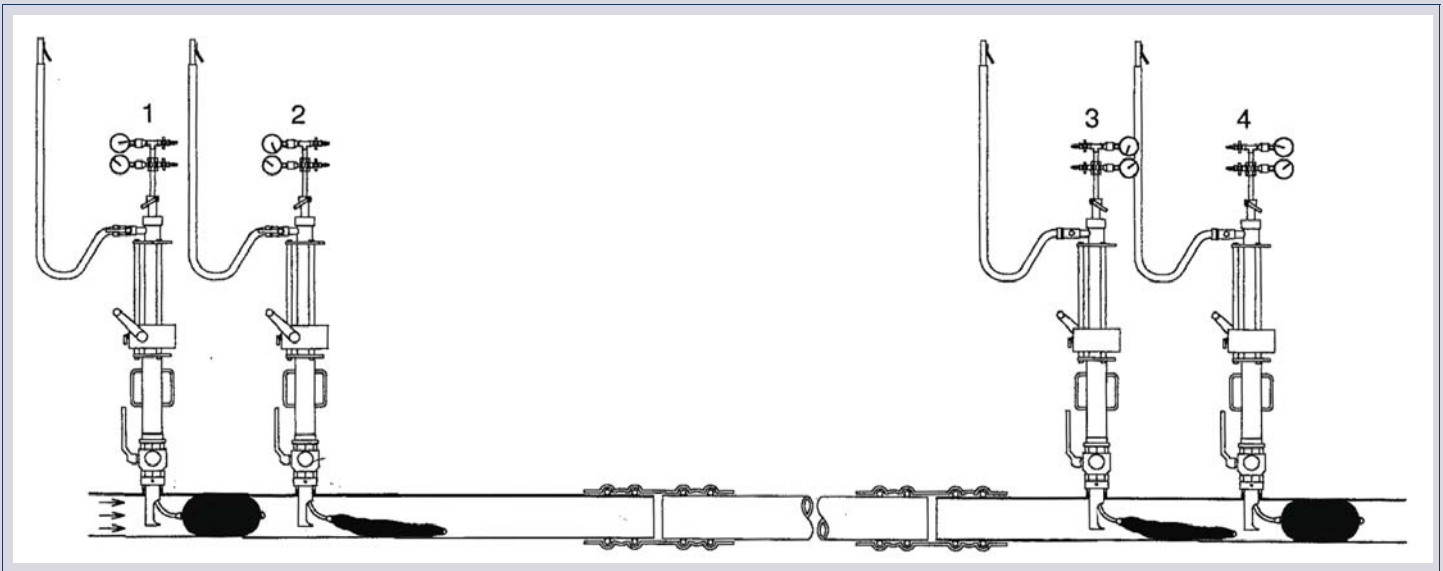
Nominal Pipe Size	A	B	L1 = Steel Welding	L2 = PE, CI, and Mechanical
3"	18"	20"	18"	9"
4"	24"	22"	24"	12"
6"	36"	26"	36"	18"
8"	48"	36"	48"	24"

A = minimum distance between towers | B = stopper length | L1 & L2 = minimum distance from stopper/tower to work area

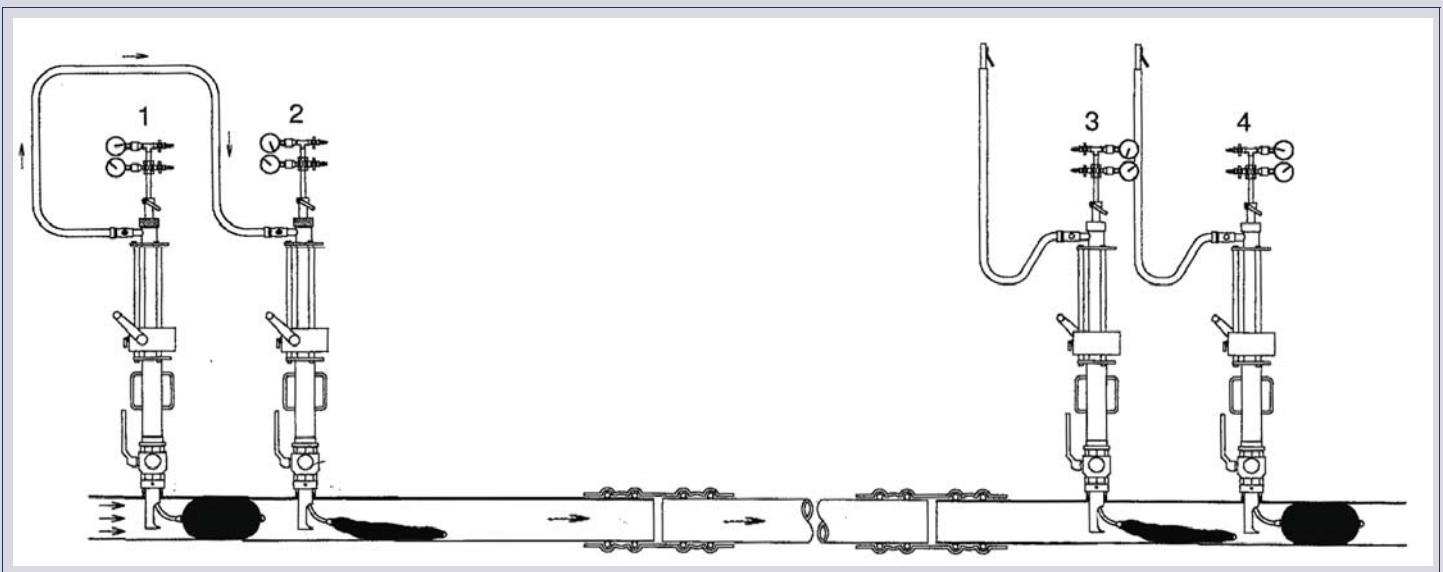
- 1) Always insert first inflatable stopper WITH the flow of gas.
- 2) Always inflate the stopper as quickly as practical.
- 3) Suggested stopper setting sequence is tower #2, #1, #3, #4. Set all 4 stoppers.
- 4) First inflated stopper is now in a no flow condition. Reset stopper for best possible seal (deflate, reposition gauge rod, inflate).
- 5) Always allow stoppers to settle for 10 minutes prior to beginning pipeline work. This allows the stopper to acclimate to internal pipe conditions. Verify system pressures, inflation pressures, and any bleed-by before starting pipeline work. Adjust as necessary.
- 6) Keep by-pass / vent ports on towers #2 and #4 open to atmosphere during work to keep gas away from the work area. Follow company procedures for venting and purging gas.
- 7) Use the by-pass / vent port on tower #3 to purge the work area. Utilize the MCS vent stack to assist in evacuating the work area. This connection can also be used to inject nitrogen into the work zone.
- 8) This set up can easily be used on both single feed and dual feed systems.

Example II – Stopper Retraction Sequence: Stoppers Positioned in Same Direction

NOTE: Always equalize pressure on both sides of the stopper before deflation or removal. This makes the retraction operation easier and prolongs the life of the stoppers.



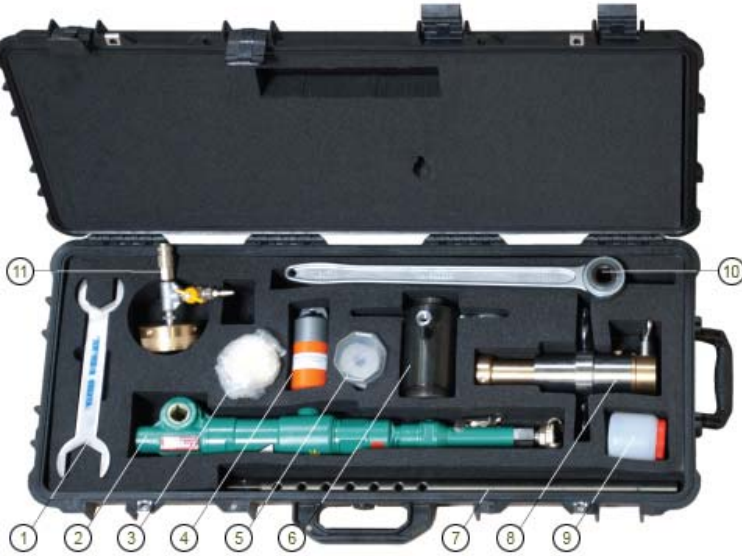
1) Deflate stoppers #2 and #3.



- 2) Use by-pass / vent ports on tower #1 and #2 to equalize pressures on stoppers #1 and #4.
- 3) Use by-pass / vent port on tower #3 or #4 to purge air from the repaired area.
- 4) Use system pressure gauge on tower #1, #2, or #3 to determine if stoppers are equalized.
- 5) When pressure is equalized, deflate stoppers #1 and #4. Retract all stoppers.
- 6) Remove tools and install completion plugs.

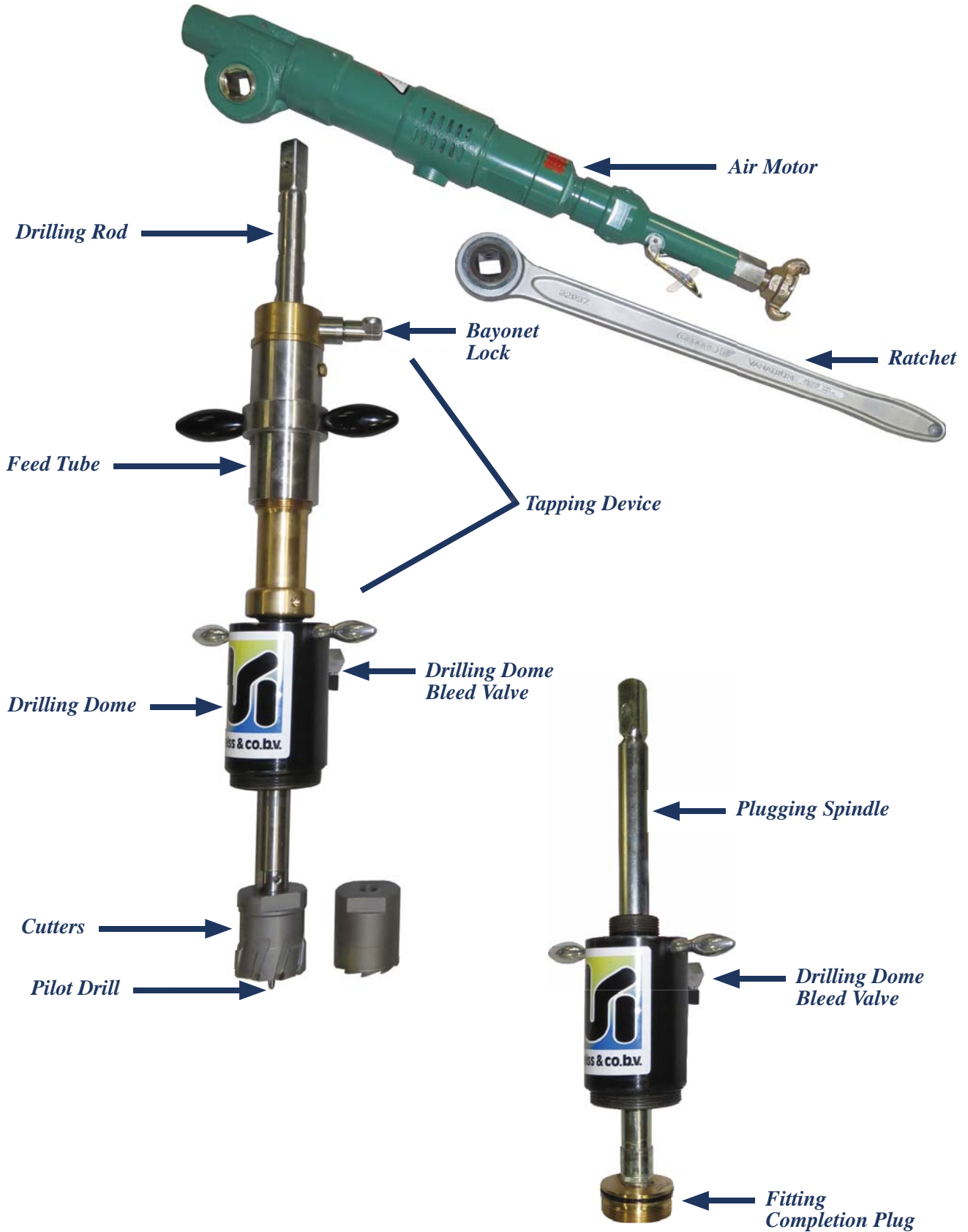
4.0 Equipment:

Tapping Case [Part # MCSTK060-0308-001]:

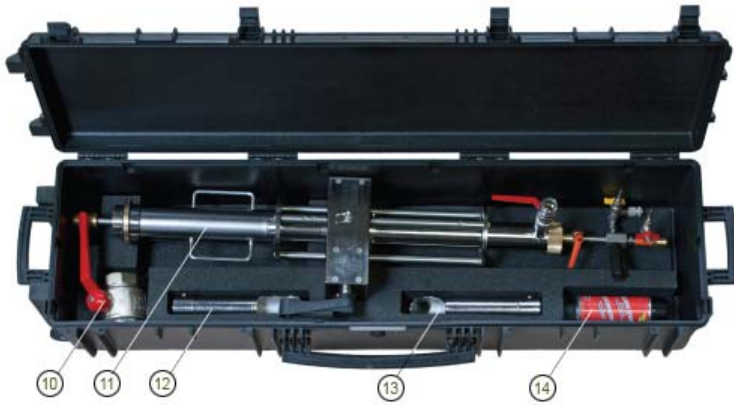


	PART #	DESCRIPTION
1)	10310835	Cutter Wrench (56.5 mm)
2)	10800248	Air Motor (small 20 mm square)
3)	14700015	Cutter Grease
4)	13200140	Steel and Cast Iron Cutter (1004HM 56.5 mm x 3/8")
5)	13100080	PE Cutter (1003 56.5 mm x 3/8")
6)	10310816	Drilling Dome 2-1/2"
7)	10800094	Drilling Rod (650 mm 25 mm x 20 mm square)
8)	10310800	Hot Tapping Device (493 HD)
9)	94200020	Silicone Grease
10)	11000120	Ratchet (20 mm square)
11)	90090030	Test Cap Assembly 2-1/2"
12)	10310830	Spare Seal Set
13)	14300060	Pilot Drill (6.3 mm with retainer spring)
14)	14300060	Pilot Drill (6.3 mm with retainer spring)
15)	10310780	Adapter (3/4" WW x 3/8")
16)	10310780	Adapter (3/4" WW x 3/8")
17)	99512506	Hexagonal Key (4 mm)
18)	11005310	Hook Assembly Wrench (58-62)
19)	10800846	Plug Spindle (20 mm square)
	99518863	Case (Peli 1700)
	99310015	Foam Interior

Tapping Tool and Completion Tool Components:

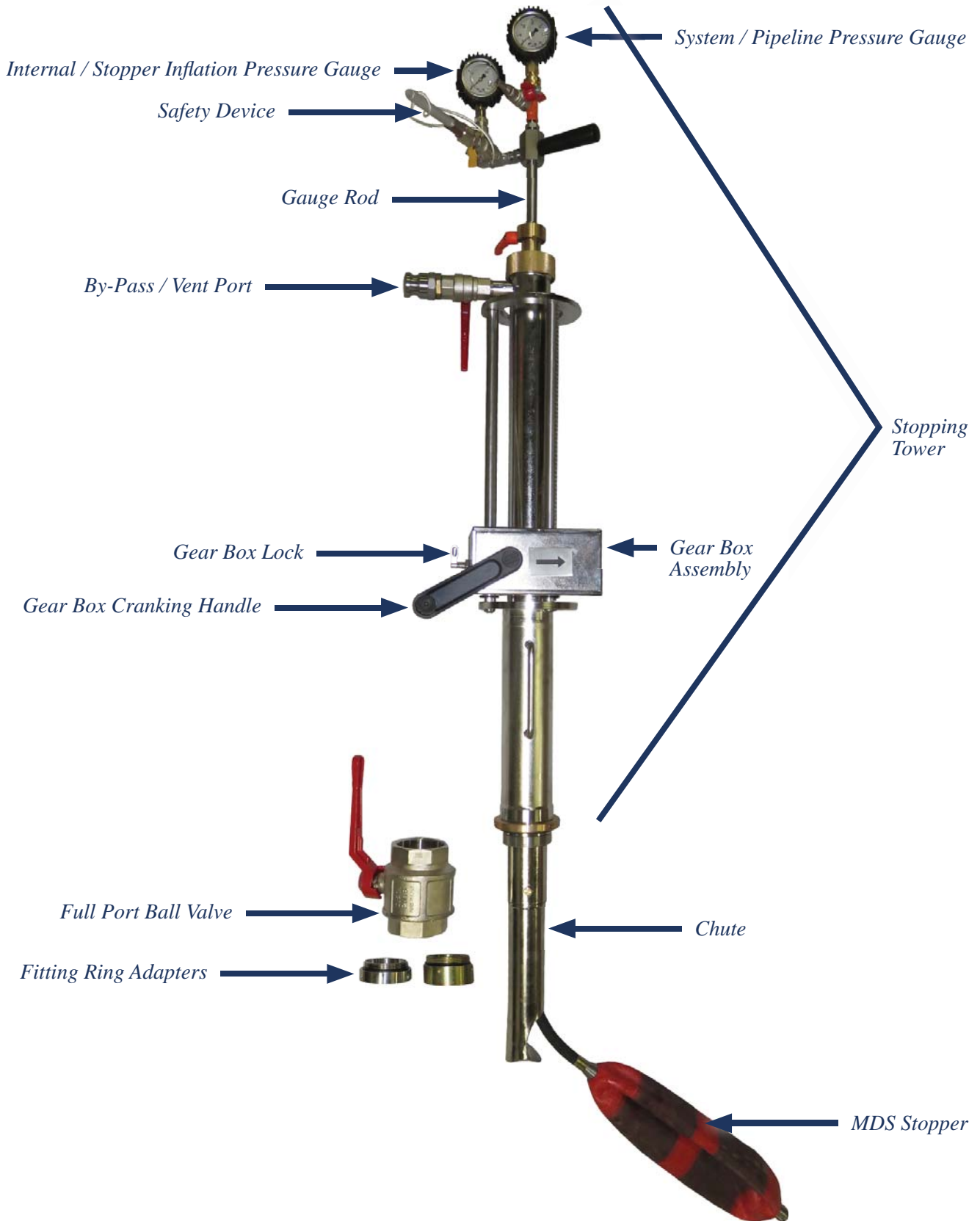


Stopping Case [Part #MCS060-0308-001]:



	PART #	DESCRIPTION
1)	10311030	Ring Adapter for Steel and Cast Iron (2-1/2" x 2-1/2" / Stamped "S")
2)	10311031	Ring Adapter for PE (2-1/2" x 2-1/2" / Stamped "P")
3)	12100023	Pipeline Pressure Gauge (0 to 60 psi)
4)	12100022	Inflation Pressure Gauge (0 to 160 psi)
5)	90090040	Safety Fitting
6)	11000190	Wrench (32 mm)
7)	11000190	Wrench (32 mm)
8)	12100255	Hook Assembly Wrench (95-100 mm)
9)	12000572	Gasket Set MCS60-38
10)	12100120	Full Bore Ball Valve FM 2-1/2"
11)	12100025	Flow Stopping Tower MCS60-38
12)	99518681	Chute # 1
13)	99518682	Chute # 2
14)	94200010	Silicone Grease Aerosol
	99500003	Case (Explorer)
	99500019	Foam Interior

Stopping Tool Components:

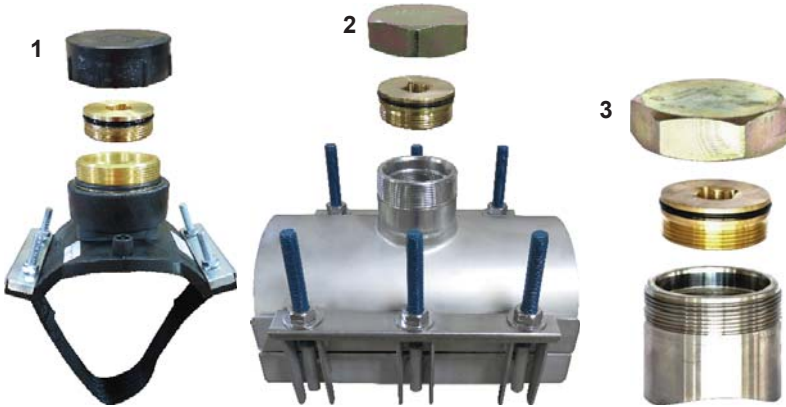


MDS Stoppers:



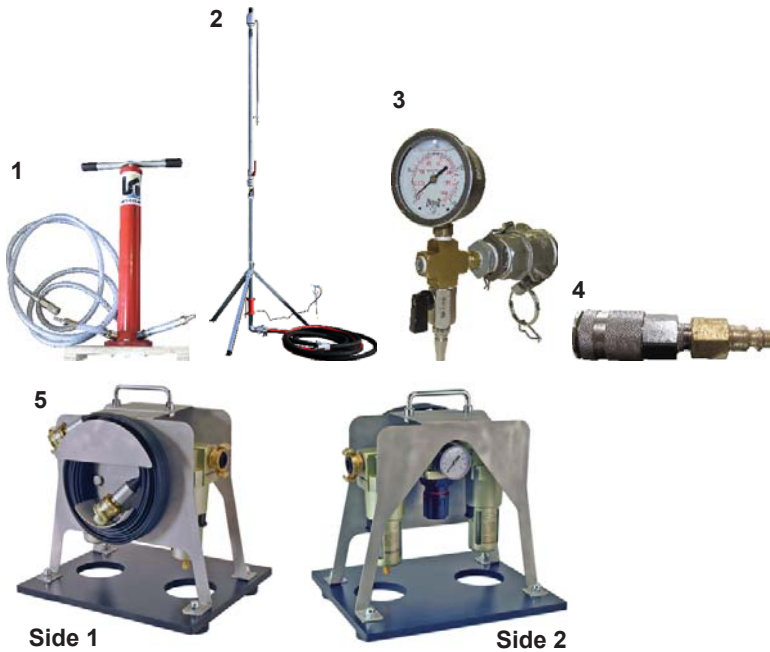
	PART #	DESCRIPTION
1)	23100353	MDS Stopper Size 2.75" – 3.54" (70 mm – 90 mm)
2)	23100354	MDS Stopper Size 3.54" – 4.72" (90 mm – 120 mm)
3)	23100355	MDS Stopper Size 4.72" – 6.29" (120 mm – 160 mm)
4)	23100356	MDS Stopper Size 6.29" – 8.46" (160 mm – 215 mm)

Fittings / Completion Plug / Completion Cap:



	PART #	DESCRIPTION
1)	90401010 to 90401040	Polyethylene Fitting (size specific)
2)	90004001 to 90004012	Cast Iron Fitting (size specific)
3)	11009050	Steel Fitting (3" – 8")

Accessories:



	PART #	DESCRIPTION
1)	22500011	Hand Pump with Hose
2)	59003176	Vent Stack with Hose
3)	BPGT-1	By-Pass Gauge Tree
4)	AHA-1	Air Hose Adapter
5)	49101380	Air Motor Oiler / Water Separator Unit (Complete)

Sizing Table [Equipment Part #'s]:

POLYETHYLENE PIPE				
Nominal Pipe Size	3"	4"	6"	8"
Fitting	90401010	90401020	90401030	90401040
Ring Adapter	10311031 ("P")	10311031 ("P")	10311031 ("P")	10311031 ("P")
Cutter	13100080	13100080	13100080	13100080
Pilot Drill	14300060	14300060	14300060	14300060
Chute	99518681 (#1)	99518681 (#1)	99518682 (#2)	99518682 (#2)
MDS Stopper <i>(Pipe ID Range)</i>	23100353 <i>(2.75" - 3.54" / 70 mm - 90 mm)</i>	23100354 <i>(3.54" - 4.72" / 90 mm - 120 mm)</i>	23100355 <i>(4.72" - 6.29" / 120 mm - 160 mm)</i>	23100356 <i>(6.29" - 8.46" / 160 mm - 215 mm)</i>



CAST IRON PIPE				
Nominal Pipe Size	3"	4"	6"	8"
Fitting <i>(Pipe OD Range)</i>	900004001 <i>(3.46" - 4.33")</i>	900004003 <i>(4.49" - 5.27")</i>	90004008 <i>(6.61" - 7.48")</i>	90004013 <i>(8.85" - 9.68")</i>
Ring Adapter	10311030 ("S")	10311030 ("S")	10311030 ("S")	10311030 ("S")
Cutter	13200140	13200140	13200140	13200140
Pilot Drill	14300060	14300060	14300060	14300060
Chute	99518681 (#1)	99518681 (#1)	99518682 (#2)	99518682 (#2)
MDS Stopper <i>(Pipe ID Range)</i>	23100353 <i>(2.75" - 3.54" / 70 mm - 90 mm)</i>	23100354 <i>(3.54" - 4.72" / 90 mm - 120 mm)</i>	23100355 <i>(4.72" - 6.29" / 120 mm - 160 mm)</i>	23100356 <i>(6.29" - 8.46" / 160 mm - 215 mm)</i>

STEEL PIPE					
Nominal Pipe Size	3"	4"	5"	6"	8"
Fitting	11009050	11009050	11009050	11009050	11009050
Ring Adapter	10311030 ("S")	10311030 ("S")	10311030 ("S")	10311030 ("S")	10311030 ("S")
Cutter	13200140	13200140	13200140	13200140	13200140
Pilot Drill	14300060	14300060	14300060	14300060	14300060
Chute	99518681 (#1)	99518681 (#1)	99518682 (#2)	99518682 (#2)	99518682 (#2)
MDS Stopper <i>(Pipe ID Range)</i>	23100353 <i>(2.75" - 3.54" / 70 mm - 90 mm)</i>	23100354 <i>(3.54" - 4.72" / 90 mm - 120 mm)</i>	23100355 <i>(4.72" - 6.29" / 120 mm - 160 mm)</i>	23100355 <i>(4.72" - 6.29" / 120 mm - 160 mm)</i>	23100356 <i>(6.29" - 8.46" / 160 mm - 215 mm)</i>

5.0 Preparatory Steps:

❑	Select proper MDS Stopper from the sizing table in Section 4.0.
❑	Select proper fitting from the sizing table in Section 4.0.
❑	Attach selected fitting, based on pipe material, per company standards and specifications.
	❑ Before welding steel fitting on main, remove the completion cap and plug from fitting.
	❑ When welding, if there is concerns about warping the fitting, install test cap assembly on fitting with valve open to vent heat.
	❑ Kleiss Gastool PE fittings use a 4.0 mm fusion pin. Ensure you have the appropriate tips/adapters on your electrofusion processor that will fit the 4.0 mm pins.
	❑ When installing PE fittings, as part of the electrofusion process, make certain to allow the fitting to completely cool down for the entire “cooling time” before tapping the main.
❑	Pressure test attached fitting per company standards and specifications.

6.0 Tapping Operation:

<p>❑ Mount the appropriate ring adapter onto the fitting and tighten the ring by means of the hooked wrench. Tighten completely.</p> <p>For PE fittings, use the ring adapter stamped with a “P” [10311031].</p> <p>For steel and cast iron fittings, use the ring adapter stamped with a “S” [10311030].</p>	
<p>❑ Position the valve so that when the valve is open the handle is up.</p> <p>Install the ball valve onto the adapter ring of the fitting and tighten the valve by hand to compress the o-ring.</p> <p>Operate the valve to ensure smooth operation.</p>	

□ Take the hot tapping device out of the case and inspect the device for dirt and debris. Make sure the threads are clean and the device operates freely.



□ Visually inspect the drilling dome and verify o-rings are in place.



□ Attach the drilling dome to the hot tapping device. Tighten the connection by means of the hooked wrench.



□ Attach pilot drill to cutter adapter. Secure pilot drill with allen wrench. Then attach cutter adapter to cutter.

Figure A:
Steel and cast iron cutter [13200140] and pilot drill [14300060].

Figure B:
PE cutter [13100080] and pilot drill [14300060].



A:



B:

❑ If cutting through steel or cast iron, grease the cutter and pilot drill with the cutting grease for better drilling results.

If cutting through PE, skip this step.



❑ Grease rod with silicone grease for a smooth installation. Then, install the drilling rod through the hot tapping device and dome.



❑ Install the cutter onto the drilling rod and tighten the cutter.



❑ Retract the drilling rod and cutter completely into the drilling dome. No part of the cutter should be visible.

When retracted into the drilling dome, the cutter should be in the position as shown in the picture.

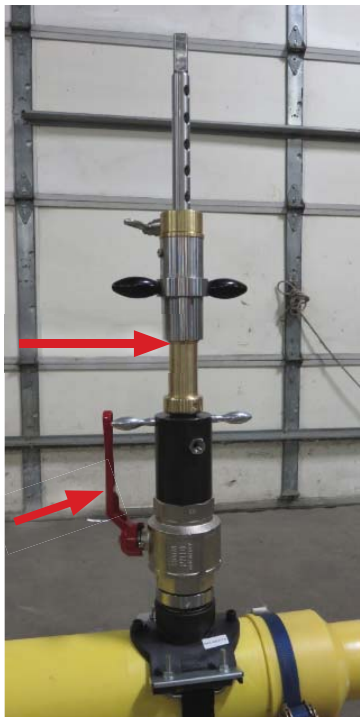


❑ Install the complete tapping tool onto the ball valve and tighten the tool.

When doing this, make certain the valve doesn't inadvertently turn.

❑ Position feed tube so it is flush with the bottom thread.

❑ Make sure the ball valve is open. (The ball valve is open if the handle is in an upward position.)



❑ Pull out the bayonet lock on tapping device and lower drilling rod until pilot drill touches the surface of the pipeline to be tapped.

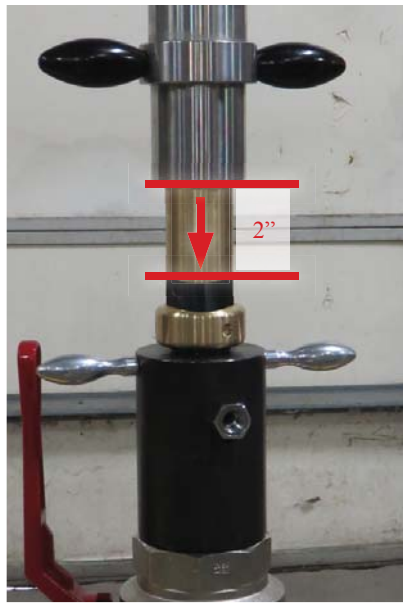
When doing this, make sure the bayonet lock is in a free position and does not lock into the drilling rod.



❑ After the pilot drill is in contact with the pipeline, lock the feed tube to the drilling rod at the closest hole on the drilling rod using the bayonet lock. Do this by rotating the feed tube until it locks in place.



- ❑ Locate the maximum drilling depth by measuring 2" down from the bottom of the feed tube. Place a mark on the brass tapping tube. (In picture, 1/2" black electrical tape was used.)



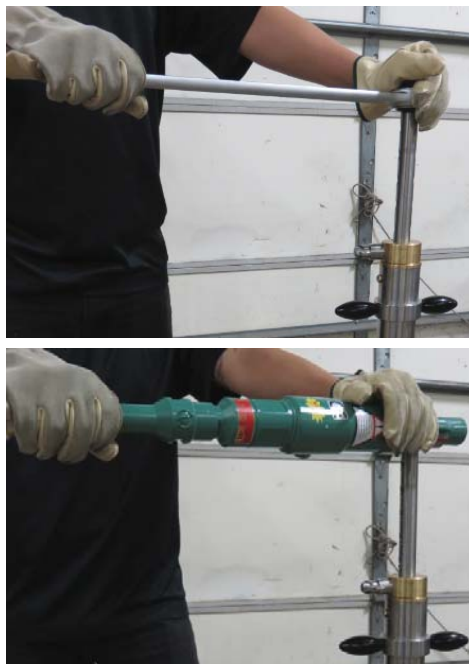
- ❑ Rotate the feed tube counterclockwise until 3 additional threads are exposed. (This ensures the pilot drill is not on the pipe and is in the proper position to start drilling.)



- ❑ Place air motor or ratchet on drilling rod square.

If using the air motor for the drilling process, operator should ensure the air compressor is working properly (100 -120 psi) plus make certain the oiler / separator is in place.

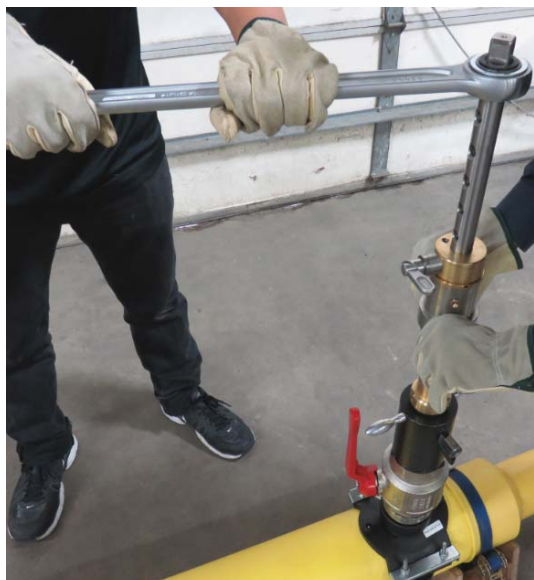
Note: For steel and cast iron, air motor is recommended. For most PE operations, hand cutting is recommended.



- ❑ Use the air motor or hand ratchet to turn the drilling rod clockwise.

While the drill rod is rotating clockwise slowly hand feed the cutter downward by turning the feed tube handles clockwise to cut the pipe.

(Do not feed the cutter too quickly and cause a bind and potential cutter breakage. Especially on steel and cast iron.)



- ❑ The tapping procedure is finished when the drilling rod can rotate without any resistance or the maximum drilling depth mark is reached.

Note: You will feel less resistance twice - once in the beginning when the pilot drill has perforated the pipe wall and secondly when the cutter is completely through.

- ❑ **WARNING: Always control the drilling rod.**

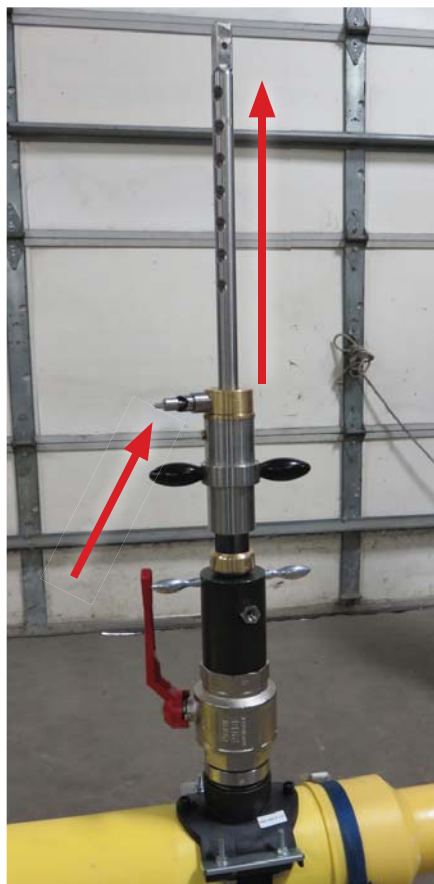
Free the drilling rod by unlocking the bayonet lock. Then pull the drilling rod completely upwards above the ball valve.





(If assistance to get the cutter out is needed, turn the drilling rod clockwise.)

(NEVER turn the drilling rod counterclockwise. This can damage the cutter.)

(Be aware of the fact that the pressure inside the pipeline may automatically move the rod upwards. Avoid being above the rod with your hands or face.)

WARNING: Always control the drilling rod.

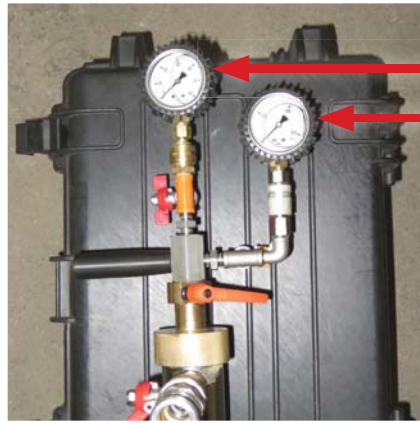


<p>❑ Close the ball valve.</p>	
<p>❑ Release pressure from the dome by opening bleed valve.</p>	
<p>❑ Remove the complete tapping tool from the ball valve.</p> <p>When doing this, make certain the valve doesn't inadvertently turn.</p>	
<p>❑ Disassemble the tapping tool.</p> <p>The cutter should contain the drilling coupon. Use the necessary tools to remove the coupon from the cutter.</p> <p>Note: It is sometimes easiest to remove pilot drill first.</p>	
<p>❑ Clean and store tapping tool in its case.</p>	

7.0 Stopping Operation:

- Install the appropriate gauges on the appropriate couplings at the top of the gauge rod.

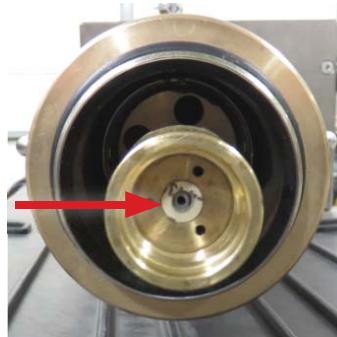
Each gauge has a specific function. The gold connection gauge will indicate the pressure inside the pipeline in front of the MDS Stopper. The silver connection gauge indicates the inflation pressure of the inflatable stopper.



- Verify that the coupling on the bottom of the gauge rod contains a seal. The seal should be in good condition.

Note: Extra gauge rod seals should always be available.

Never use the stopping tool if the seal is not inside the coupling.



- Take the stopper you selected from the chart in Section 4.0, and pre-bend the hose of the MDS Stopper as this will facilitate the positioning of the stopper into the pipeline through the chute.

NEVER pre-bend the MDS Stopper on the frame!!! This can damage the frame and it will not help as the internal frame is rigid.

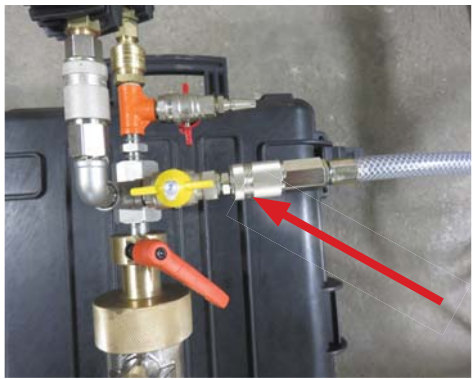


- Attach the MDS Stopper onto the gauge rod.

Tighten the connection by means of a pair of wrenches. Always use two wrenches to ensure tight connection and seal.



❑ Connect hand pump to the stopper inflation connection on the top end of the gauge rod. (This is the offset connection.)



❑ With the valve open, pull a vacuum to -15 psi on the stopper to make it as compact as possible.



❑ Close the valve after evacuation.

❑ Verify negative pressure is maintained for 5 minutes to ensure seal and integrity of MDS Stopper.

This is what a well evacuated MDS Stopper looks like!



❑ For proper MDS Stopper insertion into the pipeline, use Kleiss silicon spray to lubricate the stopper. (Do not use spray from local builder merchants as they make the stopper to slippery and may contain solvents.)







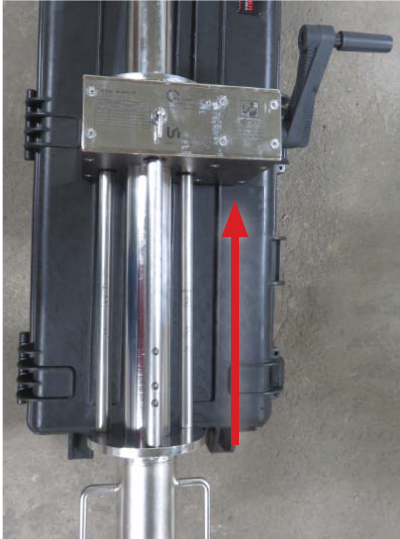



❑ Spray the back of the stopper at the conical connection.

❑ Spray the front of the stopper around the nose.

❑ Do NOT spray the body of the stopper.



<ul style="list-style-type: none"> ❑ Pull stopper up into tower. 	
<ul style="list-style-type: none"> ❑ Lock the gauge rod by operating the orange handle. 	
<ul style="list-style-type: none"> ❑ Operate the gear handle and crank gear box to lowest position. 	
<ul style="list-style-type: none"> ❑ Select the proper chute from the sizing table in Section 4.0. 	
<ul style="list-style-type: none"> ❑ Connect the chute into the bottom of the stopping tower. (There is only one way to connect the chute properly and that is to match the pin and hole. The chute fits the tower properly if a “click” is heard after insertion.) 	
<ul style="list-style-type: none"> ❑ Using the same Kleiss silicon spray you used on the stopper, lightly spray the open end of the chute. 	

<ul style="list-style-type: none"> ❑ Make sure stopper is oriented (rotated) in the optimum direction (same as the chute). 	
<ul style="list-style-type: none"> ❑ Operate the gear handle and crank gear box to highest position completely retracting the chute into the tower. (Locking pins will engage when in highest position.) 	
<ul style="list-style-type: none"> ❑ Install the flow stopping tower onto the ball valve and turn the tower clockwise until some resistance is experienced. 	
<ul style="list-style-type: none"> ❑ Position the stopping tower so stopper will be inserted into the correct position. (Reference arrow on gear box.) 	
<ul style="list-style-type: none"> ❑ Tighten the ring adapter by means of the hooked wrench and make sure the MDS Stopper stays in the right position. <p>When doing this, make certain the valve doesn't inadvertently turn.</p>	

❑ Close the valve of the by-pass / vent port.



❑ Open the ball valve and check for any leaks in the stopping tower. Use leak soap if necessary.

Correct any blow-by or leaks before continuing stopping operation.



❑ Locate the proper height indication on the rod of the tower. (These indications identify the position of the chute inside the pipeline based on the size of the pipe.)

NOTE: The left rod shows indications for PE and cast iron pipelines. The right rod shows indications for steel pipelines.



❑ Control the crank handle on the gear assembly and unlock the gear assembly.

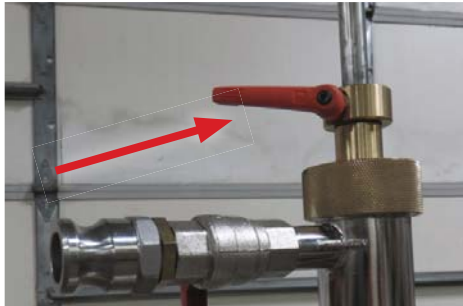
Using the crank handle, lower the gear box down until appropriate height indicator on rod is visible on top of the gear box. (This lowers the chute into the pipeline.)



❑ Lock the tower at this position. (The chute is now in the correct position inside the pipeline and you can commence inserting the stopper into the pipeline.)



❑ Unlock the gauge rod by operating the orange handle.

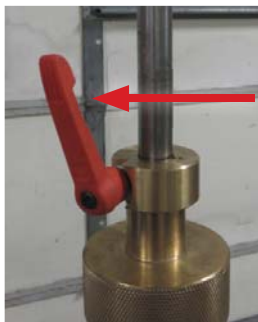


❑ Push the gauge rod downwards. You may have to use a little force to do so. **Try NOT to rotate the gauge rod when inserting.**

Stop pushing the gauge rod downwards when the depth indicator mark is at the brass locking component.

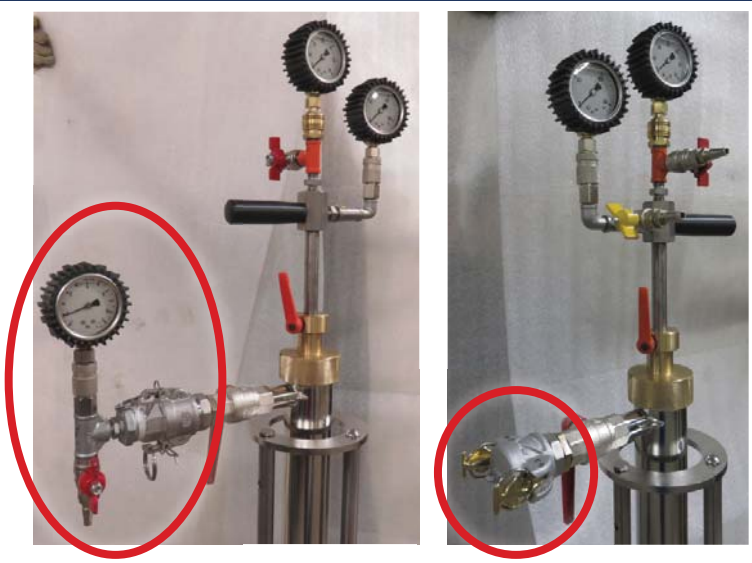


❑ Lock the gauge rod by operating the orange handle.



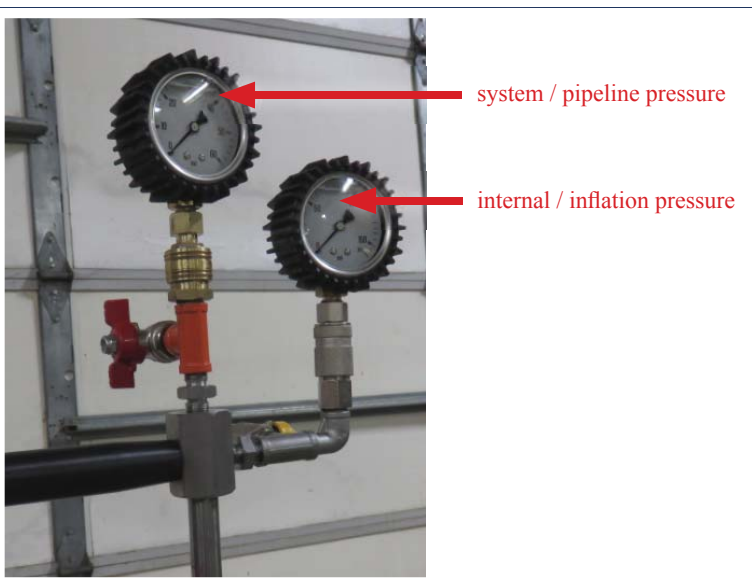
❑ *Recommended:* If needed or applicable, attach purge / gauge assembly to by-pass / vent port.

If purge / gauge assembly is not added, attach by-pass lock out assembly for additional safety.



❑ Prior to stopper inflation, verify system / pipeline pressure is displaying on proper gauge (not more than 60 psi).

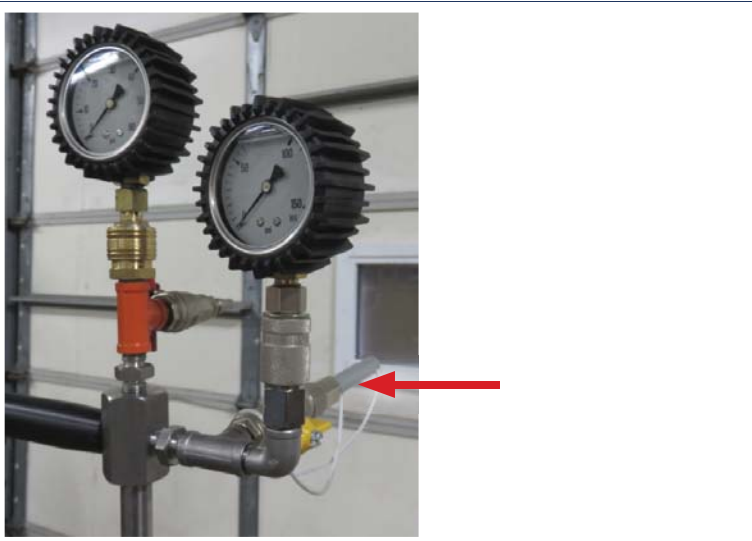
The MDS Stopper inflation pressure gauge will be indicating a pressure of -15 psi.



❑ Inflate the stopper to 2 times system pressure.

If this does not secure a complete stop off, inflate stopper until flow is completely stopped off up to a maximum of 120 psi.

Note: If the condition of the interior of the pipe being stopped is unknown, it is a recommended practice to inflate the stopper to the maximum inflation pressure to obtain the best stop off possible.



❑ Allow the stopper to stabilize inside the pipeline for at least 10 minutes.

❑ If purge / gauge assembly or by-pass lock out assembly was attached, remove it from the by-pass / vent port.



❑ Evacuate or purge pipeline work area. Use the by-pass / vent port on tower and Kleiss vent stack, if desired. (Do this in accordance with your gas company procedures.)



❑ Verify inflation pressure and system pressure remains stable.

❑ You may now start your work on the pipeline.

Note: Continue to monitor gauges on stopping towers.

8.0 Retrieving MDS Stopper:

NOTE: Always equalize pressure on both sides of the stopper before deflation or removal. This makes the retraction operation easier and prolongs the life of the stoppers.

- ❑ After the work on the pipeline is complete, equalize the pressure behind the MDS Stopper and in front of the MDS Stopper.

This can be done in a variety of ways. Refer to examples in Section 3.0 of this manual and your gas company procedures.

- ❑ Once pressure is equalized, open the inflation valve of the MDS Stopper to deflate the stopper. Pressure inside the pipeline will assist with the evacuation.

Connect the hand pump to the stopper and pull a vacuum on the stopper to make it as compact as possible.

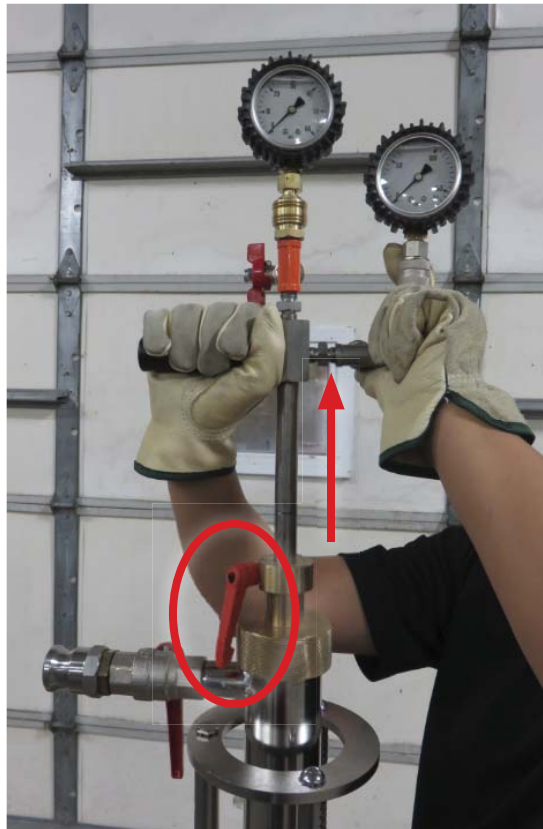
Leave inflation valve open for stopper flexibility.



- ❑ Unlock the gauge rod by operating the orange handle.

- ❑ Pull the gauge rod completely upwards. You may need to use some force to do this.

Hint: If you feel some resistance and can't move the rod further, push rod in slightly then with speed and a 1/4 turn clockwise pull the rod upwards.



❑ Lock the gauge rod by operating the orange handle.



❑ Unlock the gear box assembly and crank the gear box to the highest position moving the chute out of the pipeline.

NOTE: Keep control of the handle.









❑ Lock the gear assembly.

❑ Close the ball valve.



❑ Open the by-pass / vent valve in order to evacuate the stopping tool.



<ul style="list-style-type: none"> ❑ Unlock the adapter ring between the stopping tool and the ball valve by means of the hooked wrench. <p>When doing this, make certain the valve doesn't inadvertently turn.</p>	
<ul style="list-style-type: none"> ❑ Remove the stopping tool from the ball valve. 	
<ul style="list-style-type: none"> ❑ Remove the chute from the stopping tool. (Crank gear assembly to the lowest position to expose the chute.) 	
<ul style="list-style-type: none"> ❑ Disconnect the MDS Stopper from the stopping tool. (Push gauge rod to lowest position to expose the stopper connection.) 	
<ul style="list-style-type: none"> ❑ Clean and store MDS Stopper in transportation case. Do not leave it on the ground. <p>Inspect the stopper for damages.</p> <p>Clean the stopper with a cloth.</p> <p>Place a protection cap over the thread.</p>	 
<ul style="list-style-type: none"> ❑ Remove gauges. 	
<ul style="list-style-type: none"> ❑ Clean and store stopping tool in its case. 	

9.0 Plugging Operation:

- ❑ Assemble the plug spindle and drilling dome together. Verify bottom o-ring is in place.



- ❑ Connect the fitting completion plug onto the plug spindle. The connection is good when the detent balls of the plug spindle grip the completion plug. You will hear a positive click.



- ❑ Fully retract the plug into the dome.



- ❑ Install the dome onto the ball valve and tighten the dome by hand.



- ❑ Make certain the plugging spindle is at the top of the dome.

Keep control of the spindle.



- ❑ Open the ball valve.



- ❑ Place the ratchet handle on top of the plug spindle.

Push the plugging spindle fully downwards.

- ❑ Screw the plug into the fitting with the ratchet until bottomed-out and tight.



❑ Test to make sure there is a seal by opening the bleed valve on the dome and relieving the pressure in the dome.



❑ After the plug seal has been verified, pull the plug spindle fully upwards (out of the completion plug).




❑ Remove the dome from the valve.



❑ Remove the valve from the ring adapter.



<ul style="list-style-type: none"> ❑ Remove the ring adapter from the fitting by means of the hooked wrench. 	
<ul style="list-style-type: none"> ❑ Prior to placing the completion cap, inspect the completion plug again for any leakage. 	
<ul style="list-style-type: none"> ❑ Screw the completion cap onto the fitting. 	
<ul style="list-style-type: none"> ❑ Disassemble the completion tool. 	
<ul style="list-style-type: none"> ❑ Clean and store the completion tool and valve in their respective cases. 	

10.0 Tips and Hints:

❑	Wipe off and clean all equipment for next operation (well-maintained equipment have extended life).
❑	Ensure gauges go to the zero mark and function properly.
❑	Clean all threads and quick connections.
❑	Clean and inspect MDS Stoppers, note any excessive wear and replace if necessary.

11.0 Periodic Maintenance and Inspection:

❑	All equipment should be cleaned and inspected for wear after each job to prolong the life of the equipment and ensure the safety of the operators.
❑	MCS recommends that the complete set of tools be inspected, tested, and updated by an authorized MCS distributor on a two year rotation or sooner, depending on the usage of the tools.