

# CGA Energy Nexus & Annual Technical Conference 2024

*Fuelling the Future*

## Valve 211

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# Safety Moment

- Ensure you have SPECIFIC PERMISSION to operate any valve from either your supervisor or the control room
- Gasses are hazardous in high concentrations, and some are explosive
- Familiarize yourself with the Installation operations and maintenance manual before operating or maintaining any valve or pressure equipment. If you are unclear on any instructions consult your manufacturer or their representative
- Follow you company's safety and work procedures
- Always wear the proper PPE

# Maintenance free valves



# Types of greasing equipment



# Caution

- High pressure grease equipment can generate 10,000 to 15,000 psi, more than enough force to damage a valve
- Accidents involving high pressure fittings are the most common cause of death and injury for workers operating valves under pressure

# Greases, Sealants and Cleaners

- We have different types of grease for different applications. Lubrication, Cleaning, and sealing
- Your valve has come from the plant lubricated with a specific type of grease and that grease; excess grease can be whipped away from the bore with a lint free cloth
- Greases should not be mixed with other grease types. When using a new lubricant or valve cleaner ensure you displace the entire volume of the old lubricant

Injection Capacity Chart

Valve Size	Volume per Seat (oz)	Volume per Valve (oz)	Volume per Seat (cm <sup>3</sup> )	Volume per Valve (cm <sup>3</sup> )
2"	1	2	25	50
3"	1	2	35	65
4"	2	3	50	100
6"	2	4	65	130
8"	3	6	80	160
10"	3	6	90	180
12"	5	10	135	270
14"	5	10	155	310

# Greasing equipment

- Always inspect your greasing equipment is working properly prior to use. If anything isn't working properly do not proceed with use.
- Most Manufacturers of lubricator products have online videos detailing proper use and repair.



## Note

- Valve cleaners such as Valve purge used to flush lubricant but should not be left in greasing equipment

# Ask questions from the outset

- Establish a history for the Valve in question
- How long has the valve been in service?
  - When was the last maintenance?
  - Any known issues in advance?
  - When was the last assessment/function check
  - Are any special tools or greases required to check out or maintain the valve?



# Assessing position

- Position indication-

## Multi-turn Valves-(Gates and Globes )-

- Rising stem-stem rises thru the handwheel or thru the gear box
- Non-Rising stem can be more difficult to determine visually without consulting the manual to understand which direction to turn to close the valve



Quarter turn valves typically come with position indication

- Lever Valves typically are designed to have the lever inline parallel to the pipe in the open position, and conversely perpendicular position when closed, top of stem may also be marked
- Gear operated valves have position indication on top



# Cleaning a valves

## Exterior cleaning

Removing grease and dirt from any visible surface

Inspect fittings if applicable visually and clean

Cleaners such as Simple green can safely be used to remove dirt and corrosion from the valve exterior

If bare metal is exposed on the valve body ensure it is sealed with a paint or primer. Ensure you do not paint over Injection and bleed fittings

Finish cleaning injection fittings with a lint free cloth to avoid

# Routine cleaning Ball valves, Plug Valves and DBB Gate Valves

## Seat cleaning

- Can only be performed on valves with seat injection or a lubrication system; stem injection fittings on ball valves are typically for emergency use.
- Before first using a valve purge or seat cleaning product for the first time consult your manufacturer and maintenance manual.
- Inspect Injection equipment, ensuring it is properly functioning
- Inject a valve purge cleaner and let it breakdown old product and dirt for a minimum of 30 minutes, cycling the valve to loosen and debris
- Relubricate afterward and remove valve purge from Grease Gun lubricator
- Ensure valve is left in the proper position after cleaning

# Wedge Gate/Globe Valve functional check

- Visual inspection inspect valve stem for cleanliness
- Clean away any lubricant that appears to be dirty from stem (OS&Y) and grease fittings, and apply new lubricant if necessary
- Stroke Valve thru full operation (if possible)

# Wedge Gate/Globe issues

## Issues

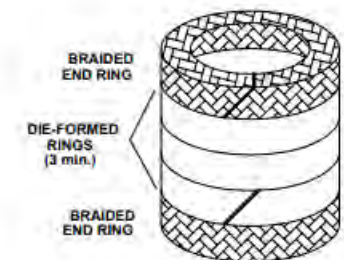
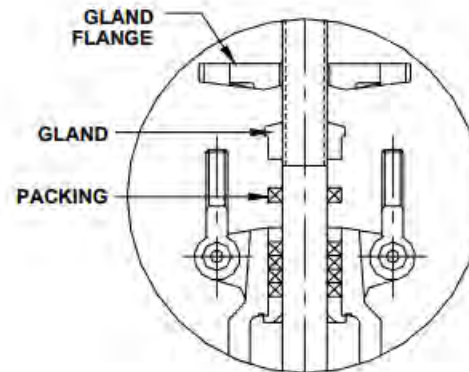
### Problems operating valve

- Inspect drivetrain, looking for dirt or excess corrosion, or damage to the threads or drive nut, inspect the gland flange is even and not binding with the stem
- Packing adjustment may be required if the Packing gland adjustment is too tight-Adjust evenly doing only quarter turns on each side. Cycle in between adjustments
- Internal components may be damaged-Repair or replace

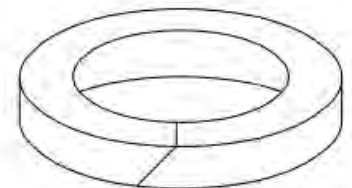
# Wedge Gate/Globe issues continued

## Leaking thru packing

- Check gland bolting-adjust evenly in quarter turn intervals between valve strokes, checking that the valve is not becoming too stiff to operate
- Ensure gland flange and follower are not binding against stem and body
- Depressurization and replacement of the packing may be required if it is no longer sealing



120° STAGGER OF JOINTS



45° END CUT

# Wedge Gate/Globe issues continued

- Leaking thru seat
- Check to see if valve is tightly closed
- Globe and Wedge gates can be mechanically forced into the seat via the operator

# Functional Check Plug valve

Ensure Grease fittings are still accepting grease

- Grease fittings should still be accepting grease(clean the groove or fitting face, if required use a file or scraping tool to remove paint and dirt)
- Do not use a damaged grease fitting as they may leak or lose pressure. Seriously scratched dented or pitted fitting should be replaced (system must be depressurized)
- Wipe any debris on the fitting away ensuring it is clean
- Attach the giant button head coupling to the Giant Button head fitting(use a rocking up and down motion not left to right)
- Start pumping pressure into the coupling monitoring the gauge pressure



# Gauge pressure

- Looking for a steady rise in pressure with a slight drop in between strokes finally reaching a plateau before falling back ( this occurs when the plug is floated, and sealant able to pass between the plug and seat
  - Trouble shooting
    - If the gauge pressure is not rising, ensure lubricator has grease or the valve lubrication system is empty. A damaged seat may also be the reason the system cannot pressurize, once we have injected the right volume of grease to fill the cavity.
    - No rise in gauge pressure while the lubricator gets harder to operate is a sign you may have run out of grease
    - Gauge pressure rises but never falls back- Fitting may be clogged or lubrication system may be blocked assuming the lubricator is working properly. Plug may have sized in taper

# Functional Check continued

- After adding grease to the valve exercise the valve thru 90 degrees to evenly distribute grease (If Possible)

## Warning

- When lubricating a plug valve in liquid service the valve should only be lubricated in the open position. The valve cover bolts may be damaged if the valve is lubricated in the closed position causing the cover to leak

# Plug valve Warning

When lubricating a plug valve in liquid service the valve should only be lubricated in the open position

The valve cover bolts may be damaged if the valve is lubricated in the closed position

# Valve is receiving grease, but still difficult to operate

- Drive train corrosion
  - Grease dam and penetrant for lever operated valves
  - Gear operated valve may have an issue in the gear box
- Plug adjustment has been made to tight
- If the plug is locked and the valve is still accepting grease, sealant is bypassing the seat ( body or plug may be damaged)

# Plug valve trouble shooting

- Noise emitted from a closed valve is a sign the valve may be leaking at the seat. A whistling sound indicates severe erosion of the seating surface, a gurgling and popping sound may signify less damage
  - Ensure the valve seat is lubricated, try a cleaning cycle. Relubricate to ensure there is no debris on seat face
    - If the valve has external stops you may be able to rotate the plug and rotate the downstream side of the plug upstream to try and achieve a seal
    - Gear operated valve require a special procedure

# Ball valve functional check

- Inspect-Injection fittings for dirt and debris, damage and wear
- Inject a small amount of lubricant to clean way any dirt from seat face
- Rotate ball thru it's 90 degree fully open to fully closed (if possible)
  - Trouble shooting
    - If the valve has been in service for some time and is “passing” during test you may need to cycle multiple times to help the elastomers “relax”
    - Top up lubricant if required and continue to stroke the valve thru the allowable operating range
    - If this does not resolve the issue additional valve flushing may be required
    - Extra heavy/PTFE Sealants can also help in getting a passing valve to seal. Be sure to flush out after use

# Ball Valve trouble shooting

- Fitting leaks between coupler and fitting-paint may be covering the fitting-(Coupling seal may also be damaged)
- Sealant fitting leaking-Trash could be in the fitting or the fitting seal may be damaged-try first injecting a small amount of cleaner
  - If fitting requires replacement –depressurize the valve to replace fitting, Bleed pressure trapped between the fitting and the secondary check by depressing the ball, wiggle the fitting as you unscrew it to relive any trapped pressure. “Never stand in front of the fitting”

# Double block and bleed seat integrity test

- With the valve in the closed position seat integrity of the valve can be verified by bleeding down the body cavity of pressure
- This a dangerous procedure and should be not be undertaken if you are not familiar with your company safety procedures
- This testing applies only to Double Block an and Bleed Ball and Gate valves. Both self relieving and isolation seat design can utilize this seat integrity test method
- High velocity gas is dangerous and position your body safely and ensure other are not in the area unnecessarily



## Double Block and Bleed

Whether in the open or closed position, pressure on each side of the ball is blocked from the body cavity by the seat ring. The body cavity can then be blown down or drained through the body port. Take the following steps when block and bleeding a valve:

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**Warning:** Make sure proper safety garments are worn, and follow all customer safety procedures. Failure to do so could injure you or others.

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1. The Cameron bleed fittings have one or two exhaust ports. You should be aware of their orientation. Any debris in the valve or fitting will be exhausted at a high velocity.
2. If necessary, tighten the fitting to reorient the exhaust ports.
3. With the valve fully open or fully closed, open the bleed fitting all the way. When opening the bleed fitting, a backup wrench may be used to prevent accidental removal of bleed fitting.

The process of block and bleeding the valve is intended to test the valve integrity. If the valve does not blow down, this indicates that the seats are leaking. Consult the Troubleshooting section.

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**Warning:** Never try to block and bleed the valve in the partially open position. Failure to do so could injure you or others.

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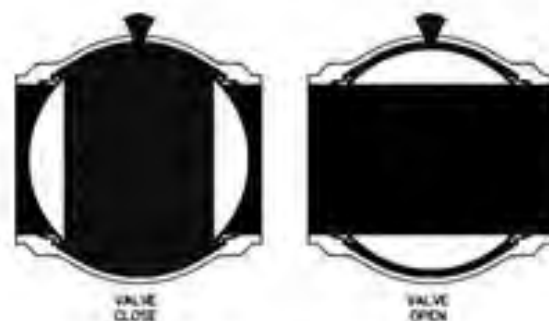


Figure 10 - Valve closed    Figure 11 - Valve open

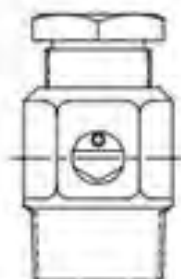
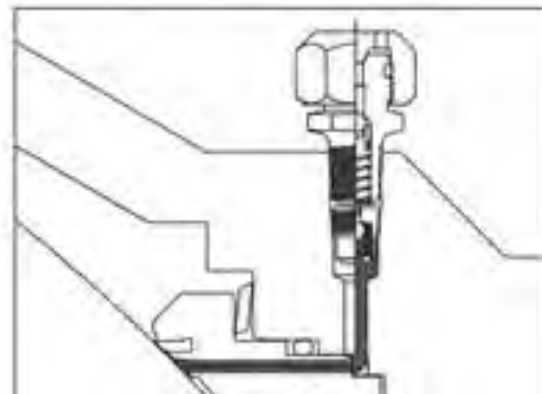


Figure 12 - Typical bleed fitting



# Buried service valves

- Valves in buried service are often provided with an extension for the operator as well as lube and drain lines. The exception being maintenance free valves that are typically have no fittings are not DBB
- Ball valves and Plug valves are the most common buried valves, but Wedge Gate and check valves can be buried as well
- Valves in buried service are often welded body or welded end connections to prevent ingress into the pipeline of foreign materials when the system is depressurized

# Buried plug valves





# Buried Ball valves



Questions