EST. 1940

Dobbie

PN16 & PN35 Metal Seated Gate Valves DN80 - DN1000

Series: VGM16
VGM35

Dobbie Metal Seated Gate Valves

Gate Valve or Sluice Valve: The great naming debate

The correct terminology referencing control valves for fluid media has, for many years, been hotly debated and settling on the appropriate term has often been difficult for industry. Historically, below ground valves (BGV) with their heavier, more robust construction designed to cope with the endurance required of a buried service, have been referred to as 'Sluice Valves'. These valves were traditionally cement lined with a black bituminous coating and supplied without handwheels. Valves to be installed above ground (AGV), were constructed with a lighter body and were normally nominated as 'Gate Valves'.
AGVs were commonly supplied with a handwheel, although not in every case.

Red Oxide coatings improved corrosion resistance but it was not until the advent of Fusion Bonded Epoxy (FBE) and subsequently similar, advanced, thermally bonded polymeric coating systems that the issue was largely overcome. This resulted in heavy, grey cast iron bodies becoming essentially redundant and consequently, a uniform design strategy for both BGV and AGV evolved. This has not only significantly reduced manufacturing costs, but also rendered the distinction between AGV and BGV largely academic.

Consequently in today's market they are all simply referred to as 'Gate Valves'.

Dobbie Metal Seated Gate Valves

Dobbie have been manufacturing Metal Seated Gate Valves to AS/NZS 2638.1 in Australia since 1990. Dobbie Metal Seated Gate Valves are non-rising stem (NRS) valves, with the gate traversing a 431 stainless steel spindle. Valves can be configured as either Clockwise (CC) or Anti-Clockwise (ACC) closing as per client specification. They are suitable for use in either above ground or a below ground applications and can be installed either horizontally or vertically. Dobbie Metal Seated Gate Valves have been engineered right here in Australia for high abrasion resilience, robust impact resistance and durability. They provide long term, trouble free performance coupled with minimal maintenance obligations.
They are a proven performer.

All Dobbie Metal Seated Gate Valves with pressure ratings to either PN16 or PN35, are manufactured with flange connections compliant to AS/NZS 4087 (*Metallic Flanges for Waterworks Purposes*). However, as a local manufacturer, Dobbie has the flexibility to provide flanging to alternate Standards (ANSI, ASME, BSEN 1092, etc.) or other drilling as per client requirements. The body and cover castings are manufactured using high quality 500-7 ductile iron, and are coated with a thermally bonded polymeric coating to AS/NZS 4158, which provides excellent protection from corrosion and abrasion.

Dobbie manufacture dezincification resistant (DZR) copper alloy gates on valve sizes from DN80 up to and including DN300. DN375 and above sized valves are manufactured with a ductile iron gate, protected with a polymeric coating and fitted with machined DZR copper alloy gate rings.
The body of the valves are fitted with corresponding DZR copper alloy rings which are also precision machined to allow exact opening and closing of the gate. Sealing is achieved when the ring surfaces are close matched against each other.

EPDM gaskets to AS 1646 are fitted between the body and cover, and also between the cover and gland to prevent leakages of the valve. Nitrile O-Rings and a wiper ring are also fitted to the spindle to eliminate leakage and to prevent debris and foreign objects from entering the gland housing. As per AS/NZS 2638.1 requirements, the spindle O-Rings are capable of being replaced in-situ under normal operating pressure. This prevents spindle leakage while 'in-the-field' maintenance is performed.

Dobbie Metal Seated Gate Valves can have a variety of control mechanisms fitted at time of manufacture.
Options include:

- Cap
- Handwheel
- Gearbox Ready
- Gearbox
- Gearbox and Actuator

Direction of Actuation

Dobbie Gate Valves feature a multi turn design (NRS) and are offered in either Clockwise Closing or Anti-Clockwise Closing directions. Direction of operation is indicated via directional arrows on the key cap or handwheel and colour coded caps or inserts.

- Clockwise Closing (CC): Red
- Anti-Clockwise Closing (ACC): Blue

Note: Always check with local Water Authorities to confirm colour coding relevant to each installation

Dobbie Metal Seated Gate Valves

Gate Valves are 'isolation' type valves utilising a sliding wedge plate (gate) to interact within a flow path and are primarily used for preventing or facilitating the flow of fluid media. Dobbie's planar sealing surfaces between the gate and seats are ideal for straight-line flow applications where minimal flow restriction is required. When fully open, a Dobbie Gate Valve has little or no obstruction in the flow path, resulting in very low friction loss.

Dobbie Metal Seated Gate Valves come in a range of configurations:

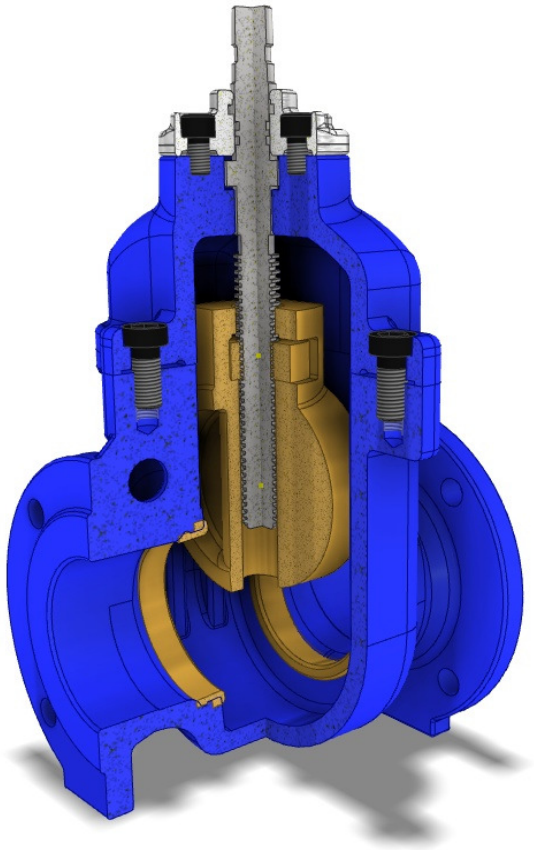
- NRS (Non Rising Stem)
- ACC / CC
- Flange Connections: AS/NZS 4087
- Flange Options: (ANSI / ASME, BSEN 1092, etc.) or as per custom specification
- Pressure Ratings: PN16 / PN35
- Standard Cap / Handwheel
- Gearbox Ready / Gearbox / Actuator

Gate Valves should only be operated in either a fully open or fully closed position. Singular Gate Valves should not be used for regulating /modulating the flow of the media or for throttling purposes. These are tasks more suited to the use of Globe or Butterfly Valves, the utilisation of Orifice Plates or the inclusion of additional Gate Valves.
The high velocities associated with throttling create turbulence and cavitation which can lead to numerous problems such as: vibration in the line causing water hammer (hydraulic shock) and chattering / fretting wear; body, gate, or sealing ring damage to the valves; and/or system damage to the downstream pipe service. Damage to the gate, caused by high fluid velocities occurring close to 'shut off', can result in leakages if the valve is repeatedly used to regulate flow. Damage to Gate Valves is not easily rectified on site, and repair in the workshop is the only viable way to ensure that the valve will operate correctly again once returned to operational service. This is an expensive exercise, best avoided whenever possible through correct selection, placement, installation & use of valves.

Dobbie Metal Seated Gate Valves

Dobbie Metal Seated Gate Valves: Benefits

- AS/NZS 4020 approval make them well suited to applications involving the transfer and control of potable (drinking) water.
- Strong chemical compatibility makes Dobbie valves suitable for a wide range of fluid media.
- Highly abrasion resistant gates are well suited to applications involving media contaminated with suspended particulates.
- As per AS/NZS 2638.1, valves are thoroughly tested to a minimum 1.5 times their rated operational pressure.
- Dobbie Metal Seated Gate Valves are additionally routinely tested to 5400Kpa thus making them especially suited to applications requiring high pressure and/or high temperature tolerance.
- Metal Seated Gate Valves present a clear, full bore waterway that limits flow inhibition and friction loss.
- Suitable for above or below ground applications
- Low torque values mean easy operation and extended service life
- Minimal maintenance obligations



3D Sectional View of Metal Seated Gate Valve

Typical Gate Valve Applications

Mains Water Lines	Trunk/Ring Mains	Storm Water	Sewer Lines
Fire Services	Recycled Water	Waste Water Plants	Static Water Stations
Desalination Plants	Pump Stations		

Pipe Compatibility with Gate Valves

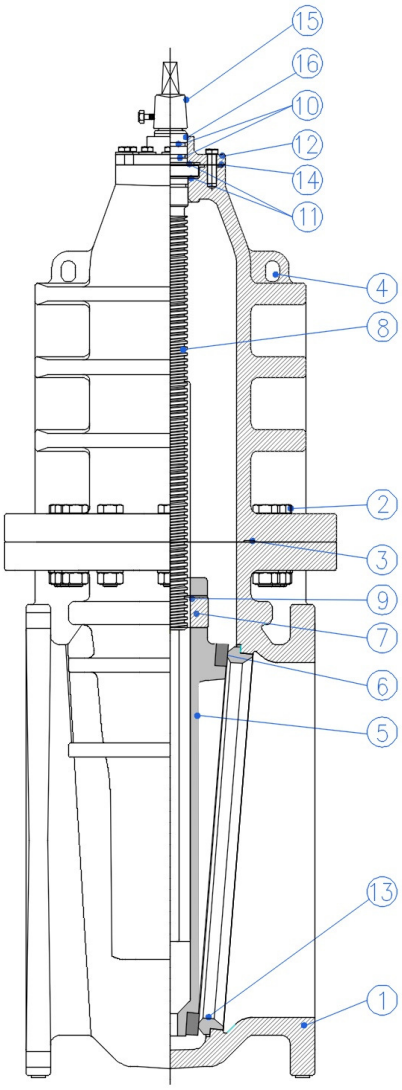
Dobbie Metal Seated Gate Vales are suitable for use on a wide range of piping materials.

Typical pipe materials include:

Series 1 PVC (O,M,U)	Series 2 PVC (O,M,U)	PE
GRP	MSCL	HDG STEEL
HEAVY STEEL (SCHED #40)	DUCTILE IRON	AC

Dobbie Metal Seated Gate Valves

Technical Specifications & Information



Materials & Part Listing

No.	Component	Material / Specification
1	Body	Ductile Iron AS 1831 Grade 500-7
2	Bolts (Set)	Stainless Steel ASTM A276-316
3	Gasket	EPDM AS 1646
4	Cover	Ductile Iron AS 1831 Grade 500-7
5	Gate	Gunmetal AS 1565 Grade C83600 (DN80-300)
		Ductile Iron AS 1831 Grade 500-7 (Coated) (DN375-1000)
6	Gate Rings	Gunmetal AS 1565 Grade 83600 (DN375-1000)
7	Nut	DR Brass AS 1568 Grade C48600
8	Spindle	Stainless Steel ASTM A276-431
9	Vertical Seal	EPDM AS 1646
10	O-Rings	Nitrile
11	Thrust Washers	Ertalyte
12	Gland	Ductile Iron AS 1831 Grade 500-7
		Stainless Steel A351 CF8M
13	Body Rings	Gunmetal AS 1565 Grade C83600
14	Gland Gasket	EPDM AS 1646
15	Cap	Ductile Iron AS 1831 Grade 500-7
16	Wiper Seal	Nitrile

Technical Data

Size Range - DN80 -DN1000

Allowable Operating Pressure - 1600kPa (PN16)

Allowable Operating Pressure - 3500kPa (PN35)

Manufactured to AS 2638.1

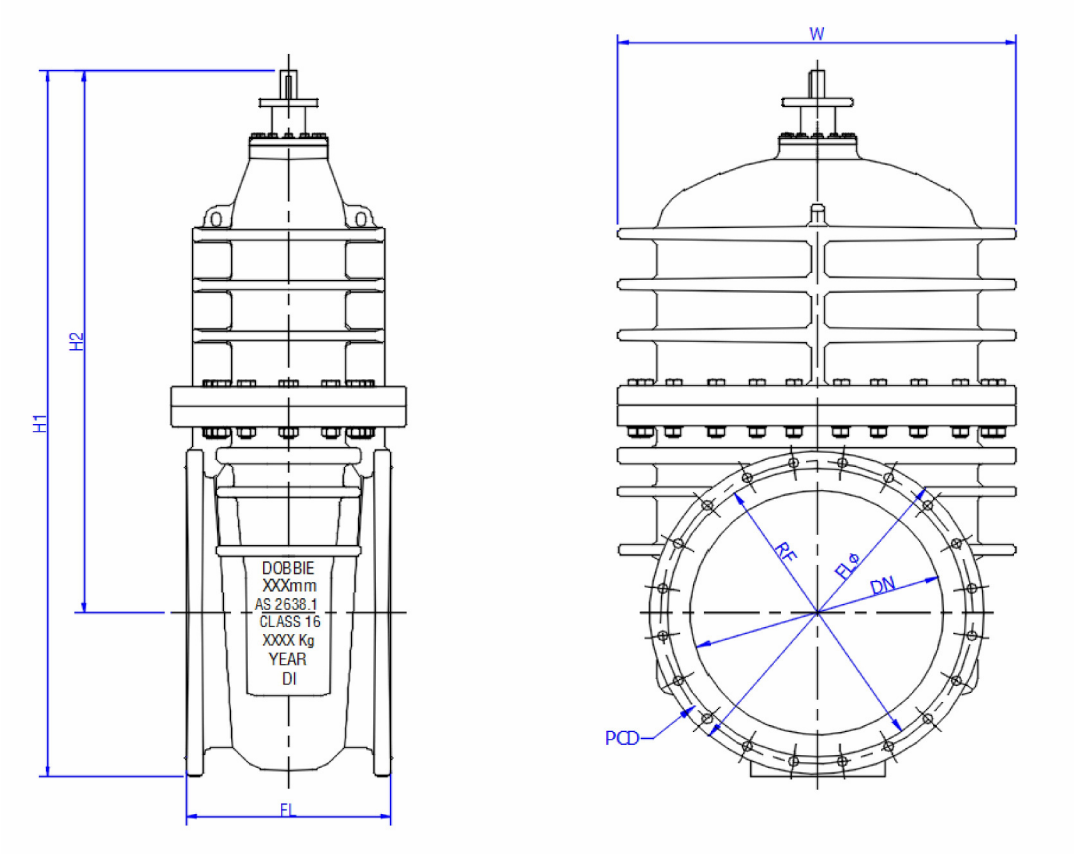
Certified to be suitable for contact with drinking water (AS 4020)

Features

- Manufactured to AS/NZS 2638.1,Dobbie metal seated gate valves feature high quality 500/7 ductile iron body and cover castings, providing superior strength and substantial resistance to impact damage.
- Precision machined 431 grade stainless steel has been utilised for the manufacture of valve spindles, providing a significant level of corrosion resistance and high strength.
- Valve gates DN80–DN300 are manufactured from dezincification resistant copper alloy. Larger sizes feature polymeric coated ductile iron gates with copper alloy sealing rings.
- High mechanical strength and wear resistant engineering Ertalyte thrust washers ensure low torque requirement for both sealing and cracking operations.
- A robust gland incorporates two O-ring seals and a wiper ring, ensuring both reliability and longevity in service. O-rings may be serviced or replaced with the valve fully open under maximum operating pressure.
- Integral feet provide a stable platform and lifting points have been included in the design to aid safe installation.
- Valves may be operated using a key, handwheel or via gearbox reduction (IP67 rating on supplied gearboxes is standard).
- Thermally bonded polymeric coating to AS/NZS 4158 provides excellent protection from corrosion and abrasion.
- May be installed in either horizontal or vertical position.
- Available in either clockwise closing (CC) or anti-clockwise closing (ACC) configurations.

Dobbie Metal Seated Gate Valves

Valve Dimensions



PN16 Data

DN	FL	H1	H2	FLØ	RF	PCD	W	Hole Ø & Qty
80	203	468	366	185	122	146	239	Ø18 / 4
100	229	489	382	215	154	178	261	Ø18 / 4
150	267	640	487	280	211	235	321	Ø18 / 8
200	292	775	605	335	268	292	375	Ø18 / 8
225	305	803	618	370	300	324	460	Ø18 / 8
250	330	970	750	405	328	356	485	Ø22 / 8
300	380	1075	835	455	376	406	620	Ø22 / 12
375	381	1160	880	550	463	495	600	Ø26 / 12
400	470	1330	1040	580	489	521	670	Ø26 / 12
450	432	1480	1160	640	552	584	718	Ø26 / 12
500	510	1665	1305	705	609	641	705	Ø26 / 16
600	570	1860	1435	825	720	756	970	Ø30 / 16
700	610	2125	1645	910	809	845	1180	Ø30 / 20
750	610	2150	1650	995	888	927	1180	Ø33 / 20
900	711	2460	1867	1175	1050	984	1405	Ø36 / 24
1000	811	2700	2065	1255	1133	1092	1510	Ø36 / 24

PN35 Data

DN	FL	H1	H2	FLØ	RF	PCD	W	Hole Ø & Qty
80	280	485	380	205	141	165	239	Ø18 / 4
100	305	500	382	230	167	191	263	Ø18 / 4
150	330	650	487	305	232	260	321	Ø18 / 8
200	380	820	605	370	296	324	375	Ø18 / 8
225	405	820	618	405	324	356	460	Ø18 / 8
250	420	970	750	430	349	381	485	Ø22 / 8
300	430	1082	835	490	406	438	620	Ø22 / 12
375	610	1175	880	580	485	521	600	Ø26 / 12
400	610	1355	1040	610	516	552	670	Ø26 / 12
450	660	1498	1160	675	571	610	718	Ø26 / 12
500	710	1680	1305	735	634	673	705	Ø26 / 16
600	785	1870	1435	850	739	781	970	Ø30 / 16
700	900	2110	1645	935	815	857	1180	Ø36 / 24
750	950	2160	1650	1015	898	940	1180	Ø36 / 28

Note:

Overall sizes are for Key Cap operated valves only.

H1 & H2 are approximate sizes only +-5mm.

Valves are available with Handwheels, Gearboxes & Actuators.

Valves can be manufactured to suit client requirements including modified flange drilling to ANSI, BSEN 1092 & others.

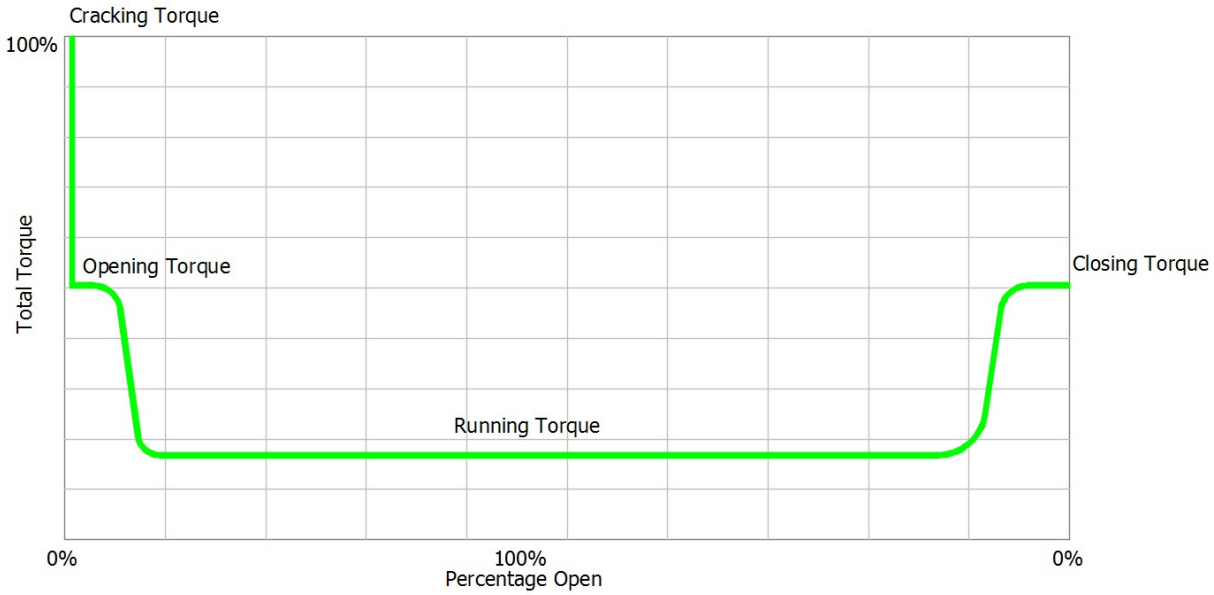
Flange dimensions stated as per AS/NZS 4087 - Figure B5

Metal Seated Gate Valve Torque Requirements

Torque values, the force required to rotate the spindle, in Dobbie Metal Seated Gate Valves vary as valves open and close.

'Cracking Torque' is the force applied to open a valve. This torque is high due to differential pressures on each side of the gate as well as from inertial pressure and the friction of the gate sealing against the body rings. After the initial 'cracking' of the valve, differential pressure and friction reduces and the torque requirement drops to an 'Opening Torque' as the gate opens. As the valve continues to open and differential pressures further stabilise, the torque drops to a constant value known as the 'Running Torque'.

As the valve gate is closed and seals against the body rings, a 'Closing Torque' is applied. This torque is usually similar to the 'Opening Torque' but of a smaller value than the 'Cracking Torque'. Asymmetric pressure upon the gate can effect sealing properties of the valve. It may be necessary to 'back off' the spindle half a rotation (180°) once fully closed to mate the rings correctly and achieve proper seating.



Gearboxes

Standard Dobbie Metal Seated Gate Valves are supplied sans gearing. However, Dobbie are able to provide gearboxes when appropriate or when required by specification. There are several determining factors which may indicate the requirement for a gearbox including: valve diameter; operating pressure; possible differential pressure on the gate; maximum operator input torque; horizontal or vertical valve orientation; maximum possible input torque; and client stipulation.

Gearbox Sizing for Dobbie Metal Seated Gate Valves

Gearboxes sizing calculated according to 'Running Torque' is preferred rather than sizing gearboxes based on 'Cracking Torque'. Basing a gearbox size on 'Cracking Torque' usually results in a high ratio gearbox being selected, which not only unduly causes inordinately long operating times, but can cause damage to valves due to the torque value being in excess of the 'Minimum Strength Test Torque'. 'Cracking Torque' is only required to initially open the valve. Torque limiting devices should be considered if high ratio gearboxes cannot be avoided.

The most common method for selecting a gearbox is the use of 'Maximum Functional Test Torque', as it is often difficult to determine the accurate 'Running Torque' of a valve. Low ratio gearboxes are less likely to cause damage to the valve, although a higher input torque is required to 'crack' the valve in these instances. Under this method it may be that the 'Cracking Torque' required is greater than the nominated 'Maximum Operator Input Torque'. To counter this, extra operators, a longer bar or a torque multiplier may be required.

Low ratio gearboxes are the preferred installation option wherever possible as they mitigate risk of valve damage due to their requirement for less rotations to operate efficiently, whereas the increased number of rotations required by high ratio gearboxes aggravates risk.

Common Gearbox Ratios:

2:1, 3:1, 4:1, 6:1, 8:1, 12:1, 16:1, 24:1

Minimum Required Gearbox Ratio Calculation

The following calculation can be used to determine the gearbox ratio required.

G = Tf / (TmE)

where

G = Minimum required ratio rounded up to nearest common size. e.g. 2:1, 4:1, 6:1, 8:1, 12:1, 16:1, 24:1, etc.
Tf = Maximum Running Torque (Maximum Functional Test Torque)
Tm = Maximum Operator Input Torque
E = Gearbox efficiency - Single reduction spur = 0.9
- Single reduction bevel = 0.85

Maximum Allowable Gearbox Input Torque Calculation

The following calculation can be used to determine the gearbox torque based on selected ratio.

Tmg =Tms/(GE)

where

Tmg =Maximum Allowable Gearbox Input Torque
Tms =Minimum Strength Test Torque
G =Selected gearbox ratio
E =Gearbox efficiency

Final Check

Once the above calculations are made, a final check is required to evaluate that the 'Cracking Torque' of the valve is less than Tmg and the selected gearbox ratio. Practical achievement of Maximum Allowable Gearbox Input Torque (Tmg) will subsequently assume that the valve is able to be cracked with the selected gearbox. The applied input torque may be greater than the specified maximum input torque, but as the 'Cracking Torque' is always less than the minimum strength test torque, the gearbox will be able to open it.

The gearbox output torque will need to be calculated based on the maximum possible input torque, if the figures of Tmg are greater than the achievable input torque. The following calculation can be used to determine this figure.

Tgo = TpGE

where

Tgo = Gearbox Output Torque
Tp = Maximum Possible Input Torque
G = Gearbox ratio
E = Gearbox efficiency

After calculation, the Tgo should be greater than the cracking torque. If not, the Tmg will need to be recalculated with a gearbox with a higher ratio, until the Tgo is greater than the 'Cracking Torque' for the valve.

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