CAMERON

ENTECH Non-Slam, Nozzle Check Valve

Reliable backflow prevention for the oil, gas, water, process and nuclear industries

TECHNOLOGY

Table of Contents

ENTECH NON-SLAM, NOZZLE CHECK VALVE

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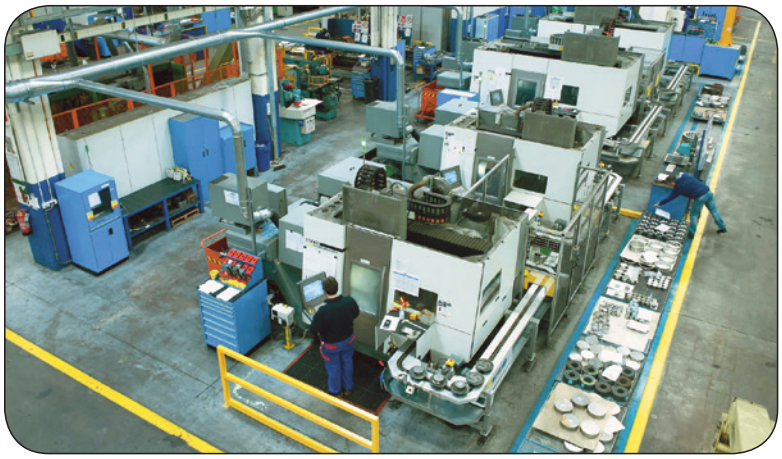


Voghera, Italy

Cameron is a leading provider of valves, valve automation and measurement systems to the oil and gas industry. We offer products used primarily to control, direct and measure the flow of oil and gas as it is moved from individual wellheads through flowlines, gathering lines and transmission systems to refineries, petrochemical plants and industrial centers for processing.

Cameron provides a wide range of valves for use in natural gas, LNG, crude oil and refined products transmission lines. The traditional CAMERON® fully welded ball valve product line has been combined with the GROVE®, RING-O®, TOM WHEATLEY®, ENTECH™ and TK® product lines. This broad offering has strengthened Cameron's ability to serve as a single source for a wide scope of customer requirements. Cameron also provides critical service valves for refinery, chemical and petrochemical processing businesses and for associated storage terminal applications, particularly through its ORBIT® and GENERAL VALVE® brands. These brands are complimented by WKM®, TBV™ and TEXSTEAM™ valve products and expand the scope of Cameron's product offerings.

Cameron's ENTECH brand is recognized for its use in pipelines, production and process applications. The valves are applied primarily in gas compression applications. Non-slam valves prevent reverse flow, and their short stroke length reduces closing time and eliminates water hammer. The pressure loss with a nozzle check valve is minimal and has one of the highest fluid dynamic performances.

FEATURES

Since 1935, ENTECH nozzle check valves have provided reliable backflow prevention for the oil, gas, water and process industries. Beginning in 1972, they also served the nuclear industry with nozzle check valves for containment and commercial process.

Cameron's ENTECH nozzle check valve is designed to meet the criteria of conventional check valves by allowing forward flow under normal conditions, opening easily, firmly backseating at low velocity and closing on reverse flow with minimal seat leakage.

Easy to stroke – requires very low flow to fully open and guarantees the highest fluid dynamic performances

Nozzle design – streamlines the flow for very low pressure drops and operating costs with no turbulence and vibrations

Tight shutoff – accomplished by means of metal-to-metal conical seating for perfect self-alignment and minimal maintenance costs

Extremely reliable – the single spring-loaded disc responds quickly to flow variations

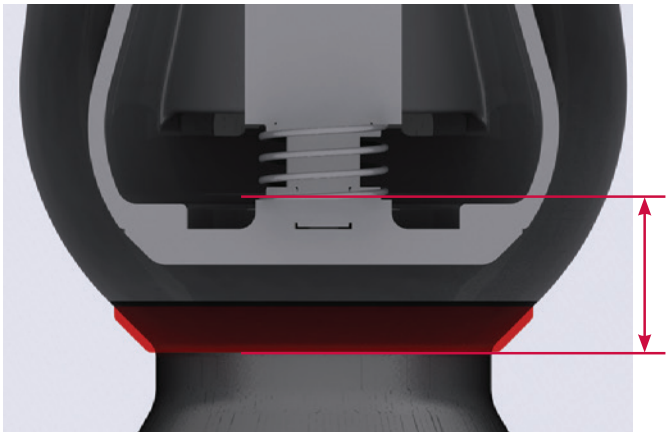
Closes rapidly – helps to prevent backflow to protect the pipe and critical equipment

Highly customizable – designed to fit almost any application and with internals that can be replaced to suit future flow conditions

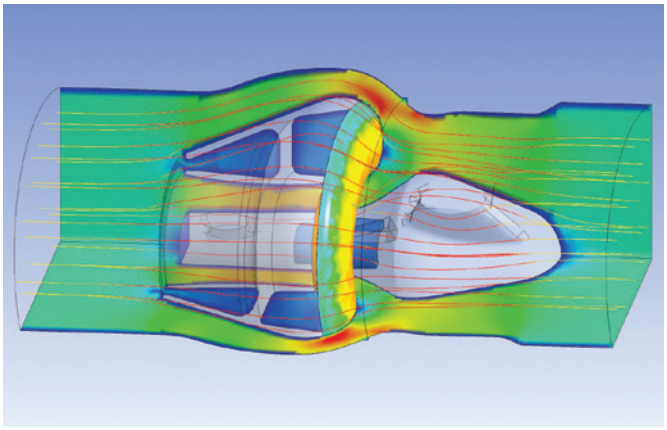
The ENTECH nozzle check valve is aligned with other Cameron products, leading the field in pipeline and gas production, offshore, onshore, subsea, refining and industrial processing.

APPLICATIONS

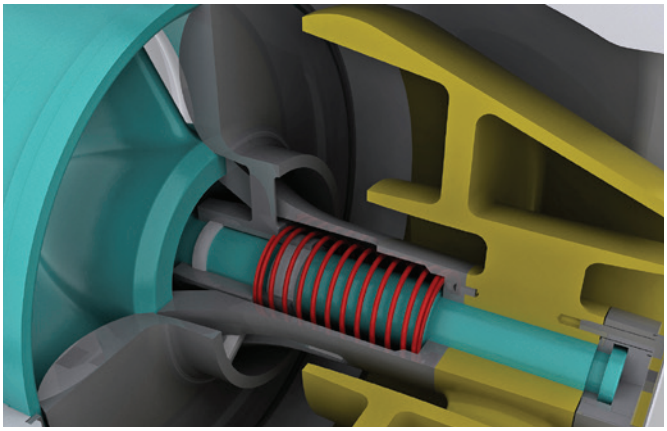
- Compressor discharge
- Natural gas refineries
- Pump discharge
- Critical equipment discharge
- Compressor/pump bypass
- Storage facilities
- Offshore
- Nuclear power plants



Short stroke, very low flow velocity to fully open the valve, short closure time.



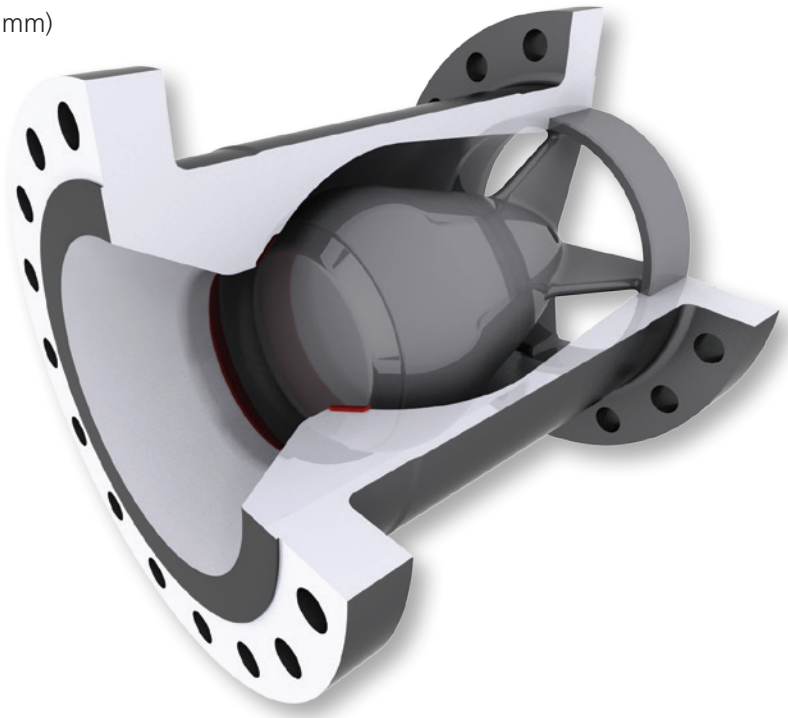
Axial design, streamlined flow, low pressure drops and high-dynamic performances.



Can be customized to customer needs with modular internal components.

DESIGN AND PRODUCT OFFERINGS: DRV-Z

The DRV-Z nozzle check valve is a small-bore valve designed for use in piping systems from 1" to 14" (25 mm to 350 mm) in diameter. This size range allows the use of a simple, streamlined, in-line check design, which is quick to respond to changes in velocity.

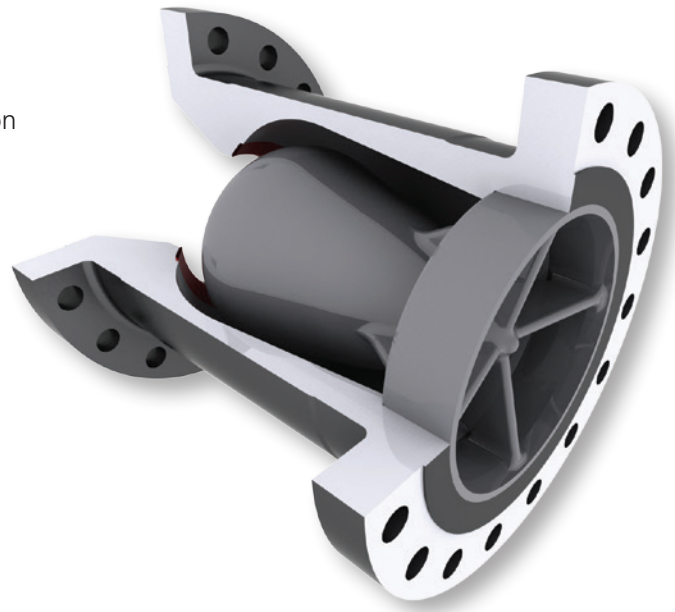


The DRV-Z Design Also Provides:

- Non-slam closure
- Metal seating
- Fast closing
- Mounting in any orientation
- Low pressure drop
- No scheduled maintenance
- Tight shutoff

Sizes and Ratings:

- Size 1" to 14"(25 mm to 350 mm)
- ANSI/ASME Classes 150 to 2500
- API 2000 to 10,000
- Face-to-face manufacturers standard
- ANSI/ASME flanges, weld-end or other flange-end configurations can be provided upon request
- Other sizes and pressure classes will be considered upon request

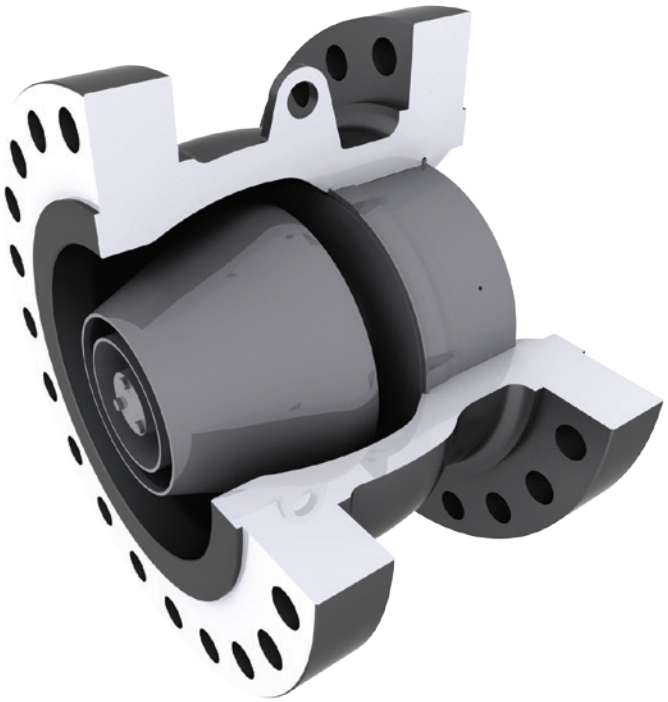


DESIGN AND PRODUCT OFFERINGS: DRV-BN

The DRV-BN nozzle check valve is a large-bore valve designed for compressor and pumping stations from 16" (400 mm) in diameter and larger.

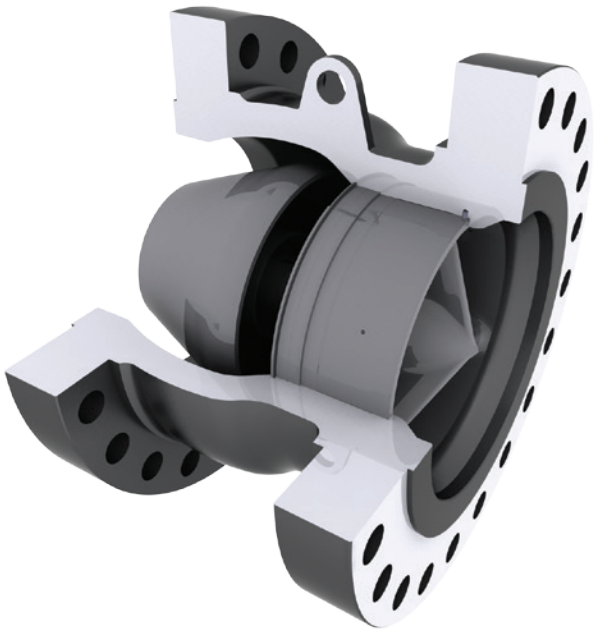
In this size range, the ENTECH line incorporates the following:

- The use of an annular ring design reduces the weight of the disc, so avoiding any fatigue phenomena and significantly improve valve response time to pipeline flow changes.
- Centralized single-coil spring mechanism as the most consistent spring-force design, which is stable and responds rapidly to flow variation.
- A flowspacer that allows the valve to be fully customizable to specific service and installation conditions and easily re-configurable in case of potential changes of customer plant flow performances over the years.



The DRV-BN Design Also Provides:

- Non-slam closure
- Metal seating
- Fast closing
- Spring-loaded disc, which allows mounting in any orientation
- Low pressure drop
- No scheduled maintenance
- Tight shutoff



Sizes and Ratings:

- Size 16" (400 mm) and larger
- ANSI/ASME Classes 150 to 2500
- Face-to-face manufacturers standard
- ANSI/ASME flanges, weld-end or other flange-end configurations can be provided upon request
- Other sizes and pressure classes will be considered upon request

QUALITY ASSURANCE

Cameron operates a high-level quality control program to ensure all its products are designed and manufactured to the highest standards available using the latest technology. The quality assurance program encompasses our entire operation, from order entry to final inspection and delivery.

Cameron's Lean Six Sigma manufacturing philosophy and the standard warranty, which covers the product for 12 months after installation or 18 months after shipment, whichever occurs first, assures that the design, materials and workmanship of all ENTECH products result in years of dependable operation.

Specifications and Compliance

ISO 9001:2008, API 6D/ISO 14313, ISO 19001, API 6DSS/ISO 14723, API 6A/ISO 10423, PED, GOST and CRN.

DIMENSIONAL DATA AND WEIGHTS

DRV-Z FLANGED END VALVES

Valve Size		150#		300#		600#		900#	
NB	DN	Length mm	Weight kg	Length mm	Weight kg	Length mm	Weight kg	Length mm	Weight kg
1	25	100	5	100	5	100	8	100	12
2	50	120	9	120	9	120	11	200	16
3	80	180	16	180	23	180	30	180	32
4	100	240	25	240	38	240	46	240	60
6	150	350	49	350	70	350	97	350	165
8	200	450	88	450	121	450	163	450	241
10	250	500	130	500	177	500	269	500	310
12	300	600	*	600	*	600	*	600	*
14	350	700	*	700	*	700	*	700	*

DRV-BN FLANGED END VALVES

Valve Size		150#		300#		600#		900#	
NB	DN	Length mm	Weight kg	Length mm	Weight kg	Length mm	Weight kg	Length mm	Weight kg
16	400	500	385	500	385	500	550	500	640
20	500	625	665	625	665	625	905	665	1210
24	600	745	1060	745	1060	745	1450	800	2165
30	750	930	2040	930	2040	930	2640	1060	3855
36	900	1190	3285	1190	3285	1190	4340	1270	6430
42	1050	1308	*	1308	*	1308	*	*	*
48	1200	1485	*	1485	*	1485	*	*	*

* Information provided upon request.

FLOW PERFORMANCE DATA

C_v VALUES (gal/min)

	Size	150	300	600	900
DRV-Z	1″	20	20	20	20
	2″	84	84	84	84
	3″	227	227	227	227
	4″	366	366	366	366
	6″	881	881	881	881
	8″	1692	1692	1692	1692
	10″	2762	2762	2762	2762
	12″	3043	3043	3043	3043
	14″	6003	6003	6003	5952

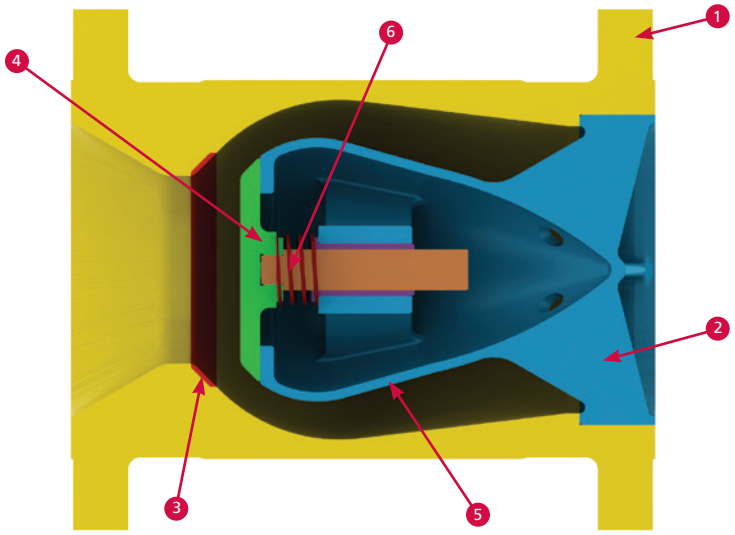
Pressure classes above ANSI 900 are available upon request.

C_v VALUES (gal/min)

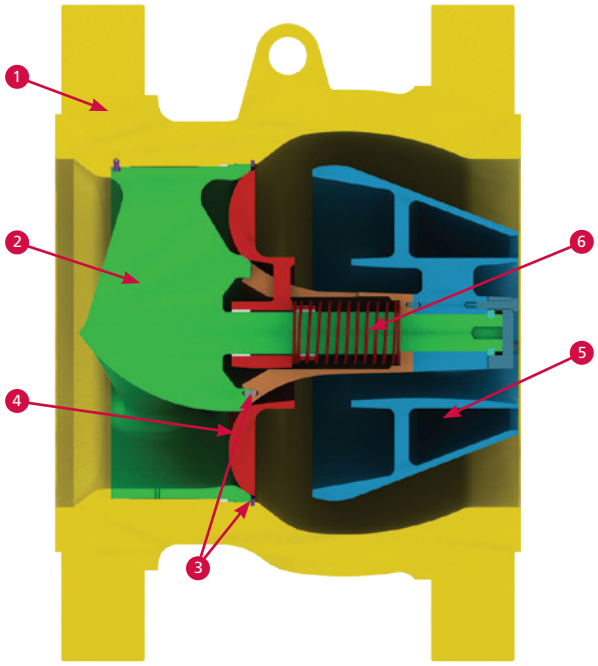
	Size	150	300	600	900
DRV-BN	16″	8100	8100	8100	8100
	20″	12,500	12,500	12,500	12,500
	24″	17,984	17,984	17,984	17,984
	30″	30,900	30,900	30,900	30,900
	36″	43,000	43,000	43,000	43,000
	42″	46,000	46,000	46,000	46,000
	48″	58,000	58,000	58,000	58,000

MATERIALS OF CONSTRUCTION

DRV-Z



DRV-BN



Part	Description	Low-Temp. Carbon Steel/316SS Seats	Low-Temp. Carbon Steel/ Inc625 Seats	Full Stainless Steel	Full Duplex
1	Body	A352 LCC/A350 LF2	A352 LCC/A350 LF2	A351 CF8M/A182 F316	S31803/A182 F51
2	Nozzle	A352 LCC	A352 LCC	A351 CF8M	S31803
3	Seat	316SS	Inconel 625	Integral	Integral
4	Disc	A351 CF8M	A351 CF8M	A351 CF8M	S31803
5	Diffuser	A352 LCC	A352 LCC	A351 CF8M	S31803
6	Spring	X-750	X-750	X-750	X-750

DESIGN TEMPERATURES

Low-temperature carbon steel: -50° F to 572° F (-45° C to 300° C)

Stainless steel: -320° F to 572° F (-196° C to 300° C)

Duplex: -320° F to 572° F (-196° C to 300° C)

All materials comply with NACE MR0175/ISO 15156 sour service requirements.

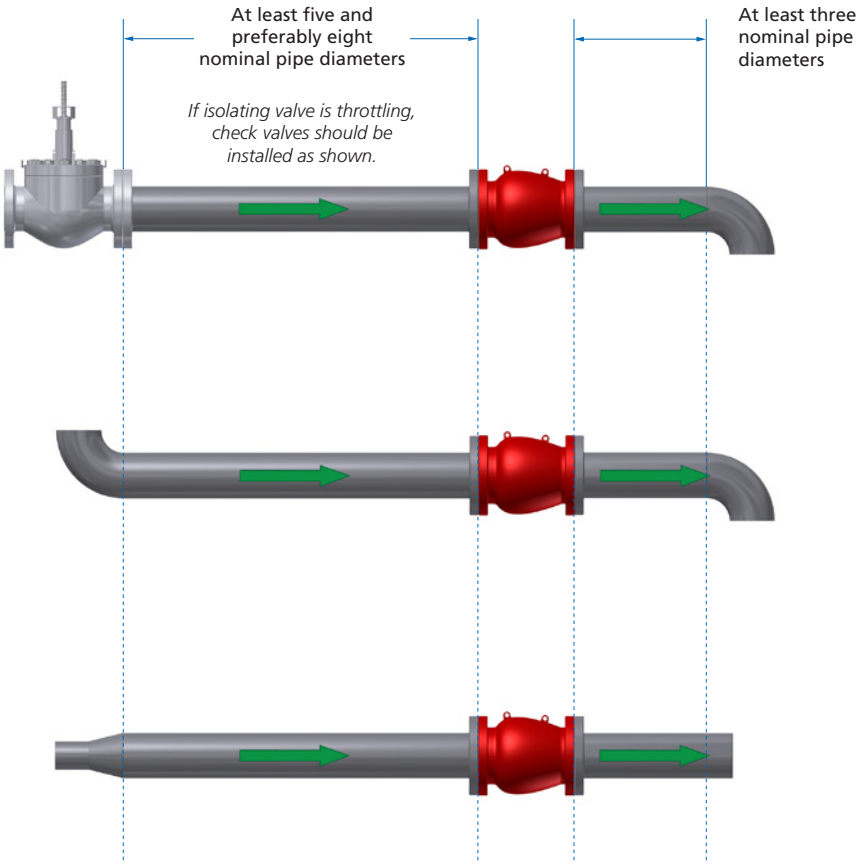
Others materials are available upon request to meet specific service requirements.

Applications with temperatures below -50° F (-45° C) or exceeding 350° F (176° C) are subject to engineering approval.

INSTALLATION GUIDELINES

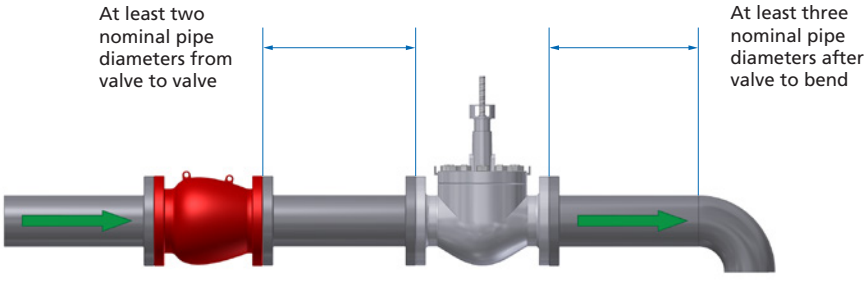
The nozzle check valve should be installed a minimum of five diameters, and preferably eight diameters, downstream of a flow impediment, i.e., valve, reducer or bend, etc., to ensure a good flow pattern at the entry to the nozzle check valve.

The nozzle check valve also should be installed at least three diameters upstream of a bend or reducer to avoid choked flow conditions, which can prevent the full opening of the check valve.



The nozzle check valve can be installed on the upstream side of isolating valves. If the isolating valve is throttling, clearance as shown should be allowed to ensure full pressure recovery after the nozzle check valve.

The nozzle check valve can be installed closer to the inlet of the isolating valve if it is full port and fully open.



All valve inquiries will require valve data sheets that provide minimum, normal and maximum operating conditions. Valves must be sized to fully open at minimum operating conditions. The minimum operating conditions refer to what the lowest consistent flow rate will be for an extended period of time. Start-up conditions are not to be considered as minimum operating conditions.

CAMSERV™ Aftermarket Services for Valves and Actuation

WE BUILD IT. WE BACK IT.

Global Network and Local Support

Cameron is well-positioned to deliver total aftermarket support, quickly and efficiently, with unmatched OEM expertise. Our highly skilled engineers and technicians are available around the clock, seven days a week, to respond to customer queries, troubleshoot problems and offer reliable solutions.

Easily Accessible Parts and Spare Valves

- OEM spare valves, actuators and parts (including non-Cameron brands)
- Handling, storage, packaging and delivery
- Dedicated stocking program

Comprehensive Aftermarket Services Portfolio

- Parts and spare valves
- Repair
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- Remanufacturing
- Asset preservation
- Customer property management
- Training and recertification services
- Warranty

Customized Total Valve Care℠ (TVC) Programs

Customized asset management plans that optimize uptime, availability and dedicated services.

- Engineering consultancy
- Site management
- Flange management
- Startup and commissioning
- Spare parts and asset management
- Operational support

CAMERON

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HSE Policy Statement
At Cameron, we are committed ethically, financially and personally to a working environment where no one gets hurt and nothing gets harmed.