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GATE VALVES Introduction

Technical Information

For almost three decades working in water supply sector (potable, waste water and irrigation systems), DAVINCI VALVES have witnessed firsthand the technological evolution applied to shut-off and flow control.

One of our star products are well known worldwide as DAVINCI GATE VALVES.

Let's give you a full overview about our manufacture programm here.

Take for granted, that ourtechnical department is always open to give you more information if your stock or project requires and needs.

What is a Gate Valve?

A gate valve is an isolation valve designed to start or stop the flow of a fluid by means of a movable gate or wedge that travels perpendicular to the direction of the flow. Unlike other valve types, gate valves are specifically engineered for on/off service and are not suitable for throttling purposes. Structurally, they are designed to fully stop or allow fluid flow.

The "gate" element - named for the way it slides perpendicular to the flow moves into or out of the fluid stream to achieve full shutoff.

Gate valves are among the most widely installed valves in water distribution systems, pipelines, and utility systems due to their robust design and reliable shut-off capability.

They operate through linear motion, allowing the gate to move up and down to fully open or fully close the flow path. When the valve is in the open position, the gate is completely withdrawn from the flow stream, resulting in minimal flow restriction, exceptionally low pressure drop.

A critical feature of gate valves is their ability to provide a tight shut-off. This is achieved through a full 360-degree contact seal between the disc and the valve seats when the valve is completely closed, ensuring zero leakage under specified operating conditions.

It is important to note that gate valves are not designed for flow regulation or throttling. Partial opening can lead to high fluid velocities that may cause erosion of the seating surfaces and the gate itself, as well as vibration and low-induced noise, potentially compromising the integrity of the valve and the pipeline.

Because of their straightforward on/off functionality, gate valves form the backbone of any robust water distribution system.

Key Advantages:

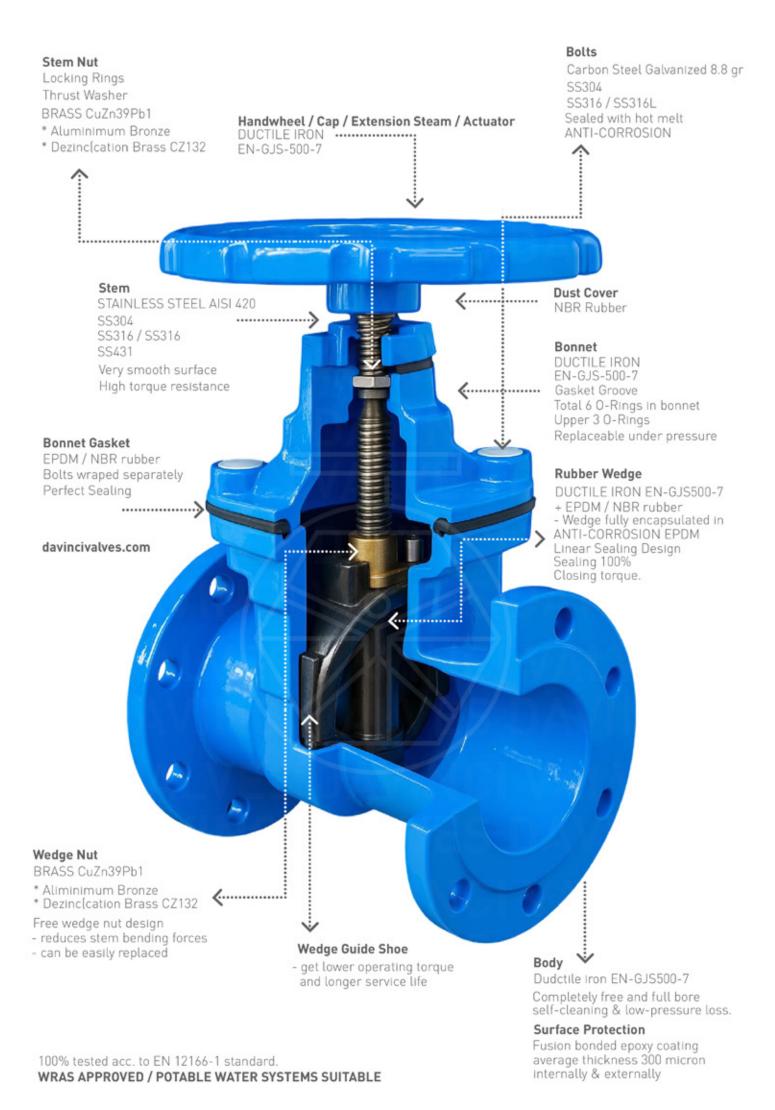
Full bore design for minimal flow resistance.
Bi-directional sealing capability.
Available in a wide range of materials, sizes, and pressure classes to suit various media and operating conditions.
Suitable for a wide variety of applications, including water and wastewater treatment, HVAC and general industrial use (cellulose, canning, etc)

They are essentials for:

- + Isolating specific pipeline segments during routine maintenance or emergency repairs
- + Rerouting flow when integrating new installations
- + Performing system upgrades without disrupting the entire network







Which are the KEY COMPONENTS of DAVINCI GATE VALVES design?

Gate valves are known for their straightforward construction and versatility, which is why they remain a popular choice for applications where minimal pressure drop is essential. Designed as full-port valves, they feature an internal passage that matches the pipe's inner diameter exactly. This full-bore design ensures that fluid flows through freely without obstructions, maintaining consistent pressure and even allowing cleaning pipes to pass through easily.

A resilient seated gate valve with a non-rising stem typically includes these main elements:

- 1. WEDGE
- 3. SEATING SURFACES
- 5. SPINDLE BEARING
- 7. PACKING

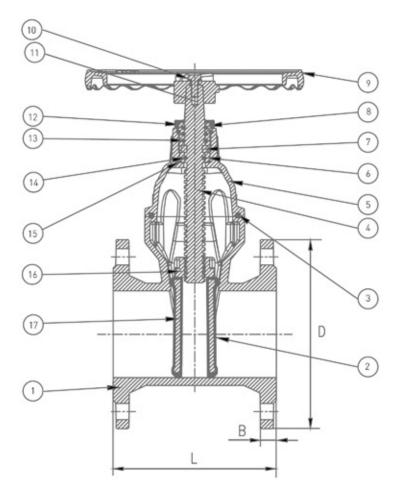
- 2. DUCTILE IRON VALVE BODY
- 4. STEM (SPINDLE)
- 6. BONNET



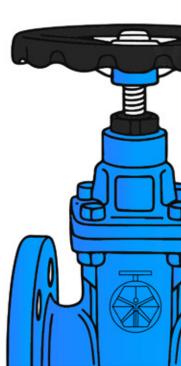
The valve body is the largest part, providing the main structure and housing the moving stem. Because the stem remains inside the body as it operates, the bonnet can be engineered in a more cost-ef(cient way. The bonnet is bolted to the body for easy access, making inspection, cleaning, or maintenance straightforward.

When the valve is shut, the wedge moves down and seals tightly against the seating area to stop Jow completely. To open the valve, the wedge lifts back up into the upper body cavity.

While the basic wedge gate valve design has stayed remarkably consistent for over a century, individual parts have been re(ned to extend lifespan, improve sealing, and enhance corrosion resistance. Today's designs feature high-quality materials, robust epoxy coatings, and a more compact body pro(le — making installation easier, even in tight spaces.



01 BODY 02 DISC 03 BONNET GASKET 04 STEM / SPINDLE 05 BONNET 06 THRUST WASHER 07 HOLDING RING **08 THRUST NUT** 09 HANDWHEEL CAP 10 BOLT 11 FLAT WASHER 12 DUSTCOVER 13 0 RING **14 0 RING 15 0 RING** 16 STEM NUT 17 CORE / WEDGE



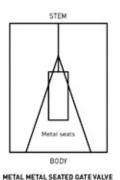


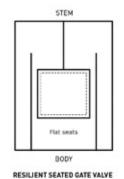
Which are the TYPES of DAVINCI GATE VALVES?

Based on construction, gate valves for water supply systems can generally be divided into the following types:

BY SEAL / SEAT

metal seat or resilient seated gate valves







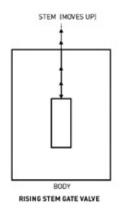


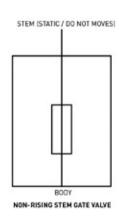
BY STEM

with rising or non-rising stem.



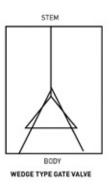


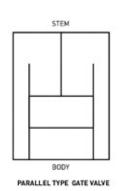




BY WEDGE

parallel gate valves and wedge gate valves













GATE VALVES by SEAT: metal seat or resilient seated gate valves

Before the resilient seated gate valve was introduced to the market, gate valves with a metal seated wedge were widely used. The conical wedge design and angular sealing devices of a metal seated wedge require a depression in the valve bottom to ensure a tight closure. Herewith, sand and pebbles are embedded in the bore. The pipe system will never be completely free from impurities regardless of how thoroughly the pipe is Jushed upon installation or repair. Thus any metal wedge will eventually lose its ability to be drop-tight.

A resilient seated gate valve has a plain valve bottom allowing free passage for sand and pebbles in the valve. If impurities pass as the valve closes, the rubber surface will close around the impurities while the valve is closed. A high-quality rubber compound absorbs the impurities as the valve closes, and the impurities will be flushed away when the valve is opened again. The rubber surface will regain its original shape securing a drop-tight sealing.





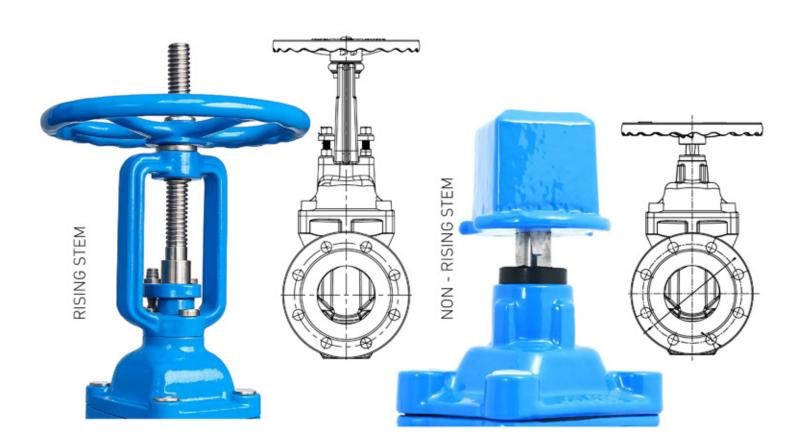
GATE VALVES by STEM: with rising or non-rising stem

Rising stems are **fixed** to the gate and they rise and lower together as the valve is operated, providing a visual indication of the valve position and making it possible to grease the stem. A nut rotates around the threaded stem and moves it.

This type is only suitable for above-ground installation. Non-rising stems are threaded into the gate, and rotate with the wedge rising and lowering inside the valve. They take up less vertical space since the stem is kept within the valve body. We offers gate valves with a factory-mounted indicator on the upper end of the stem to indicate the valve position. Gate valves with non-rising stems are suitable for both above-ground and underground installations.

The majority range are designed with non-rising stem, but we also offer gate valves with rising stem for water, wastewater and fire protection applications.







GATE VALVES by WEDGE: parallel gate valves

Gate valves can be divided into two main types:

Parallel and Wedge-shaped:

1. The parallel gate valves use a flat gate between two parallel seats, and a popular type is the knife gate valve designed with a sharp edge on the bottom of the gate.

2. The wedge-shaped gate valves use two inclined seats and a slightly mismatched inclined gate.

Parallel slide gate valves feature a flat, parallel-faced gate-like closing element, fitting between two parallel seats.

The so-called knife gate valve is a type of parallel gate valves.

Wedge gate valves are so called because of a wedge-shaped gate.

The wedge has ribs on both sides and is guided by the slots in the gate valve body.

WEDGE SHAPED GATE

The wedge guides serve the following purposes:

+ to transfer the axial loads imposed on the wedge by the medium to the valve body

+ to enable a low-friction movement of the wedge in radial direction to prevent the wedge from rotation while travelling between open/closed valve

positions (serving as an anti-twist lock).

Most gate valves used in water distribution systems have wedge-shaped design DAVINCI VALVES range.

For wastewater treatment you will be offered our parallel slide knife gate valves, completing the full water cycle.





GATE VALVES with Bypass

Bypass valves are integrated into gate valve systems for three primary operational advantages:

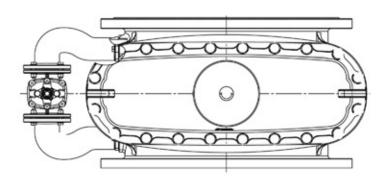
Reduced operating torque: By equalizing pressure on both sides of the main valve, the bypass minimizes the effort required to operate the valve, enabling single-person operation.

Maintained continuous flow: When the main valve is closed and the bypass is open, Juid circulation is maintained, preventing stagnation within the pipeline.

Controlled pipeline filling: The bypass allows for gradual filling of the line, reducing hydraulic shocks and supporting a smoother system start-up.

Operational Flexibility and Safety: In water distribution networks where reliability and quick response are essential, the bypass system allows pre-pressurization before full valve actuation. This reduces system shock and ensures safer operation during critical maneuvers, such as isolations or reactivations of network sections.

Energy and Cost Ef(ciency: By minimizing the force required for valve operation and reducing the need for large actuators or powered systems, bypass-equipped gate valves contribute to lower energy consumption and maintenance costs over the valve's lifecycle.







How OPERATES DAVINCI GATE VALVES?

DAVINCI VALVES provides a wide range of actuation solutions designed to ensure the optimal option for every valves installation.

Gate valves can be operated manually or via an electric actuator, with or without a gearbox. Additionally, we offer dedicated solutions for buried installations, as well as pneumatically actuated gate valves with special designs for applications where fast operation is essential.

1. MANUAL ACTUATION

Our resilient seated gate valves are engineered for operation with either a **handwheel or a T-key**. For T-key operation, the valve is (tted with a square cap. DAVINCI VALVES supplies handwheels dimensioned acc. to the valve's DN and required operating torque.

Our standard handwheels are manufactured in pressed steel, with ductile iron available as an alternative. The square caps comply with national standards and practices.

An internal cap plug indicates the closing direction:

blue for clockwise closing and red for anti-clockwise.





T-KEY

STEM ADAPTED

SQUARE CAP

HANDWHEEL

2. BURIED INSTALLATIONS

When valves are installed underground, manual operation is carried out from the surface using fixed or telescopic stem extensions, adaptable to various national specifications.

We also develop customized solutions to meet specific requirements in each market.







3. ELECTRIC ACTUATION

Alternatively, gate valves can be motorized with an electric actuator, which can be integrated with a remote control system to monitor and manage operations remotely.

Motorized versions are equipped with top flanges compatible with actuators from various manufacturers giving customers full flexibility of choice.



Try Us



Why the COATING METHOD of DAVINCI VALVES matters?

DAVINCI VALVES COATING

Davinci valves can be protected using several proven coating methods, each designed to deliver optimal performance, longevity, and corrosion resistance.

1. IMMERSION COATING (Complete Homogeneous High Quality DAVINCI VALVES Coating)

Our Standard Coating Offering

We proudly offer immersion coating as our standard coating solution. Because Quality Matters.

This advanced process involves completely submerging the valve in epoxy coating, ensuring a uniform, consistent, and comprehensive layer both internally and externally. Immediately after immersion, valves undergo a supplementary spray painting process to ensure an optimal external lnish. This dual-step approach guarantees superior corrosion resistance, excellent coating adhesion, a visually appealing smooth external surface, and complete protection even in areas dif[cult to reach by conventional methods.





Electrostatic Powder Coating (Fusion Bonded Epoxy - FBE)

Electrostatic powder coating applies charged epoxy powder particles onto valve surfaces using electrostatic forces. Subsequent heat treatment melts and fuses the particles into a tough, smooth, and durable (nish. This method provides exceptional external corrosion resistance and long-term performance.

Spray Painting

Spray painting utilizes high-performance spray guns to apply epoxy-based coatings evenly over the valve surfaces. It is an effective external coating method that delivers a reliable and aesthetically pleasing (nish suitable for various operational environments.





Why the COATING TEST of DAVINCI VALVES matters?

TECHNICAL INFORMATION - TEST PROCEDURES FOR COATING VALVES

For all valves within DAVINCI VALVES range, we perform the quality tests included in the 3.1 certi[cate. Specifically, regarding the coating process, we emphasize the following quality assurance tests to ensure product integrity:

Coating Thickness

The epoxy coating thickness on gate valves must be no less than 250 μ m. Consistency must be maintained across the entire coated surface.

2. Pore-free Coating Inspection

The coating must be completely free of penetrating pores to prevent corrosion of the underlying casting. A holiday detector set at 3V with a brush electrode is used to detect and locate any pores in the coating.

3. Cross-Linkage Test

To ensure proper curing and cross-linking of the epoxy coating, the following test must be performed 24 hours after coating:

its applied one drop of methyl isobutyl ketone onto a horizontal epoxy-coated test surface at room temperature. After 30 seconds, wipe the test area with a clean white cloth.

Its **onfirmed** that the test surface has neither become matt nor smeared, and if the cloth remains clean, we can proceed to the next step quality confirmation.







Adhesion testing of the epoxy coating is conducted quarterly (four times per year) at each coating plant, the procedure is as follows:

Coating thickness over the test item's dispersed area must range from 250 μm to 400 μ

Immerse test pieces for seven days in deionized water maintained at 90°C.

After immersion, dry test pieces remains in an oven for 3 hours.

And we condition the test pieces for 3 to 5 days under normal atmospheric conditions.

We verify that no blisters are formed during the immersion coating period.

Degrease and roughen the test piece surface is done, by using abrasive paper, followed by dust removal using oil-free compressed air.

Perform adhesion testing, ensuring a minimum pulling force greater than 12 N/mm².

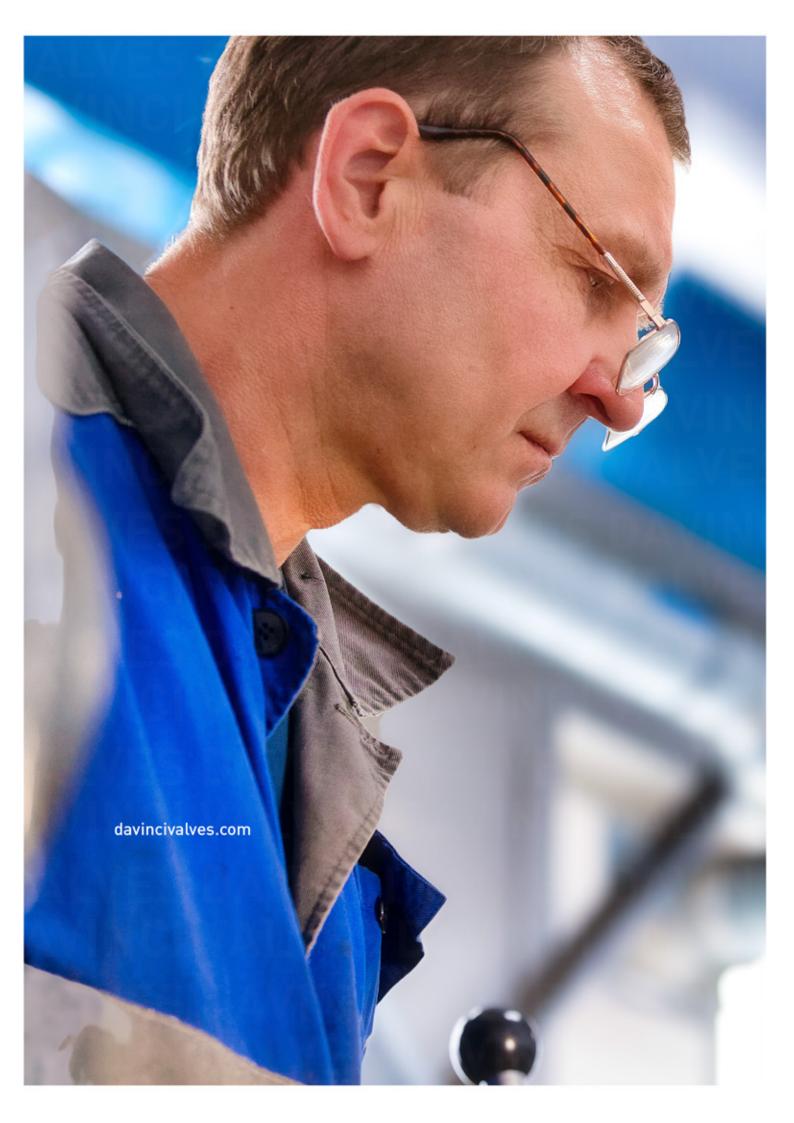
Cathodic disbonding tests are required for each valve component type, performed at least twice per year: Coating thickness across the dispersed test item area should range from 250 µm to 400 µm. Its ensured no bubbles or disbonding occur in the coating during the cathodic disbonding test.

Do you need more technical details? Please contact our team: valves@davincivalves.com









Why the RUBBER VULCANIZATION of DAVINCI GATE VALVES matters?

DAVINCI VALVES uses specially formulated rubber compounds that are exceptionally durable, ensuring they can withstand repeated open/close operations over the valve's entire service life.

DAVINCI VALVES quality rubber also delivers extremely low friction against the valve body's internal epoxy coating, resulting in very low operating and closing torques, which in turn reduce wear and improve energy efficiency.

The ductile iron wedge core undergoes a two-stage process:

First, it is carefully prepared; second, the rubber is vulcanised directly onto the core.

This advanced vulcanisation process creates a full, permanent bond between the rubber and the metal wedge core. The bond is so strong that, even if the rubber is pierced by a sharp object, there is no risk of creeping corrosion developing underneath. This ensures long-term reliability and integrity, even in harsh environments.

Our vulcanisation process fully encapsulates the ductile iron core with rubber on both the inside and outside surfaces. A minimum of 1.5 mm of rubber is applied to all pressure-bearing areas, while all sealing surfaces receive a minimum of 4 mm, regardless of valve design.

This precise thickness control guarantees consistent sealing performance, enhanced mechanical strength, and superior resistance to deformation over time.

The quality of the bond between the rubber and the wedge core is a critical factor for valve performance and longevity. **DAVINCI VALVES** employs a unique double bonding system, delivering optimum adhesion and ensuring that the rubber remains firmly in place throughout the valve's lifespan.

In addition to corrosion protection, the rubber compound offers:

Chemical resistance to a wide range of Juids, minimising degradation.

Elastic memory, enabling the rubber to return to its original shape after repeated compression.

Abrasion resistance, reducing wear from particle-laden lows.

Temperature resilience, maintaining performance in both high and low temperature conditions.

The result is industry quality rubber adhesion, maximum corrosion protection, and exceptional mechanical performance, making **DAVINCI VALVES** durable and reliable.





Why the RUBBER TEST of DAVINCI VALVES matters?

In **DAVINCI VALVES**, the EPDM rubber components play a critical role in ensuring reliable operation and long-lasting performance. The main sealing element — located at the "heart" of the valve — is responsible for opening and closing the passage of water, while smaller EPDM rubber rings around the inner circumference provide a tight seal to prevent leakage.

To guarantee these components meet the highest quality standards, a series of rigorous tests are performed:

1. Tensile Strength and Elongation Testing

Ensures the EPDM rubber can withstand the mechanical stresses of repeated valve operation without tearing or deforming.

2. Compression Set Testing

Measures the rubber's ability to recover its original shape after prolonged compression, ensuring lasting sealing capability.

3. Hardness ShoreTesting

Con(rms the rubber has the correct hardness for optimal sealing without compromising)exibility.



4. Aging and Weather Resistance Testing

Simulates long-term exposure to temperature changes, UV rays, and ozone to verify that the rubber maintains its properties over time.

5. Water Absorption and Swelling Tests

Checks the material's resistance to water and ensures it does not swell or lose integrity during service.

6. Chemical Resistance Testing

Validates that the rubber can endure contact with treated water and other chemicals without degradation.

Through these evaluations,

DAVINCI VALVES ensure that the EPDM rubber in a gate valve delivers reliable sealing, extended service life, and safe operation under real-world conditions.





Why the CERTIFICATION of DAVINCI VALVES matters?

At DAVINCI VALVES quality is our cornerstone—from every raw ingredient to each batch of finished coating. We hold rigorous quality certi[cations to ensure that our products perform reliably, safely, and consistently in the most demanding fluid-handling applications.

Our coatings are approved worldwide for use in: Potable Water Systems (ACS, WRAS, PZH... Ask for yours.

Please contact our team: valves@davincivalves.com

Wastewater Treatment and Irrigation Infrastructure ...backed by our ISO 9001-certified quality management system.

Why Choose Certified Coatings for Water Market?

Health Protection

Potable Water: ACS, WRAS, PZH approvals guarantee zero leaching of harmful substances, safeguarding public health in drinking-water networks.

Superior Corrosion Control

Our coatings resist aggressive chemicals, fluctuating pH and microbial attack found in sewage treatment and agricultural runoff.

Certified immersion testing ensure long service life in corrosive environments.

Unwavering Performance Consistency

ISO 9001 oversight means every lot meets the same strict formulation and testing protocols.

Predictable adhesion, hardness and flexibility minimize maintenance and extend DAVINCI VALVES life.

Regulatory & Environmental Assurance

Compliance documentation for regulators, insurers and owners is at your fingertips no surprises at inspection time.







Every DETAIL MATTERS in DAVINCI VALVES

We believe that purchasing valves should be a unique and memorable experience. As a respected manufacturer and trading company specializing in all type of valves, fittings, and pipe components we strive to provide our customers, partners and distributors with products and services that make them feel truly special through our personalized attention.

And in POTABLE WAATER MARKET more

Efficient and sustainable water resource management is one of the world's most critical responsibilities. But often taken for granted, not treated with enough professional care. Access to clean water results from a complex and meticulous process.

At **DAVINCI VALVE**S, we enhance water systems with our essential valves. Our products are crucial in water storage, transportation, and distribution, ensuring proper control and maintenance. Our valves regulate water levels, manage air intake and release, enable line shut-offs or equipment isolation, and control flow and pressure.

They also protect against pipe breakage and system failures. By performing these vital functions, our valves ensure the efficient and reliable operation of water supply networks, providing safe and continuous water delivery to consumers.

DAVINCI VALVES, provides a diverse selection of valves, hydrants, and accessories suitable for all types of pipe materials and operating pressures, ensuring reliable and efficient water distribution.

COST- EFFECTIVE WATER SOLUTIONS

Our extensive and very complete range of products is designed to meet our customer's and partner's needs just as their not only WATER project requirements ask for.

This also requires to give cost-effective solutions fo our partners and distributors.

Remember to ask our team for that too: valves@davincivalves.com

Click Info



GREAT TIPS

Remember to PERSONALIZE your VALVE ACTUATION







SERIES 200D RESILIENT SEAT GATE VALVE NP16 NON-RISING STEM FLANGED END S

Made of Ductile Iron GJS500. Vulcanize wedge EPDM con Wras Epoxy paint FBE Min 250 Mic. con Wras Working pressure 1.0Mpa 1.6Mpa



SERIES 200D RESILIENT SEAT GATE VALVE RISING STEM FLANGED END

Made of Ductile Iron GJS500. Vulcanize wedge EPDM Epoxy paint FBE Min 250 Mic Working pressure 1.0Mpa 1.6Mpa Flanged ends DIN NP 10/16



SERIES 210A RESILIENT SEAT GATE VALVE NP16 THREADED END

Made of Ductile Iron GJS500. Vulcanize wedge EPDM WRAS Epoxy paint FBE Min 250 Mic WRAS Working pressure 1.0Mpa 1.6Mpa Threaded ends DIN 259 [GAS/NPT]



SERIES 2000 RESILIENT SEAT GATE VALVE AWWA515 NON-RISING STEM FLANGED B16,5 CL125/150

Made of Ductile Iron GJ5500. Vulcanize wedge EPDM WRAS Epoxy paint FBE Min 250 Mic WRAS Working pressure 150 psi



SERIES 200D METAL SEAT GATE VALVE NP16 NON-RISING STEM FLANGED END

Made of Ductile Iron GJS500. Vulcanize wedge EPDM Epoxy paint FBE Min 250 Mic Working pressure 1.0Mpa 1.6Mpa Flanged ends DIN NP 10/16



SERIES 200D RESILIENT SEAT GATE VALVE BS5163 NON-RISING STEM FLANGED END DIN pn10/16

Made of Ductile Iron GJS500. Vulcanize wedge EPDM WRAS Epoxy paint FBE Min 250 Mic WRAS Face to face EN 558 Serie BS5163



SERIES 210A RESILIENT SEAT GATE VALVE NP16 VERTICAL THREADED END

Made of Ductile Iron GJS500. Vulcanize wedge EPDM WRAS Epoxy paint FBE Min 250 Me Working pressure 1.0Mpa 1.6Mpa Threaded ends DIN 259 [GAS/NPT]]



SERIES 210A RESILIENT SEAT GATE VALVE NP16 VERTICAL THREADED END

Made of Ductile Iron GJS500, Vulcanize wedge EPDM WRAS
Epoxy paint FBE Min 250 Mic
Working pressure 1.0Mpa 1.6Mpa
Threaded ends DIN 259 [GAS/NPT]]



SERIES 200D RESILIENT SEAT GATE VALVE NP16 NON-RISING STEM FLANGED END

Material construction in CF8M Vulcanize wedge EPDM WRAS Epoxy paint FBE Min 250 Mic WRAS Working pressure 1.0Mpa 1.6Mpa)



SERIES 220D RESILIENT SEAT GATE VALVE NP16 NON-RISING STEM PVC END

Made of Ductile Iron GJS500. Vulcanize wedge EPDM Epoxy paint FBE Min 250 Mic WRAS Working pressure 1.0Mpa 1.6Mpa



SERIES 210A RESILIENT SEAT GATE VALVE NP16 VERTICAL THREADED END

Made of Ductile Iron GJS500. Vulcanize wedge EPDM WRAS Epoxy paint FBE Min 250 Mic Working pressure 1.0Mpa 1.6Mpa Threaded ends DIN 259 [GAS/NPT]]



SERIES PERSONALIZED VALVES

Measures / Materials / Complements as your Project rq. Do not hesitate to contact our Technical Department: valves@davincivalves.com

