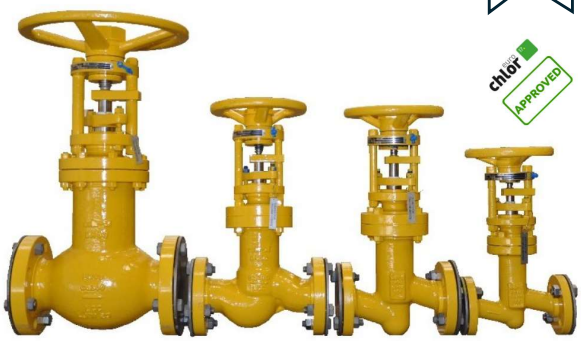
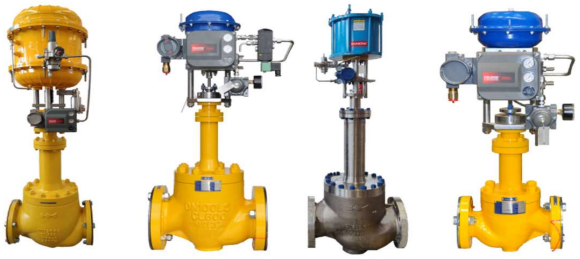
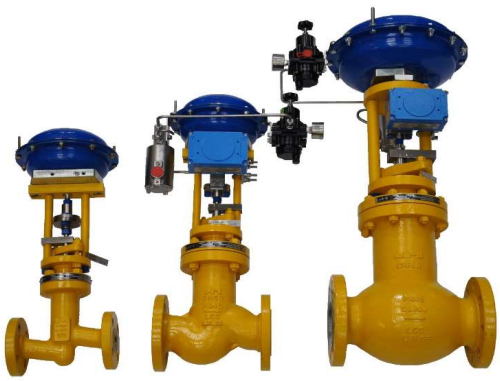
Operating Range: Hazardous Chemicals

Category
ISOLATION
CONTROL
ACTUATOR

safety, quality, efficiency, and environmental protection

THUMBNAIL/IMAGE		SERIES	DN	PN	CONNECTION
Manual Valves - Isolation					
 STRAIGHT THROUGH	**Manual Bellows Seal Globe Valves** Flow Isolation- Hand wheel Operation ON/OFF The open bellows version of the Euro Chlor approved isolation valve can be opened or closed via a balanced handwheel that ensures smooth and easy operation. Straight through (8800/01) and the angle pattern (8900/01). **Open Bellows Design** Our design of open bellows and bolted top assembly gives easy access to inspect the bellows assembly area. The open design ensures that any corrosion products in the fluid do not get trapped around the bellows causing damage and early failure. **The bellows are guaranteed for the life of the valve.** **Repeatable Tight Closure and Isolation** For metal to metal seated valves the disc is harder than the seat minimising disc damage during operation ensuring long life for the seating surfaces.Polymer ring soft seat plugs are also available.	8800	15-50	16 25 40 ASA150 ASA300	**Screwed end** **Socket Weld end** **Flanged**
		8801	65-400	16 25 40 ASA150 ASA300	**Flanged**
		Bellows fitted as standard and guaranteed for 20,000 cycles on actuated ON/OFF valves, 100,000 cycles on control valves or for life on manual valves			
 ANGLE PATTERN		8900	15-50	16 25 40 ASA150 ASA300	**Screwed end** **Socket Weld end** **Flanged**
		8901	50-150	16 25 40 ASA150 ASA300	**Flanged**
		Easy access to bellows for inspection and maintenance.			
 STRAIGHT THROUGH	**Polymerising Applications.** For applications on Hydrogen Cyanide (HCN) or Sodium Cyanide (NaCN) in which there is a possibility of polymerisation of the fluid. The design of the 8700/01 series valves incorporates a precision fixed disc and stem, a low internal volume internal body eliminating dead space and creating a smooth flow path for the fluid. The design of the bellows ensures that in the closed position the fluid can drain easily from between the convolutions.	8700	25-50	16 25 40 ASA150 ASA300	**Butt weld**
		8701	80-200	16 25 40	**Butt weld**
		Test and Material certification are available for every valve we produce.			

THUMBNAIL/IMAGE		SERIES	DN	PN	CONNECTION
Control Valves					
 STRAIGHT THROUGH	## Bellows Seal Control Globe Valves **Control Valves for Chlorine Service Control** **Valves for Hazardous Chemical Applications** Our bellows seal control valve product combines the knowledge and know-how of hazardous chemical valves, designed for isolation and zero leakage to the environment, with control valves designed for modulating applications. This product has been designed with the safety features associated with the latest Euro Chlor GEST 17/492 in mind whilst maintaining the functionality of control valves such as longer stroke to provide a better flow modulation, smoother flow paths and a better pressure recovery factor compared to that of an ON/OFF globe valves. The body assembly has a wider chest to allow the use of more sophisticated trims such as multi-stage low noise for gases and anti-cavitation for liquid applications. Our control valve sizing program enables us to offer the correct choice of valve for your application to give a controlled performance and longer service life.	5601	25-300	16 25 40 ASA150 ASA300 ASA600	
		5801	25-300	16 25 40 ASA150 ASA300 ASA600	
		5601 Packed Gland			
		5801 Bellows Seal			
		The body assembly has a wider chest to allow the use of more sophisticated trims such as multi-stage low noise for gases and anti-cavitation for liquid applications.			
 STRAIGHT THROUGH		Throttling and control function with zero leakage to atmosphere, reliable process isolation and robust designs for ease of operation and maintenance.			
Actuated Bellows Seal Valves					
 STRAIGHT THROUGH	## Actuated Bellows Seal Globe Valves **Flow Isolation** **Remote Actuation of ON/OFF Operation** The open bellows version of the Euro Chlor approved isolation valve can be actuated via a pneumatic or electric actuator. We also offer a range of accessories to enable a greater level of actuated control. **Air regulator sets** for pressure control of the actuator **Solenoid valves** for open or close operation **Limit Switches** for open/close remote position indication	8850	15-50	16 25 40 ASA150 ASA300 ASA600	**Screwed end** **Socket Weld end** **Flanged**
		8851	65-400	16 25 40 ASA150 ASA300 ASA600	**Flanged**
		Stopping hazardous fluid leaks- The valve is equipped with a bellows made of UNS N10276, which is guaranteed to last 20,000 open-close-open cycles. The valve is also designed with a standard backup secondary Teflon packing and gland seal.			
		"Hunt & Mitton" provides 100% qualified castings inspected by X-ray flaw detection for Chlorine certified valves used in dangerous working conditions.			

THUMBNAIL/IMAGE		SERIES	DN	PN	CONNECTION
Pneumatic Actuator					
	**Actuators** are a key component in the operator's ability to control, open or close a valve on his process line. Many end users prefer pneumatic actuators driven by compressed air. Our range of HM Series actuators are spring opposed rolling diaphragm actuated converting air pressure into linear travel of the valve stem. Depending on the air supply pressure, actuator configuration and different control signals the actuator will produce the appropriate forces at the stem. Fail Open (FO) or Fail Closed (FC) The assembly of the springs and diaphragm can be reversed to allow changes from fail open to fail close or in reverse. This offers greater flexibility for distributors and end users. Air inlet connections are 1/4" NPT above and below the diaphragm. **For higher thrust applications we offer double or triple mounted actuators**	HM280, HM530, HM530D	HM960, HM960D, HM960T	-25°C - 120°C	**1536-50,508 Thrust range (N)**
		Cast Diaphragm Housing. The actuator diaphragm housings are made of precision cast Aluminium alloy ACD12 or carbon steel A216WCB.			
		Actuator Pillars are made of Duplex Stainless Steel.			
		**Diaphragms** are made of Neoprene and nylon mesh which has been type **tested to over 1 million open/close/open cycles without failure.**			
		Selection each actuator is selected to match each control valve or actuated ON/OFF valve by our team of engineers. The criteria of valve size, valve trim, application fluid, pressures, temperatures, pressure differential, amount of supply air pressure and travel required are all taken into consideration. FAT testing and documentation are all registered at the factory before delivery.			

Severe Services for hazardous chemicals include the following

Cl2 Chlorine - Liquid and Gas	**Clo2** Chlorine Dioxide	**HF** Hydrogen Fluoride Liquid and Gas	**COCl2** Phosgene
AHCl Anhydrous Hydrogen Chloride	**EDC** Ethylene Dichloride	**VCM** Vinyl Chloride Monomer	**NH3** Liquid Ammonia
	HCN Hydrogen Cyanide	**TiCl4** Titanium Tetrachloride (Tickle)	

Bellow Seals and Packed Gland Designs			
	Bellow seals are made from UNS N10276. Welded in to position on the bonnet and stem and are subject to 100% DPI.		Design of packed gland combined with a deep packing chamber of more than twice the travel ensures zero leakage.

AVS

HUNT & MITTON SINCE 1842

Cv values and Face to Face Dimensions for Hand Operated Isolation valves and actuated Isolation valves.

Face to Face dimensions are in accordance with international standards:
ASME B16.10 ; BS EN 588 ; BS2080 ; GB/T 12221 ; JIS B2002

Category	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100	DN125	DN150	DN200	DN250	DN300	DN350	DN400
8800/1-8850/1																
Globe Class 300 flow under			12		28	47		112	182		391	682				
Globe Class 150 flow under			11		26	44		105	171		368	644				
6800/1-8700/1																
Globe Class 300 flow under			12		28	47		112	182		391	682				
Globe Class 150 flow under			11		26	44		105	171		368	644				
8800/1,8850/1,6800/1,8700/1																
Class 150 Series 3 (Ball & Plug Valve)		117	127		165	178		203	229		267					
Class 150 Series 10 (Globe)		117	127		165	203		241	292		406	495	622	699	787	914
Class 150 Series 12 (Ball & Plug Valve)	130	130	140		165	203		241	305		394	457				
Class 300RF Series 21 (Globe)	152	178	203		229	267		318	356		445	559	622	711	838	914
Class 300LG Series 21 (Globe)	162	187	213		238	276		327	365		454	568	632	721	848	924
Class 300LT Series 21 (Globe)	165	191	216		241	279		330	368		457	572	635	724	851	927
Class 300RF Series 4 (Ball & Plug Valve)	140	152	165		191	216		283	305		406	502	568	648	762	838
PN16, PN25, PN40 Series 1	130	150	160	180	200	230	290	310	350	400	480	600	730	850	980	1100

Bellow Seal Control Valves

Valve sizing coefficient/ Cv Rating for contured, Single-stage and Double-Stage Trims for ASME
Class 150 ; Class 300 ; Class 600 ; PN16 ; PN25 ; PN40

	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100	DN125	DN150	DN200	DN250	DN300	DN350	DN400
56/801																
Valve Stroke			19		25	25		30	40		50	75	100	100		
Contour/Port Cage EQ%			19		40	58		130	190		406	660	1100	1400		
Contour/Port Cage Linear			19		40	58		130	190		406	730	1150	1600		
Single Stage Cage Linear			19		39	55		114	190		400	657	1100	1350		
Single Stage Cage EQ%			17		35	55		110	190		382	620	1010	1250		
2 Stage Cage Linear Liquid anti cavitation			9		21	26		52	88		172	345	565	680		
2 Stage Cage Linear low noise Gas			10		23	33		62	96		188	360	580	700		

The above represent the standard flow capacities. Reduced capacities including trickle spline trim are also available for each vlave size for lower flow applications. 3 and 4 stage Linear Cages ca be provided if required for high pressure drop conditions.

Cl2

Chlorine

Chlorine valves are specialized components designed to handle and control the flow of chlorine gas or liquid. They are used in various industries where chlorine is an essential chemical in the production or treatment processes. Here are some industries that commonly use chlorine valves:

Industry

In all these industries, chlorine valves must be designed to withstand the corrosive nature of chlorine and ensure safe and precise control of its flow to protect equipment and personnel.

1	**Water Treatment and Municipal Water Supply**	Ensuring safe disinfection of drinking water and wastewater.	Valves controlling chlorine flow are critical in these processes to ensure safe and effective disinfection.
2	**Chemical Manufacturing**	Managing chlorine in the production of chemicals like hydrochloric acid and PVC.	Chlorine is a key raw material in the production of a variety of chemicals and compounds. Valves are used to manage its flow in these processes.
3	**Pulp and Paper Industry**	Regulating chlorine in the paper bleaching process.	Chlorine and chlorine dioxide are used in the bleaching process of paper manufacturing. Valves are needed to regulate the chlorine used in these applications.
4	**Pharmaceuticals**	Ensuring safety and precision in manufacturing.	Chlorine is used in the production of certain pharmaceuticals and intermediates. Proper handling with specialized valves ensures safety and precision in the manufacturing process.
5	**Food and Beverage**	Controlling chlorine for sanitizing equipment and processing water.	Chlorine is used for sanitizing equipment and processing water in the food and beverage industry.Valves are crucial for controlling chlorine dosing and ensuring food safety standards.
6	**Petrochemical and Refining**	Managing chlorine in chemical reactions and processes.	In the petrochemical industry, chlorine is used for various chemical reactions and processes. Valves are essential for managing its use in these applications.
7	**Textiles**	Handling chlorine for fabric bleaching and treatment.	Chlorine is used in the textile industry for bleaching and treating fabrics.Valves ensure the proper handling and control of chlorine during these processes.
8	**Plastics and Polymers**	Controlling chlorine in plastic and polymer production.	Chlorine is a fundamental component in the production of various plastics and polymers, such as PVC. Valves are used to control the flow of chlorine in these manufacturing processes.
9	**Agriculture**	Regulating chlorine in pesticide and herbicide production.	Chlorine is used in the production of certain pesticides and herbicides. Valves are necessary to control the flow and handling of chlorine in these applications.
10	**Mining and Metallurgy**	Managing chlorine in metal extraction processes.	Chlorine is sometimes used in metallurgical processes, such as extracting certain metals from their ores. Valves are essential for managing the chlorine used in these processes.

Chlorine Dioxide

Valves designed for handling chlorine dioxide (ClO2) are essential in various industries where ClO2 is used for its disinfecting, bleaching, and oxidizing properties. Here are some industries that utilize valves for chlorine dioxide:

Industry

In these industries, valves handling chlorine dioxide must be designed to withstand its corrosive nature and ensure precise control and safety in various applications.

1	**Water Treatment and Municipal Water Supply**	Disinfecting drinking water and treating wastewater.	Chlorine dioxide is extensively used to disinfect drinking water and treat wastewater. Valves are crucial for controlling the flow and dosing of ClO2 in water treatment plants, ensuring safe and effective disinfection processes.
2	**Pulp and Paper Industry**	Bleaching wood pulp.	In the pulp and paper industry, chlorine dioxide is used in the bleaching process of wood pulp. Valves are needed to regulate the precise flow of ClO2, ensuring the desired bleaching effects while maintaining process safety and efficiency.
3	**Food and Beverage**	Sanitizing equipment, surfaces, and processing water.	The food and beverage industry uses chlorine dioxide for sanitizing equipment, surfaces, and processing water. Valves control the accurate dosing of ClO2, helping maintain hygiene standards and ensuring product safety.
4	**Healthcare**	Disinfecting medical and laboratory equipment and surfaces.	In healthcare facilities, chlorine dioxide is used as a disinfectant for medical and laboratory equipment and for sanitizing surfaces. Valves are essential for managing the flow of ClO2 in disinfection systems, ensuring effective sterilization while protecting sensitive equipment.
5	**Cooling Towers and Industrial Water Systems**	Controlling microbial growth and biofilm.	Chlorine dioxide is used to control microbial growth and biofilm in cooling towers and industrial water systems. Valves regulate the injection and distribution of ClO2, maintaining system efficiency and preventing contamination.
6	**Oil and Gas Industry**	Downhole applications, pipeline cleaning, and treating fracturing fluids.	In the oil and gas industry, chlorine dioxide is used for downhole applications, pipeline cleaning, and treating fracturing fluids. Valves control the precise application of ClO2, ensuring effective treatment while maintaining safety standards.
7	**Textiles**	Bleaching fabrics and controlling microbial growth.	The textile industry uses chlorine dioxide for bleaching fabrics and controlling microbial growth during manufacturing. Valves are used to manage the flow of ClO2, ensuring consistent and effective treatment of textiles.
8	**Pharmaceuticals**	Disinfecting production facilities and equipment.	Chlorine dioxide is used in pharmaceutical manufacturing for disinfecting production facilities and equipment. Valves ensure accurate dosing and distribution of ClO2, maintaining sterile conditions essential for pharmaceutical production.
9	**Agriculture**	Disinfecting irrigation systems, treating water supplies, and sanitizing equipment.	In agriculture, chlorine dioxide is used for disinfecting irrigation systems, treating water supplies, and sanitizing equipment. Valves control the flow of ClO2, ensuring effective pathogen control and safe agricultural practices.
10	**Electronics Manufacturing**	Cleaning and etching printed circuit boards (PCBs).	Chlorine dioxide is used for cleaning and etching printed circuit boards (PCBs) in electronics manufacturing. Valves regulate the flow of ClO2, ensuring precise application and effective processing of electronic components.

HF

Hydrogen fluoride

Hydrogen fluoride (HF) is a highly corrosive and toxic chemical used in various industrial applications. Handling HF requires specialized equipment, including valves designed to withstand its aggressive nature. Here are some industries that use valves for hydrogen fluoride:

Industry

In all these industries, valves handling hydrogen fluoride must be made from materials resistant to HF's highly corrosive nature, such as certain alloys, fluoropolymers (like PTFE), or other specialized materials. These valves must also be designed to ensure the safety of personnel and equipment, given HF's toxic and reactive properties.

1	**Chemical Manufacturing**	Producing fluorine compounds.	HF is used in the production of various fluorine-containing compounds, including fluorocarbons and fluoropolymers. Valves are essential for controlling the flow of HF in these chemical processes.
2	**Petrochemical and Refining**	Catalyzing alkylation in oil refineries.	HF is used as a catalyst in the alkylation process in oil refineries to produce high-octane gasoline components. Valves are critical for managing the flow and handling of HF in these processes, ensuring safety and efficiency.
3	**Metal Processing**	Pickling and etching metals.	HF is used for pickling and etching stainless steel and other metals to remove oxides and other impurities. Valves control the precise flow of HF in these metal treatment processes.
4	**Glass and Ceramics Manufacturing**	Etching and cleaning surfaces.	HF is employed in the production of glass and ceramics for etching and cleaning purposes. Valves regulate the application of HF to achieve desired surface properties and finishes.
5	**Electronics and Semiconductor Manufacturing**	Etching silicon wafers and cleaning components.	In the electronics industry, HF is used for etching silicon wafers and cleaning semiconductor components. Valves ensure accurate and safe delivery of HF in these high-precision processes.
6	**Pharmaceuticals**	Synthesizing compounds and intermediates.	HF is used in the synthesis of certain pharmaceutical compounds and intermediates. Valves control the flow of HF in pharmaceutical manufacturing, ensuring precise and safe chemical reactions.
7	**Mining and Metallurgy**	Extracting rare earth elements and uranium.	HF is used in the extraction and processing of rare earth elements and uranium. Valves manage the flow of HF in these processes, facilitating the efficient recovery of valuable materials.
8	**Laboratories**	Chemical analysis and research.	HF is used in various laboratory applications for chemical analysis and research. Valves ensure controlled and safe handling of HF in laboratory environments.
9	**Aerospace and Defense**	Manufacturing specialized materials.	HF is used in the manufacturing of specialized materials and components for the aerospace and defense industries. Valves regulate the flow of HF in these high-tech applications, ensuring quality and safety.
10	**Plastics and Polymers**	Producing fluoropolymers and plastics.	HF is involved in the production of certain fluoropolymers and plastics. Valves control the flow of HF in these manufacturing processes, ensuring consistency and safety.

COCl2

Phosgene

Phosgene ($COCl_2$) is a highly toxic and reactive chemical used in various industrial applications. Handling phosgene safely requires specialized equipment, including valves designed to withstand its corrosive and hazardous nature. Here are some industries that use valves for phosgene:

Industry

In these industries, valves used for phosgene must be made from materials that can withstand its corrosive nature and prevent leakage. This often involves using materials like certain stainless steel alloys, Hastelloy, and other specialized materials. Safety features such as fail-safe mechanisms and stringent maintenance protocols are also essential to ensure safe handling of phosgene.

1	**Chemical Manufacturing**	Producing isocyanates and polycarbonates.	Phosgene is a key intermediate in the production of various chemicals, such as isocyanates and polycarbonates. Valves are crucial for controlling the flow and handling of phosgene in these chemical synthesis processes.
2	**Pharmaceuticals**	Synthesizing pharmaceutical compounds and intermediates.	Phosgene is used in the synthesis of certain pharmaceutical compounds and intermediates. Valves manage the precise flow of phosgene in pharmaceutical manufacturing to ensure safe and controlled chemical reactions.
3	**Agricultural Chemicals**	Producing pesticides and herbicides.	Phosgene is utilized in the production of some pesticides and herbicides. Valves are essential for handling phosgene safely in the manufacturing processes of these agrochemicals.
4	**Plastics and Polymers**	Making polycarbonates and polyurethanes.	Phosgene is used in the production of polycarbonates and polyurethanes, which are important materials in the plastics industry. Valves control the flow of phosgene during the polymerization processes, ensuring safety and efficiency.
5	**Dyes and Pigments**	Producing certain dyes and pigments.	The production of certain dyes and pigments involves the use of phosgene. Valves are necessary to manage the flow of phosgene in these processes, maintaining product quality and safety.
6	**Specialty Chemicals**	Synthesizing specialty chemicals and intermediates.	Phosgene is employed in the synthesis of various specialty chemicals and intermediates. Valves regulate the handling and flow of phosgene to ensure precise chemical reactions and safe operations.
7	**Defense Industry**	Research and manufacturing within controlled environments.	In modern times, phosgene is primarily utilized for research and manufacturing within tightly controlled environments. Valves play a critical role in safely managing phosgene in these applications.

EDC

Ethylene dichloride

Ethylene dichloride (EDC), also known as 1,2-dichloroethane, is a chemical compound primarily used in the production of vinyl chloride monomer (VCM), which is further processed to make polyvinyl chloride (PVC). Valves for ethylene dichloride are crucial in industries involved in its production and downstream applications. Here are some industries that use valves for ethylene dichloride:

Industry

In all these industries, valves for ethylene dichloride must be made from materials that are resistant to corrosion and compatible with EDC to ensure safe and efficient operation. They play a critical role in controlling the flow, pressure, and isolation of EDC throughout its production, handling, and application processes.

1	**Chemical Manufacturing**	EDC is used to produce VCM. Valves control EDC flow during synthesis and purification.	EDC is primarily used in chemical manufacturing processes, especially in the production of VCM. Valves are essential for controlling the flow of EDC during its synthesis, purification, and subsequent reactions.
2	**Plastics and Polymer Industry**	EDC is a precursor to PVC. Valves ensure precise control during PVC production.	EDC is a precursor to PVC, a widely used plastic in construction, automotive, packaging, and other industries. Valves are critical in the production of PVC from VCM, ensuring precise control of EDC feedstock and reaction conditions.
3	**Petrochemicals**	EDC, derived from ethylene and chlorine, is handled in petrochemical plants using valves.	EDC is derived from ethylene and chlorine, both of which are petrochemical products. Valves are used in the handling and processing of EDC in petrochemical plants involved in the production of various chemical intermediates.
4	**Solvent Applications**	EDC acts as a solvent for organic compounds, with valves managing its distribution.	EDC is used as a solvent for various organic compounds in industrial processes. Valves control the transfer and distribution of EDC in solvent-based applications.
5	**Textiles**	EDC is used in synthetic fiber production, with valves controlling its use.	EDC is used as a solvent in textile processing, particularly in the production of synthetic fibers. Valves ensure controlled use and handling of EDC in textile manufacturing processes.
6	**Adhesives and Sealants**	EDC serves as a solvent or carrier, with valves regulating its mixing.	EDC is sometimes used as a solvent or carrier in the formulation of adhesives and sealants. Valves are employed to regulate the addition and mixing of EDC in these formulations.
7	**Metal Cleaning and Surface Treatment**	EDC cleans metal surfaces, with valves managing its flow.	EDC is used in cleaning and degreasing metal surfaces in industrial applications. Valves control the flow of EDC in these processes, ensuring effective cleaning and treatment.
8	**Laboratory and Research**	EDC is used in labs, with valves ensuring safe handling and precise metering.	EDC is used in laboratories for various chemical reactions and experiments. Valves facilitate the safe handling and precise metering of EDC in laboratory settings.
9	**Water Treatment**	EDC is sometimes used in disinfection, with valves controlling its dosing and distribution.	In some cases, EDC may be used in water treatment processes, particularly in disinfection applications. Valves are used to control the dosing and distribution of EDC in these treatments.

Vinyl Chloride Monomer

Vinyl chloride monomer (VCM) is a crucial chemical intermediate primarily used in the production of polyvinyl chloride (PVC), which is a versatile plastic used in various industries. Valves for vinyl chloride monomer are essential in industries involved in its production, handling, and downstream applications. Here are some industries that use valves for vinyl chloride monomer:

Industry

In these industries, valves for vinyl chloride monomer must be designed to handle the specific requirements of VCM production and PVC manufacturing processes. They ensure precise control over critical parameters such as temperature, pressure, and flow rates to optimize production efficiency and product quality while maintaining safety standards.

1	**Chemical Manufacturing**	VCM, produced by ethylene chlorination, is used to synthesize PVC. Valves control feedstock, reactions, and safety.	VCM is primarily produced through the chlorination of ethylene and is used as a precursor in the synthesis of PVC. Valves are critical in the production processes of VCM, ensuring precise control of feedstock, reaction conditions, and safety.
2	**Plastics and Polymer Industry**	VCM is the primary component of PVC. Valves regulate flow, pressure, and temperature during PVC production.	VCM is the essential building block for polyvinyl chloride (PVC), which finds widespread use in construction, automotive, packaging, and other industries. Valves play a vital role in the production of PVC from VCM, controlling the flow, pressure, and temperature during polymerization processes.
3	**Construction**	PVC, from VCM, is used in pipes, fittings, windows, and roofing. Valves ensure consistent quality in PVC manufacturing.	PVC, derived from VCM, is extensively used in construction for pipes, fittings, profiles, windows, doors, and roofing materials. Valves are used in manufacturing facilities that produce PVC products, ensuring consistent quality and safety.
4	**Packaging**	PVC is used for shrink wrap, food, and blister packaging. Valves ensure reliable and safe PVC production.	PVC is used in packaging applications, such as shrink wrap films, food packaging, and blister packaging. Valves contribute to the production of PVC materials used in these applications, ensuring reliability and safety in packaging processes.
5	**Automotive**	PVC is used in interiors, wiring, and parts. Valves ensure VCM control for automotive-grade PVC.	PVC is used in automotive applications for interior trim, seating components, wiring insulation, and exterior parts. Valves in PVC manufacturing plants ensure precise control of VCM and polymerization processes to meet automotive industry standards.
6	**Medical**	PVC is used in medical devices like IV bags and tubing. Valves ensure production meets medical standards.	PVC is used in medical devices and equipment, such as IV bags, tubing, and medical packaging. Valves ensure the production of high-quality PVC materials that meet stringent medical industry regulations.
7	**Electrical**	PVC is used for insulation and wiring. Valves ensure safe and reliable PVC production for electrical uses.	PVC is used for electrical insulation and wiring applications due to its excellent electrical properties and durability. Valves are integral to the production of PVC materials used in electrical applications, ensuring safety and reliability.
8	**Consumer Goods**	PVC is used in toys, flooring, clothing, and household items. Valves ensure quality and safety in PVC manufacturing.	PVC is used in a wide range of consumer goods, including toys, flooring, clothing, and household products. Valves play a role in manufacturing facilities that produce PVC for these consumer applications, ensuring product quality and safety.

NH3

Liquid ammonia

Liquid ammonia (NH3) is used in various industries due to its versatility as a chemical compound. Valves for liquid ammonia are essential in industries involved in its production, storage, and application. Here are some industries that commonly use valves for liquid ammonia:

Industry

In all these industries, valves for liquid ammonia must be designed to withstand the corrosive nature of ammonia and provide reliable performance in varying temperature and pressure conditions. Materials such as stainless steel, nickel alloys, and specially coated materials are often used to ensure compatibility and durability in handling liquid ammonia. Proper valve selection and maintenance are crucial to ensure safety, efficiency, and regulatory compliance in the handling and application of liquid ammonia across diverse industrial sectors.

1	**Fertilizer Industry**	Ammonia is key in nitrogen-based fertilizers. Valves control ammonia synthesis and distribution.	Ammonia is a key ingredient in the production of nitrogen-based fertilizers such as ammonium nitrate, urea, and ammonium phosphate. Valves are used in the synthesis of ammonia from nitrogen and hydrogen, as well as in the handling and distribution of liquid ammonia for fertilizer production.
2	**Refrigeration and Air Conditioning**	Ammonia is a refrigerant in industrial systems. Valves manage flow and pressure for optimal cooling.	Ammonia is used as a refrigerant in industrial refrigeration systems and large-scale air conditioning systems. Valves control the flow and pressure of liquid ammonia in these refrigeration cycles to maintain optimal cooling temperatures.
3	**Chemical Manufacturing**	Ammonia is a precursor for chemicals like ammonium sulfate and nitric acid. Valves are crucial in synthesis and transfer processes	Ammonia is used as a precursor in the production of various chemicals, including ammonium sulfate, nitric acid, and hydrazine. Valves are crucial in the synthesis processes and for transferring liquid ammonia between different stages of chemical production.
4	**Food and Beverage**	Ammonia is used in refrigeration for food storage. Valves regulate ammonia flow to maintain temperatures.	Ammonia is used in food processing facilities for refrigeration and cooling purposes. Valves regulate the flow of liquid ammonia in refrigeration systems used to maintain cold storage temperatures for perishable food products.
5	**Textiles**	Ammonia is used in dyeing and treating fabrics. Valves control its application in processing.	Ammonia is used in the textile industry for chemical treatments, including dyeing, scouring, and mercerizing cotton fabrics. Valves control the application and distribution of liquid ammonia in these textile processing operations.
6	**Water Treatment**	Ammonia removes pollutants in wastewater. Valves regulate its dosing.	Ammonia is used in water treatment processes, particularly in the treatment of municipal and industrial wastewater to remove pollutants such as heavy metals. Valves regulate the dosing of liquid ammonia in these water treatment applications.
7	**Pharmaceuticals**	Ammonia is used for pH adjustment and synthesis. Valves manage its handling in manufacturing.	Ammonia is used in pharmaceutical manufacturing for various purposes, including pH adjustment and as a reactant in chemical synthesis. Valves control the handling and introduction of liquid ammonia in pharmaceutical processes.
8	**Power Generation**	Ammonia is a potential clean energy source. Valves control ammonia flow in fuel cells and power plants.	Ammonia is considered as a potential clean energy carrier in hydrogen fuel cells and as a fuel for ammonia-fired power plants. Valves are used to control the flow of liquid ammonia in these emerging energy applications.
9	**Cleaning and Sterilization**	Ammonia solutions clean and sterilize equipment. Valves regulate dilution and application.	Ammonia solutions are used for cleaning and sterilizing equipment in various industries, including pharmaceuticals, food processing, and healthcare facilities. Valves regulate the dilution and application of ammonia solutions in cleaning processes.

HCN

Hydrogen cyanide

Hydrogen cyanide (HCN) is a highly toxic and potentially lethal chemical compound that is used in various industrial applications despite its hazards. Valves used for hydrogen cyanide are crucial in industries involved in its production, handling, and utilization. Here are some industries that commonly use valves for hydrogen cyanide:

Industry

In all these industries, valves used for hydrogen cyanide must be designed to handle its corrosive nature and ensure safe and reliable operation. Materials such as stainless steel, nickel alloys, and specialized coatings are often used to prevent corrosion and ensure compatibility with hydrogen cyanide. Safety protocols, including proper ventilation, monitoring systems, and emergency response procedures, are crucial when handling hydrogen cyanide due to its toxicity and hazardous properties.

1	**Chemical Manufacturing**	Essential in synthesizing organic compounds like adiponitrile and methyl methacrylate, where valves control HCN flow during synthesis.	Hydrogen cyanide is primarily used in chemical synthesis to produce various organic compounds, including adiponitrile (used in nylon production) and methyl methacrylate (used in acrylic plastics and resins). Valves are essential for controlling the flow of hydrogen cyanide during its synthesis and subsequent chemical reactions.
2	**Mining**	Used in cyanidation to extract gold and precious metals, valves regulate HCN dosing and mixing.	Hydrogen cyanide is used in the mining industry for extracting gold and other precious metals from ore through the process of cyanidation. Valves regulate the dosing and mixing of hydrogen cyanide in these extraction processes.
3	**Electronics**	In electroplating, HCN deposits metal coatings on semiconductor components; valves manage HCN flow.	Hydrogen cyanide is used in the electronics industry for electroplating processes, where it serves as a precursor in the deposition of metal coatings on semiconductor components. Valves control the flow and distribution of hydrogen cyanide in these plating operations.
4	**Fumigation**	Vital for pest control in agriculture and storage, valves regulate HCN release in fumigation chambers.	Hydrogen cyanide is used as a fumigant for pest control in agriculture and stored product protection. Valves are used in fumigation chambers to regulate the release and concentration of hydrogen cyanide gas for effective pest eradication.
5	**Chemical Intermediates**	Used in producing chemicals like cyanuric chloride and adipic acid, valves handle HCN in synthesis processes.	Hydrogen cyanide is used as an intermediate in the production of various chemicals, such as cyanuric chloride (used in the production of pesticides and herbicides) and adipic acid (used in the production of nylon). Valves are critical in the handling and processing of hydrogen cyanide for these chemical synthesis processes.
6	**Pharmaceuticals**	Essential in synthesizing pharmaceutical intermediates, valves ensure precise HCN addition and mixing.	Hydrogen cyanide is used in pharmaceutical manufacturing for synthesizing certain pharmaceutical intermediates. Valves control the precise addition and mixing of hydrogen cyanide in these chemical reactions under controlled conditions.
7	**Metal Processing**	Cleans metal surfaces by removing oxides and contaminants; valves control HCN application and concentration.	Hydrogen cyanide is used in metal cleaning and surface treatment processes, particularly for removing oxides and contaminants from metal surfaces. Valves regulate the application and concentration of hydrogen cyanide solutions in these metal treatment applications.
8	**Laboratory and Research**	Used in chemical synthesis and research, valves ensure safe handling and accurate dosing of HCN.	Hydrogen cyanide is used in laboratories for chemical synthesis and research purposes. Valves facilitate the safe handling and accurate dosing of hydrogen cyanide in laboratory settings.

$TiCl_4$

Titanium tetrachloride

Titanium tetrachloride ($TiCl_4$) is a compound primarily used in the production of titanium metal and various titanium-containing compounds. Valves for titanium tetrachloride are critical in industries involved in its production, refining, and utilization. Here are some industries that commonly use valves for titanium tetrachloride:

Industry

In these industries, valves for titanium tetrachloride must be designed to withstand its corrosive nature and ensure safe and reliable operation. Materials such as stainless steel, titanium alloys, and specialized coatings are often used to prevent corrosion and ensure compatibility with $TiCl_4$. Safety measures, including proper ventilation, handling procedures, and emergency response protocols, are essential when working with titanium tetrachloride due to its corrosive and reactive properties.

1	**Titanium Production**	Key in Kroll and Hunter processes, $TiCl_4$ valves manage gas flow, pressure, and temperature.	Titanium tetrachloride is a key intermediate in the production of titanium metal through the Kroll process or the Hunter process. Valves are used in various stages of the production process to control the flow, pressure, and temperature of $TiCl_4$ gas.
2	**Titanium Dioxide Production**	A TiO_2 precursor, $TiCl_4$ valves aid in synthesis and refining.	Titanium tetrachloride is used as a precursor in the production of titanium dioxide (TiO_2), which is widely used as a pigment in paints, coatings, plastics, and cosmetics. Valves play a role in the synthesis and refining processes of TiO_2 production.
3	**Chemical Synthesis**	As a catalyst (e.g., polypropylene), valves control $TiCl_4$ addition and distribution.	Titanium tetrachloride is used as a catalyst in certain chemical reactions, such as in the production of polypropylene. Valves are essential for controlling the addition and distribution of $TiCl_4$ in these catalytic processes.
4	**Semiconductor Manufacturing**	In CVD and ALD, $TiCl_4$ valves regulate deposition for semiconductor devices.	Titanium tetrachloride is used in the semiconductor industry for depositing titanium thin films in semiconductor device fabrication. Valves control the flow and deposition of $TiCl_4$ in chemical vapor deposition (CVD) and atomic layer deposition (ALD) processes.
5	**Textile and Paper Industries**	Valves help in synthetic fiber and paper production using $TiCl_4$ as a catalyst.	Titanium tetrachloride is used as a catalyst in the production of certain synthetic fibers and paper products. Valves regulate the addition and mixing of $TiCl_4$ in these manufacturing processes.
6	**Water Treatment**	Valves manage $TiCl_4$ dosing for drinking water and wastewater treatment.	Titanium tetrachloride is used in water treatment applications, particularly in the purification of drinking water and wastewater treatment. Valves control the dosing and dispersion of $TiCl_4$ for coagulation and flocculation purposes.
7	**Research and Development**	In labs, valves ensure safe $TiCl_4$ handling and precise metering for experiments.	Titanium tetrachloride is used in laboratories for chemical research and development, including its use as a reagent and precursor in various experiments. Valves facilitate the safe handling and precise metering of $TiCl_4$ in laboratory settings.

HCL

Anhydrous hydrogen chloride

Anhydrous hydrogen chloride (HCl) finds application in several industries due to its versatile properties.

The chemical symbol for anhydrous hydrogen chloride (pure hydrogen chloride gas) is HCl. For hydrous hydrogen chloride, which is more commonly known as hydrochloric acid when dissolved in water, the chemical symbol is also HCl.

The chemical formula and symbol remain the same (HCl), indicating that the fundamental chemical composition is hydrogen and chlorine in a 1:1 ratio. The distinction between anhydrous and hydrous forms lies in their physical state (gas vs. aqueous solution) and their specific applications.

Industry

These industries rely on **anhydrous hydrogen chloride** for its role as a versatile chemical reagent and as a pH regulator in various processes.

1	**Chemical Manufacturing**	Essential in producing chemicals like vinyl chloride, alkyl chlorides, and pharmaceuticals.	Anhydrous HCl is a crucial reagent in the production of various chemicals such as vinyl chloride (used in PVC production), alkyl chlorides, and pharmaceuticals.
2	**Food Processing**	Used for pH control and as a processing aid in making food additives.	It is used in the food industry for pH control and as a processing aid in the production of food additives.
3	**Metals Processing**	Utilized in refining processes, particularly for pickling and cleaning metals like steel.	Anhydrous HCl is utilized in metal refining processes, particularly for pickling and cleaning metals such as steel.
4	**Water Treatment**	Used to adjust pH and control alkalinity in water systems.	It is used in water treatment facilities for pH adjustment and to control alkalinity in water systems.
5	**Textile Industry**	Applied for pH control in dyeing and printing processes.	Anhydrous HCl is used in the textile industry for pH control in dyeing and printing processes.
6	**Rubber Industry**	Promotes cross-linking reactions in rubber production.	It is used in the production of rubber to promote cross-linking reactions.
7	**Pharmaceutical Industry**	Involved in the synthesis of pharmaceuticals and fine chemicals.	Anhydrous HCl is used in the synthesis of pharmaceuticals and fine chemicals.
8	**Plastics Industry**	Used as a chemical intermediate in plastic production.	It is used in the production of various plastics as a chemical intermediate.