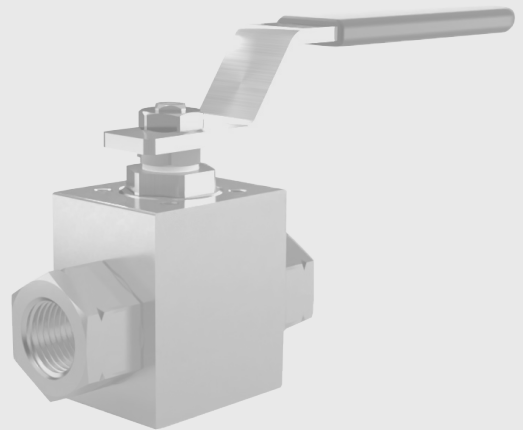


STAUFF Clamps



STAUFF Ball Valves



STAUFF Control Valves



Introduction

Hydrogen H_2 will make a significant contribution to sustainability and environmental protection in the future and is therefore a decisive factor in de-carbonising the existing energy supply. At the same time, Hydrogen is amazingly versatile: the areas of application range from feeding it into the natural gas grid for domestic energy and heat supply, to providing process heat in industry and fuel cells for stationary or mobile use.

STAUFF provides access to a comprehensive range of products for the complete hydrogen value chain - from production to application, including; hydrogen generation, transport and mobile pipelines, and compression and fuelling stations.

STAUFF's portfolio includes:

- STAUFF block clamps are used for fastening pipes and tubes in the hydrogen industry. Available in sizes ranging from 6mm OD to 114mm OD, stainless steel material for liquid Hydrogen pipes or plastic materials from the standard range for securing pipes and tubes.
- Ball valves with stainless steel construction offer manual or automatic actuation up to 1034 Bar and -40 to +85°C (-40°F to +185°F)
- Control valves featuring magnetic or pneumatic actuation, catering to high-pressure applications from 100 to 500 Bar

Applications include unpressurised and liquid storage at -253°C (-423°F), refuelling processes, high-pressure test rigs, production, storage, and transportation vehicles (Category 3 & 4).



STAUFF Clamps

STAUFF block clamps are used for fastening pipes and tubes in the hydrogen industry. Their vibration and noise-reducing features are appreciated as being an important contribution to environmental protection and occupational health and safety. Available in sizes ranging from 6mm OD to 114mm OD, stainless steel material for liquid Hydrogen pipes or plastic materials from the standard range for securing pipes and tubes.

STAUFF Block Clamps

STAUFF Clamps made from plastic, aluminium, steel and stainless steel symbolise quick and easy as well as secure installation of pipes, tubes, hoses, cables and other flexible and rigid components with outside diameters up to 1016 mm.

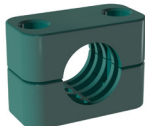


Benefits

- Quicker and more reliable assembly
- Off the shelf product worldwide
- Lower cost
- Significant weight savings compared to traditional fixing methods
- Fire retardant and resistant properties
- Resistance to shock

STAUFF Stainless Steel Clamps

STAUFF offers a range of W5 block clamps made from stainless steel in material 316Ti (1.4571) suitable for low-temperature liquid Hydrogen applications where Hydrogen is liquid at -253°C (-423.4°F). Available in Heavy-duty series, standard series, and twin series, the block clamps are available to suit outside diameters from 6 mm to 117 mm.

Mounting hardware is not suitable and available from the current STAUFF range of hex bolts, cover plates, and weld plates due to the temperature limitation of their material and construction. However, STAUFF can work with H₂ system designers and applications to provide the most suitable mounting options to suit the stainless-steel block clamps for mounting H₂ liquid tubes.

Type	Series		Size	Material	Material	Colour	H ₂ Application
STAUFF Block Clamps							
	PP	Standard Series	1A-6	6-108	Polypropylene	Green	Gaseous
		Twin Series	1D-5D	6-42			
		Heavy Series	3S - 12S	6 - 406			
STAUFF Stainless Steel Clamps							
	W5	Heavy Series	3S	6 - 18	316 Ti	Self Colour	Liquid* & Gaseous
			4S	17.2 - 30			
			5S	30 - 42.4			
			6S	38 - 70			
			7S	76.1 / 88.9			
			8S	112/114.3/117			
	W5	Standard & Twin Series (Heavy Series available on request)	1	6 - 12	316 Ti	Self Colour	Liquid* & Gaseous
			1A	6 - 12			
			2	10 - 18			
			3	17.2 - 26			
			4	26.9/28/30			
			5	32 - 42.4			
			6	42.4 - 52			
			7	60.3/76.1			
			8	89			

* Note: STAUFF Stainless Steel block clamps require special mounting hardware for use in H₂ liquid applications -253°C (-423.4°F), contact STAUFF for more information.

STAUFF Ball Valves

STAUFF Ball Valves can be used in the complete hydrogen value chain - from production to application, including; hydrogen generation, transport and mobile pipelines, and compression and fuelling stations.

Ball valves for H₂ production include systems e.g. for electrolysis or power-to-gas systems. Larger nominal widths of up to 4" can also be offered to ensure maximum flow capacity. A leakage rate A according to DIN EN 12266 is guaranteed even at larger nominal diameters.

STAUFF Ball Valves are available with either threaded or flange connections according to your specifications. Limit switches, locking devices or fully automated valves are available on request.

Technical Features

- Sizes: up to DN100 (4") full flow
- Connections: threaded, flanged
- Manual or automatic actuation

Design Features

- Size reduction advantage compared to other types of valves: Full flow cross section in open position! A DN13 ½" ball valve has a Cv value of 22 gal / min. This Cv value can only be reached with sizes of approx. DN32 (1 ¼") at other valve types, e.g. globe or needle valves. In addition, ball valves can be used to achieve a high degree of leakage free closure
- Materials suitable for temperatures from -40°C up to +140°C (-40°F up to 284°F)
- Temperature range according to ISO 19880-3 is specified as -40°C / +85°C (-40°F / +185°F)
- Leakage: Internal / External acc. DIN EN 12266 leakage rate A and the TPED standard for ball valves ISO 23826
- Pressure testing: acc. DIN EN 12266-1 and DIN EN 14246 with test gas (nitrogen + helium) Static and Cyclic high pressure gas testing with air (≤ 550 bar) or nitrogen (up to 1000 bar) in the temperature range from -40°C to + 85°C (-40°F to + 185°F)
- Valve endurance tests acc. to ISO 19880-3 and ISO 23826 (actuation at full ΔP, -40°C ≤ T ≤ +85°C) carried out in-house during development and on customer request
- Sealing materials selected for hydrogen use and chosen to prevent damages through explosive decompression (e.g. NORSOK M-710). Sealing materials acc. DIN EN ISO 11114-2 for hydrogen usage. Note: Special attention is paid to low temperature seal performance



Certified Performance

TPED

Certified by German BAM according to DIN EN ISO 23826

ATEX

Compliant for category IIC, Ez-zone 1, 2G

Technical leak tightness

- Re-adjustable packing
- Internal and external leakage according to DIN EN 112266 leakage rate A and the TPED standard for ball valves, ISO 23826

Fire-safe



Approved according to DIN EN ISO 10497

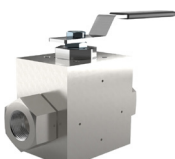
Hydrogen embrittlement

All materials are resistant to hydrogen embrittlement according to ISO 11114-1/2

Explosive decompression resistance

All sealing materials chosen to prevent damages through explosive decompression (e.g. NORSOK M-710)

Type		Size	Number of Ports	Body Material / Surface Finishing						Pressure Bar / PSI
				Body	Ball	Stem	Ball Seats	Body and Stem Sealing	Temperature min / max	
	HBV500 Transport and Fuelling	DN8 (3/8") DN13 (1/2") DN25 (1")	2	1.4571	1.4571 / Nitronic-50®	Nitronic-50®	PEEK	FKM / PTFE	-40°C / +85°C	500 / 7252
	HBV650 Transport and Storage	DN8 (3/8") DN13 (1/2") DN25 (1")	2	1.4571	1.4571 / Nitronic-50®	Nitronic-50®	PEEK	FKM / PTFE	-40°C / +85°C	650 / 9428

Type		Size	Number of Ports	Body Material / Surface Finishing					Pressure Bar / PSI
				Body	Trunnion	Ball Seats	Body and Stem Sealing	Temperature min / max	
	HBV1000 H ₂ Fuelling pressures	DN8 (3/8") DN13 (1/2")	2	1.4571	Nitronic-50®	PEEK	FKM / PTFE	-40°C / +85°C	1034 / 14997

STAUFF Control Valves

STAUFF offers a comprehensive range of lateral high-pressure, coaxial high-pressure, and coaxial valves for the complete hydrogen value chain:

- Hydrogen production/electrolysis
- Storage
- Transport
- Filling
- Test benches

STAUFF's range of control valves stand out for their hydrogen-resistant materials and compact design, ensuring both a substantial flow rate and a broad pressure range. These features make them extremely well-suited for installation in very confined spaces, such as within containers for PEM electrolysis systems. The valve's "open/closed" position can be conveniently monitored directly from the limit switch display.

Technical Features

- Standard voltage 24V DC / 230V AC (special voltages available on request)
- Connections: threaded (e.g. SAE / NPT thread), Flange (e.g. DIN EN 1092-1), Weld end
- Valve component materials: 316L, or 316Ti, 301, 304, PTFE or FPM (Viton)

Design Features

- 2/2 or 3/2 versions
- Pneumatic or Solenoid Actuation
- bi-directional operation
- Compact and small design; low weight
- Valves with flow on both sides
- Manual or automatic actuation
- Very fast switching times

Certified Performance

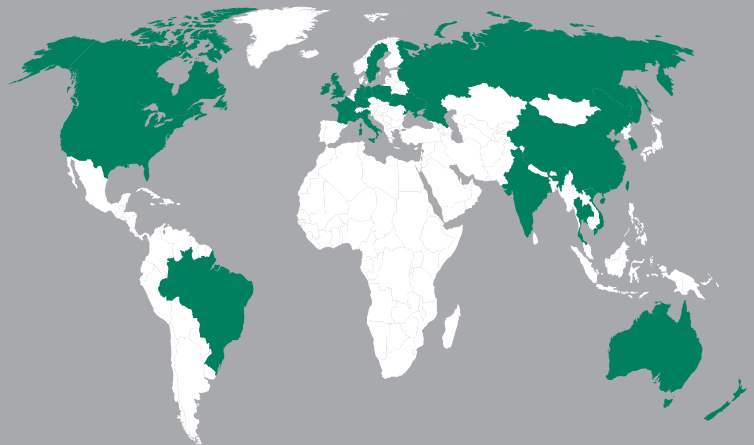
- Safety Integrity Level: SIL 2 as standard, SIL 3 optional
- MTF values on request

Advantages

- Maintenance-free/resistant to dirt
- Fast actuation
- Back pressure tight and pressure balanced design / operating from 0 Bar
- 100% tightness (Vacuum leak rate up to 10^{-6} mbar-l/s)
- High pressures and high flow; pressure balanced (switching from 0 psi, regardless of differential pressure)

Type		Pressure Range Bar / PSI	Orifice	Kv value	Possible Applications
	PCD-H 10	0-500 / 0-7252	DN 10 mm	1.5 m³/h	Hydrogen Refilling Stations Test benches
	KBS 15	0-500 / 0-7252	DN 1.5-3 mm	0.066-0.312 m³/h	
	KB 15	0-400 / 0-5801	DN 2-8 mm	0.102-1.44 m³/h	
	MK / FK	0-100 / 0-1450	DN 10-80 mm	1.6-70 m³/h	Electrolysis Pressure swing adsorption Fuel cells Gas turbines Test benches
	VMK / VFK / FCF / FMX	0-200 / 2900	DN 8-250 mm	1.6-650 m³/h	
	Pressure Control Valves SPI	0-100 / 0-1450	DN 10-32 mm	3-24 m³/h	

STAUFF Product Overview Hydrogen Industry



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STAUFF products and services are globally available through wholly-owned subsidiaries and a tight network of authorised distributors and representatives in all major industrial regions of the world.

Contact STAUFF:

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