

# Dampers for Green Hydrogen Applications



# Towards net-zero operations

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The world is facing the challenge of maintaining economic growth while reducing and mitigating the effects of human-caused CO<sub>2</sub> and other greenhouse gas emissions. Economies worldwide must achieve net-zero emissions by 2050 and accelerate the transition to clean energy to avoid a climate catastrophe. Halton is ready to support the development of clean energy production with its know-how and expertise, as well as its extensive range of high-quality and energy-efficient HVAC products and solutions designed for demanding indoor environments.



## What is green hydrogen?

The transition to renewable energy sources will need to be achieved amid the challenges of a rising global population and an expanding middle class in emerging markets, adding to energy demand and consumption. New approaches and innovative solutions are needed to meet the ambitious energy-related CO2 emission reduction targets set by national governments, regional organisations and international bodies. Many countries worldwide envision an economy where synthetic H2 produced with renewable energy, also known as “green hydrogen”, is utilised in industries, power generation, heat and transportation. Hydrogen is clean burning fuel and efficient energy carrier; upon combustion, water is the only byproduct of this zero-emissions fuel. This makes it an ideal medium for electrification and substituting fossil fuels. The opportunities offered by green hydrogen could help overcome several obstacles toward a full-fledged revolution of energy systems.



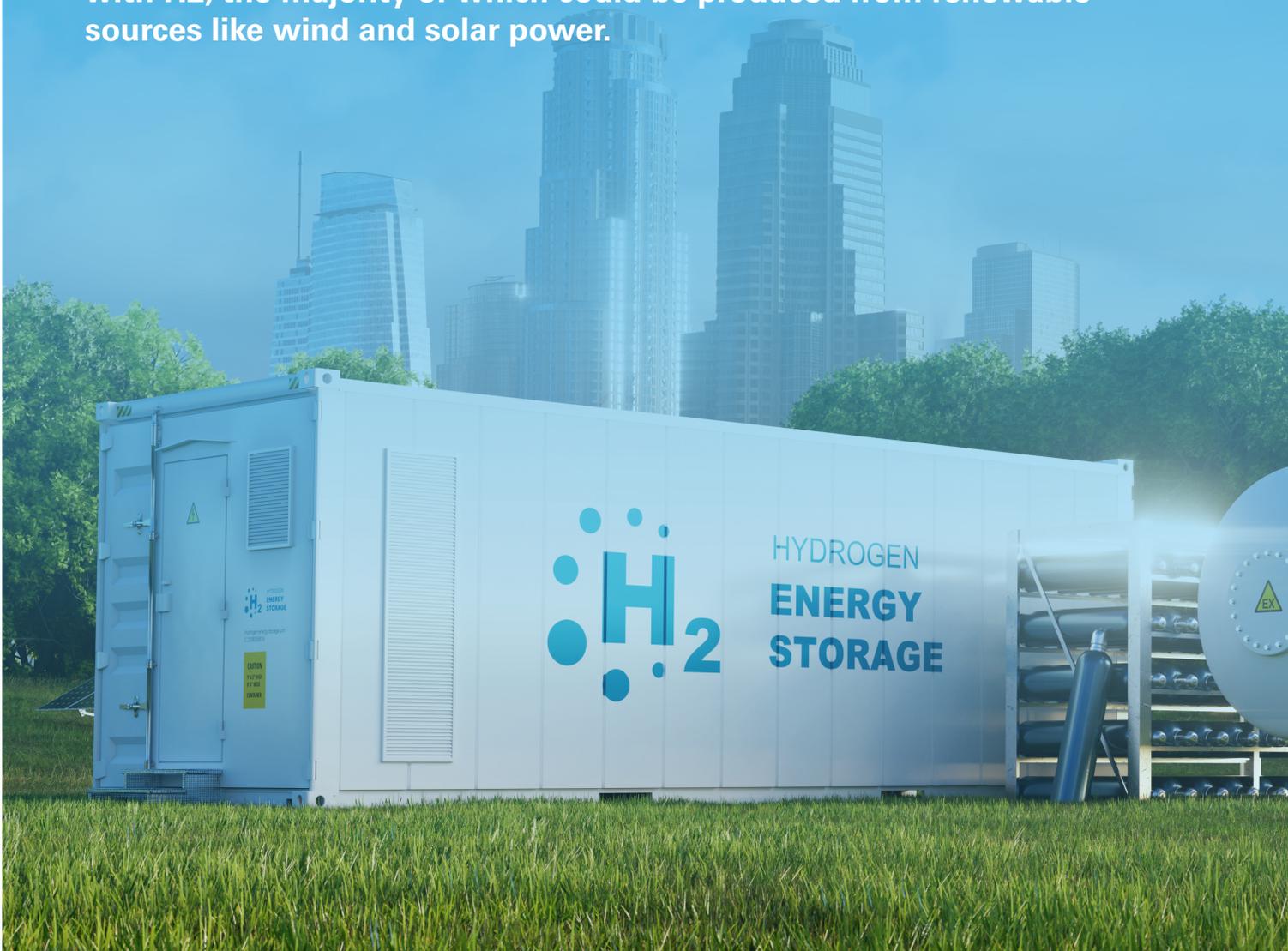
## Halton, at your service

As economies worldwide are taking steps towards net-zero objectives, Halton is ready to support the development of clean energy production on a much broader scale. Halton is one of the world’s leading manufacturers and suppliers of HVAC solutions designed for demanding indoor environments. With over 50 years of experience, Halton has supplied over 400 products for different industrial applications, from offshore wind to nuclear projects. Halton offers robust products for green hydrogen applications and supports overall progress towards net-zero objectives.

# Green hydrogen – fuel of the future

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Green hydrogen is seen as a technology of the future with enormous potential both for commercial reasons and in the context of climate action. Green hydrogen is produced by water electrolysis using only renewable, CO<sub>2</sub>-free electricity sources. By 2040, about 10 per cent of the world's primary energy demand could be replaced with H<sub>2</sub>, the majority of which could be produced from renewable sources like wind and solar power.



## Halton's offering for green hydrogen

When the scale of green hydrogen production increases, so too do the safety risks. Hydrogen itself is an extremely flammable element and could cause explosions and fires under certain conditions. Ammonia, the most likely medium for hydrogen transportation, is a corrosive gas that can also cause an explosion hazard under certain conditions. Therefore, extensive safety systems are required to minimize the damages caused by possible explosions, fires, or corrosion. Halton contributes to a comprehensive high-integrity ventilation damper offering for industrial applications. Halton's robust dampers protect components, equipment, and most importantly human beings inside the building. Halton's dampers are widely certified for various applications with different requirements. Halton offers a range of ATEX-approved dampers, available in different materials and designed for use in potentially explosive atmospheres, as well as in demanding environments with a high risk of corrosion.

## Halton's way of doing business

- Halton enables people's wellbeing in demanding indoor environments and helps its customers by offering energy-saving technologies
- Halton possesses type approvals from the major classification societies, including ISO 9001, ISO3834-2, ISO 14001, ISO 14500, ATEX, CE, and EAC certifications
- Besides dampers, Halton can offer a vast range of solutions, including droplet separators, louvres, central vacuum cleaning systems, diffusers and more
- Halton production emphasises tailoring, which means that we can adapt solutions for each customer's specific needs
- Halton is a well-established but flexible company that offers long-term business relationships with comprehensive project management and after-sales service. Halton has manufacturing facilities in 9 countries with high-tech production and certified welders. We can also offer testing and simulation services



# High-quality products for green hydrogen

Halton's products are designed for demanding conditions. In addition to a wide range of dampers, Halton offers droplet separators and external louvres.

## Fire dampers

Fire dampers are designed to prevent the possible progression of fire, smoke and gas through the ductwork system to other areas. Fire dampers close when the temperature in the ductwork rises over the threshold limit. Halton fire dampers are CE certified according to EN 12101-8:2011 and available as ATEX-approved.



ATEX  
CERTIFICATION  
AVAILABLE

## Smoke control dampers

When detecting smoke, smoke control dampers open and allow smoke to be extracted from the single or multi-compartment smoke zone by a dedicated smoke extraction system. They prevent air from infiltrating the extraction ducts by collecting smoke from the smoke zone. They can be used in manually or automatically activated systems. Halton smoke control dampers are CE certified according to EN 12101-8:2011.



## Blast protection dampers



ATEX  
CERTIFICATION  
AVAILABLE

In case of an explosion, blast dampers protect people and equipment. Without proper blast protection, a blast wave could penetrate the building through air intakes and outlets. Blast dampers close automatically when the blast wave hits them. Halton blast dampers are available as ATEX-approved.

## Airflow control dampers



ATEX  
CERTIFICATION  
AVAILABLE

Airflow control dampers are designed to regulate the airflow, temperature, air pressure, and safety levels in rooms and spaces serviced by the HVAC system. Halton airflow control dampers are CE certified according to EN 12101-8:2011 and available as ATEX-approved.

## Droplet separators



Halton droplet separators are designed for demanding applications where reliability, easy installation and special design play an important role. Separator vanes are designed to restrict the passage of moisture, salt spray and rainwater into HVAC systems or engine room intakes. The unique form of separator vanes enables high-efficiency separation. A model with heated vanes keeping intakes clear during cold conditions is available.

## External louvres

Halton external louvres are designed to restrict the passage of rainwater, snow, leaves, animals and other objects from entering the ductwork.

## Are you looking for a solution to your challenge?

Consult us! Let's see if we have a ready-made solution for you or if we can make one together.

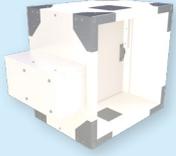
# Fire dampers, rectangular

Specifications	For demanding conditions	For regular conditions		
				
<b>Name</b>	<b>Halton FCE</b>	<b>Halton FDT</b>	<b>Halton Exe Sturdy Rectangular (ESR)</b>	<b>Halton Exe Tough Rectangular (ETR)</b>
<b>Fire resistance classification</b>	EI 60 S E 120 S	EI 60 S	Up to EI 120 S	Up to EI 120 S
<b>Installation</b>	Vertical (wall) and horizontal (ceiling/floor)	Vertical (wall) and horizontal (ceiling/floor)	Vertical (wall) and horizontal (ceiling/floor)	Vertical (wall) and horizontal (ceiling/floor)
<b>Fuse temperature</b>	72 °C	72 °C	72 °C	72 °C
<b>Frame material</b>	EN 1.4301, EN 1.4404 or EN 1.4432 or hot-dip galvanised carbon steel (3 mm) or steel galvanised finish Z275 (1 mm)	Galvanised steel	Galvanised steel or stainless steel (EN 1.4404)	Galvanised steel or stainless steel (EN 1.4404)
<b>Blade material</b>	EN 1.4301, EN 1.4404 or EN 1.4432 or steel galvanised finish Z275	Heat-insulating panel structure	Asbestos free boards made of mineral fibre	Asbestos free boards made of mineral fibre
<b>Blade gaskets</b>	Silicone seals and thermal expansion graphite seals	Silicone seals and thermal expansion graphite seals	EPDM seals and thermal expansion graphite seals	EPDM seals and thermal expansion graphite seals
<b>Leakage class according to EN 1751:2014</b>	Case: Class C Blade: Closed damper fulfils the leakage requirement class 3 for size $\geq 200 \times 200$ mm	Case: Class C Blade: Closed damper fulfils the leakage requirement class 4	Case: Class C Blade: Closed damper fulfils the leakage requirement class 2	Case: Class C Blade: Closed damper fulfils the leakage requirement class 2
<b>Size</b>	From 150x150 mm up to 1000x1000 mm at 50 mm intervals for height and 25 mm intervals for width	From 200x200 mm up to 2100x1000 mm at 50 mm intervals	From 200x200 mm up to 1000x500 mm	From 800x700 mm up to 1500x800 mm at 100 mm intervals
<b>Modular construction</b>	Module construction is not available. "Damper wall" available	Available	Not available	Not available
<b>Working temperature</b>	From -30 °C up to +50 °C	From -30 °C up to +50 °C	From -30 °C up to +50 °C	From -30 °C up to +50 °C
<b>Actuator</b>	Pneumatic or electric	Electric (24 V or 230 V) or manual (spring mechanism)	Electric (24 V or 230 V) or manual (spring mechanism)	Electric (24 V or 230 V) or manual (spring mechanism)
<b>CE certified according to EN 12101-8:2011</b>	Yes	Yes	Yes	Yes
<b>ATEX certificate</b>	Available	Not available	Available	Available
<b>SIL 2 certificate</b>	Available	Not available	Not available	Not available

## Fire dampers, circular

Specifications	For demanding conditions	For regular conditions		
				
<b>Name</b>	<b>Halton Exe Sturdy Circular (ESC)</b>	<b>Halton Exe Tough Circular (ETC)</b>	<b>Halton FDI</b>	<b>Halton Exe Fold Circular (EFC)</b>
<b>Fire resistance classification</b>	EI 120 S	Up to EI 120 S	EI 60 S	Up to EI 120 S
<b>Installation</b>	Vertical (wall) and horizontal (ceiling/floor)	Vertical (wall) and horizontal (ceiling/floor)	Vertical or horizontal (wall)	EI 120 S: Vertical (wall) EI 60 S: Vertical (wall) and horizontal (ceiling/floor)
<b>Fuse temperature</b>	72 °C	72 °C	72 °C	72 °C
<b>Frame material</b>	Galvanised steel or stainless steel (EN 1.4404)	Galvanised steel or stainless steel (EN 1.4404)	Galvanised steel	Galvanised steel
<b>Blade material</b>	Asbestos free boards made of mineral fibre	Asbestos free boards made of mineral fibre	Galvanised steel or heat-insulating panel structure	Asbestos free boards made of mineral fibre
<b>Blade gaskets</b>	Silicone seals and thermal expansion graphite seals	EPDM seals and thermal expansion graphite seals	EPDM seals and thermal expansion graphite seals	EPDM seals and thermal expansion graphite seals
<b>Leakage class according to EN 1751:2014</b>	Case: Class C Blade: Closed damper fulfils the leakage requirement class 2	Case: Class C Blade: Closed damper fulfils the leakage requirement class 3	Case: Class C Blade: Closed damper fulfils the leakage requirement class 4	Case: Complies with duct tightness requirements Blade: Closed damper fulfils the leakage requirement class 2
<b>Size</b>	From Ø160 mm up to Ø630 mm	From Ø800 mm up to Ø1000 mm	From Ø100 mm up to Ø630 mm	From Ø100 mm up to Ø200 mm
<b>Modular construction</b>	Not available	Not available	Not available	Not available
<b>Working temperature</b>	From -30 °C up to +50 °C	From -30 °C up to +50 °C	From -30 °C up to +50 °C	From -30 °C up to +50 °C
<b>Actuator</b>	Electric or manual (spring mechanism)	Electric or manual (spring mechanism)	Electric or manual (spring mechanism)	Manual (spring mechanism)
<b>CE certified according to EN 12101-8:2011</b>	Yes	Yes	Yes	Yes
<b>ATEX certificate</b>	Available	Available	Not available	Not available
<b>SIL 2 certificate</b>	Not available	Not available	Not available	Not available

# Smoke control dampers, rectangular

Specifications	For demanding conditions	For regular conditions		
				
<b>Name</b>	<b>Halton Sec Compact Rectangular (SCS)</b>	<b>Halton Sec Fit Rectangular (SFR)</b>	<b>Halton Sec Stable Rectangular (SSR)</b>	<b>Halton Sec Mighty Rectangular (SMR)</b>
<b>Fire resistance classification</b>	Up to E <sub>600</sub> 120 S	Up to E <sub>600</sub> 90 S	Up to EI 120 S	Up to EI 120 S
<b>Installation</b>	Horizontal duct (concrete, masonry or lightweight wall construction) or vertical duct (concrete ceiling or floor)	Horizontal duct (concrete, masonry or lightweight wall construction)	Horizontal duct (concrete, masonry or lightweight wall construction) or vertical duct (concrete ceiling or floor)	Horizontal duct (concrete, masonry or lightweight wall construction) or vertical duct (concrete ceiling or floor)
<b>Compartment</b>	Single	Single	Multi	Multi
<b>Activation system</b>	Automatically activated (AA) or manually activated (MA)	Automatically activated (AA)	Automatically activated (AA)	Automatically activated (AA) or manually activated (MA)
<b>Frame material</b>	Galvanised steel or stainless steel (EN 1.4404)	Galvanised steel	Galvanised steel or stainless steel (EN 1.4404)	Asbestos free boards made of mineral fibre
<b>Blade material</b>	Galvanised steel or stainless steel (EN 1.4404)	Asbestos free board made of mineral fibre	Asbestos free board made of mineral fibre	Asbestos free boards made of mineral fibre
<b>Blade gaskets</b>	Incombustible glass fiber	Incombustible glass fiber	Incombustible glass fiber	Incombustible glass fiber
<b>Leakage class according to EN 1751:2014</b>	Case: Class C Blade: Closed damper fulfils the leakage requirement class 1	Case: Class C Blade: Closed damper fulfils the leakage requirement class 2	Case: Class C Blade: Closed damper fulfils the leakage requirement class 2	Case: Class C Blade: Closed damper fulfils the leakage requirement class 2
<b>Size</b>	From 200×200 mm up to 1250×1000 mm	From 200×200 mm up to 1600×1000 mm	From 200×200 mm up to 1500×800 mm	From 200×200 mm up to 1600×1000 mm
<b>Modular construction</b>	Available	Not available	Not available	Not available
<b>Working temperature</b>	From -30 °C up to +50 °C	From -30 °C up to +50 °C	From -30 °C up to +50 °C	From -30 °C up to +50 °C
<b>Actuator</b>	Electric (24 V or 230 V) without spring return or fuse	Electric (24 V or 230 V) without spring return or fuse	Electric (24 V or 230 V) without spring return or fuse	Electric (24 V or 230 V) without spring return or fuse
<b>CE certified according to EN 12101-8:2011</b>	Yes	Yes	Yes	Yes

## Smoke control dampers, circular

## Blast dampers

Specifications	For demanding conditions	For regular conditions	Specifications	
				
<b>Name</b>	<b>Halton Sec Stable Circular (SSC)</b>	<b>Halton Sec Fit Circular (SFC)</b>	<b>Name</b>	<b>BDH Blast Protection Damper</b>
<b>Fire resistance classification</b>	Up to EI 120 S	Up to E <sub>600</sub> 120 S	<b>Maximum blast load</b>	1.0 bar
<b>Installation</b>	Horizontal duct (concrete, masonry or lightweight wall construction) or vertical duct (concrete ceiling or floor)	Horizontal duct (concrete, masonry or lightweight wall construction)	<b>Installation</b>	Vertical (wall or between ducts) or horizontal (floor, roof or between ducts)
<b>Compartment</b>	Multi	Single	<b>Frame material</b>	EN 1.4404 or hot dip galvanized or painted steel
<b>Activation system</b>	Automatically activated (AA)	Manually activated (MA)	<b>Frame material thickness</b>	5 mm
<b>Frame material</b>	Galvanised steel or stainless steel (EN 1.4404)	Galvanised steel	<b>Blade material</b>	EN.14404 or hot dip galvanized steel (blades are bolted to shafts)
<b>Blade material</b>	Asbestos free boards made of mineral fibre	Galvanised steel	<b>Blade material thickness</b>	5 mm
<b>Blade gaskets</b>	Incombustible glass fiber	Incombustible glass fiber	<b>Special flanges and drilling patterns</b>	Yes
<b>Leakage class according to EN 1751:2014</b>	Case: Class C Blade: Closed damper fulfils the leakage requirement class 2	Case: Class C Blade: Closed damper fulfils the leakage requirement class 4 (from Ø125 mm to Ø630 mm) and class 3 (Ø100 mm)	<b>Aerodynamic testing according to EN 1751:2014</b>	Yes
<b>Size</b>	From Ø200 mm up to Ø630 mm	From Ø100 mm up to Ø630 mm	<b>Size</b>	From 200x300 mm to 1200x1200 mm at 25 mm interval for width and 50 mm interval for height
<b>Modular construction</b>	Not available	Not available	<b>Modular construction</b>	Available
<b>Working temperature</b>	From -30 °C up to +50 °C	From -30 °C up to +50 °C	<b>Working temperature</b>	From -60 °C up to +80 °C in stainless steel damper. From -20 °C up to +80 °C in carbon steel damper
<b>Actuator</b>	Electric (24 V or 230 V) without spring return or fuse	Electric (24 V or 230 V) without spring return or fuse	<b>Operation principle</b>	Self-actuating, remains locked in closed position until manually opened and armed
<b>CE certified according to EN 12101-8:2011</b>	Yes	Yes	<b>ATEX certificate</b>	Available

# Airflow control dampers

Specifications	For demanding conditions			For regular conditions
				
<b>Name</b>	<b>CID-01 Zero Leakage Isolation Damper</b>	<b>CCD-01 Shut-Off Control Damper</b>	<b>Halton UTA Gastight Shut-off Damper</b>	<b>Halton UTT Multi-Blade Damper</b>
<b>Installation</b>	Duct, floor, roof or bulkhead mounted, depending upon the application	Blades either in the vertical or horizontal position	Wall or roof (at wall installation the blade orientation must always be in horizontal plane)	Blades vertical or horizontal
<b>Frame material</b>	EN 1.4307 or EN 1.4404 with a painted or galvanised finishing	EN 1.4307, EN1.4404, or galvanised steel with a painted, galvanised or uncoated finish	EN 1.4301, EN 1.4404 or EN 1.4432 or carbon steel with a painted or galvanised finishing	EN 1.4404 or galvanised steel
<b>Blade material</b>	EN 1.4307 or EN 1.4404 with a galvanised finishing	EN 1.4307, EN1.4404, or galvanised steel with a painted, galvanised or uncoated finish	EN 1.4301, EN 1.4404 or EN 1.4432 or galvanised steel	EN 1.4404 or galvanised steel
<b>Blade gaskets</b>	Silicone or neoprene	PVC blade seals	Stainless spring steel seals or silicon seals	Silicon seals
<b>Leakage class according to EN 1751:2014</b>	Case: Class C Blade: Closed damper fulfils the leakage requirement class 4  Zero leakage up to 10,000 Pa	Case: Class C (with bearing lipseals) Blades: Closed damper fulfils the leakage requirement class 3 (with bearing lipseals)	Case: Class C Blade: Closed damper fulfils the leakage requirement class 3 for size > 300x300 mm (stainless steel seals) and for size > 150x150 mm (silicon seals)	Case: Class B Blade: Closed damper fulfils the leakage requirement class 3
<b>Size</b>	From 150x150 mm up to 1000x1000 mm at 1 mm interval	From 100x100 mm up to 1275x1800 mm in 1 mm intervals	From 100x100 mm up to 1200x1600 mm at 25 mm interval for width and 50 mm interval for height (special sizes available)	From 100x100 mm up to 2400x2400 mm at 1 mm intervals (special sizes available)
<b>Circular connection pieces</b>	Yes	From Ø100 up to Ø1250 mm	From Ø200 up to Ø1250 mm	From Ø100 up to Ø1250 mm
<b>Modular construction</b>	Yes	Yes	Yes	Yes
<b>Special drilling patterns</b>	Yes	Yes	Yes	Yes
<b>Working temperature</b>	Project specific temperatures on request	Up to +100 °C (optionally up to +200 °C)	From -50°C up to +80°C	Up to +100 °C (optionally up to +200 °C)
<b>Actuator</b>	Pneumatic, electric or manual	Pneumatic, electric or manual	Pneumatic, electric or manual	Pneumatic, electric or manual
<b>CE certified according to EN 12101-8:2011</b>	Available	Available	Available	Available
<b>ATEX certificate</b>	Available	Available	Available	Available
<b>SIL 2 certificate</b>	Available	Available	Available	Not available

## External louvres and droplet separators

Specifications				
				
Name	USS External Louvre	USL External Louvre with Electric Heating	USM External Louvre	DSH Highly Efficient Droplet Separator
Installation	Wall	Wall	Wall or duct	Wall or duct
Frame material	Galvanised steel with a painted finishing	Aluminium	Painted or galvanised steel, EN 1.4404, EN 1.4432 or aluminium ENAW 5754	Aluminium EN AW 5754 with a painted finishing or EN 1.4404 with a painted finishing as an option
Effectiveness	Rainwater prevention capacity of at least 90% according to Eurovent 2/5	Snow prevention capacity of at least 70% and rainwater prevention capacity of at least 90% according to Eurovent 2/5	Rainwater prevention capacity of at least 90%	The efficiency for the removal of simulated rain is class A according to EN 13030:2001
Size	From 150x150 mm up to 1200x1000 mm at 50 mm intervals	From 400x400 mm up to 10000x2000 mm at 50 mm intervals	From 150x150 mm up to 1500x2400 mm at 1 mm intervals	From 200x200 mm up to 1500x1200 mm at 1 mm intervals
Circular connection pieces	From Ø125 up to Ø500 mm	Not available	Not available	Not available
Modular construction	Available	Available	Available	Available
Working temperature	No restrictions	No restrictions. Equipped with an electric self-regulating heating cable	No restrictions	No restrictions. DSA droplet separator with heating available for working temperature from -50 °C up to +40 °C
Operation principle	Horizontal blades	Tapering slot maze	Special front edge blade profile and side grooves	Inertial vane separation

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# About us

## Halton Marine

Halton Marine, one of the world's leading suppliers of marine HVAC, develops, manufactures and markets reliable, high-quality ventilation solutions specifically designed for different types of ships, offshore oil & gas, heavy industry and offshore wind. Our track record includes deliveries to over 200 major cruise ships, 200 oil & gas projects and 150 naval vessels.

## Halton Group

Halton Group specializes in indoor environment solutions, ranging from public and commercial buildings to foodservice facilities. Founded in Finland in 1969, Halton operates today in over 35 countries around the world, with annual sales of €220 million and over 1850 employees. The company has production facilities in Brazil, Canada, China, France, Finland, Germany, Malaysia, the United Kingdom, and the USA.