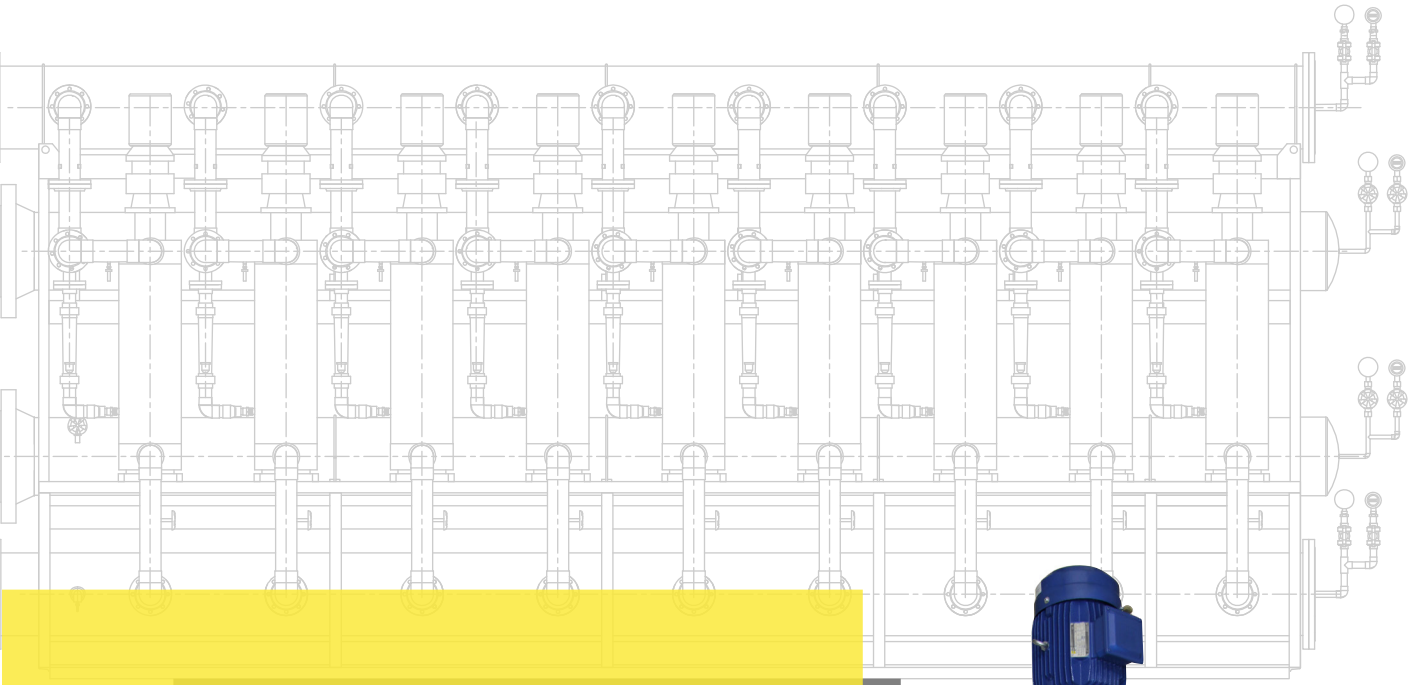
H+S Technologie



Desalination Technology

SER PRESSURE EXCHANGER

An Energy Recovery Device for Desalination

Energy Recovery Solution

Overview

To Significantly Reduce The Energy Consumed By Desalination

Desalination is increasingly being used as a principal source of water for communities globally as the technology has become more reliable and its costs has decreased over the years. Despite its increasing usage, desalination remains energy intensive.

To create a more energy efficient desalination plant, H+S is introducing an isobaric energy recovering device (SER) that is designed in Europe. It is highly efficient and easily scalable to meet the requirements of each desalination plant.

The main function of the SER is to recover energy that would otherwise be wasted, back into the desalination process. The SER is installed in the desalination unit where it recovers energy from the brine reject and is transferred into the seawater going into the advanced membranes. The SER can be easily incorporated into the desalination unit as per the process designer's requirements due to its scalability.

Key Advantages & Considerations

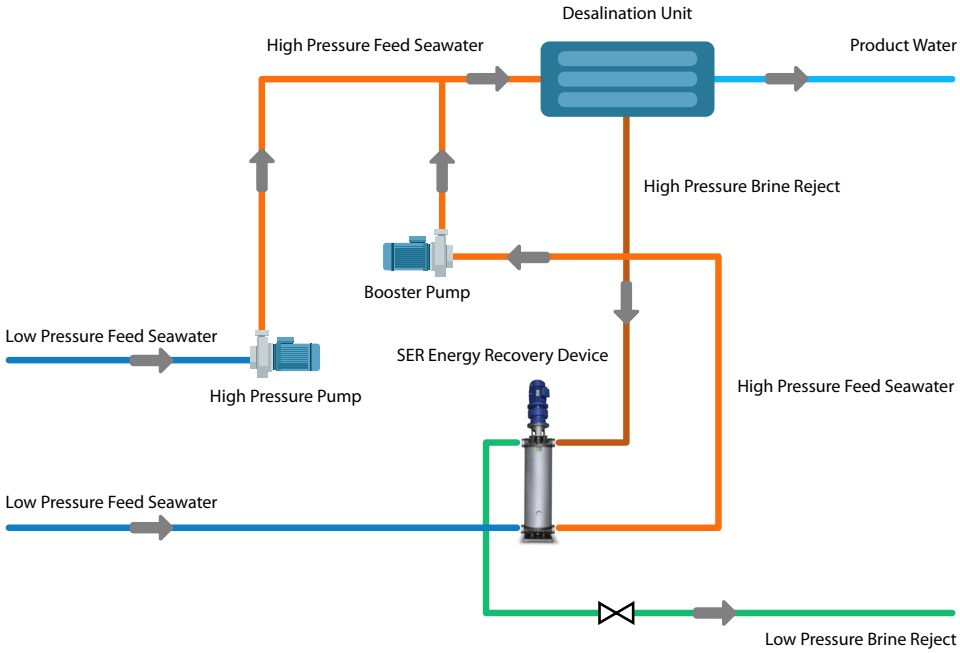
SER Advantages

1. Isobaric device, Higher energy recovery compared to pelton wheel and turbocharger.
2. Low salinity increase.
3. Modular design and available in different unit capacity.
4. Controlled rotation of rotor for reliable operation and robust operation.
5. Super duplex stainless steel construction.

Energy Recovery Solution

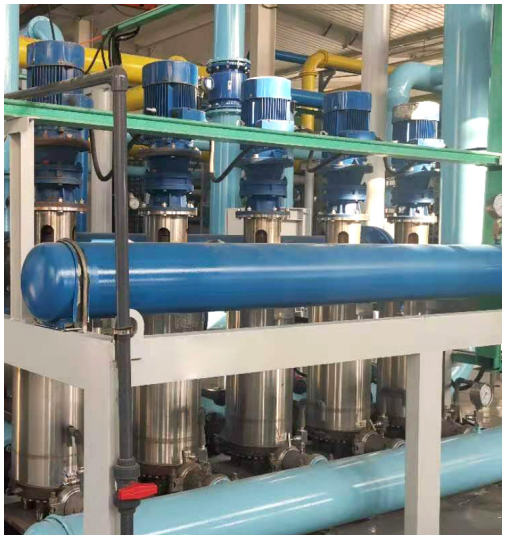
SER Pressure Exchanger

Ensure efficiency, availability and durability for energy intensive SWRO plants



In a SWRO system equipped with SER devices, the membrane reject is directed to the membrane feed as described below:

- Controlled rotation between the high-pressure and low-pressure streams, displacing the brine and replacing it with an equal volume of seawater.
- Pressure transfers from the high-pressure membrane reject stream to a low-pressure seawater feed stream with minimal physical contact in the flow path.
- After energy transfer in the SER, high pressured seawater feed stream will exit the unit and enter the booster pump.
- Booster pump will further increase the seawater feed pressure before discharging into the SWRO system.



Energy Recovery Solution

SER Pressure Exchanger

The Efficient Energy Recovery Device In Desalination Projects

Up to 97% Energy Efficiency

The SER captures the hydraulic energy from the high-pressure reject stream in the seawater reverse osmosis process and transfers this energy to the low-pressure feed water with an efficiency of up to 97%.

Landmark Engineering and Material Science

The SER device is constructed from super duplex stainless steel SUS 2507 materials. The durability of this material allows the SER to be robust and reliable during operation.

Highest Availability, Simple Maintenance

With modular configuration, troubleshooting can easily conducted and identified. The electrical motors are easily available in any markets and are simple to installed. Minimal schedule maintenance is required.

Energy Recovery Solution

Advantages

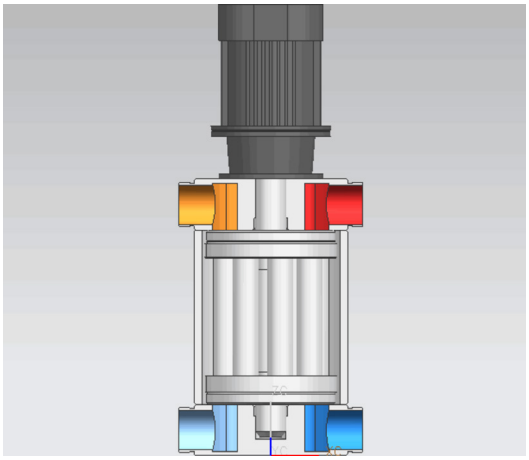
Efficient, Reliable, Robust Operation and Eco Friendly Designed

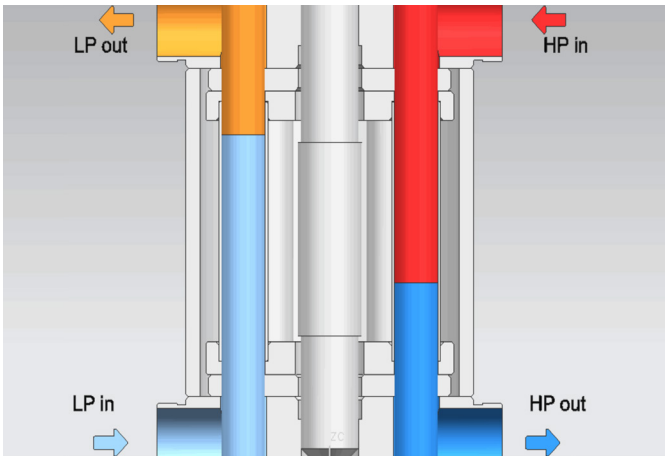
High Efficiency

Efficiency as high as 97%

Low Mixing Degrees

Mixing as low as 2%



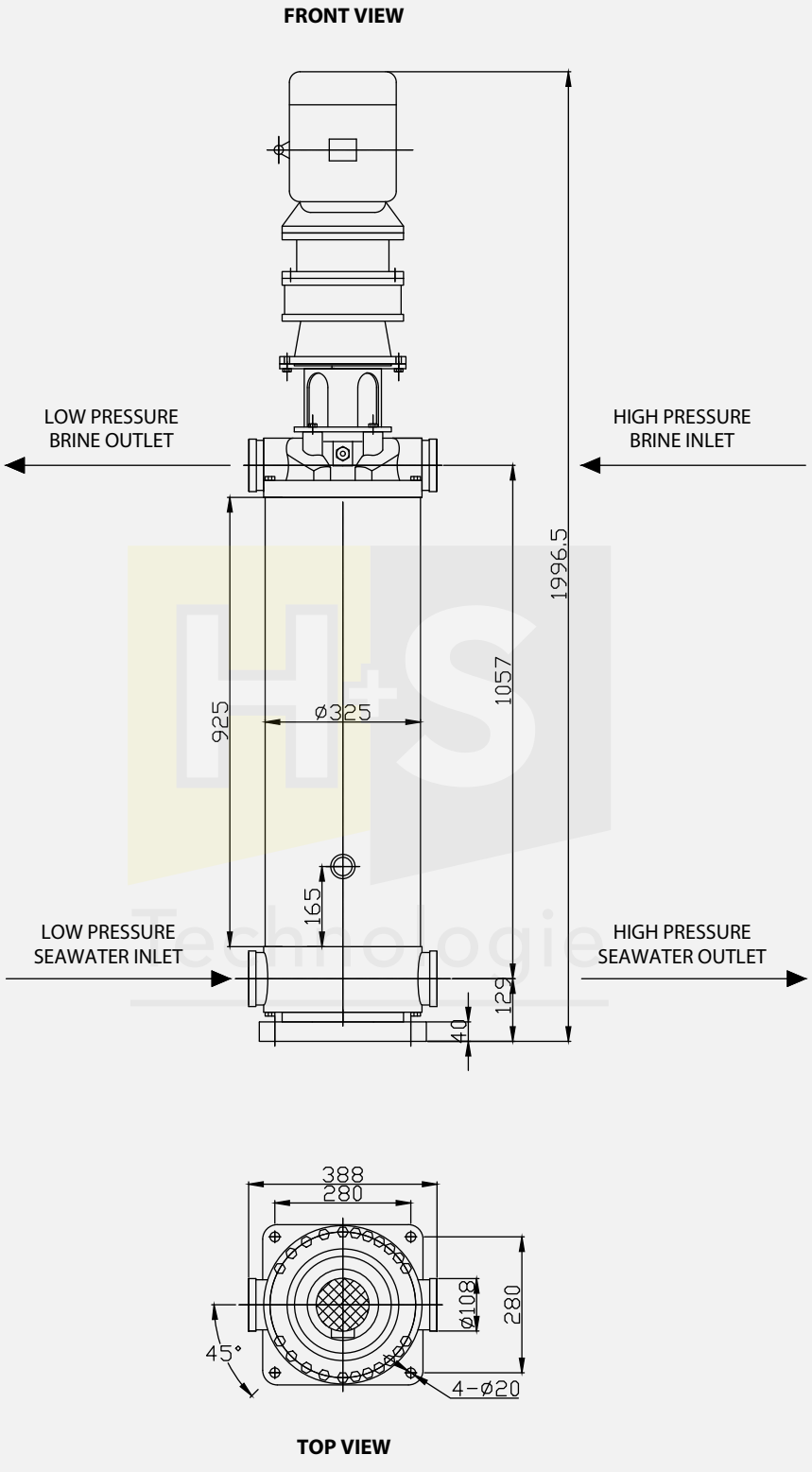


SER DESIGN CHARACTERISTIC	
Compact Design	Modular SER Unit
Wide Flow Range	SER models with different flow capacities
Technology	Isobaric design
Self Sealing	Lower leakage of high pressured fluid due to self sealing effect
Low Mixing Rate	Long tubular passage facilitate pressure exchange and results in low mixing

RELIABLE & ROBUST OPERATION	
Cavitation Resistance	Rotor: Super Duplex Stainless Steel SUS 2507 Housing: Super Duplex Stainless Steel SUS 2507 Designed for long service life & low maintenance
Impact Resistance	
Controlled Rotation	Enhanced life of friction parts with low speed design

Energy Recovery Solution

SER 90 Specifications



Energy Recovery Solution

SER 90 Specifications

SER 90 DATA SHEET

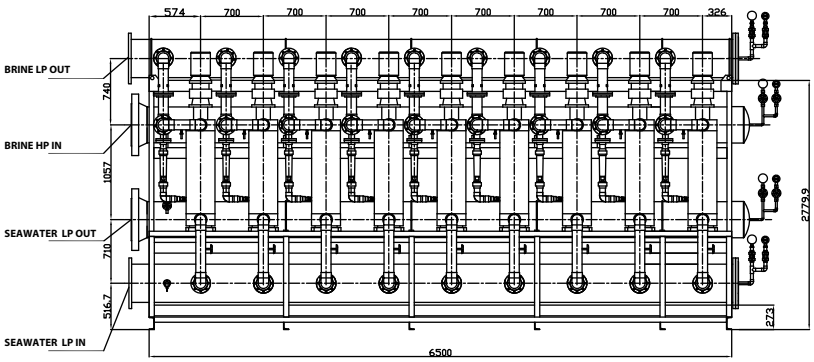
OPERATING CONDITIONS	Max. Temperature	120°F (49°C)
	Flow range, Design	65 - 95 m^3/h
	Maximum High-Pressure Inlet Flow	95 m^3/h
	Maximum Outlet High Pressure	82.7 bar
	Maximum Outlet Low Pressure	9.66 bar
	Maximum Inlet High Pressure	82.7 bar
	Minimum Inlet Low Pressure	N/A
	Minimum Discharge Pressure	1 bar
	Filtration Requirement (Nominal)	10 µm
PERFORMANCE	Peak Efficiency	97%
	Maximum High Pressure Differential	1 bar @ 95.0 m^3/hr
	Maximum Low Pressure Differential	0.9 bar @ 95.0 m^3/hr
	Maximum Lubrication Flow	0.5 - 4.8 m^3/hr
	Maximium Rotational Speed	130 rpm
	Maximum Salinity Increase at Membranes	4% @ 40% Recovery
	Sound Level	98dB(A)
MATERIALS	Housing	SS2507
	Rotor, Sleeve, Endcover Assembly	SS2507/PEEK
	Low Pressure Inlet Port Fitting	SS2507
	Low Pressure Outlet Port Fitting	SS2507
	High Pressure Inlet Port Fitting	SS2507
	High Pressure Outlet Port Fitting	SS2507
	Fasteners/Hardware	SS2205
	Axis	SS2507
	O-rings	EPDM/F4

TESTS	Performance	Standard
	Rotation Speed Test	Standard
	Witnessed Test	Optional
INSPECTION	Outside Dimensions	Standard
	Internal Components	
	Housing Dimensions	
	Rotor Dimensions	
	Material Certificates	
	Visual	
	Packing and Crating	
SHIPPING WEIGHT AND DIMENSIONS	SER-90 Unit Shipping Weight	280 kg
	SER-90 Unit Dry Weight	245 kg
	Cartridge Shipping Dimensions	147 x 58 x 47 cm
	Drive Motor Shipping Weight	93 kg
	Drive Motor Dry Weight	83 kg
	Cartridge Shipping Dimensions	77 x 35 x 36 cm
	Shipping and Storage Temperature	33°F-120°F (0.6-49°C)
PIPING CONNECTIONS	Low Pressure Inlet Port Fitting	4" (DN100) Grooved-end Flexible Pipe Coupling
	Low Pressure Outlet Port Fitting	
	High Pressure Inlet Port Fitting	4" (DN100) Grooved-end Flexible Pipe Coupling
	High Pressure Inlet Port Fitting	

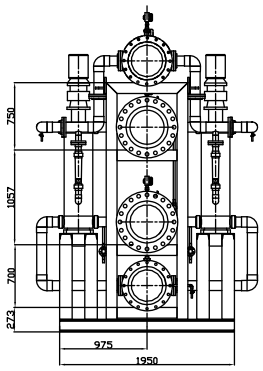
Energy Recovery Solution

SER Typical Skid Model

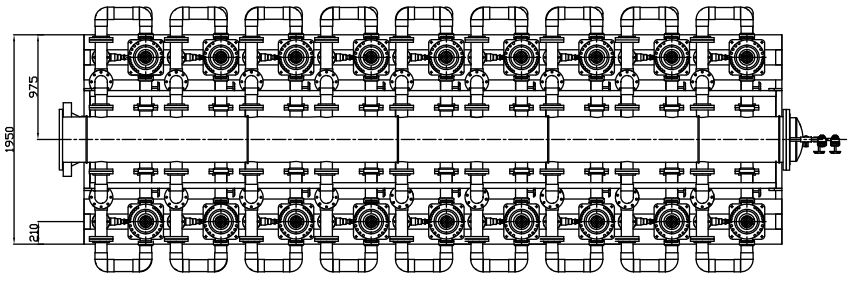
Efficient, Reliable, Robust Operation and Eco Friendly Designed



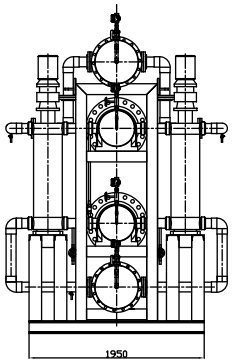
FRONT VIEW



SIDE VIEW A



PLAN VIEW



SIDE VIEW B

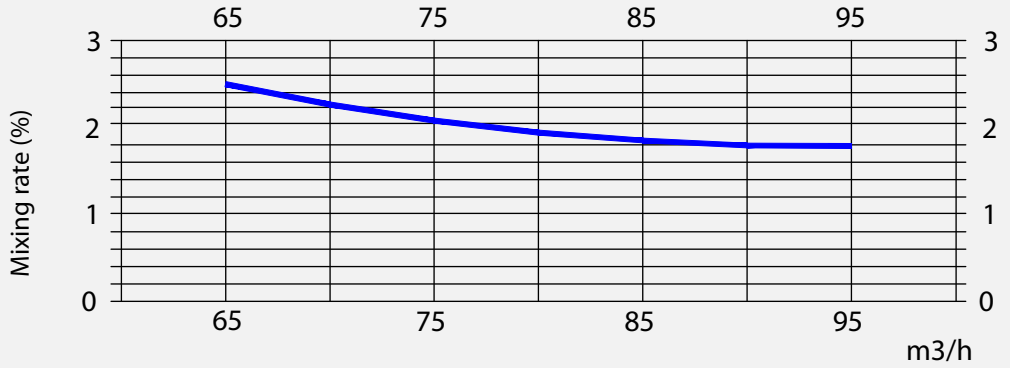
SER PRODUCT INFORMATION

MODEL	CONNECTION	FLOW RANGE	EFFICIENCY
SER-10	1.5 "	< 12.5m³/hr	90.0% - 96.4%
SER-20	2 "	12.6m³/hr - 22m³/hr	90.0% - 96.5%
SER-30	2.5 "	23m³/hr - 37.8m³/hr	90.0% - 96.7%
SER-50	3 "	37.9m³/hr - 56.4m³/hr	90.0% - 96.7%
SER-90	4 "	65m³/hr - 95m³/hr	90.0% - 97.2%

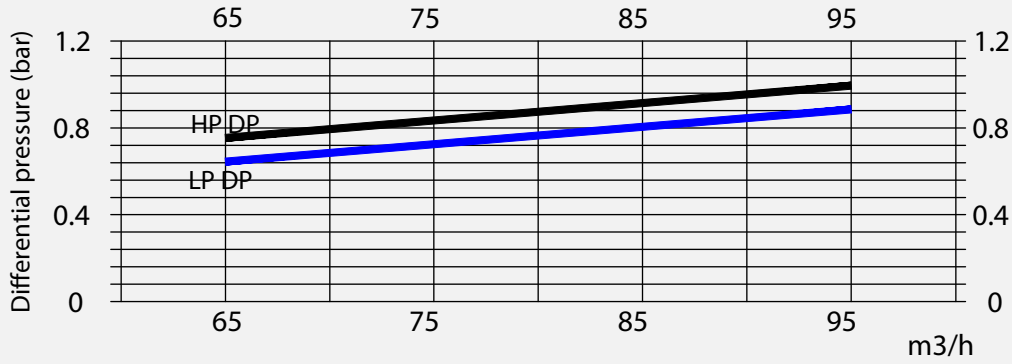
Energy Recovery Solution

SER Performance Chart

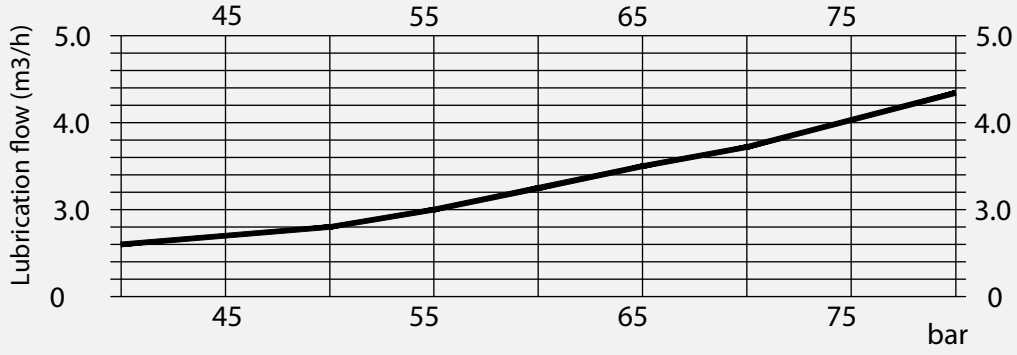
MIXING RATE



HP & LP DIFFERENTIAL PRESSURE



LUBRICATION FLOW



H+S Commitment To Quality and Excellence

Our goals are to achieve total customer satisfaction by delivering the greatest value to our customers at the most competitive cost. We focus on on-time delivery, customer-satisfying products, and services. We are committed to maintaining and constantly improving the quality of our products and services so that customer requirements are consistently met.

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