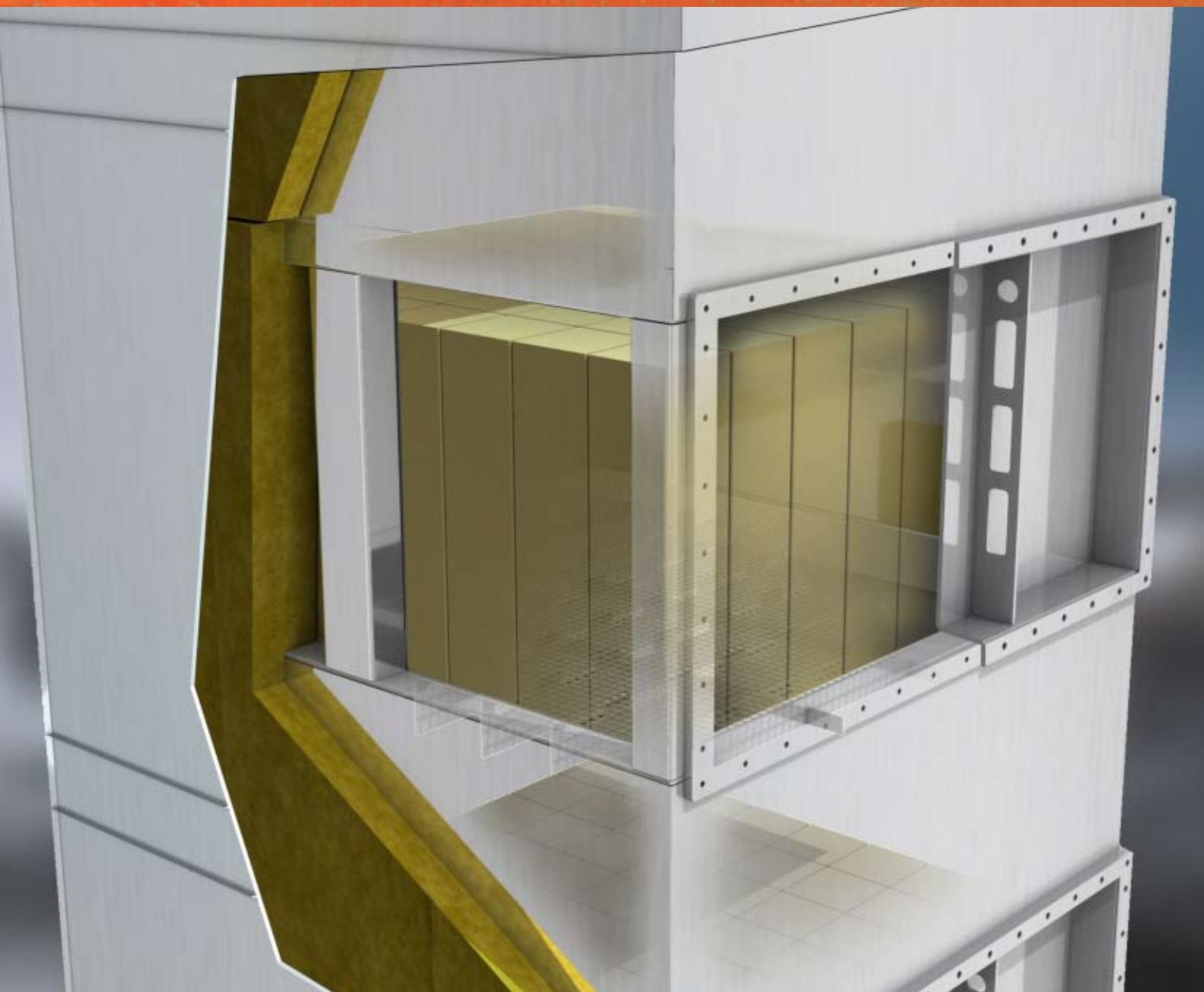
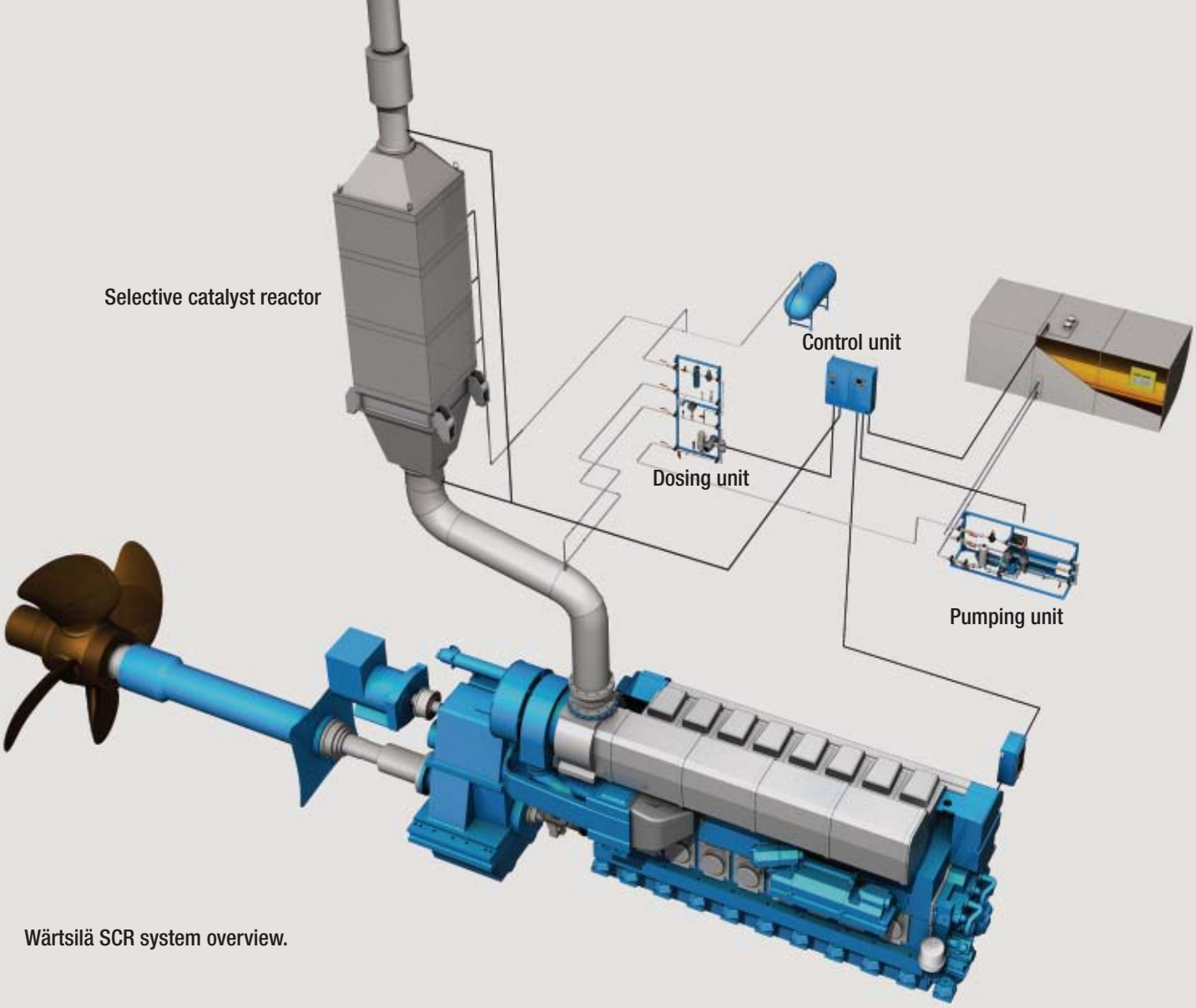
WÄRTSILÄ

WÄRTSILÄ NITROGEN OXIDE REDUCER





Wärtsilä SCR system overview.

WÄRTSILÄ SELECTIVE CATALYST REDUCTION (SCR) TECHNOLOGY

Wärtsilä has developed an SCR programme to cover its 4-stroke engine portfolio. The size of the SCR is optimized in terms of performance and cost in order to deliver the best solution. This approach also supports the highest availability of spare parts at all times. Tailor-made solutions are, however, also available.

NITROGEN OXIDES (NO_X) LEGISLATION

New and more stringent legislation concerning NO_X emissions is a global phenomenon. Some prime examples are:

- The Norwegian NO_X tax requiring NO_X emissions to be below 2 g/kWh.
- IMO Tier III. The IMO will, effective from 2016, introduce a new limit that is 80% below its Tier I level, for ships in designated areas.

SELECTIVE CATALYST REDUCTION TECHNOLOGY

THE PRINCIPLE

The concept is based on a chemical reactor wherein NO_X is converted by ammonia into nitrogen and water. A catalyst material that enables the reaction to occur is needed. An urea and water solution is injected into the gas flow to generate the amonia.

Urea is a non-toxic compound, easy to handle and widely available.

In order to ensure the right quantity and mix of ammonia into the system, pumping and dosing systems as well as an injection system, are required.

THE COMPONENTS

The reactor is formed by a steel casing containing the catalyst material in the form of ceramic squared bricks (TiO_2) covered by the catalytic material (V_2O_5).

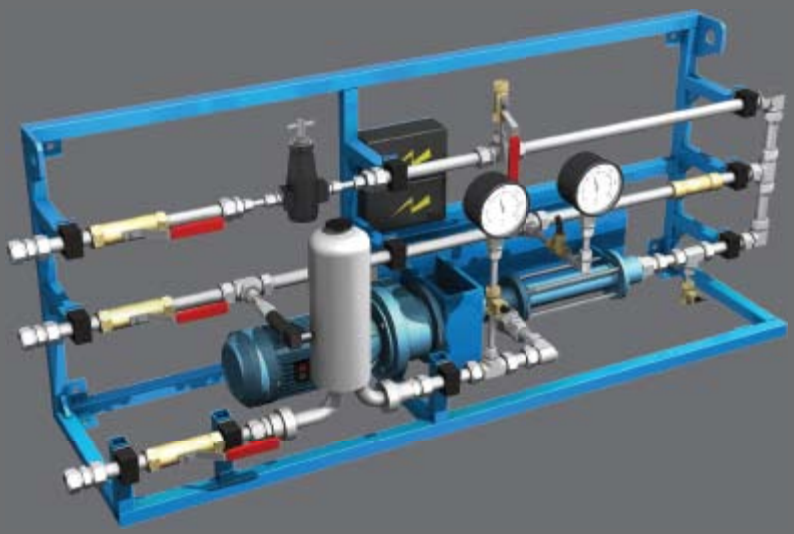
The control system is the 'brain' that controls the different functions of the auxiliary equipment, matching them with the engine's working point.

The pumping system transfers the urea solution from the tank to the system.

The dosing unit has the task of feeding the correct amounth of urea flow for the given engine load.

The injection system makes it possible for the urea to become atomized into the gas flow.

Compressed air is used both to inject urea and to perform soot blowing of the reactor.



The urea pumping and dosing units are delivered in prefabricated and tested units of standard sizes.

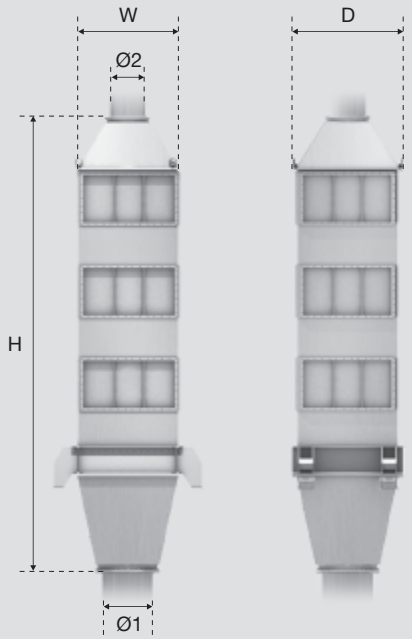
The control system uses the same hardware, software and communication protocols as the engine. This simplifies the connection with the automation system.

SELECTION OF SCR – WÄRTSILÄ ENGINES*

Engine	Cyl.	Reactor size	Urea pumping system	Urea dosing system	Compact unit	Urea injection system	Control system
Wärtsilä 20	4–9	1	1	1	1	1	1
Wärtsilä 26	6–8						
Wärtsilä 26	9–12	2				2	
Wärtsilä 32	6–8						
Wärtsilä 38	6						
Wärtsilä 26	16	3				3	
Wärtsilä 32	9–12						
Wärtsilä 38	9						
Wärtsilä 46	6						
Wärtsilä 50DF	6						
Wärtsilä 32	16–18	4	2	2		4	
Wärtsilä 38	12						
Wärtsilä 46	8–9						
Wärtsilä 50DF	8–9						
Wärtsilä 38	16	5				5	
Wärtsilä 46	12–18						
Wärtsilä 50DF	12–18						
Wärtsilä 64	6–9						

*Also available as retrofits.
For retrofits and non-Wärtsilä engines please contact nox@wartsila.com.

Size	H mm	W mm	D mm	Ø1 mm	Ø2 mm
1	4590	1414	1414	800	500
2	4790	1725	1570	1000	700
3	5170	1885	2035	1200	900
4	5690	2350	2350	1450	1000
5	6050	2665	2665	1700	1200
5.1	6950	2665	2665	1700	1200



PERFORMANCE

SCR is a very powerful tool in reducing NO_X. For practical reasons the reduction is limited to a range covering 80–90% of the engine's emissions.

In addition to NO_X abatement, SCR also has a beneficial effect on other pollutants, such as HC and PM, which are also reduced.

The SCR design has been developed to enhance the noise suppression characteristics.

ENGINE OPERATION

The design of SCR has been enhanced in order to reduce its sensitivity to Sulphur content within recommended limits.

When not in use, SCR can be run dry with its urea injection swiched off.

"All in One" solution where all the auxiliary equipment for a single SCR is installed connected and tested prior to the delivery to the customer.

WÄRTSILÄ

Wärtsilä enhances the business of its customers by providing them with complete lifecycle power solutions. When creating better and environmentally compatible technologies, Wärtsilä focuses on the marine and energy markets with products and solutions as well as services. Through innovative products and services, Wärtsilä sets out to be the most valued business partner of all its customers. This is achieved by the dedication of more than 16,000 professionals manning 150 Wärtsilä locations in 70 countries around the world. Wärtsilä is listed on The Nordic Exchange in Helsinki, Finland.

WARTSILA.COM

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