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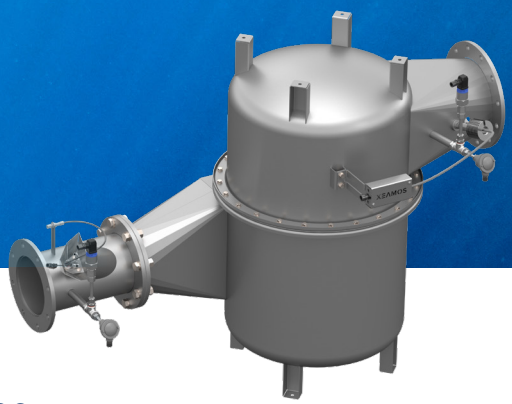
Reducing emissions together

Clean air engineering



Zero NOx-RB

Xeamos solution for IMO Tier III OEM solutions for marine engines < 850kW (propulsion and auxilary)

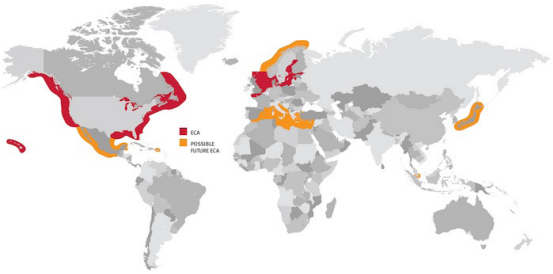
With all eyes focussed on the new Emission Control Area's that has come into force since January 2021, Xeamos has developed an innovative and modular OEM solution for SCR DeNox systems for marine applications. These systems have been based on our extensive experience since the first system was installed in 2011. Currently, our systems convert almost a half million kilograms of NOx to harmless nitrogen each year.

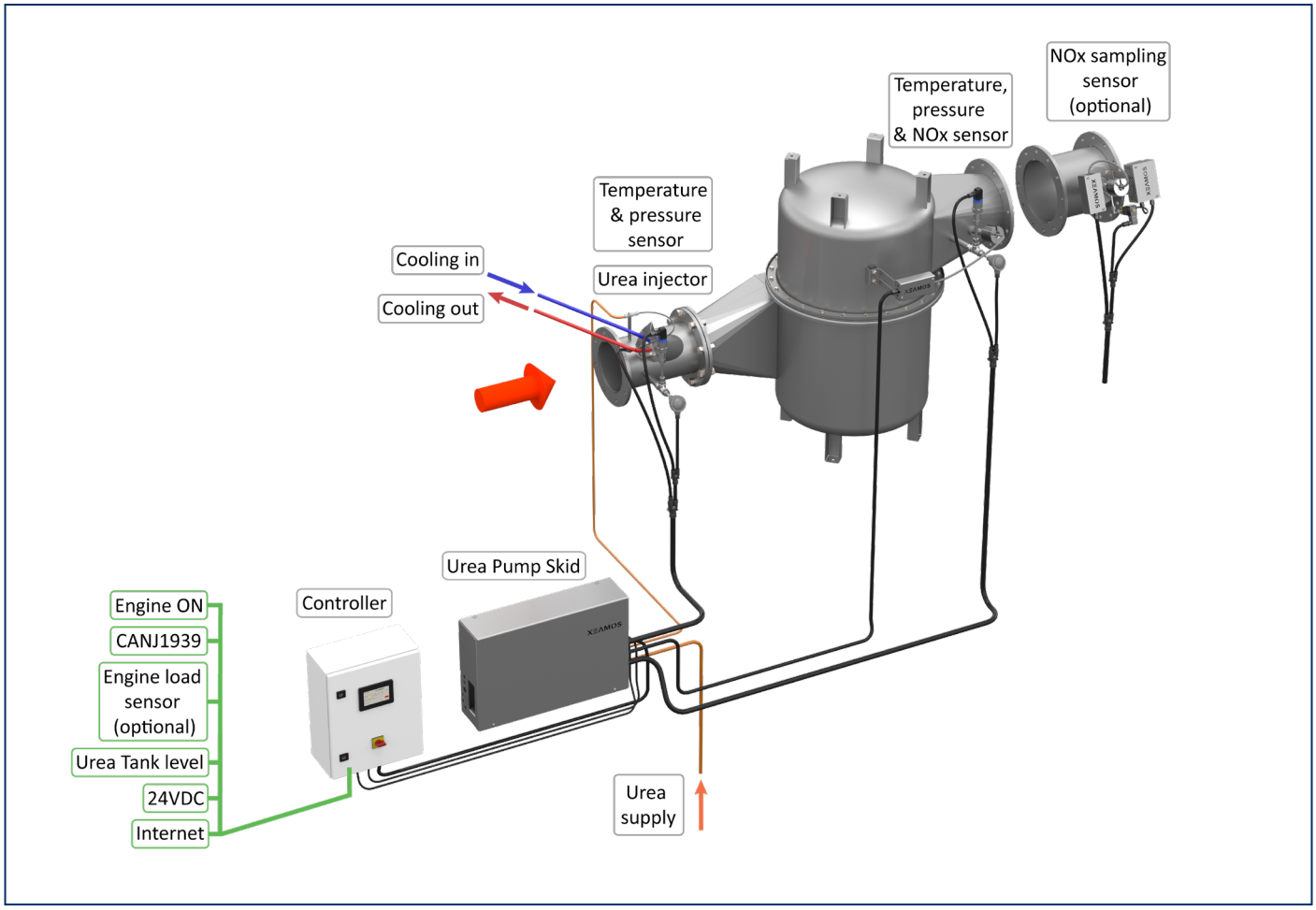
With Xeamos SCR systems any diesel engine can comply with the IMO Tier III NOx emission standard, or even better. Our systems can be designed with integrated sound attenuation and in any geometry as far as the laws of physics allow.

- More than 600.000 hrs of experience in exhaust emission reduction in the maritime industry
- Extensive experience with IMO III certification procedures. Holder of multiple certificates.
- Zero NOx-RB systems can be applied in wet and dry exhaust systems, even if high back pressures can occur.
- The Zero NOx unit can be mounted in any orientation with multiple mounting points. Outlet can be fully rotated 360 degrees with steps of 7,5, 9 or 15 degrees, (depending on system type), all for optimal integration in existing or future exhaust systems.
- Intelligent PLC control ensures trouble free operation.
- Intergrated sound attenuation. Optional extra sound attenuation.

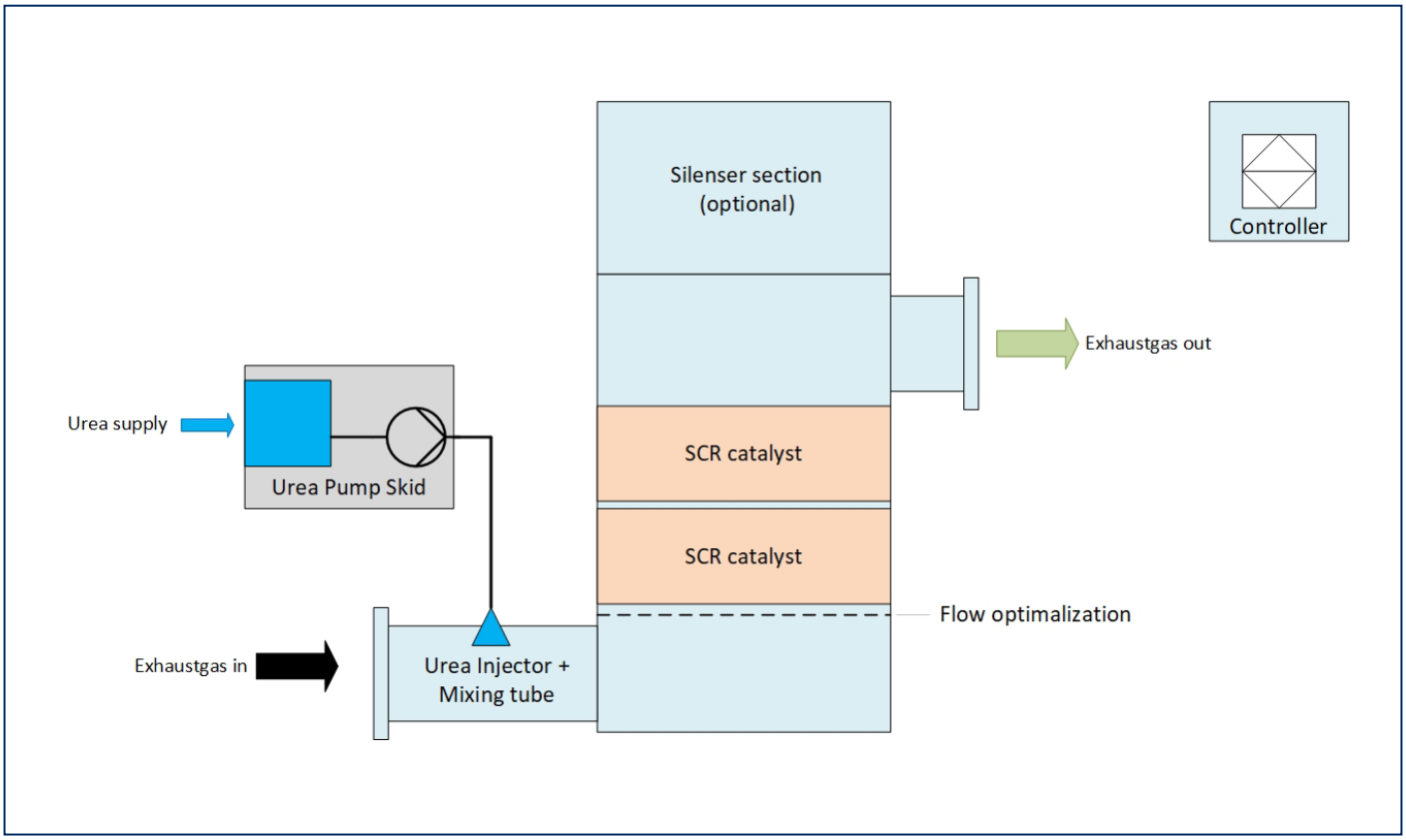
Main Features

- Intelligent modular design
- Easy integration in small engine rooms, various mounting options
- New generation airless urea injection
- Integrated silencer
- Designed for hars marine environments
- CDF and FEM aided design
- Suitible for LS, MGO and MDO fuels
- For up to 600°C exhaustgas temperature
- Full stainless steel housing
- SCR catalytic elements are exchangeable
- Various thermal insulation options
- Remote service option





Lay out of the Zero NOx-RB system.



Process schematic of the Zero NOx-RB system.

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Operational conditions

Application	LS/ULSF, MGO, MDO
Ambient Temperature	-20 + 50°C
Degree of Protection	IP55
Relative humidity	5 to 95% Non-condensing
Inspection & service interval	Approx. 1x per year (normal conditions)
Urea specification	AUS32 or AUS40 or equivalent

Utilities

Power supply	24 VDC - 32A (uninterrupted)
Coolwater for urea injector	30l/h @ max. 110 °C. (from engine cooling circuit)

Supplies

Materials Reactor	Housing: Stainless Steel Mixing tube: Stainless Steel
Surface treatment	No treatment or heat resistant primer
Max system pressure	200mbar @550°C. For higher pressure please consult Xeamos
Pressure drop (ΔP)	30-50 mbar
Emission reduction	IMO Tier III limit
Operational temperature	>230°C (EN590 fuel)
Control strategy	Closed loop with NOx sensor
Supports	Standard
Thermal insulation	Optional

Legal requirements and standards

Standards	EMC directive 2014/30/EU Machinery directive 2006/42/EC Low voltage directive 2014/35/EU Classification Lloyds Register

System parts

Controller	PLC with full colour HMI, marine standard (acc. to LR requirements) One controller cabinet is applied for up to 2 Zero NOX-RB systems per engine room - Inputs: Engine ON, CANJ1939, Engine load sensor, Urea tank level - Outputs: System ON, Alarm, MOD bus - Data logging - Remote access (optional)
Reactor Housing	Flexible orientation of outlet
Urea pump skid	Urea Pump module Airless urea injector Day tank Urea quality sensor
Sensors	2x temperature, 2x pressure transmitter & 1x NOx out
Wiring	Wiring harness between Controller and Urea Pump skid included (3m standard) Wiring harness between Urea Pump skid and field components included (5m standard, 10m option)

Performance

NOx – Nitrogen oxides	75 - 80% reduction
Sound attenuation	25 dB(A) or 35 dB(A) with optional silencer

Emission standards

The IMO NOx Tier III emission standards is effective in the NECA areas since January 1st 2016. This means that all vessels (500 GT and above) with a length of ≥24 metres, have to comply with the IMO Tier III emission rules. These NOx emission requirements are laid down in the MARPOL (73/78) Annex VI regulation 13 (2008). From January 1st 2016 the IMO NOx Tier III emission standards is effective in the North American and US Caribbean Nitrogen Emission Control Areas (NECAs). Besides that, the IMO has adopted the designation of the Baltic Sea and the North Sea as an emission control area for nitrogen oxides (NECA) for ships with keel-laying on or after 1 January 2021; this was decided during the 71th session of the IMO Marine Environment Protection Committee (MEPC 71). All this means that engines on board above 130 kW are not allowed to emit more than approx. 2 g/kWh NOx (high speed engines). This means a 75% reduction of NOx compared to the IMO Tier II standard. With diesel engines this emission level can only be reached by fitting an SCR system.

Certification

Xeamos has extensive experience with IMO Tier III certification and holds various IMO III certificates. Please contact us for more information.

Optional

- Remote access via LAN accessible for diagnostics/remote Services
- Single controller for each system in case of a two engines per engine room
- NOx sample unit for sulphur containing fuels

System selection

To configure your system we kindly ask you to submit the following information.

Engine model and power	kW
Maximul exhaust gas flow	kg/h
Engine certification	IMO II / n.c./ …
Exhaust system	wet / dry
Available	backpressure mbar
Running hours per year	hours
Average engine load	%
Fuel type	EN590, DMA etc (specify max.sulphur content)

IMO III modular SCR unit selection Table

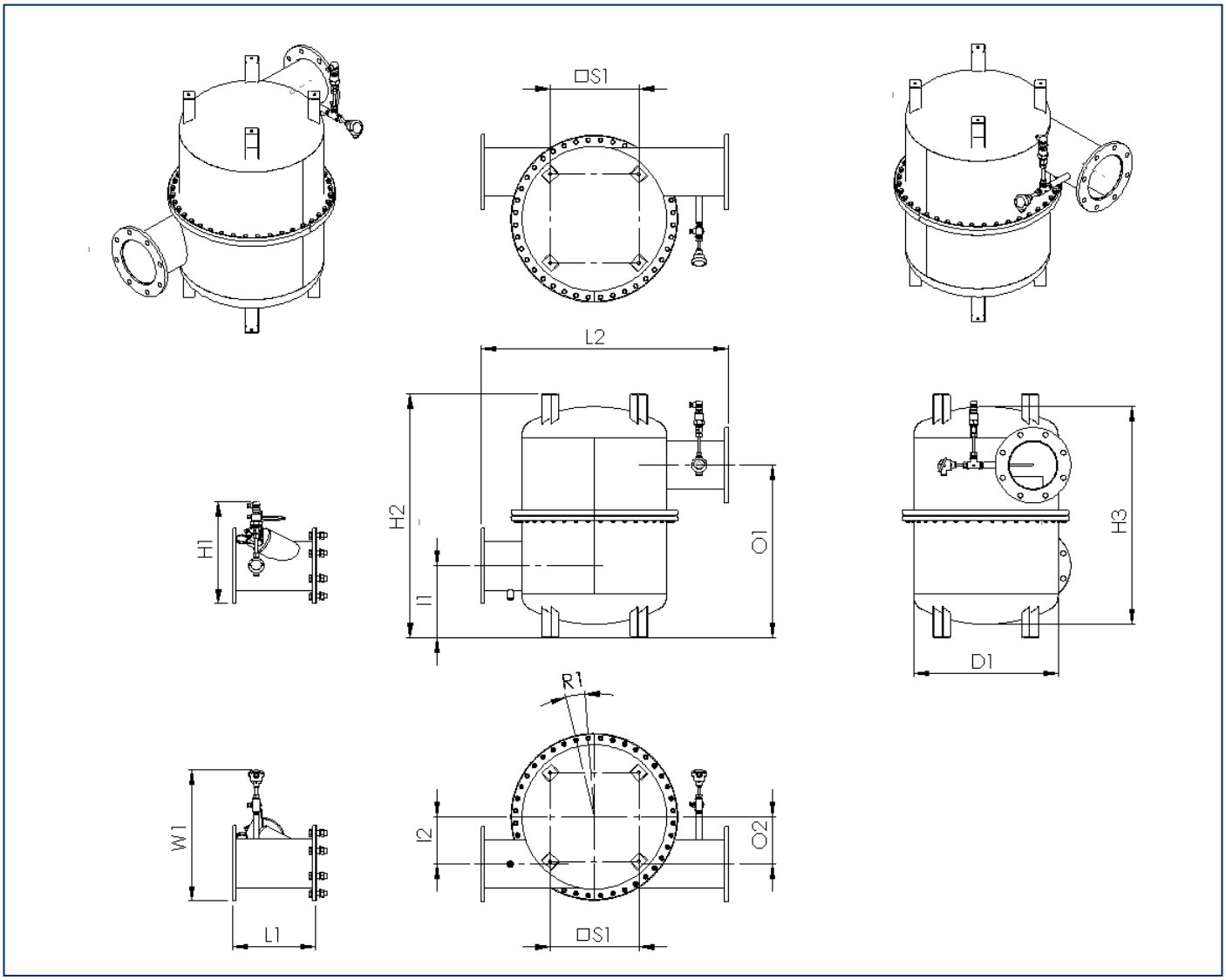
System type	Max. exhaust-gas flow kg/h	Reference engine power kW	Pressure drop @ 100% load mbar
ZN-RB-M-30	1180	200	~30
ZN-RB-M-40	1770	320	~50
ZN-RB-M-60	2400	430	~30
ZN-RB-M-90	3600	650	~50
ZN-RB-M-115	4400	750	~50

IMO III modular SCR unit size Table

System type	Flange EN1092 PN10		W1	L1	L2	H1	H2*	H3*	I1	I2	O1	O2	S1	D1	R1	Weight unit	Weight mixing tube
	In	Out	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	°	kg	kg
ZN-RB-M-30	DN150	DN150	450	375	1000	400	965	830	295	165	670	165	315	508	15	130	20
ZN-RB-M-40	DN150	DN150	450	375	1000	400	1145	1010	475	165	850	165	315	508	15	160	20
ZN-RB-M-60	DN200	DN200	590	375	1110	460	1100	980	323	210	776	212	400	650	9	160	25
ZN-RB-M-90	DN200	DN250	590	375	1315	460	1255	1135	465	210	920	n.a.	400	650	9	260	25

** H2/H3 : with (optional) internal damper section height is +500mm*

Drawing standard Zero NOx-RB system



Note: This drawing is preliminary & provided for reference only and is not intended for installation purpose.
Contact us either your local distributor for detailed information

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