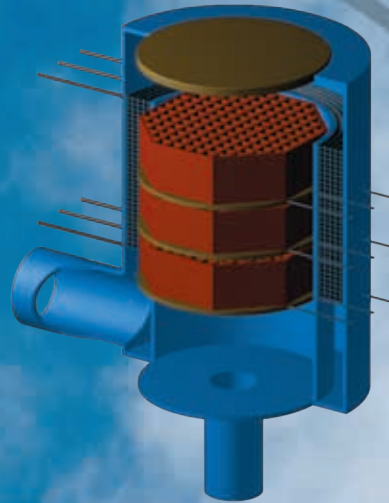


GESAB



NO_x REDUCTION SYSTEMS

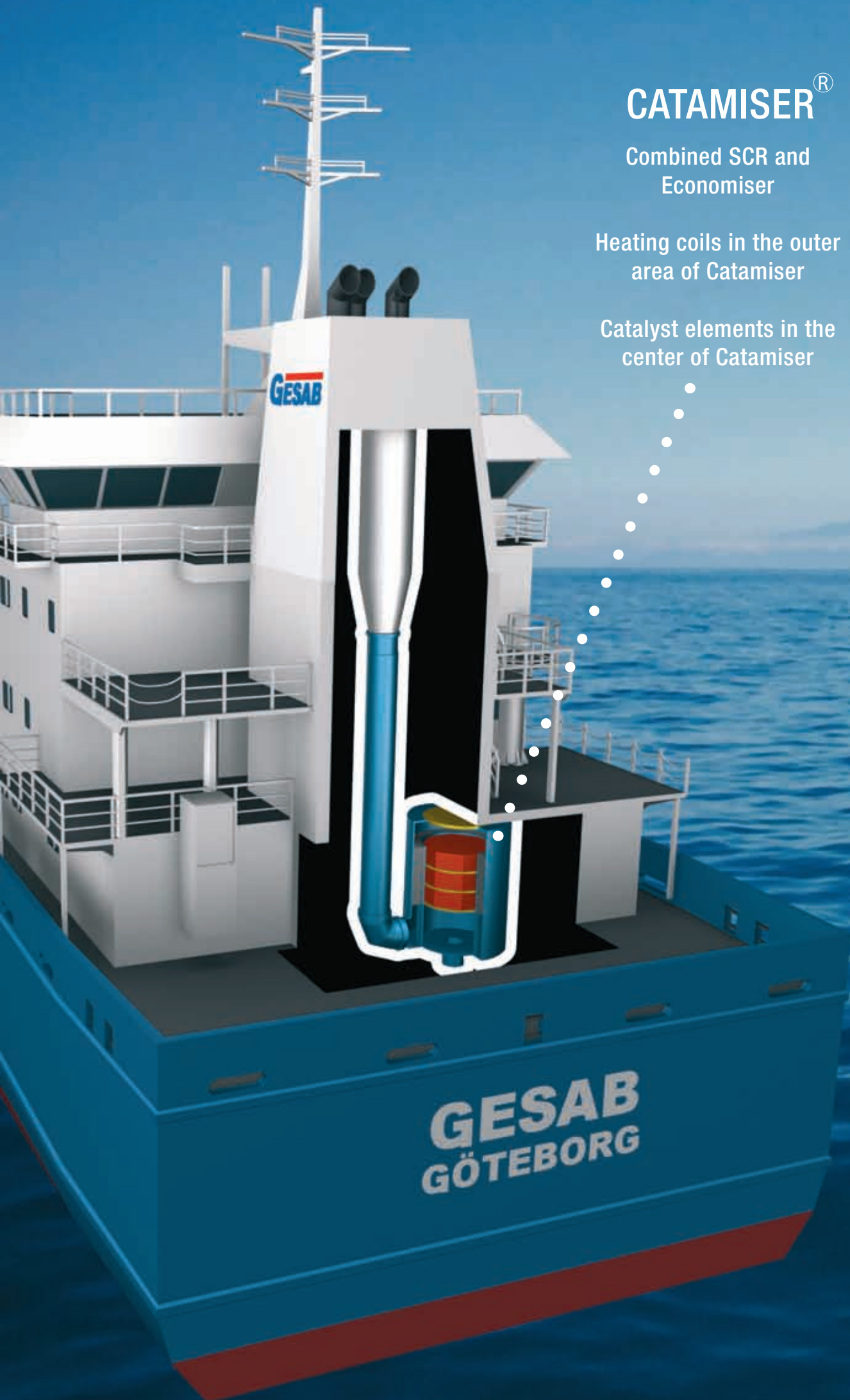


CATAMISER[®]

Combined SCR and
Economiser

Heating coils in the outer
area of Catamiser

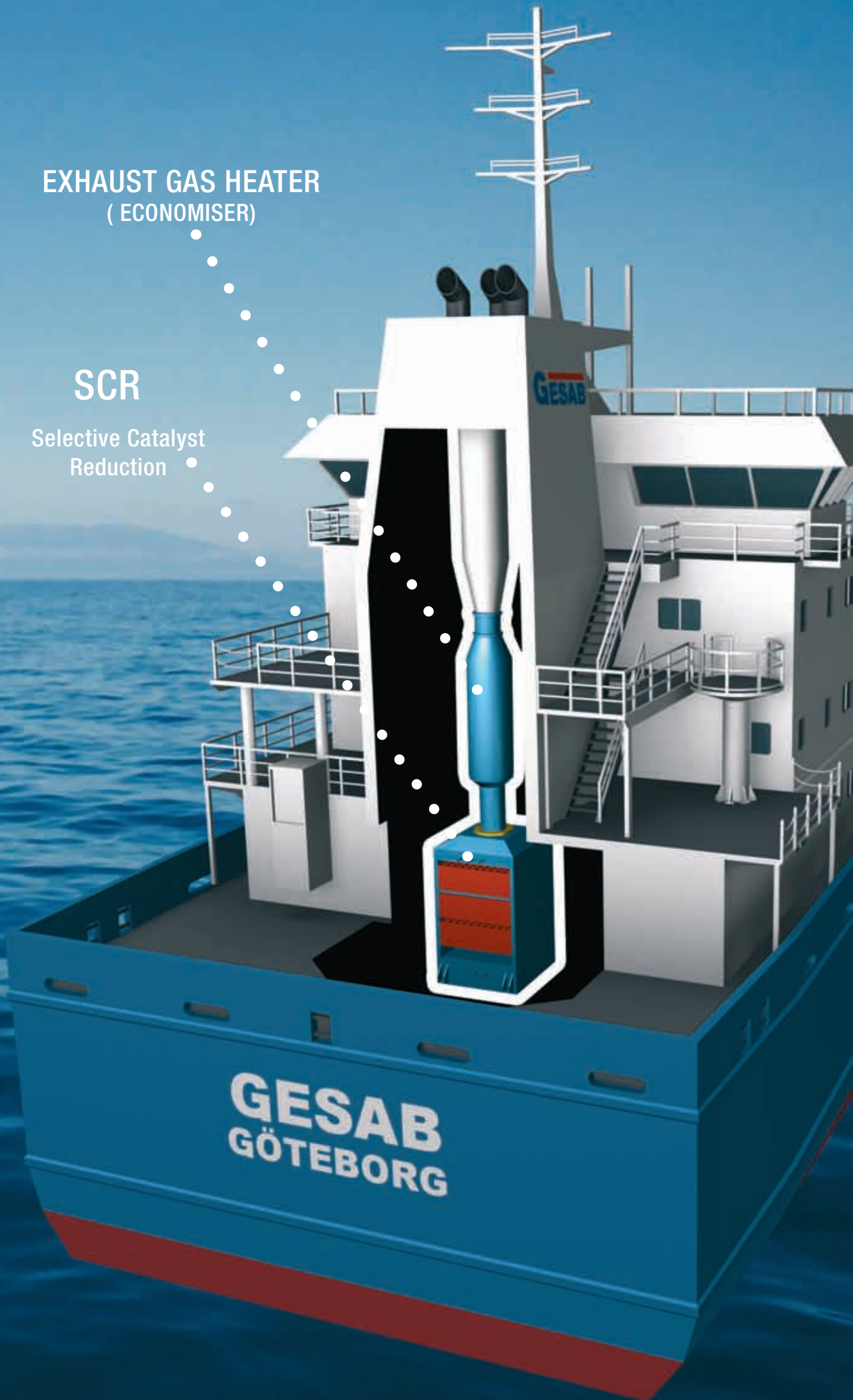
Catalyst elements in the
center of Catamiser



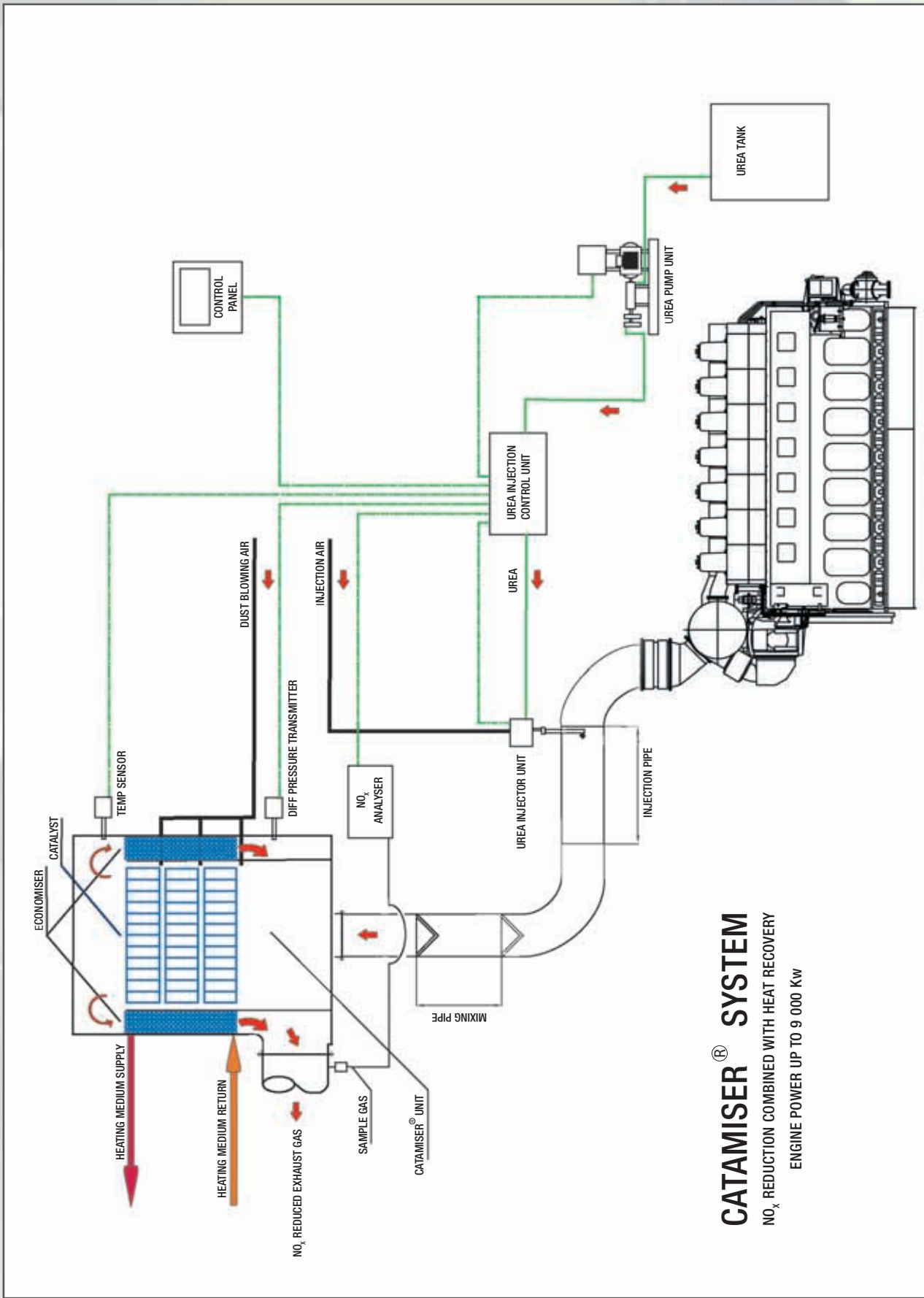
EXHAUST GAS HEATER
(ECONOMISER)

SCR

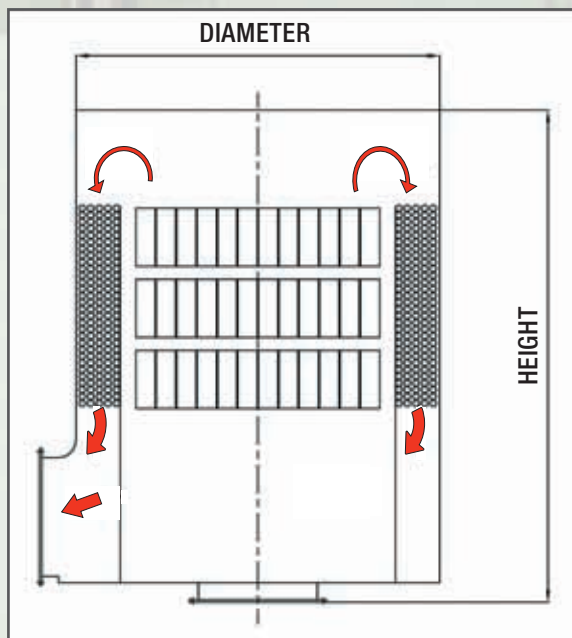
Selective Catalyst
Reduction



CATAMISER[®]



CATAMISER[®] SYSTEM
NO_x REDUCTION COMBINED WITH HEAT RECOVERY
ENGINE POWER UP TO 9 000 Kw



CATAMISER[®] SYSTEM

NO_x REDUCTION COMBINED WITH HEAT RECOVERY

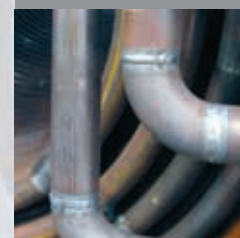
| Engine Power kW | Heating Capacity kW | Diameter mm | Height mm | Weight ¹ kg |
|--------------------|------------------------|----------------|--------------|---------------------------|
| 500 | 100 | 1 400 | 2 300 | 2 000 |
| 1 000 | 200 | 1 600 | 2 500 | 2 500 |
| 2 000 | 400 | 1 900 | 2 800 | 4 000 |
| 4 000 | 800 | 2 400 | 3 400 | 6 500 |
| 6 000 | 1 200 | 2 700 | 3 600 | 9 000 |

¹Weight including catalyst, injection and mixing pipe.

* Other sizes to be calculated on request

PERFORMANCE DATA

| | |
|---------------------------|----------------------------------|
| Heat recovery | 15-20 % of engine power |
| NO _x reduction | 80 - 85 % (<2.0 g/ kWh) |
| Noise reduction | not specified |
| Service life | 5 years |
| Product range | 4-stroke engines, 500 - 9 000 kW |



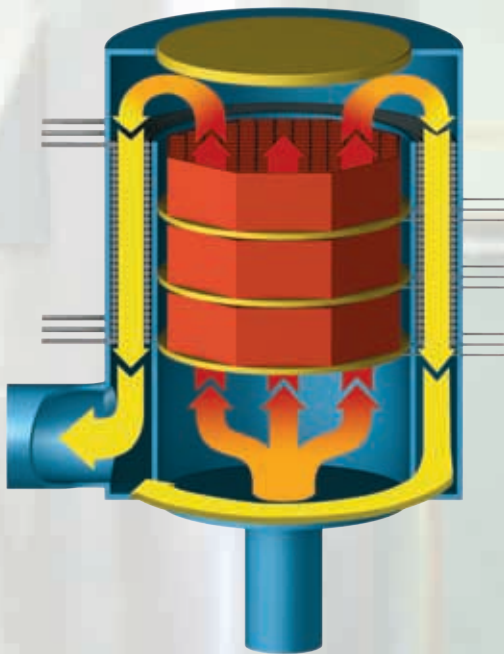
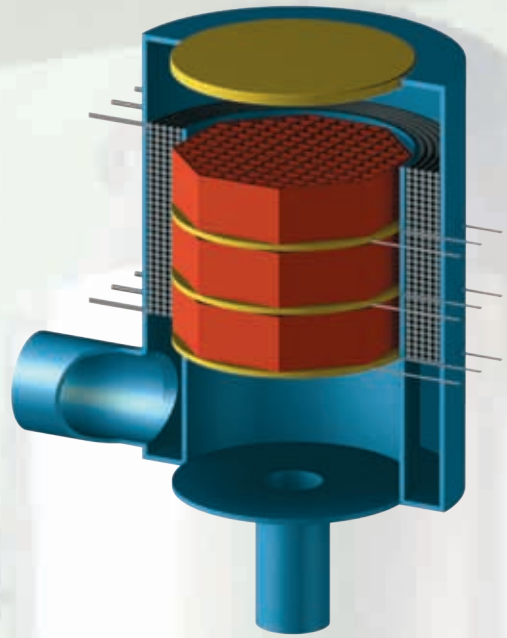


General

Catamiser® is a combined unit for waste heat recovery and NO_x reduction of exhaust gases.

The unit will meet future NO_x requirements according to IMO Tier III and makes the engine system more energy efficient.

To be installed on vessels, offshore units or power plants.



Design and Construction

NO_x reduction is achieved by Selective Catalyst Reduction (SCR). The unit is surrounded by spirally wound heating coils. GESAB's long experience in Exhaust Gas Heaters (Economisers) ensures efficient waste heat recovery.

Advantages compared to two separate units (SCR and Economiser)

- More cost effective
- Reduced weight
- Less space required
- One supplier will service the after treatment system

General

As an alternative to Catamiser® system, GESAB can deliver pure SCR systems that will meet future NO_x requirements according to IMO Tier III.

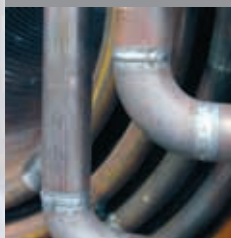
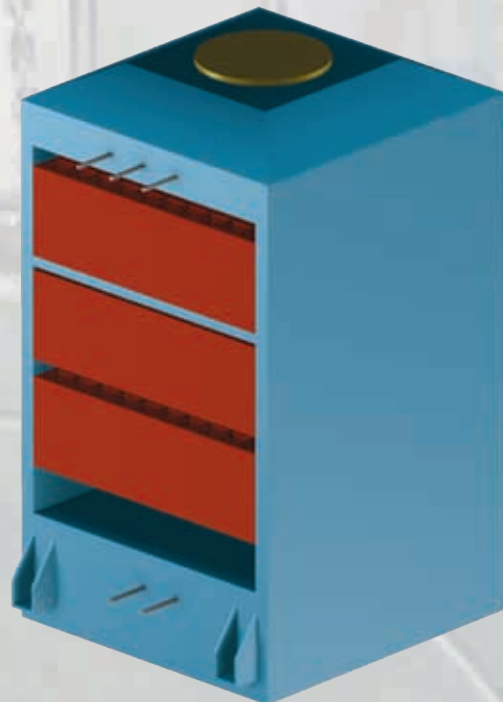


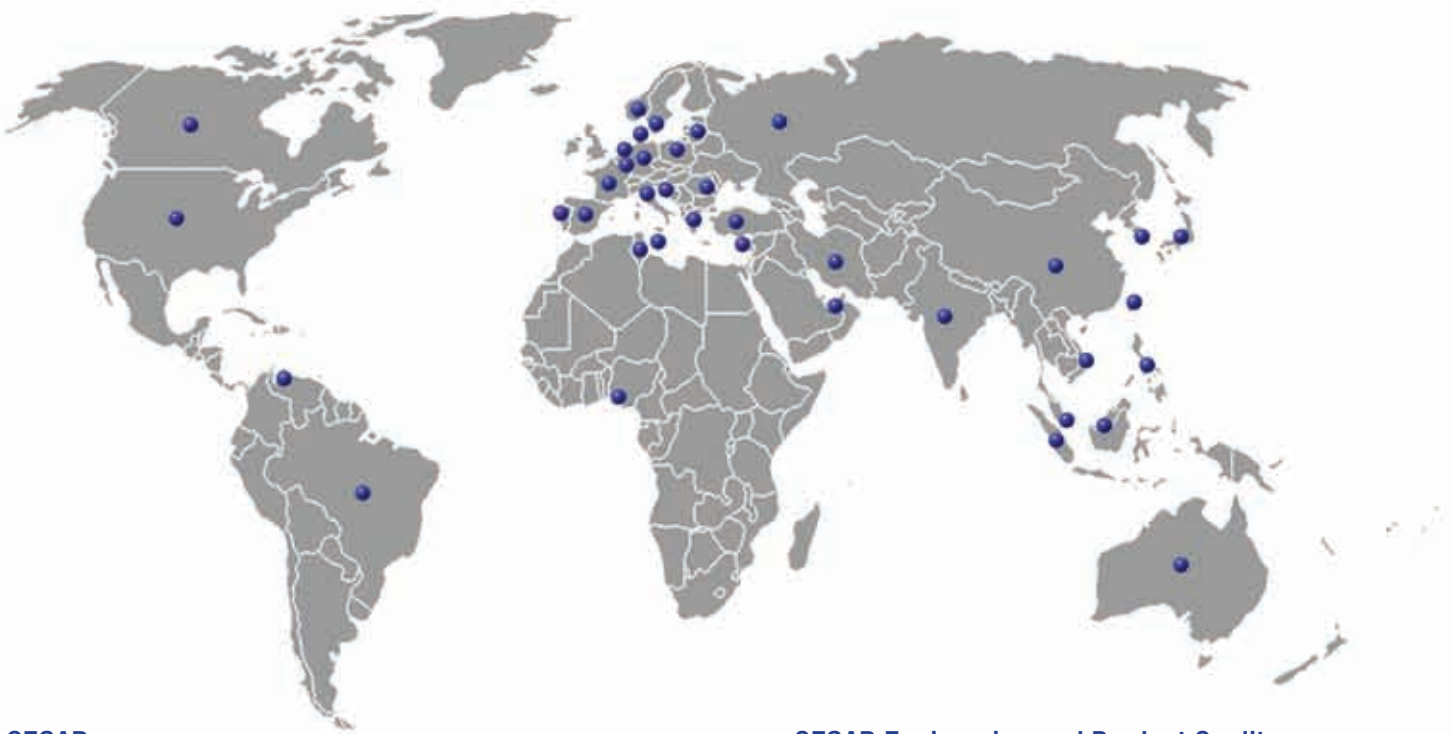
Design and Construction

NO_x reduction is achieved by Selective Catalyst Reduction (SCR). The catalyst elements are placed in a steel reactor.

Advantages compared to separate suppliers of SCR and Economiser

- Built from GESAB's long experience from after treatment systems in own production facilities
- GESAB performs service on both SCR and Economiser





GESAB

Located in Gothenburg, the maritime center of Scandinavia, GESAB has over 40 years of experience in delivering heating systems for marine application. GESAB's quality products provide cost effective and competitive solutions to the heating needs in all types of ships and industries e.g. :

Marine

- Product/Chemical Tankers
- Bulk Carriers
- Container Vessels
- Passenger Ferries
- Asphalt/Bitumen Carriers
- Ro-Ro/Ro-Pax Vessels
- Car Carriers
- Tugs/Barges
- Dredgers
- Heavy Lifters
- Recovery Vessels
- Navy Ships
- Drilling Ships/Rigs

Industrial

- Refineries
- Process Industries
- Automotive Industries
- Asphalt Process Industries
- Concrete Industries
- Chemical Industries
- Paper Industries
- Wood Process Industries
- Textile Industries
- Rubber Industries
- Electronic Industries

GESAB's products are distributed worldwide.

GESAB Engineering and Product Quality

The well managed GESAB ensures the highest quality in all phases of product design, procurement, planning and production. By continuously developing new technology and production methods, GESAB can meet the constantly changing market demands. A highly skilled and service oriented staff ensures that the customers gets the specified product in a cost effective and timely fashion.

Advanced logistics

On-line connections with our local agents ensure complete control of worldwide product delivery. Our experienced staff keeps the customer continuously informed about current status of design, fabrication, transportation, commissioning, start-up, inspection testing etc.

GESAB Göteborgs Energy Systems AB
 Adress: Ångpannegatan 15A
 SE - 417 05 Göteborg
 Sweden



Phone: +46 (0)31 744 19 50
 Fax: +46 (0)31 779 78 41
 Email: gesab@gesab.net
 Web: www.gesab.net