SCR

Cat® SCR System (**S**elective **C**atalytic **R**eduction)

- Environmentally friendly NO_x reduction solution
- Meets IMO Tier III regulations
- MCS approved





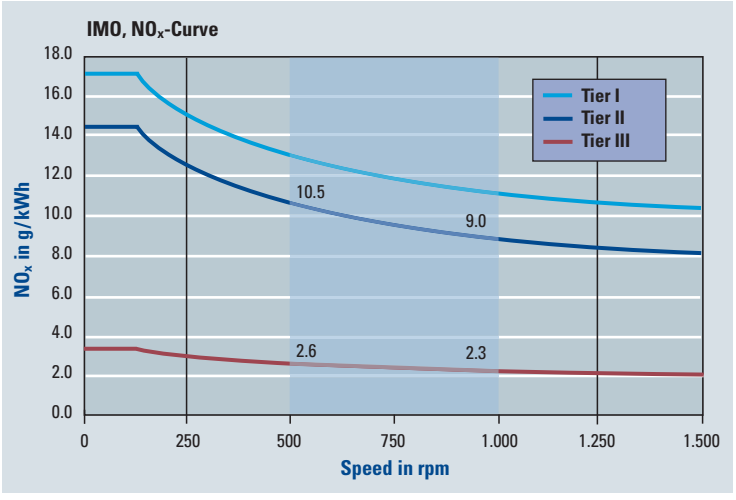
MaK

Cat SCR System • Emissions and Legislation

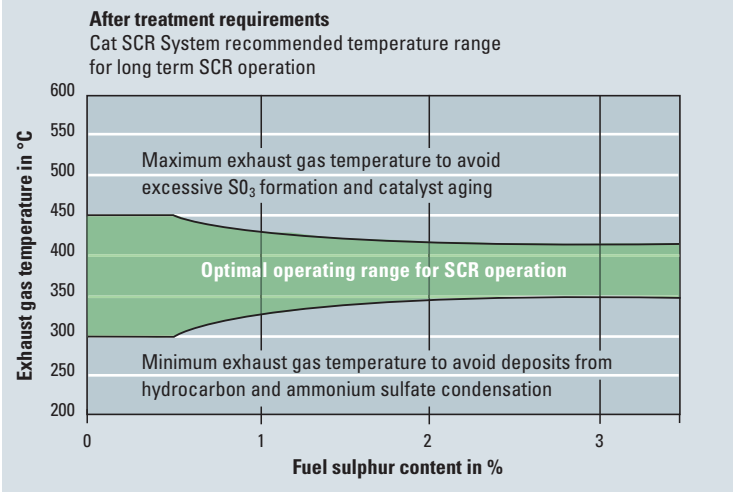
The upcoming global and local regulations covering exhaust gas emissions for medium-speed marine diesel engines will be more stringent. While meeting IMO Tier II exhaust gas emissions is possible with engine internal solutions, IMO Tier III compliance will be achieved with exhaust gas after treatment solutions.

Regional initiatives from environmentally friendly governments are already in effect with incentives benefitting ship owners who invest in NO_x emissions reduction technology.

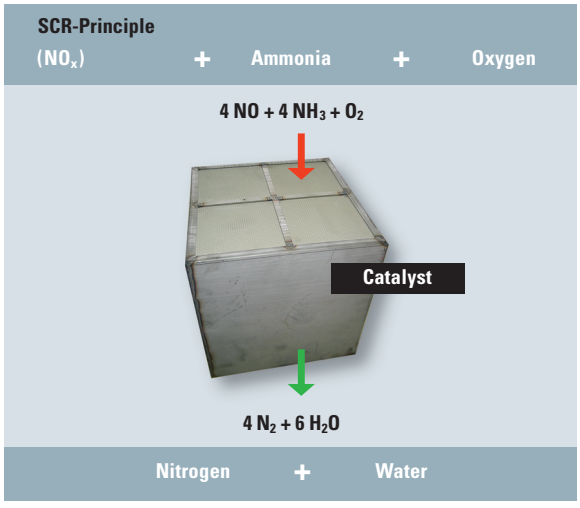
Cat SCR System for MaK medium-speed engines is part of the environmentally friendly strategy of Caterpillar Marine. The Cat SCR System is also available as a retrofit package*



When the IMO Tier III regulations go into effect in 2018, they will limit NO_x exhaust gas emissions in NO_x Emissions Control Areas (NECA). The IMO Tier III regulations lower the permissible NO_x emissions in NECAs by about 75% in comparison to IMO Tier II. Outside of the NECA IMO Tier II will remain valid. IMO Tier III will be valid for newly built vessels only.



To avoid deposit buildup and ensure optimal operation of the SCR module, the exhaust gas temperature has to be adjusted to the operating conditions for each application.



The Cat SCR System is based on selective catalytic reduction technology. A urea solution is injected into the hot exhaust gas and transformed to NH_3 and CO_2. Inside the SCR module the NH_3 reacts with the NO_x to form harmless nitrogen and water vapor, which are major components of ambient air.

* Please contact your local dealer for availability.



Cat SCR System • IMO Tier III

Design

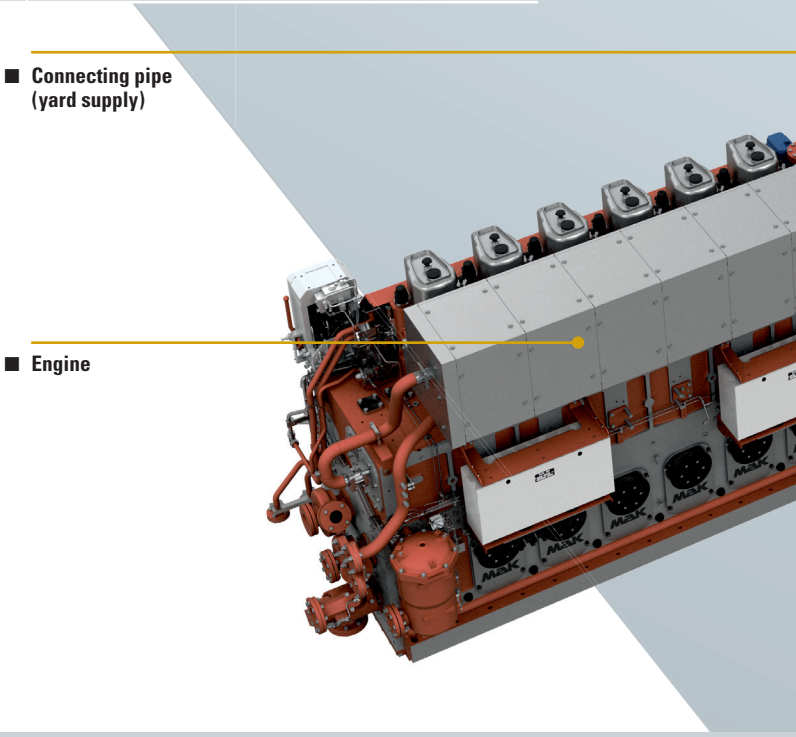
The Cat SCR System consists of the following key components necessary to support an engine arrangement for emissions compliance. The mixing tube and SCR housing including counter flanges, can be easily installed into the exhaust system. The dosing cabinet controls urea injection and communicates with the engine control and monitoring system to ensure safe operation of the SCR System and engine. A urea pump skid, to supply urea from the main tank to the dosing cabinet, is available. All pipes and harnesses need to be supplied by the customer. Wiring harness kits are available for easy connections between system components. For further details refer to the "Cat IMO Tier III SCR A&I Guide".

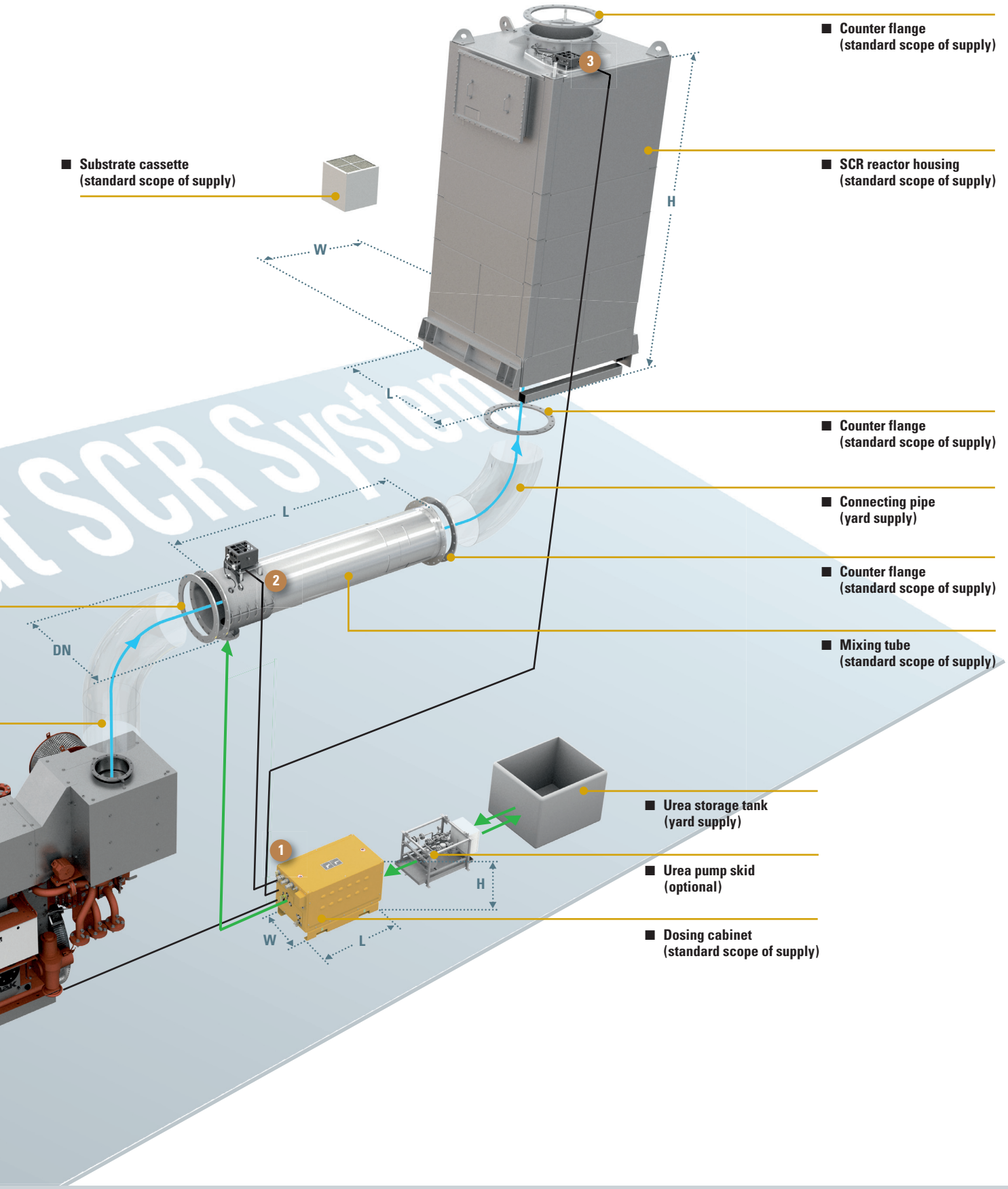
Technical data

	SCR Reactor Housing			Mixing Tube			Dosing Cabinet	
Engine	Dimension LxWxH (mm)	Flange Size (DN)	Weight Including Catalyst (kg)	Length (mm)	Flange (DN)	Weight (kg)	Dimension LxWxH (mm)	Weight (kg)
6 M 20 C	1,711x1,521x3,010	500	1,964	2,464	500	122.5	940x500x585	95
8 M 20 C			2,070					
9 M 20 C			2,176					
6 M 25 E								
8 M 25 E	1,711x1,521x3,470	600	2,609					
9 M 25 E			2,715					
6 M 32 E	2,160x2,363x4,455	900	4,289	3,657	700	263.4	940x500x585	95
8 M 32 E			4,528					
9 M 32 E							1,010x553x634	140
6 M 34 DF			4,289				940x500x585	95
8 M 34 DF			4,528					
9 M 34 DF							1,010x553x634	140
6 M 46 DF			4,897					

Notes:
– Length is from inlet flange to outlet flange
– Width is of the main box and does not include brackets, hatches, blankets etc.
– Dimensions are subject to change without further notice
– Heavy fuel engines and dual fuel engines are available
– Some engines need exhaust gas temperature control
– Please contact Caterpillar Motoren for further details






■ Substrate cassette
(standard scope of supply)
■ Counter flange
(standard scope of supply)
■ SCR reactor housing
(standard scope of supply)
■ Counter flange
(standard scope of supply)
■ Connecting pipe
(yard supply)
■ Counter flange
(standard scope of supply)
■ Mixing tube
(standard scope of supply)
■ Urea storage tank
(yard supply)
■ Urea pump skid
(optional)
■ Dosing cabinet
(standard scope of supply)
W
H
L
L
DN
H
W
L
1
2
3

Cat SCR System • Product Benefits

The Cat SCR System solution was designed by Caterpillar® especially for MaK medium-speed engines to meet future IMO Tier III emissions requirements. Installation and operation of the Cat SCR System is a sustainable solution to reduce NO_x emissions without sacrificing the typical MaK marine engine efficiency, durability and reliability that our customers are accustomed to.

The service- and maintenance-friendly design, remote condition monitoring and diagnostic capabilities, as well as our unmatched global product support respond to the industry's desire to lower operational costs and downtime beyond today's standards.

Cat SCR System key features:

- Complete marine certification society solution
- NO_x reduction solution consisting of SCR chamber, mixing tube, urea injection system and dosing cabinet
- Urea transfer pump skid optional available
- Single supplier IMO Tier III solution
- IMO Tier III parent engine certification (scheme A), no certification in the vessel necessary (no certification necessary for engine installation)
- Integrated control and monitoring of engine and SCR System for reliable and safe operation which enables market leading user friendliness
- Concurrent of SCR System and engine calibration for optimized performance
- Application and installation support for every market segment and ship type
- Excellent serviceability due to strong Caterpillar dealer network
- Corresponding maintenance schedules of SCR System and engine for optimized operational availability

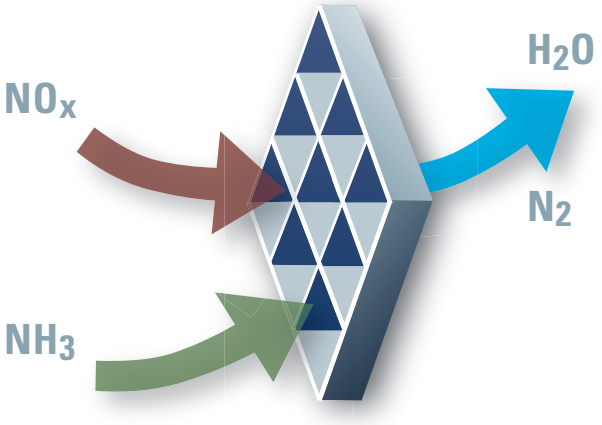
Standard scope of supply:

- Reactor housing with catalyst
- Mixing tube with urea injection lance
- NO_x, temperature and pressure sensors
- Urea dosing cabinet with ECM and closed loop function
- Set of flanges
- Scheme A certificate IMO Tier III

Optional scope of supply:

- Urea pump skid
  - for transfer of urea from urea tank to dosing unit
  - MCS certified
- Wiring kit
  - for ease of installation
  - for connecting dosing unit, mixing tube and reactor housing
  - for connecting plugs, cable and junction box

A sustainable solution to reduce NO_x emissions!







The Power You Need.

The Cat® and MaK™ brands of Caterpillar Marine offer premier high- and medium-speed propulsion, auxiliary, and generator set solutions, as well as optional dual fuel, diesel-electric, and hybrid system configurations. With the launch of Caterpillar Propulsion our comprehensive and evolving product line gives customers one source for the most extensive engine power range available, as well as for complete propulsion systems, controllable pitch propellers, transverse and azimuth thrusters, and controls. Cat and MaK products and technologies have proven reliability and are built to last in all marine applications, demonstrating superior productivity and the lowest lifecycle cost.

The Cat Global Dealer Network, more than 2,200 global service locations strong, ensures that you will have local expertise, highly-trained technicians, rapid parts delivery, and the proper equipment and services to keep you working – anytime, anywhere.

Construction, term, or repower financing through Cat Financial will help you make Cat and MaK power a reality. With our knowledge of customer needs, local markets, and legal and regulatory requirements, we have been providing tailored financing solutions and exceeding expectations since 1986.

For more information or to find your local dealer, visit our website: **www.cat.com/marine**
Visit Cat Financial at: **www.CatPowerFinance.com**

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