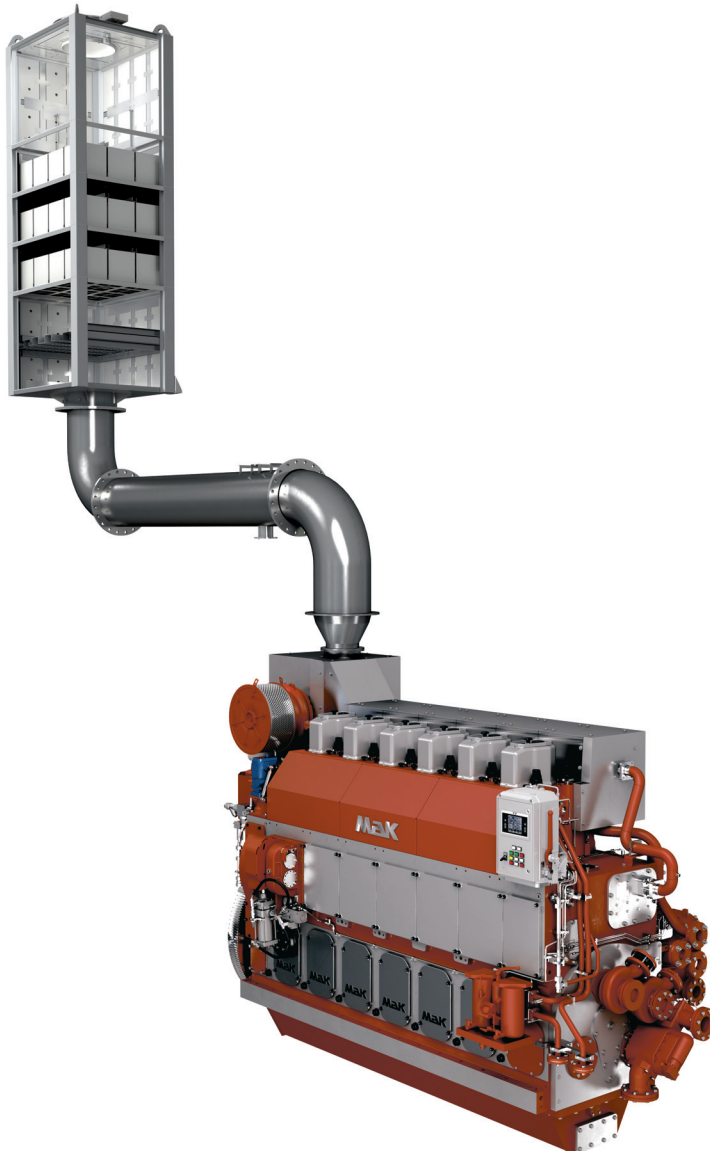


SCR

Cat® SCR System (Selective Catalytic Reduction)

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



MaK

Cat SCR System • Product Dimensions and Benefits

Already today governments benefit shipowners who invest in NO_x emissions reducing technologies.

The Cat SCR System solution was designed by Caterpillar® especially for MaK medium-speed engines to meet future IMO 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 without sacrificing the engine efficiency, durability and reliability that our customers are used 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 and values:

- 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
- IMO Tier III certification
- Optimized engine and SCR system
- Application and installation support for every market segment and ship type
- Excellent serviceability due to strong Caterpillar dealer network

Vertical flow SCR systems			
Engine	Reactor Dimensions W x L x H (mm)	Reactor Weight (kg)	Flange Size DN
6 M 20 C	1,180 x 1,180 x 3,470	1,857	450
8 M 20 C	1,530 x 1,520 x 3,470	2,376	500
9 M 20 C	1,530 x 1,520 x 3,470	2,376	500
6 M 25 E	1,530 x 1,520 x 3,470	2,376	500
8 M 25 E	1,710 x 1,520 x 3,470	2,700	700
9 M 25 E	1,710 x 1,520 x 3,470	2,700	700
6 M 32 E	1,850 x 1,711 x 3,470	3,200	700
8 M 32 E	2,160 x 2,050 x 4,460	4,700	900
9 M 32 E	2,160 x 2,050 x 4,460	4,700	900
12 M 32 E	2,160 x 2,360 x 4,460	5,300	900
16 M 32 E	<i>ask for availability</i>	_____	_____
6 M 34 DF	1,850 x 1,710 x 3,470	3,200	700
8 M 34 DF	2,160 x 2,050 x 4,460	4,700	900
9 M 34 DF	2,160 x 2,050 x 4,460	4,700	900
6 M 43 C	2,160 x 2,360 x 4,460	5,300	900
7 M 43 C	<i>ask for availability</i>	_____	_____
8 M 43 C	<i>ask for availability</i>	_____	_____
9 M 43 C	<i>ask for availability</i>	_____	_____
6 M 46 DF	2,160 x 2,360 x 4,460	5,300	900
7 M 46 DF	<i>ask for availability</i>	_____	_____
8 M 46 DF	<i>ask for availability</i>	_____	_____
9 M 46 DF	<i>ask for availability</i>	_____	_____

Notes:

- Length is from inlet flange to outlet flange
- Width is of 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 – ask for availability
- Some engines need exhaust gas temperature control
- Please contact Caterpillar Motoren for further details

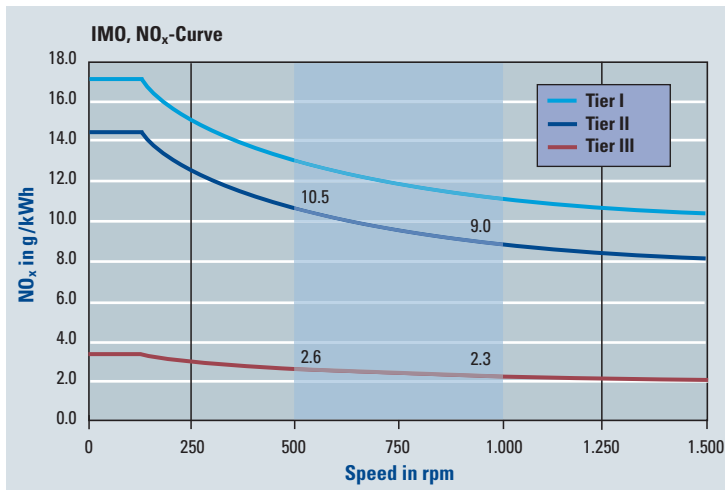


Cat SCR System • Emissions and Legislation

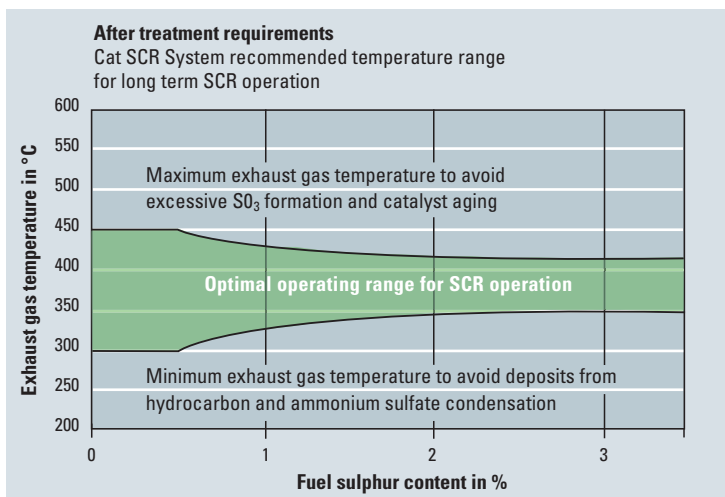
The upcoming global and local regulations covering exhaust gas emissions for medium-speed marine diesel engines will become more stringent. While fulfilling IMO Tier II exhaust gas emissions is possible with engine internal solutions, IMO Tier III compliance will be achieved with exhaust gas after treatment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

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

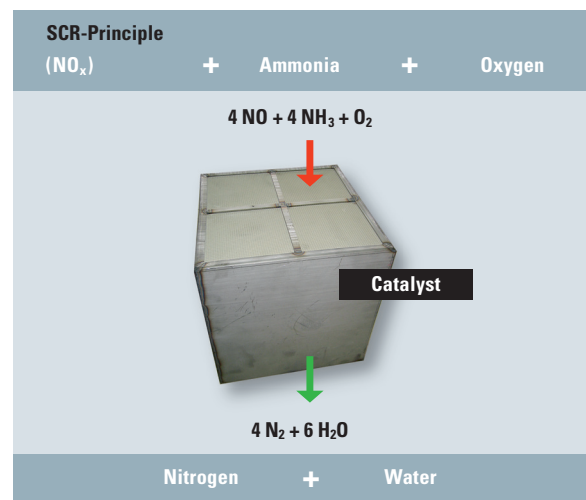
Caterpillar Marine decided to take part in this environmentally friendly strategy. Thus Caterpillar designed the Cat SCR System for MaK medium-speed engines. The Cat SCR System is also available as a retrofit package.



When the IMO Tier III regulations go into effect in 2016, 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 NECA's 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 an optimal operation of the SCR module, the exhaust gas temperature has to be regulated 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 NH₃ and CO₂. Inside the SCR module the NH₃ reacts with the exhaust gas NO_x emissions to form harmless nitrogen and water vapor, which are major components of ambient air.



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, complete propulsion systems, controllable pitch propellers, transverse and azimuth thrusters, and controls. Cat and MaK products and technologies are proven reliable and are built to remain 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'll 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 helps you make Cat and MaK power a reality. With our knowledge of customer needs, local markets, and legal and regulatory requirements, we've been providing tailored financing solutions and exceeding expectations since our start in 1986.

For more information and to find your local dealer, please visit our website: www.cat.com/marine

Visit Cat Financial at: www.finance.cat.com/power

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MaK