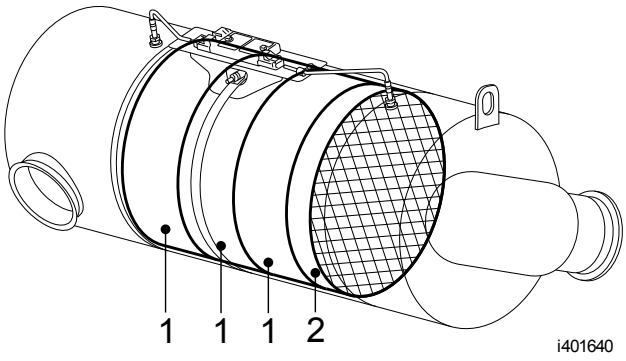
SCR unit

SCR unit

The SCR unit consists of three selective catalytic reduction (SCR) elements. The last part of the third element is an ammonia oxidation catalyst (AMOX). The elements are integrated into the exhaust silencer.

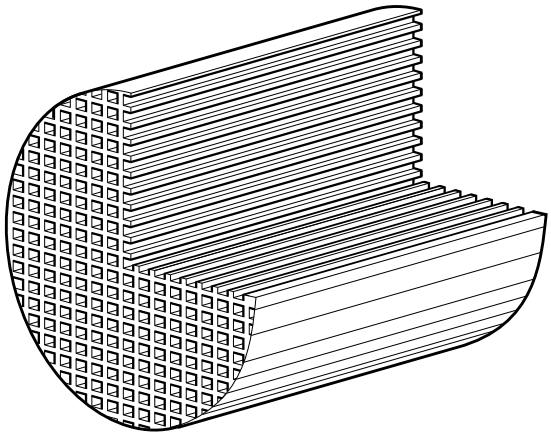


1 Selective Catalytic Reduction (SCR)
2 Ammonia oxidation catalyst (AMOX)

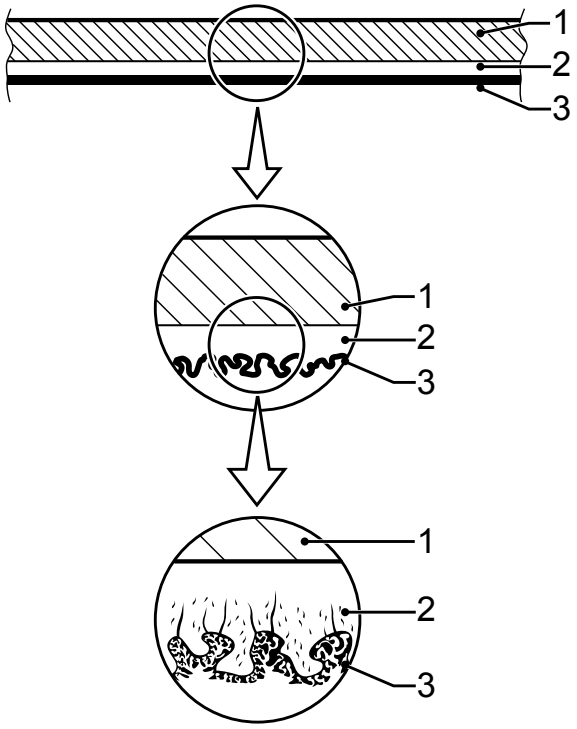
Design

A catalyst initiates a chemical reaction, but it does not actually take part in the reaction.

The catalytic converter is a cylindrical element that has many fine channels to create a very large surface.



A carrier material (2) that holds the active catalytic agent (3) is applied to the element (1). The catalytic agent for the SCR catalyst is zeolite. The catalytic agent for the AMOX catalyst is platinum. The surface of the carrier material is very rough and porous, so the effective area through which the exhaust gas flows is very large.



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Operation of SCR catalyst

The SCR catalyst, which is located after the DPF unit and in front of the AMOX catalyst, is used to reduce NOx emissions. The SCR system uses DEF. DEF is a solution of 32.5% urea (NH_2CONH_2) and 67.5% water (H_2O).

After dosing before the catalytic converter, the DEF ($NH_2CONH_2 + H_2O$) breaks down into ammonia ($2NH_3$) and carbon dioxide (CO_2). The zeolite in the catalytic converter attracts ammonia ($2NH_3$). The nitrogen oxides (NO_x) in the exhaust gases coming from the DPF unit consist of ±60% nitrogen monoxide (NO) and ±40% nitrogen dioxide (NO_2). The NOx in the exhaust gases flows through the catalytic converter and comes into contact with the ammonia ($2NH_3$), and the resulting reaction converts the nitrogen oxides (NOx) into nitrogen (N_2) and water (H_2O).

Operation of AMOX catalyst

The AMOX catalyst, which is located after the SCR catalyst, is used to reduce the unreacted ammonia. This is called ammonia slip. The majority of ammonia (NH_3) reacts with oxygen (O_2). This is converted into nitrogen (N_2) and water (H_2O) in the AMOX.

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