

SCR & FUEL EFFICIENCY



SCR (Selective Catalytic Reduction) is the only viable solution that meets EPA '10 emissions requirements to reduce NOx to 0.2 grams per horsepower/hour (g/hp-hr). This represents an 83% reduction from 2007 levels and brings us to "near zero" NOx emissions.

That's good for the environment, of course. But SCR is also good for the pocket book as it is the only EPA '10 solution delivering improved fuel efficiency. As a result, 2010 SCR trucks will have lower fuel costs than comparable 2007 vehicles, with significantly lower fuel costs than vehicles using massive EGR.

ADVANTAGES OF SCR:

Higher specific power output

Increased power density may allow higher output for a given displacement. This can increase residual values, as the next owner can up-rate the engine.

Improved engine life and efficiency

Significantly lower peak cylinder pressure and turbocharger compressor pressure ratio.

Increased reliability

Fewer cooling system components, and no changes to engine hardware; SCR is proven in more than 150,000 Volvo Group units already.

Lower cost of operation

Lower heat rejection and thermal cycling of catalysts mean less stress on vehicle components for longer life and less required maintenance.

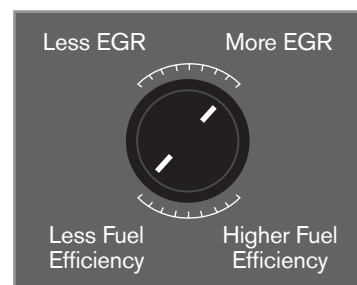


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What's affected?	SCR (Less EGR)	Massive EGR (More EGR)
Soot in DPF (decreases DPF life, increases need for active regeneration and DPF maintenance)	LESS	MORE
Passive Regenerations (uses no additional fuel, takes advantage of existing thermal dynamics)	MORE	FEWER
Active Regenerations (consumes more fuel)	FEWER	MORE
Thermal Cycling of Catalysts (reduces catalyst life, increases cost of operation)	LESS	MORE
Response (improves vehicle performance and fuel efficiency)	FASTER	SLOWER
Power Density (improves vehicle performance and fuel efficiency, plus greater residual value)	HIGHER	LOWER
Heat Rejection (increases component wear, reduces component life, increases cost of operation)	LESS	MORE
Power Fan (consumes hp, reduces fuel efficiency)	LOWER	HIGHER
Residual Value	HIGHER	LOWER
Fuel Efficiency	BETTER	WORSE
Cost of Operation	LOWER	HIGHER

How do we achieve greater fuel efficiency with SCR?

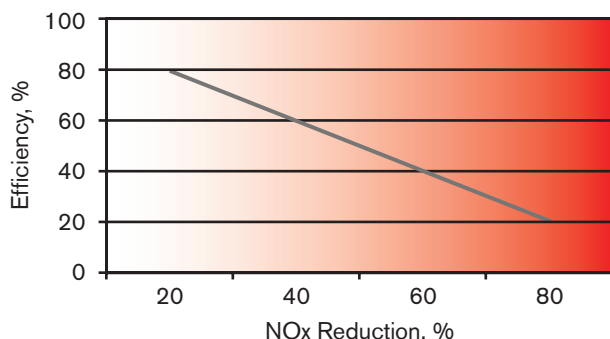
In general, the more efficient the engine, the higher the NOx output. EGR reduces engine efficiency to lower NOx output. Unfortunately, this also lowers fuel efficiency, horsepower, and engine performance. It also increases overall operating costs.



Volvo's SCR solution uses less EGR, allowing greater engine performance and increased fuel efficiency. The additional NOx that results also allows the DPF to work more efficiently, reducing the need for active regeneration (and the additional fuel it requires). This NOx is then eliminated in the SCR portion of the after-treatment.

SCR uses Diesel Exhaust Fluid (DEF), an aqueous solution of urea that is affordable and readily available. Urea is a compound of nitrogen that turns to ammonia when heated. When this is injected into the exhaust stream and passed over the SCR catalyst, the NOx is converted to harmless nitrogen and water vapor – both components of the air we breathe. There is nothing remaining but clean exhaust.

EFFICIENCY vs. NOx



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