

GRPE / Off-cycle Working Group

OICA contribution on the item: Operating Regions and Conditions

During the WG meeting in Paris, November 8, 2002, OICA (and EMA) were requested to report on currently used additional technologies on HD vehicles when operating in 'non-basic' ambient conditions.

Most of the HD vehicles intended for Europe have a basic specification to meet the main ambient conditions in Europe.

When these vehicle types are used either in colder or warmer climatic zones some subsystems or components need to be redesigned or upgraded to still be operational under these more severe or extreme ambient conditions.

In the following specifications the most frequently used technologies and/or upgraded systems are outlined briefly for HD vehicles operating in such zones.

Hot Climate

Cooling capacity improvements by:

- Radiator capacity increase
wider, longer, thicker core etc or additional radiators
- Charge air cooler capacity increase
(similar to the radiator steps)
- Fan capacity increase
upgraded fan clutch, fan size, geometry and gear ratio
- Powertrain transmission cooling
primarily gearbox lube oil cooling

Cooling of electronic components

- Control units, power stage etc

Due to different prerequisites, like basic standard and available space, a lot of different technical solutions have to be taken into account. Consequently, the additional cost for these different technology steps vary in a wide range.

In addition, the fan power may increase by 100-150% and gives a fuel consumption penalty as well as an increase of both the external and the internal noise level. That causes additional cost to combat.

Cold / arctic climate

Upgrading measures:

- Cooling system:
glycol content up to 60%
- Fan:
On-Off fan clutch instead of viscous
- Shutter may be used
- Engine:
preheater or start aid
engine heating devices including battery
- Fuel system:
heated prefilter incl water separation
fuel pipes heated and insulated
- Change to cold resistant polymers:
silicone hoses etc

The most costly components are the heated and insulated fuel pipes.

The total cost is on a higher level compared with the “hot climate measures.

More attention needs to be paid to engine/vehicle systems to really meet the In-Use emission expectations in the future not only acceptable operational conditions.

That is extremely valid also with respect to the future aftertreatment technologies.