

HSTV

High-speed Surface Temperature Visualization



The High-speed Surface Temperature Visualization (HSTV) method measures the instant, true temperature of surfaces.

How does HSTV work?

- ▶ Visualizes temperature distribution on the surface being measured
- ▶ Works without contact or thermal inertia
- ▶ Detects infrared radiation from a surface in a temperature range from 300 to 1200 °C
- ▶ Allows flexible installation at various components
- ▶ Component thermal cycling over time is also shown with absolute precision with HSTV
- ▶ The temperature-critical regeneration of the particle filter in diesel engines can be observed.

Benefits

Emissions reduction

- ▶ Specific cold start calibration of catalyst heating functions
- ▶ Reduced fuel consumption at full load through controlled enrichment

Components protection

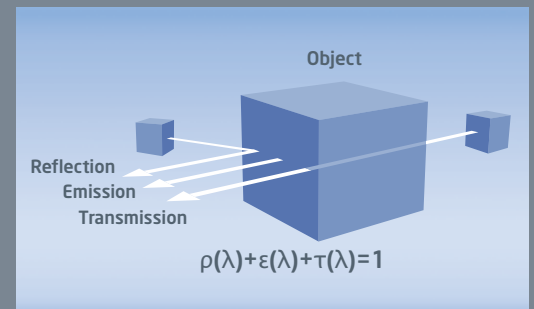
- ▶ Avoidance of damage, such as cell melting, cell cracking and stress cracking
- ▶ Measures to prevent moving of monoliths in catalysts and particle filters

Cost reduction

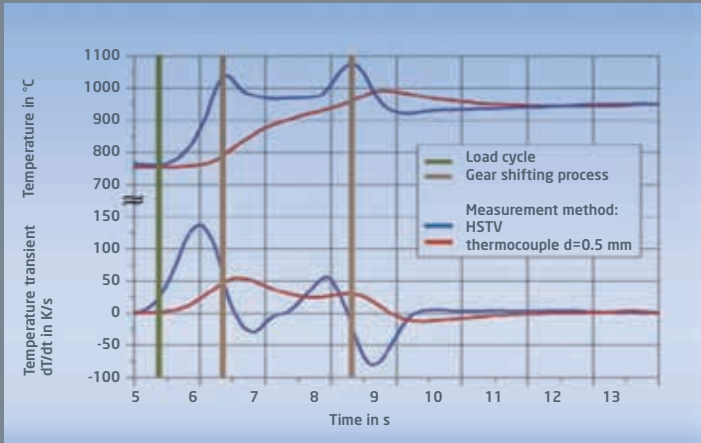
- ▶ Reduced aging and lowering precious metal loading for the catalytic converter

Drivability optimization

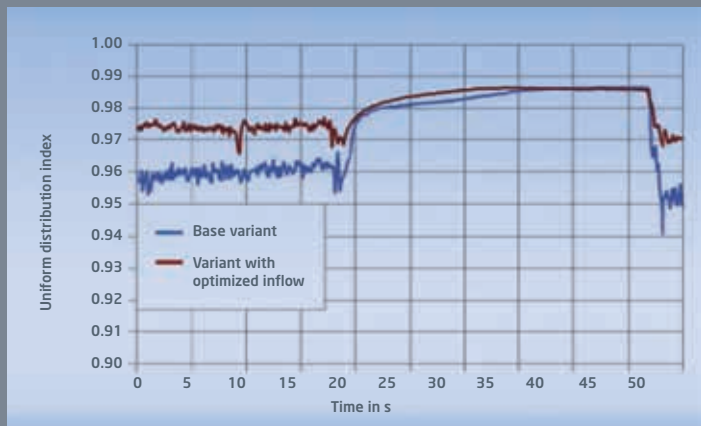
- ▶ Reduction of gear shift times
- ▶ Optimization of transient load changes, e. g. full load to coast down



Properties of a solid-body radiator



Surface temperature in the catalytic converter during full-throttle acceleration (example application)



Uniform distribution of temperature on the end face of the catalytic converter

Compared to thermocouples, HSTV allows the true surface temperature of the catalyst to be measured. The example at top left shows a transient gasoline engine operation including two gear shifting events. The thermocouple trace only delivers a delayed and suppressed signal reading as a result of its thermal inertia.

Using HSTV to display temperature distribution permits calculation of a uniform distribution index. At bottom left, the base in the graph exhibits a much poorer distribution of temperature at high exhaust-gas volumetric flow (up to the 18th second) than the variant with optimized inflow. In the subsequent phase with low volumetric flow (up to the 47th second) the uniform distribution indices for both variants converge again.