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Thermal Windows Can't Be Closed

During the course of discussions about the future of the diesel engine and, in particular, about its use in cars, many people have become familiar with a new concept. In the heated debate about the (alleged) manipulation of diesel engines and their influence on the air quality in our cities and urban areas, everyone has suddenly started talking about “thermal windows.”

The implication has often been that the restriction of specific operating states or the targeted modification of operating parameters in technical systems as a result of thermal conditions is something new. Another assumption made in the public discussions is that this technical procedure has only been used to manipulate the exhaust emissions of diesel engines. As engineers know, this is not the case.

For example, vehicles with battery electric powertrains are subject to thermal windows in order to protect their batteries and, at the same time, to allow them to operate without restrictions or damage when the ambient temperatures are very high or very low. Electric vehicles also operate in modes where the electricity consumption is nowhere near as good as the brochures promise. But no one thinks about introducing bans or claiming damages as a result.

Thermal windows are an inevitable feature of diesel engines, but they represent a challenge for researchers and engine

developers who need to focus on the thermal windows of catalytic converters and exhaust gas recirculation systems in their efforts to resolve the complex problem of emission reductions. However, condensation and soot in exhaust gas recirculation systems and AdBlue deposits in SCR catalysts are the inevitable physical and chemical consequences of temperatures that are too low.

The aim is and always has been to keep the periods when the engine is operating in a state where the exhaust gas treatment system cannot function at its full potential to a minimum. Developers need to proceed with caution and ensure that the measures they take to achieve this goal make sense in technical terms. This has undoubtedly not always been the case in the past. However, everyone agrees that practices are changing. The impressive improvements that have been made will continue to have an impact in the long term and will inevitably help to regain the trust of the public in the automotive industry.

Yes, it's true: Research and development cost money! These essential improvements have generally also led to increased manufacturing costs. However, dissatisfied customers, legal proceedings and a poor image among potential customers and political decision-makers are even more expensive.