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## Thermal Soak Simulation of Scania's Eu6 Silencer using Co-simulation



The Eu6 silencer developed by Scania has a complex structure with different chemical and physical phenomena taking place inside it, varying from simple flow through filters to the mixing and chemical reactions of the urea spray. The silencer function is controlled by a number of sensors which are not heat tolerant. The heat received by these sensors is a function of how the heat is propagated through the structure of the silencer and the external flow field. The external flow field in turn varies from the normal steady-state cruising conditions to an extreme case of sudden hot shut down of the engine.

In this work, a complete truck model is built with all the solid components of the silencer included and the soak process is simulated. In order to do this effectively, the co-simulation feature of STAR-CCM+ is exploited with the transient heat propagation in the solid parts in one simulation and the quasi-steady evolution of the surrounding air in the other simulation. Embedded thin mesher is also used to provide conformal meshes between the many different regions of the silencer structure. This study has led to an improved understanding of the heat flux in and around the silencer.

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