



Published on *CD-adapco* (<http://www.cd-adapco.com>)

[Home](#) > AUTOMOTIVE TURBOCHARGER COMPRESSOR CFD AND EXTENSION TOWARDS INCORPORATING INSTALLATION EFFECTS

AUTOMOTIVE TURBOCHARGER COMPRESSOR CFD AND EXTENSION TOWARDS INCORPORATING INSTALLATION EFFECTS



This paper focuses on the application of CFD to turbocharger compressor characteristics predictions over a range of speeds between 100,000 and 200,000RPM, and concentrating around the peak performance at 160,000RPM. A production turbocharger compressor which is widely used in the small-to-medium size automotive sector is studied. A methodical approach is taken to compare computation versus rig measurements, which represents an idealised installation.

Benchmarking under the idealised rig conditions then gives a degree of confidence to apply the same prediction method to the device under real installation conditions. In practice this means that the inlet duct is strongly curved due to space constraints. One observes that the performance of the compressor deteriorates at higher mass flows when the inflow to the compressor face is distorted by a curvilinear duct. Under the same installation constraint, we then observe that performance reduces when using inlet guide vanes upstream of the compressor face to alleviate noise problems.

A primary motivator in this work is to develop an efficient methodology for analysing the turbocharger compressor performance. To do this it is necessary first to benchmark the CFD methodology in steady-state so that the OEM can be confident to perform intake design analyses for their vehicles under installation conditions. Therefore we concentrate here on robust processes for geometry handling, meshing and flow solution which can be easily automated.

Author Company:

Ford OTOSAN,CD-adapco

Author Name:

Onur Baris

Fred Mendonça

Industries:

Products:

Conference:

CD-adapco is the world's largest independent CFD focused provider of engineering simulation software, support and services. We have over 30 years of experience in delivering industrial strength engineering simulation.

Source URL: <http://www.cd-adapco.com/presentation/automotive-turbocharger-compressor-cfd-and-extension-towards-incorporating-installation>

Links:

[1] <http://www.cd-adapco.com/sites/default/files/Presentation/Turbo%20charger%20GT2011-46796.pdf>