***Title:*** *A one dimensional lumped model for calculation of heat fluxes inside turbochargers*

***Authors:***

P. Olmeda: pabolgon@mot.upv.es (corresponding author)

V. Dolz. vidolrui@mot.upv.es

F.J. Arnau: farnau@mot.upv.es

M.A. Reyes: mirebel@mot.upv.es

***Addresses:***

CMT-Motores Térmicos. Universidad Politécnica de Valencia

Camino de Vera s/n

46022 Valencia (Spain)

Tel: (+34) 96 387 76 50

Fax: (+34) 96 387 76 59

***Abstract:***

In the present paper a methodology to calculate the heat fluxes inside a turbocharger from diesel passenger car has been presented. The heat transfer phenomenon is solved by using a one dimensional lumped model that takes into account both the heat fluxes between the different turbocharger elements, as well as the heat fluxes between the working fluids and the turbocharger elements.

This heat transfer study is supported by the high temperature differences between the working fluids passing through a typical diesel turbocharger. These flows are the hot exhaust gases coming from the diesel engine exhaust passing through the turbine, the fresh air taken by the compressor, and the lubrication oil passing through the housing. The model has been updated to be used with a new generation of passenger car turbochargers using an extra element in the heat transfer phenomenon that is the water cooling circuit.

This procedure allows separating the aerodynamic from the heat transfer effects, permitting study the behavior of compressor and turbine in a separate way.