

Modelling a virtual wind tunnel for vehicle aerodynamic measurements

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Abstract

The automotive makes of our days are challenged to fulfil more and more criteria to remain competitive and financially performant, considering the legislation that must be respected to be able to commercialise each model. One highly important set of rules focus on emissions and strict limits are implemented. To develop compliant products, each make must focus on aerodynamic performance so to reduce the drag of air, thus the required force to overcome for movement at high speeds. While homologation is currently done exclusively as a physical test, to be able to reduce the aerodynamic coefficient, strong virtual tools are used. These measurements performed with computation fluid dynamic software are translated into a virtual wind tunnel that must be able to give relevant and coherent results in respect to final physical validations. The paper will indicate the main types of wind tunnels, parameters to consider, error source and how results can be used. While the computational power is growing each moment, the industry is continuously adapting to obtain the most performant and appealing designs with minimal resources, this being the key of reducing the CO₂ footprint of passenger vehicles transport segment.

Keywords: CO₂ emissions, aerodynamic performance, wind tunnels

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