WT CORRECTIONS APPLIED IN F1

Empty test section corrections

These corrections consist in a Mach number and total pressure correction. They correspond to the difference between the location of the wind tunnel total and static reference taps and the center of the test section. These differences are assessed during wind tunnel calibration.

Longitudinal static pressure gradient is negligible thanks to the F1 wall divergence, no buoyancy-induced drag correction needs to be applied.

Test section upwash was deduced from lift measurements on a typical full span model in upright and inverted positions, and confirmed with clinometric measurements. This upwash is taken into account as a correction to the angle of attack. Dedicated upright/inverted test is possible to refine the results or for non-conventional model. No significant sidewash was observed.

Wall interference correction

These effects are induced by the presence the test section walls around the model. They are evaluated thanks to a compressible linearized potential flow method (DXV877 software).

In the mathematical model, the potential flow around the model is represented by an array of singularities. Wall boundary conditions are accounted for, either by an infinite series of model "images", or by Fourier transform.

Thanks to the linearity of the model, the test section walls introduce a perturbation flow-field that linearly adds up to the model flow-field. Corrections to Mach number (and consequently dynamic pressure), incidence, drag and moment coefficients are calculated thanks to survey and averaging of this perturbation flow field.

The corrections comprise two terms, one constant and the other one proportional to the lift coefficient of the model. They are evaluated for several Mach number and model attitude in the test section, covering the entire test matrix.

The corrected values are then calculated in real time, based on the current aerodynamic coefficients and flow conditions.

Support interference correction

The far-field interference effect of a sting (e.g. effect on the wing) can be calculated together with wall corrections, with the same flow potential model (DXV877 software).

The mono-strut or 3-strut interference corrections can be obtained by performing a specific test campaign, with the model supported by a fin sting without and with the dummy support, only for longitudinal test.

No correction to lateral coefficients is applied for a side sweep polar, since no significant effect was demonstrated by CFD.