

Using the windtunnel spreadsheet

Case 1 (bottom of spreadsheet)

This has calculations for a simple hole or orifice.

You can change any of the parameters in white and see the effect on the other parameters in green. The discharge coefficient is around 1 for a simple round hole.

The exit speed for a simple hole is around Mach 1.

Case 2 (top of spreadsheet)

This is a hole followed by a simple diverging duct.

You can enter the required output Mach number you'd like into the sheet and the required input to output pressure ratio will be calculated along with aero ratio for hole (throat) to outlet.

Case 3

This case is a diverging duct followed by a long straight test section.

Input the required Mach number and the various pressure ratios present (between outside air and inside duct and inside duct to compressor (source) are shown.

The area of the test section is the same as in case two.

Case 4

This is the full system, which is the same as case 3, but with a diffuser added.