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From CAS to EAS –
Calculating and Plotting the Compressibility Correction Chart

Purpose – Relatively cumbersome is the conversion between calibrated airspeed (CAS) and equivalent airspeed (EAS), because it involves the calculation of incompressible flow. Equations are quite long. If calculations on the computer are required, a conversion with these equations is necessary. In contrast, this report uses the equations to calculate and construct the CAS to EAS Compressibility Correction Chart (Figure 1). In this way, the result can be read quickly from the chart.
Methodology – In Excel, compressibility correction is achieved through equations from flight mechanics. The correction is calculated with two distinct functions, one based on Mach number and the other on pressure altitude. These functions are graphed individually and then integrated to produce the Compressibility Correction Chart.
Findings – The Compressibility Correction Chart was successfully created as a 2-D graph. Upon comparison with other correction charts, the determined correction for CAS showed no variation, proving the accuracy of the findings.
Research Limitations – Due to a limitation in Excel, which allows for 255 series for plotting, the range of input parameters had to be adjusted accordingly. The iterations of altitude span 1000 ft intervals, while those for Mach Number span 0.05 intervals.
Practical Implications – Pilots can easily use the Compressibility Correction Chart for a quick and highly accurate conversion between CAS and EAS.
Originality – CAS-EAS Compressibility Correction Charts are also available from other sources. This report presents a creation of the 2-D Correction Chart using Excel as spreadsheet.

This informative poster is based on a student project with the same title. Details here:
https://nbn-resolving.org/urn:nbn:de:gbv:18302-aero2024-03-27.012

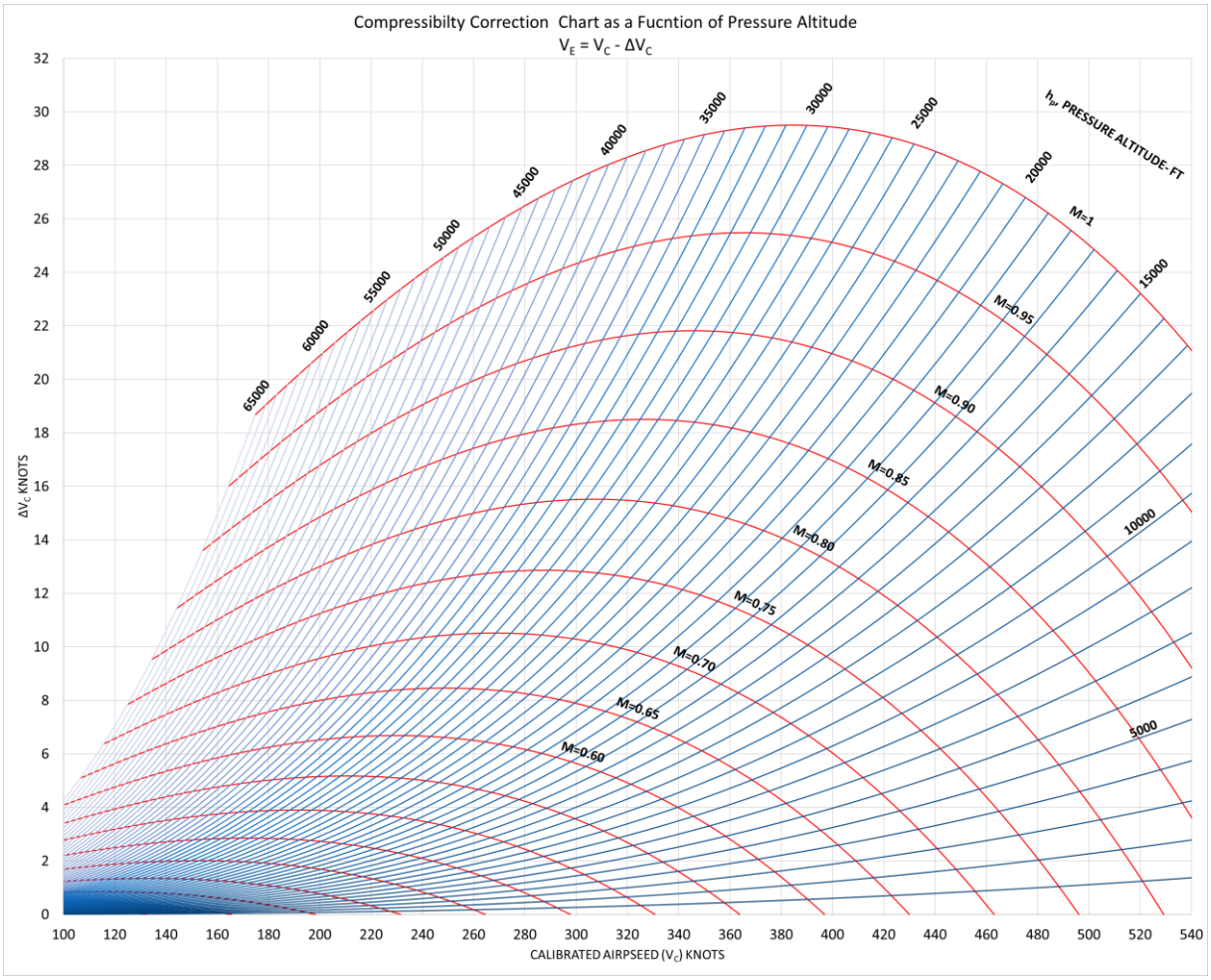

Figure 1: The Compressibility Correction Chart, converting from CAS to EAS.

This is an abstract answering the Call for Papers of the German Aerospace Conference 2025 for an informative poster at the conference.

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