

Figure 17: Comparison of computed modified Orbiter  $C_m$  at wind tunnel and flight conditions

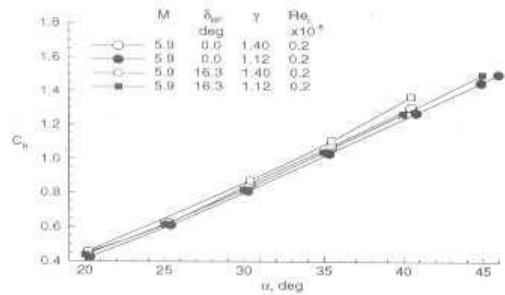


Figure 18: Comparison of Shuttle Orbiter aerodynamics in air and  $CF_4$

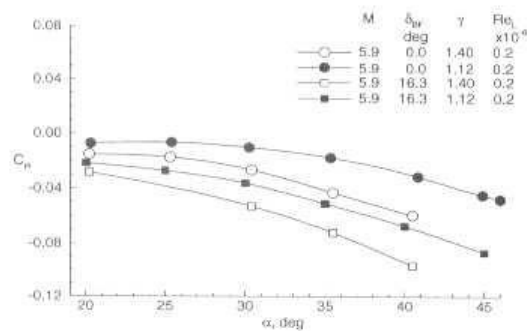


Figure 19: Comparison of Shuttle Orbiter aerodynamics in air and  $CF_4$ : wind tunnel data

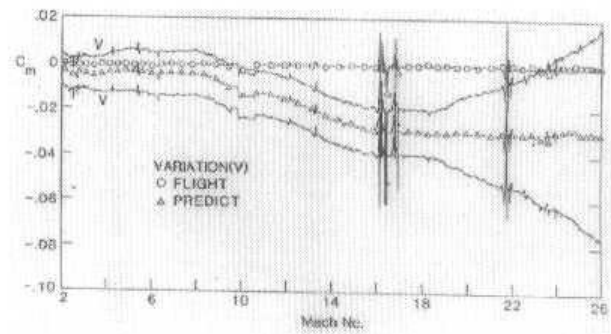


Figure 20: Pre-flight to flight discrepancy for STS-5

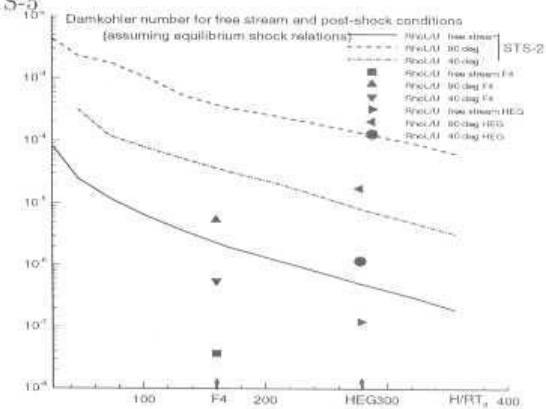


Figure 21: Damkohler number in terms of  $\rho L/V$  for free stream and post-shock conditions assuming equilibrium flow, plotted versus reduced enthalpy following STS2 trajectory or for F4, HEG wind tunnel conditions.

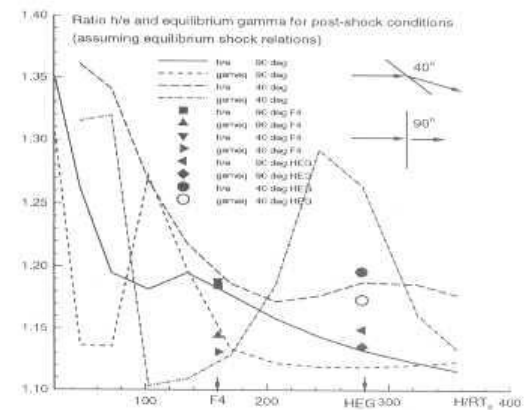


Figure 22: Equivalent  $\gamma$ 's behind a 40 or 90 degree shock wave assuming equilibrium flow, plotted versus reduced enthalpy following STS2 trajectory or for F4, HEG wind tunnel conditions.