$\Delta t$ is the difference between test and standard day carburetor air temperature and was previously described as the change in ambient air temperature

$$\Delta t = T_{at} - T_{as}$$

$P_{ts}/P_{tt}$ is the ratio between standard and test day total (ram) inlet pressures at the standard and test Mach numbers. The first step in determining this ratio is to recognize

$$\frac{P_{ts}}{P_{tt}} = \frac{\frac{P_{ts}}{P_a}}{\frac{P_{tt}}{P_a}}$$

$P_a$ is the pressure altitude and must be the same for test and standard days. Calculate $P_{tt}/P_a$ using test Mach number and the equation

$$\frac{P_t}{P_a} = \eta_r \left[ \left( 1 + .2M^2 \right)^{3.5} - 1 \right] + 1$$

$\eta_r$ is the carburetor inlet ram efficiency and is usually between 0.7 and 0.75. A more exact value may be calculated as

$$\eta_r = \frac{P_t(actual) - P_a}{P_t(theoretical) - P_a}$$

Calculate $P_{ts}/P_a$ using the same equations and standard Mach number.

- This last calculation may be iterative because standard Mach number cannot be exactly determined from the drag polar until power output is known.
- This correction is not normally made unless the flight Mach number is above 0.6 and the power change causes a speed change of more than 3 knots.
- To get a feel for the dynamic pressure change (and therefore ram effect change) due to Mach number change, recall

$$q\left[\frac{lb}{ft^2}\right] = \frac{1}{2}\rho_a V_T^2 = 1481\delta M^2$$

The final standard day power curves are presented in a form similar to that shown in Figure 10.3c