

The preceding converging-diverging nozzle concepts can be easily codified, as in Figure 6-17, by realizing that three key back pressures separate the nozzle exit conditions into four regions. In order of decreasing values, the three key back pressures are

1. the maximum for choked flow
2. the pressure required for a normal shock in the nozzle exit plane
3. the pressure required for supersonic nozzle flow with no wave structure exterior to the exit plane. ('design condition')

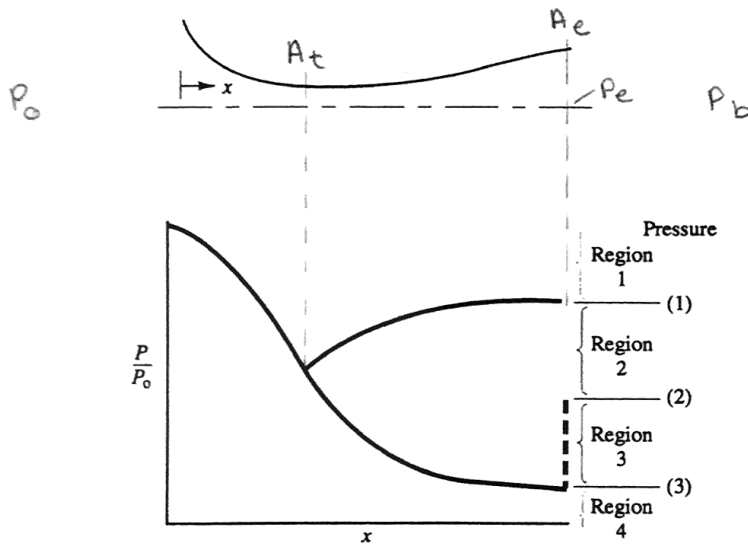


Figure 6-17 Key Pressures and Regions for Converging-Diverging Nozzle Flows

These are indicated and labeled as (1), (2), and (3) in Figure 6-17. The four regions are also shown in the figure. Region 1 is associated with subsonic flow throughout the nozzle, region 2 with a normal shock wave within the nozzle, region 3 with an oblique shock wave at the lip of the nozzle, and region 4 with an expansion wave at the lip of the nozzle.

Reference: 'Compressible Fluid Dynamics'
 by B.K. Hodge, K. Koenig
 Prentice Hall, 1995.