

COMBUSTION CHAMBER DESIGN:

The simplest combustor consists of a straight-walled duct connecting the compressor and turbine. This combustor is impractical due to the excessive pressure drop across it. The pressure drop from combustion is proportional to the square of the air velocity. Since the compressor air discharge velocity is around (170 m/s), the pressure drop will be around one-third of the pressure increase developed by the compressor. This pressure loss can be reduced to an acceptable value by installing a diffuser. Even with a diffuser, the air velocity is still high to permit stable combustion. A low-velocity region is required to anchor the flame. This is accomplished by installing a baffle (Fig. 1). An eddy region forms behind the baffle. It draws the gases in to be burned completely. This steady circulation of the flow stabilizes the flame and provides continuous ignition.

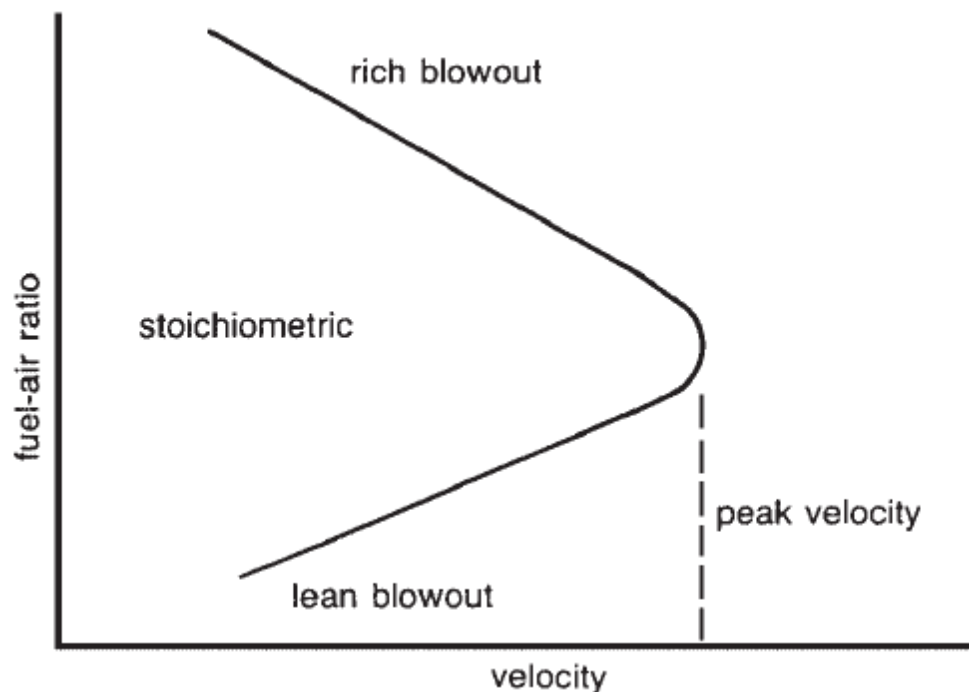


FIGURE (4) Range of burnable fuel-to-air ratios versus combustor gas velocity.

below the blowout limit to accommodate a wide operating range of fuel-to-air ratios. The air velocity does not normally vary with the load, because the compressor operates at a constant speed. In some applications, the mass flow varies with the load. In these applications, the

