

THE "20 000 FT" MAX FLAP EXTENSION LIMITATION

GENERAL

Why is there a "20 000 ft" Flaps extension ? Many pilots always ask themselves the reason of this limitation...

- At low velocities air can be considered an essentially incompressible fluid. However, when an aircraft increases speed and/or climbs to a sufficiently high altitude, the surrounding air increasingly assumes the characteristics of a compressible fluid.
- It is necessary to either account for these (compressibility) characteristics in the aircraft design or impose limitations to prevent operation in the region of the operating envelope where compressibility effects exist. The Mach number at which compressibility becomes significant ranges from approximately 0.50 to 0.55M.
- For Flaps up, high speed flight the compressibility effects are accounted for in design of the aircraft structure as well as for handling qualities, performance, etc. However, the high lift systems are normally intended for use during relatively low speed flight and consequently are designed using low speed, incompressible aerodynamic data.
- The flap placard speeds (in knots IAS) are established in relation to the altitude where compressibility effects (Mach Number) could be expected to significantly influence the aerodynamic characteristics of the airplane. In standard atmospheric conditions, flap placard speed approaches the compressibility significant Mach number range at approximately 20000 ft.
- The operation of high lift devices is limited to altitudes no greater than 20000 ft. Operation of high lift devices at altitudes greater than 20000 ft. may place the aircraft into a flight regime for which it was not specifically designed and may produce unexpected aerodynamic characteristics.