




MACH NUMBER

- The **speed of an aircraft** in relation to the **speed of a sound** is called Mach number.
- Since speed of sound changes with temperature variation, the Mach number also varies.
- As the **altitude increases** the **temperature** and density **decreases**. So the speed of the sound decreases with the increase in altitude.

MACH NUMBER Cont..1

- The speed of an aircraft must be corresponding to the temperature of the air in which the sound is traveling.
- The speed of a sound is proportional to the square root of the temperature.
- It can be calculated with the equation Speed of sound= 49.022 * square root of temperature
Mach number = True airspeed/ speed of sound.
- The mach number is depended on the temperature of the atmosphere.

AIRCRAFT SPEED

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- Subsonic speed
 - » Less than 0.8Mach
 - Transonic speed
 - » Between 0.8 and 1.2 Mach
 - Supersonic speed
 - » Between 1.2 and 5 mach
 - Hypersonic speed
 - » More than 5 Mach

TRANSONIC SPEED

- Speed of a sound is the speed at which the sound travels in the air.
- Speed of sound in the air at sea level conditions is
 - 340 meter/second or 1224 kilometer/ hour or 661 knots
- When an aircraft is traveling at subsonic speed, the sound of the aircraft arrives before the aircraft arrive.

TRANSONIC SPEED Cont..1

- When an aircraft is traveling at supersonic speed, the aircraft arrives before the sound of the aircraft arrives.
- The region where the aircraft going from subsonic speed to supersonic speed is known as Transonic speed.
- In this region some of the airflow over the airplane is at subsonic speed and some are on supersonic speed.
- Transonic speed is more critical because the shockwave is created in this speed.