



# INTERNATIONAL STANDARD ATMOSPHERE

## 1. Introduction

The ICAO Standard Atmosphere or ISA is a standard against which to compare the actual atmosphere at any point and time. (ICAO = International Civil Aviation Organization).

The real atmosphere differs from ISA in many ways. Sea level pressure varies from day to day and there are wide extremes of temperature at all levels.

Variation in pressure, vertically and horizontally, affects the operation of the pressure altimeter.

## 2. ISA parameters

At mean sea level, the ISA parameters are:

- Pressure = 1013.25 hPa
- Temperature = +15 °C

Each of these parameters decreases when the height from mean sea level reference increases:

- 1hPa loss each 8 meters → 1hPa loss each 26.25ft
- 6.5°C loss each kilometre → 1°C loss each 505ft or 15m
- When height is above 11km, the temperature is -56.6°C and constant until reaching 20km

## 3. Layers definition

The ISA model divides the atmosphere into layers with linear temperature distributions.

Layer	Layer name	Altitude above MSL (in km)	Lapse Rate (°C/km)	Temperature (in °C)	Atmospheric Pressure (Pa)
0	Troposphere	0	-6.5	+15.0	101325
1	Tropopause	11	+0.0	-56.5	22632
2	Stratosphere	20	+1.0	-56.5	5474.9
3	Stratosphere	32	+2.8	-44.5	868.02
4	Stratopause	47	+0.0	-2.5	110.91
5	Mesosphere	51	-2.8	-2.5	66.939
6	Mesosphere	71	-2.0	-58.5	3.9564
7	Mesopause	84.852	-	-86.28	0.3734

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