FORMULE E GRAFICI DA CONSULTARE

Tabella Aria tipo

ISA Atmophere

Alt.	Temp.	Temp. Ratio	Press.	Press. Ratio	Density	Density Ratio	Coeff. of Viscosity	Speed of Sound
h (m) Geopotential	T (^{0}K)	θ	p (N/m^2)	δ	ϱ (Kg/m^3)	σ	μ (N − sec/m^2) (x10^{-5})	V_a (m/sec
0	288.2	1.0000	101,325	1.0000	1.2250	1.0000	1.789	340.3
500	284.9	0.9888	95,460	0.9421	1.1673	0.9529	1.774	338.4
1,000	281.7	0.9775	89,874	0.8870	1.1116	0.9075	1.758	336.4
1,500	278.4	0.9662	84555	0.8345	1.0581	0.8637	1.742	334.5
2,000	275.2	0.9549	79495	0.7846	1.0065	0.8216	1.726	332.5
2,500	271.9	0.9436	74682	0.7371	0.95686	0.7811	1.710	330.6
3,000	268.7	0.9324	70108	0.6919	0.90912	0.7421	1.694	328.6
3,500	265.4	0.9211	65764	0.6490	0.86323	0.7047	1.678	326.6
4,000	262.2	0.9098	61640	0.6083	0.81913	0.6687	1.661	324.6
4,500	258.9	0.8985	57728	0.5697	0.77677	0.6341	1.645	332.6
5,000	255.7	0.8872	54019	0.5331	0.73612	0.6009	1.628	320.5
5,500	252.4	0.8760	50506	0.4985	0.69711	0.5691	1.612	318.5
6,000	249.2	0.8647	47181	0.4656	0.65970	0.5385	1.595	316.4
6,500	245.9	0.8534	44034	0.4346	0.62384	0.5093	1.578	314.4
7,000	242.7	0.8421	41060	0.4052	0.58950	0.4812	1.561	312.4
7,500	239.4	0.8309	38251	0.3775	0.55662	0.4544	1.544	310.2
8,000	236.2	0.8196	35599	0.3513	0.52517	0.4287	1.527	308.1
8,500	232.9	0.8083	33099	0.3267	0.49509	0.4042	1.510	305.9
9,000	229.7	0.7970	30742	0.3034	0.46635	0.3807	1.492	303.8
9,500	226.4	0.7857	28523	0.2815	0.43890	0.3583	1.475	301.6
10,000	223.2	0.7745	26436	0.2609	0.41271	0.3369	1.457	299.5
10,500	219.9	0.7632	24474	0.2415	0.38773	0.3165	1.439	297.3
11,000	216.7	0.7519	22632	0.2234	0.36392	0.2971	1.422	295.1
11,500	216.7	0.7519	20916	0.2064	0.33633	0.2746	1.422	295.1
12,000	216.7	0.7519	19330	0.1908	0.31083	0.2537	1.422	295.1
12,500	216.7	0.7519	17864	0.1763	0.28726	0.2345	1.422	295.1
13,000	216.7	0.7519	16510	0.1629	0.26548	0.2167	1.422	295.1
13,500	216.7	0.7519	15258	0.1506	0.24536	0.2003	1.422	295.1
14,000	216.7	0.7519	14101	0.1392	0.22675	0.1851	1.422	295.1
14,500	216.7	0.7519	13032	0.1286	0.20956	0.1711	1.422	295.1

T_0=288.2 °K , 15 °C
°K=°C+273.2

Variazione di temp : 6.5 K° per Km

$$T = T_0 - 0.0065 \cdot h$$

$$a = \sqrt{\gamma \cdot R \cdot T}$$

$$R = 287 \frac{J}{Kg \cdot °K}$$

$$\gamma = 1.4$$

$$\left(\frac{p}{p_0}\right) = \left(\frac{T}{T_0}\right)^{5.25}$$

$$\left(\frac{\rho}{\rho_0}\right) = \left(\frac{T}{T_0}\right)^{4.25}$$

A quote elevate si può assumere una variazione media di sigma pari a circa 0.040 ogni 1000 m.

FATTORI CONVERSIONE

Lunghezze

1 nm = 1852 m = 1.852 Km — 1 Km=0.540 nm

1 inch = 2.54 cm — 1 ft = 0.3048 m — 1m = 3.2808 ft

Velocita'

1 kts = (nm/hr) = 1.852 Km/hr — 1 ft/sec = 1.09728 Km/hr — 1 ft/sec = 0.5925 Kts

1 Kts = 1.688 ft/sec — 1 m/s = 197 ft/min (per RC)

Pesi o forze

1 Kgf =9.81 N — 1 lb = 0.45359 Kgf — 1 Kgf = 2.2046 lbs

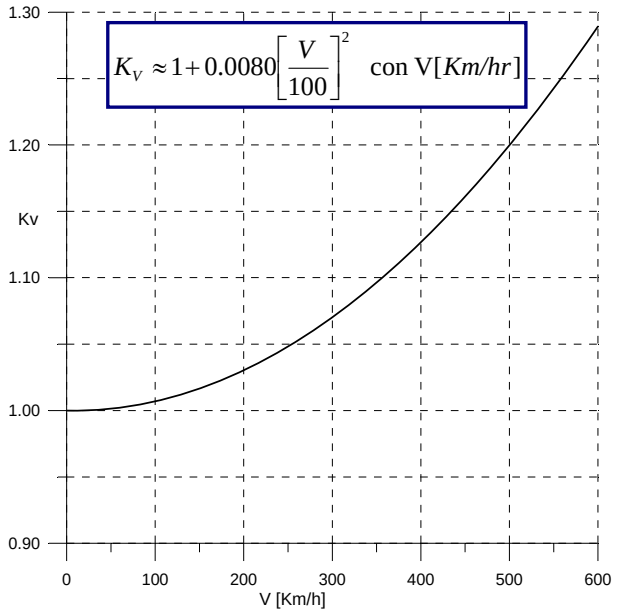
Pressione

1 psf = (lbs/ft^2) = 4.8824 kp/m^2 — 1kg/m^2 = 0.20482 psf — 1 psf = 47.88 N/m^2

1 Pa = 1 N/m^2 = 0.02088 psf — 1 Pa = (1/9.81) 1kg/m^2

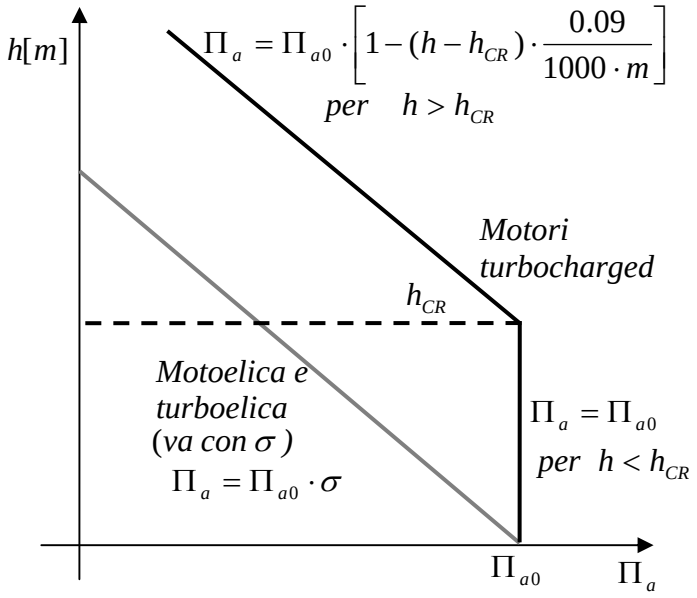
Potenze

1 Hp = 746 W = 0.746 KW — 1 KW = 1.34 Hp



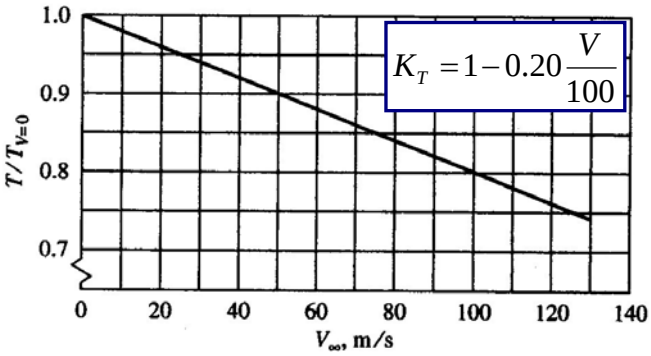
EFFETTO RAM MOTORE TURBOELICA

Leggere Valore Kv dal grafico oppure dalla formula



VARIAZIONE POT. QUOTA (ELICA)

Variaz. per motoelica, turboelica e per motori turbocompressi (turbocharged)



Fattore K_T riduzione spinta TURBOFAN IN DECOLLO e SALITA (basse quote)
(*vedi modelli spinta turbofan riportati di seguito*)

SPINTA MOTORE TURBOFAN VELIVOLO a GETTO (Turbofan alto rapporto di By-Pass)

$T_d = T_o \cdot 0.71 \cdot \sigma \cdot \varphi$

Spinta turbofan in condizioni di **crociera (MAX CRUISE) alte quote** (massimo con φ=1) (≥ 20,000 ft)

$T_d = T_o \cdot K_T(V) \cdot \sqrt{\sigma} \cdot 0.83 \cdot \varphi$

Spinta turbofan in condizioni **di salita (MAX CLIMB) a basse quote** (massimo con φ=1) (fino a 10,000 ft)

$T_d = T_o \cdot 0.75 \cdot \sigma \cdot \varphi$

Spinta turbofan in condizioni **di salita (MAX CLIMB) ad alte quote** (massimo con φ=1) (≥ 20,000 ft)

$T_d = T_o \cdot K_T(V) \cdot \sqrt{\sigma}$

Spinta turbofan in condizioni **DECOLLO (Max Take-Off Thrust)** (usare sigma solo in caso di decollo da pista in quota)

FORMULE UTILI

VELOCITA' DI EQUILIBRIO VOLO LIVELLATO VELIVOLO A GETTO

$$V = \left[\frac{(T_d/W)\cdot(W/S)}{\rho \cdot C_{Do}} \cdot \left(1 + \sqrt{1 - \frac{1}{\left(\frac{T_d}{W}\right)^2 \cdot E_{MAX}{}^2}}\right)\right]^{1/2}$$

CONSUMO SPEC. ELICA - FORMULE BREGUET

$$c = \left[\frac{N}{W \cdot s}\right] = \left[\frac{1}{m}\right]$$

$$SFC = \left[\frac{lb}{hp \cdot hr}\right]$$

$$c = \frac{SFC}{603500}$$

$$R_{MAX} = 603.5 \cdot (Formula\ Breguet\ Elica)$$
R in[Km]

$$En_{MAX} = 53.5 \cdot (Formula\ Breguet\ Elica)$$
En in[hr] con peso in[Kg]

Consumo specifico Jet

$$SFCJ = \left[\frac{lb}{lb \cdot hr}\right]$$

Formula Breguet Range - Quota ed assetto costante

$$R_{MAX} = 11.27 \cdot (Formula\ Breguet\ Jet)$$
R in[Km] con peso in[Kg]