

Temperature  
  
 °C  
 K  
 °F

Length  
  
 m  
 km  
 in  
 ft  
 yards  
 miles  
 naut miles

Area  
  
 m<sup>2</sup>  
 km<sup>2</sup>  
 in<sup>2</sup>  
 ft<sup>2</sup>  
 miles<sup>2</sup>  
 acres

Volume  
  
 m<sup>3</sup>  
 liters  
 in<sup>3</sup>  
 ft<sup>3</sup>  
 us gal

Weight  
  
 kgf  
 N  
 lbf

Velocity  
  
 m/s  
 km/h  
 ft/min  
 ft/s  
 mph  
 knots

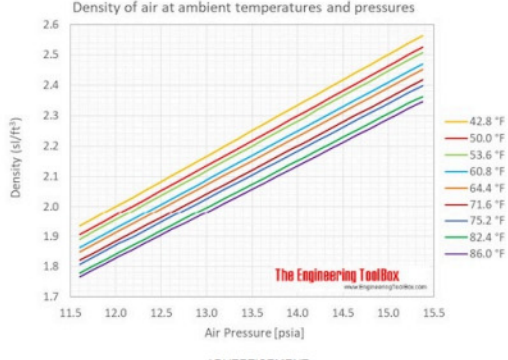
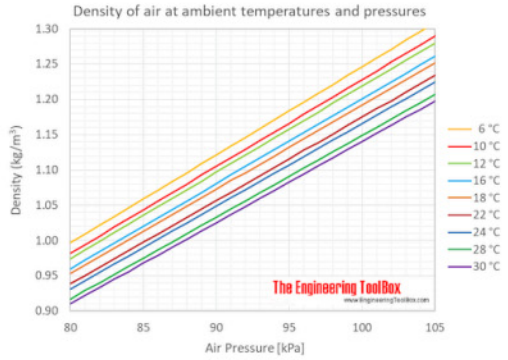
Pressure  
  
 Pa  
 bar  
 mm H<sub>2</sub>O  
 kg/cm<sup>2</sup>  
 psi  
 inches H<sub>2</sub>O

Flow  
  
 m<sup>3</sup>/s  
 m<sup>3</sup>/h  
 US gpm  
 cfm

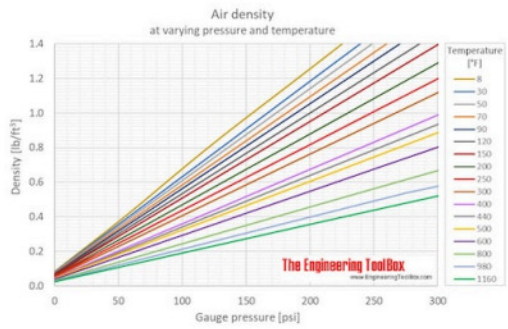
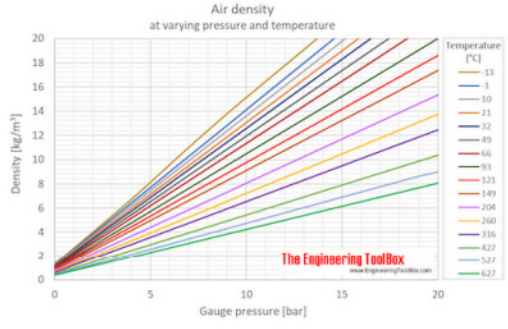
11.4.12

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Figures showing air density at ambient pressures (80-105 kPa, 0.8-1.05 bara, 11.6-15.4 psia) and temperatures:



Figures showing air density as function of gauge pressure (0-20 bar, 0-300 psi) at selected temperatures:



Figures showing air density as function of absolute pressure (1-10 000 bar, 14.5 - 150 000 psia) at selected temperatures:

Air density      Temperature

10	0.136	0.134	0.131	0.128	0.126	0.124	0.121	0.119	0.115	0.111	0.109	0.101	0.094	0.088	0.078	0.070	0.063
20	0.192	0.188	0.185	0.180	0.177	0.174	0.171	0.168	0.162	0.156	0.154	0.142	0.132	0.123	0.109	0.098	0.089
30	0.247	0.242	0.238	0.232	0.228	0.224	0.220	0.216	0.208	0.201	0.198	0.183	0.170	0.159	0.141	0.126	0.114
40	0.302	0.295	0.291	0.284	0.279	0.274	0.269	0.264	0.255	0.246	0.242	0.225	0.208	0.195	0.172	0.154	0.140
50	0.357	0.350	0.344	0.336	0.330	0.324	0.318	0.312	0.302	0.291	0.287	0.265	0.246	0.23	0.203	0.182	0.165
60	0.412	0.404	0.397	0.388	0.381	0.374	0.367	0.361	0.348	0.337	0.331	0.306	0.284	0.266	0.235	0.210	0.190
70	0.467	0.458	0.451	0.440	0.432	0.424	0.416	0.409	0.395	0.382	0.375	0.347	0.322	0.301	0.266	0.238	0.216
80	0.522	0.512	0.504	0.492	0.483	0.474	0.465	0.457	0.441	0.427	0.420	0.388	0.361	0.337	0.298	0.267	0.241
90	0.578	0.566	0.557	0.544	0.534	0.524	0.515	0.505	0.488	0.472	0.464	0.429	0.399	0.372	0.329	0.295	0.267
100	0.633	0.620	0.610	0.596	0.585	0.574	0.564	0.554	0.535	0.517	0.508	0.470	0.437	0.408	0.360	0.323	0.292
120	0.743	0.728	0.717	0.700	0.687	0.674	0.662	0.650	0.628	0.607	0.597	0.552	0.513	0.479	0.423	0.379	0.343
140	0.853	0.836	0.823	0.804	0.789	0.774	0.760	0.747	0.721	0.697	0.686	0.634	0.589	0.550	0.486	0.436	0.394
150	0.909	0.890	0.876	0.856	0.840	0.824	0.809	0.795	0.768	0.742	0.730	0.675	0.627	0.586	0.518	0.464	0.420
200	1.185	1.161	1.142	1.116	1.095	1.075	1.055	1.036	1.001	0.967	0.951	0.879	0.817	0.764	0.675	0.604	0.547
250	1.46	1.431	1.408	1.376	1.350	1.325	1.301	1.278	1.234	1.193	1.173	1.084	1.008	0.941	0.832	0.745	0.675
300	1.736	1.702	1.674	1.636	1.605	1.575	1.547	1.519	1.467	1.418	1.395	1.289	1.198	1.119	0.989	0.886	0.802
400	2.29	2.24	2.21	2.16	2.12	2.08	2.04	2.00	1.933	1.868	1.838	1.698	1.579	1.475	1.303	1.167	1.057
500	2.84	2.78	2.74	2.68	2.63	2.58	2.53	2.48	2.4	2.32	2.28	2.11	1.959	1.83	1.618	1.449	1.312
700	3.94	3.86	3.8	3.72	3.65	3.58	3.51	3.45	3.33	3.22	3.17	2.93	2.72	2.54	2.25	2.01	1.822
800	4.49	4.4	4.33	4.24	4.16	4.08	4.00	3.93	3.8	3.67	3.61	3.34	3.1	2.9	2.56	2.29	2.08
900	5.05	4.95	4.87	4.76	4.67	4.58	4.50	4.42	4.26	4.12	4.05	3.75	3.48	3.25	2.87	2.58	2.33
1000	5.6	5.49	5.4	5.28	5.18	5.08	4.99	4.9	4.73	4.57	4.5	4.16	3.86	3.61	3.19	2.86	2.59

Weight or density of air ( kilograms per cubic meter) for different gauge pressures (bar) :

Air - Density vs. Pressure and Temperatures - SI Units

Gauge pressure [bar]	Density of air [kg/m <sup>3</sup> ] at different temperatures [°C]																
	-1.1	4.4	10.0	15.6	21.1	26.7	32.2	37.8	48.9	60.0	65.6	93.3	121.1	148.9	204.4	260.0	315.6
0.00	1.30	1.28	1.25	1.22	1.20	1.19	1.15	1.14	1.11	1.06	1.04	0.96	0.90	0.83	0.74	0.66	0.61
0.34	1.75	1.71	1.68	1.63	1.62	1.59	1.55	1.52	1.47	1.43	1.39	1.30	1.20	1.12	0.99	0.90	0.80
0.69	2.18	2.15	2.10	2.05	2.02	1.99	1.94	1.91	1.84	1.78	1.75	1.62	1.51	1.41	1.25	1.12	1.01
1.38	3.08	3.01	2.96	2.88	2.84	2.79	2.74	2.69	2.59	2.50	2.47	2.27	2.11	1.97	1.75	1.57	1.43
2.07	3.96	3.88	3.81	3.72	3.65	3.59	3.52	3.46	3.33	3.22	3.17	2.93	2.72	2.55	2.26	2.02	1.83
2.72	4.84	4.73	4.66	4.55	4.47	4.39	4.31	4.23	4.08	3.94	3.88	3.60	3.33	3.12	2.76	2.47	2.24
3.45	5.72	5.61	5.51	5.38	5.29	5.19	5.09	5.00	4.84	4.66	4.60	4.24	3.94	3.68	3.25	2.92	2.64
4.14	6.60	6.47	6.36	6.22	6.10	5.99	5.88	5.78	5.57	5.40	5.30	4.90	4.55	4.26	3.76	3.36	3.04
4.83	7.48	7.34	7.22	7.05	6.92	6.79	6.66	6.55	6.33	6.12	6.01	5.56	5.16	4.82	4.26	3.81	3.46
5.52	8.36	8.20	8.07	7.88	7.74	7.59	7.45	7.32	7.06	6.84	6.73	6.22	5.78	5.40	4.77	4.28	3.88
6.21	9.26	9.07	8.92	8.71	8.55	8.39	8.25	8.09	7.82	7.56	7.43	6.87	6.39	5.96	5.27	4.73	4.28
6.89	10.14	9.93	9.77	9.55	9.37	9.19	9.03	8.87	8.57	8.28	8.14	7.53	7.00	6.54	5.77	5.17	4.68
8.27	11.90	11.66	11.49	11.21	11.00	10.80	10.60	10.41	10.06	9.72	9.56	8.84	8.22	7.67	6.78	6.07	5.49
9.65	13.66	13.39	13.18	12.88	12.64	12.40	12.17	11.97	11.55	11.16	10.99	10.16	9.43	8.81	7.78	6.98	6.31
10.34	14.56	14.26	14.03	13.71	13.46	13.20	12.96	12.73	12.30	11.89	11.69	10.81	10.04	9.39	8.30	7.43	6.73
13.79	18.98	18.60	18.29	17.88	17.54	17.22	16.90	16.60	16.03	15.49	15.23	14.08	13.09	12.24	10.81	9.68	8.76
17.24	23.39	22.92	22.55	22.04	21.62	21.22	20.84	20.47	19.77	19.11	18.79	17.36	16.15	15.07	13.33	11.93	10.81
20.68	27.81	27.26	26.81	26.21	25.71	25.23	24.78	24.33	23.50	22.71	22.35	20.65	19.19	17.92	15.84	14.19	12.85
27.58	36.68	35.88	35.40	34.60	33.96	33.32	32.68	32.04	30.96	29.92	29.44	27.20	25.29	23.63	20.87	18.69	16.93
34.47	45.49	44.53	43.89	42.93	42.13	41.33	40.53	39.73	38.44	37.16	36.52	33.80	31.38	29.31	25.92	23.21	21.02
48.26	63.11	61.83	60.87	59.59	58.47	57.35	56.22	55.26	53.34	51.58	50.78	46.93	43.57	40.69	36.04	32.20	29.19
55.16	71.92	70.48	69.36	67.92	66.64	65.36	64.07	62.95	60.87	58.79	57.83	53.50	49.66	46.45	41.01	36.68	33.32
62.05	80.89	79.29	78.01	76.25	74.81	73.36	72.08	70.80	68.24	66.00	64.87	60.07	55.74	52.06	45.97	41.33	37.32
68.95	89.70	87.94	86.50	84.58	82.98	81.37	79.93	78.49	75.77	73.20	72.08	66.64	61.83	57.83	51.10	45.81	41.49

**Density units conversion:**

[Density converter](#)

kilogram/cubic meter [kg/m<sup>3</sup>] = gram/liter [g/l], kilogram/liter [kg/l] = gram/cubic centimeter [g/cm<sup>3</sup>] = ton(metric)/cubic meter [t/m<sup>3</sup>], ounce/gallon(US liquid) [oz/gal(US liq)] pound/cubic inch [lb/in<sup>3</sup>], pound/cubic foot [lb/ft<sup>3</sup>], pound/gallon(UK) [lb/gal(UK)], pound/gallon(US liquid) [lb/gal(US liq)], slug/cubic foot [sl/ft<sup>3</sup>], ton(short)/cubic yard [ton(short)/yd<sup>3</sup>], ton(long)/cubic yard [yd<sup>3</sup>]

- 1 g/cm<sup>3</sup> = 1 kg/l = 1000 kg/m<sup>3</sup> = 62.428 lb/ft<sup>3</sup> = 0.03613 lb/in<sup>3</sup> = 1.9403 sl/ft<sup>3</sup> = 10.0224 lb/gal(UK) = 8.3454 lb/gal(US liq) = 0.5780 oz/in<sup>3</sup> = 0.7525 ton(long)/yr<sup>3</sup>
- 1 g/l = 1 kg/m<sup>3</sup> = 0.001 kg/l = 0.000001 kg/cm<sup>3</sup> = 0.001 g/cm<sup>3</sup> = 0.99885 oz/ft<sup>3</sup> = 0.0005780 oz/in<sup>3</sup> = 0.16036 oz/gal(UK) = 0.1335 oz/gal(US liq) = 0.06243 lb/ft<sup>3</sup> = 3.6127x10-5 lb/in<sup>3</sup> = 1.6856 lb/yd<sup>3</sup> = 0.010022 lb/gal(UK) = 0.0083454 lb/gal(US liq) = 0.0007525 ton(long)/yd<sup>3</sup> = 0.0008428 ton(short)/yd<sup>3</sup>
- 1 kg/l = 1 g/cm<sup>3</sup> = 1000 kg/m<sup>3</sup> = 62.428 lb/ft<sup>3</sup> = 0.03613 lb/in<sup>3</sup> = 1.9403 sl/ft<sup>3</sup> = 8.3454 lb/gal(US liq) = 0.5780 oz/in<sup>3</sup> = 0.7525 ton(long)/yr<sup>3</sup>
- 1 kg/m<sup>3</sup> = 1 g/l = 0.001 kg/l = 0.000001 kg/cm<sup>3</sup> = 0.001 g/cm<sup>3</sup> = 0.99885 oz/ft<sup>3</sup> = 0.0005780 oz/in<sup>3</sup> = 0.16036 oz/gal(UK) = 0.1335 oz/gal(US liq) = 0.06243 lb/ft<sup>3</sup> = 3.6127x10-5 lb/in<sup>3</sup> = 1.6856 lb/yd<sup>3</sup> = 0.010022 lb/gal(UK) = 0.0083454 lb/gal(US liq) = 0.0007525 ton(long)/yd<sup>3</sup> = 0.0008428 ton(short)/yd<sup>3</sup>
- 1 lb/ft<sup>3</sup> = 27 lb/yd<sup>3</sup> = 0.009259 oz/in<sup>3</sup> = 0.0005787 lb/in<sup>3</sup> = 16.01845 kg/m<sup>3</sup> = 0.01602 g/cm<sup>3</sup> = 0.1605 lb/gal(UK) = 0.1349 lb/gal(US liq) = 2.5687 oz/gal(UK) = 2.1389 oz/gal(US liq) = 0.01205 ton(long)/yd<sup>3</sup> = 0.0135 ton(short)/yd<sup>3</sup>
- 1 lb/gal(UK) = 0.8327 lb/gal(US liq) = 16 oz/gal(UK) = 13.323 oz/gal(US liq) = 168.179 lb/yd<sup>3</sup> = 6.2288 lb/ft<sup>3</sup> = 0.003605 lb/in<sup>3</sup> = 0.05767 oz/in<sup>3</sup> = 99.7764 kg/m<sup>3</sup> = 0.09977 g/cm<sup>3</sup> = 0.07508 ton(long)/yd<sup>3</sup> = 0.08409 ton(short)/yd<sup>3</sup>
- 1 lb/gal(US liq) = 1.2009 lb/gal(UK) = 19.215 oz/gal(UK) = 16 oz/gal(US liq) = 201.97 lb/yd<sup>3</sup> = 7.4805 lb/ft<sup>3</sup> = 0.004329 lb/in<sup>3</sup> = 0.06926 oz/in<sup>3</sup> = 119.826 kg/m<sup>3</sup> = 0.1198 g/cm<sup>3</sup> = 0.09017 ton(long)/yd<sup>3</sup> = 0.1010 ton(short)/yd<sup>3</sup>
- 1 lb/in<sup>3</sup> = 1728 lb/ft<sup>3</sup> = 46656 lb/yd<sup>3</sup> = 16 oz/in<sup>3</sup> = 27680 kg/m<sup>3</sup> = 27.680 g/cm<sup>3</sup> = 277.419 lb/gal(UK) = 231 lb/gal(US liq) = 4438.7 oz/gal(UK) = 3696 oz/gal(US liq) = 20.8286 ton(long)/yd<sup>3</sup> = 23.3280 ton(short)/yd<sup>3</sup>
- 1 oz/gal(UK) = 0.8327 oz/gal(US liq) = 6.2360 kg/m<sup>3</sup> = 6.2288 oz/ft<sup>3</sup> = 0.3893 lb/ft<sup>3</sup> = 10.5112 lb/yd<sup>3</sup>
- 1 oz/gal(US liq) = 1.2009 oz/gal(UK) = 7.4892 kg/m<sup>3</sup> = 7.4805 oz/ft<sup>3</sup> = 0.4675 lb/ft<sup>3</sup> = 12.6234 lb/yd<sup>3</sup>
- 1 sl/ft<sup>3</sup> = 515.3788 kg/m<sup>3</sup> = 514.7848 oz/ft<sup>3</sup> = 0.2979 oz/in<sup>3</sup> = 32.1741 lb/ft<sup>3</sup> = 82.645 oz/gal(UK) = 68.817 oz/gal(US liq)

## Related Topics

- **Air Psychrometrics**  
Moist and humid air calculations. Psychrometric charts and Mollier diagrams. Air-condition systems temperatures, absolute and relative humidities and moisture content in air.
- **Densities**  
Densities of solids, liquids and gases. Definitions and conversion calculators.
- **Fluid Mechanics**  
The study of fluids - liquids and gases. Involving velocity, pressure, density and temperature as functions of space and time.
- **Gases and Compressed Air**  
Properties of air, LNG, LPG and other common gases. Pipeline capacities and sizing of relief valves.
- **Material Properties**  
Properties of gases, fluids and solids. Densities, specific heats, viscosities and more.

## Related Documents

- **Air - Composition and Molecular Weight**  
Dry air is a mechanical mixture of nitrogen, oxygen, argon and several other gases in minor amounts.
- **Air - Density and Specific Volume vs. Altitude**  
Density and specific volume of air varies with elevation above sea level.
- **Air - Density, Specific Weight and Thermal Expansion Coefficient vs. Temperature and Pressure**  
Online calculator, figures and tables showing density, specific weight and thermal expansion coefficients of air at temperatures ranging -100 to 1600 °C (-140 to 2900 °F) at atmospheric and higher pressure - Imperial and SI Units.
- **Air - Diffusion Coefficients of Gases in Excess of Air**  
Diffusion coefficients ( $D_{12}$ ) for gases in large excess of air at temperatures ranging 0 - 400 °C.
- **Air - Dynamic and Kinematic Viscosity**  
Online calculator, figures and tables with dynamic (absolute) and kinematic viscosity for air at temperatures ranging -100 to 1600°C (-150 to 2900°F) and at pressures ranging 1 to 10 000 bara (14.5 - 145000 psia) - SI and Imperial Units.
- **Air - Humidity Ratio**  
The mass of water vapor present in moist air - to the mass of dry air.
- **Air - Moisture Holding Capacity vs. Temperature**  
The moisture holding capacity of air increases with temperature.
- **Air - Molecular Weight and Composition**  
Dry air is a mixture of gases where the average molecular weight (or molar mass) can be calculated by adding the weight of each component.
- **Air - Prandtl Number**  
Prandtl number for air vs. temperature and pressure.
- **Air - Properties at Gas-Liquid Equilibrium Conditions**  
Properties of air change along the boiling and condensation curves (temperature and pressure between triple point and critical point conditions). An air phase diagram included.
- **Air - Specific Heat vs. Pressure at Constant Temperature**  
Figures and tables with isobaric ( $C_p$ ) and isochoric ( $C_v$ ) specific heat of air at constant temperature and pressure ranging 0.01 to 10000 bara.
- **Air - Specific Heat vs. Temperature at Constant Pressure**  
Online calculator with figures and tables showing specific heat ( $C_p$  and  $C_v$ ) of dry air vs. temperature and pressure. SI and imperial units.
- **Air - Speed of Sound vs. Temperature**  
Speed of sound in air at standard atmospheric pressure with temperatures ranging -40 to 1000 °C (-40 to 1500 °F) - Imperial and SI Units.
- **Air - Thermal Conductivity vs. Temperature and Pressure**  
Online calculator with figures and tables showing air thermal conductivity vs. temperature and pressure. SI and imperial units.
- **Air - Thermal Diffusivity vs. Temperature and Pressure**  
Figures and tables with dry air thermal diffusivity vs. temperature and pressure. SI and Imperial units.
- **Air - Thermophysical Properties**  
Thermal properties of air at different temperatures - density, viscosity, critical temperature and pressure, triple point, enthalpy and entropy, thermal conductivity and diffusivity and more.
- **Air Conditioning - Cooling of Air and Condensate Generated**  
Water may condensate when air is cooled in air conditioning systems.
- **Ammonia Gas - Density vs. Temperature and Pressure**  
Online calculator with figures and tables showing density and specific weight of ammonia for temperatures ranging -50 to 425 °C (-50 to 800 °F) at atmospheric and higher pressure - Imperial and SI Units.
- **Compressed Air - Pressure Drop Diagrams, Metric Units**  
Pressure loss in compressed air pipe lines.
- **Density vs. Specific Weight and Specific Gravity**  
An introduction to density, specific weight and specific gravity.
- **Dry Air - Thermodynamic and Physical Properties**  
Thermodynamic properties of dry air - specific heat, ratio of specific heats, dynamic viscosity, thermal conductivity, Prandtl number, density and kinematic viscosity at temperatures ranging 175 - 1900 K.
- **Dry Air and Water Vapor - Density and Specific Volume vs. Temperature - Imperial Units**  
Density and specific volume of dry air and water vapor at temperatures ranging 225 to 900 degF (107 to 482 degC).
- **Hydrogen - Density and Specific Weight vs. Temperature and Pressure**  
Online calculator, figures and tables showing density and specific weight of hydrogen, H<sub>2</sub>, at temperatures ranging from -260 to 325 °C (-435 to 620 °F) at atmospheric and higher pressure - Imperial and SI Units.

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