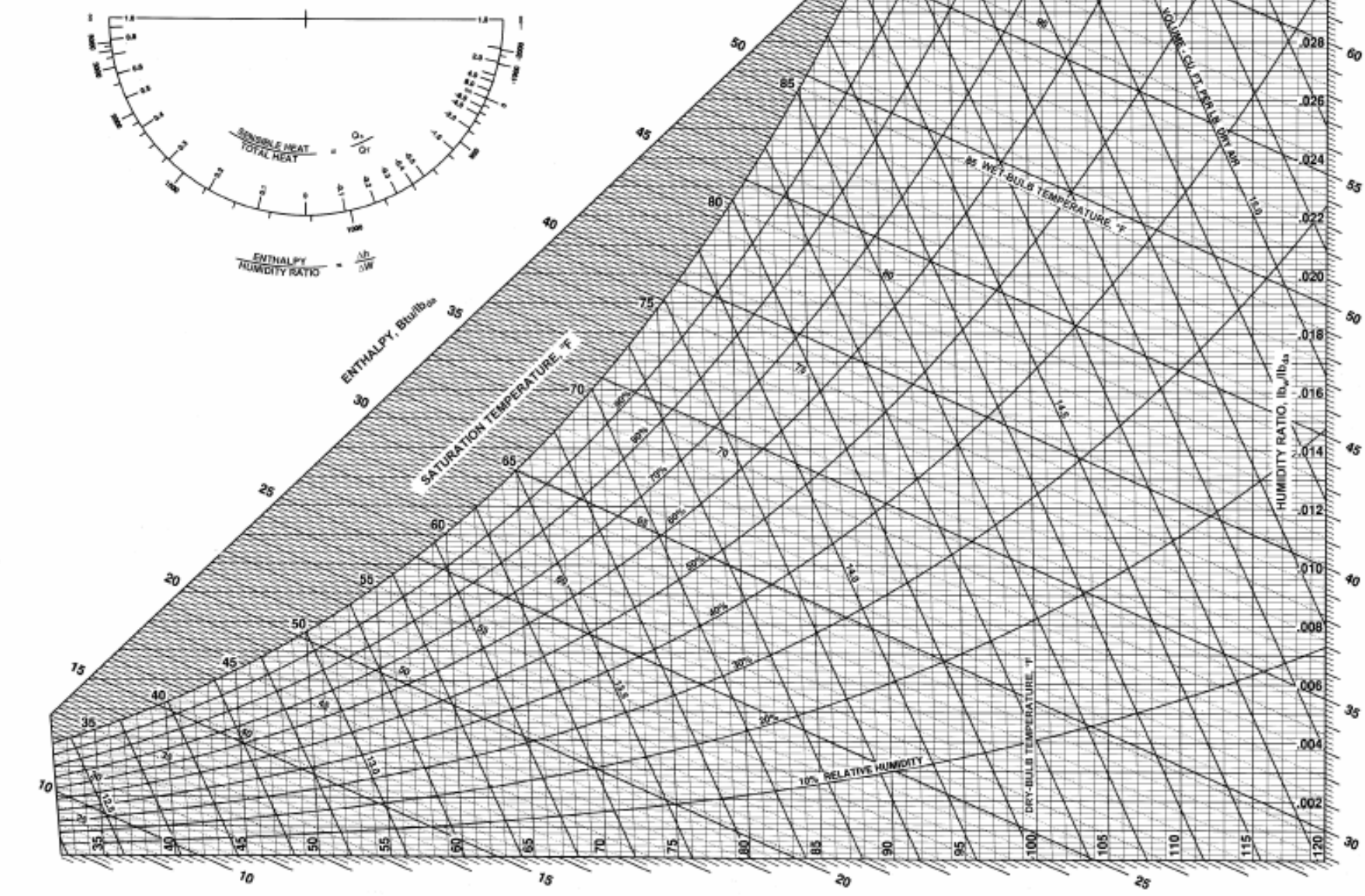
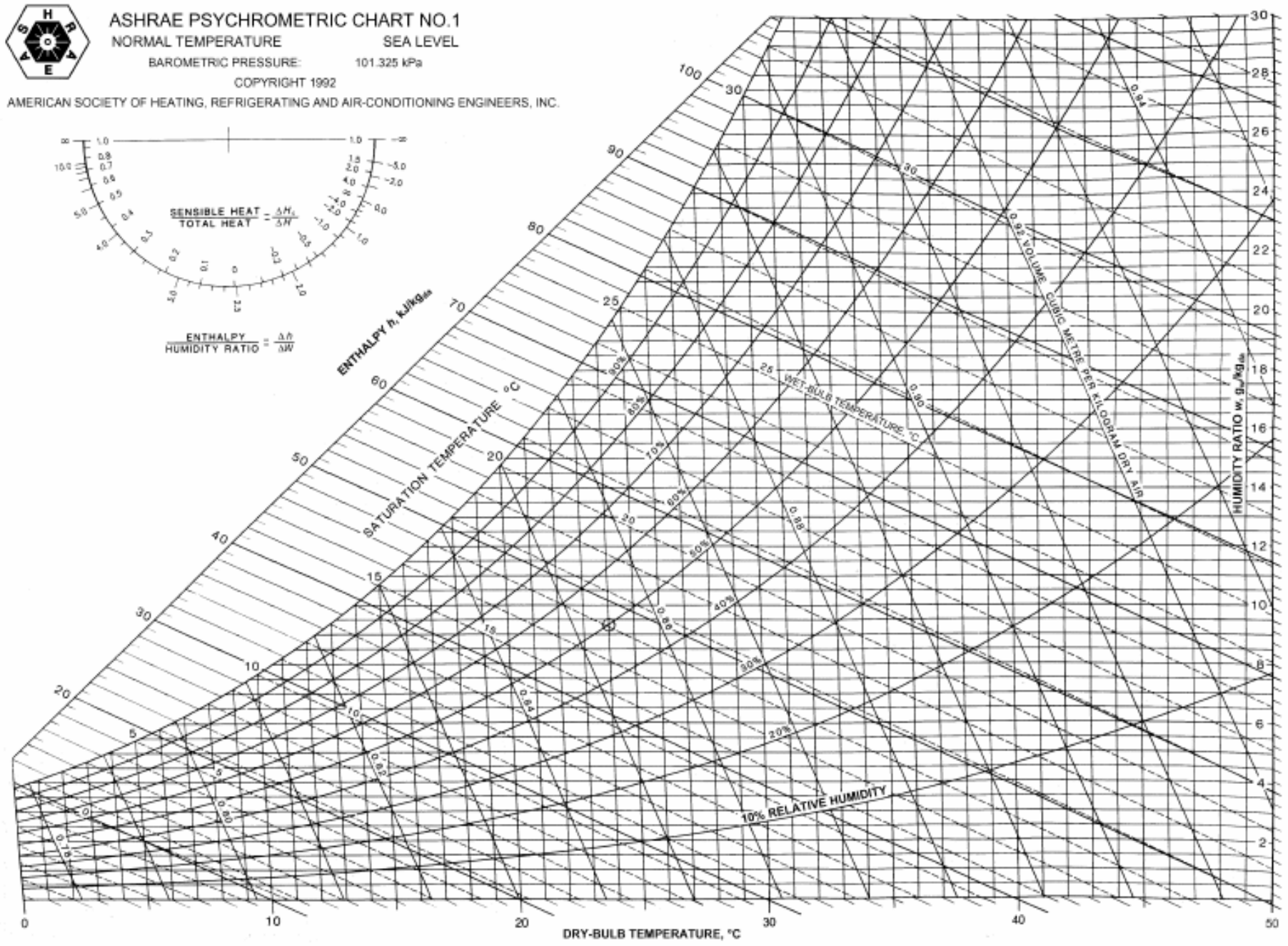
ASHRAE PSYCHROMETRIC CHART NO.1

NORMAL TEMPERATURE SEA LEVEL

BAROMETRIC PRESSURE: 29.921 in. MERCURY




ASHRAE PSYCHROMETRIC CHART NO.1
NORMAL TEMPERATURE
SEA LEVEL
BAROMETRIC PRESSURE: 101.325 kPa
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AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.
SENSIBLE HEAT / TOTAL HEAT = ΔH / ΔW
ENTHALPY / HUMIDITY RATIO = Δh / Δw
ENTHALPY h, kJ/kg
SATURATION TEMPERATURE °C
WET-BULB TEMPERATURE °C
0.94 VOLUME CUBIC METRE PER KILOGRAM DRY AIR
HUMIDITY RATIO w, g/kg
10% RELATIVE HUMIDITY
DRY-BULB TEMPERATURE, °C

UNITS AND CONVERSIONS

Table 1 Conversions to I-P and SI Units

(Multiply I-P values by conversion factors to obtain SI; divide SI values by conversion factors to obtain I-P)

Multiply I-P	By	To Obtain SI
acre (43,560 ft²)	0.4047	ha
	4046.873	m²
atmosphere (standard)	*101.325	kPa
bar	*100	kPa
barrel (42 U.S. gal, petroleum)	159.0	L
	0.1580987	m³
Btu (International Table)	1055.056	J
Btu (thermochemical)	1054.350	J
Btu/ft² (International Table)	11,356.53	J/m²
Btu/ft³ (International Table)	37,258.951	J/m³
Btu/gal	278,717.1765	J/m³
Btu·ft/h·ft²·°F	1.730735	W/(m·K)
Btu·in/h·ft²·°F (thermal conductivity k)	0.1442279	W/(m·K)
Btu/h	0.2930711	W
Btu/h·ft²	3.154591	W/m²
Btu/h·ft²·°F (overall heat transfer coefficient U)	5.678263	W/(m²·K)
Btu/lb	*2.326	kJ/kg
Btu/lb·°F (specific heat c_p)	*4.1868	kJ/(kg·K)
bushel (dry, U.S.)	0.0352394	m³
calorie (thermochemical)	*4.184	J
centipoise (dynamic viscosity μ)	*1.00	mPa·s
centistokes (kinematic viscosity ν)	*1.00	mm²/s
clo	0.155	m²·K/W
dyne	1.0×10^{-5}	N
dyne/cm²	*0.100	Pa
EDR hot water (150 Btu/h)	43.9606	W
EDR steam (240 Btu/h)	70.33706	W
EER	0.293	COP
ft	*0.3048	m
	*304.8	mm
ft/min, fpm	*0.00508	m/s
ft/s, fps	*0.3048	m/s
ft of water	29,989.07	Pa
ft of water per 100 ft pipe	98.1	Pa/m
ft²	0.092903	m²
ft²·h·°F/Btu (thermal resistance R)	0.176110	m²·K/W
ft²/s (kinematic viscosity ν)	92,900	mm²/s
ft³	28.316846	L
	0.02832	m³
ft³/min, cfm	0.471947	L/s
ft³/s, cfs	28.316845	L/s
ft·lb$_f$ (torque or moment)	1.355818	N·m
ft·lb$_f$ (work)	1.356	J
ft·lb$_f$/lb (specific energy)	2.99	J/kg
ft·lb$_f$/min (power)	0.0226	W
footcandle	10.76391	lx
gallon (U.S., *231 in³)	3.785412	L
gph	1.05	mL/s
gpm	0.0631	L/s
gpm/ft²	0.6791	L/(s·m²)
gpm/ton refrigeration	0.0179	mL/J
grain (1/7000 lb)	0.0648	g
gr/gal	17.1	g/m³
gr/lb	0.143	g/kg
horsepower (boiler) (33 470 Btu/h)	9.81	kW
horsepower (550 ft·lb$_f$/s)	0.7457	kW
inch	*25.4	mm
in. of mercury (60°F)	3.37	kPa
in. of water (60°F)	249	Pa
in/100 ft, thermal expansion	0.833	mm/m
To Obtain I-P	**By**	**Divide SI**

Multiply I-P	By	To Obtain SI
in·lb$_f$ (torque or moment)	113	mN·m
in²	645.16	mm²
in³ (volume)	16.3874	mL
in³/min (SCIM)	0.273117	mL/s
in³ (section modulus)	16387	mm³
in⁴ (section moment)	416 231	mm⁴
kWh	*3.60	MJ
kW/1000 cfm	2.118880	kJ/m³
kilopond (kg force)	9.81	N
kip (1000 lb$_f$)	4.45	kN
kip/in² (ksi)	6.895	MPa
litre	*0.001	m³
met	58.15	W/m²
micron (μm) of mercury (60°F)	133	mPa
mile	1.609	km
mile, nautical	*1.852	km
mile per hour (mph)	1.609344	km/h
	0.447	m/s
millibar	*0.100	kPa
mm of mercury (60°F)	0.133	kPa
mm of water (60°F)	9.80	Pa
ounce (mass, avoirdupois)	28.35	g
ounce (force or thrust)	0.278	N
ounce (liquid, U.S.)	29.6	mL
ounce inch (torque, moment)	7.06	mN·m
ounce (avoirdupois) per gallon	7.489152	kg/m³
perm (permeance at 32°F)	5.72135×10^{-11}	kg/(Pa·s·m²)
perm inch (permeability at 32°F)	1.45362×10^{-12}	kg/(Pa·s·m)
pint (liquid, U.S.)	4.73176×10^{-4}	m³
pound		
lb (avoirdupois, mass)	0.453592	kg
	453.592	g
lb$_f$ (force or thrust)	4.448222	N
lb$_f$/ft (uniform load)	14.59390	N/m
lb/ft·h (dynamic viscosity μ)	0.4134	mPa·s
lb/ft·s (dynamic viscosity μ)	1490	mPa·s
lb$_f$·s/ft² (dynamic viscosity μ)	47.88026	Pa·s
lb/h	0.000126	kg/s
lb/min	0.007559	kg/s
lb/h [steam at 212°F (100°C)]	0.2843	kW
lb$_f$/ft²	47.9	Pa
lb/ft²	4.88	kg/m²
lb/ft³ (density, ρ)	16.0	kg/m³
lb/gallon	120	kg/m³
ppm (by mass)	*1.00	mg/kg
psi	6.895	kPa
quad (10^{15} Btu)	1.055	EJ
quart (liquid, U.S.)	0.9463	L
square (100 ft²)	9.29	m²
tablespoon (approximately)	15	mL
teaspoon (approximately)	5	mL
therm (U.S.)	105.5	MJ
ton, long (2240 lb)	1.016	Mg
ton, short (2000 lb)	0.907	Mg; t (tonne)
ton, refrigeration (12 000 Btu/h)	3.517	kW
torr (1 mm Hg at 0°C)	133	Pa
watt per square foot	10.76	W/m²
yd	*0.9144	m
yd²	0.8361	m²
yd³	0.7646	m³
To Obtain I-P	**By**	**Divide SI**

*Conversion factor is exact.

Notes: 1. Units are U.S. values unless noted otherwise.
2. Litre is a special name for the cubic decimetre. 1 L = 1 dm³ and 1 mL = 1 cm³.

The preparation of this chapter is assigned to TC 1.6, Terminology.