

LIST OF SYMBOLS

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Symbol	Unit	Meaning	Symbol	Unit	Meaning
A	m ²	Area	s	kJ/kg	Specific entropy
a	m/s	Speed of sound	T	N	Thrust
B	m	Width	T	k	Temperature
b _s	kg/kWh	Specific fuel consumption	t	s	Time
c	m/s	Velocity, speed	t	-	Thrust deduction coefficient
c	kJ/kgK	Specific heat capacity	U	kJ	Internal energy
c _p	kJ/kgK	Specific heat capacity at p=const. (i.e. constant pressure)	u	kJ/kg	Specific internal energy, specific intrinsic energy
D	m	Internal diameter, bore	u	m/s	Tangential velocity (peripheral velocity)
d	m	External diameter of pipe	V	m ³	Volume
E	kJ	Energy	V _H	m ³	Swept volume
F	N	Force	\dot{V}	m ³ /s	Volumetric flow
H	m	Stroke	v	m ³ /kg	Specific volume
H	kJ	Enthalpy	v	m/s or sm/h (knots)	Ship's speed
H _u	kJ/kg	Upper calorific value, Gross calorific value, GCV	W	kJ	Work
H _l	kJ/kg	Lower calorific value, Net calorific value, LCV	w	kJ/kg	spec. work
h	kJ/kg	Specific enthalpy	w	m/s	Velocity, speed
I	m ⁴	Moment of area	w	-	Wake coefficient
J	kgm ²	Moment of inertia	x	kg/kg	Steam content (in case of wet steam)
J	1	Coefficient of advance	x	kg/kg	Water content of air
K	1	Coefficient	x, y, z		Coordinates
k	W/m ² K	overall heat transfer coefficient	α	°, degree	Angle
L _{stich, m_{stich}}	kg/kg	stoichiometric air – fuel mass ratio	α	W/m ² K	Convection heat transfer coefficient
l	m	Length	β	°, degree	Angle
M	Nm	Torque	δ	-	Play
M	kg/kmol	Molar mass	ε	-	Compression ratio
m	kg	Mass	ξ	-	Coefficient
\dot{m}	kg/s	Mass flow	η	-	Efficiency, efficiency factor
n	r.p.m.	Engine speed	η	kg/m s	Dynamic viscosity
P	kW	Power, output or input	κ	-	Specific heat ratio, isentropic exponent
P _e	kW	Effective output (effective power)	λ	-	Coefficient of heat conduction, coefficient of thermal conductivity
P _i	kW	Internal power; piston engines: Indicated Power	λ _v	-	Excess air ratio/Combustion air ratio
p	N/m ² , bar	Pressure	λ _z	-	Charging efficiency
p _{me}	N/m ² , bar	Mean effective pressure	μ	-	Flow coefficient
Q	Nm	Torque of propeller	ν	m ² /s	Kinematic viscosity
Q	kJ	Total heat transfer/Quantity of heat	π	-	Pressure ratio
\dot{Q}	kW	Heat transfer rate/Heat flow	ρ	kg/m ³	Density
q	kJ/kg	Specific quantity of heat	σ	N/mm ²	Surface tension, stress, direct stress
R	kJ/kg	Gas constant	τ	N/mm ²	Shear stress
R	N	Resistance	φ	°, degree	Angle, crank angle
R _T	N	Ship resistance (total)	ψ		Pressure rise ratio
r	m	Radius	Ω	s ⁻¹	Frequency of excitation
S	N	Thrust deduction	ω	s ⁻¹	Angular velocity, rotational frequency
s	m	Stroke	θ	°C	Temperature
S	kJ/K	Entropy	λP	-	Ratio of connecting rod

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Indices	Meaning	Indices	Meaning	Indices	Meaning	Indices	Meaning
rem, out	Purged, evacuated, removed	Fl	Fluid, liquid	Air	Air	Fw	Feed water
Eg	Exhaust gas	FW	Fresh water	Mot	Engine	Seaw	Seawater
Egb	Exhaust gas boiler	G	Generator	m	Mean value	T	Turbine
ext	Outside, external	ME	Main engine	max	Maximal, maximum	th	Thermal
F	Fuel	Htr	Heater	mech	Mechanical	amc	Ambient condition
crit	Critical condition	h	hour	min	Minimal, minimum	Sh	Superheating
St	Steam	i	Inside, intrinsic, internal	R	Rated value, reference value	Ev	Evaporation
E	Entry, end	c	Compression	S	State of saturation	L	Loose
e	effective	B	Boiler	s	Isentropic process	in	Fed, input

Source: Meier-Peter, Hansheirich, Bernhardt, Frank (Eds.), Compendium Marine Engineering: Operation – Monitoring – Maintenance, 2009, by courtesy of PMC Media House GmbH: www.pmeda.com