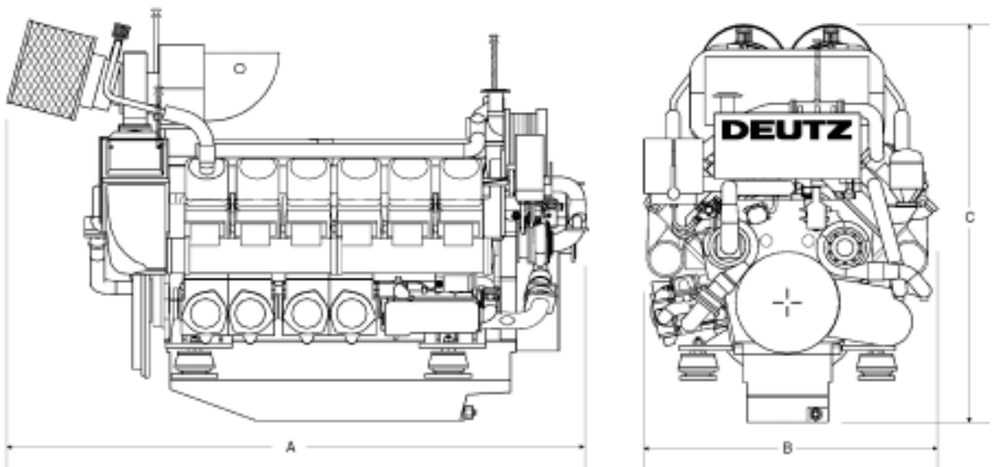
603/604

330-1470 kW at 1000-1800 min^{-1}

Dimensions



Engine type		A	B	C
TBD 604 L6	mm	2194	1143	1735
TBD 604 V8	mm	1912.5	1389	1989
TBD 604 V12	mm	2628.5	1389	2035
TBD 603 V12	mm	2558	1554	1720
TBD 603 V16	mm	3058	1554	1720

Engine type	Weight (t)
TBD 604 L6	2.2
TBD 604 V8	2.75
TBD 604 V12	3.89
TBD 603 V12	4.46
TBD 603 V16	4.85

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WÄRTSILÄ

Total Service

WÄRTSILÄ DEUTZ marine engines

Characteristics

- Sturdy engine design.
- Low noise engine.
- Cylinder heads with four-valve technology.
- Water-cooled 6, 8, 12 and 16 cylinder engines.
- Turbocharger(s) and charge air cooler.
- Mechanical hydraulic or electronic speed governing.
- Large inspection openings in the crankcase.
- Full power take-off at both crankshaft ends.

Benefits

- Operating cost savings due to an optimized combustion process.
- Easy maintenance.
- Reasonable power-to-weight ratio.
- Engine type 603/604 and 601/602 have compatible components, except for the crankshaft, pistons and injection equipment.
- Extremely low smoke emission.

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➢ Engine description

Crankcase — The crankcase with reinforced ribs is made of grey cast-iron.

Crankshaft — The crankshaft is drop forged, made of heat-treated steel and induction-hardened.

Main and big end bearings — Multi-layer bearing shells with steel back.

Torsional vibration damper — Rubber or viscous-fluid damper.

Cylinder liner — The water-cooled cylinder liner is made of alloyed centrifugally cast iron.

Connecting rod — The obliquely split connecting rod is made of heat-treated, forced Cr-steel. Two bolts tighten the bearing cap to the connecting rod foot.

Piston — The piston is made of a special aluminium alloy.
The oil-cooled piston has 3 piston rings.

Cylinder head — The cylinder head is made of special grey cast-iron.
The cylinder head has two inlet and two exhaust valves with valve rotators.
The injection nozzle is centrally arranged in the cylinder head.

Camshaft — The camshaft is made in one-piece and is induction-hardened.

Injection pump — Block pump with internal camshaft. The gear wheel mounted on this internal camshaft is driven by the camshaft gear wheel of the engine.

Governor — Hydraulic-mechanical governor.

Fuel system — A fuel supply pump and a duplex filter are mounted in the fuel system.

Lubricating oil system — Forced-feed circulating pump, switch-over oil filter with paper filter cartridges. Lube oil centrifuge is optional.

Starting air system — Electric starter (24 V). Compressed air starter is optional.

Cooling water system — Two-circuit cooling with gear driven freshwater pump, gear driven raw water pump and heat exchanger.

Exhaust gas system — The exhaust manifold is made of distortion-free, heat-resistant special cast iron.

Turbocharger — Turbocharger type depends on the requirements.

Alternator — 24 VDC

Optional — PTO variants, electronic governor.

Classification — By all established classification societies.

➢ Technical Data

Engine type

		TBD604L6	TBD604V8	TBD604V12	TBD603V12	TBD603V16
Model		in-line	V-engine	V-engine	V-engine	V-engine
Number of cylinders		6	8	12	12	16
Bore / stroke	mm	160 / 185	160 / 185	160 / 185	160 / 185	160 / 185
Displacement	l	22.3	29.8	44.6	44.6	59.5
Compression ratio		14.2	14.2	14.2	14.5	14.2
Direction of rotation				counter-clockwise		

Marine Generating Sets

Unrestricted continuous operation for marine generating sets in isolated or in parallel operation - DIN 6271.
State of load: 100%

Rated speed	min^{-1}	1000-1800	1000-1800	1000-1800	1000-1800	1000-1800
Engine output[1]	kW	330-470	440-625	660-940	660-940	880-1250
Mean effective pressure	bar	14.0-17.7	14.0-17.7	14.0-17.7	14.0-17.7	14.0-17.7
Fuel consumption[2]	g/kWh	190-207	191-206	187-200	191-207	189-204
Lubricating oil consumption	kg/h	0.23-0.38	0.30-0.50	0.46-0.76	0.60-1.0	0.60-1.0
Overload capacity		10% for 1 hour within 12 hours - DIN 6271				

Main propulsion units for ships

With unrestricted continuous operation MCR output blocked.
E.g. for drilling rig supply boats, tugs, fishing vessels, push tugs, inland waterway vessels, passenger ships and ferries in all-year operation.
State of load: 100%.

Rated speed	min^{-1}	1350-1650[4]	1350-1650[4]	1350-1650[4]	1350-1650[4]	1350-1650[4]
Engine output[1]	kW	410-470	545-625	820-940	820-940	1090-1250
Mean effective pressure	bar	15.3-16.3	15.3-16.3	15.3-16.3	15.3-16.3	15.3-16.3
Fuel consumption[2]	g/kWh	197-203	188-198	191-196	191-213	194-197
Lubricating oil consumption[3]	kg/h	0.30-0.35	0.40-0.47	0.60-0.70	0.79-1.00	0.79-0.93
Overload capacity		none				

With continuous operation over limited periods, with or without overload, blocked at overload if necessary, e.g. customs and police launches, crew boats, yachts, ferries and passenger ships in seasonal operation.
State of load: 100%

Rated speed	min^{-1}	1720-1800[4]	1720-1800[4]	1720-1800[4]	1720-1800[4]	1720-1800[4]
Engine output[1]	kW	480-500	640-665	960-1000	960-1000	1280-1330
Mean effective pressure	bar	14.9	14.9	14.9	14.9	14.9
Fuel consumption[2]	g/kWh	201-206	199-203	199-201	199-201	199-201
Lubricating oil consumption[3]	kg/h	0.37-0.38	0.48-0.50	0.74-0.76	0.96-1.0	0.96-1.0
Overload capacity		10% for 2 hours within 12 hours on propeller curve, however at 1800 min^{-1} overload impossible.				

With continuous operation over limited periods overload and maximum load, e.g. yachts, navy vessels, patrol boats.

Rated speed	min^{-1}	1720-1800[4]	1720-1800[4]	1720-1800[4]	1720-1800[4]	1720-1800[4]
State of load	%	100-115	100-115	100-115	100-115	100-115
Engine output[1]	kW	480-550	640-735	960-1100	960-1100	1280-1470
Mean effective pressure	bar	14.9-16.4	14.9-16.4	14.9-16.4	14.9-16.4	14.9-16.4
Fuel consumption[2]	g/kWh	201-205	199-203	201-203	199-213	199-203
Lubricating oil consumption[3]	kg/h	0.37-0.38	0.48-0.50	0.74-0.76	0.96-1.0	0.96-1.0
Overload capacity		10% for 2 hours within 12 hours, 15% for half an hour within 6 hours on propeller curve.				

Idling speed	min^{-1}	600	600	600	600	600
Total oil capacity of engine	l	86	112	180	175	177

Ambient conditions ISO 3046-I, DIN 6271 on board, 45 °C / 32 °C / 1000 mbar.

[1] Engine output with dual-circuit cooling system, output data with single-circuit cooling system on request.
[2] The fuel consumption figures are based on the outputs quoted, using a fuel with a lower calorific value of 42,700 kJ/kg (10,200 kcal/kg) as per DIN 6271 with a tolerance of +5% after completion of a 100 hours running-in period of the engine with raw water pump.
[3] Without taking into account lube oil changes.
[4] Based on propeller curve.