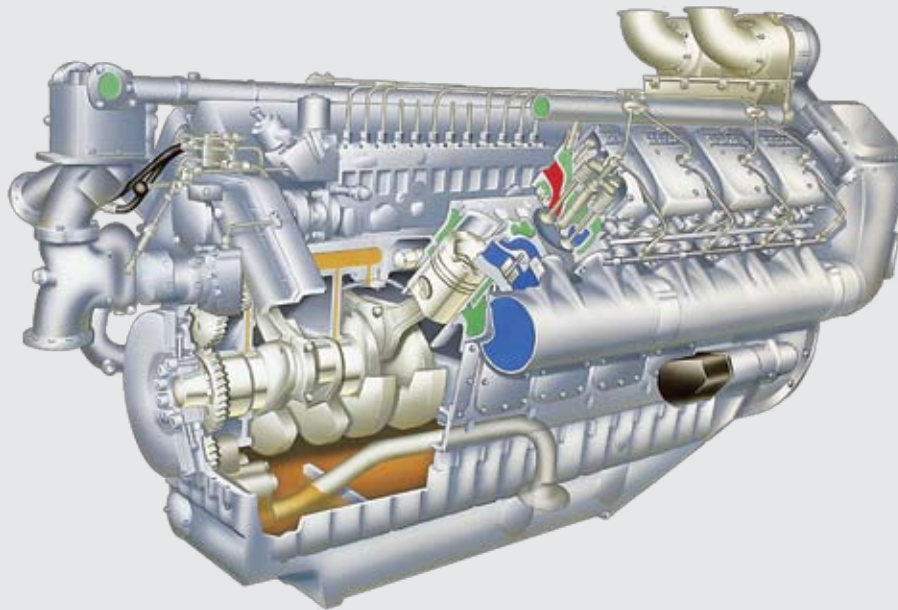


# 604B

420-1920 kW at 1000-1800 min<sup>-1</sup>

## TOTAL SERVICE



## WÄRTSILÄ DEUTZ MARINE ENGINES

### CHARACTERISTICS

- Robust engine design.
- Low noise engine.
- New cylinder head design with four-valve technology.
- Turbocharger(s) and charge air cooler.
- Mechanical-hydraulic or electronic speed governing.
- Full power take-off at both crankshaft ends.

### BENEFITS

- Operating cost savings due to reduced fuel consumption because of an increased compression ratio and an optimized combustion process.
- Easy maintenance.
- Reduced smoke and toxic gas emission.
- High reliability in operation.
- Low final cost.



## ENGINE DESCRIPTION

<b>Crankcase</b>	The crankcase is made of grey cast iron or spheroidal graphite iron. This depends on the engine output.
<b>Crankshaft</b>	The crankshaft is drop forged, made of heat-treated steel and induction-hardened.
<b>Main and big-end bearings</b>	Multi-layer bearing shells with steel back.
<b>Torsional vibration damper</b>	Rubber or viscous vibration damper.
<b>Cylinder liner</b>	The water-cooled cylinder liner is made of a centrifugally cast iron alloy.
<b>Connecting rod</b>	The obliquely split connecting rod is made of heat-treated, forced Cr steel. Two bolts tighten the bearing cap to the connecting rod foot.
<b>Piston</b>	The piston is made of a special aluminium alloy. The oil-cooled piston has 3 piston rings. The piston is cooled with lubricating oil via a cooling nozzle in the crankcase.
<b>Cylinder head</b>	The cylinder head is made of special grey cast iron with two inlet ducts to optimize air swirl in the combustion chamber. The cylinder head has two inlet and two exhaust valves with valve rotators.
<b>Camshaft</b>	The camshaft is made in one-piece and is induction-hardened.
<b>Injection pump</b>	Block pump with internal camshaft. The camshaft gear wheel of the engine drives the gear wheel, which is mounted on the internal camshaft of the block pump.
<b>Governor</b>	At in-line engines, the hydraulic governor is mounted on the fuel injection pump. At V-engines, the hydraulic governor is mounted separately. Optional: electronic governor.
<b>Fuel system</b>	A fuel supply pump and a duplex filter are mounted in the fuel system.
<b>Lubricating oil system</b>	Forced-feed lubrication by a gear pump, one or two duplex oil filters with a strainer, followed by a paper filter cartridge. Lube oil centrifuge in by-pass circuit. A control valve limits the lubrication oil pressure.
<b>Starting air system</b>	Electric starter (24 V). Compressed air starter is optional.
<b>Cooling water system</b>	<ul style="list-style-type: none"><li>• Two-circuit cooling with a fresh water centrifugal and raw water pump, heat exchanger with seawater and dirt resistant circular tube bundle.</li><li>• Keel cooling with fresh water pump and optional cooling temperature regulator.</li></ul>
<b>Exhaust gas system</b>	The exhaust manifold is made of distortion-free, heat-resistant special cast iron.
<b>Turbocharger</b>	Turbocharger type depends on the operational requirements.
<b>Alternator</b>	24 VDC.
<b>Optional</b>	PTO variants.
<b>Classification</b>	By all established classification societies.
<b>EIAPP</b>	The engine can be provided with an EIAPP certificate if it complies with the NO <sub>x</sub> Technical Code according IMO regulations MARPOL 73/78 - annex VI.

# TECHNICAL DATA

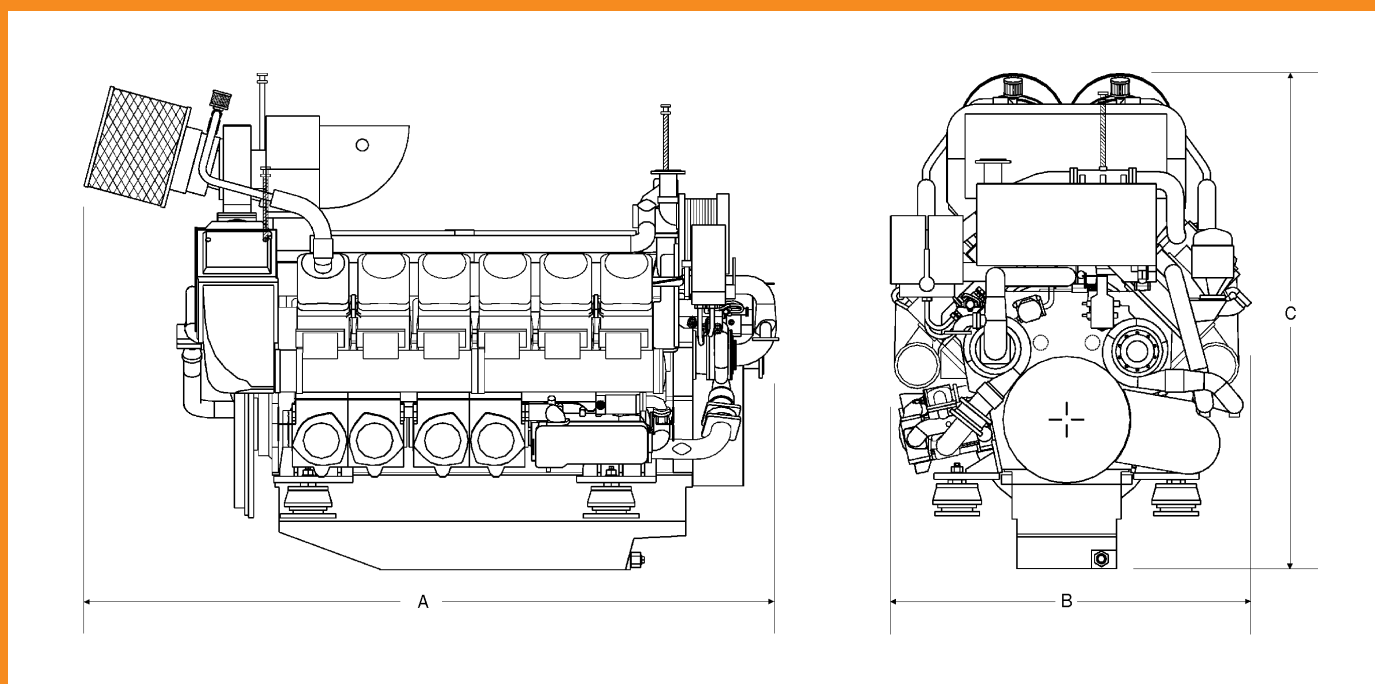
TECHNICAL DATA					
Engine type		TBD604B L6	TBD604B V8	TBD604B V12	TBD604B V16
Model		in-line	90° V	90° V	90° V
Number of cylinders		6	8	12	16
Bore / stroke	mm	170 / 195	170 / 195	170 / 195	170 / 195
Displacement	l	26.6	35.4	53.1	70.8
Compression ratio		14.2	14.2	14.2	14.2
Direction of rotation		Counter-clockwise			
<b>Marine Generating Sets</b>					
Continuous operation for marine generating sets in isolated or in parallel operation – DIN 6271. State of load: 100%					
Rated speed	min <sup>-1</sup>	1000 - 1800	1000 - 1800	1000 - 1800	1000 - 1800
Engine output <sup>1)</sup>	kW	420 - 600	560 - 800	840 - 1200	1120 - 1600
Mean effective pressure	bar	15.1 - 19.1	15.1 - 19.1	15.1 - 19.1	15.1 - 19.1
Specific fuel consumption <sup>2)</sup>	g/kWh	189 - 200	189 - 202	189 - 202	188 - 200
Lubricating oil consumption <sup>3)</sup>	kg/h	0.25 - 0.42	0.33 - 0.56	0.50 - 0.84	0.66 - 1.12
Idling speed	min <sup>-1</sup>	n/a	n/a	n/a	n/a
Overload capacity		10% for 1 hour within 12 hours – DIN 6271			
<b>Main propulsion units for ships</b>					
Continuous operation MCR output blocked. E.g. for tugs, fishing vessels, push tugs, inland waterway vessels, passenger ships and ferries. State of load: 100%.					
Rated speed	min <sup>-1</sup>	1350 - 1800 <sup>4)</sup>	1350 - 1800 <sup>4)</sup>	1350 - 1800 <sup>4)</sup>	1350 - 1800 <sup>4)</sup>
Engine output <sup>1)</sup>	kW	475 - 630	635 - 840	950 - 1260	1270 - 1680
Mean effective pressure	bar	15.8 - 15.9	15.8 - 15.9	15.8 - 15.9	15.8 - 15.9
Fuel consumption <sup>2)</sup>	g/kWh	191 - 201	192 - 202	192 - 202	190 - 201
Lubricating oil consumption <sup>3)</sup>	kg/h	0.32 - 0.42	0.43 - 0.56	0.65 - 0.84	0.86 - 1.12
Overload capacity		None			
Continuous operation over limited periods, e.g. customs and police launches, crew boats, yachts, navy vessels, patrol boats, sea rescue boats, fireboats. State of load: 100 - 120%					
Rated speed	min <sup>-1</sup>	1690 - 1800 <sup>4)</sup>	1690 - 1800 <sup>4)</sup>	1690 - 1800 <sup>4)</sup>	1690 - 1800 <sup>4)</sup>
Engine output <sup>1)</sup>	kW	600 - 720	800 - 960	1200 - 1440	1600 - 1920
Mean effective pressure	bar	16.0 - 18.1	16.0 - 18.1	16.0 - 18.1	16.0 - 18.1
Fuel consumption <sup>2)</sup>	g/kWh	200 - 201	199 - 202	199 - 202	199 - 201
Lubricating oil consumption <sup>3)</sup>	kg/h	0.43 - 0.47	0.58 - 0.62	0.87 - 0.93	1.16 - 1.24
Overload capacity		10% for 2 hours within 12 hours 20% for 2 hours within 1 hour on propeller curve			
Idling speed	min <sup>-1</sup>	600	600	600	600
Total oil capacity of engine	l	86	112	180	177

Ambient conditions ISO 3046-1, 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, no pumps attached.
- 3) Without considering lube oil changes.
- 4) Based on propeller curve.



## DIMENSIONS



**PRINCIPAL ENGINE DIMENSIONS (mm) AND WEIGHTS (t)**

Engine type	A	B	C	Weight (with flywheel)
TBD604B L6	2194	1143	1735	2.15
TBD604B V8	1912.5	1389	1875	2.75
TBD604B V12	2628.5	1389	2035	3.89
TBD604B V16	3128.5	1389	2035	4.85

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