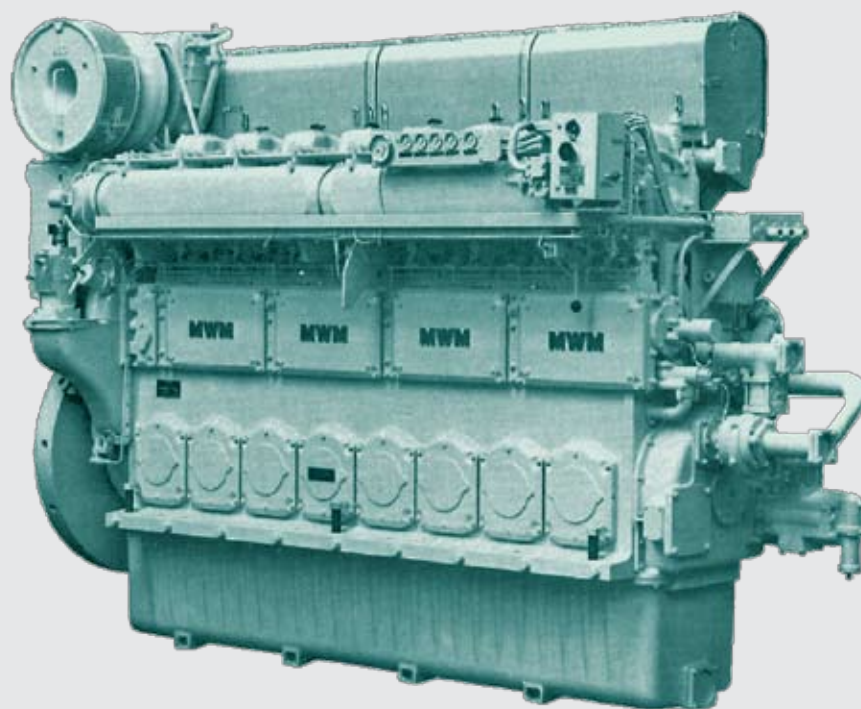


## TOTAL SERVICE



## WÄRTSILÄ DEUTZ MARINE ENGINES

### CHARACTERISTICS

- Water-cooled 6- and 8-cylinder in-line engines.
- Four stroke, direct fuel injection.
- Turbocharged and charge air cooled.
- Mechanical-hydraulic governing.
- Small-sized medium speed engine for heavy fuel operation.
- Usual marine gas-oils, MDF and heavy fuels with a specification meeting ISO 8217:2005(E), ISO-F-RMH 700.

### BENEFITS

- Extremely compact engine, which has a sturdy construction.
- Easy maintenance.
- Engine can be used both for marine propulsion units and for marine generating sets.



## ENGINE DESCRIPTION

<b>Crankcase</b>	The crankcase is made of grey cast iron alloy and made in one piece.
<b>Crankshaft</b>	The crankshaft is made of forged heat-treated steel and has bolted counterweights.
<b>Torsional vibration damper</b>	Fluid-viscosity vibration damper.
<b>Cylinder liner</b>	The case-hardened cylinder liner is water-cooled.
<b>Connecting rod</b>	The obliquely split connection rod is made of heat-treated, drop forged steel with a serrated joint. Big end bearing shells and main bearings are made of approved tri-metal.
<b>Piston</b>	The oil-cooled piston has 4 piston rings. The piston crown is made of heat-treated forced steel. The piston skirt is made of light alloy.
<b>Cylinder head</b>	The cylinder head is made of spherical graphite cast iron. Each cylinder head has two inlet and two exhaust valves with valve rotators. A connection is mounted on the cylinder head for measurement of the cylinder pressure.
<b>Camshaft</b>	The camshaft is made in one piece and has hydraulic fitted cams. The camshaft is mounted in the crankcase with laterally removable bearings.
<b>Injection pump</b>	Individual pumps on the cylinders with extremely short injection lines The complete injection equipment is designed for heavy fuel operation.
<b>Governor</b>	Mechanical-hydraulic.
<b>Fuel system</b>	A fuel supply pump and a switch-over duplex fuel filter are mounted in the fuel system.
<b>Lubricating oil system</b>	Forced oil circulation by engine mounted gear lubricating oil pump and a switch-over filter. The engine can be equipped with a wet sump or dry sump lubricating circuit.
<b>Lubricating oil filter</b>	Switch-over duplex oil filter with a maintenance indicator. The filter is a strainer and paper combination.
<b>Starting system</b>	The engine is started with compressed air.
<b>Cooling system</b>	The engine can have the following cooling water systems: <ul style="list-style-type: none"><li>• One-circuit cooling system: a re-cooler is used for the high-temperature and low-temperature circuit. Both cooling circuits are also provided with separate cooling water pumps and thermostats.</li><li>• Two-circuit cooling system: the low-temperature water, coming from the charging air and oil cooler, flows through the engine as well. A thermostat controls the flow rate to the re-cooler.</li></ul>
<b>Exhaust gas system</b>	Exhaust pipes are easily accessible. The insulation of the casing is according the requirements of the classification societies.
<b>Turbocharging</b>	The 6-cylinder engine is turbocharged according to the 3-pulse process. The 8-cylinder engine is turbocharged according to the multi-pulse process.
<b>Optional</b>	<ul style="list-style-type: none"><li>• The turbocharger can be mounted at driving end or at free end.</li><li>• Heavy fuel operation.</li><li>• In case of a dry sump lubrication system an additional scavenge pump can be mounted.</li><li>• A fresh-water circulating pump is optional.</li></ul>
<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 <sup>1)</sup>		TBD444L6	TBD444L8
Model		in-line	in-line
Number of cylinders		6	8
Bore / stroke	mm	230 / 320	230 / 320
Displacement	l	79.8	106.4
Compression ratio		12.8	12.8
Direction of rotation		Clockwise or counter-clockwise	
<b>Power ratings for marine propulsion units and on board generating sets</b>			
Rated output <sup>2)</sup>			
at 720 min <sup>-1</sup>	kW	1070	1420
at 750 min <sup>-1</sup>	kW	1110	1480
Mean piston speed			
at 720 min <sup>-1</sup>	m/s	7.7	7.7
at 750 min <sup>-1</sup>	m/s	8.0	8.0
Mean effective pressure	bar	22.3	22.3
Fuel consumption at fuel load <sup>3)</sup>			
at 720 min <sup>-1</sup>	g/kWh	193	193
at 750 min <sup>-1</sup>	g/kWh	193	193
Lubricating oil consumption <sup>4)</sup>			
at 720 min <sup>-1</sup>	kg/h	1.5	2.0
at 750 min <sup>-1</sup>	kg/h	1.5	2.0

1) Explanation of model designation:

T = engine with turbocharger.

B = engine with charge air cooler.

D = diesel engine.

L = in-line engine.

2) For marine propulsion engines, the MCR (maximum continuous rating) is a service power considered as a continuous brake power blocked at full load.

This output is corresponding in its magnitude to the ISO standard output, but under the following reference conditions:

Air temperature 45 °C

Atmospheric pressure 1000 mbar

Relative air humidity 60%

Cooling water temperature before charge air cooler 32 °C

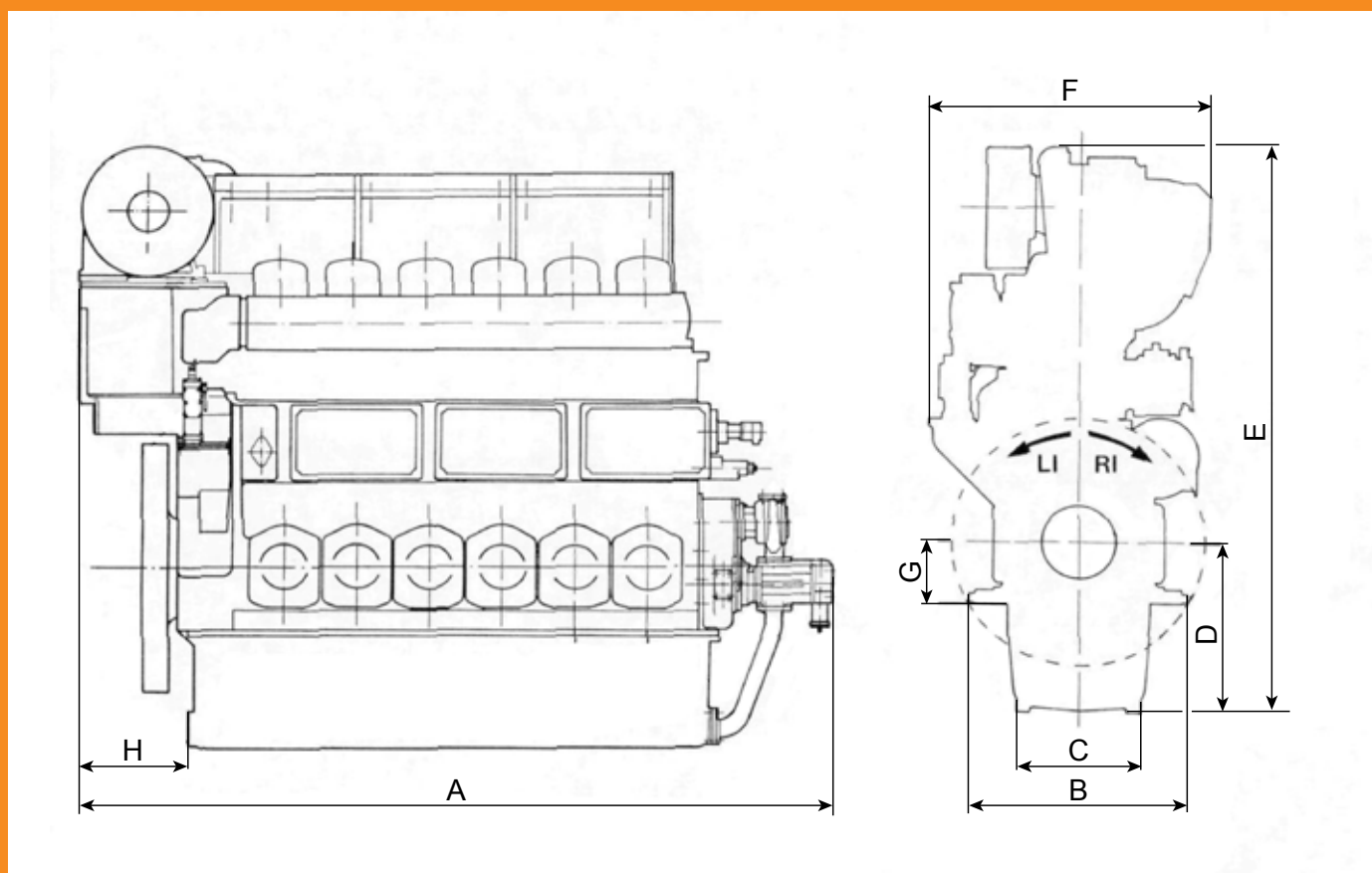
3) The fuel consumption values refer to DIN 6271 with a tolerance of +5%, without built-on pumps and using a fuel with a lower calorific value of 42,700 kJ/kg (10,200 kcal/kg).

4) According to ISO 3046.

The values given in this document are for information purposes only and not binding.



## DIMENSIONS



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

Engine type	A	B	C	D	E	F	G	H	Weight <sup>5)</sup>
TBD444L6	3445	960	580	805	2675	1435	290	505	9.35
TBD444L8	4085	960	580	805	2675	1435	290	505	11.45

<sup>5)</sup> Dry weight and without accessories.

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