18V48/60TS
Two-stage turbocharged diesel engine
The Best in its Class
18V48/60TS

Two turbochargers in sequence provide a new dimension in engine performance and operational flexibility. A wide load range from 1,050 to 1,200 kW/cyl., a specific fuel oil consumption of 171 g/kWh at 1,050 kW/cyl. and reduced NOx emissions set a new benchmark for four stroke diesel engines.

**Turbochargers from MAN Diesel & Turbo**

Turbochargers are the core of this innovative new concept – and MAN Diesel & Turbo is the only engine manufacturer that also designs and builds turbochargers. This unique expertise translates into exceptional efficiency and reliability.

**Two-stage turbocharging**

The idea is simple: just place two of MAN’s most efficient turbochargers upstream from the engine, one after the other. The result: the engine gets twice the charge air pressure, while turbocharger efficiency is increased significantly.

A single turbocharger, such as MAN Diesel & Turbo’s well known TCA88, is highly efficient; however, it has a limited pressure ratio. A specially designed compressor, as in the TCA88/RCF23, can increase the pressure ratio – but also has the effect of decreasing efficiency. The only solution to this dilemma is two-stage turbocharging, also known as sequential turbocharging (STC).

The 18V48/60TS deploys MAN Diesel & Turbo’s tried and tested TCA88 and TCA77 standard turbochargers in sequence. The TCA88 is located upstream and provides the low pressure turbocharger, while the TCA77 forms the high pressure turbocharger, next to the engine. In this configuration, both turbochargers can achieve pressure ratios over 6 bars and efficiencies of more than 76 per cent.
## 18V48/60TS Technical Data

### Overview

#### 18V48/60TS engine

<table>
<thead>
<tr>
<th>Performance data</th>
<th>Unit</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power per cylinder</td>
<td>kW</td>
<td>1050</td>
<td>1100</td>
<td>1150</td>
<td>1200</td>
</tr>
<tr>
<td>Tot. engine power</td>
<td>kW</td>
<td>18,900</td>
<td>19,800</td>
<td>20,700</td>
<td>21,600</td>
</tr>
<tr>
<td>Tot. el. genset power</td>
<td>kW</td>
<td>18,426</td>
<td>19,305</td>
<td>20,183</td>
<td>21,000</td>
</tr>
<tr>
<td>Spec. fuel oil consumption acc. to ISO 3046, without pumps, mech. Power output, +5% tolerance</td>
<td>g/kWh</td>
<td>171</td>
<td>172</td>
<td>174</td>
<td>177</td>
</tr>
<tr>
<td>Heat Rate acc. to ISO 3046, without pumps, mech. Power output, +5% tolerance</td>
<td>kj/kWh</td>
<td>7,305</td>
<td>7,350</td>
<td>7,400</td>
<td>7,500</td>
</tr>
<tr>
<td>NOx emissions (dry at 15% O2)</td>
<td>mg/Nm³</td>
<td>1860</td>
<td>1740</td>
<td>1800</td>
<td>1480</td>
</tr>
<tr>
<td>Mean effective pressure</td>
<td>bar</td>
<td>23.2/22.6</td>
<td>24.3/23.7</td>
<td>25.4/24.7</td>
<td>26.5/25.8</td>
</tr>
<tr>
<td>Spec. lube oil consumption</td>
<td>g/kWh</td>
<td>0.60</td>
<td>0.60</td>
<td>0.60</td>
<td>0.60</td>
</tr>
</tbody>
</table>

#### Dimensions (mm)

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>H</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>9625</td>
<td>5410</td>
<td>24510</td>
<td>9023</td>
<td>4694</td>
</tr>
</tbody>
</table>

#### Dry mass (t)

| 407 | 407 | 407 | 407 | 407 |

---

18V48/60TS – Four-stroke diesel engine
Engine type: 18V48/60TS

Engine cycle: four-stroke
Turbocharging system: 2-stage, constant pressure
- Low pressure TC type: MAN TCA88
- High pressure TC type: MAN TCA77

Number of cylinders: 18
Bore: 480 mm
Stroke: 600 mm
Swept volume per cyl.: 108.6 dm³
Engine speed 50/60 Hz: 500/514 rpm
Mean piston speed: 10.0/10.3 m/s
Nom. generator efficiency: 97.5%

Cooling:
- Cylinder cooling: HT cooling water
- LP-TC charge air cooler: 2-stage HT and LT cooling water
- HP-TC charge air cooler: 2-stage HT and LT cooling water

Starting method: compressed air with blower for low part load operation up to 25% load

General definition of diesel engine ratings according to ISO 3046-1: 2002

ISO Reference conditions:
- Air temperature: +25°C (77°F)
- Air pressure: 1000 mbar
- Cooling water temperature upstream of charge air cooler: +25°C (77°F)
- Relative air humidity: 30%

Figures are given with a tolerance of 5%, except for the lubrication oil consumption, which is given with a tolerance of 20%.

Abbreviations:
- TC Turbocharger
- HP High pressure
- LP Low pressure
- HT High temperature
- LT Low temperature