MAN Diesel & Turbo is a leading turbomachinery supplier and service provider worldwide. The comprehensive range of services and products including various types of compressors and turbines is based upon experience in more than a century, state-of-the-art manufacturing facilities, extensive R&D efforts as well as experienced professionals all around the world.

The wide range of multi-stage reaction type steam turbines as condensing-, saturated- and backpressure steam turbines offered by MAN Diesel & Turbo are suited for mechanical drive applications from 1 to 160 MW. Turbine solutions supplied by MAN Diesel & Turbo combine proven technology with convincing operating profitability. MAN Diesel & Turbo steam turbines cover the full spectrum of mechanical drive applications including:

**Refinery**
- Gas-to-Liquids (GTL)
- Coal-to-Liquids (CTL)
- Hydrogen processing, -production, -recovery and -cracking
- Desulfurization
- Fluid catalytic cracking (FCC)

**Chemicals/Petrochemicals**
- Propane dehydrogenation
- Methanol/syngas
- Olefin
- Purified terephthalic acid (PTA)
- Ethylene
- Chlorine

**Fertilizer industry**
- Ammonia
- Urea
- Nitric acid

**Oil & Gas**
- Liquefied natural gas (LNG)
- Gas transport

**Industrial gases**
- Air separation units (ASU)
- Carbon dioxide

**Iron & steel, mining**
- Coke oven
- Blast furnace blowers
Main characteristics and benefits for our customer

The steam turbine is characterized by a variety of design features for an optimized turbine configuration to meet the process conditions of customer needs. The modular design concept optimizes delivery time and cost to a minimum.

Proven steam turbine modules with a long reference history, that have demonstrated the highest level of reliability in operation, constitute a fundamental element of the design. Steam turbines made by MAN Diesel & Turbo are designed according to latest standards such as API 612, SIL, ATEX, IC, ASME, etc. The operational high efficiency minimizes the CO₂ emissions as well as operating cost.

The MAN steam turbine can also be designed with controlled and uncontrolled extractions as well as admissions to operate and control the client’s steam networks using defined steam parameters.

The turbine can be connected with an air-cooled condenser or a water-cooled condenser.

MAN mechanical drive steam turbines are fabricated within MAN Diesel & Turbo’s international manufacturing network.
Package concept

The steam turbines are delivered by MAN Diesel & Turbo as fully packaged units. The packages contain all necessary equipment for safe operation. Special emphasis is on easy and fast maintenance as well as modular and compact design to comply with all customer specifications. The package is preassembled, so site erection work is minimized.

Testing

MAN mechanical drive steam turbines can be tested within MAN Diesel & Turbo’s international test bed facilities. Several test beds are available on an area of approximately 4,500 qm where mechanical running tests or complete string tests can be performed according to API rules. Live steam is available up to 60 t/h at 50 bar and 500°C.

MAN PrimeServ: Service without limits

“MAN PrimeServ” is the MAN Diesel & Turbo’s after-sales service brand. Our experts help to reach and exceed the expectations our customers have in their steam turbines, also covering far more than just routine servicing of machinery or the simple delivery of spare parts.

- Individual consulting, service agreements and contracts
- Maintenance, spare parts supply and repairs
- Retrofits, upgrades, rerates, relocations
- Online monitoring and diagnosis
- Training at MAN PrimeServ Academies
- Worldwide network of service hubs
- 24/7, 365 days a year – service around the globe.

Technical Data

<table>
<thead>
<tr>
<th></th>
<th>Condensing steam turbines</th>
<th>Backpressure turbines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power out</td>
<td>MW</td>
<td>1-160</td>
</tr>
<tr>
<td>Speed</td>
<td>rpm</td>
<td>up to 14,500</td>
</tr>
<tr>
<td>Inlet pressure</td>
<td>bar</td>
<td>up to 140</td>
</tr>
<tr>
<td>Inlet temperature</td>
<td>°C</td>
<td>up to 540</td>
</tr>
<tr>
<td>Exhaust pressure</td>
<td>bar</td>
<td>vacuum</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 40</td>
</tr>
</tbody>
</table>
Construction Features

- Horizontal partition-joint with hydraulically preloaded partition joint bolts
- Multi-stage reaction blading, integrated shrouds for maximum efficiencies
- Rotor forged from one piece
- Welded or bolted steam inlet casing with hydraulic operated control valves and hydraulic operated trip valve with integrated steam strainer
- Exhaust flange: radial (upward/downward) or axial
- Mounting arrangement on table or block foundation
- High efficient exhaust blades with transsonic profiles
- In condensing steam turbines the fabricated exhaust casing is welded or bolted to the main cast steel casing
- Full system integration with steam turbine, condenser, control unit for improved efficiency.

On the following pages you will find some typical references.
Typical Driver References

**Fluid Catalytic Cracking (FCC)**

<table>
<thead>
<tr>
<th>Turbine type</th>
<th>DK100/210</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>41 MW</td>
</tr>
<tr>
<td>Speed</td>
<td>3,511 rpm</td>
</tr>
<tr>
<td>Live steam temperature</td>
<td>360°C</td>
</tr>
<tr>
<td>Live steam pressure</td>
<td>40 bar</td>
</tr>
<tr>
<td>Exhaust pressure</td>
<td>0.24 bar</td>
</tr>
</tbody>
</table>

**Refinery**

<table>
<thead>
<tr>
<th>Turbine type</th>
<th>DK040/70</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>2.1 MW</td>
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<tr>
<td>Speed</td>
<td>13,000 rpm</td>
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<tr>
<td>Live steam temperature</td>
<td>341°C</td>
</tr>
<tr>
<td>Live steam pressure</td>
<td>28.5 bar</td>
</tr>
<tr>
<td>Exhaust pressure</td>
<td>0.15 bar</td>
</tr>
</tbody>
</table>

**Ethylene**

<table>
<thead>
<tr>
<th>Turbine type</th>
<th>DK063/180</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraction</td>
<td>1</td>
</tr>
<tr>
<td>Power</td>
<td>30 MW</td>
</tr>
<tr>
<td>Speed</td>
<td>7251 rpm</td>
</tr>
<tr>
<td>Live steam temperature</td>
<td>490°C</td>
</tr>
<tr>
<td>Live steam pressure</td>
<td>100 bar</td>
</tr>
<tr>
<td>Exhaust pressure</td>
<td>0.2 bar</td>
</tr>
</tbody>
</table>

**Purified Terephthalic Acid (PTA)**

| Turbine type   | DK125/400 | Admissions | 2 |
|----------------|-----------|------------|
| Power          | 28 MW     |
| Speed          | 3,014 rpm |
| Live steam temperature | 160°C    |
| Live steam pressure | 6.2 bar  |
| Exhaust pressure | 0.11 bar  |
### Steam Turbines for Mechanical Drive Application

#### Turbine type: DK125/280
- **Power**: 83 MW
- **Speed**: 3511 rpm
- **Live steam temperature**: 260°C
- **Live steam pressure**: 18 bar
- **Exhaust pressure**: 0.24 bar

#### Turbine type: DK080/170
- **Power**: 46 MW
- **Speed**: 4,764 rpm
- **Live steam temperature**: 540°C
- **Live steam pressure**: 110 bar
- **Exhaust pressure**: 0.26 bar

#### Turbine type: DG040/040
- **Power**: 6 MW
- **Speed**: 10,288 rpm
- **Live steam temperature**: 530°C
- **Live steam pressure**: 131 bar
- **Exhaust pressure**: 24.5 bar

#### Turbine type: DK050/110
- **Power**: 9.4 MW
- **Speed**: 7,973 rpm
- **Live steam temperature**: 400°C
- **Live steam pressure**: 45 bar
- **Exhaust pressure**: 0.14 bar

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#### Air Separation for CTL

- **Turbine type**: DK080/170
- **Power**: 46 MW
- **Speed**: 4,764 rpm
- **Live steam temperature**: 540°C
- **Live steam pressure**: 110 bar
- **Exhaust pressure**: 0.26 bar

#### Air Separation for GTL

- **Turbine type**: DK125/280
- **Power**: 83 MW
- **Speed**: 3511 rpm
- **Live steam temperature**: 260°C
- **Live steam pressure**: 18 bar
- **Exhaust pressure**: 0.24 bar

#### Carbon Dioxide (CO₂)

- **Turbine type**: DG040/040
- **Power**: 6 MW
- **Speed**: 10,288 rpm
- **Live steam temperature**: 530°C
- **Live steam pressure**: 131 bar
- **Exhaust pressure**: 24.5 bar

#### Nitric Acid (HNO₃)

- **Turbine type**: DK050/110
- **Power**: 9.4 MW
- **Speed**: 7,973 rpm
- **Live steam temperature**: 400°C
- **Live steam pressure**: 45 bar
- **Exhaust pressure**: 0.14 bar