The THM 1304 heavy-duty gas turbine family offers a long life with a high level of reliability and availability. The modular design facilitates easy installation and maintenance features to realize an optimized cost-to-benefit ratio over the entire lifecycle. Onshore and offshore requirements for power generation applications are perfectly met.

**Benefits at a glance**
- Modular design for easy and fast installation
- High reliability and availability
- Low emissions
- Fuel flexibility

Illustration shows package for THM1304-10N with ACC combustion chambers
**THM1304 Generator Drive**

**Technical data**

<table>
<thead>
<tr>
<th>Performance at ISO conditions</th>
<th>1304-10N**</th>
<th>1304-12N***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power output</td>
<td>kWₚ</td>
<td>10,080</td>
</tr>
<tr>
<td>Heat rate</td>
<td>kJ/kWhₚ</td>
<td>12,330</td>
</tr>
<tr>
<td>Efficiency</td>
<td>%ₚ</td>
<td>29.2</td>
</tr>
<tr>
<td>Exhaust gas flow</td>
<td>kg/s</td>
<td>46.5</td>
</tr>
<tr>
<td>Exhaust gas temperature</td>
<td>°C</td>
<td>490</td>
</tr>
<tr>
<td>Generator speed (50 Hz/60 Hz)</td>
<td>rpm</td>
<td>1,500/1,800</td>
</tr>
<tr>
<td>NOₓ emissions</td>
<td>mg/Nm³</td>
<td>50</td>
</tr>
<tr>
<td>(ref. to 15% O₂, dry)</td>
<td>ppm</td>
<td>25</td>
</tr>
<tr>
<td>CO emissions</td>
<td>mg/Nm³</td>
<td>20</td>
</tr>
<tr>
<td>(ref. to 15% O₂, dry)</td>
<td>ppm</td>
<td>16</td>
</tr>
</tbody>
</table>

*all data valid for sea level, 15 °C, no inlet and exhaust pressure losses, 60 % rel. humidity, natural gas. Power output will decrease with increase of site altitude (1.1 % per 100 m), inlet pressure loss (1.9 % per 1 kPa) and exhaust pressure loss (0.9 % per 1 kPa)

** ACC combustor

*** DLN combustor

**Typical applications**

Gas turbine generator units are operated for e.g. emergency and black start applications, on off-shore platforms (with adapted package design) mainly in simple cycle mode.

For CHP¹) applications (most common) gas turbine generator units are operated in combination with a heat recovery unit for different heat processes, resulting in e.g.
- Power, Steam Generation
- Power, Hot Water Generation
- Power, Steam & Chilled Water
- Power, Steam & Hot Water

CHP applications are beneficial for various industries such as food processing, pulp & paper, breweries, automotive, etc. having demand for heat and power.

CHP processes provide increased efficiencies and reduced CO₂ emissions compared to conventional power & heat generation.

Overall CHP efficiencies reach 90% and higher depending on the heat process.
Gas turbine
- Heavy duty, twin shaft
- 11 stage air compressor
- 2 combustion chambers in V arrangement
- 2 stage high pressure turbine
- 2 stage power turbine

Combustion systems
- Low Emission combustion system
  - ACC combustors (THM1304-10N)
  - DLN combustors (THM1304-12N)
- Diffusion combustion system
  - Standard combustor
  - High fuel flexibility
  - Dual fuel compatible

Integrated auxiliary gear
- Parallel shaft gear type
- Drive for main lube oil pump
- Torque transmission of electric starter motor for gas turbine start-up

Load gear
- Speed reduction to 1,500 rpm (for 50 Hz) or 1,800 rpm (for 60 Hz)
- Free standing (on foundation)

Generator
- 4 pole, 3 phase, synchronous generator with built-in exciter, rotating rectifier and permanent magnetic pilot generator (PMG)
- Air cooled
- Water cooled
- Insulation Class F / temperature rise class B
- Free standing (on foundation)

Gas turbine package
- Package for outdoor installation
- Noise emission
  - All equipment is designed for
    \[ L_{PA} = 85 \text{ dB(A)} \] measured in 1 m distance and 1.5 m height
  - \[ L_{PA} = 80^{(3)}, 75^{(3)}, 70^{(3)} \text{ dB(A)} \]
- Base frame
  - With integrated lube oil and fuel system
- Starting system
  - Variable frequency drive for gas turbine starter motor
  - Integrated lube oil system
  - Main lube oil pump driven via auxiliary gear
  - Stand-by lube oil pump (AC-motor driven)
  - Emergency lube oil pump (DC motor driven)
  - Air to oil cooler (free standing)
  - Water cooler
- Integrated lube oil tank
- Lube oil tank heater
- Lube oil filter
- Control valves
- Oil mist separator
  - Fuel system
    - Fuel gas system
    - Double block and bleed valves
    - Control valves
    - Liquid & dual fuel system (standard combustor)
  - Air inlet system
    - Table type filter house with depth loading cartridges
    - Filtration class:
      - Pre-filter: G4,
      - Fine-filter: F9 (E11)
    - Static filter with anti-icing
    - Pulse type filter in table or down flow arrangement
  - Exhaust system
    - Transition duct up to interface at enclosure for connection to optional downstream exhaust system
    - Free standing stack
  - Enclosure
    - Gas turbine enclosure for outdoor installation
    - Fire detection and CO2 fire-fighting system
    - Water-mist fire-fighting system
    - Gas leakage detection
    - Maintenance cranes
    - Turbine compressor cleaning system
    - Offline and online washing
    - Mobile wash trolley

Controls
- For installation in air conditioned control room (to be provided by others)
- Gas turbine control system
  - Gas turbine control & protection
  - Unit sequencing
  - Human machine interface (HMI)
  - Alarm management
- Generator control & protection system
  - Automatic synchronizaton
  - Automatic voltage regulator (AVR)
  - Generator protection relay
- Low voltage distribution system
- AC power supply for all electrical consumers
- Turbine starting system
  - Variable frequency drive (VFD)
- Uninterrupted power supply system
  - Buffered with batteries
  - DC supply for emergency lube oil pump
  - AC supply for all electrical panels
- Data storage system
  - Long term data archive
  - Event logger
- Plant control system interface
  - Modbus TCP interface
  - Others optional

Documentation
- Engineering documents
- Installation manual
- Operating instructions
- Quality documentation

Factory acceptance test of turbine
- Core engine
  - full-speed, full-load

Complete unit test
- Full-speed, full-load
- Full-speed, no-load

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1 CHP = Combined Heat and Power
2 ACC = Advanced Can Combustor (Dry Low Emission (DLE) Technology)
3 can be offered as option
All data provided in this document is non-binding. This data serves informational purposes only and is not guaranteed in any way. Depending on the subsequent specific individual projects, the relevant data may be subject to changes and will be assessed and determined individually for each project. This will depend on the particular characteristics of each individual project, especially specific site and operational conditions.

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