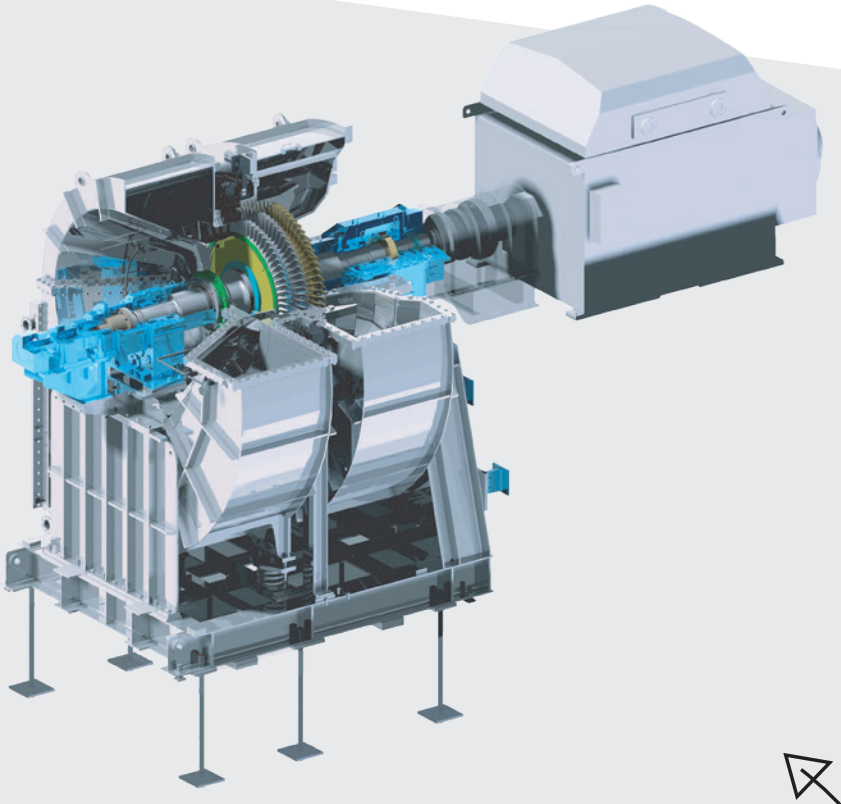
IMI Z&J®

Top-Gas Recovery Turbine (TRT)



Engineering GREAT Solutions

Energy recovery system for blast furnace plants

IMI Critical Engineering

Top-Gas Recovery Turbine (TRT)

Within the blast furnace process (integrated steel mills) an implementation of a Top-Gas Recovery Turbine plant provides a high potential economic and environmental solution to recover and gain power from existing energy. An expander turbine utilizes the pressure and thermal energy which is provided by the compressed “Top Gas” from a blast furnace. This gas expander is specially designed for all technical requirements to process the blast furnace gas. Highly resistant against dust particles and water drops the turbine blades and nozzles guarantee a very long lifetime (25 years and more).
A Top-Gas Recovery Turbine has no negative effect on the blast furnace production, with the controllable nozzles at the Top-Gas Recovery Turbine giving an absolutley steady top pressure.

Key features

- Low revolution of 1500/min (50Hz), 1800/min (60Hz)
- Low pressure differential over the stages
- Low dust deposit at the blades
- All internals coated including blades and nozzles
- Gas sealing device with low nitrogen consumption
- Bearings outside of gas chambers
- Double Flow Design compensates axial loads
- Fast and exact Top Gas Pressure control
- Long maintenance intervals
- Less energy losses (no gearbox is necessary between turbine and generator)
- No additives for spraying water necessary (cleaning of controllable nozzles)

Benefits

The turbine expander recovers about 33% of the pressure energy which is supplied from the blower to the blast furnace. Blast furnace plants without Top-Gas Recovery Turbines lose this energy by gas expansion via control valves (inside the washer or with “Septum Valves”). The expander process doesn’t affect the calorific energy of the blast furnace gas. This recovery of electrical energy has no CO2 pollution

- High-energy output – high efficiency
- Reliable and proven technology
- Compact design leads to an easy implementation into an existing structure
- Long maintenance intervals and long lifetime
- 30 years experience in Top-Gas Recovery Turbine business and 36 installed turbines worldwide
- Return of investment within 3 years possible (depending on plant size)
- Dual Duty Turbine - Only one installation serving two blast furnaces

Product Specification

Temperature
Up to 100 Deg C blast furnace gas temperature

Volume
Up to 1.000.000 Nm³/h of blast furnace gas

Pressure
up 2.50 bar(g) inlet blast furnace gas pressure

Power output
up to 35 MW

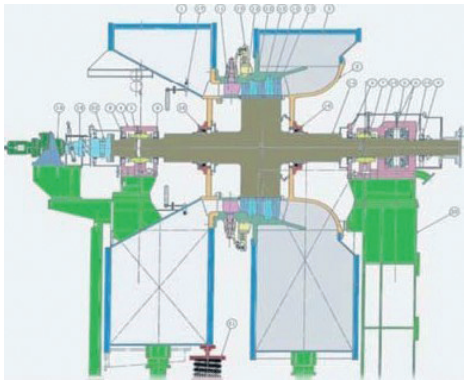
Type
Axial single flow, multi stages expansion turbine

Speed
1500 rpm for 50 Hz; 1800 rpm for 60 Hz

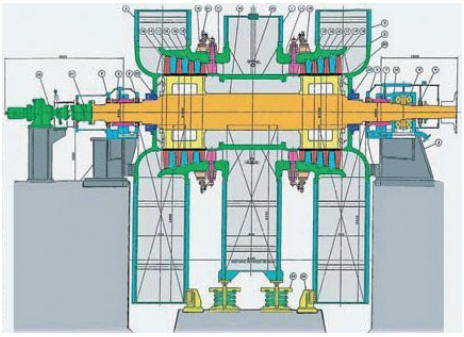
Generator speed
1500 rpm for 50 Hz; 1800 rpm for 60 Hz

Dual duty multi-stage turbine

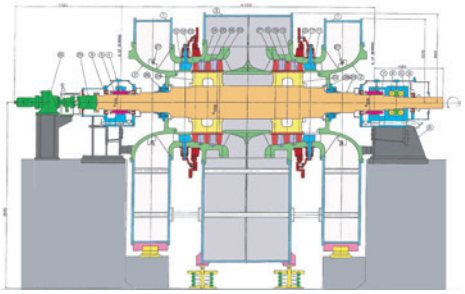
IMI Z&J's Dual Duty Turbine enables the simultaneous support of two blast furnaces. The production of 2 x 13 MW in combination with less maintenance and long service periods provides the advantage of less investment to our customers. Only one Top-Gas Recovery Turbine plant for two blast furnaces has to be built. Both blast furnaces use independent Top Pressure Controls.



Single Flow Turbine up to 500.000 Nm3/h and 2.5 bar (g)



Double·Flow Multi Stage Turbine up to 1.000.000 Nm'/h and 2.5 bar (g)



DualDuty Multi Stage Turbine up to 1.000.000 Nm3/h and 2.5 bar (g)

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