

Comprehensive **Steam Turbine Solutions** for Palm Oil Industry

Palm oil industry is one of the leading agro-industry in South East Asian region owing to the optimum climate for oil palm plantation. While Indonesia is the largest palm oil producer and exporter, India is the largest consumer and importer of palm oil in the world. Utilizing wastes generated from the oil production process not only replaces the use of expensive fossil fuels, but also reduces the impact to global warming.

Triveni has the perfect selection of Single and Multi stage steam turbines that are carefully designed to comply with the individual operating parameters of each palm oil mill.

- **Robust & Compact Design** - Turbine, Gear Box and Generator mounted on single skid with integral lube oil console. Integral rotor shaft with disc (Solid forged rotor)
- **High Operational Reliability** – Torsional, vibration and short circuit analysis of full train ensures operational reliability and uptime of over 99%
- **Reduced Maintenance** - Steam ejector prevents steam leakage and oil contamination. Triveni offers Labyrinth packaging for more efficient and durability compared to the conventional carbon ring seals
- **Quick Start & Stable Part Load Operation** – Designed for daily start & stop conditions. Additionally flatter efficiency curve type design offers high stability during partial load conditions

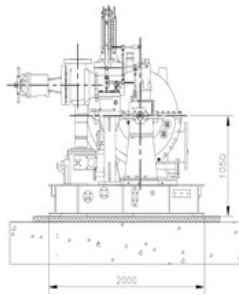
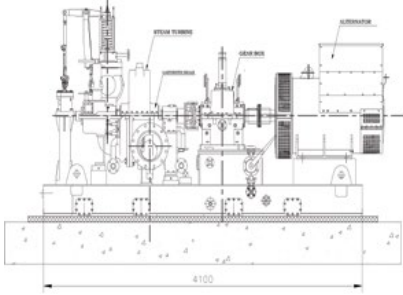
Total installed base of over 130 Steam Turbines in Palm Oil Industry that have more than 60 multi stage steam turbine units, Triveni has an established customer base in Malaysia, Indonesia, Thailand & Latin America by providing its reliable, efficient and robust steam turbine solutions with many benefits.

- **Mechanical Run Test** - In house facility for real time full speed mechanical steam run test of every turbine manufactured at Triveni with vibration, bearing temperature, stability, governor response and safety trips inspection
- **After Sales & Spares** - With strength of over 100 personnel in engineering, there is a directed focus towards standardization and value engineering of parts to bring them up to the current design. Added to this there are multiple advantages
 - A stock of fast moving parts are always stocked at our works
 - Being an OEM we have the unique advantage of supplying critical spares at short notice to meet emergencies
- **Faster Product Delivery & Cost Effective Solutions** - State of the art manufacturing facilities in Bengaluru, India with combined capacity to manufacture over 200 turbines annually. This enables us to optimize the product cost & provide faster product delivery

Single Stage Turbine



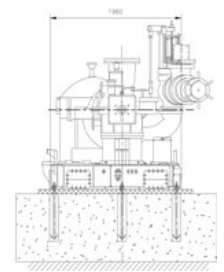
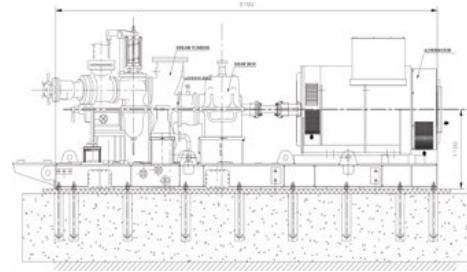
Upto 3MWe
Inlet Pressure upto 45 Bar
Inlet Temperature upto 450 Deg C
Exhaust Pressure upto 5 Bar



Multi Stage Turbine



Upto 6MWe
Inlet Pressure upto 65 Bar
Inlet Temperature upto 480 Deg C
Exhaust Pressure upto 5 Bar



Standard Scope of Supply:

- Steam Turbine with Labyrinth Seal
- Gear Box
- Alternator
- Woodward Governor – UG8/UG10/UG40/505 to suit customer requirement
- Set of Instrumentation Turbine Local Panel
- Complete Erection and Commissioning (Supply on FOT – Turnkey basis)
- Supervisory Services

Case Studies

1 1.2 MWe Back Pressure Single Stage Turbine

Mill Capacity	50 TPH
Power Required by the mill	1000 kW
Boiler Parameters	30 Bar / Saturated
Boiler Capacity	35 TPH
Single Stage Capacity	1200 kW



Challenge

Fluctuating process and power demand

Solutions

Multi functional hand valve to meet process demand and operate turbine with higher efficiency.

Customer Benefits

Uninterrupted Steam and power supply

2 8MWe Extraction Condensing Steam Turbine

Inlet Steam 38 Bar
Inlet Temperature – 400 Deg C

Challenge

- With the existing 45TPH boiler and TG unit, there was no provision for future expansion
- Combined heat and power solution for 3 different refineries and factories adjacent to the unit

Solution

- Modified the standard frame size of the turbine to meet the existing site conditions
- Hybrid optimised efficient extraction condensing turbine offered with customised design.
- Modern control and operating system

Customer Benefits

Existing units replaced with highly efficient extraction condensing steam turbine to meet power and heat requirement of other units

3 5MWe Extraction Condensing Steam Turbine

Inlet Steam 30 Bar
Inlet Temperature – 350 Deg C

Challenge

- Process steam required at 4.2 Bara (3.2 B arg) and variable flow from 12TPH to 18TPH during plant operation
- Power export to the grid

Solution

- Extraction condensing TG set for variable process flow and maximum power export to the grid
- Water cooled condenser, Gear box – Double Helical, Single Reduction, Generator
- PLC based control system

Customer Benefits

- Cost effective and reliable solution
- Another unit of extraction condensing TG is under erection with commissioning expected soon

CONTACT US

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