

**Engine assembling special tools**

**Objective:** At the end of this lesson you shall be able to

- use of special tools

**Cylinder block assembly****1 Place the crankshaft in position at the crankcase**

<b>Engine Assembly</b>	<b>Special Tools</b>
1. Refitting of liner	Hydraulic press
2 Bearing oil - clearance	Plastic gauge
<b>3 Piston assembly</b>	Arbor press, Mallet & copper hammer
(a) piston clearance	Feeler gauge
(b) Piston pin assembly	Copper Drift, circlip plier
(c) Piston ring expander	Piston ring assembly
(d) Piston ring groover cleaning	Piston ring groover
(e) Piston ring clearance checking	Feeler gauge
4 Inserting of piston into cylinder block	Piston ring compressor
5 <b>connectting rod</b>	Connectting rod alignment fixture
6 <b>Crankshaft Assembly</b>	Crankshaft balancer , Dial gauge, Feeler gauge, Out side micrometer.
7 <b>Cylinder bore ovality and taper</b>	inside micrometer/ Telescopie gauge

<b>Cylinder Head</b>	<b>Special Tools</b>
Valve assembly	Valve spring compressor
Valve measurement	Vernier caliper ,bevel protrector, valve guide gauge
Valve Recontioning	Valve refacing m/c
Valve seat reconditing	Valve seat grinding m/c , valve seat cutter
Valve spring	Valve spring tester
Valve leakage cheacking	Valve leakage Tester
Spring checking	Try squear, surface plate
warpage	Strightedge, Feeler gauge
Cyliner block crack	Ultrasonic tester , megnetic particl inspection test

# Gas turbine

**Objectives:** At the end of this lesson you shall be able to

- describe gas turbines
- state stages of turbine
- compare the gas turbine and diesel engine.

## Gas turbine

A gas turbine Fig 1 is a continuous combustion, internal combustion engine. There are three main components:

- 1 Gas compressor
- 2 Turbine on the same shaft
- 3 Combustion chamber

Some attachments used to increase efficiency, and also to convert power into mechanical or electrical form.

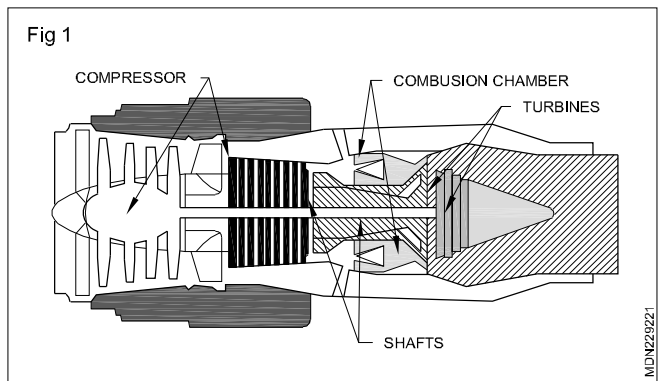
The basic operation of the gas turbine is a Brayton cycle. Fresh atmospheric air flows through the compressor that brings it to higher pressure. Energy is then added by spraying fuel into the air and igniting it. So the combustion generates a high-temperature and pressure. This high-temperature high-pressure gas enters a turbine, where it expands. This producing a shaft work output in the process.

The turbine shaft work is used to drive the compressor. The energy that can also be (not used for shaft work comes out in the exhaust gases) produce thrust which is used to push aircraft. The purpose of the gas turbine determines the design so that the most desirable split of energy between the thrust and the shaft work is achieved. Separate cooling system not required as gas turbines are open systems that do not use the same air again.

Gas turbines are used to power aircraft, trains, ships, electrical generator, pumps, gas compressors, and military war tanks.

### Stages in turbine

The two primary parts of turbine stage are the stator nozzle and the turbine rotor blades. The stage consists of a ring of fixed blades followed by the rotor blade ring. Most of the



### Difference between turbine and diesel engine

Turbine	Engine
Large power achieved by relatively small size	Less power generated with occupying more space
High efficiency	Low efficiency
Simple design	Complicated in design
High RPM	Low RPM
High torque	Low torque
Needs very less maintenance suitable for stationary only	Needs very frequent maintenance suitable for both stationary and mobile.
Needs to have more safety conscious (More hazardous)	Less hazardous