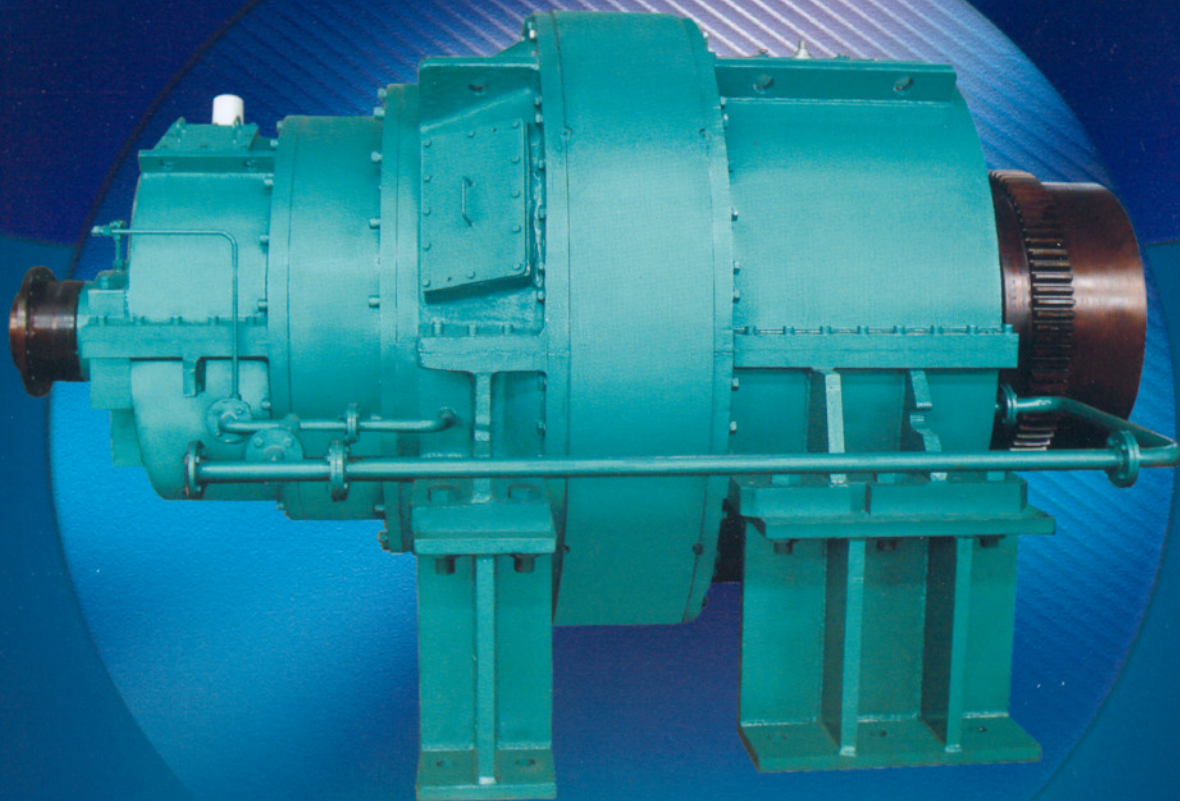
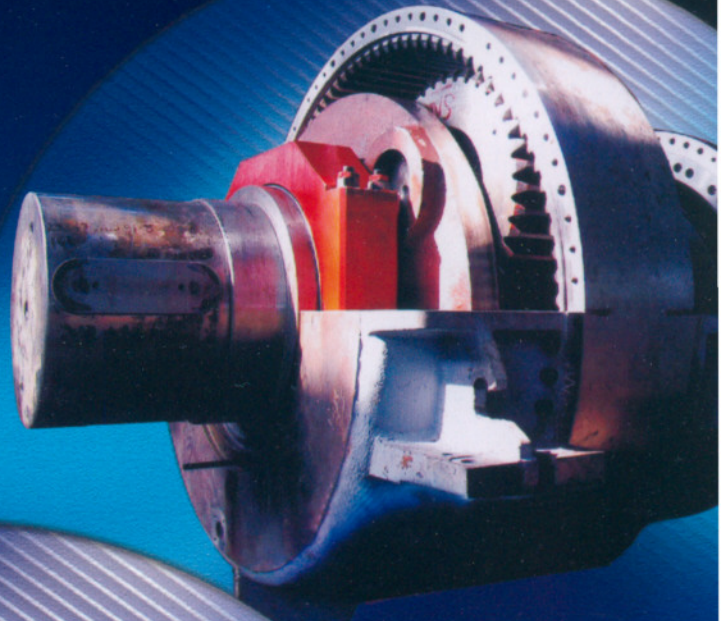
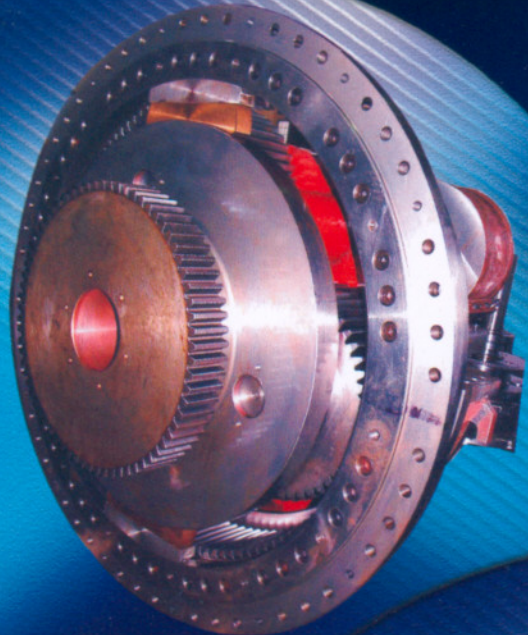


# PLANETARY GEAR BOXES

| Energy Efficient | Long Service Life | Reliable & Compact |



WALCHANDNAGAR INDUSTRIES LTD.



A Tradition of Engineering Excellence



Walchandnagar Industries has inherited Gear Technology from world renowned gear specialist MAAG Gear AG Zurich, Switzerland. The design philosophy and manufacturing procedures are based on MAAG Technology. For the manufacture of gear elements, highly accurate (precision) gear cutting and grinding machines of internationally reputed manufacturers including MAAG - Zurich have been imported and installed. Heat treatment (case carburizing and hardening) of gear internals is carried out by patented CARBO MAAG process to increase wear resistance and hence life. Strict quality control is exercised at all stages. WIL has been the pioneer in design & manufacture of special purpose Gear Boxes in India, and has supplied Gear Boxes for variety of applications to suit customer's specific needs such as sugar plants, cement plants, steel rolling mills, paper mills, refineries, fertilizer & petrochemical industry, hydel power projects, compressor drives, turbo generators, blowers, main propulsion for naval warships & other defence special applications. Many Gear Boxes are being developed as import substitution.

## Planetary Gear Box

WIL has successfully designed, manufactured & supplied Planetary Gear Boxes. Planetary Gear Boxes are very compact, highly efficient & reliable with long life & negligible maintenance cost. WIL, aware of the need to develop energy efficient drive systems for Sugar industry, decided to develop planetary gear drive systems. Initially Planetary Gear Boxes for TRPF drives were developed & installed at South India Sugars in 1997 & encouraged by their excellent performance, large Planetary gearboxes for mill drives are developed.

The Planetary Gear Boxes for sugar mill drive, reducing speed from 1000 RPM to 5RPM, replace the combination of intermediate Gear Box & open gearing and is connected to the mill through flexible coupling. The first Planetary Gear Box for

sugar mill drive (750 HP, 1000 / 5 RPM) was installed at M/s Sakthi Sugar, Sivaganga Unit. WIL has successfully manufactured upto 1200 HP Gear Box.

WIL has also developed planetary gearboxes as Import substitute for various applications which include centrifuge drives for Reliance Industries, crane gear boxes for TISCO & for Fuel Pump Test Rig (running at 30,000 RPM)



**Planetary Gear Box**



## Construction Details

A Planetary Gear Box has three or more "Planet" gears simultaneously in mesh with a central pinion (Sun) & internal teeth of a Rim (Annulus). The planet carrier supports the planets through pin & bearing. The Planet Carrier (PF type) & the Annulus is fixed (not allowed to rotate about its axis) to achieve the desired reduction & direction of rotation of the output shaft.

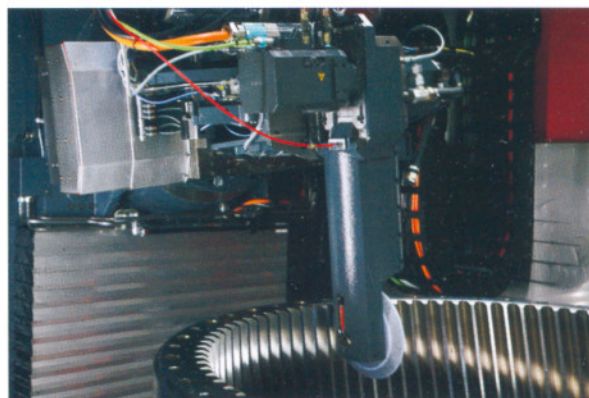
The type of Gear Box is selected as per drive system requirements. The material for the Sun pinions & planet gears is case carburizing steel. For Annulus, alloy steels are used which are ultrasonically tested. The casing is either of cast or fabricated construction. Anti-friction bearings or in-house manufactured highly accurate white metal lined ultrasonically tested bearings are used based on design requirements.

Precision ground gears, rolling action of moving parts, floating sun pinion offering negligible transmission losses, zero reaction on planet carrier bearings due to balancing of tooth loads on planets and sun pinion and also the fact that internal to external tooth meshing (Planet to annulus) has lower losses than external to external tooth meshing, provide a Planetary Gear Box its unique feature "HIGH EFFICIENCY".

## Quality Control

WIL Planetary Gear Boxes are designed & manufactured for long service life. Individual components of Planetary Gear Boxes are inspected with great care. After Heat Treatment, carburising depth, hardness etc. are thoroughly checked in metallurgical laboratories.

A quality assurance system based on requirements of ISO-9001-2000 standard, embraces all activities ensuring a reliable, durable & efficient product.



**Internal Teeth Grinding (Annulus)**

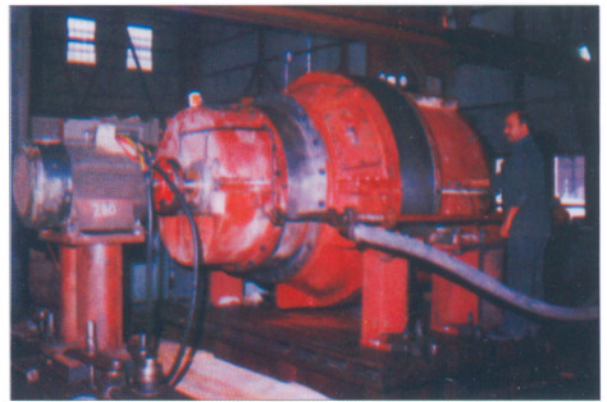


**Gear Teeth Grinding**



## Performance & Applications

Planetary Gear Boxes offer a co-axial arrangement of Input & Output shafts and are mainly selected on account of their energy efficient performance & reliability. Because of their compactness, high efficiencies & practically maintenance free working, Planetary Gear Boxes have found wide range of applications such as Sugar Mills, Cement Plants, Centrifuges, Defence applications etc. For Sugar Mill applications Planetary Gear drives are found 10% more efficient as compared to conventional Gear drives or



**Planetary Gear Box**

Hydraulic drives. WIL having vast experience & know-how in Gear technology, can presently design & manufacture Planetary Gear Boxes, as per customer's requirements for various applications upto 1500 HP for sugar mill drive and 3500 HP for cement mill application.

## Advantages

- Planetary Gear Box is extremely compact.
- High reduction ratios can be achieved as per requirement.
- Has long service life.
- Highly energy efficient.
- Requires negligible maintenance on account of
  - Bearing reactions & loads are negligible
  - Low pressure lub oil piping
  - Gears are precision ground.
- Chances of catastrophic failure due to "NO LUB OIL" are low since Gear Box is partially self lubricated by splash due to rotating elements being immersed in lub oil maintained to a level in the casing.
- Planetary gear drives are very smooth in operation due to high accuracy and totally enclosed casing.
- Foundation requirement is very much less.
- Installation is very easy & can be completed in a short period.
- Pay back period for differential cost of Planetary drive over conventional / hydraulic drive is very short.



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