

Flange Heating

Used for quick starting of turbine from warm or cold start. Helps in reducing the temperature difference of the metal to reduce thermal stress. The device consists of jackets welded to side walls of casing flanges and special piping complete with fittings and measuring instruments for steam inlet, outlet, and drains. The flanges and studs are heated with live steam bled from pipelines before main stop valve (ESV).

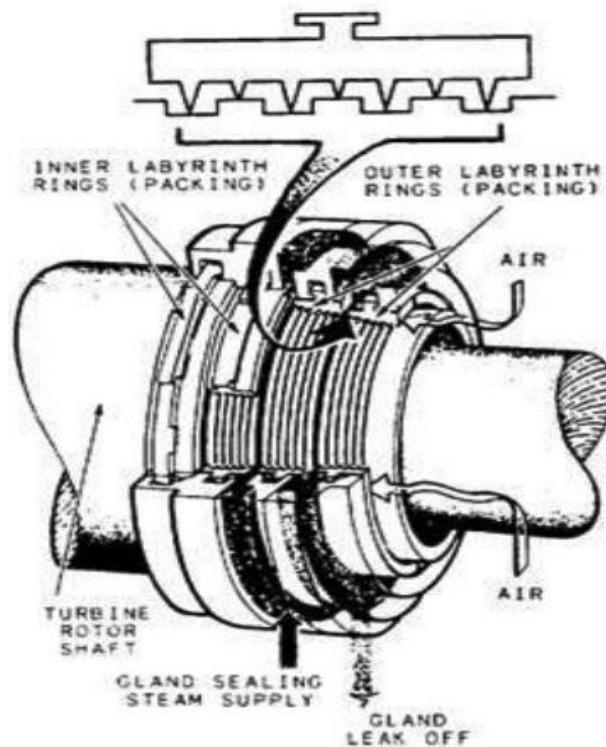
Gland sealing system:

Glands and seals are used on turbines to prevent or reduce the leakage of steam or air between rotating and stationary components that have a pressure difference across them, for example, where the turbine shaft is extended through the cylinder endwalls to the atmosphere. When the cylinder pressure is higher than atmospheric, there will be a general steam leakage outwards: if the cylinder contains steam below atmospheric pressure, the tendency is for air to leak inwards and the sealing system is designed to prevent the air from entering the cylinder and the condenser.

Gland Leakage prevention

Shaft Packing Glands:

Shaft packing glands prevent the leaking of steam out of or air into the turbine casing where the turbine rotor shaft extends through the turbine casing. Labyrinth and carbon rings are two types of packing. They are used either separately or in combination.

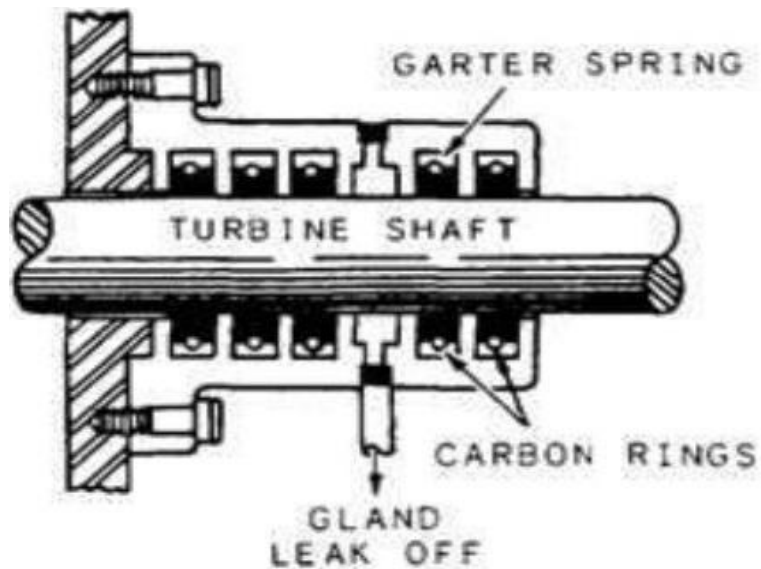


Labyrinth Packing Gland

Labyrinth packing consists of rows of metallic strips or fins. The strips fasten to the gland liner so there is a small space between the strips and the shaft. As the steam from the turbine casing leaks through the small space between the packing strips and the shaft, steam pressure gradually reduces.

Carbon packing rings:

Carbon packing rings restrict the passage of steam along the shaft in much the same manner as labyrinth packing strips. Carbon packing rings mount around the shaft and are held in place by springs. Three or four carbon rings are usually used in each gland. Each ring fits into a separate compartment of the gland housing and consists of two, three, or four segments that are butt-jointed to each other. A garter spring is used to hold these segments together. The use of keepers (lugs or stop pins) prevents the rotation of the carbon rings when the shaft rotates. The outer carbon ring compartment connects to a drain line.



Carbon Packing Gland