Direct heating inert gas turbine

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Abstract: In present coal-based power plants and nuclear power plants uses water for steam generation to run steam turbine. For this required huge amount of water also for cooling purpose water required is more. Also, for generating this steam boiler is required where as in direct heating inert gas turbine inert gas is used eg. Helium, for rotating the turbine for generation of electricity.

Keywords: Inert gas, Helium gas, super-heated gas, gas turbine.

1. Introduction
Here helium gas is heated in a drum connected to turbine which rotates a turbine and it is a direct heating of turbine drum, hence called direct heating inert gas turbine. For heating gas small reactor is required which generates heat and gas drum connected to turbine is directly mounted over the reactor for heating gas. Here after heating helium gas expanded at high pressure and temperature and rotates the turbine and return again for again heating the gas and reutilises. Hence helium gas circulates for again heating and rotating the turbine.

2. Construction & Working
The construction of direct heating inert gas turbine is as follows.
2.1 Figure shows front view and cross-section of the direct heating inert gas turbine gas drum. It shows three partitions.
- Upper chamber super-heated pressurised gas.
- Middle chamber medium temperature pressurised gas.
- Lower chamber cold gas.
- Holes on opposite side for passing gas.

2.2 Figure shows side view of direct heating inert gas turbine.
- Super-heated gas chamber with gliding arrangement for super-heated gas.
- Super-heated gas in and cold depressurised gas out tubings with one number and seven number pair in super-heated gas high pressure chamber and cold gas chamber.
- NRV (non-return valve).

2.3 Figure shows side view of turbine tubes and transverse section of direct heating inert gas turbine shaft.
- Inert gas in path for gliding of gas and creating pressure drop to rotate turbine.
- Pairing of turbine tubes.

### 3.0 Advantages of direct heating inert gas turbine.
- Water consumption is less.
- Small reactor is required without heating tubes.
- Less maintenance is required.