

First Laureate Research & Development

- **Research Work Title:** The Design and Production of Gas Turbine MAP2B
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Abstract:

In the road of new products in MAPNA group, one of the most important actions in recent years is upgrading E-class gas turbines family. The MAP2B gas turbine has significant enhancing in output power and efficiency compared to previous productions.

The latest version of this product known as MAP2B is an advanced product in related class that is the result of a comprehensive plan in MAPNA the research and development program during the last 5 years.

The updated design and used technology resulted to increasing output power up to 185 MW and reaching efficiency to 36.4. This new properties of this new gas turbine allow MAPNA group to produce E-class combined cycle up to %55 in efficiency.

The enhanced capacity, significant improvement in energy conversion efficiency, decreasing of fuel consumption, increasing of life time, decreasing of investment costs in new power plant construction, decreasing of undesired effects on environment, parts assurance and service guaranty in long term utilization and optimizing of generator performance as well as control system and auxiliaries for achieving maximum allowable output power are the properties based on entirely native science and technology.

The differences of MAP2B gas turbine compared to previous versions- in design and manufacturing processes are as follows:

- 3D design blading of compressor blades
- 3D design blading of turbine blades
- Redesign of cooling and heat transformation system of turbine blades
- Redesign of turbine secondary air system (SAS) elements pertaining to sealing and cooling
- Recompose of bearing at the compressor side
- Using of new materials for turbine blades
- Using of advanced coating on hot gas way

The design and development team has conducted and performed a comprehensive test plan for this new product using precise instrument and special data acquisition sensors with advance measuring tools in a statically and dynamically way on a prototype that had been installed in UNIT6 of PARAND combined cycle power plant.

These tests parallel to records of different parameters (such as temperature, pressure, mass flow, velocity, clearance and vibration) in members of operating turbine, verified the new product and monitored it's trend as well as validated computational codes and native developed tools that had been generated during the design of this turbomachine.

