

High Temperature Cathode/Anode Recycle Blowers for Large Megawatt Size SOFC Power Plants

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Abstract:

Development of large (greater than 100MWe) Solid Oxide Fuel Cell (SOFC) power blocks will enable affordable, efficient and environmentally friendly electrical power from coal. SOFC based power block configurations for coal fueled central generation applications could benefit from recycling a portion of the high temperature (e.g., 800-850°C) cathode and anode gas effluent back to the incoming stream in order to improve the overall plant efficiency. Key requirements of the cathode and anode recycle blower are:

- Reliability at high temperature (up to 850 °C), which is critical to ensure safe long-term operation.
- Contamination free operation (no oil or grease)

Currently, there is no blower available to meet these challenges; hence an innovative high temperature blower technology is needed.

R&D Dynamics is developing a dual recycle blower which can be used for either anode gas recycling or cathode gas recycling. The blower being developed has the following features:

- High temperature capable (up to 850°C)
- Highly reliable
- Highly energy efficient
- Low life cycle cost
- Oil free
- Maintenance free
- Higher design life (>40,000 hrs)
- Lower noise (< 70dBa)
- Easily scalable
- Turn down ratio up to 5:1

R&D Dynamics has designed, manufactured and tested the blower under ambient conditions and will report the findings.