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TURBINES



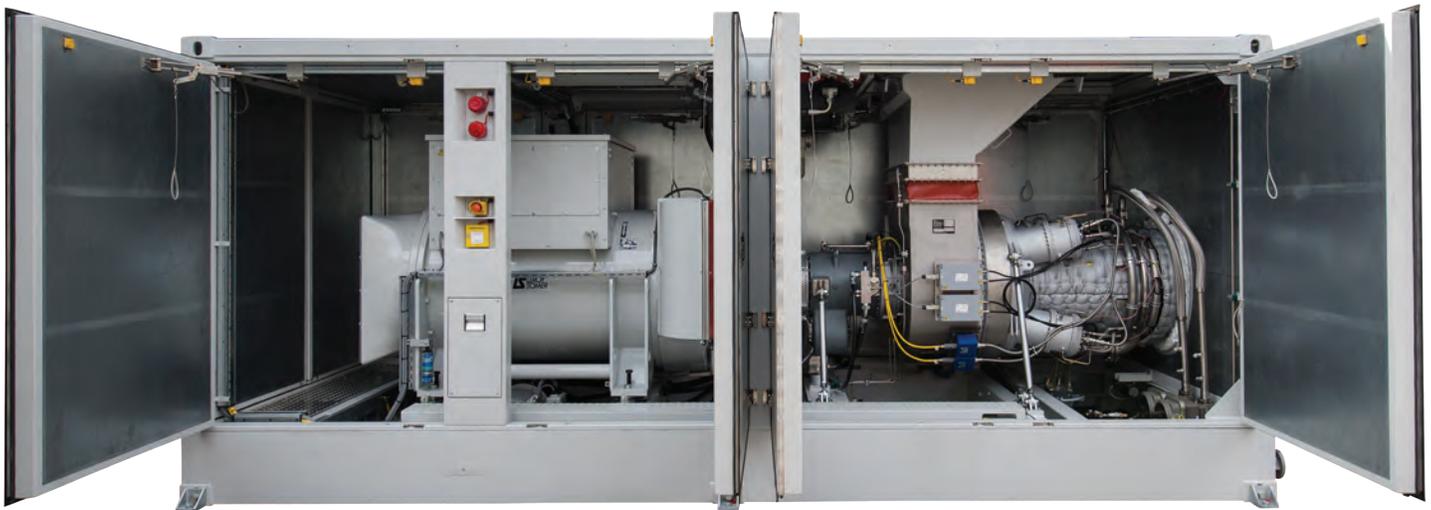
AIREM™ ENVIRONMENTAL SOLUTION

Combining VOC Removal with Reliable Energy Output

Airem™ Environmental Solution

Increasingly stringent emission regulations, coupled with ongoing pressure to reduce operating costs are impacting the way we protect the environment. The conventional methods to abate the impact to the environment are expensive to maintain and operate with significant energy requirements.

AFGlobal's Airem™ environmental solution combines the removal of volatile organic compounds (VOCs) with the ability to provide clean and reliable energy. With a wide range of fuel options, *Airem* uses OPRA Turbines' innovative gas turbine engine to efficiently destroy regulated VOC/HAP air emissions (US EPA and state standards) while cogenerating high quality electric power and thermal energy.



Product Description

The *Airem* environmental solution incorporates OPRA's OP16 Gas Turbine, all-radial, single-shaft engine that is proven for electrical power and cogeneration applications while operating in extreme environments. The *Airem* technology takes the VOC-laden air stream from the manufacturing process through the air inlet of the turbine, combusting the VOCs with supplemental fuel to provide a reliable and cost-effective alternative to traditional technologies. This process results in the generation of electricity and thermal energy for use by the facility, significantly offsetting operational costs and increasing profitability.

Benefits

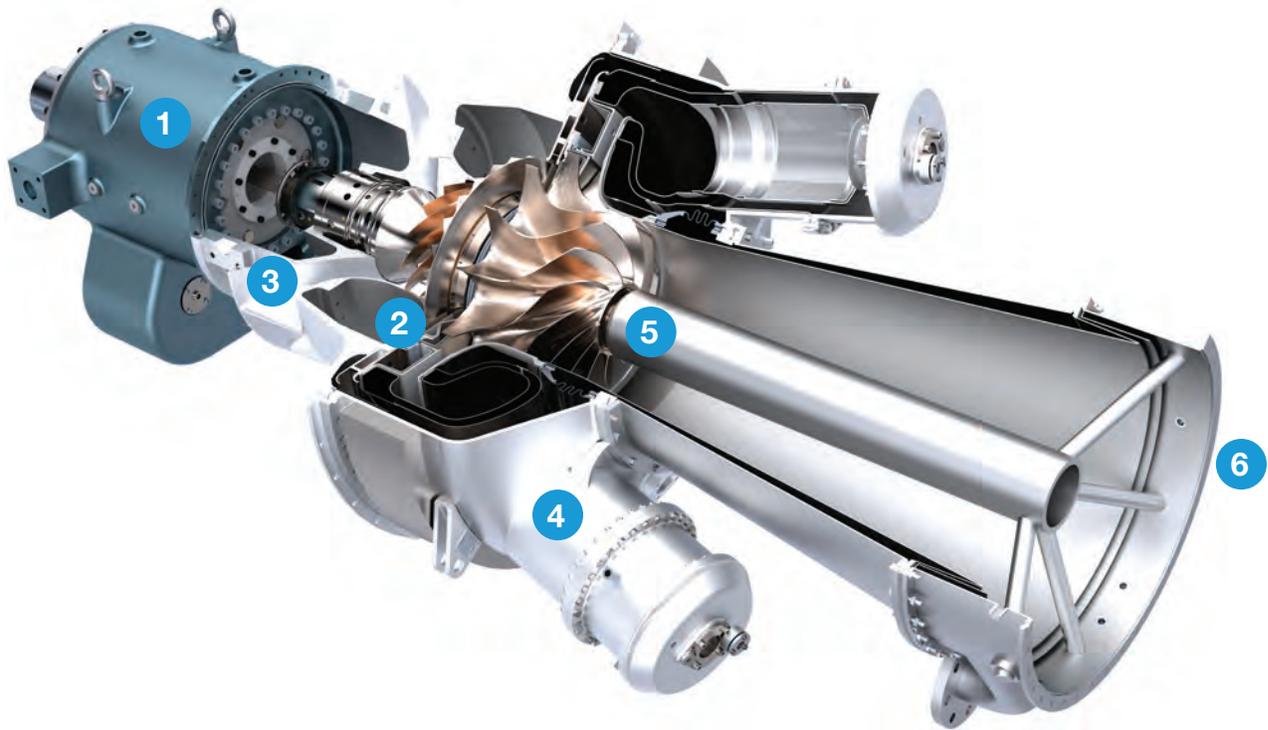
Our *Airem* technology is a combined air pollution control and cogeneration solution, which empowers states to comply with planning needed to reduce Ozone as determined by the National Ambient Air Quality Standards (NAAQS). *Airem* is compliant with the Clean Power Plan and reduces the carbon emission footprint by approximately 60 percent. Other key benefits are:

- Overall system energy efficiency of approximately 85 percent
- CHP offsets air pollutants greater than utility scale renewables, including: ground-level Ozone, toxics and carbon equivalents (CO₂e)
- Avoidance of non-attainment air shed issues
- Increases energy independence
- Complete offset of operating costs with attractive payback on investment

Key Features

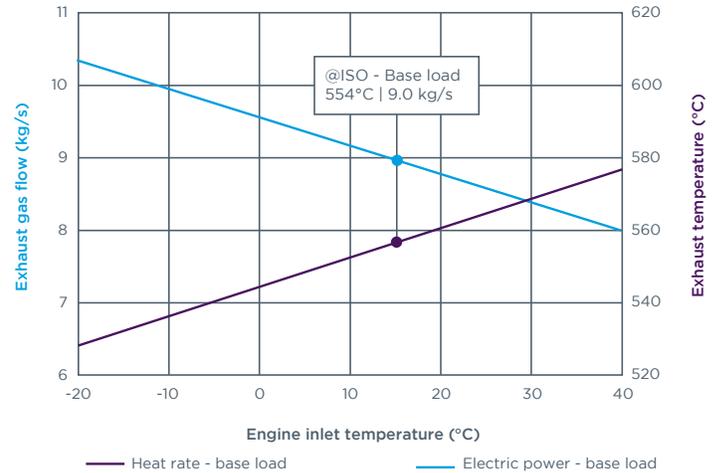
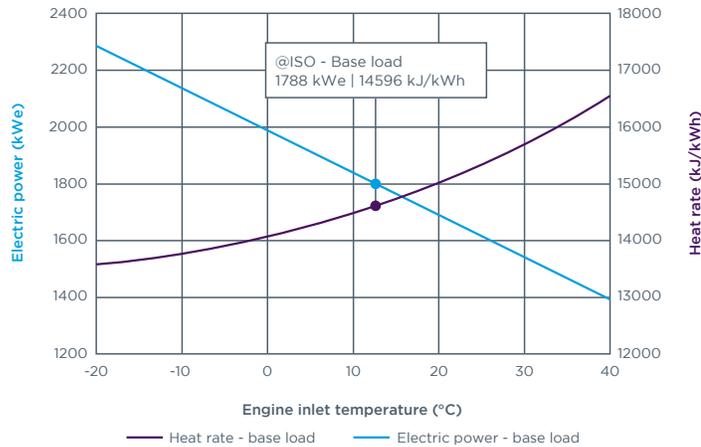
- Achieves federal and state standards
- Heavy duty construction
- Compact, skid-mounted and sound attenuated to 85 dB(a), with additional options down to 60 dB(a)
- Operates in extreme environments
- Continuous or intermittent duty
- Fuel flexibility – operates on natural gas, liquid fuel, or multiple alternative fuels
- Fast stop and start
- Integrates with factory control system
- Replaces standby/emergency backup power
- Operates grid-connected or island mode
- Reduces downtime and maintenance costs compared to thermal oxidizers

OPRA OP16 Gas Turbine



- 1. Reduction gear:** Allows the use of compact 4-pole generators for 50 or 60 Hz applications
- 2. Compressor:** The Compressor ratio allows for direct use of low fuel-gas pressures minimizing the need for external gas compression
- 3. Bearings:** Bearings in the cold part allow minimal oil consumption and a guaranteed oil-free exhaust
- 4. Combustors:** Can be fitted and exchanged based on fuel requirements. All combustor types are interchangeable
- 5. Radial turbine:** Enables high fuel flexibility due to lack of cooling holes and robust forged design
- 6. Exhaust:** Oil-free and high temperature resulting in clean, oxygen-rich exhaust with high mass flow

Performance Curves



GENERAL SPECIFICATIONS

Electrical output (ISO)	1788kWe
Generator voltage	0.4-13.8kV
Total system efficiency	85%
Time between major overhaul	40,000 hours
Time between minor inspection	8,000 hours
Start and stop time	~3 minutes
Steam generation capacity	12,000 lbs/hour
Sound attenuation	85 dB(a) Standard, 60 dB(a) Optional
Fuel consumption	25.7 MMBtu/hr
Thermal output (ISO)	16 MMBtu/hr
Heat rate	13,661 BTU/kWh
Exhaust gas temperature	1064°F
Pressure ratio	6.7:1
Total mass	55,000 - 70,000 lbs



For more information about our environmental solutions, visit afglobalcorp.com/airem