



COMMUNITY ENERGY SYSTEMS

CLEAN ENERGY TECHNOLOGIES

EXPERIMENTAL INVESTIGATION AND EVALUATION OF LOW NO_x NATURAL GAS-FIRED MESH DUCT BURNER

The Issue

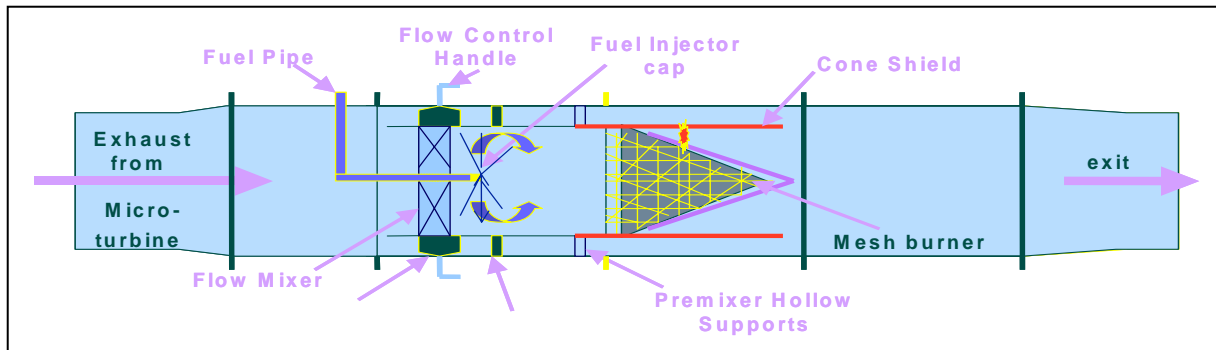
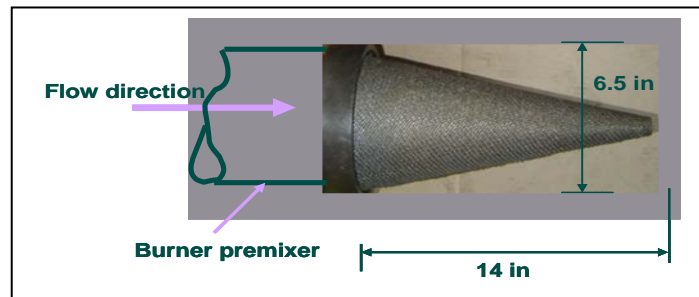
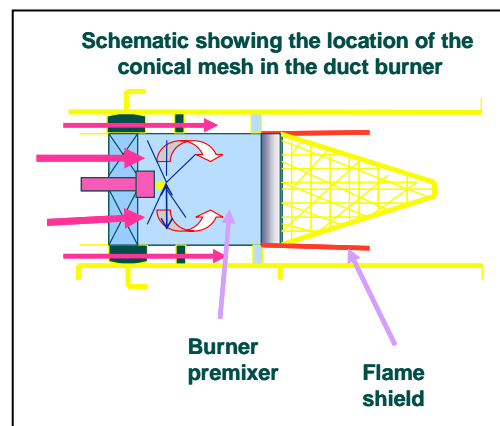
In order to increase the thermal output from microturbines it will be required to burn additional gas on occasions in the turbine exhaust.

A critical attribute of microturbines is their ability to produce power at very low NO_x emissions. Therefore the duct burner should result in similar NO_x emissions so the environmental value is not degraded significantly.

Conical Mesh Burner

ACOTECH * (Advanced Combustion Technology) fabricated three test burners of different pressure drop for this investigation.

The design was based on heat release per unit area of 2500 kW/m² and 236 kW of heat release with 100% excess air.



Duct burner design (test rig): Schematic of the proposed duct burner :

* N. A. Acotech S.A. of Belgium (Bekaert Group + Royal Dutch/Shell Group)

Material:

- **LD04** grid (with diamond shapes of 4 mm long and 2 mm wide 1.4 kg/m² made of wire of 0.65 mm wide and 0.4 mm thick), with 97% open area;
- **NIT 100**: is FeCrAlloy alloy, made mostly out of Iron, Chrome & Aluminum of 1/16" thick wire with 95% open area.

FeCrAlloy Composition:

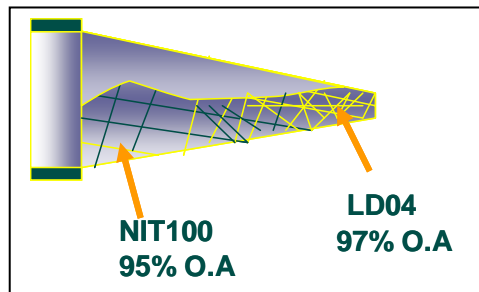
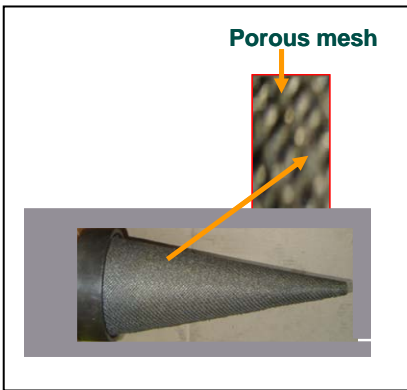
- 20% Chromium (Cr)
- 5% Aluminum (Al)
- Yttrium(Y) > 0.1%
- 0.3% Silicon (Si)
- 0.08% Manganese (Mn)
- 0.03% Copper (Cu)
- 0.03% Carbon &
- Iron (Fe) balance

Modes of operation of surface combustion burner

Depending on the local momentum of the gaseous mixture introduced through the porous mesh, the flame stabilizes within the porous mesh (Radiant mode) or outside the burner mesh (Blue flame mode).

Characteristics of the blue flame mode:


- Flame stabilized outside the mesh
- High specific power input
- Less radiation and most of the heat released remains in the combustion products
- High excess air
- Low metal temperature.



The micro-turbine duct burner operated in a blue flame mode

Your Invitation to Work with Us

We are interested in collaborating with you. Please contact the Business Office to discuss your particular needs.

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