

SAFE AND EFFICIENT OXYGEN / AIR MIXING USING THE OXYNATOR™

A dynamic fluid mixer based on swirl effects

Air Liquide has developed and commercialized a patented gas-gas mixing device using crossflow radial injection. (*Air Liquide patent US 5,356,213 EP 474,524*)
The Oxynator is designed to minimize mixing distance and to prevent high oxygen concentrations near the pipewalls.
Oxygen flows radially from the center of the pipe and swirls in the air stream, improving mixing efficiency.

Performance beyond static mixers

A complete mixing after a short distance

The oxygen distribution variation coefficient (VC) characterizes the mixing efficiency of mixers.
The Oxynator allows fast and thorough mixing within 2D (VC<5%) and ensures a complete mixing at 4D (VC< 2%).

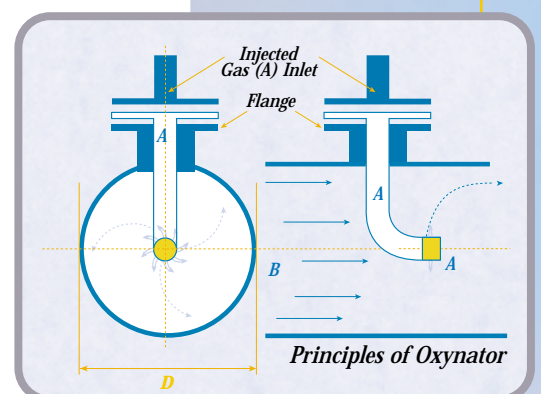
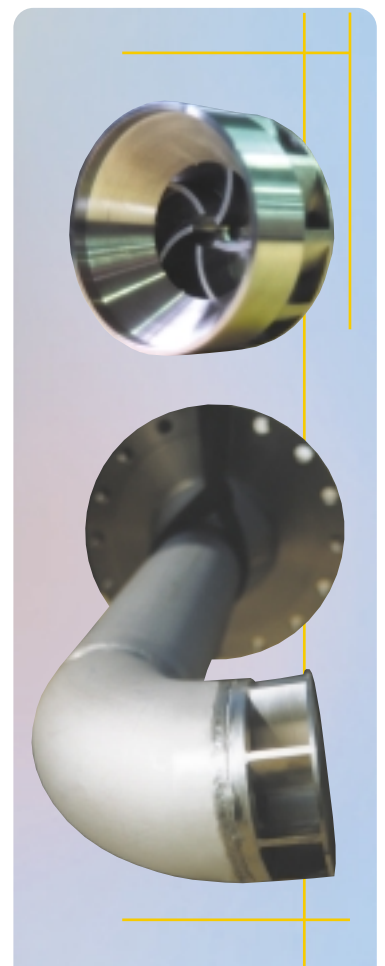
A minimal pressure drop

The Oxynator ensures a lower pressure drop than static mixers.

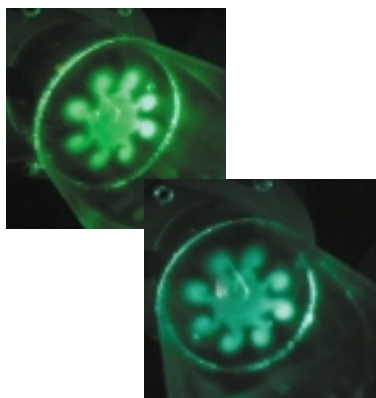
Ex: for $P_{inlet} = 3$ bar

- $\Delta P = 60-120$ mbar for O_2 flow
- $\Delta P = 1-5$ mbar for process air

- *Complete mixing within 4D*
- *Minimal pressure drop*
- *Easy to install*
- *No maintenance*
- *No moving parts*
- *Industrial operations from 1 to 400 t/d O_2*
- *Design available for any gas and quantity*



Easy to install. No maintenance. No moving parts.



A compact device

A single piece of equipment provides both oxygen injection and gas mixing, making the Oxynator very compact compared to static mixers.

Easy to install

The Oxynator is ideal for compact plants and retrofits.

The equipment can be easily installed during temporary shut-downs or while the plant is running (using hot taps).

Allows on/off operations without penalty

The Oxynator does not need to be removed when no mixing is required since pressure drop on the air side is negligible.

Maximum safety, no maintenance

The Oxynator has no moving parts and is designed with a minimal surface area to the air flow for improved operations.

More than 50 references worldwide

For several years now, more than 50 Oxynators have been in operation in refineries (FCC & Claus) and other Chemical

Process Industries in Europe, the USA and Asia.

References

► Laboratory (Europe)

10 Nm³/hr oxygen in a 300 Nm³/hr air flow, 8 inch Oxynator

► Claus (Asia)

600 Nm³/hr oxygen in a 6,000 Nm³/hr combustion air flow, 3 inch Oxynator

► Acrylonitrile (USA)

8,000 Nm³/hr oxygen in a 75,000 Nm³/hr air flow, 8 inch Oxynator

► FCC (USA)

10,000 Nm³/hr oxygen in a 150,000 Nm³/hr air flow, 6 inch Oxynator

► Catalytic Oxidation (Europe)

12,000 Nm³/hr oxygen in a 150,000 Nm³/hr recycle stream, 8 inch Oxynator

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