



OXYMIX[®] Injector.

Oxygen injector for oxygen enrichment.



OXYMIX Injector designed for 200 m³/h before used in a refinery.

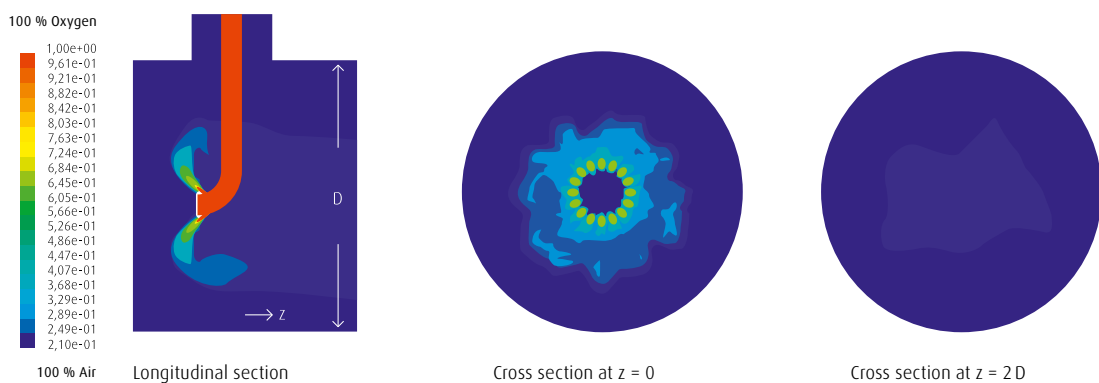
Many oxidation processes in refineries (Claus, FCC) and in base chemical production (intermediates, end products) use ambient air as an oxidant. Oxygen enrichment of these processes can increase plant capacity. Yield and selectivity can often be improved as well.

The additional oxygen and the air have to be mixed completely within a short mixing distance to obtain a reliable oxygen analysis and a smooth oxidation in the reactor downstream. In the reactor, areas of high oxygen concentrations, have to be avoided as these may lead to localised high temperatures. These hot spots can cause runaway reactions. Therefore, uneven oxygen distribution in the air flow has to be avoided.

Description

The design of the OXYMIX[®] Injector is based on CFD (computational fluid dynamics) simulations. The OXYMIX injector is implemented into the process air pipe and the oxygen is injected into the air against the air flow at a specific angle through a circle of nozzles.

The OXYMIX Injector provides a thorough mixing within a short mixing distance. High oxygen concentrations near the pipeline wall are prevented and operational risks of oxygen enrichment are reduced.



Example of CFD simulation of an OXYMIX Injector
Oxygen distribution in longitudinal and cross sections
Operating data: air velocity 5 m/s, oxygen enrichment 24 vol.-%

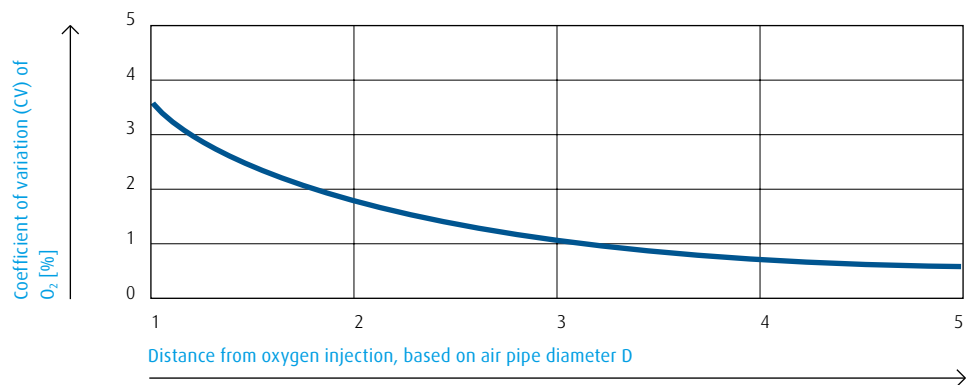
Benefits → Complete mixing within a short mixing distance

An oxygen coefficient of variation (CV) < 2% describes a complete mixing of air and oxygen. CV is defined as the standard deviation of the oxygen distribution divided by the mean value. For the designed operating conditions more clearly relate to figure on page 1, the OXYMIX Injector reaches an excellent mixing quality within a short mixing distance:

CV < 2% at 2D, D = Air pipe diameter

CV < 1% at 4D

- Simultaneous injection and mixing
- Compact dimensions
- Easy installation via flange
- Low installation costs
- Maintenance-free since no moving parts
- Improvement of operating safety



- Low pressure drop Δp in the air pipe

Examples of Δp for different air velocities and injector head diameters:

$\Delta p < 2$ mbar at 10 m/s and injector head diameter 33% of D

$\Delta p < 4$ mbar at 30 m/s and injector head diameter 22% of D

Material The OXYMIX Injector is made of stainless steel (grade 326 Ti or equivalent), which is suitable for pure oxygen applications. Other materials are available on request.

Installation The OXYMIX Injector can be installed easily into the air pipe through a flange during a short plant shutdown. Due to the compactness of the OXYMIX Injector, little space is required for the installation and installation costs are low. The OXYMIX Injector is checked by a ball valve, does not contain any moving parts and is maintenance-free.

References The performance of the OXYMIX Injector was proven in over 100 installations for oxygen enrichment under various operational conditions in several Claus and FCC plants and other oxidation processes worldwide.

Service and know-how

- Customised design and manufacturing of the OXYMIX Injector and its integration into the air pipeline
- Delivery and installation of oxygen supply equipment including measurement and control device OXYMIX Flowtrain
- Start-up assistance
- Oxygen enrichment tests for the customer's process
- Performance and profitability calculations
- Reliable oxygen supply

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