# FLOW – AIRMIXER (FAM)

## What are FAM?

FAMs are static mixers designed to promote the efficient homogenization of gas streams in pipelines and pipes. Its application allows mixing two or more air streams or standardizing flow properties after heating, cooling, humidification, dehumidification, evaporation, gas injection or other steps that can generate flow gradients.

The mixers act on the flow through fixed internal elements that continuously divide, redirect and recombine the flow, promoting intense radial and axial mixing. As a result, greater uniformity of temperature, humidity, gas concentration, suspended particles and velocity profile is obtained.

The main benefits of FAM are the high mixing efficiency, the predictability of results, the reduction of the distance required for homogenization and the consequent decrease in the length of ducts or conditioning chambers.

In systems that do not have equipment capable of generating high turbulence, such as fans or other active mixing devices, FAMs represent a highly efficient solution to ensure the uniformity of process conditions, contributing to greater operational stability and better performance of the equipment installed downstream.

## Construction:

- Completely fixed device with no moving parts. Welded and mechanically fixed construction.
- The 3mm thick SS304/316 construction produces a lightweight, corrosion-resistant component
- Two counter-rotational sets of fixed blades to induce turbulence and mixing

## Efficiency:

Mixing efficiency is a measure of a device's ability to homogenize two or more gas streams. This parameter indicates the degree of uniformity of flow properties, such as temperature, humidity, gas concentration, suspended particles and velocity profile.

An ideal mixer would feature 100% mixing efficiency, corresponding to complete homogenization of the flow, while a system with no mixing capacity would feature 0% efficiency.

The figure below presents a comparative study of the mixing performance in a system with and without the use of FAM. It is observed that for this specific case, the mixing efficiency increased from approximately 65% to 97% after the installation of the equipment, reaching about 85% efficiency after only 2 meters of duct and approximately 97% after 5 meters.

The results demonstrate that the use of FAM significantly reduces the distance required for flow homogenization, providing more uniform and predictable process conditions.

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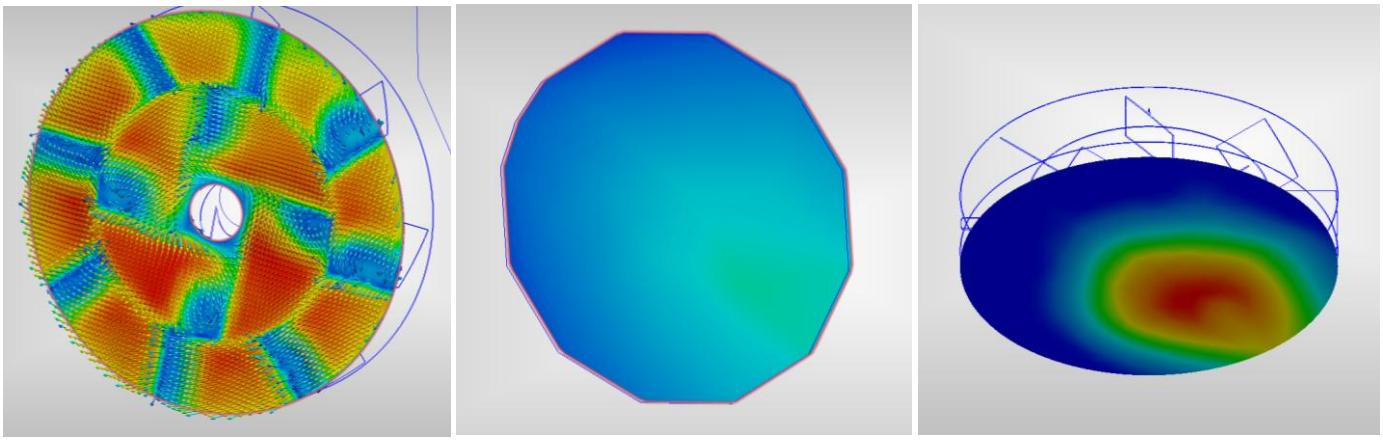
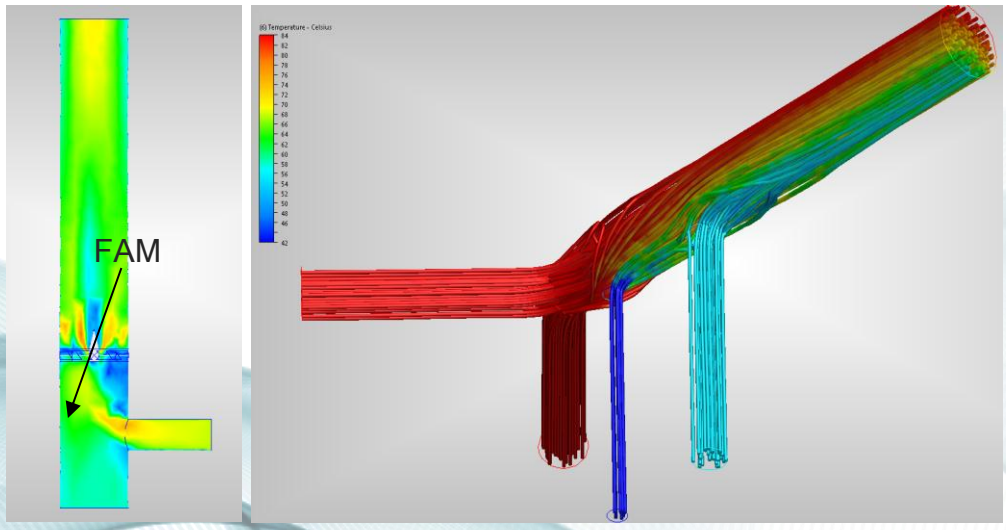
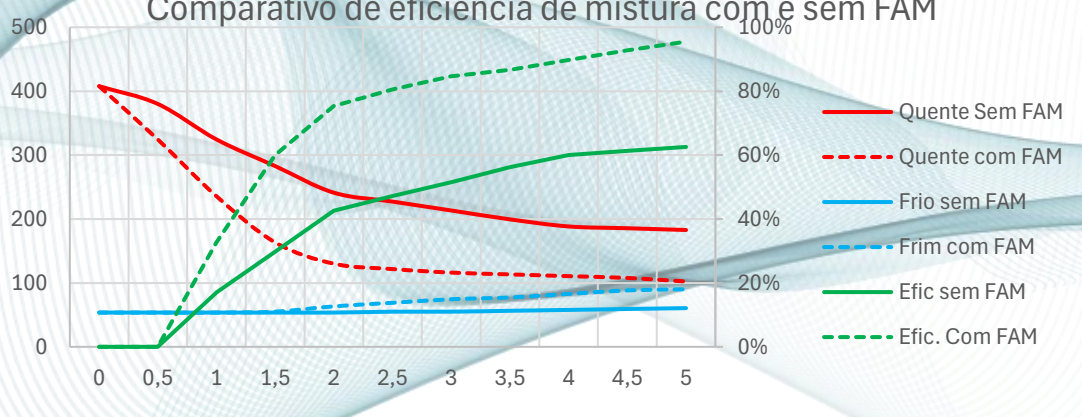
The distance required to achieve a given level of efficiency depends on the characteristics of each application, including duct geometry, air velocity, properties of the flows involved, and desired degree of homogenization. For this reason, the recommended mixing distance is defined on a case-by-case basis and reported in our technical datasheet for each project.



Temperature profile indicator / temperature profile comparison before/after the mixer.




Distance comparison for standardization with and without the FAM

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## Benefits:

- Homogenization of flow properties, including temperature, humidity, concentration of gases, vapors, suspended particles, and velocity profile.
- Recommended downstream application of heating or cooling coils, thermal wheels, evaporative cooling systems, humidifiers, dehumidifiers, air mixers, and other equipment that may generate non-uniformities in flow.
- More uniform distribution of air along the duct cross-section.
- Efficient mixing of multiple gaseous streams with different temperatures, humidity or compositions.
- Significant reduction in the distance required for flow homogenization, allowing for more compact designs and shorter duct lengths.
- Increased predictability of process conditions due to high mixing efficiency.
- Improved accuracy in measurements of temperature, humidity and other process variables, reducing errors caused by local gradients in flow.
- Improved air distribution to downstream installed equipment, contributing to greater operational stability and process performance.
- Design dimensioned on a case-by-case basis to meet the specific conditions of each application, reconciling high mixing efficiency with low pressure loss.
- Construction with no moving parts, providing high operational reliability and minimal maintenance requirements.
- Uniformity of the absolute humidity of the process air, providing more stable drying conditions.
- Equalization of the flow velocity profile, reducing high or low velocity regions at the chamber inlet.
- Improved distribution of thermal energy available for evaporation, contributing to greater process uniformity.
- Reduction of risks associated with localized overheating points, which can compromise temperature-sensitive products.
- Reduces the length required for mixing to occur by more than 50%.

During the operation and maintenance of the hydrocyclone, it is mandatory to use appropriate PPE (Personal Protective Equipment), such as:

- Safety helmet;
- Goggles;
- Gloves;
- Safety boots;
- Among others;