

## Sulzer turbocompressors offer total control over yeast fermentation process

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Founded in 1971, Refineria del Centro is a major company in Argentina manufacturing and commercializing various types of food products, including edible and refined oils and fats. Its modern factory near Cordoba is ISO 22000 certified, ensuring all food handling and processing are performed to a high standard of hygiene.

In 2014, the factory of Refineria del Centro was extended with a new line to produce baker's yeast. When searching for trustable suppliers, the client favored those making reliable and safe equipment. For the aeration of the fermentation tanks, Sulzer was chosen to provide six completely oil-free HST turbocompressors. This has since been proven to be a winning choice.



“The HST turbocompressors are highly efficient, flexible, and deliver 100% clean air. They combine safety and ease of operation.”

Marcos Gervan, Yeast Plant Manager, Refineria del Centro

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### The challenge

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Baker's yeast is produced in a multiple-stage fed-batch process. Yeast propagation occurs in successive fermenters operated under aerobic conditions. In the mother and commercial fermenters, the yeast suspension is first introduced and mixed with nourishing media, consisting of molasses and other nutrients, under strong aeration from bottom diffusers.

Once yeast growth starts, the nutrients are fed incrementally which makes the level of liquid rise progressively. Air flow also increases as yeast cells multiply and require more oxygen. At the end of the fermentation, the nutrient feeding stops, and the tanks are progressively emptied and then cleaned and disinfected prior to the next batch. The feed rate of nutrients, temperature, pH, and aeration must be strictly controlled for optimum yeast yield and product quality.

The right aeration is especially critical, as underaeration leads to excessive alcohol formation and overaeration to increased production costs. The air compressors must combine reliability, efficiency, and flexibility to cope with varying flows, which depend on the need for oxygen, and pressure, which depends on the liquid level. Above all, the quality of the compressed air must be perfect in sanitary terms as yeast is a living organism.



### The solution

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At Refineria del Centro, the large-scale fermentation is conducted in two large tanks. For each tank, two process cycles can be selected:

- Cycle 1 - Mother batch: duration of 34 hours, of which 26 hours of growth cycle with continuous air supply, and 8 hours of emptying and cleaning without air supply.
- Cycle 2 - Commercial batch: duration of 22 hours, of which 16 hours of growth cycle with continuous air supply, and 6 hours of emptying and cleaning without air supply.

For both tanks Sulzer tailored the same package of three HST turbocompressors. Each set of compressors is controlled by one Master Control Unit (MCU) to exactly match the changing air needs during the complete cycles. After installation and start-up, the Sulzer technicians continued regular visits on site, providing additional support for the best use of the equipment.

### Customer benefit

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The HST turbocompressors have unrivalled wire-to-air efficiency, guaranteeing optimal life cycle costs. Depending on the air flow needs and the liquid level in the fermenter, the MCU will operate one, two or three turbocompressors at their respective optimal operational points in order to maximize the energy savings.

The high efficiency of HSTs also means that the delivered compressed air will have lower temperature than air generated by less efficient blowers. This will ultimately reduce the cooling costs, resulting in water and energy savings.

Thanks to contactless, wear-free active magnetic bearing (AMB) technology, the HSTs will run smoothly for years and adapt to flow and pressure variations as well as frequent starts

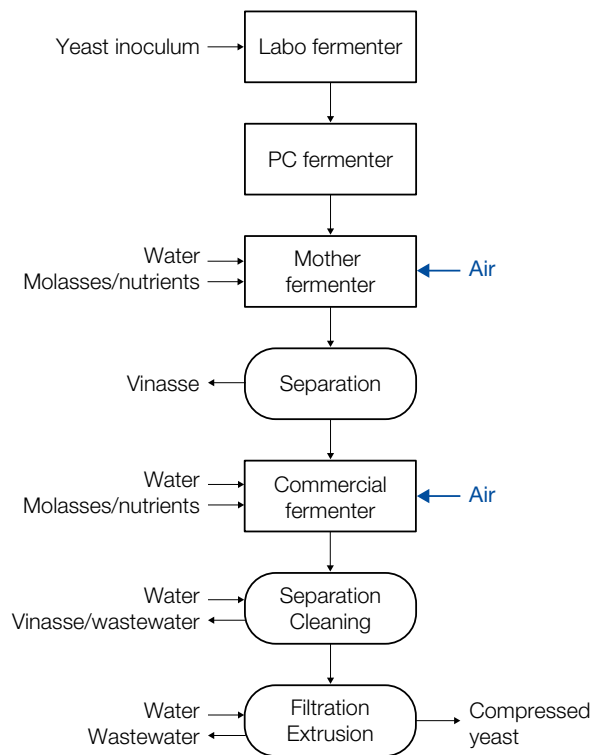
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The six HSTs in the compressor room

and stops. With AMB, the HST turbocompressors do not require oil or any lubricant, so real oil-free and contaminant-free compressed air is delivered, and costly oil filtration systems are eliminated.

Since initial commissioning, the operational costs have been minimized, with low energy consumption and little service or maintenance. Maintenance of the HSTs consists of changing air filters every two years. Today, the client is satisfied with the Sulzer partnership and considers extra investments in HST products in the near future.

Simplified flowchart



## Project data

For each fermenter, with air flow varying from 1'500 to 12'000 Nm<sup>3</sup>/h and differential pressure from 0.35 to 1 bar:

- (2) HST20-6000-1-190-40 and (1) HST2500-2-L-4 with a common discharge manifold
- (1) Master Control Unit (MCU) allowing optimal number of HSTs running in parallel at their best highest efficiencies

In addition to the HST turbocompressors, Sulzer also supplied five AHLSTAR single-stage process pump units for auxiliary applications.

### Turbocompressors type HST20-6000-1-190-40

Airflow range	3'000 to 6'000 Nm <sup>3</sup> /h
Pressure rise	35 to 100 kPa
Input power	190 kW
Power supply	380 – 690 V
Input frequency	50 – 60 Hz
Thermal protection	PT100
Max. noise level	62 dBA

### Turbocompressors type HST2500-2-L

Airflow range	1'000 to 2'000 Nm <sup>3</sup> /h
Pressure rise	60 to 100 kPa
Input power	90 kW
Power supply	380 – 690 V
Input frequency	50 – 60 Hz
Thermal protection	PT100
Max. noise level	74 dBA



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