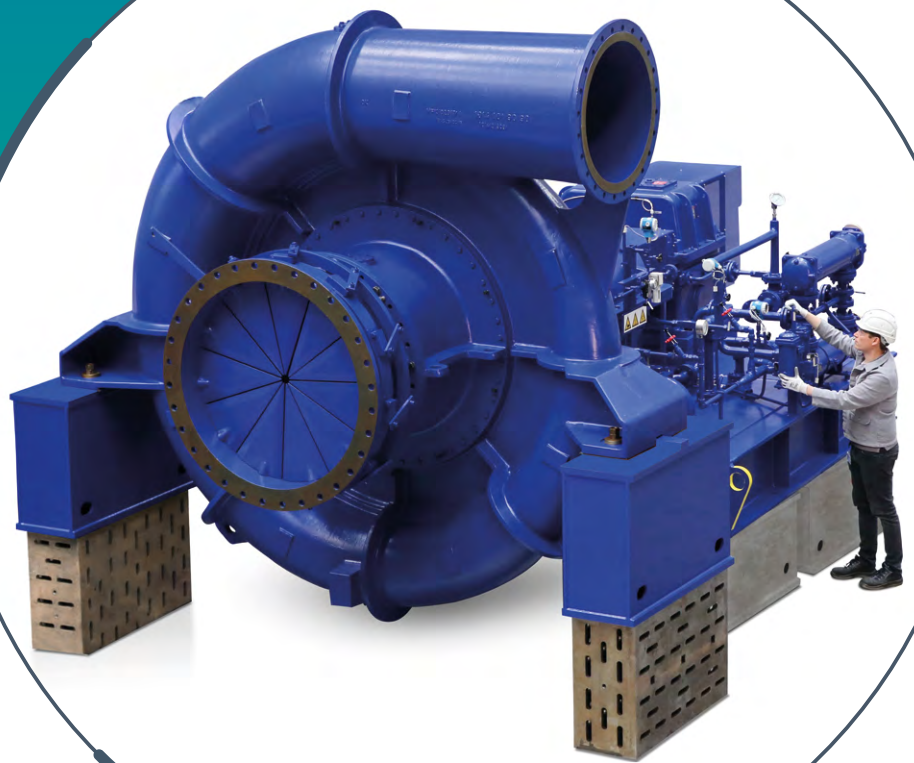


# Howden's range of Kühnle, Kopp & Kausch® industrial turbo compressors



# Industrial turbo compressors to meet the needs of the metallurgical, oil and gas and chemical industries

Howden offers a comprehensive range of Industrial Centrifugal Turbo Compressors up to 600,000 m<sup>3</sup>/h, with the flexibility to address the specific requirements for your application. Our standardised units with modular design ensure low life cycle and investment cost and short delivery times. Metallurgical, chemical and petrochemical plants as well as refineries are amongst the most common applications for our compression solutions.

With our in-house manufacturing facility in Frankenthal, Germany, we are one of the leading turbo machinery manufacturers with over 100 years of experience and continuous development, and a fleet of more than 4,000 installed turbo compressors and blowers, we are a prime partner for your business.

## Your driver of choice

Our turbo compressors can be equipped with electric motors, or – if steam is available – with our very own in-house Kühnle, Kopp & Kausch or Peter Brotherhood steam turbines.

If the operating parameters are suitable, compressor and steam turbine can even run at the same speed – which allows the machine to operate without gearbox and with maximum efficiency. This does not only result in lower investment costs, but also brings additional OPEX savings.



## Compressor Key Features

- Highest aerodynamic efficiency
- Widest performance envelope on the market
- Minimum cooling water requirements
- Modular design principle
- Standardized components
- Wide range of proven aerodynamic impeller designs
- Flow control via variable inlet guide vanes, variable diffuser guide vanes, speed control or combinations
- Backward curved impellers or radial tip with three-dimensional blades
- Excellent wear resistance over the complete impeller
- Maintenance friendly design
- Installation in hazardous area possible
- Driver of your choice
- OEM packages with Howden steam turbine available (guaranteeing very low steam consumption)
- Dual drive option available (Electric motor + Howden Steam turbine)

## SF Series

### Formerly known as

- STC-SO (SFO/SFP/SFN) or STC-SO (FO/FP/FN) (under Siemens)
- SFO/SFP/SFN (under Kühnle, Kopp & Kausch)

The SF series is a range of single-stage centrifugal turbo compressors with an overhung, semi-open impeller (3D design), supported by a separate bearing pedestal, direct driven or provided with a separate gearbox. With this design, featuring highest rigidity and optimised rotordynamic behaviour, the SF series serves the most demanding duties in its industries – like compression of corrosive, erosive and sticky gases and suitable for installation in harsh environments. Gas flows up to 600,000 m<sup>3</sup>/h can be handled. It sets the benchmark for safety and reliability, at lowest lifecycle costs, in favour of our customers.



## Applications

- Sulphuric Acid Plants (Metallurgical and Chemical/ Fertilizer)
- Spent Acid Regeneration
- Industrial Evaporation Processes
- Zero Liquid Discharge
- Steam Assisted Gravity Drainage
- Process Gas & Chemical Plants (PA, MA, MMA, EO/EG, Acrylic Acid, Oxo-Alcohol, PE, Ammonia, CTL/CTG etc.)

## Process Gas Application

### Technical Features

- Design as per API Standard 617, Part 1 & 2
- Materials for impeller and compressor housing according to project requirements
- Dry Gas Seal (DGS) double or tandem arrangement
- Sealing gas panel as per project specifications
- Local Control Panel (LCP) according to project specifications available

### Technical Data

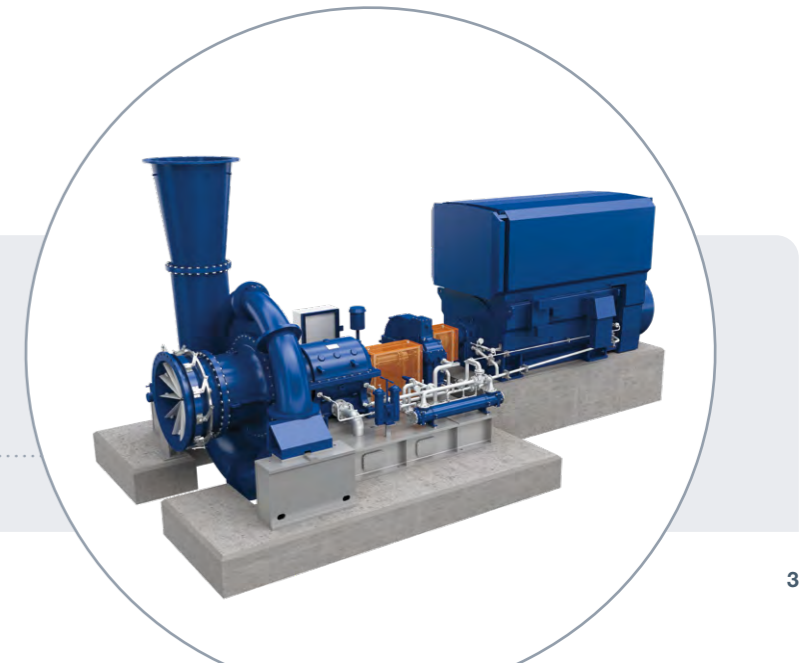
- Flow rates from 3,000 up to 200,000 m<sup>3</sup>/h
- Design pressure up to 50 bar (g)
- Temperatures from -150 °C up to 500 °C
- Impeller diameter up to 900 mm
- Pressure ratio up to 3.0
- Maintenance friendly design
- OEM packages with Kühnle, Kopp & Kausch steam turbine

## Technical data

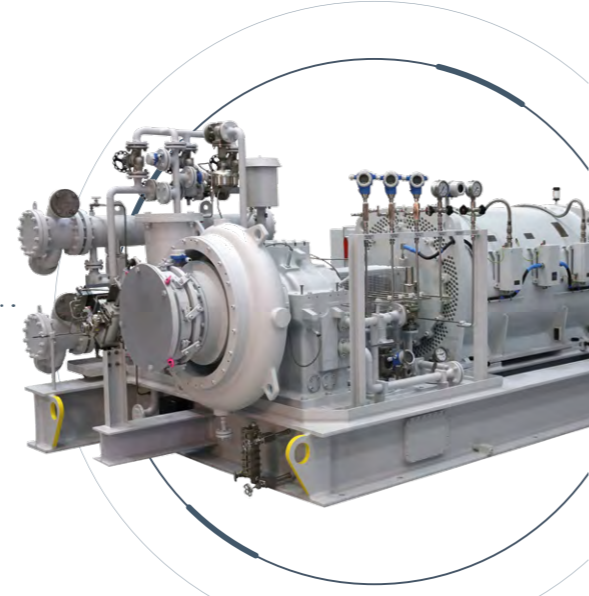
- Flow rates from 3,000 up to 600,000 m<sup>3</sup>/h
- Pressure ratio up to 3.5
- Impeller diameter up to 2,240 mm
- Driver of your choice



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# SFG Series



## Formerly known as

- STC-GO (SFOG/SFNG/SFPG) or STC-GO (FO/FN/FP) (under Siemens)
- SFOG/SFNG/SFPG (under Kühnle, Kopp & Kausch)

The SFG series is a range of integrally geared single-stage centrifugal turbo compressors. The semi-open impeller (3D design) is overhung mounted directly onto the high-speed shaft of the gearbox. Due to this design and the resulting minimum mechanical losses, the SFG series offers a very high efficiency and is the preferred solution for demanding duties in clean process gas or air service applications, even in harsh environments. Gas flows up to 250,000 m<sup>3</sup>/h can be handled. It provides state-of-the-art safety and reliability at lowest lifecycle costs to our customers.

## Applications

- Air Service
- Copper Converter Blower
- Industrial Evaporation Processes
- Zero Liquid Discharge
- Steam Assisted Gravity Drainage
- Process Gas & Chemical Plants (PA, MA, MMA, EO/EG, Acrylic Acid, Oxo-Alcohol, PE, Ammonia, CTL/CTG etc.)

## Technical data

- Flow rates from 3,000 up to 250,000 m<sup>3</sup>/h
- Pressure ratio up to 3.5
- Impeller diameter up to 1,120 mm
- Driver: Electric motor or steam turbine

## Process Gas Application

### Technical Features

- Design as per API Standard 617, Part 1 & 3
- Materials for impeller and compressor housing according to project requirements
- Dry Gas Seal (DGS) double or tandem arrangement
- Sealing gas panel as per project specifications
- Local Control Panel (LCP) according to project specifications

### Technical Data

- Flow rates from 3,000 up to 200,000 m<sup>3</sup>/h
- Design pressure up to 50 bar (g)
- Temperatures from -150 °C up to 500 °C
- Impeller diameter up to 900 mm
- Pressure ratio up to 3.0

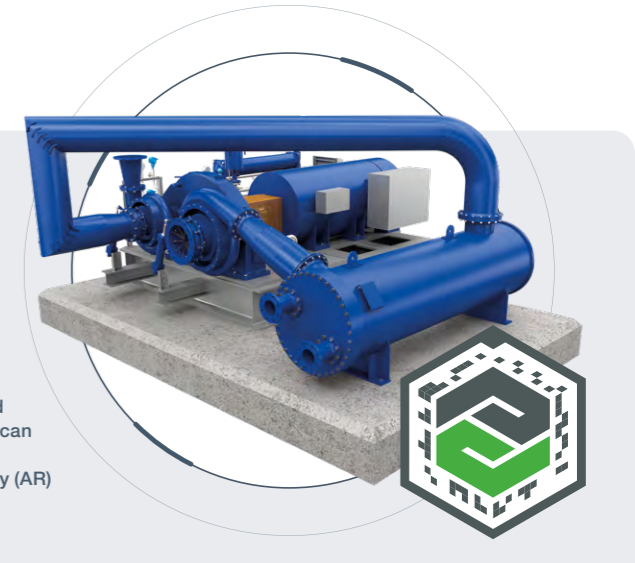
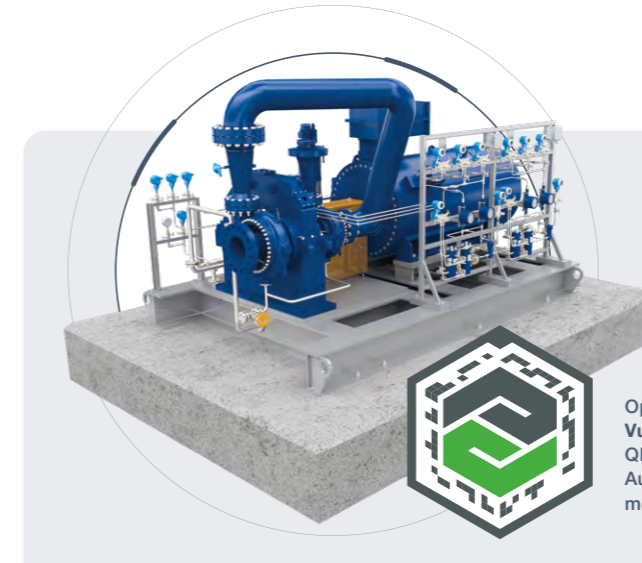


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# Multi-stage compressors

Additionally to the single stage SFG series we can offer a multi-stage SFG compressor, also for high pressure applications. The proven design can be customized to a back-to-back or twin arrangement for pressures up to 50 bar (g) and gas flows up to 200,000 m<sup>3</sup>/h. It offers the same features and customization options like the single stage SFG series and is the preferred solution for demanding duties in clean process gas, MVR or air applications, even in harsh environments.



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## Back-to-Back arrangement

Integrally geared turbo compressor with semi-open overhung impellers mounted directly onto the high-speed shaft(s). The Back-to-Back arrangement provides a highly efficient solution for process gas applications when balancing of high gas forces between the stages is required.

## Applications

- Industrial Evaporation Processes
- Process Gas & Chemical Plants (PA, MA, MMA, EO/EG, Acrylic Acid, Oxo-Alcohol, PE, Ammonia, CTL/CTG etc.)

## Technical data

- Flow rates from 3,000 up to 200,000 m<sup>3</sup>/h
- Pressure ratio up to 6.0
- Impeller diameter up to 900 mm
- Driver: Electric motor or steam turbine

## Twin arrangement

Integrally geared turbo compressor with semi-open overhung impellers each mounted directly onto a separate high-speed shaft. The Twin arrangement provides a highly efficient solution for MVR or air applications.

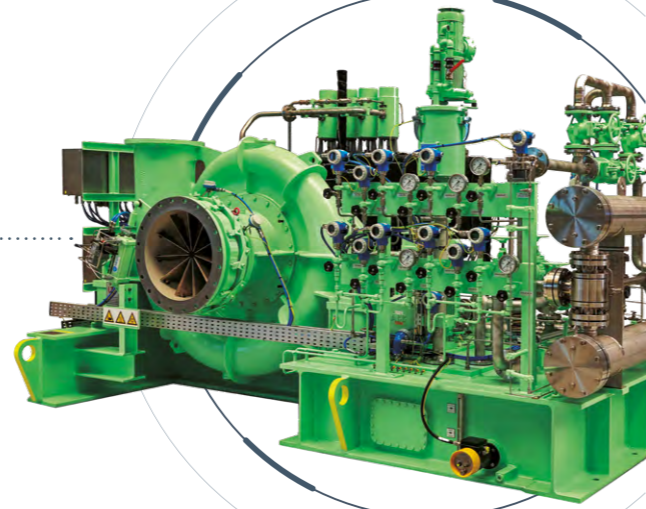
## Applications

- Industrial Evaporation Processes
- Air Service
- Copper Converter Blower
- Zero Liquid Discharge
- Steam Assisted Gravity Drainage
- Carbon Capture & Storage

# ST Series

## Formerly known as

- STC-STO (under Siemens)
- ECM (under Kühnle, Kopp & Kausch)



The ST series is a range of integral single-stage centrifugal turbo compressor/steam turbine-units with single shaft design. Its compact design features a semi-open overhung impeller (3D design) and turbine wheel, supported on a single rotor stand, without coupling or gearbox. This ensures very low steam consumption, low maintenance requirements and smallest footprint size, while operating in harsh environments.

The ST series serves demanding duties in its industries – like compression of corrosive, erosive and sticky gases or process gas or air service applications.

Gas flows up to 200,000 m<sup>3</sup>/h can be handled. The machine provides state-of-the-art safety and reliability at lowest lifecycle costs to their owners, along with minimised initial capital expenditure.

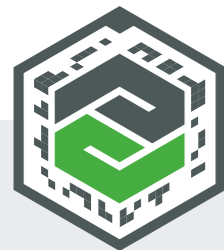
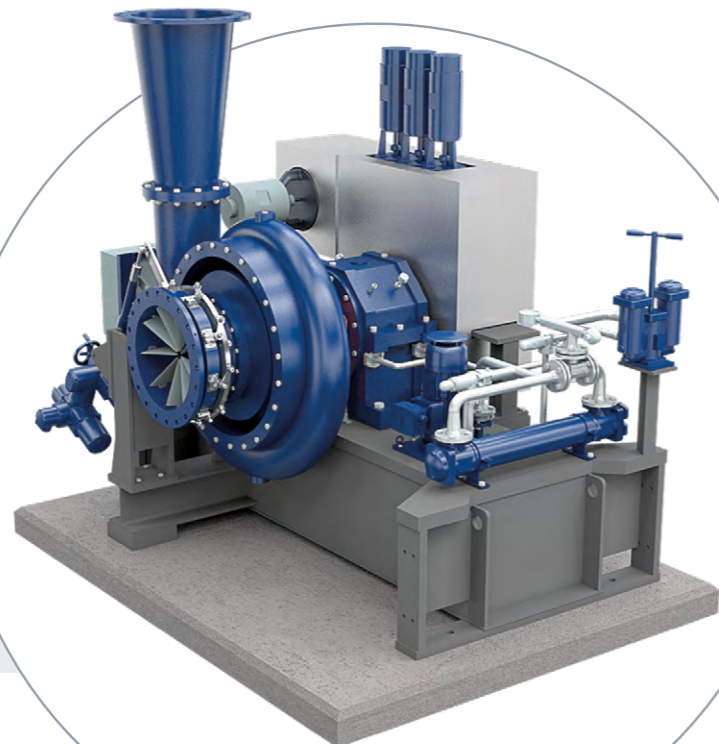
It is optionally available in a design compliant to API Standard 617 engineering practices and testing requirements.

## Applications

- Sulphuric Acid Plants (Metallurgical and Chemical/ Fertilizer)
- Spent Acid Regeneration
- Air Service
- Steam Assisted Gravity Drainage
- Chemical Plants (PA, MA, MMA, EO/EG, Acrylic Acid, Oxo-Alcohol etc.)

## Technical data

- Flow rates from 3,000 up to 200,000 m<sup>3</sup>/h
- Pressure ratio up to 3.5
- Impeller diameter up to 900 mm
- Driver: Integrated Howden Kühnle, Kopp & Kausch steam turbine

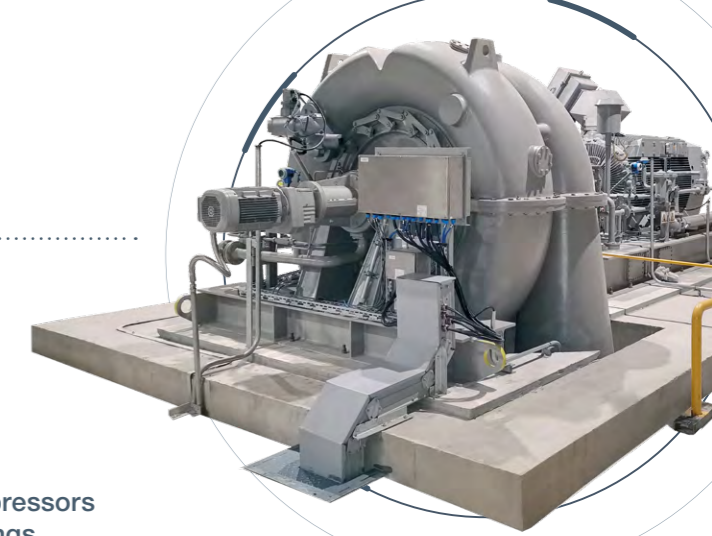


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# SL Series

## Formerly known as

- STC-SO (SL or SLO) or STC-SO (L or LO) (under Siemens)
- SL or SLO (under Kühnle, Kopp & Kausch)



The SL series is a range of single-stage centrifugal turbo compressors with a semi-open impeller (3D design) mounted between bearings. The SL series is designed to meet the most demanding duties in coke oven gas applications, especially to handle rotor unbalances caused by the sticky cokery gases.

Its design features, such as the gas inlet and outlet facing downwards, the self-cleaning, semi-open impeller and the rotor turn drive, enable this compressor to handle the built-up of tar from the coke oven gas. Consequently, the SL series serves the most demanding

duties in cokeries all over the world and provides top class safety and reliability at low lifecycle costs to our customers.

Gas flows up to 250,000 m<sup>3</sup>/h can be handled.

## Applications

- Coke gas service

## Technical data

- Flow rates from 15,000 up to 250,000 m<sup>3</sup>/h
- Pressure ratio up to 1.45 (coke gas service)
- Impeller diameter up to 1,800 mm
- Driver of your choice



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## Howden Uptime

### Our unique digital solution

Howden has been supplying robust, highly reliable products for the metallurgical, oil and gas and chemical industries for over a century and is combining our exceptional product knowledge and OEM expertise with a

unique data driven advantage. This offers our customers an invaluable insight into the performance of their rotating equipment that will increase the availability and reliability of critical assets and extend operational life.



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