

# Howden's range of KK&K<sup>®</sup> steam turbines for the glass industry



Use waste heat, save energy and protect the environment.

**Small, flexible steam turbines from Howden convert the waste heat produced in glass manufacturing to new forms of energy with a high degree of overall utilisation: electric power, heat and steam.**

Energy recovery is a major topic of our time. Key objectives are both efficiency and protection of the environment.

The production processes in the glass industry generate enormous quantities of heat that are too valuable to simply send up the stack.

Steam turbines convert this waste heat to electricity using heat recovery steam generators.

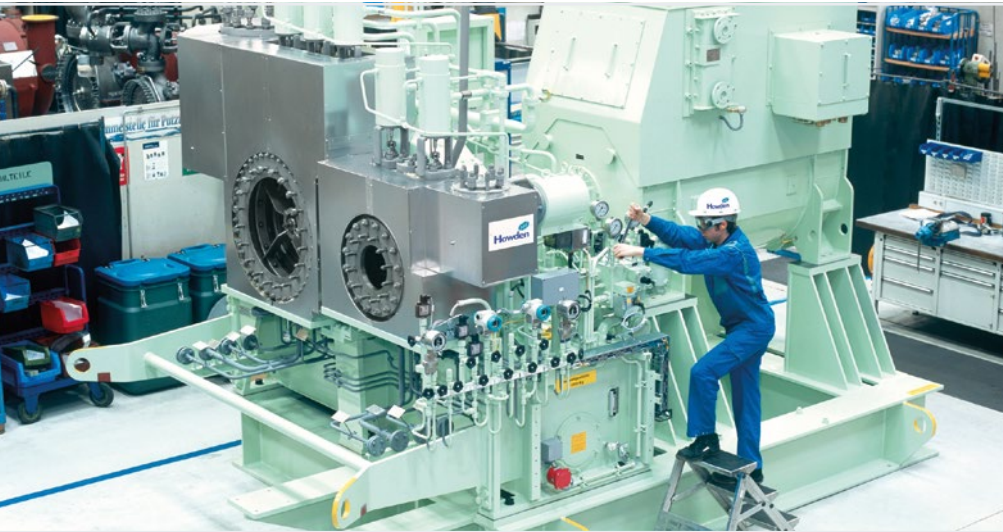
The manufactured product always remains in the foreground. This means that the production process must not be affected by the heat recovery. Howden Turbo GmbH provides steam turbines especially for industrial applications with capacities ranging from 45 kilowatts up to ten megawatts, the most important feature of which is their extremely flexible design.

This ensures optimum customer-specific configuration, simple integration in the heat recovery process and fast installation. Investment and subsequent maintenance costs remain low.

The flexibility of the turbines is crucial, especially in the glass industry. The quantity of exhaust air from the glass making process increases successively over the operating period of the glass furnace. The turbine must be capable of handling the continuously increasing steam production with a load range between 50 and 100 percent. A nozzle group control for the high-pressure and condensing turbine ensures optimum efficiency even in part load operation. The monitoring and control system is individually programmed and is integrated in the higher-level control system via Profibus. This enables the steam turbine to be monitored and controlled from both the central control room as well as directly on site via a separate control panel.

**Howden pre-designed steam turbines improve the cost effectiveness of industrial processes.**





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#### High specialisation required

An overall efficiency of over 90 percent can be achieved if the steam is used not only for electric power generation, but also for other processes in a combined heat and power (CHP) system, such as for producing hot water or for air conditioning using absorption refrigeration systems. Depending on the infrastructure, heat energy can also be provided to the public district heating system or to neighbouring companies. It is clear from this that many factors influencing system effectiveness have to be accounted for, some of which extend beyond the plant perimeter. Implementation therefore takes two to three years from elaboration of the overall concept to final construction. Many experienced specialists have to be brought to the table. Howden therefore relies on well-known partners for boilers, piping, structural work and auxiliaries.

#### ROI in just a few years

The return on investment (ROI) of a steam turbine for a medium-size float glass plant is on the order of only a few years. Results depend on production volume and energy prices in the respective country, but especially on the design of the overall system. The remuneration for electricity and heat supplied to public grids and networks, incentives for the construction of CHP plants, renewable energy bonuses and fuel tax refunds can accelerate the ROI.

However, energy recovery is not only an economic question, even if the motivation is primarily monetary. Statutory provision is already in progress under which new plants will only be approved if they include provisions for CHP. The German Parliament adopted an amendment to the CHP Act in early 2009. Based on this, electric power generation from cogeneration in Germany is to be increased to 25 percent, through incentives for modernisation and the construction of new CHP plants as well as new construction and expansion of district heating networks into which the heat from cogeneration plants is to be fed.

Howden has already successfully implemented several industrial steam turbines in the German glass industry, for example in newly constructed float glass and solar glass plants. Depending on plant operation, waste heat is either used only for electric power generation or a part of it is used for process heat, heating or cooling.

Energy prices and the requirements for CO<sub>2</sub> reduction can quickly change from country to country around the world based on political decisions and economic developments.