

Steam compressor STC300

Svenska Rotor Maskiner AB



Figure 1: Steam supply unit

Summary of technology

SRM are offering a new type of compressor for the use in high temperature heat pumps and drying processes.

The compressor is delivered in a package with drive motor, lubrication system and frame and can be supplied with or without a steam buffer tank and various accessories.

The compressor has a nominal volumetric capacity of 6750 m³/h and operates with no oil inside the compression chamber. Bearings and gears are still lubricated by oil and sealed off with reliable seal solution against the working chamber. An inverter is provided for variable speed operation to regulate capacity in a range down to 50% or less, depending on condition.

The compressor was an original development from SRM in Sweden in order to meet the coming market for low GWP and no PFAS refrigerants in drying and heat pump

applications as well as direct steam supply to industries, where the dominating heat source today is natural gas.

Water steam is by far the most suitable refrigerant in the temperature range between 100-200 deg C, due to its low cost, non-toxic or flammable, and excellent thermodynamic properties. Only disadvantages are the low density and pressure at low temperature and non-compatibility with oil. This makes the oil-free design from SRM suitable and even necessary.

Some sample applications for the STC range compressors:

- Drying of food, bricks, textiles, pulp and paper, etc.
- Direct steam supply for cleaning and heating
- Heat pump cycles with secondary condenser circuit, heating various processes



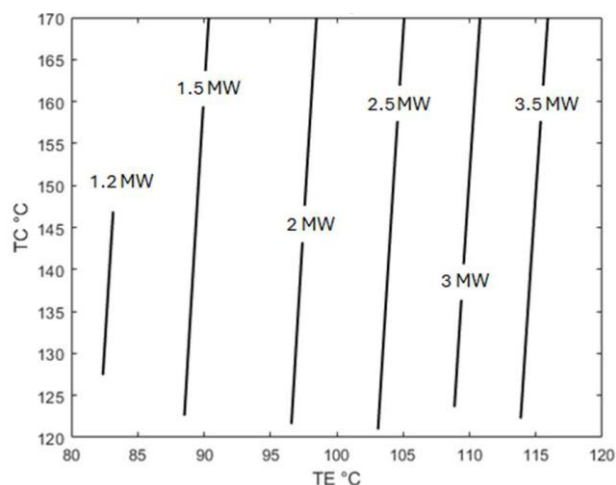


Figure 2: Condenser capacity STC300

As a next step SRM are now developing a steam compressor for up to 200 deg C (16 bara). This one will serve the need for even higher steam and drying temperature applications such as industrial baking, asphalt heating and other. Target heat capacity is 300-700 kW.

Table 1: Performance STC300

T _{source,in} [°C]	T _{source,out} [°C]	T _{sink,in} [°C]	T _{sink,out} [°C]	COP _{heating} [-]
115	110	145	150	7.1
115	110	160	165	4.0
105	100	145	150	4.5
105	100	160	165	3.1

(Note: steam is usually supplied directly to the user with no heat exchanger on the condenser side.)

Project example

The Interheat project funded by EUDP in Denmark will use one STC300 steam compressor which will be combined with Butane low cascade stage, which was also delivered by SRM. Source temperature is 40 deg C and sink 150 deg C. The application is in biogas upgrading to lift heat from the cooled absorption side to the heated stripper column. Project is planned to be installed at site in April 2026.

FACTS ABOUT THE TECHNOLOGY

Heat supply capacity: 1 MW to 4 MW

Supply Temperature, max: 165 °C

Temperature lift, max: 65 K

Working fluid: water, R718

Heat carrier: Refrigerant from low cascade stage condenser or water

Compressor technology: screw

Specific investment cost for installed system without integration: 1000 Euro/kW

TRL level: 6

Operational hours achieved: 100 h

Expected lifetime: 20 years

Size: Weight 7000 kg, Floor space 5.5 m²

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