

# Process-Gas Screw Compressors for Styrene Monomer Service

## Major References

Engineering the Future –  
since 1758.

**MAN Turbo**



# Best choice for styrene monomer processes

- 1 Packaged styrene compressor unit
- 2 Compressor casing manufacture for styrene service
- 3 Compressor rotor manufacture for styrene service



There are several styrene monomer processes on the market, where Styrene is mostly produced by the dehydrogenation of ethylbenzene with steam. The process-gas screw compressor is operating in this process in the off gas recovery unit under deep vacuum conditions.

The styrene process poses some challenges to the off gas compressor, such as:

- various operation conditions with different gas analysis and molecular weights;
- possible polymerisation of the process gas;
- part-load behaviour (flow variation);
- compression from deep vacuum with a pressure ratio range up to 9 in one single stage.

## Product information

MAN Turbo, with the widest product range in process-gas screw compressors, offers standard solutions for this application with complementary products to ensure the best customer benefits. Due to the positive displacement be-

haviour of the screw compressor, various influences such as changes in molecular weight of the process gas and operation case variations make the process-gas screw compressor the most suitable compressor selection for this application.

The compressor unit can be driven by a fixed- or variable-speed driver. For the styrene process, a steam turbine is often used to drive the unit to utilize the excellent flow control behaviour of a screw compressor by controlling the driver speed.

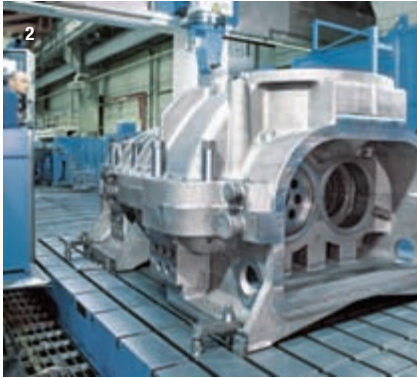
MAN Turbo has developed a compressor type, for high volume flow and low pressure applications. The MAN Turbo SKUEL type screw compressor is avail-

able in different sizes (different rotor diameters and lengths) and is selected according to the project plant size.

## Benefits and features

Further to the above advantages, the following properties make MAN Turbo the right choice for your project:

- horizontal compressor casing split, air-cooled
- specific compressor seal design for styrene service
- self-drained casing, with top suction nozzle and bottom discharge nozzle design
- discharge temperature control by injection of suitable liquid, usually condensate water
- possibility of additional inhibitor injection (prevention of polymerization)

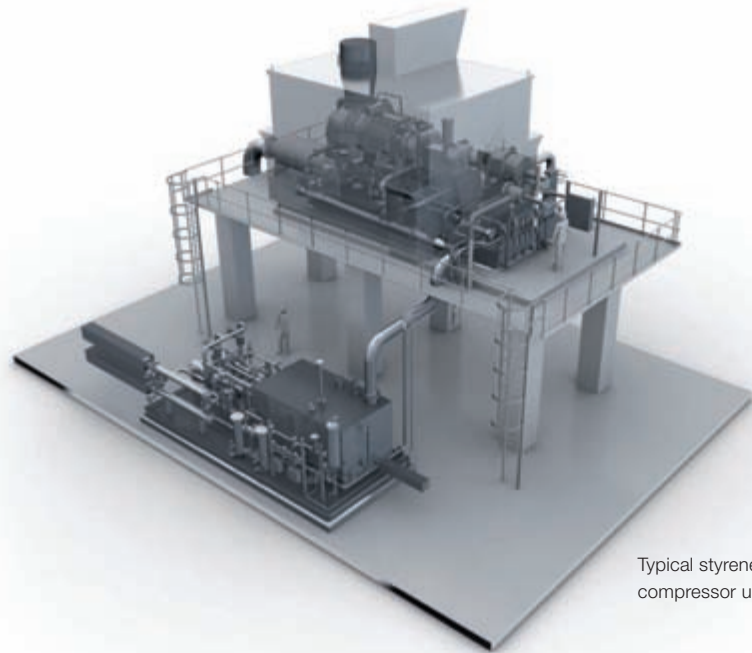


### References

Some examples of the MAN Turbo process-gas screw compressor references for the styrene monomer application.

### World records by MAN Turbo

In 2006 and 2008 MAN Turbo was the first company to sell process-gas screw compressor units for new styrene monomer plants with a volume flow of 77,000 m<sup>3</sup>/h, which is the world record.



Typical styrene off gas compressor unit

References	Two units	One unit	One unit
Unit type	SKUEL 816	SKUEL 816	SKUEL 816
Gas	H <sub>2</sub> -rich gas	H <sub>2</sub> -rich gas	H <sub>2</sub> -rich gas
Volume flow	67,122 m <sup>3</sup> /h (rated)	77,000 m <sup>3</sup> /h (rated)	77,000 m <sup>3</sup> /h (rated)
Molecular weight	13 - 28 kg/kmol	15.5 - 28 kg/kmol	15.5 - 28 kg/kmol
Suction pressure	0.26 bara	0.24 bara	0.24 bara
Discharge pressure	1.7 bara	1.5 bara	1.9 bara
Driver	Steam turbine	Steam turbine	Steam turbine
Shaft power	1,900 kW	1,720 kW	2,011 kW

**MAN Turbo AG**

Steinbrinkstrasse 1  
46145 Oberhausen/Germany  
Phone +49.208.692-01  
Fax +49.208.692-2019  
[www.manturbo.com](http://www.manturbo.com)

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