

# CASE STUDY

MEHRER COMPRESSORS IN USE

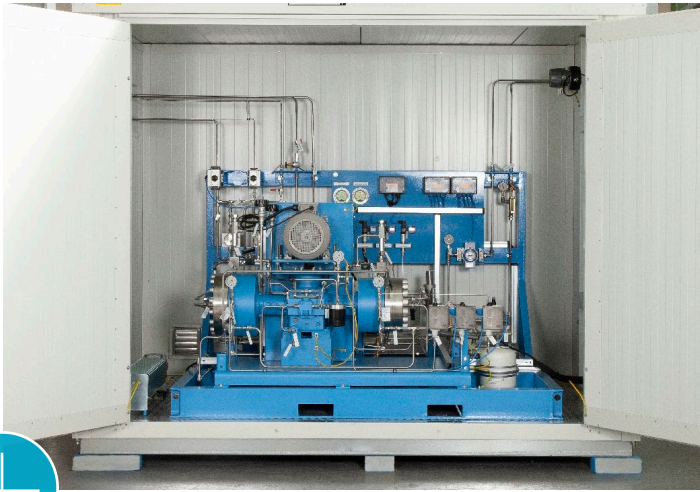


## COMPRESSORS FOR SMALL FLEET HYDROGEN FILLING STATIONS

In future fuel cell vehicles shall have a decisive contribution to CO<sub>2</sub>-neutral mobility. The refuelling of these vehicles currently takes place at storage pressures of 350 bar (buses, trucks, industrial trucks) or at 700 bar for passenger cars. In order to ensure an energy efficient and fast refuelling, the hydrogen will be taken from buffer storages („buffer banks“) of different pressure levels (cascading principle). Mehrer diaphragm compressor systems guarantee the continuous filling of the buffer storage. On the basis of this fact they are an elementary core component in the refuelling process.

### The Project

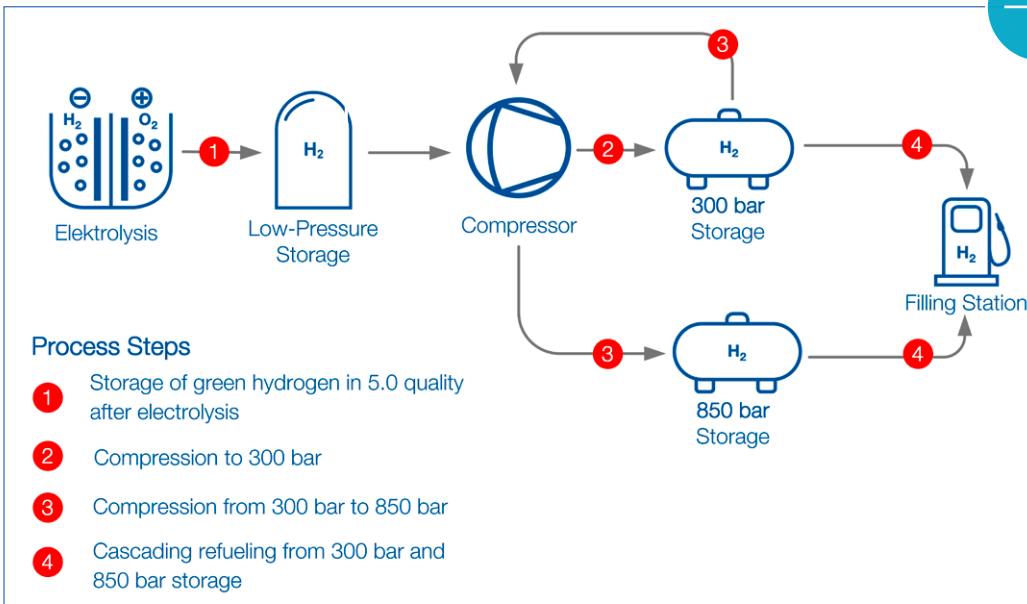
A newly developed electrolyser with downstream gas purification (H<sub>2</sub> in 5.0 quality) supplies the green hydrogen in a pressure range from 30 to 100 bar. The high gas purity requires a compressor system which does not allow any contamination. Mehrer diaphragm compressors comply with all these requirements. In the specific case described, a small fleet of fuel cell vehicles should be refuelled regularly. Between the individual refuelling operations the diaphragm compressor fills the buffer tanks up to the respective pressure level (max. 850 bar). In between lies a sufficiently large period of time, so that a relatively small single-stage diaphragm compressor can make the hydrogen available for the next refuelling process.



Diaphragm compressor for hydrogen infrastructures

## The Implementation: Mehrer diaphragm compressor offers high reliability

Security and availability are the most important requirements on H<sub>2</sub> refuelling systems. Compressors are of paramount importance here. Mehrer diaphragm compressor systems are all designed for a reliable and safe operation, offer the required monitoring control systems and safety components. They can be operated intermittently and/or permanently (24/7). The diaphragm compressors cover small (in the described case approx. 15 Nm<sup>3</sup>/h) and medium flow rate ranges (up to 500 Nm<sup>3</sup>/h and higher depending on suction pressure) at pressures to a maximum of 1,000 bar. Due to the multi-layer diaphragm technology no gas leakage – and therefore no gas loss – occurs.



Flow chart of the cascading refuelling: The hydrogen recovered by electrolysis is temporarily stored with a pressure up to 100 bar. From this stage the gas is compressed down to a minimum pressure from about 30 bar up to 300 bar to fill the first storage bank. In a second compression process, the gas is compressed to a pressure level of 850 bar. This system principle enables the use of a single 1-stage compressor for compression of the hydrogen from 30 to 850 bar.

» For more than 30 years we have been producing hydrogen compressors. The development of high-pressure compressor systems for hydrogen infrastructures was therefore a logical consequence – and our contribution to energy transformation.«

Ralph Held,  
Sales Director, Mehrer Compression GmbH