

Hydrogen at speed and scale

Managing pressure and refuelling of bulk hydrogen

By Stephen B. Harrison, sbh4 GmbH

Maximator GmbH is part of the German-based Schmidt Kranz Group, a family-owned business which has evolved through four generations from building tractors to the manufacture of state-of-the-art hydrogen fuelling stations.

In its latest move to maintain the relevance of its business to the challenges that the world faces today and secure ongoing market leadership, the company has created a new Hydrogen Division within Maximator.

Naturally, a new Division Head has also been appointed, and gasworld spoke exclusively with the man at the helm, Mathias Kurras at Maximator's Nordhausen factory, to discuss the rapidly evolving hydrogen mobility scene and technological innovations related to hydrogen fuelling stations.

Mathias, please remind us... how has Maximator evolved to become a leading manufacturer of hydrogen fuelling stations?

Maximator has interests in high-pressure testing, components and



© Maximator | Mathias Kurras

hydraulics. As part of a family-owned holding company that has four generations of heritage dating back to the 1800s, the business has continuously evolved to maintain its relevance.

On this site in Nordhausen, our company used to make tractors. That was centuries ago. Through a culture of innovation and investment in the right opportunities, this business has transformed to be a key player in the modern hydrogen economy.

Do you play a role beyond stations?

Yes, for sure. Some of the high pressure testing equipment produced at the Maximator site is supplied to hydrogen cylinder manufacturers. They use it to conduct burst testing of their Type 4 composite cylinders to ensure safety within the hydrogen mobility sector.

What notable infrastructure developments can you highlight?

Bavaria is famous for the Oktoberfest and green pastures, and is now putting itself firmly on the map as a regional leader for green energy. The Bavarian state parliament announced on 16th September that it will support the development of a hydrogen mobility infrastructure consisting of 100 fuelling stations. The installation of additional electrolyzers for green hydrogen production is integral to this plan.

How does that benchmark vs Germany as a nation?

Only five years ago, the organisation H2

Mobility set the target of 100 hydrogen fuelling stations across Germany. At the latest count of 85 stations open, the achievement of this goal is clearly in sight. This recent announcement echoes that national goal within the Bavarian state, which with around 13 million inhabitants represents approximately 16% of the total German population. The speed and extent to which the hydrogen economy is scaling up are evident through this development.

Will the focus be cars, trains or trucks?

In their announcement, the Bavarian Ministry for Business, Regional Development and Energy makes a clear focus towards supporting fuel cell operated trucks, buses and other logistics vehicles. They declare their belief that there is the greatest potential for hydrogen mobility in these transportation categories.

And how can Maximator support this infrastructure development?

Hydrogen fuelling stations for buses and trucks need to deliver vast quantities of hydrogen at speed. That's exactly what our fuelling stations do best.

We have played a part in enabling the development of hydrogen mobility in Switzerland, Germany and many other nations. With the creation of our new Hydrogen Division, we are ramping up our focus in this area in line with the scale-up in sector demand. We are thrilled that the green energy potential of hydrogen will be further

unlocked through this ambitious hydrogen mobility infrastructure development programme.

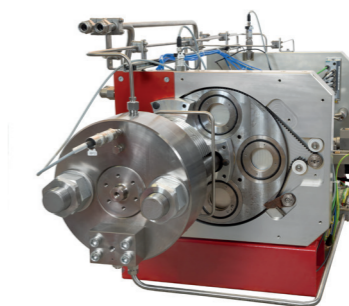
What makes your fuelling stations different from other models?

Our fuelling station utilises two stages of hydrogen compression with a gas intercooler between the stages. This allows for optimal energy efficiency, operational flexibility and maximum hydrogen throughput, and sets us apart from our competitors.

Are there other examples to underline your technology leadership and USP?

Indeed, there are. The high-pressure gas seal on our equipment must withstand pressures close to 900 bar. Our solution to automate the routine maintenance of that seal is unique.

In the past across all fuelling station manufacturers, changing out the gasket was a time-consuming process that meant the fuelling station must be taken offline for one or more days. For pilot stations, that has been tolerated either by the acceptance of the downtime or the use of a second fuelling station to build redundancy into the system – at a significant cost. But, as hydrogen fuelling stations become an integral part of our mobility infrastructure they must compete with traditional diesel and gasoline pumps and offer 99% availability, or better.



© Maximator | Patented automated high pressure gas seal replacement unit

So, tell us, what has Maximator done to move this issue forward for the operators?

We have addressed that challenge with a patented innovation that operates like the rotating bullet chamber in a wild-west revolver. It holds multiple sealing gaskets that can automatically be loaded into the compressor as required.

To fully automate the process, a sensitive hydrogen gas detection system is integrated into the design that can measure the high-pressure seal leakage rate and determine the optimal timing for the gasket replacement.

The benefits of the automated gasket change-over system are a significant increase in availability and a significant reduction in maintenance costs due to a reduction in the frequency of service team visits to the fuelling station that is required. These points directly address two of the main challenges in the hydrogen fuelling station technology faces today.



Beyond innovation, what do you see as critical success factors to retain leadership in this market?

R&D is at the heart of Maximator's strategy and will be a critical enabler of their growth. Finding and training new people to join our growing team is also high on the agenda. On a workforce of close to 400 people, we have close to 50 apprentices in mechanical and electrical disciplines.

Recruiting the right people, equipping them with the skills they need and immersing them into our company culture of safety, flexibility, reliability and innovation is an ongoing task. It will remain at the heart of our growth strategy for decades to come. [sw](#)