

JULY 2024

NEWSLETTER

Thank you for subscribing to our newsletter, we are very pleased that you are a part of our audience.

In this issue of our regular newsletter, we provide insight into our manufacturing processes with an article featuring the **fischer group**, which continuously collaborates with us to reduce costs and enhance quality through top-notch innovations in stainless-steel manufacturing.

At GRZ, we emphasize the **scalability of our solutions**, recognizing that significantly more hydrogen technology will need to be produced in the coming decades. Since the signing of the Kyoto Protocol in 1997, the share of fossil fuels in primary energy consumption has only decreased by approximately 4%, now standing at 81%. Thus, scalable solutions are essential for the future, much remains to be done.

Complementing our previous focus on hydrogen storage, we are excited to report on our **compression systems** in this issue, known as HyCo. A few months ago, we commissioned the largest **HyCo** system ever built, marking a significant milestone in hydrogen technology.

Additionally, we are eager to introduce some of our **new partners** to you who have joined our global and growing network recently.



Did you know?

DASH hydrogen storage modules are exceptionally safe due to their unique properties, outperforming pressure and liquid hydrogen storage systems.

In case of leakage, the system self-limits the hydrogen flow, often even sealing the leak via local icing. The operation at low pressures, typically below 30 bar, further improves safety.

With welded connections and rigorous testing, our systems meet top quality standards, allowing safe installation everywhere. Our **Wiki** contains more information on this, and is continuously updated. Check it out!

www.grz-technologies.com/wiki



The **fischer group** specializes in precision metal manufacturing, offering advanced solutions in stainless steel and special alloys. With a global presence and decades of experience, the company serves diverse industries including automotive, aerospace, and medical technology.

The fischer group emphasizes **innovation, sustainability, and quality**, supported by state-of-the-art production facilities and a commitment to continuous improvement. The company's capabilities range from engineering and prototyping to large-scale production, ensuring tailored solutions for the most complex technical challenges. The company has maintained a strong reputation worldwide as a **leading provider of high-quality metal components made of various alloys such as austenitic steel, titan and nickel-based materials.**

Today, stainless steel tubes and components are integral to exhaust systems in internal combustion engine vehicles. The fischer group plays a pivotal role in this sector, supplying **large volumes of high-quality products to global automotive manufacturers.** However, the same competencies are also crucial for future industries like hydrogen technology, where hydrogen gas properties and high-pressure environments demand expertise in stainless steel manufacturing too.

The fischer group is a shareholder and strategic partner of GRZ. Together, the GRZ technical team and the fischer Innovation Center have collaborated on advancing cell production capabilities at scale. **Innovations in welding, sourcing, and automation have significantly enhanced the scalability of GRZ's technology.** Today, GRZ is well-equipped to meet the increasing demand driven by the expanding global hydrogen economy. The partnership underscores the fischer group's commitment to pioneering solutions in hydrogen technology. Together, the companies are ensuring readiness to supply the market with high-quality products essential for sustainable energy solutions worldwide.



Hello, I'm Guido Eckenwalder!

I am Sales Director Hydrogen Technologies at the fischer group.

GRZ has been one of the very first companies in the hydrogen space to reach volumes where our highly specialized metal manufacturing skills are applied.

Together, we've ensured that the company can now accept orders of any size. This is necessary for the buildup of a new energy system.

I'd be pleased to discuss your hydrogen component needs with you too – please just reach out to me here!



The world's largest thermal hydrogen compressor

Earlier this year, a significant milestone was reached with the delivery of what is probably the world's largest metal hydrides hydrogen compressor ever built. Our HyCo metal hydrides compressor is installed on the site of Arxada in Visp and operated by Messer Schweiz AG.

Designed to compress **30 kilograms of hydrogen per hour from 10 to 200 bar**, the HyCo system aims to rival conventional mechanical compression across various applications. A direct comparison with an existing mechanical compressor under real working conditions is ongoing and will be published.

Unique Advantages

Utilizing an innovative metal hydrides compression technique, this project has not only demonstrated technical prowess but also marked a significant step toward sustainable energy solutions. The HyCo compressor operates through a four-step process: hydrogen absorption at low pressure, system heating, hydrogen desorption at increased pressure, and system cooling. It offers the following benefits:

- 1. Combined storage-compression unit:** Hydrogen can be stored directly from an electrolyzer and compressed as needed, eliminating the need for separate storage and compression processes.
- 2. Enhanced energy efficiency:** The compressor can be operated using waste heat instead of electricity, providing a much more energy-efficient alternative to mechanical compression.
- 3. Reduced noise and maintenance:** With no major moving parts, the HyCo compressor operates quietly, without vibrations, and requires minimal maintenance, thus reducing operational costs and increasing reliability.



Versatile Applications

The HyCo compressor's versatility makes it suitable for a wide range of markets, from the chemical industry to renewable energy and hydrogen infrastructure. HyCo is the ideal choice for industries and processes with high waste heat outputs. It offers a sustainable solution for pressurized hydrogen needs and achieves a **Levelized Cost of Compression (LCOC) up to 50% lower** than that of mechanical compressors. Do not hesitate to contact us directly to discuss your needs for compressed hydrogen with us.

NEW PARTNERS

At GRZ we have a clear strategy to work with local qualified partners in order to be closer to the market, and thus provide better service to our final customers. We are building a global presence, so the end-users can always find a local GRZ partner to help them designing and delivering the best state-of-the-art hydrogen solutions. We are happy to introduce new partners to you also in this newsletter:

S I M
P L I
F H Y



Sergio Torriani, CEO

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Born in 2021 as an innovative start-up from Italy, **Simplifyh** proposes itself to industrial customers, transport operators and municipalities as partner in developing strategies and systems for the decarbonization of industrial processes, using technologies based on the use of hydrogen as energy carrier and as alternative fuel.

Simplifyh acts as a single point of contact during the design and feasibility study, project engineering and execution, installation up to system maintenance.

Simplifyh even provides complete tailor-made solutions, designed to meet the specific needs of each customer including pre-assembly, testing, and commissioning in the field.

"I am excited about the collaboration of Simplifyh and GRZ," says Sergio Torriani, CEO of Simplifyh. "The mission of both companies is to simplify the implementation of hydrogen-based technologies to facilitate the energy transition. As a partner of GRZ, we will have the opportunity to introduce highly innovative technologies to the Italian market"

Hind Rectifiers Limited, founded in 1958, is a fourth-generation, public listed company in India. Hirect is in the business of designing and manufacturing highly advanced Power Electronic, Electrical and Electro Mechanical power conversion systems for a wide range of applications including Railways, Defence, Energy and Process Industries. Hirect exports to over 30 countries.

Hirect is a leader in High Current/Power Rectifiers with DC output currents of up to 60,000A for applications like Hydrogenation, Electro-chemical, Smelting etc. and an established supplier of High Voltage ESP Power Supplies transformer-rectifiers with outputs of up to 150,000V for air pollution control for varied industries such as power, steel, cement, paper etc.

Furthermore, Hirect's Railways vertical boasts a huge portfolio of IGBT Converters, Propulsion Systems, Communication Systems, Traction Transformers, Traction Motors, HVAC Systems, Brake Systems, and more. Hirect has a vision to expand its offering of Hydrogen Power Supplies with latest Technologies needed for the Hydrogen Economy to contribute to the carbon neutral goal, globally.



Hind Rectifiers Ltd.



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NEW PARTNERS

In the early 1980s, we embarked on designing electrical circuits in Pakistan – a passion that eventually evolved into the establishment of **Ahsanullah Electronics (Pvt) Ltd.** We started by servicing the burgeoning Oil & Gas industry, supporting US & EU corporate giants with their Apple and IBM PC needs. Over the next 30 years, we adapted to meet their frantic demands: Telephony & reliable data communication, uninterrupted power solutions, radio links, local and wide area networks, communication towers, international satellite links, and mobile communication. We helped them navigate the evolving regulatory landscape and provided software and equipment to manage their demanding, intrinsically safe Oil & Gas environmental needs.

By 2018, we witnessed a significant breakthrough with the commercial emergence of electrolysis and the safe, building-integrable storage of hydrogen using metal hydride technology by GRZ Technologies. The combination of this technology with the proven EV fuel cell presented the cleanest, safest and the most compact energy solution for the future. Recognizing its potential, we promptly partnered with GRZ-Technologies to advance it and offer sustainable energy solutions for a better future for our planet Earth.

Today, together with the GRZ global team we are dedicated to serving a diverse range of users, from residential to industrial, providing green hydrogen production, storage, and megawatt-scale power solutions with high priority for industrial needs.



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