Fastener Innovation Alley

Hydrogen Embrittlement Resistant Steel Applicable to Fasteners

Hydrogen is considered a future clean energy source, but hydrogen embrittlement has long been a major obstacle to its development. National Cheng Kung University(NCKU) has successfully invented a type of stainless steel, known as 416B, which is referred to as "non-hydrogen-embrittlement steel," capable of resisting hydrogen permeation. This innovation is expected to address significant safety concerns in the hydrogen energy sector.

Hydrogen embrittlement occurs when hydrogen atoms easily penetrate materials, causing them to become brittle and crack, which can lead to leaks and explosions in storage tanks or pipelines. Existing hydrogen storing materials, such as 309 and 316 stainless steel or fiberglass, are unable to effectively resist hydrogen embrittlement and may have issues with insufficient strength or carcinogenic risks.

Unlike conventional materials, "non-hydrogen-embrittlement steel" offers superior resistance to acid and alkali corrosion, higher strength, and hardness. It also possesses magnetic properties that can be connected electrically to form non-hydrogen electromagnetic steel. After heat treatment, it can further resist hydrogen permeation, making it suitable for hydrogen storage and the manufacture of hydrogen-resistant valves and fasteners. Additionally, the University's team collaborated with a welding rod company in Tainan (southern Taiwan) to find weldable material 420L, solving the problem of welded joints being susceptible to hydrogen attacks.

▲ Image from NCKU

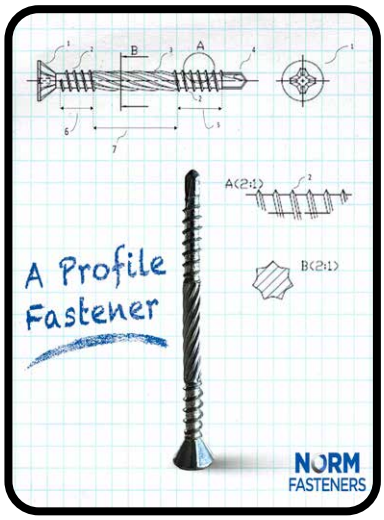
To validate the hydrogen resistance of "non-hydrogen-embrittlement steel," the University established one of the few laboratories nationwide capable of evaluating metal hydrogen embrittlement. The lab conducted hydrogen accumulation and hydrogen embrittlement fatigue tests. The results showed that "non-hydrogen-embrittlement steel" has a significantly better hydrogen permeation resistance compared to other industrial-grade stainless steels.

A Profile Fastener

(News provided by Irem Yaren BAYSAL, Editor of Fastener Eurasia Magazine) Norm Fasteners introduces the utility model issued as "A Profile Fastener", an innovative solution developed by R&D and engineering teams, now granted by the Turkish Patent and Trademark Office.

Technical Features:

- **Specialized Screw Structure:** The screw features a drill-bit design, allowing it to drill its own path without the need for pre-drilling.
- **Centering Effect:** The screw prevents axis misalignment within the material, ensuring a stable and accurate connection.
- **Chip Displacement Feature:** The design allows chips generated during drilling to be expelled through channels on the screw, enhancing performance.
- **Rigid and Reusable:** The screw is durable during the connection process and is designed to be reusable.



Benefits:

- **Time and Cost Savings:** By eliminating the need for pre-drilling, it accelerates the assembly process, providing time and cost advantages.
- **Reliable Connection:** The screw creates rigid and strong connections without any deformation of the material.
- **Versatility:** The screw can easily be used to assemble wood, metal, or different materials, progressing without disrupting the connection between various materials.
- **Reusability:** Since the screw does not suffer any damage during assembly, it offers the possibility of reuse for different connections.
- **Industrial Use:** It provides high efficiency in industries such as furniture and construction.

ARP Tiny Bolts

Automotive Racing Products (ARP), renowned for its high-performance fasteners, has announced an expansion of its tiny bolt offerings. These precision bolts are designed for applications where space is limited and high strength is crucial, such as in miniature engines, precision machinery, and specialized automotive components.

ARP's tiny bolts are crafted from premium materials, including stainless steel and chrome-moly steel, ensuring durability and resistance to corrosion. The company's manufacturing process involves precise cold-forming techniques that enhance the bolts' strength and clamping power, making them ideal for demanding environments. In addition to large bolts that range from 1/2” to 1/4” in diameter, ARP offers #10-32, #10-24 and the new #8-32 sizes.

The expansion includes a broader range of sizes and configurations, catering to the diverse needs of engineers and builders who require precise control over fastening solutions. This move reflects ARP's commitment to supporting innovation in both racing and non-racing applications, where precision and reliability are paramount.

ARP's products are widely used in motorsports, including Formula 1, IndyCar, and NHRA drag racing, as well as in aerospace applications. The company's dedication to quality and performance has earned it a reputation as a leader in fastener technology.

AIRYOSA™ Pneumatic System Solutions for Commercial Vehicles

ARaymond, a global leader in fastening and assembly systems, is expanding into the commercial vehicle pneumatics sector with its new AIRYOSA™ line of connectors, fasteners, and tubes. The company is known for its innovative solutions in fluid handling.

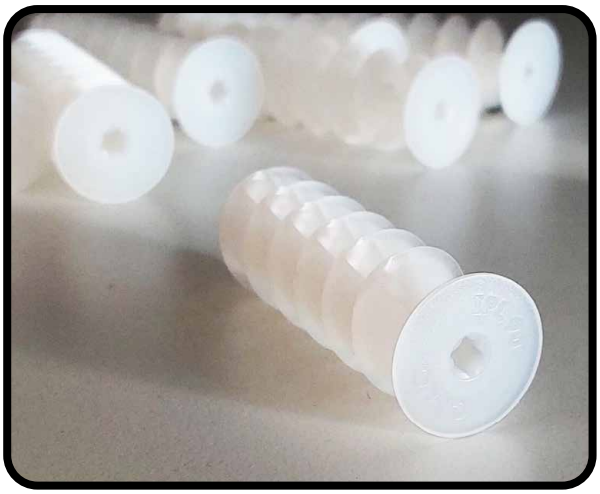
The AIRYOSA™ product range is designed to improve the safety, ergonomics, and sustainability of pneumatic systems in commercial vehicles, such as braking and suspension systems. ARaymond leverages its extensive expertise in fluid handling to offer a comprehensive set of products and solutions for the pneumatic market.

A key benefit of AIRYOSA™ is improved ergonomics. The quick connectors (QC) are engineered to reduce insertion force by approximately 30%, a significant advantage given that installers complete over 110 end piece connections and 130 tube insertions per vehicle. This reduction in force minimizes installer fatigue, speeds up the manufacturing process, and lowers the risk of misassembly, enhancing worker health and productivity.

Furthermore, the AIRYOSA™ products are compact and lightweight, delivering a 17% weight reduction compared to industry standards. This contributes to lowering the overall weight of commercial vehicles, which aligns with the sustainability goals of vehicle manufacturers. The products also boast an eco-friendly design using bio-based materials, resulting in a more than 50% reduction in CO^2 emissions during the manufacturing process compared to industry standards.

The AIRYOSA™ line is designed for easy servicing, featuring wear-resistant components that allow for simple maintenance even after extended use in harsh environments. Disassembly can be performed with standard tools, further simplifying maintenance procedures. ARaymond also offers customization options, providing customers with a single-source supplier for connectors, tubes, and fastening solutions, including customized parts tailored to specific needs.

IPL 90 Insulation Plug



CELO, a leading manufacturer of fasteners and fixings, has introduced its new IPL 90 insulation plug, designed for efficient and secure fastening to mineral wool and Heraklith boards. This innovative plug eliminates the need for pre-drilling, saving significant time during installation.

The IPL 90 features a sharp drilling tip that can reliably penetrate hard ETICS plaster up to 7 mm thick, making it suitable for a wide range of insulation applications. With a length of 90 mm, the plug provides secure anchoring in mineral wool boards, offering better hold than shorter alternatives.

The IPL 90's innovative thread geometry and slim core allow for easy insertion through pre-punched holes in sheet metal profiles, ensuring a smooth and efficient installation process. The fastener is also energy-efficient, enabling direct fastening in insulation without creating thermal bridges, which helps maintain optimal insulation performance.

Featuring a 25 mm head diameter and a TX40 drive, the IPL 90 is ideally suited for insulation applications, providing a strong and stable hold. Made from high-quality nylon, the plug is resistant to aging and weathering, making it suitable for long-term outdoor use. Its semi-transparent color allows for a discreet appearance, and it can be painted to match the surrounding surface for a seamless finish.

The IPL 90 is specifically designed to handle two particularly challenging fastening applications with ease. It is ideal for securing 10 mm or 12 mm thick Heraklith panels to ceiling panels made of mineral wool or EPS, providing a reliable and stable hold. Additionally, it is well-suited for attaching sheet metal profiles with 18 mm clearance holes to ceiling panels composed of mineral wool or expanded polystyrene (EPS), ensuring a secure and precise installation. The IPL 90 is a versatile and reliable solution for a variety of insulation fastening needs.

EcoCcompact Line with L and XL Variants

Ecoclean, a leading provider of industrial cleaning solutions, has expanded its EcoCcompact line with L and XL variants, designed to meet the diverse needs of the general industry. These single-chamber cleaning solutions handle batch weights up to 150 kg, offering enhanced capacity and cleaning performance tailored to specific company requirements.

The L and XL variants feature working chamber diameters of 650 mm and 750 mm, respectively, allowing for batch sizes of 650 x 470 x 300 mm for the L version and 650 x 470 x 400 mm for the XL version. A key advantage is the ability to switch between hydrocarbons and modified alcohols without conversion work, ensuring flexibility in cleaning processes.

Powerful, frequency-controlled flood pumps enable fast chamber filling and emptying, generating a high mechanical cleaning effect during standard injection flood washing. An optional frequency-controlled rotary drive can further enhance fabric rotation and positioning. The systems can be equipped with various process technologies like ultrasound and PPC to meet specific cleanliness requirements.

The EcoCcompact line is notable for its energy efficiency and sustainability, achieved through optimized system technology. Heat recovered from the distillation process is used to heat the flood tanks, minimizing energy consumption. These systems offer high material compatibility, allowing components of different materials to be cleaned together. ■