Category : Pressure Vessels

Winner : Maruhachi Co., LTD. (Japan)

Partner : Osaka University (Japan)

Name of Product or Process :

Ultra-durable CFRP high-pressure hydrogen fuel storage tank

Description :

Maruhachi Co., Ltd. has developed an innovative hydrogen fuel storage tank with a plastic liner for use at hydrogen fuelling stations. High-pressure tanks are rapidly shifting from Type 3 CFRP containers with aluminium liners to Type 4 CFRP containers with plastic liners to achieve higher levels of durability, safety and reliability. However, large hydrogen tanks are expensive and they are required to show economic efficiency (long life/durability of more than 15 years). Maruhachi Corp. has developed a CFRP high-pressure hydrogen fuel storage tank for hydrogen fuelling stations using its basic technology for CFRP high-pressure containers.

Fuel cell automobiles are being developed on a global scale as an effective way to curb global warming. As automakers aim to introduce them in the automotive markets around the world in 2015, creating infrastructure for fuel cell cars is an urgent task. Accumulators at hydrogen fuelling stations and large containers to transport huge volumes of high-pressure hydrogen gas have been made with chromium molybdenum steel. But they should be replaced with strong, lightweight CFRP multipurpose containers. The newly developed Type 4 high-pressure tank for hydrogen fuelling stations will help create the necessary infrastructure, which is a task that needs to be dealt with before fuel cell cars hit the market.

The tank uses a multilayered resin liner that is extremely effective as a hydrogen barrier. In addition to high strength to withstand high filling pressures, the tank is lightweight, highly durable and resistant to impact. The head and body are moulded and processed separately before the liner is welded with an original technology. This enables the production of large and long containers.

Maruhachi Corp. plans to develop a prototype of a 200 litre-class Type 4 CFRP high-pressure container in 2015 and a prototype of a 500 litre-class large high-pressure container in 2017.

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