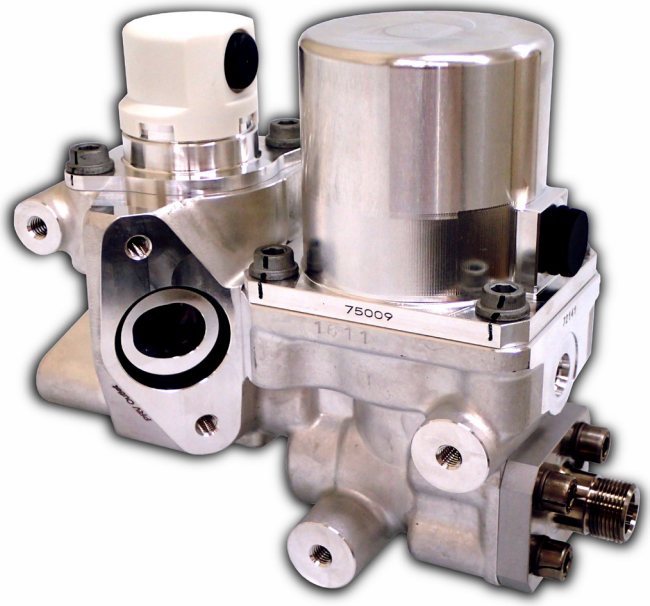

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Case Study: Kawasaki

Kawasaki
Powering your potential

Since 2014, Kawasaki Heavy Industries has partnered with TÜV SÜD in its efforts to achieve compliance with European Union (EU) regulations related to components used in hydrogen-powered motor vehicles. This partnership has enabled Kawasaki to successfully certify its hydrogen pressure components in accordance with EU requirements and has positioned the company to gain critical market share with major OEMs in the automotive industry.

Business challenges

Since its founding in the late 19th Century, Kawasaki Heavy Industries has been recognized around the world for the development of advanced technical solutions for a wide range of global industries, including aerospace, defense, shipbuilding and transportation. Today, with a market capitalization estimated at approximately $5 billion (U.S.), Kawasaki is an integrated technology leader, committed to providing high-performance products and services to its customers while also contributing to a better environment for future generations. The company is also consistently ranked as one of the world's top regarded companies, as well as one of the world's best employers by its nearly 35,000 employees[1].

In 2013, Kawasaki initiated development work on an advance high-pressure hydrogen regulator, as part of a joint development effort with NuCellSys, a subsidiary of German automobile manufacturer Daimler. The regulator performs an essential function in hydrogen-powered motor vehicles by reducing the pressure of stored hydrogen gas to a level appropriate for use in a vehicle's fuel cell stack to generate power. By combining its own expertise in fluid control technology with NuCellSys's extensive knowledge of fuel cell systems, Kawasaki successfully developed a hydrogen regulator that offered superior reliability.

OVERVIEW	
Client name	Kawasaki Heavy Industries, Ltd., a consortium of more than 100 group of companies, with headquarters in Tokyo and Kobe, Japan.
Industry	Industrial and commercial engineering services
Profile	A major global manufacturer, Kawasaki Heavy Industries, develops advanced engineered systems, products and components for industrial and commercial applications in the energy, mobility and leisure industries.
Business challenge	Successfully navigating EU approval of the company's high-pressure hydrogen regulator for use in automotive fuel cell applications.
Our solution	TÜV SÜD's witness testing and conformity of production services.
Business benefits	Adoption of Kawasaki-brand hydrogen regulators by a major global vehicle manufacturer.

However, a critical factor in gaining industry acceptance of a production version of Kawasaki's hydrogen regulator was demonstrating compliance with the EU Regulation No 79/2009. The Regulation, which is applicable to hydrogen-powered vehicles produced or sold within the EU, establishes strict criteria for type approval of components and systems used in such vehicles, and imposes rigorous testing requirements. To achieve compliance with the Regulation's requirements, Kawasaki would require the specialized knowledge of independent third-parties familiar with every aspect of the regulatory requirements and possessing the expertise to oversee the requisite testing.

TÜV SÜD's solutions

TÜV SÜD holds a worldwide reputation for its expertise in advanced technologies and systems, as well as an intimate understanding of the regulatory requirements with which such technologies must comply. In late 2014, working with Toyota Tsusho America (TAI), Kawasaki contracted with TÜV SÜD America to assist the company in evaluating its high-pressure hydrogen regulator for compliance with EU requirements. The scope of the engagement also included providing independent corroboration of the testing conducted for EU type-approval by Canadian-based Powertech Labs, verifying test results, and facilitating the process of obtaining EU certification from the relevant EU authorities.

Kawasaki's development of a high-pressure hydrogen regulator for the automotive industry represented a significant investment in upfront research by the company. It also required the evaluation and testing of components that would meet the rigorous specifications of the intended application, while also conforming with the technical specifications of EU requirements

These and other factors resulted in the implementation of a comprehensive component evaluation and type approval program. Multiple hydrogen regulator designs and prototypes were evaluated and tested for compliance with both design specifications and regulatory technical requirements. Flexibility of approach throughout the program was key, as planned evaluation and testing was expected to accommodate design and prototype production schedules. Testing methods needed to be adapted or modified in some cases to accommodate unique aspects of the hydrogen regulator design while still verifying compliance with the essential requirements of the EU Regulation.

In addition to offering extensive consultation regarding the regulatory requirements applicable to the design of Kawasaki's high-pressure hydrogen regulator, TÜV SÜD America was on hand throughout the entire testing cycle to witness multiple rounds of testing conducted by Powertech Labs and to assess compliance with the requirements of EU Regulation 79/2009. Representatives from Toyota Tsusho America were also present throughout the testing period to provide overall program management and assist in communications between Kawasaki's representatives and non-Japanese speaking participants. Following the successful conclusion of the testing in late 2017, TÜV SÜD America prepared a final report for submission to EU authorities documenting the results of testing and verifying compliance with the EU's requirements.

Business benefits

Daimler, NuCellSys's parent organization, has selected Kawasaki's regulator for use in the fuel system its Mercedes GLC F-Cell brand of hydrogen-powered vehicles.

"We could not have achieved this landmark accomlishment without the help of our selected partners TÜV SÜD America, Toyota Tsusho America and Powertech Labs," said Masatsugu Fujie, Kawasaki's Senior Staff Officer. "We consider hydrogen-related business to be an important future growth area for Kawasaki, and the adoption by of our hydrogen regulator by Daimler marks a major step forward for our company. TÜV SÜD tireless efforts to evaluate the testing of our hydrogen regulator and to provide sound engineering recommendations to achieve compliance with EU requirements helped to ensure our ultimate success."

Along with Toyota Tsusho America and Powertech Labs, TÜV SÜD is also expected to continue its new product development partnership with Kawasaki. These efforts are expected to help the company to obtain certification of other Kawasaki hydrogen components, and to assist in the expansion of the company's hydrogen product line into other automotive related applications.

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