

Your partner in automotive!

Technology for cleaner vehicles

The market breakthrough of environmentally friendly vehicles is upon us. The stricter environmental standards become, the larger the scope for using alternative fuels and other drive systems. Hydrogen, natural and biogas, hybrids and fuel cells, all of these alternatives are rapidly becoming realities. Kiwa Nederland B.V. (Kiwa) is your all-round partner for the automotive industry.

Your Partner in automotive

Manufacturers of motor vehicles and components are preparing themselves for some rapidly changing market needs. Of course, many vehicles already meet the highest emission standards in their standard version, so we know that the leading manufacturers are investigating and developing vehicles that run on alternative fuels such as hydrogen, biogas, CNG and LNG. They are also exploring opportunities for cleaner drive systems. We at Kiwa are supporting many of them as a technology developer. That is entirely logical since, for almost three quarters of a century, we have been at the centre of the dynamic world of gas technology and more than any other company are capable of providing the automotive industry with bespoke "state-of-the-art" technology.

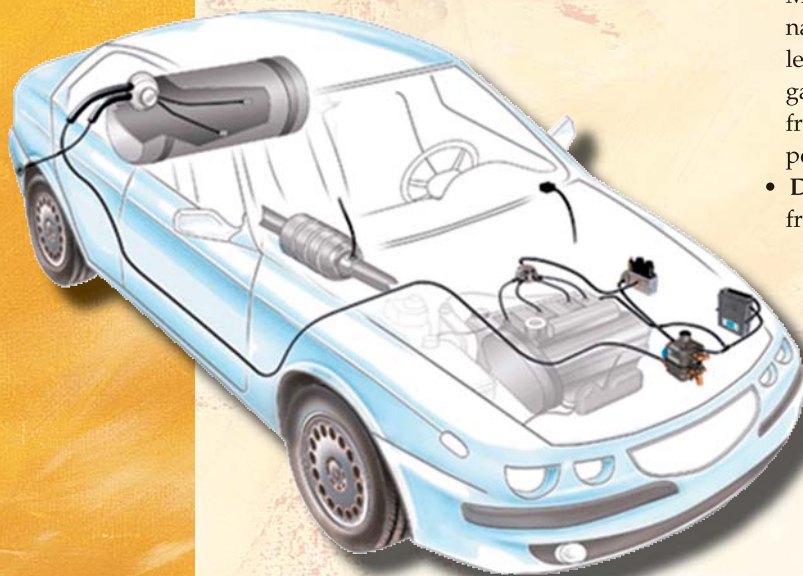
Clean drive systems

Apart from selecting environmentally friendly fuels, different drive systems can also make quite a difference. Fuel cells, hybrid systems and turbines make a substantial contribution towards cutting back on harmful emissions. Our Kiwa engineers are actively involved in helping to design the required technologies.

Kiwa Gastec Certification

Knowledge centre for alternative fuels

- **Hydrogen** - the ideal clean fuel. The only substance remaining after combustion is harmless water vapour. Hydrogen can be made from traditional fuels such as natural gas, LPG, methanol, diesel, or petrol, using a reformer.
- **CNG** - Compressed Natural Gas
- **LNG** - Liquefied Natural Gas (in liquid form at -163°C).
- **Methanol** - a fluid produced either from natural gas or synthesized; it has emission levels comparable with those of natural gas. Hydrogen is relatively easy to produce from methanol and is used in fuel cell-powered vehicles.
- **DME** (dimethyl ether) - fluid synthesized from natural gas; comparable with LPG, but used in diesel engines. No sooting or NOx emission issues.
- **Biogas** - gas that is liberated from organic waste (green waste, wood and paper).
- **LPG** - Liquefied Petroleum Gas; a by-product of petrol production



Wide range of services

Kiwa provides the automotive industry with more than just technology. As a 'technical service company' for the RDW (Dutch Centre of Vehicle Technology and Information) we test the applicability of components in vehicles. In addition, we carry out feasibility studies, safety assessments and damage investigations, we test and certify products and systems, and we conduct product demonstration and training courses. So, there are several reasons to choose Kiwa when it comes to technology developments within the automotive industry.

1. Approval testing and certification

Kiwa tests and certifies components of fuel systems such as valves, pipe work, couplings/fittings, injection systems, pressure governors and electronic controls such as timing advance processors and electronic control units. We have our own (ISO 17025) accredited test laboratories for CNG, LNG, LPG and H2 components. It does not stop there, because we also carry out audits of fuelling stations for CNG, LNG, LPG and H2.

We obviously carry out our work in the automotive sector to various codes of practice and product standards. However, thanks to our participation in the standardisation committees (such as ISO and CEN which are responsible for preparing specifications and standards in this field), we are always able to apply the most up-to-date versions.

On top of all this, Kiwa has partnered with the RDW (E4 approval) to test LPG, LNG and CNG installations and components to European and ISO 15500 standards. If desired, we are also able to advise on the installation of gas systems in vehicles and assess their safety.



RDW

2. Materials testing

Kiwa tests and evaluates all kinds of materials including corrosion-resistance of metals, rubber analyses to investigate their susceptibility to fuels, research into defective components, and other evaluation aimed at product improvement such as aging of plastics thermal shock. In addition, electronic components can be tested for EMC emissions and immunity.



3. Safety assessment and damage investigations

Kiwa carries out safety assessments concerning alternative fuels and fuel systems (tanks, vehicles and drive systems) and corresponding risk analyses. We conduct damage investigations and are able to pinpoint the exact cause(s) in the event of a problem. This service provides developers with every opportunity to enhance their designs.

4. Demonstrations

Kiwa has carried out several demonstration projects in the Netherlands. Examples include:

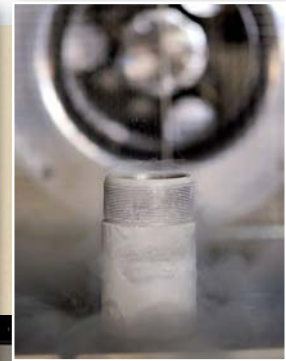
- LPG and natural gas powered taxis; natural gas-fuelled canal boats in Amsterdam;
- waste collection vehicles and road sweeping machines powered by natural gas;
- the natural gas vehicle fleet of some energy companies.

Projects of this kind boost the 'Green Image' campaigns of companies and local authorities. Because Kiwa knows most of the possibilities, we can usually answer your (technical) questions and advise on how to tackle the constraints concerned.

5. Training

For technicians, maintenance engineers and drivers who are working with alternative fuels, Kiwa runs training courses on:

- how to deal with LPG and CNG;
- maintenance work on LPG and CNG fuel tanks in vehicles;
- maintenance work on natural gas filling stations;
- company-specific courses, fully tailored to the your precise needs and staff training levels (these can even take place in-house).





About Kiwa

In our role as a leading European certification body, Kiwa provides clients all over the world with internationally recognized certification services for systems, products, processes and persons.

In addition, as independent experts, we carry out product inspections and investigations. We provide a wide range of services aimed at satisfying all your quality related issues. Whenever appropriate, we can also help you when it comes to obtaining certificates from other organizations in the energy sector.

Want to know more?

We are active all over Europe and in the Far East. If you want more information on Kiwa's activities for the automotive industry, in the first instance please contact:

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Following initial discussions to establish your requirements, your local representative will be asked to contact you to establish how we might best help you.

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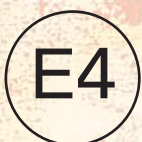
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