



ISO/TC 197
Hydrogen technologies

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2016 Letter to ISO TC 197 Chair from Argentina

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2016 Country Status and Perspectives on Hydrogen Technologies

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Argentine ISO/TC 197 National Committee

The National Mirror Committee of the ISO/TC 197 has almost twenty years of experience participating in the development of standards for the production, storage, transportation, measurement and use of hydrogen as an energy vector. The activities usually take place in Buenos Aires where headquarters of the Institute of Normalization of Argentina (IRAM) are located. The authorities are the following:

Chairman: José Luis Aprea
Convenor: Cristian Vázquez
Secretariat: Horacio Trigubo

The technical committee of Hydrogen Technologies, in agreement with the Board of Standardization quality assurance system, has a sub-committee where new standards in different fields are discussed and developed. The Argentine TC 197 is integrated by representatives and expert members from industry, government, NGO, entrepreneurs and academia.

The enterprises of the industrial sector, including oil and natural gas companies, car spare parts makers and designers, industrial gases sector, govern and non-governmental organizations, research institutes and academia members participate in the sessions of the ISO TC 197 National Committee, so all the documents are circulated for analysis and discussion among the representatives previous to send to ISO Secretariat the national position, vote and/or comments. From the very beginning the committee has had the technical support of the Argentine Hydrogen Association (AAH) and his chairman, Juan Carlos Bolcich, pioneers at Latin-American level.

Working Groups and interest

Subjects covered by any of the different WGs of the TC 197 are considered to be interesting for the development of the country infrastructure, as indicated below. However the same is valid for HCNG (hydrogen plus natural gas blends) practically for every subject related with quality specifications, stationary and on-board fuel tanks and service stations.

Working Group	Title	Interest
ISO/TC 197/TAB 1	Technical Advisory Board	High
ISO/TC 197/WG 5	Gaseous hydrogen land vehicle refueling connection devices	High
ISO/TC 197/WG 15	Gaseous hydrogen - Cylinders and tubes for stationary storage	High
ISO/TC 197/WG 17	Pressure swing adsorption system for H ₂ separation and purification	High
ISO/TC 197/WG 18	Gaseous hydrogen land vehicle fuel tanks and TPRDs	Regular
ISO/TC 197/WG 19	Gaseous hydrogen fueling station dispensers	Regular
ISO/TC 197/WG 20	Gaseous hydrogen fueling station valves	Regular
ISO/TC 197/WG 21	Gaseous hydrogen fueling station compressors	Regular
ISO/TC 197/WG 22	Gaseous hydrogen fueling station hoses	Regular
ISO/TC 197/WG 23	Gaseous hydrogen fueling station fittings	Regular
ISO/TC 197/WG 24	Gaseous hydrogen fueling stations - General requirements	Regular
ISO/TC 197/WG 25	Hydrogen absorbed in reversible metal hydride	High
ISO/TC 197/WG 26	Hydrogen generators using water electrolysis	High
ISO/TC 197/WG 27	Hydrogen fuel quality	High
ISO/TC 197/WG 28	Hydrogen quality control	High

Hydrogen production perspectives

Argentina is in a very good situation about the manufacturing, use and exportation of hydrogen as fuel in its different forms. Great resources of clean water as well as renewable energy (solar and wind) ranks the country in a very good position for the near future about the hydrogen generation and utilization. This will facilitate the development of interest and hydrogen business activities with other countries and would be an effective and realistic way to achieve sustainable development with generation of new and genuine job opportunities.

Hydrogen utilization perspectives

The special characteristics of the country and its development make it possible to glimpse each and every one of the applications classically covered so far by the TC 197, excluding by the moment any application related to liquid hydrogen that falls outside the national interest, in addition to all the applications considered, such as fuel cells, reversible hydride storage, generation via electrolysis, etc., the utilization that appears as the one that has gained the most ground in the last years is the use of the combined hydrogen in mixtures with natural gas, for both mobile vehicular and stationary applications.

Relevant CNG experience

Special importance is given to the standards about Safety Aspects and generation of Hydrogen as well as the use of H₂ gaseous mixed with natural gas. Argentina has been pioneer in this technology and has 2014 compressed natural gas (CNG) refuelling stations, with 2.295 million vehicles running on CNG (As per IANGV). Argentina ranks 4th worldwide behind China, Iran and Pakistan if number of Natural gas vehicles (NGV) are considered.

The industry is very well established and now although the number of car conversions from gasoline to CNG is declining due to the crisis in natural gas relative prices, makers are commercializing their products worldwide with very good perspectives

Several universities, private companies and research institutes are studying the use of natural gas hydrogen blends to expand the knowledge and disseminate the use of the vector. As a result, less Greenhouse Gas (GHG) Emissions are achieved and CO₂ and NO_x are decreased when proper adjustments on ICE are implemented.

It's considered that the respective standards are a key point to establish safe handling and utilization practices for hydrogen and also to facilitate the international trade without barriers and the same criteria is applicable for hydrogen natural gas blends

Final considerations and HCNG Initiative position

The members of the hydrogen community of our country are very encouraged by the multiple developments and applications of hydrogen worldwide, at service stations, serial vehicles and the increase of hydrogen gas production. They visualize this moment as the most important in the use of hydrogen throughout history and wish to accompany this definite world trend.

In our country, several successful experiences have been made through the use of mixtures of natural gas with hydrogen gas, in different proportions, both in vehicles and in large stationary engines.

The promising experience of an oil company in our country in electricity generation through the use of electric generators with mixtures of GN + 40% GH, using depleted gas wells to accumulate GH indicate the need to have specific normative documents in our country for the handling of hydrogen in mixtures with other gases as mentioned.

The Argentine market for the use of CNG is a mature market launched in 1984, currently counting more than 2000 service stations for NGV that use natural gas at 200 bar of service pressure and 2.295 million vehicles that use this gas as a fuel. The development of an important local industry has allowed to achieve these levels of employment of CNG with more than three decades of experience and developments, being necessary to take advantage of it and to increase its potential.

As mentioned in item 6.2 of the current business plan, there are not many specialists in the management and design of systems that exclusively use hydrogen, and we could add that even less, in the use of mixtures of CNG with hydrogen, constituting a limitation in the advance for the development of respective standards.

We agree with what is stated in item 5.2.10 of the business plan in the sense that our committee (ISO TC 197) cannot delegate responsibilities to other committees when issues related to hydrogen safety aspects are at stake.

5.2.10. ISO/TC 197 cannot delegate its responsibilities when safety issues related to the use of hydrogen are under consideration, and in order to achieve its mandate in a most effective manner, ISO/TC 197 has established liaisons and work in close collaboration with a number of ISO technical committees and other organizations

Our technical and political opinion is that the standards and normative documents for hydrogen gas blends should be developed by hydrogen specialists in order to maintain the same levels of safety that have been achieved with the use of pure hydrogen, always within this technical committee 197.

Our country has recently awarded new projects for the electric generation using renewable energies for 2400 MW with investments of more than US \$ 4500 M, which will be followed by other similar projects taking into account the wide interest aroused by interested parties with offers that reached 6000 MW. For this reason it is possible to expect a participation of hydrogen both as a vector of energy and also as a fuel to maximize those energy uses.

Finally, it is clear that Argentina wishes to participate in the development of specific normative documents for blends of natural gas and hydrogen for vehicular use, as well as the use of mixtures by applying the power to hydrogen or biogas generation technologies.

Regarding the dilemma of carrying out this work within or outside the TC 197, it is preferable for the country to do so within the scope of TC 197 of Hydrogen Technologies, especially so as not to leave the safety of new technologies completely in the hands of other organisms or committees that could delay or complicate the arrival of the hydrogen vector on the commercial side for the benefit of the environment and all peoples

Final Message

Unfortunately none of our experts will be able to attend this important new plenary meeting of the committee in December in the Netherlands.

For this reason, we ask the Chairman to consider the position of Argentina regarding the treatment of hydrogen and natural gas mixtures, including their discussion and standardization within TC 197 and the support to the HCNG initiative within TC 197 for the elaboration of the necessary normative documents that allow to achieve the implementation of the new technologies under the guidelines and philosophy of ISO

In a few words:

- Argentina desires a genuine advance in the field of hydrogen and natural gas blends production, storage and utilization, including stationary applications and the use of blends in vehicles.
- Argentina at country level supports the HCNG ISO TC 197 initiative within the ISO TC 197 structure
- Argentine will contribute with experts on hydrogen technologies and compressed natural gas specialists for the tasks related with the initiative.

We would also like to convey this request to the various representatives present in the plenary and wish all members and committee authorities a fruitful event.

José Luis Aprea
Chairman TC 197 Argentina