

HYDROGEN DETECTORS – NWIP

Purpose and Justification

1. The specific aims and reason for the standardization activity, with particular emphasis on the aspects of standardization to be covered, the problems it is expected to solve or the difficulties it is intended to overcome.

This new work item proposal for international standard will provide guidelines for the application of hydrogen leak detectors for the hydrogen-related facilities such as hydrogen refueling station and underground parking facilities, and can be used for quality assessment or certification of the detectors. The main aspects that will be covered are both safety and performance requirements ensuring safety and wide spread use of hydrogen.

Many regulations of the hydrogen system will require the ability to detect hydrogen concentrations before certain low concentration of hydrogen or a fraction of explosive limit is reached, in order to allow for multilevel safety operations such as nitrogen purging or ventilation and or system shut-off. Furthermore, the gas selectivity, response speed, long-term stability, durability against various vapors will be required. To certify these performances, a practical test method for hydrogen detector must be defined.

2. The main interests that might benefit from or be affected by the activity, such as industry, consumers, trade, governments, distributors.

The international standard will benefit mostly builders of refueling stations and governments of preparation of new regulation. By ensuring the safety with the quantitative and technological specification against the danger of hydrogen leakage, wide-spread hydrogen infrastructures will encourage the economics of hydrogen and safe operation of the station or system will appeal to the public consensuses. The specification will promote international cooperation under the easy-to-understand guideline bring up wide-spread use of hydrogen energy.

3. Feasibility of the activity: Are there factors that could hinder the successful establishment or general application of the standard?

Even though there are many flammable gas detectors available commercially, the standards such as UL2075 and IEC61779 which cover gas detectors in accordance with the codes of electricity are too stringent to be applied for the infrastructure of hydrogen safety. Including new hydrogen-specific sensors under development, there is currently no hydrogen detector which can meet these standards. It is necessary to revise these guidelines for hydrogen leak detectors which can be practically usable for the safety. New performance test method for the detectors is also to be clearly defined how the detectors are certified to the standards, and it must be practical and reliable method. To understand this mismatch in the existing standards and the needs of new standard of hydrogen detector is very important.

4. Timeliness of the standard to be produced: Is the technology reasonably stabilized? If not, how much time is likely to be available before advances in technology may render the proposed standard outdated? Is the proposed standard required as a basis for the future development of the technology in question?

The performances of many sensors out there are enough to confirm the safe operation of the hydrogen refueling stations, but severe rules are applied for the safety concerns and risk management is not developed. Simple, applicable and reliable certification program for a hydrogen detector should be proposed.

5. Urgency of the activity, considering the needs of other fields or organizations indicate target date and, when a series of standards is proposed, suggest priorities.

Before the hydrogen powered fuel cell vehicles come into the customer market, the infrastructure of hydrogen refueling station need to be developed with the reliable safety. A leading project of Japanese government spreading domestic hydrogen power system also requires a guideline of gas detector.

6. The benefits to be gained by the implementation of the proposed standard: alternatively, the loss or disadvantage(s) if no standard is established within a reasonable time. Data such as product volume or value of trade should be included and quantified.

Benefits gained by the implementation of proposed hydrogen detectors standard include:

- Using the standard to establish common rules concerning the safe use and inspection of hydrogen stations in different countries and activating new participation from other

countries.

- Using the standard to overcome safety concerns and aiding in development of the hydrogen fuel infrastructure.

The loss/disadvantage if no technical specification is developed will delay the development of the hydrogen infrastructure and will increase the cost of risk management.

7. If the standardization activity is, or is likely to be, the subject of regulations or to require the harmonization of existing regulations, this should be indicated.

If a series of new work items is proposed having a common purpose and justification, a common proposal may be drafted including all elements to be clarified and enumerating the titles and scopes of each individual item.

It is anticipated that this standardization activity will likely lead to regulation and support the future regulations. In Japan, a draft of installation guide, a regulation, for hydrogen refueling stations has been open for public comment in March 2005, for reducing the severe regulation for hydrogen use. One section of the draft reads, by applying new guide, it is assumed that the station should be fitted with suitable safety systems including hydrogen detectors.