
The High Pressure Gas Safety Institute of Japan

KHK is the core institution ensuring high pressure gas safety in Japan.

core

While it is needless to say that both the legal regulations imposed by administrative organizations and the self-regulated safety activities undertaken by the private sectors play important respective roles in ensuring the safety of high pressure gas, it should be particularly noted with regard to Japan that the High Pressure Gas Safety Institute of Japan (KHK, *Kouatsu-gasu Hoan Kyoukai*) takes the fundamental role of a specialized technical agency, but with the

characteristics of a public body.

As for its history, the predecessor of KHK was a private juridical person founded by private sector enterprises, and then a public agency based on the High Pressure Gas Safety Act was established in 1963 for the purpose of providing high pressure gas safety services including research, inspections and education.

Developing high level activities, it has played a key role in the area of high pressure gas safety in Japan for more than half a century since that time. The organization shifted its operations in due course to a style of administration that was more characteristic of a private juridical person, and was able to achieve an efficient level of management.

KHK is active across a wide range of fields.

Conducting a variety of research on high pressure gas safety, KHK creates and publishes technical standards based on its achievements to provide norms for safety activities in private sector companies and organizations.

As a public agency equipped with technical expertise, it supports the operations of the regulatory authorities through preliminary evaluations from a technical standpoint and through conducting qualification examinations. It also promotes the efforts of private sector companies by providing information and education, and offers regular citizens information about safety.

In addition, KHK is expanding its activities across extensive areas; it submits opinions to the Minister, performs public-private platform activities for policy formation, interacts and cooperates with domestic industrial associations and similar parties overseas, and so forth.

KHK acts as the core institution of high pressure gas safety in Japan through the wide range of activities mentioned above.

It is now ready to actively cooperate with agencies and companies in foreign countries, improve its abilities and move up to higher levels, and further expand the fields of its international activities. We appreciate the understanding of many people both in Japan and overseas.

Four key functions of KHK

KHK contributes to the promotion of high pressure gas safety in Japan and overseas through the four important functions.

T think tank

KHK brings together wisdom in Japan and operates as a major think tank to contribute to safety.

One of the important functions of KHK is as a think tank.

KHK has long-term experience and achievements including the following: survey of systems, actual circumstances, trends, etc. on high pressure gas safety in Japan and overseas; research and development of hardware, and technical analysis relevant to accident investigation. As part of this, KHK owns a research laboratory with world-class equipment and devices, which has enabled its many research achievements.

The results of these original KHK research studies have since borne the fruits of the establishment and revision of technical standards (KHK Standards). The KHK Standards provide core references for high pressure gas safety in Japan, serving as guidelines for the self-regulated efforts of companies and organizations, and norms for administrative judgements by regulatory authorities such as permissions & authorizations.

It is required by law that the Minister of METI (Ministry of Economy, Trade and Industry) shall refer to KHK for its opinions when instituting or amending any technical METI Ordinances. This is based on the assumption that KHK is operating as such a think tank.

In addition, the wisdom of Japanese industrial and academic circles is all gathered within KHK. Services to prepare examination questions for the national qualification examinations and related training courses, in addition to the creation of technical standards, which may be needless to mention, are carried out with the cooperation of a huge number of experts in industry and academia who are assembled in organizations under various types of committees. It is no exaggeration to say that these services are provided by fully utilizing Japan's experts in high pressure gas safety.

The inspections, evaluations and other certification activities conducted by KHK require an extremely high level of expertise and are technically underpinned by this group of experts. The high level of technical expertise in this area has gained an international reputation.

L legal

KHK fulfils various roles required by law as a fair, specialized technical agency.

KHK acts as required by law in the vast and critical areas as a specialized technical agency equipped with the characteristics of a public body.

KHK conducts inspections and other certification activities for equipment, cylinders/containers, etc. used for high pressure gas in Japan. The safety management systems in places of business that handle high pressure gas and the quality control systems of manufacturers that produce high pressure gas equipment are also technically evaluated, and the Minister of METI makes a judgement regarding legal procedures based on these evaluation results.

Moreover, the statutory qualification examinations required for persons who handle high pressure gas, the training courses related to national qualifications and other educational services are conducted based on the law.

S self-regulated

KHK actively promotes self-regulated safety activities in cooperation with the private sector.

The substantial think tank function of KHK also contributes to the self-regulated safety activities of private sector companies.

KHK runs a publishing business which widely reports the achievements of its research. Various different pieces of information are provided through the member network. Related seminars, explanatory meetings, etc. are also held to help share them. In addition, in order to promote and popularize self-regulated actions in industries related to high pressure gas safety, assistance is offered with creating technical standards in respective fields.

Furthermore, the audit and registration of management systems in accordance with ISO standards are conducted as an accredited certification body from the perspective of supporting corporate safety activities.

These services of KHK are implemented with the close cooperation with all sorts of organizations in the private sector. The decision-making bodies in relation to the operation of KHK accept the participation of representatives of the relevant groups, such as academia, industry and consumers as the core members, and their opinions are properly reflected in the operation of KHK.

N network

KHK conducts its services through a nationwide network based on the fair and efficient running of the organization.

In order to carry out the important functions mentioned above, KHK is consistent with the principle of a select few in terms of the organization, and forms a close network with high pressure gas-related bodies across the nation, performing the services with their cooperation. For example, the service of national qualification examinations and related training courses are supervised by KHK and carried out in cooperation with high pressure gas-related bodies all over Japan to which the execution of the services is entrusted.

While ensuring fairness is maintained as an absolute requirement for the execution of public services like those described above, KHK is also subject to certain legal regulations as well as its own strict internal audit system and needs to conduct audits properly.

Moreover, KHK is an independent institution without financial support from the national government, and efficiently runs its organization based on operating revenue from training courses, inspections, etc.

Outline of the organization

Name

The High Pressure Gas Safety Institute of Japan
The designation is stipulated in the High Pressure Gas Safety Act. Commonly known as KHK, the acronym of *Kouatsu-gasu Hoan Kyoukai*, its name in Japanese.

Establishment

Established in December 1963 in accordance with the High Pressure Gas Control Act (presently the High Pressure Gas Safety Act).

Directors and the board of directors

The board consists of the president, vice president, directors and auditor. Appointment or dismissal of directors comes into effect after obtaining authorization of the Minister of METI. The board determines important matters with respect to the operation of KHK.

Membership

KHK has a membership system. The organizations, companies and individuals related to high pressure gas may choose to become members. Members have the right to vote for the councilors and have opportunities to gain information from the distributed bulletin, *Journal of the High Pressure Gas Safety Institute of Japan* and other information sources. Members also receive various benefits such as discounts. There are about 1,200 members (as of 2015).

Council

KHK has a council composed of councilors elected by the members. The council deliberates on important matters including amendments to the articles of incorporation and the assignment of the president.

Technical Committee

While KHK legally has the authority to submit opinions to the Minister of METI, the Technical Committee is established as a supreme body that deliberates technically important matters including issues related to the submission of opinions. The Technical Committee is composed of those who are authorities in their fields. The Standards Committees are in place for each of seven special areas under the Technical Committee and are in charge of the establishment and revision of standards related to the respective areas.

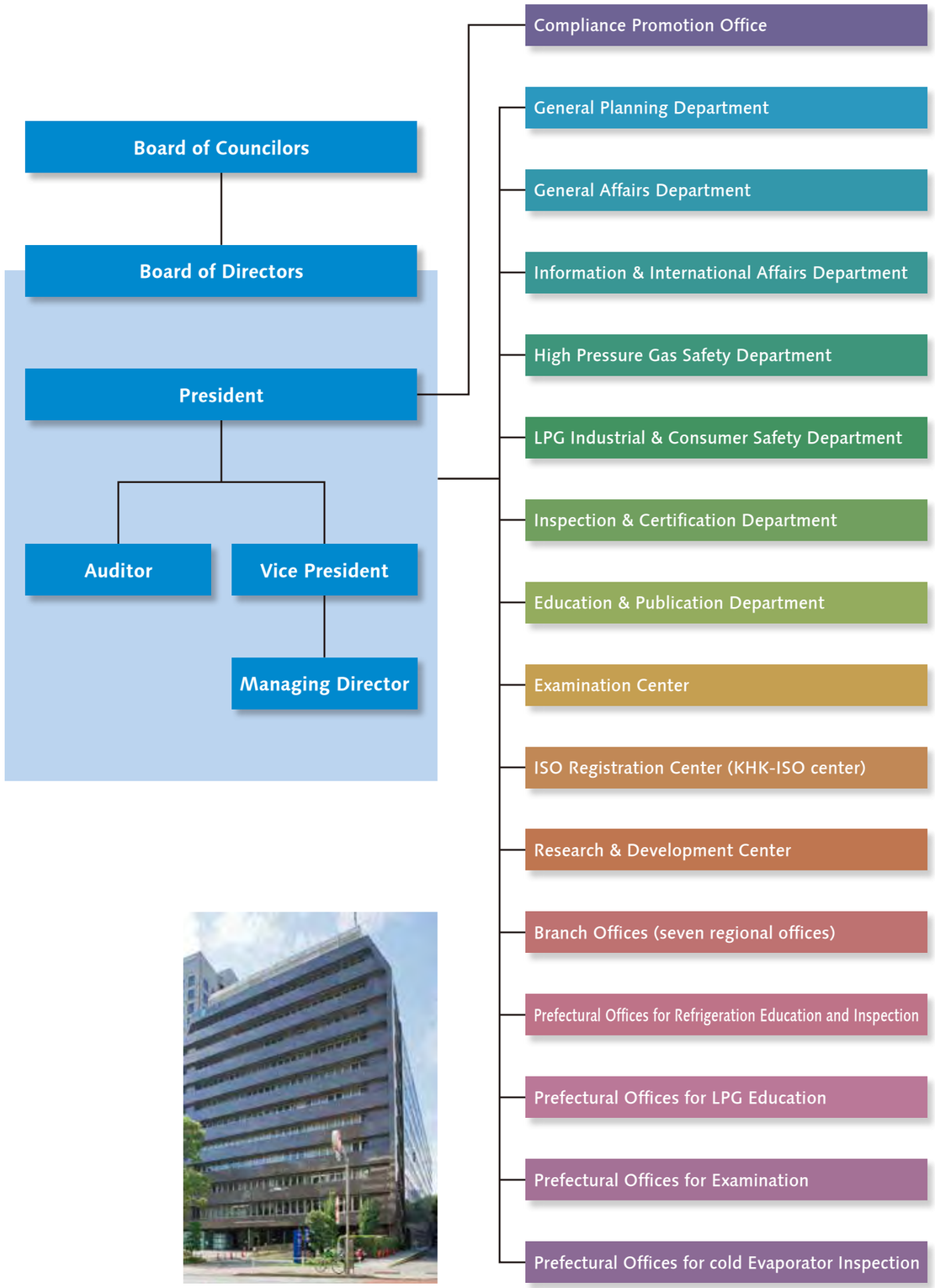
Personnel

There are 173 directors and employees (as of the end of FY 2015)

Business scale

About 4.9 billion yen (FY 2015)
The revenue of KHK is mostly operating profits derived from the operating activities described below, and includes the income from members' membership fees.

Organization chart



Operating activities

R research

Research activities

KHK conducts surveys, research and development, information gathering, etc. on high pressure gas safety as a think tank that deals with national policy matters. Some of these activities are entrusted by the national government. As part of this, KHK has a research laboratory where hardware research and development is conducted. A wide range of activities are performed: information on high pressure gas accidents in Japan is collected and analyzed in an integrated manner in order to share the results, and safety-related systems in foreign countries are researched.

Recent cases of research involve the following themes for example, and these achievements are then used for national measures, such as amendments of statutes and the establishment of operation standards.

♦The sales of mass-production type fuel-cell vehicles first started worldwide in December 2014, and the installation of hydrogen filling stations started to become encouraged in Japan at around that time. In order to address such a trend in advance, KHK conducted the research required to further popularize of fuel-cell vehicles in the future, and also proposed standards and others, including the standard for cylinders mounted on fuel-cell vehicles, the standard for the installation of hydrogen filling stations, the standard for cylinders/containers to transport the hydrogen, and a manual on government permissions & authorizations.

♦Following the Great East Japan Earthquake which occurred in March 2011, the seismic design standards of high pressure gas equipment were reviewed; KHK conducted the research required to review the standard in order to evaluate the seismic performance of equipment through numerical analyses and model vibration experiments which were carried out for that purpose. In addition, to prepare for the huge earthquake which is expected to occur in the future, a review of the seismic design standards based on the estimated damage in each area caused by the earthquake is also being conducted.

♦Various efforts are being made globally for new refrigerants with low GWP (Global Warming Potential) to address the increasing awareness of global ecology in recent years. KHK conducted research for the incorporation of new rules on slightly flammable refrigerants, such as R1234yf, into statute, and a draft to amend the standard was created and proposed.

In addition, the collection of various technical evidence data to reflect the technical standards, technical analysis of the actual equipment where an accident has occurred, and so forth, are also performed as part of self-regulated safety activities.

S standards

Creating technical standards

While the minimum requirements for persons to follow when handling high pressure gas are stipulated as statutory regulations, it is actually effective to prepare additional detailed technical standards for assured safety. KHK has created the technical standards for such self-regulated safety activities.

To create these standards, the Standards Committee per area, under the Technical Committee composed of external experts, discusses the contents based on the technical standards development process that was originally established by KHK to guarantee fairness and equity. The standards development process takes into account the proper constitution of committee members such as scholars and relevant parties from industry, the requirement for public comments and other procedures.

Some of the KHK Standards are legally specified as so-called Exemplified Standards (detailed technical standards; meeting the said Exemplified Standards, which describe example cases, is regarded as conforming to statutory performance-based regulations) or as compulsory standards in the METI Ordinances, both of which means they are dealt with in practice as statutory regulations.

Recent cases of KHK Standards are described below:

Standards for in-service inspection

Places of business that produce high pressure gas in Japan are required by law to have their facilities subject to periodic in-service inspections. Previously, the inspection standards were stipulated by METI Ordinance in detail and the contents were uniform regardless of the use environment of the equipment without exception. In contrast, KHK developed inspection standards which depend on the situation of each piece of equipment, resulting in the present situation where the standards are specified as legally effective and bring significant benefits to all relevant parties.

Installation standard for LPG equipment

When LPG is consumed at home or in a place of business, standards for the design, construction and maintenance of the equipment, from the LPG cylinders/vessels to the end user consumption devices were in the past only provided by law. However, these statutory regulations were not sufficiently effective. Therefore, systematic and specific KHK Standards were created. The standard is now commonly known as "blue book" and widely used as the sole comprehensive norm in the related industries.

Standard for remaining life management

While the annual measurements of wall thickness and periodic overhaul inspections were previously mandatory as in-service inspections, the introduction of the Fitness For Service (FFS) technique for more accurate management of the remaining life allows for extended inspection intervals without lowering the level of safety. KHK created the KHK Standards based on such ideas. The application of these standards is presently a considerable advantage especially for those places of business with large-scale equipment.

Inspections, evaluations, etc.

KHK conducts a wide variety of certification activities, including inspections of gas cylinders/containers, pressure equipment and facilities used for high pressure gas, and also evaluations of safety control systems. They are divided into two main categories: statutory activities and certification as part of self-regulated safety activities.

1 Inspections, etc. based on statute

Typical inspections that manufacturers and importers are required to undergo by the High Pressure Gas Safety Act are listed below:

(i) Inspections on transportable gas cylinders and containers used to fill high pressure gas; standards similar to the US DOT Specifications apply.

(ii) Inspections on cylinder fittings such as valves and safety devices

(iii) Inspection on stationary pressure vessels; standards similar to the ASME Boiler and Pressure Vessel Code and the European standards based on the Pressure Equipment Directive apply.

When these products are exported from foreign countries into Japan, they must undergo and successfully pass these inspections.

The users of high pressure gas equipment such as valves, pumps and compressors in Japan may be requested to obtain KHK certification on the safety of their equipment by the prefectural governor, who has the authority to permit the installation of facilities to handle high pressure gas. Responsive to such needs, KHK conducts Tests of High Pressure Gas Equipment based on applications from the manufacturers depending on user demand. These tests are used by many overseas manufacturers based on user demand in Japan.

In addition, a variety of other activities are carried out, including preliminary evaluations in relation to approvals by the Minister, registrations by the Minister and authorizations by the Minister, which are required for the applicant to gain a legal advantage (for example, the interval for statutory in-service inspections may be extended, or the business operator itself may be granted the power to conduct statutory inspections on behalf of the external statutory inspection body), as well as inspections of entire facilities.

2 Inspections, etc. not based on statue

KHK conducts a wide range of inspections, tests, accreditations and other certification activities as KHK self-regulated services on equipment and facilities as well as on quality management systems, which are not required according to the High Pressure Gas Safety Act. These activities include inspections and tests which are conducted based on the importers' standards before exporting overseas from Japan. The high-level professional knowledge of the organization is fully used for these activities. They include the following, which are undertaken at specialized, particular facilities:

(a) Evaluation of material strength, including material tests, and the evaluation of product strength, including pressure-proof tests and structural analysis of FRP/metal cylinders and other equipment conducted in the Research & Development Center. The Center with its strong analysis capabilities accepts accident analysis requests from places of business where accidents have occurred and from accident investigation boards.

(b) Verification of LPG gas leak alarms conducted in the LPG Equipment Certification Office

National qualification examinations and related training courses

1 Implementation of national qualification examinations

The High Pressure Gas Safety Act in Japan stipulates that those persons who perform specific handling of high pressure gas must have the specified national qualifications. The qualifications consist of 12 categories broken down by type of high pressure gas and operation (categories such as production, sales, consumption, etc. of high pressure gas), and KHK organizes all 12 qualification examinations by accepting a delegation from the Minister of METI and the prefectural governors, who are the examination executers stipulated by law.

For the execution, KHK prepares all of the examination questions, provides examination sites in all 47 prefectures of Japan, and supervises the high pressure gas-related body in each area. Recently, the examinations are taken by about 50,000 people per year.

2 Implementation of related training courses

In Japan, according to the law, those who have taken the specified training course and successfully passed the related certification examination will gain a certain advantage when they take the national qualification examination. Meanwhile, the level of knowledge always needs to be maintained even after the national qualification has been obtained, and it is required by law that all qualified persons should take specified training courses at regular intervals as a rule.

KHK holds training courses related to the national qualifications as the legal system requires, as mentioned above, and recently about 100,000 people take the training per year.

Seminars and publications

1 Implementation of seminars

In addition to the training courses related to national qualifications, KHK offers other training courses to obtain qualifications. A wide range of seminars, including those that are offered generally and those based on individual customer specifications, are conducted to contribute to improving the level of safety of high pressure gas-related places of business.

While such seminars are also held by many organizations related to high pressure gas, KHK in particular conducts seminars with various themes against the background of its close relationship with central and local governments, and the considerably strong collaborative relationship with experts in industry and academia.

Representative specific cases in recent years are as follows:

- Seminar on general topics regarding law and administrative work for staff of prefectural administrative bodies
- On-site seminar for a place of business where an accident has occurred to reeducate the employees
- In-house training to educate employees about new technologies related to high pressure gas, such as hydrogen technology

2 Publication of books

KHK is the sole publisher in Japan that generally publishes books on high pressure gas safety. In addition to the Statute Book of High Pressure Gas Safety Act, various other books are published and sold, such as books helpful for national qualifications and training courses, technical standards and documents that should be followed in places of business that handle high pressure gas, books helpful for the education of employees in places of business, and information on accidents. Some of the books which are useful for on-site education in places of business have been translated into English and Chinese.

Safety activities of LPG consumers

Of the high pressure gases, liquefied petroleum gas is used as a general household fuel and is regarded as unique when compared with other high pressure gases that are principally used by professionals. About 24 million households, or half of the total number of households in Japan, use LPG (the others mainly use city gas) and the number of end users is extremely large. KHK contributes to the safety of LPG consumers across a variety of different fields, including technical development, creating standards and educating consumers.

1 Contribution to a dramatic reduction in the number of LPG accidents

The previous record for the number of accidents involving LPG consumers in Japan reached about 800 per year at the end of the 1970s. Addressing the situation, KHK developed a gas meter equipped with safety functions, such as an automatic shutoff in case of an abnormal rate of gas flow. The campaign to popularize safety devices, mainly referring to this gas meter, had been conducted in earnest by KHK along with both the public and private sectors since the 1980s. As a result, the coverage of safety devices reached almost 100% in the mid-1990s, and the number of accidents drastically decreased to around 80 per year, a level one-tenth of the former number.

Subsequently, KHK still acts as a major player in the development of new safety equipment, the creation of standards for safety apparatus, and so forth.

2 Steady expansion of consumer safety activities

It is regulated in the special law to ensure the safety of general LPG consumers, and the law stipulates that securing the safety of general consumers is basically assigned to the LPG dealers.

Against this background, KHK has worked together with related parties to prepare various useful guidebooks on the subject of securing safety and distributes them to about 20,000 LPG dealers across Japan free of charge. KHK also supports consumer groups to conduct activities which raise the awareness of safety. Moreover, a variety of awareness-raising activities are conducted for general LPG consumers all over Japan using magazines, posters and the Internet.

Audit and registration of management systems

KHK is a certification body accredited by the Japan Accreditation Board (JAB) to audit and register management systems based on ISO standards such as ISO 9001 and ISO 14001. This service was started for the purpose of contributing to the improvement of high pressure gas safety through improving the management systems at relevant places of business, by utilizing the technological knowledge and system auditing know-how, which KHK had accumulated for years mainly through its inspection and accreditation services.

Presently, it enjoys a reputation as a fair, reliable certification body based on its abundance of auditing records not only in the area of high pressure gas but also across a broad range of industrial fields from electricity, chemistry, mechanics, construction, pharmacy and food to the service industry.

KHK offers a variety of support to make management systems useful for business, such as providing information related to the acquisition and maintenance of ISO certifications, holding explanatory meetings and training sessions in various different places in Japan to support the secretariat work of registered companies, and also providing learning programs that fully utilize the Internet.

Overseas activities

KHK actively surveys the systems, new technology trends and other matters related to high pressure gas safety in foreign countries, and utilizes this accumulated abundance of data for safety activities in Japan. In addition, the following overseas activities are also conducted:

1 Participation in preparation of international standards

Regarding the Technical Committees (TC) of the International Organization for Standardization (ISO), which create a diverse range of international standards in industrial fields, KHK contributes to the preparation of international standards as the Japanese Standardization Body for ISO/TC 11 (Boilers and pressure vessels), ISO/TC 58 (Gas cylinders) and ISO/TC 220 (Cryogenic vessels) that administrates high pressure gas devices. In ISO/TC 11 of the above, KHK played the central role in the preparation of international standards by undertaking the international secretariat tasks of the standard preparation work group and dispatching a convener from Japan to lead the coordination between countries. In addition, it also participates in and contributes to the ASME standards development committee and other organizations in a position to integrate the opinions of pressure vessel manufacturers and scholars in Japan.

2 Offering information internationally

KHK communicates with high pressure gas-related agencies overseas and conducts a wide range of activities for the purpose of improving the level of safety of both parties, by sharing information with regard to accidents, problems to be solved, statutory amendments and other matters concerning high pressure gas safety. It also contributes to improving the global level of safety of high pressure gas by giving presentations at international conferences about the Japanese legal systems, research results and other related information that all contribute to the low incidence of high pressure gas accidents in Japan.

Moreover, the Overseas Consultation Desk has been set up to give advice in relation to high pressure gas safety in Japan and to assist in technical exchanges. The Desk has so far provided useful information, including information on related statutory and inspection procedures for exporting equipment to Japan, in response to many enquiries from abroad. The business reports of KHK as well as the annual accident reports are also disclosed on the web site.

Access to the offices

Headquarters

Hulic Kamiyacho Building, 3-13, Toranomon 4-Chome,Minato-Ku, Tokyo 105-8447, Japan
Tel: +81-3-3436-6100 Fax: +81-3-3436-5704 http://www.khk.or.jp

General Planning Dept.

Tel +81-3-3436-1704
Fax +81-3-3436-5704
E-Mail gp@khk.or.jp

General Affairs Dept.

Tel +81-3-3436-6100
Fax +81-3-3436-5704
E-Mail aff@khk.or.jp

Information &International Affairs Dept.

Tel +81-3-3436-6101
Fax +81-3-3438-4163
E-Mail oversea@khk.or.jp

High-Pressure Gas Safety Dept.

Tel +81-3-3436-6103
Fax +81-3-3438-4163
E-Mail hpg@khk.or.jp

LPG Industrial & Consumer Safety Dept.

Tel +81-3-3436-6108
Fax +81-3-3438-4163
E-Mail lpg@khk.or.jp

Inspection & Certification Dept.

Tel +81-3-3436-6104
Fax +81-3-3436-0688
E-Mail insp@khk.or.jp

Education & Publication Dept.

Tel +81-3-3436-6102
Fax +81-3-3459-6613
E-Mail edu@khk.or.jp

Examination Center

Tel +81-3-3436-6106
Fax +81-3-3436-5746
E-Mail exam@khk.or.jp

ISO Registration Center (KHK-ISO Center)

Tel +81-3-5405-1160
Fax +81-3-5405-4890
E-Mail qa@khk.or.jp

Research & Development Center

Tel +81-42-793-1033
Fax +81-42-792-7058
E-Mail rdc@khk.or.jp

LPG Equipment Certification Office

Tel +81-42-793-6133
Fax +81-42-793-6144
E-Mail lpgec@khk.or.jp