

# STRATEGIC BUSINESS PLAN

## ISO/TC 220 “Cryogenic vessels”

### EXECUTIVE SUMMARY

This document gives background and strategic information to the worldwide cryogenic vessel industry along with detailed information on the related ISO activities and standards published.

ISO/TC 220 was formed in 1999. Since its inception, ISO/TC 220 elaborates a package of International Standards in the field of insulated pressure vessels (vacuum or not vacuum) for the storage and the transport of refrigerated gases including the design of the pressure vessels and their safety accessories, the gas/material compatibility, the insulation performance, the operational requirements of the equipment and accessories.

Over the years, ISO/TC 220 reviewed and updated existing standards.

#### **Business environment**

Regarding the cryogenic pressure vessels, the main manufacturers and users of insulated (vacuum or non-vacuum) pressure vessels for the transport or the storage of refrigerated gases are located in Europe, North America, Asia and Australia.

The parties involved are:

- Manufacturers of cryogenic pressure vessels, actuators and safety devices against excessive pressure
- End-users and gas industries.

#### **Benefits**

ISO/TC 220 was created in 1999 to elaborate a package of International Standards describing the design, fabrication and inspection of static or transportable insulated pressure vessels (vacuum or non-vacuum), the operational requirements relevant to these pressure vessels and the specifications on their equipment. The safety was the main objective of this ISO/TC 220 and consequently standards on compatibility of gases with materials, cleanliness and safety accessories were drafted.

Since its inception more than 20 standards were published.

#### **Priorities**

The priorities have been:

- To develop International product standards;
- To develop standardized methods for the cryogenic pressure vessels design, the operational requirements and the specifications on their equipment.

## 1. INTRODUCTION

### 1.1 ISO technical committees and business planning

The extension of formal business planning to ISO Technical Committees (ISO/TCs) is an important measure which forms part of a major review of business. The aim is to align the ISO work programme with expressed business environment needs and trends and to allow ISO/TCs to prioritize among different projects, to identify the benefits expected from the availability of International Standards, and to ensure adequate resources for projects throughout their development.

### 1.2 International standardization and the role of ISO

The foremost aim of international standardization is to facilitate the exchange of goods and services through the elimination of technical barriers to trade.

Three bodies are responsible for the planning, development and adoption of International Standards: [ISO](#) (International Organization for Standardization) is responsible for all sectors excluding Electrotechnical, which is the responsibility of [IEC](#) (International Electrotechnical Committee), and most of the Telecommunications Technologies, which are largely the responsibility of [ITU](#) (International Telecommunication Union).

ISO is a legal association, the members of which are the National Standards Bodies (NSBs) of some 140 countries (organizations representing social and economic interests at the international level), supported by a Central Secretariat based in Geneva, Switzerland.

The principal deliverable of ISO is the [International Standard](#).

An International Standard embodies the essential principles of global openness and transparency, consensus and technical coherence. These are safeguarded through its development in an ISO Technical Committee (ISO/TC), representative of all interested parties, supported by a public comment phase (the ISO Technical Enquiry). ISO and its [Technical Committees](#) are also able to offer the ISO Technical Specification (ISO/TS), the ISO Public Available Specification (ISO/PAS) and the ISO Technical Report (ISO/TR) as solutions to market needs. These ISO products represent lower levels of consensus and have therefore not the same status as an International Standard.

ISO offers also the International Workshop Agreement (IWA) as a deliverable which aims to bridge the gap between the activities of consortia and the formal process of standardization represented by ISO and its national members. An important distinction is that the IWA is developed by ISO workshops and fora, comprising only participants with direct interest, and so it is not accorded the status of an International Standard.

## 2. BUSINESS ENVIRONMENT OF THE ISO/TC

The following political, economic, technical, regulatory, legal and social dynamics describe the business environment of the industry sector, products, materials, disciplines or practices related to the scope of this ISO/TC, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards:

The objective of ISO/TC 220 is the standardization in the field of insulated pressure vessels (vacuum or not vacuum) for the storage and the transport of refrigerated liquefied gases, as defined in class 2 of "Recommendations on the Transport of Dangerous Goods – Model Regulations", in particular concerning the design of the pressure vessels and their safety accessories, the gas/materials compatibility, the insulation performance, the operational requirements of the equipment and accessories.

Cryogenics gases and liquids are used in the following sectors: medical, public, food, industry and transport. Main gases are: Nitrogen, Carbon dioxide, Oxygen, Helium, Argon, Hydrogen, Methan and Natural gas. Protecting, carrying organic produce, preserve samples, storing and transporting cryogenic fluids are the main activity of normalization of ISO/TC 220 "Cryogenic vessels". Indeed, cryogenics vessels involved at all levels of this kind of industry.

The cryogenic sector is present in Oceania, North America, Europe and Asia. America and Asia refer to the building code of ASME (American code) but not exclusively. It's easier to find, in these regions, all the components following the American standards. Otherwise, Europe and Oceania use ISO standards and European standards.

ISO/TC 220 involves to product more efficient standards to harmonise (go in the same way) the built and work about cryogenic pressure vessels in the world.

Categories of relevant stakeholders that could be impacted by ISO/TC 220 are as follow:

- manufacturers
- gas companies
- laboratory and test houses
- suppliers
- fuel suppliers
- consumer associations, etc.

The regulation is first international: RID/ADR. The international regulations became European Regulations with PED (Pressure Equipment Directive) and TPED (Transportable Pressure Equipment Directive). These directives are "new approach" directives.

Furthermore, the Transportable Pressure Equipment Directive allows the free circulation and use of pressure vessels covered by RID/ADR.

Nearly all the standards of ISO/TC 220 on transportable cryogenic pressure vessels are candidate to be referred to by RID/ADR and by the UN Recommendations on the Transport of Dangerous Goods, Model Regulations.

The concern which might arise is the conformity assessment

Hence it is essential to ensure this is provided for so that the reliability, safety and equity are ensured. As the risk of the pressure vessels increases (i.e. with increased pressure, volume etc.), the level of conformity assessment should increase. The PED does this well but an international clause is required. For supply to most of the large users of this equipment, this is adequately covered but there is the concern that less experienced purchasers may save initially by reducing conformity assessment. This is primarily a matter for the purchasers – at all levels.

With this resolved (also by other ISO work) there should be maximum economy and safety with this equipment and the elimination of most technical barriers to trade.

### 3. BENEFITS EXPECTED FROM THE WORK OF THE ISO/TC 220

- An estimate of the worldwide cost savings resulting from the issue of a high class of ISO standards on this subject is above 2% of the total capital cost of new pressure vessels.
- Standardization within ISO/TC 220 is to allow cryogenic pressure vessels manufacturers and users to meet in a well-known structure, to write together standards which are used by all.
- The last benefit is that International Standards removed the technical barriers, decrease the cost of designing, manufacturing, inspecting and testing the cryogenic pressure vessels and their accessories. It also emphasizes the production in series with "type pressure vessels" for small cryogenic pressure vessels. 20 standards have been published

### 4. REPRESENTATION AND PARTICIPATION IN THE ISO/TC

#### 4.1 Membership

#### Countries/ISO member bodies that are P and O members of the ISO committee

#### 4.2 Analysis of the participation

Since a long time, the participation is well balanced between the different regions of the world concerned by the standardization of cryogenic pressure vessels.

ISO/TC 220 notes a decrease of participation probably due to the lack of or inactivity of a national standards committee or the failure of national standards organizations to make the appropriate industries aware of the ISO standards activity.

## 5. OBJECTIVES OF THE ISO/TC AND STRATEGIES FOR THEIR ACHIEVEMENT

### 5.1 *Defined objectives of the ISO/TC*

Technical Committee ISO/TC 220 elaborates a package of International Standards in the field of insulated pressure vessels (vacuum or non-vacuum) for the storage and the transport of refrigerated gases including the design of the pressure vessels and their safety accessories, the gas/material compatibility, the insulation performance, the operational requirements of the equipment and accessories.

It is expected that these International Standards support the UN regulations on the transport of dangerous goods on the use of cryogenic liquids as fuel. These International Standards should help remove technical barriers by providing the necessary requirements for the construction and use of such pressure vessels in International Standards.

ISO/TC 220 is responsible for establishing International standards for cryogenic pressure vessels according to the following principles:

- Standards shall meet market needs;
- Market prefers ISO global standards rather than national standards;
- ISO standard should not conflict with national and/or regional regulations;
- Standardization process shall be flexible but consistent.

The aim of the Technical Committee is also to increase the economic efficiency in the manufacture (by creating worldwide market) and use (by harmonization of good practices) to the benefit of manufacturers, users and society at large.

Currently, the objectives of ISO/TC 220 are the maintenance of published standards by updating functions technological developments.

### 5.2 *Identified strategies to achieve the ISO/TC's defined objectives*

Design philosophies differ between countries and these differences must be accommodated:

- the North American philosophy;
- the European philosophy.

The European harmonization regulated by:

- the Pressure Equipment Directive for the stationary pressure vessels;
- the Transportable Pressure Equipment Directive for the transportable pressure vessels allowed to draft some European standards thanks to the work done by CEN/TC 268 whose Secretariat is AFNOR.

The publication of these European standards was the basis for the first International draftstandards.

In order to try to avoid diverging standards on the same subject, the application of the Vienna Agreement between ISO/TC 220 and CEN/TC 268 is considered on a case by case basis.

To improve the work in ISO/TC 220, liaisons are established with the following committees and organizations:

- ISO/TC 67/SC 9 "Production, transport and storage facilities for cryogenic liquefied gases";
- ISO/TC 197 "Hydrogen technologies";
- EIGA "European Industrial Gas Association";
- MEGA "Middle East Gases Association".

## 6. FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF THE ISO/TC WORK PROGRAMME

The reduction in participation by key member bodies is the most serious factor in maintaining the existing International Standards, or implementing procedures for revisions, or replacing old, but still valid, test methods with new methods using more modern technology.

This situation has arisen due to escalating costs, the general economic situation and the retirement of a number of key supporters in industry.

The technical committees are dependent on experts from industry for their continuing support. There appears to be ever increasing internal pressures on these experts by their own organizations. It also appears that many national standards organizations may not be reaching out to industry to ensure that the key people are aware of activity in international standardization.

It's proposed to elaborate direct contact with key industrial companies to make them aware of the activities of ISO/TC 220 and to renewal of participation through National Member Bodies. All member bodies (both "P" and "O") are registered with the website and have been invited to nominate individuals who could also have access to the site.

## 7. STRUCTURE, CURRENT PROJECTS AND PUBLICATIONS OF THE ISO/TC

This section gives an overview of the ISO/TC's structure, scope, projects and publications. All of this information is updated regularly and is available on ISO's website, ISO Online.

The link below is to the TC's page on ISO's website:

[ISO TC 220 on ISO Online](#)

Click on the tabs and links on this page to find the following information:

- About (Secretariat, Secretary, Chair, Date of creation, Scope, etc.)
- Contact details
- Structure (Subcommittees and working groups)
- Liaisons
- Meetings
- Tools
- Work programme (published standards and standards under development)

### Reference information

[Glossary of terms and abbreviations used in ISO/TC Business Plans](#)

[General information on the principles of ISO's technical work](#)