BUSINESS PLAN

ISO/TC 67

Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries
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The picture on the front page is based on a picture published by IOGP.
Executive summary

The ISO Technical Committee 67, "Materials, equipment and offshore structures for the petroleum, petrochemical and natural gas industries," has the responsibility of establishing standards for most capital equipment used in all streams of the oil business.

This equipment is the hardware portion used for exploration, production, transportation, and processing of liquid and gaseous hydrocarbons within the petroleum, petrochemical and natural gas industries, and refining of crude oil or natural gas products. The TC was reactivated in 1989, with the secretariat given to the American Petroleum Institute (API) through its affiliation with the American National Standards Institute (ANSI). In 2008, the secretariat changed and was transferred to the Dutch Standardization Organization (NEN). The progress of work has been steady in bringing to publication nearly 200 key standards for the industry.

The overall industry investment in materials and equipment is estimated to be around $200 billion U.S. dollars annually. Ideally, the provision of consensus standards eliminates duplicative work by all interested parties. The need for regional, national or company specifications is reduced, manufacturing and inventory costs are minimized, and regulatory authorities are able to incorporate these standards by reference rather than by restating requirements in regulations. Multiple grades or ratings are incorporated in most standards and the use of a particular grade is an agreement between supplier and user. The adoption of standards is entirely voluntary, but companies estimate savings in the millions (U.S. dollars) through having a common set of agreed standards.

This business plan is meant for all those interested in the work of ISO/TC 67 and gives an overview of the work being carried out. In order to keep this business plan readable, links are included that lead to more detailed information.
1 Introduction

1.1 ISO technical committees and business planning

Formal business planning to ISO Technical Committees (ISO/TCs) is an important measure that aims to align the ISO work programme with expressed business environment needs and trends and to allow ISO/TCs to prioritize 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 160 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 three principles are safeguarded through the development in an ISO Technical Committee (ISO/TC), representative of all interested parties, supported by a public comment phase (the ISO Technical Enquiry; Draft International Standards).

Besides full International Standards, 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

2.1 Scope

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 ISO/TC 67, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards:

The petroleum, petrochemical and natural gas industry is a major industry in most countries' economies. It is one of the major suppliers of energy for the entire world. The industry is involved in the Gross National Product as production/supply or in usage, or both. Petroleum and natural gas provide fuel for heating, lighting, transportation, and mechanization of most of the world. Petrochemical products provide everything from fabrics, plastic, and tyres, to soft drink/water bottles, lubricants, fertilizers, and medicines. The constancy of supply is integral to the functioning of the world economy, and equipment standardized by ISO/TC67 is necessary to assure that supply.

This committee is responsible for standardization of the materials, equipment and offshore structures used in the drilling, production, transport by pipelines and processing of liquid and gaseous hydrocarbons within the petroleum, petrochemical and natural gas industries.

This technical committee does not set standards for the end product, oil or natural gas, or define its composition, volume or properties. The committee sets standards for only those items that are in regular commerce, that are easily attainable and utilized by a broad spectrum of customers. The TC does not set specifications for patented items, or specialty ones that have been manufactured for unique situations. The TC is always looking at new items that have become accepted but are not "serial number one."

2.2 Description of the Business Environment

Multiple interested parties work in or influence the petroleum, petrochemical and natural gas industry. As previously stated, it is a very visible business sector in the international marketplace and necessary for continuation of economies. It is a closely observed industry from the financial community and by the public in general.

Petroleum, petrochemical and natural gas operating companies (referred to as operators throughout this business plan) with their stockholders; governments; public interest groups; investing and lending institutions, employees, suppliers and contractors, media, consumers and local communities are stakeholders in the process. Each stakeholder expects a readily available product, delivered when and where it is needed, minimal cost associated with the product, and the whole delivery done with no accidents or injuries. Each group exerts economic, societal, and technical constraints on the ability to find and develop petroleum and natural gas resources.

Generally, the "industry" includes operators, manufacturers, regulatory organizations, trade associations and academics. The personnel pool is diverse in knowledge and experience, but all seek a usable end product. The equipment and materials must all be designed to provide assurance that designs have been
completed with safety of supply factors in mind. If any individual stakeholder interprets an action as not addressing a concern, activity may be adversely influenced or halted. The operator is seen as the user of these materials and equipment, and therefore, closely scrutinized as to compliance and intent.

By defining the basic requirements via standardization, the operator, manufacturer and/or service supply and regulators benefit. Interchangeability of equipment parts is a requisite for equipment which is moved into and out of areas frequently. This equipment must be fit for purpose and easily obtained. Operators see international standards as a way to gain the ability to purchase and use equivalent parts worldwide. Standards, thereby, reduce the number of internal company specifications that must be written and maintained to assure equipment and materials comply with company needs. Manufacturers and service-supply companies find that standards clearly define product specifications and they can economically produce equipment for the entire industry, thereby, reducing their manufacturing costs and subsequent inventory costs.

The discovery, recovery, transportation and refining are constantly evolving technologies and technology is a major driver in the industry. Cheap and easily obtained sources of petroleum and natural gas have been found and produced. Therefore, exploration and production is becoming more difficult and being forced to take place in more inhospitable areas, remote locations, and to smaller, lower quality reservoirs. The capabilities of the materials and equipment must meet these challenges.

Technological developments by service/suppliers and operators have allowed extending the operating areas to deeper water, arctic areas, and very remote locations with no road access or local political infrastructure. The operator and service companies must protect the worker, well products, indigenous population and wildlife and maintain a pristine environment. These remote, difficult areas mean that the costs for equipment, materials, transport and personnel are escalating.

Non-traditional sources of petroleum and natural gas are also being explored through shale oil, tar sands, coal gas and natural gas hydrates, each requiring new technical applications to economically produce and refine these products. Newer ways of handling current products, through extended-reach drilling and shipment as liquefied natural gas (LNG), also require technical augmentation. The demands on equipment must be mitigated with improvements or new technology.

Standards must address health, safety and environmental precautions which satisfy companies using them, the regulatory agencies, communities in which operations are done, public-interest groups and the public at large. The inclusion of HSE into standards protects workers, population in general, and the environment in which the operations are taking place. Regulators see international standards as a way to ensure the sustainable development of their countries' natural resources, while protecting workers' health and safety, and the environment. In the past national or industry standard, such as BSI, Norsok, and API, have been used extensively but not always applied internationally. Most market participants agree that one set of international standards is the only means to true standardization.
2.3 Quantitative Indicators of the Business Environment

The petroleum, petrochemical and natural gas industry is an extremely complex and interrelated one, in which countries produce, import, and export, both petroleum and natural gas, and are interdependent markets of crude product and equipment to support the industry. Most countries of the world are involved in the petroleum industry, either as exporters or importers as petroleum and/or natural gas fuel their economy. In some countries, over 50% of the entire economy is centered on this industry. The supply of petroleum and natural gas is directly tied to the industrialization of an economy, and this drives the demand and production for final commodities – petrol, kerosene, jet fuel, electricity, and heating fuels.

Several factors can be examined for a picture of the business environment
- reserves (amount of discovered petroleum and natural gas),
- proven reserves (reserves confirmed by actual production),
- production (amount taken from the ground),
- drilling rig count (activity needs to provide extraction means),
- refining volumes (amount processed),
- price per unit volume, and
- consumption (indicates needs and potential shortfalls).

These factors define the business but not the actual utilization of the standards written in ISO/TC 67. When viewed as a whole, the need for petroleum and natural gas is globally increasing as advanced economies continue nominal growth and developing/transition economies still escalate exponentially. The upward trends in these economic indicators are a view of the health and continued viability of this industry segment.

Nevertheless, the global economic crisis has also touched the oil- and gas sector, most recently resulting in a strong decrease in price per barrel crude oil to 50% of the year before. The consequences for the industry are not yet to oversee and will strongly depend on the development of the price on short- and long term.

The economic strength of a region's upstream and downstream segments usually influences the amount a company is willing to spend in that area. The economic strength is indicated by finding costs, lifting costs, production costs and refining costs, as well as the regulatory constraints of business. Materials and equipment used for the petroleum, petrochemical and natural gas industries is a multi-billion US dollar investment annually. Selecting a favorable production area requires multi-disciplines within an operator company.

Estimating the number of companies in the petroleum, petrochemical and natural gas industries is not an easy task. According to sources, there were 16 companies in 2014 with a revenue of more that 100 Billion US dollars, meaning that the oil and gas industry is one of the worlds major industries (https://en.wikipedia.org/wiki/List_of_largest_oil_and_gas_companies_by_revenue). The next tier of majors has about thirty or more companies, many being publicly traded and several being national companies. These publicly owned companies are joined by national oil and gas companies which are held within their national economy. These are "fully integrated" companies with upstream, downstream and retail business. The number of "independents" includes those providing in one or more segments but not all. The independent number escalates dramatically, and is impossible to track. Independents includes small operators to "mom and pop" one well operations. These are the companies which lease the operating areas and own the production from it. Majors, national companies and some independents are also owners and operators of refineries, pipelines, transportation equipment, and retail outlets (service stations). The petrochemical portion of ISO/TC 67
standards usually involves plants co-located with refineries and the common equipment used for processing products.

The community of **drilling contractors** own and manage the drilling rigs, equipment and field equipment. The International Association of Drilling Contractors is a liaison member of ISO/TC 67, and currently has a worldwide membership over 250. About 25 of this membership is considered major consumers of the materials and equipment produced under the standards of ISO/TC 67.

Supporting the operators and drilling contractors with equipment, maintenance, application and material directly are the **service companies**. These companies could be manufacturers or resellers. The service sector is dominated by a few worldwide companies and a myriad of smaller companies. Depending on the equipment, these companies may supply one or more products, and can be regional or international in market.

The **manufacturing segment** provides the basic equipment and materials, and may or may not also be service companies. These are dispersed worldwide and could be major or minor players. A manufacturer wishing to enter the petroleum and natural gas industry should rely heavily on the ISO standards set by this committee, as a means to expedite entry and acceptance into the market. All standards are written so that performance rather than physical characteristics are standardized.

The **regulatory agencies** and authorities are also involved in the petroleum, petrochemical and natural gas industries. These national bodies provide oversight to operations – upstream, downstream, retail, pipelines, etc. – and the implementation rules which carry out the legislators intended directives. Many regulatory agencies are also responsible for leasing or sale of property on which the industry can function.

A benchmark, carried out by IOGP in 2015 shows that compared with a benchmark carried out in 2008, international standards get more and more widely accepted ([http://www.iogp.org/pubs/500.pdf](http://www.iogp.org/pubs/500.pdf)).

### 3 Benefits expected from the work of the ISO/TC

ISO/TC 67 is a market-driven technical committee addressing needs of the manufacturers and purchasers of oil field, transfer pipelines and refining equipment. The operators have clearly shown that participation in the writing of ISO standards will reduce the need for national/regional, internal, company specification, facilitate transfer and application of equipment worldwide, reduce barriers to trade across country boundaries, and allow the purchase of compatible equipment from multiple suppliers.

Manufacturers use standards to outline basic requirements, and then allow for innovation and expansion of basic concepts. This innovation is a major driver for the manufacture of more complex, technologically advanced products and allows the manufacturer to differentiate his products and company. The differentiation is a marketing advantage to manufacturers and suppliers, and encourages their participation in standardization.

The regulatory community is charged by their country legislators and authorities to provide a market which leads to development of natural resources, employment of the population, and provides a safe, environmentally protected workplace. A regulator finds that participation in the standard writing process covers the requirements of his mandate and incorporates his national ideas. All parties find it a benefit to work within a common system of standards preparation.

The goal of ISO/TC 67 is the coordination of technical input from all interest parties, with no
consideration of national or regional origin, or employer. Regional standards and commonly available standards form the basis of all work, as the desired result is a standard that can be universally used.

The major benefit is a reduction in cost to all parties involved. Operators, drilling contractors, service/supply and manufacturers find that a common set of engineering practices reduces the number and volume of individual specifications needed. Manufacturing (materials, retooling and set-up) costs are reduced which benefits both the end users and manufacturers. Inventory cost for all concerned is significantly reduced.

Regulatory agencies find that the incorporation of standards reduce their work involved in rewriting and maintaining their own set of identical specifications.

The application of international standards allows free trade in countries that are in or wish to enter the industry. When clearly stated and meticulously followed, a small manufacturer anywhere can enter the international market. A country can build its internal industry and still meet the market needs while ensuring health, safety and environmental agreements.

4 Representation and participation in the ISO/TC

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

In January 2015 the members are:

**P Members – 32**
Argentina, Bahrain, Belgium, Brazil, Canada, China, Denmark, Finland, France, Germany, Indonesia, Iran, Italy, Japan, Kazakhstan, Republic of Korea, Kuwait, Mexico, Netherlands (S), Norway, Portugal, Qatar, Romania, Russian Federation, Saudi Arabia, Spain, Sweden, Thailand, Ukraine, United Arab Emirates, United Kingdom, United States.

**O Members – 34**
Armenia, Australia, Austria, Azerbaijan, Bulgaria, Colombia, Croatia, Cuba, Cyprus, Czech Republic, Ecuador, Egypt, Gabon, Hong Kong, Hungary, India, Ireland, Libya, Malaysia, Republic of Moldova, Mongolia, Myanmar, Nigeria, Oman, Poland, Serbia, Singapore, Slovakia, South Africa, Switzerland, Trinidad and Tobago, Turkey, Viet Nam, Yemen.
Beside the P- and O-membership, ISO/TC 67 has several liaisons with technical committee’s (those are not listed here) and other organizations.

Cat. A Liaison members

OGP: International Association of Oil and Gas Producers
IADC: International Association of Drilling Contractors
WMO: World Meteorological Organization
NGV Global: Natural Gas Vehicle Knowledge Base (formerly known as The International Association for Natural Gas Vehicles – IANGV)

Cat. B Liaison members

WCO: World Customs Organization

4.2 Analysis of the participation

ISO/TC 67 has thirty-two participating "P" member countries and thirty-four observing "O" member countries. The TC has established four "A" status liaisons with The World Meteorological Organization, International Association of Drilling Contractors (IADC), The International Association for Natural Gas Vehicles (NGV Global) and International Association of Oil and Gas Producers (IOGP). The TC and SCs have numerous liaisons with other ISO and IEC technical committees and subcommittees. At present, ISO/TC 67 has signed a Memorandum of Understanding with ISO/TC 8 (Ships and marine technology) which delineates the responsibilities of each committee, and pledges reciprocal support of the two technical programmes.
5 Objectives of the ISO/TC and strategies for their achievement

5.1 Defined objectives of the ISO/TC

The ISO/TC 67 has one stated mission

Global standards used locally worldwide

The major objectives to which the TC operates are stated are in four encompassing goals:
1) prepare standards required by the petroleum, petrochemical and natural gas industries,
2) prepare standards that can be adopted worldwide by other standards organizations, such as CEN and ANSI,
3) publish standards that enable companies to minimize their specifications, and
4) deliver standards to the target dates set on the agreed work program.

The principal vision for the entire work programme and all participants is for global standards used locally worldwide. To ISO/TC67 this means a reduction in national standards, regional standards, industry standards and company standards by a coordinated market-driven standardization programme. Effectively, it is a cost savings for all operating in the international marketplace.

The work programme is managed within the various subcommittees and working groups. These are the technical experts who can readily identify needs for standards created by new technology or by gaps in existing standards. All new work items for existing standards are balloted by the P-members of the subcommittee or, in the case of a working group reporting to the technical committee, by the P-members of the TC. If a new technology is introduced which would result in a totally new standards, the TC members will ballot that.

5.2 Identified strategies to achieve the ISO/TC’s defined objectives

ISO/TC 67 has very specific work objectives and employ all methods available to achieve results. It has established a Management Committee that is responsible for assisting subcommittee chairs and work group convenors in obtaining resources.

The Management Committee meets once a year and has web based conferences every 2 months. It has been established for assistance, support, and explanation of ISO standardization process and the deadlines necessary for compliance with TMB rulings. At the end of each year, the management committee assesses the performance toward goals and deadlines created by the SC/WG chairs. With these internal performance indicators, it is possible to measure the overall progress of the TC.

Following the annual plenary meeting, the MC thoroughly reviews the work programme as presented by the SC/WG chairs/convenors. The SC/WG reports are collated into an annual Management Plan of target dates, project leaders, and other pertinent information (the so called hitlist). The MC reviews the progress of standards on publication track, identify problem areas, and seek resources to solve the problems.

Each subcommittee sets priorities based on the balloted market need, technical writers offered, and resources/time needed to complete. ISO/TC 67 will set standards for materials and equipment that is commonly used, and widely available. The test for widely available and needed is by the voting process.
Projects with technologies used by multiple industries are worked in joint working groups with other ISO technical committees. These are predominantly in subcommittee 6 which covers refineries, and the associated pumps, compressors, gears, and HVAC systems. The remaining SCs cover very specialized equipment which necessitates oil and gas industry standards. Liaisons are established with many TCs who contribute to the effort of the standards creation.

All technical work of ISO/TC 67 is done at the project level which may be an assigned task from a subcommittee or the technical committee. The project leader determines how the work will be conducted, but most projects are a mix of meetings, teleconferences, and e-mail. Meetings are held with sufficient advance notice to participants and are usually scheduled to coincide with other activity to minimize travel/expenses. Many of the documents are of such size that they will not transit company protective firewalls, so with increasing frequency these documents are being placed in a web site holding box so that an author can withdraw it, make modifications, and replace it. In this manner, all corrections are incorporated and current.

ISO/TC 67 is currently striving to use the same definitions for terms and has compiled the definitions from each standard currently available. Project leaders are encouraged to use these definitions rather than create new and somewhat similar ones.

Each subcommittee meets once or twice a year, but always in the late-April to June time period. These two months of meetings allow the subcommittees to finalize their work programme in preparation for the technical committee annual plenary meeting. The plenary meeting is held in September or very early October, the time depending on the hosting organization.

5.3 Trade sanctions

Since For some years, the industries are have been affected impacted by trade sanctions.

Although ISO states that participation in standardization is not affected by sanction regulation, experts from the United States and Europe have sought clarity from their national governments and are becoming less able to participate. In order to help the work being able to continue, IOGP has offered to take some of the work under their umbrella, making it possible to discuss standards without loosing the ‘all parties concerned’ principle.

Although it is of course important that the work can continue, in general all efforts of the ISO/TC 67 leadership are directed to solving the issue in general and being able to have the ‘normal’ ISO process.

6 Factors affecting completion and implementation of the ISO/TC work programme

ISO/TC 67 has very capable and dedicated technical persons working on the standards projects. The technical experts are employed in all areas of the industry and at present, number over 1000 people involved in the standardization process. These people are employed by operators, service/supply, manufacturers, academia, consultants and government. They are recognized experts in their technical field and represent worldwide concerns for standards. Because of their knowledge and expertise, they are usually fully engaged in employing, not writing, standards. The allocation of time to standards writing is a major resource constraint to getting their employers’ projects completed. Where applicable, most standards work is conducted via net meetings, emails,
and web drop boxes to expedite the writing and review process.

Implementation is progressing well. The Committee on European Normalisation (CEN) Technical Committee 12 mirrors the work of ISO/TC 67, and by agreement, allows ISO/TC 67 be the lead organisation.

Once a standard is introduced as a new work item in ISO, the CEN committee incorporates it onto its work programme. Approval in ISO usually results in approval within CEN.

7 Structure, current projects and publications of ISO/TC 67

This section gives an overview of the ISO/TC’s structure, scopes of the ISO/TC and any existing subcommittees and information on existing and planned standardization projects, publication of the ISO/TC and its subcommittees.

7.1 Structure of the ISO committee

ISO/TC 67 has been structured with subcommittees and working groups reporting to the TC. The working groups (WGs) have narrowly defined subject matter and a very small community of knowledgeable experts. The subcommittees (SCs) are much broader in scope, have multi-subject projects and many more participants. All subcommittees have working groups as part of the division of subject matter. A subcommittee may have from three to ten working groups, and these working groups usually have several projects. The programme is constantly evaluated by the SCs/WGs for projects that should be added or deleted.

The simplest view of the structure is a diagram of the working relationships of the TC. The national flags indicate the country holding the secretariat to each of the working groups and subcommittees.
7.2 **Current projects of the ISO technical committee and its subcommittees**

The current projects within ISO/TC 67 can be found on the ISO website that is kept up-to-date on daily bases.

7.3 **Publications of the ISO technical committee and its subcommittees**

Below table and figure give some numbers on the portfolio and publications of ISO/TC 67 till August 2015.

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ISO/TC 67 Target for publication

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Table 1 Facts and figures (1)

![Bar chart showing number of published standards from 1994 to 2015](chart.png)

Figure 3 Facts and figures (2) – number of published standards

### 7.4 General information on the principles of ISO’s technical work

General information on the principles of ISO’s technical work can be found on [www.iso.org](http://www.iso.org) and about the rules of standards development on:

[http://www.iso.org/iso/standards_development/processes_and_procedures/iso_iec_directives_and_iso_supplement.htm](http://www.iso.org/iso/standards_development/processes_and_procedures/iso_iec_directives_and_iso_supplement.htm)

Terms and abbreviations used in this business plan can be found on: