



STRATEGIC BUSINESS PLAN – ISO/TC 25

Executive summary

The scope of ISO/TC 25 is the standardization of cast iron alloys, pig irons, test methods, and designations. The objective of ISO/TC 25 is to facilitate the timely development and maintenance of quality, market relevant, material test methods and standards for the global casting industry.

Cast irons and pig irons are important, strategic and versatile materials in the global economy. From automotive, through machine tools to steelmaking, the family of cast irons and pig irons provide designers, engineers, manufacturers, legislators and consumers with products that contribute to economic growth, sustainability of the environment (cast iron is 100% recyclable and is made from steel scrap as the principle raw material) and a higher standard of living worldwide. Cast irons have good inherent strength and machinability, important features that are exploited in a wide range of industry applications, and are an important contributor to the circular economy.

The need for a common terminology, measurement techniques and material descriptors increases as globalisation and international trade expands. In 2018 there were 19,560 iron foundries spread across 37 major countries on four different continents, as reported by the December 2019 issue of Modern Castings Magazine. The countries with the greatest production of iron castings in 2018 in order of decreasing tonnages were China, India, the USA, Germany Japan and Russia.

Through 2018, the world cast iron foundry sector produced 80 million metric tonnes of castings and overall the trend for casting production in recent years has been positive with global growth. The number of foundries has reduced while global casting production has increased which indicates that metal casting businesses are continuing to consolidate and become more efficient.

The current committee structure is given below:

| | | |
|-----------------|-------------------------------------|---------------------|
| ISO/TC 25 | Cast irons and pig irons | |
| ISO/TC 25/WG 16 | Materials and properties for design | Established 2018-09 |

Previous working groups, now disbanded, are listed below:

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|-----------------|--|----------------------|
| ISO/TC 25/WG 1 | Advisory group of INSM | Disbanded |
| ISO/TC 25/WG 2 | Microstructure of graphite in cast irons | Disbanded 2019-12 |
| ISO/TC 25/WG 3 | Microstructure of graphite | Disbanded 2019-12 |
| ISO/TC 25/WG 4 | Casting design and welding of cast irons | Disbanded 2014-10-10 |
| ISO/TC 25/WG 5 | Classification: Malleable cast irons | Disbanded 2014-10-10 |
| ISO/TC 25/WG 6 | Classification: Spheroidal graphite cast irons | Disbanded 2019-12 |
| ISO/TC 25/WG 7 | Classification: Ausferritic cast irons | Disbanded 2020-11 |
| ISO/TC 25/WG 8 | Classification: SiMo cast irons | Disbanded 2014-10-10 |
| ISO/TC 25/WG 9 | Classification: Grey cast irons | Disbanded 2019-09 |
| ISO/TC 25/WG 10 | Classification: Compacted graphite cast irons | Disbanded 2017-11-15 |
| ISO/TC 25/WG 11 | Classification: Pig irons | Disbanded 2012-10-09 |
| ISO/TC 25/WG 12 | Classification: Abrasion resistant cast irons | Disbanded 2012-10-09 |
| ISO/TC 25/WG 13 | Classification: Austenitic cast irons | Disbanded 2017-01-16 |

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|-----------------|-----------------------------------|----------------------|
| ISO/TC 25/WG 14 | Designation system for cast irons | Disbanded 2012-10-09 |
| ISO/TC 25/WG 15 | Casting imperfections | Disbanded 2014-10-10 |
| ISO/TC 25/TG 1 | Units and dimensions | Disbanded |

As appropriate, liaison activities exist with other standards development committees and organizations to help facilitate the efficient and effective development of globally relevant standards, in particular liaisons exist with CEN/TC 190 and the World Foundry Organisation.

The TC holds annual meetings, normally in October, supported by its industry and in a member body country, at which time all or some of the WGs and the ad-hoc groups meet as appropriate to their individual work programmes. ISO/TC 25 is committed to the efficient use of state-of-the-art electronic communication tools and pioneered the original Livelink pilot scheme when it was first introduced.

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 164 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

2.1 Description of the Business Environment

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 market for cast irons (and pig irons) underpins virtually all manufacturing activity. It also impinges upon environmental, social, leisure, entertainment, strategic and communications activity across the globe.

The production of cast irons (and pig irons) is considered to be a primary manufacturing process in that it provides the raw material and semi-processed components for many of the manufacturing world's industry sectors. The total market consists of, but is by no means restricted to, the following industry sectors:

- Agriculture and horticulture, including irrigation
- Automotive (cars, commercial and off-road)
- Civil engineering, construction and architecture
- Domestic appliances and ornamental electrical engineering
- Energy industry and gas engineering including renewables and nuclear
- Machine tools and marine engineering
- Mining (underground and open cast), oil exploration and exploitation
- Power generation using all primary fuel families and petrochemicals
- Process plant and chemicals industry
- Pumps, valves and pipes in the water and waste water industry
- Railways and
- Steelmaking

The production of castings in cast iron grades is endemic to most of the world's developed nations. The increasing custom of adding value by machining or carrying out sub or full assembly, as well as finishing processes such as painting or coating, is a growing phenomenon in the highly industrially developed nations.

Certain industry sectors and countries dominate the market both in terms of volume of production and also in relation to the specific type of cast iron material that it is produced. For example, spheroidal graphite cast iron (SG) is widely used in the water, gas and oil industries for the transportation of those media and in the motor industry due its high strength. Consequently, the volume of SG produced is high compared to other cast irons and this production tends to be concentrated in France, Germany, USA, South Africa, Korea and Japan.

Significant markets in countries such as China, India and Brazil emphasise the global scale of the cast iron industry.

The specifying of more highly alloyed cast irons to satisfy market demands has led to the development of a range of additional grades including spheroidal, austenitic, wear resistant, compacted graphite, ausferrite, as well as the more traditional malleable and grey iron grades. The publication of a series of European Standards during the late 1990s in some of these fields prompted the global producers to react to the situation with pressure on the ISO/TC 25 Secretariat. A programme of work was implemented to cover these additional materials / grades. Additionally, the work programme of ISO/TC 25 has prompted further activities at the European level in the field of standardisation and revision of existing European Standards. A new International Standard for compacted graphite cast iron has also been introduced.

The designation of cast irons and pig irons has become an important requirement of contractual arrangements between producers and customers. This demand led to the publication of ISO/TR 15931, *Designation system for cast irons and pig irons*, in August 2004.

The now almost universal use of third-party certification schemes and the wide utilization of ISO 9000 series is often now also used as a means of ensuring quality of process.

A lack of knowledge and understanding of the range of cast irons as a design material for a wide range of applications, led to the need to develop documentation that gives a full treatise on the various cast irons that can provide design engineers with useful facts about the suitability of cast irons for particular applications. An International Technical Report was commenced in 2005 and the document published in the latter part of 2009, ISO/TR 10809-1:2009 Cast irons — Part 1: Materials and properties for design. The second part of the Technical Report, the scope of which covers the welding of cast irons was published in 2011, ISO/TR 10809-2:2011 Cast irons — Part 2: Welding. A revision of Part 1 is now considered necessary and is currently underway to ensure it includes the full range of the cast irons.

Developments in technology in the assessment of micro-structure and the increase in types and designations of cast irons has led to the need to bring the standard covering microstructure of cast irons up to date. A working group of the TC was created to process this work. Revision of the present ISO 945 has led to the conclusion that the standard needed to be divided into at least two parts. The first part of the revision has now been published as EN ISO 945-1; the standard was progressed as an EN ISO standard under the UAP procedure with ISO/TC 25 taking the lead. The Standard was published in late 2008 and a revised version published in 2019. Work commenced on the development of a Technical Report which details the image analysis of graphite as a technological development from ISO 945-1. This Technical Report (ISO/TR 945-2) was published in 2011 and PD ISO/TR 945-3 on Matrix Structures was published in 2016. ISO/TR 945-4 covering a test method for evaluating nodularity in spheroidal graphite (or ductile cast) irons was published in 2019. Over time the Technical Reports may be published as full standards as knowledge in the field of image analysis improves.

Adoption of the ISO 9000 series across most of the global scene means that customers are paying much more attention to suppliers. Therefore, quality, reliability and delivery play as much importance as price. One of the responsibilities of ISO/TC 25 is to ensure that proper standard delivery conditions are attached to the provision of the product. ISO/TC 25 has reviewed the requirement for a new International standard covering delivery conditions and has, for the time being, decided not to proceed with a work item.

Publication of the ISO 14000 series of standards has produced a climate of environmental awareness in the manufacture of iron castings that has led to, or is leading to, a greater emphasis on the use of cleaner metal production methods. The totally recyclable nature of the raw materials used in the production of cast irons is also seen as a benefit to the circular economy, with foundries able to take scrap steel and recycle it into new components. Also some pig irons are produced using residual materials from the steel and iron industries, closing material cycles and saving natural resources such as iron ores.

It has long been recognized that cast iron materials are able to meet current national, European and International regulations in those areas where they play an active part such as: oil exploration, pumps and valves, pressure applications, compression strength (in tunnels), explosion protection and so on.

2.2 Quantitative Indicators of the Business Environment

The following list of quantitative indicators describes the business environment in order to provide adequate information to support actions of the ISO/TC:

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The major production of cast irons is in the field of SG and lamellar (grey) cast irons.

SG cast irons

Total tonnage 2018 (latest figures): approx 28000 tonnes, largest producers: China, USA, Japan, Germany and India.

Grey cast irons

Total tonnage 2018 (latest figures): approx 49500 tonnes, largest producers: China, India, USA, Germany, Russia, Japan and Turkey.

Cast iron production represented over 69% of the total cast metal production in 2018 at 78k Mt. By comparison the total tonnage of steel castings produced in the same year was 111.7 million metric tonnes and for aluminum castings the figure was 18.8Mt.

NOTE: Data is taken from Modern Castings Annual Census, published in Dec each year – so international statistics for cast iron production are normally available one to two years in arrears.

3 Benefits expected from the work of the ISO/TC

The regular review and approval/revision of the cast iron and pig iron international standards ensures that as new nations come into the arena there is a consistency of material standard that allows all the producers to compete on an equal footing.

The exploitation of technological changes by the industry and its customer industries ensures that ISO/TC 25 is always ready to react to the new industries and applications that emerge by the revision of and the writing of new international standards to cover these eventualities.

Iron is a common element in the world but when combined with other metals to form alloys, it becomes a valuable recyclable and permanent material because of the strategic importance of some of its alloying elements such as nickel, chromium and molybdenum and the less polluting qualities due to its ability as an infinitely recyclable metal. Ferrous casters take steel and pig irons as the raw materials to make new castings with reproducible properties. This is an up-cycling process and is material and resource efficient.

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

ISO/TC 25's present membership represents approx. 90% of the world market in cast iron and pig iron production. The total tonnage of cast and pig irons produced by the member bodies is in excess of 70 million metric tonnes tonnes per annum.

The important groups on the Committee are European Economic Union members, EFTA countries not included in the European list, China, India, Japan, some of the Asian States, South Africa, Australia and the USA.

The geographical distribution of the market forces within the committee is roughly on the basis of equal splits between the member-groupings mentioned in the previous paragraph.

5 Objectives of the ISO/TC and strategies for their achievement

5.1 Defined objectives of the ISO/TC

To elaborate and revise international material standards for cast irons and pig irons, designations and delivery conditions for cast iron components and pig irons, also to elaborate non-destructive testing and appraisal methods to check the quality of such irons and the provision of technical advice on cast irons to design engineers. Special attention is paid to those materials which extend or will extend the global use of cast irons and pig irons. In addition, opportunities to exploit new material types within the global market place are sought and implemented vigorously.

Continuous attention is paid to the updating of standards and test methods to align with the latest developments both in global technical terms and the global market place.

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

ISO/TC 25 had remained dormant for some 15 years. It was revived in October 1998 under new Chairman, Mr. M. MacNaughtan (UK). Dr Pam Murrell has been in post for 3 years has updated the Business Plan. Its strategies have not changed with the publication of this new type business plan and its current revision.

These strategies are:

- to review currently published International Standards and progress with the preparation of either new International Standards or Technical Reports for the range of cast iron materials. This work will be hastened by the use of project managers whose function will be to prepare a first draft of the respective standard or technical report and then use the sub-committee to progress the work against the agreed timetable. Where relevant the ISO/TC will decide by resolution in plenary session whether or not use should be made of the Vienna Agreement to hasten the preparation of these international standards.

The TC holds annual meetings in October, supported by its industry in a member body country, at which time the plenary, WGs and the ad-hoc groups usually meet. The TC Chairman maintains close contact with the WGs and the ad-hoc groups to review their progress, offer advice as appropriate and address situations that need his attention and possible decision.

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

The TC suffers from a lack of support by the majority of the member bodies. Only about 30% of the P members regularly attend and take part in the meetings. With the imminent approach of the revision phase for some of the standards, it would help the drafting work of the TC, WGs and ad groups if other member bodies could actively involve themselves in the various projects. It has had some success in making direct contact with the industry in the member body countries concerned in an attempt to get the message across that the development of International Standards is not only the responsibility of the few dedicated members but requires the input from all concerned. They have had some measure of success in this initiative. The shift of the focus of cast iron production to the Asian continent is probably also a factor in this matter in that travel for such members can be a prohibitive factor in their non-attendance.

The committee will undertake to discuss inviting representatives of national foundry associations to participate in some way, (perhaps through the World Foundry Organisation) for instance by acting as national 'hubs' to collect and pre-assess national comments, presuming and providing that this does not impact upon national standards bodies.

Secretariats and convenorships of the TC, and WGs are spread across a sector of members such that UK, Germany and Sweden run their activities.

The TC has adopted a forward plan for meetings so that member bodies have sufficient notice of forthcoming meetings. Notification of forthcoming meetings are normally given 6 months before the date of the meeting and reports of recent meetings are available to all member body representatives within one month of the meeting being held.

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

Information on ISO online

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

[ISO/TC 25 on ISO Online](#)

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

- About (Secretariat, Committee Manager, 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](#)