



DRAFT BUSINESS PLAN for final approval

ISO/TC 244 Industrial furnaces and associated processing equipment

EXECUTIVE SUMMARY

Industrial furnaces and associated processing equipment (“TPE”) are used widely in the world in many industrial sectors such as materials like iron and steel, nonferrous metals and glass, and machinery parts like gear and bearing for automobile.

The main activity of TC 244 establishes International Standards to disseminate the safety guidelines, technology and services of TPE through eliminating the technical barriers to trade. As of October 2023, TC244 has established 14 International Standards which cover safety, energy evaluation and quality controls.

In the TPE market, requirements vary greatly, involving specialist provided application-specific engineering. Key factors governing safe and effective combustion, such as chamber geometry and pressure, combustion flow patterns, methods of heat transfer, air preheating, oxygen level, emission requirements, etc. are the subject of application-by-application assessment by engineers. These factors are not generally capable of being fully tested until the specific system has been constructed and commissioned.

Scope of TC 244:

“Standardization of the requirements for industrial thermoprocessing equipment (e.g. heated enclosures such as furnaces, ovens, kilns, lehrs and dryers) and associated processing equipment.

The scope includes, but is not limited to, requirements for safety, energy efficiency (including exergy), design, construction, operation, processes and quality control of processed material.”

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

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:

TPE are equipment which provide heat into a specified space enclosed with materials like refractory to heat materials. Industrial furnaces use two types of heat sources; one is combustible fuels, like gaseous fuels (e.g. natural gas, liquefied petroleum gas, manufactured gases like coke oven gas or Hydrogen) and liquid fuels (e.g. all kind of fuel oils), and the other is electricity. Industrial furnaces have a long history and have been developed with the development of whole industry.

In addition, industrial furnaces are equipment which are generally designed under each specific condition which comes from the limitation of products or spatial conditions of factories, etc. Therefore, TPE are a type of equipment for which it is difficult to establish a unified standard. In that respect, it is important to promote standardization to reduce technical barriers.

Industrial sectors which are expected to utilize the resulting standards are widely distributed. For example, they are iron and steel industry, non-ferrous industry, metal-products industry, electric products industry, precision-instrument manufacturing industry, food industry, and ceramic industry. The amount of energy consumption used by these industrial sectors adds up to 40% of the usage of energy by the whole industry in Japan. Figure 1 shows the breakdown of energy consumption in Japan

Energy consumption by TPE

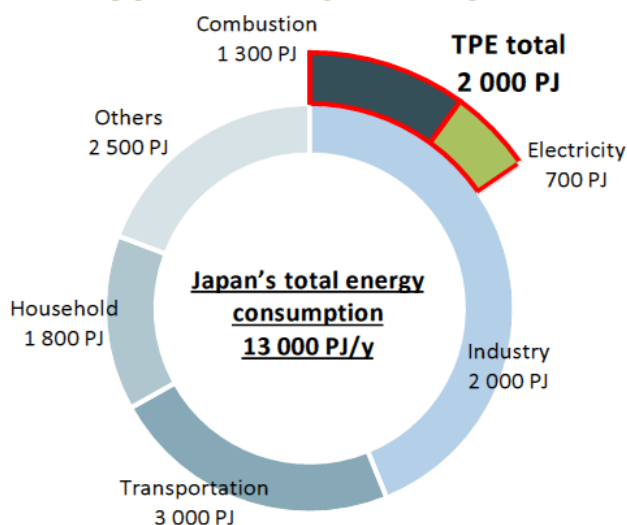


Figure 1: Energy consumption by TPE in Japan

Industrial furnaces are a type of industrial installations which consume large amount of energy. For example, energy consumption by industrial furnaces is estimated to be about 15 % of total energy consumption in Japan. Therefore, energy saving and transition to carbon-free heat source by TPE are very important to be in line with the overall carbon-neutral trend. In addition, it is expected that use of the non-fossil fuel such as hydrogen and ammonia as energy sources of TPE is going to be expanded under the trend. Setting safety guidelines for the use of such new energy sources could be one of the tasks of this TC over the next few decades.

Under the above mentioned environment and market conditions, strong demands for quality, safety and energy saving of TPE will continue.

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:

The types of furnaces and corresponding industries are shown in Table 1.

Table 1 –Amount of sales of TPE by furnace type in Japan in 2022

| Type of furnace | Industry | Amount of sales in Japan (2022) million EURO | Sales ratio in 2022 % | Sales ratio compare to 2006 (2006=100) |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|--------------------------|-------------------------------------------|
| Blast furnace | Iron and steel industry | 178 | 22 | 117 |
| Basic Oxygen Furnace / Converter | | 11 | 1 | 25 |
| Arc furnace | | 17 | 2 | 73 |
| Combustion furnace | Iron and steel industry Cast and forging industry Non ferrous industry Metal products industry Machinery Shipbuilding Transport machinery Electric &electronics industry Chemistry & petroleum industry Ceramics industry | 170 | 21 | 50 |
| Resistance furnace | Precision instrument industry | 314 | 40 | 61 |
| Induction furnace | Electric products industry Machinery products industry Non ferrous industry | 102 | 13 | 66 |
| Total | | 791 | 100 | 65 |

Source: JIFMA (exchange rate: 1Euro=150JPY)

Sales of TPE has not fully been recovered after the recession in 2008 in Japan.

The world exports of TPE in 2022 are shown in Figure 2.

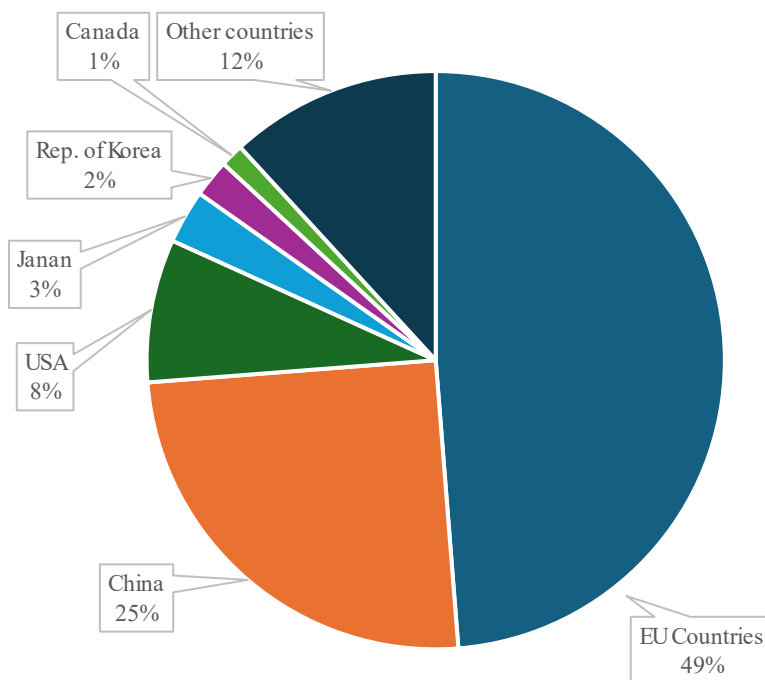


Figure 2: World exports of TPE in 2022

Source: National & VDMA statistics

Note: total volume of world exports 2022: ca. 10,763 bn €

3 BENEFITS EXPECTED FROM THE WORK OF THE ISO/TC

The benefits of international standardization of industrial furnaces and TPE are:

A. The technical aspect

- a) **Improve the quality of products:**
International standardization ensures consistency and standardization in the design, manufacturing and operation of industrial furnaces, making product quality more stable and reliable. Industrial furnaces produced by different manufacturers can reach similar levels in terms of performance, safety and efficiency, reducing problems caused by quality differences.
- b) **Promote technological innovation:**
It provides a common technical framework for enterprises and encourages innovation on the basis of international standardization. New technologies and designs can be more easily integrated into standardization systems, driving technological progress across the industry.

B. The economic aspect

- a) **Reduce production cost:**
International standardization enhances the versatility of parts, and enterprises can mass-produce standardized parts and reduce production costs. At the same time, the complexity of design and manufacturing caused by different standards is reduced, and production efficiency is improved.
- b) **Expand market scale:**
International standardization breaks down trade barriers and enables industrial furnace products to circulate globally. Businesses can access a wider market, increase sales and achieve economies of scale.

- c) Eliminate trade barriers:
International standardization is expected to help eliminate trade barriers.

C. Safety and environmental protection

- a) Improve safety performance:
The harmonized safety requirements of industrial furnaces are defined, including structural strength, protective devices, operation specifications, etc. Reduce the casualties and property losses caused by safety accidents.
- b) Promote environmental protection and energy conservation:
International standardization helps to promote the development of industrial furnaces in the direction of more energy saving and environmental protection. Energy consumption standards and pollutant emission limits are set to encourage enterprises to adopt advanced technology and equipment to reduce their impact on the environment.

D. Cooperation and exchange aspect

- a) Facilitate international cooperation:
The activity of international standardization provides the basis for cooperation between enterprises and scientific research institutions of various countries. Companies in different countries can more easily carry out technical exchanges, collaborative research and development and project cooperation to jointly promote the development of the industrial furnace industry.

4 REPRESENTATION AND PARTICIPATION IN THE ISO/TC

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

This information is updated regularly and is available on ISO's website, ISO Online, see [here](#).

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

5.1 Defined objectives of the ISO/TC

Industrial furnaces and TPE are one of the important equipment among manufacturing industries and a large number of TPE are produced and operating in the world.

In terms of developing International Standards, safety related items are especially crucial. TC 244 has been elaborating a package of International Standards regarding safety related items.

Environment issues including the global warming are one of our important perspectives in developing International Standards. Development of safety guidelines for the use of non-fossil fuels like hydrogen or ammonia can be one of the task for TC 244.

It is important to construct new standards timely with these practical subjects. Other subjects which are not mentioned above will be incorporated accordingly.

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

TC 244 will promote standardization considering current needs of the market such as decarbonization.

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

Aspects of the resulting standards, regarding safety and evaluation of the performance of industrial furnaces and TPE are important not only for the manufacturers but also for the users. Reflecting a diverse range of views of developing countries in the new standards is the challenging part of the work of TC 244 for developing and disseminating the new standards. TC 244 will encourage the participation of developing countries and play a role in disseminating the technology of the industrial furnaces and TPE.

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

Structure and personnel

This information is updated regularly and is available on ISO's website, ISO Online, see [here](#).

Projects

Industrial furnaces and associated processing equipment --

- |
- |—Vocabulary (ISO 13574 by WG 4)
- |
- |—Safety - 13577 series
 - | |— Part 1: General requirements (ISO 13577-1 by WG 1)
 - | |— Part 2: Combustion and fuel handling systems (ISO 13577-2 by WG 2)
 - | |— Part 3: Generation and use of protective gases (ISO 13577-3 by WG 6)
 - | |— Part 4: Protective systems (ISO 13577-4 by WG 5)
- |
- |—Safety Requirements for Steelmaking Equipment by WG 7
 - | |— ISO 4529: Secondary steelmaking — Machinery and equipment for treatment of liquid steel
 - | |— ISO 13578: Safety requirements for machinery and equipment for production of steel by electric arc furnaces
 - | |— ISO 23495: Safety requirements for steel converter and associated equipment
- |
- |—Heat treatment by WG 8
 - | |— ISO 20431 Control of quality
- |
- |— Method of measuring energy balance and calculating efficiency -- 13579 series by WG 3
 - | |— Part 1: General methodology (ISO 13579-1)
 - | |— Part 2: Reheating furnace for steel (ISO 13579-2)
 - | |— Part 3: Batch type aluminium melting furnace (ISO 13579-3)
 - | |— Part 4: Furnaces with protective or reactive atmosphere (ISO 13579-4)
 - | |— Part 11: Evaluation of various kinds of efficiency (ISO 13579-11)