EXECUTIVE SUMMARY

The packaging industry must continuously review the social significance of packaging and develop or improve it to harmonize with society in response with today’s trends including environmental conservation, the aging population combined with the diminishing number of children, and the wide-spread use of technology. To tackle with 17 Sustainable development goals (SDGs), the needs of safety, reliability, environmental consciousness, food waste reduction and accessible designs are especially increasing at present, and the momentum of considering the social and environmental adequacy of packaging is growing in cooperation with consumers as well as representatives from industry, government, and academia.

The 2015 Paris Agreement resolved to limit global warming preferably below 1.5 °C compared to pre-industrial levels, and in 2016 the Davos meeting highlighted the marine plastics issue. In response to these, the packaging industry is focusing on getting along well with plastics, especially reducing the amount used, recycling plastics, and utilizing recycled plastics. Even under these circumstances, we are working on the evolution of accessible design packaging that is easy for anyone to use (even for elderly people and people with handicap), prevents accidents due to mishandling and misunderstanding, and to guarantee quality for a longer period.

Along with these two great trends of environment-conscious packages and accessible design packages, efforts for developing packaging technology, especially for safety and reliability for foods, have recently been in progress too. Traceability for food is defined as tracking and tracing the food and its information at each stage of a food chain of production, processing, distribution, and selling. In our ubiquitous society created by sophisticated computer network technology, the development of RFIDs, including peripheral devices and their applications, is indispensable for increasing the safety and reliability of products for consumers. The development of active, intelligent and smart packaging is also indispensable. These packages will have indicating functions providing detailed information about whether or not the barrier characteristic and special functions provided by the packager are normally working, any problem is arising in distribution routes, and the expiration date is passing. Many companies, as was expected, are carrying on the development of these packages from the standpoint of food safety and reliability.

The TC will elaborate a suite of International Standards in the packaging sector with regard to terminology and dimensions, performance requirements and tests.

ISO/TC 122 standards will provide cost effective and more reliable test methods allowing for clear, unambiguous technical specifications through harmonization and clarification.

ISO/TC 122 standards will improve the design of packaging fitting for global consumer needs of accessible to address relevant social, safety, health or environmental concerns;

ISO/TC 122 standards enable easy and expedient exchange of world commodities in the field of international trade and logistics, by removing technical barriers of packaging and opening markets in various regions of the world.

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.

2 BUSINESS ENVIRONMENT OF THE ISO/TC

2.1 Description of the Business Environment

Note: Some of the statistics and graphics contained in this section have been contributed by Smithers who published in November 1, The Future of Global Packaging to 2026. Information on this report and purchase can be found at https://www.smithers.com/resources/2021/november/world-packaging-demand-to-break-$1-trillion-mark

The market for global packaging is expected to exceed $1 trillion for the first time in history and reach more than $1.1 trillion in 2021. Smithers reported that Despite of the COVID-19 pandemic, the packaging industry has recorded to grow at a Compound Annual Growth Rate (CAGR) of 4.8% during 2020-2021, and expects to become a steady CAGR of 3.9% from 2021 to 2026, and the global packaging market will reach $1.22 trillion in 2026.

By country, China has the largest national market in the world, worth $256 billion in 2021, and forecasted to keep fastest growing rate over 2026. Asia maintains a key contributor for growth of packaging market, with the key players with Japan, worth $53.2 billion, and India, worth $48.2 billion. The US market is worth $197.2 billion in 2021, and will mark the lowest growth rate through 2026.

While the factors like rising e-commerce sales and growing demand for Fast-Moving Consumer Goods (FMCG) and pharmaceutical packaging are propelling the market growth, the non-availability of raw materials is hampering market growth. Used in a wide range of industries across the food and drink, healthcare, cosmetics and other consumer goods sectors, as well as a range of industrial sectors, packaging has become an essential everyday item, with usage growing broadly in line with the global economy, linked to its performance.

By segment, the growth rates of cardboard packaging, including corrugated boxes, folding cartons and liquid carton board is expected to mark the highest over the next five years. The reason is the brand owners of FMCG prefer fiber-based packaging due to fulfilling their SDGs and tightening policies and regulations aimed at the transition to Circular Economy. Especially, corrugated boxes have been benefitted from a sharp increase of e-Commerce sales under the influence of the COVID-19 pandemic. And the demand of folding cartons will

ISO/TC 122 N 1112
ISO/TC 122 Strategic business plan
Page 2 of 6
increase due to take-out purchasing preference, especially, luxury items, pharmaceuticals, beverages and retail? food takeaway products.

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:

**Key drivers that influence Packaging Demand**

- Overall population growing
- The trend towards smaller households
- The move towards smaller pack sizes as the incidence of families eating together at the dinner table become less common
- The increasing requirement for convenience among consumers
- The increasing requirements for accessibility
- Increasing awareness of environmental issues, and the adoption of new regulatory requirements on packaging recycling
- Rising health awareness amount consumers
- Growing requirements for brand enhancement / differentiation in an increasingly competitive environment
- Shift of consumer purchasing patterns- E-commerce and takeaway
- Transition to the circular economy
- New packaging material development
- Geopolitical risks, associated trade barriers and economic trends

### 2.2 Environment and packaging

First of all, we need to understand the trade-offs between packaging optimization, such as cost-efficient, user-friendly and highly protecting function, and environmental burden.

Environmental problems have been highlighted on a global scale, and a reduction in environmental impact is demanded including the following: CO\(_2\) generated from commodity distribution, disposal of final package waste, and usage of packaging materials. The reusable packaging is developed and produced from the view point of being reused as much parts as possible, as long as possible, in order to reduce overall costs along the supply chain and reduce the environmental impact. More often the reusable packaging weight can not be compared with one way packaging made for instance of styrofoam, but its clear to us that through the Life Cycle Assessment (LCA) methodology, the market has been able to clarify that the comparison of the packaging typology is clearly demonstrating the enormous advantages of the reusable packaging. And reducing packaging at the source is also necessary to make packaging more acceptable in the highly eco-conscious nations, such as the EU. This requires making packaging with the minimum of materials to offer maximizing packaging functions, such as protection during transportation while using the minimum energy required. Such packaging requires standardization including methods and equipment for more efficient transportation, testing methods for packaged cargoes for ensuring the optimal protection, and more efficient assessment? methods.

With concern about CSR (Corporate Social Responsibility) rising, the packaging industry is working hard from design to waste reduction including the employment of biomass material and sorted collection of refuse on the basis of the 3Rs (Reduce, Reuse, and Recycle) toward constructing a sustainable circulating society. The industry is implementing plans, especially using the LCA technique with its emphasis on resource and energy savings, as well as countermeasures against hazardous materials from material procurement for packaging products to their final disposal as waste. Today, regulation of chemical materials is moving to international unification. It is inevitable, therefore, that people concerned about packaging should develop and manufacture products by investigating and confirming the trends of chemical material regulation in the world (PRTR-Pollutant Release and Transfer Register, a reporting system for use and transfer of specified chemical substances, RoHS-Restriction of Hazardous Substances, REACH-Registration, Evaluation and Authorisation of Chemicals, and VOC-Volatile Organic Compound). Nowadays, the production of packaging products is globalized and international standardization for those products is required as environment-conscious measures for packaging and packaging waste.

Moreover, reduce, reuse, and recycle field of packaging main problems for many of developing countries, while developed countries that are main source for GHSSs generated by industrial production activity.
2.3 Active and intelligent packaging as a tool of product safety/secure, quality assurance and food loss

Active and intelligent packaging (AIP), frequently referred to as “smart” packaging, is evolving technology that can enhance preservation of contained products and communicate effectively to distributors and users. “Smart packaging” is a general term to describe a large category of packaging that leverages technology to provide enhanced functionality that goes beyond simply housing a product.

AIP helps to optimize for transport and efficiency in logistics by providing interactive and accurate supply chain information. AIP will be useful for improving safety and security of perishable and temperature-sensitive products such as vaccine and pharmaceutical industry. It also helps companies in branding and marketing advantages. Ultimately, this technology will help to minimize the packaging and product waste by reducing unnecessary resources and product spoilage during distribution process.

Some of these technologies can be used in combination (for example active labels and tamper evidence) and nano-solutions seem to be developing across both areas (for example coatings to materials for use in shelf-life extension but also printed electronics, inks, etc.)

According to market research by Smithers, the integrated AIP market value is estimated to be $6 billion in 2019 with an annual growth rate of 5.1%. By 2025, the global AIP market is expected to reach $8.6 billion. Of these, the active packaging market is expected to reach USD 6.1 billion and the intelligent market to reach USD 2.5 billion. Although the market share of active packaging is higher than that of intelligent packaging, the annual growth rate of intelligent packaging is projected to be 13.3%, higher than that of active packaging, 4.1%. As material and communication technologies evolving, there will be more products and packaging related to the AIP to enhance contained products and user experience. Main industry segment is food and beverage accounting for 90.2% of total applications. (https://www.smithers.com/services/market-reports/packaging/the-future-of-active-and-intelligent-packaging)

From regulation wise, there are general concerns on safety especially on food contact materials. European regulation (EC) No 1935/2004, concerning a declaration of compliance and the availability of appropriate documentation, states that any active and intelligent material shall provide and certificate that the material is safe to be used in contact with food under specified conditions of contact.

2.4 Accessible design

The packaging industry must now review the social significance of packaging and develop or improve it to harmonize with society in line with today’s trends, including environmental conservation, the aging population, combined with the diminishing number of children, and high informatization. The needs of safety, reliability, environmental consciousness, and accessible designs are especially increasing at present, and the momentum of considering the social and environmental adequacy of packaging is growing in cooperation with consumers and retailers as well as people from industry, government, and academia.

One major issue in society along with the environmental problem is how to respond to our aging society. The problem with our aging society has only just been addressed in the packaging field in the last few years. Packages created from these efforts, which are called accessible design packages, have been used for all packages including food and toiletries. Consumers will not buy inconvenient goods more than once, and differences between policies for accessible design affect business survival.

When we think of what consideration should be given to accessible designs of packages and containers, we can roughly cite (1) designs to make merchandise easily understandable, (2) designs for easy opening and content removal, (3) designs for easy carrying, (4) designs for easy use,

2.5 BENEFITS EXPECTED FROM THE WORK OF THE ISO/TC

Progress and develop of the packaging in the entire world are the main purpose for ISO/TC 122, especially in developing countries. Many of developing countries have good product especially in agriculture field that they can’t sell them in global markets; which is mainly due to unsuitable packaging. Many local agriculture products, such as saffron, date, pistachio and so on are exported in bulk to other countries, packaged in bags with other...
country’s name printed on them, and selling in global markets; in fact, the countries using the name gets benefit of it. To solve this problem as well as the other issues mostly mentioned in section 2, the following benefits should be expected from the work of ISO/TC 122.

1) ISO/TC 122 standards will provide cost effective and more reliable test methods allowing for clear, unambiguous technical specifications through harmonization and clarification.

2) ISO/TC 122 standards will improve the design of packaging fitting for global consumer needs of sustainability or accessible packaging responded to, or is expected to, address relevant social, safety or health concerns.

3) ISO/TC 122 standards enable easy, fair and efficient trade in the field of international trade and logistics, by removing technical barriers of packaging and opening markets in various regions of the world.

3  REPRESENTATION AND PARTICIPATION IN THE ISO/TC122

3.1 Membership

See; https://www.iso.org/committee/52040.html?view=participation

Analysis of the participation

— Participation in TC 122 is relatively complete and balanced among the countries that produce and distribute commodities using various types of packaging.

— To be honest, the most active members would include USA, China, Japan, Republic of Korea, Germany, Sweden and the UK. These are countries where packaging industry are matured and seek business opportunities by global standardization.

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

4.1 Defined objectives of the ISO/TC 122

The TC 122 will elaborate a package of International Standards in the packaging sector with regard to terminology and dimensions, performance requirements and tests, and utilization of related technologies on packaging

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

The work of TC 122 and its subcommittees and working groups is usually done by plenary meetings, working group sessions, ad hoc groups, and teleconferences (meetings by modern means). A meeting will be scheduled only if the work-progress made by the various working groups justifies such a meeting. A great deal of standardization work will be done by correspondence.

ISO/TC 122 will continue to work closely with CEN/TC 261, where appropriate, with the development of new standards.

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

Some factors have increased the delays in the improving and proceeding of the work program. The most important factor is the lack of interest of participating actively in the development of new projects. On the other hand, interest in a project is not necessarily maintained throughout the development of process and low attendance to some working group meetings could indicate that although membership may be balanced, it might not be representative. There is always the danger that a small group of experts could produce a document that is voted against by bodies, which did not assist in its development.
The other important factors in causing delays in the delivery of standards are the lack of consensus caused by differing national regulations or attitudes towards the subject of study and the absence of proven test methods. More worrying however, is the lack of resources to conduct collaborative trials which may occasionally prove necessary to validate test methods.

There also is an increasing and disturbing infringement into TC 122’s areas of responsibilities in such areas as RFID technology, packaging security, and processes/information exchanges with a security purpose.

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

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

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:

https://www.iso.org/committee/52040.html

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)