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Transport packages for dangerous goods — Dangerous goods packagings, intermediate bulk containers (IBCs) and large packagings — Guidelines for the application of ISO 9001

Emballages de transport pour marchandises dangereuses — Emballages pour marchandises dangereuses, grands récipients vrac (GRV) et grands emballages — Lignes directrices pour l'application de l'ISO 9001

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 122, *Packaging*, Subcommittee SC 3, *Performance requirements and tests for means of packaging, packages and unit loads (as required by ISO/TC 122)*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This second edition cancels and replaces the first edition (ISO 16106:2006), which has been technically revised.

The main changes compared to the previous edition are as follows:

— ISO 9001:2015 has been integrated;

— the sector-specific requirements on quality management systems for transport packages for dangerous goods into ISO 9001:2015 have been revised;

— new Annexes E and F have been created;

— editorial changes have been made.

Introduction

0.1 General

The United Nations Recommendations on the Transport of Dangerous Goods[27] (referred to in this document as the UN Model Regulations) require the application of a quality assurance programme for the manufacture and testing of packagings, IBCs and large packagings that satisfies the competent authority in order to ensure that each manufactured packaging, IBC and large packaging meets the requirements.

The UN Model Regulations are given legal entity by the provision of a series of international modal agreements and national legislation for the transport of dangerous goods. These international agreements include:

— the European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR)[28];

— the Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID)[29];

— the International Civil Aviation Organization's Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO TI)[30];

— the International Maritime Dangerous Goods Code (IMDG)[31].

The application of this document should take into account the requirements of these international agreements and the national legislation for the transport of dangerous goods.

In conjunction with ISO 9001, this document gives guidance on a system for applying quality processes and assurance to the production of dangerous goods packagings, IBCs and large packagings.

The change in terminology in the ISO 9000 series from "quality assurance programmes" (1987 edition), over "quality systems" (1994 edition) to "quality management systems" (2000 edition), is not reflected in the UN Model Regulations and the international agreements referred to in the bibliography of this document. The former term "quality assurance programme" is still used there. Furthermore, the term "testing", which was used in the 1994 edition of the ISO 9000 series in the context of product inspection and testing was replaced by "measurement and monitoring" in the 2000 edition. For the purposes of this document, the latest terminology is used, in accordance with ISO 9000. This difference in terminology should not deter users from using this document.

This document is based on Revision 19 of the UN Model Regulations.

This document is an application standard for transport packages for dangerous goods, which contains the text of ISO 9001:2015.

For an explanation of how this document was prepared, see Annex A.

The adoption of a quality management system is a strategic decision for an organization that can help to improve its overall performance and provide a sound basis for sustainable development initiatives.

The potential benefits to an organization of implementing a quality management system based on this document are:

a) the ability to consistently provide products and services that meet customer and applicable statutory and regulatory requirements;

b) facilitating opportunities to enhance customer satisfaction;

c) addressing risks and opportunities associated with its context and objectives;

d) the ability to demonstrate conformity to specified quality management system requirements.

This document can be used by internal and external parties.

It is not the intent of this document to prescribe:

— uniformity in the structure of different quality management systems;

— alignment of documentation to the clause structure of this document;

— the use of the specific terminology of this document within the organization.

The quality management system requirements specified in this document are complementary to requirements for products and services.

This document employs the process approach, which incorporates the Plan-Do-Check-Act (PDCA) cycle and risk-based thinking.

The process approach enables an organization to plan its processes and their interactions.

The PDCA cycle enables an organization to ensure that its processes are adequately resourced and managed, and that opportunities for improvement are determined and acted on.

Risk-based thinking enables an organization to determine the factors that can cause its processes and its quality management system to deviate from the planned results, to put in place preventive controls to minimize negative effects and to make maximum use of opportunities as they arise (see A.4).

Consistently meeting requirements and addressing future needs and expectations poses a challenge for organizations in an increasingly dynamic and complex environment. To achieve this objective, the organization can find it necessary to adopt various forms of improvement in addition to correction and continual improvement, such as breakthrough change, innovation and re-organization.

0.2 Quality management principles

This document is based on the quality management principles described in ISO 9000. The descriptions include a statement of each principle, a rationale of why the principle is important for the organization, some examples of benefits associated with the principle and examples of typical actions to improve the organization's performance when applying the principle.

The quality management principles are:

— customer focus;

— leadership;

— engagement of people;

— process approach;

— improvement;

— evidence-based decision making;

— relationship management.

0.3 Process approach

0.3.1 General

This document promotes the adoption of a process approach when developing, implementing and improving the effectiveness of a quality management system, to enhance customer satisfaction by meeting customer requirements. Specific requirements considered essential to the adoption of a process approach are included in 4.4.

Understanding and managing interrelated processes as a system contributes to the organization's effectiveness and efficiency in achieving its intended results. This approach enables the organization

to control the interrelationships and interdependencies among the processes of the system, so that the overall performance of the organization can be enhanced.

The process approach involves the systematic definition and management of processes, and their interactions, so as to achieve the intended results in accordance with the quality policy and strategic direction of the organization. Management of the processes and the system as a whole can be achieved using the PDCA cycle (see 0.3.2) with an overall focus on risk-based thinking (see 0.3.3) aimed at taking advantage of opportunities and preventing undesirable results.

The application of the process approach in a quality management system enables:

a) understanding and consistency in meeting requirements;

b) the consideration of processes in terms of added value;

c) the achievement of effective process performance;

d) improvement of processes based on evaluation of data and information.

Figure 1 gives a schematic representation of any process and shows the interaction of its elements. The monitoring and measuring check points, which are necessary for control, are specific to each process and will vary depending on the related risks.

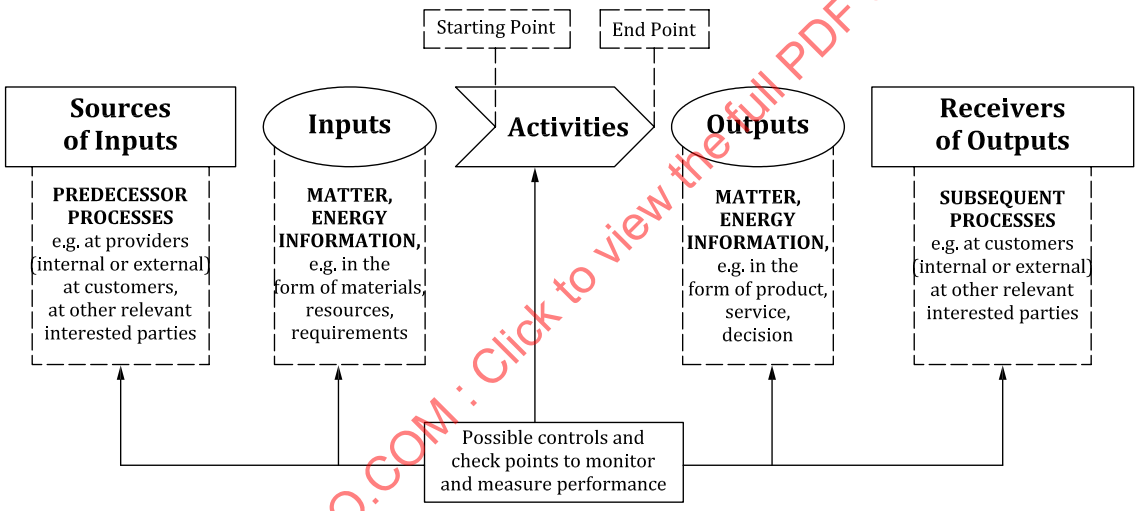

Figure 1 — Schematic representation of the elements of a single process

0.3.2 Plan–Do–Check–Act cycle

The PDCA cycle can be applied to all processes and to the quality management system as a whole. Figure 2 illustrates how Clauses 4 to 10 can be grouped in relation to the PDCA cycle.

NOTE Numbers in brackets refer to the clauses in this document.

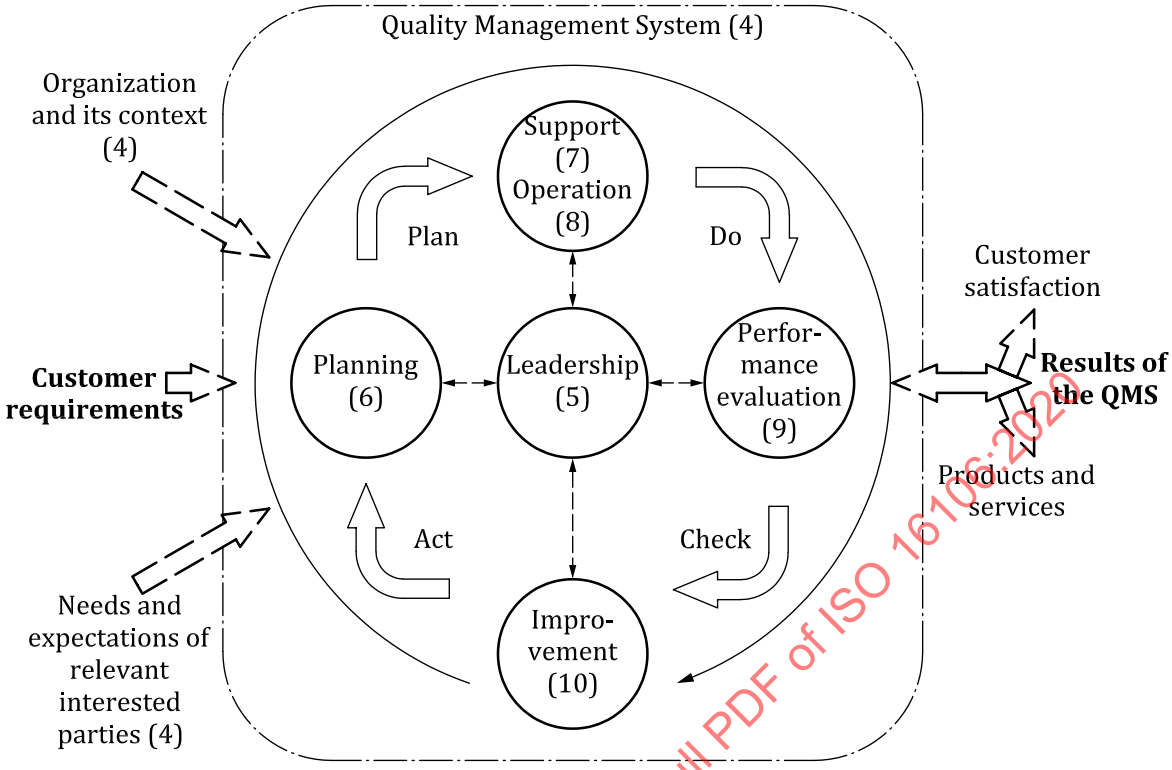

Figure 2 — Representation of the structure of this document in the PDCA cycle

The PDCA cycle can be briefly described as follows:

— **Plan:** establish the objectives of the system and its processes, and the resources needed to deliver results in accordance with customers' requirements and the organization's policies and identify and address risks and opportunities;

— **Do:** implement what was planned;

— **Check:** monitor and (where applicable) measure processes and the resulting products and services against policies, objectives, requirements and planned activities, and report the results;

— **Act:** take actions to improve performance, as necessary.

0.3.3 Risk-based thinking

Risk-based thinking (see A.4) is essential for achieving an effective quality management system. The concept of risk-based thinking was implicit in the previous editions of this document including, for example, carrying out preventive action to eliminate potential nonconformities, analysing any nonconformities that do occur, and taking action to prevent recurrence that is appropriate for the effects of the nonconformity.

To conform to the requirements of this document, an organization needs to plan and implement actions to address risks and opportunities. Addressing both risks and opportunities establishes a basis for increasing the effectiveness of the quality management system, achieving improved results and preventing negative effects.

Opportunities can arise as a result of a situation favourable to achieving an intended result, for example, a set of circumstances that allow the organization to attract customers, develop new products and services, reduce waste or improve productivity. Actions to address opportunities can also include consideration of associated risks. Risk is the effect of uncertainty and any such uncertainty can have positive or negative effects. A positive deviation arising from a risk can provide an opportunity, but not all positive effects of risk result in opportunities.

0.4 Relationship with other management system standards

This document applies the framework developed by ISO to improve alignment among its International Standards for management systems (see A.1).

This document enables an organization to use the process approach, coupled with the PDCA cycle and risk-based thinking, to align or integrate its quality management system with the requirements of other management system standards.

This document relates to ISO 9000 and ISO 9004 as follows:

— ISO 9000 provides essential background for the proper understanding and implementation of this document;

— ISO 9004 provides guidance for organizations that choose to progress beyond the requirements of this document.

Annex B provides details of other International Standards on quality management and quality management systems that have been developed by ISO/TC 176.

Sector-specific quality management system standards based on the requirements of this document have been developed for a number of sectors. Some of these standards specify additional quality management system requirements, while others are limited to providing guidance to the application of this document within a particular sector.

Transport packages for dangerous goods — Dangerous goods packagings, intermediate bulk containers (IBCs) and large packagings — Guidelines for the application of ISO 9001

1 Scope

This document gives guidance on the application of a quality management system in the manufacture, measuring and monitoring of design type approved dangerous goods packaging, intermediate bulk containers (IBCs) and large packaging.

This document does not include guidance specific to other management systems, such as those for environmental management, occupational health and safety management, or financial management.

It is applicable to an organization that:

a) needs to demonstrate its ability to consistently provide products and services that meet customer and applicable statutory and regulatory requirements; and

b) aims to enhance customer satisfaction through the effective application of the system, including processes for improvement of the system and the assurance of conformity to customer and applicable statutory and regulatory requirements.

All the guidance in this document is generic and intended to be applicable to any organization, regardless of its type or size, or the products and services it provides.

NOTE In this document, the terms "product" or "service" only apply to products and services intended for, or required by, a customer.

It does not apply to design type testing, for which reference is made to 6.1.5, 6.3.5, 6.5.6 and 6.6.5 of the UN Model Regulations[27].

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9000, *Quality management systems — Fundamentals and vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 9000 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
organization
person or group of people that has its own functions with responsibilities, authorities and relationships to achieve its *objectives* (3.8)

Note 1 to entry: The concept of organization includes, but is not limited to, sole-trader, company, corporation, firm, enterprise, authority, partnership, charity or institution, or part or combination thereof, whether incorporated or not, public or private.

3.2
interested party
stakeholder
person or *organization* (3.1) that can affect, be affected by, or perceive itself to be affected by a decision or activity

3.3
requirement
need or expectation that is stated, generally implied or obligatory

Note 1 to entry: "Generally implied" means that it is custom or common practice for the organization and interested parties that the need or expectation under consideration is implied.

Note 2 to entry: A specified requirement is one that is stated, e.g. in documented information.

3.4
management system
set of interrelated or interacting elements of an *organization* (3.1) to establish *policies* (3.7) and *objectives* (3.8) and *processes* (3.12) to achieve those objectives

Note 1 to entry: A management system can address a single discipline or several disciplines.

Note 2 to entry: The system elements include the organization's structure, roles and responsibilities, planning and operation.

Note 3 to entry: The scope of a management system can include the whole of the organization, specific and identified functions of the organization, specific and identified sections of the organization, or one or more functions across a group of organizations.

3.5
top management
person or group of people who directs and controls an *organization* (3.1) at the highest level

Note 1 to entry: Top management has the power to delegate authority and provide resources within the organization.

Note 2 to entry: If the scope of the *management system* (3.4) covers only part of an organization, then top management refers to those who direct and control that part of the organization.

3.6
effectiveness
extent to which planned activities are realized and planned results achieved

3.7
policy
intentions and direction of an *organization* (3.1), as formally expressed by its *top management* (3.5)

3.8
objective
result to be achieved

Note 1 to entry: An objective can be strategic, tactical, or operational.

Note 2 to entry: Objectives can relate to different disciplines (such as financial, health and safety, and environmental goals) and can apply at different levels (such as strategic, organization-wide, project, product and *process* (3.12)).

Note 3 to entry: An objective can be expressed in other ways, e.g. as an intended outcome, a purpose, an operational criterion, as a quality objective, or by the use of other words with similar meaning (e.g. aim, goal, or target).

Note 4 to entry: In the context of quality management systems, quality objectives are set by the organization, consistent with the quality policy, to achieve specific results.

3.9
risk
effect of uncertainty

Note 1 to entry: An effect is a deviation from the expected — positive or negative.

Note 2 to entry: Uncertainty is the state, even partial, of deficiency of information related to, understanding or knowledge of, an event, its consequence, or likelihood.

Note 3 to entry: Risk is often characterized by reference to potential "events" (as defined in ISO Guide 73) and "consequences" (as defined in ISO Guide 73), or a combination of these.

Note 4 to entry: Risk is often expressed in terms of a combination of the consequences of an event (including changes in circumstances) and the associated "likelihood" (as defined in ISO Guide 73) of occurrence.

3.10
competence
ability to apply knowledge and skills to achieve intended results

3.11
documented information
information required to be controlled and maintained by an *organization* (3.1) and the medium on which it is contained

Note 1 to entry: Documented information can be in any format and media, and from any source.

Note 2 to entry: Documented information can refer to:

— the management *system* (3.4), including related *processes* (3.12);

— information created in order for the organization to operate (documentation);

— evidence of results achieved (records).

3.12
process
set of interrelated or interacting activities which transforms inputs into outputs

3.13
performance
measurable result

Note 1 to entry: Performance can relate either to quantitative or qualitative findings.

Note 2 to entry: Performance can relate to managing activities, *processes* (3.12), products (including services), systems or *organizations* (3.1).

3.14
outsource (verb)
make an arrangement where an external *organization* (3.1) performs part of an organization's function or *process* (3.12)

Note 1 to entry: An external organization is outside the scope of the *management system* (3.4), although the outsourced function or process is within the scope.

3.15
monitoring
determining the status of a system, a *process* (3.12) or an activity

Note 1 to entry: To determine the status, there can be a need to check, supervise or critically observe.

3.16
measurement
process (3.12) to determine a value

3.17
audit
systematic, independent and documented *process* (3.12) for obtaining audit evidence and evaluating it objectively to determine the extent to which the audit criteria are fulfilled

Note 1 to entry: An audit can be an internal audit (first party) or an external audit (second party or third party), and it can be a combined audit (combining two or more disciplines).

Note 2 to entry: An internal audit is conducted by the organization itself, or by an external party on its behalf.

Note 3 to entry: "Audit evidence" and "audit criteria" are defined in ISO 19011.

3.18
conformity
fulfilment of a *requirement* (3.3)

3.19
nonconformity
non-fulfilment of a *requirement* (3.3)

3.20
corrective action
action to eliminate the cause(s) of a *nonconformity* (3.19) and to prevent recurrence

3.21
continual improvement
recurring activity to enhance *performance* (3.13)

3.22
competent authority
any national regulatory body or authority designated, or otherwise recognized as such, for any purpose in connection with the international agreements

Note 1 to entry: International agreements are referred to in the Bibliography.

3.23
design type approved packaging
IBC
large packaging
dangerous goods packaging that has been tested and approved in accordance with:

— 6.1.5, 6.3.5, 6.5.6 and 6.6.5 of the UN Model Regulations; or

— national regulations

Note 1 to entry: The modal agreements are referred to in the Bibliography.

4 Context of the organization

4.1 Understanding the organization and its context

The organization should determine external and internal issues that are relevant to its purpose and its strategic direction and that affect its ability to achieve the intended result(s) of its quality management system.

The organization should monitor and review information about these external and internal issues.

NOTE 1 Issues can include positive and negative factors or conditions for consideration.

NOTE 2 Understanding the external context can be facilitated by considering issues arising from legal, technological, competitive, market, cultural, social and economic environments, whether international, national, regional or local.

NOTE 3 Understanding the internal context can be facilitated by considering issues related to values, culture, knowledge and performance of the organization.

4.2 Understanding the needs and expectations of interested parties

Due to their effect, or potential effect, on the organization's ability to consistently provide products and services that meet customer and applicable statutory and regulatory requirements, the organization should determine:

a) the interested parties that are relevant to the quality management system;

b) the requirements of these interested parties that are relevant to the quality management system.

The organization should monitor and review information about these interested parties and their relevant requirements.

4.3 Determining the scope of the quality management system

The organization should determine the boundaries and applicability of the quality management system to establish its scope.

When determining this scope, the organization should consider:

a) the external and internal issues referred to in 4.1;

b) the requirements of relevant interested parties referred to in 4.2;

c) the products and services of the organization.

The organization should apply all the requirements of this document if they are applicable within the determined scope of its quality management system.

The scope of the organization's quality management system should be available and be maintained as documented information. The scope should state the types of products and services covered, and provide justification for any requirement of this document that the organization determines is not applicable to the scope of its quality management system.

Conformity to this document may only be claimed if the requirements determined as not being applicable do not affect the organization's ability or responsibility to ensure the conformity of its products and services and the enhancement of customer satisfaction.

4.4 Quality management system and its processes

4.4.1 The organization should establish, implement, maintain and continually improve a quality management system, including the processes needed and their interactions, in accordance with the requirements of this document.

The organization should determine the processes needed for the quality management system and their application throughout the organization, and should:

a) determine the inputs required and the outputs expected from these processes;

b) determine the sequence and interaction of these processes;

c) determine and apply the criteria and methods (including monitoring, measurements and related performance indicators) needed to ensure the effective operation and control of these processes;

d) determine the resources needed for these processes and ensure their availability;

e) assign the responsibilities and authorities for these processes;

f) address the risks and opportunities as determined in accordance with the requirements of 6.1;

g) evaluate these processes and implement any changes needed to ensure that these processes achieve their intended results;

h) improve the processes and the quality management system.

4.4.2 To the extent necessary, the organization should:

a) maintain documented information to support the operation of its processes;

b) retain documented information to have confidence that the processes are being carried out as planned.

5 Leadership

5.1 Leadership and commitment

5.1.1 General

Top management should demonstrate leadership and commitment with respect to the quality management system by:

a) taking accountability for the effectiveness of the quality management system;

b) ensuring that the quality policy and quality objectives are established for the quality management system and are compatible with the context and strategic direction of the organization;

c) ensuring the integration of the quality management system requirements into the organization's business processes;

d) promoting the use of the process approach and risk-based thinking;

e) ensuring that the resources needed for the quality management system are available;

f) communicating the importance of effective quality management and of conforming to the quality management system requirements;

g) ensuring that the quality management system achieves its intended results;

h) engaging, directing and supporting persons to contribute to the effectiveness of the quality management system;

i) promoting improvement;

j) supporting other relevant management roles to demonstrate their leadership as it applies to their areas of responsibility.

NOTE 1 Reference to "business" in this document can be interpreted broadly to mean those activities that are core to the purposes of the organization's existence, whether the organization is public, private, for profit or not for profit.

NOTE 2 Documentation can be subject to audit by the competent authority.

5.1.2 Customer focus

Top management should demonstrate leadership and commitment with respect to customer focus by ensuring that:

a) customer and applicable statutory and regulatory requirements are determined, understood and consistently met;

b) the risks and opportunities that can affect conformity of products and services and the ability to enhance customer satisfaction are determined and addressed;

c) the focus on enhancing customer satisfaction is maintained.

5.2 Policy

5.2.1 Establishing the quality policy

Top management should establish, implement and maintain a quality policy that:

a) is appropriate to the purpose and context of the organization and supports its strategic direction;

b) provides a framework for setting quality objectives;

c) includes a commitment to satisfy applicable requirements;

d) includes a commitment to continual improvement of the quality management system.

5.2.2 Communicating the quality policy

The quality policy should be:

a) available and be maintained as documented information;

b) communicated, understood and applied within the organization;

c) available to relevant interested parties, as appropriate.

5.3 Organizational roles, responsibilities and authorities

Top management should ensure that the responsibilities and authorities for relevant roles are assigned, communicated and understood within the organization.

Top management should assign the responsibility and authority for:

a) ensuring that the quality management system conforms to the requirements of this document;

b) ensuring that the processes are delivering their intended outputs;

c) reporting on the performance of the quality management system and on opportunities for improvement (see 10.1), in particular to top management;

d) ensuring the promotion of customer focus throughout the organization;

e) ensuring that the integrity of the quality management system is maintained when changes to the quality management system are planned and implemented.

6 Planning

6.1 Actions to address risks and opportunities

6.1.1 When planning for the quality management system, the organization should consider the issues referred to in 4.1 and the requirements referred to in 4.2 and determine the risks and opportunities that need to be addressed to:

a) give assurance that the quality management system can achieve its intended result(s);

b) enhance desirable effects;

c) prevent, or reduce, undesired effects;

d) achieve improvement.

6.1.2 The organization should plan:

a) actions to address these risks and opportunities;

b) how to:

1) integrate and implement the actions into its quality management system processes (see 4.4);

2) evaluate the effectiveness of these actions.

Actions taken to address risks and opportunities should be proportionate to the potential impact on the conformity of products and services.

NOTE 1 Options to address risks can include avoiding risk, taking risk in order to pursue an opportunity, eliminating the risk source, changing the likelihood or consequences, sharing the risk, or retaining risk by informed decision.

NOTE 2 Opportunities can lead to the adoption of new practices, launching new products, opening new markets, addressing new customers, building partnerships, using new technology and other desirable and viable possibilities to address the organization's or its customers' needs.

6.2 Quality objectives and planning to achieve them

6.2.1 The organization should establish quality objectives at relevant functions, levels and processes needed for the quality management system.

The quality objectives should:

a) be consistent with the quality policy;

b) be measurable;

c) take into account applicable requirements;

d) be relevant to conformity of products and services and to enhancement of customer satisfaction;

e) be monitored;

f) be communicated;

g) be updated as appropriate.

The organization should maintain documented information on the quality objectives.

6.2.2 When planning how to achieve its quality objectives, the organization should determine:

a) what will be done;

b) what resources will be required;

c) who will be responsible;

d) when it will be completed;

e) how the results will be evaluated.

6.3 Planning of changes

When the organization determines the need for changes to the quality management system, the changes should be carried out in a planned manner (see 4.4).

The organization should consider:

a) the purpose of the changes and their potential consequences;

b) the integrity of the quality management system;

c) the availability of resources;

d) the allocation or reallocation of responsibilities and authorities.

7 Support

7.1 Resources

7.1.1 General

The organization should determine and provide the resources needed for the establishment, implementation, maintenance and continual improvement of the quality management system.

The organization should consider:

a) the capabilities of, and constraints on, existing internal resources;

b) what needs to be obtained from external providers.

7.1.2 People

The organization should determine and provide the persons necessary for the effective implementation of its quality management system and for the operation and control of its processes.

7.1.3 Infrastructure

The organization should determine, provide and maintain the infrastructure necessary for the operation of its processes and to achieve conformity of products and services.

NOTE Infrastructure can include:

a) buildings and associated utilities;

b) equipment, including hardware and software;

c) transportation resources;

d) information and communication technology.

7.1.4 Environment for the operation of processes

The organization should determine, provide and maintain the environment necessary for the operation of its processes and to achieve conformity of products and services.

NOTE A suitable environment can be a combination of human and physical factors, such as:

a) social (e.g. non-discriminatory, calm, non-confrontational);

b) psychological (e.g. stress-reducing, burnout prevention, emotionally protective);

c) physical (e.g. temperature, heat, humidity, light, airflow, hygiene, noise).

These factors can differ substantially depending on the products and services provided.

7.1.5 Monitoring and measuring resources

7.1.5.1 General

The organization should determine and provide the resources needed to ensure valid and reliable results when monitoring or measuring is used to verify the conformity of products and services to requirements.

The organization should ensure that the resources provided are:

a) suitable for the specific type of monitoring and measurement activities being undertaken;

b) maintained to ensure their continuing fitness for their purpose.

The organization should retain appropriate documented information as evidence of fitness for purpose of the monitoring and measurement resources.

7.1.5.2 Measurement traceability

When measurement traceability is a requirement, or is considered by the organization to be an essential part of providing confidence in the validity of measurement results, measuring equipment should be:

a) calibrated or verified, or both, at specified intervals, or prior to use, against measurement standards traceable to international or national measurement standards. When no such standards exist, the basis used for calibration or verification should be retained as documented information;

b) identified in order to determine their status;

c) safeguarded from adjustments, damage or deterioration that would invalidate the calibration status and subsequent measurement results.

The organization should determine if the validity of previous measurement results has been adversely affected when measuring equipment is found to be unfit for its intended purpose, and should take appropriate action as necessary.

7.1.6 Organizational knowledge

The organization should determine the knowledge necessary for the operation of its processes and to achieve conformity of products and services.

This knowledge should be maintained and made available to the extent necessary.

When addressing changing needs and trends, the organization should consider its current knowledge and determine how to acquire or access any necessary additional knowledge and required updates.

NOTE 1 Organizational knowledge is knowledge specific to the organization; it is generally gained by experience. It is information that is used and shared to achieve the organization's objectives.

NOTE 2 Organizational knowledge can be based on:

a) internal sources (e.g. intellectual property; knowledge gained from experience; lessons learned from failures and successful projects; capturing and sharing undocumented knowledge and experience; the results of improvements in processes, products and services);

b) external sources (e.g. standards; academia; conferences; gathering knowledge from customers or external providers).

7.2 Competence

The organization should:

a) determine the necessary competence of person(s) doing work under its control that affects the performance and effectiveness of the quality management system;

b) ensure that these persons are competent on the basis of appropriate education, training, or experience;

c) where applicable, take actions to acquire the necessary competence, and evaluate the effectiveness of the actions taken;

d) retain appropriate documented information as evidence of competence.

NOTE Applicable actions can include, for example, the provision of training to, the mentoring of, or the re-assignment of currently employed persons; or the hiring or contracting of competent persons.

7.3 Awareness

The organization should ensure that persons doing work under the organization's control are aware of:

a) the quality policy;

b) relevant quality objectives;

c) their contribution to the effectiveness of the quality management system, including the benefits of improved performance;

d) the implications of not conforming with the quality management system requirements.

7.4 Communication

The organization should determine the internal and external communications relevant to the quality management system, including:

a) what it will communicate on;

b) when to communicate;

c) with whom to communicate;

d) how to communicate;

e) who communicates.

7.5 Documented information

7.5.1 General

The organization's quality management system should include:

a) documented information required by this document;

b) documented information determined by the organization as being necessary for the effectiveness of the quality management system.

NOTE The extent of documented information for a quality management system can differ from one organization to another due to:

— the size of organization and its type of activities, processes, products and services;

— the complexity of processes and their interactions;

— the competence of persons.

Documented information in 7.5.2 and 7.5.3 should be kept during the assumed lifetime of packagings, IBCs and large packagings or for five years, whichever is longer.

7.5.2 Creating and updating

When creating and updating documented information, the organization should ensure appropriate:

a) identification and description (e.g. a title, date, author, or reference number);

b) format (e.g. language, software version, graphics) and media (e.g. paper, electronic);

c) review and approval for suitability and adequacy.

7.5.3 Control of documented information

7.5.3.1 Documented information required by the quality management system and by this document should be controlled to ensure that it is:

a) available and suitable for use, where and when it is needed;

b) adequately protected (e.g. from loss of confidentiality, improper use, or loss of integrity).

7.5.3.2 For the control of documented information, the organization should address the following activities, as applicable:

a) distribution, access, retrieval and use;

b) storage and preservation, including preservation of legibility;

c) control of changes (e.g. version control);

d) retention and disposition.

Documented information of external origin determined by the organization to be necessary for the planning and operation of the quality management system should be identified as appropriate, and controlled.

Documented information retained as evidence of conformity should be protected from unintended alterations.

NOTE Access can imply a decision regarding the permission to view the documented information only, or the permission and authority to view and change the documented information.

8 Operation

8.1 Operational planning and control

The organization should plan, implement and control the processes (see 4.4) needed to meet the requirements for the provision of products and services, and to implement the actions determined in Clause 6, by:

a) determining the requirements for the products and services;

b) establishing criteria for:

   1) the processes;

   2) the acceptance of products and services;

c) determining the resources needed to achieve conformity to the product and service requirements;

d) implementing control of the processes in accordance with the criteria;

e) determining, maintaining and retaining documented information to the extent necessary to:

   1) have confidence that the processes have been carried out as planned;

   2) demonstrate the conformity of products and services to their requirements.

The output of this planning should be suitable for the organization's operations.

The organization should control planned changes and review the consequences of unintended changes, taking action to mitigate any adverse effects, as necessary.

The organization should ensure that outsourced processes are controlled (see 8.4).

The product specifications for packaging and IBCs should conform to Annexes C and F.

8.2 Requirements for products and services

8.2.1 Customer communication

Communication with customers should include:

a) providing information relating to products and services;

b) handling enquiries, contracts or orders, including changes;

c) obtaining customer feedback relating to products and services, including customer complaints;

d) handling or controlling customer property;

e) establishing specific requirements for contingency actions, when relevant.

8.2.2 Determining the requirements for products and services

When determining the requirements for the products and services to be offered to customers, the organization should ensure that:

a) the requirements for the products and services are defined, including:

   1) any applicable statutory and regulatory requirements;

2) those considered necessary by the organization;

b) the organization can meet the claims for the products and services it offers.

8.2.3 Review of the requirements for products and services

8.2.3.1 The organization should ensure that it has the ability to meet the requirements for products and services to be offered to customers. The organization should conduct a review before committing to supply products and services to a customer, to include:

a) requirements specified by the customer, including the requirements for delivery and post-delivery activities;

b) requirements not stated by the customer, but necessary for the specified or intended use, when known;

c) requirements specified by the organization;

d) statutory and regulatory requirements applicable to the products and services;

e) contract or order requirements differing from those previously expressed.

The organization should ensure that contract or order requirements differing from those previously defined are resolved.

The customer's requirements should be confirmed by the organization before acceptance, when the customer does not provide a documented statement of their requirements.

NOTE In some situations, such as internet sales, a formal review is impractical for each order. Instead, the review can cover relevant product information, such as catalogues.

8.2.3.2 As applicable, the organization should retain documented information on:

a) the results of the review;

b) any new requirements for the products and services.

8.2.4 Changes to requirements for products and services

The organization should ensure that relevant documented information is amended, and that relevant persons are made aware of the changed requirements, when the requirements for products and services are changed.

8.3 Design and development of products and services

8.3.1 General

The organization should establish, implement and maintain a design and development process that is appropriate to ensure the subsequent provision of products and services.

8.3.2 Design and development planning

In determining the stages and controls for design and development, the organization should consider:

a) the nature, duration and complexity of the design and development activities;

b) the required process stages, including applicable design and development reviews;

c) the required design and development verification and validation activities;

d) the responsibilities and authorities involved in the design and development process;

e) the internal and external resource needs for the design and development of products and services;

f) the need to control interfaces between persons involved in the design and development process;

g) the need for involvement of customers and users in the design and development process;

h) the requirements for subsequent provision of products and services;

i) the level of control expected for the design and development process by customers and other relevant interested parties;

j) the documented information needed to demonstrate that design and development requirements have been met.

8.3.3 Design and development inputs

The organization should determine the requirements essential for the specific types of products and services to be designed and developed. The organization should consider:

a) functional and performance requirements;

b) information derived from previous similar design and development activities;

c) statutory and regulatory requirements;

d) standards or codes of practice that the organization has committed to implement;

e) potential consequences of failure due to the nature of the products and services.

Inputs should be adequate for design and development purposes, complete and unambiguous.

Conflicting design and development inputs should be resolved.

The organization should retain documented information on design and development inputs.

8.3.4 Design and development controls

The organization should apply controls to the design and development process to ensure that:

a) the results to be achieved are defined;

b) reviews are conducted to evaluate the ability of the results of design and development to meet requirements;

c) verification activities are conducted to ensure that the design and development outputs meet the input requirements;

d) validation activities are conducted to ensure that the resulting products and services meet the requirements for the specified application or intended use;

e) any necessary actions are taken on problems determined during the reviews, or verification and validation activities;

f) documented information of these activities is retained.

NOTE 1 Design and development reviews, verification and validation have distinct purposes. They can be conducted separately or in any combination, as is suitable for the products and services of the organization.

For the design validation process, reference should be made to the official design validation process (design type testing and approval procedure) which is completed by the allocation of the UN marking, as required in 6.1.3, 6.3.4, 6.5.2 and 6.6.3 of the UN Model Regulations.

NOTE 2 Different requirements for notification of the competent authority can exist in the authorizing states.

8.3.5 Design and development outputs

The organization should ensure that design and development outputs:

a) meet the input requirements;

b) are adequate for the subsequent processes for the provision of products and services;

c) include or reference monitoring and measuring requirements, as appropriate, and acceptance criteria;

d) specify the characteristics of the products and services that are essential for their intended purpose and their safe and proper provision.

The organization should retain documented information on design and development outputs.

8.3.6 Design and development changes

The organization should identify, review and control changes made during, or subsequent to, the design and development of products and services, to the extent necessary to ensure that there is no adverse impact on conformity to requirements.

The organization should retain documented information on:

a) design and development changes;

b) the results of reviews;

c) the authorization of the changes;

d) the actions taken to prevent adverse impacts.

8.4 Control of externally provided processes, products and services

8.4.1 General

The organization should ensure that externally provided processes, products and services conform to requirements.

The organization should determine the controls to be applied to externally provided processes, products and services when:

a) products and services from external providers are intended for incorporation into the organization's own products and services;

b) products and services are provided directly to the customer(s) by external providers on behalf of the organization;

c) a process, or part of a process, is provided by an external provider as a result of a decision by the organization.

The organization should determine and apply criteria for the evaluation, selection, monitoring of performance, and re-evaluation of external providers, based on their ability to provide processes or products and services in accordance with requirements. The organization should retain documented information of these activities and any necessary actions arising from the evaluations.

Purchased products should conform to the approved design type specification. Verification of conformity by certificates of conformity in accordance with ISO/IEC 17050-2 or any other documentation providing the same level of confidence, or, where those are not provided with the delivery, by tests, should be based on the criteria given in Table G.1. The conformity of components with the approved design type specification should be verified in accordance with the minimum specification data given in Annexes C to F.

8.4.2 Type and extent of control

The organization should ensure that externally provided processes, products and services do not adversely affect the organization's ability to consistently deliver conforming products and services to its customers.

The organization should:

a) ensure that externally provided processes remain within the control of its quality management system;

b) define both the controls that it intends to apply to an external provider and those it intends to apply to the resulting output;

c) take into consideration:

   1) the potential impact of the externally provided processes, products and services on the organization's ability to consistently meet customer and applicable statutory and regulatory requirements;

   2) the effectiveness of the controls applied by the external provider;

d) determine the verification, or other activities, necessary to ensure that the externally provided processes, products and services meet requirements.

8.4.3 Information for external providers

The organization should ensure the adequacy of requirements prior to their communication to the external provider.

The organization should communicate to external providers its requirements for:

a) the processes, products and services to be provided;

b) the approval of:

   1) products and services;

   2) methods, processes and equipment;

   3) the release of products and services;

c) competence, including any required qualification of persons;

d) the external providers' interactions with the organization;

e) control and monitoring of the external providers' performance to be applied by the organization;

f) verification or validation activities that the organization, or its customer, intends to perform at the external providers' premises.

8.5 Production and service provision

8.5.1 Control of production and service provision

The organization should implement production and service provision under controlled conditions.

Controlled conditions should include, as applicable:

a) the availability of documented information that defines:

   1) the characteristics of the products to be produced, the services to be provided, or the activities to be performed;

   2) the results to be achieved;

b) the availability and use of suitable monitoring and measuring resources;

c) the implementation of monitoring and measurement activities at appropriate stages to verify that criteria for control of processes or outputs, and acceptance criteria for products and services, have been met;

d) the use of suitable infrastructure and environment for the operation of processes;

e) the appointment of competent persons, including any required qualification;

f) the validation, and periodic revalidation, of the ability to achieve planned results of the processes for production and service provision, where the resulting output cannot be verified by subsequent monitoring or measurement;

g) the implementation of actions to prevent human error;

h) the implementation of release, delivery and post-delivery activities.

After any change in process parameters, visual inspection should be carried out to ensure that the changes do not impair or change the specified design type criteria.

NOTE Changes in process parameters can change the design characteristics and require retesting in accordance with 6.1.5, 6.3.5, 6.5.6 and 6.6.5 of the UN Model Regulations.

Manufacturing processes should be validated using the control parameters given in Table G.2.

The design type test and approval procedure is also required as validation of the manufacturing process and the equipment, personnel and procedures involved.

8.5.2 Identification and traceability

The organization should use suitable means to identify outputs when it is necessary to ensure the conformity of products and services.

The organization should identify the status of outputs with respect to monitoring and measurement requirements throughout production and service provision.

The organization should control the unique identification of the outputs when traceability is a requirement, and should retain the documented information necessary to enable traceability.

8.5.3 Property belonging to customers or external providers

The organization should exercise care with property belonging to customers or external providers while it is under the organization's control or being used by the organization.

The organization should identify, verify, protect and safeguard customers' or external providers' property provided for use or incorporation into the products and services.

When the property of a customer or external provider is lost, damaged or otherwise found to be unsuitable for use, the organization should report this to the customer or external provider and retain documented information on what has occurred.

NOTE A customer's or external provider's property can include materials, components, tools and equipment, premises, intellectual property and personal data.

8.5.4 Preservation

The organization should preserve the outputs during production and service provision, to the extent necessary to ensure conformity to requirements.

NOTE Preservation can include identification, handling, contamination control, packaging, storage, transmission or transportation, and protection.

8.5.5 Post-delivery activities

The organization should meet requirements for post-delivery activities associated with the products and services.

In determining the extent of post-delivery activities that are required, the organization should consider:

a) statutory and regulatory requirements;

b) the potential undesired consequences associated with its products and services;

c) the nature, use and intended lifetime of its products and services;

d) customer requirements;

e) customer feedback.

NOTE Post-delivery activities can include actions under warranty provisions, contractual obligations such as maintenance services, and supplementary services such as recycling or final disposal.

8.5.6 Control of changes

The organization should review and control changes for production or service provision, to the extent necessary to ensure continuing conformity with requirements.

The organization should retain documented information describing the results of the review of changes, the person(s) authorizing the change, and any necessary actions arising from the review.

8.6 Release of products and services

The organization should implement planned arrangements, at appropriate stages, to verify that the product and service requirements have been met.

The release of products and services to the customer should not proceed until the planned arrangements have been satisfactorily completed, unless otherwise approved by a relevant authority and, as applicable, by the customer.

The organization should retain documented information on the release of products and services. The documented information should include:

a) evidence of conformity with the acceptance criteria;

b) traceability to the person(s) authorizing the release.

8.7 Control of nonconforming outputs

8.7.1 The organization should ensure that outputs that do not conform to their requirements are identified and controlled to prevent their unintended use or delivery.

The organization should take appropriate action based on the nature of the nonconformity and its effect on the conformity of products and services. This should also apply to nonconforming products and services detected after delivery of products, during or after the provision of services.

The organization should deal with nonconforming outputs in one or more of the following ways:

a) correction;

b) segregation, containment, return or suspension of provision of products and services;

c) informing the customer;

d) obtaining authorization for acceptance under concession.

Conformity to the requirements should be verified when nonconforming outputs are corrected.

If controls have previously shown nonconformities during production, appropriate measures, such as final inspection of the complete lot, or performance testing at a higher frequency, should be carried out in context with corrective/preventive actions.

NOTE Corrective actions can be subject to the agreement of the competent authority.

8.7.2 The organization should retain documented information that:

a) describes the nonconformity;

b) describes the actions taken;

c) describes any concessions obtained;

d) identifies the authority deciding the action in respect of the nonconformity.

9 Performance evaluation

9.1 Monitoring, measurement, analysis and evaluation

9.1.1 General

The organization should determine:

a) what needs to be monitored and measured;

b) the methods for monitoring, measurement, analysis and evaluation needed to ensure valid results;

c) when the monitoring and measuring should be performed;

d) when the results from monitoring and measurement should be analysed and evaluated.

The organization should evaluate the performance and the effectiveness of the quality management system.

The organization should retain appropriate documented information as evidence of the results.

Monitoring of production should be based on visual or computer-aided automated monitoring of the manufacturing process to identify any need for adjustment to the function of machines and installations.

At initial production, first samples should be checked for conformity with the design type specifications as described in Annexes C to E. Where applicable, conformity of the following should be verified:

— dimensions;

— masses;

— quality of openings;

— quality of seams;

— UN marking.

Monitoring and measurement of the manufactured packagings, IBCs and large packagings should include (as a minimum) the items/elements given in Table G.3.

Conformity with the approved performance levels of packaging, IBC and large packaging design types should be verified periodically as specified in a test plan or procedure (including frequency and acceptance limits) to confirm the continuing ability of the manufacturing process to satisfy its intended purpose.

NOTE 1 See 6.1.5, 6.3.5, 6.5.6 and 6.6.5 of the UN Model Regulations for the relevant regulatory requirements.

NOTE 2 See Annex H for examples of typical frequencies for the verification of conformity.

Performance test conditions should be specified. For the execution of the performance tests listed in Tables G.4 and G.5, the design type performance test requirements should be met.

NOTE 3 For the purpose of production monitoring, the test conditions can differ from the design type test requirements and can be restricted to comparisons with previous test results.

NOTE 4 The monitoring and measurement of product can also be used to demonstrate compliance with 6.1.5.1.3, 6.3.5.1.3, 6.5.1.6.7 and 6.6.5.1.3 of the UN Model Regulations. For this purpose, performance tests at random can be performed on production samples at intervals agreed with the competent authority.

9.1.2 Customer satisfaction

The organization should monitor customers' perceptions of the degree to which their needs and expectations have been fulfilled. The organization should determine the methods for obtaining, monitoring and reviewing this information.

NOTE Examples of monitoring customer perceptions can include customer surveys, customer feedback on delivered products and services, meetings with customers, market-share analysis, compliments, warranty claims and dealer reports.

9.1.3 Analysis and evaluation

The organization should analyse and evaluate appropriate data and information arising from monitoring and measurement.

The results of analysis should be used to evaluate:

a) conformity of products and services;

b) the degree of customer satisfaction;

c) the performance and effectiveness of the quality management system;

d) if planning has been implemented effectively;

e) the effectiveness of actions taken to address risks and opportunities;

f) the performance of external providers;

g) the need for improvements to the quality management system.

NOTE Methods to analyse data can include statistical techniques.

9.2 Internal audit

9.2.1 The organization should conduct internal audits at planned intervals to provide information on whether the quality management system:

a) conforms to:

   1) the organization's own requirements for its quality management system;

   2) the requirements of this document;

b) is effectively implemented and maintained.

9.2.2 The organization should:

a) plan, establish, implement and maintain an audit programme(s) including the frequency, methods, responsibilities, planning requirements and reporting, which should take into consideration the importance of the processes concerned, changes affecting the organization, and the results of previous audits;

b) define the audit criteria and scope for each audit;

c) select auditors and conduct audits to ensure objectivity and the impartiality of the audit process;

d) ensure that the results of the audits are reported to relevant management;

e) take appropriate correction and corrective actions without undue delay;

f) retain documented information as evidence of the implementation of the audit programme and the audit results.

NOTE See ISO 19011 for guidance.

9.3 Management review

9.3.1 General

Top management should review the organization's quality management system, at planned intervals, to ensure its continuing suitability, adequacy, effectiveness and alignment with the strategic direction of the organization.

9.3.2 Management review inputs

The management review should be planned and carried out taking into consideration:

a) the status of actions from previous management reviews;

b) changes in external and internal issues that are relevant to the quality management system;

c) information on the performance and effectiveness of the quality management system, including trends in:

   1) customer satisfaction and feedback from relevant interested parties;

   2) the extent to which quality objectives have been met;

   3) process performance and conformity of products and services;

4) nonconformities and corrective actions;

5) monitoring and measurement results;

6) audit results;

7) the performance of external providers;

d) the adequacy of resources;

e) the effectiveness of actions taken to address risks and opportunities (see 6.1);

f) opportunities for improvement.

9.3.3 Management review outputs

The outputs of the management review should include decisions and actions related to:

a) opportunities for improvement;

b) any need for changes to the quality management system;

c) resource needs.

The organization should retain documented information as evidence of the results of management reviews.

10 Improvement

10.1 General

The organization should determine and select opportunities for improvement and implement any necessary actions to meet customer requirements and enhance customer satisfaction.

These should include:

a) improving products and services to meet requirements as well as to address future needs and expectations;

b) correcting, preventing or reducing undesired effects;

c) improving the performance and effectiveness of the quality management system.

NOTE 1 Examples of improvement can include correction, corrective action, continual improvement, breakthrough change, innovation and re-organization.

NOTE 2 In order to achieve conformity with the approved design type specifications, the procedures for corrective action can require agreement with the competent authority.

10.2 Nonconformity and corrective action

10.2.1 When a nonconformity occurs, including any arising from complaints, the organization should:

a) react to the nonconformity and, as applicable:

1) take action to control and correct it;

2) deal with the consequences;

b) evaluate the need for action to eliminate the cause(s) of the nonconformity, in order that it does not recur or occur elsewhere, by:

1) reviewing and analysing the nonconformity;

2) determining the causes of the nonconformity;

3) determining if similar nonconformities exist, or can potentially occur;

c) implement any action needed;

d) review the effectiveness of any corrective action taken;

e) update risks and opportunities determined during planning, if necessary;

f) make changes to the quality management system, if necessary.

Corrective actions should be appropriate to the effects of the nonconformities encountered.

10.2.2 The organization should retain documented information as evidence of:

a) the nature of the nonconformities and any subsequent actions taken;

b) the results of any corrective action.

10.3 Continual improvement

The organization should continually improve the suitability, adequacy and effectiveness of the quality management system.

The organization should consider the results of analysis and evaluation, and the outputs from management review, to determine if there are needs or opportunities that should be addressed as part of continual improvement.

Annex A
(informative)

Clarification of new structure, terminology and concepts

A.1 Structure and terminology

The clause structure (i.e. clause sequence) and some of the terminology of this document, in comparison with the previous edition (based on ISO 9001:2008), have been changed to improve alignment with other management systems standards.

There is no requirement in this document for its structure and terminology to be applied to the documented information of an organization's quality management system.

The structure of clauses is intended to provide a coherent presentation of requirements, rather than a model for documenting an organization's policies, objectives and processes. The structure and content of documented information related to a quality management system can often be more relevant to its users if it relates to both the processes operated by the organization and information maintained for other purposes.

There is no requirement for the terms used by an organization to be replaced by the terms used in this document to specify quality management system requirements. Organizations can choose to use terms which suit their operations (e.g. using "records", "documentation" or "protocols" rather than "documented information"; or "supplier", "partner" or "vendor" rather than "external provider"). Table A.1 shows the major differences in terminology between this edition of this document and the previous edition.

Table A.1 — Major differences in terminology between ISO 9001:2008 and ISO 9001:2015

ISO 9001:2008	ISO 9001:2015
Products	Products and services
Exclusions	Not used (See A.5 for clarification of applicability)
Management representative	Not used (Similar responsibilities and authorities are assigned but no requirement for a single management representative)
Documentation, quality manual, documented procedures, records	Documented information
Work environment	Environment for the operation of processes
Monitoring and measuring equipment	Monitoring and measuring resources
Purchased product	Externally provided products and services
Supplier	External provider

A.2 Products and services

ISO 9001:2008 used the term "product" to include all output categories. This edition of this document uses "products and services". "Products and services" include all output categories (hardware, services, software and processed materials).

The specific inclusion of "services" is intended to highlight the differences between products and services in the application of some requirements. The characteristic of services is that at least part of the output is realized at the interface with the customer. This means, for example, that conformity to requirements cannot necessarily be confirmed before service delivery.

In most cases, products and services are used together. Most outputs that organizations provide to customers, or are supplied to them by external providers, include both products and services. For example, a tangible or intangible product can have some associated service or a service can have some associated tangible or intangible product.

A.3 Understanding the needs and expectations of interested parties

Subclause 4.2 specifies requirements for the organization to determine the interested parties that are relevant to the quality management system and the requirements of those interested parties. However, subclause 4.2 does not imply extension of quality management system requirements beyond the scope of this document. As stated in the scope, this document is applicable where an organization needs to demonstrate its ability to consistently provide products and services that meet customer and applicable statutory and regulatory requirements, and aims to enhance customer satisfaction.

There is no requirement in this document for the organization to consider interested parties where it has decided that those parties are not relevant to its quality management system. It is for the organization to decide if a particular requirement of a relevant interested party is relevant to its quality management system.

A.4 Risk-based thinking

The concept of risk-based thinking has been implicit in previous editions of this document, e.g. through requirements for planning, review and improvement. This document specifies requirements for the organization to understand its context (see 4.1) and determine risks as a basis for planning (see 6.1). This represents the application of risk-based thinking to planning and implementing quality management system processes (see 4.4) and will assist in determining the extent of documented information.

One of the key purposes of a quality management system is to act as a preventive tool. Consequently, this document does not have a separate clause or subclause on preventive action. The concept of preventive action is expressed through the use of risk-based thinking in formulating quality management system requirements.

The risk-based thinking applied in this document has enabled some reduction in prescriptive requirements and their replacement by performance-based requirements. There is greater flexibility than in ISO 9001:2008 in the requirements for processes, documented information and organizational responsibilities.

Although 6.1 specifies that the organization should plan actions to address risks, there is no requirement for formal methods for risk management or a documented risk management process. Organizations can decide whether or not to develop a more extensive risk management methodology than is required by this document, e.g. through the application of other guidance or standards.

Not all the processes of a quality management system represent the same level of risk in terms of the organization's ability to meet its objectives, and the effects of uncertainty are not the same for all organizations. Under the requirements of 6.1, the organization is responsible for its application of risk-based thinking and the actions it takes to address risk, including whether or not to retain documented information as evidence of its determination of risks.

A.5 Applicability

This document does not refer to “exclusions” in relation to the applicability of its requirements to the organization's quality management system. However, an organization can review the applicability of requirements due to the size or complexity of the organization, the management model it adopts, the range of the organization's activities and the nature of the risks and opportunities it encounters.

The requirements for applicability are addressed in 4.3, which defines conditions under which an organization can decide that a requirement cannot be applied to any of the processes within the scope

of its quality management system. The organization can only decide that a requirement is not applicable if its decision will not result in failure to achieve conformity of products and services.

A.6 Documented information

As part of the alignment with other management system standards, a common clause on "documented information" has been adopted without significant change or addition (see 7.5). Where appropriate, text elsewhere in this document has been aligned with its requirements. Consequently, "documented information" is used for all document requirements.

Where ISO 9001:2008 used specific terminology such as "document" or "documented procedures", "quality manual" or "quality plan", this edition of this document defines requirements to "maintain documented information".

Where ISO 9001:2008 used the term "records" to denote documents needed to provide evidence of conformity with requirements, this is now expressed as a requirement to "retain documented information". The organization is responsible for determining what documented information needs to be retained, the period of time for which it is to be retained and the media to be used for its retention.

A requirement to "maintain" documented information does not exclude the possibility that the organization can also need to "retain" that same documented information for a particular purpose, e.g. to retain previous versions of it.

Where this document refers to "information" rather than "documented information" (e.g. in 4.1: "The organization should monitor and review the information about these external and internal issues"), there is no requirement that this information is to be documented. In such situations, the organization can decide whether or not it is necessary or appropriate to maintain documented information.

A.7 Organizational knowledge

In 7.1.6, this document addresses the need to determine and manage the knowledge maintained by the organization, to ensure the operation of its processes and that it can achieve conformity of products and services.

Requirements regarding organizational knowledge were introduced for the purpose of:

a) safeguarding the organization from loss of knowledge, e.g.:
   - through staff turnover;
   - failure to capture and share information;

b) encouraging the organization to acquire knowledge, e.g.:
   - learning from experience;
   - mentoring;
   - benchmarking.

A.8 Control of externally provided processes, products and services

All forms of externally provided processes, products and services are addressed in 8.4, e.g. whether through:

a) purchasing from a supplier;

b) an arrangement with an associate company;

c) outsourcing processes to an external provider.

Outsourcing always has the essential characteristic of a service, since it will have at least one activity necessarily performed at the interface between the provider and the organization.

The controls required for external provision can vary widely depending on the nature of the processes, products and services. The organization can apply risk-based thinking to determine the type and extent of controls appropriate to particular external providers and externally provided processes, products and services.

Annex B
(informative)

Other International Standards on quality management and quality management systems developed by ISO/TC 176

The International Standards described in this annex have been developed by ISO/TC 176 to provide supporting information for organizations that apply this document, and to provide guidance for organizations that choose to progress beyond its requirements. Guidance or requirements contained in the documents listed in this annex do not add to, or modify, the requirements of this document.

Table B.1 shows the relationship between these standards and the relevant clauses of this document.

This annex does not include reference to the sector-specific quality management system standards developed by ISO/TC 176.

This document is one of the three core standards developed by ISO/TC 176.

— ISO 9000 provides an essential background for the proper understanding and implementation of this document. The quality management principles are described in detail in ISO 9000 and have been taken into consideration during the development of this document. These principles are not requirements in themselves, but they form the foundation of the requirements specified by this document. ISO 9000 also defines the terms, definitions and concepts used in this document.

— ISO 9001 specifies requirements aimed primarily at giving confidence in the products and services provided by an organization and thereby enhancing customer satisfaction. Its proper implementation can also be expected to bring other organizational benefits, such as improved internal communication, better understanding and control of the organization's processes.

— ISO 9004 provides guidance for organizations that choose to progress beyond the requirements of this document, to address a broader range of topics that can lead to improvement of the organization's overall performance. ISO 9004 includes guidance on a self-assessment methodology for an organization to be able to evaluate the level of maturity of its quality management system.

The International Standards outlined below can provide assistance to organizations when they are establishing or seeking to improve their quality management systems, their processes or their activities.

— ISO 10001 provides guidance to an organization in determining that its customer satisfaction provisions meet customer needs and expectations. Its use can enhance customer confidence in an organization and improve customer understanding of what to expect from an organization, thereby reducing the likelihood of misunderstandings and complaints.

— ISO 10002 provides guidance on the process of handling complaints by recognizing and addressing the needs and expectations of complainants and resolving any complaints received. ISO 10002 provides an open, effective and easy-to-use complaints process, including training of people. It also provides guidance for small businesses.

— ISO 10003 provides guidance for effective and efficient external dispute resolution for product-related complaints. Dispute resolution gives an avenue of redress when organizations do not remedy a complaint internally. Most complaints can be resolved successfully within the organization, without adversarial procedures.

— ISO 10004 provides guidelines for actions to enhance customer satisfaction and to determine opportunities for improvement of products, processes and attributes that are valued by customers. Such actions can strengthen customer loyalty and help retain customers.

— ISO 10005 provides guidance on establishing and using quality plans as a means of relating requirements of the process, product, project or contract, to work methods and practices that support product realization. Benefits of establishing a quality plan are increased confidence that requirements will be met, that processes are in control and the motivation that this can give to those involved.

— ISO 10006 is applicable to projects from the small to large, from simple to complex, from an individual project to being part of a portfolio of projects. ISO 10006 is to be used by personnel managing projects and who need to ensure that their organization is applying the practices contained in the ISO quality management system standards.

— ISO 10007 is to assist organizations applying configuration management for the technical and administrative direction over the life cycle of a product. Configuration management can be used to meet the product identification and traceability requirements specified in this document.

— ISO 10008 gives guidance on how organizations can implement an effective and efficient business-to-consumer electronic commerce transaction (B2C ECT) system, and thereby provides a basis for consumers to have increased confidence in B2C ECTs, enhance the ability of organizations to satisfy consumers and help reduce complaints and disputes.

— ISO 10012 provides guidance for the management of measurement processes and metrological confirmation of measuring equipment used to support and demonstrate compliance with metrological requirements. ISO 10012 provides quality management criteria for a measurement management system to ensure metrological requirements are met.

— ISO/TR 10013 provides guidelines for the development and maintenance of the documentation necessary for a quality management system. ISO/TR 10013 can be used to document management systems other than those of the ISO quality management system standards, e.g. environmental management systems and safety management systems.

— ISO 10014 is addressed to top management. It provides guidelines for realizing financial and economic benefits through the application of quality management principles. It facilitates application of management principles and selection of methods and tools that enable the sustainable success of an organization.

— ISO 10015 provides guidelines to assist organizations in addressing issues related to training. ISO 10015 can be applied whenever guidance is required to interpret references to “education” and “training” within the ISO quality management system standards. Any reference to “training” includes all types of education and training.

— ISO/TR 10017 explains statistical techniques which follow from the variability that can be observed in the behaviour and results of processes, even under conditions of apparent stability. Statistical techniques allow better use of available data to assist in decision making, and thereby help to continually improve the quality of products and processes to achieve customer satisfaction.

— ISO 10018 provides guidelines which influence people involvement and competence. A quality management system depends on the involvement of competent people and the way that they are introduced and integrated into the organization. It is critical to determine, develop and evaluate the knowledge, skills, behaviour and work environment required.

— ISO 10019 provides guidance for the selection of quality management system consultants and the use of their services. It gives guidance on the process for evaluating the competence of a quality management system consultant and provides confidence that the organization's needs and expectations for the consultant's services will be met.

— ISO 19011 provides guidance on the management of an audit programme, on the planning and conducting of an audit of a management system, as well as on the competence and evaluation of an auditor and an audit team. ISO 19011 is intended to apply to auditors, organizations implementing management systems, and organizations needing to conduct audits of management systems.

Table B.1 — Relationship between other International Standards on quality management and quality management systems and the clauses of this document

Other International Standard	Clause in this document						
	4	5	6	7	8	9	10
ISO 9000	All	All	All	All	All	All	All
ISO 9004	All	All	All	All	All	All	All
ISO 10001					8.2.2, 8.5.1	9.1.2	
ISO 10002					8.2.1	9.1.2	10.2.1
ISO 10003						9.1.2	
ISO 10004						9.1.2, 9.1.3	
ISO 10005		5.3	6.1, 6.2	All	All	9.1	10.2
ISO 10006	All	All	All	All	All	All	All
ISO 10007					8.5.2		
ISO 10008	All	All	All	All	All	All	All
ISO 10012				7.1.5			
ISO/TR 10013				7.5			
ISO 10014	All	All	All	All	All	All	All
ISO 10015				7.2			
ISO/TR 10017			6.1	7.1.5		9.1	
ISO 10018	All	All	All	All	All	All	All
ISO 10019					8.4		
ISO 19011						9.2	

NOTE "All" indicates that all the subclauses in the specific clause of this document are related to the other International Standard.

Annex C
(informative)

Packaging specification data

Tables C.1 to C.5 correlate to the different packaging codifications found in the UN recommendations with data, which are necessary for the identification of test packagings by users, test facilities and competent authorities.

Specification data in this annex are grouped for the following 3 categories of packagings and 2 complements:

1) light gauge metal packagings, drums, jerricans, and composite drums — see Table C.1;

2) boxes, composite boxes —see Table C.2;

3) bags — see Table C.3;

4) inner packagings (or articles) of combination packaging — see Table C.4;

5) fittings of combination packagings — see Table C.5.

Each item in the tables is numbered and the key to Tables C.1 to C.5 is in Table F.1.

Table C.1 — Light gauge metal packagings, drums, jerricans, and composite drums specification

		0 Light gauge metal packagings		1 Drum									3 Jerrican						6 Composite Packaging				
No.		A1	A2	A1	A2	B1	B2	D	G	H1	H2	N	A1	A2	B1	B2	H1	H2	HA1	HB1	HD1	HG1	HH1
1	Packaging description (code and, if necessary, trade name)(see Annex F)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2	Manufacturer's name and address (see Annex F)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
3	Method of construction (see Annex F)									•	•	•					•	•	•	•	•	•	•
4	Nominal capacity (see Annex F)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
5	Brimful capacity (see Annex F)	+	+	+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+
7	Diameter, external at widest point	+	+	+	+	+	+	+	+	+	+	+							+	+	+	+	+
8	Diameter, external at narrowest point (e.g. conical pails)	+	+	+	+	+	+	+	+	+	+	+											
9a	Dimension external (length, width, height)	+	+										+	+	+	+	+	+					
11	Overall height	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
13	End seams type	•	•	•	•	•	•	•	•			•	•	•	•	•			•	•	•		
14	Side seam type	•	•	•	•	•	•					•	•	•	•	•			•	•	•		
15	Handles, material type, number and position	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
16	Closure(s), diameter(s),design(s) (thread, type, pitch and venting) and material(s)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
17	Closure(s), (or neck(s)) position(s)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
21	Mass of closures with gasket/wad	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
22	Closure manufacturer's name	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Table C.1 *(continued)*

		0 Light gauge metal packagings		1 Drum									3 Jerrican						6 Composite Packaging				
No.		**A1**	**A2**	**A1**	**A2**	**B1**	**B2**	**D**	**G**	**H1**	**H2**	**N**	**A1**	**A2**	**B1**	**B2**	**H1**	**H2**	**HA1**	**HB1**	**HD1**	**HG1**	**HH1**
25	Closure(s)(e.g screw cap, Lid): material	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
31	Tare mass	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
32a	Wall thickness, top head, bottom head, body, removable head	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
33	Material type and grade (polymer), top head, bottom head, body, removable head	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
39	Body corrugations, number	•	•	•	•	•	•												•	•			
41	Rolling hoops, number, height and location			•	•	•	•					•											
42	Closing ring , description, material, thickness		•		•		•	•	•		•			•		•		•					
45	Number of plies/Grammage per ply body, and combined (body)							•	•														
47	Inner liner type, material	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•					
48	Chime reinforcement								•														
49	Method of lid retention (other than closing ring)							•	•														
50	Mass inner packagings																		+	+	+	+	+

Table C.2 — Boxes and composite boxes packaging specification

		4 Box								6 Composite Packaging					
No.		**A**	**B**	**C**	**D**	**F**	**G**	**H1**	**H2**	**HA2**	**HB2**	**HC**	**HD2**	**HG2**	**HH2**
1	Packaging description (code and, if necessary, trade name) (see Annex F)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2	Manufacturer's name and address (see Annex F)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
3	Method of construction (see Annex F)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
9a	Dimension external (length × width × height)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
9b	Dimension internal (length, width, height)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
15	Handles, material type, number and position	•	•	•	•	•	•	•	•	•	•	•	•	•	•
31	Tare mass	+	+	+	+	+		+	+	+	+	+	+		+
32a	Wall thickness, top head, bottom head, body, removable head	+	+	+	+	+		+	+	+	+	+	+		+
33	Material type and grade (polymer), top head, bottom head, body, removable head	•	•	•	•	•		•	•	•	•	•	•		•
53	Closures, number, type, position and materials (see Annex F)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
54	Reinforcements, type, position and materials	•	•	•	•	•	•	•	•	•	•	•	•	•	•
55	Material ends	•	•	•	•	•	•	•	•	•	•	•	•	•	•
56	Method of joining panels	•	•	•	•	•	•	•	•	•	•	•	•	•	•
58	Grammage by paper and paper type						+							+	
59	Corrugated flute type						+							+	
60	Corrugated combined grammage						+							+	
61	Edge compression test (ECT)						+							+	
62	Burst strength						+							+	
64	top inner flap: gap or meet						•							•	
65	top outer flap: meet or overlap						•							•	
66	bottom inner flap: gap or meet						•							•	
67	bottom outer flap: meet or overlap						•							•	
91	Puncture resistance						+							+	
105	Water resistance of the outer surface of the solid or fibreboard by Cobb method						+							+	

Table C.3 — Bags packaging specification

		5 Bags								
No.		**H1**	**H2**	**H3**	**H4**	**L1**	**L2**	**L3**	**M1**	**M2**
1	Packaging description (code and, if necessary, trade name) (see Annex F)	•	•	•	•	•	•	•	•	•
2	Manufacturer's name and address (see Annex F)	•	•	•	•	•	•	•	•	•
3	Method of construction (see Annex F)	•	•	•	•	•	•	•	•	•
9c	Dimensions external (length, width, height), flat un-opened (where applicable)	+	+	+	+	+	+	+	+	+
46	Grammage of material per square metre	+	+	+		+	+	+		
58	Grammage by paper and paper type								+	+
69	Gusset, open width	+	+	+	+	+	+	+	+	+
70	Bottom width, flat unopened	+	+	+	+	+	+	+	+	+
71	Valve width	+	+	+	+	+	+	+	+	+
73	Closure method (top, base, side)	•	•	•	•	•	•	•	•	•
74	Perforations	•	•	•	•	•	•	•	•	•
75	Sewing, style and density of stitches	•	•	•	•	•	•	•	•	•
76	Type of thread and minimum breaking load	•	•	•	•	•	•	•	•	•
78	Adhesive, type	•	•	•	•	•	•	•	•	•
79	Fabric (warp/weft), tapes per 100 mm					•	•	•		
82	Coating, material, thickness, mass		•	•			•	•	•	•
83	Liner material, thickness		+	+			+	+	+	+
84	Material strength, tensile (energy absorption) and elongation	+	+	+	+	+	+	+		
106	Structure of wall: number, type and specification of plies								•	•
107	film thickness				+					

Table C.4 — Inner packaging (or articles) of combination packaging

No.		**Inner packagings**	**Articles**
1a	Description	•	•
27	Tare mass	+	
30	Material type	•	
32	Nominal thickness	•	
51	Design standard or drawing	•	•
52	Dimensions	•	•
87	Quantity or number	•	•
90	Orientation and arrangement of inner packagings and articles	•	•

Table C.5 — Fittings of combination packagings specification

No.		Removable fittings	Permanent fittings
1a	Description	•	•
27	Tare mass	+	
30	Material type	•	•
52	Dimensions	+	
87	Quantity or number	•	•
88	Location(s)		•
89	Means of fixing to packaging		•

Annex D
(informative)

IBC specification data

Tables D.1 and D.2 correlate to the different IBC types found in the UN recommendation with data, which are necessary for the identification of test IBCs by users, test facilities and competent authorities.

Specification data in this annex are grouped for the following 2 categories of IBCs:

1) Metal IBCs, rigid plastics IBCs, wooden and fibreboard IBCs — see Table D.1

2) Flexible IBCs — see Table D.2

Each item in the tables is numbered and the key to Tables D.1 and D.2 is in Table F.1.

NOTE 1 In many instances, specifications can be in the form of dimensioned drawings rather than as text.

NOTE 2 For flexible IBC (FIBC), a sample of the body material is usually cut-out, labelled or otherwise identified and retained as part of the specification.

Table D.1 — Metal IBCs, rigid plastics IBCs, wooden and fibreboard IBCs specification

No.		11 Rigid for solids											21 Rigid for solids							31 Rigid for liquids						
		A	B	C	D	F	G	H1	H2	HZ1	HZ2	N	A	B	H1	H2	HZ1	HZ2	N	A	B	H1	H2	HZ1	HZ2	N
1	IBC description (code and, if necessary, trade name) (see Annex F)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2	Manufacturer's name and address (see Annex F)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
3	Method of construction	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
4	Nominal capacity (see Annex F)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
5	Brimful capacity (see Annex F)	+	+					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
9c	Dimensions external (length, width, height), flat unopened (where applicable)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
15a	Top lift devices: Number, material, position	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
16a	Filling and discharge aperture closure, material, type and identification	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
17a	Filling and discharge aperture(s), internal diameter, design, position	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
17b	Pressure relief fittings, internal diameter and design, position												•	•	•	•	•	•	•	•	•	•	•	•	•	•
31	Tare mass	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
32b	Nominal thickness and material type and grade, head or lid, body, base	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
38	Material lid gasket	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
42	Closing ring, description, material, thickness	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
45a	Number of plies				•																					

Table D.1 *(continued)*

No.		11 Rigid for solids											21 Rigid for solids							31 Rigid for liquids						
		A	B	C	D	F	G	H1	H2	HZ1	HZ2	N	A	B	H1	H2	HZ1	HZ2	N	A	B	H1	H2	HZ1	HZ2	N
47	Inner liner type, material			•	•	•	•																			
49	Method of lid retention (other than closing ring)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
50	Mass inner packagings									+	+						+	+						+	+	
53a	Fastening system: Number, position, material			•	•	•	•																			
56	Method of joining panels			•	•	•	•																			
58	Grammage by paper and paper type						+																			
59	Corrugated flute type						+																			
60	Corrugated combined grammage						+																			
91	Puncture resistance						+																			
101	Type of base, material and means of attachment (where appropriate)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Table D.2 — Flexible IBCs specification

No.		H1	H2	H3	H4	H5	L1	L2	L3	L4	M1	M2
1	IBC description (code and, if necessary, trade name) (see Annex F)	•	•	•	•	•	•	•	•	•	•	•
2	Manufacturer's name and address (see Annex F)	•	•	•	•	•	•	•	•	•	•	•
3	Method of construction	•	•	•	•	•	•	•	•	•	•	•
4	Nominal capacity (see Annex F)	•	•	•	•	•	•	•	•	•	•	•
9c	Dimensions external (length, width, height), flat unopened (where applicable)	+	+	+	+	+	+	+	+	+	+	+
15a	Top lift devices: Number, material, position	+	+	+	+	+	+	+	+	+	+	+
16a	Filling and discharge aperture closure, material, type and identification	•	•	•	•	•	•					
17a	Filling and discharge aperture(s), internal diameter, design, position	•	•	•	•	•	•					
31	Tare mass	+	+	+	+	+	+	+	+	+	+	+
32b	Nominal thickness and material type and grade, head or lid, body, base					•						
32c	Material type	•	•	•	•	•	•	•	•	•	•	•
45a	Number of plies										•	•
46	Grammage of material per square metre	+	+	+	+		+	+	+	+	•	•
75	Sewing: Style and density of stitches	•	•	•	•	•	•	•	•	•	•	•
76	Type of thread and minimum breaking load	•	•	•	•	•	•	•	•	•	•	•
77	Filter cord	•	•	•	•	•	•	•	•	•	•	•
78	Adhesive, type	•	•	•	•	•	•	•	•	•	•	•
79	Fabric (warp/weft), tapes per 100 mm	+	+	+	+		+	+	+	+		
82	Coating, material, thickness, mass		•	•	•			•	•	•	•	•
83	Liner: material, thickness		+	+	+			+	+	+	+	+
84	Material strength, tensile (energy absorption) and elongation	+	+	+	+	+						
104	Seams: Type	•	•	•	•	•	•	•	•	•	•	•

Annex E
(informative)

Large packaging (LP) specification data

Tables E.1, E.2 and E.3 correlate to the different large packaging codifications found in the UN recommendation with data, which are necessary for the identification of test LP by users, test facilities and competent authorities.

Specification data in this annex are grouped for the following 1 category of LP and 2 components:

1) Large packaging — see Table E.1;

2) Inner packaging (or articles) of Large Packaging — see Table E.2;

3) Fittings of Large Packaging — see Table E.3.

Each item in the tables is numbered and the key to Tables E.1, E.2 and E.3 is in Table F.1.

Table E.1 — Large packaging specification

No.		50 Rigid								51 Flexible	
		A	B	C	D	F	G	H	N	H	M
1	Packaging description (code and trade name) (see Annex F)	•	•	•	•	•	•	•	•	•	•
2	Manufacturer's name and address (see Annex F)	•	•	•	•	•	•	•	•	•	•
3	Method of construction (see Annex F)	•	•	•	•	•	•	•	•	•	•
4	Nominal capacity (see Annex F)									•	•
9b	Dimension internal (length, width, height)	•	•	•	•	•	•	•	•		
9c	Dimensions external (length, width, height), flat unopened (where applicable)	+	+	+	+	+	+	+	+	+	+
15	Handles, material type, number and position	•	•	•	•	•	•	•	•		
31	Tare mass	+	+	+	+	+	+	+	+	+	+
32b	Nominal thickness and material type and grade, head or lid, body, base	•	•	•	•	•	•	•	•	•	
32c	Material type									•	•
38	Material lid gasket	•	•					•	•		
45a	Number of plies										+
46	Grammage of material per square metre									+	+
53	Closures, number, type, position and materials (see Annex F)	•	•	•	•	•	•	•	•		
54	Reinforcements, type, position and materials	•	•	•	•	•	•	•	•		
56	Method of joining panels			•	•	•	•				
58	Grammage by paper and paper type						+				
59	Corrugated flute type						+				
60	Corrugated combined grammage						+				
69	Gusset, open width									+	+
70	Bottom width, flat unopened									+	+
71	Valve width									+	+