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

Emballage — Emballage de transport pour marchandises dangereuses — Emballage pour marchandises dangereuses, grands récipients pour vrac et grands emballages — Directives pour l'application de l'EN ISO 9001

ICS 13.300; 55.020

ISO/CEN PARALLEL ENQUIRY

This draft International Standard is a draft European Standard developed within the European Committee for Standardization (CEN) and processed under the CEN-lead mode of collaboration as defined in the Vienna Agreement. The document has been transmitted by CEN to ISO for circulation for ISO member body voting in parallel with CEN enquiry. Comments received from ISO member bodies, including those from non-CEN members, will be considered by the appropriate CEN technical body. **Accordingly, ISO member bodies who are not CEN members are requested to send *a copy* of their comments on this DIS directly to CEN/TC 261** (AFNOR, Avenue Francis de Pressensé, 11, F - 93571 Saint Denis La Plaine Cedex) **as well as returning their vote and comments in the normal way to the ISO Central Secretariat.** Should this DIS be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month FDIS vote in ISO and formal vote in CEN.

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 16106 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)*.

Contents

Foreword

This document (prEN ISO 16106) has been prepared by CEN /TC 261, "Packaging" in collaboration with ISO/TC 122 "Packaging".

This document is currently submitted to the Parallel Enquiry.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports the objectives of the framework Directives on Transport of Dangerous Goods.

This European Standard has been submitted for reference into the RID and/or in the technical annexes of the ADR. Therefore in this context the standards listed in the normative references and covering basic requirements of the RID/ADR not addressed within the present standard are normative only when the standards themselves are referred to in the RID and/or in the technical annexes of the ADR.

Introduction

This Standard gives guidance for the application of EN ISO 9001, as a means of compliance with legal requirements, based on the multi-modal United Nations Recommendations on the Transport of Dangerous Goods [1], (referred to in this document as the UN Model Regulations). These 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. The international agreements include:

- The European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR) (covering most of Europe). (2)
- Regulations concerning the International Carriage of Dangerous Goods by Rail (RID) (covering most of Europe, parts of North Africa and the Middle East). (3)
- The International Civil Aviation Organisation's Technical Instructions for the Safe Transport of Dangerous Goods by Air (world wide). (4)
- The International Maritime Dangerous Goods Code (world wide). (5)

The application of this Standard will need to take account of the requirements of these international agreements and the relevant national regulations for dangerous goods.

Compliance with this standard does not replace the agreement of competent authorities as well as competent authorities may also accept quality assurance programmes following different patterns.

In conjunction with EN ISO 9001, this International Standard specifies technical details for quality management systems relating to the production and testing of dangerous goods packaging, IBCs and large packagings. It can only be used in combination with EN ISO 9001 and is not a "stand alone" standard. However, this standard does not apply to the design type testing, for which reference is made to EN/ISO 16104 and 16467.

The change in words in the EN ISO 9000 standard series from "quality assurance programmes" (1987 revision), over "quality systems" (1994 revision) to "quality management systems", has not yet been considered by the rule setting authorities responsible for the modal requirements referred to in the Bibliography. This is why the former expression is still used in the legal texts. Furthermore, the term "testing", which was used in the 1994 revision in context with product inspection and testing has now been replaced by "measurement and monitoring" in the 2000 revision.
However, for this standard, the new wording is applied to be consistent with the EN ISO 9000 standard series. The successful application of this standard should not be hindered by this difference in wording.

The reasons for establishing this specific document in addition to the EN ISO 9000 standard series and for interpretations of the legal requirements (e.g. ADR 6.1.1.4, 6.5.1.6.1 and 6.6.1.2) are as follows:

a) The wording of the legal requirements is restricted to the basic need, that there should be a quality assurance programme that satisfies the competent authority and is open to different interpretation;
b) The items of concern to be assured with respect to their quality (dangerous goods packagings, IBCs and large packagings) are subject to legal requirements. The conformity of any manufactured item to the relevant provisions is based on the principle of official design type

testing and approval, which requires that specific measures are applied in order to secure the conformity of any of the unlimited number of items to the requirements of an approved design;

c) In view of the cost implications of quality assurance/ quality management measures, complete freedom of interpretation could have an avoidable negative impact on competition;
d) The establishment of quality assurance/ management measures is, particularly for smaller companies, a heavy burden and calls for further guidance;
e) Interactions between companies and competent authorities on the adequacy of QA/QM programmes need to be rationalised and unnecessary effort reduced to a minimum.

This Standard is based on Revision 12 of the UN Model Regulations.

This International standard has been prepared in co-operation with CEN under mandate M/086 (Standardisation in the field of dangerous goods) given to CEN by the European Commission. The relationship of this standard with EC directives is given in annex A.

1 Scope

This Standard applies to the manufacture, quality measurement and monitoring of design type approved dangerous goods packagings, IBCs and large packagings.

2 Normative references

The following normative documents contain provisions, which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

ISO 9000:2000 *Quality management systems — Fundamentals and vocabulary*
EN ISO 9001:2000, *Quality management systems —Requirements;*
EN ISO 16104:2002, *Packaging – Transport packaging for dangerous goods – Test methods;*
EN ISO 16467:2002, *Packaging – Transport packaging for dangerous goods – Test methods for IBCs;*
EN 45014:1998: *General criteria for supplier's declaration of conformity (ISO/IEC Guide 22:1996).*

3 Terms and Definitions

For the purposes of this standard, the definitions given in ISO 9000:2000 apply, together with the following:

3.1
competent authority
any national regulatory body or authority designated or otherwise recognized as such for any purpose in connection with the regulations specified in the bibliography

3.2
design type approved packaging, IBC or large packaging
packaging, intermediate bulk container or large packaging that has been tested and approved in accordance with chapters 6.1, 6.5 and 6.6 of the UN Model Regulations, the modal regulations listed in the bibliography or with national regulations

4 Quality Management system

ISO 9001:2000, clause 4 applies

5 Management responsibility

ISO 9001:2000, clause 5 applies.

NOTE Documentation specified in ISO 9001:2000, 5.5.7 should be kept during the assumed lifetime of packagings, IBCs and large packagings or for 5 years, whichever is longer. Documentation may be subject to audit by the competent authority.

6 Resource management

ISO 9001:2000, clause 6 applies.

7 Product realisation

7.1 Planning of realisation processes

ISO 9001:2000, clause 7.1 applies.
The product specifications for packaging, IBCs and large packagings should conform to annexes B and C.

NOTE 1 Annex B and C are taken from EN ISO 16104:2002 (Annex G) and EN ISO 16467:2002 (Annex C) respectively.

NOTE 2 In the absence of a standard on the design type testing of large packagings including an annex with product specifications, similar to EN ISO 16104 and EN ISO 16467, this standard does not include product specifications on large packagings.

7.2 Customer-related processes

ISO 9001:2000, clause 7.2 applies.

7.3 Design and/or development

ISO 9001:2000, clause 7.3 applies

NOTE For the design validation, specified in ISO 9001:2000, 7.3.6, 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-mark.

7.4 Purchasing

ISO 9001:2000, clause 7.4 applies.
Purchased product should comply with the approved design type specification. Verification of conformity by certificates of conformity in accordance with EN 45014/ ISO/IEC Guide 22, 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 of table D.1.
The conformity of components with the approved design type specification should be verified with respect to the minimum specification data given in annex B and annex C.

7.5 Production and service operations

7.5.1

ISO 9001:2000, clause 7.5 applies.

7.5.2

Manufacturing processes should be validated using the control parameters given in table D.2.

NOTE The design type test and approval procedure should also be regarded as validation of the manufacturing process, the involved equipment, personnel and procedures.

7.5.3

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 may change the design characteristics and require retesting in accordance with test standards EN ISO 16104 and EN ISO 16467.

7.5.4 Control of measuring and monitoring devices

ISO 9001:2000, clause 7.6 applies

8 Measurement, analysis and improvement

8.1 Planning

ISO 9001:2000, clause 8.1 applies

8.2 Monitoring and measurement

ISO 9001:2000, clause 8.2 applies.
Monitoring of production should be based on the visual or computer-aided automated monitoring of the manufacturing process to identify the need for adjustment to the function of machines and installations.
At initial production first samples should be checked for compliance with the design type specifications. Where applicable, conformity of the following should be verified:

- dimensions,
- masses,
- quality of openings,
- quality of seams.

Monitoring and measurement of the manufactured packagings, IBCs and large packagings should include at least the items/elements given in clause D.3.
To confirm the continuing ability of the manufacturing processes to satisfy their intended purpose, conformity with the approved performance requirements of packagings, IBCs and large packagings as set out in 6.1.5.2, 6.5.4 and 6.6.5 of the UN model regulations should be verified periodically as specified in a test plan or procedure including frequency and acceptance limits. Examples of typical frequencies are given in annex E as case studies. Performance test conditions should be specified. For purpose of production monitoring the test conditions may differ from the design type test requirements and may be restricted to comparisons with previous test results. However, for the execution of the performance tests listed in D.4 and D.5 the design type performance test requirements should be met.

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

8.3 Control of nonconformity

ISO 9001:2000, clause 8.3 applies.
If controls previously carried out have 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.

8.4 Analyses of data

ISO 9001:2000, clause 8.4 applies

8.5 Improvement

ISO 9001:2000, clause 8.5 applies
NOTE The procedures for corrective action may require agreement with the competent authority, in order to achieve conformity to the approved design type specifications.

Annex A
(informative)

Relationship of this standard with EC directives

This International standard has been prepared in co-operation with CEN under mandate M/086 (Standardisation in the field of dangerous goods) given to CEN by the European Commission.

The clauses of this standard address the following provisions:

Directive 94/55EC, Annex A, as amended, No's. 6.1.5.2, 6.5.4 and 6.6.5

Directive 96/49EC, Annex I, as amended, No's. 6.1.5.2, 6.5.4 and 6.6.5 to read:

"Packagings/IBCs/large packagings should be manufactured and tested under a quality assurance programme which satisfies the competent authority, in order to ensure that each packaging/IBC/large packaging meets the provisions of this Annex".

This Standard has been prepared for the purpose of providing a means of presuming the conformity of quality assurance programmes with the above quoted provisions. However, quality assurance programmes are subject to the agreement of the competent authority.

The evaluation of conformity of quality assurance programmes or quality management systems may be subject to the assessment, certification and surveillance according to EN 45012.

ANNEX B
(Normative)
Packaging specifications

NOTE This Annex is an extract of EN ISO 16104: 2002, Annex G.

Packaging design types should, at least, be specified by the data as indicated in the tables B.1 to B.5.

B.1 Specification data

The attached table matrices, B.1.1 to B.5.2, correlate the different packaging types with data, which are necessary for the identification of test packagings by users, test facilities and competent authorities.

There are five parts to this annex:

1) drums, jerricans, bottles, jars etc — Tables B.1.1 and B.1.2;

2) boxes — Tables B.2.1 and B.2.2;

3) bags — Tables B.3.1 and B.3.2;

4) inner receptacles of composite packagings — Table B.4;

5) inner packagings of combination packagings — Tables B.5.1 and B.5.2.

Tables B1, B.2, B.3 and B.5 are in two parts. The first table should apply to all packagings in that category. The second table should be applicable only to particular packaging types when indicated by an “S”.

Each item in the table is numbered and in B.2 at the end of this Annex there are explanatory notes for many of the numbers to assist in interpretation.

Table B.1.1— Drums, jerricans, bottles and jars etc. — Packaging specification detail applicable to all

No		No	
1	Packaging description (code and trade name)	17	Closure(s), (or neck(s)) position(s)
2	Manufacturer’s name and address	18	Closure(s), material(s) and grade
3	Method of construction	19	Closure(s), type, identification
4	Nominal capacity	20	Closure(s), thread, type and pitch
5	Brimful capacity	21	Closure(s) mass
6	Diameter, nominal (cylindrical) internal	22	Closure manufacturer’s name and address
7	Diameter, external at widest point	23	Closure torque(s)
8	Nominal diameters (conical i.e. pails)	24	Type of overseal
9	Body/section dimensions (non-round)	25	Closure(s) seal, material
10	Recess of ends	26	Neck internal diameter
11	Height overall	27	Height to neck face
12	Stacking height	28	Neck height (external)
13	End seams type	29	Neck thread, type and pitch
14	Side seam type	30	Neck thread number of starts
15	Handles, material type, number and position	31	Tare mass
16	Closure(s), diameter(s) and design		

Table B.1.2 — Drums, jerricans, bottles and jars etc — Packaging specification detail applicable as indicated

No.		Non-removable head metal	Removable head metal	Non-removable head plastics	Removable head plastics	Fibreboard	Plywood	Glass and other materials
32	Nominal thickness and material type and grade, head or lid	S	S			S	S	S
33	Nominal thickness and material type and grade, body	S	S			S	S	S
34	Nominal thickness and material type and grade, base	S	S		S	S	S	
35	Material type, grade (polymer), body			S	S			
36	Material type, grade (polymer), base			S	S			
37	Material type, grade (polymer), lid/head			S	S	S		S
38	Material lid gasket		S		S	S	S	S
39	Body corrugations, number	S	S					
40	Body corrugation, heights	S	S					
41	Rolling hoops, number, height and location	S	S	S	S	S	S	
42	Closing ring type		S		S	S	S	
43	Closing ring material		S		S	S	S	
44	Thickness closing ring		S		S	S	S	
45	Number of plies (body)					S		
46	Grammage per ply body, and combined					S		
47	Inner lining or coating material					S		
48	Chime reinforcement	S	S			S	S	
49	Method of lid retention (other than closing ring)		S		S	S	S	S
50	Mass body			S	S			S

Table B.2.1— Boxes packaging specification detail — Applicable to all

No	
1	Packaging description (code and trade name)
2	Manufacturer's name and address
51	Design standard, drawing, or style
3	Method of construction
31	Mass empty box
52	Dimension external (l x b x h)
9	Dimension internal (l x b x h)
12	Stacking height
15	Handles, material type, number and position
53	Closures, number, type, position and materials
54	Reinforcements, type, position and materials

Table B.2.2— Boxes packaging specification detail — Applicable as indicated

No.		Metal	Natural wood	Plywood and reconstituted wood	Fibreboard	Expanded plastics	Plastics
38	Material lid gasket	S				S	S
55	Material ends			S	S		
32	Nominal thickness, material type and grade head or lid	S	S	S	S	S	
33	Nominal thickness, material type and grade side walls	S	S	S	S	S	
34	Nominal thickness, material type and grade base	S	S	S	S	S	
56	Method of joining panels		S	S			
57	Manufacturer's join body				S		
58	Grammage by paper and paper type				S		
59	Corrugated flute type				S		
60	Corrugated combined grammage				S		
61	Corrugated edge crush				S		
62	Burst strength				S		
91	Puncture				S		
35	Material type, grade (polymer) body						S
36	Material type, grade (polymer) base						S
37	Material type, grade (polymer) lid						S
63	Density					S	
64	Top flap inner gap or meet				S		
65	Top flap outer meet or overlap				S		
66	Bottom flap inner gap or meet				S		
67	Bottom flap outer meet or overlap				S		

Table B.3.1— Bags packaging specification detail — Applicable to all

No	
1	Packaging description, (code and trade name)
2	Manufacturer's name and address
4	Nominal capacity
51	Design standard or drawing
5	Method of construction
68	Style
52	Dimensions flat unopened
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
77	Filter cord
78	Adhesive, type

Table B.3.2— Bags packaging specification detail — Applicable as indicated

No.		Unlined/uncoated woven plastics	Other woven plastics	Plastics film	Unlined/uncoated textile	Other textile	Paper
32	Material type and grade	S	S		S	S	S
35	Type of film grade			S			
33	Nominal thickness, material type and grade			S			
79	Fabric (warp/weft), tapes per 100 mm	S	S		S	S	
82	Coating, material, thickness/weight		S			S	S
83	Liner, material, thickness		S			S	S
45	Number of plies						S
46	Grammage of plies	S	S				S
84	Material strength elongation	S	S	S			
85	Material strength tensile (energy absorption)						S

Table B.4— Inner receptacles of composites packaging specification detail — Applicable to all

No.	
1a	Description
2	Manufacturer's name and address
4	Nominal capacity
5	Brimful capacity
30	Material type and grade
32	Nominal thickness body
33	Nominal thickness base
34	Nominal thickness head
31	Tare (mass)
86	Assembler of complete container

Table B 5.1— Inner packaging of combination packaging specification detail — Removable fittings

No.	
30	Material type (and grade)
1	Description
51	Design standard or drawing
87	Quantity or number
52	Dimensions
27	Tare mass
32	Nominal thickness
58	Grammage by paper and paper type
60	Corrugated combined grammage
90	Orientation and arrangement of inner packagings

Table B.5.2— Inner packaging of combination packaging specification detail — Permanent fittings

No.	
1	Description
30	Material type and grade
51	Design standard or drawing
87	Number
88	Location(s)
89	Means of fixing to packaging

B.2 Notes to packaging specification detail applicable to Tables B.1 to B.5.2.

1. Packaging description i.e. steel drum, code where appropriate i.e. 1A1 (see EN ISO 16104: 2002 Table B.2) and trade name.

2. Name and address of manufacturer of packaging or appropriate component.

3. Method of construction i.e. welded; glued and stitched; nailed etc.

4. Nominal capacity: capacity in litres which, by convention, is used to represent a class of packagings of similar brimful capacities.

5. Brimful capacity: maximum volume of water in litres held by the packaging when filled through the designed filling orifice to the point of overflowing in its normal position of filling

8. Smallest and largest for conical shaped packagings.

9. For non-circular packagings.

10. Usually found on drums.

11. From ground to highest point, however the dimensions may be less than that specified in the test report.

12. Adjusted height to allow for any interlocking features of packaging; may also include battens on boxes.

13. Where applicable.

14. Where applicable.

15. Also indicate if an optional extra.

16. Required for each closure and variant.

17. Position on drum.

18. Required for each one and variant, including plastics polymer details.

19. May include trade name and any features or marks on closure.

21. Mass of individual closure with gasket/wad.

22. For each closure.

23. For each closure.

24. If fitted.

25. Gasket details.

31. Mass of container and closures and associated fittings.

32. All materials other than plastics.

33. All materials other than plastics.

34. All materials other than plastics.

35. Plastics materials only.

36. Plastics materials only.

37. Plastics materials only.

38. When lid or head fitted with gasket, washer or seal.

46. Combined grammage will include an allowance for the glues between the paper plies.

49. To allow for large screw caps, pillbox lids, etc.

50. Particularly plastics.

51. Include FEFCO/ASSCO code for fibreboard boxes if applicable.

53. This is to include taping patterns and any additional means of closing such as straps.

54. Battens, corner posts etc.

68. Valved, gussetted etc. Some of this may be covered by 1.

86. This may not be the same as any of the manufacturers of the parts of a composite packaging.

Annex C
(normative)

IBC - Specifications

NOTE 1 This Annex is an extract of EN ISO 16467: 2002, Annex C.

IBC design types should, at least be specified by the data as indicated in the tables C.1.1 to C.2.2.

NOTE 2 In many instances specifications may be in the form of dimensioned drawings rather than as text.

NOTE 3 For flexible IBC (FIBC) a sample of the body material are usually cut-out, labelled or otherwise identified and retained as part of the specification.

C.1 Specification data

The attached table matrices, C.1.1 to C.2.2, correlate the different types of IBCs with data which are necessary for the identification of IBCs for users, test facilities and competent authorities.

Tables C.1.1 and C.1.2 relate to all IBC-types, except FIBCs. The first table applies to all IBC types in that group. The second table is applicable only to particular IBC types when indicated by an “S”.

Tables C 2.1 and C.2.2 list items that that apply to FIBCs. C.2.1 are general data for FIBCs. Additional data are related to various types of wall material in Table C 2.2 when indicated by an “S”.

Each item in the table is numbered and at the end of this Annex there are explanatory notes for many of the numbers to assist in interpretation.

TABLE C.1.1. Metal IBCs, rigid plastics IBCs, composite IBCs with rigid receptacles, wooden and fibreboard IBCs – IBC specification detail applicable to all

No		No	
1	IBC description, proposed code and trade name	22	Filling aperture closure manufacturer, address and identity/part number
2	Manufacturers names and addresses	23	Filling closure, closure torque
3	Method(s) of construction	16	Discharge aperture(s), internal diameter and design
4	Nominal capacity	17	Discharge aperture(s) position
5	Brimful capacity	18	Discharge aperture closure material and grade
6	Diameter, nominal (cylindrical) internal	19	Discharge aperture closure type and identification
92	Diameter, external (at widest point) of receptacle	20	Discharge aperture closure thread type and pitch
93	Diameters, external conical type receptacles	21	Discharge aperture closure mass

94	Cross section dimensions non-round receptacles	22	Discharge aperture closure manufacturer, address and identity/part no
9	Overall cross section (non round)	16	Pressure relief fittings, internal diameter and design
95	Position and types of seam in receptacle	17	Pressure relief fittings position
96	Number of top lift points	18	Pressure relief fittings material and grade
97	Number of bottom lift points or access directions	20	Pressure relief fittings thread type and pitch
11	Overall height	21	Pressure relief fittings mass
12	Number to be stacked on top during transport	22	Pressure relief fittings manufacturer and manufacturers identity/part no
16	Filling aperture(s), internal diameter and design	98	Other fittings in body of receptacle, type, number, location and identity
17	Filling aperture(s), position	31	Tare mass
18	Filling aperture material and grade	99	Details of any liner, material type, thickness, grammage, tare weight
19	Filling aperture closure type and identification	100	Details of any coatings, material type gm m^3
20	Filling aperture closure thread type and pitch	101	Type of base, material and means of attachment (where appropriate)
21	Filling aperture closure mass	102	Compliance to drawings

Table C.1.2 — Metal IBCs, rigid plastics IBCs, wooden and fibreboard IBCs — IBC specification detail applicable as indicated

No.		Metal IBCs	Plastics IBCs	Natural wood (Wooden) IBCs	Plywood IBCs	Reconstituted wood IBCs	Fibreboard IBCs
32	Nominal thickness and material type and grade head or lid	S		S	S	S	S
33	Nominal thickness and material type and grade body	S		S	S	S	S
34	Nominal thickness and material type and grade base	S		S	S	S	S
35	Material type, grade (polymer) body		S				

36	Material type, grade (polymer) base		S				
37	Material type, grade (polymer) lid/head		S				
38	Material lid gasket	S	S	S	S	S	S
42	Closing ring type	S	S	S	S	S	S
43	Closing ring material	S	S	S	S	S	S
44	Closing ring thickness	S	S	S	S	S	S
45	Number of plies				S		S
46	Grammage of material per square metre					S	S
47	Inner lining or coating material			S	S	S	S
49	Method of lid retention (other than closing ring)	S	S	S	S	S	S
53	Fastening system: Number, position, material			S	S	S	S
54	Reinforcements Type, position, material			S	S	S	S
56	Method of joining panels			S	S	S	
59	Corrugated flute type						S
60	Corrugated combined grammage						S
61	Edge compression test (ECT)						S
62	Burst strength						S
91	Puncture resistance						S

Table C.2.1 Flexible IBCs - IBC specification detail applicable to all

No.		No	
1	IBC description (code and trade name)	19	Filling aperture closure type
2	Manufacturer's name and address	16	Discharge aperture, internal diameter and design
3	Method of construction	17	Discharge aperture position
4	Nominal capacity	18	Discharge aperture closure material and grammage
12	Stacking capability, number	19	Discharge aperture closure type
15	Top lift devices: Number, material, position	75	Sewing: Style and density of stitches
31	Tare mass	76	Type of thread and minimum breaking load
51	Design standard or drawing	77	Filter cord
52	Dimensions of the empty IBC	78	Adhesive, type
16	Filling aperture, internal diameter and design	103	Statement of compliance to appropriate UN design type
17	Filling aperture position	104	Seams: Type
18	Filling aperture closure material and grammage		

Table C.2.2 – Flexible IBCs — IBC specification detail applicable as indicated

No.		Unlined/uncoated woven plastics	Other woven plastics	Plastics film	Unlined/uncoated textile	Other textile	Paper
32	Material type and grade	S	S		S	S	S
33	Nominal thickness, material type and grade			S			
35	Type of film grade			S			
45	Number of plies						S
46	Grammage of material per square meter	S	S				S
79	Fabric (warp/weft), tapes per 100 mm	S	S		S	S	
82	Coating, material, thickness/weight		S			S	S
83	Liner, material, thickness		S			S	S
84	Material strength elongation	S	S	S			
85	Material strength tensile (energy absorption)						S

C.2 Notes to IBC specification detail applicable to Tables C.1.1 to C.2.2

1. IBC description i.e. metal IBC made of steel for liquids, code where appropriate i. e. 31A (see ADR/RID 6.1.5.4) and trade name

2. Name and address of manufacturer of IBC and major components if different

3. Method of construction of receptacle and framework (where appropriate), i.e. welded, glued, stitched; nailed etc.

4. Volume declared by the manufacturer (smaller than brimful capacity)

5. Maximum volume of water in litres held by the IBC when filled through the designed filling orifice to the point of overflowing in its normal position of filling

6. If cylindrical: internal diameter; if conical: 2 internal diameters; if angular: length x breadth

8. Conical shaped IBCs: Smallest and largest external diameter

11. From ground to highest point (incl. framework and fittings, if existing)

12 Number to be stacked on top during transport

15 Notice: Fibreboard or wooden IBCs shall not incorporate top lifting devices

16 Required for each closure and variant

18. Required for each one and variant, including plastics polymer details

19. May include trade name and any features or marks on closure
20. If fitted
21. Mass of individual closure with gasket/wad
22. For each closure
23. For each closure
24. If fitted

Annex D
(normative)

Items and elements of verification, controls, monitoring and validation

NOTE 1 The Tables D.1 – D.4 cover the materials, packagings, IBCs and large packagings most commonly in use. For the rest of packaging and IBC-types adequate items and controls may need to be agreed with the competent authority.

NOTE 2 In the absence of a standard on the design type testing of large packagings including an annex with product specifications, similar to EN ISO 16104 and EN ISO 16467, this annex include only partially product specifications on large packagings.

NOTE 3 Other equivalent criteria, parameters, items/elements than those given in the tables below may be used if accepted by the competent authority.

D.1 Minimum conformity verification of materials

Materials obtained as purchased product should be verified for conformity with the design type specification according to the minimum criteria given in Table D.1, as relevant. Where raw material is concerned, verification should take type and grade or agreed specification into account.

Table D.1 Minimum conformity of material

Material	**Criteria**
Metal	Thickness, width Tensile strength and elongation Hardness
Paper (for bags)	Basis weight Tensile strength and elongation Tensile energy absorption
Plastics granular/powder	Melt flow rate Density
Fibre board, corrugated	Basis weight Bursting strength Puncture test Edgecrush test Cobb-Test
Fibre board, solid	Thickness Basis weight Bursting strength and/or Puncture test Cobb-Test
Plastics film	Thickness or basis weight Melt Flow Rate Tensile strength and elongation
Woven fabric	Basis weight Number of warps and wefts per area Breaking strength and elongation
Wood, natural/ reconstituted	Basis weight Humidity Thickness
Plywood	Thickness Number of plies Basis weight

D.2 Monitoring elements of manufacturing processes

The elements as shown in Table D.2 should, as a minimum, be monitored during production:

Table D.2 Monitoring elements of manufacturing processes

Type of packaging, IBC and large packaging	Parameter
Metal packagings, IBCs and large packagings	Folding (Seams) Welding Soldering Application of sealing material Mounting of gaskets/closures
Paper/fibreboard – packagings, IBCs and large packagings	Gluing Taping Creasing/Folding Joining
Bags IBCs and large packagings	Sewing Gluing Assembly of filling/emptying/lifting devices
Plastics packagings, rigid plastics IBCs and large packagings	Tare mass Mounting of gaskets/closures
Composite packagings and IBCs	Combination of the above items, as appropriate Assembly of components

D.3 Measurement items/elements for the manufacture of packaging, IBC and large packagings

The items/elements as shown in Table D.3 should, as a minimum, be measured or visually controlled during production:

Table D.3 Measurement items/elements

Type of packaging/IBC/large packaging	Item/element
Metal packagings, -IBCs and large packagings	Dimensions Tare mass Surface treatment Proper installation of gaskets/sealing/closures
Fibre drums	Dimensions Tare mass
Plastics packagings, rigid plastics IBCs and large packagings, plastic inners of composite IBCs	Dimensions, wall thickness distribution Tare mass Proper installation of gaskets/closures/closures
Boxes (non-paper, non-fibreboard, non-metal), wooden IBCs and large packagings	Outer dimensions Correct assembly (e.g. nailing pattern) Mounting of closures Surface treatment/liners
Fibreboard boxes, IBCs and large packagings	Dimensions Appearance of beads (creases) and joints
Bags, FIBCs and flexible large packagings	Dimensions Appearance of seams and joints

Outer packagings of combination/composite packagings and /outer casings of composite IBCs should be controlled as relevant with respect to their material in analogy with the types of packagings, IBCs and large packagings mentioned in the table. The same applies to inner packagings/receptacles.

Verification of correctness and legibility of the UN marking and verification of the specification check data as defined in Annex B and Annex C are applicable to all types of packagings IBCs and large packagings.

D.4 Performance validation of completed packagings and IBCs designed to carry liquids

Performance test should, at least, be performed periodically in accordance with tables D.4 and D.5, as relevant and as specified in test plans, which may be agreed with the competent authority.

Verification of correctness and legibility of the UN marking and verification of the specification check data as defined in Annex B and Annex C are applicable to all types of packagings IBCs and large packagings.

Table D.4 Performance validation of completed packagings and IBCs to carry liquids

Type of packaging/IBC	Performance verification
Metal jerricans and drums	Drop test Leakproofness test Hydraulic pressure test
Plastics jerricans and drums	Drop testing (-18 °C) Leakproofness test Hydraulic pressure test Dynamic compression test
Composite packagings, type 6AH1	Drop testing (-18 °C) Leakproofness test Hydraulic pressure test
Composite packagings, type 6HH1	Drop testing (-18 °C) Leakproofness test Hydraulic pressure test Dynamic compression test
Composite packagings, type 6HG1	Drop testing (-18 °C) Leakproofness test Hydraulic pressure test Compression or stacking test
Metal IBCs	Conformity check with design type specification Leakproofness test Hydraulic pressure test Non-destructive testing (e.g. dye penetrant) of the welds Function test of service equipment (if assembled with the manufacturer)
Plastics and composite IBCs	Conformity check with design type specification Leakproofness test Hydraulic pressure test Function test of service equipment (if assembled with the manufacturer)

NOTE For types of composite packagings see Table B.2 of ISO 16104: 2002

The leakproofness test is an obligatory part of the performance validation for every manufactured item.

D.5 Performance validation of completed packagings and large packagings for solids/ articles and IBCs for solids

Table D.5 Performance validation of completed packagings and large packagings for solids/articles and IBCs for solids

Type of packaging/IBC/large packaging	Performance verification
Metal jerricans and drums	Drop test
Plastics jerricans and drums	Drop testing (-18 °C) Dynamic compression test
Fibre drums	Drop test Stacking or compression test
Combination packagings	To be tested as relevant with respect to the material of their outer packaging in analogy with the other types of packagings mentioned in the table
Boxes, all materials	Drop test Compression or stacking test
Bags, all materials	Drop test
Metal IBCs and large packagings	Conformity check with design type specification Non-destructive testing (e.g. dye penetrant) of the welds Function test of service equipment (if relevant and if assembled with the manufacturer)
Plastics and composite IBCs and plastics large packagings	Conformity check with design type specification Function test of service equipment (if relevant and if assembled with the manufacturer)
Fibreboard and wooden IBCs and large packagings	Conformity check with design type specification Drop test Stacking test
FIBCs and flexible large packagings	Drop test Top lift test

Annex E
(informative)

Typical frequencies for the verification of conformity to design and performance requirements

NOTE 1 The frequencies indicated in Tables E.1 – E.3 are considered typical for mass production of packagings and **IBCs**. They may be used for the establishment of test plans, as mentioned under 8.2. However, especially for smaller lots, alternative frequencies may be agreed with the competent authority. In this case, the items/elements may, at least, be monitored once per lot.

NOTE 2 Due to the limited experience with quality assurance measures for the production of large packagings, table E.1 doesn't include typical frequencies for large packagings.

Table E.1 Typical frequencies for verification items/elements during production

Type of packaging/IBC	Item/element	Frequencies
Metal packagings	Dimensions Tare mass Surface treatment Proper installation of gaskets/sealing/closures	Once per1000 units[a] “ “ “
Fibre drums	Dimensions Tare mass	Once per 1000 units “
Plastics packagings	Dimensions, wall thickness distribution Tare mass Proper installation of gaskets/sealing/closures	Once per shift Twice per shift “
Boxes (non-paper, non-fibreboard, non-metal)	Dimensions Correct assembly Mounting of closures Surface treatment/liners	Once per 500 units “ “ “
Fibreboard boxes	Dimensions Appearance of beads (creases) and joints	Once per 1000 units “
Bags	Dimensions Appearance of seams and joints	Twice per shift “
Metal IBCs	Dimensions Tare mass Surface treatment Proper installation of gaskets/sealing/closures	Once per shift “ “ “
Plastics IBCs and plastic inners of composite IBCs	Dimensions, wall thickness distribution Appearance of seams Tare mass	Once per shift Twice per shift “
Wooden IBCs	Dimensions Correct assembly (e.g. nailing pattern) Mounting of closures Surface treatment/liners	Once per 250 units “ “ “
Fibreboard IBCs	Dimensions Appearance of beads (creases) and joints	Once per 250 units ““
FIBCs	Dimensions Appearance of seams and joints	Once per 250 units “

[a] For light gage metal packagings, a frequency of once/5000 units is acceptable

The correctness and legibility of the UN marking is verified for all types of packagings and IBCs during production at adequate intervals, relevant to the technique of marking.

Table E.2 Typical frequencies for the performance validation of completed packagings and IBCs designed to carry liquids

Type of packaging/IBC	Performance verification	Frequencies
Metal jerricans and drums	Drop test Leakproofness test Hydraulic pressure test	Once per month Every unit Once per month
Plastics jerricans and drums	Drop testing (-18 °C) Leakproofness test Hydraulic pressure test Dynamic compression test	Once per month Every unit Once per month Once per week
Metal IBCs	Leakproofness test Hydraulic pressure test Non-destructive testing (e.g. dye penetrant) of the welds	Every unit Once per month Once per100 units
Plastics and composite IBCs	Leakproofness test Hydraulic pressure test	Every unit Once per 3 month

Table E.3 Typical frequencies for the performance validation of completed packagings for solids/articles and IBCs for solids

Type of packaging/IBC	Performance verification	Frequencies
Metal drums	Drop test	Once per month
Plastics drums	Drop test (-18 °C) Dynamic compression test	Once per month Once per week
Boxes, fibreboard	Drop test Compression or stacking test	3 units per lot 5 units per lot
Bags	Drop test	3 units per lot
Metal IBCs	Non-destructive testing (e.g. dye penetrant) of the welds Function test of service equipment (if assembled with the manufacturer)	Once per week Every unit
Plastics and composite IBCs	Drop test Function test of service equipment (if assembled with the manufacturer)	Once per 3 month or, at least, once per 1000 units Every unit
Fibreboard and wooden IBCs	Drop test Stacking test	Once per 3 month “
FIBCs	Drop test Top lift test	Once per 1000 units Once per 3 month or, at least, once per 1000 units

Bibliography

[1] The United Nations Recommendations on the Transport of Dangerous Goods — Model Regulations. ST/SG/A.C. 10/1/Rev.12. Geneva: United Nations, 2001. ISBN 92-1-139057-5.

The UN Recommendations have been developed by the United Nations Committee of experts on the transport of dangerous goods, in the light of technical progress, the advent of new substances and materials, the exigencies of modern transport systems and, above all, the need to ensure the safety of people, property and the environment. Amongst other aspects, the recommendations cover principles of classification and definition of classes, listing of the principal dangerous goods, general packing requirements, testing procedures, marking, labelling or placarding, and shipping documents. There are in addition special recommendations related to particular classes of goods (in particular Explosives).

The following regulations are referred to in the text of the standard. Each edition is revised regularly and the latest one should be used. Test facilities should be in possession of at least one of the documents or alternatively their national law where it includes the relevant UN provisions.

[2] The European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR). Geneva: United Nations 1999, ISBN 92-1-139057-5.

[3] Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID). Berne: Organisation intergouvernementale pour les transports ferroviaires (OTIF), 1999.

[4] International Maritime Dangerous Goods Code (IMDG). London: International Maritime Organisation, ISBN 92-801-1314-3.

[5] Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO TI/2001/2002). DOC 9284. AN/905. Montreal: International Civil Aviation Organization

The following directives of the European Community require the member states to apply the provisions of RID/ADR to all dangerous goods traffic in their territories:

Council Directive 94/55EC on the approximation of the laws of the Member States with regard to the transport of dangerous goods by road. OJ L319.

Council Directive 96/49EC on the approximation of the laws of the Member States with regard to the transport of dangerous goods by rail. OJ L235.

Each of the above rules is revised regularly and the latest one should be used.