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General specifications for transport packages of dangerous goods

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the People's Republic of China**

Standardisation Administration of the People's Republic of China (SAC)

Foreword

Clause 5 and Clause 8 of this Standard are mandatory, whilst the rest are recommended.

This Standard replaces GB 12463-1990, “General specifications for transport packages of dangerous goods”.

The main differences between this Standard when compared to GB 12463-1990:

- some of the terms removed, directly adopted relevant Standards;
- the maximum volume of drum packaging has been modified from 450L to 250L;
- in Clause 4, division of the transport packaging as groups, changed Class to Group, the content of the general requirements are combined into Clause 8;
- Merging of the contents of general requirements in Article 4.2 and Clause 5 to the Clause 5 of this Standard as Packaging requirements;
- Removal of “textile woven bags” (Article 5.14 of Edition 1990);
- Removal of “plastic bags” (Article 5.16 of Edition 1990);
- Modification of the pressure for airtightness test and hydraulic pressure test;
- Removal of “Marking dimensions and Marking application methods must conform to the relevant provisions in GB/T 191” (Section 7.2.6.2 of Edition 1990);
- Removal of the application range of the packaging characteristics tests (Article 8.1 of Edition 1990);
- In Table 4, addition of the hydraulic pressure test value for “acid proof jerrycans, porcelain jerrycans, and large glass bottle with a wall thickness of at least 3mm”;
- Removal of “packaging inspection” (Clause 9 of Edition 1990);
- Added “the basic structures of packaging must conform to the provisions set out in GB/T 9174” (Section 4.3.11 of this Edition).

Appendix A to this Standard is an informative annex.

This Standard is proposed and is under the jurisdiction of the Dangerous Chemicals Management of Standardisation Administration of China (SAC/TC251).

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This standard replaces the previously issued Standard:
GB 12463-1990

General specifications for transport packages of dangerous goods

1 Scope

This Standard specifies the groups, general requirements, characteristics tests and inspection methods, technical requirements, types and marking identification codes of transport packaging for dangerous goods (hereinafter referred to as the transport packaging).

This Standard applies to transport packaging that contains dangerous goods.

This Standard does not apply to:

- a) transport packaging which is intended to contain radioactive materials;
- b) transport packaging which is intended to contain pressurised receptacles with compressed gases and liquefied gases;
- c) transport packaging which is intended to contain goods with a net mass over 400kg;
- d) transport packaging with a volume in excess of 450L.

2 Normative References

The provisions of the following documents become provisions of this Standard after being referenced. For dated reference documents, all later amendments (excluding corrigenda) and versions do not apply to this Standard; however, the parties to the agreement are encouraged to study whether the latest versions of these documents are applicable. For undated reference documents, the latest versions apply to this Standard.

GB 190 Labels for packages of dangerous goods

GB/T 191 Packaging – Pictorial markings for handling of goods (HB 191-2000, ISO780:1997, EQV)

GB/T 4857.2 Packaging – Transport packages – Temperature and humidity conditioning (GB/T 4857.2-2005, MOD ISO2233:2000)

GB/T 4857.3 Packaging – Complete, filled transport packages – Stacking tests using static load (GB/T 4857.3-200X, IDT ISO2234:2000)

GB/T 4857.5 Packaging – Transport packages – Vertical impact test method by dropping (GB/T 4857.5-1992, MOD ISO2248: 1985)

GB/T 9174 General specifications for transport packages of general cargo

GB/T 13040 Packaging terms – metal containers

3 Terms and definitions

The terms and definitions set out in GB/T 13040 and the terms and definitions listed below apply to this Standard.

3.1 Transport packaging for dangerous goods

According to the characteristics of dangerous goods, the transport packaging which is specially

designed and constructed in accordance with relevant Standards and regulations.

3.2 Composite packaging

The integrated single unit packaging that consists of outer packaging and inner packaging (or a composite layer), is called composite packaging.

4 Transport packaging groups

According to the degree of danger presented by the substances contained in the packaging, the transport packaging is divided into three groups:

Packaging group I: suitable for containing high risk substances;

Packaging group II: suitable for containing medium risk substances;

Packaging group III: suitable for containing lower risk substances.

5 Packaging requirements

5.1 General requirements

5.1.1 Transport packaging must be reasonably constructed and must be sufficiently strong, with good protective characteristics. The material qualities, types, specifications, methods, and the content mass must correspond to the characters and the applications of the dangerous goods which are contained, must be convenient for handling, transporting and storage.

5.1.2 The quality of transport packaging must be good, its construction and closure must be able to withstand any operational risks encountered during normal transport conditions, must prevent any loss (leakages) of content that could be caused by changes of temperature, humidity or pressure, the surface must be clean, and no dangerous residue must adhere to the outside of the packaging.

5.1.3 The parts of transport packaging which are in direct contact with the substances contained therein must, where necessary, be provided with a suitable inner coating or protective treatment, the materials of the transport packaging and the contents must not cause a reaction and must not generate a dangerous product, and the transport packaging must not be affected or significantly weakened by those dangerous goods.

5.1.4 The inner packaging must be fixed. If the inner packaging is liable to break or to be punctured easily and contains loose goods, then the packaging must be secured with cushioning materials or absorbent materials in order to sufficiently fill the empty spaces.

5.1.5 Packaging which is used to contain liquids must be able to bear the internal pressure which is produced under normal transport conditions. When filling the contents, sufficient expansion ullage (outage) must be left, unless otherwise specified; and must be maintained at the stable temperature of 55°C. Any liquids must not completely fill the packaging.

5.1.6 The closing parts of transport packaging must have tight hermetic or liquid sealing in accordance with the characteristics of the contents.

5.1.7 When transport packaging containing wetted substances or substances with added stabilisers, the closure of the packaging must effectively ensure that the percentage of the liquid therein (water, solvent or stabilisers) remains within the prescribed limit range during transport and storage.

5.1.8 If transport packaging is equipped with a pressure drop device, its vent must be designed

and installed in a manner that prevents its contents from leaking and prevents foreign substances from entering the product; the vent must ensure that the quantity of gas emitted will not cause any danger or environmental pollution.

5.1.9 The inner packaging and outer packaging of composite packaging must be compactly attached. There must not be any protruding articles on the outer packaging which may cause abrasion to the inner packaging.

5.1.10 Additional requirements for packaging containing explosive substances:

a) The closing parts of packaging containing liquid explosive substances must have double protection to prevent contents leakage;

b) The inner packaging must sufficiently prevent contact between the explosive substances and any metal articles. Any metal nails or any other metal parts without protective coatings must not break through the outer packaging;

c) For steel drums which have dual crimped edges, metal drums or transport packaging which uses metal as a liner, must be able to prevent any explosive substances from entering any gaps. The closing parts of steel drums or aluminium drums must be fitted with suitable gaskets;

d) The explosive substances and articles contained inside of the packaging, including the inner packaging, must have sufficient cushioning to prevent any dangerous movement during transportation;

e) Transport packaging containing explosive articles equipped with an electrical initiation device and which is sensitive to exterior electromagnetic sources must prevent the contents being affected by outside electromagnetic sources.

5.1.11 The basic structures of the packaging must conform to the provisions set out in GB/T 9174.

5.1.12 See Appendix A for the combination models, marking identification codes, and mass limits of transport packaging for general dangerous goods.

5.2 Packaging

5.2.1 Steel drums

5.2.1.1 Drum ends must be welded or dual mechanically crimped; the inside of the crimps must be evenly filled with seam sealants. The joints of the drum body (except those containing solids or liquids of 40L and under) can use welding or mechanical seaming. In all other cases, the drum ends must be welded.

5.2.1.2 The chimes on both ends of the drum must be mechanically seamed or welded. Reinforced hoops may also be used.

5.2.1.3 The drum body must be sufficiently rigid. For drums with a volume of more than 60L, the drum body must be provided with two moulded ring ribs, or two detached steel rolling hoops, in order to keep the body of the drum steady. If the rolling hoops are welded onto the drum body, spot welding is not permitted. There must be no overlaps between the welded seam of the rolling hoops and the welded seam of the drum body.

5.2.1.4 Maximum volume is 250L.

5.2.1.5 Maximum net mass is 400kg.

5.2.2 Aluminium drums

5.2.2.1 The material for the drum must be aluminium with a purity of at least 99%, or an aluminium alloy which is corrosion resistant and the correct mechanical strength.

5.2.2.2 The entire seams of the drum must be welded. In the case of chime seams, reinforced hoops which are independent from the drum must be used to strengthen the drum.

5.2.2.3 For drums with a volume greater than 60L, there must be two independent metal rolling hoops around the drum body, to keep the drum steady. If the rolling hoops are welded onto the drum body, then spot welding is not permitted. There must be no overlaps between the welded seam of the rolling hoops and the welded seam of the drum body.

5.2.2.4 Maximum volume is 250L.

5.2.2.5 Maximum net mass is 400kg.

5.2.3 Steel jerry cans

5.2.3.1 The joint seams of both ends of steel jerry cans must be welded or dual mechanically crimped. For jerry cans with a volume of more than 40L, the seams of the jerry can body must be welded; for jerry cans with volume of 40L and under, the seams of the jerry can body must be welded or dual mechanical crimped.

5.2.3.2 Maximum volume is 60L.

5.2.3.4 Maximum net mass is 120kg.

5.2.4 Plywood drums

5.2.4.1 The plywood material for the drums must be of good quality. Waterproof adhesive must be used between the board layers to glue along the crossbar. After dry treatment, there must not be any faults which could reduce the prescribed efficiency.

5.2.4.2 The drum body must be made of at least three-ply board. In the case that any other materials are selected to make the drum ends, the quality of the selected material must be equivalent to the quality of the plywood.

5.2.4.3 The inner drum body must be lined. The liner of the drum lid must be firmly fixed on the drum lid, and effectively prevent any leakage of the content thereof.

5.2.4.4 Both ends of the drum body must be strengthened with steel strips. Where necessary, it is permitted to use wooden cross supports to strengthen the drum ends.

5.2.4.5 Maximum volume is 250L.

5.2.4.6 Maximum net mass is 400kg.

5.2.5 Wooden barrels

5.2.5.1 The wooden material used must be of good quality, with no knots, cracks, rot, sapwood or any other faults which may reduce the prescribed purpose and efficiency of the drums.

5.2.5.2 The barrel body must be strengthened with a number of reinforced hoops. Good quality materials must be selected to make the reinforced hoops, and the drum ends must be tightly mounted into the drum body slot.

5.2.5.3 Maximum volume is 250L.

5.2.5.4 Maximum net mass is 400kg.

5.2.6 Rigid fibreboard drums

5.2.6.1 Good quality rigid fibreboard which has good waterproofing must be selected to make the drums. Other equivalent materials can be selected to make the drum ends.

5.2.6.2 The joint seams of the drums must have additional firmly integrated nails, and must have the same strength as the drum body. The drum ends must have steel strips for extra strength.

5.2.6.3 The inner drum body must be lined; wooden cross supports must be used to strengthen the drum bottom and drum lids, and must be integrated firmly.

5.2.6.4 Maximum volume is 250L.

5.2.6.4 Maximum net mass is 400kg.

5.2.7 Hardboard drums

5.2.7.1 The drum body must be made of hardboard, bound and pressed from multiple layers of Kraft paper. The outer surface of the drum body must be coated with protective layers which have good waterproofing.

5.2.7.2 If the material for the drum ends is the same as the material for the drum body, then this material must conform to the provisions set out in 5.6.2 and 5.6.3. Other equivalent materials can also be selected.

5.2.7.3 The joint locations between the drum body and drum ends must be joined by pressing with steel strips.

5.2.7.4 Maximum volume is 250L.

5.2.7.5 Maximum net mass is 400kg.

5.2.8 Plastic drums and plastic jerry cans

5.2.8.1 The material used must be able to bear the effect of any abrasions, temperatures, illumination and ageing action under normal transport conditions.

5.2.8.2 Appropriate ultraviolet protection must be added into the materials, but must also be compatible with the contents of the drum (jerry can), and its efficiency maintained within the period of use. Additives for any other purpose must not cause any negative reactions to the chemical properties and physical properties of the packaging materials.

5.2.8.3 The thickness of any part of the (jerry can) body must correspond to the volume, application and the pressure endured everywhere on the drum (jerry can).

5.2.8.4 Maximum volume: 250L for plastic drums; 60L for plastic jerry cans.

5.2.8.5 Maximum net mass: 250kg for plastic drums; 120kg for plastic jerry cans.

5.2.9 Wooden boxes

5.2.9.1 The box bodies must be strengthened with reinforced strips and reinforced belts which correspond to the volume and application thereof. The tops and bottoms of the boxes must be made of waterproof reconstituted wooden board, rigid fibreboard, plastic board or other appropriate materials.

5.2.9.2 Each part of a whole board box must be made of a whole piece board or materials equivalent to a whole piece board. The slab joint, lap joints, rabbet joints or the butt joints which have at least two corrugated metal fasteners at each joint, must be considered as equivalent materials to a whole piece board.

5.2.9.3 Maximum net mass is 400kg.

5.2.10 Plywood boxes

5.2.10.1 The materials used must conform to the provisions set out in 5.4.1.

5.2.10.2 The corner posts and apexes of the plywood box must be fitted firmly.

5.2.10.3 Maximum net mass is 400kg.

5.2.11 Reconstituted wooden boxes

5.2.11.1 The body of the boxes must be made of waterproof reconstituted wooden board, rigid fibreboard or other suitable types of board materials.

5.2.11.2 The body of the boxes must be strengthened with a wooden frame, the body of the box and the frame must be fitted firmly; joint seams must be tight.

5.2.11.3 Maximum net mass is 400kg.

5.2.12 Cardboard boxes, corrugated boxes, calcium plastic boxes

5.2.12.1 Cardboard boxes and calcium plastic boxes must be waterproof to a certain extent. Cardboard boxes, calcium plastic boxes and corrugated boxes must have a certain flexibility, and there must be no cracks when cutting, or hemming stitch, and no surface split or over bending when assembling; the between board layers must be adhered firmly.

5.2.12.2 The joints of the body of the box must use adhesive tape or be lap jointed, or use both steel pins and staples to be lap jointed, and there must be suitable overlaps at the joints. If any adhesive or adhesive tapes are selected for the closures, then waterproof adhesive must be used.

5.2.12.3 The outer surfaces of the calcium plastic boxes must be slip-proof.

5.2.12.4 Maximum net mass is 60kg.

5.2.13 Metal boxes

5.2.13.1 The body of the box is normally welded or riveted. If dual crimping is used for the joints of lattice boxes, this must prevent any contents from entering the sunken slot of the joint seams.

5.2.13.2 The closing parts of the box must be of a suitable type and must remain tight under normal transport conditions.

5.2.13.3 The maximum net mass is 400kg.

5.2.14 Plastic woven bags

5.2.14.1 The bags must be sewn, woven or of equivalent strength.

5.2.14.2 The inner surface of sift-proof bags must be glued with paper or plastic film.

5.2.14.3 The inner surface of waterproof bags must be glued with plastic film or other equivalent materials.

5.2.14.4 Maximum net mass is 50kg.

5.2.15 Paper bags

5.2.15.1 The materials for the bags must be good quality multiple layers of Kraft paper or other paper equivalent to Kraft paper, and sufficiently strong and sturdy.

5.2.15.2 The closures of the bag joints must be firm, airtight, and must be able to remain efficient under normal transport conditions.

5.2.15.3 The sift-proof bags must be provided with a damp-proof layer.

5.2.15.4 The maximum net mass is 50kg.

5.2.16 Jars

5.2.16.1 Jars must be sufficiently thick and even, with no bubbles or sand holes. The outer

surfaces of pottery and porcelain must have no noticeable peeling or faults that might affect the efficiency of the containers.

5.2.16.2 Maximum volume is 32L.

5.2.16.3 Maximum net mass is 50kg.

5.2.17 Baskets and hampers

5.2.17.1 Must be woven with good quality materials in the correct shapes, must be equipped with protective lids, and must have a certain level of rigidity.

5.2.17.2 Maximum net mass is 50kg.

6 Protective materials

6.1 Protective materials, including materials used for supporting, strengthening, cushioning, lining and adsorption.

6.2 The protective materials and protective methods for transport packaging must be compatible with the characteristics of the contents therein, must conform to the requirements of integral performance of transport packaging, must be able to withstand any impact and vibrations during transport, and must protect the contents and outer packaging. If the inner packaging is damaged and the contents leak, the outer packaging must remain safe and undamaged.

7 Packaging symbols and marking identification codes

7.1 Symbols

The correct symbols and dimensions, colours and application methods which are set out in GB 190 and GB/T 191 must be selected according to the characteristics of the dangerous goods.

7.2 Marking identification codes

7.2.1 The marking identification codes of packing groups

Represented by the following lower case English letters:

x – Meets the requirements of packing group I, packing group II and packing group III;

y – Meets the requirements of packing group II and packing group III;

z – Meets the requirements of packing group III.

7.2.2 Marking identification codes of packaging

Represented by the following Arabic numerals:

1 – Drums;

2 – Wooden barrels;

3 – Jerry cans;

4 – Boxes, cases;

5 – Bags, hoses;

6 – Composite packaging;

7 – Pressure vessels;

8 – Baskets, hampers;

9 – Bottles, jars.

7.2.3 Material marking identification codes of packaging

Represented by the following capital English letters:

A – Steel;

B – Aluminium;

C – Natural wood;

D – Plywood;

F – Reconstituted wood (wood particle board);

G – Rigid fibreboard, cardboard, corrugated board, calcium plastic board;

H – Plastic materials;

L – Woven materials;

M – Multiple layer papers;

N – Metals (excluding steel and aluminium);

P – Glass, porcelain;

K – Wicker, chaste tree twig, rattan and bamboo strips.

7.2.4 Representation methods of marking identification code of combination packaging

7.2.4.1 Single packaging

A single packaging consists of Arabic numerals and an English letter; the English letter represents the material of the packaging, and the Arabic numeral which is parallel, on the left-hand side of the English letter, represents the type of packaging. The Arabic numerals located in the right-hand lower corner of the English letter are the model numbers, which represent the same type of packaging with different openings.

Example: 1A – Represents a steel drum;

1A₁ – Represents a steel drum with closed opening;

1A₂ – Represents a steel drum with medium-sized opening;

1A₃ – Represents a steel drum with full-sized opening.

See Appendix A for the representation methods of opening model numbers for other packaging.

7.2.4.2 Composite packaging

The model number of a composite packaging consists of the Arabic numeral “6” to represent the composite packaging, a group of characters to represent the packaging materials and the packaging model. This group of characters consist of two capital English letters and one Arabic numeral. The first English letter represents the material of the inner packaging, the second English letter represents the material of the outer packaging, the Arabic numeral on the right-hand side represents the packaging model.

Example: 6HA1 represents a composite packaging with a plastic packaging as the inner packaging and a steel drum as the outer packaging.

7.2.5 Other marking identification codes

Represented by the following English letters:

S – Marking to represent packaging intended to contain solids;

L – Marking to represent packaging intended to contain liquids;

R – Marking to represent repaired packaging.

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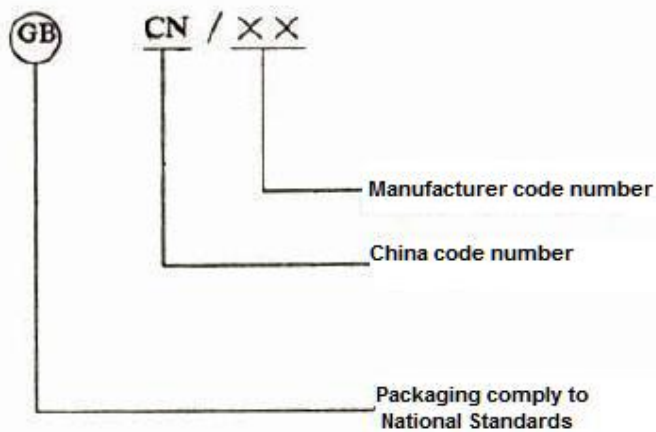
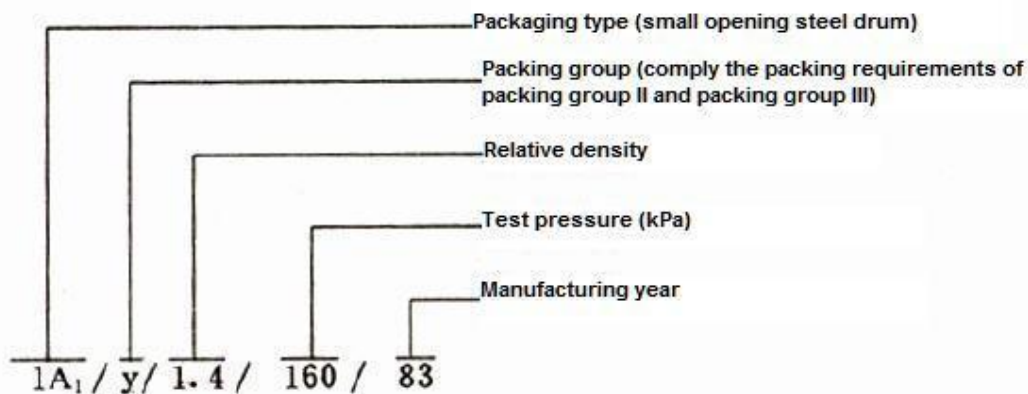
– Represents conformance with the requirements of national standards;

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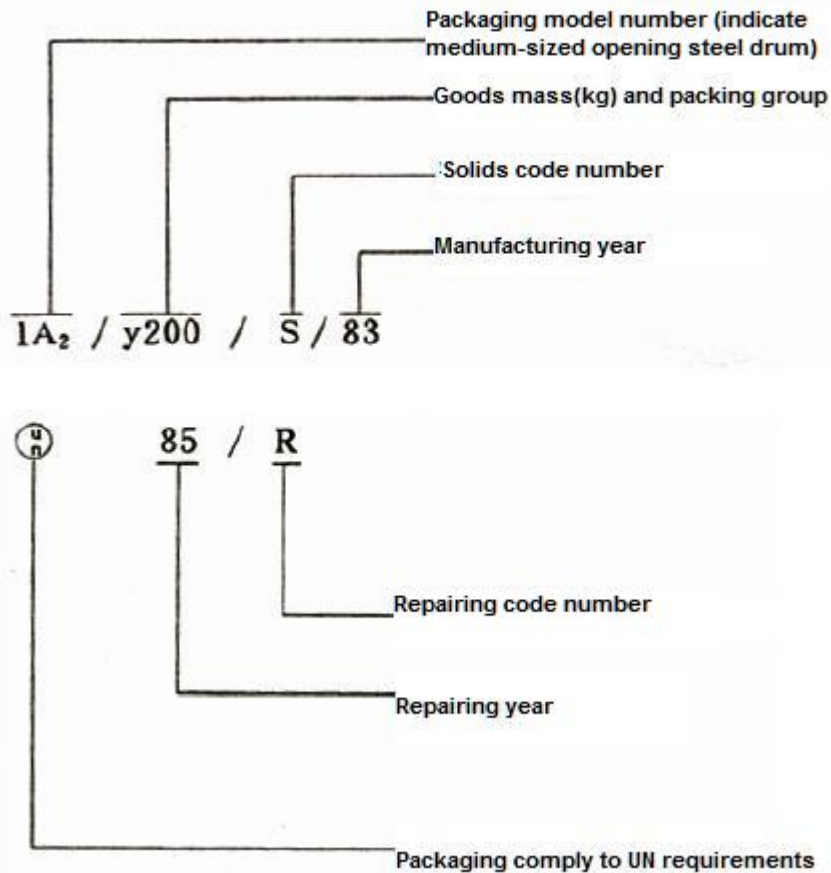
– Represents conformance to the requirements specified by the United Nations;

Example: the marking identification code of a steel drum and the marking identification code after an item of packaging is repaired.

Example 1 New drum



Example 2: Repaired drum



7.2.6 Manufacturing and application methods of the markings

The background colour of the markings must be white (or the background colour of the packaging should be adopted), with black as the text colour. The font must be clear and eye-catching. The marking can be printed, pasted, rendered or nailed.

8 Characteristic tests of transport packaging

8.1 Test preparation

8.1.1 Transport packaging prepared for testing must be ready to be transported. For any packaging which is intended to contain solids, other articles which have the similar physical characteristics (such as mass, particle size) as the solid goods can be used to replace the goods during testing; for any packaging which is intended to contain liquids, other articles which have the similar physical characteristics (such as density, viscosity) as the liquid goods can be used to replace the goods during tests. Water is usually used as the replacement.

8.1.2 Packaging containing solids must be filled up to 95% of the volume thereof, and packaging containing liquids must be filled up to 98% of its volume.

8.1.3 According to the condition requirements of circulation and environment, any paper-based packaging and rigid fibreboard packaging must undergo temperature and humidity pre-treatment in accordance with the provisions set out in GB/T 4857.2.

8.1.4 Prior to plastic packaging undergoing the drop test, the temperature of the sample and its content must be decreased to -18°C or under. If the content is liquid, it must remain liquid after its temperature has been decreased. Where necessary, antifreeze must be added.

8.1.5 The air vent of the ventilation device on the sample packaging must be sealed up or the ventilation device must be replaced with a closure device which is similar to the vent.

8.1.6 Prior to the characteristics test for packaging which is intended to directly contain dangerous goods, protective materials such as closures, absorption and liners must withstand a compatibility test where the packaging contains the intended goods for a certain period of time (example for 6 months).

8.2 Main test items and conformity criteria

The test items, quantitative value and conformity criteria of each type packaging must conform to the relevant provisions set out in Tables 1 to 4.

Table 1

Type of transport packaging	Stacking test				
	Quantity	Test method	Stacking height and test duration	Conformity criteria	Remarks
Drums: Steel (iron) drum (jerry can); Aluminium drum; Wooden barrel; Plywood drum; Cardboard drum; Rigid fibreboard drum; Boxes: Steel box; Natural wooden box; Plywood box; Reconstituted wooden box; Cardboard box; Rigid fibreboard box; Corrugated paper box; Acid-proof jar, porcelain jar, large glass bottle with thickness more than 3mm; Plastic drum (jerry can); Plastic box; Calcium plastic box; Drum composite packaging (inner packaging are plastic materials); Box-shaped composite	3 samples	See 8.2.1	1) Stacking height: land transport is 3m; ocean transport is 8m; if containers transport or on deck transport are adopted, the stacking height is 3m. 2) Test duration: 24 hours – 1 week	Test samples must not show any distortion or deterioration which might cause instability in stacks of packages.	Use on packing group I is not permitted.
			1) Stacking height: 3m. 2) Test duration: 28 days (at a temperature of 40 °C).		

Baskets, hampers			1) Stacking height: 3m 2) Test duration: 24 hours		
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Table 2

Packaging type	Drop test				
	Quantity	Test method	Drop height	Conformity criteria	Remarks
Drums: Steel (iron) drum (jerry can); Aluminium drum; Wooden barrel; Plywood drum; Cardboard drum; Rigid fibreboard drum; Plastic drum (jerry can); Drum-shaped composite packaging	6 samples (drop 3 samples each time)	See 8.2.2 First time drop: diagonally of the drum chime (for example angle 1-2-6) on to the impact face, if there is no chime on the packaging, then the weld seam position or the edge of the packaging must be dropped onto the impact face. Second time drop: the weakest position of the drum which was not tested in the first drop must be	When the content of the test sample is solids or liquids, or other liquids which have the similar proportion as the liquids which are intended to contain are selected for the test: for packing group I packaging must be 1.80m; for packing group II packaging must be 1.20m; for packing group III packaging must be 0.80m.	Any damage to the inner packaging or outer packaging that might cause its contents to leak is not permitted.	

		impacted onto the impact face, for example the drum closure, or the vertical weld seam position (5-6 line) of a cylinder shaped drum.			
Boxes: Natural wooden box; Plywood box; Reconstituted wooden box; Rigid fibreboard box; Cardboard box; Corrugated box; Calcium plastic box; Plastic box; Steel box; Box-shaped composite packaging	5 samples (drop one sample each time)	First time drop: flat on the base (3); second time drop: flat on the top (1); third time drop: flat on the longest side (2 or 4); fourth time drop: flat on the shortest side (5 or 6); fifth time drop: on a corner (such as 1-2-5)			
Paper bags; Plastic woven bags	3 samples (drop each sample 3 times)	First drop: flat on the wide face of the bag (1 or 3); Second drop: flat on the narrow face of the bag (2 or 4); Third drop: flat on the end of the bag (6 or 6).	According to the danger level of the contents: packing group II: 1.2m packing group III: 0.8m	There must be no leakage or damage to the bag.	This type of packaging is not permitted for use in packing group I.

Table 3

Packaging type	Leak-proof test				
	Quantity	Test method	Test pressure	Conformity criteria	Remarks
Steel drums; Aluminium drums; Steel jerry cans; Steel and plastic composite drums (boxes); Plastic drums; Plastic jerry cans	3 samples	Soak the samples completely into water, then pressurise the samples by air inflation, check if any bubbles are produced. The water soaking method must not affect the test result. Or spread soap solution or other suitable liquids at the joint seam position of the drum (jerry can) or other positions where the leakage is easily to happen, then pressurise the drum (jerry can) by air inflation, check for any bubbles, other equivalent methods can also be used.	Packing group I: not less than 30kPa; Packing group II and packing group III: not less than 20kPa.	If there is no air-leakage on the packaging, then it is considered to have qualified.	All packaging which are intended to contain liquids, must undergo the leak-proof test.

Table 4

Packaging type	Hydraulic pressure test				
	Quantity	Test method	Test pressure	Conformity criteria	Remarks
steel (iron) drums(jerry cans); Aluminium drums (jerry cans); Drum-shaped composite packaging (inner packaging are plastic materials)	3 samples	Install pressure gauges onto the sample packaging, connect the hydraulic pump, pressurise by adding water into the packaging, when the pointers of the pressure gauges point to the required pressure, then the plastic packaging and the composite packaging which have plastic as the materials of the inner packaging, must undergo a pressure test for 30 minutes; other material packaging or composite packaging must undergo a pressure test for 5 minutes. The test pressure must be applied continuously, and keep stable. If the samples are supported by other support equipment, then the support must not affect the test results.	Packing group I: 250kPa; Packing group II and packing group III: not smaller than the value from the vapour pressure at a temperature of 50oC multiple 1.75, and then take away 100kPa. The minimum test pressure is 100kPa.	If the packaging does not leak, then it is considered to have qualified.	All packaging which is intended to contain liquids must undergo the hydraulic pressure test.
Acid proof jars, ceramics jars and large glass with thickness above 3mm	3 samples	Install pressure gauges onto the sample packaging, connect the hydraulic pump, pressurise by adding water into the packaging, when the pointers of the pressure gauges point to the required pressure, begin the constant pressure test for 5 minutes.			

8.2.1 Stacking test

8.2.1.1 The test method must conform to the provisions set out in GB/T 4857.3.

8.2.1.2 See Table 1 for the stacking test and conformity criteria of each type transport packaging.

8.2.2 Drop test

8.2.2.1 Test methods must conform to the provisions set out in GB/T 4857.5.

8.2.2.2 When using water as a replacement when testing, this must be according to the density p of contained liquid, in accordance with the following formula:

Packaging group I:

If density $p \leq 1.2$, then the drop height = $1.2 \times 1.5 = 1.8$ (m);

If density $p > 1.2$, then the drop height = $p \times 1.5$ (m)

Packaging group II:

If density $p \leq 1.2$, then the drop height must be 1.2 (m);

If density $p > 1.2$, then the drop height = $p \times 1.0$ (m).

Packaging group III:

If density $p \leq 1.2$, then the drop height must be $1.2/1.5=0.8$ (m);

If density $p > 1.2$, then the drop height = $p /1.5$ (m).

Where, p – the density of the liquid, unit is gram per cubic centimetre (g/m^3)

1.0 and 1.5 are the coefficient.

8.2.2.3 See Table 2 for the drop test and conformity criteria for each type of transport packaging.

8.2.3 leak-proof test

See Table 3 for the leak-proof test and conformity criteria of each type of transport packaging.

8.2.4 Hydraulic pressure test

See Table 4 for the hydraulic pressure test and conformity criteria or each type of transport packaging.

8.2.5 Other tests

Where necessary, test items such as weathering conditions and mechanical strength can be added in accordance with the requirements of environment, circulation or the packaging.

Appendix A

(Informative Annex)

Transport packages of common dangerous goods list

A.1 See Table 1 for the transport packages of common dangerous goods list

Packaging No	Combination packaging		Combination packaging identification code	Applicable goods type	Limit mass of package	Remarks	
	Outer packaging	Inner packaging					
1	Closed top steel drums		1A ₁	Liquids	Net mass per drum must not exceed:	If the steel drum is filled with corrosive substances, then the inner wall of the drum must be coated with an anti-corrosion layer	
A	Steel plate thickness is 1.50mm				A: 250kg		
B	Steel plate thickness is 1.25mm				B: 200kg		
C	Steel plate thickness is 1.00mm				C: 100kg		
D	Steel plate thickness is more than 0.50mm ~ 0.75mm				D: 200kg (disposable packaging)		
2	Medium-sized opening steel drums	Plastic bags or multi-layer Kraft paper	1A ₂ H ₄ 1A ₂ M ₁ 1A ₂ M ₂	Solids, powders and crystal goods	Net mass per drum must not exceed:		
A	Steel plate thickness is 1.25mm						250kg
B	Steel plate thickness is 1.00mm						150kg
C	Steel plate thickness is 0.75mm						100kg
				50kg or 20kg			
			1A ₂ 1N ₂	Glue and colloidal	50kg or		

D	Steel plate thickness is 0.50mm					
E	Steel drums or tin-plated thin steel drums (jerry cans)					
3	Full-sized opening steel drums	Plastic bags or multi-layer Kraft paper	1A ₃ 5H ₄ 1A ₃ 5M ₁ 1A ₃ 5M ₃ 1A ₃	Solids, powders and crystal goods	Net mass per drum must not exceed:	
A	Steel plate thickness is 1.25mm					250kg
B	Steel plate thickness is 1.00mm					150kg
C	Steel plate thickness is 0.75mm					100kg
D	Steel plate thickness is 0.50mm					50kg
4	Composite steel plastic drums					
A	Steel plate thickness is 1.25mm				200kg	
B	Steel plate thickness is 1.00mm				50kg or 100kg	
5	Opening closed aluminium drums: aluminium plate thickness must be greater than 2mm		1B ₁	Liquids	Net mass per drum must not exceed 200kg	
6	Fibreboard drums; Plywood drums;	Plastic bags or multi-layer	1F5H ₄ 1F5M ₁ 1D5H ₄	Solids, powders and crystal	Net mass per drum must not exceeds	

	Cardboard drums	Kraft paper	1D5M ₁ 1G5H4 1G5M ₁	goods	30kg	
7	Opening closed plastic drums		1H ₁	Corrosive liquids	Net mass per drum must not exceed 35kg	
8	Full-sized opening plastic drums	Plastic bags or multi-layer Kraft paper	1H ₃ 5H ₄ 1H ₃ 5M ₁	Solids, powders and crystal goods	Net mass per drum must not exceed 50kg	
9	Whole-board wooden boxes	Plastic bags or multi-layer Kraft paper	4C ₁ 5H ₄ 4C ₁ 5M ₁	Solids, powders and crystal goods	Net mass per drum must not exceed 50kg	
10	Whole-board wooden boxes	1. Inside of the middle layer of the metal drum: a threaded closure glass bottle, plastic bottle, plastic bag 2. Inside of the middle layer of metal jerry can: a threaded closure glass bottle, plastic bottle, plastic bag 3. Inside of the middle layer of plastic drum: a threaded closure glass bottle,	4C ₁ 1N ₃ 9P ₁ 4C ₁ 1N ₃ 9H 4C ₁ 1N ₃ 5H ₄ 4C ₁ 3N ₃ 9P ₁ 4C ₁ 3N ₃ 9H 4C ₁ 3N ₃ 5H ₄ 4C ₁ 1H ₃ 9P ₁ 4C ₁ 1H ₃ 9H 4C ₁ 1H ₃ 5H ₄ 4C ₁ 3H ₃ 9P ₁ 4C ₁ 3H ₃ 9H 4C ₁ 3H ₃ 5H ₄	Strong oxidant, Peroxides Sodium chloride, Potassium chloride	Net mass per box must not exceed 20kg. Inside of the case: net mass per bottle must not exceed 1kg, net mass per bag must not exceed 2kg.	

		plastic bottle, plastic bag 4. Inside of the middle layer of plastic jerry can: a threaded closure glass bottle, plastic bottle, plastic bag				
11	Whole-board wooden boxes	Threaded closure glass bottles, or grounding closure glass bottles	4C ₁ 9P ₁	Strong acid liquids	Net mass per box must not exceed 20kg. Inside of the case: net mass per box must not exceed 0.5kg ~5kg.	
12	Whole-board wooden boxes	1. Threaded closure glass bottles; 2. Glass bottles with metal lids; 3. Plastic bottles; 4. Metal drums (jerry cans)	4C ₁ 9P ₁ 4C ₁ 9P ₁ 4C ₁ 9H 4C ₁ 1N 4C ₁ 3N	Liquids, solid powders and crystal goods	Net mass per box must not exceed 20kg. Inside of the case: net mass per bottle/drum (jerry can) must not exceed 1kg.	
13	Whole-board wooden boxes	Wrap the ampoule bottle with corrugated paper cover or plastic bubble cover, then put into the	4C ₁ G9P ₃ 4C ₁ H9P ₃	Gases, Liquids	Net mass per box must not exceed 10kg. Inside of the case: net mass per bottle must not exceed 0.25kg.	

		paper box				
14	Whole-board wooden boxes or semi-lattice wooden boxes	Acid proof jars or ceramics jars	4C ₁ 9P ₂ 4C ₃ 9P ₂	Strong acid liquids	1. jar contained net mass per box must not exceed 50kg 2. bottle contained net mass per box must not exceed 30kg	
15	Wooden boxes or semi-lattice wooden boxes	Glass bottles or plastic drums	4C ₁ 1H ₂ 4C ₁ 9P ₁ 4C ₃ 1H ₁ 4C ₃ 9P ₁	Acid liquids	1. bottle contained net mass per box must not exceed 30kg, each bottle must not exceed 25kg; 2. drum contained net mass per box must not exceed 40kg, each drum must not exceed 20kg;	
16	Lattice wooden boxes	Thin steel plate drums or tin-plated thin steel plate drums (jerry cans)	4C41A2 4C41N 4C43N	gluey and colloidal goods, such as paints	1. net mass per box must not exceed 50kg; 2. net mass per drum (jerry can) must not exceed 20kg;	
17	Lattice wooden boxes	Metal drums (jerry cans) or plastic drums, plastic bag liners inside of drums	4C ₄ 1N5H ₄ 4C ₄ 3N5H ₄ 4C ₄ 1H ₂ 5H ₄	Solids, powders and crystal goods	Net mass per box does not exceed 20kg	

18	Bottom board lattice wooden boxes	Threaded closure glass bottles, plastic bottles or tin-plated thin steel drums (jerry cans)	4C ₂ 9P ₁ 4C ₂ 9P 4C ₂ 1N 4C ₂ 3N	gluey and colloidal, powder goods	Net mass per box must not exceed 20kg. Inside of boxes: net mass per bottle/ drum (jerry can) must not exceed 1kg
19	Fibreboard boxes; wood particle board boxes; chipboard boxes	Threaded closure glass bottles, plastic bottles or tin-plated thin steel plate drums (jerry cans)	4F9P ₁ 4F9H 4F1N 4F3N	Solids, powders and crystal goods, gluey and colloidal, goods	Net mass per box must not exceed 20kg. Inside of boxes: net mass per bottle must not exceed 1kg; net mass per each drum (jerry can) must not exceed 4kg
20	Calcium plastic boxes	Threaded closure glass bottles, plastic bottles, composite plastic bottles, metal drums(jerry cans), tin-plated thin steel plate drums, metal hose fitted inside paper boxes	4G ₃ 9P ₁ 4G ₃ 9H 4G ₃ 3N 4G ₃ 5N4M	Liquid pesticides, gluey and colloidal, goods	Net mass per box must not exceed 20kg. Inside of boxes: net mass per bottle/ drum (jerry can)/tube must not exceed 1kg
21	Calcium plastic boxes	Double-layer of plastic bags or	4G ₃ 5H ₄ 4G ₃ 5M ₁	Solid, powder pesticides	Net mass per box must not exceed 20kg. Inside of

		multi-layers of Kraft paper			boxes: net mass per bag must not exceed 5kg
22	Corrugated paper boxes	Metal drums (jerry cans), tin-plated thin steel plate drums, metal hose	4G ₁ 3N 4G ₁ 3N 4G ₁ 5N	gluey and colloidal, goods	Net mass per box must not exceed 20kg. Inside of boxes: net mass per tube/ drum (jerry can) must not exceed 1kg
23	Corrugated board boxes	Plastic bottles, composite plastic bottles, double-layer plastic bags, multi-layer Kraft papers	4G ₁ 9H 4G ₁ 6H9 4G ₁ 5H ₄ 4G ₁ 5M ₁	powder pesticides	Net mass per box must not exceed 20kg. Inside boxes: net mass per bottle must not exceed 1kg, each bag must not exceed 5kg
24	Baskets, hampers, or cages woven with materials such as wicker, chaste tree twig, rattan or bamboo strips	Threaded closure glass bottles, plastic bottles or tin-plated thin steel plate drums (jerry cans)	8K9P ₁ 8K9P 8K3N 8K1N	Low-poisonous liquid or powder pesticides, gluey and colloidal, goods, oil-paper products and flax fibre	Net mass per basket/ hamper/ cage must not exceed 20kg; net mass for paint type per drum (jerry can) must not exceed 5kg; per bottle must not exceed 1kg.
25	Plastic woven bags	Plastic bags	5H ₁ 5H ₄	Powder, lamp goods	Net mass per bag must not exceed 50kg
26	Composite plastic woven bags		6HL5	Lamp, powder and crystal goods	Net mass per bag is within the range of 25 ~50kg

27	Gunnysacks	Plastic bags	5L ₁ 5H ₄	Solid goods	Net mass per bag must not exceed 100kg
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A2 See A.2 for the identification codes of common composite packaging

Serial number	Packaging name	Identification code	Serial number	Packaging name	Identification code
1	Opening closed steel drums	1A1	16	Corrugated boxes	
2	Medium-sized opening steel drums	1A2	17	Cardboard boxes	
3	Full-sized opening steel drums	1A3	18	Calcium plastic boxes	
4	Opening closed metal drums	1N1	19	General woven bags	
5	Full-sized opening metal jerry cans	3B3	20	Composite plastic woven bags	
6	Opening closed aluminium drums	1B1	21	General plastic woven bags	
7	Medium-sized opening aluminium drums	3B2	22	Sift-proof plastic woven bags	
8	Opening closed plastic drums	1H1	23	Waterproof plastic woven bags	
9	Full-sized opening plastic drums	1H3	24	Plastic bags	
10	Opening closed plastic jerry cans	3H1	25	General paper bags	
11	Full-sized opening plastic jerry cans	3H3	26	Waterproof paper bags	
12	Whole-plate	4C1	27	Glass bottles	

	wooden boxes				
13	Wooden-base lattice wooden boxes	4C2	28	Ceramic jars	
14	Semi-lattice wooden boxes	4C3	29	Ampoule bottles	
15	Lattice wooden boxes	4C4	30		