



BSI Standards Publication

Safety of toys

Part 5: Chemical toys (sets) other than experimental sets

National foreword

This British Standard is the UK implementation of EN 71-5:2013. It supersedes BS EN 71-5:1993+A2:2009/BS 5665-5:1993 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee CW/15, Safety of toys.

A list of organizations represented on this committee can be obtained on request to its secretary.

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**Safety of toys - Part 5: Chemical toys (sets) other than
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autres que les coffrets d'expériences chimiques

Sicherheit von Spielzeug - Teil 5: Chemisches Spielzeug
(Sets) ausgenommen Experimentierkästen

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Contents

Page

Foreword.....	4
Introduction	6
1 Scope.....	7
2 Normative references.....	7
3 Terms and definitions	7
4 Plaster of Paris (gypsum) moulding sets	9
4.1 Marking	9
4.2 First aid information.....	9
4.3 Safety rules.....	9
5 Ceramic and vitreous enamelling materials supplied in miniature workshop sets	10
5.1 Chemical mixtures	10
5.2 Marking.....	10
5.3 First aid information.....	10
5.4 Safety rules.....	11
6 Oven-hardening plasticised PVC modelling clay sets.....	11
6.1 Chemical substances.....	11
6.2 Marking	12
6.3 First aid information.....	12
6.4 Safety rules.....	12
7 Plastic moulding sets.....	12
7.1 Polystyrene granules	12
7.2 Embedding sets	13
8 Adhesives, paints, lacquers, varnishes, thinners and cleaning agents (solvents) supplied or recommended in model sets	14
8.1 General	14
8.2 Adhesives	14
8.3 Water-based paints and lacquers.....	20
8.4 Solvent-based paints, lacquers, thinners and cleaning solvents	22
9 Marking	24
9.1 General	24
9.2 Marking of the primary packaging.....	24
9.3 Marking of individual containers and any packagings.....	24
10 Instructions for use.....	25
10.1 General	25
10.2 Contents list	25
10.3 Advice for adult supervision.....	25
10.4 Safety rules.....	26
10.5 Instructions for carrying out the activities.....	26
10.6 Spills and disposal of chemicals.....	26
11 Test methods.....	27
11.1 General	27
11.2 Determination of elements in ceramic and vitreous enamelling materials.....	27
11.3 Determination of plasticisers in oven-hardening polyvinyl chloride (PVC) modelling clay sets	32
11.4 Determination of the emission of benzene, toluene and xylenes from oven-hardening plasticised PVC modelling clay sets and plastic moulding sets.....	44

11.5	Determination of styrene content in polystyrene granules	47
11.6	Determination of organic solvents	50
11.7	Combined approach for the determination of plasticisers in solvent-based adhesives and in solvent-based paints and lacquers, film-forming agents in paints and lacquers and modifiers in solvent-based paints and lacquers	70
Annex A	(normative) Environmental, health and safety precautions	82
Annex B	(informative) Organic solvents	83
Annex C	(informative) Maximum permitted element concentrations for the compounds permitted in ceramic and vitreous enamelling materials	85
Annex D	(informative) Validation of test methods	86
Annex E	(informative) Rationale	87
E.1	General remark.....	87
E.2	Primary packaging (4.1; 5.2; 6.2; 7.1.2; 7.2.2; 8.2.1.2.2; 8.2.2.6; 8.3.2; 8.4.3; 9.2).....	87
E.3	Minimum age (4.1; 5.2; 6.2; 7.1.2; 7.2.3; 8.2.1.2.3; 8.2.1.3.3; 8.2.2.6; 8.3.3; 8.4.3).....	87
E.4	Phthalates (6.1 Table 2; 8.2.2; 8.4.1)	87
E.5	Benzene (6.1, Table 3; 8.2.2.4, Table 12; 8.4.1, Table 16).....	88
E.6	Preservatives (7.2.1; 8.2.1.1; 8.3.1)	88
Annex F	(informative) Significant technical changes between this European Standard and the previous version.....	89
Annex ZA	(informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2009/48/EC	90
Bibliography		91

Foreword

This document (EN 71-5:2013) has been prepared by Technical Committee CEN/TC 52 “Safety of toys”, the secretariat of which is held by DS.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2013, and conflicting national standards shall be withdrawn at the latest by December 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 71-5:1993.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive 2009/48/EC, see informative Annex ZA, which is an integral part of this document.

The significant changes from the previous edition of this standard are detailed in Annex F.

This standard is Part 5 of the European Standard for safety of toys, EN 71.

This Part 5 of the EN 71 series is intended to be read in conjunction with EN 71, Part 1, Part 2 and Part 3, particularly the Introduction and Clause 1 of Part 1.

EN 71, *Safety of toys*, consists of the following parts:

- *Part 1: Mechanical and physical properties;*
- *Part 2: Flammability;*
- *Part 3: Migration of certain elements;*
- *Part 4: Experimental sets for chemistry and related activities;*
- *Part 5: Chemical toys (sets) other than experimental sets;*
- *Part 7: Finger paints — Requirements and test methods;*
- *Part 8: Activity toys for domestic use;*
- *Part 9: Organic chemical compounds — Requirements;*
- *Part 10: Organic chemical compounds — Sample preparation and extraction;*
- *Part 11: Organic chemical compounds — Methods of analysis;*
- *Part 12: N-Nitrosamines and N-nitrosatable substances;*
- *Part 13: Olfactory board games, gustative board games, cosmetic kits and gustative kits;*

— Part 14: Trampolines for domestic use.

NOTE 1 In addition to the above parts of EN 71, the following guidance documents have been published: CEN Report, CR 14379, *Classification of toys — Guidelines*, CEN Technical Report CEN/TR 15071, *Safety of toys — National translations of warnings and instructions for use in EN 71*, and CEN Technical Report CEN/TR 15371, *Safety of toys — Replies to requests for interpretation of EN 71-1, EN 71-2, and EN 71-8*.

NOTE 2 Words in *italics* are defined in Clause 3 (Terms and definitions).

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard is intended to reduce the risks which may present health hazards to a child when the *chemical toys* are used as intended or in a foreseeable way, bearing in mind the behaviour of children.

When using these *chemical toys*, potential risks should be kept to a minimum by inclusion of appropriate information to give special attention to possible hazards, risks and other problems.

Chemical Abstract Service Registry Number (CAS) and European Inventory of Existing Chemical Substances Number (EINECS) given in various tables are provided for information purposes only.

1 Scope

This European Standard specifies requirements and test methods for the substances and materials used in *chemical toys* (sets) other than *experimental sets*. These substances and mixtures are:

- those classified as dangerous by the EC-legislation applying to dangerous substances and dangerous mixtures [5];
- substances and mixtures which in excessive amounts could harm the health of the children using them and which are not classified as dangerous by the above mentioned legislation; and
- any other chemical substance(s) and mixture(s) delivered with the *chemical toy*.

NOTE The terms “substance” and “mixture” are defined in the REACH regulation No. (EC)1907/2006 and in the CLP regulation (EC) No. 1272/2008.

Additionally, requirements are specified for markings, warnings, safety rules, contents list, instructions for use and first aid information.

This Part of EN 71 applies to:

- *plaster of Paris (gypsum) moulding sets*;
- *ceramic and vitreous enamelling materials supplied in miniature workshop sets*;
- *oven-hardening plasticised PVC modelling clay sets*;
- *plastic moulding sets*;
- *embedding sets*;
- adhesives, paints, lacquers, varnishes, thinners and cleaning agents (solvents), supplied or recommended in *model sets*.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 3104, *Petroleum products — Transparent and opaque liquids — Determination of kinematic viscosity and calculation of dynamic viscosity (ISO 3104)*

EN ISO 3219, *Plastics — Polymers/resins in the liquid state or as emulsions or dispersions — Determination of viscosity using a rotational viscometer with defined shear rate (ISO 3219)*

EN ISO 3696, *Water for analytical laboratory use — Specification and test methods (ISO 3696)*

EN ISO 22854, *Liquid petroleum products — Determination of hydrocarbon types and oxygenates in automotive-motor gasoline — Multidimensional gas chromatography method (ISO 22854)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
chemical toy
toy intended for the direct handling of chemical substances and mixtures and which is used in a manner appropriate to a given age-group and under the supervision of an adult

[SOURCE: EN 71-4:2013, 3.1]

3.2
experimental set
chemical toy where the experimental and explorative character in playing with single chemical substances and mixtures along strict instructions dominates over the creative ideas of the user

[SOURCE: EN 71-4:2013, 3.2]

3.3
plaster of Paris (gypsum) moulding set
toy containing moulds into which a mixture of water and gypsum is poured and allowed to harden

Note 1 to entry: The gypsum consists predominantly of calcium sulfate hemihydrate $\text{CaSO}_4 \cdot 0,5 \text{H}_2\text{O}$.

Note 2 to entry: Plaster of Paris (gypsum) moulding sets are for example used for preparing figures and plates.

3.4
ceramic and vitreous enamelling materials supplied in miniature workshop set
toy containing ceramic glazes and vitreous enamels (transparent, opaque or coloured) which after addition of water are painted on ceramic and metallic bodies to obtain smooth coatings, after which it is dried and fired at temperatures above 700 °C

3.5
oven-hardening plasticised PVC modelling clay set
toy to be used for creating all kinds of figures, brooches, fashion jewellery etc. prepared by hardening in the oven at temperatures between (100–130) °C

3.6
plastic moulding set
toy to be used in substitution of ceramic materials to create decorative articles or models by fusion of a polymer by heating in an oven up to a maximum of 180 °C

3.7
embedding set
toy to be used to preserve certain products in a transparent material

3.8
model set
product used to assemble and coat models which are supplied with or recommend adhesives, paints, lacquers, varnishes, thinners and cleaning agents

Note 1 to entry: Examples for these models are motorcars, aeroplanes, houses and ships.

3.9
adhesive
non-metallic substance capable of joining materials by surface bonding (adhesion) and the bond possessing adequate internal strength (cohesion)

3.10
water-based paints and lacquers
water based pigmented material which when applied in a liquid form to a surface, forms after a time a dry adherent film or coating

3.11

solvent based paints and lacquers

solvent based pigmented material which when applied in a liquid form to a surface, forms after a time a dry adherent film or coating

3.12

varnish

low viscosity lacquer

3.13

thinners and cleaning agents

solvents

products which are intended to obtain the required viscosity of paints and lacquers and to clean tools and brushes

4 Plaster of Paris (gypsum) moulding sets

NOTE Basically plaster of Paris (gypsum) is not a harmful material, but if the powder is inhaled or swallowed, it may form hard clots in the lungs or in the stomach.

4.1 Marking

The primary packaging shall in addition to the marking required in Clause 9 bear the following:

"Warning. Not suitable for children under (*) years. For use under adult supervision.

Read the instructions before use, follow them and keep them for reference."

(*) The age is to be specified by the manufacturer, authorised representative or importer. It shall not be below 5 years.

4.2 First aid information

The instructions for use shall in addition to the general first aid information in 10.2 d) contain the following:

- "In case of eye contact: Wash out eye with plenty of water, holding eye open. Seek immediate medical advice.";
- "If swallowed: Wash out mouth with water, drink some fresh water. Do not induce vomiting. Seek immediate medical advice.".

4.3 Safety rules

The instructions for use shall in addition to the rules required in 10.4 contain the following safety rules:

- "Do not place the material in the mouth.";
- "Do not inhale dust or powder.";
- "Do not apply to the body.".

5 Ceramic and vitreous enamelling materials supplied in miniature workshop sets

5.1 Chemical mixtures

These ceramic glazes and vitreous enamels are ready-made mixtures consisting of substances and mixtures given in Table 1. In each mixture there shall be not more than one of the pigments given in Table 1 with the limit for the pigment in the glaze. The maximum mass of each ready-made mixture in a set shall not exceed 50 g.

NOTE A ceramic glaze is a vitrified inorganic silicate material. A ceramic frit is a vitrified inorganic silicate material incorporating a pigment. These ready-made mixtures of silicate glazes are incorporating metal oxides and other compounds.

Table 1 — Chemical mixtures

Chemical substance/mixture	CAS-Number	EINECS-Number
Calcium silicate hydrate (clay)	1344-96-3	-
Kaolin (china clay)	1332-58-7	-
Sparingly soluble silicate glazes, e.g. enamel and ceramic frits	65997-18-4	266-047-6
Pigments	CAS-Number	EINECS-Number
Copper oxide 0,25 %	1317-38-0	215-269-1
Di-iron trioxide 5 %	1309-37-1	215-168-2
Ferro-zirconium silicate 5 %	68412-79-3	270-210-7
Tin dioxide 10 %	18282-10-5	242-159-0
Vanadium-zirconium silicate 5 %	68186-95-8	269-057-9
(x)Aluminium-(y)cobalt (z)oxide 3 %	1333-88-6	—
Zirconium orthosilicate 15 %	10101-52-7	—
Zirconium-praseodymium silicate 5 %	68187-15-5	269-075-7

5.2 Marking

The primary packaging shall in addition to the marking required in Clause 9 bear the following warnings:

"Warning. Not suitable for children under (*) years. For use under adult supervision.

Read the instructions before use, follow them and keep them for reference."

(*) The age is to be specified by the manufacturer, authorised representative or importer. It shall not be below 5 years.

5.3 First aid information

The instructions for use shall in addition to the general first aid information in 10.2 d) contain the following:

— "In case of eye contact: Wash out eye with plenty of water, holding eye open. Seek immediate medical advice."

5.4 Safety rules

The instructions for use shall in addition to the rules required in 10.4 contain the following safety rules:

- "Do not inhale powder.";
- "Do not place the powder in the mouth.";
- "Do not apply to articles intended to come into contact with food and drink.";
- "Keep the set away from food and drink.";
- "The firing process is not part of the function of the toy. Therefore keep children away during the firing process and do not inhale gases emitted.".

6 Oven-hardening plasticised PVC modelling clay sets

6.1 Chemical substances

These modelling clay sets shall consist of PVC (polyvinylchloride) and plasticisers and may contain modifiers, fillers (e.g. China clay) and colourants. Only plasticisers given in Table 2 shall be used.

The maximum content of plasticisers in the mixture shall not exceed 30 %.

The vinyl chloride monomer content shall be below 1 mg/kg (see [11]).

Table 2 — Plasticisers in oven-hardening plasticised PVC modelling clay sets

Chemical substance	CAS-Number
Adipic acid polyesters	-
Alkylsulfonic acid esters (C ₁₂ to C ₂₀) of phenol	-
Di-isononyl cyclohexane-1,2-dicarboxylate (DINCH)	166412-78-8
Phthalic acid esters with straight-chain aliphatic (C ₆ upwards except C ₈) alcohols and mixtures of these esters	-
Tributyl acetylcitrate	77-90-7
Tris(2-ethylhexyl) acetylcitrate	144-15-0

During heating of these materials at the maximum permitted temperature and duration, the limits given in Table 3 shall not be exceeded for the emission of the listed toxic substances when tested according to 11.4.

Table 3 — Limits for the emission of substances from oven-hardening plasticised PVC modelling clay sets and plastic moulding sets during heating

Substance	Limit mg/kg
Benzene	5
Toluene	15
Xylenes	25

6.2 Marking

The primary packaging shall in addition to the marking required in Clause 9 bear the following warning:

“Warning. Not suitable for children under (*) years. For use under adult supervision.

Read the instructions before use, follow them and keep them for reference.”.

(*) The age is to be specified by the manufacturer, authorised representative or importer. It shall not be below 8 years.

6.3 First aid information

The instructions for use shall in addition to the general first aid information in 10.2 d) contain the following:

- “In case of accidental overheating and inhalation of poisonous gases: Remove person to fresh air and seek immediate medical advice.”.

6.4 Safety rules

The instructions for use shall in addition to the rules required in 10.4 contain the following safety rules:

- “Do not place the material in the mouth.”;
- “Do not exceed a hardening temperature of 130 °C or harmful gases may be produced.”;
- “Do not exceed a hardening time of 30 minutes.”;
- “The hardening process is not part of the function of the toy and should be carried out by the supervising adult.”;
- “Use a domestic oven thermometer, e.g. bimetal, to measure the temperature.”;
- “Do not use a glass thermometer.”;
- “Do not heat the material and cook food at the same time in a domestic oven”;
- “Do not use a microwave oven.”.

7 Plastic moulding sets

7.1 Polystyrene granules

7.1.1 Chemical substances

These sets shall contain uncoloured and coloured polystyrene granules in accordance with Table 4.

Table 4 — Polystyrene

Chemical substance	CAS-Number	EINECS-Number
Polystyrene with monomer content of styrene $\leq$ 500 mg/kg	9003-53-6	-

7.1.2 Marking

The primary packaging shall in addition to the marking required in Clause 9 bear the following warnings:

"Warning. Not suitable for children under (*) years. For use under adult supervision.

Read the instructions before use, follow them and keep them for reference."

(*) The age is to be specified by the manufacturer, authorised representative or importer. It shall not be below 10 years.

7.1.3 First aid information

The instructions for use shall in addition to the general first aid information in 10.2 d) contain the following:

— "In case of accidental overheating and inhalation of poisonous gases: Remove person to fresh air and seek immediate medical advice."

7.1.4 Safety rules

The instructions for use shall in addition to the rules required in 10.4 contain the following safety rules:

- "Do not exceed a melting temperature of 180 °C.";
- "The melting process is not part of the function of the toy and should be carried out by the supervising adult.";
- "Use a domestic oven thermometer, e.g. bimetal, to measure the temperature.";
- "Do not swallow material.";
- "Do not heat the material and cook food at the same time in a domestic oven.";
- "Do not use a glass thermometer.";
- "Do not exceed the maximum recommended processing period.";
- "Do not use a microwave oven."

7.2 Embedding sets

7.2.1 General

Substances classified as dangerous substances (see [5]) shall not be used in *embedding sets*.

NOTE Substances such as gelatine or agar could be utilised with suitable preservation.

Only preservatives permitted in foodstuffs (see [9]) and/or cosmetics, except those preservatives which are only allowed in cosmetic products that are rinsed-off after use, (see [10]) shall be used.

7.2.2 Packaging

The name(s) of any preservative(s) used shall be indicated on the primary packaging.

7.2.3 Marking

The packaging shall in addition to the marking required in Clause 9 bear the following warnings:

"Warning. Not suitable for children under (*) years. For use under adult supervision.

Read the instructions before use, follow them and keep them for reference."

(*) The age is to be specified by the manufacturer, authorised representative or importer. It shall not be below 5 years.

7.2.4 First aid information

The instructions for use shall in addition to the general first aid information in 10.2 d) contain the following:

— "If swallowed: Wash out mouth with water, drink some fresh water. Do not induce vomiting. Seek immediate medical advice."

7.2.5 Safety rules

The instructions for use shall in addition to the rules required in 10.4 contain the following safety rule:

— "Do not place the preserved material in the mouth."

8 Adhesives, paints, lacquers, varnishes, thinners and cleaning agents (solvents) supplied or recommended in model sets

8.1 General

Adhesives, paints, lacquers, varnishes, thinners and cleaning agents (solvents) supplied in *model sets* shall comply with the requirements in Clause 8. The instructions included in the set shall mention only *adhesives, paints, lacquers, varnishes, thinners and cleaning agents (solvents)* that comply with the requirements in Clause 8.

8.2 Adhesives

8.2.1 Water-based adhesives

8.2.1.1 General

Water-based *adhesives* shall consist of water and basic materials. Only basic materials given in Table 5 shall be used. Additionally, water based *adhesives* may contain special materials given in Table 6 or Table 8, preservatives, fillers and modifiers.

Only preservatives permitted in foodstuffs (see [9]) and/or cosmetics, except those preservatives which are only allowed in cosmetic products that are rinsed-off after use, (see [10]) shall be used.

Basic materials for water-based *adhesives* shall be in accordance with Table 5.

Table 5 — Basic materials for water-based adhesives and water-based paints and lacquers

Chemical substance	CAS-Number	EINECS-Number
Acrylic polymers	-	-
Hydrophilic polyurethane containing neither free isocyanate-groups nor aromatic amino-compounds	-	-
Polymers and copolymers of monomers permitted for materials intended to come into contact with foodstuffs	-	-
Poly(vinyl acetate)	9003-20-7	-
Poly(vinyl alcohol)	9002-89-5	209-183-3

The basic materials shall be appropriate for food contact (see [11]). The migration solvent shall be water, grade 3 according to EN ISO 3696. The contact time shall be approximately 60 min at approximately 40 °C.

8.2.1.2 Liquid adhesives for paper and wood

8.2.1.2.1 General

Special materials for *adhesives* for paper and wood shall be in accordance with Table 6.

Table 6 — Special materials for adhesives for paper and wood and water-based paints and lacquers

Chemical substance	CAS-Number	EINECS-Number
Cellulose ethers (e.g. carboxymethylcellulose, methylcellulose)	9004-67-5	-
Dextrin	9004-53-9	232-675-4
Gum arabic	9000-01-5	232-519-5
Starch or modified starch	9005-25-8	232-679-6

Special additives for *adhesives* for paper and wood shall be in accordance with Table 7.

Table 7 — Special additives for liquid adhesives for paper and wood

Chemical substance	CAS-Number	EINECS-Number
Butyl glycolate (Butyl hydroxyacetate) < 3 %	7397-62-8	230-991-7
Caprolactam < 5 %	105-60-2	203-313-2
Glycerol	56-81-5	200-289-5
Polyacrylamide	9003-05-8	-
Poly(acrylic acid)	9003-01-4	-
Polyethylene glycol	25322-68-3	-
Poly(methacrylic acid)	25087-27-7	-
Polypropylene glycol	25322-69-4	-
Sodium salts of fatty acids (C ₁₄ upwards)	-	-
Sorbitol	50-70-4	200-061-5
2-(2-Butoxyethoxy)ethyl acetate < 3 %	124-17-4	204-685-9
Xylitol	87-99-0	201-788-0

The polymers given in Table 7 shall be appropriate for food contact (see [11]). The migration solvent shall be water grade 3 according to EN ISO 3696. The contact time shall be approximately 60 min at approximately 40 °C.

8.2.1.2.2 Packaging

The capacity of the containers for water-based *adhesives* in a set shall not be more than 100 ml. The name(s) of any preservative(s) used shall be indicated on the primary packaging.

8.2.1.2.3 Marking

The *adhesive* container shall in addition to the marking required in Clause 9 bear the following warnings:

"Warning. Not suitable for children under (*) years. For use under adult supervision."

(*) The age is to be specified by the manufacturer, authorised representative or importer. It shall not be below 3 years.

8.2.1.2.4 First aid information

The instructions for use shall in addition to the general first aid information in 10.2 d) contain the following:

- "In case of skin contact: Wash affected area with plenty of water.";
- "In case of eye contact: Wash out eye with plenty of water, holding eye open. Seek immediate medical advice."

8.2.1.3 Adhesive sticks for paper

8.2.1.3.1 General

Special materials for *adhesive* sticks for paper shall be in accordance with Tables 6, 7 and 8.

Table 8 — Special material for adhesive sticks for paper

Chemical substance	CAS-Number	EINECS-Number
Poly(vinyl pyrrolidone)	9003-39-8	-

The special materials shall be appropriate for food contact (see [11]). The migration solvent shall be water grade 3 according to EN ISO 3696. The contact time shall be approximately 60 min at approximately 40 °C.

8.2.1.3.2 Packaging

The mass of the *adhesive* stick in a set shall not exceed 50 g.

8.2.1.3.3 Marking

The packaging, if any, or the *adhesive* stick container shall in addition to the marking in Clause 9 bear the following warning:

"Warning. Not suitable for children under (*) years. For use under adult supervision."

(*) The age is to be specified by the manufacturer, authorised representative or importer. It shall not be below 3 years.

8.2.1.3.4 First aid information

The instructions for use shall in addition to the general first aid information in 10.2 d) contain the following:

- "In case of skin contact: Wash affected area with plenty of water.";
- "In case of eye contact: Wash out eye with plenty of water, holding eye open. Seek immediate medical advice."

8.2.2 Solvent-based adhesives

8.2.2.1 General

Solvent-based *adhesives* consist of basic material specified in Tables 5, 6 and 8 and basic materials from the relevant sub-clauses under 8.2.2. Further they consist of substances from Tables 7 and 12 with the limits given there and may additionally contain fillers, modifiers and plasticisers. Plasticisers shall be appropriate for food contact (see [11]) or be in accordance with Table 13).

NOTE 1 Certain phthalate plasticisers are restricted in toys, see E.4.

The content of plasticiser in these *adhesives* shall not exceed 8 %. The content of modifiers shall not exceed 3 %.

For solvent-based *adhesives* containing petroleum fractions, the *n*-hexane content shall not exceed 0,5 %.

The final mixture containing petroleum fractions shall not be classified with R48/20 and/or H372.

NOTE 2 The classifications are detailed in Directive 67/548/EEC [6] and Regulation (EC) No. 1272/2008 [5].

8.2.2.2 Multi-purpose adhesives

Basic materials for multi-purpose *adhesives* shall be in accordance with Table 9.

Table 9 — Basic materials for multi-purpose adhesives

Chemical substance	CAS-Number	EINECS-Number
Acrylic polymers	9003-01-4	-
Cellulose nitrate	9004-70-0	-
Poly(vinyl acetate)	9003-20-7	-
Vinyl acetate copolymers	-	-

8.2.2.3 Contact adhesives

Basic materials for contact *adhesives* shall be in accordance with Table 10.

Table 10 — Basic materials for contact adhesives

Chemical substance	CAS-Number	EINECS-Number
Polymers and copolymers of monomers permitted for materials intended to come into contact with foodstuffs	-	-
Poly(chlorobutadiene)	9010-98-4	-
Polyurethane	73561-64-5	-

8.2.2.4 Special adhesives

Basic materials for special *adhesives* shall be in accordance with Table 11.

Table 11 — Basic materials for special adhesives

Chemical substance	CAS-Number	EINECS-Number
Acrylic polymers	-	-
Polymers and copolymers of monomers permitted for materials intended to come into contact with foodstuffs	-	-
Polystyrene	9003-53-6	-
Vinyl chloride copolymers	-	-

The basic materials shall be appropriate for food contact (see [11]). The migration solvent shall be water, grade 3 according to EN ISO 3696. The contact time shall be approximately 60 min at approximately 40 °C.

Table 12 — Solvents in solvent-based adhesives

Chemical substance/mixture	CAS-Number	EINECS-Number
Acetone (Dimethyl ketone)	67-64-1	200-662-2
Cyclohexane < 3 %	110-82-7	203-806-2
Pentan-3-one (Diethyl ketone)	96-22-0	202-490-3
Ethyl acetate	141-78-6	205-500-4
Ethanol (Ethyl alcohol)	64-17-5	200-578-6
Propan-2-yl acetate (Isopropyl acetate)	108-21-4	203-561-1
Propan-2-ol (Isopropyl alcohol)	67-63-0	200-661-7
Methyl acetate	79-20-9	201-185-2
Butan-2-one (Methyl ethyl ketone)	78-93-3	201-159-0
3-Methylbutan-2-one (Methyl isopropyl ketone)	563-80-4	209-264-3
<i>n</i> -Butyl acetate	123-86-4	204-658-1
<i>n</i> -Propyl acetate	109-60-4	203-686-1
1-Methoxypropan-2-ol	107-98-2	203-539-1
1,1-Dimethoxyethane	534-15-6	208-589-8
Petroleum fraction (60 to 140) °C	64742-89-8	265-192-2
Petroleum fraction (135 to 210) °C	64742-88-7	265-191-7

The maximum content of 1-methoxypropan-2-ol shall be 20 %.

If the product contains Petroleum fraction (60 to 140) °C and/or Petroleum fraction (135 to 210) °C, the viscosity of the product shall exceed 20,5 mm²/s when tested in accordance with EN ISO 3104 or EN ISO 3219.

Table 13 — Plasticisers in solvent-based adhesives and solvent-based paints, lacquers, thinners and cleaning solvents

Plasticiser	CAS-Number
Tributyl acetyl citrate	77-90-7
Tri(2-ethylhexyl) acetyl citrate	144-15-0
Alkylsulfonic acid esters (C ₁₂ to C ₂₀) of phenol	91082-17-6
Adipic acid polyesters	various
Di-isononyl cyclohexane-1,2-dicarboxylate (DINCH)	166412-78-8

2,2-Bis(4-hydroxyphenyl)propane diglycidyl ether (BADGE), bis(hydroxyphenyl)methane diglycidyl ether (BFDGE) and Novolac glycidyl ethers (NOGE), together with their derivatives shall not be used as modifiers for *adhesives*.

NOTE Key

BADGE - 2,2-bis(4-hydroxyphenyl)propane diglycidyl ether, Bisphenol-A diglycidyl ether [1675-54-3];

BFDGE - bis(hydroxyphenyl)methane diglycidyl ether, Bisphenol-F diglycidyl ether [39817-09-9];

NOGE - Novolac glycidyl ethers [28064-14-4] and [9003-36-5].

8.2.2.5 Packaging

The content of the container in a set shall not exceed 15 g.

8.2.2.6 Marking

The primary packaging of the set shall in addition to the marking required in Clause 9 bear the following warnings:

"Warning. Not suitable for children under (*) years. For use under adult supervision.

Read the instructions before use, follow them and keep them for reference."

(*) The age is to be specified by the manufacturer, authorised representative or importer. It shall not be below 8 years.

The individual container shall be marked according to 9.3.

8.2.2.7 First aid information

The instructions for use shall in addition to the general first aid information in 10.2 d) contain the following:

- "In case of skin contact: Wash affected area with plenty of water.";
- "In case of eye contact: Wash out eye with plenty of water, holding eye open. Seek immediate medical advice.";
- "In case of inhalation: Remove person to fresh air."

8.2.2.8 Safety rules

The instructions for use shall in addition to the rules required in 10.4 contain the following safety rules:

- "Keep away from ignition sources.";
- "Do not allow adhesive to come into contact with the skin, the eyes and the mouth.";
- "Do not swallow material.";
- "Do not inhale fumes."

8.3 Water-based paints and lacquers

8.3.1 General

Water-based paints and lacquers shall consist of water and basic materials. Only basic materials given in Table 5 shall be used. Additionally, *water-based paints and lacquers* may contain special materials given in Table 6 and organic solvents and film-forming agents given in Table 14 or Table 7, colouring agents, preservatives, fillers and modifiers.

The content of organic solvents and film-forming agents shall not exceed 10 %. Only preservatives permitted in foodstuffs (see [9]) and/or cosmetics, except those preservatives which are only allowed in cosmetic products that are rinsed-off after use, (see [10]) shall be used.

Table 14 — Organic solvents and film-forming agents

Chemical substance/mixture	CAS-Number	EINECS-Number
Di(2-methylpropyl)ester of aliphatic dicarboxylic acids (C ₂₀ to C ₃₃) (maximum 2 % as film-forming agents)	-	-
Ethanol (Ethyl alcohol)	64-17-5	200-578-6
Mixture of aliphatic esters and alcohols (C ₁₂ to C ₁₄) (maximum 2 % as film-forming agents)	-	-
1-Methoxypropan-2-ol	107-98-2	203-539-1
Propan-1,2-diol (Propylene glycol)	57-55-6	200-338-0
2-Methylpentane-2,4-diol (Hexylene glycol)	107-41-5	203-489-0
Propan-2-ol (Isopropyl alcohol)	67-63-0	200-661-7

8.3.2 Packaging

The content of the container in a set shall not exceed 100 ml.

The name(s) of any preservative(s) used shall be indicated on the primary packaging.

8.3.3 Marking

The packaging or the container shall in addition to the marking required in Clause 9 bear the following warning:

"Warning. Not suitable for children under (*) years. For use under adult supervision.

Read the instructions before use, follow them and keep them for reference."

(*) The age is to be specified by the manufacturer, authorised representative or importer. It shall not be below 8 years.

8.3.4 First aid information

The instructions for use shall in addition to the general first aid information in 10.2 d) contain the following:

- "In case of skin contact: Wash affected area with plenty of water.";
- "In case of eye contact: Wash out eye with plenty of water, holding eye open. Seek immediate medical advice.";
- "In case of inhalation: Remove person to fresh air."

8.3.5 Safety rules

The instructions for use shall in addition to the rules required in 10.4 contain the following safety rules:

- "Do not allow material to come into contact with the eyes.";
- "Do not place material in the mouth.";
- "Do not inhale vapours.".

8.4 Solvent-based paints, lacquers, thinners and cleaning solvents

8.4.1 General

Solvent-based paints and lacquers shall consist of solvents and basic materials. Only basic materials given in Table 15 and solvents given in Table 14 and Table 16 shall be used. Paints and lacquers shall not contain more than 2 % of 2-methylpropan-1-ol or *n*-butanol and not more than 20 % 1-methoxypropan-2-ol. Additionally, solvent-based paints and lacquers may contain colourants, fillers and modifiers. The content of modifiers shall not exceed 3 %.

For solvent-based paints and lacquers prepared with nitrocellulose the content of plasticiser shall not exceed 5 %.

Plasticisers shall be appropriate for food contact (see [11]) or be in accordance with Table 13.

NOTE 1 Certain phthalate plasticisers are restricted in toys, see E.4.

Thinners and cleaning solvents shall contain only substances and mixtures given in Tables 14 and 16 except film-forming agents. 2-Methylpropan-1-ol, *n*-butanol and 1-methoxypropan-2-ol shall not be used in thinners and cleaning agents.

For solvent-based paints, lacquers, thinners and cleaning solvents containing petroleum fractions the *n*-hexane content shall not exceed 0,5 %. *n*-Hexane shall only occur in these solvents as a contaminant of petroleum fractions.

The final mixture containing petroleum fractions shall not be classified with R48/20 and/or H372.

NOTE 2 The classifications are detailed in Regulation (EC) No. 1272/2008 [5].

Pressurised containers (aerosols) shall not be used for paints, lacquers, thinners or cleaning solvents.

Table 15 — Basic materials

Chemical substance	CAS-Number	EINECS-Number
Acrylic polymers	-	-
Alkyd polymers	-	-
Nitrocellulose	9004-70-0	-

Table 16 — Solvents

Chemical substance/mixture	CAS-Number	EINECS-Number
Glycerol triacetate	102-76-1	203-051-9
2-Methylpropan-1-ol (<i>iso</i> -Butanol)	78-83-1	201-148-0
Butan-2-one (Methyl ethyl ketone)	78-93-3	201-159-0
1-Methoxypropan-2-ol	107-98-2	203-539-1
1-methoxypropan-2-yl acetate	108-65-6	203-603-9
Butan-1-ol (<i>n</i> -Butanol)	71-36-3	200-751-6
3-Methoxybutyl acetate	4435-53-4	224-644-9
Petroleum fraction (60 to 140) °C	64742-89-9	—
Petroleum fraction (135 to 210) °C	64742-88-7	265-191-7

If the product contains Petroleum fraction (60 to 140) °C and/or Petroleum fraction (135 to 210) °C, the viscosity of the product shall exceed 20,5 mm²/s when tested in accordance with EN ISO 3104 or EN ISO 3219.

8.4.2 Packaging

The maximum content of the container in a set shall not exceed:

- 15 ml for liquids with a flash point < 23 °C and initial boiling point > 35 °C;
- 50 ml for liquids with a flash point ≥ 23 °C.

NOTE For information regarding packaging and labelling, including child-resistant fastenings, see [5] and EN ISO 8317 [2].

8.4.3 Marking

The primary packaging shall in addition to the marking required in Clause 9 bear the following warning:

"Warning. Not suitable for children under (*) years. For use under adult supervision.

Read the instructions before use, follow them and keep them for reference."

(*) The age is to be specified by the manufacturer, authorised representative or importer. It shall not be below 8 years.

8.4.4 First aid information

The instructions for use shall in addition to the general first aid information in 10.2 d) contain the following:

- "In case of skin contact: Wash affected area with plenty of water.";
- "In case of eye contact: Wash out eye with plenty of water, holding eye open. Seek immediate medical advice.";
- "If swallowed: Wash out mouth with water, drink some fresh water. Do not induce vomiting. Seek immediate medical advice.";

— "In case of inhalation: Remove person to fresh air."

8.4.5 Safety rules

The instructions for use shall in addition to the rules required in 10.4 contain the following safety rules:

- "Keep away from ignition sources.";
- "Do not allow product to come into contact with the skin and the eyes.";
- "Do not place material in the mouth.";
- "Do not inhale vapours."

9 Marking

9.1 General

Markings shall be visible, easily legible, indelible and in the national language(s) of the country of sale.

If the container is too small to carry all the information necessary an additional instruction leaflet shall be supplied with the package.

9.2 Marking of the primary packaging

9.2.1 General

The primary packaging shall indicate any dangerous substances or dangerous mixtures (see [5]) that are recommended but not included in the toy.

NOTE Examples for dangerous substances or dangerous mixtures that are recommended but not included in the toy are adhesives, paints or lacquers.

9.2.2 Manufacturer's identification

The primary packaging shall bear the name, registered trade name or registered trade mark of the manufacturer or the importer and the address at which they can be contacted.

NOTE If the manufacturer (declaring himself as a manufacturer by putting his name and address on the toy) is outside the Community and the products are placed on the EU market by an importer, the toy will bear two addresses: the one of the manufacturer and the one of the importer.

Chemical toy (sets) shall bear a type, batch, serial or model number or other element allowing their identification.

9.2.3 Warning phrases

The primary packaging shall bear the relevant warning phrases in Clauses 4 to 8. An uppercase letter size of a minimum height of 7 mm shall be used for the word "Warning" (as recommended under "Marking" in Clauses 4 to 8) on primary packaging.

9.3 Marking of individual containers and any packagings

The individual containers and packagings (including primary packaging) shall bear the following information:

- a) If the substance/mixture is classified as dangerous (see [5]), the name of the chemical substance or mixture as given in the relevant table(s) and clause(s).
- b) Where relevant, the required pictogram(s) and the required H- and P- phrases (see [5]).

NOTE For information on transitional provisions on classification, labelling and packaging of substances and mixtures see Regulation (EC) No 1272/2008, art. 61.

10 Instructions for use

10.1 General

The instructions for use shall be given in the national language(s) of the country of sale.

The marking of the primary packaging according to 9.2.3 shall be repeated on the cover of the instructions for use.

10.2 Contents list

The contents list shall contain the following information:

- a) where relevant, the name(s) of the chemical(s) supplied;
- b) where relevant, the H- and P-phrases specified in Regulation (EC) No. 1272/2008 [5] appropriate to each particular substance and mixture;

NOTE 1 For information on transitional provisions on classification, labelling and packaging of mixtures see Regulation (EC) No 1272/2008 [5], art. 61.

NOTE 2 H- and P-phrase information is required for all dangerous substances and dangerous mixtures supplied in these sets even if a derogation from labelling is permitted by EU legislation (e.g. for small quantities of certain dangerous substances).

- c) where relevant and if the substances/mixture is classified according to Regulation (EC) No 1272/2008 [5], an empty space shall be provided in which the telephone number of the local poison centre (central office for first aid information) or hospital, if possible, should be entered in case of intake by accident of dangerous substances;
- d) general first aid information as follows:
 - 1) "In case of doubt seek medical advice without delay: Take the chemical and/or product together with the container with you.";
 - 2) "In case of injury always seek medical advice.";

NOTE 3 First aid information may also be found in the instructions for carrying out the activity.

- e) specific first aid information specified in Clauses 4 to 8 when appropriate.

10.3 Advice for adult supervision

Where appropriate, the advice for adults shall contain the following information:

- a) This chemical toy is not suitable for children under (*) years. For use under adult supervision. Keep this chemical toy set out of reach of children under (*) years old.

- b) Read and follow these instructions, the safety rules and the first aid information and keep them for reference.
- c) Incorrect use of chemicals can cause injury and damage to health. Only carry out those activities which are listed in the instructions.
- d) Because children's abilities vary so much, even within age groups, supervising adults should exercise discretion as to which activities are suitable and safe for them. The instructions should enable supervisors to assess any activity to establish its suitability for a particular child.
- e) The supervising adult should discuss the warnings, safety information and the possible hazards with the child or children before commencing the activities. Particular attention should be paid to the safe handling of alkalies, acids and flammable liquids.
- f) The area surrounding the activity should be kept clear of any obstructions and away from the storage of food. It should be well lit and ventilated and close to a water supply. A solid table with a heat resistant top should be provided."
- g) The working area should be cleaned immediately after carrying out the activity.

(*) The age is to be specified by the manufacturer, authorised representative or importer. It shall not be below the requirements for the age limits specified within Clauses 4 to 8.

10.4 Safety rules

The following safety rules shall be given:

- "Keep younger children under the specified age limit and animals away from the activity area.";
- "Store chemical toys out of reach of young children.";
- "Wash hands after carrying out activities.";
- "Clean all equipment after use.";
- "Do not use any equipment which has not been supplied with the set or recommended in the instructions for use.";
- "Do not eat, drink or smoke in the activity area.";

and, where appropriate, the special safety rules given in Clauses 4 to 8.

10.5 Instructions for carrying out the activities

Detailed information on how to perform each activity shall be given.

The activities, where relevant, should be evaluated by the manufacturer.

Any known hazards arising from the use of the toy should be detailed.

10.6 Spills and disposal of chemicals

Where relevant, information on the handling of spills and on the disposal of used chemicals shall be given.

The instructions for disposal shall take account of national regulations for the disposal of such chemicals.

11 Test methods

11.1 General

All chemicals used for analysis shall be of analytical grade (pro analysis) or, if unavailable, the best technical grade. Water shall be of grade 3 according to EN ISO 3696 or of a comparable quality, and demonstrably free from analytes of interest.

The precision of volumetric glassware should be grade A.

The analysis of *chemical toys* and *chemical toy materials* for chemical compounds shall be performed in accordance with the methods of analysis described in this European Standard. Alternative methods of analysis or modifications to the procedures described are acceptable only if they are capable of achieving at least the accuracy and precision of the methods described in this European Standard, an adequate sensitivity and have been validated to show that the results are equivalent to those of these standard methods.

11.2 Determination of elements in ceramic and vitreous enamelling materials

11.2.1 Principle

The ceramic or enamel sample is submitted to a melting digestion using dilithium tetraborate. After the dissociation the fused product is extracted by means of diluted hydrochloric acid. The individual metals are determined by atomic emission spectrophotometry.

11.2.2 Standards and reagents

11.2.2.1 Standards

NOTE These elemental standard solutions are commercially available.

Table 17 — Standards

Chemical	Concentration mg/l
Copper	1 000
Iron	1 000
Praseodymium	1 000
Cobalt	1 000
Zirconium	1 000
Vanadium	1 000
Tin	1 000

11.2.2.2 Reagents

Table 18 — Reagents

Chemical	Concentration
Dilithium tetraborate ($\text{Li}_2\text{B}_4\text{O}_7$)	
Hydrochloric acid	$\rho(\text{HCl}) = 1,12 \text{ g/ml}$