INTERNATIONAL STANDARD

ISO 8442-6

First edition
2000-12-01

Materials and articles in contact with foodstuffs — Cutlery and table holloware —

Part 6: Lightly silver-plated table holloware protected by lacquer

Matériaux et objets en contact avec les denrées alimentaires — Coutellerie et orfèvrerie de table —

Partie 6: Orfèvrerie de table laquée et avec un léger placage d'argent

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

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Foreword

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

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 8442 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 8442-6 was prepared by the European Committee for Standardization (CEN) in collaboration with ISO Technical Committee TC 186, *Cutlery and table and decorative metal hollow-ware*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this standard, read "...this European Standard..." to mean "...this International Standard...".

ISO 8442 consists of the following parts, under the general title *Materials and articles in contact with foodstuffs — Cutlery and table holloware*:

— *Part 1: Requirements for cutlery for the preparation of food*

— *Part 2: Requirements for stainless steel and silver-plated cutlery*

— *Part 3: Requirements for silver-plated table and decorative holloware*

— *Part 4: Requirements for gold plated cutlery*

— *Part 5: Specification for sharpness and edge retention test of cutlery*

— *Part 6: Lightly silver-plated table holloware protected by lacquer*

— *Part 7: Requirements for table cutlery made of silver, other precious metals and their alloys*

— *Part 8: Requirements for silver table and decorative holloware*

Annexes A to I form a normative part of this part of ISO 8442. Annex J is for information only.

Contents

Foreword

The text of EN ISO 8442-6:2000 has been prepared by Technical Committee CEN/TC 194 "Utensils in contact with food", the secretariat of which is held by BSI, in collaboration with Technical Committee ISO/TC 186 "Cutlery and table and decorative metal hollow-ware ".

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 March 2001, and conflicting national standards shall be withdrawn at the latest by March 2001.

Attention is drawn to the European Community Directives relative to materials in contact with foodstuffs, in particular Directives 89/109/EEC and 90/128/EEC.

EN ISO 8442 consists of the following parts:

Part 1:Requirements for cutlery for the preparation of food
Part 2: Requirements for stainless steel and silver-plated cutlery
Part 3: Requirements for silver-plated table and decorative holloware
Part 4: Requirements for gold-plated cutlery
Further parts are proposed with the following titles

Part 5: Specification for sharpness and edge retention test of cutlery
Part 7: Requirements for table cutlery made of silver, other precious metals and their alloys
Part 8: Requirements for silver table and decorative holloware

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This Standard specifies material and performance requirements for table holloware and cast attachments, made from metals which are lightly silver-plated and protected by lacquer.

This Standard is applicable to such items as jugs, dishes, wine coolers, tea- and coffee-pots, trays and tureens.

Requirements are specified for brass, copper, bronze, nickel-silver, pewter and stainless steel holloware with a light silver-plating and a lacquered coating.

The standard does not cover holloware made entirely of precious metals, brass, nickel-silver, stainless steel or made from ceramics or glass or non-stainless steel or zinc-based die cast.

Composition limits are specified for the basic metals for fabrication of the holloware prior to silver-plating and lacquering.

The standard does not include requirements for design, size or any other characteristics which are matters of personal choice or which can be readily assessed by the purchaser at the point of sale.

2 Normative references

This Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

ISO 301	Zinc alloy ingots intended for casting
EN ISO 2177	Metallic coatings - Measurement of coating thickness – Coulometric method by anodic dissolution (ISO 2177:1985)
ISO 4481	Cutlery and flatware - Nomenclature
ISO 6508	Metallic materials - Hardness test - Rockwell test (scales A-B-C-D-E-F-G-H-K)
EN ISO 8442-2:1997	Materials and articles in contact with foodstuffs — Cutlery and table holloware - Part 2: Requirements for stainless steel and silver-plated cutlery (ISO 8442-2 : 1997)
EN 10088-1	Stainless Steels - Part 1: List of stainless steels
ENV 12875-1:1998	Mechanical dishwashing resistance of domestic utensils — Part 1:Reference test method

3 Terms and definitions

For the purposes of this European standard the following terms and definitions apply.

3.1
table holloware
items formed into a hollow shape for the containment of food or drinks.

3.2
functional surface
exterior surface of table holloware or the interior surface of a shallow item of holloware, the surface of which will receive usage equivalent to, or exceeding that of, the exterior.

3.3
other surfaces
surface of an item of holloware which is lightly silver-plated and lacquered principally for aesthetic reasons, e.g. the interiors of pots, or which is lightly silver-plated and lacquered for use with food or drinks but which will receive a minimum of abrasive usage.

3.4
attachments
component of an item of holloware joined to it.

3.5
load-bearing attachments
attachment upon which a force resulting from the support of the mass of the holloware and/or its contents will be applied in normal use and comprising such items as handles, taps, feet, bases, spouts and goblet stems.

3.6
burr
metal in excess of that required to shape an article and which forms a thin plate at its edges.

3.7
vessel
item of holloware specifically intended as a container for food and/or liquid.

3.8
usable capacity
volume of liquid required to fill a vessel to 15 mm ± 1 mm from its rim.

3.9
popping
sudden transformation of an apparently flat surface of an item of holloware from convex to concave when a load is applied to the convex side, usually accompanied by a distinctive sound.

3.10
visual inspection
examination carried out from a distance of (250±50) mm with the unaided eye, or using normal corrected vision only, at ambient light levels sufficient to provide 250 lux at the surface under inspection

3.11
light silver plating
silver coating with a thickness in excess of 0,3 µm but less than 5 µm

3.12
lacquer
polymer coating

4 Materials

4.1 Metal

4.1.1 The composition of the metals from which the holloware is made shall be as given in table 1.

4.1.2 When determined in accordance with annex B.3 silver coatings shall have a minimum content of 98,5 % Ag.

4.2 Non-metals

Non-metal parts of table holloware shall be capable of withstanding either washing processes in aqueous dishwashing solutions at 50 °C or the test according to annex A.

NOTE Non-metal parts of lacquered lightly silver-plated holloware may be made of such materials as glass, ceramic, bone, horn, vulcanized fibres, plastics, wood, wood-plastics laminates or impregnated wood.

Table 1 —Base metals for lacquered, lightly silver-plated holloware

Materials	Chemical composition (%)									
	C max	Cr Min	Ni min	Cu min	Mn max	Fe max	Pb max	As min	Sn min	Zn min
Austenitic stainless steel[3)]	0,10	17	8							
Ferritic stainless steel[3)]	0,10	13								
Mild steel	0,08	0,087			0,45					
Nickel-silver (Cu, Ni, Zn)			9	60	0,5	0,3	0,5			
Brass (Cu, Zn)				60			3,5[2)]			
Copper				99,4			0,2	0,2		
ISO 301 Alloy ZnA14										
ISO 301 Alloy ZnA14Cu1				max 1						
Pewter							0,5		90	
Alloy [1)]							0,3			

[1)] Only for attachments which do not come into contact with food.
[2)] Any part of the item that comes into direct contact with foodstuffs shall not have a Pb content of greater than 0,05%
[3)] The chemical composition of the stainless steel sections of the articles shall conform to the requirements of EN 10088-1

5 Construction

5.1 Average thickness

When measured in accordance with annex B (mass of coatings) and annex B of EN ISO 8442-2 : 1997 (area of coatings), the average thickness of silver coatings on the surface(s) of each finished item, with the exception of the other surfaces of an item of holloware, shall not be less than 0,3 µm with a minimum local thickness of 0,2 µm.

5.2 Uniformity and absence of defects

5.2.1 All surfaces shall be free from cracks and other defects.

5.2.2 All accessible edges shall be free from burrs and shall not be rough

5.2.3 Gaps between components shall not exceed 0,4 mm. Seams joining hollow sections together shall be watertight unless otherwise required by the design.

5.2.4 Compliance with the requirements of 5.2.1 to 5.2.3 shall be checked by touch or visual inspection and 5.2.3 with a feeler gauge of appropriate thickness.

5.3 Lacquering

All surfaces shall be free from cracks and other defects. There shall be no dimnesses and discolourations

NOTE Attention is drawn to the requirements of EEC Directives 89/109 [1] and 90/128 [2].

6 Performance

6.1 Lacquering

6.1.1 Resistance of lacquering to discolouration and peeling

After testing in accordance with annex A, the lacquer shall be free from white discolourations. Lacquering shall show no signs of looseness, blistering or peeling.

6.1.2 Resistance to scratching

After testing in accordance with annex C, the lacquer shall show no signs of scratching.

NOTE: Insignificant mat stripes producing a milky dimness may be ignored.

6.1.3 Resistance to ultraviolet radiation

After testing in accordance with annex D, the lacquer shall be free from discolouration.

6.2 Strength under load

6.2.1 Resistance of rectangular and square trays and dishes to twisting

The temporary deflection of a rectangular or square tray or flat dish exceeding 300 mm at its maximum axis shall not exceed 3,5 mm in 100 mm deviation from flat in any diagonal across the surface of the base when tested in accordance with annex E.

6.2.2 Resistance of trays and dishes to popping

A tray or dish shall not exhibit popping when tested in accordance with annex F.

6.2.3 Load strength of vessels

A vessel shall exhibit no permanent deformation when tested in accordance with annex G.

6.3 Attachment strength

6.3.1 There shall be no breakage, visible deformation or disengagement of any load-bearing attachment when it is tested in accordance with annex H.

6.3.2 There shall be no breakage, visible deformation or disengagement of a lid knob or any hinge retaining the lid when a vessel is suspended by the lid knob whilst containing a mass, in grams, equal to 1,5 times its usable capacity in millimetres.

6.4 Stability

When placed on a hard plane surface an item with feet shall be stable to within the clearance limit given in table 2 and no flat item shall be capable of being spun around by the application of a tangential force.

Table 2 — Stability criteria

Overall width of items at its widest axis mm	**Maximum permitted clearance between any foot and a plane surface** mm
< 100	0,25
100 to 250	0,40
> 250	1

6.5 Pouring and leakage

Spout openings shall pour cleanly without dribbling when tested in accordance with annex J. There shall be no leakage from the vessel during the test.

6.6 Adhesion of silver coating

Silver coatings shall show no signs of looseness, blistering or peeling, when the holloware is tested in accordance with annex E of EN ISO 8442-2:1997. If items of holloware are too large to be fitted within the test apparatus, they shall be tested at a temperature of 150 °C ± 10 °C for 30 min ± 5 min followed by immediate quenching in water at a temperature of 20 °C ± 5 °C.

All attachments shall be secure (see 6.3) following the test described in annex E of EN ISO 8442-2:1997.

Discolourations of the lacquer shall be disregarded.

6.7 Dishwasher safety (optional)

If the product is labelled as dishwasher-safe, it shall be tested in accordance with ENV 12875-1 for 125 cycles and shall subsequently conform to 6.1.1, 6.3 and 6.6.

7 Marking and labelling

7.1 Marking

Each item of lacquered, lightly silver-plated holloware shall be marked durably with:

-the name and/or trade mark or any other means of identifying the manufacturer or responsible supplier;

-the number of this Standard.[1)]

7.2 Labelling

The following information shall be available at the point of sale:

- number and title of this Standard and a statement that the holloware meets the requirements of this standard;

NOTE: The information may be provided by labels, leaflets, display cards or on the packaging.

[1)] Such marking is a claim of compliance with this standard but does not imply approval of the product; the accuracy of this claim is therefore the sole responsibility of the person applying the marking.

Annex A
(normative)

Method of test for the resistance of lacquering to colouration and peeling

The resistance of lacquering to colouration and peeling shall be evaluated after 50 cycles of the method given in ENV 12875-1: 1998 .

In order to make visible small damages to the lacquer coating, the samples shall be placed for 30 s in diluted oxide solution 1:10.

NOTE: Proprietary brands of oxide solution which are used for the black finishing of silver are available e.g. from LPW Langbein-Pfanhauser Works Ltd, PO Box 317, D-41460 Neuss, Germany[2)].

[2)] This information is given for the convenience of users of this standard and does not constitute an endorsement of the supplier named.

Annex B
(normative)

Method of test for the determination of the thickness and silver content of silver coatings on lacquered, lightly silver-plated table holloware

B.1 Principle

The silver coating together with the lacquer is chemically or electro-chemically dissolved from the item without attacking the substrata. The average thickness of the silver coating is calculated from its surface area, see annex B of ISO 8442-2:1997, and the mass of silver.

For larger table holloware, e.g. trays, the thickness of the silver coating shall be determined by recognized equipment according to the coulometric method (see EN ISO 2177).

B.2 Stripping solutions

B.2.1 For silver-plated stainless steel, nitric acid of 40 % m/m shall be used.

B.2.2 For silver-plated nickel-silver or brass, concentrated sulfuric acid with an addition of 200 g/l potassium nitrate shall be used; the stripping solution shall have a temperature of approximately 100 °C.

B.3 Determination of the silver content

B.3.1 For thin silver coatings (< 2,5 µm) the silver content of the solution shall be determined by the AAS flame method.

B.3.2 For silver coatings > 2,5 µm the determination shall be done by means of titration.

Annex C
(normative)

Method of test for resistance of lacquering to scratching

C.1 Principle

The test specimen is secured on a horizontal surface and is mechanically rubbed with a felt pad. The test specimen is then examined for scratching.

C.2 Materials

Felt pad manufactured from 100 % wool fibre with a density of 0,36 grams per cm^3 and thickness of 3 mm ± 0,3 mm.

NOTE 1: A felt with a relative compressibility of (9-13) % when tested in accordance with DIN 61206 [3] has been found to be suitable.

NOTE 2: a suitable material has been found to be Quality T22 10, 36 supplied by VFG Giengen/Brenz, Germany.[3)]

C.3 Apparatus

A schematic diagram of a suitable apparatus is given in Figure 1.

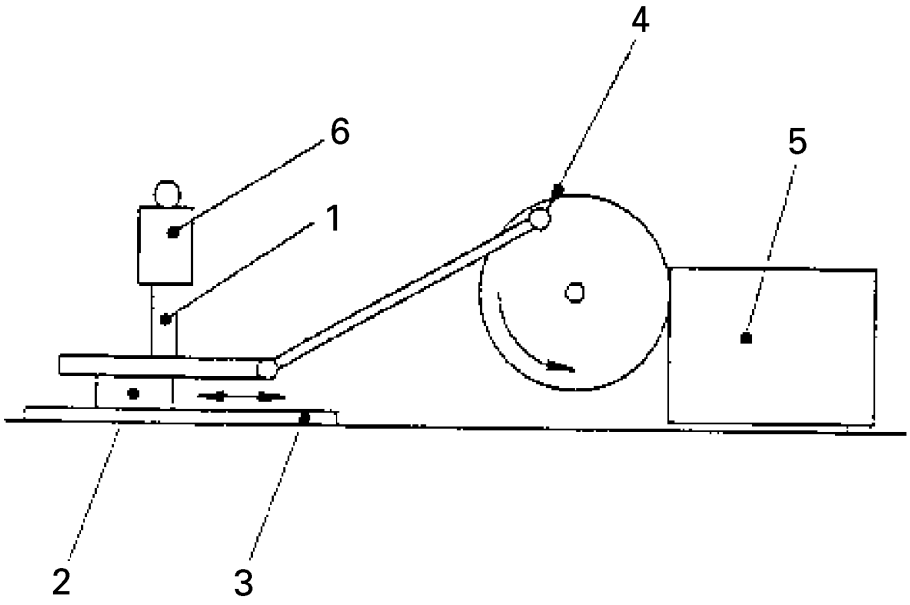
C.4 Procedure

Secure the test specimen (3) on a horizontal surface. Secure the felt pad (2) on the horizontal slide (1) so that the total area of felt in contact with the test specimen is 3 cm^2, apply a load (6) so that the total load on the felt pad is 10N and rotate the eccentric cam (4), by means of the gear motor (5) 100 times so that the felt pad reciprocates across the surface of the test specimen. The felt pad shall move 40 mm in each direction.

C.5 Assessment

Examine the rubbed surface (see 5.2.4) by moving the surface to display any scratching. There shall be either no scratching of the lacquer or not more than slight sporadic scratches.

[3)] This information is given for the convenience of users of this standard and does not constitute an endorsement of the supplier named.



Key

1 Slide
2 Felt pad
3 Surface of test specimen
4 Eccentric cam
5 Gear motor
6 Load

NOTE This figure is not to scale

Figure C.1 — Diagram illustrating the mechanism of the resistance to scratching apparatus.

Annex D
(normative)

Method of test for resistance of the lacquer to ultraviolet radiation

D.1 Principle

Lacquered, lightly silver-plated table holloware is subject to an irradiation of 80 h by a spot lamp with a wave length of 366 nm, capacity 180 W.

D.2 Apparatus

A lamp capable of providing ultraviolet radiation with a wavelength of 366 nm, capacity 180 W for 80 h.

D.3 Procedure

Cover half the test specimen so that it receives no ultra violet radiation. Expose the test specimen to the ultraviolet radiation from a distance of 200 mm for 80 h.

D.4 Assessment

After completion of the test no yellowing shall be detectable on the irradiated surface in comparison with the screened off part.

NOTE: A suitable lamp is the Fluotest forte produced by Heraeus GmbH, P.O. Box 1553, 63457 Hanau, Germany.[4)]

[4)] This information is given for the convenience of users of this standard and does not constitute an endorsement of the supplier named.

Annex E
(normative)

Method of test for the resistance of rectangular and square trays and dishes to twisting

E.1 Principle

Rectangular and square trays and dishes are examined for twisting deformation during the application of a load simulating that likely to occur in normal use.

E.2 Apparatus

E.2.1 Supports, rigid rectangular bars with one side measuring 70 mm ± 5 mm.

E.2.2 Loads, cylindrical weights of diameter 80 mm ± 5 mm and a mass of 2,5 kg ± 0,1 kg.

NOTE: The supporting area of the bars and the base area of the weights may be covered by, for example, felt or baize to minimize scratching of plated surfaces.

E.3 Procedure

E.3.1 Support the sample on bars placed at diagonally opposite corners, as shown in figure 1 and load the supported sample with two weights disposed at the other two (opposite) corners of the sample. After not less than 30 s, measure and record the temporary deflection of the loaded surface.

E.3.2 Move the supporting bars to the adjoining corners of the sample and repeat E.3.1.

E.3.3 Expression of results

Calculate the total deflection under load from the following:

$$d = \frac{100(a+b)}{L}$$

where

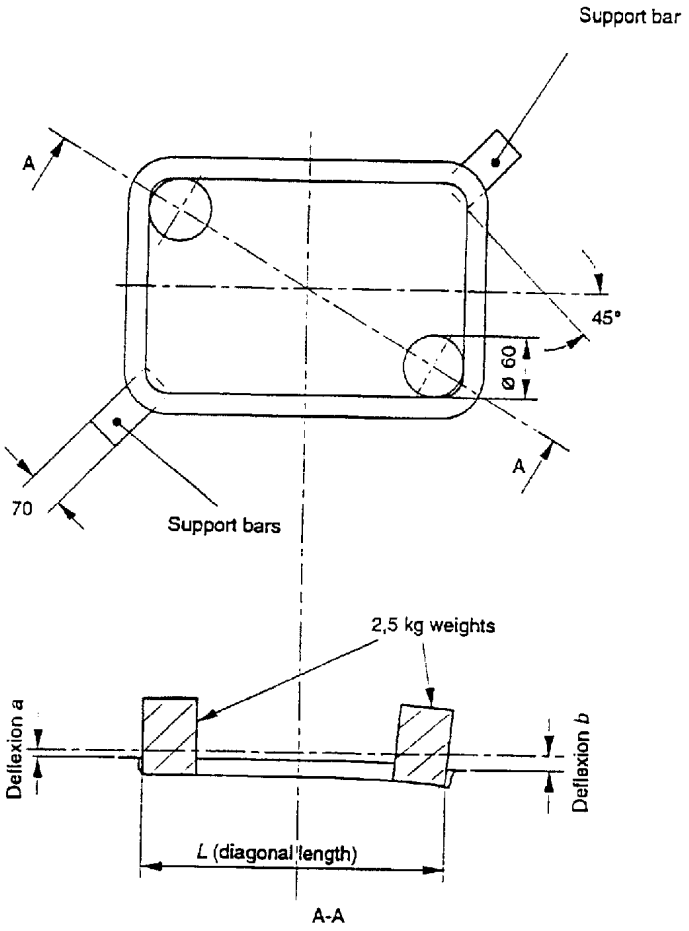
d is the total temporary deflection under load expressed as millimetres of deflection per 100 mm of sample length (mm / 100 mm)

a is the temporary deflection of the loaded surface at point a in mm

b is the temporary deflection of the loaded surface at point b in mm

L is the diagonal length.

Dimensions in mm



NOTE The corners of the supporting bars are coincident with the edge of the flat base area

Figure E.1 — Twist test for trays and dishes

Annex F
(normative)

Method of test for the resistance of trays and dishes to popping

F.1 Principle

Trays and dishes are examined for popping by the application of a load simulating that likely to occur in normal use.

F.2 Apparatus

Load, conforming to E.2.2.

F.3 Procedure

F.3.1 Raise the sample clear of any supporting surface by its normal means of lifting and apply the cylindrical weight to any appropriate point on the flat surface of the sample and then remove it. Record whether any popping of the loaded surface occurs during application and/or removal of the load.

F.3.2 Turn the sample over and repeat F.3.1.

Annex G
(normative)

Method of test for load strength of a vessel

G.1 Principle

Vessels are examined for deformation after lifting when filled with a load exceeding that likely to occur in normal use.

G.2 Apparatus

Load, metal spheres of diameter 10 mm ± 5 mm.

G.3 Procedure

G.3.1 Determine the usable capacity of the sample by filling it to within 15 mm ± 1 mm of the rim with a known volume of water at 20 °C ± 5 °C.

G.3.2 Place into the sample, without undue impact, a mass of metal spheres equivalent to 3 g for every millilitre of usable capacity of the item for items of capacity 5 l or less, or 1,5 g for every millilitre of usable capacity for items of capacity over 5 1. Raise the sample clear of any supporting surface by its normal means of lifting; after not less than 30 s remove the metal spheres, observe and record any permanent deformation of the sample.

NOTE: The metal spheres may be retained within a flexible plastic bag for convenience of handling.

Annex H
(normative)

Methods of test for strength of attachments

H.1 Principle

Attachments to holloware are examined for breakage, deformation or disengagement resulting from the application of a force simulating that likely to occur as the result of minor abuse such as dropping.

H.2 Apparatus

Load, a metal weight of mass 10 kg ± 0,01 kg suspended from a cord terminating in a loop or clamp.

H.3 Procedure

H.3.1 Loop the cord around, or clamp it to, the attachment to be tested and raise the sample so that the weight is in free suspension with its mass acting vertically downwards.

H.3.2 Rotate the sample so that the force is transferred to all relevant points on the attachment and record any breakage, deformation or disengagement of the attachment.

Annex I
(normative)

Method of test for pouring

I.1 Principle

The pouring efficiency of spouts is evaluated by tilting the vessel, filled to its usable capacity with water, at a controlled rate.

NOTE Traces of detergent from washing processes promote dribbling; any vessel which has been washed with the aid of a detergent should be thoroughly rinsed not less than five times in deionized water prior to testing for pouring efficiency.

I.2 Apparatus

Tilt platform, capable of traversing an angle of 70 ° at a speed of (5 ± 1) °/min.

I.3 Procedure

I.3.1 With the platform in the horizontal position, place the sample under test upon it (suitably restrained, e.g. by means of a large rubber band) and fill it to within 15 mm ± 1 mm of the rim with deionized water at 20 °C ± 5 °C. Tilt the platform at 5 ° ± 1 ° per minute so that water emerges only from the spout, until an angle of 10 ° ± 1 ° to the horizontal is reached. Record the form of pouring which takes place. Return the sample to the horizontal position at the same speed and record whether dribbling down the outside of the sample occurs.

NOTE: If water emerges over the rim of a vessel in this test, the pouring angle should be reduced progressively until this no longer occurs.

I.3.2 Repeat the procedure described in I.3. l for angles increasing successively by 10 ° ± l ° to a maximum of 70 °.

Annex J
(informative)

A-deviations

A-deviation: National deviation due to regulations, the alteration of which is for the time being outside the competence of the CEN/CENELEC member.

This European Standard does not fall under any Directive of the EU. In the relevant CEN/CENELEC countries these A-deviations are valid instead of the provisions of the European Standard until they have been removed.

Clause	Deviation
Table 1	**France** Arrêté du 13 Janvier 1976 relatif aux matériaux et objets en acier inoxydable au contact des denrées alimentaires: Article 2

Where the minimum chromium content given in EN 10088-1:1995 is less than 13,00 %, replace with “13,00 % min. Cr”

Bibliography

Directives of the European Community

[1] EC 89/109 Dated 21.12.1988, Official Journal EC 1989, No L 40/38 page 38 Directive of the Council for the Harmonization of the Legal Procedures of the Member States concerning Materials and Utensils determined to come into contact with Foodstuffs.

[2] EC 90/128 Commission Directive of 23 February 1990 relating to plastics materials and articles intended to come into contact with foodstuffs. O.J. n° L75, of 21.03.1990, p.19 . Corrigendum O.J. n° L349 of 13.12.1990, p.26

Standards

[3] DIN 61206: 1976 Pressed woollen felts in pieces for technical purposes.

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