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Pewter handcraft products — Specification

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In order to match with technological development and to keep continuous progress in industries, standards are subject to periodic review. Users shall ascertain that they are in possession of the latest edition

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Contents

Page

Foreword

Rwanda Standards are prepared by Technical Committees and approved by Rwanda Standards Board (RSB) Board of Directors in accordance with the procedures of RSB, in compliance with Annex 3 of the WTO/TBT agreement on the preparation, adoption and application of standards.

The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical committees are ratified by members of RSB Board of Directors for publication and gazettment as Rwanda Standards.

DRS 179 was prepared by Technical Committee RSB/TC 25, *Handcraft products.*

In the preparation of this standard, reference was made to the following standards:

BS 5140 *Specification for pewter*

BS EN 12938 *Methods for the analysis of pewter — Determination of alloying and impurity element contents by atomic spectrometry*

BS EN 611-1, *Tin and tin alloys — Pewter and pewterware — Specification — Part1: Pewter*

B560-00:2010, *Standard specification for modern pewter alloys*

The assistance derived from the above source is hereby acknowledged with thanks.

This second edition cancels and replaces the first edition (RS 179: 2013), which has been technically revised. The main changes compared to the previous edition are as follows:

- Clause 1: Scope has been modified to reflect the content of the standard
- Clause 4: Pewterware has been added for clarification
- Clause 5: Analytical method has been modified
- Clause 6 Sampling has been modified
- Clause 8: Health and Safety has been modified
- Annex B has been added

Committee membership

The following organizations were represented on the Technical Committee on *Handcraft products* (RSB/TC 45) in the preparation of this standard.

City of Kigali — Agaseke Project

Dikam Ltd

Glo Creations

JNM Company Ltd

Ministry of trade and Industry

National Industrial Research Development Agency (NIRDA)

Private Sector federation (PSF)

UBURIZA Arts

Rwanda Standards Board (RSB) – Secretariat

Pewter handcraft products — Specification

1 Scope

This Draft Rwanda Standard specifies requirements, sampling and test methods for peter and pewterware and solders to be used for the joining.

2 Normative references

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

ISO 2768-1 General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications

3 Terms and definitions

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

3.1

hazard

thing or a situation with potential to cause injury or illness to a person due to its chemical composition

3.2

pewter

tin-based metal alloyed with varying amounts of other metals such as lead, antimony, bismuth, copper or zinc to make it stronger and harder

4 Requirements

4.1 Chemical composition of pewter and pewterware

4.1.1 The chemical composition of a pewter and pewterware shall conform to the requirements given in table 1 when determined on samples selected in accordance with clause 5.

4.1.2 In expressing the results for the analysis, the values obtained shall be rounded to the same number of decimal places as used in expressing the specified limit given in table1.

4.1.3 The chemical composition for pewter and pewterware may be determined by using any appropriate approved test methods for the analysis with agreement between supplier and customer or by using the test method given in Annex A.

4.1.4 Pewter products that may come in contact with foodstuffs shall shall contain not more

than 0,25 % lead and 0,05 % cadmium.

Table 1 — Chemical requirement for pewter handicraft

(Composition in %)

Pewter categories	Sn	Element	Ag	Bi	Cd	Cu	Pb	Sb	Total other element
1	Not less than 94 %	min max	- 0.05	- 0.5	- 0.05	- 1.0	- 0.25	1.0 3.0	- 0.2
2	Between 91 % and 94 %	min max	- 4.0	- 0.5	- 0.05	1.0 2.5	- 0.25	3.0 7.0	- 0.2

Note 1 For category 1 the silver range required up to a maximum of 4.0 % Ag shall be agreed between the purchaser and the supplier and stated in the order.

Note 2 For purposes of determining conformance with these specifications, an observed value or a calculated value shall be rounded according to the following rules:

a) if the figure immediately after the last figure to be retained is less than five the last figure to be retained shall be kept unchanged; and

b) if the figure immediately after the last figure to be retained is equal to or greater than five the last figure to be retained shall be increased by one.

Note 3 The tin content shall not be less than 91 % in any pewter products.

4.2 Chemical composition of solders for joining pewterware

4.2.1 The chemical composition of solders for joining pewterware shall be in accordance with table 1.

4.2.2 In case the soldered joint may reasonably be expected to come into contact with foodstuffs, the solder used for joining the component parts of the pewterware shall meet the following requirements:

a) one of the alloys designated 1 to 6 in Table 1 of this Rwanda Standard; or

b) Alloy No. 21 specified in Annex B

4.3 Tolerances

4.3.1 Pewter handicraft products dimensions will vary in accordance with the agreement between the manufacturer and the client.

4.3.2 In case of disputes between the manufacturer and the client, tolerances shall be in accordance with ISO 2768-1.

5 Analytical methods

5.1 5.1 Pewter component(s) of the pewterware article

5.1.1 All surface coatings on the pewter components to be analysed shall be removed

5.1. 2 Analysis samples shall be taken, by drilling or cutting, to represent each pewter component part of the article. These samples shall be taken from zones furthest from any soldered joints

5.1.3 The chemical composition shall be determined by using appropriate approved test methods for the analysis with agreement between supplier and customer or by using the test method given in Annex A.

5.2 Soldered joints

5.2.1 The joint shall be cut from the pewterware article

5.2.2 The sample for analysis shall be a length of the joint, taken so as to include not more than 2 mm of the pewter on each side of the joint.

5.2.3 The mass of the sample taken for analysis shall be at least 0,1 g

6 Sampling

According to the number of pewter handicraft products in batch randomly select a number of sample in accordance with the sampling rate given in Table 2.

Table 2 — Sampling rate

Number of pewter handicraft products	Number of sample pewter handicraft products
1 - 10	2
10 - 60	4
> 60	10 % of pewter handicraft products or pewterware in batch

7 Marking

7.1 All pewter handicraft products shall be marked with the following information:

a) manufacturer's name or mark; and

b) percentage (%) of tin where applicable

c) the word PEWTER (or corresponding translation, for instance `ETAIN' in French).

7.2 The marking may be done by cast or stamp and shall be permanent.

7.3 In addition, the pewterware article or if this is not practicable, its label or associated packaging shall be marked with the number of this Rwanda Standard.

8 Health and safety

8.1 For health and safety issues, the government laws and instructions shall be respected.

8.2 The waste and hazardous material shall respect the prevailing environmental management laws.

Annex A
(normative)

Methods of determination of pewter of alloying and impurity element contents by atomic spectrometry

A.1 Principle

The test sample is dissolved in hydrochloric acid plus nitric acid and tartaric or citric acid and the concentration of the element sought is measured using Atomic Absorption Spectrometry (AAS) or atomic emission spectrometry (AES). Interference is minimized by matching sample and standard materials and by the choice of instrument parameters.

A.2 Reagents

During the analysis, unless otherwise stated, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity. The following reagents are used for determination of alloy and impurities:

a) hydrochloric acid. concentrated (ρ≈1. 18 g/ml);

b) dilute hydrochloric acid (1+1). Dilute 100 ml hydrochloric acid (4.2) with 100 ml water;

NOTE For safety reasons the acid should be added to the water.

c) dilute hydrochloric acid (1+19). Dilute 10 ml hydrochloric acid (4.2) with 190 ml water;

NOTE For safety reasons, the acid should be added to the water.

d) nitric acid. (ρ≈1. 42 g/ml);

e) sulphuric acid. ((ρ≈1. 84 g/ml);

f) tartaric acid or citric acid;

g) acid mixture. Add 250 ml hydrochloric acid (a) to 250 ml water. Cool. Add 250 ml nitric acid (d) and 50 ml tartaric (or citric) acid (f). Dilute to 1 l with water;

h) dilute nitric acid (1+1). Add 100 ml nitric acid (d) to 100 ml water;

i) dilute nitric acid (1+4). Add 50 ml nitric acid (d) to 200 ml water;

j) dilute nitric acid (1+9). Add 25 ml nitric acid (d) to 225 ml water;

k) dilute nitric acid (1%). Dilute 5 ml nitric acid (4.5) up to 500 ml;

l) standard solutions of metals. Freshly purchased standard metal solutions may be used or standard metal solutions should be made up as follows:

1) standard antimony solution (1 ml contains 1 mg Sb). Place 0.10g Sb in 5 ml sulphuric acid (4.6) and heat to complete dissolution. Cool. Carefully add approximately 10 ml water and cool again. Transfer to a 100 ml volumetric flask with dilute hydrochloric acid (1+1) (b);

2) standard copper solution (1 ml contains 1 mg Cu). Dissolve 1g Cu in 30 ml nitric acid (1+4) (i) and transfer to a 100 ml volumetric flask. Make up to volume with water. Mix well;

3) standard copper solution (1 ml contains 10 mg Cu). Dissolve 1g Cu in 30 ml nitric acid (1+4) (i) and transfer to a 100 ml volumetric flask. Make up to volume with water. Mix well;

4) standard lead solution (1 ml contains 1 mg Pb). Dissolve 0.10 g Pb in 10 ml dilute nitric acid (1+4) (i) and transfer to a 100 ml volumetric flask. Make up to volume with water. Mix well;

5) standard bismuth solution (1 ml contains 1 mg Bi). Dissolve 0.10 g Bi in 10 ml dilute nitric acid

6) (1+1) (h) and transfer to a 100 ml volumetric flask. Make up to volume with water. Mix well;

7) standard cadmium solution (1 ml contains 1 mg Cd). Dissolve 0.10 g Cd in 10 ml dilute nitric acid (1+4) (i) and transfer to a 100 ml volumetric flask. Make up to volume with water. Mix well;

8) standard silver solution (1 ml contains 1 mg Ag). Dissolve 0.787 g silver nitrate in 50 ml water. Transfer to a 500 ml volumetric flask and make up to volume with nitric acid (1 %) (k). Mix well;

9) standard silver solution (1 ml contains 0.1 mg Ag).Transfer 10 ml silver solution (l.7) to a 100 ml volumetric flask. Make up to volume with water; and

10) mix well.

m) tin min purity 99.99 % (mass fraction).

A.3 Apparatus

The following apparatus are used:

a) ordinary laboratory apparatus. Use grade A glassware;

b) burette of capacity 5ml graduated in 0.02 ml;

c) atomic absorption or atomic emission spectrometer;

NOTE Plasma inductively-coupled emission spectrometer is also suitable.

d) hollow cathode lamps or electrodeless discharge lamps for antimony bismuth cadmium copper lead and silver; and

NOTE The presence of other elements may also need to be ascertained.

e) analytical balance with an accuracy of 0.1 mg.

A.4 Procedure

A.4.1 Preparation of the solution of the sample under test for the determination of antimony copper, lead, bismuth, cadmium and silver up to 0.01 %. The preparation is done as follows:

a) weigh accurately about 0.5 g of the sample and transfer to a 150 ml beaker. Add 20 ml of the acid mixture (g); heat to complete dissolution and cool. Transfer to a 100 ml volumetric flask and make up to the mark with dilute hydrochloric acid (1+19) (c). Mix well;
b) for determination of antimony in all alloys and for copper in alloys, introduce 10 ml of the solution a) into a 100 ml volumetric flask and make up to the mark with dilute hydrochloric acid (1+19) (c); Mix well; and
c) prepare a blank solution following the procedure described in a) but using 0.5 g of high purity tin (m) instead of the sample.

A.4.2 Preparation of the sample for the determination of silver from 0.01 % to 5 % (mass fraction); the preparation is done as follows:

a) weigh accurately 0.5 g ± 0.1 g of the sample into a 250-ml beaker. Add 20 ml dilute nitric acid (1+1) (h); Warm to dissolve; add antibumping granules or similar and boil vigorously to expel brown fumes;
b) cool and transfer the solution and the precipitate to a 250-ml volumetric flask with dilute nitric acid (1+9)(j);
c) mix well and allow to stand until the precipitate has settled;
d) for the determination of silver by ICP and for up to 0.2 % by AAS use this solution;
e) for high silver content determinations by AAS, transfer 10 ml of this solution to a 100-ml graduated flask and dilute to the mark with dilute nitric acid (1+9) (j);

NOTE 1 Tin and antimony will be precipitated out of the solution containing nitric acid and will not therefore be in the solution being analyzed for silver content.

NOTE 2 All glassware and reagents should be chlorine free. Before use, it is recommended that all glassware is thoroughly rinsed with distilled water.

f) to prepare a range of standard solutions, transfer 15 ml; 20 ml; 30 ml; 50 ml and 60 ml silver solution (l.7) into 250 ml volumetric flasks;
g) add sufficient standard copper solution (1 ml contains 10 mg Cu) (l.3) to matrix match the copper content of the alloys being analyzed;
h) finally dilute to the mark with dilute nitric acid (1+1); and
i) mix well.

A.4.3 Preparation of calibration solutions

For the determination of antimony, copper, lead, bismuth and cadmium.

a) weigh 0.5 g ± 0.1 g tin (m) into a 400-ml beaker;

b) add 50 ml of the acid mixture (g) and heat to complete dissolution;

c) cool and transfer to a 100-ml volumetric flask and make up to the mark with dilute hydrochloric acid (1±19) (c);

d) mix well;

e) to each of seven 100 ml volumetric flasks. first add 10 ml of this solution and then add the amounts of the standard metal solutions shown in Table A.1;

f) finally, dilute all the solutions to the mark with dilute hydrochloric acid (c); and

g) for determination of antimony in all samples and for copper, transfer 10.0 ml of the solutions to a 100-ml flask and dilute to the mark with dilute hydrochloric acid (c).

Table A.1 — Volume of standard metal solutions used in the preparation of the calibration solutions

Flask No.	Standard metal solution ML					
	Sb	Cu (B.4.13.2)	Pb	Bi	Cd	Ag
1	-	-	-	-	-	-
2	20	0.20	0.20	0.20	0.05	0.2
3	25	0.50	0.50	0.50	0.10	0.5
4	30	1.0	0.75	1.0	0.20	1.0
5	35	5.0	1.0	1.5	0.25	2.0
6	40	10.0	1.5	2.0	0.30	4.0
7	45	15.0	2.0	2.5	0.40	8.0
8	-	-	-	-	-	10.0

A.4.4 Certified reference materials (CRM)

Where CRM of similar matrix to the sample under test is available, treat an appropriate sample of the CRM in exactly the same way as the sample under test (D.1).

A.4.5 Spectrometric measurements

Set up the spectrometer (AAS or AES) using wavelengths given in Annex B.3.5 or D.3.3, as appropriate. A minimum of two runs of the sample under analysis shall be made; first the calibration solutions, then the samples under analysis; and the cycle repeated without altering the instrument parameters. For the purposes of calculating the element content in the sample, the average of readings from a minimum of two separate runs shall be used.

NOTE This also applies to ICP spectrometers.

A.4.6 Expression of results

Determining the metal content shall be done by means of the calibration curves; determine the quantities of each metal corresponding to the spectrometer measurements of the test and the blank test solutions.

NOTECalibration curves are usually prepared automatically by the instruments.

The content of each element is given, as a mass fraction, in % by the formula:

$$\frac{(M_2 - M_1)}{M_0} \times 100$$

where:

M_0 is the mass of the test portion in milligrams

M_1 is the mass of the element in the blank test solution in milligrams;

M_2 is the mass of the element in the test solution in milligrams, as indicated from the calibration curve and calculated for any dilution that may have been required.

A.4.7 Test report

A test report shall be drawn up containing the following information:

a) identification of the sample;
b) reference to this standard and the method used;
c) the experimental test results;
d) the date the test was carried out; and
e) any particular observations made during the tests.

Annex B
(normative)

Chemical composition of Alloy No. 21

Alloy no.	Alloy designation	Melting or solidus/liquidus temperature °C	Chemical composition % (m/m)										
			Element	Sn	Pb	Sb	Cd	Zn	Al	Bi	As	Fe	Cu	Total excluding Sb, Bi, Cu
21	S-BI57Sn43	138	min.	42,5	—	—	—	—	—	Remain	—	—	—	—
			max.	43,5	0,05	0,10	0,002	0,001	0,001		0,03	0,02	0,10	0,2[1) 2)]

1) In alloy 21, the sum of all impurities (i.e. elements other than Bi and Sn) is 0,2 % maximum.

2) In alloy 21, the maximum indium (In)content is 0.05 % and the maximum silver (Ag) content is 0,05 %

DRS 179: 2020

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