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DRAFT EAST AFRICAN STANDARD

Steel tubes for non-pressure purposes — Stainless steel tubes for round, oval, square and rectangular section for furniture — Specification

EAST AFRICAN COMMUNITY

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Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

The committee responsible for this document is Technical Committee EASC/TC 35, *Steel and steel products*.

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Steel tubes for non-pressure purposes — Stainless steel tubes for round, oval, square and rectangular section for furniture — Specification

1 Scope

This Draft East African Standard specifies the requirements, sampling and test methods for round, oval, square and rectangular section stainless steel for use to manufacture furniture.

2 Normative references

The following referenced 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 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*
ISO 1127, *Stainless steel tubes — Dimensions, tolerances and conventional masses per unit length*
ISO 15510, *Stainless steels — Chemical composition*
ISO 9328-7, *Steel flat products for pressure purposes — Technical delivery conditions — Part 7: Stainless steels*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:
— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
acceptable quality level (AQL)
acceptable to the authority administering this standard, or to the parties concluding the purchase contract, as relevant

3.2
defective
steel tube that fails in one or more respects to comply with the relevant requirements of this standard

3.3
lot
not less than 25 and not more than 3 200 tubes of the same nominal outside diameter, nominal wall thickness and length, made by one manufacturer, and submitted at any one time for inspection and testing

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4 Requirements

4.1 Material

Tubes shall be made of austenitic stainless steel for class A, type 1 or type 2 tubes.

4.2 Supply condition and mechanical properties of tubes

4.2.1 Supply condition and when determined in accordance with Clause 7, the mechanical properties of a tube, shall be the appropriate of those given in Table 1.

4.2.2 When tested in accordance with 6.3 and 6.4, a tube shall show no sign of cracking or any other such defect.

Table 1 — Type, grade, supply condition and physical properties of tubes

Type designation	Grade	Yield stress, MPa, min	Tensile strength, MPa, min	elongation %, min	Supply condition
Class A Type 1	304	310	628	30	Direct off mill (DOM)
Class A Type 2	304	186	538	45	Heat-treated, descaled and surface finished
Note 1: Equivalent steel grade designations according to ISO 15510 and ISO 9328-7 may be used. **Note 2:** Other austenitic stainless steel grades (weldable grades) according to ISO 15510 and ISO 9328-7 may be used.					

4.3 Nominal size of tube, wall thickness and tolerances

4.3.1 The nominal size and wall thickness of the tubes shall be within the range provided in Table 2, Table 3 and Table 4.

Table 2 — Tubes of round section

Nominal size mm	External diameter mm		Wall thickness mm			Approximate mass Kg/m	
	Max.	Min.	Nominal	Max.	Min.	Nominal wall thickness mm	
						1.2	1.6
16	16.16	15.84	-	Not limited	-	0.445	0.578
20	20.20	19.80	-		-	0.564	0.736
25	25.25	24.75	1.2		1.14	0.704	0.936
32	32.32	31.68	1.6		1.52	0.925	1.22
50	50.50	49.50	-		-	1.46	1.94
Note: Other dimensions according to ISO 1127 for austenitic stainless steel may be used.							

Table 3 — Tubes of square section

Nominal size mm	External dimensions mm		wall thickness mm			Approximate mass Kg/m
	Max.	Min.	Nominal	Max.	Min.	
25 × 25	25.15	24.85	1.6	Not limited	1.52	1.242
32 × 32	32.19	31.81	1.6		1.52	1.585
Note: Other dimensions according to international standards for austenitic stainless steel may be used.						

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Table 4 — Tubes of rectangular section

Nominal size mm	External dimensions mm				wall thickness mm			Approximate mass g/mm	
	d_1		d_2		Nominal	Max.	Min.	Nominal wall thickness mm	
	Max.	Min.	Max.	Min.				1.2	1.6
50 × 20	50.30	49.70	20.12	19.88	1.2	Not limited	1.14	1.256	1.634
50 × 25	50.30	49.70	25.15	24.85	1.6		1.52	1.348	1.890
Note: Other dimensions according to international standards for austenitic stainless steel may be used.									

NOTE 1: Approximate mass included in these tables is for information only.

NOTE 2: Dimensions specified in these tables are measured:
a) across the flats in the case of tubes of square or rectangular section; and
b) across the smallest and largest dimensions in the case of tubes of oval section.

4.4 Length

Tubes shall be supplied in random lengths in the range 4 m to 7 m or if so required in:
a) specified cut lengths (subject to a tolerance of ± 1 mm. unless otherwise agreed upon); or
b) specified "mill cut" lengths (subject to a tolerance of 0).

4.5 Straightness

Any deviation from straightness in a length of tube shall not exceed 1 in 1 000 measured at the midpoint of the length.

4.6 Tubes of square and rectangular section

When a tube of square or rectangular section is measured in accordance with 6.1:
a) any twist in the length measured, at least 30 mm from the end of the tube, shall not exceed 2.5 mm per metre of the length (see figure 1);
b) external dimensions resulting from any concavity/convexity of the outer surface shall not deviate from the nominal external dimensions by more than 1 %; and
c) corner radius of the tube (see figure 1) shall not exceed 3T where T is equal to the wall thickness. The nominal internal and external radii shall be 1.5T and 2.5T.

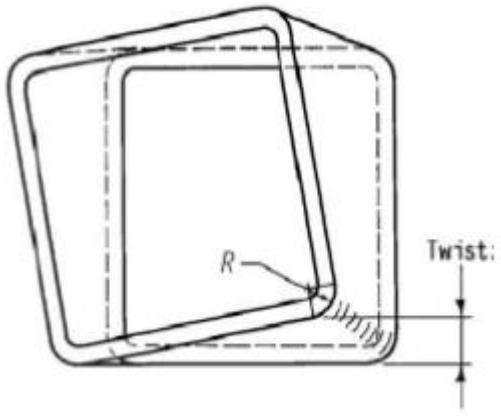

Figure 1(a) — Square section

NOTE: Twist to be measured at a distance of at least 30 mm from the end of the tube.

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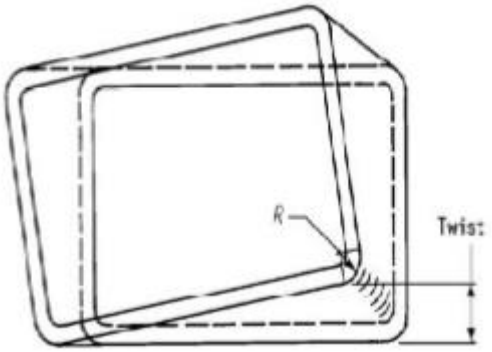

Figure 1(b) — Rectangular section

Figure 1 — Measurement of twist

NOTE: Twist to be measured at a distance of at least 30 mm from the end of the tube.

4.7 Workmanship

4.7.1 A tube shall be smooth, well finished and free from defects which may affect its appearance or impair its serviceability (or both).

4.7.2 Unless otherwise agreed upon, tubes shall have "mill cut" ends and any deformation caused by the cutting process shall not extend further than 30 mm from the cut.

4.8 Cross-welds

Tubes for furniture shall have no cross-welds.

4.9 Weldability
Steel specified in this standard shall be suitable for welding by all appropriate welding processes.

5 Packing and marking

5.1 Packing

Tubes shall be supplied loose or bundled. When supplied in bundles, only tubes of the same material, type, grade, finish, nominal length, size and wall thickness shall be bundled together.

5.2 Marking

The following information shall appear in legible and indelible marking to each tube and a label shall be securely attached to bundle of tubes:

a) manufacturer’s name or trade name or trade mark;
b) nominal diameter and thickness of the tubes;
c) steel grade designation of the material; and
d) country of origin.

6 Sampling

Sample of steel tube to be inspected and tested shall be taken in accordance with the requirements of table 9

Table 5 — Sampling

Lot size	Sample for inspection	Sample for testing

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stainless Steel tubes	Sample size	Acceptance No. (AQL=15)	Sample size	Acceptance No. (AQL=15)
50 – 90	8	0	8	0
91 - 280	32	1	8	0
281 - 500	50	2	8	0
501 – 1 200	80	3	32	1
1 201 – 3 200	125	5	32	1
3201 – 10 000		7	32	1

7 Inspection and test methods

7.1 Inspection

Visually examine and measure (using an acceptable measuring device) each tube for compliance with all the requirements of Clause 4 and Clause 5

7.2 Tensile test

The tensile test shall be carried out in accordance with ISO 6892-1, and shall be deemed to pass this test if it meets the requirements indicated in 4.2

For the determination of elongation use a gauge length of 5.65 × $\sqrt{So}$ (where $\sqrt{So}$ = the original cross-sectional area.

7.3 Flattening test (round section)

7.3.1 From the tube under test, cut a ring of length at least 40 mm and so place it between two parallel flat surfaces (of width at least 1.5 times the length of the ring) that the weld is centred between (and parallel to) the flat surfaces.

7.3.2 By applying a load to one of the flat surfaces, flatten the ring until the distance between the two surfaces is 60 % ± 2 % of the original external diameter of the tube.

7.3.3 Then examine the ring for compliance with the requirements of 4.2.2.

7.4 Drift expansion test (round section)

7.4.1 From the tube under test, cut a ring of length at least twice the actual external diameter of the tube.

7.4.2 Gradually force, without shock, a conical drift that has an included angle of 60° ± 1°, into the ring until the external diameter at the expanded end has been increased by 12 % ± 1 %, and then examine the ring for compliance with the requirements of 4.2.2.

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Bibliography

[1] RS 263-4, Steel tubes for non-pressure purposes — Specification — Part 4: Stainless steel tubes for round, oval, square and rectangular section for furniture

[2] SANS 657-4, Steel tubes for non-pressure purposes Part 4: Steel tubes of round, oval, square and rectangular section for furniture

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