
**Steel tubes for non-pressure purposes —
Specification**

Part 2: Steel tubes for cycles

ICS 77.140.75

Reference number

DRS 263-2: 2020

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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 263-2 was prepared by Technical Committee RSB/TC 47, *Steel aluminium and related products*.

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

- 1) SANS 657-2 *Steel tubes for non-pressure purposes Part 2: Steel tubes for cycle*

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

This second edition cancels and replaces the first edition (RS 263-2: 2015), which has been technically revised.

DRS 263 consists of the following parts, under the general title *Steel tubes for non-pressure purposes — Specification*:

- *Part 1: Sections for scaffolding general engineering and structural applications*
- *Part 2: Steel tubes for cycles*
- *Part 3: Steel tubes for rolls for conveyor belt idles*
- *Part 4: Steel tubes for rolls for round, oval, square and rectangular section for furniture.*

Committee membership

The following organizations were represented on the Technical Committee on *Steel aluminium and related products* (RSB/TC 47) in the preparation of this standard.

University of Rwanda- College of Science and Technology (UR-CST)

MANUMETAL

Rwanda Transport Development Agency (RTDA)

HEROCEAN Ltd

AFRIFOAM

IPRC Ngoma

Mota Engil

Ministry of infrastructure (MININFRA)

National quality testing laboratory (NQTLD)

Rwanda Standards Board (RSB) – Secretariat

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Steel tubes for non-pressure purposes — Specification — Part 2: Steel tubes for cycles

1 Scope

This Draft Rwanda Standard covers the requirements, sampling and test methods for welded steel tubes used to manufacture cycles.

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.

RS ISO 6892-1, *Metallic materials – Tensile testing – Part 1: Method of test at room temperature*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

acceptable

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 requirements of this draft standard

3.3

lot

not less than 25 and not more than 35 000 tubes of the same type, grade, length, nominal outside diameter, and nominal wall thickness, made by one manufacturer, and submitted at any one time for inspection and testing

4 Requirements

4.1 Grade and type

Tubes shall be of one of the grades given in Table 1 and of the related electrically (induction/resistance) welded mild steel (ERW) type given in table.

Table 1 — Grades and types

Grade	Type of tube
170	Welded and supplied in the heat-treated condition
216(a)	Welded and supplied in the heat-treated condition
216(b)	Welded and supplied direct off the mill
309	Welded and supplied direct off the mill
371	Welded and cold drawn
386	Welded and cold drawn

4.2 Material

Tubes shall be of such chemical composition as ensures their compliance with all the other requirements of the specification. The compositions set out in table 2 are given for guidance

Table 2 — Chemical composition

Grade	Carbon %	Manganese %	Sulphur %, max.	Phosphorus %, max
170	0.10 - 0.15	0.30 - 0.50	0.06	0.06
216(a)	0.15 - 0.20	0.30 - 0.50	0.06	0.06
216(b)	0.10 - 0.15	0.30 - 0.50	0.06	0.06
309	0.20 - 0.25	0.30 - 0.50	0.05	0.05
371	0.10 - 0.15	0.30 - 0.50	0.06	0.06
386	0.15 - 0.20	0.30 - 0.50	0.05	0.05

4.3 Mechanical properties

4.3.1 The yield stress, tensile strength and elongation of a tube shall at least meet minimum value given table 3. when tested in accordance with 7.2.

4.3.2 When tested in accordance with ISO 8493 and ISO 8492, a tube shall show no signs of cracking or any other defect.

Table 3 — Tensile properties of tubes

Grade	Yield stress MPa, min.	Tensile strength MPa, min	Elongation %, min
170	170	309	15
216(a)	216	309	15
216(b)	216	386	15
309	309	463	15
371	371	432	12
386	386	463	10

4.4 Dimensions

4.4.1 Outside diameter and wall thickness

The nominal outside diameter and wall thickness of the tubes and shall be one of the values given in Table 4. The actual outside diameter and wall thickness shall be within the appropriate range given in Table 4.

Table 4 — Dimensions of tubes

Outside diameter mm			Wall thickness mm		
Nom.	Max.	Min.	Nom.	Max.	Min.
12.6	12.725	12.573	0.9	Not limited	0.9
			1.6		1.6
15.8	15.900	15.748	0.9		0.9
22.1	22.200	22.100	1.4		1.4
			1.6		1.6
			2.0		2.0
22.2	22.250	22.098	0.9		0.9
			1.2		1.2
22.8	22.860	22.758	1.4		1.4
23.4	23.444	23.292	1.2		1.2
25.3	25.425	25.273	1.0	1.0	
			1.2	1.2	
25.4	25.451	25.375	1.5	1.62	1.5
28.5	28.600	28.448	1.2	Not limited	1.2
31.7	31.775	31.625	0.9		0.9

4.4.2 Length

Except when tubes of "exact" length (subject, in accordance with the purchaser's requirements, to a tolerance in the range -0.5 mm to +0.5 mm) are specified by the purchaser, tubes shall be supplied in random lengths, as agreed between the purchaser and the manufacturer.

4.5 Straightness

The deviation from straightness of a tube shall not exceed 1 in 600, measured at the midpoint of the length.

4.6 Workmanship

4.6.1 Tubes shall have an acceptable finish and shall be free from defects that might affect their serviceability.

4.6.2 Except when otherwise specified by the purchaser, tubes shall be supplied with square "mill cut" ends suitably deburred and, in the case of random lengths of tube, deformations that do not extend more than 25 mm from the cut shall not be included in the specified length of a tube.

4.7 Cross-welds

Tubes shall have no cross-welds.

4.8 Coating

Unless otherwise specified by the purchaser, tubes shall be supplied uncoated.

5 Packing and marking

5.1 Packing

The tubes shall be packed in bundles, cartons, or on pallets, and only tubes of the same grade, type, nominal outside diameter, nominal wall thickness, and (when relevant) length, shall be packed together.

5.2 Marking

The following information shall legibly and indelibly appear on the label/ labels attached to at least one bundle, carton or pallet, as relevant, per size of the tube in a consignment:

- a) manufacturer's name or trade name or trade mark;
- b) nominal outside diameter and nominal wall thickness;
- c) grade; and

d) length (not applicable to random lengths).

6 Sampling

Sample of steel tube to be inspected and tested shall be taken in accordance with the requirements of Table 5 and Table 6.

Table 5 — Samples for inspection

Lot size number of tubes	Sample size number of tubes	Acceptance number
25 - 90	13	1
91 - 150	20	2
151 - 280	32	3
281 - 500	50	5
501 - 1 200	80	6
1 201 - 3 000	125	8
3 201 - 10 000	200	10
10 001 - 35 000	315	15

Table 6 — Samples for testing

Lot size number of tubes	Sample size number of tubes	Acceptance number
25 - 150	5	0
151 - 1 200	20	1
1 201 - 3 200	32	1
3 201 - 10 000	50	2
10 001 - 35 000	80	4

7 Inspection and test methods

7.1 Inspection

Visually examine and measure each tube in the sample taken as indicated in Table 5 for compliance with the requirements of clause 4.4 - 4.8.

7.2 Tensile tests

The tensile test shall be carried out in accordance with RS ISO 6892-1

For the determination of elongation use a gauge length of $5.65 \times \sqrt{S_0}$ (where $\sqrt{S_0}$ = the original cross sectional area).

7.3 Flattening test

7.3.1 From the tube under test, cut a ring of length at least 40 mm,

7.3.2 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.

7.3.3 By applying a load to one flat surface, flatten the ring until the distance between the two surfaces is one of the following, as relevant:

a) grade 216(b): 5 times the wall thickness ± 0.25 mm; or

b) all other grades: 10 times the wall thickness ± 0.25 mm.

7.3.4 Remove the ring and examine for compliance with the requirements of 4.3.2.

7.4 Drift expansion test (grade 216(b) and 309 only)

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 $60^\circ \pm 1^\circ$, into the ring until the internal diameter at the expanded end has been increased by the relevant of the following:

a) grade 216(b): 12.5 % ± 1 %; or

b) grade 309: 7.5 % ± 1 %.

7.4.3 Examine the ring for compliance with the requirements of 4.3.2.

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