TRINIDAD AND TOBAGO STANDARD

COMPULSORY

STANDARD SPECIFICATION FOR DEFORMED AND PLAIN CARBON-STEEL BARS FOR CONCRETE REINFORCEMENT

PCTTS/ASTM A 615M:20XX

This Trinidad and Tobago Standard is based on ASTM A 615M-08a
Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.
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Public Comment

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In accordance with the Standards Act, the Bureau shall promote and encourage the development and maintenance of standards and further shall establish standards for the following: to improve goods produced or used in Trinidad and Tobago; to ensure industrial efficiency and development; to promote public and industrial welfare, health and safety; and to protect the environment.

The Bureau develops standards through consultation with relevant interest groups, and public comment is invited on all draft standards before they are declared as Trinidad and Tobago Standards in accordance with the provisions of the Standards Act.

The Bureau is the legal custodian of Trinidad and Tobago Standard Marks, which are issued in accordance with the Standards Act. When a Trinidad and Tobago Standard Mark appears on any product, or in connection with any service, process or practice, it provides assurance that such a product, service, process or practice conforms to a Trinidad and Tobago Standard.

The Bureau's Standards Information Centre maintains a reference library of standards, including local, regional and international standards and is the national node of the International Organization for Standardization Information Network (ISONET). The Centre also acts as the sales agent for the publications of foreign and international standards organizations.

NOTE In order to keep abreast of progress in the industries concerned, Trinidad and Tobago Standards are subject to periodic review. Suggestions for improvements are welcome.

COMMITTEE

The Specification Committee responsible for the development of this Trinidad and Tobago Standard comprised representatives from the following organizations:

Faculty of Engineering, University of the West Indies (Chairman)
(*Clement Imbert)*

ArcelorMittal Point Lisas Limited
(*Feisal Ali)*

Caribbean Industrial Research Institute
(Marco Nunes)

Caribbean Steel Mills Limited
(Peter Ramdass)

Central Trinidad Steel Limited
(Joseph Bridgelal)

Lee Young and Partners Limited
(Farhad Khan)

Metal Industries Company Limited
(Bennedict Chatoor)

MET-SPEC Limited
(Dennis Sumadh)

Ministry of Legal Affairs, Consumer Affairs Division
(Boris Noris)

Ojeer's Hardware
(Raficul Hosein)

Reesal Industries Limited
(Salick Reesal)

Sure-QUAL
(Abriham Daniel)

TRINRICO Steel and Wire Products Limited
(David Latchoo, Kamal Gangapersad)

Trinidad and Tobago Bureau of Standards
(*Ishmael Soobrattee, Marvin Charles & Darryl Thomson (*Technical Secretary*))*

Public Comment

Contents

Public Comment

Foreword

This specification was declared a Trinidad and Tobago Standard with effect from…… ……. after the draft, finalized by the Specification Committee on Steel Products had been approved by the Bureau.

The committee has recommended that this standard be compulsory because of the danger to health and safety arising from defective reinforcing steel bars in concrete construction.

This standard will be effective as a compulsory standard on a date to be notified by the Minister responsible for trade and industry in a Notice to be published in the Trinidad and Tobago Gazette, as required by the Standards Act.

This Trinidad and Tobago standard is a modified adoption of the American Society of Testing and Materials Standard ASTM A 615M-08a, *Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.*

This standard, along with TTS/ASTM A 706M:20XX, *Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement,* replaces TTS 583: 2002, *Carbon steel bars for the reinforcement of concrete – Specification*.

It is intended that this standard guide producers, importers, retailers, building designers and contractors in respect of the size classifications and the minimum performance requirements for reinforcing steel bars.

This standard specifies nominal bar dimensions based on both the imperial and metric size series. This approach reflects the current market reality of reinforcing bars which are commercially available in Trinidad and Tobago in both imperial and metric size series.

Acknowledgement is hereby given to ASTM International for permission to adopt with appropriate modifications the technical content of ASTM A 615M-08a.

Although the editorial style and layout of ASTM International standards do not conform to that of Trinidad and Tobago Standards, it has been approved as suitable for publication as a Trinidad and Tobago Standard.

Technical deviations to the original standard necessary to make the provisions relevant to Trinidad and Tobago are given in pages v to viii.

Public Comment

National deviations

7 Requirements for Deformations

- Replace 7.5 with the following:

7.5 The spacing, height, and gap of deformations shall conform to the requirements prescribed in Table 1. Alternatively, bars which have nominal sizes based on a metric size series shall satisfy the requirements of Table 1M.

- Add Table 1M after Table 1, specifying dimensions for bar designation numbers based on a metric size series.

Table 1M - Deformed bar Designation Numbers, Nominal Weights (masses), Nominal Dimensions and Deformation Requirements[a]

Bar Designation No	Nominal mass per metre run	Nominal size (*d*)	Nominal cross-sectional area	Nominal perimeter	Deformation requirements		
					Maximum average spacing[b]	Minimum average height	Maximum gap[c]
	kg/m	mm	mm^2	mm	mm	mm	mm
6 M	0.222	6	28.3	18.8`	4.2	0.19	2.4
8 M	0.395	8	50.3	25.1	5.6	0.30	3.1
10 M	0.616	10	78.5	31.4	7.0	0.40	3.9
12 M	0.888	12	113.1	37.7	8.4	0.48	4.7
14 M	1.210	14	154.1	43.9	9.8	0.60	5.8
16 M	1.579	16	201.1	50.2	11.2	0.72	6.3
20 M	2.466	20	314.2	62.8	13.9	1.01	7.9
25 M	3.854	25	490.9	78.5	17.5	1.25	9.8
28 M	4.834	28[d]	616.0	88.0	19.6	1.40	11.0
30 M	5.549	30	707.0	94.2	20.9	1.51	11.8
32 M	6.313	32	804.2	100.5	22.3	1.61	12.6
40 M	9.864	40	1 256.6	125.6	28.0	2.07	15.7
50 M	15.413	50	1 963.5	157.0	35.0	2.37	19.6

[a] Deformation requirements do not apply to smooth bars.

[b] Maximum average spacing = 0.7*d*.

[c] Maximum gap = 12.5 % of nominal perimeter. These values shall only apply where there are two or less longitudinal ribs present. Requirements for gap where more than two longitudinal ribs are present shall be as specified in 8.5.

Public Comment

6 Chemical Composition

- Add new sub-clause 6.3

6.3 The maximum percentage composition limit for Nitrogen shall be 0.012% based on a heat analysis and 0.014% based on a product analysis. Higher levels may be allowed if nitrogen binding elements such as Niobium or Vanadium, are present.

8 Tensile Requirements

- Replace 9.1 with the following:

9.1 Test specimens taken from bars which conform to the designation requirements of Table 1, shall conform to the requirements for tensile properties and elongation prescribed in Table 2. Alternatively, test specimens taken from bars which conform to the designation requirements of Table 1M, shall conform to the requirements for tensile properties and elongation prescribed in Table 2M.

- Delete 9.4.

- Add Table 2M after Table 2, specifying tensile and elongation requirements for bar designations based on a metric size series.

Table 2M - Tensile Requirements (metric nominal sizes)

	Grade 280	**Grade 420**	**Grade 520**
Tensile strength, min MPa	420	620	690
Yield strength, min MPa	280	420	520
Elongation in 203.2 mm, min % **Bar Designation No**			
6 M, 8 M, 10 M	11	9	7
12 M, 14 M, 16 M	12	9	7
20 M	12	9	7
25 M	-	8	7
28 M, 30 M, 32 M	-	7	6
40 M, 50 M	-	7	6

Public Comment

10 Bending Requirements

- Replace 10.1 with the following:

10.1 The bend test specimen shall withstand being bent around a pin without cracking on the outside radius of the bent portion. The requirements for degree of bending and sizes of pins are prescribed in Table 3 for bars conforming the designations listed in Table 1 or Table 3M for bars conforming to the designations listed in Table 1M. When material is furnished in coils, the test sample shall be straightened prior to placing it in the bend tester.

- Add Table 3M after Table 3, specifying bend requirements for bar designations based on a metric size series.

Table 3M - Bend Test Requirements (metric nominal sizes)

Bar Designation No.	Grade 280	Grade 420	Grade 520
6 M, 8 M, 10 M, 12 M, 14 M, 16 M	3½ d	3½ d	5d
20 M	5d	5d	5d
25 M	-	5d	5d
28 M, 30 M, 32 M	-	7d	7d
40 M, 50 M	-	9d	9d

17 Inspection

- Delete this cause (inclusive of 17.1 and 17.2).

19 Marking

- Replace 19.1 with the following:

19.1 Bars shall be separated into bundles and labelled in English using durable tags to identify manufacturer's heat or test identification number.

- Replace 19.3 with the following:

19.3 All bars produced to this specification, except plain round bars, shall be identified by a distinguishing set of marks legibly rolled onto the surface of at least one side of the bar, at intervals not greater than 2.5 m in the order set forth in 19.3.1 to 19.3.4.

- Replace 19.3.2 with the following:

19.3.2 *Size Designation* – Bars which satisfy the requirements of Table 1 shall be designated by the Arabic number corresponding to bar designation number of Table 1. Bars which satisfy the requirements of Table 1M shall be designated by the nominal diameter followed by the letter 'M' as specified in Table 1M.

Public Comment

- Add the following new clause:

22 Compliance[1]

22.1 Lots under consideration shall be sampled in accordance with clause 13.

22.2 Test samples shall be tested to and satisfy the requirements of clauses 6 (Chemical Composition), 7 (Requirements for Deformations), 8 (Measurements of Deformations), 9 (Tensile Requirements), 10 (Bending Requirements), 11 (Permissible Variation in Weight (mass)), 12 (Finish), 15 (Test Specimens) and 19 (Marking).

22.3 Lots from which test samples have failed shall be subjected to retests in accordance with clause 14.

22.4 A lot shall be considered to be in compliance with this standard if a sample taken in accordance with clause 13 satisfies the relevant requirements of clauses 6 (Chemical Composition), 7 (Requirements for Deformations), 8 (Measurements of Deformations), 9 (Tensile Requirements), 10 (Bending Requirements), 11 (Permissible Variation in Weight (mass)), 12 (Finish) and 19 (Marking).

Public Comment

[1] Clause 22 – Compliance, inclusive of its sub- clauses 22.1 to 22.4, is a new clause.