

**FOR COMMENT ONLY**

**PROPOSAL FOR A**

**TRINIDAD AND TOBAGO STANDARD**

**STEEL SHEETS – ZINC AND ALUMINIUM-ZINC ALLOY COATED –  
PROFILED FOR ROOFING AND GENERAL PURPOSES –  
SPECIFICATION**

**(1<sup>st</sup> Revision)**

**PCTTS 69:20XX  
(Replaces TTS 16 35 511: 1988)**

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Public comment

## **General statement**

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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.

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**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 formulation of this Trinidad and Tobago Standard is as follows:

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Public comment

## **PCTTS 69:20XX**

### **Foreword**

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

The Committee has recommended that this standard be declared compulsory in order to protect public health, welfare and safety from the danger of defective roofing sheets giving way during storm conditions.

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.

TTS 69:20XX, *Steel sheets - Zinc and aluminium-zinc alloy coated – Profiled for roofing and general purposes* – specification replaces TTS 16 35 511:1998, *Specification for corrugated galvanised and aluzinc coated steel sheets for roofing and general purposes*. TTS 69:20XX specifies thicker minimum base sheets of higher strengths and a revised conformity assessment procedure than that specified in TTS 16 35 511:1998.

This standard was developed in order to contribute to the objective of standardizing the basic materials and components used in the construction industry and to ensure an acceptable level of quality for users.

This standard is intended for compliance by importers, distributors and householders to provide guidance on the minimum performance requirements necessary to ensure safe performance of the product.

In the preparation of this national standard considerable assistance was derived from the following documents.

#### **Standards Australia**

AS 1365: 1996 *Tolerances for flat-rolled steel products*;

AS 1397: 2001 *Steel sheet and strip – Hot-dipped zinc-coated or aluminium/zinc-coated*; and

AS 1445: 1986 *76 mm Pitch corrugated hot-dipped zinc-coated or aluminium-zinc alloy-coated steel sheet*;

#### **ASTM International**

ASTM A90M – 10, *Standard test method for weight (mass) of coating on iron and steel articles with zinc or zinc-alloy coatings*;

ASTM A653M – 10, *Standard specification for steel sheet, zinc-coated (galvanized) or zinc-iron alloy-coated (galvannealed) by the hot-dip process*;

ASTM A792M – 10 *Standard specification for steel sheet, 55 % aluminum-zinc alloy-coated by the hot-dip process*;

**British Standards**

BS 3083: 1988 *Specification for hot-dip zinc coated corrugated steel sheet for roofing and general purposes;*

Annexes A and B form an integral part of this Trinidad and Tobago Standard. Annexes C, D, E, F and G are included for information purposes only.

Public comment



## **1 Scope**

This standard specifies minimum requirements for the base steel sheet as well as coating mass per area, coating adhesion, base metal thickness and mechanical performance. With respect to profiled steel sheets that are cut into lengths, this standard specifies labelling requirements and includes tolerances for the length, pitch, depth, squareness and gives guidance on commonly used profiles.

This standard applies to profiled steel sheets of base thicknesses ranging from 0.35 mm to 1.0 mm which are hot dip coated with zinc or aluminium-zinc alloy.

NOTE Profiled steel sheets are cut to specified lengths for use in roofing and general purpose applications and may contain additional coatings such as paint.

## **2 Normative references**

The following referenced documents are indispensable for the application of this document. For undated references, the latest edition of the referenced document (including any amendments) applies.

### **ASTM International**

ASTM A924M, *Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process*

ASTM A370, *Test methods and Definitions for Mechanical Testing of Steel Products*

### **International Organisation for Standardisation**

ISO 2859-1, *Sampling procedures for inspection by attributes, Part 1 Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

## **3 Terms and definitions**

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

### **3.1**

#### **accumulated pitch**

distance between the first and last profile along the width of the profiled sheet

### **3.2**

#### **aluminium- zinc alloy**

alloy used for coating steel sheets and which is composed of essentially 50 % to 60 % aluminium with the remainder zinc and minor additions of control elements

### **3.3**

#### **chemical passivation**

treatment involving the application of a solution designed to reduce the reactivity of the base metal to air

**3.4**

**cover width**

transverse distance of the effective area covered by a sheet after it is overlapped

**3.5**

**cracking**

visible rupture or breaking of the protective coating

**3.6**

**edge tail**

final slope at the longitudinal edge of a trapezoid profiled sheet

NOTE The edge tail falls outside the cover width (refer to Figure 1).

**3.7**

**flaking**

detachment of flakes of the protective coating

**3.8**

**hot-dipping**

immersing (under controlled conditions) iron or steel in a bath of molten zinc or aluminium- zinc alloy to form a protective coating against corrosion

**3.9**

**longitudinal direction**

parallel to the direction of rolling

**3.10**

**lot**

specified quantity of the product of the same steel grade, nominal thickness, coating type, coating mass, profile and dimensions manufactured under the same conditions and essentially at the same time from which a sample is to be chosen to determine compliance with this standard

**3.11**

**manufacturer**

entity responsible for shaping or roll-forming the coated steel sheets into a profile for distribution within Trinidad and Tobago or is engaged in the business of importing profiled coated steel sheets for distribution within Trinidad and Tobago

**3.12**

**pitch**

distance between two successive profiles along the width of the profiled sheet

**3.13**

**profile**

characterising shape for a particular sheet

**3.14**

**roof deck**

flat slab or sloped slab of a roof assembly not including its supporting members or vertical supports

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### 3.15

#### **seconds**

marking that is applied to a profiled sheet that does not fully satisfy the coating requirements of this standard, but is still, however, suitable for its intended use

NOTE Profiled sheets marked as "seconds" would not provide full service life.

### 3.16

#### **steel base**

base metal substrate onto which a protective coating is applied

### 3.17

#### **steel base thickness**

thickness of the steel sheet without protective coating

NOTE Steel base thickness is also referred to as base metal thickness (bmt).

### 3.18

#### **zinc coating**

coating consisting of essentially zinc with minor additions of control elements

NOTE Sheets coated with zinc via the hot-dipping process are referred to as galvanized sheets.

## 4 Steel sheet requirements

### 4.1 Base metal thickness

Base metal thicknesses shall be at least 0.35 mm.

The permissible deviation of base metal thickness shall be based on the stated sheet thickness and shall be assessed on the basis of sheets sampled in accordance with Annex A and subject to the deviations permitted in Table 1.

**Table 1 — Steel base thickness and permissible deviations**

<b>Steel base thickness (nominal) mm</b>	<b>Permissible deviation mm</b>
≥ 0.35 and < 0.50	± 0.04
≥ 0.50 and < 0.80	± 0.05
≥ 0.80 and < 1.00	± 0.06

### 4.2 Coating mass per area

**4.2.1** Sheets with a zinc coating shall have a minimum coating mass of 275 g/m<sup>2</sup> when tested in accordance with Annex C and shall be designated in accordance with Table 2.

**4.2.2** Sheets with an aluminium-zinc alloy coating shall have a minimum coating mass of 150 g/m<sup>2</sup> when tested in accordance with Annex C and shall be designated in accordance with Table 3.

**4.2.3** Metallic coatings that are different to those defined in 4.2.1 and 4.2.2 shall meet the following requirements:

- a) the triple spot test value shall be the coating mass, in  $\text{g/m}^2$ , indicated by the manufacturer; and
- b) the single spot test value shall be 85 % of the triple spot test value rounded to the nearest 5 units.

NOTE Other metallic coatings would include zinc - 5 % aluminium alloy coatings and zinc-iron alloy coatings.

### **4.3 Manufacture of steel sheet base**

The composition of the steel and the method used to manufacture and coat the steel sheet is left to the discretion of the steel producer and the manufacturer, but shall be in accordance with an accepted current practice of manufacture of steel sheet for hot-dip zinc and aluminium-zinc alloy coatings.

NOTE Aluminium-zinc alloy coated sheets are not solderable.

### **4.4 Strength of coated steel sheet**

**4.4.2** The lower yield strength (longitudinal direction) of the coated steel sheet shall be not less than  $275 \text{ N/mm}^2$  when sampled in accordance with Annex A and determined in accordance with ASTM A370.

**4.4.3** The tensile strength (longitudinal direction) of the coated sheet shall be not less than  $320 \text{ N/mm}^2$  when sampled in accordance with Annex A and determined in accordance with ASTM A370.

NOTE If yielding does not occur, the 0.2 % proof stress shall be determined.

### **4.5 Freedom from defects**

Coated surfaces shall be free from visible imperfections and harmful contaminants that are likely to reduce the service life of the sheets.

### **4.6 Coating adhesion**

The adhesion of the coating shall be such that there is no visible flaking or cracking of the coating after the sheets have been profiled.

NOTE This applies for both metallic and non-metallic coatings.

### **4.7 Surface treatment**

**4.7.1** The coated surfaces shall be subjected to a chemical passivation treatment unless otherwise specified by the purchaser.

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**4.7.2** Where untreated products are specified, the manufacturer shall not be responsible for the formation of surface stains.

NOTE 1 A chemical passivation treatment may cause slight discolouration of the surface that is not detrimental to the general performance of the product.

NOTE 2 A chemical passivation treatment may also interfere with painting operations. In such a case, it is recommended that the surface of the product be properly etched before painting.

## 5 Designation

### 5.1 General

Profiled zinc coated and aluminium-zinc alloy coated steel sheets shall be designated in terms of the following:

- a) steel base thickness;
- b) coating mass per area; and
- c) profile designation.

### 5.2 Steel base thickness

Steel sheet thickness shall be stated in millimetres to two decimal places.

### 5.3 Coating mass per area

**5.3.1** The zinc coating and the aluminium-zinc alloy coating shall be expressed in  $\text{g/m}^2$  and designated in terms of the appropriate coating mass per area given in Table 2 and Table 3 respectively.

**5.3.2** The letters "Z" and "AZ" shall be used to indicate the zinc coating and the aluminium-zinc alloy coating respectively. They shall be followed by a numerical value that will represent the coating mass per area (in  $\text{g/m}^2$ ) over both surfaces.

EXAMPLE 1 **Z 275** indicates a zinc coating of  $275 \text{ g/m}^2$  over both surfaces.

EXAMPLE 2 **AZ 150** indicates an aluminium-zinc alloy coating of  $150 \text{ g/m}^2$  over both surfaces.

**Table 2 — Zinc coating mass per area requirements**

Designation	Minimum zinc coating mass per area (both surfaces)	
	Triple spot test $\text{g/m}^2$	Single spot test $\text{g/m}^2$
Z 275	275	235
Z 350	350	300
Z 450	450	385
Z 600	600	510

Table 3 — Aluminium-zinc alloy coating mass per area requirements

Designation	Minimum aluminium-zinc alloy coating mass per area (both surfaces)	
	Triple spot test g/m <sup>2</sup>	Single spot test g/m <sup>2</sup>
AZ 150	150	130
AZ 200	200	170

#### 5.4 Profile designation

Profiles shall be designated in terms of the number of profiles, the nominal pitch and the nominal depth of the corrugations. This shall be expressed as:

NUMBER OF PROFILES/NOMINAL PITCH/NOMINAL DEPTH (PROFILE SHAPE) <sup>OPTIONAL</sup>

EXAMPLE A corrugated sheet with 8 corrugations having a nominal pitch of 76 mm and a nominal depth of corrugation of 18 mm would be designated as: **8/76/18 Corrugated**.

## 6 Dimensional requirements

### 6.1 Length

No sheet shall be shorter in length than the dimension agreed to between the purchaser and manufacturer. The permissible deviation of length on the plus side shall be 0.5 % of the length or 10 mm whichever is greater.

NOTE The preferred lengths for profiled sheets are 1.83 m (6 ft), 2.44 m (8 ft), 3.05 m (10 ft), 3.66 m (12 ft), 4.27 m (14 ft), 4.88 m (16 ft), 5.49 m (18 ft), 6.10 m (20 ft) and 7.32 m (24 ft).

### 6.2 Steel base thickness

The steel base thickness shall be within the appropriate permissible deviation indicated in Table 1.

NOTE 1 Annex E gives guidance on recommended sheet thickness and coating for different applications.

NOTE 2 The base metal thickness should be measured with an accuracy of 0.01 mm or better.

### 6.3 Pitch

The tolerance on nominal pitch shall be  $\pm 2.5$  mm for all profiles.

### 6.4 Accumulated pitch

The tolerance on the nominal accumulated pitch shall be  $\pm 10$  mm for all profiles.

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NOTE For trapezoidal and standing seam profiles, the nominal accumulated pitch is usually equivalent to the nominal cover width. This is not necessarily the case for corrugated profiles since the nominal cover width is dependent on the type of overlap used (see Annex F).

### 6.5 Profile depth

The tolerance on nominal profile depth shall be  $\pm 1.5$  mm for all profiles.

### 6.6 Edge tail for trapezoid profiles

All trapezoid profiles shall have an edge tail of minimum length 12 mm (see Figure 1).

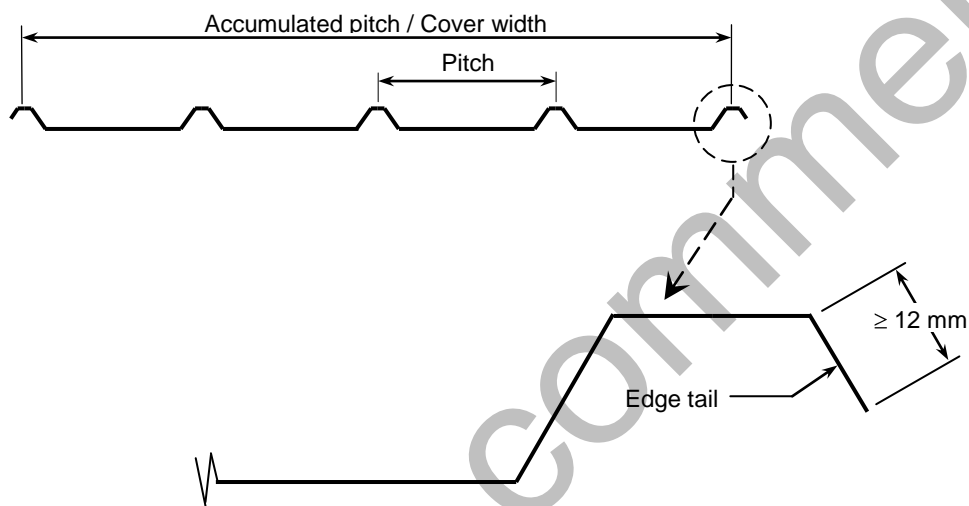


Figure 1 — Edge tail location and minimum requirement

### 6.7 Squareness

The difference in length of the diagonals of any sheet shall not exceed 20 mm. Figure 2 illustrates how the measurements shall be taken.

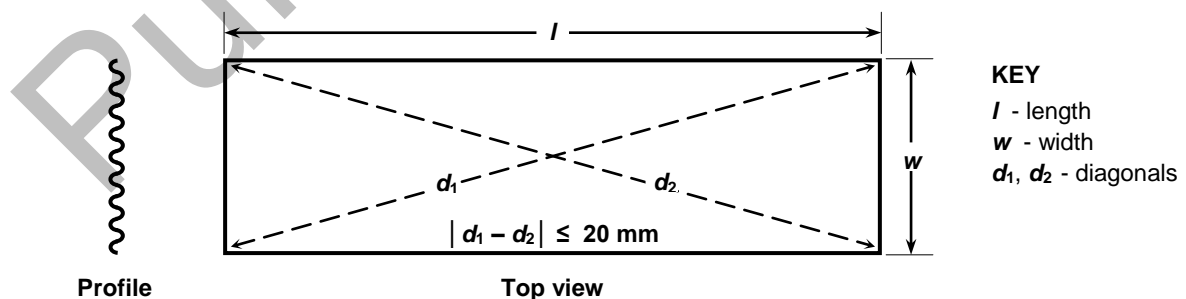


Figure 2 — Measurement of diagonals

## 7 Marking

### 7.1 Labelling requirements for sheets

Each profiled sheet shall bear the following information:

- a) the steel base thickness in mm;
- b) lower yield strength in N/mm<sup>2</sup> or MPa; and
- c) the coating mass per area in g/m<sup>2</sup> or coating mass designation.

EXAMPLE This information may be presented as: 0.35 mm 275 N/mm<sup>2</sup> AZ 150.

### 7.2 Labelling requirements for bundles of sheets

Bundles of sheets which are packaged together shall be labelled with the following information:

- a) name and address of manufacturer;
- b) profile designation;
- c) production batch code or number; and
- d) certification mark, if applicable.

### 7.3 Requirements for ink and labels

**7.3.1** The required information shall be in letters having a minimum upper-case letter height of 3 mm and shall be in non water-soluble ink where printed.

**7.3.2** Where the information required by 8.2 and 8.1 is presented on labels, the labels used shall be made of material not adversely affected by water. The labels shall also be attached to the sheets by means of non water-soluble adhesive such that they can only be removed by tearing the label.

## 8 Profiles

Some of the common profiles are shown in Annex D for information purposes only. Profiles other than those indicated are also permissible, but shall satisfy all the requirements presented in this standard.

## 9 Compliance

Where the samples taken in accordance with A.2 and A.3 satisfy the appropriate specified requirements of clauses 4, 5, 6, 7 and 8, the lot shall be deemed to comply with this Trinidad and Tobago Standard.

Based on the level of product certification the enforcement body can be permitted to exercise discretion in monitoring and inspection.



## Annex A (normative)

### Sampling

#### A.1 General

Roofing sheets are manufactured in a two-stage process. Steel sheets are produced in steel mills and are rolled to the required thickness after which the steel sheets are coated with a protective coating. The coated sheets are then rolled into coils and shipped. These coils are subsequently imported by local manufacturers who form the sheets into various profiles and cut them to length.

This standard utilises a two stage sampling procedure. One sampling plan assesses the material properties of the coil and a separate sampling plan assesses the properties of the cut and formed sheets.

#### A.2 Coil (material property) compliance

##### A.2.1 Sampling

Coils are sampled in order to assess the following material properties:

- Base metal thickness;
- Coating mass per area; and
- Tensile strength (longitudinal).

The sampling plan shall be based upon ISO 2859-1. For the purposes of this sampling the number of coils in a shipment shall be considered as a lot size, with the sample unit specified in coils.

NOTE It is recommended that a general inspection level II and an AQL of 1.5 be employed.

The local producer is responsible for providing a feasible tracing scheme for coils back to shipments prior to testing by the enforcement agency.

A sample shall be at least three lengths of 75 mm.

NOTE It is recommended that two of the test pieces be taken at least 6 m from the edges of the coil and the third test piece at the middle of the coil.

##### A.2.2 Assessment

The base metal thickness shall be tested in accordance to Annex C and shall satisfy the requirements of clause 4.

The coating mass per area shall be tested in accordance to Annex C and shall satisfy the requirements of clauses 4, 5 and 7.

The tensile strength shall be tested in accordance to ASTM A370 and shall satisfy the requirements of clause 4.

### **A.3 Cut sheet properties**

#### **A.3.1 Sampling**

Cut sheets shall be sampled in order to assess the following properties:

- strength of coated sheets;
- profile (pitch and pitch depth);
- accumulated pitch;
- edge tail;
- squareness; and
- sheet markings.

Sampling shall be done in accordance with the ISO 2859-1. For the purpose of this sampling a lot size shall be referred to as the number of profiled sheets in a product batch and the sampling unit shall be sheets.

NOTE It is recommended that a general inspection level II and an AQL of 1.5 be utilised. The enforcement body can exercise discretion when sampling requires extensive samples.

#### **A.3.2 Assessment**

The sheet properties shall be determined by the enforcement body and shall satisfy the requirements of clauses 4, 5, 6 and 8.

NOTE The base metal thickness should be taken with an accuracy of 0.01 mm or better.

#### **A.3.3 Retesting**

Where the lot fails to satisfy the assessment requirements of A 2.2 and A 3.2, additional samples shall be taken from the same lot using a sampling scheme no less stringent than the one originally employed. If any of the additional samples fail to satisfy the specified requirements, the entire lot shall be deemed not to comply with this standard.

## Annex B (informative)

### Example sampling plan

#### B.1 General

Shipment batch: 100 T (assuming each coil is approximately 5 T)

Lot size: 20

Referring to Table B.1 for a lot size of 20, this corresponds to Code letter C and a sampling size of 5 shall be used. Therefore 1 sample (three test pieces) shall be taken from each of the 5 coils for sampling.

Referring to Table B.1 the compliance and non-compliance of the shipment would be governed by; accept zero (0) defects or reject once there is one (1) defect in the sampling size.

**Table B.1 — Example of Sampling Plans**

Lot Size	Code letter	Sample Size	Accept	Reject
2 to 8	A	2	0	1
9 to 15	B	3	0	1
16 to 25	C	5	0	1
26 to 50	D	8	0	1
51 to 90	E	13	0	1
91 to 150	F	20	1	2
151 to 280	G	32	1	2
281 to 500	H	50	2	3
NOTE Inspection level II and AQL value of 1.5				

## Annex C (normative)

### Test methods

#### C.1 Determination of coating mass per area – Dissolution Method

##### C.1.1 Principle

Each sample with an individual surface area of approximately 2 000 mm<sup>2</sup> (both faces) is stripped of the coating using a suitable solvent. The mass per area of the zinc or the aluminium-zinc alloy coating is then calculated from the resulting loss of mass.

##### C.1.2 Stripping solution

Dissolve approximately 3.5 g of hexamethylenetetramine in 500 ml of concentrated hydrochloric acid (specific gravity = 1.19). Make up to 1 000 ml of solution with distilled water. Cool to room temperature.

##### C.1.3 Test procedure

Where necessary degrease the test piece with a suitable organic solvent that will not attack the coating. Determine the mass of the test piece to an accuracy of at least 1 % of the presumed coating mass. Completely immerse each test piece, one at a time, in 500 ml of the stripping solution at ambient temperature and leave until the coating is completely dissolved. The coating is completely dissolved for all practical purposes when the violent evolution of hydrogen has ceased. The temperature of the stripping solution shall at no time exceed 38 °C. Rinse the test piece in running water and then brush to remove any residues adhering to the surface. Immerse in ethanol, dry rapidly and then determine the mass of the specimen again as before.

NOTE It is strongly advised that adequate ventilation be provided during the reaction, and for frequent tests a fume extraction cupboard should be used. No naked flames should be used near to the stripping test area for all coating mass determinations.

##### C.1.4 Calculation of coating mass

The coating mass per area shall be calculated according to the following formula:

$$M_c = \frac{M_1 - M_2}{A} \times 10^6$$

where

$A$  – area of the test piece, in mm<sup>2</sup>

$M_c$  – coating mass per area, in g/m<sup>2</sup>

$M_1$  – mass of test piece before stripping, in g

$M_2$  – mass of test piece after stripping, in g

## **C.2 Determining steel base thickness**

The steel base thickness samples shall be sampled in accordance to A.1.2.

The coatings shall be removed in accordance to C.1. The thickness of the samples with the coating removed shall be measured to an accuracy of 0.01 mm.

NOTE The same samples used for the coating mass test can be used for determining the steel base thickness requirements.

Public comment

## Annex D (informative)

### Common sheet profiles

#### D.1 General

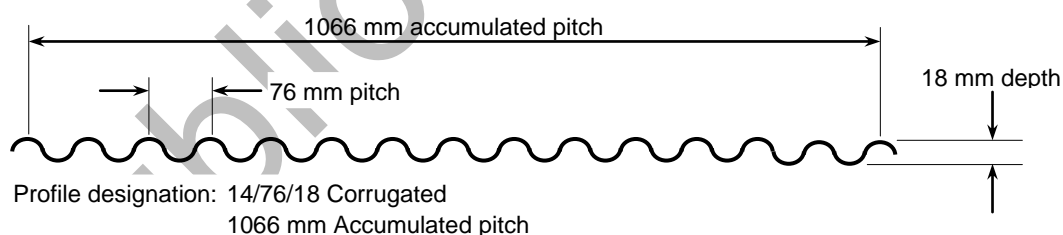
This annex lists some of the common profile shapes and is intended for information purposes only. Sheets with profiles other than those included in this annex are also permissible, but shall meet all the requirements presented in this standard.

Unless otherwise stated, the dimensions indicated are nominal and are in millimetres (mm). The figures shown are not drawn to scale.

#### D.2 Corrugated profile – 18 mm profile depth

A typical example of this is shown in Figure D.1. The following variations are also common:

- a) 8/76/18 Corrugated with 610 mm accumulated pitch;
- b) 9/76/18 Corrugated with 686 mm accumulated pitch;
- c) 12/76/18 Corrugated with 914 mm accumulated pitch; and
- d) 13/76/18 Corrugated with 990 mm accumulated pitch.



**Figure D.1 — Corrugated profile with 18 mm corrugation depth**

#### D.3 Corrugated profile – 19 mm profile depth

A typical example of this is shown in Figure D.2. The following variations are also common:

- a) 8/76/19 Corrugated with 610 mm accumulated pitch;
- b) 9/76/19 Corrugated with 686 mm accumulated pitch;
- c) 12/76/19 Corrugated with 914 mm accumulated pitch; and

d) 13/76/19 Corrugated with 990 mm accumulated pitch.

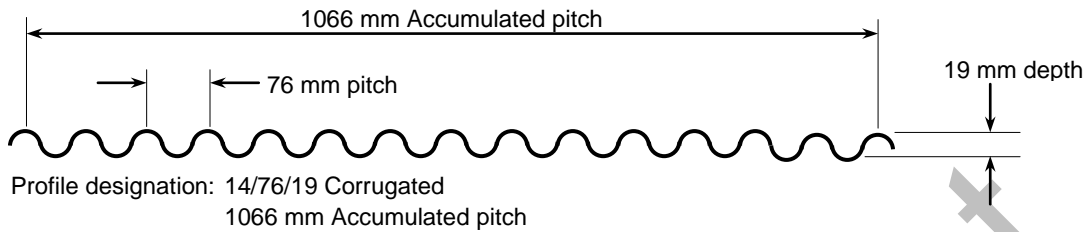


Figure D.2 — Corrugated profile with 19 mm corrugation depth

**D.4 Trapezoid – 127 mm pitch**

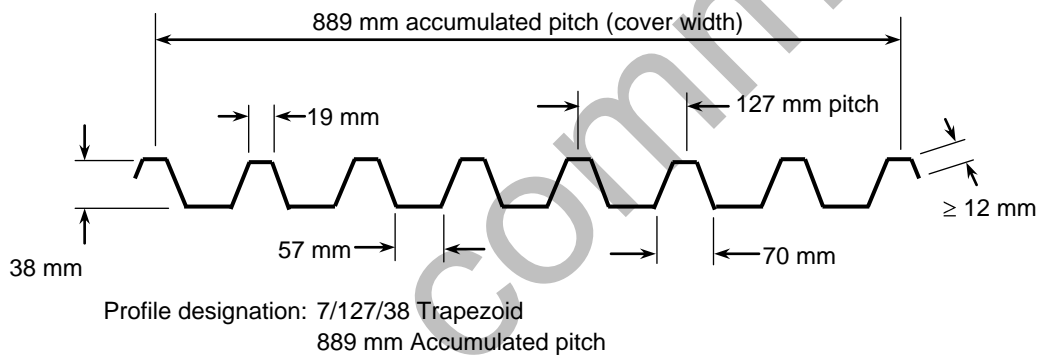


Figure D.3 — 7/127/38 Trapezoid with 889 mm cover width

**D.5 Trapezoid – 254 mm pitch**

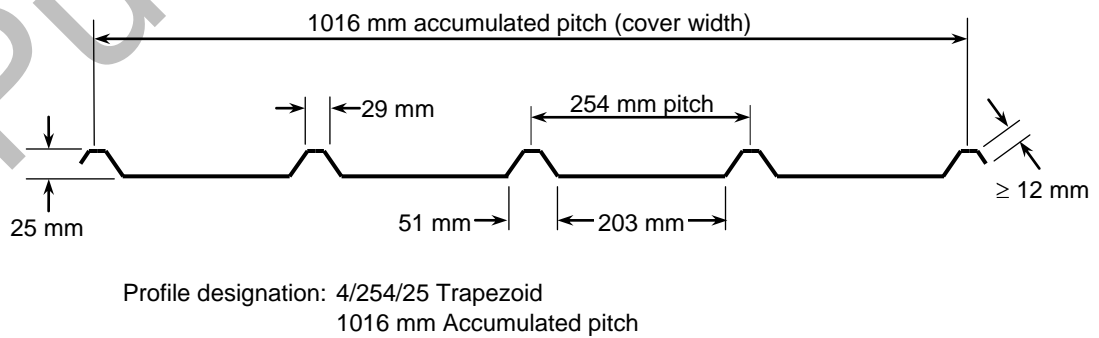
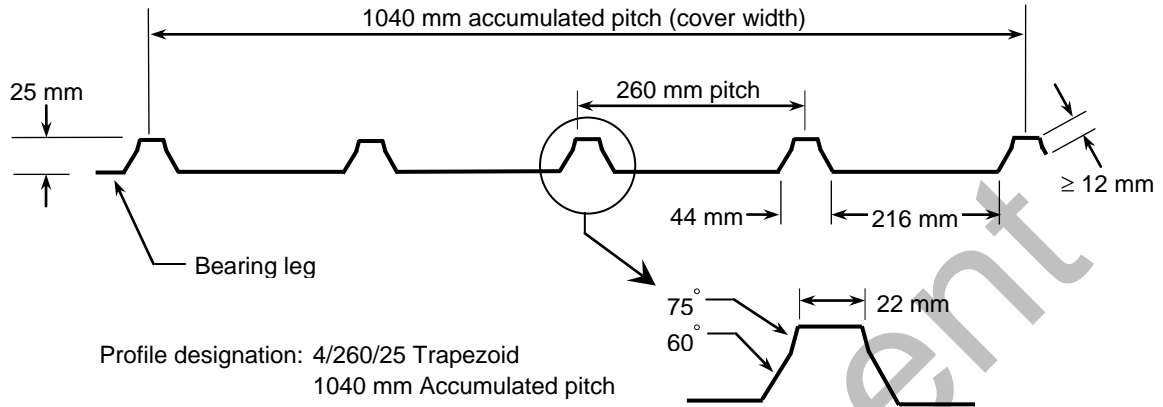


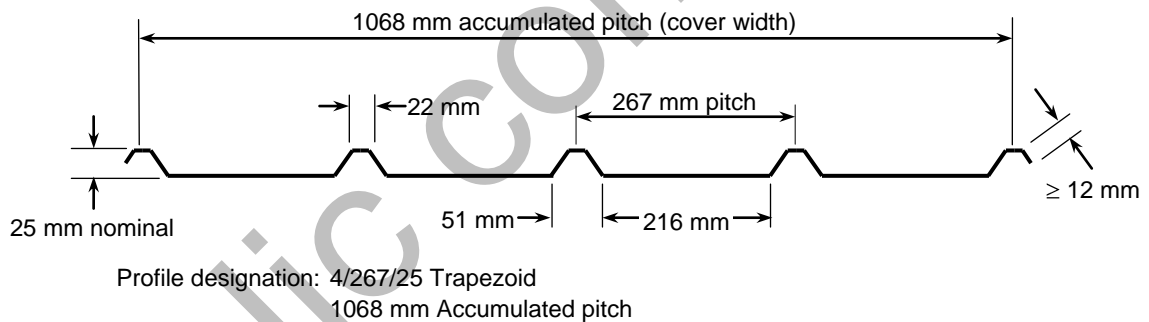
Figure D.4 — 4/254/25 Trapezoid with 1016 mm cover width

**Trapezoid – 260 mm pitch**



**Figure D.5 — 4/260/25 Trapezoid with 1040 mm cover width**

**D.6 Trapezoid – 267 mm pitch**

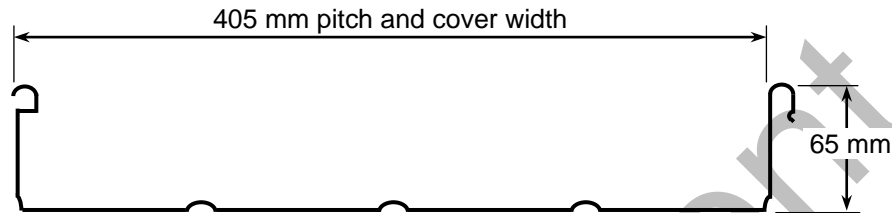


**Figure D.6 — 4/267/25 Trapezoid with 1068 mm cover width**



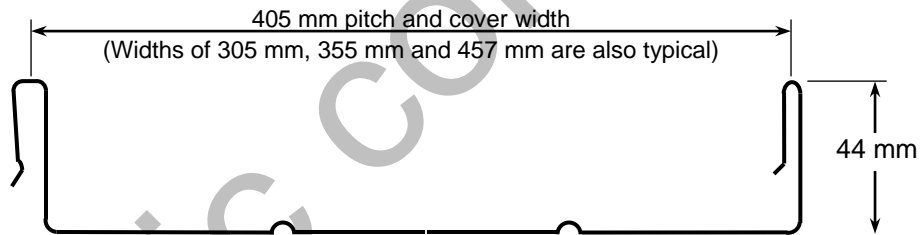
### D.7 Standing seam

Aluminium-zinc alloy coatings are generally stiffer than zinc coatings and therefore more prone to cracking when the sheet is bent over radii less than  $2T$ , where  $T$  is the steel base thickness of the coated sheet. It is therefore recommended that aluminium-zinc alloy coated sheets not be used when roll forming standing seam profiles if the process of locking the seam would create bend radii less than  $2T$ .



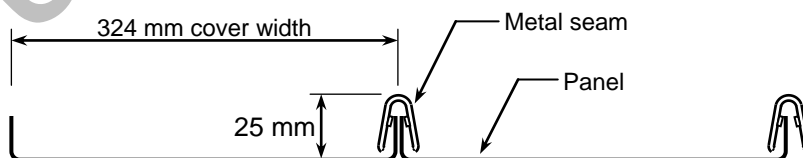
Profile designation: 1/405/65 Standing seam  
405 mm Pitch (cover width)

**Figure D.7 — 1/405/65 Standing seam with 405 mm cover width**



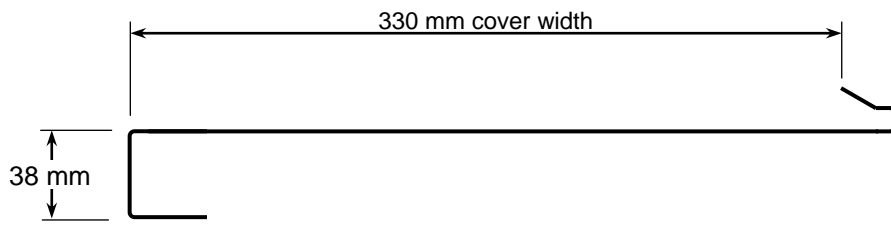
Profile designation: 1/405/44 Standing seam  
405 mm Pitch (cover width)

**Figure D.8 — 1/405/44 Standing seam with 405 mm cover width**



Profile designation: 1/324/25 Standing seam  
324 mm Pitch (cover width)

**Figure D.9 — 1/324/25 Standing seam profile: Two panels are shown seamed together**



Profile designation: 1/330/38 Standing seam  
330 mm Pitch (cover width)

Figure D.10 — 1/330/38 Standing seam profile

Public comment

## Annex E (informative)

### Recommendations for steel sheet properties

The minimum steel base thickness and the corresponding minimum coating mass per area that is recommended for wall siding, residential roofing and industrial applications are given in Table E.1.

**Table E.1 — Minimum steel base thickness and coating mass per area recommended for specific applications**

Application	Minimum steel base thickness mm	Minimum coating mass per area g/m <sup>2</sup>	
		Zinc	Aluminium-zinc alloy
Residential roofing	0.4 – If applied over roof decking 0.5 – If roof decking is not used	275	150
Industrial applications	0.60	275	150

NOTE 1 The above recommendations are based on profiled sheets that satisfy the minimum yield strength requirements of this standard. Profiled sheets of thinner thickness that possess higher yield strengths (such as 500 N/mm<sup>2</sup> and above) may be used instead. In such a case, advice should be sought from applicable building regulations.

NOTE 2 A heavier coating mass per area may be appropriate depending on environmental conditions, such as the proximity to coastal areas, saline sea spray and industrial emissions.

## Annex F (informative)

### Overlapping of sheets

#### F.1 General

This annex describes accepted methods for the overlapping of various types of profiled sheets. However, it is advised that manufacturer's installation instructions and applicable building regulations should be first consulted before applying any type of profiled sheet.

#### F.2 Corrugated profile

##### F.2.1 One pitch overlap

This overlap is illustrated in Figure F.1. It is achieved by turning over each alternate sheet so that its outside corrugation is turned up.

NOTE Sheets that have one of its outside corrugations turned up (such as sheets with 10½ and 12½ corrugations) may be used to achieve this type of overlap without turning over.

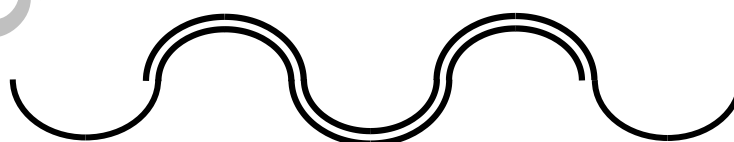


Corrugation Profile

Figure F.1 — One pitch overlap

##### F.2.2 One and a half pitch overlap

This overlap is illustrated in Figure F.2. It is laid with both edges turned downwards.



Corrugation Profile

Figure F.2 — One and a half pitch overlap

### F.3 Trapezoid profile

The overlap for trapezoid profiles is illustrated in Figure F.3.

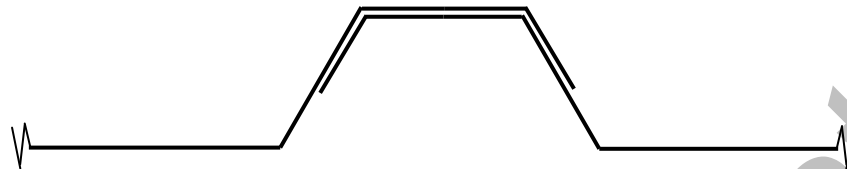


Figure F.3 — Trapezoid profile overlap

### F.4 Standing seam profile

Manufacturer's installation instructions should be followed for the proper application of this type of profiled sheet.

Public comment

## **Annex G** (informative)

### **Purchasing guidelines**

It is recommended that the purchaser gives the following information to the manufacturer at the time of ordering or enquiry:

- a) the number of this Trinidad and Tobago Standard;
- b) the number of profiles, pitch and depth of profile (i.e. the profile designation);
- c) the length;
- d) the steel base thickness;
- e) the minimum yield strength;
- f) the coating mass per area designation;
- g) whether or not a chemical passivation treatment is required;
- h) whether or not the purchaser requires to inspect the product at the manufacturer's works; and
- i) the packaging instructions, that is, bundle masses or the number of sheets per bundle.

The information should preferably be given in the sequence outlined above.

EXAMPLE TTS 69: 2005, 14/76/18 – Corrugated, 3.05 m length, 0.35 mm, 275 N/mm<sup>2</sup>, AZ 150, chemical passivation, no inspection at manufacturers' works, 1 t maximum bundle.

## Annex H (informative)

### Length per mass

Tables H.1 and H.2 illustrates the length per mass for zinc and aluminium-zinc alloy coated steel sheets of widths; 743 mm, 908 mm, 946 mm, 1070 mm and 1130 mm.

#### H.1 Zinc coated sheets – mass per length

**Table H.1 — Length per mass for zinc coated sheets**

Thickness	743 mm		908 mm		946 mm		1070 mm		1130 mm	
	kg/m	m/t	kg/m	m/t	kg/m	m/t	kg/m	m/t	kg/m	m/t
0.40	2.50	400	3.05	328	3.78	315	3.59	278	3.80	263
0.50	2.94	341	3.59	279	3.74	267	4.23	236	4.47	224
0.60	3.52	284	4.31	232	4.49	223	5.07	197	5.36	187
0.70	4.11	243	5.02	199	5.23	191	5.92	169	6.25	160
0.80	4.70	213	5.74	178	5.98	167	6.77	148	7.15	140
0.90	5.28	192	6.45	156	6.73	151	7.61	133	8.04	126
1.00	5.87	170	7.17	139	7.48	134	8.46	118	8.93	112
1.20	7.05	142	8.61	116	8.97	111	10.15	99	10.72	93

## H.2 Aluminum-zinc alloy coated sheets – mass per length

Table D.2 — Length per mass for aluminum-zinc alloy coated sheets

Thickness	743 mm		908 mm		946 mm		1070 mm		1130 mm	
	kg/m	m/t	kg/m	m/t	kg/m	m/t	kg/m	m/t	kg/m	m/t
0.40	2.18	459	2.66	376	2.78	360	3.14	318	3.31	302
0.50	2.76	362	3.37	297	3.52	284	3.98	251	4.20	238
0.60	3.38	299	4.09	244	4.25	235	4.82	207	5.09	196
0.70	3.93	254	4.80	208	5.01	200	5.66	177	5.98	167
0.80	4.51	222	5.52	181	5.75	174	6.50	154	6.86	146
0.90	5.10	196	6.23	161	6.49	154	7.34	136	7.75	129
1.00	5.68	176	6.94	144	7.23	138	8.18	122	8.74	116
1.20	6.74	148	8.37	119	8.72	115	9.86	101	10.41	96