

# Pioneer<sup>®</sup>

## PIONEER DECKING TECHNICAL DATA SHEET

VERSION A - 1.0 | 16/01/2023



Before installing, please ensure you have downloaded the latest version of this TDS by scanning this code.

[www.eva-last.com](http://www.eva-last.com)

A PRODUCT BY

**EVA-LAST<sup>®</sup>**  
INSPIRED BY NATURE, DESIGNED FOR LIFE.

## Contents

<b>Document guide</b> .....	<b>3</b>
<b>Material composition</b> .....	<b>5</b>
<b>Physical properties</b> .....	<b>6</b>
<b>Mechanical properties</b> .....	<b>7</b>
<b>Thermal properties</b> .....	<b>10</b>
<b>Fire reaction properties</b> .....	<b>10</b>
<b>Weathering</b> .....	<b>11</b>
<b>Appendix A - Profiles details</b> .....	<b>14</b>
<b>Appendix B - Chemical compatibility</b> .....	<b>19</b>

## Pioneer reinforce foamed mineral-PVC decking

Pioneer composite brings to market a photorealistic print technology which creates the most natural looking composite finish available in the Eva-Last range.

<b>Product name:</b>	Pioneer reinforced foamed mineral-PVC decking
<b>Product use:</b>	Primarily used in decking, fascia, and similar applications
<b>Material:</b>	Glass fiber reinforced mineral and PVC composite
<b>Material description:</b>	Co-extruded profiles with PMMA cap around a foamed mineral-polymer composite core

## Document guide

Eva-Last strives to evaluate their products in depth and present the technical and safety information available in a manner that assists with the application thereof. If additional data or information is required, please do not hesitate to contact us at [rad@eva-last.com](mailto:rad@eva-last.com).

In an attempt to simplify the information, similar data is loosely grouped into the categories summarised below. This document is ordered according to these categories and the applicable page number for the start of each section captured in the Table of contents above.

- Material composition
- Physical properties
- Mechanical properties
- Thermal properties
- Fire reaction properties
- Weathering properties
- Surface properties

The material compositions section captures a summary of the product make-up from the Material Safety Data Sheet (MSDS). A link to the MSDS is provided for additional detail. Summaries of chemical compliance data available are also collected in this section.

The physical properties section provides a summary of available profiles and general material properties such as density, water absorption, etc. Additional profile information can be obtained from drawings in the appropriate appendix. Where possible, material properties that can be assigned to more specific categories are moved to the relevant section.

The mechanical properties section captures data related to the product's reaction to various load conditions. The section is broadly assembled into the below categories. Additional profile and sectional information are captured by the drawings in the appropriate appendix.

- Material specific mechanical properties
- Profile specific mechanical properties
- Sectional properties

Product properties such as the expansion coefficient, thermal resistance, etc. are captured, where applicable, in the thermal properties section.

Information regarding the product's reaction to fire is captured in the fire reaction properties section.

Test data relating to the acoustic performance of the product is summarised in the acoustic properties section.

Information on the products resistance to mould, termites, etc. is collected in the biodegradation properties section.

The surface properties section summarises information regarding the finish or texture of the product. Test data on aspects such as slip resistance (where applicable) is captured in this section.

Where the products form part of a system and, as a result, utilise other components, an additional section to capture useful data regarding these components has been added to this document.

Where information is not yet available, has been omitted. In the cases where information can be substituted or supplemented with alternative data (based on similar compositions, etc.), an attempt to do so is made. Where this is the case, it is highlighted. Please make use of the data accordingly. For any additional information regarding this, please feel free to contact [rad@eva-last.com](mailto:rad@eva-last.com).

Ensure the product and application thereof is suitable, rational, and compliant with any applicable regulations or standards. Wherever necessary, consult a suitably qualified professional. For information about the installation and use of the product, please see the applicable Installation Guide (IG). For additional material safety and handling information, please refer to the applicable MSDS. For any further information, please contact [rad@eva-last.com](mailto:rad@eva-last.com).

**Please note this is an initial version of a new product and, as a result, limited test data is available. The information within this document is based on internal laboratory reports at various stages of product development and data from what are considered to be similar products. The information herein is for internal consumption only. For additional information please contact [rad@eva-last.com](mailto:rad@eva-last.com).**

## Material composition

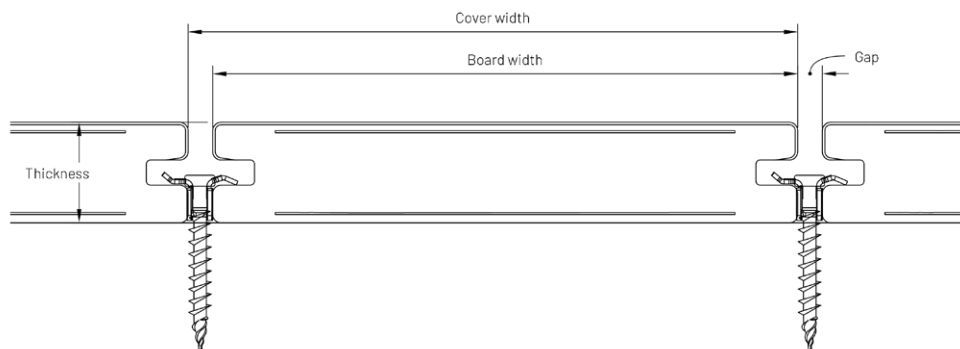
The following table is a simplified material composition for the Pioneer material technology. For more information regarding the composition, safety, and handling of the material, please see the Pioneer MSDS. Please also refer to the safety section and the Safe Working Procedure (SWP) in the IG (Installation Guide) for additional information related to the safe use of these products. To confirm which substances are compatible, or incompatible, with the product, please refer to **Appendix B**.

<b>Component</b>	<b>Substance</b>	<b>Mass (%)</b>
Core	Poly chloroethylene (PVC)	50%
	Calcium carbonate	30%
	Acrylonitrile-butyl acrylate-styrene copolymer	10%
	Glass fiber	1%
Additional additives	Other	9%
Cap	PMMA	

## Physical properties

### General material properties

Typical properties of the Apex Plus material technology are captured below as an indication of the expected behaviour of the Pioneer material.



Profile ID	Application type	Board width (mm)	Thickness (mm)	Mass per meter (kg/m)	Cover width <sup>(1)</sup> (mm)	Coverage <sup>(2)</sup> (m/m <sup>2</sup> )	Coverage mass <sup>(3)</sup> (kg/m <sup>2</sup> )
<b>STFM101A</b>	Deck board	145.0	21.0	2.2	151.0	6.7	14.1
<b>STFM102A</b>	Deck board	141.0	24.5	2.6	147.0	6.8	17.6
<b>STFM103A</b>	Deck board	141.0	24.5	2.5	147.0	6.8	16.6
<b>STFM106</b>	Fascia board	151.0	12.5	1.4	157.0	6.4	9.9

<sup>(1)</sup> Coverage width = Board width + an assumed typical gap of 6 mm.

<sup>(2)</sup> Coverage = 1000/Coverage width

<sup>(3)</sup> Coverage mass = Coverage x mass per meter.

## Mechanical properties

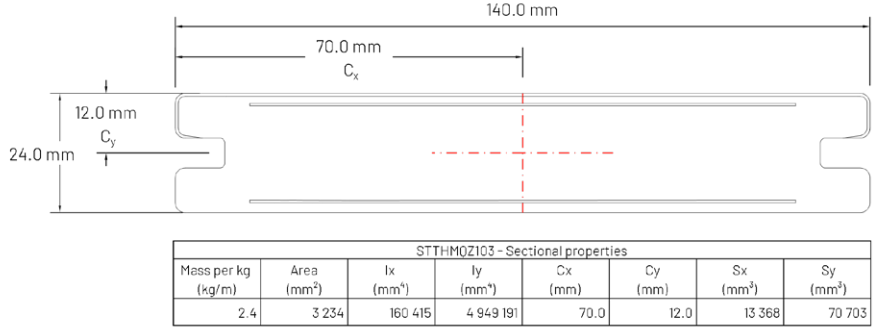
### Material specific mechanical properties

All information within this table is currently based on internal laboratory results of Pioneer version 1.0. Where results are supplemented with Apex Plus material technology data this is noted.

Property	Result	Requirement	Test method standard	Information	
<b>Surface to core bonding performance in low temperature conditions</b>	267 N	60 N	ISO 24345	Boards were cooled to -5°C and the bond strength tested at a speed of 100 mm per minute.	
<b>Surface to core bonding performance at ambient temperatures</b>	217 N	75 N	ISO 24345	Boards were tested at an ambient temperature of 23°C and the bond strength tested at a speed of 100 mm per minute.	
<b>Cap shrinkage rate under high temperatures</b>	Left	-0.75%	BS EN 15534-1	The board was heated at temperatures of 100°C for one hour. There were no obvious signs of cap shrinkage, and the length of the substrate was consistent with that of the film.	
	Centre	-0.064%			Less than 1.4%
	Right	-0.87%			
<b>Impact resistance</b>	Pass	No cracks found	BS EN 15534-1	A ball weighing 324g was dropped onto the board from a height of 1 750 mm at ambient temperatures.	
<b>Impact resistance at low temperatures</b>	Pass	No cracks found	GB/T 24508	The board were cooled at temperatures of -10°C for two hours. A hammer was dropped for a height of 1 000 mm. No cracks were found in the surface, nor any fractures in the substrate.	
<b>Scratch resistance</b>	4 N		FORD FLTM B0 162-01		
<b>Abrasion resistance</b>	Cap wear	5 000 cycles	3 500 cycles	EN 13329	The PMMA cap was subjected to a 0.5 kg rotating abrasive wheel moving at 60 rotations a minute. The cycles were counted until the approximately 0.55 mm layer was completely removed.
	Material loss	0.06g	Less than 0	ISO 7784-1	The PMMA cap was subjected to a rotating abrasive wheel at 100 cycles. The product of the abrasive interaction was then weighed.
<b>Modulus of Elasticity (MOE)</b>	2637 MPa		BS EN 15534-1	As the modulus of elasticity is a material property as well as a flexural property, the following information has been provided as a summary of the flexural performance tests below. MOE can be dependent on profile. This value is based on Apex Plus GFR results.	

### Profile flexural performance testing

Flexural properties of polymer composites can be influenced by the profile geometry and span. Typical properties of the Apex Plus material technology are captured below based on internal test results as an indication of the expected behaviour of the Pioneer material. The STTHMZQ103 profile is a 140 mm x 24 mm grooved board. The following sectional properties are provided for reference:



Profile	Span (mm)	Ultimate Load (kN)	Modulus of rupture MOR (MPa)	Modulus of elasticity MOE (MPa)	Test method	Information
STTHMZQ103 3 Point test	300	10.7	60.4	2 903.3	BS EN 15534-1	Internal reports have provided the flexural performance of STTHMZQ103 profiles at varying spans. Further testing is underway for Pioneer materials.
	400	8.5	63.6	2 629.5		
	500	7.4	69.5	2 702.6		
STTHMZQ103 4 Point test	300	17.2	64.6	2 670.1		
	400	12.8	63.9	2 569.0		
	500	8.6	53.7	2 342.3		

### Material weathering factor

Material properties can vary as a result of long-term weathering. To estimate this impact on the material's flexural properties, the product is subjected to various weathering effects and the performance with and without weathering is compared. The overall end-use adjustment factor is selected based on the weathering effect that has the most impact on the material.

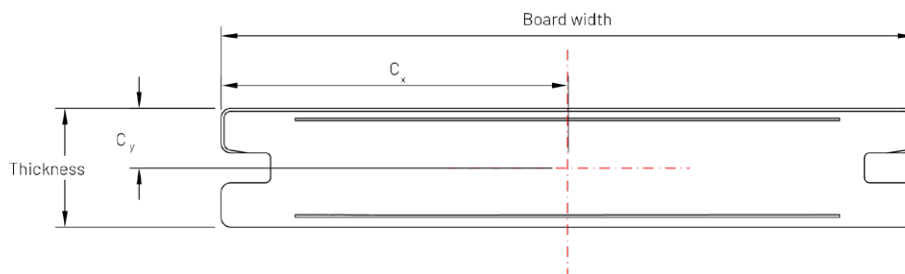
Typical properties of the Apex material technology are captured below as an indication of the expected behaviour of the Pioneer material. It is anticipated that the glass fiber reinforcing sheets of the Pioneer material technology would improve the performance of the high temperature effect results below.

Weathering effect	MOR (%)	MOE (%)	Adjustment factor	Test method	Information
High temperature effect	18%	24%	0.76	ASTM D7032 - 17, ASTM D2565, and ASTM D790	To confirm compliance with ICC-ES, AC 174, Apex materials were evaluated for a decking application to determine what affect temperature, moisture and UV exposure had on the flexural performance of the material in accordance with the test methods listed. The end use adjustment factor is based on the effect with the most impact. The results of which can be located within the issued CCR report, here.
Low temperature effect	-26%	-14%	1.00		
Moisture effect	-3%	4%	0.96		
UV effect	-6%	1%	1.00		
Freeze-thaw effect	1%	13%	0.97		
Overall end-use adjustment factor			0.76		



### Sectional properties

The following table provides a sectional property summary of the currently available Pioneer profiles in their typical board orientation. Please see Appendix A for profile drawings and further information.



Profile ID	Application	Profile details		Area (mm <sup>2</sup> )	Moments of inertia		Centroid		Elastic sectional modulus	
		Width (mm)	Thickness (mm)		$I_x$ (mm <sup>4</sup> )	$I_y$ (mm <sup>4</sup> )	$C_x$ (mm)	$C_y$ (mm)	$S_x$ (mm <sup>3</sup> )	$S_y$ (mm <sup>3</sup> )
<b>STFM101A</b>	Decking	144.9	21.0	2 843	101 499	4 615 773	72.4	10.2	9 936	63 713
<b>STFM102A</b>	Decking	141.1	24.5	3 447	171 787	5 663 635	70.6	12.4	13 878	80 277
<b>STFM103A</b>	Decking	141.1	24.5	3 264	159 826	5 061 233	70.0	12.0	13 293	72 303
<b>STFM106</b>	Fascia <sup>(1)</sup>	151.0	12.5	1 879	3 513 737	24 405	6.3	75.6	46 505	3 887

## Thermal properties

Typical properties of the Apex Plus material technology are captured below as an indication of the expected behaviour of the Pioneer material.

Properties	Results	Test method	Information
Coefficient of thermal expansion (CTE)	$35.0 \times 10^{-6}$ mm/mm.°C	ASTM D696-16	Results are based on Apex Plus materials.

## Fire reaction properties

Typical properties of Apex and Apex Plus material technologies are captured below as an indication of the expected behaviour of the Pioneer material.

Standard	Properties	Result	Requirement	Test Method	Information	
ICC-ES AC 174	Flame spread index (FSI)	35	Less than 200	ASTM E84	Test was conducted on Apex deck boards with a dual cap technology. The results of which can be located within the issued CCR report, here.	
	Smoke development index	1 300	Less than 450			
EN 13501	Class	$E_{fl}$	Less than 150 mm in 20 seconds	EN 9239 and ISO 11925	Test was conducted on Apex Plus STTHMZ0128 material in a decking application.	
	Smoke production	728% min	Less than 750% min			
	Flame spread (Fs)	10 min	500 mm			Less than 150 mm in 20 seconds
		20 min	660 mm			
	Critical heat flux	30 min	760 mm			Greater than 3.0 kW/m <sup>2</sup>
		1.8 kW/m <sup>2</sup>				
	Heat flux (HF)	10 min	3.8 kW/m <sup>2</sup>			Greater than 8.0 kW/m <sup>2</sup>
		20 min	2.4 kW/m <sup>2</sup>			
		30 min	1.8 kW/m <sup>2</sup>			
	Maximum light attenuation	92%				
Class	$E_{fl-s1}$					
Critical heat flux	11 kW/m <sup>2</sup>	Greater than 8.0 kW/m <sup>2</sup>				
Smoke production	254.0% min	Less than 750% min		Test was conducted on Apex material in a decking application. Profile STPVB103 was tested with a single cap layer. The report can be found here.		
Flame spread (Fs)	Yes	Less than 150 mm in 20 seconds				
Class	$B_{fl-s1}$					

## Weathering

The environment to which materials are exposed influences how quickly the material will weather (or deteriorate). This includes degradation factors like UV exposure, oxidation or contact with organisms within the environment such as termites or mould.

### Colour fade

Materials are susceptible to colour change over time due to weathering.  $\Delta E$  denotes the colour difference between an original sample and a tested sample after exposure to UV light.  $\Delta E$  is measured on a scale of 1 to 100 and provides a metric to understand how the human eye perceives colour change.

Standard	Hours	Colour	$\Delta E$	Test method	Information
ASTM	1 000	X20001 - GFN (Grey Fraxinus)	0.89	ASTM G154	The colour change would be perceptible at a glance
	2 000		1.89		
	3 000		2.53		
	4 000		3.21		
	1 000	W2002ECN-Y (Exotic canarywood)	0.93		The colour change would be perceptible at a glance
	2 000		1.95		
	3 000		2.67		
	4 000		3.39		

### Biodegradation

Materials exposed to organisms such as termites or mould can degrade as a result.

### Decay resistance

Mould resistance does not apply to products without significant cellulose materials within the composition.

### Termite resistance

Termite resistance does not apply to products without significant cellulose materials within the composition.

## Surface properties

### Slip resistance

Various test standards are available to estimate the slip resistance and grade the product accordingly. A common test method utilised by the industry is the pendulum test. There are primarily two slider types used. Slider 55 consists of a relatively softer rubber and is used to simulate bare foot interactions with the product. Slider 96 consists of a relatively harder rubber and is used to simulate shod/shoes interactions with the product. The results can be used to generate a slip resistance value (SRV) that can be utilised to estimate slip resistance classes based on existing correlations. The tables below provide a classification system according to **Appendix A** of AS 4586 and the internal test results of existing Pioneer surfaces at the time.

Class	Pendulum SRV	
	Slider 55 (barefoot)	Slider 96 (shod)
P5	>44	>54
P4	40 to 44	45 to 54
P3	35 to 39	35 to 44
P2	20 to 34	25 to 34
P1	<20	12 to 24
P0		<12

Finish	SRV	Class	Test method	Information
Matt texture	40	P4	CEN/TS 15676	Tests were conducted using slider 55 with wet conditions. It is assumed that these profiles will have better slip resistance when dry.
Matt B texture	55	P5		

## Disclaimer and copyright

### Document disclaimer

The provided information is offered in good faith as accurate but without guarantee. Eva-Last makes no warranties or representations of any kind (express or implied) about the accuracy, adequacy, currency, or completeness of the information, or that it is necessarily suitable for the intended use.

Compliance with this document does not guarantee immunity from breach of any statutory requirements, building codes or relevant standards. The final responsibility for the correct design and specification rests with the designer and, for its satisfactory execution, with the contractor. Appropriate warnings and safe handling procedures should be provided to handlers and users.

While most data have been compiled from research, case histories, experience and testing, small changes in the environment can produce marked differences in performance. The decision to use a material, and in what manner, is made at your own risk. The use of a material and method may therefore need to be modified to its intended end use and environment.

Eva-Last, its directors, officers or employees shall not be responsible for any direct, indirect, or special loss or damage arising from, or as a consequence of, use of, or reliance upon, any information contained in this document or other documents referenced herein. Eva-Last expressly disclaims any liability which is based on or arises out of the information or any errors, omissions or misstatements herein.

### Drawing disclaimer

All dimensions and specifications are offered in good faith as accurate but without guarantee. The information captured herein may not contain complete details. Eva-Last makes no warranties or representations of any kind (express or implied) about the accuracy, adequacy, currency, or completeness of the information, or that it is necessarily suitable for the intended use.

Compliance with this document does not guarantee immunity from breach of any statutory requirements, building codes or relevant standards. The final responsibility for the correct design and specification rests with the designer and, for its satisfactory execution, with the contractor.

### Utilisation disclaimer

Legislation may differ between jurisdictions. Before installing any Eva-Last product, ensure that the application is rational and complies with the local regulations and building codes. Wherever necessary, consult a suitably qualified professional. Be sure to comply with material manufacturer specifications. Where manufacturers and building codes differ, revert to the building code requirements. Check that your choice of product is suitable for its intended application. For further product specification and information visit [www.eva-last.com](http://www.eva-last.com).

### Copyright

If reprinted or reproduced or utilised in any form Eva-Last should be acknowledged as the source of the information.

Eva-Last periodically updates the information contained in this document as well as that of the Eva Last documents that have been referenced herein. Before using this document, please refer to the Eva-Last website ([www.eva-last.com](http://www.eva-last.com)) for the most up-to-date documents.

### Contact information

Eva-Last

Room 1203, 12/F Tower 333 Canton Road, Tsimshatsui, Hong Kong, China

**Emergency Contact:** +86 021 53397986

**Product information:** +27 10 593 9220

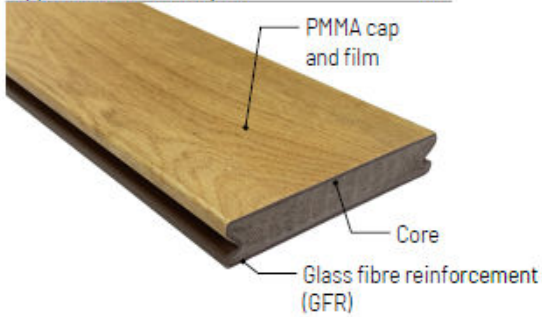
**Email:** [info@eva-last.com](mailto:info@eva-last.com)

**Website:** [www.eva-last.com](http://www.eva-last.com)

**Appendix A**  
Profiles details

### Profile properties

Product code	<b>STFM101A</b>
Sectional area (mm <sup>2</sup> )	2 843
Approximate mass (kg/m)	2.1



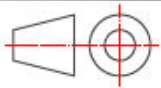
### Sectional properties

$I_x$ (mm <sup>4</sup> )	101 499
$I_y$ (mm <sup>4</sup> )	4 615 773
$C_x$ (mm)	72.4
$C_y$ (mm)	10.2
$S_x$ (mm <sup>3</sup> )	9 936
$S_y$ (mm <sup>3</sup> )	63 713

### Drawing title

STFM101A - Grooved deck board - Pioneer

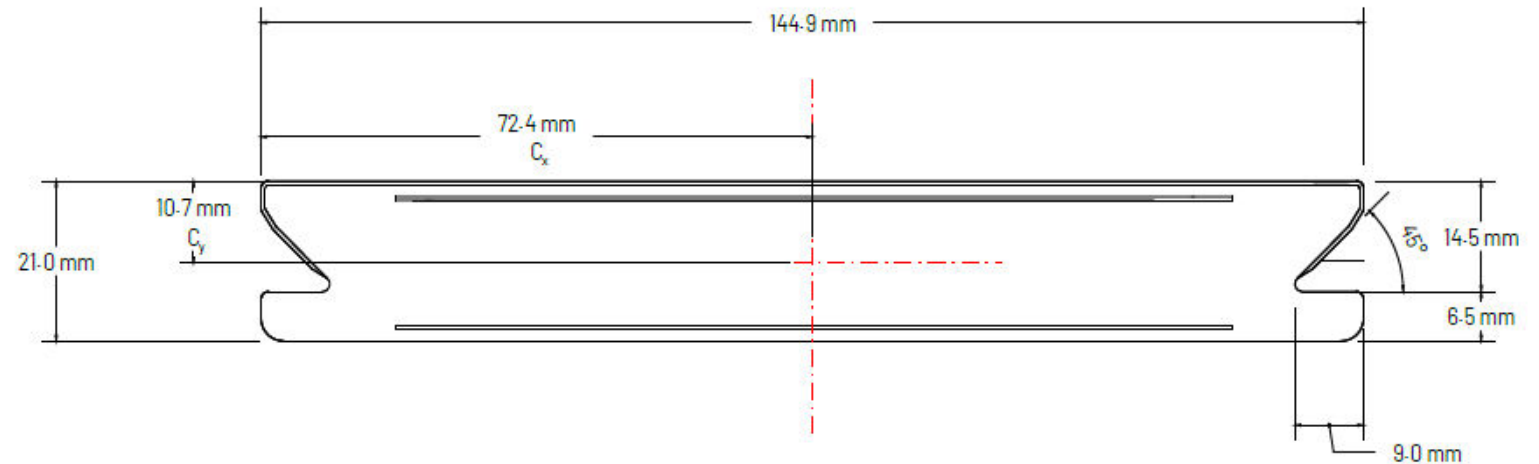
### File details



Drawing number	01
Date	January 20, 2023
Page	N/a
Scale	NTS

Unless otherwise specified all dimensions are in millimeters.

Issued for information. See supporting documentation for disclaimers and details.



# Pioneer®

### Profile properties

Product code	STFM102A
Sectional area (mm <sup>2</sup> )	3 447
Approximate mass (kg/m)	2.6

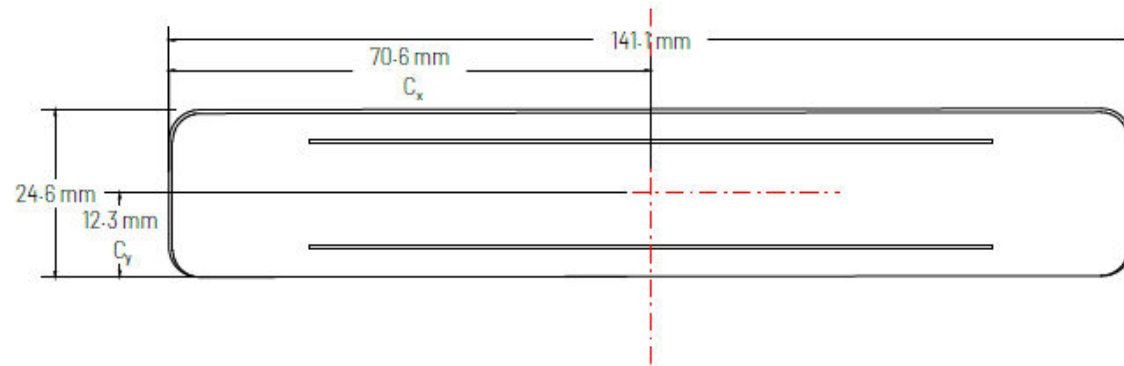


### Sectional properties

$I_x$ (mm <sup>4</sup> )	171 787
$I_y$ (mm <sup>4</sup> )	5 663 635
$C_x$ (mm)	70.6
$C_y$ (mm)	12.4
$S_x$ (mm <sup>3</sup> )	13 878
$S_y$ (mm <sup>3</sup> )	80 277

### Drawing title

STFM102A - Square edge deck board - Pioneer



### File details



Drawing number	01
Date	January 20, 2023
Page	N/a
Scale	NTS

Unless otherwise specified all dimensions are in millimeters.

Issued for information. See supporting documentation for disclaimers and details.

# Pioneer®



#### Profile properties

Product code	STFM103A
Sectional area (mm <sup>2</sup> )	3 264
Approximate mass (kg/m)	2.4



#### Sectional properties

$I_x$ (mm <sup>4</sup> )	159 826
$I_y$ (mm <sup>4</sup> )	5 061 233
$C_x$ (mm)	70.0
$C_y$ (mm)	12.0
$S_x$ (mm <sup>3</sup> )	13 293
$S_y$ (mm <sup>3</sup> )	72 303

#### Drawing title

STFM103A - Grooved deck board - Pioneer

#### File details

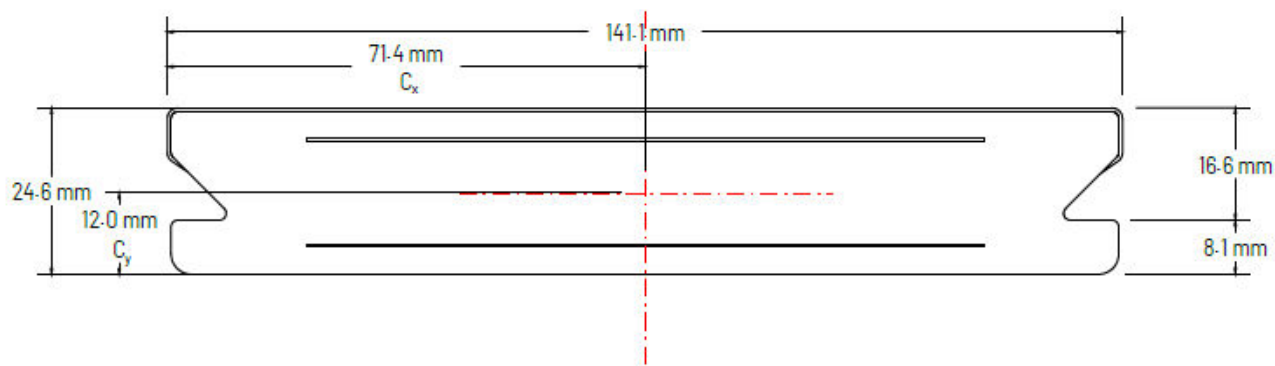


Drawing number	01
Date	January 20, 2023
Page	N/a
Scale	NTS

Unless otherwise specified all dimensions are in millimeters.

Issued for information - See supporting documentation for disclaimers and details.

# Pioneer®



#### Profile properties

Product code	<b>STFM106</b>
Sectional area (mm <sup>2</sup> )	1 879
Approximate mass (kg/m)	1.4



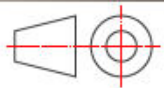
#### Sectional properties

$I_x$ (mm <sup>4</sup> )	3 513 737
$I_y$ (mm <sup>4</sup> )	24 405
$C_x$ (mm)	6.3
$C_y$ (mm)	75.6
$S_x$ (mm <sup>3</sup> )	46 505
$S_y$ (mm <sup>3</sup> )	3 887

#### Drawing title

STFM106 - Fascia board - Timber structure - Pioneer

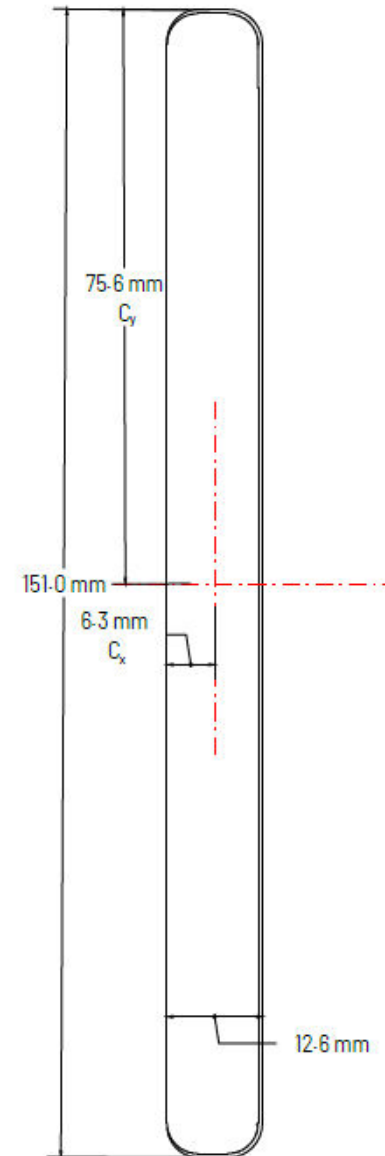
#### File details



Drawing number	01
Date	January 20, 2023
Page	N/a
Scale	NTS

Unless otherwise specified all dimensions are in millimeters.

Issued for information- See supporting documentation for disclaimers and details.



# Pioneer®

**Appendix B**  
Chemical compatibility

The following information provides a list of substances that may negatively impact the PMMA cap material of Pioneer. Below is an extensive (not complete) list of common substances and solutions known to influence the surface of PMMA cap of Pioneer. The table provided is referenced from the Industrial Specialties MFG. and IS med specialties (ISM) and provided for ease of reference.

It is important to check material compatibility when choosing chemicals that the product may encounter, as they may prematurely degrade the product, these may include ingredients in cleaning products, pool additives and even oils and saps from local vegetation.

Key to General Chemical Resistance - All data is based on ambient or room temperature conditions, about 18°C to 23°C.

A = Excellent - resistance to substances.

B = Good - minor effect, slight corrosion or discoloration.

C = Fair - moderate effect, not recommended.

D = Severe effect - not recommended for any use.

It is the sole responsibility of the system designer and user to select products suitable for their specific application requirements and to ensure proper installation, operation, and maintenance of these products. Material compatibility, product ratings and application details should be considered in the selection. (Hydrogen Peroxide Material Compatibility Chart - Industrial Spec) Improper selection or use of products described herein can cause personal injury or product damage.

#### Acetal (POM) Chemical Compatibility Chart

Version 28-Oct-2022

#### Acetal (POM) Chemical Compatibility Chart

Chemical	Effect
Acetaldehyde	A
Acetamide	A
Acetate Solvents	A
Acetic Acid	D
Acetic Acid, 20%	C
Acetic Acid, 80%	D
Acetic Acid, Glacial	D
Acetic Anhydride	D
Acetone	A
Acetyl Chloride, dry	D
Acetylene	A
Alcohols: Amyl	A
Alcohols: Benzyl	A
Alcohols: Butyl	A
Alcohols: Diacetone	A
Alcohols: Ethyl	A

Alcohols: Hexyl	A
Alcohols: Isobutyl	A
Alcohols: Isopropyl	A
Alcohols: Methyl	A
Alcohols: Octyl	A
Alcohols: Propyl (1-Propanol)	A
Aluminum chloride, 20%	C
Aluminum Fluoride	C
Aluminum Hydroxide	A
Aluminum Nitrate	B
Aluminum Potassium Sulfate, 10%	C
Aluminum Potassium Sulfate, 100%	C
Aluminum Sulfate, 10%	B
Alums	C
Amines	D
Ammonia, 10% (Ammonium Hydroxide)	C
Ammonia, 10%	D
Ammonia, anhydrous	D
Ammonia, liquid	D
Ammonia Nitrate	C
Ammonium Acetate	C
Ammonium Bifluoride	D
Ammonium Carbonate	D
Ammonium Caseinate	D
Ammonium Chloride, 10%	B
Ammonium Hydroxide	D
Ammonium Nitrate, 10%	A
Ammonium Oxalate	B
Ammonium Persulfate	D
Ammonium Phosphate, Dibasic	B
Ammonium Phosphate, Monobasic	B
Ammonium Phosphate, Tribasic	B
Ammonium Sulfate	B
Ammonium Sulfite	D
Ammonium Thiosulfate	B
Amyl Acetate	B
Amyl Alcohol	A
Amyl Chloride	A
Aniline	A
Aniline Oil	D
Anise Oil	D
Antifreeze	D
Aqua Regia (80% HCl, 20% HNO <sub>3</sub> )	D
Aromatic Hydrocarbons	A
Arsenic Acid	D

Asphalt	B	Carbon Bisulfide	A
Barium Carbonate	A	Carbon Dioxide, dry	A
Barium Chloride	A	Carbon Dioxide, wet	A
Barium Cyanide	B	Carbon Disulfide	A
Barium Hydroxide	D	Carbon Monoxide Gas	A
Barium Nitrate	B	Carbon Tetrachloride, wet	A
Barium Sulfate	B	Carbonated Water (carbonic acid)	A
Barium Sulfide	A	Carbonic Acid (carbonated water)	B
Bay Oil	D	Castor Oil	A
Beer	A	Catsup	B
Beet Sugar Liquids	B	Chloric Acid	D
Benzaldehyde	A	Chlorine, anhydrous liquid	A
Benzene	A	Chlorine Gas, dry 10%	D
Benzene Sulfonic Acid	C	Chlorine Water (5-10 ppm)	D
Benzoic Acid	B	Chloroacetic Acid	D
Benzol	A	Chlorobenzene (mono)	D
Benzyl Chloride	A	Chlorobromomethane	B
Bone Oil	D	Chloroform	A
Borax (Sodium Borate)	B	Chlorosulfonic Acid	D
Boric Acid, 10%	A	Chocolate Syrup	A
Brewery Slop	B	Chromic Acid, 5%	D
Bromine Gas	D	Chromic Acid, 10%	D
Butadiene	A	Chromic Acid, 30%	D
Butane Gas	A	Chromic Acid, 50%	D
Butanol (Butyl Alcohol)	A	Cider	A
Butter	A	Cinnamon Oil	D
Buttermilk	A	Citric Acid, aqueous 10%	B
Butylene	A	Citric Oils	D
Butyl Acetate	A	Citrus Oil or Terpene (d-Limonene)	D
Butyl Amine	C	Clorox® Bleach	D
Butyl Ether	D	Coconut Oil	A
Butyric Acid, 20%	A	Coffee	A
Calcium Bisulfide	D	Copper Chloride	A
Calcium Bisulfite	D	Copper cyanide	A
Calcium Carbonate (Chalk) CaCO <sub>3</sub>	A	Copper Fluoroborate	B
Calcium Chlorate	A	Copper Nitrate	A
Calcium Chloride, 10%	D	Copper Sulfate, 5%	D
Calcium Hydroxide (Lye), 10%	D	Copper Sulfate, over 5%	D
Calcium Hypochlorite	D	Cream	A
Calcium Nitrate	D	Creosote Oil	D
Calcium Oxide (Unslaked Lime) CaO	A	Cresols	D
Calcium Sulfate, 10%	D	Cresylic Acid	D
Calgon	A	Cyanic Acid	D
Cane Juice	A	Cyclohexane	A
Carbolic Acid (Phenol)	D	Cyclohexanone	A

Detergents	A
Diacetone Alcohol	A
Dichlorobenzene	B
Dichloroethane	A
Diesel Fuel	A
Diethyl Ether	A
Diethylamine	B
Diethylene Glycol	A
Dimethyl Aniline	D
Dimethylformamide	D
Diphenyl Oxide	D
Dyes	C
Epsom Salts (magnesium sulfate)	B
Ethane	A
Ethanol (ethyl alcohol)	A
Ethanolamine	D
Ether	A
Ethyl Acetate	A
Ethyl Benzoate	A
Ethyl Chloride	A
Ethyl Ether	A
Ethylene Chloride	A
Ethylene Chlorohydrin	D
Ethyl Diamine	D
Ethylene Dichloride	B
Ethylene Glycol	B
Ethylene Oxide Gas (EtO), dry 3%	D
Fatty Acids	A
Ferric Chloride, 10%	D
Ferric Nitrate	D
Ferric Sulfate	D
Ferrous Chloride	D
Ferrous Sulfate	D
Fluobric Acid	A
Fluorine Gas	D
Fluosilicic Acid, 20%	B
Fluosilicic Acid, 100%	A
Formaldehyde, 40%	A
Formaldehyde, 100%	A
Formic Acid (methanoic acid), 10%	A
Freon 11	D
Freon 12	B
Freon 22	A
Freon TF	A
Fruit Juices	D

Fuel Oils	A
Furan Resin	D
Furfural (ant oil) C <sub>5</sub> H <sub>4</sub> O <sub>2</sub>	A
Gasoline, high aromatic	B
Gasoline, leaded	A
Gasoline, unleaded	A
Gelatin	B
Ginger Oil	A
Glucose	A
Glue, PVA (polyvinyl acetate)	A
Glycerin	A
Glycolic Acid	A
Gold Monocyanide	A
Grape Juice	A
Grease	D
Heptane	A
Hexane	A
Hexyl Alcohol	A
Honey	A
Hydraulic Oil, petroleum based	B
Hydraulic Oil, synthetic	B
Hydrazine (Diamine) H <sub>2</sub> NNH <sub>2</sub>	B
Hydrobromic Acid, 20%	C
Hydrobromic Acid, 100%	D
Hydrochloric Acid, 20%	C
Hydrochloric Acid, 37%	C
Hydrochloric Acid, 100%	C
Hydrocyanic Acid	A
Hydrocyanic Acid Gas, 10%	C
Hydrofluoric Acid, 20%	D
Hydrofluoric Acid, 50%	D
Hydrofluoric Acid, 75%	D
Hydrofluoric Acid, 100%	D
Hydrofluosilicic Acid, 20%	B
Hydrofluosilicic Acid, 100%	A
Hydrogen Peroxide, 10%	D
Hydrogen Peroxide, 30%	D
Hydrogen Peroxide, 50%	D
Hydrogen Peroxide, 100%	D
Hydrogen Sulfide, aqueous	C
Hydrogen Sulfide, dry	A
Hydroquinone	A
Hydroxyacetic Acid, 70%	A
Ink	B
Iodine	D

Iodine, in alcohol	D
Isopropyl Acetate	D
Isopropyl Ether	D
Jet Fuel (JP3, JP4, JP5)	A
Kerosene	A
Ketones	D
Lacquer Thinners	D
Lacquers	D
Lactic Acid	B
Lard	A
Latex	B
Lead Acetate	B
Lead Sulfamate	A
Lemon Oil	D
Ligroin	B
Lime (CaO)	B
Linoleic Acid	B
Linseed Oil	A
Lithium Chloride	A
Lubricants	A
Lye (Ca (OH)2, calcium hydroxide)	D
Lye (KOH, potassium hydroxide)	A
Lye (NaOH, sodium hydroxide)	C
Magnesium Carbonate	A
Magnesium Chloride, 10%	B
Magnesium Hydroxide, 10%	A
Magnesium Nitrate	A
Magnesium Oxide	A
Magnesium Sulfate (Epsom salts)	B
Maleic Acid	A
Maleic Anhydride	D
Malic Acid (Apple Acid) C <sub>4</sub> H <sub>6</sub> O <sub>5</sub>	A
Manganese Sulfate	A
Mash	A
Mayonnaise	A
Melamine	A
Mercuric chloride, dilute	B
Mercury	A
Methane Gas	A
Methanol (methyl alcohol)	A
Methyl Acetate	B
Methyl Acetone (mixture)	D
Methyl Acrylate	B
Methyl Alcohol, 10%	A
Methyl Bromide	D

Methyl Butyl Ketone	D
Methyl Cellosolve	D
Methyl Chloride	B
Methyl Dichloride	D
Methyl Ethyl Ketone (MEK, Butanone)	C
Methyl Ethyl Ketone Peroxide (MEKP)	D
Methyl Isobutyl Ketone	D
Methyl Isopropyl Ketone	A
Methyl Methacrylate	D
Methylamine	D
Methylene Chloride	B
Milk	A
Mineral Spirits	A
Molasses	A
Monochloroacetic Acid	D
Monoethanol Amine	D
Motor Oil	B
Mustard	C
Naphtha	A
Naphthalene	A
Natural Gas	B
Nickel Chloride	A
Nickel Sulfate	A
Nitrating Acid (H2SO4), over 15%	D
Nitric Acid, 5-10%	D
Nitric Acid, 20%	D
Nitric Acid, 50%	D
Nitric Acid, concentrated	D
Nitrobenzene	C
Nitromethane	A
Octyl Alcohol	A
Oils: Aniline	D
Oils: Anise	D
Oils: Bay	D
Oils: Bone	D
Oils: Castor	A
Oils: Cinnamon	D
Oils: Citric	A
Oils: Coconut	A
Oils: Cod Liver	B
Oils: Corn	A
Oils: Cottonseed	A
Oils: Creosote	D
Oils: Diesel Fuel (20, 30, 40, 50)	D
Oils: Fuel (1, 2, 3, 5A, 5B, 6)	D

Oils: Ginger	A	Phthalic Acid	C
Oils: Hydraulic Oil, petroleum	B	Phthalic Anhydride	C
Oils: Hydraulic Oil, synthetic	B	Picric Acid	A
Oils: Lemon	D	Pine Oil	A
Oils: Linseed	A	Potash (potassium carbonate)	
Oils: Mineral	A	Potassium Bicarbonate	C
Oils: Olive	A	Potassium Bromide	A
Oils: Orange	D	Potassium Chlorate	B
Oils: Palm	A	Potassium Chloride, up to 30%	A
Oils: Peanut	A	Potassium Chloride	A
Oils: Peppermint	D	Potassium Chromate	C
Oils: Pine	A	Potassium Cyanide Solutions	C
Oils: Rapeseed	A	Potassium Dichromate	A
Oils: Sesame Seed	D	Potassium Ferrocyanide	B
Oils: Silicone	A	Potassium Hydroxide (caustic potash)	A
Oils: Soybean	A	Potassium Nitrate, 10%	A
Oils: Tanning	D	Potassium Nitrite	A
Oils: Transformer	A	Potassium Permanganate	A
Oils: Turbine	A	Potassium Sulfate	B
Oleic Acid	A	Propane, liquefied	A
Oleum, 25%	D	Propylene (propene, methyl ethylene)	A
Oleum, 100%	D	Propylene Glycol	B
Olive Oil	A	Pyridine (C <sub>5</sub> H <sub>5</sub> N)	B
Orange Oil	D	Pyrogallic Acid	D
Oxalic Acid, cold 10%	B	Rapeseed Oil	A
Ozone Gas	C	Rosins	B
Palm Oil	A	Rum	A
Palmitic Acid	A	Rust Inhibitors	A
Paraffin	A	Salad Dressings	A
Peanut Oil	A	Salicylic Acid	D
Pentane (amyl hydride) C <sub>5</sub> H <sub>12</sub>	B	Salt Brine (NaCl saturated)	A
Peppermint Oil	D	Sea Water	A
Peracetic Acid (Peroxyacetic Acid)	D	Sesame Seed Oil	D
Perchloric Acid	C	Shellac, bleached	A
Peroxyacetic Acid (Peracetic Acid)	D	Shellac, orange	A
Petroleum	B	Silicone	A
Phenol, 10%	B	Silver Bromide	C
Phenol (Carbolic Acid)	D	Silver Nitrate	A
Phosphoric Acid, >40%	D	Soap Solutions	A
Phosphoric Acid, crude	D	Soda Ash (sodium carbonate)	A
Phosphoric Acid, S40%	D	Sodium Acetate	B
Phosphoric Acid Anhydride	D	Sodium Aluminate	B
Phosphorus	B	Sodium Bicarbonate (Baking Soda)	A
Photographic Developer	D	Sodium Bisulfate, 10%	B
Photographic Solutions	D	Sodium Bisulfite	C



Sodium Bromide	A
Sodium Carbonate	A
Sodium Chlorate	A
Sodium Chloride	A
Sodium Cyanide	A
Sodium Ferrocyanide	A
Sodium Hydroxide, 20%	A
Sodium Hydroxide, 50%	A
Sodium Hydroxide, 80%	D
Sodium Hypochlorite, <20%	D
Sodium Hypochlorite, 100%	D
Sodium Metaphosphate	B
Sodium Metasilicate	D
Sodium Nitrate	A
Sodium Perborate	B
Sodium Peroxide	D
Sodium Polyphosphate	B
Sodium Silicate (water glass)	C
Sodium Sulfate (salt cake, thenardite)	B
Sodium Sulfide	B
Sodium Sulfite	A
Sodium Thiosulfate (hypo)	C
Sorghum	A
Soy Sauce	A
Stannic Chloride	C
Stannic Fluoborate	C
Starch	A
Stearic Acid	A
Stoddard's Solvent	A
Styrene (Vinylbenzene) $C_6H_5CHCH_2$	A
Sugar Liquids	A
Sulfite Liquors	D
Sulfur Chloride	D
Sulfur Dioxide	B
Sulfur Dioxide Gas, dry	B
Sulfur Dioxide Gas, wet	B
Sulfur Trioxide, dry	D
Sulfuric Acid, <10%	D
Sulfuric Acid, 10-75%	D
Sulfuric Acid, 75-100%	D
Sulfuric Acid, cold concentrated	D
Sulfurous Acid, 10%	C
Sulfuryl Chloride	A
Tallow	A
Tannic Acid, 10%	B

Tanning Liquors	B
Tanning Oil	D
Tetrachloroethane	A
Tetrachloroethylene	A
Tetrahydrofuran	A
Toluene (Toluol)	C
Tomato Juice	B
Transformer Oil	A
Trichloroethane	A
Trichloroethylene	D
Trichloropropane	A
Tricresyl Phosphate	C
Triethylamine	D
Trisodium Phosphate	A
Turpentine (C0H16)	A
Urea	A
Urine	A
Varnish	A
Vegetable Juice	A
Vinegar	B
Water, acid mine	A
Water, distilled (deionized)	A
Water, distilled	B
Water, fresh	A
Water, salt	A
Weed Killers	A
Whey	A
Whiskey and Wines	A
White Liquor (Pulp Mill)	D
White Water (Paper Mill)	B
Xylene (xylol, dimethylbenzene)	A
Zinc Chloride, 10%	C
Zinc Hydrosulfite	C
Zinc Sulfate, 10%	C