

Pioneer

TECHNICAL DATA SHEET

VERSION A4.1 | 2025/01/24



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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.

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

Document layout

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.

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.

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.

1.0 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**.

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

1.1 Material compliance

Apex has been assessed to determine whether it contains Substances of Very High Concern (SVHC) that may be classified as carcinogenic, mutagenic, or toxic to reproduction of humans or animals, or have a persistent, cumulative, or negative impact on the environment in accordance with European REACH (Registration, evaluation, and authorization of chemicals) regulations.

Compliance report	Result	Issue date	Compliance body	Information
SVHC	Pass	2023-02	EU REACH	Of the 233 substances evaluated, non-have been detected. SVHC concentration require detection levels of less than 0.05% of the whole product. BPA was detected at 2ppm, the limit for the EU been 1ppm. See this link for the full list of substances.

2.0 Physical properties

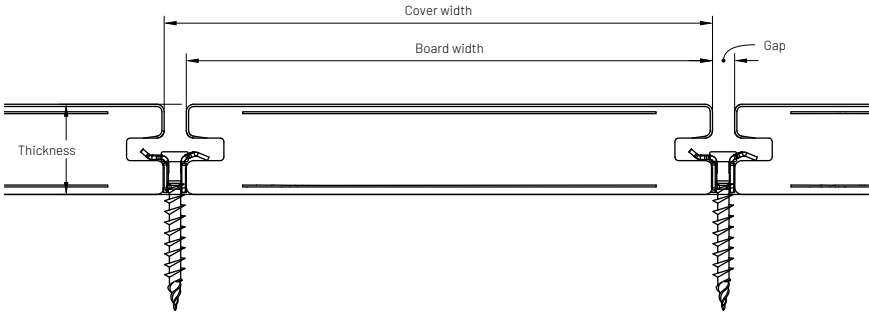
2.1 General material properties

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

Properties	Results	Test Method	Information
Density	650 to 760 kg/m ³ (40.58 to 47.45 lb/ft ³)	ASTM D2395	Results are based on Apex Plus materials per internal testing.

2.2 Profile properties

The following table is a summary of the currently available profiles, please see **Appendix A** for profile drawings.



Profile ID	Application type	Board width (mm)(in)	Thickness (mm)(in)	Mass per meter (kg/m)(lb/ft)	Cover width ⁽¹⁾ (mm)(in)	Coverage ⁽²⁾ (m/m²)(ft/ft²)	Coverage mass ⁽³⁾ (kg/m²)(lb/ft²)
STFM101A	Deck board	145.0 (5.71)	21.0 (0.83)	2.2 (1.48)	151.0 (5.95)	6.7 (2.04)	14.1 (2.89)
STFM102A	Deck board	141.0 (5.55)	24.5 (0.97)	2.6 (1.75)	147.0 (5.79)	6.8 (2.07)	17.6 (3.61)
STFM103A	Deck board	141.0 (5.55)	24.5 (0.97)	2.5 (1.68)	147.0 (5.79)	6.8 (2.07)	16.6 (3.40)
STFM104A	Deck board	145.0 (5.71)	21.3 (0.84)	2.3 (1.55)	151.0 (5.95)	6.6 (2.02)	15.5 (3.18)
STFM112A	Deck board	170.0 (6.69)	21.0 (0.83)	2.8 (1.88)	176.0 (6.93)	5.7 (1.77)	15.9 (3.26)
STFM113A	Deck board	170 (6.69)	21.3 (0.84)	2.8 (1.88)	176.0 (6.93)	5.7 (1.77)	15.9 (3.26)
STFM105A	Deck board	190.0 (7.49)	21.0 (0.83)	3.1 (2.09)	196.0 (7.72)	5.1 (1.56)	15.8 (3.24)
STFM107A	Deck board	190.0 (7.49)	21.0 (0.83)	3.1 (2.09)	196.0 (7.72)	5.1 (1.56)	15.8 (3.24)
STFM106	Fascia board	151.0 (5.95)	12.5 (0.49)	1.4 (0.94)	157.0 (6.18)	6.4 (1.95)	9.9 (2.03)

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

⁽²⁾ Coverage = 1000/Coverage width

⁽³⁾ Coverage = Coverage x mass per meter.

3.0 Mechanical properties

3.1 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. Internal reports can be found here.

Property	Result		Requirement	Test method standard	Information
Surface to core bonding performance in low temperature conditions	267 N (60.03 lbf)		60 N (13.49 lbf)	ISO 24345	Boards were cooled to -5°C and the bond strength tested at a speed of 100 mm per minute.
Surface to core bonding performance at ambient temperatures	217 N (48.79 lbf)		75 N (16.86 lbf)	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.
Cap shrinkage rate under high temperatures	Left	-0.75%	Less than 1.4%	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%			
	Right	-0.87%			
Impact resistance	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.
Impact resistance at low temperatures	Pass		No cracks found	GB/T 24508	The board were cooled at temperatures of -10 °C (14°F) for two hours. A hammer was dropped for a height of 1 000 mm (3') . No cracks were found in the surface, nor any fractures in the substrate.
Scratch resistance	15 N (3.37 lbf)			FORD FLTM BO 162-01	
Abrasion resistance	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 (0.002 oz)	Less than 0.1	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.
Modulus of Elasticity (MOE)	2637 MPa (382 365 lbf/in ²)			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.

3.2 Profile flexural performance testing

Flexural properties of polymer composites can be influenced by the profile geometry and span. Typical properties of the Infinity material technology are captured below based on internal test results. See appendix A for profile details.

Profile	Application	Span (L) (mm)(in)	Load at Rupture (kN)(lbf)	Flexural strength MOR (MPa)(lbf/in ²)	Flexural stiffness MOE (MPa)(lbf/in ²)	Load at L /180 (kN)(lbf)	Strength at L/180 (MPa)(lbf/in ²)	Test Method	Notes
STFM101A	Deck board	572 (22.5)	5.75 (1 294)	52.8 (7 658)	3035 (440 190)	0.404 (90.8)	3.7 (537)	ASTM D6109- 19	Pre-liminary report for STFM101A can be found here.

3.3 Stair tread performance and concentrated loads

The following profiles were tested in a stair tread application. The application requires that the profiles be tested against point loads over a specified span.

Profile	Deflection limitation load N (lbf)	Deflection at limitation load (mm)(in)	Ultimate load N (lbf)	Span mm (in)	Test method	Notes
STFM101A	1 335 N (300 lbf)	2.4 (0.1)	7.4 (1 657)	305 (12)	ASTM D7032-21, 5.3.2	STFM101A Profiles were tested in order to confirm compliance with ICC-ES, AC 174, flexural properties in a stair tread application. See the Preliminary CCR report, here .
		5.3 (0.2)	6.2 (1 392)	406 (16)		
		15.1 (0.6)	4.2 (934)	572 (22.5)		

3.4 Impact of weathering (material factor estimate)

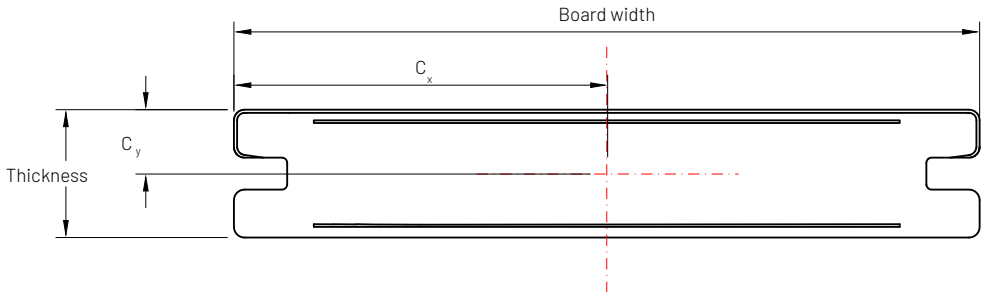
Material properties can vary as a result of long-term weathering. To estimate this impact on the material's flexural properties, the product is subjected to various weathering effects and the performance with and without weathering is compared. The overall end-use adjustment factor is selected based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

Properties	Flexural strength (%)	Flexural stiffness (%)	Adjustment factor	Test method	Information
High temperature effect	-14%	-15%	0.85	ASTM D7032 - 4	To confirm compliance with ICC-ES, AC 174, Pioneer 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 pre-liminary CCR report, here .
Low temperature effect	21%	20%			
Moisture effect	2%	1%			
UV resistance	1%	1%	1.0		
Freeze-thaw resistance	0%	1%	1.0		
Overall end-Use adjustment factor			0.85		

Note - Negative results indicate a reduction in strength

3.5 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 details				Moments of inertia		Centroid		Elastic sectional modulus		
Profile ID	Application	Width (mm)(in)	Thickness (mm)(in)	Area (mm ²)(in ²)	I _x (mm ⁴)(in ⁴)	I _y (mm ⁴)(in ⁴)	C _x (mm)(in)	C _y (mm)(in)	S _x (mm ³)(in ³)	S _y (mm ³)(in ³)
STFM101A	Decking	144.9 (5.70)	21.0 (0.83)	2 843 (4.41)	101 499 (0.24)	4 615 773 (11.09)	72.4 (2.85)	10.2 (0.40)	9 936 (0.61)	63 713 (3.89)
STFM102A	Decking	141.1 (5.56)	24.5 (0.97)	3 447 (5.34)	171 787 (0.41)	5 663 635 (13.61)	70.6 (2.78)	12.4 (0.49)	13 878 (0.85)	80 277 (4.90)
STFM103A	Decking	141.1 (5.56)	24.5 (0.97)	3 264 (5.06)	159 826 (0.38)	5 061 233 (12.16)	70.0 (2.76)	12.0 (0.47)	13 293 (0.81)	72 303 (4.41)
STFM104A	Decking	145 (5.71)	21.3 (0.83)	3 885 (6.02)	145 270 (0.35)	11 116 873 (26.71)	95.0 (3.74)	10.5 (0.41)	13 813 (0.84)	117 019 (7.14)
STFM112A	Decking	170.0 (6.69)	21.0 (0.83)	3 465 (5.37)	129 839 (0.31)	7 894 711 (18.97)	85.0 (3.35)	10.5 (0.41)	12 343 (0.75)	92 835 (5.67)
STFM113A	Decking	170.0 (6.96)	21.3 (0.83)	3 564 (5.53)	135 804 (0.33)	8 336 050 (20.03)	86.1 (3.39)	10.6 (0.42)	12 738 (0.77)	96 806 (5.91)
STFM105A	Decking	190 (7.48)	21.0 (0.82)	2 930 (4.54)	106 068 (0.26)	4 881 116 (11.73)	73.4 (2.89)	10.4 (0.41)	10 212 (0.62)	66 476 (4.06)
STFM107A	Decking	190.0 (7.48)	21.0 (0.82)	3 934 (6.09)	145 570 (0.35)	11 519 988 (27.68)	96.1 (3.78)	10.5 (0.41)	13 853 (0.85)	119 838 (7.31)
STFM106	Fascia*	151.0 (5.95)	12.5 (0.49)	1 879 (2.91)	3 513 737 (8.44)	24 405 (0.06)	6.3 (0.25)	75.6 (2.98)	46 505 (2.84)	3 887 (0.24)

*Details provided in orientation of application

4.0 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)	33.4 x 10-6 mm/mm. °C 18.5 x 10-6 inch/inch/. °F	EN 15534-1:2014 ISO 11359-2:2021	Results are based on Apex plus materials external results .

5.0 Fire reaction properties

Typical properties of Pioneer are captured below.

Standard	Properties	Result	Requirement	Test Method	Information
ICC-ES AC 174	Flame spread index (FSI)	100	Less than 200	AC 174 Section 3.10 ASTM D703 ASTM E84	Test was conducted on Pioneer deck boards. The results of which can be located within the issued CCR report, here .
	Smoke development index	1 200	Less than 450		

6.0 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 mold.

6.1 Colour fade

Materials are susceptible to colour change over time due to weathering. ΔE denotes the colour difference between an original sample and a tested sample after exposure to UV light. ΔE is measured on a scale of 1 to 100 and provides a metric to understand how the human eye perceives colour change. Internal test results can be found [here](#).

Standard	Hours	Colour	ΔE	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 canary wood)	0.93		The Colour change would be perceptible at a glance
	2 000		1.95		
	3 000		2.67		
	4 000		3.39		

6.2 Biodegradation

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

6.2.1 Decay resistance

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

6.2.2 Termite resistance

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

7.0 Surface properties

7.1 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
Standard capping *	16	P1	AS 4586:2013	Tests were conducted using slider 55 with wet conditions. It is assumed that these profiles will have better slip resistance when dry. Test results can be found here for Matt B texture and here for Standard texture.
Matt B texture	42	P4		

*Superseded by Matt B texture.

8.0 Disclaimer and copyright

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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.

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Contact information

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Appendix A

Profiles details

Profile properties	
Product code	STFM101A
Sectional area (mm²)	2 843
Approximate mass (kg/m)	2.1

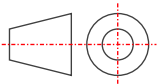


Sectional properties in typical orientation	
I _x (mm ⁴)	101 499
I _y (mm ⁴)	4 615 773
C _x (mm)	72.4
C _y (mm)	10.2
S _x (mm ³)	9 936
S _y (mm ³)	63 713

Drawing title	
STFM101A - Grooved deck board - Pioneer	

File name	
2023-11-17 - Pioneer - TDS - Version 5.0	

File details	
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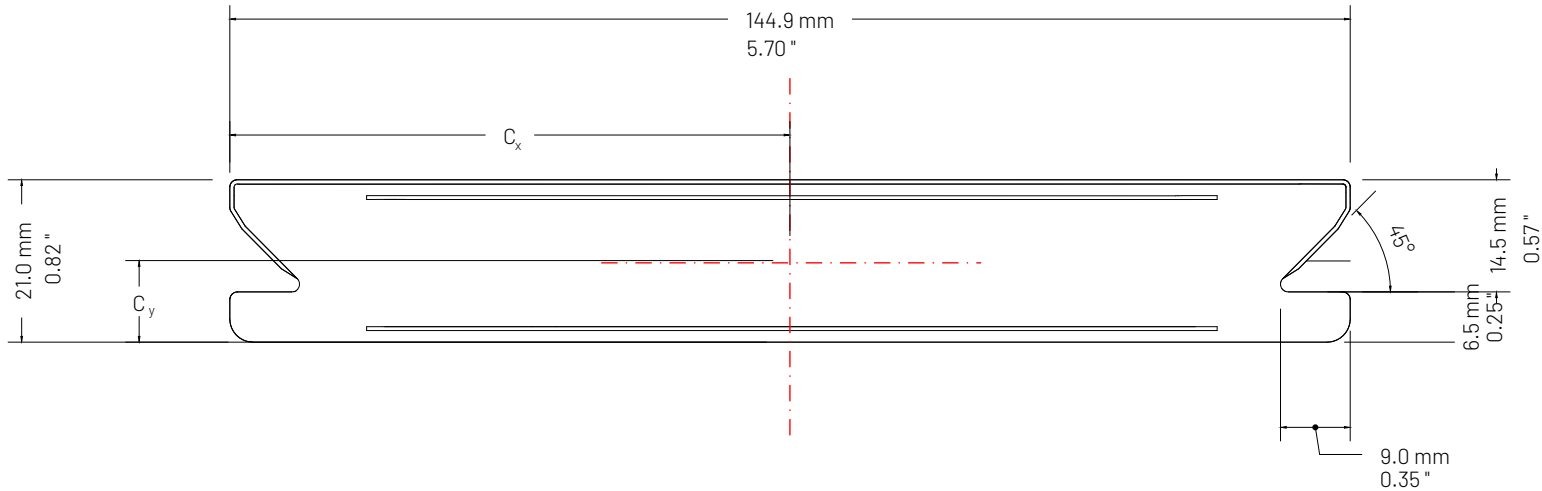


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Scale	NTS

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Profile properties	
Product code	STFM102A
Sectional area (mm²)	3 447
Approximate mass (kg/m)	2.6

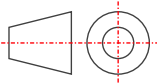


Sectional properties in typical orientation	
I _x (mm ⁴)	171 787
I _y (mm ⁴)	5 663 635
C _x (mm)	70.6
C _y (mm)	12.4
S _x (mm³)	13 878
S _y (mm³)	80 277

Drawing title	
STFM102A - Square edge deck board - Pioneer	

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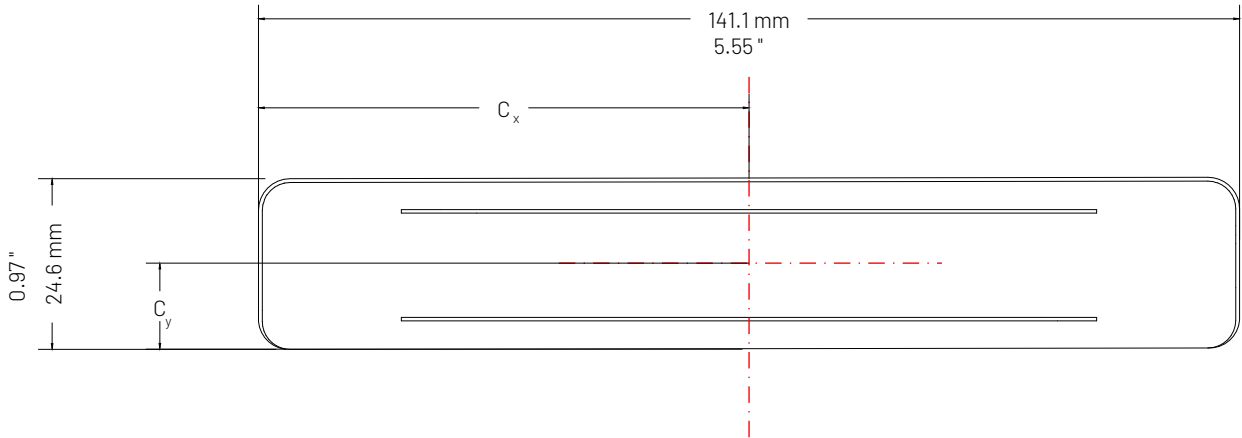


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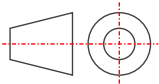


Profile properties	
Product code	STFM103A
Sectional area (mm ²)	3 264
Approximate mass (kg/m)	2.4



Sectional properties in typical orientation	
I _x (mm ⁴)	159 826
I _y (mm ⁴)	5 061 233
C _x (mm)	70.0
C _y (mm)	12.0
S _x (mm ³)	13 293
S _y (mm ³)	72 303
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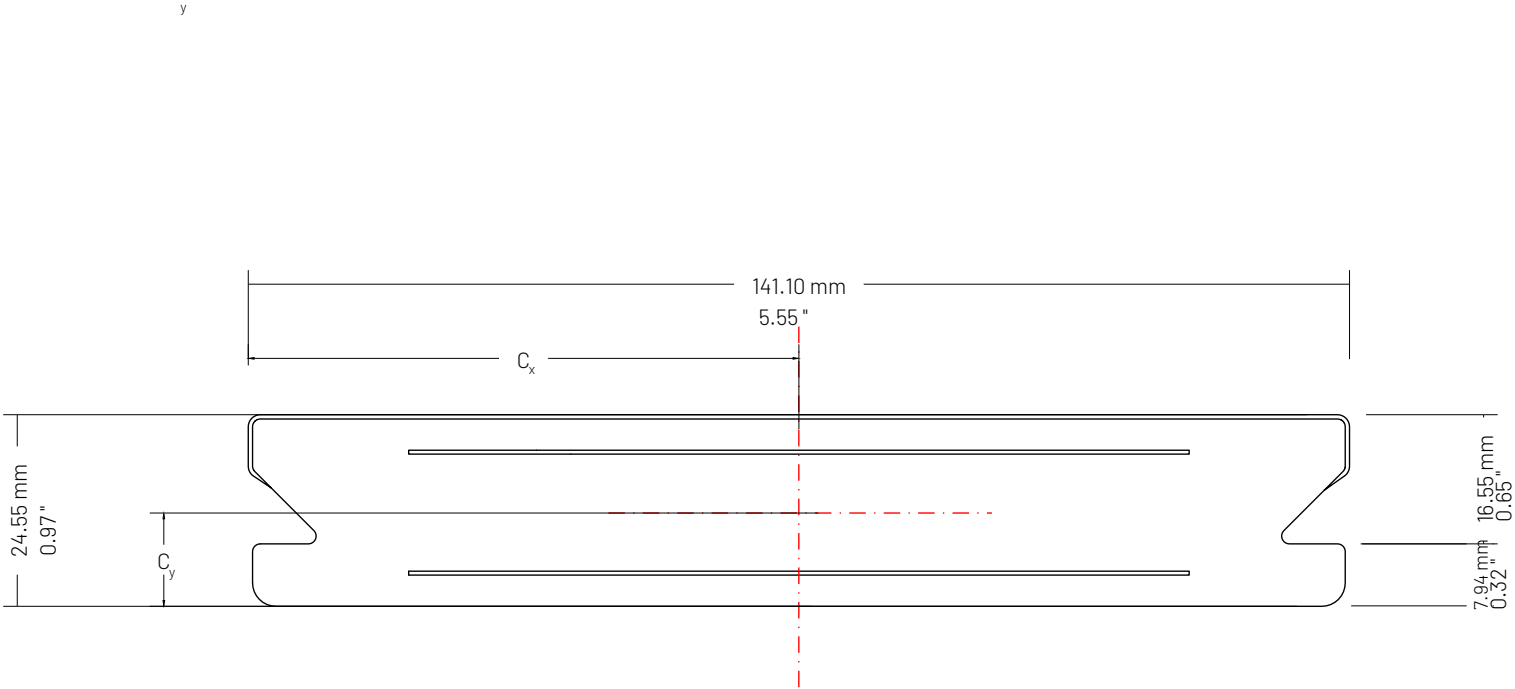


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Scale	NTS

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Profile properties	
Product code	STFM104A
Sectional area (mm²)	2930
Approximate mass (kg/m)	2.3



Sectional properties in typical orientation	
$I_x(\text{mm}^4)$	106 068
$I_y(\text{mm}^4)$	4 881 116
$C_x(\text{mm})$	73.4
$C_y(\text{mm})$	10.4
$S_x(\text{mm}^3)$	10 212
$S_y(\text{mm}^3)$	66 476

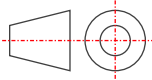
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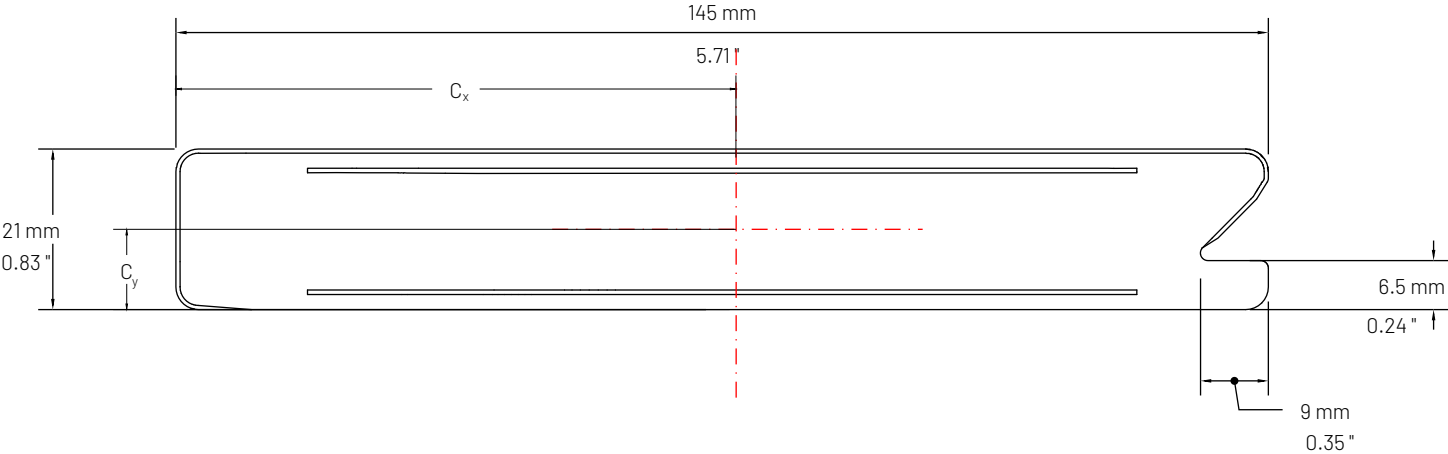


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Date	January 24, 2025
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Profile properties	
Product code	STFM112A
Sectional area (mm ²)	3 465
Approximate mass (kg/m)	2.8

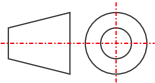


Sectional properties in typical orientation	
I _x (mm ⁴)	129 839
I _y (mm ⁴)	7 894 711
C _x (mm)	85.0
C _y (mm)	10.4
S _x (mm ³)	12 343
S _y (mm ³)	92 835
Drawing title	

STFM112A - Grooved deck board

File name	
2023-11-17 - Pioneer - TDS - Version 5.0	

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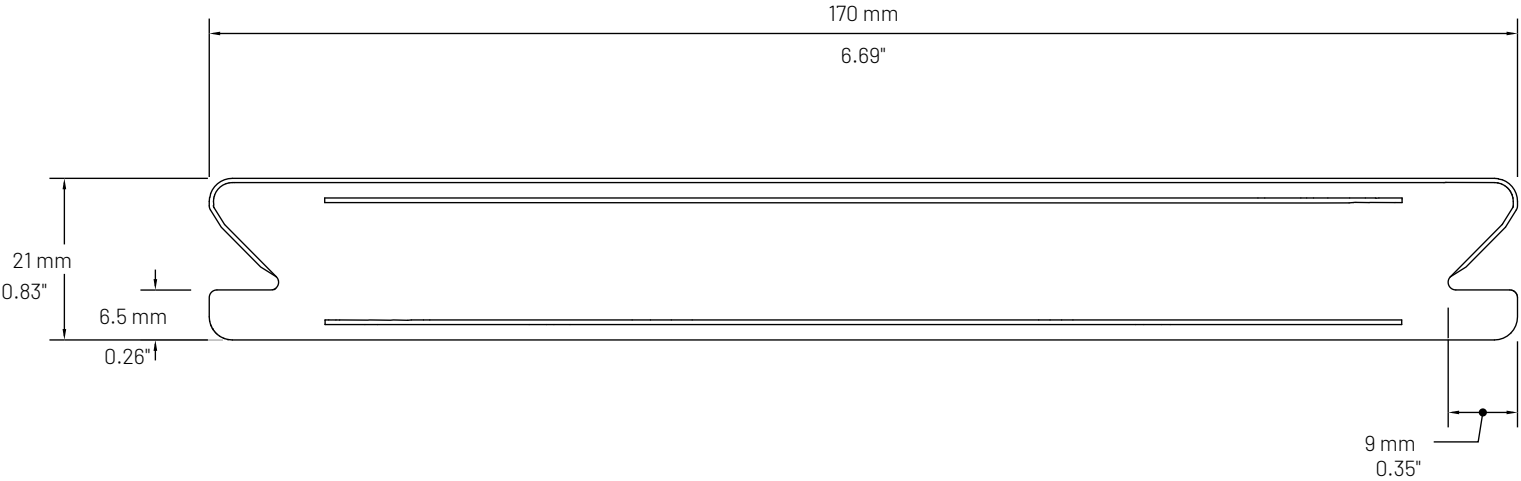


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Date	January 24, 2025
Page	N/a
Scale	NTS

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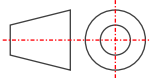
Profile properties	
Product code	STFM113A
Sectional area (mm²)	3 465
Approximate mass (kg/m)	2.8



Sectional properties in typical orientation	
I _x (mm ⁴)	135 804
I _y (mm ⁴)	8 336 050
C _x (mm)	86.1
C _y (mm)	10.6
S _x (mm³)	12 738
S _y (mm³)	96 806
Drawing title	
STFM113A - Starter board	

File name	
2023-11-17 - Pioneer - TDS - Version 5.0	

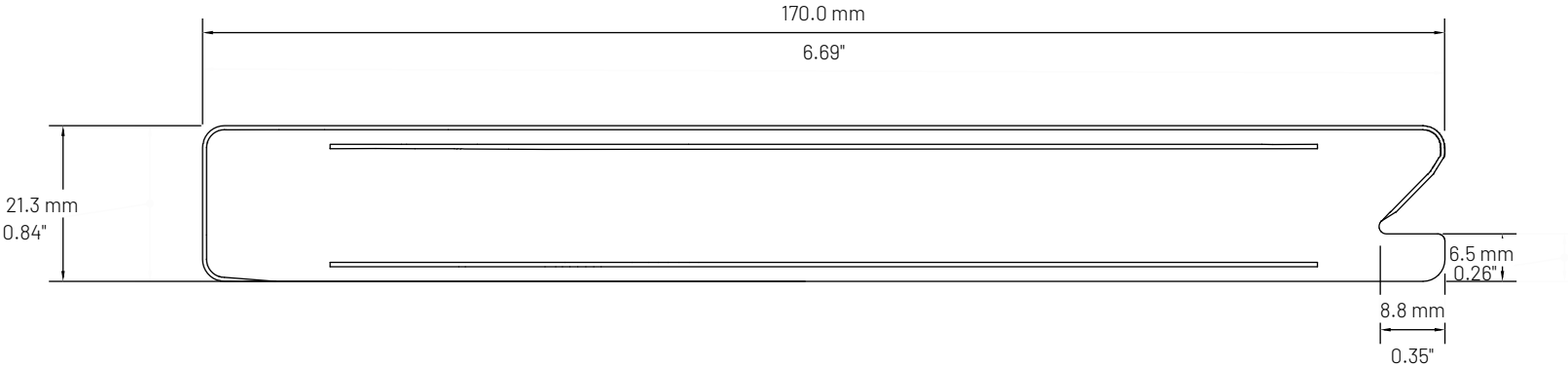
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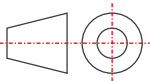
Profile properties	
Product code	STFM105A
Sectional area (mm ²)	3 885
Approximate mass (kg/m)	3.1



Sectional properties in typical orientation	
I _x (mm ⁴)	145 270
I _y (mm ⁴)	11 116 873
C _x (mm)	95.0
C _y (mm)	10.5
S _x (mm ³)	13 813
S _y (mm ³)	117 019
Drawing title	
STFM105A - Grooved deck board 190 mm	

File name	
2023-11-17 - Pioneer - TDS - Version 5.0	

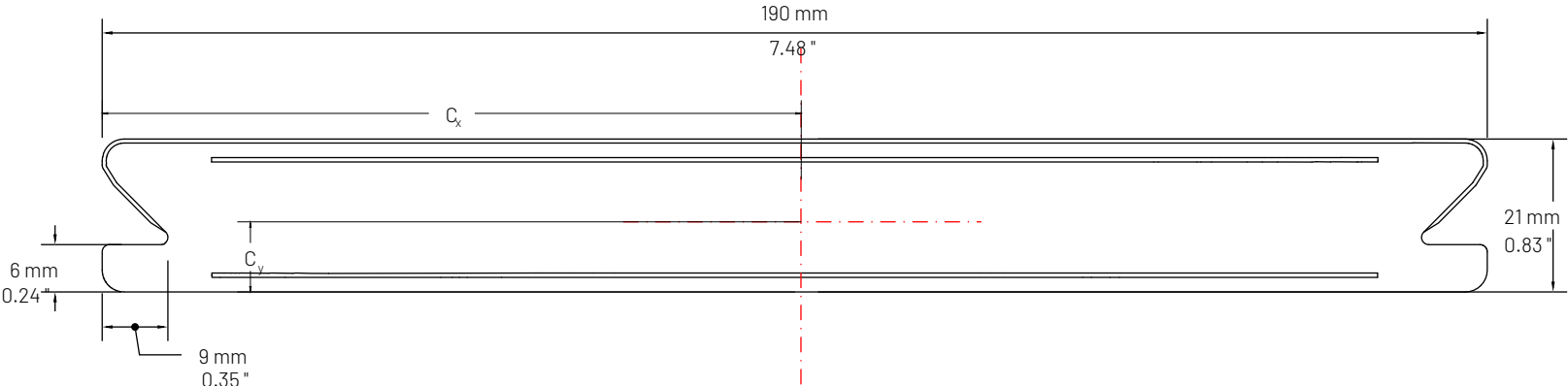
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Profile properties	
Product code	STFM107A
Sectional area (mm²)	3 934
Approximate mass (kg/m)	3.1

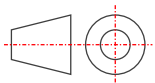


Sectional properties in typical orientation	
I _x (mm ⁴)	145 570
I _y (mm ⁴)	11 519 998
C _x (mm)	96.1
C _y (mm)	10.5
S _x (mm ³)	13 853
S _y (mm ³)	119 838

Drawing title	
STFM107A - Starter board 190 mm	

File name	
2023-11-17 - Pioneer - TDS - Version 5.0	

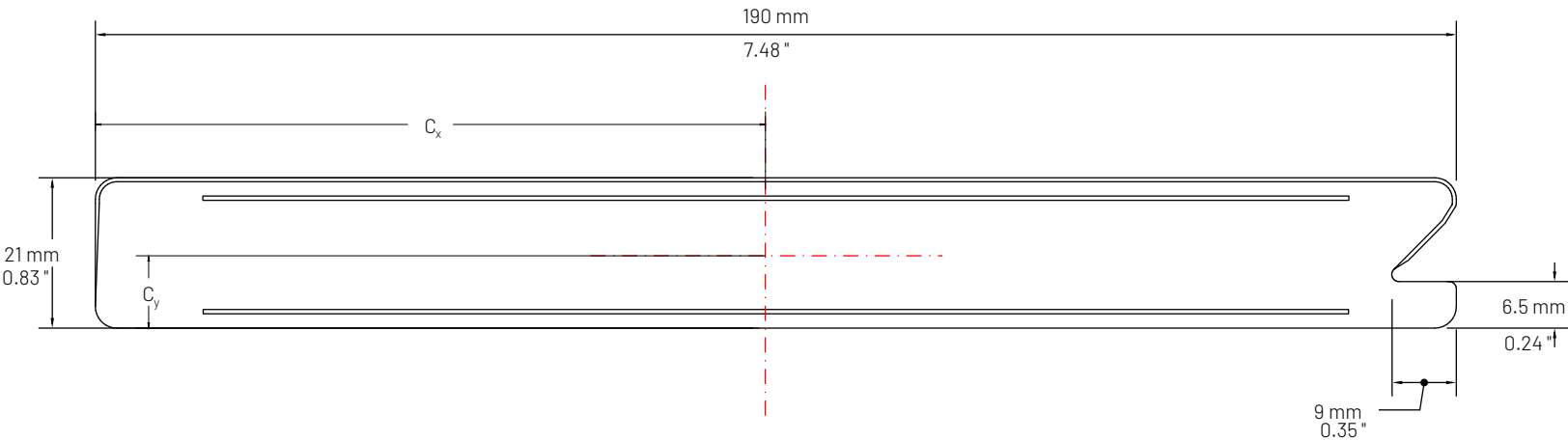
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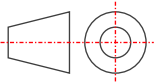
Profile properties	
Product code	STFM106
Sectional area (mm ²)	1 879
Approximate mass (kg/m)	1.4



Sectional properties in typical orientation	
I _x (mm ⁴)	3 513 737
I _y (mm ⁴)	24 405
C _x (mm)	6.3
C _y (mm)	75.6
S _x (mm ³)	46 505
S _y (mm ³)	3 887

Drawing title	
STFM106 - Fascia board - Timber structure - Pioneer	
File name	
2023-11-17 - Pioneer - TDS - Version 5.0	

File details	
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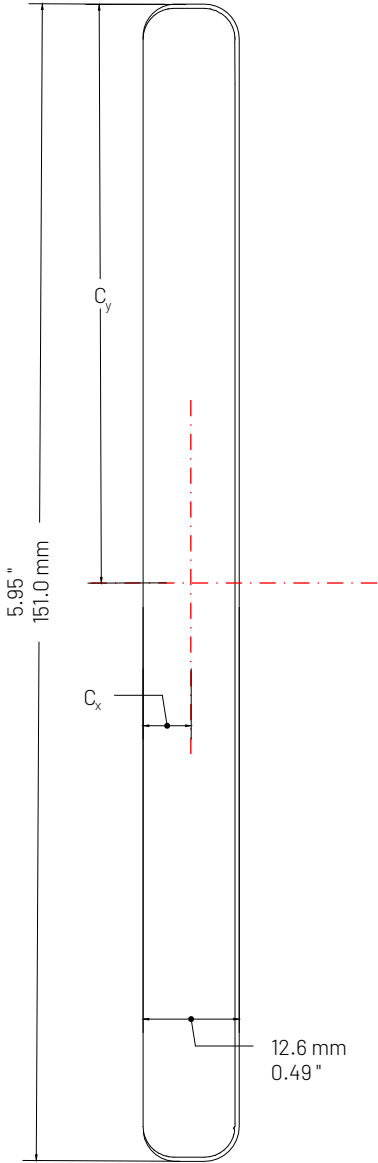


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Appendix B

Chemical compatibility

The following information provides a list of substances that may negatively impact the PMMA cap material of Pioneer. Below is a comprehensive (though not exhaustive) list of common substances and solutions known to affect the surface of the PMMA cap of Pioneer. This table is referenced from Industrial Specialties MFG and IS Med Specialties (ISM) for ease of reference.

Pay particular attention to solvents, sunscreen, and insect repellents, as these can cause significant damage. Additionally, plasticizers from flexible plastics like doormats and garden hoses can leach into the cap and cause degradation.

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

The following table is duplicated from Industrial Specialties MFG and IS Med Specialties (industrialspec.com) for quick reference.

Acetal (POM) Chemical Compatibility Chart
Version 28-Oct-2022

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
Chemical	Effect
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
Chemical	Effect
Amyl Alcohol	A
Amyl Chloride	A
Aniline	A
Aniline Oil	D
Anise Oil	D
Antifreeze	D

Aqua Regia (80% HCl, 20% HNO ₃)	D
Aromatic Hydrocarbons	A
Arsenic Acid	D
Asphalt	B
Barium Carbonate	A
Barium Chloride	A
Barium Cyanide	B
Barium Hydroxide	D
Barium Nitrate	B
Barium Sulfate	B
Barium Sulfide	A
Bay Oil	D
Beer	A
Beet Sugar Liquids	B
Benzaldehyde	A
Benzene	A
Benzene Sulfonic Acid	C
Benzoic Acid	B
Benzol	A
Benzyl Chloride	A
Bone Oil	D
Borax (Sodium Borate)	B
Boric Acid, 10%	A
Brewery Slop	B
Bromine Gas	D
Butadiene	A
Butane Gas	A
Butanol (Butyl Alcohol)	A
Butter	A
Buttermilk	A
Butylene	A
Butyl Acetate	A
Butyl Amine	C
Butyl Ether	D
Butyric Acid, 20%	A
Calcium Bisulfide	D
Calcium Bisulfite	D
Calcium Carbonate (Chalk) CaCO ₃	A
Chemical	Effect
Calcium Chlorate	A
Calcium Chloride, 10%	D
Calcium Hydroxide (Lye), 10%	D
Calcium Hypochlorite	D
Calcium Nitrate	D
Calcium Oxide (Unslaked Lime) CaO	A

Calcium Sulfate, 10%	D
Calgon	A
Cane Juice	A
Carbolic Acid (Phenol)	D
Carbon Bisulfide	A
Carbon Dioxide, dry	A
Carbon Dioxide, wet	A
Carbon Disulfide	A
Carbon Monoxide Gas	A
Carbon Tetrachloride, wet	A
Carbonated Water (carbonic acid)	A
Carbonic Acid (carbonated water)	B
Castor Oil	A
Catsup	B
Chloric Acid	D
Chlorine, anhydrous liquid	A
Chlorine Gas, dry 10%	D
Chlorine Water (5-10 ppm)	D
Chloroacetic Acid	D
Chlorobenzene (mono)	D
Chlorobromomethane	B
Chloroform	A
Chlorosulfonic Acid	D
Chocolate Syrup	A
Chromic Acid, 5%	D
Chromic Acid, 10%	D
Chromic Acid, 30%	D
Chromic Acid, 50%	D
Cider	A
Cinnamon Oil	D
Citric Acid, aqueous 10%	B
Citric Oils	D
Citrus Oil or Terpene (d-Limonene)	D
Clorox® Bleach	D
Coconut Oil	A
Coffee	A
Copper Chloride	A
Copper cyanide	A
Chemical	Effect
Copper Fluoroborate	B
Copper Nitrate	A
Copper Sulfate, 5%	D
Copper Sulfate, over 5%	D
Cream	A
Creosote Oil	D

Cresols	D
Cresylic Acid	D
Cyanic Acid	D
Cyclohexane	A
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
Chemical	Effect
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 ₅ H ₄ O ₂	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 ₂ NNH ₂	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
Chemical	Effect
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
Chemical	Effect
Malic Acid (Apple Acid) C ₄ H ₆ O ₅	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
Chemical	Effect
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
Oils: Hydraulic Oil, petroleum	B
Oils: Hydraulic Oil, synthetic	B
Oils: Lemon	D
Oils: Linseed	A
Oils: Mineral	A
Oils: Olive	A
Oils: Orange	D
Oils: Palm	A
Oils: Peanut	A
Oils: Peppermint	D
Oils: Pine	A
Oils: Rapeseed	A
Oils: Sesame Seed	D
Oils: Silicone	A
Oils: Soybean	A
Oils: Tanning	D
Oils: Transformer	A
Oils: Turbine	A
Oleic Acid	A
Oleum, 25%	D
Oleum, 100%	D
Olive Oil	A
Orange Oil	D
Oxalic Acid, cold 10%	B
Ozone Gas	C
Palm Oil	A
Palmitic Acid	A
Paraffin	A
Chemical	Effect
Peanut Oil	A
Pentane (amyl hydride) C ₅ H ₁₂	B
Peppermint Oil	D
Peracetic Acid (Peroxyacetic Acid)	D
Perchloric Acid	C
Peroxyacetic Acid (Peracetic Acid)	D

Petroleum	B
Phenol, 10%	B
Phenol (Carbolic Acid)	D
Phosphoric Acid, >40%	D
Phosphoric Acid, crude	D
Phosphoric Acid, S40%	D
Phosphoric Acid Anhydride	D
Phosphorus	B
Photographic Developer	D
Photographic Solutions	D
Phthalic Acid	C
Phthalic Anhydride	C
Picric Acid	A
Pine Oil	A
Potash (potassium carbonate)	
Potassium Bicarbonate	C
Potassium Bromide	A
Potassium Chlorate	B
Potassium Chloride, up to 30%	A
Potassium Chloride	A
Potassium Chromate	C
Potassium Cyanide Solutions	C
Potassium Dichromate	A
Potassium Ferrocyanide	B
Potassium Hydroxide (caustic potash)	A
Potassium Nitrate, 10%	A
Potassium Nitrite	A
Potassium Permanganate	A
Potassium Sulfate	B
Propane, liquefied	A
Propylene (propene, methyl ethylene)	A
Propylene Glycol	B
Pyridine (C ₅ H ₅ N)	B
Pyrogalllic Acid	D
Rapeseed Oil	A
Rosins	B
Rum	A
Rust Inhibitors	A
Chemical	Effect
Salad Dressings	A
Salicylic Acid	D
Salt Brine (NaCl saturated)	A
Sea Water	A
Sesame Seed Oil	D
Shellac, bleached	A

Shellac, orange	A
Silicone	A
Silver Bromide	C
Silver Nitrate	A
Soap Solutions	A
Soda Ash (sodium carbonate)	A
Sodium Acetate	B
Sodium Aluminate	B
Sodium Bicarbonate (Baking Soda)	A
Sodium Bisulfate, 10%	B
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
Chemical	Effect
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 (C ₁₀ H ₁₆)	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