Pioneer

TECHNICAL DATA SHEET

VERSION A4.1 | 2025/01/24

Contents

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 Talasey 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

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). 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.

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 MSDS.

1.0 Material composition

The following table is a simplified material composition for the Pioneer material technology. 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

Assesments have been made 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.

2.0 Physical properties

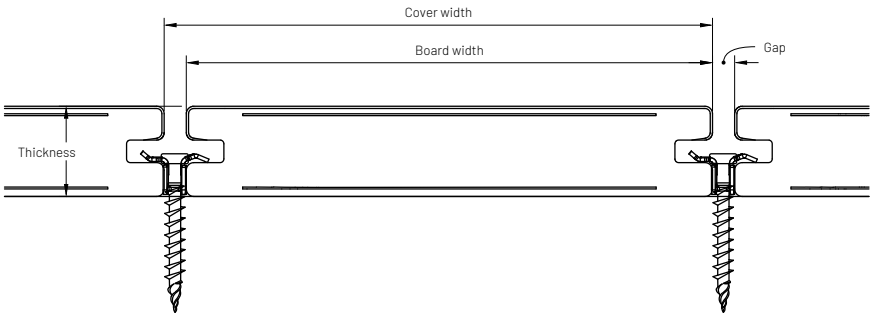
2.1 General material properties

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

Properties	Results	Test Method
Density	650 to 760 kg/m^3 (40.58 to 47.45 lb/ft^3)	ASTM D2395

2.2 Profile properties

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



Application type	Board width (mm)	Thickness (mm)	Mass per meter (kg/m)	Cover width [1] (mm)	Coverage [2] (m/m^2)	Coverage mass [3] (kg/m^2)
Deck board	170.0	21.0	2.8	176.0	5.7	15.9
Starter board	170	21.3	2.8	176.0	5.7	15.9
Fascia board	151.0	12.5	1.4	157.0	6.4	9.9

[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.

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.

3.2 Profile flexural performance testing

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

Application	Span (L) (mm)	Load at Rupture (kN)	Flexural strength MOR (MPa)	Flexural stiffness MOE (MPa)	Load at L /180 (kN)	Strength at L/180 (MPa)	Test Method
Deck board	572	5.75	52.8	3035	0.404	3.7	ASTM

3.3 Stair tread performance and concentrated loads

The application requires that the profiles be tested against point loads over a specified span.

Profile	Deflection limitation load N	Deflection at limitation load (mm)	Ultimate load N	Span mm	Test method	Notes
STFM101A	1 335 N (300 lbf)	2.4	7.4	305	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.
		5.3	6.2	406		
		15.1	4.2	572		

3.4 Impact of weathering (material factor estimate)

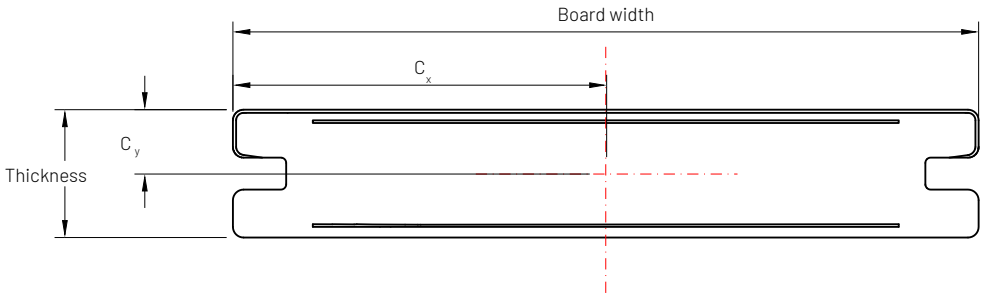
Material properties can vary as a result of long-term weathering. To estimate this impact on the material's flexural properties, the product is subjected to various weathering effects and the performance with and without weathering is compared. The overall end-use adjustment factor is selected based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



				Moments of inertia		Centroid		Elastic sectional modulus	
Application	**Width (mm)**	**Thickness (mm)**	**Area (mm^2)**	**I_x (mm^4)**	**I_y (mm^4))**	**C_x (mm)**	**C_y (mm)**	**Sx (mm^3)**	**Sy (mm^3)**
Decking	170.0	21.0	3 465	129 839	7 894 711	85.0	10.5	12 343	92 835
Starter Board	170.0	21.3	3 564	135 804	8 336 050	86.1	10.6	12 738	96 806
Fascia*	151.0	12.5	1 879	3 513 737	24 405	6.3	75.6	46 505	3 887

*Details provided in orientation of application

4.0 Thermal properties

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

Properties	Results	Test method
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

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.
	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
Matt B texture	42	P4	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.

8.0 Legal Notice

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Appendix A
Profiles details

Profile properties	
Product code	**STFM112A**
Sectional area (mm²)	3 465
Approximate mass (kg/m)	2.8

Sectional properties in typical orientation	
I_x (mm⁴)	129 839
I_y (mm⁴)	7 894 711
C_x (mm)	85.0
C_y (mm)	10.4
S_x (mm³)	12 343
S_y (mm³)	92 835

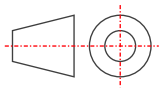
Drawing title

STFM112A - Grooved deck board

File name

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

File details



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Page	N/a
Scale	NTS

Unless otherwise specified all dimensions are in millimeters.

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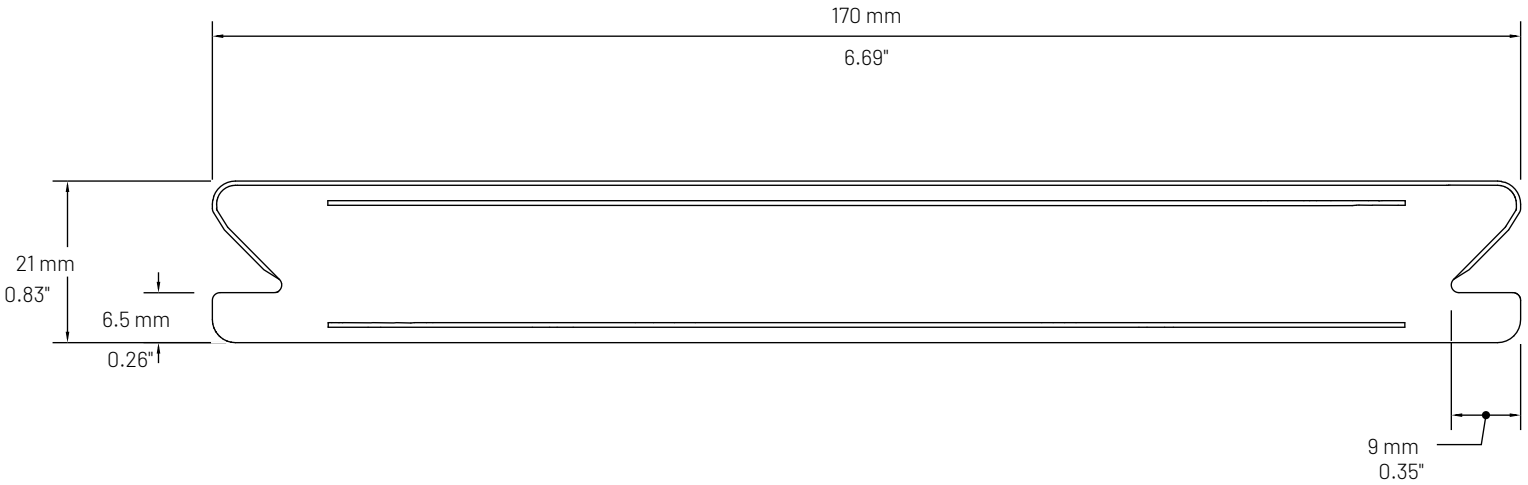


Profile properties	
Product code	**STFM113A**
Sectional area (mm^2)	3 465
Approximate mass (kg/m)	2.8

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 (mm^3)	12 738
S_y (mm^3)	96 806

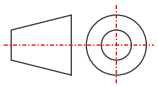
Drawing title

STFM113A - Starter board

File name

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

File details



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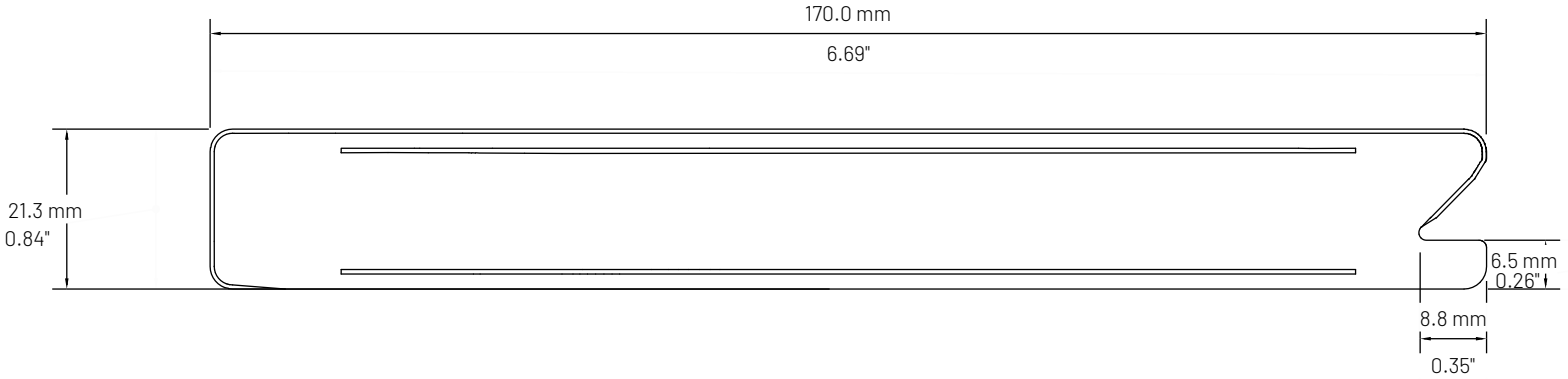
Pioneer



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

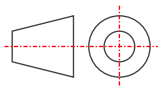
Drawing title

STFM106 - Fascia board - Timber structure - Pioneer

File name

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

File details



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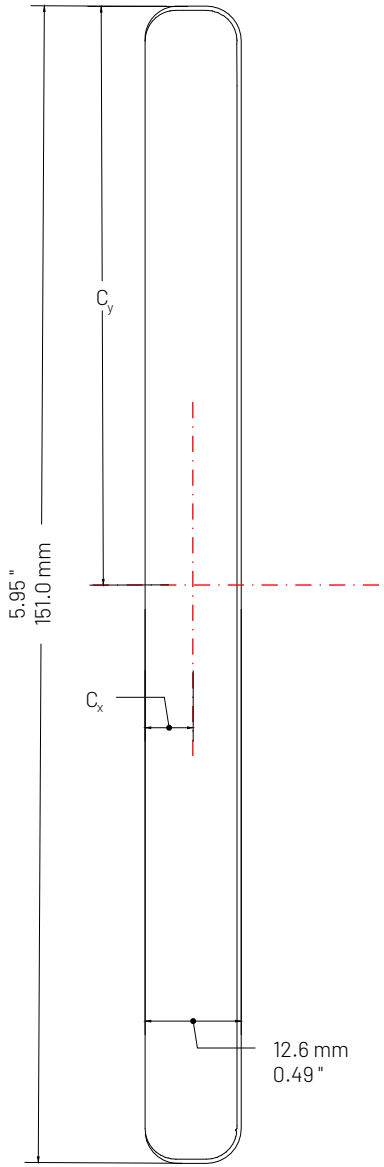

Appendix B
Chemical compatibility

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.

Key to General Chemical Resistance
All data is based on ambient or room temperature conditions, about 64°F (18°C) to 73°F (23°C)
A = Excellent
B= Good - Minor Effect, slight corrosion or discoloration
C = Fair - Moderate Effect, not recommended
D = Severe Effect, not recommended for ANY use

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

Chemical	Effect
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_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

Chemical	Effect
Calcium Bisulfite	D
Calcium Carbonate (Chalk) $CaCO_3$	A
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) $C_5H_4O_2$	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_2NNH_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

Chemical	Effect
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

Chemical	Effect
Maleic Acid	A
Maleic Anhydride	D
Malic Acid (Apple Acid) $C_4H_6O_5$	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_5H_{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_5H_5N)	B
Pyrogallic Acid	D
Rapeseed Oil	A
Rosins	B

Chemical	Effect
Rum	A
Rust Inhibitors	A
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
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