

Chemical & Corrosion

Chemical & Corrosion Resistant Plastics

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 **WARNING:** These products can potentially expose you to chemicals including, 4-Dioxane, Acetaldehyde, Acrylonitrile, Bisphenol-A, Carbon Black, Chromium, Cumene, Dichloromethane, Ethyl Acrylate, Ethylbenzene, Ethylene Glycol, Formaldehyde, Glass Fibers, Hexachlorobenzene, Lead, Methanol, Nickel, Polyvinyl Chloride, Silica-crystalline, Styrene, Tetrafluoroethylene, Titanium Dioxide, and Toluene, which are known to the state of California to cause cancer and/or birth defects or other reproductive harm. For more information, visit www.P65Warnings.ca.gov



PVC

Polyvinyl Chloride Type I and II

Polyvinyl Chloride is the plastic better known as PVC. This is the PVC from which pipes are made, and PVC pipe is everywhere. But there's more to PVC than just pipe. The "vinyl" siding used on houses is made of poly(vinyl chloride). PVC is useful because it resists two things that hate each other: fire and water. Because of its water resistance it's used to make raincoats and shower curtains, and of course, water pipes. It has flame resistance, too, because it contains chlorine. When you try to burn PVC, chlorine atoms are released, and chlorine atoms inhibit combustion.

PVC Type I: is a normal impact, corrosion-resistant material offering an excellent chemical resistance. It is highly recommended for applications where acid and alkalis are in high concentration, normal working temperatures are relatively low, 140°F or below, and the application environment is not subject to excessive physical abuse.

PVC Type II: is a uniquely adaptable polyvinyl chloride displaying excellent thermoforming capabilities, contour definition and surface texture. Available finishes include matte and glossy. Type II is fashioned in the form of homogeneous sheets.

Typical Features:

- Great corrosion resistance
- Excellent chemical resistance
- Excellent thermoforming capabilities
- Easy to machine and fabricate



PVC Type I Applications:

- Dust collecting systems
- Ceiling materials
- Corrosion control equipment
- Flues and vents
- Lab equipment
- Acid fume hood and ducts
- Waterproof covers
- Storage tanks

PVC Type II Applications:

- Food Processing
- Anodizing
- Chemical Processing
- Waste water treatment
- Electronics
- Petroleum
- Transportation
- Pickling

PVC

Polyvinyl Chloride Type I and II

PVC Type I Sheet

Standard Thickness (inches) :	Gray - 1/16" up to 4" thick White - 1/16" up to 1" thick
Standard Sheet Size (inches) :	48" x 96"
Standard Sheet Colors :	Gray, White

PVC Type I Rod

Standard Diameter :	1/4" up to 9" diameter 254mm, 280mm, 300mm, & 350mm
Standard Rod Length :	inches - 10 feet mm - 2 feet
Standard Rod Color :	Gray

PVC Type II Sheet

Standard Thickness (inches) :	1/8" up to 1/2" thick
Standard Sheet Size (inches) :	48" x 96"
Standard Sheet Colors :	Gray, White

PVC Type II Rod

Standard Diameter :	3/8" up to 8" diameter
Standard Rod Length :	3/8" - 2" dia. 10 foot lengths 2-1/4" and up 5 foot lengths
Standard Rod Color :	Dark Gray

PVC Type I Hollow Bar

Standard Diameter (inches) :	1.312" up to 8.625" O.D. 0.687" up to 5.750" I.D.
Standard Rod Length :	10 feet
Standard Rod Colors :	Gray

The heavy-wall hollows effect considerable savings in material when bored parts are required. In addition, some sizes are IPS O.D., and thus can be used as bushing stock or very heavy wall pipe which is not commercially available.

PVC, Clear Rigid

Clear, Rigid Polyvinyl Chloride

Clear Rigid PVC is versatile, high clarity, transparent PVC sheeting that can easily be embossed, thermoformed and printed. Clear Rigid PVC is highly resistant to chemicals, corrosion and impact. It is an affordable alternative to PETG and expensive polycarbonates. Clear PVC has inherent flame retardant properties unlike modified flame-retardant acrylics and polycarbonates that can be costly. It is rated UL94VO and UL945V, making it an excellent choice for back-lit signs and vending machine face-plates.

Additionally, Clear Rigid PVC is ideal to use for point of purchase (POP) displays, splash guards, skylights, protective headgear, glazing for pictures, display cases, bins, menu holders, and a variety of related fabricated parts. Clear Rigid PVC is available to meet high impact and UV resistant requirements. Thinner gauges of Clear Rigid PVC can be used to replace glass, acrylic, and other materials without sacrificing strength.

Typical Features:

- Thermoformable
- Printable and paintable
- Impervious to a variety of corrosive chemicals
- Good impact resistance

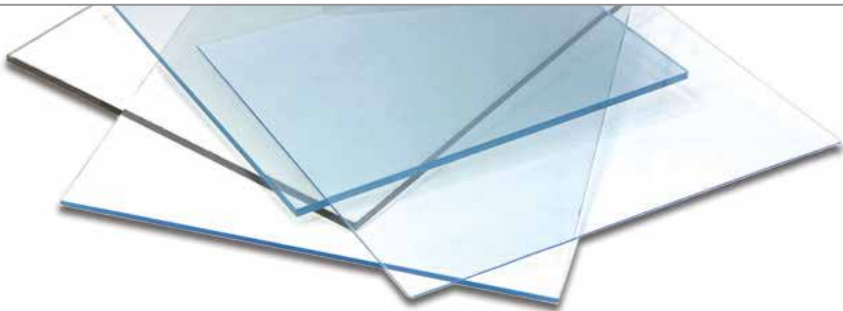
Product Applications:

- Back-lit signs
- Vending machines
- P.o.P. Displays
- Splash guards
- Skylights
- Protective headgear
- Display cases
- Menu holders

Clear PVC Sheet

Standard Thickness (inches) **0.040" up to 0.472" thick**

Standard Sheet Size (inches) : **48 x 96**



PVC, Clear Rigid

Property Comparison - PVC Type I, Clear and Type II

PROPERTY TESTED	PVC Type I Versadur® 150 Series	Clear PVC Versadur® 151 Clear	PVC Type II Versadur® 250 Series
Density, D792, g/cc	1.41	1.37	1.38
Tensile Strength at yield, D638, psi	9,000	10,600	7,400
Tensile Modulus D638, psi	481,000	479,000	435,000
Izod Impact (notched), D256, ft.lbs./in.	0.80	0.52	14.0
Shore Hardness ISO 868	84	84	82
Coefficient of Thermal Expansion, D696, in./in./°C	8 x 10 ⁻⁵	8 x 10 ⁻⁵	8 x 10 ⁻⁵
Heat Distortion Temp at 66 psi, D648, °F	172	144	165
Heat Distortion Temp at 264 psi, D648, °F	154	138	158
Temperature Range, n/a, °F	+32 to +140	+32 to +140	+32 to +140
Flammability	D635 UL 94 FM 4910	Self-extinguishing 94V-O ---	Self-extinguishing 94V-O ---
FDA regulations 21 Chapter 1, part 1.77.2510 for contact with food stuffs.	---	---	---

CPVC

Chlorinated Polyvinyl Chloride

Although CPVC is based on PVC, and shares a few of the same characteristics, it is still a unique polymer. CPVC is a high temperature grade chlorinated polyvinyl chloride that provides excellent corrosion resistance, high heat resistance, chemical resistance, inherent flame resistivity, good tensile strength, weatherability and is easily fabricated. These characteristics make CPVC a useful material in a wide range of markets including the chemical processing and metal finishing industries. It can easily be machined with standard wood-working tools. In addition CPVC can be fiberglass backed, hot gas welded with rod, cemented, (solvent bonded) riveted and threaded.

Typical Features:

- Excellent corrosion resistance
- Good chemical resistance
- High heat resistance
- Easy to machine and fabricate

Product Applications:

- Chemical processing
- Fume scrubbing
- Metal anodizing
- Metal Finishing
- Pickling and Waste treatment

Typical Properties:

PROPERTY TESTED	ASTM	UNITS	CPVC
PHYSICAL PROPERTIES			
Specific Gravity	D792	1 = water	1.51
Tensile Strength	D638	psi	7,600
Elongation, ultimate	D638	%	37M
Flexural Strength	D790	psi	11,000
Flexural Modulus	D790	psi x 10 ⁵	3.5
Impact Strength, Izod	D256	ft lbs/in notch	1.65
Hardness, Rockwell R	D785	R	118
Hardness, Durometer, Shore D	D2240	D	82
Compression Strength	D695	psi	11,400
Shear Strength	D732	psi	9,220
Weld Gas Recommended	---	---	Nitrogen
Water Absorption (24 hrs)	D570	%	.035
THERMAL PROPERTIES			
Thermal Expansion	D696	in/in/°C	7.97 x 10 ⁻⁵
Heat Distortion*	D648	°F @ 264 psi	212
Thermal Conductivity	C177	BTU/hr/ft/°F/in	0.641
Specific Heat	C351	Cal/gm/°C	0.220
Flammability**	---	1/8" an over	94 V-0
Thermoformability	---	---	Fair

*Annealed sample. **Flammability ratings for PVC in accordance with UL94V.

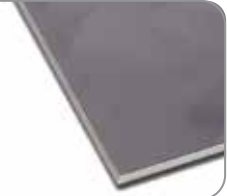
The numbers supplied for the testing of this product came directly from the manufacturer of this material. These numbers should be used as a reference only, they are not to replace the actual testing of the material in your specific application. Test results may vary from application to application.

CPVC

Product Availability

CPVC Sheet

- Standard Thickness (inches) : 1/32" up to 2" thick
- Standard Sheet Size (inches) : 48 x 96
- Standard Sheet Color : Gray



CPVC Solid Rod

- Standard Diameter (inches) : 1/4" up to 8" diameter
- Standard Rod Length (feet) : 1/4" up to 2 dia 10 foot
>2 up to 4-1/2" dia 5 foot
5" dia and up 4 foot
- Standard Rod Color : Gray



CPVC Hollow Bar

Min. O.D. (inches)	Max. I.D. (inches)	Min. O.D. (inches)	Max. I.D. (inches)
1.625	.562	3.563	1.500
2.125	.750	4.000	2.500
2.250	1.125	4.250	1.750
2.375	1.000	4.750	3.000
2.625	1.500	5.000	3.000
2.750	1.000	6.625	4.000
2.875	1.500	6.625	2.875
3.000	1.125		



- Standard Tube Length : Please inquire with Sales Dept
- Standard Tube Color : Gray

The heavy-wall hollows effect considerable savings in material when bored parts are required. In addition, some sizes are IPS O.D., and thus can be used as bushing stock or very heavy wall pipe which is not commercially available.

*For a listing of current tolerance information please contact Alro Plastics.
NSF approved compounds are used in the manufacture of CPVC solid, round, hex, hollow, square and rectangular bar.
CPVC round bar and CPVC hollow bar meet L-P 1036(1).*

PVC & CPVC

Schedule 40 Pipe Sizes & Weights

PVC and CPVC Pipe - Schedule 40					
Nominal Pipe Size (inches)	Outside Diameter (inches)	Min. Wall Thickness (inches)	Inside Diameter (inches)	Weight (lbs./ft.)	
				PVC	CPVC
1/2	0.840	0.109	0.622	0.16	0.17
3/4	1.050	0.113	0.824	0.21	0.23
1	1.315	0.133	1.049	0.32	0.34
1-1/4	1.660	0.140	1.380	0.43	0.46
1-1/2	1.900	0.145	1.610	0.51	0.55
2	2.375	0.154	2.067	0.68	0.74
2-1/2	2.875	0.203	2.469	1.07	1.18
3	3.500	0.216	3.068	1.41	1.54
4	4.500	0.237	4.026	2.01	2.20
5	5.563	0.258	5.047	2.73	---
6	6.625	0.280	6.065	3.53	3.86
8	8.625	0.322	7.981	5.39	5.81
10	10.750	0.365	10.020	7.55	8.24
12	12.750	0.406	11.938	10.01	10.89
14	14.000	0.437	13.124	11.80	---
16	16.000	0.500	15.000	15.43	---



PVC & CPVC

Schedule 80 Pipe Sizes & Weights

PVC and CPVC Pipe - Schedule 80					
Nominal Pipe Size (inches)	Outside Diameter (inches)	Min. Wall Thickness (inches)	Inside Diameter (inches)	Weight (lbs./ft.)	
				PVC	CPVC
1/2	0.840	0.147	0.546	0.20	0.22
3/4	1.050	0.154	0.742	0.27	0.30
1	1.315	0.179	0.957	0.41	0.44
1-1/4	1.660	0.191	1.278	0.52	0.61
1-1/2	1.900	0.200	1.500	0.67	0.74
2	2.375	0.218	1.939	0.95	1.02
2-1/2	2.875	0.276	2.323	1.45	1.56
3	3.500	0.300	2.900	1.94	2.09
4	4.500	0.337	3.826	2.75	3.05
5	5.563	0.375	4.813	3.87	---
6	6.625	0.432	5.761	5.42	5.82
8	8.625	0.500	7.625	8.05	8.83
10	10.750	0.593	9.564	12.00	13.09
12	12.750	0.687	11.376	16.50	18.00
14	14.000	0.750	12.500	19.30	---
16	16.000	0.843	14.314	25.44	---

Expanded PVC Foam

Foam PVC Sheet is a light, high-strength alternative, designed to eliminate heavy, hard to handle materials. Foam PVC Sheet is half the weight of solid PVC and handles the toughest jobs. It retains many of the same qualities as traditional PVC such as an outstanding strength-to-weight ratio, great flame-resistance, and excellent chemical resistance. Other characteristics of Foam PVC Sheet include its noise control, easily screened or painted, and is easily drilled, sawed, nailed, screwed or bonded. PVC foam board is a less dense form of traditional PVC, or polyvinyl chloride. However, because of its lower density, PVC foam board is significantly lighter; making it perfect for a wide variety of applications. Please contact us for custom sizes.

Common Trade Names:

- Celtec® (Vycom)
- Ex-Cel® (Jain Americas Inc.)
- KomaTex® (Kommerling USA)
- Palight® (Palram Americas)
- Sintra® (3A Composites)

Typical Features:

- Uniform fine closed cell structure
- Low flammability, self extinguishing
- Excellent impact resistance
- Inherent high rigidity
- Lightweight

Product Applications:

- Acoustical panels
- Display & exhibit materials
- P.o.P. Displays
- Indoor / Outdoor signs
- Model making
- Thermforming
- Photo mounting
- Equipment enclosures

PVC Foam Sheet

Standard Thickness (mm) :	1 mm up to 25 mm thick
Standard Sheet Size (inches) :	48" x 96"
Standard Density :	3 mm 41-44 lb/ft³ 10 mm 34-37 lb/ft³
Standard Surface Finish :	Semi-Gloss

Available in seven standard colors, please inquire about availability



Expanded PVC Foam

EX-CEL FF (Free Foam) Classic PVC

EX-CEL Classic PVC sheets are a lightweight and durable fine cell structure sheet with a smooth matte surface finish. These sheets are easy to fabricate and digitally or screen print on making them ideal for merchandising applications and high-quality POP displays. EX-CEL Classic PVC sheets contain no heavy metals making them a great replacement for wood and safe for the environment.

Fabrication options include saw cut, routing, engraving, print, photo mount, heat bending/forming paint, drill, rivet and die cut up to 3mm.

Typical Features:

- Chemical and moisture resistant
- Better insulator than wood
- Low flammability, UL 94 VO rated, self extinguishing
- Excellent impact strength
- Noncorrosive



Product Applications:

- Advertising signage
- P.O.P. displays
- Boat panels and cabins
- Digital printing
- Thermforming
- Models & prototypes
- Furniture

EX-CEL FF Classic

Standard Thickness (mm) :	1 mm up to 25 mm thick
Standard Sheet Size (inches) :	48 x 96, 48 x 120, 60 x 120
Standard Sheet Color :	Black & white plus 10 vibrant colors

PVDF

Polyvinylidene Fluoride

Polyvinylidene fluoride, or polyvinylidene difluoride, (PVDF) is a highly non-reactive thermoplastic fluoropolymer produced by the polymerization of vinylidene difluoride. PVDF is a specialty plastic used in applications requiring the highest purity, as well as resistance to solvents, acids and bases. Compared to other fluoropolymers, like polytetrafluoroethylene (PTFE), PVDF has a low density (1.78 g/cm³).

PVDF exhibits greater strength, wear and creep resistance than PTFE and FEP. It has good weathering properties and resists most chemicals. It has a high dielectric constant and a high loss factor. Temperature range is -100°C to 150°C. It is marketed under the trade name of Kynar®, and is available in sheets, rods, tubes, pipes, valves, and fittings.

It is available as piping products, sheet, tubing, films, plate and an insulator for premium wire. It can be injected, molded or welded and is commonly used in the chemical, semiconductor, medical and defense industries, as well as in lithium-ion batteries. It is also available as a crosslinked closed-cell foam, used increasingly in aviation and aerospace applications.

Common Trade Names:

- Hylar® (Solvay Polymers)
- Kynar® (Arkema)
- KF® (Kureha)
- Solef® (Solvay)

Typical Features:

- High purity
- Excellent weatherability
- Flame resistant
- Superior chemical resistance
- Easy to machine
- FDA, USDA, USP Class VI, 3-A Dairy compliant

Product Applications:

- Chemical processing & storage
- Fluid handling
- Semiconductor equipment
- DI water systems
- Fire-safe componentry

PVDF Availability

Standard Thickness (inches) :	0.031" up to 5" thick
Standard Sheet Size (inches) :	24 x 48 and 48 x 96 Inquire on 48 x 120 (limited sizes)
Standard Diameter (inches) :	1/4" up to 10" diameter
Standard Rod Length :	4 ft, 8 ft and 10 ft (varies by diameter)
Standard Color :	Natural (off white)

PVDF

Polyvinylidene Fluoride - Typical Properties

PROPERTY TESTED	ASTM	UNITS	PVDF
PHYSICAL PROPERTIES			
Tensile Strength, Ultimate	D638	psi	6,650
Tensile Modulus, 1% sec	D638	psi	348,000
Elongation, Ultimate	D638	%	80
Flexural Strength	D790	psi	10,750
Flexural Modulus, Tangent	D790	psi	391,500
Compressive Strength	D695	psi	11,600
Izod Impact, Notched .125"	D256	ft.·lb./in ²	1.90
Hardness, Rockwell	D785	R	R100
Coefficient of Friction @ 68oF	---	μ	0.30
Density	D792	lb./in ³	0.064
Water Absorption	D570	%	< 0.04
THERMAL PROPERTIES			
Deflection Temperature, 264 psi	D648	°F	235°
Melting Point	D3448	°F	352°
Thermal Expansion	D696	in/in °C	7.1 x 10 ⁻⁵
Thermal Conductivity	C177	BTU-in./hr.·ft ² -°F	1.31
Flammability, .125", est. rating	UL94	---	V-0
ELECTRICAL PROPERTIES			
Dielectric Constant, 60 Hz, 73°F		---	9
Volume Resistivity		ohm-cm	5 x 10 ¹⁴

Note: Values listed are typical and are meant only as a guide to aid in design only. As always we highly recommend testing any new material in the application first before converting over to new material based on guide data information alone. Applications and usage vary and Alro does not guarantee any results as this data is for information only.



Palclad Pro Cracked Ice

Wall and Ceiling Liner Panels

Palclad Pro Cracked Ice wall and ceiling liner panels are ideal for residential, industrial and commercial interior applications. These panels are light weight, easy to clean and easy to install. With the heavy cracked ice texture, they absorb scratches and resist marring making them great for high traffic areas. Palclad Pro Cracked Ice sheets meet the guidelines for USDA/FDA for incidental food contact making them ideal for restaurants. They also are safe for pets making them a great material for kennels, pet stores or animal hospitals.

Typical Features:

- 100% waterproof - no swelling or rotting
- Impact resistant
- Chemical resistant - not affected by acids, solvents or petroleum products
- USDA/CFIA approved
- 100% recyclable

Product Applications:

- Restaurant kitchens
- Gyms
- Showers
- Laundromats
- Locker rooms
- Commercial restrooms
- Food processing plants
- Hallways, waiting rooms



Palclad Pro Cracked Ice

Standard Thickness (inches) :	0.090" thick
Standard Sheet Size (inches) :	48 x 96 and 48 x 120
Standard Color :	Bright White

