



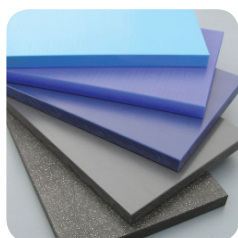
RÖCHLING

Engineering Plastics

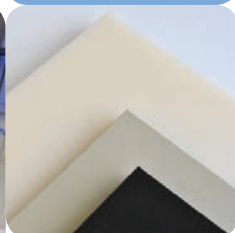
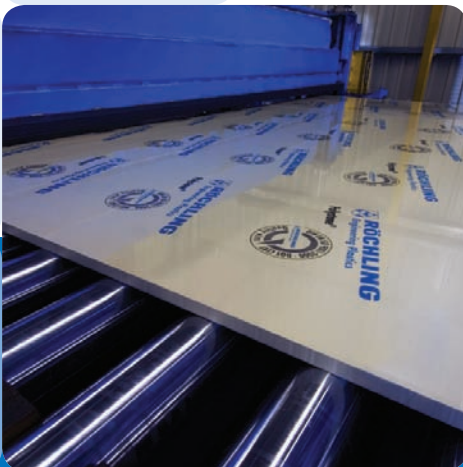
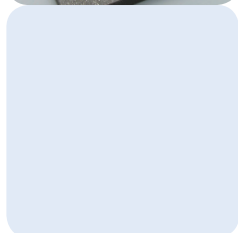
Polystone® G (HDPE)

Polystone® P (Polypropylene)

Shaping the Future through Innovation.



Innovation.



11/2011

Competence.



Quality.

Semi-Finished Thermoplastics

Competence. Quality. Innovation.

Polystone® G (HDPE):

- Outstanding impact resistance
- Easily fabricated and welded
- Operating temperature up to 180°F (82°C)
- FDA and USDA compliant
- Resistance to most acids and solvents

Polystone® G Selection Table	Material Description	Standard Color
Natural	Standard high-density polyethylene, FDA/USDA compliant	Opaque White
Colors	Available in standard and custom colors	Assorted
Cut-Rite	Food preparation cutting boards, textured both sides (NSF listed)	Natural and assorted
Play-Tec	Designed for playground structures, textured both sides, U.V. stabilized	Assorted solid colors
Pipe Grade	Special grade for the HDPE pipe market, U.V. stabilized	Black





Polystone® P (Polypropylene):

- Exceptional chemical resistance
- Easily fabricated, welded and formed
- Operating temperature up to 180°F (82°C), and up to 239°F (115°C) with heat stabilizers
- High impact resistance
- FDA and USDA accepted

Polystone® G and P sheets are extruded with exceptionally close tolerances and, since they are always stress-relieved, you can be assured of the flatness. Our unique in-line trimming process produces a clean, square cut that does not require re-trimming.

Polystone® P Selection Table	Material Description	Standard Color
Natural Homopolymer	Standard polypropylene, FDA/USDA compliant	Opaque White
Natural Copolymer	High impact strength, especially in cold temperature as low as -22°F	White
Colors	Available in standard and custom colors	Assorted
White	Designed for the semiconductor industry, with protective masking	Bright White
Röchling Grey	Operating temperature is increased up to 239°F	Grey-Tan
Flame Retardant	Manufactured from UL-94 VO approved materials	White
Foamlite®	Extruded closed cell foamed material, textured scratch-resistant surface	Assorted

Sizes

 Sheets, Extruded	 Sheets, Pressed	 Rods	 Welding Rods
1/16" – 1-1/2" x 48" x 96" 1/16" – 1-1/2" x 48" x 120" 1/16" – 1-1/2" x 60" x 120" Sheets up to 120" wide available upon request	1-1/4" – 4" x 48" x 96" 1-1/4" – 4" x 48" x 120" 1-1/4" – 4" x 96" x 240" Sheets up to 8" thick available upon request	8mm (.31") – 300mm (13.78")	3mm (.118") – 5mm (.197") diameter

Polystone® G (HDPE) defines dependability and versatility in a wide variety of industries

A polyethylene with outstanding impact resistance and tensile strength making it the perfect choice for a wide range of applications such as:

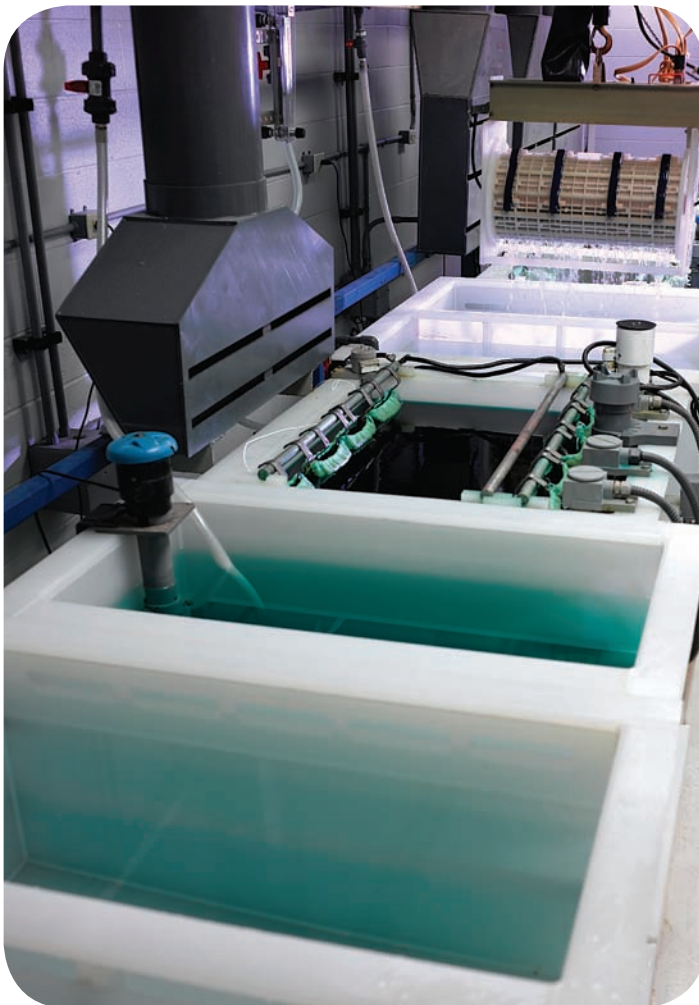
- tanks and vessels
- food cutting boards
- light-duty tanks
- playground structures
- light duty guides and rails
- pipe flanges and manholes
- light duty chute and bin linings
- boat accessories



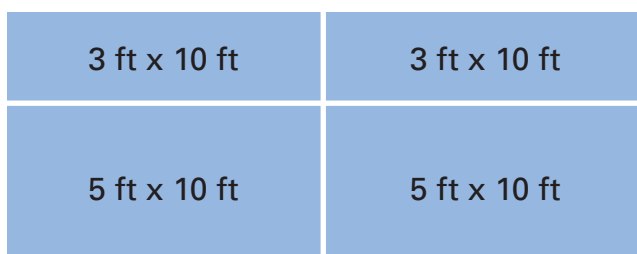
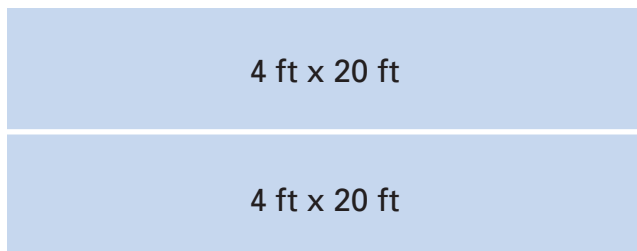
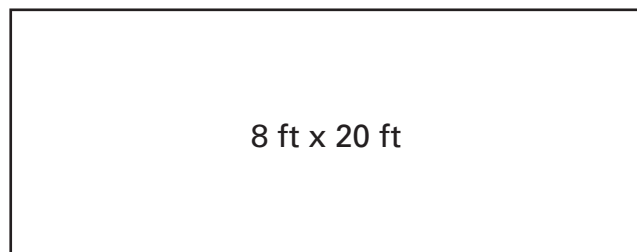
Polystone® P (Polypropylene) takes corrosion resistance to a new level

Best known for its outstanding chemical resistance, this polypropylene is easily fabricated, welded and machined for applications such as:

- structural tanks and linings
- plating barrels
- ducts and fume hoods
- semiconductor processing equipment
- orthotic and prosthetic devices
- pump and valve components
- fire truck tanks
- laboratory surfaces and cabinets



Our MegaSheet™ provides the ultimate choice for small or large parts and always with optimum yields.



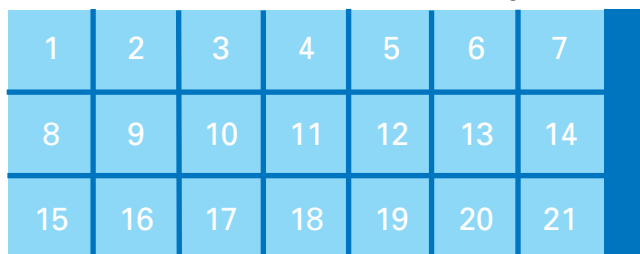
The MegaSheet™ can offer up to an incredible 40% yield advantage

Our Polystone® MegaSheet measures an incredible 8 feet by 20 feet making it the largest compression molded HDPE and Polypropylene sheet available anywhere in the world. Starting at 1-1/4" thick, it can be used as one

huge sheet or cut to a variety of size options. Polystone® G Pipe Grade is especially useful as a MegaSheet for large flanges and manholes, eliminating the need for welding and concerns about seams breaking.

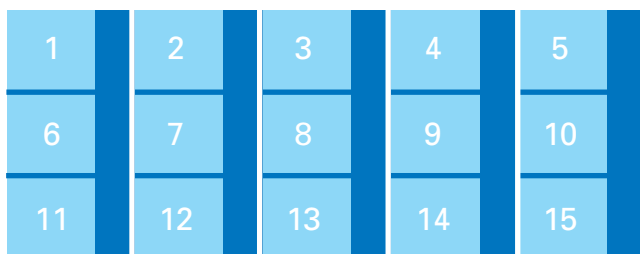
With full cutting capabilities in-house to handle this huge sheet, we can help you achieve yields that are significantly better than those of standard sheet sizes.

In the example below of a typical cut-to-size blank (32" x 32"), the MegaSheet offers an incredible 40% yield advantage over standard sheet sizes.



21 pcs. 32" x 32" from one 8' x 20' **MegaSheet™**

vs



15 pcs. 32" x 32" from five 4' x 8' *regular* sheets

Chemical Resistance, Machining and Welding Methods

Chemical resistance	Polystone®		Chemical resistance	Polystone®	
	G	P		G	P
Acetaldehyde	+	/	Glycerine	+	+
Acetic acid	+	+	Hydrochloric acid	+	+
Acetone	+	+	Hydrogen peroxide	/	30 +
Acrylonitrile	+	+	Hydrogen sulphide	+	+
Allyl alcohol	96 +	96 +	Lactic acid	+	+
Aluminum chloride	A +	A +	Magnesium chloride	A +	A +
Ammonia	A +	A +	Mercury	+	+
Ammonium chloride	A +	A +	Methanol	+	+
Aniline	+	+	Methyl ethyl ketone	+	+
Benzaldehyde	+	+	Methylene chloride	/	/
Benzene	/	/	Mineral oil	+	+
Benzyl alcohol	+	+	Motor oil	+	+
Bleach (Chlorine)	—	—	Nitric acid	25 /	25 /
Boric acid	A +	A +	Nitrobenzene	+	+
Butanol	+	+	Oleic acid	+	+
Butyl acetate	+	/	Ozone	/	/
Calcium chloride	+	+	Perchloric acid	/	/
Carbon disulphide	/	/	Petroleum	+	+
Carbon tetrachloride	/ M —	—	Phenol	+	+
Chlorine gas	—	—	Phosphoric acid	+	+
Chlorobenzene	/	/	Potassium chromate	40 +	40 +
Chloroform	—	—	Potassium hydroxide	30 +	30 +
Chromic acid	10 +	10 +	Potassium nitrate	A +	A +
Citric acid	+	+	Potassium permanganate	+	+
Cyclohexanol	+	+	Pyridine	+	/
Cyclohexanone	+	+	Sea water	+	+
Dekalin	+		Sodium carbonate	A +	A +
Dibutyl phthalate	+	+	Sodium chloride	50 +	50 +
Diesel fuel	+	+	Sodium hydroxide	A +	/
Diethyl ether	/	/	Sulphuric acid	80 +	80 +
Dioxane	+	/	Tallow	+	+
Ethanol	96 +	96 +	Tetrahydrofurane	—	—
Ethyl acetate	+	+	Tetralin	+	—
Ethylene chloride	/	/	Thionyl chloride	—	—
Ethylene diamine	+	+	Toluene	/	/
Ferric chloride	A +	A +	Transformer oil	+	+
Fluorine	—	—	Trichlorethylene	—	—
Formaldehyde	40 +	40 +	Urea, aqueous	33 +	33 +
Formic acid	+	+	Water	+	+
Furfural	+		Zinc chloride	A +	A +

Values obtained at room temperature. Call for high or low temperature applications.

Number indicates concentration if < 100 %. M = Values may change under mechanical stress. A = Aqueous solution.

+ = Specimen is resistant Swelling < 3% or weight loss < 0.5 %. Break elongation not significantly altered.

/ = Specimen has limited resistance Swelling 3-8% or weight loss 0.5-5 % and/or break elongation decreased by < 50%.

— = Specimen is not resistant Swelling > 8% or weight loss > 5 % and/or break elongation decreased by > 50%.

Recommended Machining and Welding Conditions

Polystone® G and P can be efficiently machined with all known tools used in wood and metal processing.

Sawing

Fast-running circular and band saws are suitable. Smooth surfaces can be achieved when the teeth are lightly set. Saw blades with teeth more than 5/8" apart are suggested. Especially with PP, fast chip removal is essential to prevent melting.

Milling

Fairly high feed rates and revolutions work best with attention to reduce heat generation. Suggested 9,000-12,000 rpm with a feed rate of 250-300 inches per minute.

Welding

Quality welds are achieved with the appropriate temperature setting and air pressure. The welding rod must be compatible, and along with the joint surfaces, both should be clean before starting.

Thermoforming

A controllable heating system is required that is designed to provide even heat to each point of the sheet. Typical heat time is 10 minutes per 1/8" sheet thickness.

Polystone® G (HDPE)

Extrusion welding melt temperature: 395°F–446°F

Hot gas welding temperature: 608°F

Thermoforming temperature range: 285°F–300°F

Polystone® P (Polypropylene)

Extrusion welding melt temperature: 410°F–464°F

Hot gas welding temperature: 590°F

Thermoforming temperature range: 320°F–350°F



Polystone® sheets are easily cut and welded



Seams are routed to leave a smooth, clean joint

Range of Products, Physical Properties and Specifications

Physical properties			Polystone®					
Property	Units	ASTM Test	G (HDPE)	G (Pipe Grade)	P (Polypropylene) Homopolymer	P (Polypropylene) Copolymer	P (Polypropylene) Röchling Grey Homopolymer	P (Polypropylene) Röchling Grey Copolymer
Density	gm/cm³	D792	.95	.96	.91	.91	.91	.91
Tensile strength at yield 73°F	psi	D638	4000	3625	4700	3500	4700	3500
Notched IZOD impact strength	ft. lb./in.	D256	3.5	9.0	1.0	8.0	1.0	8.0
Hardness 73°F	Shore D	D785	65	66	72	69	72	69
Coefficient of linear thermal expansion	in./in. °F	D696	6 x 10 ⁻⁵	6 x 10 ⁻⁵	6 x 10 ⁻⁵	6 x 10 ⁻⁵	6 x 10 ⁻⁵	6 x 10 ⁻⁵
Continuous service temperature in air (max)	°F	—	180	180	180	180	239	230

Specifications and Approvals

Polystone® G (HDPE)

ASTM	D-4976	Polyethylene plastics molding and extrusion materials
FDA	Natural Colors if requested	FDA Regulation Title 21 CFR 177.1520 Approved for direct contact with meat and poultry
NSF	Natural and colors	Polystone Cut-Rite is listed to NSF Standard 51

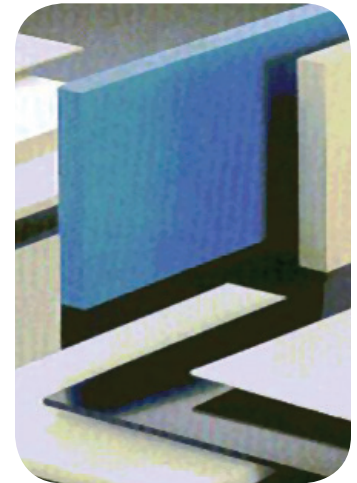
Specifications and Approvals

Polystone® P (Polypropylene)

ASTM	D-4101	Propylene plastics injection and extrusion materials
FDA	Natural Colors if requested	FDA Regulation Title 21 CFR 177.1520 Approved for direct contact with meat and poultry
UL Rating	UL-94 HB	Natural and colors
UL Rating	UL-94-VO	Polystone® P Flame Retardant is manufactured from approved materials

The information listed herein is stated to the best of our knowledge and is intended to provide a general guideline for Polystone® and its uses. The values given are based on laboratory testing backed with global industry experience. All properties in this brochure

have performed equal or better in laboratory testing. However, the data should not be considered as guaranteed specific properties. Suggested applications are provided for information only and are not specific recommendations.





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