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MATERIAL SELECTION

Chemtainer.com offers you a selection of materials that are by far the best suited for molded tanks and containers for use with aggressive corrosive chemicals as well as food products. Our 35 plus years of experience in rotational molding, combined with our professional staff of chemical, mechanical and plastics engineers, enables us to provide you with the highest quality rotationally molded tanks and containers available in the industry.

The following is a brief description of these materials:

Polyethylene

A high quality thermoplastic that has outstanding resistance to both physical and chemical attack. The overall general toughness and excellent chemical resistance to a wide array of wet and dry industrial chemicals and food products make polyethylene ideally suited for storage tanks and containers.

Polyethylene is translucent and its natural color ranges from slightly off white to creamy yellow, depending on wall thickness and type. Ultraviolet light stabilizers are added for use in outdoor applications. Colors are available on request for a nominal up charge. BPA-Free Material.

A) Linear Polyethylene

Linear Polyethylene is available as low, medium and high density. Most products offered in this catalog are molded of linear medium density polyethylene (LMDPE) and linear high density polyethylene (LHDPE). They have superior mechanical properties, high stiffness, excellent low temperature impact strength and excellent environmental stress crack resistance. The linear polyethylene used by Chem-Tainer meets specifications contained in FDA regulation 21 CFR 177.1520 (c) 3.1 and 3.2 and so may be used as an article or a component of articles intended for use in contact with food, subject to any limitations in the regulations. Maximum operating temperature for linear polyethylene is 140° F. BPA-Free Material.

B) Crosslinkable Polyethylene

Crosslinkable polyethylene is a high density polyethylene that contains a crosslinking agent which reacts with the polyethylene during molding, forming a crosslinked molecule similar to a thermoses plastic. This reaction improves toughness and environmental stress crack resistance. Crosslinked Polyethylene (XLPE) is not weldable and does not meet FDA requirement 21 CFR 177.1520. Maximum operating temperature of crosslinked polyethylene is 150° F.

2) Polypropylene

Polypropylene is a rigid plastic that has a higher operating temperature limit than polyethylene: 212° F. It offers good chemical resistance, has a high resistance to stress crack, and is autoclavable. Polypropylene (PP) is not recommended for applications in sub-freezing temperature or where high impact strength is needed. A rough, irregular interior surface is common characteristic of molded polypropylene.

Considerations to Material Selection

Elevated Temperatures

Continued or prolonged service with contents at elevated temperatures can shorten the life of a tank. The effects of the temperature will depend on the chemical content and its specific gravity, tank size and configuration, material of construction, wall thickness and if there are any external supports on the tank.

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Exposure to Ultraviolet Light

Unprotected thermoplastics exposed to sunlight for an extended period of time, absorb ultraviolet (UV) light, which can cause discolorations, embrittlement and eventual cracking. Fluorescent lighting has a similar effect. Elevated temperatures can accelerate the embrittling process. Chem-Tainer products are molded from materials utilizing the latest technology for UV stabilizers which greatly reduce the harmful effects of UV light. For greater protection, keep tanks out of direct sunlight or order dark colored tanks which will further retard the effect of UV light.

Environmental Stress Cracking

Certain surface active materials, although they have no chemical effect on polyethylene, can accelerate its cracking when under stress, such as liquid detergents and ultra pure water- (see our chemical compatibility Chart on pages 46 - 49.) Elevated temperatures tend to accelerate the cracking. Although all polyethylenes are subject to stress cracking, some are more resistant to it than others. The degree of stress on the plastic has a direct bearing on its resistance, therefore a tank and system should be designed to minimize stress. Chemtainer.com tanks are molded visually stress free, employing materials that are highly resistant to environmental stress cracking, and hence are less prone to cracking than fabricated tanks. Stress cracking agents are surface active materials. Proper care should be taken to reduce stress at fillings, bands, tie down lugs, etc.

Characteristics and Physical Properties

General Characeristics	Linear	XLPE	PP
Maximun Service Temp	140 F (60 C)	150 F (65 C)	212 F (100 C)
Chemical Resistance	Very Good	Very Good	Very Good
Stress Crack Resistanc	Excellent	Excellent	Excellent
General Toughness	Very Good	Very Good	Fair
Impact Resistance	Excellent	Excellent	Poor
Abrasion Resistance	Good	Good	Good
Rigidity	Good	Good	Good
Color	WH Translucent	Off WH Trans	Off WH Opaque
FDA Compliance	Yes	No	Yes
Outdoor Use	Yes	No	Yes
Weldable	Yes	No	Yes
Recyclable	Yes	No	Yes

Physical Properties (Nominal Values)	Linear	XLPE	PP
Density (gm/cc) ASTM:D1505	0.937–0.942	0.937–0.942	0.901–0.905
Environmental Stress Cracking (F-50hrs) ASTM:D1693	>1,000	>1,000	>1,000
Tensile Strength ASTM:D638 (Ultimate 2"/Min) (PSI) Type IV	2,600	2,600	3,000
Elongation at Break ASTM:D638 (2"/Min) (%) Type IV	450	450	5
Flexural Modulus (PSI) ASTM:D790	100,000–110,000	100,000–110,000	90,000–100,000
Brittleness Temp ASTM:D74	<-94 F (-70 C)	-180 F (-118 C)	32 F (0 C)
VICAT Softening Temp ASTM:D152	240 F	240 F	300 F