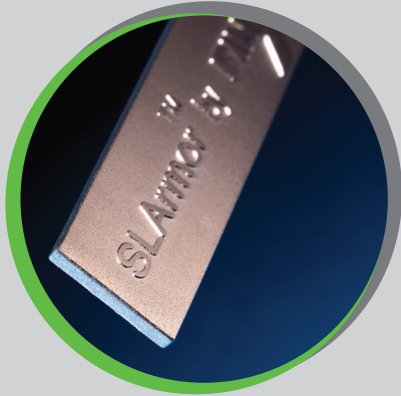


SLArmor™

Structural nickel-plating over a ceramic-filled composite stereolithography core.

SLArmor can be finished in two ways to achieve a specific look:



Light-textured semi-bright nickel



Flat, medium gray matte

SLArmor. The first rapid prototyping solution to effectively allow prototyping of die-cast parts.

Description:

SLArmor is a process/material combination that produces ceramic-filled composite stereolithography parts that are coated with a structural nickel plating for strength. The core material is a ceramic-filled composite stereolithography material that is of extreme strength, stiffness and temperature resistance. After the components are built of this material, they are electroform plated with a prescribed thickness of structural nickel. So that the dimensionality of the parts is maintained, software is used to adjust the stereolithography components prior to their fabrication to account for the targeted plating thickness.

Applications:

SLArmor is a process/material combination that enables prototyping of parts that would normally be die-cast or machined of aluminum, magnesium, or zinc. Examples of current applications include high-speed wind-tunnel models, kinematic mechanical assemblies, factory assembly fixtures and high-resolution die-castings. SLArmor components can withstand high temperatures, abrasion and highly corrosive environments.

Material Properties:

Since SLArmor is a composite material with structural plating, there is not a precise way to determine its material properties without consideration of a component's geometry. Among other things, the percentage of any given cross-section that is nickel factors heavily in the determination of a part's strength and stiffness. Therefore, to offer some guidance, properties are shown below for three different levels of Percent Metal Volume. For comparison purposes, typical properties are also shown for a medium grade of die-cast aluminum, the core ceramic-filled composite material that is used in SLArmor (ProtoTool™ 20L from DSM Somos®), and for a general-purpose stereolithography material (WaterShed™ 11120).

FineLine's experienced application engineers can work with you to determine the optimum Percent Metal Volume for your specific application to achieve your objectives.

ASTM	Description	SLArmor			Die-cast Aluminum	ProtoTool 20L (Base material)	WaterShed 11120
		10% metal volume	20% metal volume	30% metal volume			
D638M	Tensile Strength–Mpa (ksi)	100 (14.5)	145 (21)	200 (29)	300 (43.5)	78 (11.7)	47-53 (7.2)
	Elongation at break (%)	0.9	1.04	1	2-5	1.3	11-20
	Mod. of Elasticity–Mpa (ksi)	21,000 (3,046)	31,000 (4,496)	42,000 (6,100)	70,000 (10,150)	10,100 (1,464)	2,700 (390)
D790M	Flexural Strength–Mpa (ksi)	300 (43.5)	420 (61)	600 (87)	—	122 (17.7)	70 (10)
	Flexural Modulus–Mpa (ksi)	28,000 (4,060)	44,000 (6,380)	54,000 (7,830)	—	9,510 (1,379)	2,150 (311)
D648-98c	HDT@ .46 Mpa (deg C)					269	50
	Density (g/cm3)	2.33	3.06	3.79	2.7	1.6 g/cm3	1.2 g/cm3
	Coef. of Thermal Expansion (x10E-06 inch/inch-deg.F)				11.3	38	93