

# Quadrathane™ ALC-93A

Thermoplastic Polyurethane Elastomer (PC Based)

Biomerics, LLC

## Message:

Quadrathane™ ALC-93A is high performance aliphatic polycarbonate thermoplastic polyurethane. The polymer is naturally clear and supplied in small pellets for ease of processing. The material exhibits excellent mechanical properties, oxidative stability, biocompatibility, superior biostability in long term implantable devices, chemical resistance, non --yellowing during aging and softening at body temperature. The resin has consistent melt flow properties making it ideal for extrusion.

Quadrathane™, Quadraflex™, Quadraban™ and Quadraplast™ performance polymers are primarily used in life science and medical applications including vascular access devices, surgical supplies, respiratory devices, tracheotomy devices, and other medical applications. Typical end products include tubing, catheter parts, balloons, and various medical device components. These performance polymers are available in a variety of durometers, radiopacifiers, colors, and custom formulations.

General Information			
Features	Antioxidation		
	Workability, good		
	Good liquidity		
	Good color stability		
	Good chemical resistance		
	Biocompatibility		
	aliphatic		
Uses	Pipe fittings		
	Human implant		
	Surgical instruments		
	Medical/nursing supplies		
Appearance	Clear/transparent		
Forms	Particle		
Processing Method	Extrusion		
	Injection molding		
Physical	Nominal Value	Unit	Test Method
Specific Gravity	1.15	g/cm <sup>3</sup>	ASTM D792
Melt Mass-Flow Rate (MFR) (190°C/2.16 kg)	7.5	g/10 min	ASTM D1238
Molding Shrinkage - Flow	0.60 - 1.0	%	ASTM D955
Hardness	Nominal Value	Unit	Test Method
Durometer Hardness (Shore A)	93		ASTM D2240
Mechanical	Nominal Value	Unit	Test Method
Flexural Modulus	31.0	MPa	ASTM D790
Elastomers	Nominal Value	Unit	Test Method
Tensile Stress (10% Strain)	5.86	MPa	ASTM D412

Tensile Stress			ASTM D412
100% strain	11.7	MPa	ASTM D412
300% strain	27.6	MPa	ASTM D412
Tensile Strength (Break)	41.4	MPa	ASTM D412
Tensile Elongation (Break)	450	%	ASTM D412

Thermoset	Nominal Value	Unit
Post Cure Time (38°C)	6.0 - 10	hr
Injection	Nominal Value	Unit
Drying Temperature	54.4	°C
Drying Time	4.0	hr
Suggested Max Moisture	< 3.0E-3	%
Rear Temperature	177	°C
Front Temperature	191	°C
Nozzle Temperature	196	°C
Processing (Melt) Temp	204	°C
Mold Temperature	4.44 - 32.2	°C
Injection Rate	Slow	
Screw Compression Ratio	2.5:1.0 - 3.5:1.0	

#### Injection instructions

Injection Speed: 10 g/secCooling/Hold Time: Long, at least 50% of cycle (20 to 60 secs depending on thickness)

Extrusion	Nominal Value	Unit
Drying Temperature	54.4	°C
Drying Time	4.0	hr
Suggested Max Moisture	< 0.030	%
Cylinder Zone 1 Temp.	171	°C
Cylinder Zone 2 Temp.	182	°C
Cylinder Zone 3 Temp.	188	°C
Cylinder Zone 4 Temp.	193	°C
Melt Temperature	193	°C
Die Temperature	193 - 216	°C
Back Pressure	6.89 - 12.4	MPa

#### Extrusion instructions

Screen Pack: 250 meshScrew Speed: Low sheer, 150 to 250 rpmWater Bath: 80 to 110°F

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#### Recommended distributors for this material

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