QUADRA

Quadrathane™ ALC

ALIPHATIC POLYCARBONATE

BIOMERICS csr@biomerics.com | 801.355.2705 | 6030 W Harold Gatty Dr | Salt Lake City, UT 84116 | biomerics.com

TECHNICAL DATA & PROCESS GUIDE

PRODUCT
Quadrathane ALC

CHEMISTRY
Aliphatic Polycarbonate TPU

APPLICATIONS
Extrusion, Injection Molding, Solution

CHARACTERISTICS

Superior biocompatibility, chemical resistance, oxidative stability, non-yellowing, hemocompatable, body softening.

QUADRA
Quadrathane™ ALC

QUADRATHANE

Quadrathane™ ALC is a family of aliphatic polycarbonate-based thermoplastic polyurethane. It offers superior biocompatibility, chemical resistance, and oxidative stability for use in long term body contact applications. It is naturally clear, non-yellowing, hemocompatable, and softens in the body. It is USP Class VI and ISO-10993 compliant. Quadrathane™ ALC is used across a wide range of medical applications including chronic indwelling catheters, dialysis catheters, drainage catheters, pacemaker leads, coatings, and interventional devices.

CLEAR GRADES

Product & Properties	ASTM Test	ALC-75A	ALC-80A	ALC-83A	ALC-85A	ALC-90A	ALC-95A	ALC-55D	ALC-60D	ALC-65D	ALC-72D
Durometer (Shore Hardness)	D2240	75A	80A	83A	85A	90A	95A	55D	60D	65D	75D
Specific Gravity	D792	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Flex Modulus (psi)	D790	1,500	1,500	1,550	1,600	6,500	6,500	18,000	30,000	100,000	120,000
Ultimate Tensile (psi)	D412	4,500	5,000	5,300	5,500	5,700	6,000	6,200	6,400	6,700	7,500
Ultimate Elongation (%)	D412	500	450	430	430	425	400	375	350	325	320
Tensile at 100% (psi)	D412	350	500	800	900	1,050	1,400	1,700	2,000	2,500	3,000
Tensile at 300% (psi)	D412	1,500	1,700	2,200	2,400	3,000	4,000	4,500	4,700	4,700	4,700
Mold Shrinkage (in/in)	D955	.006-.01	.006-.01	.006-.01	.006-.01	.006-.01	.006-.01	.006-.01	.006-.01	.006-.01	.006-.01

Biomerics Quadrathane can be compounded with radiopacifiers, colorants, or other additives. Customization of grades available.

B20 GRADES

Product & Properties	ASTM Test	ALC 75A-B20	ALC 80A-B20	ALC 83A-B20	ALC 85A-B20	ALC 90A-B20	ALC 95A-B20	ALC 55D-B20	ALC 60D-B20	ALC 65D-B20	ALC 72D-B20
Durometer (Shore Hardness)	D2240	75A	80A	83A	85A	90A	95A	55D	60D	65D	72D
Specific Gravity	D792	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
Flex Modulus (psi)	D790	3,000	3,200	3,800	4,500	6,000	12,000	22,000	80,000	110,000	135,000
Ultimate Tensile (psi)	D412	4,700	5,200	5,800	6,000	6,300	7,000	7,500	7,000	7,500	8,000
Ultimate Elongation (%)	D412	525	450	450	430	420	375	350	325	325	300
Tensile at 100% (psi)	D412	550	750	930	950	1,200	1,800	2,000	2,200	2,700	3,500
Tensile at 300% (psi)	D412	1,500	1,800	2,200	2,400	2,700	3,400	4,200	4,300	4,500	4,500
Mold Shrinkage (in/in)	D955	.006-.01	.006-.01	.006-.01	.006-.01	.006-.01	.006-.01	.006-.01	.006-.01	.006-.01	.006-.01

Biomerics Quadrathane can be compounded with radiopacifiers, colorants, or other additives. Customization of grades available.

TECHNICAL DATA & PROCESS GUIDE

PRODUCT
Quadrathane ALC

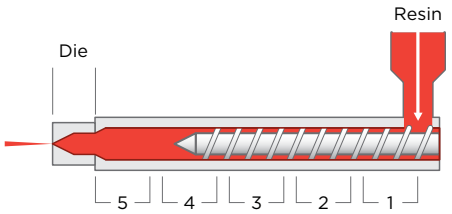
CHEMISTRY
Aliphatic Polycarbonate TPU

APPLICATIONS
Extrusion, Injection Molding, Solution

CHARACTERISTICS
Superior biocompatibility, chemical resistance, oxidative stability, non-yellowing, hemocompatable, body softening.

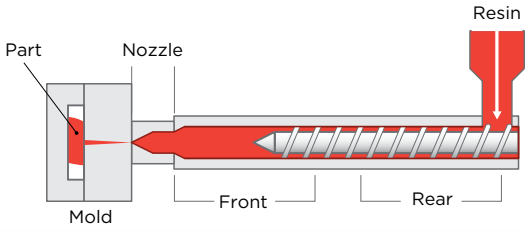
QUADRA
Quadrathane™ ALC

EXTRUSION TEMPERATURE PROFILE
CLEAR AND B20 GRADES



	ALC-75A	ALC-80A	ALC-83A	ALC-85A	ALC-90A	ALC-95A	ALC-55D	ALC-60D	ALC-65D	ALC-72D
	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C
Zone 1	300/149	340/171	340/171	340/171	340/171	340/171	340/171	340/171	350/170	350/170
Zone 2	320/160	360/182	360/182	360/182	360/182	360/182	360/182	360/182	370/188	370/188
Zone 3	340/171	370/188	370/188	370/188	370/188	370/188	370/188	370/188	380/193	380/193
Zone 4	360/182	380/193	380/193	380/193	380/193	380/193	380/193	380/193	390/199	390/199
Adapter 5	360/182	380/193	380/193	380/193	380/193	380/193	380/193	380/193	390/199	390/199
Die	360-380 / 182-193	380-420 / 193-216	380-420 / 193-216	380-420 / 193-216	380-420 / 193-216	380-420 / 193-216	380-420 / 193-216	380-420 / 193-216	390-430 / 199-221	390-430 / 199-221

INJECTION MOLDING TEMPERATURE PROFILE
CLEAR AND B20 GRADES



	ALC-75A	ALC-80A	ALC-83A	ALC-85A	ALC-90A	ALC-95A	ALC-55D	ALC-60D	ALC-65D	ALC-72D
	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C
Rear	350/177	350/177	350/177	360/182	370/188	380/193	390/199	390/199	400/204	400/204
Front	375/191	375/191	375/191	385/196	395/202	405/207	410/210	410/210	420/216	420/216
Nozzle	385/196	385/196	385/196	395/202	400/202	410/210	420/216	420/216	430/221	440/227
Melt	385/196	385/196	385/196	385/196	385/196	395/202	400/204	400/204	410/210	420/216
Mold	50-80/10-27	50-80/10-27	50-80/10-27	50-80/10-27	50-80/10-27	50-80/10-27	50-80/10-27	50-80/10-27	50-80/10-27	50-80/10-27

INJECTION SPEED: MEDIUM TO FAST

TECHNICAL DATA & PROCESS GUIDE

PRODUCT
Quadrathane ALC

CHEMISTRY
Aliphatic Polycarbonate TPU

APPLICATIONS
Extrusion, Injection Molding, Solution

CHARACTERISTICS

Superior biocompatibility, chemical resistance, oxidative stability, non-yellowing, hemocompatable, body softening.

QUADRA
Quadrathane™ ALC

HANDLING & DRYING

Quadrathane ALC is hygroscopic, meaning the material will absorb and react with moisture in the atmosphere and requires proper drying prior to processing. Moisture in the material will adversely affect the process parameters and end product physical properties. Materials should be properly dried in a desiccant dehumidifying hopper dryer prior to processing. Airflow to the hopper should be at least 1 cubic foot pound per minute for every pound of resin per hour at a dew point -40 F or less. It is also recommended that a machine mounted hopper drier be used. Material should be dried until the moisture content is less than 0.03% by weight. Recommended drying temperatures and times are listed in the table below by material grade.

DRY FOR A MINIMUM OF 4 HOURS AT -40°F / -40°C DEW POINT

	ALC-75A	ALC-80A	ALC-83A	ALC-85A	ALC-90A	ALC-95A	ALC-55D	ALC-60D	ALC-65D	ALC-72D
Recommended drying Temperature (°F)	135	140	140	150	150	160	170	170	180	180
Recommended drying Temperature (°C)	57	60	60	66	66	71	77	77	82	82

BIOCOMPATIBLITY

Standard	ISO-10993		USP Class VI								
	4	5	Acute Systemic Toxicity Test				Intracutaneous Test				Implantation
Test	MEM Elution	Hemolysis, Extract	Normal Saline	Cottonseed Oil	5% EtOH in Saline	Polyethylene	Normal Saline	Cottonseed Oil	5% EtOH in Saline	Polyethylene	Intermuscualr
Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

STERILIZATION

Sterilization Method	EtO	Peroxide	E-Beam	Gamma 25kGy	Gamma 50 kGy	Dry Heat	Autoclave
Guidance	Yes	Yes	Yes	Yes	Yes	Not Recommended	Not Recommended

NOTE

The information contained herein is believed to be accurate, but no representation or guarantees of any kind are made as to its accuracy. The information is based on lab results, are typical properties, and should not be construed as specifications. Fabrication conditions, part design, additives, process aids, finishing steps, and end use conditions all affect the performance and regulatory status of the end application. Due to variation in methods, conditions, and equipment, no warranties or guarantees are made as to the suitability or accuracy of this information for use in any end application. Users should confirm results via their own tests.

DISCLAIMER

BIOMERICS csr@biomerics.com | 801.355.2705 | 6030 W Harold Gatty Dr | Salt Lake City, UT 84116 | biomerics.com