



QUADRA
Quadraflex™ ARE
AROMATIC POLYETHER



BIOMERICS

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TECHNICAL DATA & PROCESS GUIDE

PRODUCT

Quadraflex ARE

CHEMISTRY

Aromatic Polyether TPU

APPLICATIONS

Extrusion, Injection Molding,
Solution

CHARACTERISTICS

Excellent mechanical properties, good chemical resistance, elasticity, biocompatibility, toughness, hemocompatible.



QUADRAFLEX

Quadraflex™ ARE is a family of aromatic polyether-based medical grade thermoplastic urethanes. Quadraflex ARE exhibits excellent mechanical properties, biocompatibility, and toughness. Quadraflex ARE is the most common medical grade urethane family and is used across a range of medical markets including venous access, urology, hemodialysis, respiratory, fluid management, balloons, and minimally invasive surgical devices. It is USP Class VI and ISO-10993 compliant.

CLEAR GRADES

Product & Properties	ASTM Test	ARE-75A	ARE-80A	ARE-85A	ARE-90A	ARE-93A	ARE-95A	ARE-55D	ARE-65D	ARE-72D
Durometer (Shore Hardness)	D2240	75A	80A	85A	90A	93A	95A	55D	65D	72D
Specific Gravity	D792	1.1	1.11	1.12	1.13	1.14	1.15	1.16	1.17	1.18
Flex Modulus (psi)	D790	1,300	1,800	3,000	5,500	7,000	8,000	19,000	25,000	72,000
Ultimate Tensile (psi)	D412	3,500	4,800	5,000	6,000	6,500	7,000	7,200	7,500	7,600
Ultimate Elongation (%)	D412	800	700	625	600	575	500	450	375	260
Tensile at 100% (psi)	D412	550	750	950	1,300	1,500	1,850	2,000	2,400	3,500
Tensile at 300% (psi)	D412	1,000	1,300	1,550	2,100	2,500	2,950	3,200	5,800	N/A
Mold Shrinkage (in/in)	D955	.008-.012	.008-.012	.008-.012	.008-.012	.007-.011	.007-.011	.005-.01	.005-.01	.005-.01

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

B20 GRADES

Product & Properties	ASTM Test	ARE 75A - B20	ARE 80A - B20	ARE 85A - B20	ARE 90A - B20	ARE 93A - B20	ARE 95A - B20	ARE 55D - B20	ARE 65D - B20	ARE 72D - B20
Durometer (Shore Hardness)	D2240	75A	80A	85A	90A	93A	95A	55D	65D	72D
Specific Gravity	D792	1.26	1.29	1.31	1.32	1.32	1.34	1.34	1.36	1.4
Flex Modulus (psi)	D790	1,200	1,800	2,500	3,500	9,000	12,000	20,000	50,000	80,000
Ultimate Tensile (psi)	D412	3,000	4,200	4,800	5,300	5,700	5,500	5,000	5,000	5,000
Ultimate Elongation (%)	D412	725	650	575	550	525	500	500	500	350
Tensile at 100% (psi)	D412	500	750	950	1,300	1,500	1,850	2,200	2,750	4,000
Tensile at 300% (psi)	D412	1,000	1,200	1,550	2,000	2,200	2,800	2,900	3,600	4,500
Mold Shrinkage (in/in)	D955	.008-.012	.008-.012	.008-.012	.008-.012	.007-.011	.007-.011	.005-.01	.005-.01	.005-.01

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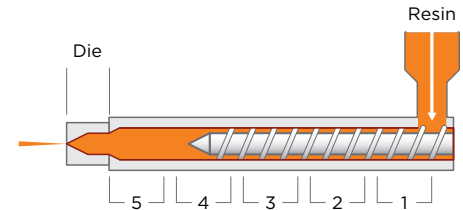
CHARACTERISTICS

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EXTRUSION TEMPERATURE PROFILE

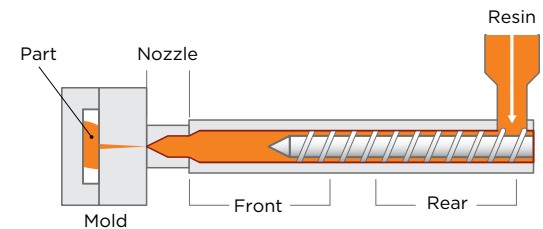
CLEAR AND B20 GRADES



	ARE-75A	ARE-80A	ARE-85A	ARE-90A	ARE-93A	ARE-95D	ARE-55D	ARE-65D	ARE-72D
	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C
Zone 1	300/149	300/149	330/166	330/166	330/166	330/166	340/171	340/171	340/171
Zone 2	320/160	320/160	350/177	350/177	350/177	350/177	360/182	360/182	360/182
Zone 3	340/171	340/171	360/182	360/182	360/182	360/182	370/188	370/188	370/188
Zone 4	350/177	350/177	370/188	370/188	370/188	370/188	380/193	380/193	380/193
Adapter 5	350/177	350/177	370/188	370/188	370/188	370/188	380/193	380/193	380/193
Die	370-410 / 188-210	370-410 / 188-210	370-410 / 188-210	370-410 / 188-210	370-410 / 188-210	370-410 / 188-210	380-420 / 193-216	380-420 / 193-216	380-420 / 193-216

INJECTION MOLDING TEMPERATURE PROFILE

CLEAR AND B20 GRADES



	ALE-75A	ALE-80A	ALE-85A	ALE-90A	ALE-93A	ALE-95A	ALE-55D	ALE-65D	ALE-72D
	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C	°F/°C
Rear	340/171	340/171	350/177	360/182	360/182	360/182	380/193	390/199	390/199
Front	365/185	365/185	370/188	380/193	380/193	380/193	395/202	405/207	405/207
Nozzle	375/191	375/191	385/196	395/202	395/202	395/202	410/210	420/216	420/216
Melt	375/191	375/191	385/196	395/202	395/202	395/202	400/204	400/204	400/204
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

INJECTION SPEED: MEDIUM TO FAST



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HANDLING & DRYING

Quadraflex ARE 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 at times are listed in the table below by material grade.

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

	ARE-75A	ARE-80A	ARE-85A	ARE-90A	ARE-93A	ARE-95A	ARE-55D	ARE-65D	ARE-72D
Recommended drying Temperature (°F)	135	140	140	150	150	160	170	180	180
Recommended drying Temperature (°C)	57	60	60	66	66	71	77	82	82

BIOCOMPATIBILITY

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	Intermuscular
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	Will Discolor	Will Discolor	Will Discolor	Will Discolor	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.

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