



**QUADRA**  
Quadra<sup>™</sup> ARC  
AROMATIC POLYCARBONATE



**BIOMERICS**

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# TECHNICAL DATA & PROCESS GUIDE

## PRODUCT

Quadrathane ARC

## CHEMISTRY

Aromatic Polycarbonate TPU

## APPLICATIONS

Extrusion, Injection Molding,  
Solution

## CHARACTERISTICS

Superior biocompatibility, superior chemical resistance, superior oxidative stability, hemocompatible, toughness.



## QUADRATHANE

Quadrathane™ ARC is a family of aromatic polycarbonate-based thermoplastic polyurethane. It offers superior biocompatibility, superior chemical resistance, and oxidative stability for use in long term body implantable applications. It is naturally clear, hemocompatible, and is USP Class VI and ISO-10993 compliant. Quadrathane™ ARC is used across a wide range of medical applications including chronic indwelling catheters, feeding catheters, pacemaker leads, coatings, orthopedics, and other applications where superior chemical resistance is required.

## CLEAR GRADES

| Product & Properties       | ASTM Test | ARC-75A   | ARC-80A   | ARC-85A   | ARC-90A   | ARC-93A   | ARC-95A   | ARC-55D   | ARC-65D   | ARC-72D   |
|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Durometer (Shore Hardness) | D2240     | 75A       | 80A       | 85A       | 90A       | 93A       | 95A       | 55D       | 65D       | 72D       |
| Specific Gravity           | D792      | 1.17      | 1.18      | 1.19      | 1.19      | 1.19      | 1.2       | 1.2       | 1.21      | 1.22      |
| Flex Modulus (psi)         | D790      | 1,200     | 1,500     | 3,500     | 6,000     | 7,500     | 10,500    | 28,000    | 40,000    | 60,000    |
| Ultimate Tensile (psi)     | D412      | 6,000     | 6,200     | 6,500     | 6,800     | 7,000     | 7,200     | 7,300     | 7,400     | 7,500     |
| Ultimate Elongation (%)    | D412      | 550       | 525       | 500       | 475       | 450       | 425       | 375       | 200       | 100       |
| Tensile at 100% (psi)      | D412      | 600       | 750       | 1,000     | 1,500     | 1,900     | 2,200     | 2,500     | 4,000     | 7,500     |
| Tensile at 300% (psi)      | D412      | 2,000     | 2,800     | 3,500     | 4,300     | 4,800     | 5,100     | 6,500     | N/A       | N/A       |
| Mold Shrinkage (in/in)     | D955      | .008-.012 | .008-.012 | .008-.012 | .008-.012 | .008-.012 | .008-.012 | .008-.012 | .008-.012 | .008-.012 |

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

## B20 GRADES

| Product & Properties       | ASTM Test | ARC 75A-B20 | ARC 80A-B20 | ARC 85A-B20 | ARC 90A-B20 | ARC 93A-B20 | ARC 95A-B20 | ARC 55D-B20 | ARC 65D-B20 | ARC 72D-B20 |
|----------------------------|-----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Durometer (Shore Hardness) | D2240     | 75A         | 80A         | 85A         | 90A         | 93A         | 95A         | 55D         | 65D         | 72D         |
| Specific Gravity           | D792      | 1.34        | 1.35        | 1.36        | 1.37        | 1.37        | 1.38        | 1.39        | 1.4         | 1.4         |
| Flex Modulus (psi)         | D790      | 1,300       | 1,800       | 3,800       | 6,100       | 8,000       | 12,000      | 30,000      | 45,000      | 75,000      |
| Ultimate Tensile (psi)     | D412      | 4,500       | 5,000       | 5,300       | 5,500       | 5,800       | 6,400       | 6,500       | 6,600       | 6,700       |
| Ultimate Elongation (%)    | D412      | 650         | 575         | 525         | 475         | 425         | 400         | 350         | 200         | 100         |
| Tensile at 100% (psi)      | D412      | 550         | 800         | 1,000       | 1,500       | 1,800       | 2,000       | 2,300       | 4,000       | 6,700       |
| Tensile at 300% (psi)      | D412      | 1,100       | 2,000       | 2,500       | 3,500       | 4,500       | 5,100       | 6,000       | N/A         | N/A         |
| Mold Shrinkage (in/in)     | D955      | .008-.012   | .008-.012   | .008-.012   | .008-.012   | .008-.012   | .008-.012   | .008-.012   | .008-.012   | .008-.012   |

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## APPLICATIONS

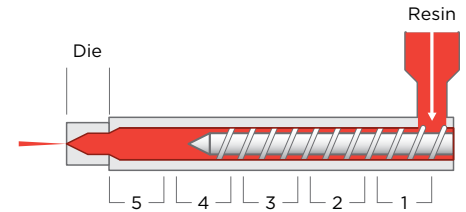
Extrusion, Injection Molding, Solution

## CHARACTERISTICS

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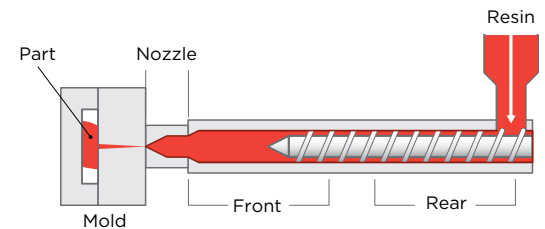


## EXTRUSION TEMPERATURE PROFILE CLEAR AND B20 GRADES



|           | ARC-75A           | ARC-80A           | ARC-85A           | ARC-90A           | ARC-93A           | ARC-95A           | ARC-55D           | ARC-65D           | ARC-72D           |
|-----------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|           | °F/°C             | °F/°C             | °F/°C             | °F/°C             | °F/°C             | °F/°C             | °F/°C             | °F/°C             | °F/°C             |
| Zone 1    | 310/154           | 310/154           | 340/171           | 340/171           | 340/171           | 340/171           | 350/177           | 350/177           | 350/177           |
| Zone 2    | 330/166           | 330/166           | 360/182           | 360/182           | 360/182           | 360/182           | 370/188           | 370/188           | 370/188           |
| Zone 3    | 350/177           | 350/177           | 370/188           | 370/188           | 370/188           | 370/188           | 380/193           | 380/193           | 380/193           |
| Zone 4    | 360/182           | 360/182           | 380/193           | 380/193           | 380/193           | 380/193           | 390/199           | 390/199           | 390/199           |
| Adapter 5 | 360/182           | 360/182           | 380/193           | 380/193           | 380/193           | 380/193           | 390/199           | 390/199           | 390/199           |
| Die       | 360-380 / 182-193 | 380-420 / 182-193 | 380-420 / 193-216 | 380-420 / 193-216 | 380-420 / 193-216 | 380-420 / 193-216 | 390-420 / 199-216 | 390-420 / 199-216 | 390-420 / 199-216 |

## INJECTION MOLDING TEMPERATURE PROFILE CLEAR AND B20 GRADES



|        | ARC-75A     | ARC-80A     | ARC-85A     | ARC-90A     | ARC-93A     | ARC-95A     | ARC-55D     | ARC-65D     | ARC-72D     |
|--------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|        | °F/°C       | °F/°C       | °F/°C       | °F/°C       | °F/°C       | °F/°C       | °F/°C       | °F/°C       | °F/°C       |
| Rear   | 350/177     | 350/177     | 360/182     | 370/188     | 370/188     | 370/188     | 390/199     | 400/204     | 400/204     |
| Front  | 375/191     | 375/191     | 385/196     | 390/199     | 390/199     | 390/199     | 405/207     | 415/213     | 415/213     |
| Nozzle | 385/196     | 385/196     | 395/202     | 405/207     | 405/207     | 405/207     | 420/216     | 430/221     | 430/221     |
| Melt   | 385/196     | 385/196     | 395/202     | 405/207     | 405/207     | 405/207     | 410/210     | 410/210     | 410/210     |
| 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

Quadrathane ARC 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

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

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