Materials for Medical Applications

Head
- TECATEC™ CF60
- TECAPEEK™ MT
- Biocompatible Tubing

Dental
- PEEK Classix™
- Tygon® Tubing
- Polycarbonate

Shoulder
- Radel®
- XRO™
- UHMWPE

Spine
- TECAPEEK™ MT
- Kydex®
- ASTM F2026 PEEK

Abdominal
- Tygon® Tubing
- Radel®
- Polypropylene HS

Hip
- TECANYL™ MT
- Ultem®
- UHMWPE

Lower Limb
- Polypropylene
- DuPont™ Vespel®

Knee
- Radel®
- Ultem®
- UHMWPE
Today's life science and healthcare markets are expanding rapidly and changing constantly. That's why medical device manufacturers and medical outsourcing companies need quality materials and fast dependable delivery from a forward-thinking supplier who can combine expert product knowledge with innovative supply chain solutions.

For more than 30 years, the AIN Plastics division of ThyssenKrupp Materials NA, has offered customers quality products, competitive pricing, and an unsurpassed level of service by supplying industrial and medical grade plastic shapes from the world's leading manufacturers including: Ensinger, Quadrant EPP, Westlake Plastics, DuPont, Bayer Corporation, St. Gobain Performance Plastics, and many other industry leaders.

The AIN Plastics Medical Technologies Group combines decades of proven expertise in engineering plastics with ThyssenKrupp's long standing reputation as a leading supplier of nonferrous metals, specialty alloys, and stainless steel products. The Medical Technologies Group is a complete integrated source in your supply base that provides the inventory management expertise and value-added processing services you need to compete in today's global medical marketplace.

ThyssenKrupp Materials NA has been steadily expanding its portfolio of products and services beyond materials procurement and processing. In recent years, we have established ourselves as an industry leader in production process support for the manufacturing industry. From warehousing, third party logistics, transportation, blanking, kitting, and sequencing, to complete supply-chain management solutions, we can develop a customized production support program which will work for you.

Not all materials are compliant; let the experts at AIN Plastics Medical Technologies Group assist you in finding the correct material for every specification and requirement.

- Full line of medical grade materials with full regulatory compliance
  - ISO 10993
  - USP Class VI
  - FDA Compliant
  - ASTM F2026
  - ASTM F-648
  - ISO 5834 (1&2)

- Complete material lot and batch traceability on all biocompatible and medical grade products.

- Certificates of conformance accompany every order and include lot and batch traceability.

- Comprehensive technical support is available at the local and national levels.

- Extensive inventory of medical grade plastic shapes in many colors, diameters, sheet sizes, and types.
Plastic Shapes

ISO 10993

<table>
<thead>
<tr>
<th>Description</th>
<th>Primary Trade Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetal Copolymer (Celcon® M25)</td>
<td>TECAFORM™ MT</td>
</tr>
<tr>
<td>Radel® R 5500 (PPSU)</td>
<td>TECASON™ P</td>
</tr>
<tr>
<td>Radel® R5500 w/ BaS04 filler</td>
<td>TECASON™ P XRO™</td>
</tr>
<tr>
<td>Noryl® HNA055 (PPE)</td>
<td>TECANYL™ MT</td>
</tr>
<tr>
<td>Noryl® 30% Carbon Fiber</td>
<td>TECANYL™ MT CF30</td>
</tr>
<tr>
<td>Noryl® w/ BaS04 filler</td>
<td>TECANYL™ MT XRO</td>
</tr>
<tr>
<td>ULTEM® (PEI)</td>
<td>TECAPEI™ MT</td>
</tr>
<tr>
<td>Polyetherimide (PEI)</td>
<td>TECAPEEK™ MT</td>
</tr>
<tr>
<td>PEEK</td>
<td>TECAPEEK™ MT</td>
</tr>
<tr>
<td>PEEK Classic® BC1</td>
<td>TECAPEEK™ Classic™</td>
</tr>
<tr>
<td>PEEK 30% Carbon Fiber</td>
<td>TECAPEEK™ XP98</td>
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<tr>
<td>PAEK 60% Carbon Woven</td>
<td>TECATEC™ CF60</td>
</tr>
<tr>
<td>Polycarbonate</td>
<td>Zelux® GS</td>
</tr>
</tbody>
</table>

NOTE: Biocompatibility test results are subject to change due to resin modifications and substitutions. Please contact AIN Plastics at (877) 770-6337 to confirm classification levels before product use.

USP VI

<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Description</th>
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<tbody>
<tr>
<td>Polypropylene (heat Stabilized)</td>
<td>TECAPRO™ MT, Propylux® HS</td>
</tr>
<tr>
<td>Polyvinylidene Fluoride (PVDF)</td>
<td>Kynar®</td>
</tr>
<tr>
<td>Polysulfone (PSU 1000)</td>
<td>Udel®</td>
</tr>
<tr>
<td>Polyphenylsulfone (PPSU)</td>
<td>Radel®, Ultrason®</td>
</tr>
<tr>
<td>Polytetrafluoroethylene (PTFE)</td>
<td>Ultem® 1000F</td>
</tr>
<tr>
<td>Polycarbonate GS</td>
<td>Zelux® GS</td>
</tr>
</tbody>
</table>

FDA Only

<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copolymer Acetal</td>
<td>Acetron® GP</td>
</tr>
<tr>
<td>Homopolymer Acetal</td>
<td>Delrin®</td>
</tr>
<tr>
<td>PET</td>
<td>Ertalyte® PET-P</td>
</tr>
<tr>
<td>PET (internally lubricated)</td>
<td>Ertalyte® TX</td>
</tr>
<tr>
<td>PTFE (mica filled)</td>
<td>Fluorosint® 207</td>
</tr>
<tr>
<td>Polycarbonate</td>
<td>Lexan®, Makrolon®</td>
</tr>
<tr>
<td>Nylon Cast — Type 6</td>
<td>Nylatron® MC 907</td>
</tr>
<tr>
<td>Nylon Extruded — Type 6/6</td>
<td>Nylon 101</td>
</tr>
<tr>
<td>UHMWPE</td>
<td>Tivar® 1000</td>
</tr>
<tr>
<td>PEEK</td>
<td>Ketron® PEEK</td>
</tr>
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ASTM F-648 & ISO 5834

<table>
<thead>
<tr>
<th>Grade</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Grade UHMWPE</td>
<td>GUR® 1020 (Type 1)</td>
</tr>
<tr>
<td>Medical Grade UHMWPE</td>
<td>GUR® 1050 (Type 2)</td>
</tr>
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</table>

NOTE: Special terms and conditions apply to the sale of permanently implantable materials.

Plastic Tubing

<table>
<thead>
<tr>
<th>Description</th>
<th>Trade Name</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical / Surgical Tubing</td>
<td>Tygon® S-50-HL</td>
<td>ISO 10993, USP Class VI, FDA</td>
</tr>
<tr>
<td>High Purity Tubing</td>
<td>Tygon® 2275</td>
<td>ISO 10993, USP Class VI, FDA</td>
</tr>
<tr>
<td>Sanitary Silicone Tubing</td>
<td>Tygon® 3350</td>
<td>ISO 10993, USP Class VI, FDA</td>
</tr>
<tr>
<td>Medical Peristaltic Pump Tubing</td>
<td>Pharmed®</td>
<td>ISO 10993, USP Class VI, FDA</td>
</tr>
<tr>
<td>Microbore Tubing</td>
<td>Tygon® S-54-HL</td>
<td>USP Class VI</td>
</tr>
</tbody>
</table>

Stainless Steel

<table>
<thead>
<tr>
<th>Type</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>17-4 Accumax® Precision</td>
<td>ASTM A564, AMS 5643, ASTM A484</td>
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<tr>
<td>17-4 Cond. A</td>
<td>ASTM A564</td>
</tr>
<tr>
<td>17-4 H 900</td>
<td>ASTM A564</td>
</tr>
<tr>
<td>17-4 HRAP Cond. A</td>
<td>ASTM A564, AMS 5643, AMS 2303, ASTM A484</td>
</tr>
<tr>
<td>303 MAXX®</td>
<td>ASTM A276, ASTM A479, ASTM A582, AMS 5640</td>
</tr>
<tr>
<td>316/316L MAXX®</td>
<td>ASTM A276, ASTM A314, ASTM A473, ASTM A479, AMS 5648</td>
</tr>
<tr>
<td>440C</td>
<td>ASTM A276, AMS 5630</td>
</tr>
<tr>
<td>455 Custom Solution</td>
<td>ASTM A564-04, Grade XM-16, AMS 5617 Rev. J</td>
</tr>
</tbody>
</table>

Radio Opaque Plastic materials allow for clear visibility of orthopedic sizing trials and other instrument devices and components on fluoroscopy and x-ray machines. This accommodates many of the new challenges created by minimally invasive and image guided surgery. Radio opaque plastics also provide a safety feature for locating plastic components during surgery.

I TECASON™ P MT XRO™ (Radel®)
I TECAPEI™ XRO™ (Ultem®)
I TECANYL™ MT XRO™ (Noryl® HNA055)

Semi-finished rods have been tested to meet the requirements of ISO 10993 for external devices intended for less than 24 hour contact with tissue, bone, and dentine.

High Strength Radiolucent materials are available in carbon fiber reinforced as well as unfilled grades. These products are characterized by high strength, extreme resistance to hydrolysis, and consistent resistance to ionizing radiation. All conventional sterilization methods are very compatible and the products are supported with biocompatibility testing to ISO 10993 for contact up to 24 hours.

I TECANYL™ MT CF30 (30% Reinforced Mod PPE)
I TECAPRO™ MT CF30 (30% Reinforced PEEK)
I TECATEC™ CF60 (60% Reinforced PAEK)

PAEK resins are excellent for repeated steam sterilization cycles and carbon fiber provides metal like dimensional stability and stiffness making it an ideal material for external fixation devices, targeting guides, retractor blades, and structural components.

Antimicrobial Additives provide an additional safety and performance factor in medical devices. The antimicrobial effect is achieved by a gradual release of silver ions that create several advantages such as reduced formulation of bacteria and reduction of accumulated odor and biofilm on material surfaces. They also reduce bacterial contamination during downtime to increase cleanliness.

I TECASON™ AH MT SAN (Copolymer Acetal)
I TECAPRO™ MT SAN (H.S. Polypolyphene)
I (Other SAN materials available as custom run)

SAN antimicrobial additive is non-toxic and conforms to FDA requirements. The homogeneous distribution of active SAN on the material surface is continuously renewed by cleaning and minor abrasion to constantly renew the antimicrobial effect.
**Materials For Life Science Applications**

### Plastic Tubing

<table>
<thead>
<tr>
<th>Product</th>
<th>Type</th>
<th>Description</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>PharmaPure™ Tubing</td>
<td>Low Spallation</td>
<td>Pump Tubing</td>
<td>USP Class IV &amp; FDA</td>
</tr>
<tr>
<td>Tygon® HPT Tubing</td>
<td>Biopharmaceutical</td>
<td>Tubing - Animal Free</td>
<td>USP Class IV, EP 3.2.9 &amp; FDA</td>
</tr>
<tr>
<td>PharMed™ Tubing</td>
<td></td>
<td>Outlasts silicone in peristaltic pumps by 30 x</td>
<td>ISO 10993, USP Class IV, FDA</td>
</tr>
<tr>
<td>Versilic™ High Strength Tubing</td>
<td>SPX-50</td>
<td>Reliable, durable &amp; resilient silicone tubing</td>
<td>USP Class IV &amp; FDA</td>
</tr>
<tr>
<td>Versilic™ Pressure Tubing</td>
<td>SPX-70 I.B.</td>
<td>High Strength braided silicone tubing</td>
<td>USP Class IV &amp; FDA</td>
</tr>
<tr>
<td>Tygon® Sanitary Silicone</td>
<td>3350</td>
<td>For high-purity applications and repeated sterilization</td>
<td>ISO 10993, USP Class IV, FDA</td>
</tr>
<tr>
<td>Tygon® Sanitary Pressure Tubing</td>
<td>3370 I.B.</td>
<td>Braided silicone tubing for high-purity applications</td>
<td>USP Class IV &amp; FDA</td>
</tr>
<tr>
<td>Tygon® Microbore Tubing</td>
<td>S-54-HL</td>
<td>Micro-diameter sizes fit needle gauges 30 to 17</td>
<td>USP Class IV &amp; FDA</td>
</tr>
<tr>
<td>Tygon® High Purity Tubing</td>
<td>2275</td>
<td>Provides an uncompromising fluid path</td>
<td>ISO 10993, USP Class IV, FDA</td>
</tr>
<tr>
<td>Tygon® High Purity Pressure Tubing</td>
<td>2275 I.B.</td>
<td>Tough braid reinforced for elevated working pressures</td>
<td>USP Class IV &amp; FDA</td>
</tr>
<tr>
<td>Tygon® Long Flex Life Pump Tubing</td>
<td>LFL</td>
<td>Longest flex life of any clear Tygon® tubing</td>
<td>USP Class IV &amp; FDA</td>
</tr>
<tr>
<td>Chemfluor® FEP Tubing</td>
<td></td>
<td>Chemically inert from -454°F to 400°F</td>
<td>USP Class IV &amp; FDA</td>
</tr>
<tr>
<td>Chemfluor® PFA Tubing</td>
<td></td>
<td>Chemical resistance and heat resistance to 500°F</td>
<td>USP Class IV &amp; FDA</td>
</tr>
<tr>
<td>Chemfluor® PVDF Tubing</td>
<td></td>
<td>Abrasion resistance, high purity &amp; mechanical strength</td>
<td>USP Class IV &amp; FDA</td>
</tr>
<tr>
<td>Chemflour® PVDF Pipe</td>
<td>Manufactured from</td>
<td>Kynar® 740</td>
<td>USP Class IV &amp; FDA</td>
</tr>
<tr>
<td>Acutech PEEK Capillary Tubing</td>
<td></td>
<td>Corrosion resistant and resistant to high pressures</td>
<td>USP Class IV &amp; FDA</td>
</tr>
</tbody>
</table>

### Engineering Plastics For Pharmaceutical Processing & Packaging

- Applications for tablet production such as strong wear resistant manifolds
- Wear parts for processing equipment such as star wheels and self lubricated bearings
- Ultem® and Polysulfone tooling plugs for in-line thermoforming of pharmaceutical packaging
- Sliding surfaces such as material chutes and wear strips on packaging conveyors
- Anti-static plastics are used to control dust build up and to control surface contamination
- High purity aseptic seals for pumps and seats for valves are machined from USP Class IV materials
- Filled PTFE products with antimicrobial additives are used for sanitary seals and gaskets

### Engineering Plastics For Biotechnology & Laboratory Equipment

- Polycarbonate for optics and lenses in electro-optical microscopes and optical systems
- Seals, stops and closures produced from natural, butyl and silicone rubber formulations
- PEEK is highly corrosion resistant and is ideal for applications in high pressure liquid chromatography (HPLC)
- PTFE, PFA and FEP are simply the most "universally inert" materials available in lab wear products
- Kydex® sheet is a great choice for impact resistant housings and equipment covers
- Fabricated thermoplastic trays used in the fermentation of microorganisms to produce antibiotics

### DuPont™ Vespel® Bearings

- Are used in powered surgical instruments such as pneumatic handpieces and battery powered bone drills. Spindles and impellers are light weight, durable, and require no external lubrication.
- Vespel® SP-21 (15% Graphite Filled)
- Vespel® SP-22 (40% Graphite Filled)
- Vespel® SP-211 (15% Graphite & 10% PTFE)
- Vespel® SCP- 50094 (15% Graphite Filled)
- Vespel® SCP- 5050 (50% Graphite Filled)

Vespel® bearings perform well without lubrication under conditions that destroy other plastics and cause severe wear in most metals. Vespel® can accommodate higher pressures and velocities and excel over a wide range of temperatures while maintaining outstanding creep resistance.

### Kydex® Specialty Thermoplastic Sheet

- Combines reliable performance and regulatory compliance with an extensive array of color and texture combinations. Kydex® resists exposure to lipids present in body fats and to gamma radiation.
- Kydex® 100 High Impact Fire-Rated Sheet
- Kydex® T High Impact Fire-Rated Sheet
- Kydex® 130 Decorative Granite-Look Sheet
- Kydex® 510 Weatherable & Decorative Sheet
- Kydex® 115 Clean Room Ceiling Panels
- Kydex® 160 Class I/A Clean Room Wall Covering

Kydex® sheet is extruded of non-porous, proprietary thermoplastic and is able to withstand repeated removal/cleaning/repair-installation cycles. Applications include medical equipment housings, mobile carts, hospital beds, and orthotic and prosthetic devices.

### Tygon® High Purity Tubing

- Is ideal for handling sensitive fluids such as pharmaceutical or biological solutions. There is virtually no absorption of key fluid constituents into the tubing material or fluid absorption into the tubing walls.
- Documented biocompatibility to ISO 10993
- Meets USP Class IV, FDA and NSF
- Plasticizer-free (virtually no extractables)
- Environmentally friendly (safe to incinerate)

Frequently, incineration is used to dispose of contaminated materials. While many tubings release hazardous byproducts when burned, this tubing only releases carbon dioxide and water when properly incinerated for safe disposal.

AIN Plastics Medical Technologies Group

(877) 770-6337 www.ainplastics.com
Materials For Medical Applications

Head
- TECATEC™ CF60 used for external fixation devices
- Biocompatible tubing for respiratory equipment
- TECAPEEK MT™ for ocular funnel in an endoscope

Dental
- PEEK Classix™ for temporary implants and healing caps
- Tygon® Tubing for suction and pump applications
- Clear Gamma Stabilized Polycarbonate for equipment housings

Shoulder
- Radel® is ideal for rotator cuff sizing trials
- XRO™ materials for X-Ray and fluoroscopic opaque applications
- Polypropylene HS, ideal for surgical caddy or trays

Spine
- TECAPEEK™ MT as pre-setup option for PEEK-OPTIMA® in spinal cages
- Modified Polyethylene and Kydex® for immobilization devices
- ASTM F2026 PEEK for spinal cages

Abdominal
- Tygon® Long Flex Life Pump Tubing for dialysis equipment
- Tygon® Surgical Tubing with higher sterilization resistance
- Ergonomic Radel® Pistol Grip for suture cutter

Hip
- TECANYL™ MT for hip arthroplasty sizing trials
- Ultem® handles for femoral shaft surgical rasps
- Radel® for hand fitting shaped grip on striking instrument
- UHMW PE GUR® 1020 and GUR® 1050 for total joint replacement prostheses

Lower Limb
- Copolymer Polypropylene for custom orthopaedic braces
- DuPont™ Vespel® non-lubricated bearing for light weight surgical drills
- Stress relieved polypropylene for ankle foot orthosis

Knee
- Celcon® Acetal for sizing trials used during knee arthroplasty
- Ultem® handles for orthopedic surgical instruments
- Radel® plate for extramedullary tibia alignment guide
- Medical Grade UHMWPE for tibial components
## Typical Colors For Common Medical Shapes

### Acetal Colors
- Aqua
- Black
- Light Blue
- Royal Blue
- Brown
- Purple
- Green
- Bright Green
- Dark Green
- Light Green
- Grey
- Hot Pink
- Natural
- Orange
- Pink
- Red
- Rust
- Tan
- Yellow

### Ultem® Colors
- Black
- Blue 1000F
- Dk Blue 1000F
- Lt Blue 1000F
- Brown 1000F
- Grey 1000F
- Dk Green 1000F
- Lt Green 1000F
- Lavendar 1000F
- Purple 1000F
- Natural 1000
- Rust 1000F
- Red 1000F
- Tan 1000F
- Lt Yellow 1000F
- Yellow 1000F
- White 1100F

### Radel® Colors
- Black
- Blue
- Brown
- Grey
- Smoke Gray
- Green
- Bright Green
- Grey
- Orange
- Purple
- Red
- Rust
- Yellow
- Natural (amber)
- Natural (bone)

### TECANYL MT® Colors
- Green
- Yellow
- Brown
- Grey
- Blue
- Black
- White

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**NOTE:** We can not guarantee that the colors shown here are true representations of the extruded shape. Please contact AIN Plastics at (877) 770-6337 to confirm the actual color per the manufacturer's specification.