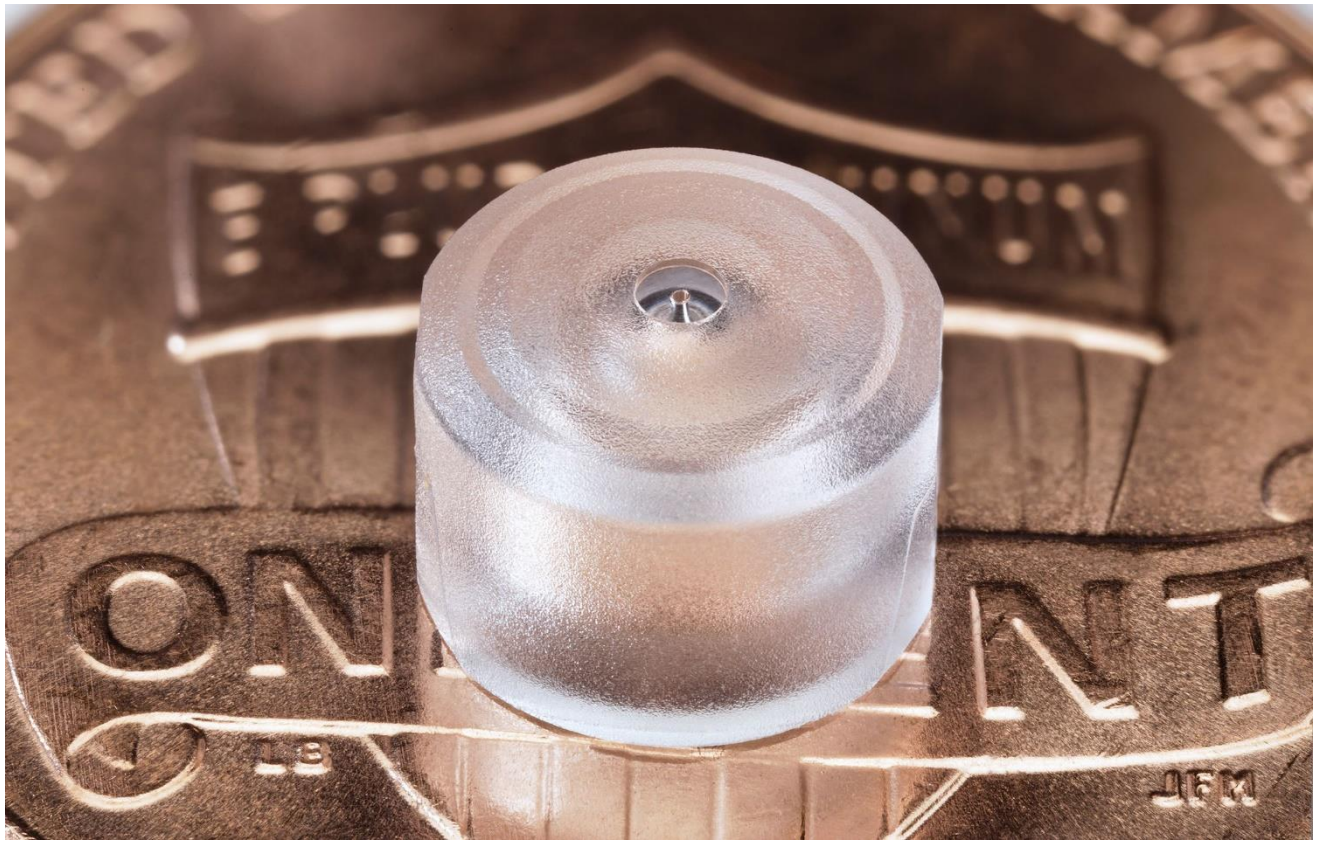
KunLun Advance Material Technology

Micro Injection Molding and Micro Assembly

Drug Delivery Nozzle



MICRO MATERIALS: This drug delivery device is made from Cyclo Olefin Polymer (COP).

MICRO FEATURES: Hole size .006″ diameter with +/- .0004″ tolerance. This diameter is molded flash-free, a requirement for the part functionality. Core pins are wire EDM turned, an unconventional approach to core pin construction. The minimized amount of microscopic radial lines in core pin improves the functionality of this part. A1 polish in the funnel area of the part geometry.

DESCRIPTION: This micro injection molded nozzle features a micro funnel geometry at the center of the part for specialized drug delivery. KunLun is the molder in the world that can successfully manufacture this complex device in production.

Spring-Shaped Bioabsorbable Tack

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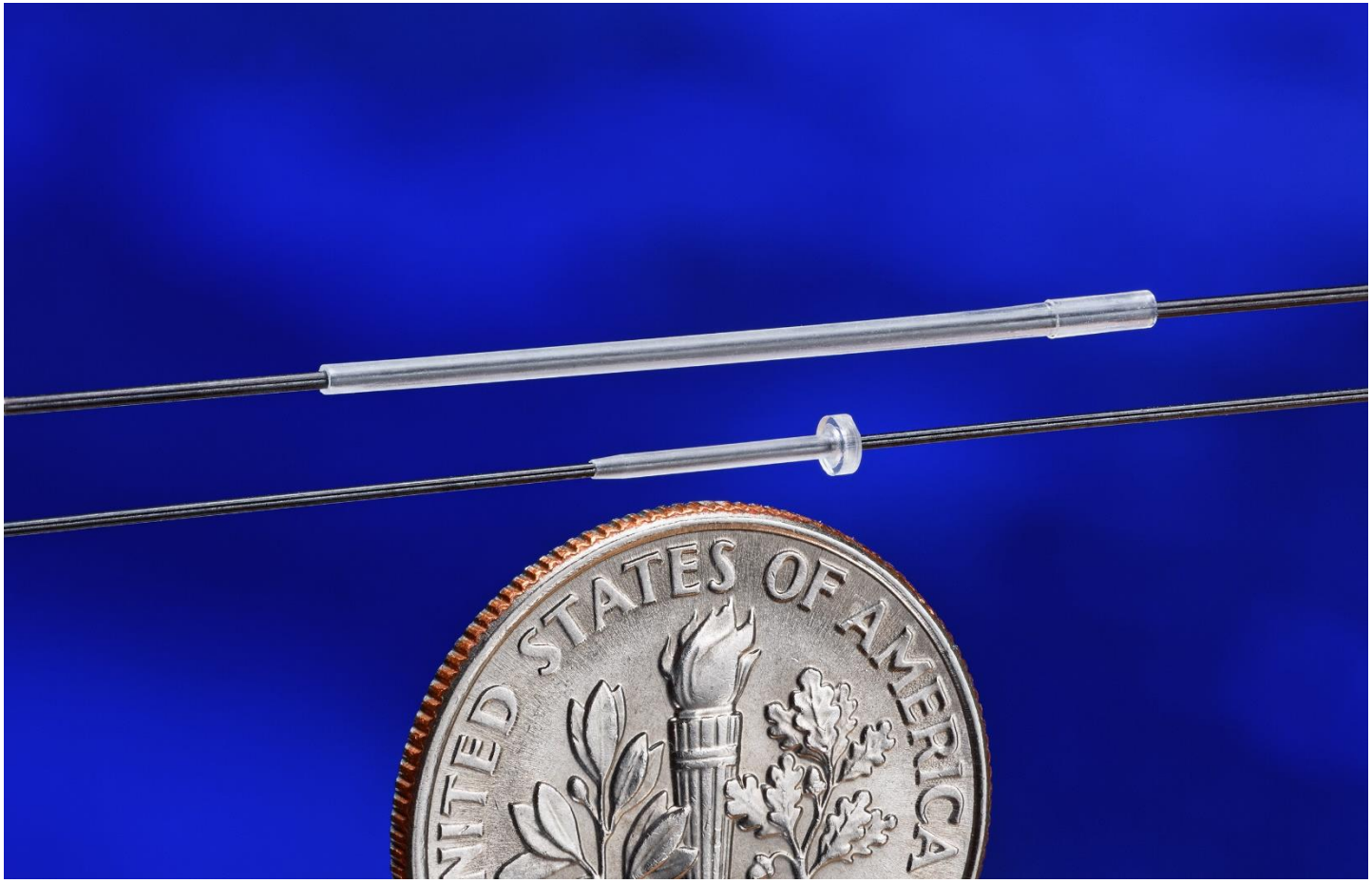
MICRO MATERIALS: This implantable tack is made of a bioabsorbable polymer.
MICRO FEATURES: All tolerances are +/-.002″ throughout. Ultra-sharp points with no discernible radius measured.
DESCRIPTION: This bioabsorbable tack required an extremely complex tool design. We built a multiple-ejector system in a sequence and reversed the sequence when the mold closed, creating a frenzy of moving parts. KUNLUN molded this spring with tight tolerances from bottom to top. During the

ejection sequence, we contained the part while it was still cooling so we didn't compress the spring shape and could maintain the overall height (OAH) of the design. We produced this component with a minimal post-mold IV loss of < 3%.

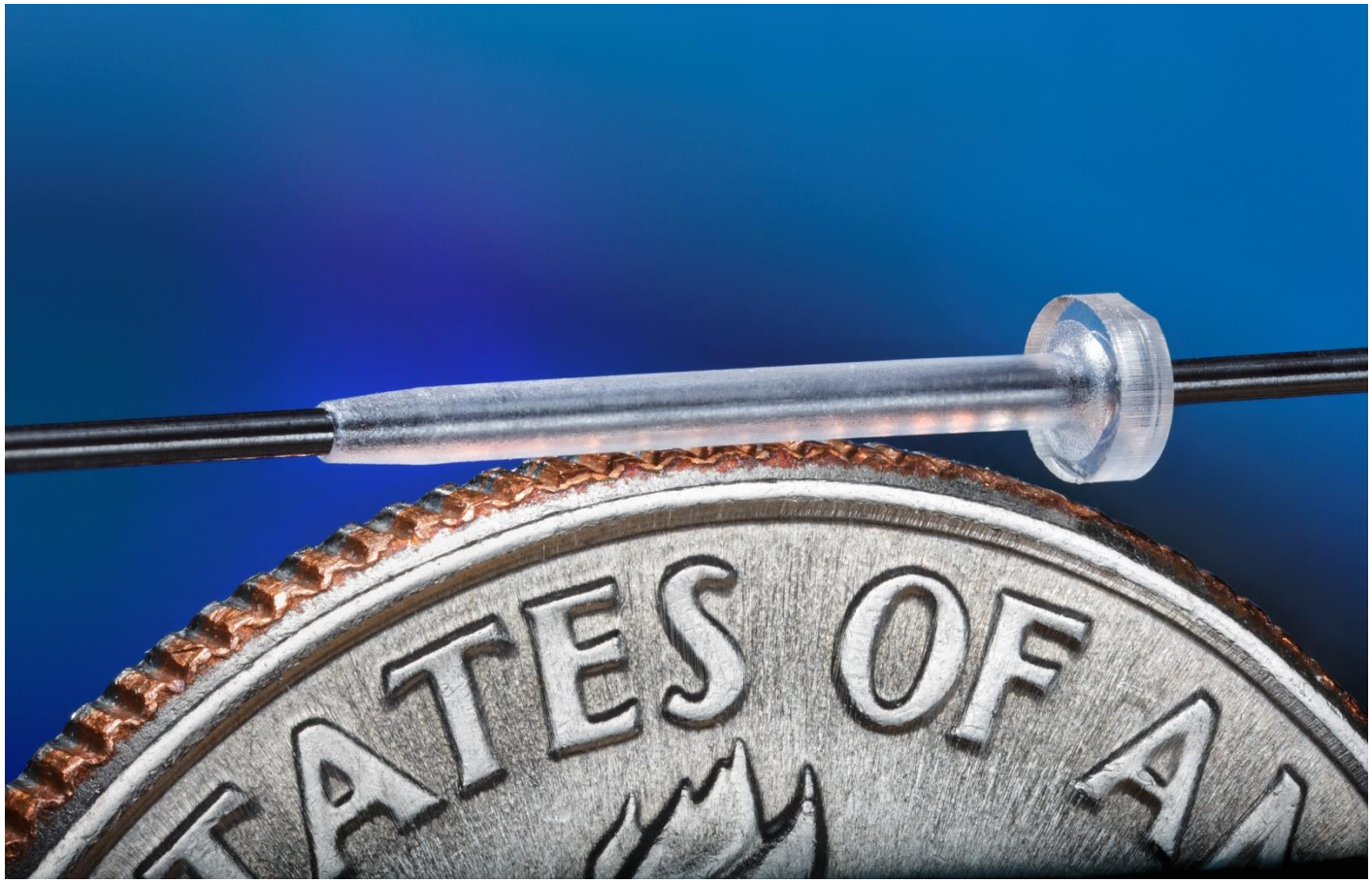
Drug Delivery Straw



MATERIALS: This drug delivery device is made from Polypropylene.

DESCRIPTION: Pictured above the **thin-walled cannula**, this thin-walled micro-molded design has a .005″ long distance wall. Highly capable tooling and molding equipment and techniques are required to successfully injection mold a part like this.

Drug Delivery Cannula



MATERIALS: This drug delivery device is made from Polypropylene.

DESCRIPTION: This thin-walled micro-molded cannula design includes walls as thin as .0025″.

Bioabsorbable Fixation Suture

MICRO MATERIALS: This device is made of a bioabsorbable polymer.
MICRO FEATURES: This unique bioabsorbable fixation suture design required an extremely challenging tooling approach. Extremely tight tolerances throughout required for part functionality.
DESCRIPTION: A client approached KUNLUN with their design, seeking a product that is consistent with minimal inherent viscosity (IV) loss.

Bioabsorbable Fastener

MICRO MATERIALS: This device is made of PLG (L-lactide/glycolide copolymer), a bioabsorbable polymer.
MICRO FEATURES: The bioabsorbable fastener has two hollow legs connected by a flexible “bridge” and features sharp tips. Its flash allowance is 0.1mm max.
DESCRIPTION: A client approached KUNLUN with their fastener design, seeking a product with minimal inherent viscosity loss and crisper features to improve functionality. While most competitors have difficulty realizing less than a 20% IV loss, KUNLUN developed a superior bioabsorbable fastener with an IV loss of less than 4%.

Bioabsorbable Fixation Screw

MICRO MATERIAL: This fixation screw is made out of PLDL, a bioabsorbable polymer.
MICRO FEATURES: World's smallest bioabsorbable unscrewing mold.
DESCRIPTION: This fixation tack is used with a mesh in hernia repair surgery. As opposed to a bioabsorbable staple, soft tissue bioabsorbable anchors or screws compete with articulating and fixed fixation devices such as the Ethicon Secure Strap Fixation Device and Covidien Absorbatack Fixation Tack.

Undermolded PEEK Anchor Device»

MATERIALS: The undermolded anchor device is made from PEEK.
DESCRIPTION: The anchor device is “under molded”. Yes, it’s possible!

Micro Needle Wheel »

MICRO MATERIAL: Confidential thermoplastic

MICRO FEATURES: The micro-needle wheel geometry was created with Sarix micro EDM technology, which includes 36 needle features. Each needle measures .003” wide with a height of .0059″.

DESCRIPTION: The device has micro-needle skincare technology.

Implantable Ligating Clip »

MICRO MATERIAL: The implantable device is molded from a confidential thermoplastic material
MICRO FEATURES: The ligating clip features a crescent-shaped window which measures 0.010″ (0.25 mm) wide.
DESCRIPTION: Yes, it snaps closed! The average cross section is 0.20″ (5.08 mm).

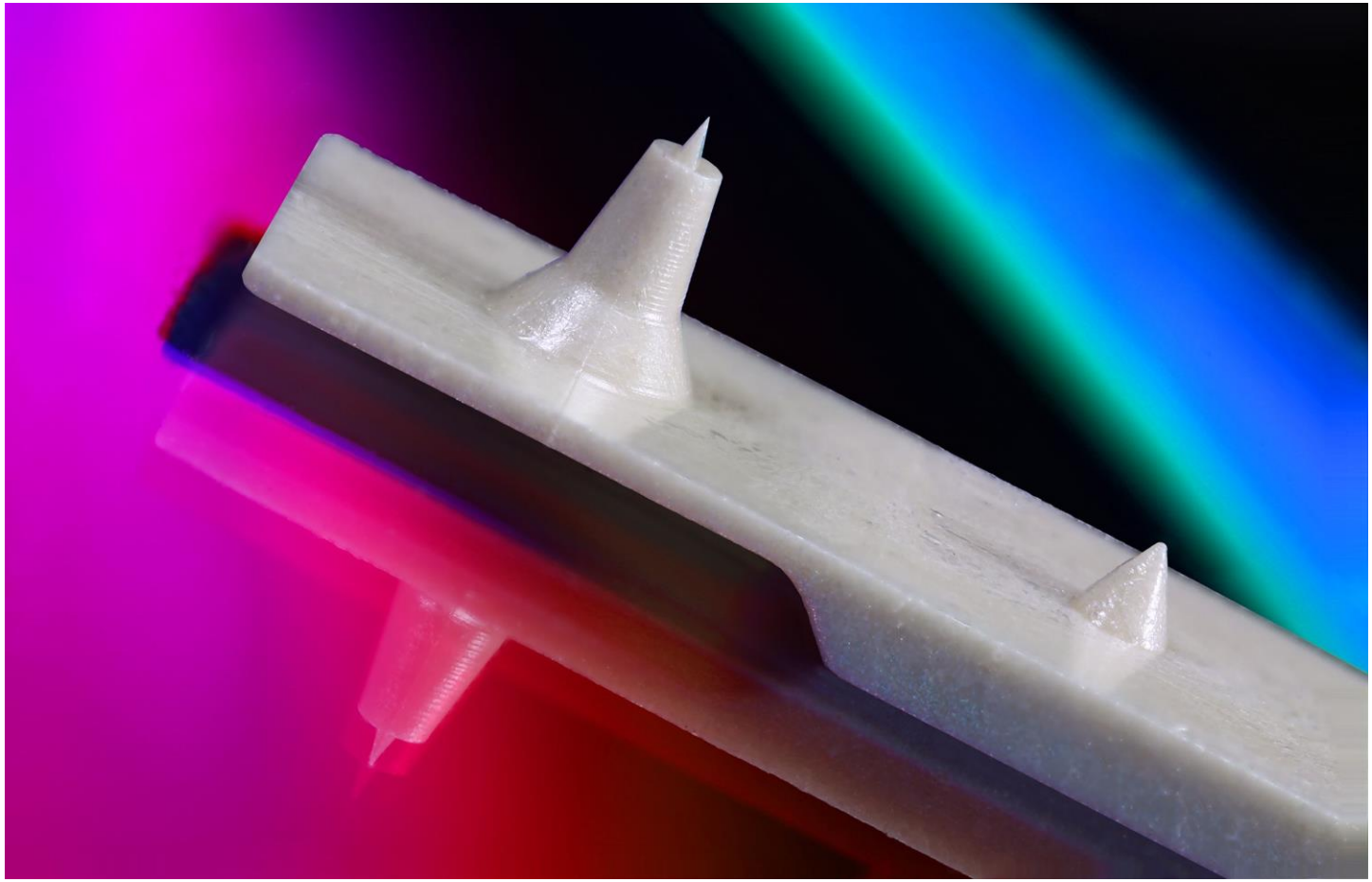
Drug Eluting Implant

MICRO MATERIALS: This drug eluting implant is made with confidential bioabsorbable materials.
MICRO FEATURES: The implant has windows with .003″ tolerances.
DESCRIPTION: This device has extreme precision required for the through-holes in this application, used for neurological implants.

Overmolded Catheter Tip

MICRO MATERIAL: The catheter tip is comprised of a stainless steel insert overmolded with Ultem.
MICRO FEATURES: This surgical device boasts extremely thin walls measuring .005″ wall thickness at the overmolded section of the metal ring. The design also features +/- .001″ tolerances throughout.
DESCRIPTION: The tip design required extreme micro tooling precision to accomplish the tiny through-holes in this application.

Micro Needles



MICRO MATERIAL: The micro needle device is made from LCP (Liquid Crystal Polymer).
MICRO FEATURES: The needle has a 5 micron tip radius (left).
DESCRIPTION: This test specimen illustrates the difference between an KUNLUN high-precision molded micro needle (left) with a 5 micron radius on the tip, which was created with Sarix EDM technology, and an industry standard needle point with a .003″ radius tip (right).

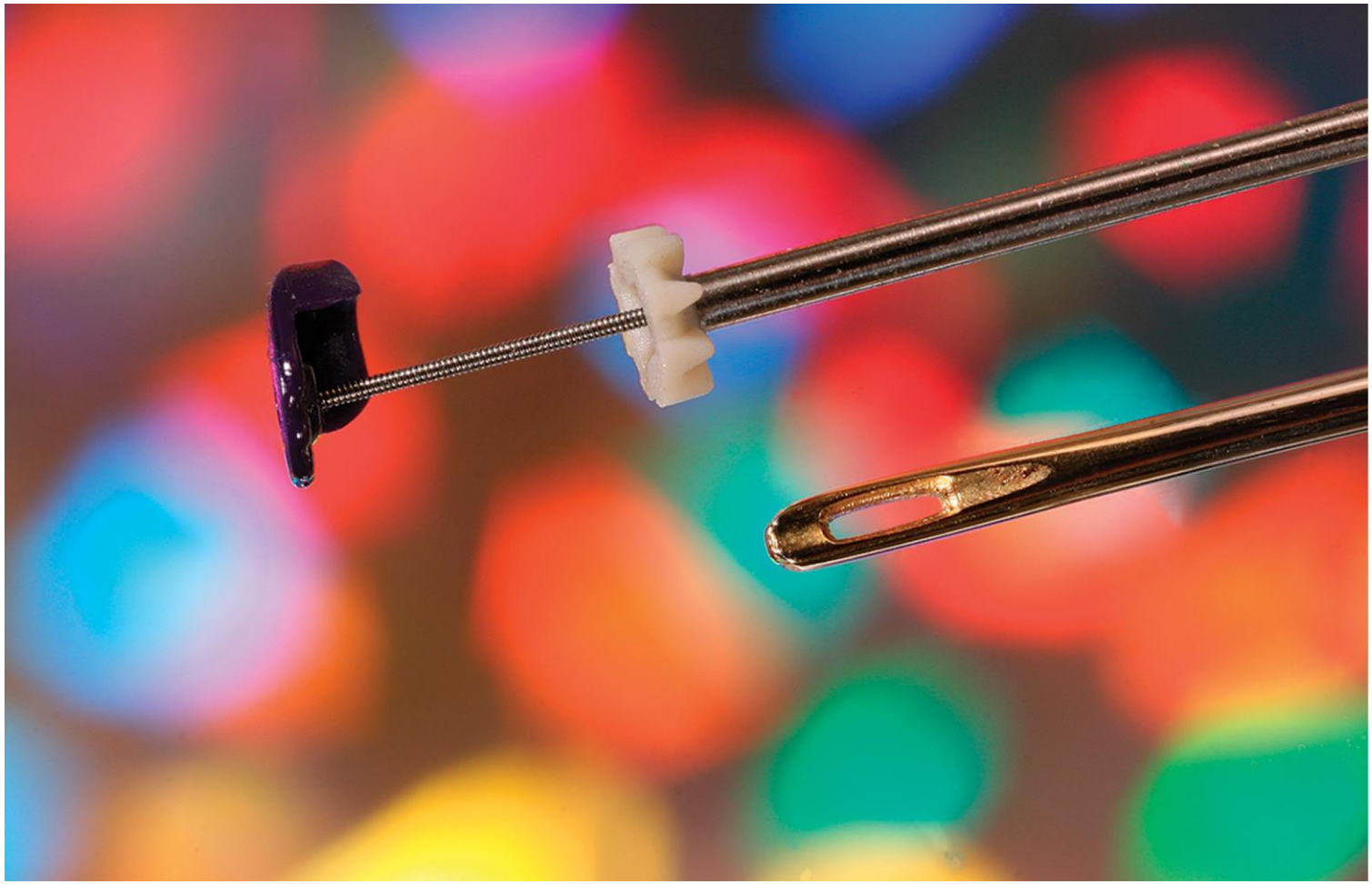
Micro Imaging Tip

MICRO MATERIAL: The micro imaging tip device is made from PC, a thermoplastic polymer.
MICRO FEATURES: The micro component stands 0.1″ tall with a .002″ wall thickness.
DESCRIPTION: The micro imaging tip is about 1/4 the size of a grain of rice.

Overmolded Surgical Hypotubes

MICRO MATERIAL: The hypotubes are made of a confidential thermoplastic material.
DESCRIPTION: The .011″ diameter overmolded surgical hypotubes have an extremely small tube-to-tube offset. Strategic gating was important to maintain an exact orientation of the tubes.

Overmolded Suturing Device



MICRO MATERIAL: The device is made from Ultem, an amorphous thermoplastic polyetherimide (PEI) resin.
MICRO FEATURES: The overmolded assembly design has a spring OD of 0.11″ (0.28mm). The Ultem wall thickness is 0.012″ (0.30mm).
DESCRIPTION: The assembly device and mating overmolded tube were components of an endoscopic suturing device used in a non-robotic, minimally invasive surgery. The laparoscopic procedure deployed a circular pattern of staples to create a closure.

Micro Assembly

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MICRO MATERIAL: The device is made from Glass Filled LCP (Liquid Crystal Polymer).
MICRO FEATURES: The micro-electronic assembly device features two 0.028″ (0.71 mm) diameter shafts.
DESCRIPTION: The objective was to assemble 5 pieces with minimal amount of plastic material into the micro-electronic assembly device. The 5-piece assembly was made possible by molding with LCP. The added challenge is that one piece is glass.

Micro Nozzle Body

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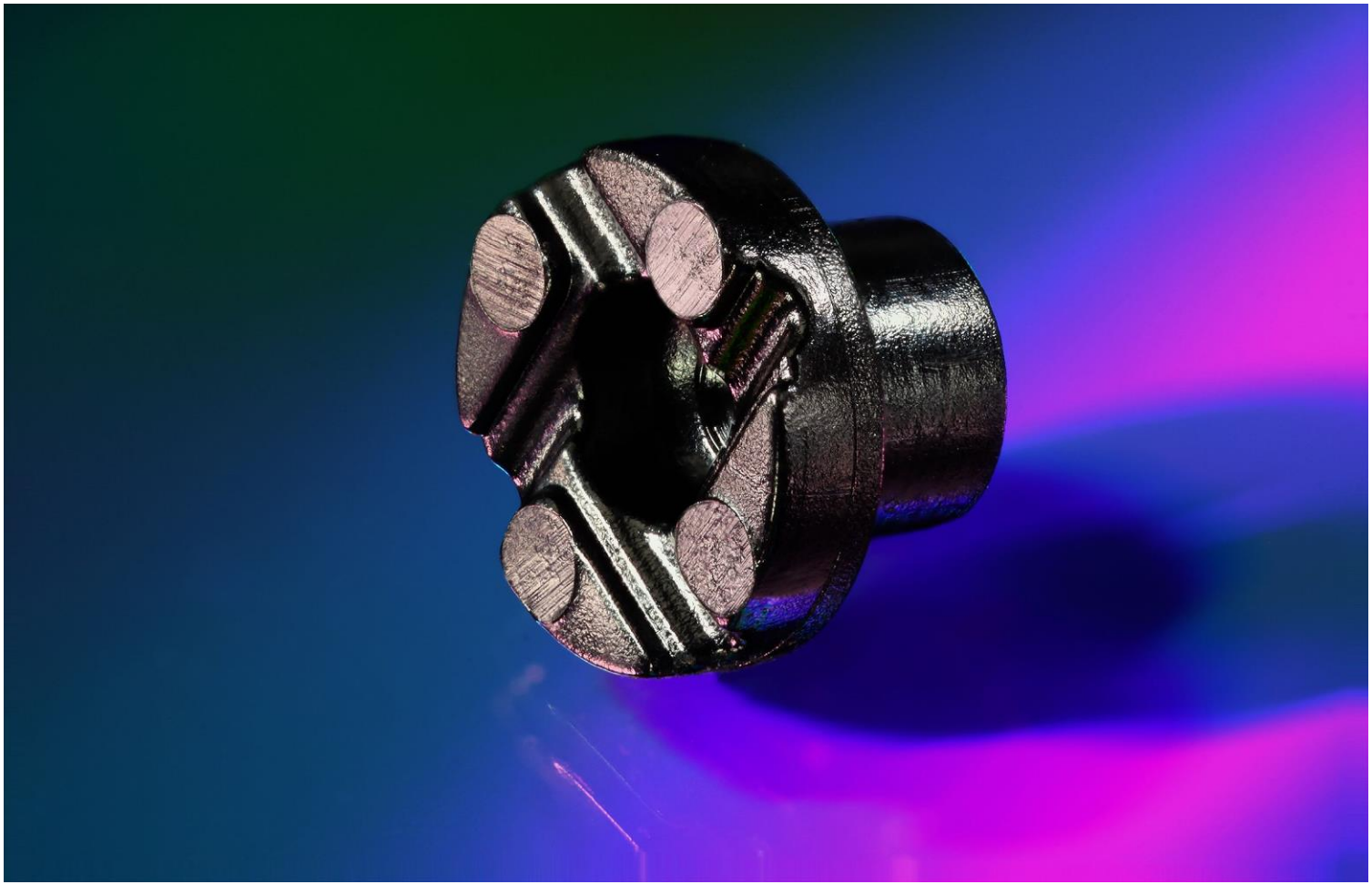

MICRO MATERIAL: The device is molded of Ultem, an amorphous thermoplastic polyetherimide (PEI) resin.
MICRO FEATURES: The nozzle body device measures 0.0063″ (0.16 mm) Nozzle ID.
DESCRIPTION: Our biggest challenge with the micro molded ultem nozzle body device was aligning the mold halves to prevent breakage of the .0063″ (0.16 mm) pin.

Micro Nozzle Cover

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MICRO MATERIAL: The device is made of Ultem, an amorphous thermoplastic polyetherimide (PEI) resin.
MICRO FEATURES: The design features a 0.0063″ (0.16 mm) Nozzle ID.
DESCRIPTION: The nozzle cover device’s Nozzle ID is directly related to spray pattern.

Fluoropolymer Gasket Component

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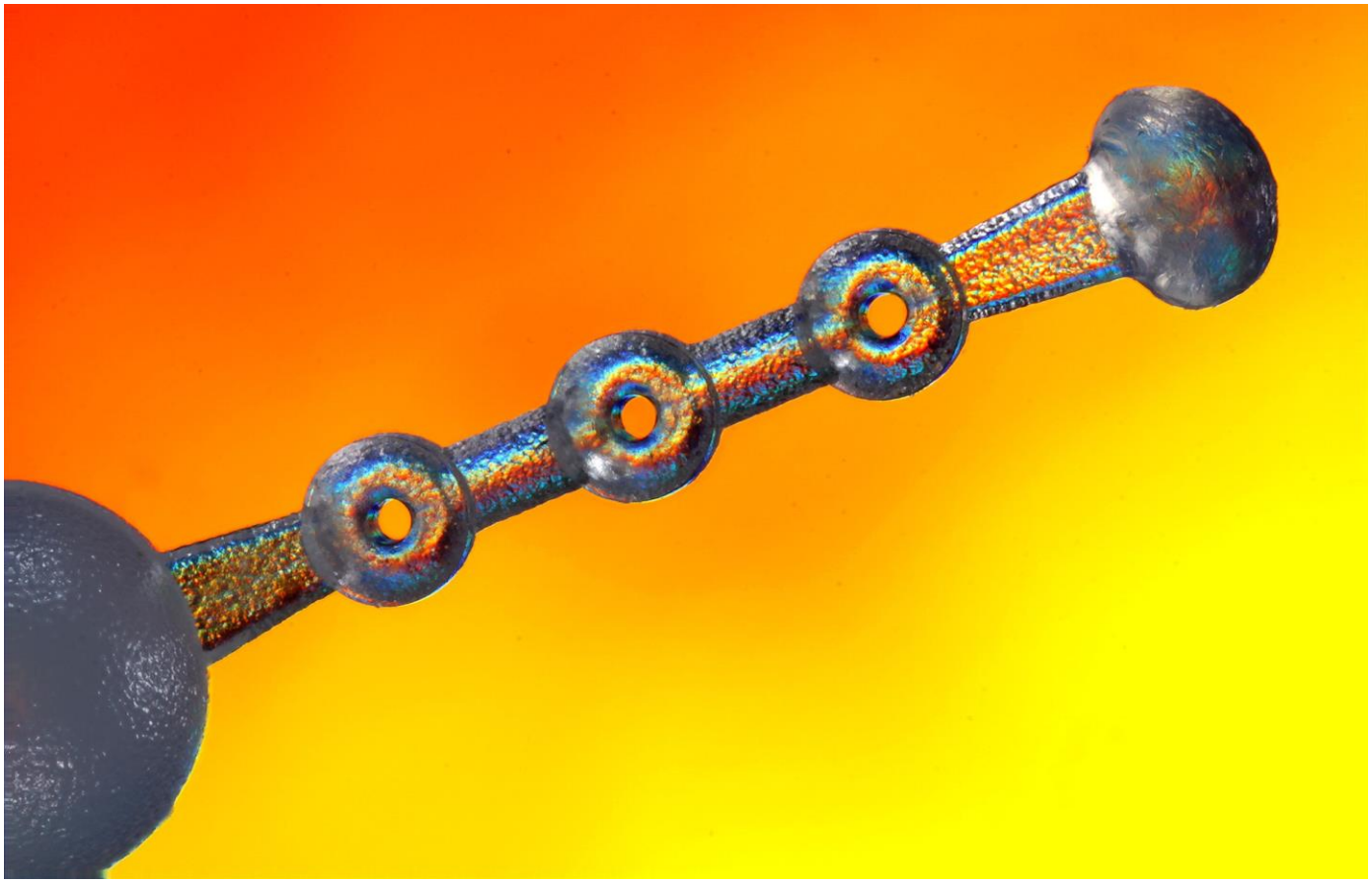
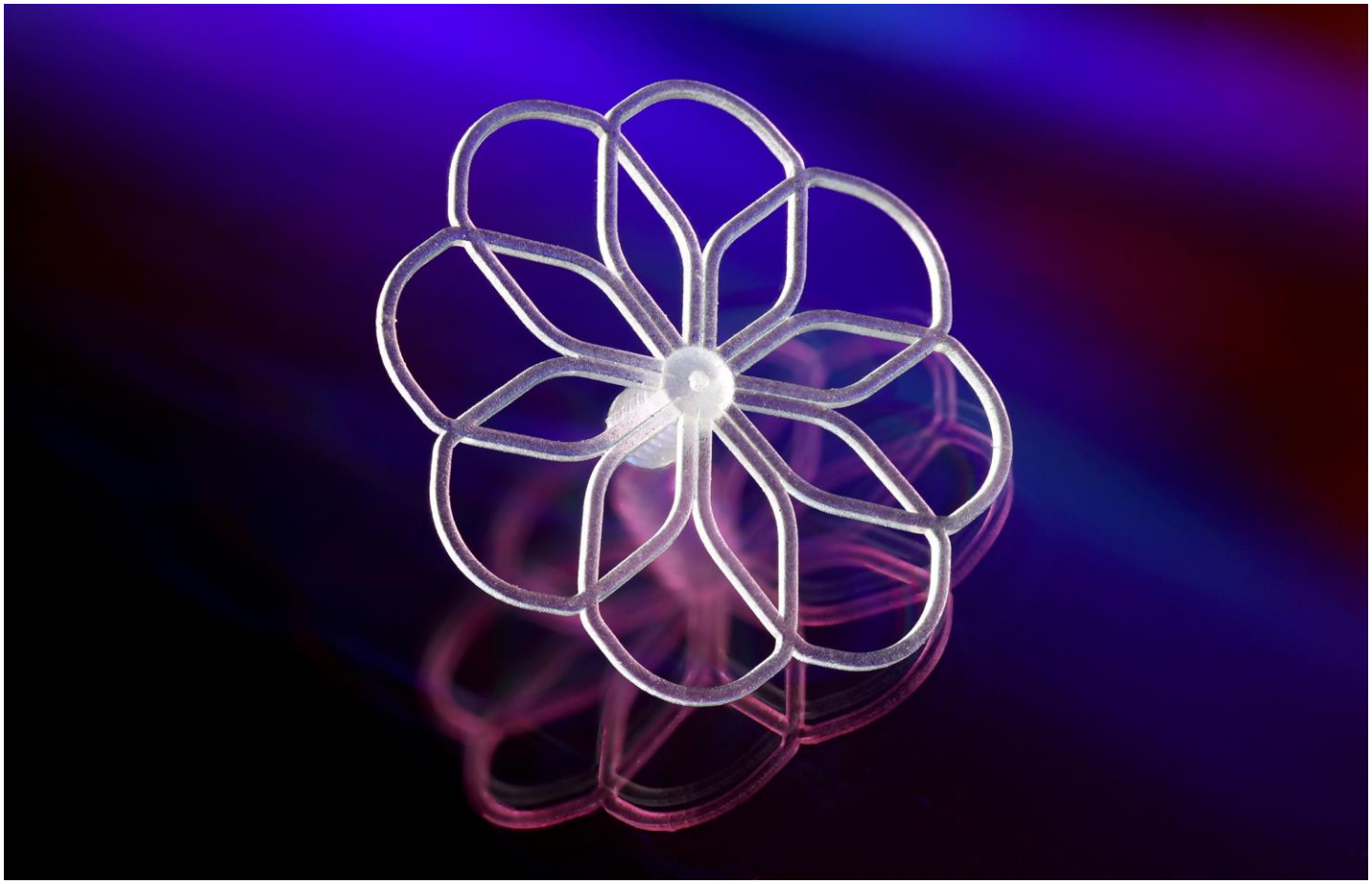


MICRO MATERIAL: The device is made of Fluoropolymer, a fluorocarbon-based polymer with multiple strong carbon–fluorine bonds.
MICRO FEATURES: The fluoropolymer gasket device features 0.006″ (0.15 mm) diameter through-holes.

Shape Memory Polymer Resin “Flower” Device



MICRO MATERIAL: The “flower” device is made of an experimental shape-memory thermoplastic material
MICRO FEATURES: The design features a 0.009″ (0.23 mm) wide webbing.
DESCRIPTION: The shape-memory material allows the “flower” to collapse or spread, as shown. This “flower” device, which is a catheter tip ablation head, demonstrates the need for MicroFlow and MicroFill micromolding technology. The challenging part design features long, looping channels that create multiple intersecting flow paths. Preventing one or more of these channels from prematurely solidifying and causing a “short-shot” is only possible with the right micromolding equipment.

Medical Actuator Spring Housing Device

MICRO MATERIAL: The device is molded of POM (polyoxymethylene), a thermoplastic acetal material.
MICRO FEATURES: The medical actuator spring housing device is less than 0.079″ (2 mm) diameter.
DESCRIPTION: Micro-edge technology was used to create razor sharp edges. The medical actuator spring housing device was built to be precise!

Bioabsorbable Tack

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MICRO MATERIALS: Bioabsorbable Tack

MICRO FEATURES: The bioabsorbable tack sharp points must be less than 0.0002″R.

DESCRIPTION: Economical micro processing of bioabsorbable materials require minimum runner sizes to reduce waste. Bioabsorbable materials degrade with shear generated in small flow paths. Manufacturing a bioabsorbable tack design solution that balances these conflicting needs is a challenge we have learned to conquer.

Flow Tube Device

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MICRO MATERIALS: The device is molded in PC (Polycarbonate), a thermoplastic material.
MICRO FEATURES: The flow tube device OD is about .0065″ and the ID is about .0046″. The diameter of the hole is .033″.
DESCRIPTION: The flow tube device part is about 0.6″ long.

PEEK Implant

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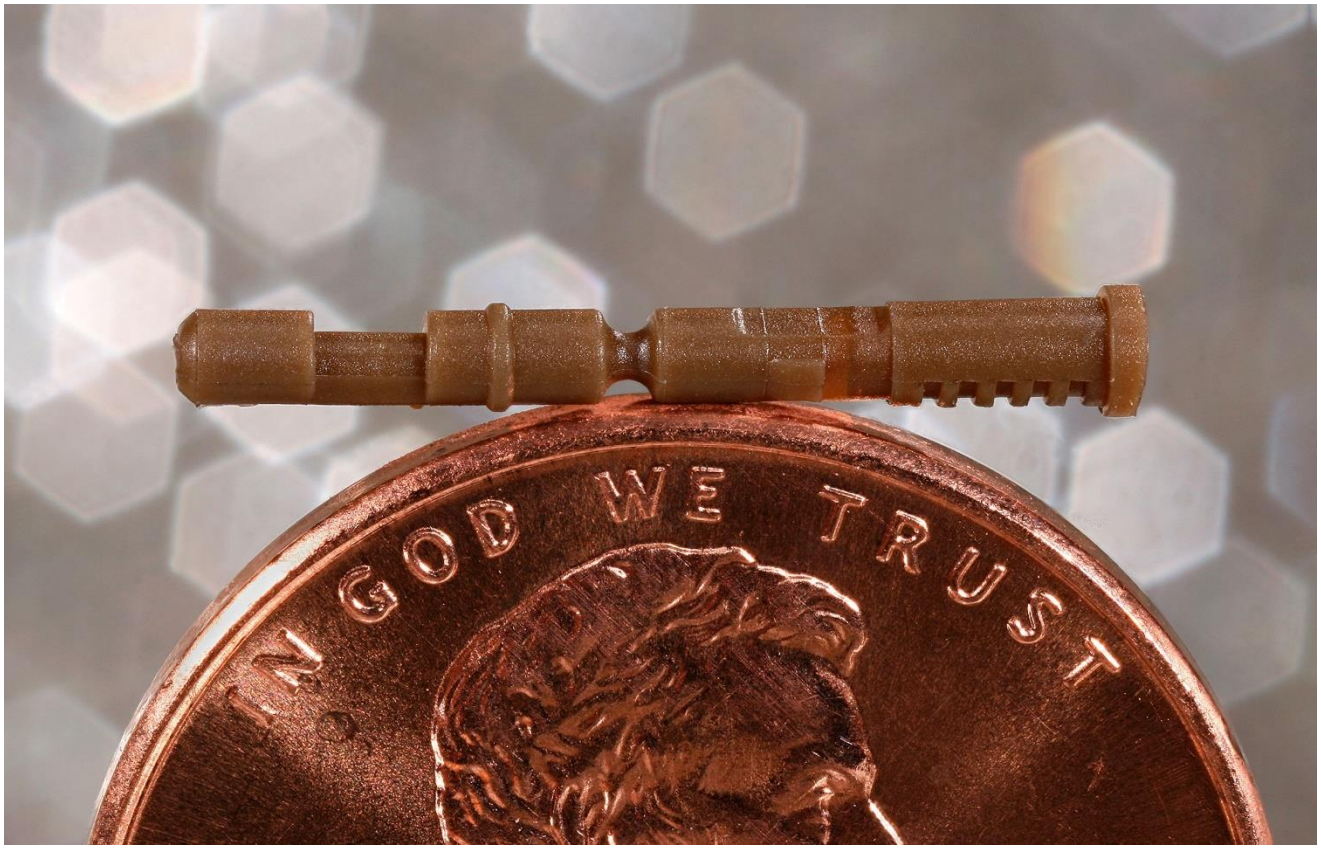

MICRO MATERIALS: This device is molded from PEEK (PolyEther Ether Keytone).

MICRO FEATURES: 0.022″ (0.56 mm) ID Passage for the implant.

DESCRIPTION: This PEEK implant is used as a soft tissue-bone anchor device in orthopedic or minimally invasive reconstructive surgeries. The PEEK device's unique .007″• micro rib design with zero draft was highly important to the design functionality as this would serve as the main region for suture compression. KUNLUN's challenge was to not only create this feature in the tool steel with adequate venting but also ensuring through the use of micro mold flow that the geometry could be completely filled.

Strain Relief Device

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MICRO MATERIAL: This ablation tip is molded Glass Filled LCP (Liquid Crystal Polymer).
MICRO FEATURES: The device design features 0.030″ (0.76 mm) ID and 0.950″ (24.13 mm) OAL.
DESCRIPTION: The strain relief device has extremely long flow length; minimum wall thickness of 0.004″ (0.10 mm).

Vascular Connector

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MICRO MATERIAL: The device is molded of confidential thermoplastic material.
MICRO FEATURES: There isn’t a straight line on this connector. Average wall thickness of 0.008″ (0.20 mm).
DESCRIPTION: The vascular connectors are surgical implants that form precisely controlled vascular connections while minimizing vessel trauma. Extremely challenging material, parts have very thin molded walls throughout (0.008″).

Micro Nozzle Component

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MICRO MATERIAL: The device is molded of Polypropylene (PP), a thermoplastic material.
MICRO FEATURES: The micro nozzle component key feature is a 60 micron diameter (0.0024″•), thin walled, exit hole with micron tolerances
DESCRIPTION: Micromolded Pipette Tip used in DNA analysis. The micro nozzle component micro-sized tip creates micro droplets dispensed from the nozzle, applications for which are abundant in Laboratory Analytics, Pharmaceuticals, and Miniature Surgical Devices. The size of this part, along with its shape, hole diameter, and thin walls, makes it similar to other micro spray and microfluidic dispensing components, including aerosols. It is also very similar to minimally invasive surgical components such as catheter tips.

Ultem Clip Component»

MICRO MATERIAL: The clip is made of Ultem 1010 thermoplastic resin.
MICRO FEATURES: The clip component measures 0.009″ (0.23 mm) in wall thickness.
DESCRIPTION: The clip device is made of a high-strength polymer that flows better than PEEK, but not as good as Polycarbonate. In this application the S-shaped geometry was used as a molded spring to create friction in a infusion pump. One challenge was selecting a gate location that developed a knit line without compromising the integrity of the spring. MicroFlow analysis was used to optimize the runner and gate geometry. This complex tooling solution required a double side action, contoured parting line with a jumped parting line feature.

Urological Care Component

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MICRO MATERIAL: The component is made of Polypropylene (PP).
MICRO FEATURES: The urological device component’s OD measures 0.059″ (1.5 mm).
DESCRIPTION: KUNLUN Micro Molding manufactured this polypropylene part to our customer’s exacting specifications. MicroFill Technology and extremely tight tolerances resulted in a product with razor sharp points and a smooth barrel.

Ultem Fixation Screw

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MICRO MATERIAL: The screw is made of Ultem, an amorphous thermoplastic polyetherimide (PEI) resin.
MICRO FEATURES: The device features an end of flow, which is a feather-edge condition.
DESCRIPTION: This design from our customer called for pushing a difficult flowing material to a feather-edge while maintaining exacting tolerances. The specifications for the screw required a very exact micro tooling design in a highly capable molding system.

Carbon-Filled PEEK Sports Medicine Device

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MICRO MATERIAL: Carbon-Filled PEEK thermoplastic
MICRO FEATURES: The component is overmolded over a .031″• diameter stainless steel rod.
DESCRIPTION: Micro overmolding with Carbon-Filled PEEK with a 400° F mold temperature present many challenges. As a micro medical device manufacturer, KUNLUN Micro Molding consistently pushes new materials and new technologies to the limit. Micro overmolding and PEEK micromolded products are the result of years of quality control and building expertise in the PEEK micro molding field.

Micro Medical Plug

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MICRO MATERIAL: Component made of polypropylene (PP) thermoplastic polymers.
MICRO FEATURES: This plug is 0.079″ (2 mm) diameter and 0.098″ (2.5 mm) length
DESCRIPTION: This tiny component plug is one of our many micro medical components that we painstakingly built from polypropylene. The micro insert molding device blends tiny radii with smooth contours. Our customer requested: No sharp edges please!

Thin Wall Micro Molding: Link Component

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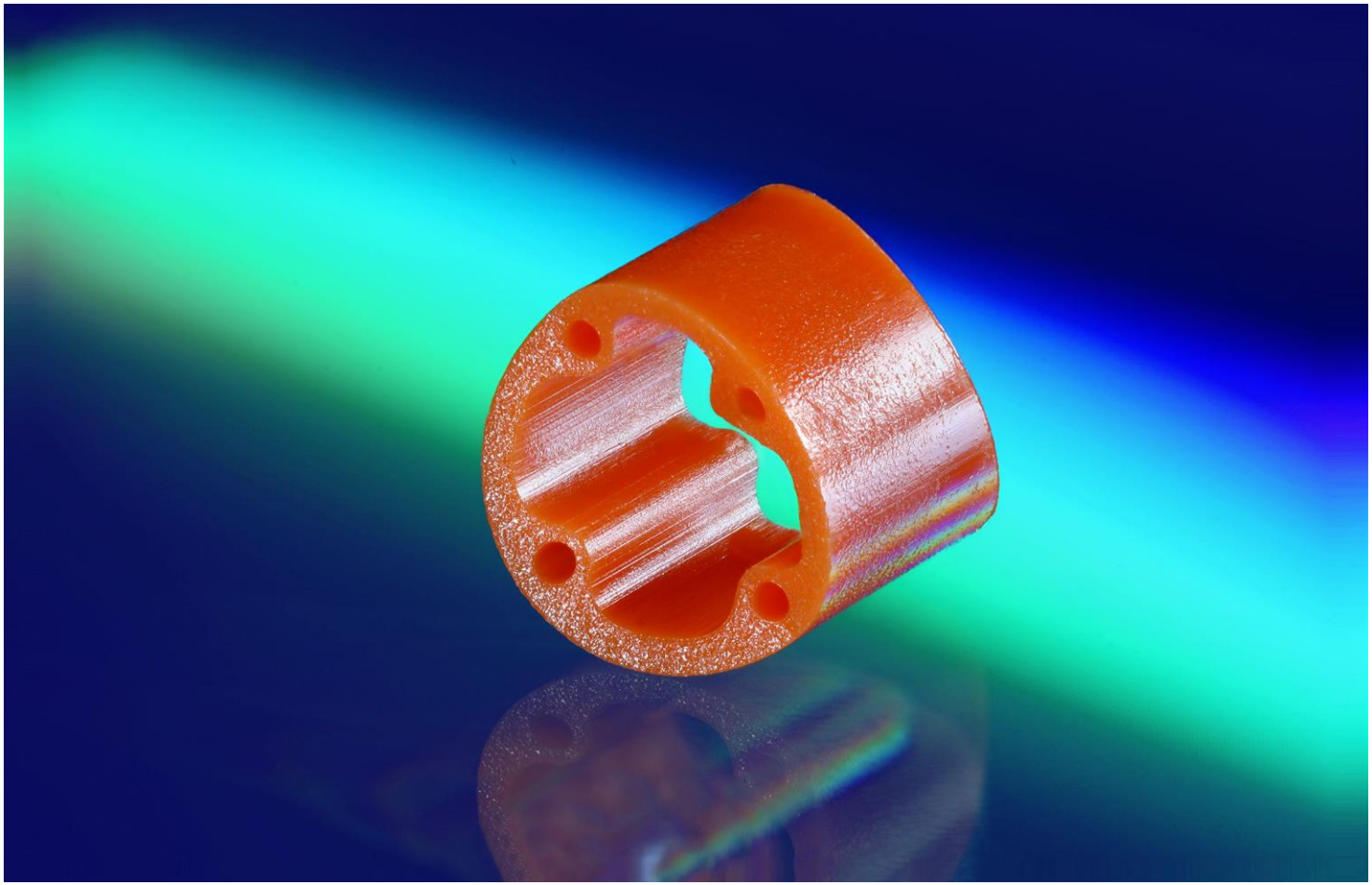

MICRO MATERIAL: This component was molded from a confidential, custom-compounded thermoplastic material.
MICRO FEATURES: The design features 0.004″ (0.10 mm) wall thickness surrounding the 0.011″ (0.28 mm) diameter through-holes.
DESCRIPTION: Custom-compounded experimental materials were used in the Research & Development phase of this thin wall micromolding device. One was a nickel-coated carbon fiber LCP. This link component was built to exceedingly tight tolerances, per our customer’s specifications.

Bioabsorbable Anchor

MATERIAL: This device is molded from PLG, a bioabsorbable copolymer.
MICRO FEATURES: The anchor weighs 0.025g.
DESCRIPTION: The bioabsorbable anchor is used in a fascia closure device that aims to minimize port site herniation following laparoscopic abdominal surgery. The reduced IV loss in these PLG wall anchors is critical in ensuring optimal wound healing. KUNLUN's extensive knowledge with micromolding bioabsorbable resins allows less than 5% IV loss to be achieved.

Thin Wall Micro Molding Ejector Ring Device

« PREVIOUS • NEXT »

MICRO MATERIAL: This device is molded from Ultem, an amorphous thermoplastic polyetherimide (PEI) resin.
MICRO FEATURES: This ejector ring features thin wall micro molding, measuring .009″ (.23mm) wall thickness restricted in four locations to .0035″ (.09mm).
DESCRIPTION: This ring design features multiple three-plate gates into a .009″ (.23mm) wall, leaving little room for error. Our expertise and experience with thin wall micro molding to tight tolerances allowed us to succeed where others could not.

Staple

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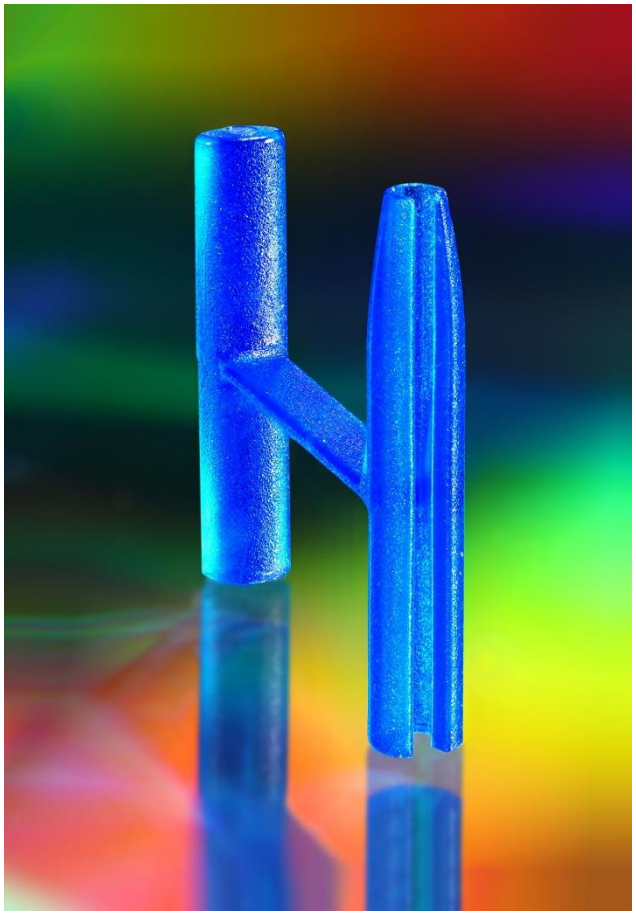

MICRO MATERIAL: This staple is molded from a custom-compounded thermoplastic material.
MICRO FEATURES: This medical device features a 0.010″ (0.25 mm) wide side-action slot.
DESCRIPTION: This staple allows the wide side-action slot to intersect with a 0.020″ (0.51 mm) diameter pin. KUNLUN Micromolding custom manufactures medical micro staples that consistently exceed expectations. Our staples are built to your exact specifications and tightest tolerances.