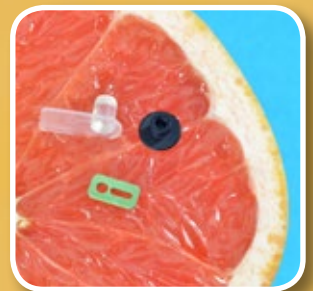


MICRO FORM

CUSTOMIZE | OPTIMIZE | MINIMIZE

Micro molded high performance elastomer components for critical applications



MicroForm® from PPE

Customize / Optimize / Minimize

Engineered and customized elastomer solutions for your micro component needs; designed and developed to fully optimize your equipment or application.

Miniaturization

The world is becoming highly interconnected and *small* at the same time.

Portability, analytical performance, agility, cost, automation and environmental sustainability are all driving companies towards miniaturization.

At PPE, we have the ability to manufacture micro elastomer components that will enable you to harness the benefits that result from miniaturization.

MicroForm®

MicroForm® components are micro sized parts manufactured in high performance elastomers that solve industry's most critical applications, that require the highest degree of precision and endurance in aggressive media.

The benefits of PPE's design service, technical support, unique elastomer material and short manufacturing lead-times are now available in micro components.

**MICRO
FORM**



MicroForm® fully automated manufacturing cell (ISO Class 6 environment)

PPE at the forefront of a market leading technology

Molding **micro components in high performance materials** is challenging, from conceptualizing the flow of the polymer into the mold to manufacturing because the fluid mechanics are dramatically different at the micro scale.

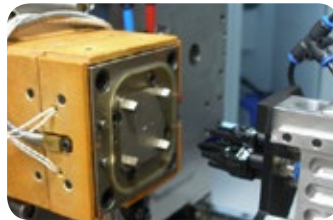
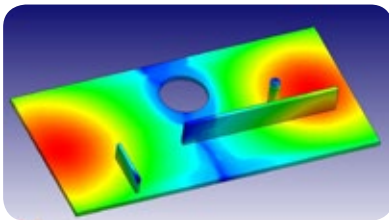
PPE has carried out extensive research in the flow characteristics of polymers and MicroForm® helps you solve micro sealing challenges that require high performance elastomers for aggressive media.

Why choose MicroForm® over alternatives?

MICROFORM® capability	Benefits to you	Comparison to alternative
A wide range of high performance elastomer materials such as FKMs and FFKMs	High temperature performance to 325°C (617°F). Broad chemical resistance including solvents, steam and amines. FDA and USP Class VI certified materials.	Non-high performance materials are not suitable to handle high temperature or aggressive media, can fracture causing leaks.
ISO Class 6 cleanroom environment Fully automated robotic handling & camera inspection	Clean, contamination-free components held to tight tolerances (exceeding Class M2 standards).	Conventional molding techniques do not lend themselves to manufacturing high precision micro components.
Flow prediction simulation software	Faster development and time to market.	Cost and time increase with every iteration without flow simulation.

How do we do it?

Simulation analysis → Robotically manufactured → Robotic camera inspection



Customized micro components

MicroForm® components are available as custom shapes and designs. Insert molding and bonding to substrate is also possible. Below are some examples of custom micro components.

Semicon end effector pads

Height: 2.5mm
Diameter: 5.33mm
Rim wall: 0.5mm
Weight: 0.06g (0.002oz)
Material: Perlast® FFKM



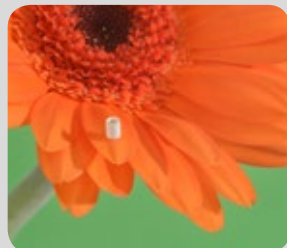
Grommet

Length: 3.7mm
Width: 2.6mm
Diameter: 1.1mm
Weight: 0.05g (0.002oz)
Material: NBR



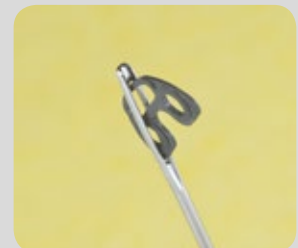
Ferrule

Length: 3mm
Diameter: 2.3mm
Wall: 0.97mm
Weight: 0.02g (0.0007oz)
Material: Perlast® FFKM



Gasket

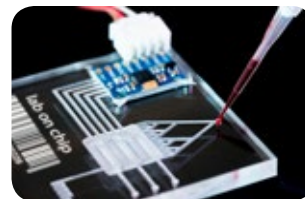
Length: 20mm
Width: 10mm
Thickness: 0.5mm
Weight: 0.13g (0.005oz)
Material: EPDM



Typical applications

MicroForm® excels in enabling mission-critical, aggressive and precision applications

Application	Market	Products
Microfluidic Flow Control & Dispensing	<ul style="list-style-type: none"> Life science Food Medical 	LOC, micro pumps, micro valves, micro reactors, analytical chemistry, miniaturized diagnostics and point-of-care applications.
Bio Analytics	<ul style="list-style-type: none"> Life science Food Medical 	Spectrometer, chromatography, assay, probes, gene synthesizers, precision syringe.
Industrial Automation	<ul style="list-style-type: none"> Industrial 	Pressure/temperature/monitoring sensors, chips, counters.
Process Tool	<ul style="list-style-type: none"> Semiconductor 	Wafer handling components.



High performance materials

Material type	Temperature range	Hardness (IRHD)	Colors	Certification	Semicon clean
FFKM	-10 to +327°C +14 to +621°F	64 - 90	Black, brown, translucent	FDA, USP, 3-A	Yes
FKM	-10 to +250°C +14 to +482°F	58 - 95	Black	FDA, USP, WRAS, 3-A	Yes
EPDM	-60 to +288°C -76 to +550°F	53 - 87	Black, white, blue	FDA, USP, 3-A	No
NBR	-60 to +135°C -76 to +275°F	57 - 90	Black, white, blue	FDA, 3-A	No
HNBR	-40 to +180°C -40 to +356°F	70 - 92	Black	FDA, 3-A	No
Silicone	-60 to +250°C -76 to +482°F	40 - 80	White, blue, red, grey, translucent	FDA, USP, 3-A	No

PPE offers an extensive range of elastomer materials that provide unique performance characteristics, compliance to food/pharma industry standards, as well as ultra-high purity grades for semiconductor process equipment. Micro components are available in PPE's leading material brands:

PERLAST®

The ultimate perfluoroelastomers for sealing applications where chemical resistance and high temperature performance are critical.

PERLAST® ICE°

Exceptional perfluoroelastomers for extreme low temperature sealing applications.

KIMURA™

A unique range of fully organic elastomers for semiconductor sealing applications which demand extreme plasma and abrasion resistance.

For further details on our complete range of high performance materials please visit: www.prepol.com

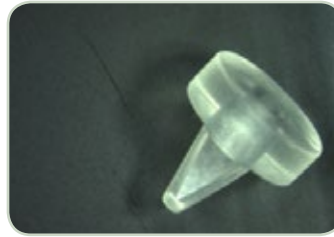
Testimonials

MicroForm® - Where reliability & precision matter most

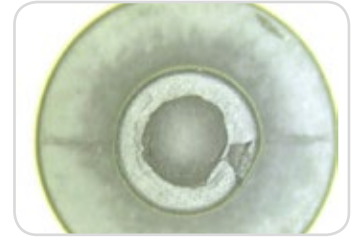
"MicroForm® duckbill valves made from Perlast® FFKM are clean, consistent & reliable. The valves have passed 2M cycles, and I'm confident they will pass another 1M."

Quality & Sustaining Engineer Manager

Manufacturer of solenoid valves & precision pumps for high purity fluids



MicroForm® molded duckbill part offers superior quality and contamination free.



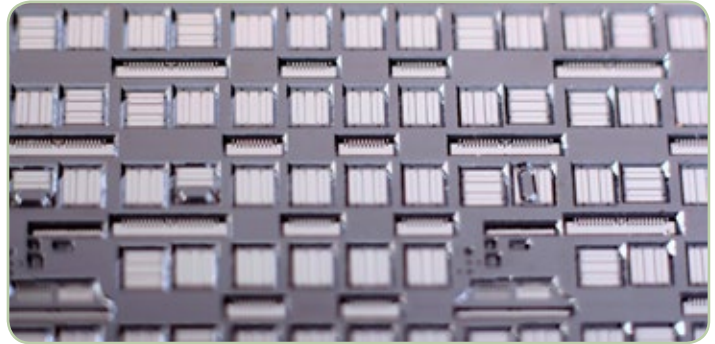
Conventional compression molded duckbill part showing damage and contamination.

MicroForm® - For meeting tight tolerances

"MicroForm® O-rings exceeded our expectations by performing even better than the ISO 3302-1 Class M2 standard. MicroForm® achieved $\pm 0.08\text{mm}$ on internal diameter and $\pm 0.05\text{mm}$ on cross section. PPE continues to push the boundaries".

Engineer

Manufacturer of sensors/MEMs for industrial automation



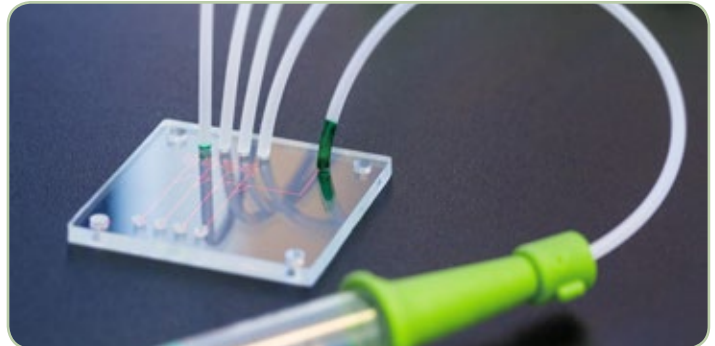
MEMS circuit

MicroForm® - For high pressure, aggressive applications

"MicroForm® seals made from Perlast® FFKM create an inert and biocompatible seal between the NanoPort and the chip surface. Perlast® ferrules create a seal between the tubing and the chip, withstanding inline system pressures up to 1,500 psi (103 bar). MicroForm® parts serve as a key component of our NanoPort Connections technology."

Marketing Manager

An industry leader in fluid-transfer components for 'Lab-on-a-Chip' applications

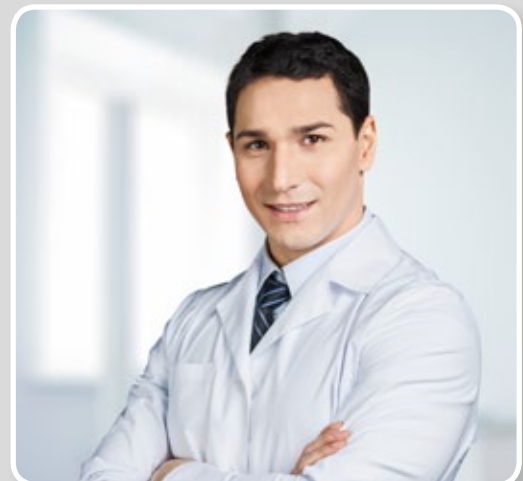


Lab-on-a-chip

How to start working with PPE

1. Contact your local PPE sales office or manufacturer's representative (see back cover for contact details).
2. Define the scope of work, supply drawings and confirm your requirements.
3. A technical proposal and/or quotation provided by our team of engineers.
4. Project commences.

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