

**FiPur®**  
Fietz Thermoplast GmbH

# High-Performance Polyurethane FiPur® Materials



VIDEO

Sealings for hydraulics  
resilient and wear resistant

FiPur® is a registered trademark of Fietz Group

for hydraulics · mobile hydraulics · pneumatics · power  
transmission · gas springs · industrial applications

**www.fipur.de**

# High **Versatility**



## Mobile Hydraulics

## Pneumatics

## Gas Springs

## Industry

Piston Seals



Rod Seals



Valve Seals



Seal/Wiper Ring Profiles



Wipers



Special Seals



Cushioning Rings



O-Rings



Back-Up Rings



Guiding Rings





Diaphragms




Multifunctional Solutions



 FiPur® 100


 FiPur® 105

 FiPur® 110


 FiPur® 150


 FiPur® 180

 FiPur® 190

 FiPur® 200

 PTFE

 EP Engineering Plastics

 S Special Materials



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# Materials

## Excellent basic properties for FiPur®

- High abrasion resistance, lowest wear values
- Outstanding pressure resistance (up to 400 bar)
- Very low permanent deformation
- Good dynamic properties: higher safety against leakage
- Sustainable solutions: by reducing maintenance costs, improved environmental protection and more favourable plant availability
- FiPur® materials are tailor-made for optimal installation conditions
- FiPur® polyurethane seals have the best prerequisites for problem-free snapping into the given installation spaces



### FiPur® – High-Performance in many ways

For the optimal design of the individual products, it is necessary to use or develop the right material with the properties specified for the application.

Because the synthesis of this TPU is carried out entirely at Fietz, the structure and property profile can be precisely controlled.

### FiPur® Technical Center – the crucial difference

Tailor made High-Performance TPUs are developed and manufactured in the FiPur Technical Center. Adjacent to the series production, there is a development laboratory where new materials are created in small-scale laboratory reactors. Individual material solutions to support customers with unique requirements are made here as well.

### Material Laboratory – Competence in material durability

In addition to comprehensive physical property profiles, we deter-

mine both the thermo-mechanical and the thermo-caloric properties.

Resistance in all market-relevant media such as hydraulic fluids, lubricating greases, cleaning agents and process fluids can be analyzed. Using different measuring stations, the chemical stability of polyurethanes can be evaluated in a meaningful way.

In total, this results in comprehensive, precisely documented material property profiles, which are indispensable as a basis for meeting customer requirements.

### FiPur® meets the requirements

- WEEE (Waste Electrical and Electronic Equipment 2012/19/EU)
- RoHS EC Directive 2011/65/EU
- GADSL (Global Automotive Declarable Substance List)
- LABS-free on request





**FiPur®  
100** \*

- Hardness 94 Shore A
- Tailored to very low swellings in mineral oils
- Temperature range from -30 °C to 110 °C
- Suitable for mobile hydraulic, pneumatic and other applications

*\*also available as reduced friction version*



**FiPur®  
105**

- Hardness 94 Shore A
- Tailored to very low swellings in mineral oils
- Temperature range from -30 °C to 110 °C
- Applications: Wipers for hydraulics



**FiPur®  
110**

- Hardness 94 Shore A
- Outstanding deep temperature flexibility without reduction in wear behaviour
- Temperature range from -50 °C to 110 °C
- Suitable for mobile hydraulic, gas springs or automotive applications



**FiPur®  
150**

- Hard TPU material (Hardness 55 Shore D)
- Excellent compatibility in mineral oils (HL, HLP, HLPD etc.)
- Temperature range from -30 °C to 110 °C
- Outstanding extrusion resistance by high pressure impact of the sealing elements
- Good resilience, despite high degree of hardness, the ring can be snap-fit assembled
- Applications as piston seals and wiper elements in element in hydraulic and gas spring technology



**FiPur®  
180**

- Soft polyurethane (82 Shore A) with very good dynamic
- Outstanding wear values with very good dynamic tightness, allow very low leakage
- Temperature range from -40 °C to 90 °C
- Due to the soft character low friction coefficients can be generated
- Applications primarily in pneumatic cylinders and valves



**FiPur®  
190**

- Hardness 90 Shore
- Very high wear resistance and good cold behaviour
- Temperature range from -35 °C to 110 °C
- Good resistance to mineral oils and greases
- Developed for pneumatics and low-pressure hydraulics as well as for gas springs










**FiPur®  
200**

- Hardness 94 Shore A
- Excellent stability under influence of hydrolysing media
- Temperature range from -30 °C to 110 °C
- Ideal solution when tropical humidity causes material degradation
- Very good stability when using alkaline thickened greases in pneumatic cylinders
- Good resistance in contact with alkaline / acidic cleaners
- Suitable for hydraulic and gas spring applications in the field of critical media such as bio-fluids, synthetic esters, water-based liquids like HFA, HFC etc ...



# FiPur® Materials

Material	Basis	Color	Hardness (Shore A)	Tempe- rature range	Media Compatibility											
					max	short term	Mineral oil	Poly-alfa-Olefin	HEPR	HEPG	HETG	HEES	HFD-R	HFD-U	HFA /HFB	HFC
	AU	blue <i>RAL 5015</i>	94 +/- 3 Shore A	(-32°C)	110°C	130°C	+	+	+	--	+/--	--	--	+	--	--
	AU	brown	93 +/- 3 Shore A	(-30°C)	100°C	120°C	+	+	+	--	+/--	+/--	N/A	N/A	+/--	+/--
	AU/ EU	blue- purple <i>RAL 4005</i>	94 +/- 3 Shore A	(-50°C)	110°C	130°C	+	+	+	--	+/--	N/A	--	+	--	--
	AU	orange <i>RAL 2004</i>	55 +/- 3 Shore D	(-30°C)	110°C	130°C	+	+	+	--	+/--	--	--	+	--	--
	AU	aqua <i>RAL 5021</i>	82 +/- 3 Shore A	(-40°C)	90°C	120°C	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	AU	red <i>RAL 3005</i>	90 +/- 3 Shore A	(-35°C)	110°C	120°C	+	+	+	--	+/--	--	--	+	--	--
	AU	red <i>RAL 3003</i>	94 +/- 3 Shore A	(-28°C)	110°C	130°C	+	+	+	+/----	+	+	--	+	+	+/--

+/- should in be checked in the laboratory

+

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# Made in Germany

## From FiPur® polymerization to the finished sealing – everything under one roof.

In order to provide the maximum flexibility, know-how and cost-efficiency for our customers, Fietz made sure that the **entire value chain is in own hands**.

From the polymerisation of the high-performance polyurethane to the tool, which is produced in the own tool shop, from metal-cutting rapid prototyping to series production using injection moulding. All processes are under constant control.

The finishing of the extremely sharp sealing lips for dynamic seals as well as the **100% visual checks with highly efficient automated testing machines** close the loop.

All processes are controlled so that Fietz remain highly flexible and reduce lead times in a way to meet customer demands.

Thanks to our **high degree of vertical integration**, we are **virtually independent of external suppliers or trade restrictions**.

**Toolmaking**  
Tool Design &  
Manufacturing



**Seal Production**  
Injection Molding  
Process  
(SPC-control)



**Finishing**  
Cutting of seal lips  
(SPC-control)



**Automated**  
100% check



**Warehousing**



**Packaging**  
and shipping



**Incoming goods**  
Check of single  
components



**Polymerization FiPur®**



**Batch-Approval**  
according to  
Specification



**Rapid Prototyping**  
Small-series  
production





# FiPur<sup>®</sup> Materials

FiPur<sup>®</sup>  
150

FiPur<sup>®</sup>  
100

FiPur<sup>®</sup>  
200

FiPur<sup>®</sup>  
190

FiPur<sup>®</sup>  
110

FiPur<sup>®</sup>  
180

FiPur<sup>®</sup>  
105





# FiPur® 100

## High tear and temperature resistant

High tear resistant polyurethane for target applications in hydraulics, gas springs, pneumatics and further more areas. FiPur® 100 has been tailor-made for low swelling rates in mineral oils.

### Technical specification

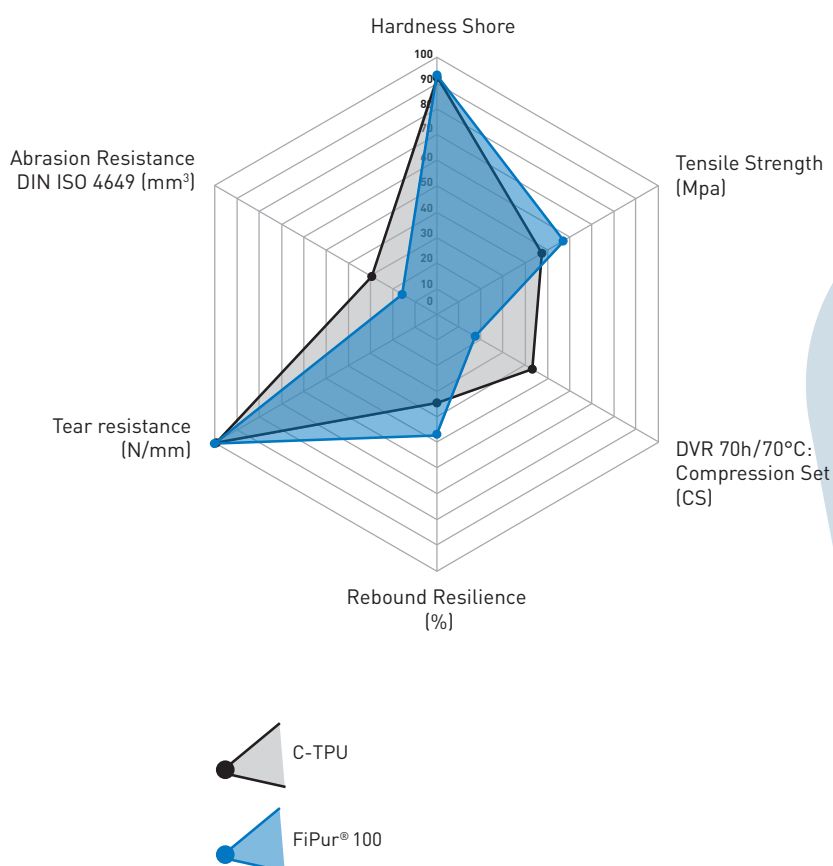
- Hardness of 94 Shore A
- Outstanding tear resistance
- Pressure capability up to 400 bar
- Temperature range -30°C to 110°C
- Durability: 1 million cycles (between 1,000 and 2,000 Km)

### Application examples

Hydraulics, gas springs and pneumatics

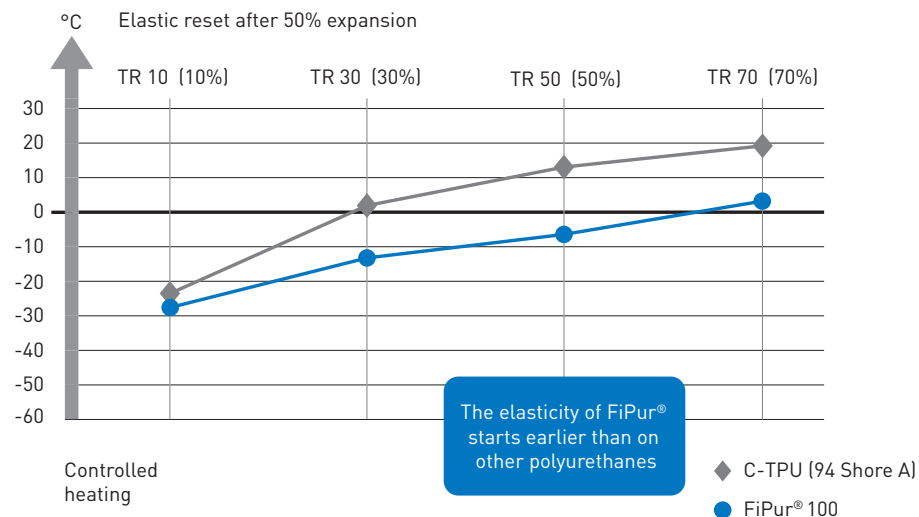
### Physical properties

FiPur® 100 vs. Commodity

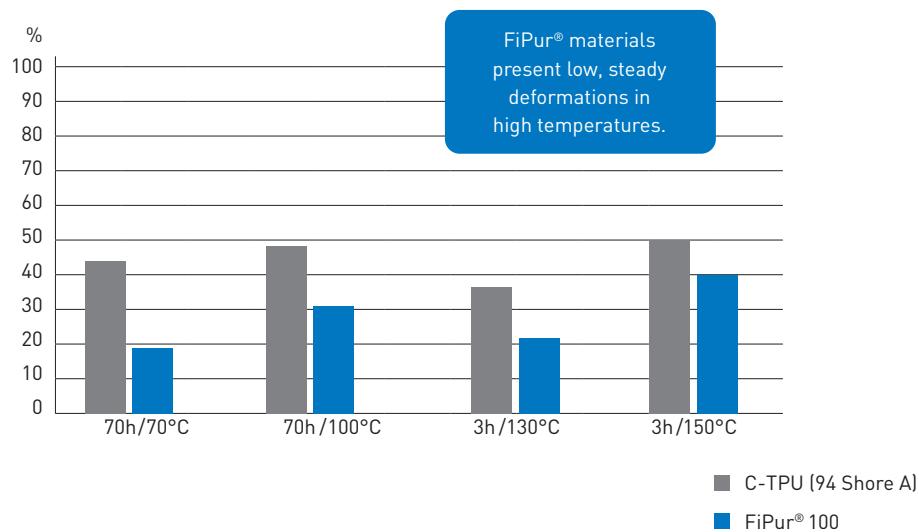




### Cold properties FiPur® 100 vs. Commodity, ASTM D 1329



### Remaining forming FiPur® 100 vs. Commodity





# FiPur® 105

## High tear and abrasion resistant

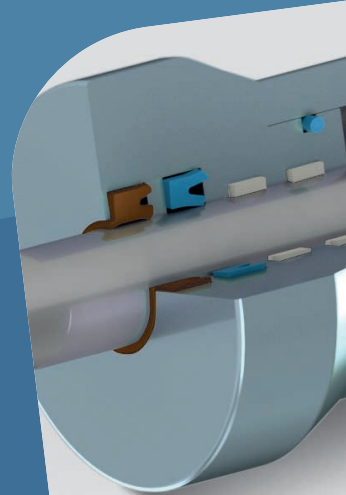
High tear resistant polyurethane, specially developed for use as a wiper. FiPur® 105 has been tailor-made for low swelling rates in mineral oils.

### Technical specification

- Hardness of 94 Shore A
- Outstanding tear resistance
- Pressure capability up to 400 bar
- Temperature range -30°C to 110°C

### Application examples

Hydraulics, pneumatics and other application areas





# FiPur<sup>®</sup> 110

## Extraordinary low temperature behavior

This material was developed to cope with extremely cold temperatures without altering its sealing behavior. The application base is preferably based on mineral oil, but may also be in synthetic ester media (HEES).

### Technical specification

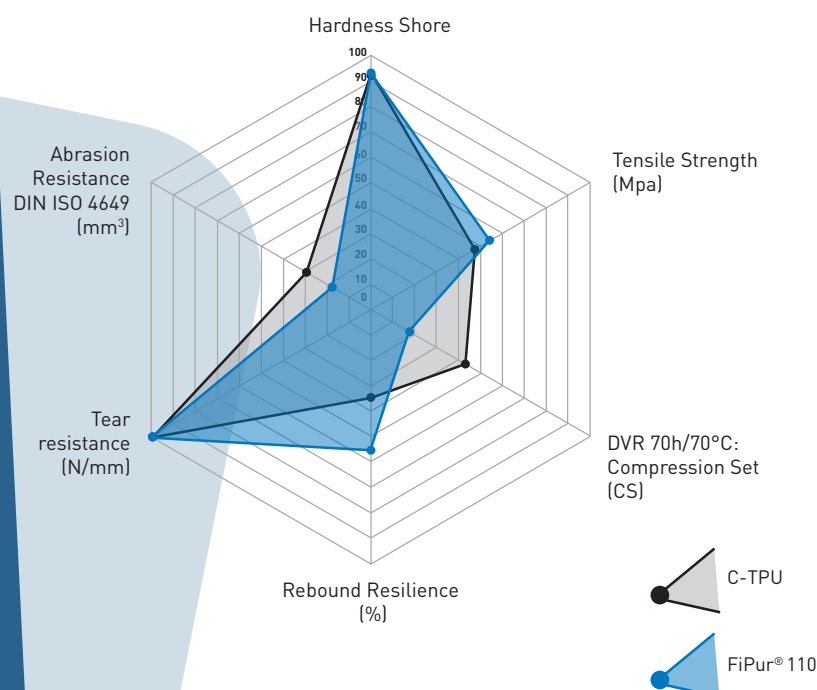
- Target hardness 94 Shore A
- High wear resistance
- Very good cold temperature behavior up to -50°C to 110°C

### Application examples

Mobile hydraulics, gas springs, automotive applications; other customer-specific application areas

### Physical properties

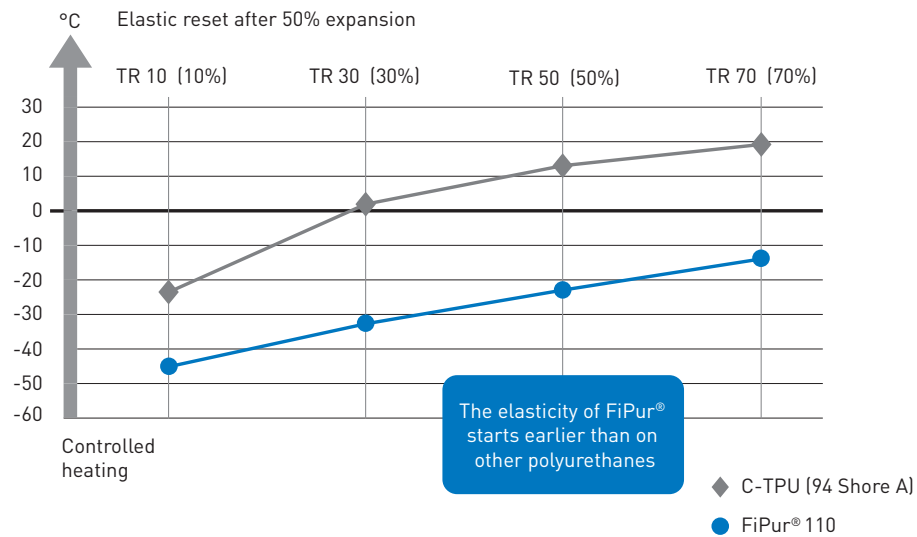
#### FiPur<sup>®</sup> 110 vs. Commodity



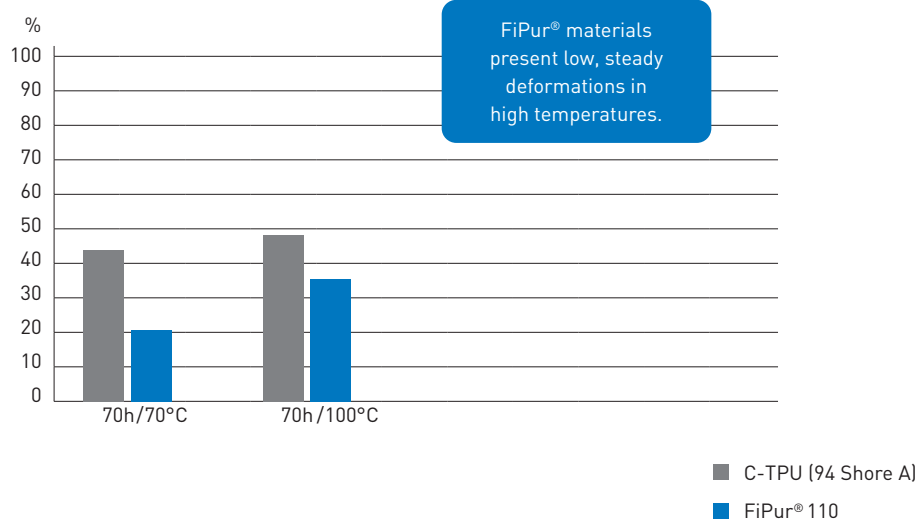




### Cold properties FiPur® 110 vs. Commodity, ASTM D 1329



### Remaining forming FiPur® 110 vs. Commodity





# FiPur<sup>®</sup> 150

## Hard elastic TPU material

### Technical specification

- Hard elastic TPU material with a hardness of 55 shore D
- Excellent compatibility in mineral oils (HL, HLP, HLPD etc.)
- Temperature range from -30°C to 110°C
- Used as piston seal and wiper element in hydraulic and gas spring technology
- Outstanding extrusion resistance by high pressure impact of the sealing elements
- Good resilience, despite high degree of hardness
- The ring can be snap-fit assembled

### Application examples

Double wiper for valve technology, in hydraulics





# FiPur® 180

## Excellent dynamic behavior

### Technical specification

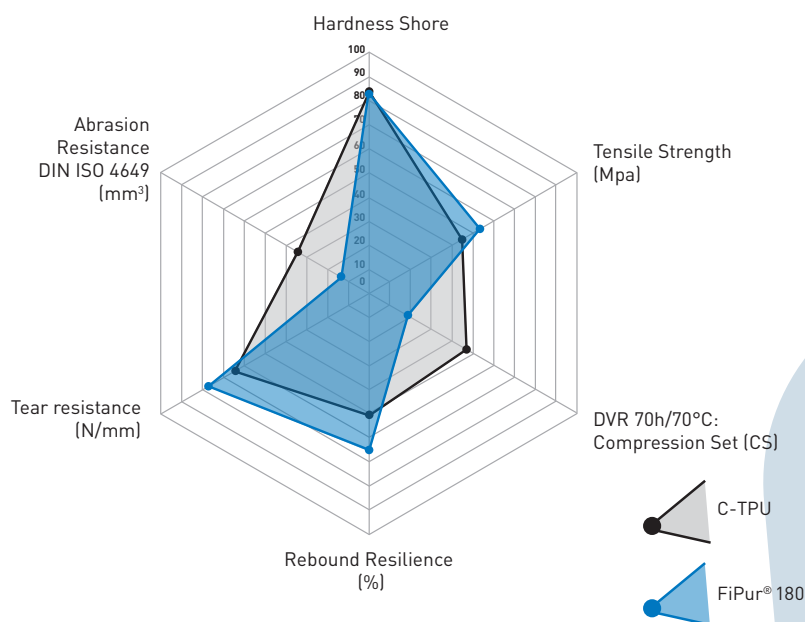
- Soft polyurethane (82 Shore A) with very good dynamic
- Outstanding wear values with very good dynamic tightness, allow very low leakage
- Due to the soft character low friction coefficients can be generated
- Temperature range from -40°C to 90°C

### Application examples

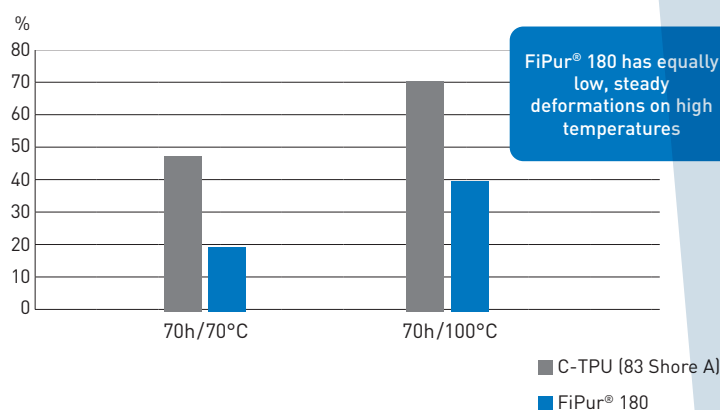
Pneumatic cylinders and valves, with high durability of more than 10,000 Km

### Physical properties

#### FiPur® 180 vs. Commodity



#### Remaining forming FiPur® 180 vs. Commodity





# FiPur® 190

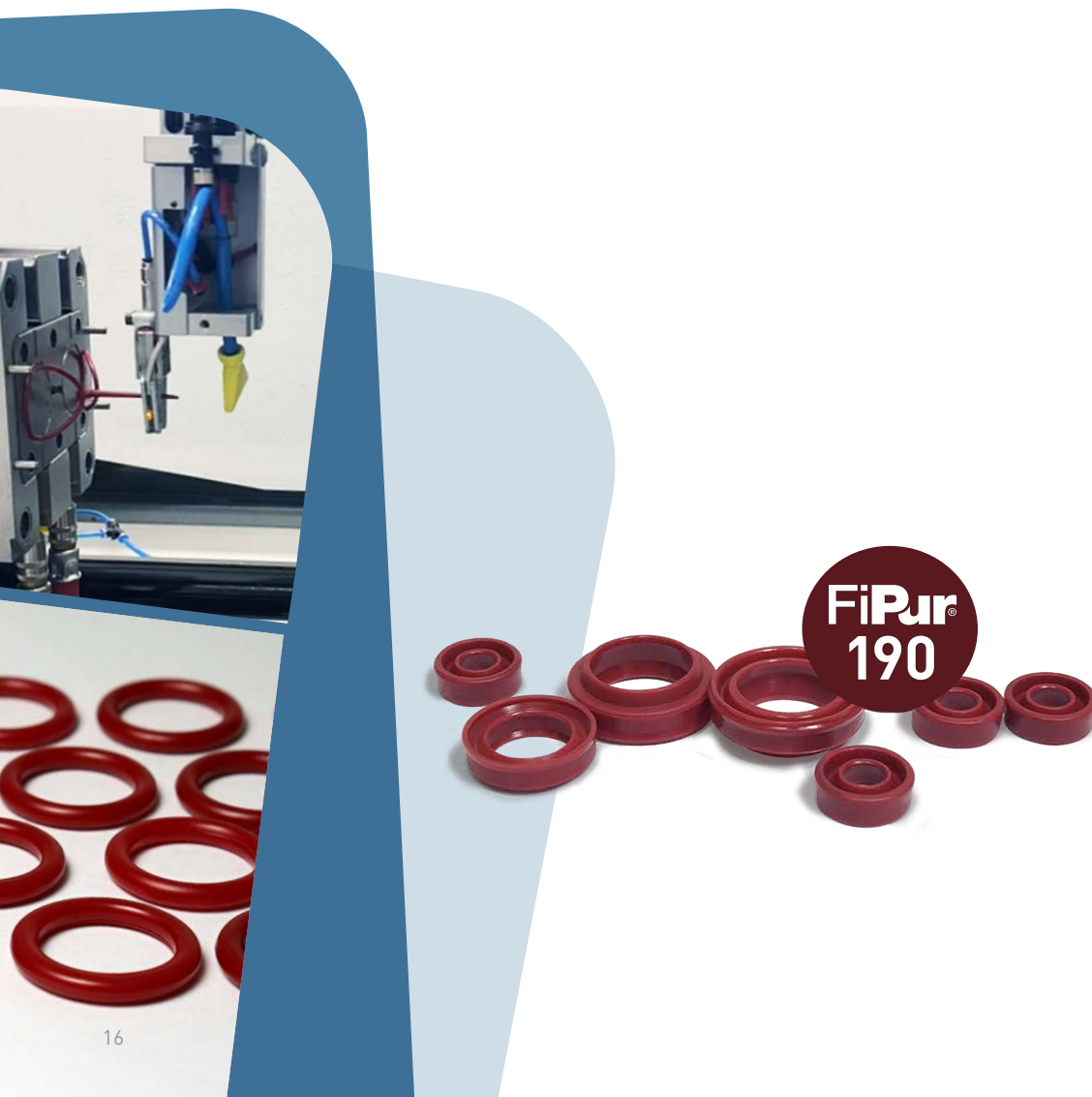
## Extraordinary low temperature behavior

### Technical specification

- Hardness 90 Shore
- Very high wear resistance and good cold behaviour
- Temperature range from -35°C to 110°C
- Good resistance to mineral oils and greases

### Application examples

Different pneumatic applications, especially for lip seals in mini pneumatic cylinders. Can also be used for low-pressure hydraulic applications and gas springs.







# FiPur® 200

## Outstanding stability

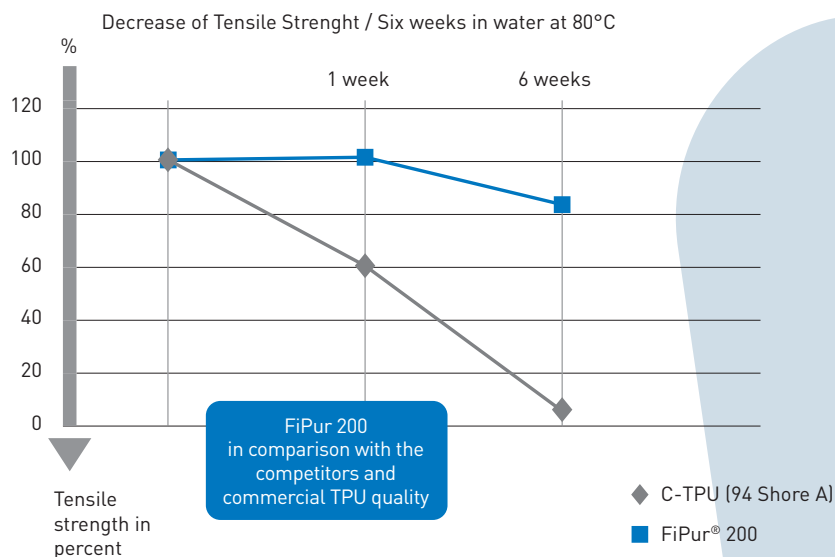
### Technical specification

- Hardness 94 Shore A
- Very good resistance to hydrolysis
- Compatible with hydraulics and gas spring applications that require critical media such as organic fluids, synthetic esters, water-based fluids such as HFA, HFB etc ...]
- Ideal solution when tropical humidity has material effects
- Excellent stability upon using alkaline greases in pneumatic cylinders
- Good resistance for applications, whose seals are exposed to alkaline/acid cleaning chemicals
- Temperature range: -30°C to 110° C

### Application examples

Mobile hydraulics, gas springs, valve seals

### Hydrolysebeständigkeit FiPur® 200 vs. Commodity





Do you wish to **optimise the sealing solutions** in your application

- a quotation?
- a consultation?
- a design proposal?

Simply send your enquiry to [fipur@fietz.com](mailto:fipur@fietz.com).



VIDEO  
**Sealings for hydraulics**  
resilient and wear resistant

# Fietz Group

Consulting, development and production –  
everything from one source



High Performance Polyurethane

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