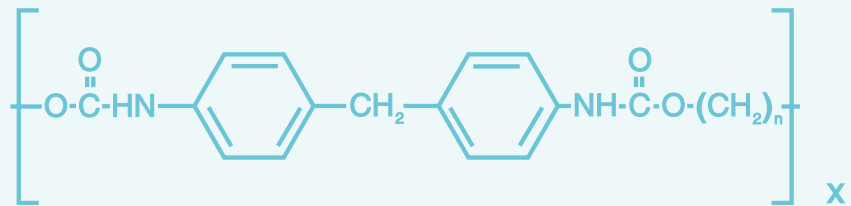


The new Class

ZURCON® Z20 / Z22
New worldclass polyurethane materials



Your Partner for Sealing Technology

Introduction

Polyurethane seals based on old technology materials do not meet the high requirements of tomorrow's fluid power industry in many key areas:

- Leak free performance
- Life
- Life cycle cost
- Temperature range

Trelleborg Sealing Solutions has therefore invested in in-house laboratory and material production facilities to develop tailor made polyurethane materials with exceptional properties to meet the expectations of the fluid power industry.

The first of this new generation of materials are now approved and released by Trelleborg Sealing Solutions:

Zurcon® Z20

Standard material for hydraulic applications.

Zurcon® Z22

Premium material for hydraulic seals applications with a wide operating temperature range.

Zurcon® Z201

Standard material for hydraulic scrapers.

Zurcon® Z221

Premium material for hydraulic scrapers for low and high temperatures.

All Trelleborg Sealing Solutions standard hydraulic seals and scrapers will be offered in the new Zurcon® material Z20/Z201 or in the premium Zurcon® Z22/Z221.

Further Zurcon® materials for alternative application types are under development and will be released as they are approved by Trelleborg Sealing Solutions.

Positioning

For all hydraulics applications with normal operating conditions, the standard polyurethane materials are recommended; Zurcon® Z20 for seals and Zurcon® Z201 for scrapers. For applications where an excellent low temperature behaviour is necessary, the new premium polyurethane Zurcon® Z22 for seals and Zurcon® Z221 for scrapers are recommended for improvements in cold flexibility and compression set. Pricing of seals and scrapers in Zurcon® Z22/Z221 is higher than the standard Zurcon® Z20/Z201.

Extrusion resistance, wear resistance

Trelleborg Sealing Solutions seals (U-cup or L-cup) produced in the new Zurcon® polyurethane materials, have outstanding extrusion and wear resistance. Therefore life, life-cycle cost and leak free performance all meet the high expectations of the end user.

No additional back-up ring is necessary for applications up to 40 Mpa if Trelleborg Sealing Solutions installation recommendations are used.

Fluid compatibility

Zurcon® Z20 and Zurcon® Z22 have been developed for use in mineral oil based hydraulic fluids. They can also be used in synthetic ester fluids within the recommended temperature range. The swell of Zurcon® Z20 in mineral oil is very low (ASTM 3 approx. 6%).

Operating temperature

The new developed Zurcon® polyurethane materials have an extended temperature range compared to old technology polyester (AU) or polyether (EU) based materials. These excellent properties increase the life, extrusion resistance and leakage performance for seals and scrapers.

Figure 1: Operating temperature range for the new Zurcon® materials

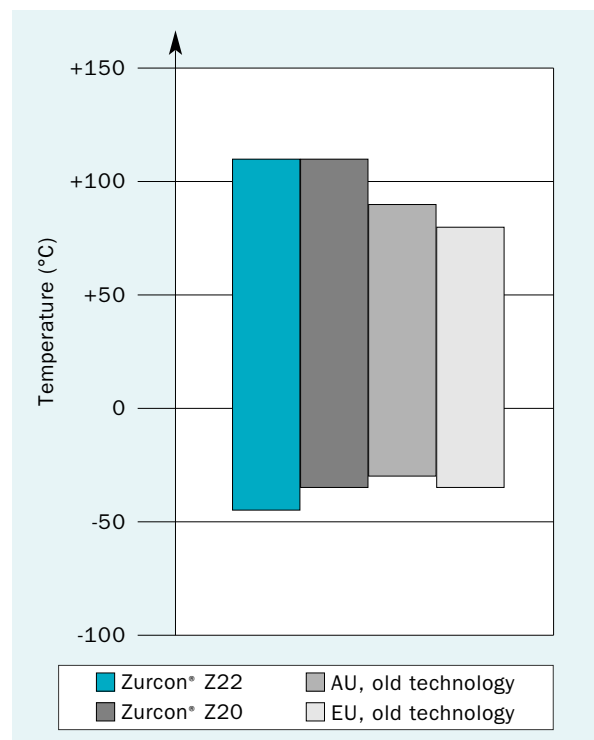


Table 1:

Typical material properties

Material	Units	Z20	Z22	TPU - old technology
Hardness	Shore A	93	93	93
100% modulus	MPa	12	13	10
Ultimate elongation	% (min.)	550	550	450
Tensile strength	MPa	57	55	45
Compression set				
24h / -20°C	%	46	25	65
72h / +70°C	%	23	21	35
72h / +100°C	%	39	36	55
3h / +130°C	%	28	25	35
Rebound resilience	%	41	44	30
TR10-point	°C	-34	-50	-27
Operating Temperature				
Max.	°C	+110	+110	+80
Min.	°C	-35	-45	-30
Colour	-	Turquoise	Dark turquoise	Turquoise

Compression set

Zurcon® Z22 and Zurcon® Z20 materials have been tailor made to have very low compression set values to meet applications under low or high temperature conditions as well as the paint drying process of hydraulic components with water based varnish paint coats.

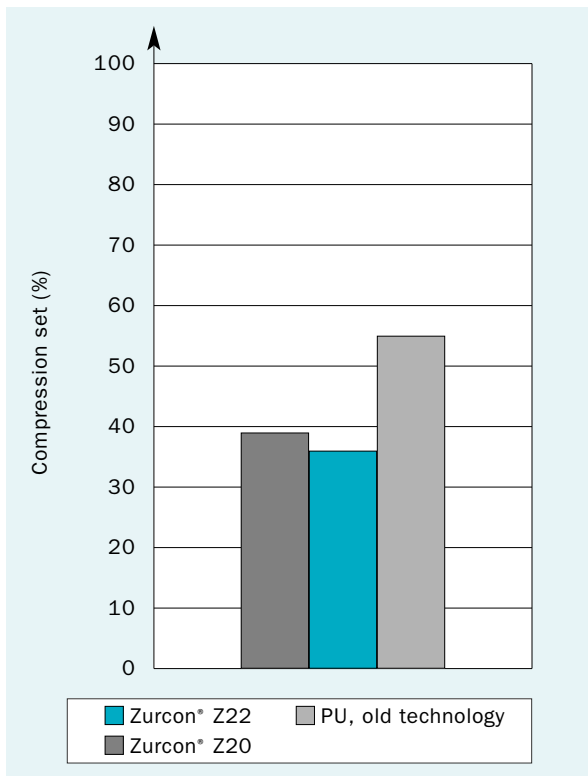
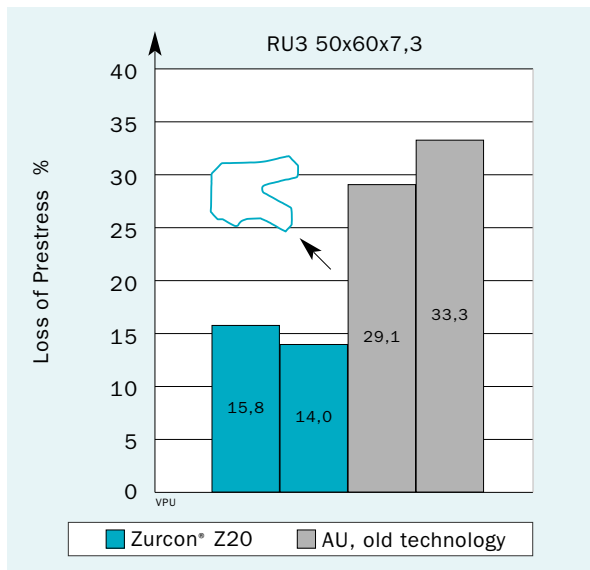


Figure 2: **Compression set 72 h / 100°C**

Figure 3: **Loss of contact stress 30min /130°C**

Short duration high temperature exposure creates severe loss of sealing stress in old technology materials.



Wear and extrusion performance of U-Cups

U-Cup RU2100500, 50 x 60 x 11

Zurcon® Z20 (Figure 4)

versus

PU, old technology (Figure 5)

U-Cup RU3200500, 50 x 65 x 12,5

Zurcon® Z20 (Figure 6)

versus

U-Cup, old technology (Figure 7)

The performance of different U-cups in different materials has been tested under the following test conditions

(Figure 8):

Pressure (cycling)	0-30 MPa	Velocity	0.2 m/s
Cycles	200 000	Stroke	300 mm
Oil temperature	+80°C	Extrusion gap	0.2 mm

Figure 4-8:

Test results



Figure 4: Zurcon® Z20



Figure 6: Zurcon® Z20



Figure 8: rod seal test rig



Figure 5: PU, old technology

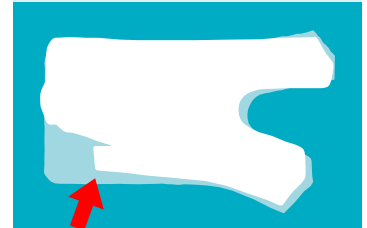


Figure 7: U-Cup, old technology

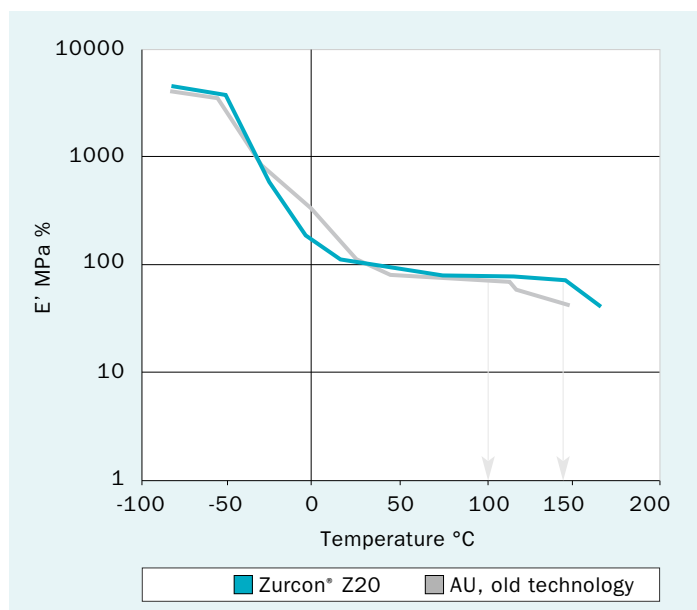


Figure 9: DMA Storage Modulus

Viscoelastic characterisation of materials by a Dynamic Mechanical Analysis (DMA)

DMA curves show the Storage Modulus E in relation with the temperature variation. DMA analysis of Zurcon® Z20 and old technology materials shows the stable elastic modulus of Zurcon® Z20 extending to +145°C and improved flexibility to -30°C.

In the area of +15°C to -30°C a significant improvement of the Zurcon® Z20 behaviour compared to the old technology material can be noticed.

Sealing solution with Zurcon® Z20 seals for hydraulic cylinder

The total sealing solution for a medium duty mobile hydraulic cylinder includes: static seals (Dualseal), piston and rod seals and scraper in Zurcon® Z20/Z201. This is a reliable and cost effective solution, which can meet the industry expectations in terms of leak free performance, life and installed cost.

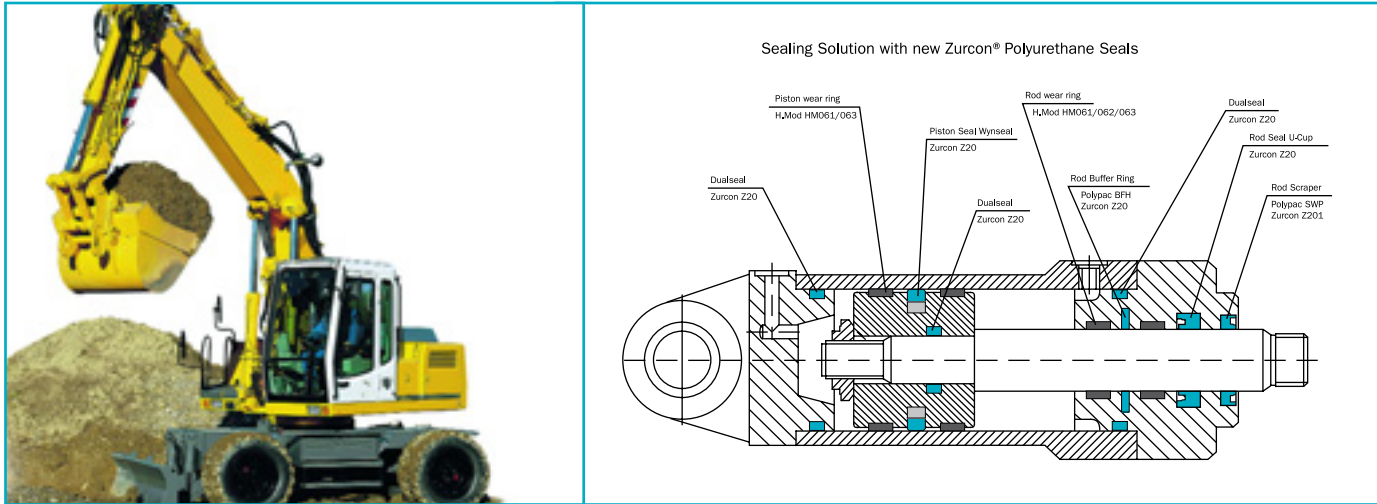


Figure 10

Zurcon® Z20 / Z22 material performance

Zurcon® materials outperform old technology polyester and polyether materials in all critical properties.

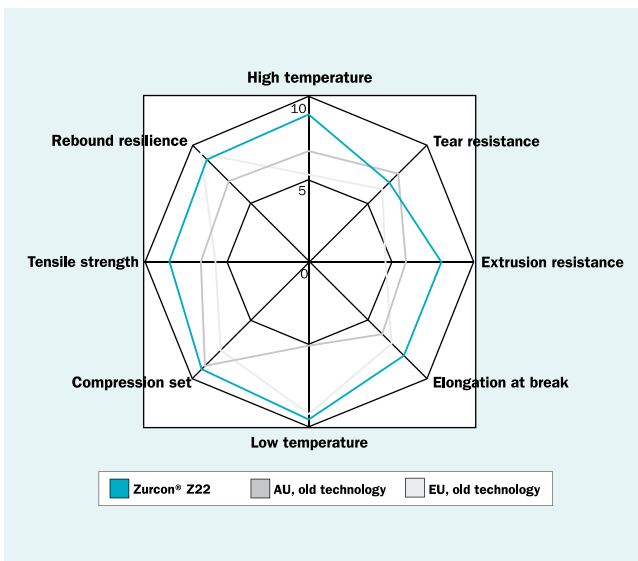


Figure 11

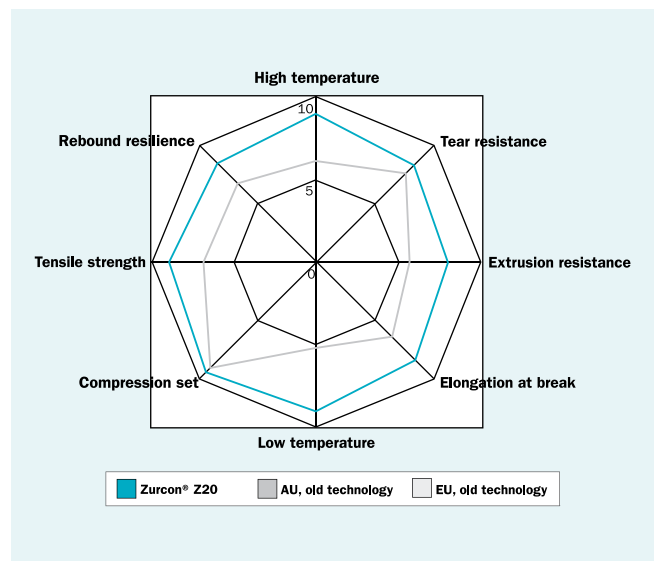


Figure 12

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