Texin® 990 R

Thermoplastic Polyurethane Elastomer (Polyether)

Covestro - PUR

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Technical Data

Product Description

Texin 990R resin is a polyether-based thermoplastic polyurethane with a Shore hardness of approximately 90A. It contains an internal mold release additive. This resin can be processed by injection molding or extrusion.

General

Material Status	• Commercial: Active		
Literature [1]	• Processing - Extrusion (English) • Processing - Injection Molding (English) • Technical Datasheet (English)		
Search for UL Yellow Card	• Covestro - PUR • Texin®		
Availability	• North America		
Additive	• Mold Release		
Features	• Food Contact Acceptable • Good Abrasion Resistance	• Good Flexibility • Good Impact Resistance	• Good Toughness • Hydrolysis Resistant
Uses	• Cable Jacketing • Film • Footwear	• Gaskets • Hose • Profiles	• Seals • Tubing • Wheels
Agency Ratings	• FDA 21 CFR 177.1680	• FDA 21 CFR 177.2600	• NSF 61
Appearance	• Natural Color		
Processing Method	• Extrusion	• Injection Molding	

Physical	Nominal Value	Unit	Test Method
Specific Gravity	1.13	g/cm³	ASTM D792 ISO 1183
Molding Shrinkage			ASTM D955 ISO 2577
Flow : 2.54 mm	0.80	%	
Across Flow : 2.54 mm	0.80	%	

Mechanical	Nominal Value	Unit	Test Method
Flexural Modulus (23°C)	41.4	MPa	ASTM D790 ISO 178
Taber Abrasion Resistance			
1000 Cycles, 1000 g, H-18 Wheel	25.0	mg	ISO 4649
1000 Cycles, 1000 g, H-18 Wheel	25.0	mg	ASTM D1044

Elastomers	Nominal Value	Unit	Test Method
Tensile Stress			
50% Strain	6.90	MPa	ISO 37 ASTM D412
100% Strain	7.60	MPa	ASTM D412 ISO 37
300% Strain	14.5	MPa	ASTM D412 ISO 37
Tensile Strength (Yield)	41.4	MPa	ASTM D412 ISO 37
Tensile Elongation (Break)	520	%	ASTM D412 ISO 37
Tear Strength			
-- [3]	96.3	kN/m	ASTM D624
--	96	kN/m	ISO 34-1
Compression Set			ASTM D395B ISO 815
23°C, 22 hr [4]	15	%	
23°C, 22 hr	20	%	
70°C, 22 hr [4]	35	%	
70°C, 22 hr	75	%	

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Elastomers	Nominal Value Unit	Test Method
Bayshore Resilience	40 %	ASTM D2632
Hardness	**Nominal Value Unit**	**Test Method**
Durometer Hardness (Shore A)	90	ASTM D2240 ISO 868
Thermal	**Nominal Value Unit**	**Test Method**
Brittleness Temperature	< -68.0 °C	ASTM D746 ISO 974
Glass Transition Temperature	-44.0 °C	DMA
Vicat Softening Temperature	106 °C	ISO 306/50 ASTM D1525 [5]
Aging	**Nominal Value Unit**	**Test Method**
Change in Tensile Strength in Air		
100°C, 70 hr	16 %	ASTM D573 ISO 216
100% Strain, 100°C, 70 hr	5.0 %	ASTM D573
300% Strain, 100°C, 70 hr	3.0 %	ASTM D573
100°C, 168 hr	24 %	ASTM D573 ISO 216
100% Strain, 100°C, 168 hr	6.0 %	ASTM D573
300% Strain, 100°C, 168 hr	1.0 %	ASTM D573
100°C, 336 hr	27 %	ASTM D573 ISO 216
100% Strain, 100°C, 336 hr	7.0 %	ASTM D573
300% Strain, 100°C, 336 hr	-9.0 %	ASTM D573
100°C, 504 hr	-9.0 %	ASTM D573 ISO 216
100% Strain, 100°C, 504 hr	-3.0 %	ASTM D573
300% Strain, 100°C, 504 hr	-24 %	ASTM D573
100% Strain 100°C, 70 hr	5.0 %	ISO 216
300% Strain 100°C, 70 hr	3.0 %	ISO 216
100% Strain 100°C, 168 hr	6.0 %	ISO 216
300% Strain 100°C, 168 hr	1.0 %	ISO 216
100% Strain 100°C, 336 hr	7.0 %	ISO 216
300% Strain 100°C, 336 hr	-9.0 %	ISO 216
100% Strain 100°C, 504 hr	-3.0 %	ISO 216
300% Strain 100°C, 504 hr	-24 %	ISO 216
Change in Ultimate Elongation in Air		ASTM D573 ISO 216
100°C, 70 hr	16 %	
100°C, 168 hr	20 %	
100°C, 336 hr	36 %	
100°C, 504 hr	68 %	
Change in Durometer Hardness in Air		ASTM D573 ISO 216
Shore D, 100°C, 70 hr	2.0	
Shore D, 100°C, 168 hr	1.0	
Shore D, 100°C, 336 hr	0.0	
Shore D, 100°C, 504 hr	0.0	

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Aging	Nominal Value	Unit	Test Method
Change in Tensile Strength			ASTM D471 ISO 175
23°C, 70 hr, in Reference Fuel A (Isooctane)	12	%	
100% Strain, 23°C, 70 hr, in Reference Fuel A (Isooctane)	-5.0	%	
300% Strain, 23°C, 70 hr, in Reference Fuel A (Isooctane)	-6.0	%	
23°C, 70 hr, in Reference Fuel C	-28	%	
100% Strain, 23°C, 70 hr, in Reference Fuel C	-23	%	
300% Strain, 23°C, 70 hr, in Reference Fuel C	-22	%	
23°C, 168 hr, in Reference Fuel A (Isooctane)	12	%	
100% Strain, 23°C, 168 hr, in Reference Fuel A (Isooctane)	-1.0	%	
300% Strain, 23°C, 168 hr, in Reference Fuel A (Isooctane)	-6.0	%	
23°C, 168 hr, in Reference Fuel C	-25	%	
100% Strain, 23°C, 168 hr, in Reference Fuel C	-20	%	
300% Strain, 23°C, 168 hr, in Reference Fuel C	-19	%	
23°C, 336 hr, in Reference Fuel A (Isooctane)	7.0	%	
100% Strain, 23°C, 336 hr, in Reference Fuel A (Isooctane)	-4.0	%	
300% Strain, 23°C, 336 hr, in Reference Fuel A (Isooctane)	-10	%	
23°C, 336 hr, in Reference Fuel C	-27	%	
100% Strain, 23°C, 336 hr, in Reference Fuel C	-19	%	
300% Strain, 23°C, 336 hr, in Reference Fuel C	-19	%	
23°C, 504 hr, in Reference Fuel A (Isooctane)	19	%	
100% Strain, 23°C, 504 hr, in Reference Fuel A (Isooctane)	-1.0	%	
300% Strain, 23°C, 504 hr, in Reference Fuel A (Isooctane)	-3.0	%	
23°C, 504 hr, in Reference Fuel C	-28	%	
100% Strain, 23°C, 504 hr, in Reference Fuel C	-16	%	
300% Strain, 23°C, 504 hr, in Reference Fuel C	-18	%	
100°C, 70 hr, in ASTM #1 Oil	15	%	
100% Strain, 100°C, 70 hr, in ASTM #1 Oil	2.0	%	
300% Strain, 100°C, 70 hr, in ASTM #1 Oil	-1.0	%	
100°C, 70 hr, in ASTM #3 Oil	22	%	
100% Strain, 100°C, 70 hr, in ASTM #3 Oil	2.0	%	
300% Strain, 100°C, 70 hr, in ASTM #3 Oil	-1.0	%	
100°C, 168 hr, in ASTM #1 Oil	-10	%	
100% Strain, 100°C, 168 hr, in ASTM #1 Oil	4.0	%	
300% Strain, 100°C, 168 hr, in ASTM #1 Oil	14	%	
100°C, 168 hr, in ASTM #3 Oil	15	%	
100% Strain, 100°C, 168 hr, in ASTM #3 Oil	4.0	%	
300% Strain, 100°C, 168 hr, in ASTM #3 Oil	14	%	
100°C, 336 hr, in ASTM #1 Oil	-4.0	%	
100% Strain, 100°C, 336 hr, in ASTM #1 Oil	8.0	%	
300% Strain, 100°C, 336 hr, in ASTM #1 Oil	1.0	%	
100°C, 336 hr, in ASTM #3 Oil	5.0	%	
100% Strain, 100°C, 336 hr, in ASTM #3 Oil	8.0	%	
300% Strain, 100°C, 336 hr, in ASTM #3 Oil	1.0	%	
100°C, 504 hr, in ASTM #1 Oil	-12	%	
100% Strain, 100°C, 504 hr, in ASTM #1 Oil	6.0	%	
300% Strain, 100°C, 504 hr, in ASTM #1 Oil	3.0	%	
100°C, 504 hr, in ASTM #3 Oil	-2.0	%	
100% Strain, 100°C, 504 hr, in ASTM #3 Oil	6.0	%	
300% Strain, 100°C, 504 hr, in ASTM #3 Oil	3.0	%	

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Aging	Nominal Value	Unit	Test Method
Change in Ultimate Elongation			ASTM D471 ISO 175
23°C, 70 hr, in Reference Fuel A (Isooctane)	11	%	
23°C, 70 hr, in Reference Fuel C	4.0	%	
23°C, 168 hr, in Reference Fuel A (Isooctane)	0.0	%	
23°C, 168 hr, in Reference Fuel C	3.0	%	
23°C, 336 hr, in Reference Fuel A (Isooctane)	15	%	
23°C, 336 hr, in Reference Fuel C	5.0	%	
23°C, 504 hr, in Reference Fuel A (Isooctane)	7.0	%	
23°C, 504 hr, in Reference Fuel C	3.0	%	
100°C, 70 hr, in ASTM #1 Oil	28	%	
100°C, 70 hr, in ASTM #3 Oil	28	%	
100°C, 168 hr, in ASTM #1 Oil	30	%	
100°C, 168 hr, in ASTM #3 Oil	30	%	
100°C, 336 hr, in ASTM #1 Oil	31	%	
100°C, 336 hr, in ASTM #3 Oil	31	%	
100°C, 504 hr, in ASTM #1 Oil	33	%	
100°C, 504 hr, in ASTM #3 Oil	33	%	
Change in Durometer Hardness			ASTM D471 ISO 175
Shore D, 23°C, 70 hr, in Reference Fuel A (Isooctane)	1.0		
Shore D, 23°C, 70 hr, in Reference Fuel C	-4.0		
Shore D, 23°C, 168 hr, in Reference Fuel A (Isooctane)	0.0		
Shore D, 23°C, 168 hr, in Reference Fuel C	-4.0		
Shore D, 23°C, 336 hr, in Reference Fuel A (Isooctane)	2.0		
Shore D, 23°C, 336 hr, in Reference Fuel C	-4.0		
Shore D, 23°C, 504 hr, in Reference Fuel A (Isooctane)	0.0		
Shore D, 23°C, 504 hr, in Reference Fuel C	-3.0		
Shore D, 100°C, 70 hr, in ASTM #1 Oil	-5.0		
Shore D, 100°C, 70 hr, in ASTM #3 Oil	-5.0		
Shore D, 100°C, 168 hr, in ASTM #1 Oil	-4.0		
Shore D, 100°C, 168 hr, in ASTM #3 Oil	-4.0		
Shore D, 100°C, 336 hr, in ASTM #1 Oil	-3.0		
Shore D, 100°C, 336 hr, in ASTM #3 Oil	-3.0		
Shore D, 100°C, 504 hr, in ASTM #1 Oil	-2.0		
Shore D, 100°C, 504 hr, in ASTM #3 Oil	-2.0		
Change in Volume			ASTM D471 ISO 175
23°C, 70 hr, in Reference Fuel A	2.0	%	
23°C, 70 hr, in Reference Fuel C	35	%	
23°C, 168 hr, in Reference Fuel A	3.0	%	
23°C, 168 hr, in Reference Fuel C	35	%	
23°C, 336 hr, in Reference Fuel A	4.0	%	
23°C, 336 hr, in Reference Fuel C	36	%	
23°C, 504 hr, in Reference Fuel A	4.0	%	
23°C, 504 hr, in Reference Fuel C	36	%	
100°C, 70 hr, in ASTM #1 Oil	0.0	%	
100°C, 70 hr, in ASTM #3 Oil	0.0	%	
100°C, 168 hr, in ASTM #1 Oil	0.0	%	
100°C, 168 hr, in ASTM #3 Oil	0.0	%	
100°C, 336 hr, in ASTM #1 Oil	1.0	%	
100°C, 336 hr, in ASTM #3 Oil	1.0	%	
100°C, 504 hr, in ASTM #1 Oil	1.0	%	
100°C, 504 hr, in ASTM #3 Oil	1.0	%	

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Additional Information	Nominal Value	Unit	Test Method
Compressive Load			ASTM D575
10% Deflection	3.10	MPa	
15% Deflection	4.48	MPa	
2% Deflection	0.689	MPa	
20% Deflection	5.86	MPa	
25% Deflection	7.24	MPa	
5% Deflection	1.72	MPa	
50% Deflection	19.3	MPa	

Injection	Nominal Value	Unit
Drying Temperature - Desiccant Dryer	93.0 to 104	°C
Drying Time - Desiccant Dryer	2.0	hr
Suggested Max Moisture	< 0.030	%
Suggested Shot Size	40 to 80	%
Suggested Max Regrind	20	%
Rear Temperature	182 to 199	°C
Middle Temperature	182 to 204	°C
Front Temperature	182 to 210	°C
Nozzle Temperature	188 to 213	°C
Processing (Melt) Temp	202	°C
Mold Temperature	16.0 to 43.0	°C
Injection Pressure	41.4 to 96.5	MPa
Clamp Tonnage	4.1 to 6.9	kN/cm²
Screw L/D Ratio	20.0:1.0	
Screw Compression Ratio	2.5:1.0 to 3.0:1.0	

Injection Notes

Injection Pressure, Second Stage: 5000 to 10000 psi
Timers (per 0.125 in cross section):

- Boost: 5 to 10 sec
- 2nd Stage: 10 to 30 sec
- Cool: 30 to 50 sec

Extrusion	Nominal Value	Unit
Drying Temperature	93.0 to 104	°C
Drying Time	2.0	hr
Cylinder Zone 1 Temp.	182 to 199	°C
Cylinder Zone 2 Temp.	193 to 210	°C
Cylinder Zone 3 Temp.	193 to 216	°C
Melt Temperature	202	°C
Die Temperature	193 to 216	°C

Notes

[1] These links provide you with access to supplier literature. We work hard to keep them up to date; however you may find the most current literature from the supplier.

[2] Typical properties: these are not to be construed as specifications.

[3] Die C

[4] Post-cured 16 hr at 230°F

[5] Rate A (50°C/h)

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Where to Buy

Supplier

Covestro - PUR
Leverkusen, Germany
Telephone: +49-214-6009-2000
Web: http://www.tpu.covestro.com/

Distributor

Amco Polymers
Telephone: 800-262-6685
Web: http://www.amcopolymers.com/
Availability: North America

M. Holland Company
Telephone: 855-497-1403
Web: http://www.mholland.com/
Availability: Mexico, United States

Nexeo Solutions
Telephone: 888-594-6009
Web: http://www.nexeosolutions.com/
Availability: North America

PolyOne Distribution
PolyOne Distribution is a global distribution company. Contact PolyOne Distribution for availability of individual products by country.
Telephone: 800-894-4266
Web: http://polyonedistribution.com/
Availability: Global

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