

Texin® 990 R

Thermoplastic Polyurethane Elastomer (Polyether)

Covestro - PUR

Message:

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 Information			
Additive	demoulding		
Features	Impact resistance, good		
	Good flexibility		
	Good wear resistance		
	Hydrolysis resistance		
	Good toughness		
	Compliance of Food Exposure		
Uses	Films		
	Wheels		
	Cable sheath		
	Washer		
	Pipe		
	Pipe fittings		
	Seals		
	Footwear		
	Profile		
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/cm ³	ASTM D792, ISO 1183
Molding Shrinkage			
Flow: 2.54mm	0.80	%	ASTM D955
Transverse flow: 2.54mm	0.80	%	ASTM D955
Vertical flow direction: 2.54mm	0.80	%	ISO 2577

Flow direction: 2.54mm	0.80	%	ISO 2577
Hardness	Nominal Value	Unit	Test Method
Durometer Hardness (Shore A)	90		ASTM D2240, ISO 868
Mechanical	Nominal Value	Unit	Test Method
Flexural Modulus (23°C)	41.4	MPa	ASTM D790, ISO 178
Taber Abrasion Resistance			
1000 Cycles, 1000g, H-18 wheel	25.0	mg	ISO 4649
1000 Cycles, 1000g, 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			
-- ¹	96.3	kN/m	ASTM D624
--	96	kN/m	ISO 34-1
Compression Set			ASTM D395B, ISO 815
23°C, 22 hr ²	15	%	ASTM D395B, ISO 815
23°C, 22 hr	20	%	ASTM D395B, ISO 815
70°C, 22 hr ³	35	%	ASTM D395B, ISO 815
70°C, 22 hr	75	%	ASTM D395B, ISO 815
Bayshore Resilience	40	%	ASTM D2632
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	%	ASTM D573, ISO 216
100°C, 168 hr	20	%	ASTM D573, ISO 216
100°C, 336 hr	36	%	ASTM D573, ISO 216
100°C, 504 hr	68	%	ASTM D573, ISO 216
Change in Durometer Hardness in Air			ASTM D573, ISO 216
Support d, 100°C, 70 hr	2.0		ASTM D573, ISO 216
Support d, 100°C, 168 hr	1.0		ASTM D573, ISO 216
Support d, 100 c, 336 hr	0.0		ASTM D573, ISO 216
Support d, 100 c, 504 hr	0.0		ASTM D573, ISO 216
Change in Tensile Strength			
23°C, 70 hr, Class C Standard Fuel	-28	%	ASTM D471
100% strain, 23°C, 70 hr, Class C standard fuel	-23	%	ASTM D471
300% strain, 23°C, 70 hr, Class C standard fuel	-22	%	ASTM D471
23°C, 70 hr, in reference fuel A	12	%	ASTM D471
100% strain, 23°C, 70 hr, in reference fuel A	-5.0	%	ASTM D471
300% strain, 23°C, 70 hr, in reference fuel A	-6.0	%	ASTM D471
23°C, 168 hr, Class C Standard Fuel	-25	%	ASTM D471
100% strain, 23°C, 168 hr, Class C standard fuel	-20	%	ASTM D471
300% strain, 23°C, 168 hr, Class C standard fuel	-19	%	ASTM D471
23°C, 168 hr, in reference fuel A	12	%	ASTM D471
100% strain, 23°C, 168 hr, in reference fuel a	-1.0	%	ASTM D471
300% strain, 23°C, 168 hr, in reference fuel a	-6.0	%	ASTM D471
23°C, 336 hr, Class C Standard Fuel	-27	%	ASTM D471
100% strain, 23°C, 336 hr, Class C standard fuel	-19	%	ASTM D471
300% strain, 23°C, 336 hr, Class C standard fuel	-19	%	ASTM D471
23°C, 336 hr, in reference fuel A	7.0	%	ASTM D471
100% strain, 23°C, 336 hr, in reference fuel A	-4.0	%	ASTM D471
300% strain, 23°C, 336 hr, in reference fuel A	-10	%	ASTM D471
23°C, 504 hr, Class C Standard Fuel	-28	%	ASTM D471

100% strain, 23°C, 504 hr, Class C standard fuel	-16	%	ASTM D471
300% strain, 23°C, 504 hr, Class C standard fuel	-18	%	ASTM D471
23°C, 504 hr, in reference fuel A	19	%	ASTM D471
100% strain, 23°C, 504 hr, in reference fuel A	-1.0	%	ASTM D471
300% strain, 23°C, 504 hr, in reference fuel A	-3.0	%	ASTM D471
100°C, 70 hr, in ASTM #1 oil	15	%	ASTM D471, ISO 175
100% strain, 100°C, 70 hr, in ASTM #1 oil	2.0	%	ASTM D471, ISO 175
300% strain, 100°C, 70 hr, in ASTM #1 oil	-1.0	%	ASTM D471, ISO 175
100°C, 70 hr, in ASTM #3 oil	22	%	ASTM D471, ISO 175
100% strain, 100°C, 70 hr, in ASTM #3 oil	2.0	%	ASTM D471, ISO 175
300% strain, 100°C, 70 hr, in ASTM #3 oil	-1.0	%	ASTM D471, ISO 175
100°C, 168 hr, in ASTM #1 oil	-10	%	ASTM D471, ISO 175
100% strain, 100°C, 168 hr, in ASTM #1 oil	4.0	%	ASTM D471, ISO 175
300% strain, 100°C, 168 hr, in ASTM #1 oil	14	%	ASTM D471, ISO 175
100°C, 168 hr, in ASTM #3 oil	15	%	ASTM D471, ISO 175
100% strain, 100°C, 168 hr, in ASTM #3 oil	4.0	%	ASTM D471, ISO 175
300% strain, 100°C, 168 hr, in ASTM #3 oil	14	%	ASTM D471, ISO 175
100°C, 336 hr, in ASTM #1 oil	-4.0	%	ASTM D471, ISO 175
100% strain, 100°C, 336 hr, in ASTM #1 oil	8.0	%	ASTM D471, ISO 175
300% strain, 100°C, 336 hr, in ASTM #1 oil	1.0	%	ASTM D471, ISO 175
100°C, 336 hr, in ASTM #3 oil	5.0	%	ASTM D471, ISO 175
100% strain, 100°C, 336 hr, in ASTM #3 oil	8.0	%	ASTM D471, ISO 175
300% strain, 100°C, 336 hr, in ASTM #3 oil	1.0	%	ASTM D471, ISO 175
100°C, 504 hr, in ASTM #1 oil	-12	%	ASTM D471, ISO 175
100% strain, 100°C, 504 hr, in ASTM #1 oil	6.0	%	ASTM D471, ISO 175
300% strain, 100°C, 504 hr, in ASTM #1 oil	3.0	%	ASTM D471, ISO 175
100°C, 504 hr, in ASTM #3 oil	-2.0	%	ASTM D471, ISO 175
100% strain, 100°C, 504 hr, in ASTM #3 oil	6.0	%	ASTM D471, ISO 175
300% strain, 100°C, 504 hr, in ASTM #3 oil	3.0	%	ASTM D471, ISO 175
23°C, 70 hr, in Reference Fuel C	-28	%	ISO 175
100% strain, 23 c, 70 hr, in Reference Fuel C	-23	%	ISO 175

300% strain, 23 c, 70 hr, in Reference Fuel C	-22	%	ISO 175
23°C, 70 hr, in reference fuel A (isooctane)	12	%	ISO 175
100% strain, 23°C, 70 hr, in reference fuel A (isooctane)	-5.0	%	ISO 175
300% strain, 23°C, 70 hr, in reference fuel A (isooctane)	-6.0	%	ISO 175
23°C, 168 hr, in Reference Fuel C	-25	%	ISO 175
100% strain, 23 c, 168 hr, in Reference Fuel C	-20	%	ISO 175
300% strain, 23 c, 168 hr, in Reference Fuel C	-19	%	ISO 175
23°C, 168 hr, in reference fuel A (isooctane)	12	%	ISO 175
100% strain, 23°C, 168 hr, in reference fuel A (isooctane)	-1.0	%	ISO 175
300% strain, 23°C, 168 hr, in reference fuel A (isooctane)	-6.0	%	ISO 175
23°C, 336 hr, in Reference Fuel C	-27	%	ISO 175
100% strain, 23 c, 336 hr, in Reference Fuel C	-19	%	ISO 175
300% strain, 23 c, 336 hr, in Reference Fuel C	-19	%	ISO 175
23°C, 336 hr, in reference fuel A (isooctane)	7.0	%	ISO 175
100% strain, 23°C, 336 hr, in reference fuel A (isooctane)	-4.0	%	ISO 175
300% strain, 23°C, 336 hr, in reference fuel A (isooctane)	-10	%	ISO 175
23°C, 504 hr, in Reference Fuel C	-28	%	ISO 175
100% strain, 23 c, 504 hr, in Reference Fuel C	-16	%	ISO 175
300% strain, 23 c, 504 hr, in Reference Fuel C	-18	%	ISO 175
23°C, 504 hr, in reference fuel A (isooctane)	19	%	ISO 175
100% strain, 23°C, 504 hr, in reference fuel A (isooctane)	-1.0	%	ISO 175
300% strain, 23°C, 504 hr, in reference fuel A (isooctane)	-3.0	%	ISO 175
Change in Ultimate Elongation			
23°C, 70 hr, Class C Standard Fuel	4.0	%	ASTM D471
23°C, 70 hr, in reference fuel A	11	%	ASTM D471
23°C, 168 hr, Class C Standard Fuel	3.0	%	ASTM D471
23°C, 168 hr, in reference fuel A	0.0	%	ASTM D471
23°C, 336 hr, Class C Standard Fuel	5.0	%	ASTM D471
23°C, 336 hr, in reference fuel A	15	%	ASTM D471

23°C, 504 hr, Class C Standard Fuel	3.0	%	ASTM D471
23°C, 504 hr, in reference fuel A	7.0	%	ASTM D471
100°C, 70 hr, in ASTM #1 oil	28	%	ASTM D471, ISO 175
100°C, 70 hr, in ASTM #3 oil	28	%	ASTM D471, ISO 175
100°C, 168 hr, in ASTM #1 oil	30	%	ASTM D471, ISO 175
100°C, 168 hr, in ASTM #3 oil	30	%	ASTM D471, ISO 175
100°C, 336 hr, in ASTM #1 oil	31	%	ASTM D471, ISO 175
100°C, 336 hr, in ASTM #3 oil	31	%	ASTM D471, ISO 175
100°C, 504 hr, in ASTM #1 oil	33	%	ASTM D471, ISO 175
100°C, 504 hr, in ASTM #3 oil	33	%	ASTM D471, ISO 175
23°C, 70 hr, in Reference Fuel C	4.0	%	ISO 175
23°C, 70 hr, in reference fuel A (isooctane)	11	%	ISO 175
23°C, 168 hr, in Reference Fuel C	3.0	%	ISO 175
23°C, 168 hr, in reference fuel A (isooctane)	0.0	%	ISO 175
23°C, 336 hr, in Reference Fuel C	5.0	%	ISO 175
23°C, 336 hr, in reference fuel A (isooctane)	15	%	ISO 175
23°C, 504 hr, in Reference Fuel C	3.0	%	ISO 175
23°C, 504 hr, in reference fuel A (isooctane)	7.0	%	ISO 175
Change in Durometer Hardness			
Support D, 23°C, 70 hr, in Reference Fuel C	-4.0		ASTM D471, ISO 175
Support D, 23°C, 70 hr, in reference fuel A	1.0		ASTM D471
Support D, 23°C, 168 hr, in Reference Fuel C	-4.0		ASTM D471, ISO 175
Support D, 23°C, 168 hr, in reference fuel A	0.0		ASTM D471
Support d, 23 c, 336 hr, in Reference fuel c	-4.0		ASTM D471, ISO 175
Support D, 23°C, 336 hr, in reference fuel A	2.0		ASTM D471
Support D, 23°C, 504 hr, in Reference Fuel C	-3.0		ASTM D471, ISO 175
Support D, 23°C, 504 hr, in reference fuel A	0.0		ASTM D471
Support D, 100°C, 70 hr, in ASTM #1 oil	-5.0		ASTM D471
Support D, 100°C, 70 hr, in ASTM #3 oil	-5.0		ASTM D471
Support D, 100°C, 168 hr, in ASTM #1 oil	-4.0		ASTM D471
Support D, 100°C, 168 hr, in ASTM #3 oil	-4.0		ASTM D471
Support D, 100°C, 336 hr, in ASTM #1 oil	-3.0		ASTM D471
Support D, 100°C, 336 hr, in ASTM #3 oil	-3.0		ASTM D471
Support D, 100°C, 504 hr, in ASTM #1 oil	-2.0		ASTM D471

Support D, 100°C, 504 hr, in ASTM #3 oil	-2.0		ASTM D471
Support D, 23°C, 70 hr, in reference fuel A (isooctane)	1.0		ISO 175
Support D, 23°C, 168 hr, in reference fuel A (isooctane)	0.0		ISO 175
Support D, 23°C, 336 hr, in reference fuel A (isooctane)	2.0		ISO 175
Support D, 23°C, 504 hr, in reference fuel A (isooctane)	0.0		ISO 175
Support D, 100°C, 70 hr, in ASTM #1 oil	-5.0		ISO 175
Support D, 100°C, 70 hr, in ASTM #3 oil	-5.0		ISO 175
Support D, 100°C, 168 hr, in ASTM #1 oil	-4.0		ISO 175
Support D, 100°C, 168 hr, in ASTM #3 oil	-4.0		ISO 175
Support D, 100°C, 336 hr, in ASTM #1 oil	-3.0		ISO 175
Support D, 100°C, 336 hr, in ASTM #3 oil	-3.0		ISO 175
Support D, 100°C, 504 hr, in ASTM #1 oil	-2.0		ISO 175
Support D, 100°C, 504 hr, in ASTM #3 oil	-2.0		ISO 175
Change in Volume			
23°C, 70 hr, Class A standard fuel	2.0	%	ASTM D471
23°C, 70 hr, Class C Standard Fuel	35	%	ASTM D471
23°C, 168 hr, Class A standard fuel	3.0	%	ASTM D471
23°C, 168 hr, Class C Standard Fuel	35	%	ASTM D471
23°C, 336 hr, Class A standard fuel	4.0	%	ASTM D471
23°C, 336 hr, Class C Standard Fuel	36	%	ASTM D471
23°C, 504 hr, Class A standard fuel	4.0	%	ASTM D471
23°C, 504 hr, Class C Standard Fuel	36	%	ASTM D471
100°C, 70 hr, ASTM Standard Oil (No.1)	0.0	%	ASTM D471
100°C, 70 hr, ASTM Standard Oil (No.3)	0.0	%	ASTM D471
100°C, 168 hr, ASTM Standard Oil (No.1)	0.0	%	ASTM D471
100°C, 168 hr, ASTM Standard Oil (No.3)	0.0	%	ASTM D471
100°C, 336 hr, ASTM Standard Oil (No.1)	1.0	%	ASTM D471
100°C, 336 hr, ASTM Standard Oil (No.3)	1.0	%	ASTM D471
100°C, 504 hr, ASTM Standard Oil (No.1)	1.0	%	ASTM D471
100°C, 504 hr, ASTM Standard Oil (No.3)	1.0	%	ASTM D471
23°C, 70 hr, in reference fuel A	2.0	%	ISO 175
23°C, 70 hr, in reference fuel C	35	%	ISO 175
23°C, 168 hr, in reference fuel A	3.0	%	ISO 175
23°C, 168 hr, in reference fuel C	35	%	ISO 175
23°C, 336 hr, in reference fuel A	4.0	%	ISO 175
23°C, 336 hr, in reference fuel C	36	%	ISO 175
23°C, 504 hr, in reference fuel A	4.0	%	ISO 175
23°C, 504 hr, in reference fuel C	36	%	ISO 175
100°C, 70 hr, in ASTM #1 oil	0.0	%	ISO 175

100°C, 70 hr, in ASTM #3 oil	0.0	%	ISO 175
100°C, 168 hr, in ASTM #1 oil	0.0	%	ISO 175
100°C, 168 hr, in ASTM #3 oil	0.0	%	ISO 175
100°C, 336 hr, in ASTM #1 oil	1.0	%	ISO 175
100°C, 336 hr, in ASTM #3 oil	1.0	%	ISO 175
100°C, 504 hr, in ASTM #1 oil	1.0	%	ISO 175
100°C, 504 hr, in ASTM #3 oil	1.0	%	ISO 175
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 ⁴
Additional Information	Nominal Value	Unit	Test Method
Compressive Load			ASTM D575
10% Deflection	3.10	MPa	ASTM D575
15% Deflection	4.48	MPa	ASTM D575
2% Deflection	0.689	MPa	ASTM D575
20% Deflection	5.86	MPa	ASTM D575
25% Deflection	7.24	MPa	ASTM D575
5% Deflection	1.72	MPa	ASTM D575
50% Deflection	19.3	MPa	ASTM D575
Injection	Nominal Value	Unit	
Drying Temperature - Desiccant Dryer	93.0 - 104	°C	
Drying Time - Desiccant Dryer	2.0	hr	
Suggested Max Moisture	< 0.030	%	
Suggested Shot Size	40 - 80	%	
Suggested Max Regrind	20	%	
Rear Temperature	182 - 199	°C	
Middle Temperature	182 - 204	°C	
Front Temperature	182 - 210	°C	
Nozzle Temperature	188 - 213	°C	
Processing (Melt) Temp	202	°C	
Mold Temperature	16.0 - 43.0	°C	
Injection Pressure	41.4 - 96.5	MPa	
Clamp Tonnage	4.1 - 6.9	kN/cm ²	
Screw L/D Ratio	20.0:1.0		
Screw Compression Ratio	2.5:1.0 - 3.0:1.0		
Injection instructions			
Injection Pressure, Second Stage: 5000 to 10000 psiTimers (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 - 104	°C	

Drying Time	2.0	hr
Cylinder Zone 1 Temp.	182 - 199	°C
Cylinder Zone 2 Temp.	193 - 210	°C
Cylinder Zone 3 Temp.	193 - 216	°C
Melt Temperature	202	°C
Die Temperature	193 - 216	°C

NOTE

1. C mould
2. Post-cured 16 hr at 230°F
3. Post-cured 16 hr at 230°F
4. 速率 A (50°C/h)

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Recommended distributors for this material

Susheng Import & Export Trading Co.,Ltd.

Tel: +86 21 5895 8519

Phone: +86 13424755533

Email: sales@su-jiao.com

No. 215, Lianhe North Road, Fengxian District, Shanghai, China



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