

Millathane® Urethane For Fuel Bladders

Millable urethanes, especially polyester urethanes such as Millathane 5004, have good resistance to oils and fuel as seen by the immersions in JP4 and JP8 fuels, below. Polyether urethanes such as Millathane CM have less resistance to fuels but have improved water resistance and improved low temperature properties.

	СМ	_		_	5004			
Millathane® CM	100							
Millathane® 5004			100					
Zinc Stearate	0.5							
Stearic Acid			0.25					
N330 black	30		35					
TP90B plasticizer			10					
MBTS	4							
MBT	2							
Thanecure® ZM	1							
Sulfur	2							
DiCup 40C		-		-	150.25			
	139.5				150.25			
Mooney Viscosity								
ML(1+4)/100°C	200				56			
MDR, 160°C								
MDR, 100 C ML, Ib-in (dNm)	3.6	(4.1	`	0.8	(0.9	`
MH, Ib-in (dNm)	41.1	())	19.3	(21.8))
ts2, min.	2.1	C	40.4)	2.7	(21.0)
t90, min.	5.5				16.4			
190, 1111.	0.0				10.4			
Original Physical Properties								
Cure time at 160°C, min.	15				20			
Hardness, Shore A	70				67			
300% Modulus, psi (MPa)	2580	(17.8)	1370	(9.4)
Tensile Strength, psi (MPa)	3420	(23.6)	2460	(17.0)
Elongation, %	370				670			
Tear Die C, lb/in (kN/m)	350	(61.3)	360	(63.0)
Oven Aged 70 hr/125°C								
Hardness Change, Pts	+7				+11			
Tensile Strength, % Change	+6				+34			
Elongation, % Change	-38				-27			
Aged in JP4 Fuel, 70 hr/88ºC(190ºF)								
Hardness Change, Pts	-7				0			
Tensile Strength, % Change	-52				+1			
Elongation, % Change	-52 -51				+15			
Weight Change, %	+26				-1.7			
Volume Change, %	+20				-1.7			
volume Ghanye, 70	±42				-0.2			

The recommendations for the use of our products are based on tests believed to be reliable. However, we do not guarantee the results to be obtained by others under different conditions. Nothing in this literature is intended as a recommendation to use our products so as to infringe on any patent. Millathane and Thanecure are registered trademarks of TSE Industries, Inc.



Millathane® Urethane For Fuel Bladders, continued

Millathane grade:	СМ	5004
Aged in JP8 Fuel, 70 hr/88°C (190°F)		
Hardness Change, Pts	-5	+3
Tensile Strength, % Change	-54	+4
Elongation, % Change	-49	+7
Weight Change, %	+18	-4.6
Volume Change, %	+28	-4.8
Aged in Water, 70 hr/100°C		
Hardness Change, Pts	-10	Too Soft
Tensile Strength, % Change	-56	То
Elongation, % Change	-35	Test
Weight Change, %	+12	+7
Volume Change, %	+14	+8
Compression Set		
70 hr/70°C, % set	54	
22 hr/100°C, % set		61
Brittle Point, °C		
Unaged	-61	-57
JP4 Aged	-57	-52
JP8 Aged	-61	-57
Temperature Retraction, °C		
TR-10	-45	-38
TR-30	-39	-23
TR-50	-24	-18

Summary

Millathane 5004 (peroxide cured) had better resistance to JP4 and JP8 fuels than Millathane CM (sulfur cured), but Millathane CM had better low temperature properties and hot water resistance.

Ref: V7831-E,V7831A-J 5004_cm_fuel_resistance_v7831.doc R2_October 2020