IROGRAN® A 85 E 4993 FCM

Thermoplastic Polyurethane Elastomer (Polyester)

Huntsman Corporation

Message:

IROGRAN A 85 E 4993 FCM is a thermoplastic polyester polyurethane for melt calendering. IROGRAN is part of the HUNTSMAN technical extrusion and injection molding product range and offers a specially designed, flexible material with a broad processing window. IROGRAN A 85 E 4993 FCM is a food contact material. PERFORMANCE FEATURES High wear resistance Good melt flow High elasticity Complies with FDA CFR 177.2600 Low color APPLICATIONS Texile Coatings Technical molding Cable jacketing

General Information			
Features	Food Contact Acceptable		
	Good Flexibility		
	Good Flow		
	Good Processability		
	Good Wear Resistance		
	High Elasticity		
Uses	Cable Jacketing		
	Coating Applications		
Agency Ratings	FDA 21 CFR 177.2600		
Forms	Pellets		
Processing Method	Calendering		
	Extrusion		
	Injection Molding		
Physical	Nominal Value	Unit	Test Method
Specific Gravity ¹	1.21	g/cm³	ASTM D792, DIN 53479
Melt Volume-Flow Rate (MVR) (190°C/10.0			
kg)	65.0	cm³/10min	
Hardness	Nominal Value	Unit	Test Method
Durometer Hardness			ASTM D2240, DIN 53505
Shore A, Injection Molded	87		
Shore D, Injection Molded	36		
Mechanical	Nominal Value	Unit	Test Method

TMÅ 3Internal MethodHigh: 6350 µm160"CLaw: 630 µm160"CCarekar Temparatur Profile 4160 to 180"CBaser Roll160 to 180"CBaser Roll160 to 180"CBaser Roll160 to 180"CBaser Roll160 to 180"CBaser Roll600MPaMSTDA12100% Strain600MPaMSTDA12, DIN S5304300% Strain600MPaMSTDA12, DIN S5304100% Strain600MPaMSTDA12, DIN S5304Terville Strength 428.3MPaMSTDA12, DIN S5304Terville Strength 48.3MPaMSTDA12, DIN S5304Terville Elingation 78.4MSTD MA12, DIN S5304Terville Elingation 78.6MPaMSTD MA12, DIN S5304Terville Elingation 78.0MPaMSTD MA12, DIN S5304Terville Elingation 78.0MSTD MA12, DIN S5304Terville Elingation 78.0MSTD MA12, DIN S5304Terville Elingation 78.0MSTD MA12, DIN S5304Terville Elingation 89.0MSTD MA12, DIN S5304Terville Elingation 69.0MSTD MA12, DIN S5304Terville Elingation 79.0MSTD MA12, DIN S5304Terville Elingation 79.0MSTD MA12, DIN S5304Terville Elingation 69.0MSTD MA12, DIN S5304Terville Elingation 8MSTD MA12, DIN S5304MSTD MA12, DIN S5304Terville Elingation MSTD MA12, DIN S5304MSTD MA12, DIN S5304	Abrasion ²	20	mm³	DIN 53516
w: 05.9 µm 116 "C Calendar Temperature Profile ⁴ . Front Roll 100 to 180 "C Rear Roll 100 to 180 "C Elestomers Nominal Value Unit Test Method Tensile Stress ⁵ . . . 100% Strain 6.69 MPa ASTM D412 (DN 3504) 100% Strain 6.60 MPa . 100% Strain 6.00 MPa ASTM D412 (DN 3504) Tensile Strength ⁵ . . . Tensile Strength ⁵ . . . Tensile Strength ⁶	TMA ³			Internal Method
Calendra Terripretative Proble *Front Roll100 to 100*CRev Roll100 to 100*CBalanomeraNominal ValueVinitTest MethodBrasslie Stress **********************************	High : 635.0 μm	160	°C	
Front Roll160 to 180"CRear Roll160 to 180"CElestomesNormin/ ValueUnitMethodTensile Stress ⁵	Low : 635.0 µm	116	°C	
Rear Roll160 to 180"CElastomersNominal ValueUnitTest MethodTendie Stress ⁵	Calendar Temperature Profile ⁴			
ElatomersNominal ValueUnitTest MethodTensile Stress 56.69MPaASTM D412100% Strain6.60MPaDIN 53504100% Strain11.7MPaASTM D412 DIN 5304Stress 68.00MPaASTM D412 DIN 5304Tensile Strength 68ASTM D412 DIN 5304Tensile Strength 78MPaASTM D412Break8.0MPaDIN 53504Break6.00%ASTM D412Break6.00%DIN 53504Tensile Elongation 78DIN 53504Tensile Elongation 78DIN 53504Tensile Strength 86.00%DIN 53504Tensile Congression Set 78STM D624	Front Roll	160 to 180	°C	
Tensile Stress ⁵ 100% Strain6.69MPaASTM D412100% Strain6.00MPaDIN 53504300% Strain1.7.7MPaASTM D412, DIN 53504Tensile Strength ⁶ STM D412Break8.6.0MPaASTM D412Break6.00%ASTM D412Break6.00%ASTM D412Break6.00%ASTM D412Break6.00%MS304Tensile Elongation ⁷ NTerr Strength ⁶ N9.8.0Kl/mASTM D624.SO 34-1Compression Set ⁹ SO 34-1Compression Set ⁹ .ASTM D6245.0Kl/mASTM D6249.8.0Kl/mASTM D6249.8.0Kl/mASTM D6245.0SO 40.0%27C, 24 hr3.0%70'C, 24 hr3.0NNominal ValueUmitLDrying Timeperature5.0 to 40.0*CCylinder Zone 1 Temp.170 to 195*CCylinder Zone 2 Temp.170 to 195*CCylinder Zone 3 Temp.170 to 205*C <tr< td=""><td>Rear Roll</td><td>160 to 180</td><td>°C</td><td></td></tr<>	Rear Roll	160 to 180	°C	
100% Strain669MPaASTM D412100% Strain600MPaDIN 53504300% Strain1.7MPaASTM D412, DIN 53504Tensle Strength ⁶ 28.3MPaASTM D412Break28.3MPaASTM D412Break600%ASTM D412Break600%ASTM D412Break600%ASTM D412Break600%ASTM D412Break630%DIN 3504Tear Strength ⁶ *STM D41298kl/mASTM D412Compression Set ⁹ *STM D42499.8kl/mSO 34-1Compression Set ⁹ *STM D335, ISO 81523°C, 24 hr90%STM D335, ISO 81523°C, 24 hr50 to 90.0*CSTM D335, ISO 815Drying Temperature85.0 to 90.0*CSTDrying Temperature3.0hrSTCylinder Zone 1 Temp.170 to 195*CSTCylinder Zone 2 Temp.170 to 195*CSTCylinder Zone 3 Temp.170 to 195*CSTCylinder Zone 5 Temp.175 to 200*CSTDie Temperature175 to 200*CSTNOTE**S*SST1.Injection Molded*C*S2.Stried Film*S*S2.Stried Film*S*SStried Stried FilmStried Film*S <tr< td=""><td>Elastomers</td><td>Nominal Value</td><td>Unit</td><td>Test Method</td></tr<>	Elastomers	Nominal Value	Unit	Test Method
10%. Strain600MPaDIN 350430%. Strain11.7MPaASTM D412, DN S3504Tensile Strength °28.3MPaASTM D412Break60.0MPaDIN 3504Tensile Elongation 75StrainDIN 3504Tensile Elongation 75StrainStrainTensile Elongation 75StrainStrainTensile Elongation 75StrainStrainTensile Elongation 75StrainStrainTensile Elongation 85StrainStrain23°C 24 hr30%Strain23°C 24 hr8Stor 90.0StrainDrying Temperature50 to 40.0°CStrainOrging Temperature3.0hrStrainCylinder Zone 1 Temp.170 to 195°CStrainCylinder Zone 2 Temp.170 to 195°CStrainCylinder Zone 3 Temp.170 to 195°CStrainCylinder Zone 5 Temp.170 to 195°CStrainCylinder Zone 5 Temp.170 to 195°CStrainChilder Elongature175 to 200°CStrain<	Tensile Stress ⁵			
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Brak36.0MPaDIN 3304Tensite Elongation 7Inseak600% 0ASTM 0412Break630% 0DIN 53504Tear Strength 8	Tensile Strength ⁶			
Tensile Elongation ⁷ Break 600 %0 ASTM D412 Break 630 %0 D1x 53504 Tear Strength ⁸ NVm ASTM D624 99.8 KN/m ASTM D624 65 KN/m ISO 34-1 compression Set ⁹ S0 % STM D595, ISO 815 23°C, 24 hr 30 % STM D395, ISO 815 Textursion Nominal Value % STM D624 Drying Temperature 85.0 to 90.0 °C STM D624 Drying Temperature 3.0 rC STM D624 Orying Temperature 2.0 to 40.0 °C STM D624 Cylinder Zone 1 Temp. 170 to 195 °C STM D624 Cylinder Zone 2 Temp. 170 to 195 °C STM D624 Cylinder Zone 3 Temp. 170 to 195 °C STM D624 Cylinder Zone 4 Temp. 170 to 195 °C STM D624 Cylinder Zone 5 Temp. 170 to 195 °C STM D624 Cylinder Zone 5 Temp. 170 to 195 °C STM D624	Break	28.3	MPa	ASTM D412
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99.8kN/mASTM D62465kN/mISO 34.1Compression Set 9ASTM D395, ISO 81523°C, 24 hr30%70°C, 24 hr42%TO°C, 24 hr65.0 to 90.0°CDrying Temperature85.0 to 90.0°CDrying Time3.0hrHopper Temperature25.0 to 40.0°CCylinder Zone 1 Temp.170 to 195°CCylinder Zone 2 Temp.170 to 195°CCylinder Zone 3 Temp.170 to 195°CCylinder Zone 5 Temp.170 to 195°CTo Temperature170 to 195°CCylinder Zone 5 Temp.170 to 195°CCylinder Zone 5 Temp.170 to 195°CTo175 to 200°CNOTEII1.1Injection MoldedI2.2Injection MoldedI3.3Extruded FilmI4.42RI MillI5.Injection MoldedI5.Injection MoldedI5.Injection MoldedI5.Injection MoldedI5.Injection MoldedI5.Injection MoldedI5.Injection MoldedI5.Injection MoldedI5.Injection MoldedI <td< td=""><td>Break</td><td>630</td><td>%</td><td>DIN 53504</td></td<>	Break	630	%	DIN 53504
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NOTE1.Injection Molded2.Injection Molded3.Extruded Film4.2 Roll Mill5.Injection Molded	Adapter Temperature	175 to 200	°C	
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2. Injection Molded 3. Extruded Film 4. 2 Roll Mill 5. Injection Molded	NOTE			
3.Extruded Film4.2 Roll Mill5.Injection Molded	1.	Injection Molded		
4. 2 Roll Mill 5. Injection Molded	2.	Injection Molded		
5. Injection Molded	3.	Extruded Film		
	4.	2 Roll Mill		
6. Injection Molded	5.	Injection Molded		
	6.	Injection Molded		

7.	Injection Molded
8.	Injection Molded
9.	Injection Molded

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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

