

Tecnoflon® FOR 80 HS



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Cure incorporated copolymer



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Tecnoflon® FOR 80 HS

GENERAL FEATURES

TECNOFLON® FOR 80 HS is a medium viscosity cure incorporated copolymer, based on our breakthrough technology on bisphenol curable fluoroelastomers. Tecnoflon® FOR 80 HS can be compounded to meet all the major fluoroelastomer specifications with only a 1 hour post cure and without using Calcium Hydroxide. Tecnoflon® FOR 80 HS is well suited for all applications requiring superior flow, mould release and excellent compression set.

Some of the unique properties of Tecnoflon® FOR 80 HS are:

- Low post cure time of 1 hour
- Lower post cure temperatures
- Curable without Calcium Hydroxide
- Excellent mould release
- Lack of mould fouling
- Lower compound viscosity
- Good scorch safety
- Fast cure rate

TECNOFLON® FOR 80 HS can be used for injection and transfer moulding of O-rings, gaskets, and seals. The material can be extruded into hoses or profiles and can be calendered to make sheet stocks or belting. The product can be mixed using typical fluoroelastomers compounding ingredients and mixing can be accomplished with two-roll mills or internal mixers. Finished goods can be produced by a variety of rubber processing methods.

Basic characteristics of the raw polymer are as follows:

PROPERTIES	TYPICAL VALUES
ML (1+10') @ 121°C	38
Fluorine content (%)	66
Specific gravity (g/cc)	1.81
Colour	Off white
Packaging / Form	Slabs
Solubility	Ketones and esters

HANDLING AND SAFETY

Normal care and precautions should be taken to avoid skin contact, eye contact and breathing of fumes. Smoking is prohibited in working areas. Wash hands before eating or smoking. For complete health and safety information, please refer to the material safety data sheet.



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Tecnoflon® FOR 80 HS

TYPICAL RHEOLOGICAL PROPERTIES

CURABLE WITH & WITHOUT CALCIUM HYDROXIDE

TEST COMPOUND			
Tecnoflon® FOR 80 HS		100	100
MgO-DE	phr	7	3
Ca(OH) ₂	phr	-	6
N-990 MT Carbon Black	phr	30	30
Mooney Viscosity ML (1+10) @ 121°C		MU	68 71
Mooney Scorch MS 135°C			
MV	MU	29	31
t ₁₅	min	66	46
MDR 12 min @ 177°C arc 0,5°			
Minimum Torque	lb*in	1.38	1.46
Maximum Torque	lb*in	20.1	22.3
t _{s2}	min	1.6	1.3
t' ₅₀	min	2.2	1.6
t' ₉₀	min	3.2	2.3
MDR 12 min @ 190°C arc 0,5° (*)			
Minimum Torque	lb*in	1.19	-
Maximum Torque	lb*in	19.4	-
t _{s2}	min	0.8	-
t' ₅₀	min	1.1	-
t' ₉₀	min	1.4	-

(*) MDR data for Ca(OH)₂ containing compound missing: too scorchy to give accurate results



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TYPICAL PHYSICAL PROPERTIES

CURABLE WITH & WITHOUT CALCIUM HYDROXIDE

TEST COMPOUND			
Tecnoflon® FOR 80 HS		100	100
MgO-DE	phr	7	3
Ca(OH) ₂	phr	-	6
N-990 MT Carbon Black	phr	30	30

MECHANICAL PROPERTIES			
Press cure 7 min @ 170°C			
100 % Modulus	MPa	4.6	5.2
Tensile Strength	MPa	12.5	10.8
Elongation at Break	%	237	216
Hardness	ShoreA	70	71
PostCure 2 h @ 250°C			
100 % Modulus	MPa	5.5	6.4
Tensile Strength	MPa	18.1	15.2
Elongation at Break	%	214	187
Hardness	ShoreA	70	72
PostCure (8+16) h @ 250°C			
100 % Modulus	MPa	5.6	6.7
Tensile Strength	MPa	18	15
Elongation at Break	%	201	178
Hardness	ShoreA	71	73

SEALING PROPERTIES			
COMPRESSION SET			
(25 % Deformation on #2140 -Ring, ASTM D395 Method B, 70 h @ 200 °C)			
Press cure: 170°C x		7 min	5 min
After press cure	%	31	35
Post cure 250°C x 1 h	%	16	18
Post cure 250°C x 2 h	%	15	17
Post cure 250°C x 4 h	%	14	16
Post cure 250°C x (8+16) h	%	13	15



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POST CURE TIME STUDY: BLACK COMPOUND

TEST COMPOUND				
Tecnoflon® FOR 80 HS			100	
Elastomag 170	phr		9	
N-990 MT Carbon Black	phr		30	
Struktol WS 280	phr		0.5	
Mooney Viscosity ML (1 +10) @ 121°C		MU	73	
MDR 6 min @ 177°C arc 0,5°				
Minimum Torque	lb* in		1.6	
Maximum Torque	lb* in		20.2	
t _{s2}	min		1.4	
t'90	min		4.1	
ODR 2000, 10 min @ 177°C				
Minimum Torque	lb* in		13	
Maximum Torque	lb* in		105	
t _{s2}	min		2.3	
t'90	min		5.6	
MECHANICAL PROPERTIES				
Press cure: 10 min @ 177°C				
Post cure: 250 °C			none	1 h
			2 h	4 h
100 % Modulus	MPa	4.0	5.2	5.2
Tensile Strength	MPa	12.0	16.9	16.1
Elongation at Break	%	300	258	228
Hardness	ShoreA	70	72	73
Tear Strength, die C	KN/m	27.1	28.2	26.9
			27.5	
HEAT RESISTANCE (ASTM D 573, 70 h @ 225°C)				
Δ Tensile strength	%	45	6	3
Δ Elongation at break	%	-31	-21	-15
Δ Hardness	ShoreA	4	3	2
			2	2
HEAT RESISTANCE (ASTM D 573, 70 h @ 275°C)				
Δ Tensile strength	%	-14	-43	-32
Δ Elongation at break	%	-12	-2	21
Δ Hardness	ShoreA	-3	-4	-4
			-4	-4



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POST CURE TIME STUDY: BLACK COMPOUND (CONT.)

TEST COMPOUND		
Tecnoflon® FOR 80 HS		100
Elastomag 170	phr	9
N-990 MT Carbon Black	phr	30
Struktol WS 280	phr	0.5

COMPRESSION SET (ASTM D 395)					
Post cure (250 °C)		none	1 h	2 h	4 h
214 O -ring, Method B 168 h @ 150°C	%	20	6	7	6
214 O -ring, Method B 22 h @ 200°C	%	27	10	10	9
214 O -ring, Method B 70 h @ 200°C	%	32	13	13	12
214 O -ring, Method B 336 h @ 200°C	%	44	31	30	29
Plied buttons, Method B 70 h @ 200°C	%	35	11	10	7

FLUID RESISTANCE, FUEL B 70 h @ 21°C (ASTM D 471)					
Δ Tensile strength	%	-4	-10	-17	-21
Δ Elongation at break	%	-11	-10	-10	-6
Δ Hardness	ShoreA	0	-2	-1	-2
Δ Volume	%	1	1	1	1

FLUID RESISTANCE, MOBIL 1 ENGINE OIL 168 h @ 150°C (ASTM D 471)					
Δ Tensile strength	%	-19	-38	-32	-35
Δ Elongation at break	%	-34	-24	-26	-10
Δ Hardness	ShoreA	1	-3	-3	-2
Δ Volume	%	0	0	0	0

FLUID RESISTANCE, ARM 200 70 h @ 150°C (ASTM D 471)					
Δ Tensile strength	%	6	-17	-13	-28
Δ Elongation at break	%	-6	-6	-7	-6
Δ Hardness	ShoreA	-11	-10	-9	-9
Δ Volume	%	16	16	16	16



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POST CURE TEMPERATURE STUDY: BLACK COMPOUND

TEST COMPOUND		
Tecnoflon® FOR 80 HS		100
Elastomag 170	phr	9
N-990 MT Carbon Black	phr	30
Struktol WS 280	phr	0.5

Compression Set on -214 O-rings (ASTM D395, Method B, 70 h @ 200°C)					
Press cure 5 min @ 177°C	Post cure Temperature (°C/°F)	Post cure time (h)			
		1	2	3	4
C Set, %	None	32			
C Set, %	93 / 200	31	31	31	31
C Set, %	121 / 250	33	30	31	31
C Set, %	149 / 300	27	24	22	22
C Set, %	177 / 350	21	19	19	19
C Set, %	200 / 392	15	15	14	14

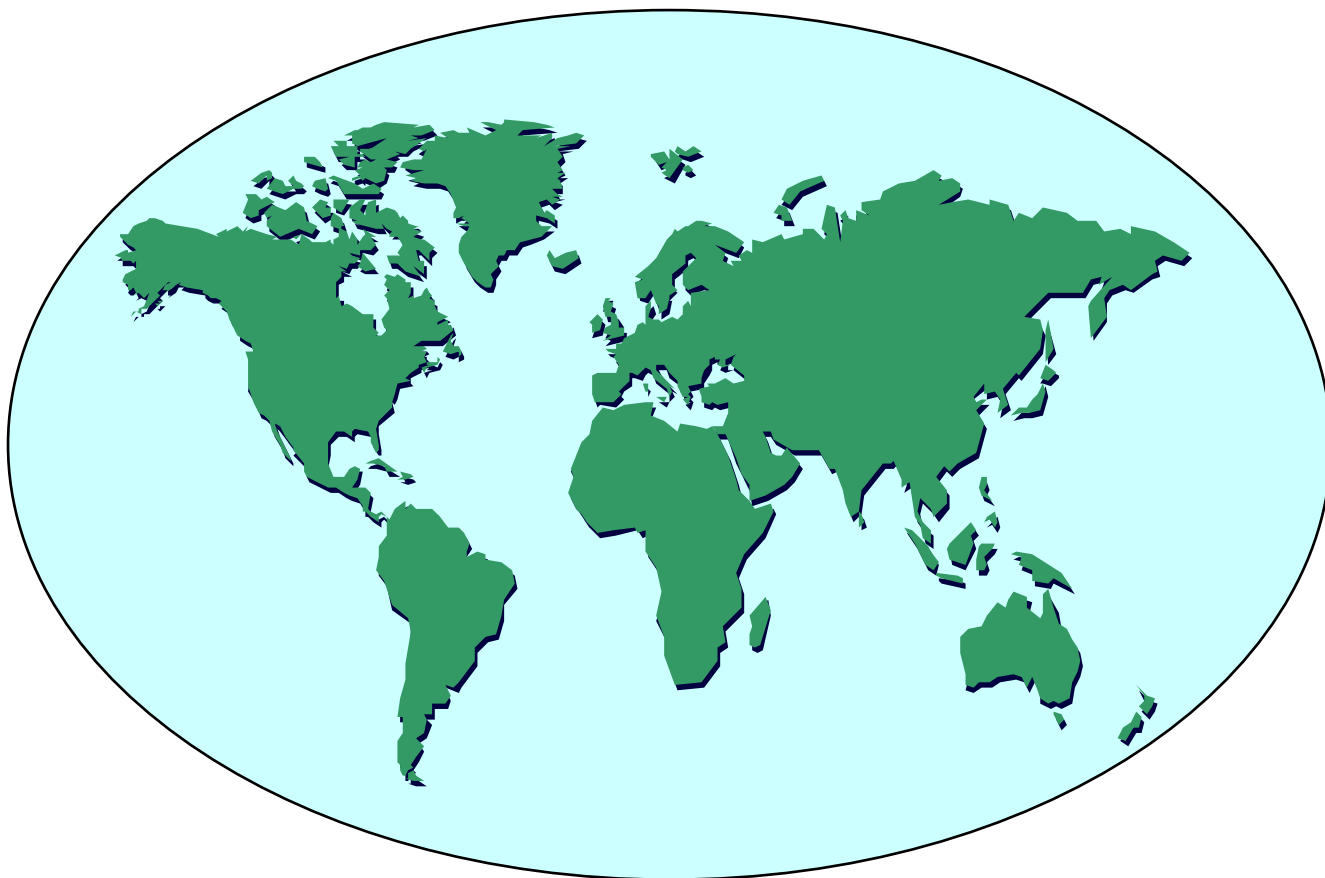


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TYPICAL PROPERTIES: GREEN COMPOUND

TYPICAL PROPERTIES & POST CURE STUDY					
Tecnoflon® FOR 80 HS			100		
MgO DE	phr		7		
Ca(OH) ₂	phr		-		
BaSO ₄	phr		35		
Tremin 283 600 EST	phr		20		
Verde Luce 5G	phr		1.5		
Nafol 1822B	phr		0.8		
Struktol WS 280	phr		0.7		
Mooney Viscosity ML (1+10) @ 121°C		MU		66	
Mooney Scorch @ 135°C					
MV		MU		28	
t ₁₅		min		38	
MDR 6 min @ 177°C arc 0,5°					
Minimum Torque		lb*in		15	
Maximum Torque		lb*in		22.3	
t _{s2}		min		1.2	
t' ₅₀		min		1.7	
t' ₉₀		min		2.4	
MECHANICAL PROPERTIES					
Press cure: 7 min @ 170°C					
Post cure: 250 °C		none	1h	4 h	8 h
					(8+16) h
100 % Modulus	MPa	4.2	7.2	7.8	8.3
Tensile Strength	MPa	9.4	14.0	14.2	15.1
Elongation at Break	%	266	197	176	178
Hardness	ShoreA	68	68	72	72
Compression Set on -214 O-rings, ASTM D395, Method B, 70h @ 200°C					
Press cure: 7 min @ 170°C					
Post cure: 250 °C		none	1h	4 h	8 h
					(8+16) h
Compression set	%	40	21	18	17
					19



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SOLVAY SOLEXIS S.p.A

Viale Lombardia, 20

20021 Bollate (MI), Italy

Tel: +39-02-38351

Fax: +39-02-3835-2110

E-mail: solvaysolexis.ita@solvay.com

Web: www.solvaysolexis.com



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