

# Compounds with High Bio-based Content using SEPTON™ BIO-series

Elastomer R&D department  
Elastomer division

***kuraray*** **Septon™** BIO-series

# Physical properties of compounds using SEPTON™ BIO-series

Dry blend (without compounding process) <sup>1)</sup>		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)											
Elastomer <sup>2)</sup>	SEPTON™ BIO-series SF902 (Bio-based cont.=82wt%)	70	50	30	10	50	50	-	-	-	-	-											
	SEPTON™ BIO-series SF904 (Bio-based cont.=50wt%)	-	-	-	-	20	10	80	70	50	30	10											
Bio-LDPE (MFR=30 g/10 min) <sup>3)</sup>	(Bio-based cont.=95 wt%)	30	50	70	90	30	40	20	30	50	70	90											
Total Bio-based cont. (wt%)		86	89	91	94	80	84	59	64	73	82	91											
Coefficient of static friction	Dry	3.8	2.1	0.8	0.6	3.9	3.5	9.0	4.8	3.4	1.0	0.7											
	Wet	2.0	0.9	0.6	0.4	1.4	1.9	5.2	3.1	1.1	0.8	0.6											
Hardness	(Type A)	62	81	91	94	56	72	55	61	81	90	95											
	(Type D)	-	-	28	36	-	-	-	-	-	29	39											
Specimen: Injection molded sheet (2 mmt)		MD	TD	MD	TD	MD	TD	MD	TD	MD	TD	MD	TD	MD	TD	MD	TD	MD	TD	MD	TD	MD	TD
100% modulus	(MPa)	2.7	1.9	4.6	3.7	7.0	7.4	9.6	7.4	2.4	1.6	3.6	2.8	1.2	1.1	2.1	1.7	5.2	3.9	7.5	5.6	9.9	7.4
Tensile strength	(MPa)	3.9	4.1	4.9	4.9	7.4	8.9	10	8.9	3.6	4.6	4.2	4.4	3.6	4.5	4.2	4.7	7.0	7.1	9	8.6	11	10
Elongation	(%)	280	500	200	420	160	480	170	480	360	580	240	580	500	670	410	650	280	600	210	570	200	580
MFR (230 deg. C, 2.16 kg)	(g/10min)	3.8	1.2	27	47	6.7	7.2	95	82	90	76	69											

1) EC75SX: 75ton (Shibaura Machine Co., Ltd.)

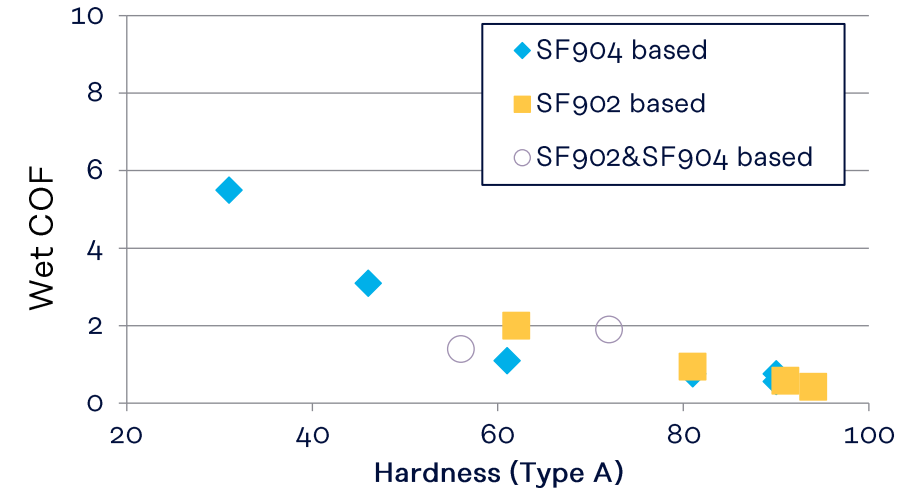
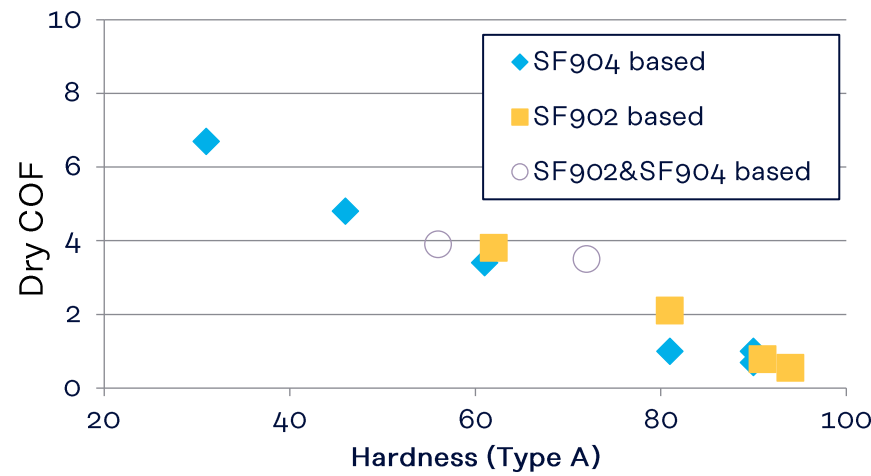
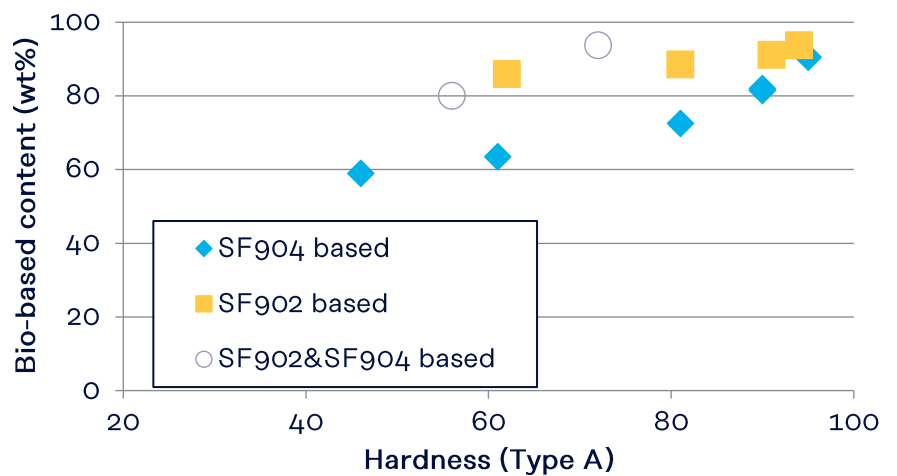
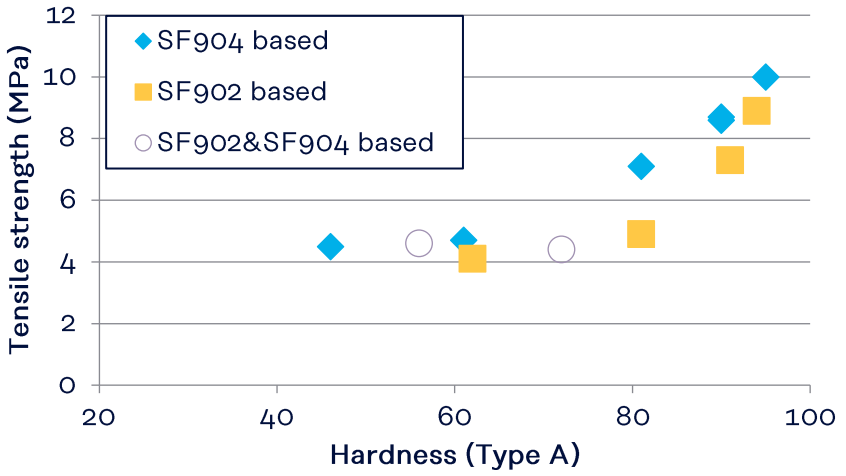
Injection molding conditions: Cylinder temp. / Mold temp. = 200/40 (deg. C), Injection pressure = 60 MPa (Hold pressure = 30 MPa), Injection speed = 20 mm/sec (Hold pressure speed = 10 mm/sec)

2) Manufactured by Kuraray Co., Ltd.

3) Manufactured by Braskem S.A., MFR=30 g/10 min at 190 deg. C, 2.16 kg

# Physical properties of compounds using SEPTON™ BIO-series

\*COF = Coefficient of static friction

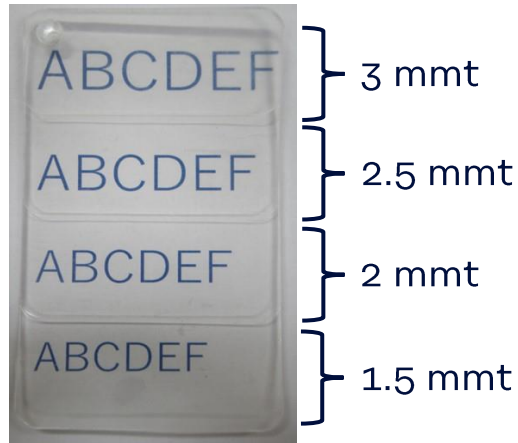


# Bio-based compounds using SEPTON™ BIO-series

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# Transparency formulation (Bio-based content > 40%)



		Bio-based Cont.(%)	Hardness 40A Clear	
SEPTON™ BIO-series		SF904	48	85
Polypropylene-2 *4				15
Slipping agent *5				0.1
Anti-blocking agent *6				0.1 (External)
Mechanical properties		Bio-based content	wt%	41
		MFR (210 deg. C, 2.16 kg)	g/10min	43
		Hardness (0 sec)	TypeA	56
		Hardness (3 sec)	TypeA	47
		Hardness (15 sec)	TypeA	43
				MD TD
		M100	MPa	1.8 1.6
		Tensile strength	MPa	5.8 5.3
		Elongation	%	670 800
Transparency		Transmittance	%	90.6
		Haze	%	6.0

\*4 Polypropylene-2 : Random-PP, MFR=20 g/10 min at 230 deg. C, 2.16 kg

\*5 Slipping age : Erucamide

\*6 Anti-blocking agent : PP powder

# Conditions

## Mixing condition

Machine	Twin screw extruder ZSK26Mc (Coperion GmbH)	
L/D	56 (D=φ25.5)	
Temp.	C2-C14	210 deg. C
	Adapter	120 deg. C
	Die	110 deg. C
Screw rotation	500 rpm	
Out put	20 kg/h	
Pelletizer	Under water pelletizer (Gala Industries, Inc.)	
Water temp.	10 deg. C	
Feeder	CE-W-1D (Kubota Corporation): Pellet	

## Molding condition

Molding machine	Injection molding machine EC75SX (Shibaura Machine Co., Ltd.)
Mold	110mm x 110mm x 2mmt Flat plate 88mm x 50mm x 1.5, 2, 2.5, 3mmt Step plate
Cylinder temp	210 deg. C
Mold temp	50 deg. C
Screw rotation	150 rpm
Injection time	10 sec
Cooling temp	15 sec
Weighing position	55 mm
V-P	5 mm
Injection pressure	40 MPa (Dwelling: 25 MPa)
Injection speed	15 mm/s(Dwelling: 15 mm/sec)

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