

Compatibility of SEPTON™ and HYBRAR™ with Polyolefin

Elastomer R&D Dept.
Elastomer Division

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Septon™

Hybrar™

Compatibility with Polyolefin

1) Ethylene-Octene copolymer
2) Ethylene-Propylene rubber

Grade	Type	PE			POE ¹⁾	EPR ²⁾	PP
		HDPE	LDPE	LLDPE	POE	EPR	Homo-PP
SEPTON™	SEEPS	C	C	C	C	C	I
	SEBS	PC	PC	PC	C	PC	I
	SEPS	PC	I	I	C	PC	I
HYBRAR™	Vinyl-bond rich SEPS	I	I	I	I	I	C

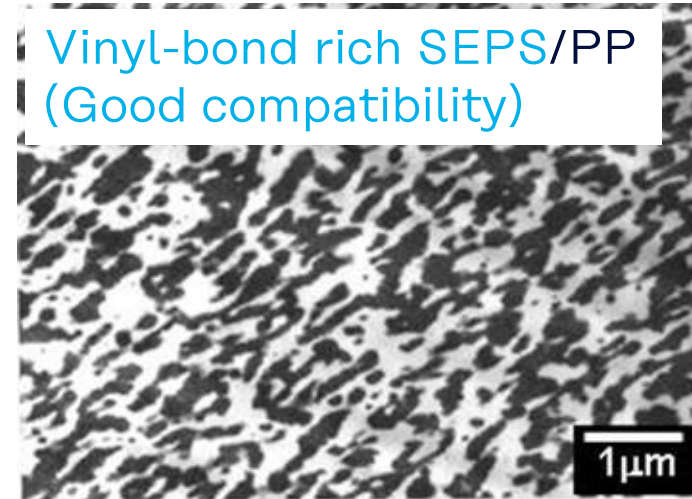
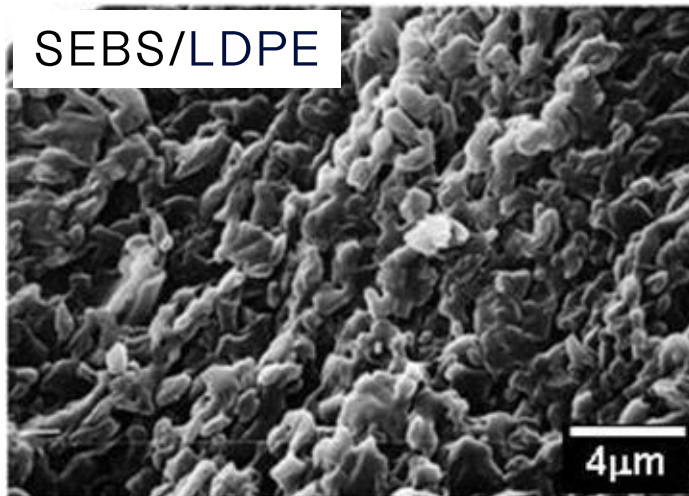
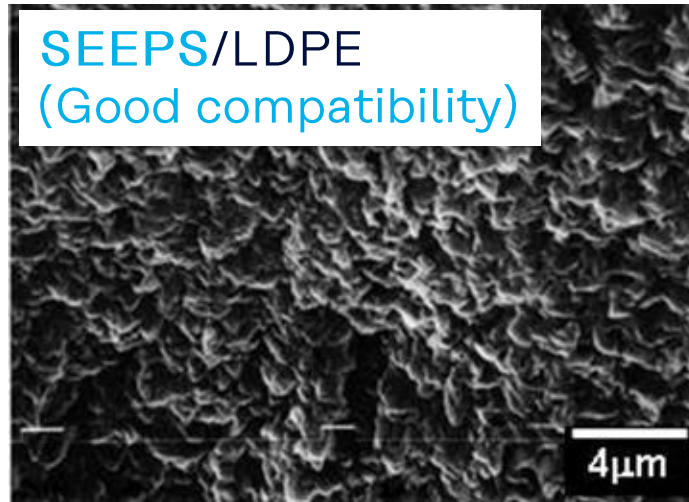
C: Compatible, PC: Partially compatible, I: Incompatible

SP value (Hoy method)	(MPa ^{1/2})
PE	18.0
EEP	17.6
EB	17.6
EP	17.2
Vinyl-bond rich EP	16.8
PP	16.7

✓ SEPTON™ SEEPS type shows good compatibility with PE.

✓ HYBRAR™ shows good compatibility with PP.

Morphology of SEPTON™ (SEEPS type, SEPS type) or HYBRAR™ (Vinyl-bond rich SEPS type) with Polyolefin



Solubility Parameter of SEPTON™ and HYBRAR™

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Estimation of Solubility Parameters using Group Contribution Method (Fedors Method)

Segment name	Monomer	Vinyl	Solubility parameter δ	
-	-	[mol%]	[MPa ^{1/2}]	[(cal/cm ³) ^{1/2}]
St	Styrene	-	21.6	10.6
EP	Isoprene	0	16.9	8.26
EB	Butadiene	40	17.2	8.41
EEP	Isoprene/Butadiene	0	17.2	8.41
Vinyl-bond rich EP	Isoprene	60	16.5	8.07
cf. PP	Propylene	-	16.4	8.02
cf. PE	Ethylene	-	17.5	8.56

Note: The solubility parameters (δ) are estimated using Fedors method. Dienes are assumed to be fully hydrogenated.

$$\delta = \left[\frac{\sum E_{\text{coh}}}{\sum V} \right]^{\frac{1}{2}}$$

Estimation of Solubility Parameters using Group Contribution Method (Hoy Method)

Segment name	Monomer	Vinyl	Solubility parameter δ	
-	-	[mol%]	[MPa ^{1/2}]	[(cal/cm ³) ^{1/2}]
St	Styrene	-	19.8	9.68
EP	Isoprene	0	17.2	8.41
EB	Butadiene	40	17.6	8.60
EEP	Isoprene/Butadiene	0	17.6	8.60
Vinyl-bond rich EP	Isoprene	60	16.8	8.21
cf. PP	Propylene	-	16.7	8.16
cf. PE	Ethylene	-	18.0	8.80

Note: The solubility parameters (δ) are estimated using Hoy's method.
Dienes are assumed to be fully hydrogenated.

Estimated Solubility Parameter (Hoy Method)

	Type	Styrene/Diene [wt/wt]	Styrene δ [MPa ^{1/2}]	Diene δ [MPa ^{1/2}]	Average* δ [MPa ^{1/2}]
SEPTON™ 4033	SEEPS	30/70	19.8	17.6	18.26
SEPTON™ 2002	SEPS	30/70	19.8	17.2	17.98
SEPTON™ 8007L	SEBS	30/70	19.8	17.6	18.26
HYBRAR™ 7125F	Vinyl-bond rich SEPS	20/80	19.8	16.8	17.40

Note: The solubility parameters (δ) are estimated using Hoy's method.
Dienes are assumed to be fully hydrogenated.
*Weight average of styrene and diene

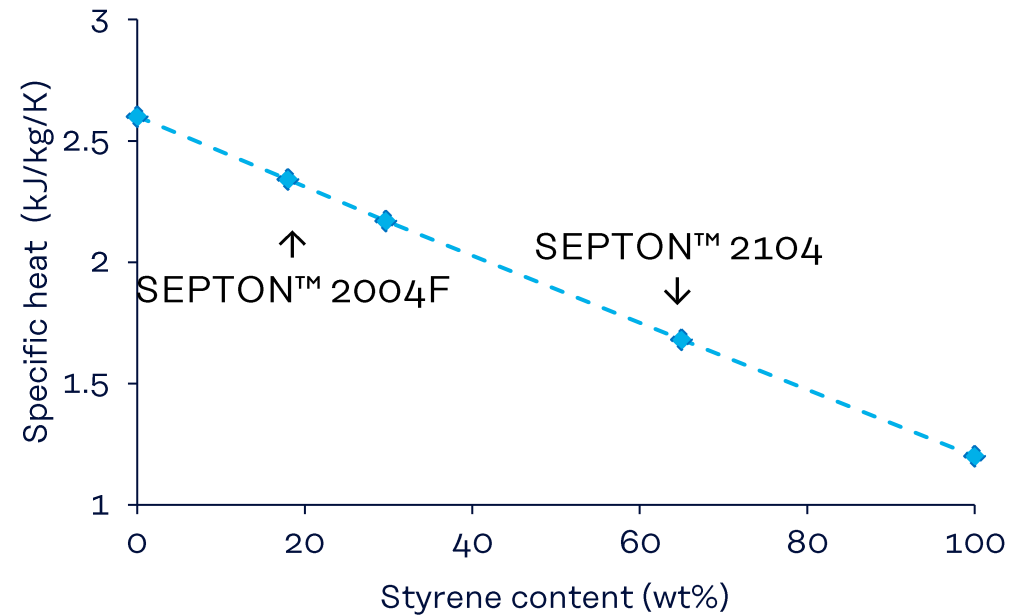
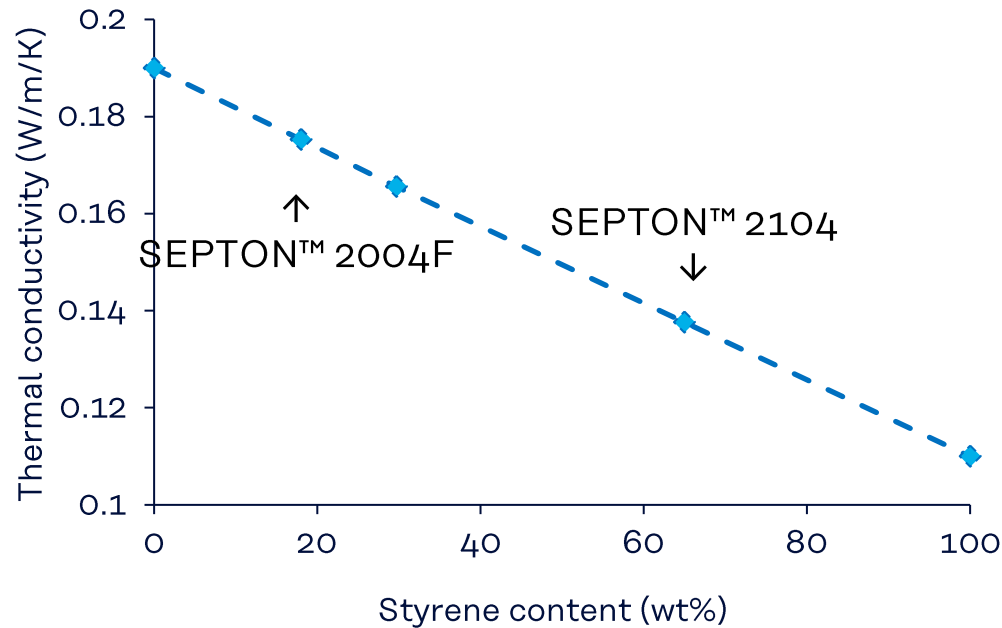
	δ [MPa ^{1/2}]
PP	16.7
PE	18.0

Thermal Conductivity and Specific Heat of SEPTON™

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Thermal Conductivity and Specific Heat of SEPTON™

Estimated values (calculated from the reference values)



Reference values

	Styrene content (wt%)	Thermal conductivity (W/m/K)	Specific heat (kJ/kg/K)
Ethylene-Propylene Rubber	0	0.19	2.6
Polystyrene	100	0.11	1.2

Refractive Index of SETPON™ and HYBRAR™

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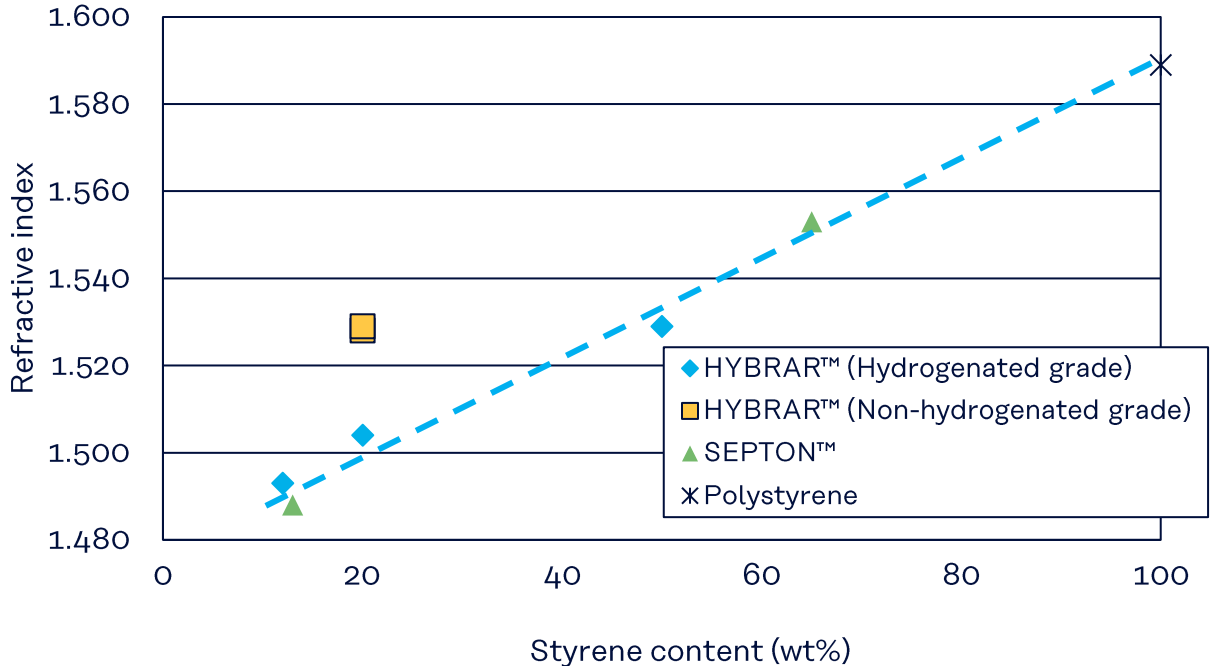
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Hybrar™

Refractive Index of SETPON™ and HYBRAR™

Grade	Styrene content (wt%)	Refractive index
SEPTON™	2063	1.488
	2104	1.553
HYBRAR™	5125	1.528
	5127	1.529
	7125F	1.504
	7311F	1.493

(Reference) PP: 1.503, PE: 1.514, Polystyrene: 1.589



Refractive index is correlated to styrene content.

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Precautions should be taken in handling and storage. Please refer to the appropriate Safety Data Sheet for further safety information. In using SEPTON™ and HYBRAR™, please confirm related laws and regulations, and examine its safety and suitability for the application.

For medical, health care and food contact applications, please contact your Kuraray representative for specific recommendations. Even so, users must conduct their own assessment, revisions, registrations as well rely in their own technical and legal judgment to establish the safety and efficacy of their compound and/or end product with SEPTON™ and HYBRAR™ for any application. SEPTON™ and HYBRAR™ should not be used in any devices or materials intended for implantation in the human body. Nothing contained herein constitutes a license to practice under any patent and it should not be construed as an inducement to infringe any patent and the user is advised to take appropriate steps to be sure that any proposed use of the product will not result in patent infringement.

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