

ZEONEX[®]

Cyclo Olefin Polymer (COP)

High Performance Thermoplastics for Pharmaceutical Packaging



ZEON CORPORATION



ZEONEX[®] Cyclo Olefin Polymer (COP) is a high performance thermoplastic that overcomes limitations of traditional packaging materials with its enhanced barrier, transparency, purity and strength properties.

ZEONEX[®] is ideal for use in the form of **Pre-filled Syringes, Vials, Ampoules, IV Bags, Barrier Films, Blister Packs** and other pharmaceutical packaging applications.



High Break Resistance

Higher impact strength ensures that breakage during handling and transport is minimized. Tensile elongation at cryogenic temperatures make ZEONEX[®] suitable for Lyophilization.

Low Protein Adsorption

ZEONEX[®]'s low surface energy and hydrophobic nature contribute to very low protein binding, making it the ideal packaging material for protein/peptide based drugs. Low surface energy also ensures low wetting and higher drainability, thus reducing the need for overfills.

High Transparency

ZEONEX[®]'s high "glass-like" light transmittance and low haze enable easy viewing of the contents creating a favorable first impression to the end-user.

High Moisture Barrier

Extremely low moisture permeability increases drug shelf life by enabling prolonged storage of moisture sensitive materials.

Drug Compatibility (Chemical Inertness and Resistance)

ZEONEX[®] offers good resistance against acids, alkalis and alcohols. ZEONEX[®] also has high resistance to organic solvents and a wide range of pH.

High Purity

ZEONEX[®] medical grades are extremely pure resin containing less-than-detectable residual metals and no process aides. Compared to conventional barrier polymers, materials packaged using ZEONEX[®] have reduced risk to be

compromised by off-gassing or extractables.

No Delamination

Extended exposure to high pH levels does not cause delamination in ZEONEX[®] packaging. ZEONEX[®] is an ideal alternate to glass in applications where delamination is a concern.



Sterilization Compatibility

ZEONEX® applications can be sterilized using EtO, Gamma, EB and Steam., offering users the flexibility to use ZEONEX® in a wide range of product packaging.

Non Halogen

ZEONEX® does not contain halogens. It is easily disposable by incineration and simultaneously reduces the environmental footprint of your product.

Excellent Molding Properties

ZEONEX®'s flow and transcription properties make it molding friendly and allows customized designs to meet end user needs. ZEONEX® can be used for molding large size syringes and cartridges.

Low-Temperature Heat Sealing

ZEONEX® is designed to enable low-temperature heat sealing. Due to its lower glass-transition temperature (Tg), ZEONEX® 5000 has a larger processing window for heat sealing.

Light Weight

ZEONEX® is up to 2.5 times lighter than glass, easing handling and bringing down transportation cost

FDA DMF Nos.

ZEONEX® 5000 : 27657
 ZEONEX® 690R : 14084
 ZEONEX® 790R : 17236
 ZEONOR® 1020R : 13885

ZEONEX® Medical Grades

Properties	unit	Method	ZEONEX® 5000	ZEONOR® 1020R	ZEONEX® 690R	ZEONEX® 790R
Light transmittance (3mmt)	%	Zeon Method	92	91	92	91
Glass Transition Temperature	°C	Zeon Method	68	102	136	162
Elongation at break (23°C)	%	ISO 527	120	90	20	10
WVTR*	g/(m ² ·24h)	JIS K7129	0.8	1.0	1.0	1.1

*WVTR - Water vapor transmission rate 40°C, 90%RH (100 μm)

Data represents experimental results and does not guarantee specific performance levels under actual usage

ZEON

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ZEONEX® 5000 TYPICAL PROPERTIES

Properties	Measurement method	Conditions	Unit	ZEONEX 5000
Specific gravity	ASTM D792			1.01
Water absorption	ASTM D570	23°C/24h	%	<0.01
Light transmittance	ASTM D1003	t=3mm	%	92
Glass transition temperature	JIS K7121		°C	68
Linear expansion coefficient	ASTM E831		cm/cm°C	8×10^{-5}
Molding Shrinkage	ASTM D955		%	0.1-0.3
MFR	ISO 1133	230°C/21.18N	g/10min	9
Flexural modulus	ISO 178		MPa	1900
Flexural strength	ISO 178		MPa	63
Tensile modulus	ISO 527		MPa	1900
Tensile strength	ISO 527		MPa	45
Tensile elongation	ISO 527		%	120
Izod impact strength	ASTM D256	With notch	J/m	85
Charpy impact strength	ISO 179	With notch	kJ/m ²	6
Water Vapor Permeability	JIS Z0208	40°C 90% 100 μm	g/m ² 24h	0.84

*Data are actual measured values and not guaranteed specifications

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ZEONOR® 1020R TYPICAL PROPERTIES

Properties	Measurement method	Conditions	Unit	ZEONOR 1020R
Specific gravity	ASTM D792			1.01
Water absorbency	ASTM D570	23°C/24h	%	<0.01
Light transmittance	ASTM D1003	Thickness 3mm	%	92
Glass transition temperature	JIS K7121		°C	102
Deflection temperature under load (annealed)	ASTM D648	1.80MPa	°C	101
Linear expansion coefficient	ASTM E831		cm/cm°C	7×10^{-5}
MFR	ISO 1133	280°C21.18N	g/10min	20
		230°C21.18N		-
Flexural modulus	ISO 178		MPa	2100
Flexural strength	ISO 178		MPa	80
Modulus of elasticity in tension	ISO 527		MPa	2200
Tensile strength	ISO 527		MPa	53
Tensile elongation	ISO 527		%	90
Izod impact strength	ASTM D256	With notch	J/m	60
Rockwell hardness	ASTM D785	M scale		20
Volume resistivity	IEC93		Ω m	$>10^{16}$
Dielectric breakdown strength	ASTM D149		KV/mm	70
Dielectric constant	IEC250	1MHz		2.3
Dielectric tangent	IEC250	1MHz		0.0002
Flammability	UL-94			94HB

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ZEONEX690R TYPICAL PROPERTIES

Properties	Measurement method	Conditions	Unit	ZEONEX 690R
Specific gravity	ASTM D792			1.01
Water absorbency	ASTM D570	23°C/24h	%	<0.01
Light transmittance	ASTM D1003	t=3mm	%	92
Glass transition temperature	JIS K7121		°C	136
Deflection temperature under load (annealed)	ASTM D648	1.80MPa	°C	136
Linear expansion coefficient	ASTM E831		cm/cm°C	7×10^{-5}
Molding Shrinkage	ASTM D955		%	0.3-0.6
MFR	ISO 1133	280°C/21.18N	g/10min	17
Flexural modulus	ISO 178		MPa	2200
Flexural strength	ISO 178		MPa	94
Tensile modulus	ISO 527		MPa	2400
Tensile strength	ISO 527		MPa	61
Tensile elongation	ISO 527		%	20
Izod impact strength	ASTM D256	With notch	J/m	32
Dupont impact strength			J	16
Rockwell hardness	ASTM D785	M scale		50
Water Vapor Permeability	JIS Z0208	40°C 90% 300 μm	g/m ² 24h	0.29
Volume resistivity	IEC93		Ωm	>10 ¹⁶
Dielectric breakdown strength	ASTM D149		KV/mm	70
Dielectric constant	IEC250	1MHz		2.3
Dielectric tangent	IEC250	1MHz		0.0002

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ZEONEX790R TYPICAL PROPERTIES

Properties	Measurement method	Conditions	Unit	ZEONEX 790R
Specific gravity	ASTM D792			1.01
Water absorbency	ASTM D570	23°C/24h	%	<0.01
Light transmittance	ASTM D1003	t=3mm	%	92
Glass transition temperature	JIS K7121		°C	163
Deflection temperature under load (annealed)	ASTM D648	1.80MPa	°C	161
Linear expansion coefficient	ASTM E831		cm/cm°C	6×10^{-5}
Molding Shrinkage	ASTM D955		%	0.3-0.6
MFR	ISO 1133	280°C21.18N	g/10min	6
Flexural modulus	ISO 178		MPa	2600
Flexural strength	ISO 178		MPa	119
Tensile modulus	ISO 527		MPa	2700
Tensile strength	ISO 527		MPa	73
Tensile elongation	ISO 527		%	10
Izod impact strength	ASTM D256	With notch	J/m	25
Dupont impact strength			J	1
Rockwell hardness	ASTM D785	M scale		75
Water Vapor Permeability	JIS Z0208	40°C 90% 300 μ m	g/m ² 24h	0.26
Volume resistivity	IEC93		Ω m	>10 ¹⁶
Dielectric breakdown strength	ASTM D149		KV/mm	70
Dielectric constant	IEC250	1MHz		2.3
Dielectric tangent	IEC250	1MHz		0.0002

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