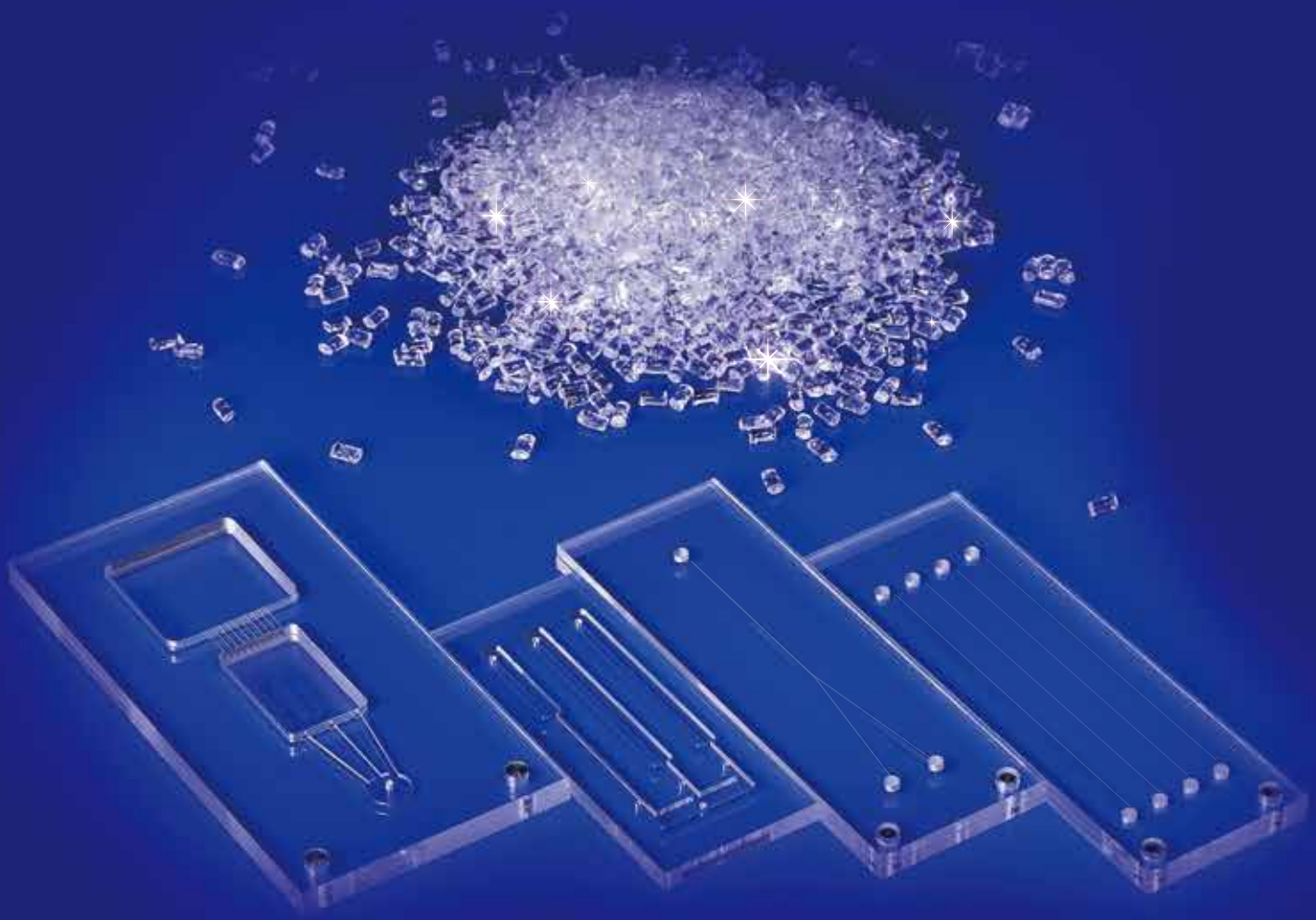
ZEON

Cyclo Olefin Polymer (COP)

ZEONEX® ZEONOR®

Prototype Production Service for Cyclo Olefin Polymer (COP) Molded Products

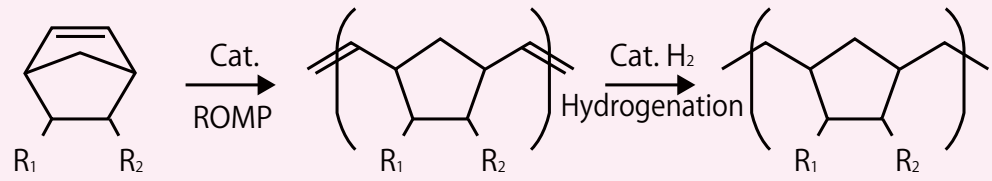


ZEON CORPORATION

What is Cyclo Olefin Polymer (COP)?

COP is a thermoplastic polyolefin resin with the alicyclic structure in its main chain.

Structure and Major Properties of COP



ROMP = Ring Opening Metathesis Polymerization

ZEONEX® and ZEONOR® are the world's first COPs exclusively developed by Zeon Corporation.
With excellent optical properties, heat resistance, low impurities, and other properties, ZEONEX® and ZEONOR® are widely used and highly valued in different fields, such as optical lenses, medical care, and biotechnology.

COP Grades for Biotechnology Applications

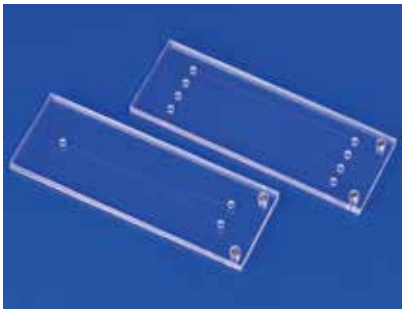
Properties	Unit	Measurement methods	ZEONEX® 480	ZEONEX® 5000	ZEONOR® 1060R	ZEONOR® 1420R	ZEONOR® 1430R
Specific gravity	—	ASTM D792	1.01	1.01	1.01	1.01	1.01
Water absorbency (23℃/24h)	%	ASTM D570	<0.01	<0.01	<0.01	<0.01	<0.01
Light (thickness : 3mm)	%	ASTM D1003	92	92	92	92	92
Glass transition temperature	℃	JIS K7121	138	68	100	136	133
MFR (280℃21.18N)	g/10min	ISO1133	20	9 (@230℃)	60	20	30
Flexural modulus	Mpa	ISO178	2100	1900	2100	2200	2200
Tensile strength	Mpa	ISO527	59	45	53	61	60
Tensile elongation	%	ISO527	40	120	60	20	16

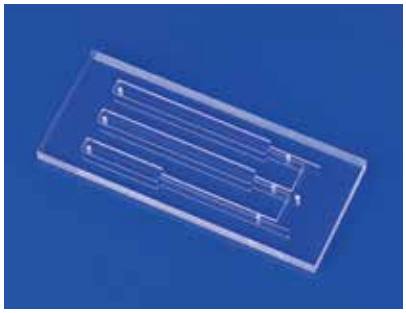
- Data represent experimental results and do not guarantee specific performance levels under actual usage.
- For information on the grades for medical equipment and medical packaging, please contact us.
- ZEONEX® and ZEONOR ® are the registered trademarks of Zeon Corporation.

Prototype Production Service

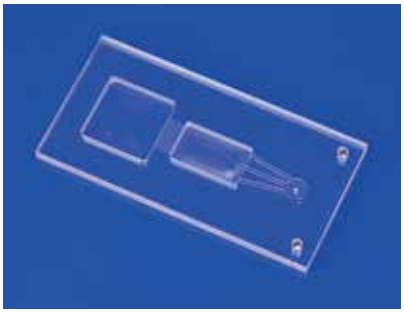
We offer prototype production of plastic microfluidic chips using ZEONEX® and ZEONOR®. Contact us if you have a specific request. We welcome single unit orders.

○Examples





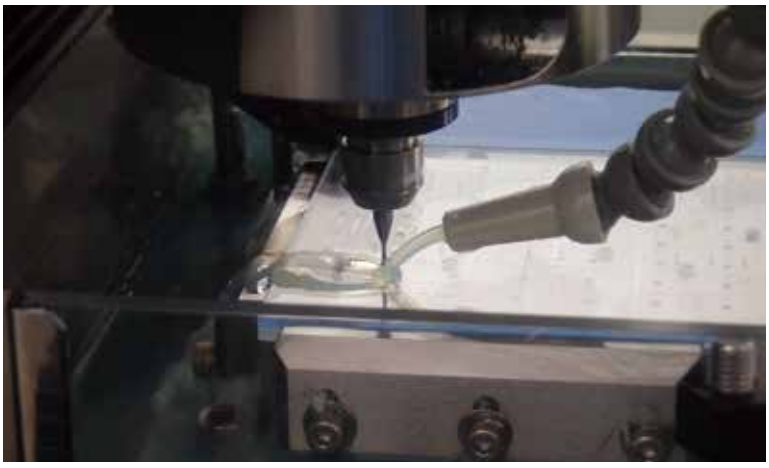
Sample provided courtesy of Professor Mizuno, Research Organization for Nano & Life Innovation, Waseda University



Sample provided courtesy of Associate Professor Matsuura, Micro-nano Physiology Course, Department of Biomedical Engineering, Faculty of Engineering, Okayama University of Science

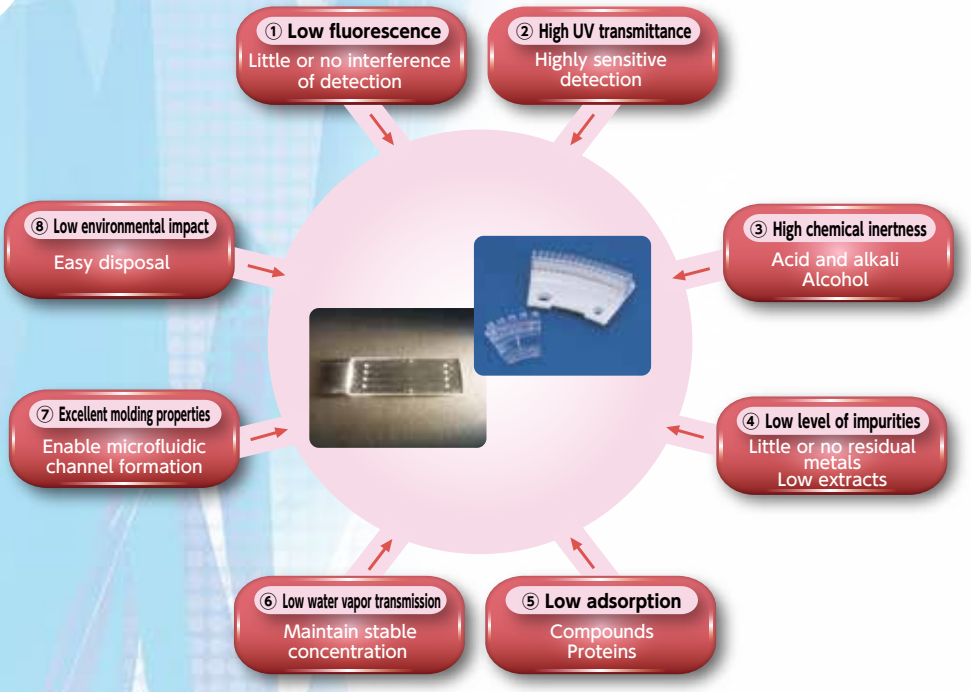
Zeon offers these services:

- **One-stop support, from molding flat plates to cutting microchannels and bonding, at low cost and for quick delivery.**
- **Product design recommendations optimized from material perspective.**
- **Product design recommendations based on computer-aided design (CAD) engineering and structural analysis.**
- **Moderate volume production capability, operating in a Class 10,000 cleanroom.**



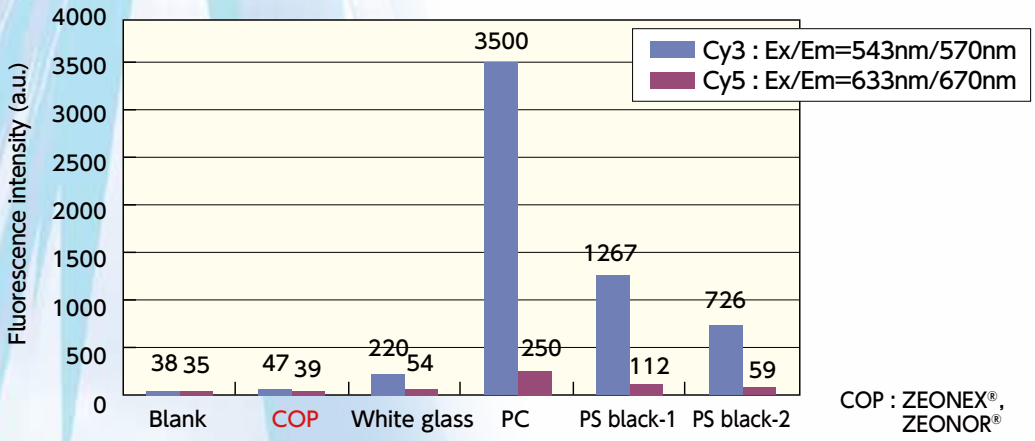
Numerical control (NC) machining

Benefits of COP in Life Science Applications

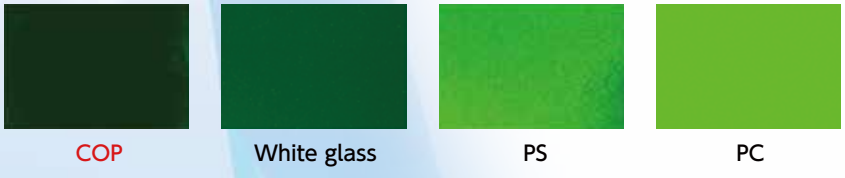


Excellent Properties of ZEONEX® and ZEONOR®

① Low Fluorescence



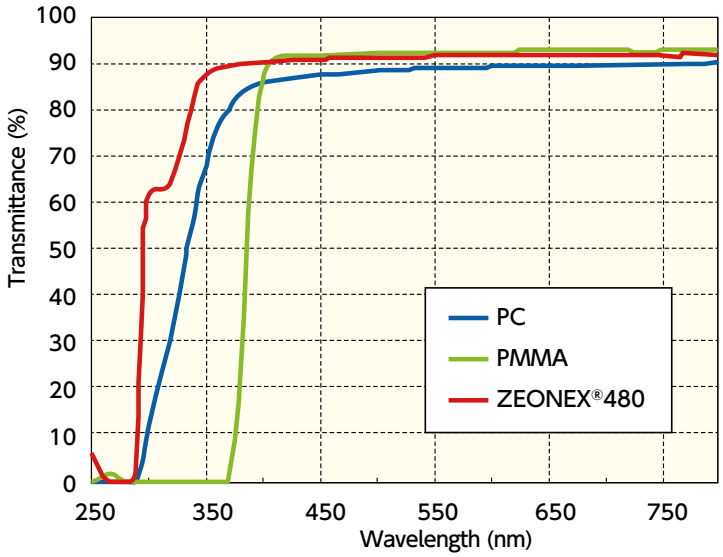
Fluorescence of Substrate in Cy3 (Ex/Em = 543 nm/570 nm)



Excellent ◀——————▶ Poor

ZEONEX® and ZEONOR® allow to perform highly sensitive fluorescence imaging tests thanks to their low fluorescence.

② High UV Transmittance (Low UV Absorption)



ZEONEX® and ZEONOR® have excellent transmittance across the 340 nm–800 nm wavelength spectrum where in vitro diagnostic and sequencing test is commonly used

③ High Chemical Inertness

Reagent		Condition	Rate of weight change (%)	Change in appearance
Acid	37% HCl	RT, 5h	0.02	None
	70% HNO_3	50℃, 5h	0.01	None
	98% H_2SO_4	100℃, 1h	0.01	Change into black
	30% H_2SO_4	70℃, 5h	0.01	None
	HF/HNO_3/H_2O=7/42/51	RT, 5h	0	None
Alkali	54% NaOH	50℃, 5h	0	None
	29% NH_4OH	RT, 5h	0.01	None
Other	30% H_2O_2	RT, 5h	0	None

ZEONEX® and ZEONOR® exhibit excellent resistance to acid, alkali, alcohol and most aqueous reagents used for life science application.

Excellent Properties of ZEONEX® and ZEONOR®

④ Low level of impurities

Residual metals in COP*

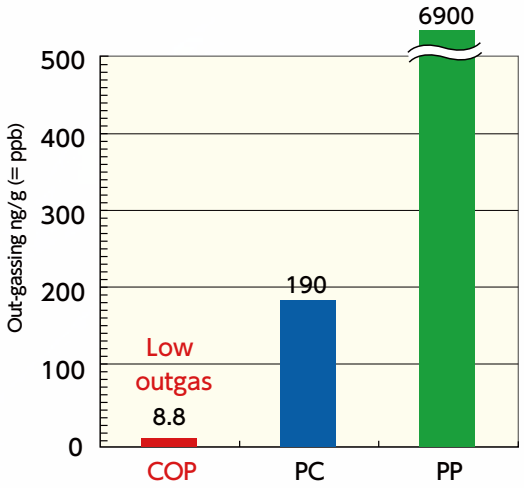
Al	V	Zr	Mg	Ti	Pd
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Cr	W	Fe	Ni	Zn	Cd
<0.02	<0.02	0.02	<0.02	<0.02	<0.02

Unit: ppm

*Measured by ICP-MS analysis

Impurity concentration is below detection threshold.

Out-gassing from Materials

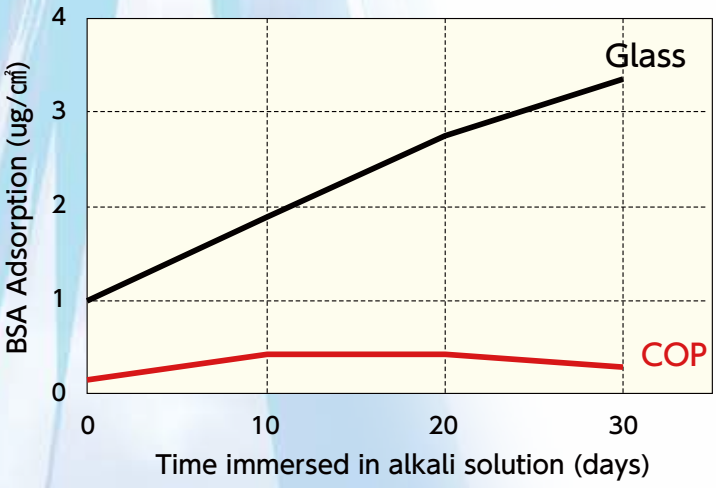


COP : ZEONEX®, ZEONOR®

ZEONEX® and ZEONOR® are extremely pure materials - a very low risk of contamination.

⑤ Low Adsorption

Comparison of Glass and COP BSA Adsorption

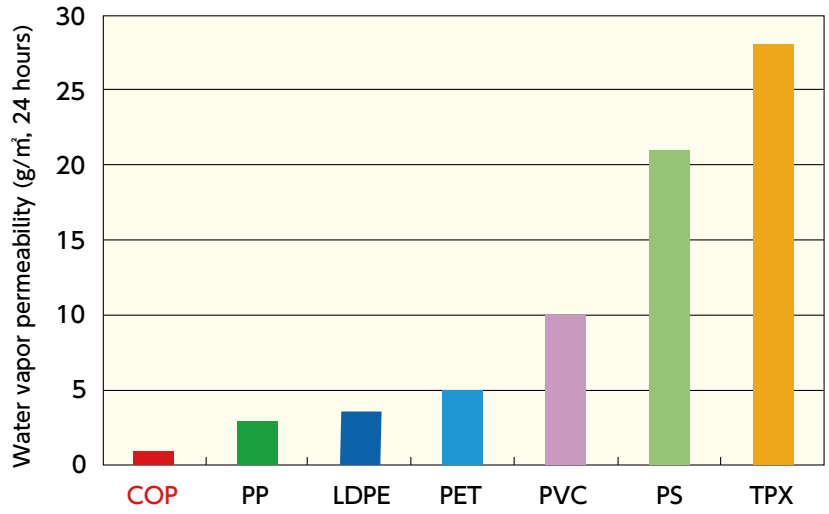


BSA : Bovine Serum Albumin
COP : ZEONEX®, ZEONOR®

Alkali solution concentration:
0.1N NaOH at 20°C
Protein adsorption:
1 mg/ml BSA solution at 25°C over 24 hours

ZEONEX® and ZEONOR® are very low in protein adsorption
Low non-specific binding to plastic for PCR application

⑥ Low Water Vapor Transmission

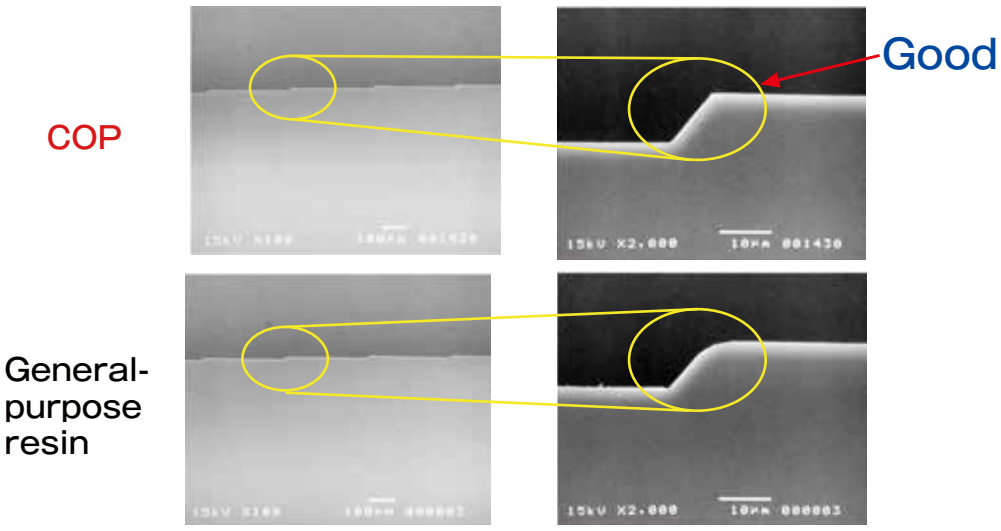


Test conditions:
100 μm film, 25°C, 90% RH

COP : ZEONEX®, ZEONOR®

ZEONEX® and ZEONOR® provide superior performance for storage stability of reagents and other substances.

⑦ Excellent Molding Properties



COP : ZEONEX®, ZEONOR®

ZEONEX® and ZEONOR® make possible the manufacture of high-precision molded products.

【Important】

(1) All the pictures described in this material are examples of potential applications, not necessarily examples of actual use.
(2) The figures in this document are typical values and not guaranteed values. These values are for reference only and should not be used as basis for designing of parts.
The contents of this document are subject to change without notice.
(3) Characteristics of molded products may be influenced by selection of molding material, design of parts, molding conditions, operating environment and so on.
It is the responsibility of the customer to evaluate and determine whether the design of the specific material or part is suitable for the application.
(4) Please check the responsibility of the customer for industrial property rights owned by a third party.

Product Liability Notes

1. Please observe the following precautions for the storage and use of the product and material molded from the product (collectively the "Product/Material").

(1) Keep the Product/Material away from fire, as it is combustible.
(2) Avoid exposure to direct sunlight and high-energy light, which can discolor the Product/Material.
(3) Do not use the Product/Material under the temperatures over the heat distortion temperature, as this may cause discoloration or deformation.
(4) Avoid exposure to high temperatures for long periods, which can discolor the Product/Material.
(5) Do not use the Product/Material under high temperatures or near a heat source, as this may cause it to emit smoke or catch fire.
(6) Do not use the Product/Material near a high-energy light source, as this may cause it to emit smoke or catch fire due to heat generation by light absorption.
(7) Improper molding conditions or use of a poorly designed mold may induce solvent cracking through residual stress.
(8) Do not use the Product/Material for parts that are subject to continuous load, as it may crack.
(9) Do not expose the Product/Material to the following solvents or liquids, which may cause it to liquefy or swell.
- Aromatic solvents such as benzene and toluene
- Chlorinated solvents, including dichloromethane and carbon tetrachloride
- Animal, vegetable, and mineral oils and greases
- Hydrocarbon solvents such as n-Hexane, cyclohexane, and ligroin
- Certain ethers such as diethylether
- Certain ketones such as cyclohexanone
- Other materials and liquids containing long-chain alkyl groups in their structure should be tested before use.

(10) Test the Product/Material to verify that it is safe and suitable for use.

2. Contact Zeon Corporation before using the Product/Material in medical care products, food, or toys.

3. Please refer to the Material Safety Data Sheet for specific details.

ZEON CORPORATION

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