



**Manufacturer:**  
AngstromLink™

**Product Name:**  
AngstromLink OKP Optical Plastic Series

**Manufacturer Part Number:**  
OKP Series

▶ [Click here for more details on the AngstromLink OKP Optical Plastic Series](#)



## OSAKA GAS CHEMICALS

**OKP4, OKP4HT, OKP-1**  
**Optical Plastic**  
For molded lenses, display elements, and LEDs

### OKP Key Features

- Injection moldable thermoplastic
- Refractive indexes of 1.61, 1.63, 1.64
- Low birefringence compared to PC and COP
- Low Abbe number
- High purity
- Accepts subsequent coatings

The OKP products are high purity optically clear thermoplastics designed especially for injection molding of high performance optical components such as phone and camera lenses, and display backlights.

The OKP products feature high refractive index (1.61, 1.63 1.64 respectively) and light transmittance comparable to optical grade polycarbonate. They have high heat resistance to withstand lead-free soldering processes, and excellent optical and thermal stability.

These products are supplied in pellet form consistent with normal injection molding processes.

OKP4, OKP4HT, OKP-1 are product designations of the manufacturer  
Osaka Gas Chemicals, Osaka, Japan

### Applications

**OKP4** - Digital and video camera lenses

**OKP4HT** - Mobile phone lenses

**OKP-1** - Where low birefringence is advantageous

Optical films to assist light extraction, light redirection

Secondary optics that modify the light radiation pattern and/or provide protection from the environment

Color Aberration Correction

### Benefits

**High Refractive Index (>1.60)**  
Increased numerical aperture for the system

**Injection moldable**  
High fluidity for injection molded parts undistorted by stress

**Optical transmission comparable to polycarbonate**  
Higher refractive index and lower birefringence than polycarbonate

**High environmental resistance**  
Rugged material that can provide long term service

**Low Abbe number**  
Higher levels of correction of chromatic aberration can be achieved

**Wide temperature service**  
Ensures stability of performance

### Catalogued in Zemax

The optical data for OKP materials is listed in Zemax, under the OSAKA GAS CHEMICAL catalogue.

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For more information on this or other products and their availability, please contact us at:  
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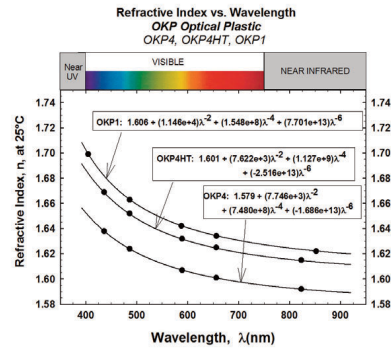
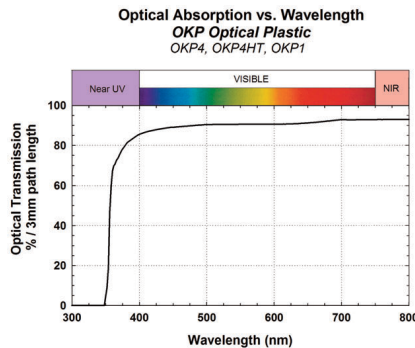
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Property (at 25°C unless noted)	Condition	OKP4	OKP4HT	OKP-1
<b>Physical Properties</b>				
Specific Gravity	-	1.22	1.26	1.22
Water Absorption	-	0.14%	0.11%	0.09%
Glass Transition	-	121°C	142°C	132°C
Heat Distortion Temperature	1.8 MPa, with Annealing	111°C	133°C	122°C
Linear thermal expansion	30 ~ 120°C	7.4 x 10 <sup>-5</sup> /°C	6.3 x 10 <sup>-5</sup> /°C	6.5 x 10 <sup>-5</sup> /°C
<b>Mechanical Properties</b>				
Tensile Strength	-	72 MPa	79 MPa	77 MPa
Tensile Elongation	-	7%	7%	14%
Flexural Modulus	-	2200 MPa	2400 MPa	2600 MPa
Flexural Strength	-	112 MPa	122 MPa	120 MPa
Poisson's Ratio	-	0.42	0.44	0.38
Izod Impact	-	40 J/m	66 J/m	42 J/m
Pencil hardness	-	F	F	-
<b>Molding Characteristics</b>				
Melt Flow Rate	g/10min, 230°C, 2.16kg	12	2	5
Mold Shrinkage Factor	-	0.6%	0.7%	0.6%
<b>Optical Properties</b>				
Appearance	visual	Optically Clear	Optically Clear	Optically Clear
Abbe Number	Abbe refractometer	26.8	23.1	22.3
Refractive Index, 589 nm, 20°C	Abbe refractometer	1.607	1.632	1.642
Refractive Index vs. Wavelength	Abbe refractometer	(see graph)	(see graph)	(see graph)
Refractive Index vs. Temperature	-	-13 x 10 <sup>-5</sup> /°C	-11 x 10 <sup>-5</sup> /°C	-12 x 10 <sup>-5</sup> /°C
Optical Absorption	2mm thickness	(see graph)	(see graph)	(see graph)
Birefringence	-	(see page 3)	(see page 3)	(see page 3)

**Graphs**



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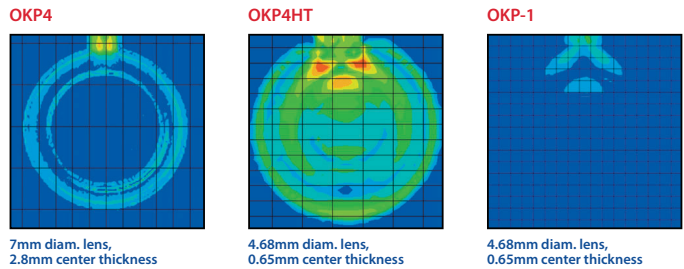
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## Birefringence



## Molding Instructions

### Mold Preparation

Mold surfaces should be free of dust, oil, and fingerprint soils. Clean mold substrates using suitable techniques for cleaning optics. If hydrocarbon solvent cleaning is used, a final rinse with reagent grade isopropanol is recommended. If aqueous detergent cleaning is used, multiple final rinses with de-ionized water or a single rinse with reagent grade isopropanol is recommended.

Molding Guidelines	OKP4	OKP4HT	OKP-1
<b>Drying Time</b>			
At reduced pressure, 90 +/- 10°C	> 6hrs.	> 5hrs.	> 5hrs.
At atmospheric pressure, 90 -100°C	> 6hrs.	> 6hrs.	> 6hrs.
<b>Molding Conditions</b>			
Cylinder temperature (°C)	230 - 280	250 - 300	240 - 280
Mold temperature (°C)	95 - 105	100 - 120	95 - 125
Injection speed (mm /s)	50 - 1000	50-1000	0.5 - 50
Injection pressure (MPa)	-	-	80 - 150
Holding pressure (MPa)	-	-	30 - 150

### Switching Resins

Purging previous resins is unique for each machine and type of resin. The following is an example for a 30-ton injection molding machine being converted for OKP series resins.

**Purge**  
Inject about 30 shots (100g/shot) of high viscosity polyethylene (melt flow rate: <1 at 190°C)

**Replacement**  
Inject about 30 shots (100g/shot) of OKP4 until a molded piece comes out absolutely translucent (polyethylene has little compatibility with OKP4, and the transition from polyethylene to OKP4 will show in the molded part.)

[See individual product notes, next page](#)

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### Individual product notes:

<b>OKP4</b>
Note differences between preset cylinder temperature and resin. This can vary from machine to machine. At temperatures less than 215°C the molded part will be distorted due to high viscosity of resin. At temperatures over 280°C discoloration and decomposition of the resin will occur. For long cycle times, even if resin temperature is 240°C, some coloring may occur. If mold temperature reaches 110°C or more, failure of the mold release can occur (depends on surface characteristics of the molded parts).
<b>OKP4HT</b>
Note differences between preset cylinder temperature and resin. This can vary from machine to machine. At temperatures less than 230°C the molded part will be distorted due to high viscosity of resin. At temperatures over 300°C discoloration and decomposition of the resin will occur. If mold temperature reaches 125°C or more, failure of the mold release can occur (depends on surface characteristics of the molded parts).
<b>OKP-1</b>
Drying for longer than 24hrs may cause oxidation and yellowing. Use product within 2hrs after drying. Exposure to moisture after drying may cause molding defects.

### Specifications

The typical properties quoted on this product data sheet should not be used as a basis for preparation of product specifications, and may change without notification. Because we cannot anticipate or control the many different conditions under which this information and our products may be used, we cannot guarantee the applicability of this information or the suitability of our products in any individual situation. Consult Fiber Optic Center for assistance with establishing specification limits and test conditions. Statements concerning the possible use of our products are not intended as recommendations to use our product in the infringement of any patent.

### Shelf Life

OKP4, OKP4HT & OKP-1 are inert compositions with no intrinsic shelf life limitations. Molded OKP4 & OKP4HT will suffer changes in properties if subjected to extreme environmental conditions, as indicated in the typical properties table on page 2, which tend to cause volatilization or thermooxidative breakdown, or alternatively through surface contamination with scratches or particles of dust or dirt.

### Warranty

OKP4, OKP4HT & OKP-1 are sold without warranty, express or implied. Fiber Optic Center expressly disclaims any liability for incidental or consequential damages resulting from use of this product.

### Safety

Consult the Safety Data Sheet (SDS) for OKP4, OKP4HT & OKP-1 before use. OKP4, OKP4HT & OKP-1 are industrial products, designed for use only by qualified laboratory or production personnel.

### For Special Quotes and Technical Consultations

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