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ABRASIVES

OVERVIEW

SILICON CARBIDE

General information

Silicon Carbide is a hard material with sharp edges. It is produced from sands and coal in electric furnaces at 2400° C. The high porosity is achieved by adding wood shavings while heating. Large lumps of material taken out of the furnace are crushed, milled and classified.

Two techniques for grading are used:

- Grading by means of vibratory sifter = MACRO GRAIN
- Grading by means of sedimentation = MICRO GRAIN

A follow-up chemical treatment grants the product's high purity.

Qualities

- SILICON CARBIDE BW plus (black)
- SILICON CARBIDE GW plus (green)

Applications

- Abrasives placed on paper, linen or fibre pads
- Abrasive grains and abrasive discs
- Suspensions
- Abrasives (non-bonded grains)
- Fire-resistant materials



PRODUCT INFORMATION

SILICON CARBIDE BW plus (black)

Product Description

Type:	SILICON CARBIDE
Colour:	Black
Hardness:	2300 – 3000 (Knoop ₁₀₀)
Specific gravity:	3.2 g / ccm
Crystal structure:	α SiC hexagonal and rhombohedral
Shape of grains:	block-like, sharp-edged

Chemical Structure

SiC:	98.60%
SiO ₂ :	0.25%
Si:	0.15%
Fe ₂ O ₃ :	0.05%
Free C:	0.15%

Applications

SILICON CARBIDE BW plus is particularly used for lapping of ceramics, for polishing in the glass and optical industry as well as in granite processing.

Types and Grains available

SILICON CARBIDE is available in 2 different grades: black and green.

Our SILICON CARBIDE is produced in accordance with F.E.P.A. standards (Fédération Européenne des Fabricants de Produits Abrasifs). Strict quality control of each batch produced certifies the conformity with those standards. The following grains are available:

Mikro FEPA 42-2:2006	50% Value	Tolerance	94 % Value	3 % Value
F 230	53.0	± 3.0	34.0	82
F 240	44.5	± 2.0	28	70
F 280	36.5	± 1.5	22	59
F 320	29.2	± 1.5	16.5	49
F 360	22.8	± 1.5	12	40
F 400	17.3	± 1.5	8	32
F 500	12.8	± 1.0	5	25
F 600	9.3	± 1.0	3	19
F 800	6.5	± 1.0	2	14
F 1000	4.5	± 0.8	1	10
F 1200	3.0	± 0.5	1	7

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PRODUCT INFORMATION

SILICON CARBIDE GW plus (green)

Product Description

Type: **SILICON CARBIDE**
Colour: **Green**
Hardness: 2.450 (Knoop₁₀₀)
Specific gravity: 3.20 g / ccm
Crystal structure: α SiC in the hexagonal and rhombohedral classes of the hexagonal system
Shape: Blocky, with sharp edges

Chemical Structure

SiC: 99.00 %
SiO₂: 0.34 %
Si: 0.27 %
Fe: 0.05 %
AL: 0.04 %
C: 0.30 %

Applications

SILICON CARBIDE GW plus is particularly used for lapping ceramics, for grinding in the glass industry and optical production as well as in granite processing.



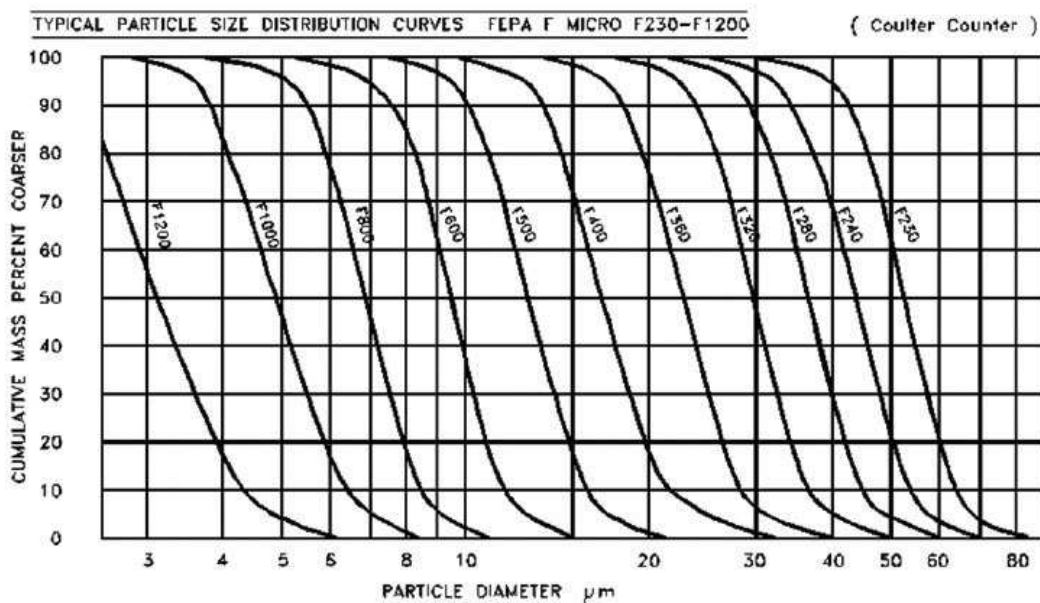
Types and Grains available

SILICON CARBIDE is available in 2 different grades: black and green.

Our SILICON CARBIDE is produced in accordance with F.E.P.A. standards (Fédération Européenne des Fabricants de Produits Abrasifs). Strict quality control of each batch produced certifies the conformity with those standards. The following grains are available:

Mikro	50% Value	Tolerance	94 % Value	3 % Value
F 230	53.0	± 3.0	34.0	82
F 240	44.5	± 2.0	28	70
F 280	36.5	± 1.5	22	59
F 320	29.2	± 1.5	16.5	49
F 360	22.8	± 1.5	12	40
F 400	17.3	± 1.5	8	32
F 500	12.8	± 1.0	5	25
F 600	9.3	± 1.0	3	19
F 800	6.5	± 1.0	2	14
F 1000	4.5	± 0.8	1	10
F 1200	3.0	± 0.5	1	7

Typical Size Curves



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OVERVIEW

EMERY

General information

Emery products are based on bauxite. After the melting process the material is milled and classified.

Two techniques for grading are used:

- Grading by means of vibratory sifter = MACRO GRAIN
- Grading by means of sedimentation = MICRO GRAIN

Different follow-up treatments, e.g. removing of iron particles by magnets, calcinating etc., make different grades available for applications.

Grades

- ABRALOX E
- ABRALOX Optical Grade

Applications

- Abrasives placed on pads (paper, linen, fibres)
- Abrasive particles and discs
- Suspensions
- Abrasives (non-bonded grains)
- Fire-resistant materials



PRODUCT INFORMATION

ABRALOX GRADE E

Product Description

Type:	Aluminiumoxide (Al ₂ O ₃)
Colour:	Brown
Hardness:	2.090 Knoop ₁₀₀
Specific Gravity:	3,92 g / ccm
Crystal structure:	α – aluminium oxide in the hexagonal crystal system
Shape:	Blocky with sharp edges

Chemical Structure

Al ₂ O ₃	96,12 %
TiO ₂	2,70 %
SiO ₂	0,67 %
Fe ₂ O ₃	0,11 %
Other Oxides	0,40 %

Applications

- Glass
- Abrasive discs synthetic resin bonded

Types and Grains available

ABRALOX Grade E is available according to F.E.P.A. 42-1:2006 in the following grains:

GRAIN	MAIN DENSITY	GRAIN	MAIN DENSITY
46	1.86 – 1.97	120	1.65 – 1.77
60	1.81 – 1.91	180	1.61 – 1.73
80	1.77 – 1.87	220	1.60 – 1.72
100	1.67 – 1.79		



PRODUCT INFORMATION

ABRALOX OPTICAL GRADE

Product Description

Type:	Aluminiumoxide (Al ₂ O ₃)
Colour:	Brown (emery)
Hardness:	2.090 Knoop ₁₀₀
Specific Gravity:	3,84 g / ccm
Crystal structure:	α - aluminium oxide in the trigonal class of the hexagonal system
Shape:	Angular

Chemical Structure

Al ₂ O ₃	96,00 %
TiO ₂	3,00 %
SiO ₂	0,54 %
Fe ₂ O ₃	0,17 %
ZrO ₂	0,18 %
CaO	0,11 %

Applications

- Precision optics
- Ophthalmics
- Quartz crystals

Types and Grains available

ABRALOX Optical Grade is produced in accordance with F.E.P.A. standards (Fédération Européenne des Fabricants de Produits Abrasifs). Strict quality control of each batch produced certifies the conformity with those standards. The following grains are available:

Mikrokörnung	50% Value	3% Value	94% Value
F 230	53.0 μ ± 3.0	82 μ	34 μ
F 240	44.5 μ ± 2.0	70 μ	28 μ
F 280	36.5 μ ± 1.5	59 μ	22 μ
F 320	29.2 μ ± 1.5	49 μ	16.5 μ
F 360	22.8 μ ± 1.5	40 μ	12 μ
F 400	17.3 μ ± 1.0	32 μ	8 μ
F 500	12.8 μ ± 1.0	25 μ	5 μ
F 600	9.3 μ ± 1.0	19 μ	3 μ
F 800	6.5 μ ± 1.0	14 μ	2 μ
F 1000	4.5 μ ± 0.8	10 μ	1 μ
F 1200	3.0 μ ± 0.5	7 μ	1 μ

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PRODUCT INFORMATION

MICROGRIT WCA

Aluminiumoxide lapping powder
Platelet-shaped particles

General Information

MICROGRIT WCA with its micro grain structure was especially developed for processing the surface of high-quality products, e.g.

A) Glass

- flat glass
- precision optics
- micro optics
- ophthalmics

B) Semi-conductors

- silicon and germanium
- piezo- electric crystals
- crystal optics
(including water- soluble materials)
- laser optics

C) Metals

- Aluminium sheets/ plates
- Mirrors (stainless steel)

D) Plastics

- acryl glass

Product Description

Product:	ALUMINIUM OXIDE powder (Al_2O_3)
Colour:	White
PH:	8,5
Hardness:	9,0 acc. Mohs
Specific gravity:	3,8
L.O.I.:	< 0,35
Crystal structure:	hexagonal (platelet-shaped grains)

Chemical Structure

Al_2O_3	99,60 %
SiO_2	0,02 %
Fe_2O_3	0,03 %
Na_2O	0,40 %
L.O.I.	0,35 %

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Quality Assurance

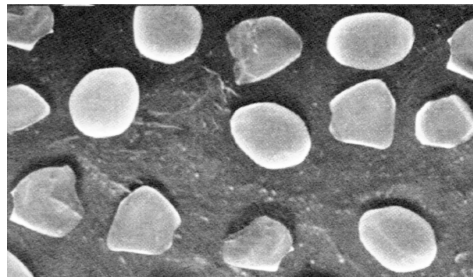
MICROGRIT WCA production meets strict quality demands. MICROGRIT WCA is permanently tested during production and at final quality control to assure its high quality at very limited tolerances. For measuring the dispersion of grains three standard techniques are used:

- Comparing by microscope
- Sedimentation by US-sedimentometer
- COULTER-COUNTER analysis

Shape of Grains

MICROGRIT WCA is platelet shaped. The ratio of grain length to grain height is 5 : 1. Due to their flat shape the particles orient parallel to work-piece and tools. A larger grain surface enables a higher performance and, consequently, a faster processing time. Furthermore, the pressure is thereby distributed uniformly over a large part of the surface resulting in a longer abrasive life cycle than with conventional abrasives.

The sliding action of the crystals prevents surface damages, as opposed to the rolling motion of conventional abrasives. This fact results in a higher surface quality and a reduced random scratching.



Mix / Concentration

MICROGRIT WCA is usually mixed as a water or oil suspension. Due to the flat grain shape one half of the amount of concentration is recommended in comparison to conventional abrasives.

Detailed information concerning the mixture of MICROGRIT WCA please find in our INSTRUCTIONS FOR APPLYING MICROGRIT WCA.



Types and Grains available

In addition to our untreated standard products MICROGRIT WCA is also available as treated version. This type was developed to avoid sedimentation which can occur in water and oil suspensions.

Abrasive compounds provided with “**Suspension Treatment**” can be identified by the letters “T” resp. “TO” following the number for grain size. Our experts will provide you further information regarding application on request.

“Suspension Treatment” does not cause any additional charges.

MICROGRIT WCA is available in the following grain sizes:

Following details were measured by Smypa Tec HELOS/ KF

Size	94% MIN	50%	3% MAX
WCA 1	0,21	1,77-2,25	6,23
WCA 2	-	2.09-2.77	-
WCA 3	0.25	2.97-3.85	9.52
WCA 5	0.54	3.72-4.74	11.40
WCA 9	1.36	5.60-6.75	13.47
WCA 12	1.90	7.05-8.50	17.60
WCA 15	3.96	9.06-11.13	21.36
WCA 20	4.76	12.40-14.66	30.11
WCA 25	7.37	16.92-20.60	41.00
WCA 30	10.30	23.67-27.45	52.77
WCA 40	13.65	31.70-37.60	62.30
WCA 50	16.12	42.81-52.50	102.00

We would be pleased to assist you finding alternative **MICROGRIT WCA** grains for abrasives being used in your production.

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INSTRUCTIONS FOR APPLICATION

MICROGRIT WCA

General Information

When starting new lapping work or using new lapping machines, the slurry should be mixed in accordance with the following recommendations:

PLEASE NOTE: For replacing conventional abrasives by MICROGRIT WCA the production system must be cleaned and washes thoroughly. Only a few sharp-edged conventional abrasive particles could cause serious scratches.

For working with MICROGRIT WCA only one half of the amount of powder needs to be used compared to conventional abrasives as aluminium oxide, silicon carbide or garnets. When previously using aluminium oxide 125 at a ratio 1 : 2 (1 part aluminium oxide, 2 parts water), the ratio for the MICROGRIT WCA 12 T mix is to be 1 : 4 (1 part MICROGRIT WCA 12 T, 4 parts water). Frequently a slightly lower concentration results in a higher performance and surface quality.

MICROGRIT WCA is designed for combination with special suspension agents which are mixed to the slurry by the supplier meeting the requirements for the very product. The letter “T” following the number for the grain size indicates water-based slurries, the letters “TO” mark oil slurries. Both types of slurries can reduce the stock removal by achieving better sliding action concurrently. On the other hand, the surface will be finer compared to using the same amount MICROGRIT WCA without suspension agents.

If there is need to provide for the slurry to be anti-corrosive, approx. ½ oz. of sodium nitride per gallon water should be added.

To prevent fast drying onto the lapping tools, 10% glycerine should be added to the water, or even, if a higher sliding action is needed.

In case of foaming, caused by different local water properties, please add a defoamer.



INSTRUCTIONS FOR APPLICATION

MICROGRIT WCA

PRECISION OPTICS

1. Spreading slurry by brush

Suspension mix (acc. to volume): 3 parts water
 1 part WCA (T)

WCA (T) abrasive should be added little by little into the water. By using warm water the abrasive powder will soak more rapidly. In case of being too viscous, water should be added to the slurry, stirring continually, until the suitable consistency has been obtained.

2. Circulation systems

Suspension mix (acc. to volume): 5 parts water
 1 part WCA (T)

An alternative way to mix the suspension can be made by using the circulation pump as mixing device. The abrasive powder is added to the water circulating inside the system. Thereupon, to achieve a good mixing process, an adequate period of time should be considered before starting the lapping process.

PLEASE NOTE:

When using grains smaller than 5 μ the mixing process should be made by ultrasound. Due to long-term processing glass and metal particles could thicken the slurry. Easily add water until the suitable concentration has been achieved. In case stock removal will be reduced, the system should be cleaned and filled with a new suspension mix.

3. Controlled lapping

Controlled lapping assures a minimum of “subsurface damage” when lapping hard glass, quartz or similar materials. Experiments show surface damage to be caused by abrasives comes up approximately threefold to the average grain size of the abrasive. Using finer grains and considering the respective stock removal at all lapping steps the “subsurface damage” will be minimized and the glass will have an utmost tensile strength.



The following example demonstrates the improvement of tensile strength when lapping quartz windows:

<u>Type of Abrasive</u>	<u>Stock removal</u>
150 grit diamond milling cutter	0.530 mm
MICROGRIT WCA 30 T	0.300 mm
MICROGRIT WCA 20 T	0.100 mm
MICROGRIT WCA 12 T	0.060 mm
MICROGRIT WCA 5 T	0.040 mm
MICROGRIT WCA 3 T	0.015 mm
Polishing	0.010 mm

Controlled lapping of Laser and Maser systems by using MICROGRIT WCA in a similar way, minimizes degradation of energy caused by dispersion.



INSTRUCTIONS FOR APPLICATION

MICROGRIT WCA

OPHTHALMICS (MINERAL GLASS)

1. Required supplies

Hydrometer with Beaumé scale, gauge glass, pH-meter

2. Grinding (by means of shell)

- a) Prepare batch: 1.10 kg MICROGRIT WCA 12 T mixed with approx. 3.8 l warm water.
- b) Beaumé-degree: 25°
PLEASE NOTE: When working on Wire-Mesh, Zinc Alloy or similar pads MICROGRIT WCA 15 T or 20 T can be used with a slightly higher pressure.
- c) Pressure: 20 lb. (ca. 10 kg)
- d) Stroke: 24 – 26 vertical and 60 – 62 laterally
- e) Cycle time: 4 minutes
- f) Exchange of slurry:
A MICROGRIT WCA 12 T slurry can be used for approx. 8 hours. In case of minimized stock removal refill water until Beaumé 25° has been reached.

3. General remarks

To work economically, either concerning tool or abrasive consumption, please consider the following facts:

- a) The abrasive can be used for a longer period of time compared to conventional abrasives.
- b) The platelet-shaped grains orient in a parallel manner between tools and glass resulting in a larger surface contact compared to working with sharp-edged conventional grains resulting in shorter processing periods and a finer surface.



- c) The finer surface allows reducing the time for polishing by 25 – 40%. The abrasive consumption can be reduced up to 65% in conjunction with a smaller request of WCA compared to conventional abrasives and a longer life cycle.
- d) Shorter cycle times minimize the tool consumption and the frequency for dressing, the machinery's wear-and-tear and the material consumption as well.

In case of the stock removal rate to be minimized after 3 – 5 hours, refill water (merely water, no abrasive). A too dense slurry might cause scratching. This procedure of resetting the original Beaumé 25° should be executed only once as glass and metal particles will vitiate the slurry, resulting in the stock removal to be minimized when the working time exceeds 8 hours. Consequently, the system is to be cleaned and refilled.

When starting work with MICROGRIT WCA the system should be cleaned and washed thoroughly. Merely a few sharp-edged grains of conventional abrasives could cause serious scratching.

Polishing time and surface cost can be reduced considerably when observing the following guidelines:

- a) Only fill premixed slurries into the system.
- b) For premixing use water at a temperature of ca. 35°C.
- c) Replace slurry when working time exceeded 8 hours.
- d) The concentration of the slurry should be measured by Beaumé spindle at least three times a day.
- e) A too thick slurry could cause scratching.
- f) In case of foaming due to the local water properties, a defoamer can be added to prevent foaming.



INSTRUCTIONS FOR APPLICATION

MICROGRIT WCA

PIEZO-ELECTRIC CRYSTALS

1. Oil suspension

Suspension mix (acc. volume): 4 parts oil
 1 part WCA

MICROGRIT WCA is to be added to the oil which should have a viscosity of 40 SSU (at 100° F = 35° C). Please note all particles to be soaked completely.

2. Water suspension

Suspension mix (acc. volume):

- a) Spreading slurry by brush: 3 parts water
 1 part WCA (T)
- b) Spreading inside circulation system: 6 parts water
 1 part WCA (T)

MICROGRIT is to be added into water. The material must be thoroughly soaked.

Where fine surface quality for high-frequency piezo-electric crystals is required, lapping up to ca. 10 µ of the thickness wanted is recommended to be made by using MICROGRIT WCA 12 or WCA 9.

The remaining amount should be lapped by using MICROGRIT WCA 5 or WCA 3. As a result flatness and surface quality will be excellent.

Using MICROGRIT WCA 1 (T) turned out to be profitable for polishing quartz exceeding 50 MHz. The surface quality will be so fine that there is no need for polishing.



INSTRUCTIONS FOR APPLICATION

MICROGRIT WCA

SILICON WAFERS

Suspension mix (acc. volume):
5 parts de-ionised water
1 part WCA (T)

For processing silicon wafers a water suspension is recommended, both concerning low cost and easy wafer cleaning after lapping. Furthermore, the machine operators can be prevented from dermatitis problems. The abrasive powder must be added to the substrate thoroughly to facilitate the complete soaking of the particles.

The mix proportion must meet the requirements for the working task. The slurry for lapping one side only can be thinner than for lapping both sides of wafers. Slurries exceeding a proportion of 1 : 3 (1 part abrasive, 3 parts water) could cause breaking or scratching due to higher stress.

In general, the thinner the wafer being lapped, the thinner the slurry to be; the finer the abrasive grains the higher the proportion substrate : solid- state consistence to be prepared.

To make full use of the particular platelet-shaped particles MICROGRIT WCA provides, both the operating speed of the machine and the pressure can be increased by approx. 10%.

When using oil slurries, the oil viscosity should be between 40 and 50 SSU. The concentration of the slurry should be approximately appropriate to the water slurry.

When turning production from oil to water slurries tools have to be cleaned from oil residues thoroughly. The tools should be kept in a solvent overnight.

When lapping wafers it proved to be helpful to add a water-soluble cutting oil or cleaning agent in order to prevent discs from staining.



PRODUCT INFORMATION

PLAKOR

(Aluminium Oxide – Alumina powder)

General Information

PLAKOR is an Alumina powder. Each Plakor particle is a discrete crystal of alumina having a purity of over 99%.

PLAKOR crystal have a smooth surface and a distinctive platelet shape with an aspect ratio of 5:1. Each Plakor particle has an exceptional resistance to fracturing which gives it an unparalleled advantage over typical fused aluminium oxides.

PLAKOR is manufactured in a time proven high tech process that offers performance, dependability and consistency. This hydraulic process offers one of the most repeatable lot to lot consistencies in the abrasive industry.

Application in Surface Finishing

- | | | | |
|----------------------|---------------------------|----------|-----------------------------------|
| - Precision Optics | - Optical Glass | - Quartz | - Germanium |
| - Piezo-Electronics | - Semiconductor Materials | | - Gallium Arsenide |
| - Precision Bearings | - Buffing Compounds | | - Stainless Steels |
| - Harden Steel | - Minerals | | - Ferrous &
Non ferrous Metals |

Product Description

Major Phase	:	Alpha
Particle shape	:	Disc-like
Colour	:	white
pH	:	7.5 – 11
Hardness	:	1,800 – 2,200 Knoop 9 Mohs
Spec. Gravity	:	3.95
Melting Point	:	2.020 °C
L.OI.	:	< .35

Chemical Structure

Al ₂ O ₃	:	99,20 %
SiO ₂	:	0,03 %
Na ₂ O	:	0,6 %
CaO	:	0,05 %
Fe ₂ O ₃	:	0,02 %

Date: 05/2018

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Advantages of using Plakor in surface finishing

The platelet crystal shape causes orientation parallel to the lap and the work surface; pressure is thereby distributed uniformly over a larger surface of the abrasives and work surface. This allows for more stock removal and less subsurface damage as well as prolonged abrasive life.

The aspect ratio allows for the abrasive to vehicle ratio to be decreased from 50% - 30% on typical fused aluminium oxide to 20% - 15% on Plakor slurries, thus reducing abrasive consumption by 50%.

Uniform size and quality of particle integrity prevent random scratching or damage to the workpiece.

Types and Grains available

We offer a variety of different suspension treatments to prevent hard packing and provide different levels of suspension. Custom blends of suspension treatments can be made for special or unique applications. Premixed slurries are available upon request.

“Suspension Treatment” does not cause any additional charges.

PLAKOR is available in the following grain sizes:

Size	94 % MIN.	50 %	3 % MAX.
Plakor 2	0.21	1.77 – 2.25	6.23
Plakor 3	0.5	3.5 – 5.5	12
Plakor 6	1.5	5.8 – 7.8	14
Plakor 9	2.5	8.5 – 11	24
Plakor 12	4.0	12.5 – 15.5	26.5
Plakor 15	6.5	16.5 - 19	34.5
Plakor 20	7.5	22.5 – 25.5	53.5
Plakor 25	9.5	26.0 – 30.0	60.0
Plakor 30	10.5	30.5 – 38.5	63.5
Plakor 40	15.5	41.5 – 53.5	103

We would be pleased to assist you finding alternative PLAKOR grains for abrasives being used in your production.



OVERVIEW

GARNETS

Basic Information

Garnets, being used as a “traditional” abrasive for years, are a natural mineral. Due to their hardness and excellent stock removal rates garnets are suitable for a variety of industrial applications.

Grades

- Barton garnets

Barton Garnets is not available at any particle sizes. For detailed information please contact our representatives.

The following chart informs about the classification of grains which is available from stock:

Barton Garnets

220-W

320-W

W- 4

W- 5

W- 6

W- 7

W- 8

Application

- pad-based abrasives
- abrasive particles and abrasive discs
- suspensions
- non-bonded grains



PRODUCT INFORMATION

BARTON GARNET

1. General Information

BARTON GARNET has proved as a well-trying abrasive due to its practical application in several industries. Garnet is a homogenous mineral not containing any foreign components. The general chemical formula: $\text{Fe}_3\text{Al}_2(\text{SiO}_4)_3$ considers all oxides and dioxides. Iron and aluminium ions are partly replaceable by calcium, magnesium and manganese ions.

2. Chemical Structure

Silicon dioxide	(SiO_2)	41,34 %
Ferric oxide	(FeO)	9,72 %
Ferric oxide	(Fe_2O_3)	12,55 %
Aluminium oxide	(Al_2O_3)	20,36 %
Calcium oxide	(CaO)	2,97 %
Magnesium oxide	(MgO)	12,35 %
Manganese oxide	(MnO)	0,71 %
		100,00 %

3. Physical Properties

Grain hardness acc. Mohs:	8 – 9
Grain shape:	crumbly - hard, sharp - edged, irregular
Colour:	red - pink
Specific gravity:	3,9 – 4
Pathologic effect:	not dangerous, not causing silicosis

4. Grains available

Size	94 % MIN.	50 %	3 % MAX.
220W	59.3	76.3	122
320W	22.0	36.5	58.5
W4	8.00	17.0	30.0
W5	6.00	14.0	25.0
W6	4.00	11.0	20.5
W7	3.00	9.00	17.0
W8	2.6	7.0	14.0

Please note: Not all grain sizes are available from stock. Please contact us for alternative grains.

5. Packaging

50 lb. drum



OVERVIEW

CERIUM OXIDE POLISHES

General Information

Cerium Oxide Polishes meet the demands for state-of-the-art technologies when polishing glass. **CERIUM OXIDE** naturally exists in various appearances whereby two types are being of economic interest, particularly Bastnaesites and Monazites. Processing the material in rotary furnaces effects the properties of the finishing product decisively. After the burning process the product is graded and, if necessary, mixed with additives, e.g. suspension agents.

Quality

We pay careful attention to a constant quality at an economical price. Our supplier's company is certified according to DIN ISO 9001. Our customers state that, compared to other products, the CERI-series provides the following benefits:

- fast polishing
- outstanding suspension properties
- no sticking to glass or machine
- excellent surface polishing
- long life
- easily washed from materials and machines



Application

FLAT GLASS:

CERI 2645	}	flat glass, mirrors, hollow glass, household glass
CERI 2630		
CERI 2640		
CERI 2660		

OPTICS:

CERI 400 VO	}	pre-polishing, precision optics
CERI 600 VO		final polishing, ophthalmics
CERI 900 Q		piezo-electric crystals
SUPOSIL P90		
SUPOSIL P100		

CERI HPC-55	}	Precision Optics
CERI HPC-90 0.7 – 0.8		Laser optics
CERI HPC-90 1.1 – 1.3		Microoptic
Opaline		High-performance optic

CERI APC 10	}	precision optics
CERI APC 12		laser optic, microoptic

CERI 3000G	}	precision optics high-performance optics
CERI 3000		
CERI 3000F		
CERI 4000 G		
CERI 4000		
CERI 4000 F		

HASTILITE	}	Precision optics
SUPOSIL 250		
SUPOSIL 500		



PRECISION OPTICS:

Nano CERI 2.0 PB	}	High- performance optics
Nano CERI 4.0 PB		
Nano CERI 10.0 PB		
Nano-AL CDA C-30		

CRYSTAL PROCESSING

Cosisol PB-50	}	Laser optic
Cosisol PB-60		
Cosisol PB-75		
SEPP PSA		

Application

- Precision optics, high performance optics
- Ophthalmics
- Flat Glass Industry



PRODUCT INFORMATION

CERI 2645

4. Product Description

CERI 2645 is a product for the coated or mirror glass production, the surface of the glass needs to be chemically clean.

This polish removes dirt, grease and interleaving particles by lightly polishing the glass surface. This ensures that the coatings successfully adhere to the glass, giving a long lasting and high quality finish.

4. Technical Data

CeO ₂ / TREO:	38 % (± 3%)	
Bulk density:	1.0 – 1.8 g/cm ³	
Average particle size:	2.1 µ (± 0.4 µ)	(sedigraph)
pH:	5 (± 1)	

4. Application

- cleaning mirrors before coating:
concentration recommended: 20 – 30 g/l (2 – 3° Baumé)

4. Advantages of using CERI 2645

- Increases quality of coatings
- Easily removed from glass
- Easily prepared
- Environmentally friendly
- High levels of consistency

4. Packaging

- 25 kg carton



PRODUCT INFORMATION

C E R I 2 6 3 0

1. Product Description

CERI 2630 is the most popular bevelling and edging grade cerium oxide based polish, capable of operating with all types of polishing wheels and at high polishing speeds, without affecting surface quality.

It has excellent suspension characteristics and non-stick properties which make it easy to wash from both glass and polishing machinery.

2. Technical Data

TREO	:	min. 40 %	
CeO ₂ / TREO	:	min. 25 %	
Bulk density	:	1.0 – 1.8 g/cm ³	
Average particle size	:	2.1 µ (± 0.4 µ)	by Sedigraph
pH	:	5 (± 1)	

3. Application

- edge polishing:
concentration recommended: 30 – 55 g/l (3 – 5° Baumé)
- straight line bevelling:
concentration recommended: 30 55 g/l (3 – 5° Baumé)

4. Advantages of using CERI 2630

- Fast polishing
- Bright finish
- Long life
- Washes easily from glass
- Does not stick to machinery
- Versatile with all pad and wheel types

5. Packaging

- 25 kg carton

Date: 05/2018

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PRODUCT INFORMATION

C E R I 2 6 4 0

1. Product Description

CERI 2640 providing a high performance and good suspension character can be used for a wide range of applications in the flat glass and mirror production. It has an excellent suspension and non-stick properties which make it easy to clean from both glass and polishing machinery.

CERI 2640 can be used in combination with natural and synthetic felts and polyurethanes as well.

2. Technical Data

TREO	:	min. 50 %	
CeO ₂ / TREO	:	min. 30 %	
Bulk density	:	1.0 – 1.6 g/cm ³	
Average particle size	:	2.1 μ (± 0.4 μ)	by Sedigraph
pH	:	5 (± 1)	

3. Application

- Straight line bevelling:
concentration recommended: 30 – 55 g/l (3 – 5° Baumé)

4. Advantages of using CERI 2640

- Increased polishing speed capabilities
- Bright finish
- Long life
- Washes easily from glass
- Does not stick to machinery
- Versatile with all pad and wheel types

5. Packing

- 25 kg carton

Date: 05/2018

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PRODUCT INFORMATION

C E R I 2 6 6 0

1. Product Description

CERI 2660 provides superior quality for flat glass and mirror production. It achieves high stock removal and, moreover, excellent surface quality, as well as in the polishing of plano lenses and photomasks.

Like all CERI- products it does not stick to glass and can be washed off easily.

CERI 2660 can be used with natural and synthetic felts as well as with polyurethanes.

2. Technical Data

TREO	:	min. 80 %	
CeO ₂ / TREO	:	min. 50 %	
Bulk density	:	1.2 – 1.6 g/cm ³	
Average particle size	:	2.1 μ (± 0.4 μ)	by Sedigraph
pH	:	5 (± 1)	

3. Application

- Straight line bevelling:
concentration recommended: 30 – 55 g/l (3 – 5° Baumé)

4. Advantages of using CERI 2660

- Long life
- Washes easily from glass
- Does not stick to machinery
- Versatile with all pad and wheel material

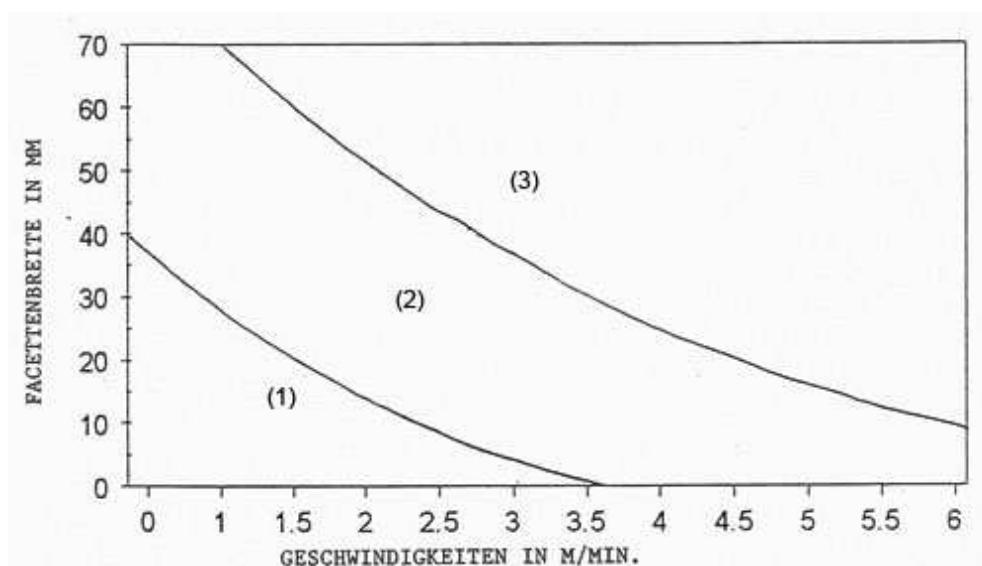
5. Packaging

- 25 kg carton



PRODUCT INFORMATION

SELECTION DIAGRAM POLISHES FOR POLISHING STRAIGHT FACETS



- (1) CERI 2630
- (2) CERI 2640
- (4) CERI 2660

This diagram provides you with a guide to selecting the ideal product from our range for different initial conditions as regards the facet width and speed.

Example: You wish to polish 20 mm wide facets. With **CERI 2630**, you can polish at a speed of up to around 3,5 m/min.
If you wish to work at a speed of 4,5 m/min., we recommend **CERI 2640**.

Needless to say, other aspects, such as the type of diamond cutters, polishing wheel and felts used, the glass thickness, pressure, etc all play an important role. In this respect, this information only constitutes a guide to the selection of the ideal polish.



PRODUCT INFORMATION

CERI 400 VO

1. Product Description

CERI 400 VO is a polishing compound based on cerium oxide. It is suitable for pre-polishing micro, plano or round optics. It can be used when spread by means of brushes and in circulation systems as well. It is also suitable for pitch and film polishing.

2. Technical Data

Average particle size:	2,5 μ (sedigraph)
pH:	7,5 \pm 1
Colour:	orange / beige

3. Concentration recommended

- When spread by means of brushes: as requested
- When used in circulating system: 60 – 90 g / l

The optimal values should be found empirically during production process.

Mix the material with water at the concentration necessary and keep the slurry in circulation for approx. 15 minutes. CERI 400 VO should be applied immediately.

The product is provided with a new suspension system which enables the slurry to be “activated” in order to guarantee a complete suspension.

A freshly mixed suspension, not being used immediately, can be re-suspended only after shaking thoroughly.

4. Suspension Temperature

The temperature of the suspension should range between 30° C and 40° C.

5. Application

Pre-polishing in precision optics.

6. Packaging

25 kg cardboard box

Date: 05/2018

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PRODUCT INFORMATION

CERI 600 VO

1. Product Description

CERI 600 VO has been developed for finish polishing of precision optics and ophthalmics. It can be used when spread by means of brushes or in circulating systems. The substrate base is polyurethanes and other synthetic materials and pitches as well.

2. Technical Data

Average particle size:	2.5 μ (Sedigraph)
pH:	7.5 \pm 1
Colour:	beige

3. Concentration recommended

- Precision optics: 40 – 90 g / l
- Ophthalmics: 30 – 90 g / l

The optimal values should be found empirically during production process.

Mix the material with water at the concentration necessary and keep the slurry in circulation for approx. 15 minutes. CERI 600 VO should be applied immediately.

The product is provided with a new suspension system which enables the slurry to be “activated” in order to guarantee a complete suspension.

A freshly mixed suspension, not being used immediately, settles out quickly, but can be re-suspended only after shaking thoroughly.

4. Suspension Temperature

The temperature of the suspension should range between 30°C and 40°C.

5. Application

Final polishing for precision optics, ophthalmics, prescription lenses and mass production.

6. Packaging

25 kg cardboard box

Date: 05/2018

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PRODUCT INFORMATION

CERI 900 Q

1. Product Description

CERI 900 Q is a high-grade cerium oxide polish developed for optimal surface quality. Substrate base are polyurethanes and other synthetic polishing discs and polishing pitches as well.

2. Technical Data

Average particle size:	2.5 μ
pH:	7 ± 1.5
Colour:	reddish / beige

3. Concentration recommended

Precision optics: 50 - 100 g / l

The optimal values should be found empirically during production process.

4. Suspension Temperature

The temperature of the suspension should range between 30° C and 40° C.

5. Application

Final polishing for precision optics, ophthalmics, especially quartz glass, LCD-glass.

6. Packaging

25 kg cardboard box



PRODUCT INFORMATION

SUPOSIL P90

1. Product Description

Suposil 90 is a high-quality cerium oxide polishing agent. It has particularly been developed to achieve a very good surface quality by using high polishing rates.

This polishing agent is very well suited for pre- as well as fine polishing in micro, plan and round optics.

The Suposil Powders can be used on synchro speed polishing machines and polishing machines with recirculating systems. It is characterized by very good settling properties, a long service life and a high degree of cleanliness. They are versatile usable with polyurethane, felts and polishing pitches.

2. Technical Data

TREO:	min. 90%
Average particle size: (Sedigraph)	D ₅₀ : 1,8-2.0 µ
pH:	6.5 - 8
Farbe:	white

3. Recommended concentration of suspension

Precision optics:	60 - 100 g / l
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The optimal values shall be found experientially during operating conditions.

4. Suspension Temperature

The temperature of the suspension should optimally be between 28 °C and 35 °C.

5. Applications

Pre-polishing and fine-polishing of Precision optics, lenses, prism, scientific and military instruments, LCD glass

6. Packing

25 kg carton



PRODUCT INFORMATION

SUPOSIL P100

1. Product Description

Suposil P100 is a high-quality cerium oxide polishing agent. It has particularly been developed to achieve a very good surface quality by using high polishing rates. This polishing agent is very well suited for pre- as well as fine polishing in micro, plan and round optics.

The Suposil Powders can be used on synchro speed polishing machines and polishing machines with recirculating systems. It is characterized by very good settling properties, a long service life and a high degree of cleanliness. They are versatile usable with polyurethane, felts and polishing pitches.

2. Technical Data

TREO:	min. 99.9%
Average particle size: (Sedigraph)	D ₅₀ : 1,8-2.0 µ
pH:	6.5 - 8
Farbe:	white

3. Recommended concentration of suspension

Precision optics: 60 - 100 g / l

The optimal values shall be found experientially during operating conditions.

4. Suspension Temperature

The temperature of the suspension should optimally be between 27 °C and 35 °C.

5. Applications

Pre-polishing and fine-polishing of Precision optics, lenses, prism, scientific and military instruments, LCD glass

6. Packing

25 kg carton



PRODUCT INFORMATION

CERI HPC-55

1. Product Description

CERI HPC-55 is a high quality cerium oxide polishing agent. It has particularly been developed to achieve a very good surface quality by using high polishing rates. This polishing agent is designed for use on Synchrospeed polishing machines and for polishing machines with recirculation systems. It provides by a very long life time and a high cleaning. The substrate base are polishing films/foils and polishing pitches.

2. Technical Data

TREO:	min. 88 %
CeO ₂ :	min. 50 %
Average particle size:	D ₅₀ : 0.7 - 0.8μ / 1.1 - 1.3 μ
(Sedigraph)	D ₉₀ : 2.5μ / 3.0μ
pH:	6-8

3. Recommended concentration of suspension

Precision optics: 50 - 100 g / l

The optimal values shall be found experientially during operating conditions.

4. Suspension Temperature

The temperature of the suspension should optimally be between 30 ° C and 40 ° C. Even temperatures up to 50° C are no problem.

5. Applications

Precision optics, lenses, prism, scientific and military instruments, LCD glass

6. Packing

25 kg carton



PRODUCT INFORMATION

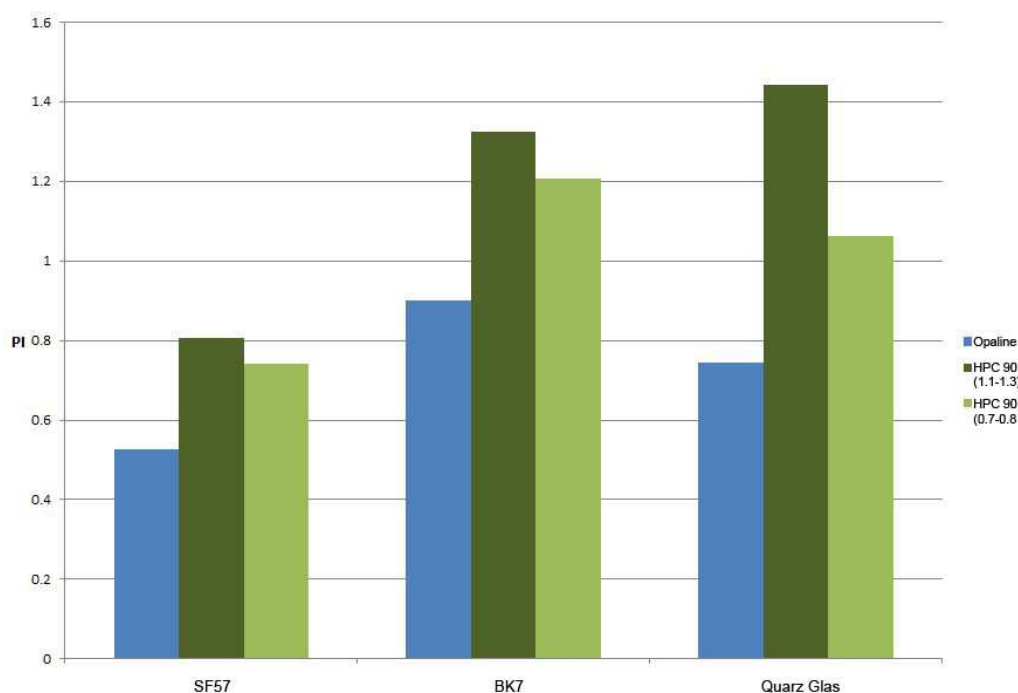
C E R I HPC-90

1. Product description

CERI HPC-90 is a high quality cerium oxide polishing agent. It has particularly been developed to achieve a very good surface quality by using high polishing rates. This polishing agent is designed for use on Synchrospeed polishing machines and for polishing machines with recirculation systems. It provides by a very long life time and a high cleaning. The substrate base are polishing films/foils and polishing pitches.

2. Technical Data

TREO:	min. 90%
CeO ₂ :	90%
Average particle size:	D ₅₀ : 0.7 - 0.8μ / 1.1 - 1.3 μ
(Sedigraph)	D ₉₀ : 2.5μ / 3.0μ
pH:	6-8



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3. Recommended concentration of Suspension

Precision optics: 50 - 100 g / l

The optimal values shall be found experientially during operating conditions.

4. Suspension Temperature

The temperature of the suspension should optimally be between 30 ° C and 40 ° C. Even temperatures up to 50° C are no problem.

5. Applications

Precision optics, lenses, prism, scientific and military instruments, LCD glass

6. Packing

25 kg carton



PRODUCT INFORMATION

Opaline

1. Product description

OPALINE is high purity cerium oxide polishing agent. It was developed specifically for the finish polishing in the micro, plan and round optics of both hard and soft glasses, glass ceramics and certain crystals. **OPALINE** is suitable for the circulation systems as well as brush lubrication. As the polishing agent carrier are suitable polyurethane films, felts as well as polishing pitches.

2. Technical Data

Average size, d_{50} :	0,5 -1,0 μ
pH of the aqueous suspension:	7
Appearance:	white
TREO:	$\geq 99 \%$
CeO ₂ /TREO:	$\geq 99 \%$

3. Recommended concentration of Suspension

Brush lubrication:	as required
Circular lubrication:	50 - 100 g / l

The optimal values shall be found experientially during operating conditions.

4. Application

Finnish polishing of different glasses, quartz and ceramic glass in precision optics.

Laser optics

Micro optics

5. Packing

20 kg pail



PRODUCT INFORMATION

CERI 2650W
CERI 2663W

1. Product Description

CERI 2650W and **CERI 2663W** are a cerium oxide-polishing agent. It has been developed particularly for the finish polishing step of different flint glasses. **Ceri 2650W** is suitable for brush lubrication. **Ceri 2663W** is due it's suspension agent suitable for circulation systems. Substrate base are polyurethanes, synthetic felt as well as polishing pitches.

2. Technical Data

Average size, d ₅₀ :	0.9 - 2.0
PH-Value	5 - 7
Appearance:	white, cream colored powder
CeO ₂ /TREO:	68,0 – 73,0 %
Mesh plus at 32µm:	< 0,01%
Density.: CeO ₂	approx. 7 g/cm ³

3. Recommended concentration of Suspension

Brush lubrication: as required
Circular lubrication: 50 - 100 g / l

The optimal values shall be found experientially during operating conditions.

4. Applications

Finnish polishing of soft glass in precision optics
Laser optics
Micro optics

5. Packaging

25 kg carton



1. Product Description

CERI APC 10 is an ultra-clean cerium oxide polishing agent. It has particularly been developed for the final polishing of hard glass in precision optics. It can be used for circulatory and brush lubrication as well. Suitable substrates are polishing films/foils and polishing pitches.

2. Technical Data

Average size, d_{50} :	< 1,0 μ
pH:	5 - 6
Appearance:	white, cream coloured powder
TREO:	minimum 99%
CeO ₂ /TREO:	minimum 99,9%
Mesh plus at 32 μ m:	< 0,01%
Density.:	circa 7 g/cm ³

3. Recommended concentration of suspension

- Brush lubrication: as required
- Circular lubrication: 50 - 100 g / l

The optimal values shall be found experientially during operating conditions.

4. Applications

- Finnish polishing of hard glass, quartz and glass ceramics in precision optics
- Laser optics
- Mikro optics

5. PACKAGING

- 25 kg carton



PRODUCT INFORMATION

C E R I APC 12

1. Product description

CERI APC 12 is an ultra-clean cerium oxide polishing agent. It has particularly been developed for the final polishing of soft glass in precision optics. It can be used for circulatory and brush lubrication as well. Suitable substrates are polishing films/foils and polishing pitches.

2. Technical Data

Average size, d_{50} :	$< 1,2 \mu$
pH:	5 - 6
Appearance:	white, cream coloured powder
TREO:	minimum 99%
CeO ₂ /TREO:	minimum 99,9%
Mesh plus at 32 μ m:	$< 0,01\%$
Density.:	circa 7 g/cm ³

3. Recommended concentration of suspension

- Brush lubrication: as required
- Circular lubrication: 50 - 100 g / l.

The optimal values shall be found experientially during operating conditions.

4. Applications

- Finnish polishing of soft glass in precision optics
- Laser optics
- Mikro optics

5. Packaging

- 25 kg carton



PRODUCT INFORMATION

CERI 3000 G

1. Product Description

CERI 3000 G is provided as a suspension especially developed for polishing precision optics. Compared to other conventional cerium oxide polishes CERI 3000 G has a carefully controlled particle size and particle size distribution. The polish is provided as a pre-mixed slurry, so there is no necessity for preparing the suspension yourself. It is particularly recommended for polishing soft flint glass.

2. Technical Data

CeO ₂ :	60 – 65 %
Total Rare Earth Oxides (TREO):	86 – 91 %
Average particle size:	1,2 µ (sedigraph)
Max. particle size (95% >):	4,0 µ
pH:	8 – 10
Specific gravity:	1,8 – 2,0
Colour:	light reddish brown

3. Concentration recommended

The suspension is supplied ready-mixed. It can be diluted, if necessary. The optimal values should be found empirically during production process.

4. Application

Precision optics

5. Packaging

5 kg bottles
2 bottles / cardboard box



PRODUCT INFORMATION

CERI 3000

1. Product Description

CERI 3000 is provided as a suspension especially developed for polishing precision optics. Compared to other conventional cerium oxide polishes CERI 3000 has a carefully controlled particle size and particle size distribution. The polish is provided as a pre-mixed slurry, so there is no necessity for preparing the suspension yourself. It is particularly recommended for polishing soft flint glass.

2. Technical Data

CeO ₂ :	60 – 65 %
Total Rare Earth Oxides (TREO):	86 – 91 %
Average particle size:	0.7 µ (sedigraph)
Max. particle size (95% >):	2,0 µ
pH:	8 – 10
Specific gravity:	1,8 – 2,0
Colour:	light reddish brown

3. Concentration recommended

The suspension is supplied ready-mixed. It can be diluted, if necessary. The optimal values should be found empirically during production process.

4. Application

Precision optics

5. Packaging

5 kg bottles
2 bottles / cardboard box



PRODUCT INFORMATION

CERI 3000 F

1. Product Description

CERI 3000 F is provided as a suspension especially developed for polishing precision optics. Compared to other conventional cerium oxide polishers CERI 3000 F has a carefully controlled particle size and particle size distribution. The polish is provided as a pre-mixed slurry, so there is no necessity for preparing the suspension yourself. It is particularly recommended for polishing soft flint glass.

2. Technical Data

CeO ₂ :	60 – 65 %
Total Rare Earth Oxides (TREO):	86 – 91 %
Average particle size:	0.4 µ (sedigraph)
Max. particle size (95% >):	1,2 µ
pH:	7 - 9
Specific gravity:	1,8 – 2,0
Colour:	light reddish brown

3. Concentration recommended

The suspension is supplied ready-mixed. It can be diluted, if necessary. The optimal values should be found empirically during production process.

4. Application

Precision optics

5. Packaging

5 kg bottles
2 bottles / cardboard box



PRODUCT INFORMATION

CERI 4000 G

1. Product Description

CERI 4000 G is a water based cerium oxide polishing suspension which is designed for the use in the precision optics.

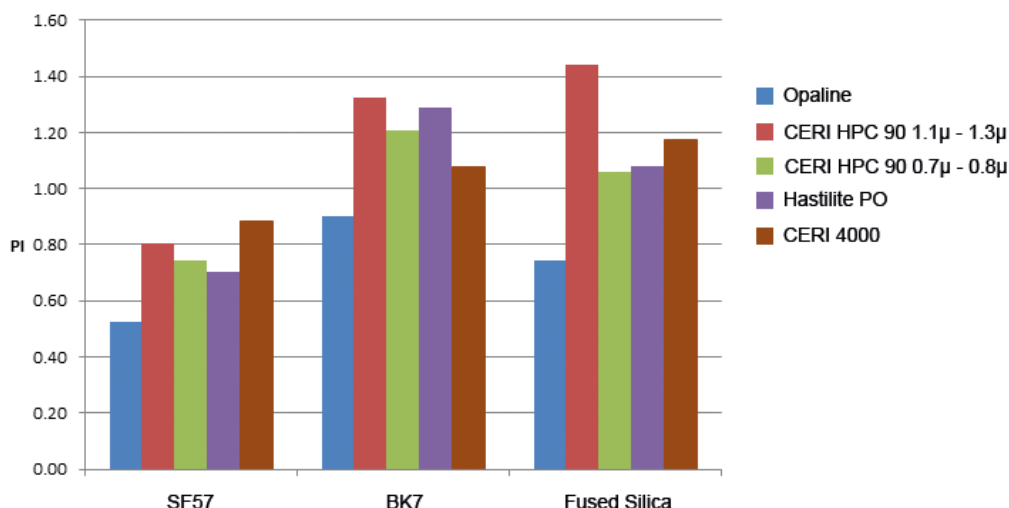
CERI 4000 G meets the highest demands on the surface quality especially in the processing of different types of glasses.

Due to its high cerium oxide content **Ceri 4000 G** is able to generate a very high stock removal. Further applications include the processing of touch screens, LCD substrates and photomask-blanks.

2. Technical Data

Percentage of Cerium Oxides	:	> 90%
Total Rare Earth Oxides (TREO)	:	> 90%
Typical particle size distribution	:	D ₅₀ : 1,1 - 1,3 μ D ₉₀ : < 3,0 μ
Solids	:	910 g/l

Suitable for the use with all convential polishing pads as well as polishing pitch.



3. Recommended Suspension Ratio

30 – 200 g/liter (3-20 Baumé)



PRODUCT INFORMATION

CERI 4000

1. Product Description

CERI 4000 is a water based cerium oxide polishing suspension which is designed for the use in the precision optics.

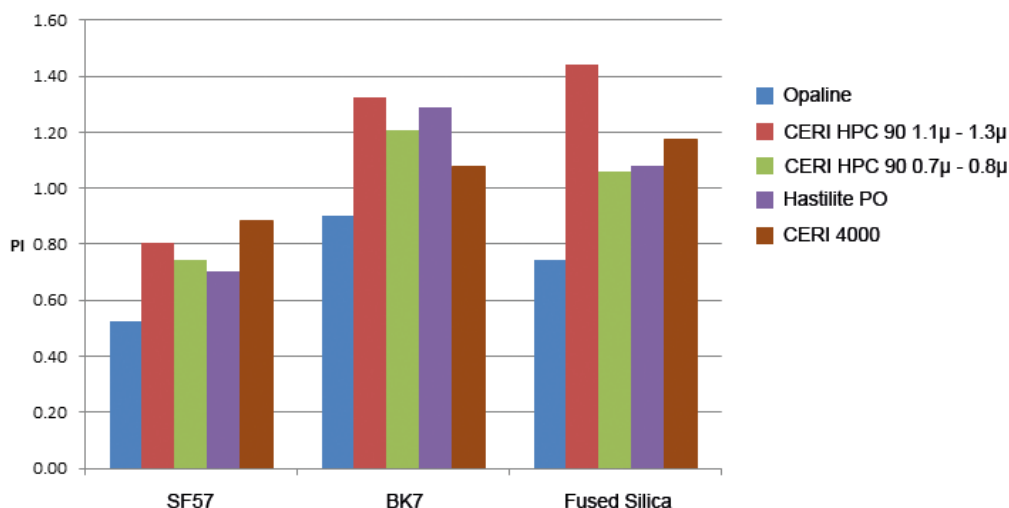
CERI 4000 meets the highest demands on the surface quality especially in the processing of different types of glasses.

Due to its high cerium oxide content **Ceri 4000** is able to generate a very high stock removal. Further applications include the processing of touch screens, LCD substrates and photomask-blanks.

2. Technical Data

Percentage of Cerium Oxides	:	> 90%
Total Rare Earth Oxides (TREO)	:	> 90%
Typical particle size distribution	:	D ₅₀ : 0,7 – 0,8 µ D ₉₀ : < 2,5 µ
Solids	:	910 g/l

Suitable for the use with all conventional polishing pads as well as polishing pitch.



3. Recommended Suspension Ratio

30 – 200 g/liter (3-20 Baumé)

Date: 05/2018

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PRODUCT INFORMATION

CERI 4000 F

1. Product Description

CERI 4000 F is a water based cerium oxide polishing suspension which is designed for the use in the precision optics.

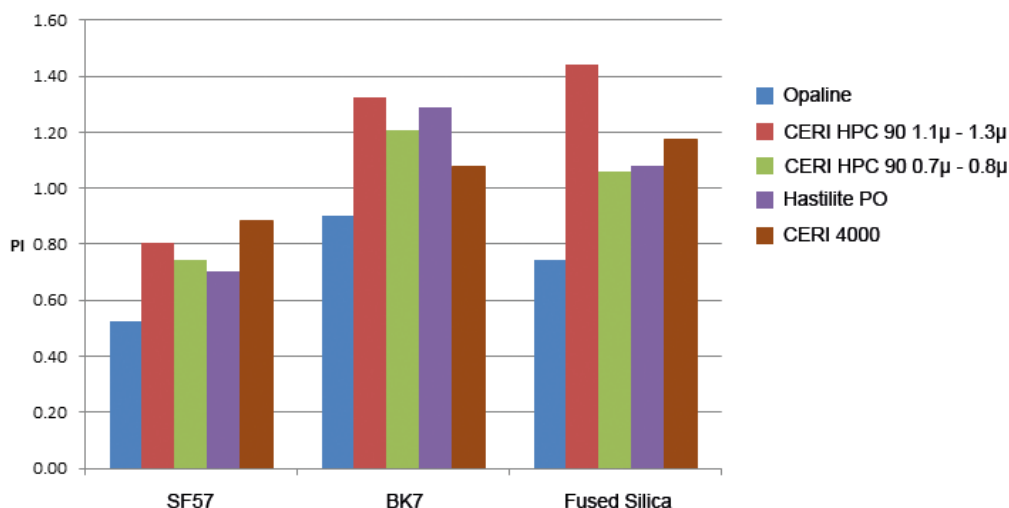
CERI 4000 F meets the highest demands on the surface quality especially in the processing of different types of glasses.

Due to its high cerium oxide content **CERI 4000 F** is able to generate a very high stock removal. Further applications include the processing of touch screens, LCD substrates and photomask-blanks.

2. Technical Data

Percentage of Cerium Oxides	:	> 90%
Total Rare Earth Oxides (TREO)	:	> 90%
Typical particle size distribution	:	D ₅₀ : 0,4 – 0,5 µ D ₉₀ : < 1,7 µ
Solids	:	910 g/l

Suitable for the use with all conventional polishing pads as well as polishing pitch.



3. Recommended Suspension Ratio

30 – 200 g/liter (3-20 Baumé)

Date: 05/2018

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PRODUCT INFORMATION

HASTILITE

1. Product Description

The **HASTILITE SERIES** are provided as a suspension, especially developed for polishing precision optics. Each of the polishing compounds in our **HASTILITE SERIES** has uniquely characteristics for a variety of application in the optical field. **Hastilite Slurries** has a carefully controlled particle size and particle size distribution. Due to the variety of Hastilite products it can be used for polishing every kind of glass.

HASTILITE PO

Meets the most stringent optics fabrication specifications with 90% of particles sized below one micron. High, ceria-base formula yields sleek-free finishes on family of softer glasses. Produces extremely low scatter surface on harder glass/ceramic materials.

HASTILITE POS

PO" formulation adjusted to a 9.0 pH.

HASTILITE PO ULTRA

PO further refined via proprietary technique removing all impurities, yielding superb surface finishes.

HASTILITE RS

A highly, concentrated, rare earth oxide-based slurry, contains 50% solids delivering both high removal rate and excellent surface finish.

HASTILITE 999

With the highest ceria content (over 99% cerium oxide), 999 is used where the greatest purity is required. Over 95% of particles sized under one micron.

HASTILITE 919

Advanced chemical compounding. Best for hard glass finishing applications like N-BK7 and fused silica. Yields very low surface roughness readings (<1 angstrom).

HASTILITE ZD

Obtains lower surface roughness readings on Zerodur in comparison with conventional compounds.



HASTILITE 2000

Offers acute chemical polishing action for rapid stock removal and angstrom level surface finish.

HASTILITE 250

HASTILITE 250's alpha alumina crystals and rare earth minerals are engineered for high resistance to particle breakdown, providing longer slurry life. Performs well with all types of pads and pitch.

HASTILITE 300

Intended for pad polishing of optics and glass.

2. Technical Data

<u>Typ of Slurry</u>	<u>ph-value</u>	<u>average particle size in μ</u>
HASTILITE PO	6 - 7	0.500
HASTILITE POS	8.95 - 9.05	0.500
HASTILITE PO ULTRA	6 - 7	0.500
HASTILITE RS	8.25 - 8.75	0.500
HASTILITE 999	5 - 6	0.750
HASTILITE 919	6.3 - 6.7	1.000
HASTILITE ZD	5 - 6	0.925
HASTILITE 2000	6 - 6.9	0.310
HASTILITE 250	8 - 10	0.275
HASTILITE 300	8 - 10	0.315

3. Concentration recommended

The suspension can be diluted, if necessary. The optimal values should be found empirically during production process.

4. Application

Precision optics

5. Packaging

1 Gallon

4 Gallons / cardboard box



PRODUCT INFORMATION

SUPOSIL 250

1. Product Description

SUPOSIL is a water-based polishing slurry based on cerium oxide which has been specially developed for the use in fine and precision optics. **SUPOSIL** fulfills the highest demands on surface quality and has unique properties for a variety of applications in the optical field. Suposil polishing slurry are delivered pre-mixed as a polishing suspension and have a carefully controlled and narrowly classified particle size distribution.

2. Technical Data

CeO ₂ :	99 %
Total Rare Earth Oxides:	99 %
Average Particle Size:	0,25 µ (Sedigraph)
Max. Particle Size (95% kleiner als:)	< 1,5 µ
pH – Value:	7 - 9
color:	white

3. Recommended concentration of Suspension

The suspension can be further diluted with very soft water or with DI water. The optimal values are to be determined empirically under operating conditions.

4. Application

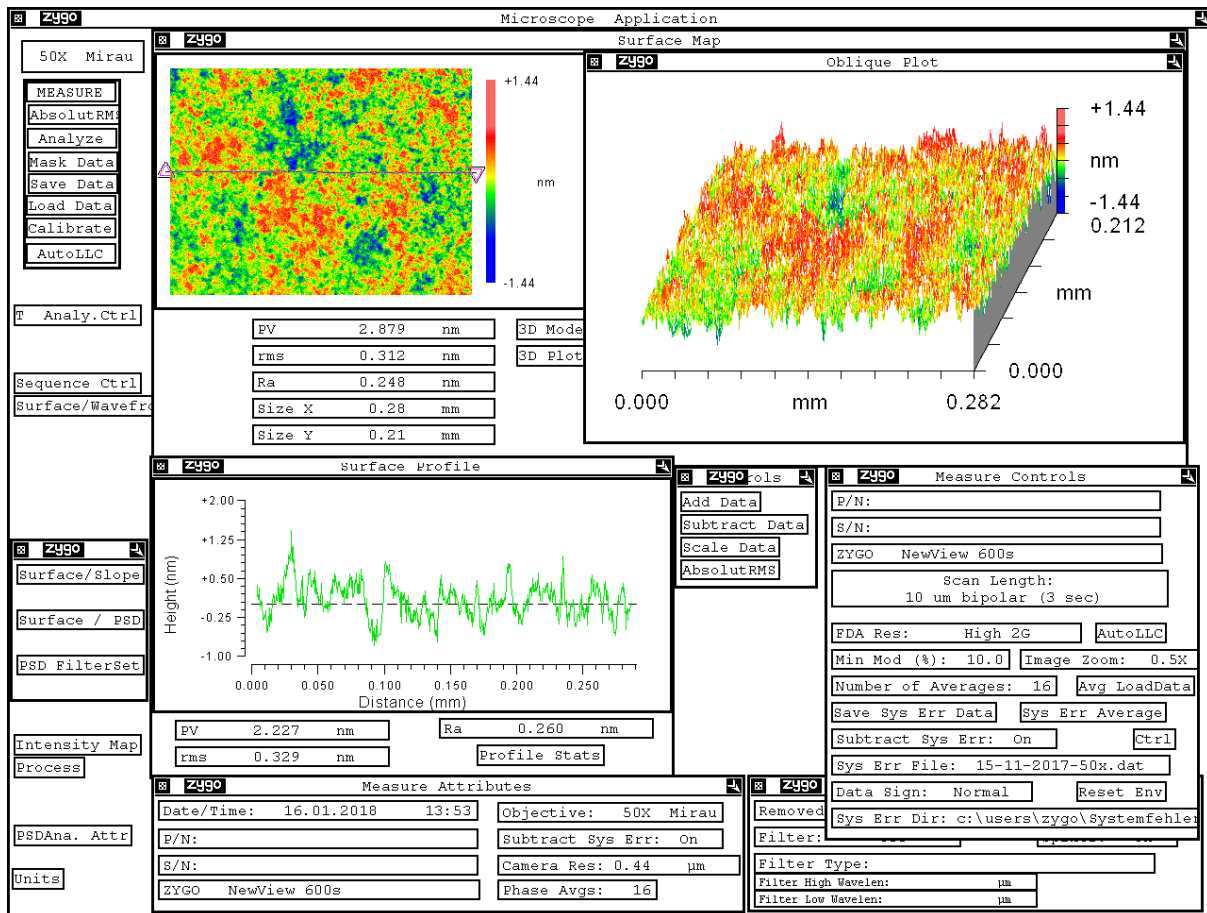
Fine- und Precision Optics

5. Packing

1 Gal. Plastic Can
4 Gal. Plastic Can / cardboard Box



SUPOSIL 250 – polishing tests on fused silica





PRODUCT INFORMATION

SUPOSIL 500

1. Product Description

SUPOSIL is a water-based polishing slurry based on cerium oxide which has been specially developed for the use in fine and precision optics. **SUPOSIL** fulfills the highest demands on surface quality and has unique properties for a variety of applications in the optical field. Suposil polishing slurry are delivered pre-mixed as a polishing suspension and have a carefully controlled and narrowly classified particle size distribution.

2. Technical Data

CeO ₂ :	99 %
Total Rare Earth Oxides:	99 %
Average Particle Size:	0,5 µ (Sedigraph)
Max. Particle Size (95% kleiner als:)	< 2,5 µ
pH – Value:	7 - 9
color:	white

3. Recommended concentration

The suspension can be further diluted with very soft water or with DI water. The optimal values are to be determined empirically under operating conditions.

4. Application

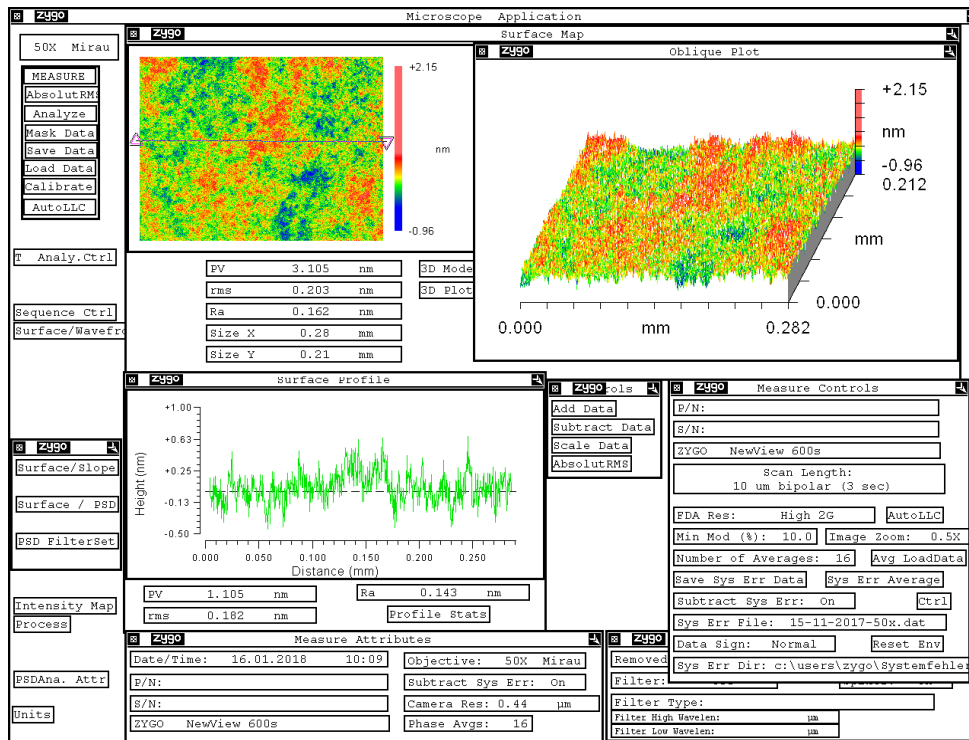
Fine- und Precision Optics

5. Packing

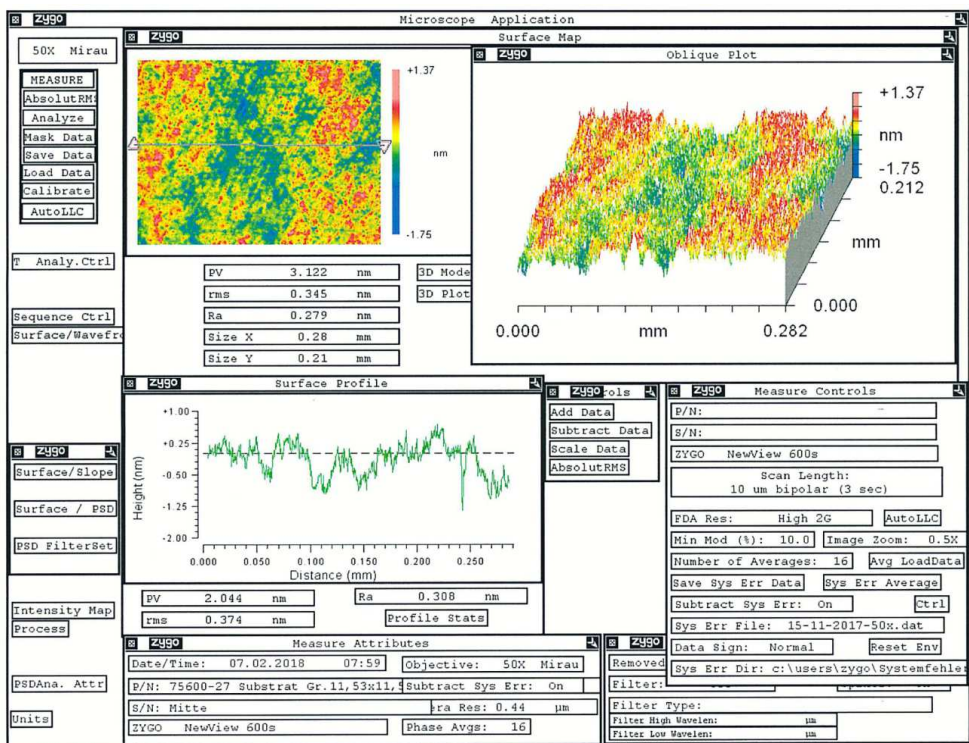
1 Gal. Plastic Can
4 Gal. Plastic Can / cardboard Box



SUPOSIL 500 – polishing tests on fused silica



SUPOSIL 500 – polishing tests on N-BK 7



Date: 05/2018

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PRODUCT INFORMATION

CERIUMOXIDE POLISH NANO-CERI PB

1. Product description

Nano-CERI PB is a special finish-polishing agent in suspended form which is characterized by a high degree of purity and an extremely small particle size. The use of optical glass and all related substrates enables the processing of surfaces with very low surface roughness. Recommended applications are: photomasks, lithography, semiconductor industry and precision optics.

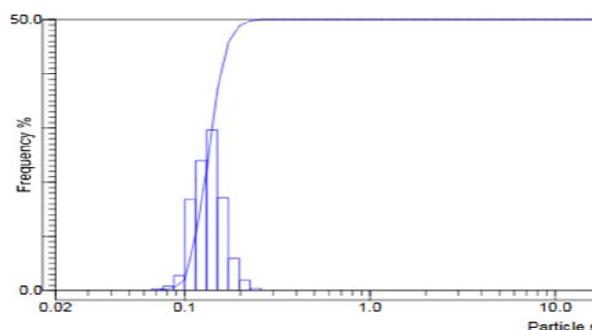
Benefits of using **Nano-CERI PB** are the consistent quality through strictly controlled particle size distributions, no forming of agglomerates, a high chemical purity and reproducible removal rates.

2. Recommended concentration

Nano-CERI PB is available with standard concentrations of 2%, 4% and 10% as a ready to use suspension. The suspension can be diluted with DI water if necessary. The optimal values are to be determined in each case empirically under operating conditions.

3. Technical data

Ceroxide content: >99,8%
Average grain size: 137 nm (D509)
pH-value: 8
Suspension colour: white

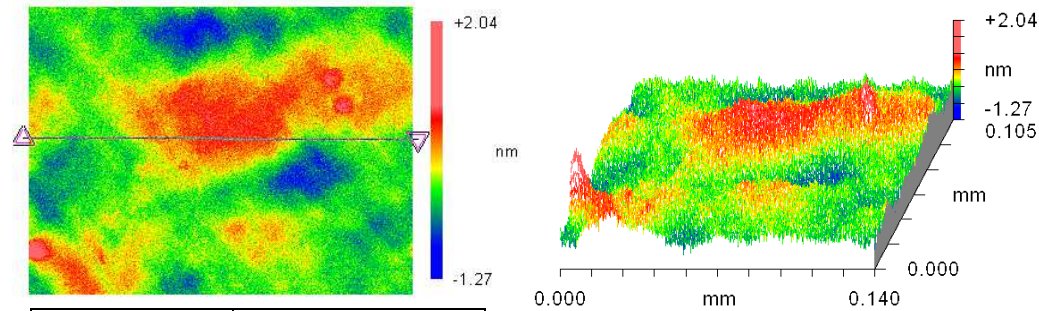


4. Packing

1 liter PE – Bottle
5 liter PE – Canister
25 liter PE – Canister

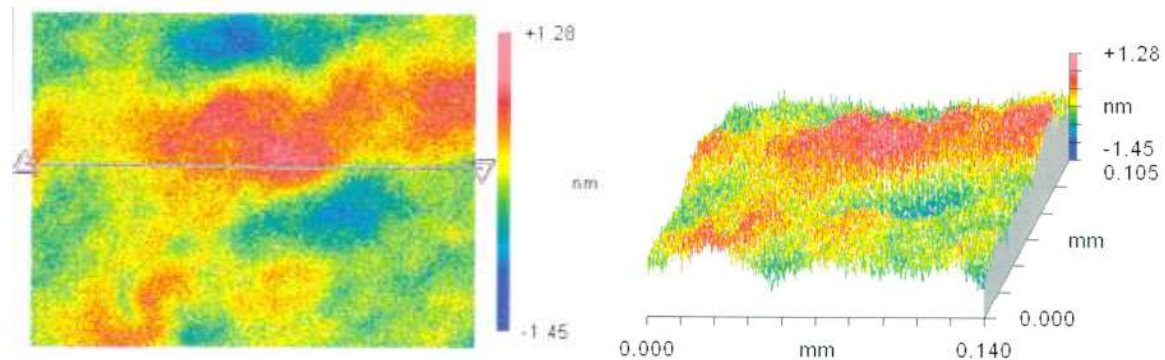


Measurements results from the use of Nano-CERI PB on BK7 with a polishing time of 10 minutes:



PV	3.305 nm
Rms	0.366 nm
Ra	0.292 nm

Measurements results from the use of Nano-CERI PB on fused silica with a polishing time of 10 minutes:



PV	2.731 nm
Rms	0.358 nm
Ra	0.286 nm



PRODUCT INFORMATION

Nano-AL CDA C-30

1. Product Description

For using high-performance polishing agents, the grain size distribution and the structure of secondary particles are of high importance.

Nano-AL CDA C-30 is a polishing suspension based on alpha-aluminium oxide with a concentration of aluminium oxide >99.9% and particles of aluminium oxide abrasive in a range of 10 – 150 nm. The suspension can be thinned user-defined.

2. Technical Data

Appearance:	white suspension	
Solids content:	29 – 31%	
Crystal phase:	Alpha	
Mohs hardness:	9	
pH:	~ 4 - 5	
Particle size:	10 – 150 nm	
Grain size distribution :	d50:	~ 60 nm
	d90:	~ 120 nm

3. Typical Chemical Analysis

Aluminium oxide	> 99,90 %
Sodium	< 0,050 %
Iron	< 0,013 %
Silicium	< 0,010 %
Calcium	< 20 ppm
Magnesium	< 20 ppm
Potassium	< 30 ppm
Heavy metals	< 30 ppm

Date: 06/2010

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4. Applications

Nano-AL CDA C-30 can be used instead of cerium oxide for polishing glass and glass ceramics. When polishing metals a slightly longer polishing time is required compared to the use of diamonds. This will be compensated by a much lower price for the polishing suspension used.

The following key words indicate a variety of applications where Nano-AL CDA C-30 can be used:

- Infrared optics, silicon, germanium, cadmium sulphide, zinc sulphite
- Mono-crystal materials
- Fibre optics
- Soft materials, aluminium, lead, copper
- As raw materials for high-tech ceramics
- Due to its high specific surface area (BET) of ca. 25 m²/g, Nano-AL CDA C-30 can be used for catalytic purposes.
- Nano-AL CDA C-30 is an effective, scratch-proof additive for industrial layers as well.

5. Packaging

- 1 kg bottle
- 5 kg bottle (on request)



PRODUCT INFORMATION

CosiSol PB-50

1. Product Description

CosiSol PB-50 is a colloidal silica polishing slurry, designed for machining particularly hard crystals, which require high surface quality. This is accomplished by the good physical properties of the base particles such as low friability, high density and high surface area. Due to the high solid content, this product can be diluted many times over. With the ever-growing market of the sapphire industry this polish provides the next generation of processing of particularly difficult sapphire materials.

CosiSol PB-50 has been developed to ensure fastest removal rates on substrates of sapphire, YAG crystals, silicon carbides and other hard materials. The high durability of this product, the removal rates and polishing results remain the same for many polishing cycles and provide a controlled and cost-effective polishing method.

2. Technical Data

Base Material:	:	colloidal silica
Average Particle Size	:	35 nm
Solid Content	:	50%
pH-Value	:	9 - 10
Viscosity	:	20 m Pa's
Specific Gravity	:	1,38

3. Application recommended

If the suspension is to be used in diluted form, only high-quality deionized water (> 18 M-ohm) should be used for it.

The suspension should be mixed before use 10-20 minutes so do not settle the particles.

In order to avoid the formation of scratches, the ready-mixed suspension should be filtered regularly.

The optimum storage temperature is between 10 ° C and 25 ° C. Recommended polishing agent carrier are polyurethanes and synthetic felts our C-Series.

4. Packaging

- 5-gallon pail



PRODUCT INFORMATION

CosiSol PB-60

1. Product Description

CosiSol PB-60 is a colloidal silica polishing slurry, designed for machining particularly hard crystals, which require high surface quality. This is accomplished by the good physical properties of the base particles such as low friability, high density and high surface area. Due to the high solids content of this product is diluted many times over. With the ever-growing market of the sapphire industry this polish provides the next generation of machining of particularly difficult sapphire materials.

CosiSol PB-60 has been developed to ensure high surface quality on substrates of silicon, calcium fluoride, barium fluoride as well as other soft materials. The high durability of this product, the removal rates and polishing results remain the same for many polishing cycles and provide a controlled and cost-effective polishing method.

2. Technical Data

Base Material	:	colloidal silica
Average Particle Size	:	60 nm
Solid Content	:	50%
pH-Value	:	8 - 8,5
Specific Gravity	:	1,39

3. Application recommended

If the suspension is to be used in diluted form only high-quality deionized water (> 18 M-ohm) should be used for it.

The suspension should be mixed before use 10-20 minutes so do not settle the particles.

In order to avoid the formation of scratches, the ready-mixed suspension should be filtered regularly.

The optimum storage temperature is between 10 ° C and 25 ° C.

Recommended polishing agent carrier are polyurethanes and synthetic felts our C-Series.

4. Packaging

- 5-gallon pail



PRODUCT INFORMATION

CosiSol PB-75

1. Product Description

CosiSol PB-75 is a colloidal silica polishing slurry which provides industry leading removal rates and highest surface quality in processing hard substrates. This is accomplished by the good physical properties of the base particles such as low friability, high density and high surface area.

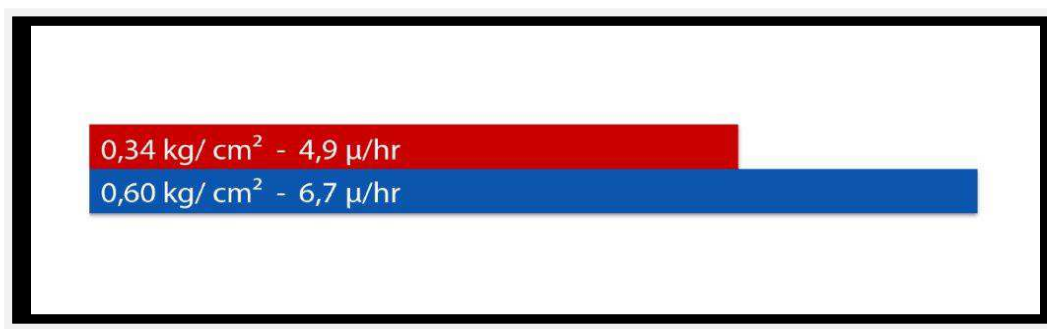
Due to the high solid content, this product can be diluted many times over. With the ever-growing market of the sapphire industry this polish provides the next generation in processing of particularly difficult sapphire materials.

CosiSol PB-75 has been developed to ensure fastest removal rates on substrates of c-plane sapphire, YAG crystals, silicon carbides and other hard materials. The high durability of this product, the removal rates and polishing results remain the same for many polishing cycles and provide a controlled and cost-effective polishing method.

2. Technical Data

Base Material	:	colloidal silica
Average Particle Size	:	75 nm
Solid Content	:	45%
pH-Value	:	9,7 - 10,2
Specific Gravity	:	1,39

REMOVAL RATES





3. Application recommended

If the suspension is to be used in diluted form only high-quality deionized water ($> 18 \text{ M-ohm}$) should be used for it.

The suspension should be mixed before use 10-20 minutes so do not settle the particles.

In order to avoid the formation of scratches, the ready-mixed suspension should be filtered regularly.

The optimum storage temperature is between 10°C and 25°C .

Recommended polishing agent carrier are polyurethanes and synthetic felts our C-Series.

4. Packaging

- 1-gallon plastic can
- 5-gallon pail



PRODUKTIINFORMATION

SEPP PSA









1. Product Description

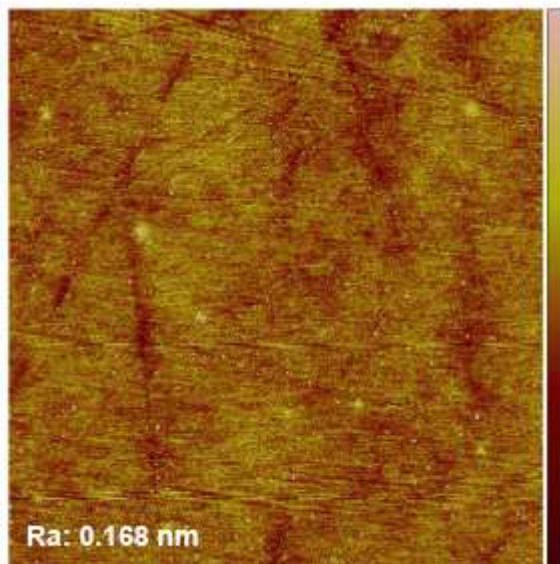
SEPP PSA has been developed as a precision alumina oxide for processing of sapphire (C-Axis). The advantages compared with the use of colloidal silica are an increased production rate combined with lower production costs.

In addition, three times higher removal rates can be achieved with the use of **SEPP PSA**, without changing the polishing-conditions.

2. Technical Data

Crystalline structure	:	Alpha
Grain Size	:	D ₁₀ :0.18 D ₅₀ :0.25 D ₉₀ :0.33
Solid Content	:	under 15%
pH-Value	:	12,5
Dilution	:	1:2

	Lapping 600er grain size	Lapping After 30 min.	Lapping After 60 min.	Lapping After 90 min
Kieselsol RR 1.97 µm/ hour				
SEPP PSA RR 6.28 µm/ hour				



Results	
Image Raw Mean	0.000007 nm
Image Mean	0.000007 nm
Image Z Range	12.1 nm
Image Surface Area	100 μm^2
Image Projected Surface Area	100 μm^2
Image Surface Area Difference	0.0190 %
Image Rq	0.243 nm
Image Ra	0.168 nm
Image Rmax	12.1 nm
Raw Mean	0.00 nm
Mean	0.00 nm
Z Range	0.00 nm
Surface Area	0.00 μm^2
Projected Surface Area	0.00 μm^2
Surface Area Difference	0.00 %
Rq	0.00 nm
Ra	0.00 nm
Rmax	0.00 nm
Skewness	0.00 nm
Kurtosis	0.00 nm
Rz	0.00 nm
Rz Count	0.00
Peak Count	0.00
Valley Count	0.00
Max Peak Height (Rp)	0.00 nm
Average Max Height (Rpm)	0.00 nm
Maximum Depth (Rv)	0.00 nm
Average Max Depth (Rvm)	0.00 nm
Line Density	0.00 / μm
Box X Dimension	0.00 μm
Box Y Dimension	0.00 μm

Date: 07/2016

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OVERVIEW

ALUMINIUM OXIDE POLISHES

Basic Information

ALUMINIUM OXIDE polishes are offered at a variety of products.

Essential criteria for selecting the most suitable polish for specific application are its purity and / or particle size distribution.

Aluminium oxide polishes are supplied as ready-mixed suspensions.

Grades

- Polish for plastic materials **HPA 2.1**
- Polish for plastic materials series **HPA**
- Liquid Aluminium Oxide **KPM**
- Polish for precision optics **SEPP**
- Polish for precision optics **SEPP H-12**
- Polish for precision optics **SEPP HA-12**
- Polish for precision optics **LINDE**
- Liquid Aluminium Oxide **SEPP L-10**

Application

- Polishing acrylic glass
- Polishing plastic ophthalmic lenses
- Polishing Auto clear coats finishes
- Polishing Marine surfaces
- Polishing CD, DVD and Blu-ray- Discs
- Polishing Chrome, Aluminium, stainless Steel
- Polishing precision optics, special optics



PRODUCT INFORMATION

PLASTIC POLISH HPA 2.1

1. Technical Data

Appearance:	white Slurry
Average particle size:	1,8 – 2,4 μ
° Beaumè:	20 °
pH:	2,8

2. Advantages of using Mircrogrit CLARON

- Superior surface finish for AR coating
- Fast removal rates
- Easy clean up
- Long life
- Low viscosity promotes polish of steep curves

3. Applications

- CR – 39
- Polycarbonate
- High Index Lenses

4. Application recommended

Evacuate ½ slurry container and shake vigorously to empty polish volume.

Clean entire polishing system thoroughly with warm water before charging with any other manufacturer's polish.

It may be necessary to restrict slurry flow to avoid splashing.

5. Packaging

- 1 US gallon plastic can
- 4 gallons / cardboard box



PRODUCT INFORMATION

PLASTIC POLISH SERIES HPA

Product Description

Plastic Polishes of series HPA have been especially developed for the high performance polishing of CR-39 lenses and polycarbonated. They are also suitable for plastics and acrylics. The polish is provided as a pre-mixed aluminium oxide suspension.

Technical Data

	HPA 50
Colour:	white
Average particle size:	1,2 μ
Beaumè:	23,5
pH:	3,1 \pm 0,3

Applications

HPA 50: High stock removal rate resulting in a quality finish. Our most economical product of the series.

HPA-50 have a long life. They are easy to set into suspension again and do not foam. Lenses and machine can be cleaned easily. For optimum results the polishes should be cooled during use.

Packaging

- 1 US gallon plastic can
- 4 gallons / cardboard box



PRODUCT INFORMATION

Plastic Polish Microgrit KPM

Technical Data

Appearance	:	white Slurry	
Average particle size	:	KPM-1 1,3 μ	KPM-6 6 μ
Percent solids	:	20 %	(50 - 80 % Alpha Aluminium)
pH	:	2,5 – 3,5	

Advantages of using Microgrit KPM

- Superior polished surface finish
- Lotion-like effect on hands
- Anti- foaming agents
- Fast removal rates
- No freezing issues
- Long life at point of use

Applications

Designed for single or recirculated systems:

- CD, DVD and DVR devices
- Plastics
- Acrylics

Packaging

- 500 ml Plastic bottle
- 1 Litre Plastic bottle
- Custom packaging available



PRODUCT INFORMATION

SEPP – POLISH

Product Description

Our aluminium oxide series **SEPP** for precision polishing has a very high purity (min. 99.98% aluminium oxide).

By changing the parameters during the calcinations process well-graded alpha and gamma products are achieved. It has proved to be an advantage that, compared to other products, the **SEPP** series is free of agglomerates. In case of existing agglomerates after calcinations the **SEPP** products undergo a special treatment resulting in a very high purity and a controlled particle size distribution.

Technical Data

TYPE	SEPP 1.0	SEPP 0.3	SEPP 0.05
Crystal shape:	hexagonal	hexagonal	cubic
Crystal structure:	alpha	alpha	gamma
Hardness (acc. Mohs)	9	9	8
PH (in distilled water):	7 – 8	7 – 8	7 – 8
Particle size distribution: (sedigraph)			
d20 (μ):	0,35	0,2	0,1
d50 (μ):	0,6	0,4	0,3
d90 (μ):	1,4	1	0,8

Chemical Structure

SEPP polishes are available in three different grades of purity whereas our standard product contains 99.98% aluminium oxide. The following impurities can occur:

<u>ELEMENT</u>	<u>CONTENT in ppm</u>	<u>ELEMENT</u>	<u>CONTENT in ppm</u>
Fe	2	K	22
Na	13	Ca	3
Si	13	Mg, Ti, Cr, Mn	< 1 (each)
Ni, Cu, Zn	< 1 (each)		

If higher purity is requested please contact us.



Application

Our **SEPP** aluminium oxide series particularly meets the demands for high-grade surface polishing. The properties of the particles, the high grade of de-agglomeration and the special strictly-controlled hardness provide a surface almost free of any scratches.

Aluminium oxides of the SEPP series can be applied among others for:

- Infra-red optics, silicon, germanium, cadmium sulphide
- Single-crystal materials
- Fibre optics
- Smooth materials, aluminium, lead, copper
- Hard-metal alloys
- Cast-iron
- Alloys
- Ferrites
- Precision ball bearings

Grades available

- SEPP 1.0
- SEPP 0.3
- SEPP 0.05

Packaging

- 1-kg pack
- 5-kg pack



PRODUCT INFORMATION

SEPP H-12

Product Description

SEPP Type H-12 is an ultra-pure nano-structured α -aluminium oxide which is very well dispersible in water without foaming.

The specific structure of the secondary particles allows a high removal rate and results in a high surface finish. Additional finishing steps are usually not required.

TECHNICAL DATA

Consistency:	white powder	
Crystal phase:	Alpha	
pH - value (in distilled water):	~ 4 - 5	
Particle size:	10 – 120 nm	
Grain size distribution	d50:	~ 190 nm
	d90:	~ 450 nm

Typical Chemical Analysis

Aluminium oxide	> 99,90 %
Sodium	< 0,01 %
Iron	< 0,01 %
Silicium	< 0,01 %

Applications

Our **SEPP H-12** Aluminium oxide particularly meets the demands for high-grade surface polishing. **SEPP H-12** can achieve very good results during the polishing process for following materials, e.g. stainless steel, plastic, glass, ceramic, lacquer, silicium and single crystal materials, other metals.

Packaging

- 1 kg bottle
- 5 kg bottle



PRODUCT INFORMATION

SEPP HA-12

Product Description

SEPP Type HA-12 is an α -aluminium oxide which is very well dispersible in water.

The specific structure of the secondary particles allows a high removal rate and results in a high surface finish. Additionally this product can be mixed with SEPP L-10 in ratio 1:1. Benefits of using **SEPP HA-12** are the increased considerably stock removal as well as high surface finishing.

TECHNICAL DATA

Consistency:	white/ grey powder	
Crystal phase:	Alpha	
pH - value (in distilled water):	~ 4 - 5	
Particle size:	~ 100 nm	
Grain size distribution	d50:	~ 0,4 μ
	d90:	< 5 μ

Typical Chemical Analysis

Aluminium oxide	> 99,90 %
Sodium	< 0,01 %
Iron	< 0,01 %
Silicium	< 0,01 %

Applications

Our **SEPP HA-12** Aluminium oxide particularly meets the demands for high-grade surface polishing. SEPP HA-12 you can achieve very good results during the polishing process for following materials, e.g. stainless steel, plastic, glass, ceramic, lacquer, silicium and single crystal materials, other metals.

Packaging

- 1 kg bottle
- 5 kg bottle



PRODUCT INFORMATION

LINDE – POLISH

Product Description

LINDE polish is aluminium oxide of highest purity (99.98% Al_2O_3 content). This product stands out for its extremely smooth particle size and distribution achieved by using special production techniques and strict controls.

Three types available can be used for pre- and final polishing depending on graduation.

Technical Data

TYPE	A	B	C
Crystal shape:	hexagonal	cubic	hexagonal
Crystal structure:	alpha	gamma	alpha
Hardness (Mohs)	9	8	9
Average particle size:	0.3 μ	0.05 μ	1.0 μ
pH (in dist. water):	6 – 9	6 – 8	6 – 9

Typical Chemical Analysis

Al_2O_3	Min. 99,98%
K	Max. 60 ppm
Na	Max. 50 ppm
Si	Max. 50 ppm
Fe	Max. 15 ppm
Ca	Max. 10 ppm
Cu	Max. 10 ppm
Mg	Max. 10 ppm
Mn	Max. 10 ppm



Application

LINDE polish can be used for achieving premium quality for processed parts. It is suitable for processing a wide range of materials:

- Metals
- Optic components
- Ceramics
- Ferrites
- Plastics
- Aluminium

LINDE polish can also be used for processing semiconductor materials like:

- Memory discs
- Optic crystals
- Germanium
- Silicon

Mixture/ Concentration

LINDE polish can be mixed with tap-water or distilled water as well as advanced lapping oils.

For individual use, the optimal concentration should be found by experimental tests, both suspension and pastes.

Polishing Wheels

For polishing with LINDE products a variable range of polishing wheels can be applied, e. g.

- SYNTEX 65/ NE
- POLYURETHANE

POLISHING PITCH



PRODUCT INFORMATION

SEPP L-10

Product Description

SEPP L-10 is an polishing suspension of Aluminiumhydrate type Böhmit.

The specific structure of the secondary particles combined with the smaller size of primary particles allows a high removal rate and results in a high surface finish.

Additional finishing steps are usually not required. This product can be mixed with SEPP HA-12 in ratio 1:1. Benefits of using this product are the increased considerably stock removal as well as high surface finish.

TECHNICAL DATA

Consistency:	white, liquid suspension
Crystal phase:	Aluminiumhydrate (Böhmit)
Specific Gravity:	$1,07 \text{ g/cm}^3 \pm 0,02 \text{ g/cm}^3$
pH - value (in distilled water):	~ 4
Solids content:	~ 20 %
Particle size:	~ 10 - 120 nm

Grain size distribution	d50:	< 0,02 - 1 μ
-------------------------	------	------------------

Typical Chemical Analysis

Aluminium oxide	> 99,90 %
Sodium	< 0,050 %
Iron	< 0,013 %
Silicium	< 0,010 %



Application

Our **SEPP** aluminium oxide series particularly meets the demands for high-grade surface polishing. The properties of the particles, the high grade of de-agglomeration and the special strictly-controlled hardness provide a surface almost free of any scratches.

Aluminium oxides of the SEPP series can be applied among others for:

- Infra-red optics, silicon, germanium, cadmium sulphide
- Single-crystal materials
- Fibre optics
- Smooth materials, aluminium, lead, copper
- Hard-metal alloys
- Cast-iron
- Alloys
- Ferrites
- Precision ball bearings

Packaging

- 1-kg pack
- 5-kg pack



OVERVIEW

PADS AND PAD MATERIALS

A wide range of substrates is available from our stock at Henstedt-Ulzburg.

Based on different materials we can offer customised products. Within the bounds of our production facilities we supply punched sheets of different materials, shapes and sizes, and if required, with pressure sensitive adhesive.

Our products are described in detail on the following pages.

- Natural felts

- Synthetic felts
 - Type SF-5 / B-Grade
 - Type SF-5 / C-Grade
 - Type SF-5 / D-Grade

- Polyurethane, LP-series

- Polyurethane, Polycon series

- Chemotextiles
 - Type 65/ NE
 - Syntex 65/BD

- Velveteens
 - Green
 - Brown

- Polishing pitches



PRODUCT INFORMATION

NATURAL FELT

Basic Information

Fulled felt is according to DIN 61205 an “area or construction made of felt-like fibres which other fibres can be admixed”. They consist of fibre fleece being reinforced by special treatments (moisture, heat, pressure etc). Fulfilled felt mainly contains wool.

Hardnesses available

Grading for hardness is made according to DIN 61200.

The following types are available:

- Specific gravity 0.52
- Specific gravity 0.56
- Specific gravity 0.60
- Specific gravity 0.65
- Specific gravity 0.68

Thicknesses available

3 mm – 15 mm

Packaging

Sheets of approx. 1200 mm x 600 mm (dimensions are subject to change)

Prices are calculated according to weight, for example:
 $\text{weight} / \text{m}^2 \text{ (in kg)} = \text{specific gravity} \times \text{thickness (in mm)}$



PRODUCT DESCRIPTION

SUBSTRATES / PAD MATERIAL TYPE SF-5

Product Description

State-of-the-art technologies for polishing and stricter quality control make new types of pad materials and tools necessary. Our SF-5 series meets these higher demands.

The SF-5 series consists of a synthetic fibre matrix soaked in synthetic/epoxy resin. A particular pore structure enables the polishing agents to be absorbed entirely. The excellent life-time of synthetic material is usually better compared to naturally-based products; accordingly, the productivity will increase when using SF-5 products.

Types available

Natural felts are subject to vary in their characteristics very much compared to SF-5 synthetic felts which have less grades concerning density and hardness.

Density and hardness result from the thickness of the fibres used as well as from the grade of soaking; fibre thickness and grade of soaking considerably influence the polishing process.

SF-5 is available in two thicknesses: B-grade = smoother fibre, D-grade = rougher fibre. Combined with different grades of soaking a wide range of products is available for a variety of applications.

The following types are available:

SF-5 / B-Grade:	B-25 very soft	B-45 soft	B-60 medium	B-75 hard
SF-5 / C-Grade:	C-35 very soft	C-45 soft	C-60 medium	C-90 very hard
SF-5 / D-Grade:	D-45 soft	D-60 medium	D-75 hard	D-90 very hard



Dimensions and Thicknesses

SF-5 is available as discs, wheels, segments and as tools on shafts.

a) Discs

Standard diameters: 4" – 34"

4", 6", 8", 10", 12", 14", 16", 18", 20", 24", 26", 28", 30", 32", 34"

Thickness: 5.5 mm

SF-5 / B-25

SF-5 / B-45

SF-5 / B-60

SF-5 / B-75

SF-5 / D-45

SF-5 / D-60

SF-5 / D-75

SF-5 / D-90



Synthetic felt – cont.:

Thickness: 1,27 mm

SF-5 / C-35

SF-5 / C-45

SF-5 / C-45
embossed 2 mm

SF-5 / C-45
embossed 10 mm

SF-5 / C-60

SF-5 / C-90

b) Polishing wheels

Outside diameter: up to 810 mm
Inside diameter: max. 105 mm
min. ÷

Thickness: up to 35 mm



c) Tools on shaft

Diameter		Work range		Shaft	Density
1/4"	x	1/4"	x	1/8"	-B60
1/4"	x	3/8"	x	1/8"	
3/8"	x	3/8"	x	1/8"	
3/8"	x	1/2"	x	1/8"	-B75
1/2"	x	1/2"	x	1/8"	-B25
1/2"	x	3/4"	x	1/8"	
1/2"	x	1"	x	1/8"	
3/4"	x	3/4"	x	1/8"	-B45
3/4"	x	1"	x	1/8"	-B60
1"	x	1"	x	1/4"	-B75
1 1/2"	x	1"	x	1/4"	

Minimum purchase quantity: 10 items / dimension and density

d) Segments

On request, according to drawing
Thickness: up to 35 mm



PRODUCT INFORMATION

POLYURETHANE

Product Description

POLYURETHANE is well-tried for polishing ophthalmics, precision optics, mirrors, flat glass and ceramics as well. This foam material has a micro structure consisting of millions of pores. A few of the below types are soaked with zirconium or cerium oxide, but polishing can not be done without using a zirconium or cerium slurry. For smooth polishing silicon carbide, natural and synthetic emery or Baton garnet as well as MICROGRIT slurry can be used. But please note that above-mentioned materials should only be used in combination with an unsoaked polyurethane pad.

Types available

Type	Filler	Density/ft ³	Hardness acc. Durometer D
• 13	Cerium oxide	21 – 25 lb.	22
• 26	Zirconium oxide	30 – 42 lb.	36
• 35	Zirconium oxid	34 – 42 lb.	37
• 46	Zirconium oxid	20 – 30 lb.	25
• 57	not filled	30 – 40 lb.	32
• 66	Cerium oxide	22 – 32 lb.	26
• 77	Cerium oxide	22 – 32 lb.	27
• 87	not filled	46 – 53 lb.	49
• 88	Cerium oxide	65 – 75 lb.	70

Application

When using polyurethane the polishing times are reduced considerably due to the excellent stableness at high temperatures, and, consequently, polishing can be made at high speed. Due to its long life-time, exceeding polishing pitches more than 10 times, it can be used for a period of two months or longer without replacement. Furthermore, it is resistant to external impacts, e.g. temperatures, moisture, a fact being of high advantage compared to the use of polishing pitches. Polyurethane softens in water or at a temperature of ca. 121°C. For fixing the polyurethane pads we recommend our TIZON POLISHING PAD ADHESIVE. The use is easy: Spread the glue both at the bottom side of the pad and on the upper side of the tool carrier, and, after approx. 5 minutes, the polyurethane can be fixed.

When bonding intensive curved material the tool carrier ought to be heated and the polyurethane ought to be notched before.

Date: 07/2016

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When using ordinary machines at a speed of 300 rpm the pressure on the lenses amounts to approx. 13 – 14 kp / cm². By increasing the working speed up to 600 rpm but retaining the pressure of 13 – 14 kp / cm² the polishing time is only reduced by 5%. In case of increasing the speed to 850 rpm and a slight increase of pressure up to 25 kp / cm² the polishing time will be reduced considerably by approx. 50%. Consequently, best results will be achieved by working at higher speeds and higher pressure at the same time.

Dimensions and Thicknesses

Polyurethane is available at standard sizes 580 mm x 1400 mm as well as discs at the following diameters: 4", 6", 8", 10", 12", 14", 16", 18", 20" and 24".

The standard thicknesses are:

Plain and PS: 0,51 mm, 0,81 mm, 1,02 mm, 1,27 mm, 1,52 mm, 2,03 mm, 2,54 mm, 3,18 mm.

Plain: 3,81 mm, 3,96 mm, 4,06 mm, 4,75 mm, 6,35 mm, 9,53 mm, 12,7 mm, 25,4 mm (not all types available).

Packaging

The minimum purchasing quantity depends on the thickness of material.

a) Thickness: 0.51 mm, 1.27 mm, 2.03 mm, 3.18 mm, 6.35 mm, 12.7 mm

sheets of 580 x 1400 mm	1 unit
discs 4"	65 discs
discs 6"	33 discs
discs 8"	18 discs
discs 10"	10 discs
discs 12"	8 discs
discs 14"	4 discs
discs 16"	3 discs
discs 18"	3 discs
discs 20"	2 discs
discs 22"	2 discs
discs 24"	2 discs (only type 26, 46, 57, 66, 77)
discs 26"	2 discs (only type 26, 46, 57, 66, 77)
discs 28"	2 discs (only type 57 and 66)
discs 29.5"	2 discs (only type 57 and 66)

b) Thickness: 0,81 mm, 1,02 mm, 1,52 mm, 2,54 mm, 3,00 mm, 3,81 mm, 3,96 mm, 4,06 mm, 4,75 mm, 9,53 mm, 25,4 mm:

sheets of 580 x 1400 mm	on request
discs	on request

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Colour Code of Types

LP-13

LP-26

GR-35

LP-46

LP-57

LP-66

LP-77

LP-87

LP-88



PRODUCT INFORMATION

POLISHING PADS – POLYCON TYPES: POLYCON 100, 205 P

Basic Information

Our delivery program of polyurethanes has been completed by a range of black pad materials of different types suitable for pre-, intermediate and final polishing of critical surfaces.

Surface of Material and Hardness

The types differ concerning pore structure and pore width. Furthermore they are available in the hardnesses A, B, C, D, E and F. Hardness “B” means double of hardness “A”, “C” means double of Hardness “B” etc.

Dimensions

Our **POLYCON** polishing pads are available at standard sizes both as material sold by the metre and as discs. The following passage refers to the maximum dimensions available. Information concerning disc diameters are provided on request. The maximum deviation is ± 0.1 mm.

Types

All pads are available as “**plain**” (non-adhesive rear) and “**PS**” (**pressure sensitive** rear).

Product Description

1. POLISHING TISSUE POLYCON 100

1.1 General facts

For completing final polishing
Hardness available: A

1.2 Application

For completing final polishing process.
Used for semiconductor substrates and substrates for solar cells (silicon, gallium arsenide, lithium niobate, GGG, sapphires), furthermore for photographic masks as well as glass for liquid crystals. Well-trying polishing compounds are e.g. smooth aluminium oxides (SEPP), cerium oxides and zirconium oxides. POLYCON 100 has proved to be a good alternative for the polishing film Supreme (refer to chart).

1.3 Dimensions

Max. width: ca. 138 cm in plain and 96 cm in PS
Thickness: 1.35 mm



2. POLISHING PADS POLYCON 205 P

2.1 General facts

For pre- and final polishing

POLYCON 205 P has an extremely smooth surface and excellent life-time. The surface is grooved to enhance spreading the slurry. This material (pH:13) resists high pressures and temperatures.

Hardnesses available: A, (B).

2.2 Application

Please refer to chart.

2.3 Dimensions

Max. width: 98 cm x 98 cm in plain
98 cm x 98 cm in PS

Thickness: 1.35 mm

3. Chart

APPLICATION:	Semiconductor Substrates: (silicon, gallium arsenide, GGG, lithium niobate, synthetic sapphires)	Photo masks Glass for liquid crystals	Storage discs: (aluminium and nickel substrates)	Optics
PRODUCT:				
Polycon 100	X	X		X
Polycon 205 P	X	X	X	X

POLYCON 100

POLYCON 205 P



PRODUCT INFORMATION

SYNTEX
POLYTEC
VELVETEEN

Basic Facts

Syntex and **Polytec** are both synthetic materials especially designed for a wide application field when doing polishing work. **Velveteen** is a pad with flocculent surface particularly suitable for precision polishing. It is available in plain, i.e. non-adhesive, or with pressure sensitive adhesive (PS).

Application

These pads are suitable for polishing glass, steel and alloys, usually when working with cerium or aluminium oxide and diamond slurries.

Dimensions and Thicknesses

Discs: 4" – 36" diameter
Sheets: 640 mm x 960 mm

Thicknesses:	SYNTEX 65 / NE	Syntex 65/BD
	0.5 mm (plain)	0.7 mm (plain)
	0.65 mm (PS)	1,0 mm (PS)

Velveteen green

Velveteen brown

Packaging

- Discs: 10 items
- Sheets: 1 sheet

Date: 07/2016

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PRODUCT INFORMATION

POLISHING PITCHES H 17 – H 43

1. Product Description

Polishing pitches are a mixture of rosin and bitumen at different grades of viscosity (hardness). By applying them as substrate for polishing compounds on the polishing tools, they are used in high-performance optic production. Depending on its ingredients all grades of hardness, from very soft to very hard, are available at a graduation of 1° difference.

2. Application

Polishing pitches are deposited by casting, dropping or melting them on polishing tools, either pure or mixed with enhancing materials (sawdust, felt flakes).

Hard types of polishing pitches and those containing enhancing materials are suitable for pre-polishing and, when using higher pressure and speed, while soft types are used for smoother application techniques in precision optic industry.

3. Technical Data

Polishing pitches	soft	medium	hard
Standard Hardnesses ⁽¹⁾	23	32	42
Other Hardnesses	17, 18, 19, 20, 21, 22	24, 25, 26, 27, 28, 29, 30, 31	33, 34, 35, 36, 37, 38, 39, 40, 41, 43

Solubility Acetone

⁽¹⁾ Hardness is defined according to the original Zeiss Jena standards as the temperature which makes a needle with a pinpoint of 1 mm² penetrate 2 mm deep into the material within 10 sec at a pressure of 1 kg.

4. Delivery Units

85 x 25 x 160 mm bars



PRODUCT INFORMATION

Natural Diamond Powder

1. Product Description

Natural Diamond Powder are used for sophisticated high-precision lapping and polishing applications. The typical properties of diamond are the extreme hardness, high thermal conductivity, high electrical resistance and low friction coefficient. Specific grinding and cleaning processes guarantee a consistent and reliable high product purity.



2. Available types of Diamond

- **Natural Diamond**
- **Monocrystalline synthetic diamond (single crystal)** is in industrial technology prevalent in grinding, lapping and polishing processes. Monocrystalline synthetic diamond (single crystal) is in industrial technology prevalent in grinding, lapping and polishing processes. Under pressure, the monocrystalline diamond particle breaks along the parallel cleavage planes.
- **Polycrystalline diamond (polycrystalline)** is composed of numerous tiny diamond grains. Under pressure small rough edges to break out of the diamond grain, so that constantly new, sharp cutting edges are formed (self-sharpening effect occurs for the lapping and polishing of extremely hard materials).

3. Applications

- Crystal processing
- Metall processing
- Ceramic processing
- Glass processing



4. Available grit sizes

<i>Grit size</i>	<i>d-50 value in μm</i>	<i>d-95 value in μm</i>
0-0.10	0.040 - 0.060	0.15
0-0.15	0.060 - 0.090	0.20
0-0.20	0.070 - 0.110	0.25
0-0.25	0.105 - 0.145	0.33
0.25-0.5	0.310 - 0.390	0.70
0.25-0.75	0.450 - 0.550	0.90
0.5-1.00	0.650 - 0.770	1.30
0.75-1.25	0.950 - 1.050	1.70
1.00-2.00	1.350 - 1.490	2.30
1.50-2.50	1.900 - 2.100	3.00
1.50-3.00	2.270 - 2.510	3.50
2.25-3.5	2.700 - 2.980	4.10
3.00-5.00	3.820 - 4.220	5.80
6-10	7.700 - 8.500	10.9
8-12	9.120 - 10.08	12.9
20-30	23.70 - 26.30	32.5

Other gritz sizes on demand.

5. Packaging

50 carat-Box
100 carat-Box



PRODUCT INFORMATION

Diamond Slurry Type PW und PO

1. Product Description

Diamond Slurry, Type PW and PO are used for demanding, high-precision lapping and polishing applications. The typical properties of diamond are the extreme hardness, high thermal conductivity, high electrical resistance and the very low friction coefficient. Specific grinding and cleaning processes guarantee reliable consistently high product purity and thereby consistent results in the application.

Our diamond suspensions are ready to use and available in water-based, oil-based and Etylenglycol based form.

The high strength of polycrystalline diamond allows about three times higher working pressure compared to monocrystalline diamond resulting in a significant increase in material removal rate.

Because of the micro-rough surface also processes with low pressure and fast polishing times can be realized.



2. Applications

Suitable for the processing of:

- Zinc selenide
- Zinc sulfide
- Germanium
- Silicon
- Calcium fluoride
- Magnesium fluoride

Additional for the processing of the above mentioned materials our particularly tried and tested polishing pitches and our polyurethane films of the series LP can be used.



3. Available suspension concentrations

Our diamond suspensions type PW and PO are available in 3 different concentration levels:

- Gering PW-G / PO-G
- Mittel PW-S / PO-S
- Hoch PW-H / PO-H

4. Packaging

- 1 litre can

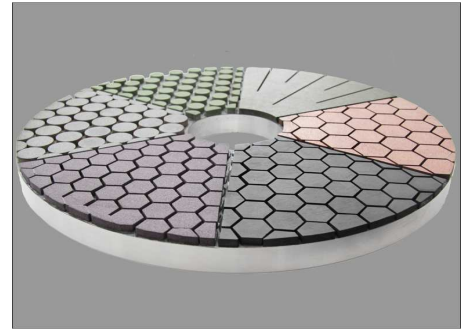


PRODUCT INFORMATION

Diamond Pellets

1. Product Description

Diamond pellets become more and more importance for fine grinding in the optical manufacture especially for lenses, mirrors and prisms. Diamond pellets are regarded as a highly efficient method for grinding optical parts. Unlike the more traditional loose abrasive grinding method, diamond grinding pellets are able to provide smooth surfaces more quickly and leads to essential shorter polishing times.



2. Available concentrations and thicknesses

- Available as resin bonded, ceramic bonded, metal bonded and hybrid bonded
- Diameter: 4 mm bis 30 mm, Thickness 2 mm bis 20 mm
- Available Grit sizes: 2 μ - 184 μ
Other grit sizes on request
- Standard concentration: C30 & C50
Other concentrations on request
- Available shapes: round, quadrangular and hexagonal

3. Applications

- Glass
- Metal
- Ceramics
- Sapphire

Our Diamond pellets are working best in combination with our new cooling concentrate TC-13 RS.

4. Advantages

- Cost effective
- Environmentally friendly
- High Performance
- Future oriented

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Approximate removal rate of the tools on different materials. (One side processing)

Pellet-Type	Float glass Removal rate (in $\mu\text{m}/\text{min}$)	Float glass medium surface roughness Ra (μm)
DM-100	1000	0,60 - 0,80
DM-50	600	0,40 - 0,50
DM-28	180	0,30 - 0,35
DM-20	120	0,20 - 0,25
DM-10	15	0,05 - 0,10
DM-7	7	0,05

Pellet-Type	N-BK7 Removal rate (in $\mu\text{m}/\text{min}$)	N-BK-7 medium surface roughness Ra (μm)
DM-100	1000	0,60 - 0,80
DM-50	600	0,40 - 0,50
DM-28	180	0,10 - 0,20
DM-20	120	0,07 - 0,10
DM-10	15	0,04 - 0,05
DM-7	7	0,03

Pellet-Typ	Quarzglas Removal rate (in $\mu\text{m}/\text{min}$)	Quarzglas medium surface roughness Ra (μm)
DM-100	1000	0,60 - 0,80
DM-50	600	0,40 - 0,50
DM-28	180	0,10 - 0,15
DM-20	120	0,04 - 0,06

Our tools are distinguished by a special plastic binding. They allow a gentle processing of various materials. The process has therefore benefits compared to the conventional processing of grinding with metal-bonded tools or lapping with loose grain. It enables an environmentally friendly process, because pure water with only 1.5%, biodegradable coolant concentrate can be used as a coolant. The cleaning of the parts after machining is completely unproblematic.



PRODUCT INFORMATION

TIZON POLISHING PAD ADHESIVE

Basic Facts

Our **TIZON POLISHING PAD ADHESIVE** is especially designed for bonding polyurethane, rubber, leather and textiles.

Product Description

Solid components:	22 % \pm 1%
Specific gravity:	0,82 kg / l
Consistency:	thin
Viscosity at 26°C:	ca. 550 mPa.s
Colour:	yellow
Flash-off time:	approx. 45 min

Application

When bonding materials the surfaces being bonded have to be dry and clean, free of any oil and contaminants. Surfaces should be sharpened by emery paper, if necessary.

Stir adhesive carefully and spread it smoothly. For very absorbent surface materials more than one application is required. Join and press the components together keeping strictly to the flash-off time prescribed. The full curing will be achieved after 3 – 5 days.

Residues of adhesive can be removed by a thinner suited to our **TIZON POLISHING PAD ADHESIVE**.

Storage

TIZON POLISHING PAD ADHESIVE should be kept at 20°C (\pm 5°C). Its shelf life is 6 months. Storing at higher temperatures decreases shelf life, lower temperatures effect a temporary higher viscosity.

Packaging

- 5-l bottle
- 2 bottles / cardboard box

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OVERVIEW

WAXES, BLOCKING PITCHES AND OPTICAL CEMENTS

Waxes and blocking pitches are used for gluing optical components to tools when doing lapping, polishing, centering and cutting work. These are primarily hot-melt glues based on natural and synthetic resins which contain various softening agents, waxes and fillers depending on their applications.

Both several processing steps and the variety of parts require a wide range of blocking pitches.

Essential parameters for applying a blocking pitch are its resistance to particular oil-containing agents (petroleum), its melting range and its stability.

Depending on its ingredients that very much influence the properties required for applications, various categories of blocking pitches and waxes are distinguished which are described on the following pages. For reading those properties please note the index below:

(1) **Hardness:**

defined according to the original Zeiss Jena standards as the temperature which makes a needle with a pinpoint of 1 mm² penetrate 2 mm deep into the material within 10 sec at a pressure of 1 kg .

(2) **Softening point:**

If not specified otherwise, in accordance with DIN 52011.

(3) **Signs indicating solubility:**

S	=	Ethanol (spirit)
A	=	Acetone
A/S	=	Acetone/Spirit mix
BDG	=	Butyldiglycol
NMP	=	N-Methyl-Pyrollidon



PRODUCT INFORMATION

SYNTHETIC RESINS

1. Product Description

These petroleum and oil resisting blocking pitches are based on synthetic resins (Ketone formaldehyde resp. Maleinate resins). They are generally used for almost all processing steps in the optical production.

2. Application

Blocking pitches based on **synthetic resins** are due to their good handling used for almost all steps when processing optic parts.

Due to their low acidity these blocking pitches are even suitable for processing glass susceptible for blooms/stains.

3. Technical Data

Product	Hardness (1)	Softening point in °C (2)	Solubility (3)	Specifications
MKS	36 ± 1 39 ± 1 41 ± 1	66 68 70	A, S	{ resistant to oil-containing coolants

(3) Solubility

S = Ethanol

A = Acetone

4. Please note

Blocking pitches should be handled under an exhaust as, due to calefaction during the production process, offensive vapours occur. Heating above 180°C for a longer period resulting in thermal decomposition should be avoided.

5. Delivery Units

- Bars 25 x 25 x 160 mm
- Bars 85 x 25 x 160 mm
- Alu- trays 128 x 33 x 220 mm

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PRODUCT INFORMATION

BLOCKING PITCHES TYPES CK

1. Product Description

These blocking pitches based on synthetic resins are designed for gluing with minimized tension.

2. Application

Blocking pitches of **type CK** are suitable for applications where extremely high strength is required. Due to their resistance to mineral cut oils they can be used for drilling and cutting glass plates. A high portion of filling material prevents the edges from chipping when being drilled or cut. The choice of filler affects the consistence of the blocking pitch to be changed. Thereby, the components, glued for being processed, are not displaced at higher room temperatures. By using fillers of extremely low expansion index blocking at most minimized tension can be made.

These blocking pitches are used in ceramics and wafer production. Their chemical composition makes these blocking pitches suitable for blooming glass.

3. Technical Data

Type	Hardness (1)	Softening point in °C (2)	Solubility (3)	Special properties
CK	36 ± 1	66	acetone ethanol	{ for ceramics and waferprocessing also available in black
	39 ± 1	68		
	41 ± 1	70		
CK 2	36 ± 1	67	acetone ethanol	{ for low tension
	39 ± 1	69		
	41 ± 1	71		



4. Please note

When using blocking pitches of CK type work should be done under an exhaust vent to reduce smelling vapour. Heat exceeding 180°C over a longer period could result in thermal decomposition. Blocking pitch Type CK cannot be re-used.

5. Delivery Units

- Bars 25 x 25 x 160 mm
- Bars 85 x 25 x 160 mm
- Alu- trays 128 x 33 x 160 mm



PRODUCT INFORMATION

WAXES / BLOCKING PITCHES

1. Product Description

Mainly consisting of natural and synthetic waxes these types of blocking pitches have a very low melting point. They are suitable for gluing at reduced tension and stress as well as for sealing the edges of optical parts when those are applied on multiple substrates.

2. Application

Wax-based blocking pitches are particularly suitable for fastening bright-finished and mat plano-optic components to substrates. Its low melting point requires low processing temperatures, that, subsequently, has a positive effect concerning work at reduced tension. Due to its excellent adhesion and resistance to moisture, these protection compounds can be used without any oil-containing coolants and cleaning agents. Furthermore, these blocking pitches protect the plano-optic parts contacting the substrates.

3. Technical Data

Type	Hardness (1)	Drop point °C (2)	Solubility (3)	Special properties
F28	28 ± 1	70 ± 5	gasoline	Blocking compounds of type HBJ can be washed off by just hot water (80°C) supported by ultrasonic cleaning.
F-34	34 ± 1	72 ± 5	gasoline	
HBJI	20 ± 1	60 ± 5	gasoline	
HBJII	24 ± 1	60 ± 5	gasoline	
HBJIII	28 ± 1	60 ± 5	gasoline	

4. Please note

Wax compounds must be kept from open fire as they are extremely inflammable.

5. Delivery Units

- Bars 25 x 25 x 160 mm
- Bars 85 x 25 x 160 mm
- Alu- trays 128 x 33 x 220 mm



PRODUCT INFORMATION

ROSIN BASED BLOCKING PITCHES

1. Product Description

Types available: **A, B I, B III, B III/OF, AKP 1010, AKP 1040**

These blocking compounds with low melting point mainly consisting of rosin, maleinates, natural softening agents and mineral fillers are suitable for low-tension applications. Rosin provides an excellent adhesive strength.

2. Application

Rosin compounds are particularly suitable for gluing plano-optic components to substrates and grids. High strain can be avoided due to their low softening points.

BIII with fillers is supplied at different hardness. **B III, AKP 1010** as well as **AKP 1040** are especially for temporary cementing at short-run production, for doing corrections and for blocking.



3. Technical Data

Type	Hardness (1)	Softening point in °C (2)	Solubility (3)	Special properties
A	26 ± 1	65	BDG, NMP	
BI	31 ± 1	62	A, A/S, BDG, NMP	
BIII	39 ± 1 41 ± 1 43 ± 1	75 75 75	A, BDG, NMP	filler cement with special strength
BIII/OF	41 ± 1			
AKP 1010	41 ± 1	80	A, BDG, NMP	filler cement with special strength
AKP 1040	50 ± 1	78	A, A/S, BDG, NMP	

4. Please note

Rosin compounds must be kept from open fire as they are extremely inflammable.

5. Delivery Units

- Bars 25 x 25 x 160 mm
- Bars 85 x 25 x 160 mm
- Alu- trays 128 x 33 x 220 mm



PRODUCT INFORMATION

MIXTURE OF ROSIN AND BEESWAX

1. Product Description

This blocking pitch contains mainly rosin with a small additive of beeswax, which diminishes the brittleness and the hardness of the rosin.

2. Technical Data

This blocking pitch is mainly used for the temporary fixing of plano-optic components (sheets, strips) to substrates. What this blocking pitch distinguishes is the high adhesion and the simple treatment. During processing please note that the blocking pitch is heated up within a range of approx. 80° C to 120° C. In this range the viscosity for the treatment is optimal and a thermal decomposition of the blocking pitch can be avoided.

3. Attention

Rosin pitches must be kept away from open fire as they are extremely inflammable.

4. Delivery Units

- Bars 25 x 25 x 160 mm
- Bars 85 x 24 x 160 mm
- Alu- trays 128 x 33 x 220 mm



PRODUCT INFORMATION

SHELLAC COMPOUNDS

1. Product Description

Our program comprises **types C** and **Punktkitt**. They mainly consist of natural resins like rosin and shellac as well as rosin pitches and natural softening agents. As these types are particularly elastic and stable they are suitable for gluing optic parts at reduced tension.

2. Application

Bonding large round-optic and plano-optic parts to proper and temporary substrates at surface and center cementing.

These types are capable to compensate high stress and high temperatures, particularly when processing precise plain surfaces.

Type **C of hardness 36** is especially designed to cementing parts for contact centering. Furthermore it can be used for bonding parts before the cutting process.

Shellac compounds must not be heated up for more than 20 minutes when exceeding temperatures of 180°C as, afterwards, shellac tends to cross-link (rubberise), and, hence, the solubility of the cements will deteriorate.

3. Technical Data

Type	Hardness (1)	Softening point in °C (2)	Solubility (3)	Special properties
C	36 ± 1 36 ± 1	68 70	A, A/S	partly resistant to oil-containing coolants and petroleum
Punktkitt	30 ± 1	62	BDG, NMP	

4. Please note

Shellac compounds must be kept from open fire as they are extremely inflammable.

5. Delivery Units

- Bars 25 x 25 x 160 mm
- Bars 85 x 25 x 160 mm
- Alu- trays 128 x 33 x 220 mm



PRODUCT INFORMATION

CEMENTS FOR SEMICONDUCTOR INDUSTRY

TANWAX

TANWAX is a very hard, viscid, non-brittle cement suitable for fixing a variety of materials, e.g. glass, ceramics etc. Melting can be made by means of gas burner.

Processed parts can be removed by using different means:

- Heated mix of a solvent and water
- Heated 1%-sodium hydroxide dilution
- For sensitive materials methanol is recommended

Storage

To be kept cool.



PRODUCT INFORMATION

CEMENTING FOIL CEMENTING PADS

1. Product Description

Cementing foils and pads consist of special paper or cloth soaked in blocking pitch. The foils and pads supplied suit to a wide range of various optical parts.

2. Application

Cementing foil is used for low-tension fixing of optical components to be processed. It protects the lenses from contacting the metallic tool. Additionally, it provides protection when the second side of the work piece is being processed. Pads matching the size of the optical parts are die-cut from the foil.

For round optics **cementing pads type MKS** are available as matrix on black or white cloth.

3. Technical Data

Properties	MKS
Hardness (1):	42 ± 1
Solubility (3):	A, S
Resistance:	resistant to oil-containing coolants and Petroleum
Matrix used:	Special cloth white or black
Thickness of foil:	$0,5 \pm 0,1$
Temperature in °C:	80 – 100

4. Delivery Units

- Roll (cloth) 15 m x ca. 300 - 330 mm
- Pads in quantities from 1 kg
Diameter: 7 – 150 mm



PRODUCT INFORMATION

TEBOLIT ADHESIVE FILM

1. PRODUCT DESCRIPTION

The Tebolit Adhesive Film has been specially developed for the quick and easy gluing of optical parts on carriers of different materials. The adhesive film unfolds its full adhesive strength even at room temperature. For detaching the film, it must be heated to a temperature of 90°C or 120°C, depending on the type of the film. Advantages of using the Tebolit Adhesive Film are:

- very fast and easy handling (no heating required for gluing)
- available in different adhesive strengths and peeling temperatures
- available in individual shapes and dimensions
- easy, residue-free removal of the film
- also soluble in acetone

2. APPLICATION

The Tebolit-Adhesive Film is used for the tension-free gluing of optics for processing such as:

- sawing
- drilling
- lapping
- fine grinding
- polishing

3. TECHNICAL DATA

	TEBOLIT ADHESIVE FILM purple	TEBOLIT ADHESIVE FILM blue
release temperature	90°C	120°
thickness	ca. 158µ	ca. 158µ
adhesive power:	middle ca. 500g / 40mm ²	high ca. 750g / 40mm ²



4. APPLICATION RECOMMENDATION

1. First, the protective film on the carrier side must be removed and be applied to the carrier as free of bubbles as possible.
2. Next, the protective film has to be removed from the optic side. On this side, the substrates to be glued are carefully pressed.
3. The adhesive needs about 0,5 to 1.0 hours until it unfolds its full adhesive force. Please do not start processing immediately after gluing.
4. The adhesive strength of the film can be increased by gently heating up to max. 50°C
5. In the process, the film needs to be heated to a temperature of 90°C or 120°C (depending on type). When the temperature is reached, the color of the film changes and becomes opaque.
6. Subsequently allow the film and substrate to cool gently and carefully remove the substrates from the film.
7. Finally, the adhesive film has to be detached from the carrier.
8. Detachment in acetone is also possible.

Important!!!

The Tebolit adhesive film differs in two sides with different bond strengths. The carrier side holds by suction force. This side has to be used exclusively for bonding on the carrier.

The carrier side as well as the optical side can be distinguished relatively easily. The protective film on the carrier side is twice as thick as the protective film on the optic side.

5. PACKAGING

- roll 50 m x 350 mm
- sheets / 350 x 350 mm
- other dimensions on request



PRODUCT INFORMATION

RAW MATERIALS FOR BLOCKING PITCHES

1. General Facts

For custom-made mixtures we supply rosin, bee's wax, shellac and paraffin.

2. Rosin

Balm rosin, Type WW

Available as flaked or crushed (gobbets) merchandise.

Melting temperature: 72° - 82° C

Packaging

10 kg

25 kg (bag)

3. Bee's Wax

Cleaned quality.

Melting temperature: 65° - 70°C

Packaging

Pastils: 10 kg

25 kg bag

4. Shellac

Shellac is a hard natural resin with high elasticity.

Bleached and wax removed quality are available.

Non-toxic and physiologically harmless.

Melting temperature: 65° - 85°C

Packaging

Flakes: 25 kg bag

Smaller quantities possible

Minimum 1 kg

Date: 07/2016

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5. Paraffin

White wax made from crude oil, solid at 20°C, above the solidification point liquid, solidification point at 53° - 55° C.

Packaging

Bars	85 x 25 x 160 mm
Alu- trays	128 x 33 x 220 mm



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ESSENTIAL INFORMATION

CEMENTS TYPE LENS BOND

General Facts

Optical cements of Type **LENS BOND** are synthetic polymer adhesives manufactured according to the **strictest quality control standards** by SUMMERS Laboratories.

They are filtered to remove all particles larger than 1 μ in size, and filled under clean room conditions. These cements will meet and exceed US-military standards.

LENS BOND optical cements are easy to handle. They should be stored cool and kept from intense light. Their maximum shelf-life is between 1 and 1½ years depending on type.

Application

Aside application for processing optical glass **LENS BOND** can successfully be used for cementing the following materials:

- Quartz
- Lithium Fluoride
- KDP crystals
- ADP crystals
- Plexiglas
- Nylon
- Ceramics
- Aluminium
- Copper
- Stainless steel
- Gelatine filters

Furthermore, **LENS BOND** has also been successful in bonding optics being coated with:

- Zinc sulphide
- Aluminium
- Silver
- Gold
- Titanium oxide



A few materials we know of that **LENS BOND** will not bond are:

- Polyethylene
- Teflon
- Lexsan
- PVC
- Polystyrene

Laser Application

Although our information is limited, we have found out that LENS BOND cements can be used in lasers, depending on the strength of the beam.

<u>Laser</u>	<u>Cement film</u>
25 watt continuous wave (CO ₂)	No effect.
5 megawatt/cm ² , pulsed 20 nanosecond (6900 Å)	Burned.
10 ⁹ watt/cm ² , subnanosecond pulse (1.06 μ YAG)	No effect.
15 watt/cm ² , continuous wave (YAG)	No effect.
6 watt/0.1 mm diameter beam (Argon, Ion)	No effect.



1. Thermal Shock Test

The object of this test is to determine the ability of a cemented component to withstand abrupt temperature changes between the limits of +40°C and -40°C.

The upper temperature was achieved with a normal Summers-Laboratory oven. The lower temperature was achieved with a cooling mixture. The specimen was placed in a polyethylene bag on removal from the oven before immersion to eliminate any solvent reaction.

A doublet of 6.35 mm (= 0.25 inch) Pilkington plate, 6.45 cm² (= 1 inch) square was used. A specimen was subjected to three cycles, and examined after each. The cycles were as follows:

- a) +40°C for 2 h → -40°C for ½ h → +40°C for 2 h → room temperature
- b) +40°C for 2 h → -40°C for 2 h → +40°C for 2 h → room temperature
- c) the same procedure as b)

LENS BOND withstood the temperature cycling with no adverse effects.

2. Mechanical Shock Test

The object of this test is to determine the ability of cemented components to withstand sudden shocks such as may be experienced in weapons applications.

The specimen was composed of glass cylinders of 2,54 mm (= 1 inch) height and 2,54 mm (1 inch) diameter bonded with LENS BOND onto flats of 3,18 cm² (= 1,25 inch) square.

The specimen was clamped to a trolley surface and subjected to a ½ sinewave pulse having peak acceleration of 100g. The specimen survived this test without discernable damage.



3. Vibration Test

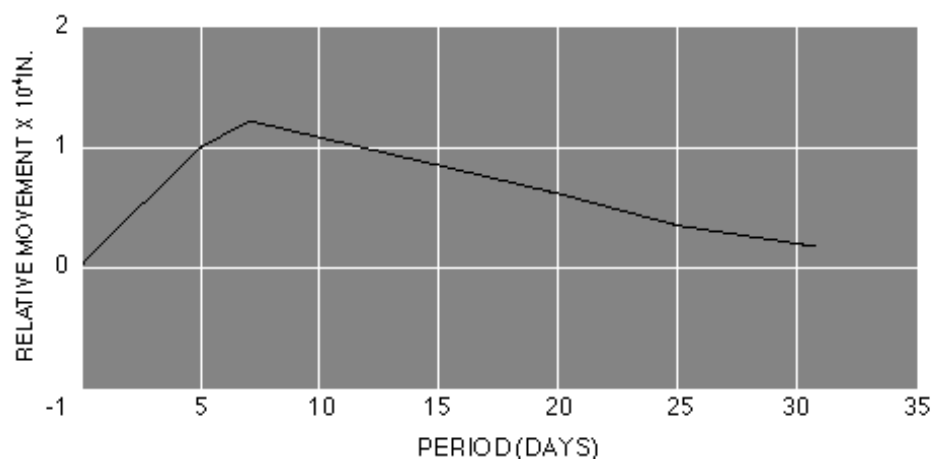
The object of this test was to ascertain the ability of cemented components to withstand vibrations such as might be met in service conditions. The specimen was identical with that used for mechanical shock treating. It was clamped to a vibration rig and vibrated both in the plane of the cement layer and perpendicular to it. The peak acceleration was 10g over the range of 10 to 300 c/s and 8g from 300 to 500 c/s. The rate of sweep was approximately 7 c/min.

No deterioration was found in the sample after testing. The specimen was checked for resonance as well, but none was found.

In order to simulate heavier stresses on the cement layer, the specimen was again subjected to vibration over the range given above, after attaching a collar of 0.46 kg (= 1 lb) lead weighting around a cylindrical element of each flat. No damage was found in the specimen.

4. Creep Test

The objective of this test was to ascertain the creep or relative movement of two components of a doublet over an extended period. One component of the specimen was clamped rigidly and a load of 0.46 kg (= 1 lb) applied to the other. Measurements were made at regular intervals. The plotted results are given below.



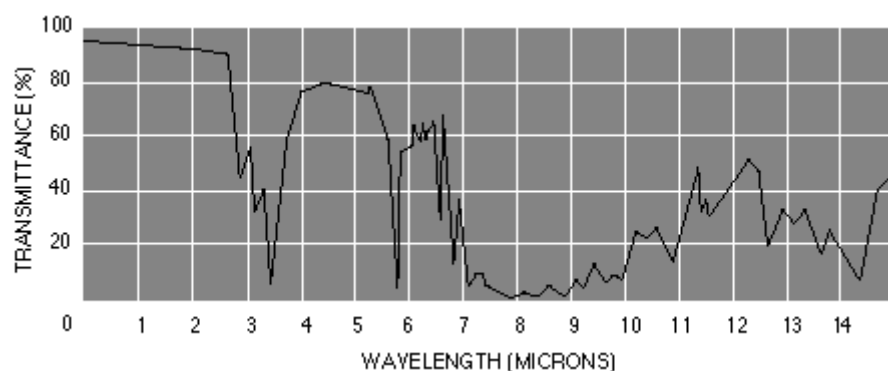
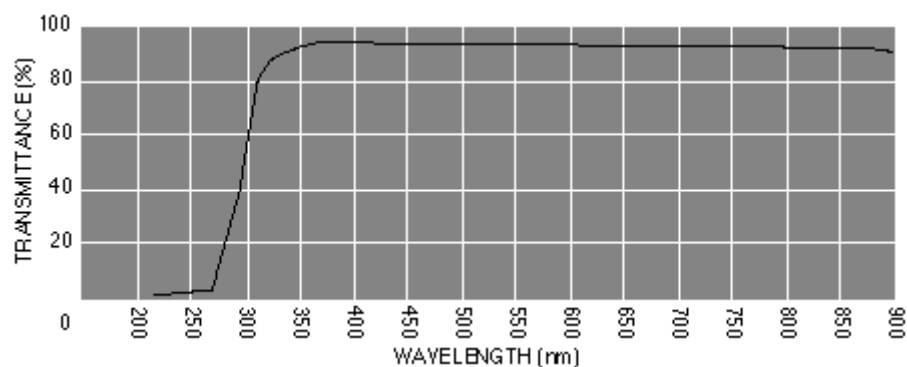


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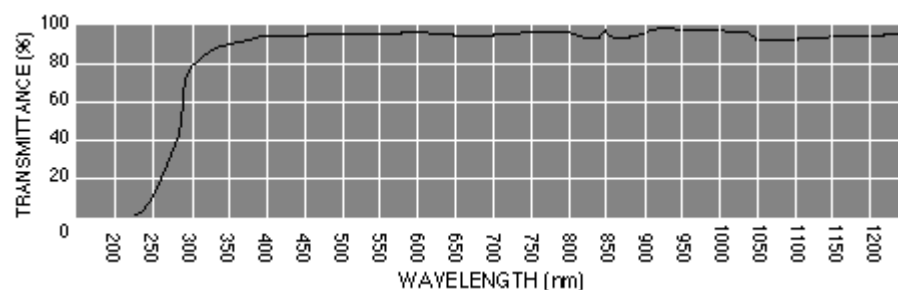
TRANSMISSION STUDIES

LENS BOND CEMENTS

Of Lens Bond Optical Cements
(.0001" film thickness)
Not including J-91



Of Lens Bond Optical Cement J-91



Date: 07/2016

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PRODUCT INFORMATION

LENS BOND Type C-59

1. General facts

This two-component cement **LENS BOND Type C-59** can be oven or room temperature cured with equally good results. It meets MIL-A-3920 Standards.

2. Curing Times

Sufficient catalyst is supplied with the bottle of cement, mixed at a 3:100 ratio or more.

Changes of the ratio will alter the curing times, i.e. cure rate can be accelerated by increasing the catalyst.

	Room Temperature 22°C (72°F)		Oven Temperature 70°C (160°F)	
<u>Catalyst ratio</u>	<u>Pre-cure</u>	<u>Full-cure</u>	<u>Pre-cure</u>	<u>Full-cure</u>
2:100	24 hours	6 days	45 minutes	2 hours
3:100	18 hours	4 days	30 minutes	1½ hours
5:100	12 hours	3 days	22 minutes	1 hour

3. Technical Data

Viscosity:	275 cps to 320 cps
Refractive Index:	1.55 at 25°C (full cured) resp. 1.53 (uncured)
Operational Temperature Range:	-54°C (-65°F) to +100°C (+212°F)
Shear Strength:	5,200 lb/inch ²
Dielectric Contrast:	3 at 10 ⁶ cps
Water Absorption:	0.3% (24 hours, 25°C)
Shrinking in Cure:	approx. 4%
pH:	3.2
Specific Gravity:	1.22
Shore D Hardness:	approx. 90
Thermal Conductivity:	500 x 10 ⁻⁶ cal (sec) (cm ²) (°C) (cm)
Flash Point (uncured):	50°C
Outgassing CVCM:	0.1 %
Shipping and Storage:	No special handling; should be kept, however, from intense light and elevated temperatures.
Shelf Life:	18 months from date of manufacture
Packing Size:	114 g (4 oz)

Date: 07/2016

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PRODUCT INFORMATION

LENS BOND TYPE M-62

1. General Facts

LENS BOND TYPE M-62 is used companies cementing large quantities of optical elements. Because of its one-hour oven cure at 70°C and with its four-hour room temperature pre-cure the use of Type M-62 permits the technician to mix a quantity of cement and bond a lot of elements before the cement starts to gel. **Type M-62 meets MIL-A-3920 Standards.**

2. Curing Times

Sufficient catalyst is supplied with the bottle of cement, mixed at a 3:100 ratio or more. Changes of the ratio will alter the curing times, i.e. cure rate can be accelerated by increasing the catalyst.

	Room Temperature 22°C (72°F)		Oven Temperature 70°C (160°F)	
<u>Catalyst ratio</u>	<u>Pre-cure</u>	<u>Full-cure</u>	<u>Pre-cure</u>	<u>Full-cure</u>
2:100	4 hours	4 days	20 minutes	1 hour
3:100	3 hours	3 days	15 minutes	45 minutes
5:100	2 hours	2 days	10 minutes	30 minutes

3. Technical Data

Viscosity:	275 cps to 320 cps
Refractive Index:	1.55 at 25°C (full cured) resp. 1.53 (uncured)
Operational Temperature Range:	-54°C (-65°F) to +100°C (+212°F)
Shear Strength:	5,200 lb/inch ²
Dielectric Contrast:	3 at 10 ⁶ cps
Water Absorption:	0.3% (24 hours, 25°C)
Shrinking in Cure:	approx. 4%
pH:	3.2
Specific Gravity:	1.22
Shore D Hardness:	approx. 90
Thermal Conductivity:	500 x 10 ⁻⁶ cal (sec) (cm ²) (°C) (cm)
Flash Point (uncured):	50°C
Outgassing CVCM:	0.1 %
Shipping and Storage:	No special handling; should be kept from intense light and elevated temperatures.
Shelf Life:	18 months from date of manufacture
Packing Size:	114 g (4 oz).

Date: 07/2016

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PRODUCT INFORMATION

LENS BOND TYPE F-65

1. General Facts

LENS BOND Type F-65 was developed for its rapid room temperature cure. With F-65 the engineer can test his systems in a few hours. Type F-65 also saves time in pilot and small production runs, or where curing ovens are not available. Type F-65 meets **MIL-A-3920 Standards**.

2. Curing Times

Sufficient catalyst is supplied with the bottle of cement, mixed at a 2:100 ratio or more. Changes of the ratio will alter the curing times, i.e. cure rate can be accelerated by increasing the catalyst.

	Room Temperature 22°C (72°F)		Oven Temperature 70°C (160°F)
<u>Catalyst ratio</u>	<u>Pre-cure</u>	<u>Full-cure</u>	<u>Pre-cure</u> <u>Full-cure</u>
2:100	60 minutes	36 hours	Not recommended!
5:100	30 minutes	1 day	Not recommended!

3. Technical Data

Viscosity:	275 cps to 320 cps
Refractive Index:	1,55 at 25°C (full cured) resp. 1,53 (uncured)
Operational Temperature Range:	-54°C (-65°F) to +100°C (+212°F)
Shear Strength:	5,200 lb/inch ²
Dielectric Contrast:	3 at 10 ⁶ cps
Water Absorption:	0,3% (24 hours, 25°C)
Shrinking in Cure:	approx. 4%
pH:	3,2
Specific Gravity:	1,22
Shore D Hardness:	approx. 90
Thermal Conductivity:	500 x 10 ⁻⁶ cal (sec) (cm ²) (°C) (cm)
Flash Point (uncured):	50°C
Outgassing CVCM:	0.1 %
Shipping and Storage:	No special handling; should be kept from intense light and elevated temperatures.
Shelf Life:	18 months from date of manufacture
Packing Size:	114 g (4 oz).

Date: 07/2016

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PRODUCT INFORMATION

LENS BOND TYPE RD 3-74

1. General Facts

LENS BOND TYPE RD-3-74 is a modification of Type F-65 containing a plasticizer. As most optical cements contract upon curing, they can occasionally set up stresses in thin elements. This stress could either cause bond breakage or lens distortion. Type RD 3-74 solves this problem by remaining slightly elastic after curing.

2. Curing Times

Sufficient catalyst is supplied with the bottle of cement, mixed at a 1:100 ratio or more. Changes of the ratio will alter the curing times, i.e. cure rate can be accelerated by increasing the catalyst.

	Room Temperature 22°C (72°F)		Oven Temperature 70°C (160°F)
<u>Catalyst ratio</u>	<u>Pre-cure</u>	<u>Full-cure</u>	<u>Pre-cure</u> <u>Full-cure</u>
1:100	2 hours	36 hours	Not recommended!
3:100	45 minutes	30 hours	Not recommended!
5:100	30 minutes	1 day	Not recommended!

3. Technical Data

Viscosity:	275 cps to 320 cps
Refractive Index:	1,55 at 25°C (full cured) resp. 1,53 (uncured)
Operational Temperature Range:	-54°C (-65°F) to +100°C (+212°F)
Shear Strength:	5,200 lb/inch ²
Dielectric Contrast:	3 at 10 ⁶ cps
Water Absorption:	0,3% (24 hours, 25°C)
Shrinking in Cure:	approx. 4%
pH:	3,2
Specific Gravity:	1,22
Shore D Hardness:	approx. 90
Thermal Conductivity:	500 x 10 ⁻⁶ cal (sec) (cm ²) (°C) (cm)
Flash Point (uncured):	50°C
Shipping and Storage:	No special handling; should be kept from intense light and elevated temperatures.
Shelf Life:	18 months from date of manufacture
Packing Size:	114 g (4 oz).

Date: 07/2016

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INSTRUCTIONS FOR USE

LENS BOND

TYPES C-59, M-62, F-65, RD 3-74

1. Preparation of Elements

Other than normal cleaning procedures, no special preparation is required. The best final cleaner is reagent grade or CP acetone.

2. Preparation of Cement

Prepare above-mentioned types by the addition of catalyst to cement in a clear glass container. Thorough mixing is important. While stirring, hold container up to the light and observe Schlieren Effect (streaks). When Schlieren Effect disappears, continue mixing for at least 30 seconds. Please note: only the amount of cement that can be used within pre-cure time should be prepared. The entrapped air in the cement will surface if the mixture rests at room temperature for a short time, or is briefly subjected to a vacuum of 625 mm Hg.

The catalyst bottles have a specially designed controlled-drop tip, pre-calibrated at Summers Optical laboratories to an accuracy of $\pm 1\%$. To use, squeeze the inverted bottle, allowing one drop to fall at a time.

For 2 : 100 mixture, use 2 drops of catalyst per 3 ml of cement (or 16 drops per 25 ml of cement).

For 3 : 100 mixture, use 3 drops of catalyst per 3 ml of cement (or 24 drops per 25 ml of cement).

For 5:100 mixture, use 5 drops of catalyst per 3ml of cement (or 8 drops per 5ml, resp. 40 drops per 25ml).

3. Application

Place the prepared **LENS BOND** cement on the concave surface, and place the convex surface thereon. Press down firmly and gently until LENS BOND completely wets the matching surfaces. Then, with a slow rotary motion and light pressure, force air bubbles from between the lenses. Excess cement can be removed with a cloth slightly moistened with alcohol or acetone. (Please note: Excess solvent will remove cement from between the cemented components.)

After pre-cure, holding devices can be removed and the components carefully be cleaned. Before testing (transmittance, refractive index etc.), however, the lenses must be fully cured.



Full cure time is in addition to the pre-cure time.

If there is no reason to remove holding devices after pre-cure, components should be cured for the total time (pre-cure plus full-cure).

Depending on components and conditions, if there is any doubt about cure being achieved, allow components to cure for a longer period of time. The cement will not “overcure”. If cure is not achieved in a reasonable time, the catalyst ratio, mixing procedure, and temperature should be checked.

4. Safety Instructions

Although **LENS BOND** is quite safe to use, some persons may be sensitive to the chemicals, and therefore, should use finger cots or gloves. Furthermore, adequate ventilation should be provided.

For further information please refer to “O.S.H.A. Material Data Sheet”.



PRODUCT INFORMATION

LENS BOND TYPE DC-90

1. General Facts

LENS BOND Type DC-90 is an innovative product meeting both the requirements for a rapid pre-curing and a complete curing at room temperature. This two-component ultraviolet sensitive cement assures excellent thermal, mechanical and chemical resistance. In addition, the low viscosity, high flow and wetting abilities eliminate the problem of working out entrapped air between large lenses and optical filters.

2. Curing Times

PRE-CURING

Room temperature 22°C (72°F)
using a longwave black light of
15 watts (365 nm) approx. 25 mm
above the element.

12 minutes

FULL CURING

Room temperature 22°C (72°F)
without UV exposure or additional
heat.

48 hours

Please note:

Pre-cure time presupposes at least 70% UV transmission of the elements being bonded. After pre-curing the elements can be placed in an oven at 70°C for 1 hour for full cure. But for best low stress results, room temperature is suggested for full curing.

3. Technical Data

Viscosity:	275 cps to 320 cps
Refractive Index:	1,55 at 25°C (full cured) resp. 1,53 (uncured)
Operational Temperature Range:	-54°C (-65°F) to +100°C (+212°F)
Shear Strength:	5,200 lb/inch ²
Dielectric Contrast:	3 at 10 ⁶ cps
Water Absorption:	0,3% (24 hours, 25°C)
Shrinking in Cure:	approx. 4%
pH:	3,2
Specific Gravity:	1,22
Shore D Hardness:	approx. 90
Thermal Conductivity:	500 x 10 ⁻⁶ cal (sec) (cm ²) (°C) (cm)
Flash Point (uncured):	50°C
Shipping and Storage:	No special handling; should be kept from intense light and elevated temperatures.
Shelf Life:	18 months from date of manufacture
Packing Size:	114 g (4 oz)

Date: 07/2016

This product information is not a specification. It is offered in good faith only as a general description of the product. All information is given without warranty or guarantee, and it is expressly understood and agreed that you assume, and hereby expressly release us from, all liability, in tort, contract or otherwise, incurred in connection with the use of this guide. Subject to alteration.



INSTRUCTIONS FOR USE

LENS BOND TYPE DC-90

1. Preparation of Elements

Other than normal cleaning procedures, no special preparation is required. The best final cleaner is reagent grade or CP acetone.

2. Application and Curing

Prepare Type **DC-90** by the addition of catalyst to cement in a clear glass container. Thorough mixing is important. While stirring, hold container up to the light and observe Schlieren Effect (streaks). When Schlieren Effect disappears, continue mixing for at least 30 seconds. The entrapped air in the cement will surface if the mixture rests at room temperature for a short time, or is briefly subjected to a vacuum of 625 mm Hg. **The catalyst bottles have a specially designed controlled-drop tip, pre-calibrated at Summers Optical laboratories to an accuracy of $\pm 1\%$. To use, squeeze the inverted bottle, allowing one drop to fall at a time.**

For 3 : 100 mixture, use 3 drops of catalyst per 3 ml of cement.

NB: The catalyst bottle supplied with Type **DC-90** contains more than sufficient catalyst for a 3 : 100 catalyst : cement ratio.

Place the prepared **LENS BOND DC-90** cement on the concave surface, and place the convex surface thereon. Press down firmly and gently until LENS BOND completely wets the matching surfaces. Then, with a slow rotary motion and light pressure, force air bubbles from between the lenses. Excess cement can be removed with a cloth slightly moistened with alcohol or acetone. **(Please note: Excess solvent will remove cement from between the cemented components.)**

After pre-curing with an ultra-violet black light, holding devices can be removed and the components be cleaned carefully. Before testing the transmittance, the lenses must be fully cured. Full cure time is in addition to the pre-cure time.

If there is any doubt about cure being achieved, allow components to cure for a longer period of time. The cement will not "overcure".

If cure is not achieved in a reasonable amount of time, the catalyst ratio, mixing procedure, UV transmission of elements, distance of lamp and power of light source should be checked.



3. Safety Instructions

Although LENS BOND is quite safe to use, some persons may be sensitive to the chemicals, and therefore, should use finger cots or gloves. Furthermore, adequate ventilation should be provided.



PRODUCT INFORMATION

LENS BOND TYPE UV-69

1. General Facts

LENS BOND Type UV-69 is ready for use without mixing catalysts with this cement. Cure is achieved by using an ordinary UV sun lamp or an equivalent source. Heat itself will not cause cure. It is recommended that lenses are irradiated on a sheet of white paper to expedite the curing process.

2. Curing Times

PRE-CURING

FULL CURING

- Using an ordinary UV sun light approx. 30 cm above the element.

20 minutes

90 minutes

- Using long-wave UV light (365 nm) approx. 25 mm above the element.

10 minutes

1 hour

3. Technical Data

Viscosity:	275 cps to 320 cps
Refractive Index:	1,55 at 25°C (full cured) resp. 1,53 (uncured)
Operational Temperature Range:	-54°C (-65°F) to +100°C (+212°F)
Youngs Modul:	6,2 x 10 ⁵ lb/inch
Shear Strength:	5,200 lb/inch ²
Dielectric Contrast:	3 at 10 ⁶ cps
Water Absorption:	0,3% (24 hours, 25°C)
Shrinking in Cure:	approx. 4%
pH:	3,2
Specific Gravity:	1,22
Shore D Hardness:	> 90
Thermal Conductivity:	500 x 10 ⁻⁶ cal (sec) (cm ²) (°C) (cm)
Flash Point (uncured):	50°C
Outgassing CVCM:	0.13 %
Shipping and Storage:	Should be kept from intense light and elevated temperatures.
Shelf Life:	18 months from date of manufacture.
Packing Size:	114 g (4 oz).



INSTRUCTIONS FOR USE

LENS BOND TYPE UV-69

1. Preparation of Elements

Other than normal cleaning procedures, no special preparation is required. The best final cleaner is reagent grade or CP acetone.

2. Application and Curing

Place the prepared **LENS BOND UV-69** cement on the concave surface, and place the convex surface thereon. Press down firmly and gently until LENS BOND completely wets the matching surfaces. Then, with a slow rotary motion and light pressure, force air bubbles from between the lenses. Excess cement can be removed with a cloth slightly moistened with alcohol or acetone. **(Please note: Excess solvent will remove cement from between the cemented components.)**

Place the cemented doublets approx. 30 cm (12 inches) beneath the sun lamp and irradiate them for 90 minutes. After pre-cure, holding devices can be removed and cleaned carefully. Before testing procedures, however, the components must be fully cured.

Full-cure time is in addition to pre-cure time. If there is no reason to remove holding devices after pre-cure, components should be cured for the total time (pre-cure plus full-cure).

Depending on components and conditions, if there is any doubt about cure being achieved, allow components to cure for a longer period of time. The cement will not "overcure".

3. Safety Instructions

Although **LENS BOND** is quite safe to use, some persons may be sensitive to the chemicals, and therefore, should use finger cots or gloves. Furthermore, adequate ventilation should be provided.

For further information please refer to "O.S.H.A. Material Data Sheet".



PRODUCT INFORMATION

LENS BOND TYPE VTC-2

1. General Facts

LENS BOND Type VTC-2 is a water-white UV-curing single-component cement. **Type VTC-2** can both be applied as cement and coating.

VTC-2 is an excellent adhesive for being used on glass, ceramics and various metals. Its high viscosity provides good adhesion for optical fibres to GRIN- lenses. It can also be useful for gluing projection screens as well as for coating electronic components and bonding lugged optical waveguide fibres.

LENS BOND Type VTC-2 does not contain any dangerous or extremely hazardous chemical substances. Its flash point is $> 200^{\circ}\text{C}$. **VTC-2** does not consist of any solvents.

2. Curing Times

PRE-CURING

Room temperature 22°C (72°F)
using a long-wave black light of
15 watts (365 nm) approx. 25 mm
above the element.

5 – 10 seconds
(15 watt light source)

20 – 30 seconds
When used as embedding cement, coating or sealing material
(100 watt light source)

FULL CURING

Room temperature 22°C (72°F)
using a long-wave black light of
15 watts (365 nm) approx. 25 mm
above the element.

1 hour
(15 watt light source)

1 hour

Please note: Pre-cure time presupposes at least 75% up to 85% UV transmission of the elements being bonded.



3. Technical Data

Viscosity:	6.000 cps to 10.000 cps
Refractive index:	1.50 at 25°C (full cured) 1.49 (uncured)
Operational Temperature Range:	-20°C to +85°C
Youngs Modul:	1,8 x 10 ⁵ lb/inch
Shrinkage on cure:	> 0,5 %
pH:	4,4
Specific Gravity:	1,22
Shore D Hardness:	65 - 75
Shipping and Storage:	Should be kept from intense light and elevated temperatures.
Shelf Life:	12 months of room temperature (22°C)
Packing Size:	30 g (1 oz)



PRODUCT INFORMATION

LENS BOND TYPE J-91

1. General Facts

LENS BOND Type J-91 is a single-component, UV-curing, general purpose optical adhesive. Its excellent adhesion combined with low shrinkage result in superior bonding. Due to its excellent viscosity it offers convenience and ease of application when bonding large elements without any air bubbles. After full-curing **Type J-91** can resist temperature extremes and high humidity. **Type J-91** has a very short pre-cure times.

2. Curing Times

PRE-CURING

Room temperature 22°C (72°F)
using a long-wave black light of
15 watts (365 nm) approx. 25 mm
above the element.

3 - 5 seconds
(15 watt light source)

FULL CURING

Room temperature 22°C (72°F)
using a long-wave black light of
15 watts (365 nm) approx. 25 mm
above the element.

1 hour
(15 watt light source)

Please note: Pre-cure time presupposes at least 75% up to 85% UV
transmission of the elements being bonded.



3. Technical Data

Viscosity:	250 cps to 300 cps
Refractive index:	1,55 at 25°C (full cured) 1,53 (uncured)
Operational Temperature Range:	-50°C to +110°C (5 days after full-cure)
Youngs Modul:	1,6 x 10 ⁵ lb/inch
Water Absorption:	0,19% (5 days after full-cure)
Shrinkage on cure:	< 0,3 %
pH:	5,5
Specific Gravity:	1,23
Shore D Hardness:	85 - 90
Shipping and Storage:	Should be kept from intense light and elevated temperatures.
Shelf live:	12 months at room temperature(22°C)
Packing Size:	30 g (1 oz) and 500 g (16 oz)



PRODUCT INFORMATION

LENS BOND TYPE P-92

1. General Facts

LENS BOND Type P-92 is a single-component, water-white, UV-curing liquid photopolymer. It can be used as a general purpose optical adhesive, as sealant, or potting material.

LENS BOND Type P-92 cures by exposure to long-wave ultraviolet light (365 nm). Its high wetting and excellent viscosity aid in maintaining location when being used as a sealant. Its high flexibility makes **Type P-92** particularly suitable for bonding and sealing materials with dissimilar coefficients of expansion.

The chemical composition of **Type P-92** as well as its high flash point and low toxicity permit shipping without restrictions and is not considered a regulated material by D.O.T.

2. Curing Times

PRE-CURING

Room temperature 22°C (72°F)
using a long-wave black light of
15 watts (365 nm) approx. 25 mm
above the element.

10 - 15 seconds
(15 watt light source)

FULL CURING

Room temperature 22°C (72°F)
using a long-wave black light of
15 watts (365 nm) approx. 25 mm
above the element.

1 hour
(15 watt light source)

Please note: Pre-cure time presupposes at least 75% up to 85% UV transmission of the elements being bonded.



3. Technical Data

Viscosity:	900 cps to 1,400 cps
Refractive index:	1,52 at 25°C (full cured) 1,51 (uncured)
Operational Temperature Range:	-10°C to +75°C (5 days after curing)
Youngs Modul:	2,5 x 10 ⁵ lb/inch
Water absorption:	0,15 % (5 days after curing)
Shrinkage on cure:	-
pH:	4,5
Specific Gravity:	1,2
Shore D Hardness:	35
Shipping and Storage:	Should be kept from intense light and elevated temperatures.
Shelf live:	12 months at room temperature(22°C)
Packing Size:	30 g (1 oz) and 500g (16 oz)



PRODUCT INFORMATION

LENS BOND TYPE SK-9

1. General Facts

LENS BOND Type SK-9 is a single component, modified Acrylate / Methacrylate Photopolymer. This low viscosity liquid polymer is easy to apply, particularly when thin cement films are required. It is quick to pre-cure as well. Type SK-9 cures by exposure to long-wave ultraviolet light (365 nm).

Its high wetting and low shrinkage combine to give a superior bond. **LENS BOND Type SK-9** practically eliminates air bubble problems due to its low viscosity.

LENS BOND Type SK-9 shows extremely high adhesion to many types of plastics which are usually problematic to be bond. **SK-9** can generally be used when bonding plastic / plastic materials, plastic / glass, plastic / metal, as well as substrates with low UV-transparency (40 – 60 %).

2. Curing Times

PRE-CURING

Room temperature 22°C (72°F)
using long-wave radiation of
15 watts (365 nm) approx. 25 mm
(1") above the element.

3 - 5 seconds

FULL CURING

Room temperature 22°C (72°F)
using long-wave radiation of
15 watts (365 nm) approx. 25 mm
(1") above the element.

1 hour

Please note: Some plastic materials transmit very little light at 365 nm; however, due to Type SK-9's sensitivity, it will cure, but times might be extended. Always test for cure speeds prior to production.



3. Technical Data

Viscosity:	80 cps to 100 cps
Refractive index:	1,49 at 25°C (full cured) 1,47 (uncured)
Operational Temperature Range:	-50°C to +100°C
Youngs Modul:	4 x 10 ⁵ lb/inch
Shrinkage on cure:	<0.25%
pH:	<3,8
Specific Gravity:	1,08
Shore D Hardness:	90
Shipping and Storage:	Should be kept from intense light and elevated temperatures.
Shelf live:	12 months at room temperature (22°C)
Packing Size:	30 g (1 oz) and 500g (16 oz)



INSTRUCTIONS FOR USE

LENS BOND TYPES VTC-2, J-91, P-92, SK-9

1. Preparation of Elements

Other than normal cleaning procedures, no special preparation is required. The best cleaning agent is chemically pure acetone.

2. Preparation of Cement

There is no mixing or measuring required for the above-mentioned LENS BOND types. They are ready to use. However, it is advantageous to have the elements placed on a white background during pre-cure and full-cure cycles. In case of using the LENS BOND type inside a centering unit, witness pieces should be tried to ascertain the repeatable pre-cure time. The user should always check with the glass or plastics manufacturer for the transmission characteristics at 365 nm of the materials that they wish to bond. Less than 85% transmission at this wavelength will lengthen the cure time.

3. Application and Curing

Squeeze a few drops of cements from the convenient dispenser onto the concave surface of the element, and place the convex surface there on. Press down firmly and gently until LENS BOND completely wets the matching surfaces. Then, with a slow rotary motion and light pressure, force air bubbles from between the lenses.

Excess cement can be removed with a cloth slightly moistened with alcohol or acetone.
(Excess solvent will remove cement from between the cemented components!)

After pre-curing with an ultraviolet light, holding devices may be removed and the components carefully cleaned. Before testing transmission and refractive index, however, the lenses must be fully cured.

Full-cure time is in addition to the pre-cure time. If there is any doubt about curing being achieved, allow components to cure for a longer period of time. The cement will not overcure.



4. Safety Instructions

Although LENS BOND cements are quite safe to use, some persons may be sensitive to the chemicals comprising the formulation. For them, the use of finger cots or gloves is recommended. Adequate ventilation should be provided.

ATTENTION:

If the bonded doublets will undergo test procedures, allow 48 – 78 hours between full-curing and testing; or wait 12 hours then subject the bonded elements to 70°C for one hour, and then another 12 hours at room temperature for best results. The latter is particularly recommended for LENS BOND Types VTC-2 and J-91.



PRODUCT INFORMATION

NOA-61

1. General Information

NOA-61 Norland Optical Adhesive 61 is a clear, colorless, liquid photopolymer that will cure when exposed to ultraviolet light. Since it is a one part system and 100% solids, it offers many advantages in bonding where the adhesive can be exposed to U.V. light. The use of NOA 61 eliminates premixing, drying or heat curing operations common to other adhesive systems.

NOA 61 meets Federal Specification MIL-A-3920 for optical adhesives and is approved for use on all government contracts specifying such adhesives. The adhesive is designed to give the best possible optical bond to glass surfaces, metals, fiberglass and glass filled plastics.

NOA 61 is recommended for bonding lenses, prisms and mirrors for military, aerospace and commercial optics as well as for terminating and splicing optical fibers. NOA 61 also has excellent clarity, low shrinkage and a slight flexibility that make it superior to other materials for optical bonding.

2. Curing Times

PRE-CURING

room temperature 22°C
using a long wave black light
UV-light source (350-380 nm, 100 Watt)
ca. 15 cm above the element

UV-Licht (350-380 nm, 15 Watt)
ca. 8 cm über den Elementen

ca. 10 seconds (1 mil, 100 Watt)
ca. 60 seconds (40 mil, 100 Watt)

ca. 60 seconds (1 mil, 15 Watt)
ca. 140 seconds (40 mil, 15 Watt)

FULL CURING

room temperature 22°C
using a long wave black light
UV-light source (350-380 nm, 100 Watt)
ca. 15 cm above the element

UV-Licht (350-380 nm, 15 Watt)
ca. 8 cm über den Elementen

5 minutes (1 mil, 100 Watt)
15 minutes (40 mil, 100 Watt)

20 minutes (1 mil, 15 Watt)
45 minutes (40 mil, 15 Watt)



3. Technical Data

Solids	100%
Viscosity at 25 °C	300 cps
Refractive Index of Cured Polymer	1.56
Elongation at Failure	38%
Modulus of Elasticity (psi)	150,000
Tensile Strength (psi)	3,000
Hardness - Shore D	85
Shipping and Storage:	is at least 4 months from the date of shipment if stored in a cool (5°C – 22°C), dark place in the original container
Packing Size:	30 g (1 oz)



PRODUCT INFORMATION

NOA-63

1. General Information

NOA-63 is a clear, colorless, liquid photopolymer that will cure when exposed to ultraviolet light. Since it is a one part system and 100% solids, it offers many advantages in bonding of optical elements where the bonding surface can be exposed to light. The use of NOA 63 eliminates premixing, drying or heat curing operations common to other optical adhesive systems. Curing time is remarkably fast, and is dependent upon the thickness applied and the amount of ultraviolet light energy available. It is recommended for the bonding of achromats, prisms and all other precision compound optics. The outstanding characteristics of the adhesive are its low fluorescence and its excellent transmission in the near UV range. After full cure, the adhesive has good transmission from 320 to 3,000 nanometers.

NOA 63 is cured by ultraviolet light with maximum absorption in the range of 350 to 380 nanometers. The NOA bond can be separated in chlorinated solvent such as methylene chloride. The bonded area must be soaked in the solvent and normally will separate overnight if only procured.

2. Curing Times

PRE-CURING

room temperature 22°C
using a long wave black light
UV-light source (350-380 nm, 100 Watt)
ca. 15 cm above the element

UV-Licht (350-380 nm, 15 Watt)
ca. 8 cm über den Elementen

ca. 15 seconds (1 mil, 100 Watt)
ca. 60 seconds (40 mil, 100 Watt)

ca. 60 seconds (1 mil, 15 Watt)
ca. 180 seconds (40 mil, 15 Watt)

FULL CURING

room temperature 22°C
using a long wave black light
UV-light source (350-380 nm, 100 Watt)
ca. 15 cm above the element

UV-Licht (350-380 nm, 15 Watt)
ca. 8 cm über den Elementen

5 minutes (1 mil, 100 Watt)
20 minutes (40 mil, 100 Watt)

20 minutes (1 mil, 15 Watt)
60 minutes (40 mil, 15 Watt)



3. Technical Data

Solids	100%
Viscosity at 25° C	2000 cps
Refractive Index of Cured Polymer	1.56
Elongation at Failure	6%
Modulus of Elasticity (psi)	240,000
Tensile Strength (psi)	5,000
Hardness - Shore D	90
Shipping and Storage:	is at least 6 months from the date of shipment if stored in a cool (5°C – 22°C), dark place in the original container
Packing Size:	30 g (1 oz)



PRODUCT INFORMATION

NOA-65

1. General Information

NOA-65 is a clear, colorless, liquid photopolymer that will cure when exposed to ultraviolet light. Since it is a one part system and 100% solids it offers many advantages in bonding of optical materials where the bonding surface can be exposed to light. The use of NOA 65 eliminates premixing drying, and heat curing operations common to other optical adhesive systems. Curing time is remarkably fast, and is dependent upon the thickness applied and the amount of ultraviolet light energy available. The cured adhesive is very flexible and was designed to minimize strain. NOA 65 is especially suitable where the adhesive cross section would be relatively thick. NOA 65 has enough elasticity to keep strain to a minimum even when dissimilar materials with different coefficients of expansion are bonded together. Typical applications would be potting of lenses in metal mounts, bonding plastic to glass and cold blocking.

NOA 65 is cured by ultraviolet light with a maximum absorption within the range of 350-380 nanometers. The polymer has minimum oxygen inhibition, and therefore any surfaces in contact with air will be non-tacky when fully cured.

2. Curing Times

PRE-CURING

room temperature 22°C
using a long wave black light
UV-light source (350-380 nm, 100 Watt)
ca. 15 cm above the element

UV-Licht (350-380 nm, 15 Watt)
ca. 8 cm über den Elementen

ca. 15 seconds (1-10 mil, 100 Watt)

ca. 60 seconds (1-10 mil, 15 Watt)

FULL CURING

room temperature 22°C
using a long wave black light
UV-light source (350-380 nm, 100 Watt)
ca. 15 cm above the element

UV-Licht (350-380 nm, 15 Watt)
ca. 8 cm über den Elementen

5 minutes (1-10 mil, 100 Watt)

20 minutes (1-10 mil, 15 Watt)



3. Technical Data

Solids	100%
Viscosity at 25° C	1200 cps
Refractive Index of Cured Polymer	1.524
Elongation at Failure	80%
Modulus of Elasticity (psi)	20,000
Tensile Strength (psi)	1,500
Hardness - Shore D	50
Temperature Range	-15 to 60° C
Shipping and Storage:	is at least 6 months from the date of shipment if stored in a cool (5°C – 22°C), dark place in the original container
Packing Size:	30 g (1 oz)



PRODUCT INFORMATION

LENS BOND TYPE EK – 93 General-purpose adhesive system with low shrinkage

1. Product Information

EK-93 is a non-toxic, 100% solids epoxy adhesive system. It does neither drop nor subside. It consists of two parts, Part “A” and “B”, mixed at a ratio of 50 : 50.

EK-93 bonds surfaces with either the same or different materials.

2. Technical Data

Viscosity:	> 25.000 cps
Refractive Index:	÷ opaque
Colour:	Part “A”: white Part “B”: black After mixing: slate-grey
Operational Temperature Range:	-20°C to +100°C
Water Absorption:	< 2% (7 days at 22°C)
Shrinking in Cure:	< 0,7%
pH:	3,2
Specific Gravity:	Part “A”: 1,3 Part “B”: 1,7 After mixing: 1,45 (1:1)
Shore D Hardness:	> 95
Shipping and Storage:	Should be kept from intense light and elevated temperatures.
Shelf Life:	18 months from date of manufacture
Packing Size:	114 g (4 oz) and 500 g (16 oz.)

3. Application

Mix Part “A” and Part “B” at approx. the same ratio. Differences up to 20% will not diminish adhesion. If required, a mix of 1 Part “A” and 2 Parts “B” can be made in order to increase flexibility.

Pot life of mixture	50 : 50:	approx. 90 minutes at 21°C (70°F) (processing)
Curing time at ratio	50 : 50:	approx. 8 hours at 21°C (70°F)

4. Please note

The use of oven or infrared lights will speed up curing times.



PRODUCT INFORMATION

TEBOLIT 2 - K ADHESIVE

1. Product discription

TEBOLIT 2-K is a 2-component epoxy adhesive, and is used primarily as a temporary adhesive or protective lacquer.

2. Application

TEBOLIT 2-K is used in:

- Polishing of lenses and prisms
- Glass and Ceramic Processing
- Protective varnish for glass processing
- Cutting and dicing in the semiconductor industry

3. Curing

Mixing ratio by weight of resin to hardener 2: 1
Processing time: 10 minutes
Initial strength after 4 h at 25 ° C
Fully cured after 24 hours at 25 ° C

4. Separating and remove

TEBOLIT 2-K is removed by placing the part in hot water. The minimum temperature is 80 ° C. At 90 ° C, the separation takes place within seconds.
The fixing adhesive is thereby removed without residues and can be removed as a film from the bath. The separation can also be performed at 140 ° C in a temperature cabinet.

5. Properties

liquid state	
Type	2-component epoxy
Color	Yellow
Odor	Typical
Viscosity	20 - 30 Pa.s
Density at +25°C	1,1 g/cm ³
Hardened condition	
Hardness	55 - 60 Shore D



6. Storage

TEBOLIT 2-K is separately stored in airtight original receptacles at $\leq + 25^{\circ} \text{C}$ in the dark until the expiration date.

7. PACKING

- 40 g double cartridge



PRODUCT INFORMATION

TEBOLIT UV-2 Adhesive

1. Product description

TEBOLIT UV-2 is a 1-component UV curable adhesive. **TEBOLIT UV-2** is used as a temporary adhesive or protective lacquer.

2. Application

TEBOLIT UV-2 can be used for:

- Polishing of lenses and prisms
- Glass and Ceramic Processing
- Protective varnish for glass processing
- Cutting and dicing in the semiconductor industry

3. Curing

A 0.5 mm thick layer can be cured within a short time with a 200 watt mercury vapor lamp or UV lamp.

4. Separating and removal

TEBOLIT UV-2 is removed by placing the part in hot water. The minimum temperature is 80 ° C. At 90 ° C, the separation takes place within seconds. **TEBOLIT UV-2** is thereby removed without residues and can be removed as a film from the bath. The separation can also be done at 140 ° C in a temperature cabinet.

5. Properties

Liquid state	
Type	1-component UV epoxy resin mixture
Color	Beige
Odor	Typical
Viscosity	35 – 40 Pa.s
Density at +25°C	1,2 g/cm ³

Hardened Condition	
Hardness	80 Shore A



6. Storage

TEBOLIT UV-2 is separately stored in airtight original containers at $\leq + 25\text{ }^{\circ}\text{C}$ in the dark until the expiration date.

7. Packing

- 50 g cartridge



PRODUCT INFORMATION

TEBOLIT TEBOLIT DEBLOCKER

1. PRODUCT DESCRIPTION

TEBOLIT is a UV- or light-curing one-component fixing adhesive for applications in precision optics processing. **TEBOLIT** is capable to glue glass to glass or metals and ceramics, and provides a mechanically stable composite during processing. After machining operations such as cutting, grinding or polishing, the separation (deblocking) is accomplished by an water based surfactant containing solution.

TEBOLIT is environmentally friendly, using only water as the separation medium and ideal for substituting blocking pitches.

TEBOLIT is suitable for bonding of optical components made of glass and quartz with each other as well as from various metals and ceramics for the purpose of subsequent processing by cutting, grinding and polishing and in particular also for the ultrasonic cutting.

Outstanding features:

- Fast UV curing at room temperature
- wet stable during processing
- environmentally friendly by using water separation
- crystal clear

2. Surface treatment

The surfaces should be dry, free of dust and other contaminations. For the surface cleaning alcohol, acetone, ethyl acetate or other cleaners used in optics are recommended.

3. Processing

The processing of **TEBOLIT** can be performed by manual or automatic dispenser contract and by other usual methods.

The adhesive must be thoroughly mixed by shaking before use.



4. Curing

Curing is accomplished by UV irradiation with a period of 10 to 50 seconds depending on the radiation intensity.

5. Technical Data

Chemical Type	Modified acrylic
Color	slightly yellow, transparent
Density DIN EN 542	1.18 g / cm ³
Solids	100 %
Viscosity	20 mPas
Heat resistance	Up to 80°C

6. Processing and Separation

The processing of the fixed optical components can be done in the usual manner. To separate the component carrier composites may be lodged in a 3% water-based solution of TEBOLIT DEBLOCKER. The separation times depend on bond surface and solution temperature. For a surface of 6 cm² following typical separation times are:

at 80°C - 1 h

at 30 °C - 10 h

Then the parts have to be thoroughly cleaned with deionized water and after that handled in the usual way. The dissolved adhesive layers can be easily separated by filtration of the water-based solution.

7. Packing

- 25 ml dropper bottle
- 50 ml dropper bottle
- 100 ml dropper bottle

8. Storage

The product can be stored in unopened by room temperature for 6 months.



9. Health and safety

TEBOLIT irritating to eyes and skin. Sensitization by skin contact. After contact with skin, wash immediately with plenty of water and mild detergent. After correct curing of the chemical conversion of the reactive groups is complete. Any contact is not dangerous in this condition.

When working with **TEBOLIT DEBLOCKER** protective gloves are to be worn. Any skin contact should be avoided. After contact with skin, wash immediately with plenty of water and mild detergent.



PRODUCT INFORMATION

NOA-107

1. General Information

NOA 107 is a single component, UV curing adhesive used for temporary bonding of lenses to metal polishing mounts or where bonded components need to be easily separated in the future. The adhesive cures in minutes at room temperature by exposure to longwave UV light and eliminates the heat induced strain typical of the old fashioned hot pitch blocking methods. **NOA 107** is specifically formulated to provide low shrinkage and low strain to further minimize any potential strain on the lens during the blocking process. Debonding is accomplished by soaking parts in a soapy warm water solution or acetone.

The adhesive cures only by exposure to UV light in the range of 350 to 380 nanometer.

Lenses typically separate after soaking in acetone for 10 to 60 minutes. Debonding time is a function of surface area. Plano surfaces will require more time than surfaces with only slight edge contact. Lenses may also be debonded just by heating between 80 and 100° C. After separation, the components and tools are cleaned in the detergent/water.

2. Curing Times

PRE-CURING

room temperature 22°C

using a long wave black light

UV-light source (350-380 nm, 100 Watt)

ca. 15 cm above the element

UV-Licht (350-380 nm, 15 Watt)

ca. 8 cm über den Elementen

ca. 15 seconds (1-10 mil, 100 Watt)

ca. 60 seconds (1-10 mil, 15 Watt)

FULL CURING

room temperature 22°C

using a long wave black light

UV-light source (350-380 nm, 100 Watt)

ca. 15 cm above the element

UV-Licht (350-380 nm, 15 Watt)

ca. 8 cm über den Elementen

5 minutes (1-10 mil, 100 Watt)

20 minutes (1-10 mil, 15 Watt)



3. Technical Data

Solids :	100%
Viscosity at 25° C:	350cps
Refractive Index of Cured Polymer:	1.51
Elongation at Failure:	5%
Modulus (psi):	800
Tensile Strength (psi):	78
Hardness - Shore D:	15
Shipping and Storage:	Should be kept from intense light and elevated temperatures.
Shelf live:	at least 6 months from the date of shipment, if stored in a cool (5-22°C), dark place in original container.
Packing Size:	30 g (1 oz)



PRODUCT INFORMATION

NOA-108

1. General Information

NOA 108 is a single component, UV curing adhesive used for temporary bonding of lenses to metal polishing mounts or where bonded components need to be easily separated in the future. The adhesive cures in minutes at room temperature by exposure to longwave UV light and eliminates the heat induced strain typical of the old fashioned hot pitch blocking methods.

NOA 108 is specifically formulated to provide low shrinkage and low strain to further minimize any potential strain on the lens during the blocking process. Debonding is accomplished by soaking parts in a soapy warm water solution or acetone.

The adhesive cures only by exposure to UV light in the range of 350 to 380 nanometer.

Lenses typically separate after soaking in acetone for 10 to 60 minutes. Debonding time is a function of surface area. Plano surfaces will require more time than surfaces with only slight edge contact. Lenses may also be debonded just by heating between 80 and 100° C. After separation, the components and tools are cleaned in the detergent/water.

Lenses may also be debonded just by heating between 80 and 100° C. After separation, the components and tools are cleaned in the detergent/water solution.

2. Curing Times

PRE-CURING

room temperature 22°C

using a long wave black light

UV-light source (350-380 nm, 100 Watt)

ca. 15 cm above the element

UV-Licht (350-380 nm, 15 Watt)

ca. 8 cm über den Elementen

ca. 15 seconds (1-10 mil, 100 Watt)

ca. 60 seconds (1-10 mil, 15 Watt)

FULL CURING

room temperature 22°C

using a long wave black light

UV-light source (350-380 nm, 100 Watt)

ca. 15 cm above the element

UV-Licht (350-380 nm, 15 Watt)

ca. 8 cm über den Elementen

5 minutes (1-10 mil, 100 Watt)

20 minutes (1-10 mil, 15 Watt)



3. Technical Data

Solids :	100%
Viscosity at 25° C:	550cps
Refractive Index of Cured Polymer:	1.51
Elongation at Failure:	18%
Modulus (psi):	710
Tensile Strength (psi):	101
Hardness - Shore D:	25
Shipping and Storage:	Should be kept from intense light and elevated temperatures.
Shelf live:	at least 6 months from the date of shipment, if stored in a cool (5-22°C), dark place in original container.
Packing Size:	30 g (1oz.)



TROUBLE SHOOTING

LENS BOND

1. CURING TIME NOT ACCORDING TO SUPPLIER'S INSTRUCTIONS

The most common problem reported to us is failure of the cement to cure within the specified time. This problem always has been caused by one of the following factors:

A. WRONG CATALYST / CEMENT RATIO

The instructions are misread or misapplied concerning the proper catalyst : cement ratio. Follow carefully the instructions under "Preparation of cement".

B. IMPROPER MIXING OF CATALYST AND CEMENT

Due to the high viscosity of the cement, casual mixing is not sufficient. Follow instructions for preparation.

C. CURING TEMPERATURE TOO LOW

The specified cure times refer to a room temperature of 22°C (72°F) and an oven temperature of 71°C (160°F). Also a drop of 1°C (5°F) within the oven is not too critical, such drop at room temperature can result in the cure taking from 50% to 100% longer.

D. OVERLOADING THE OVEN

Unless the oven has ample forced-air circulation, a large number of trays, doublets and elements etc. will lower the oven temperature for a surprisingly long time.

E. LARGE ELEMENTS

Cure speeds noted on instructions were achieved with lenses approximately 19 mm (¾ inches) to 25 mm (1 inch) diameter. When bonding elements of larger diameters, extra time must be given to allow heat to reach inner bonded surfaces.



2. RETICULATION NEAR OUTSIDE EDGE AFTER CURING

If the chamfer has ample Cement remaining in it after curing, reticulation is likely caused by microscopic air bubbles entrained while mixing the catalyst. There are four possible solutions:

- A. Mix catalyst and cement more carefully to avoid entrainment of air, or de-gas the cement after mixing (25" mercury vacuum for about one minute).
- B. Allow the cemented doublet to remain at room temperature for one to two hours, making sure the cement interface is in a concave-upward position. After this period place in oven to complete cure.
- C. When working with elements that do not have a chamfer, the technician should not remove excess cement from outer perimeter before full curing. When LENS BOND cures it contracts and then need this excess cement to draw in between the elements.
- D. Mismatched surfaces:
Because of LENS BOND's contraction factor, it is not a good filler. (Surfaces of the elements to be bonded should match with at least 4 or 5 rings.)

3. STRESS CRACKING, SEPARATION – LACK OF BOND STRENGTH AFTER CURING

When a cylinder is cemented within a cylinder (for example, a metallic or glass sleeve cemented around a lens), it is not unusual for the bond to break on curing. As LENS BOND cures it contracts slightly. This contraction causes an evenly distributed inward pull on the outer cylinder. The cylinder will not accommodate the contraction and the bond separates. To prevent this separation, one of the following steps can be taken:

- A. Reduce to a minimum the tolerance between the two members. Although the percentage of contraction of the cement remains the same, the overall physical change in thickness of the cement layer will be extremely small.
- B. Design the outer cylinder with a slit. This slit will allow the cylinder to accommodate the contraction and will close as the cure is achieved.
- C. Use **LENS BOND Type RD3-74**. This cement stays slightly elastic after curing.

Thin lenses and lenses with extremely short radii are susceptible to stress cracking, separation and distortion. This problem can be eliminated by using **LENS BOND Type RD3-74**.



4. **SEPARATION OF LENSES CAN OCCUR BECAUSE OF THE FOLLOWING FACTORS:**

A. Improper cleaning:

If denatured alcohol is used as final cleaner, care should be taken that the denaturants are not oily and will completely evaporate. We emphasize that acetone is the best final cleaner.

B. Clean lenses should be placed on dry towels or unprinted paper. Ink from newsprint will interfere with LENS BOND's adhesion properties.

C. Improper cement layer:

With normal pressure and correct procedure for working air bubbles out, layer thickness is usually about 0.001 to 0.0001" (= 0.025 – 0.0025 mm). Excessive pressure will force out too much cement, causing separation, reticulation, or low resistance to thermal shock.



SAFETY INSTRUCTIONS

LENS BOND ACCORDING TO O.S.H.A.

Manufacturer:	Summers Optical Fort Washington P.A. 19034
Trade name:	LENS BOND Optical Cements
Chemical group:	Polyester resin styrene
Appearance:	clear, straw-, burgundy- or blue-coloured liquid, sweet smell
Specific gravity:	1.22
Boiling point:	122°F resp. 50°C
Firefighting:	extinguishing foam, CO ₂ , dry powder
Please note:	At higher temperatures as in case of fire, polymerisation can occur. If the polymerisation process happened in a lid vessel, this container might break into pieces.
Resistance:	stable
Storage:	Keep away from open flames.
Incompatibility:	acids, etchants, oxidizers
Polymerisation:	can occur at high temperatures and when contacting metallic salts
Important when handling leaking and treading out materials:	<ul style="list-style-type: none">- Avoid open flames, heat or handling with acids near the tread material.- Soak with absorbing materials, use separate container for storing.- Mop up with water and soap.- Use appropriate safety equipment.
Insignificant leakage:	Mop up with a cloth moistened with acetone. Afterwards, clean carefully using soap and water.
Major defects:	Soak with appropriate means as recommended above.
Waste treatment:	According to the municipal respective legal regulations.
Swallowing with food:	LD ₅₀ = 5.000 mg/kg Limit for a person of ca. 72.7 kg weight is approx. 0.47 l.

Date: 07/2016

This product information is not a specification. It is offered in good faith only as a general description of the product. All information is given without warranty or guarantee, and it is expressly understood and agreed that you assume, and hereby expressly release us from, all liability, in tort, contract or otherwise, incurred in connection with the use of this guide. Subject to alteration.



Eye contact:	Generally, it does not do any harm, sometimes slightly harmful to cornea.
Skin contact:	Generally not harmful, slight irritation possible when contacting material frequently or for longer periods of time.
Absorption by skin:	Exceeding toxic limit is not probable.
Inhaling:	TLV 100 ppm (1972)
Problems which might occur when being exposed to for a longer period of time:	Unpleasant smell, irritated eyes or nose, vertigo, in extreme case unconsciousness
First aid:	Immediately wash with plenty of water (skin contact).
First aid (eyes):	Medical treatment.
First aid (inhaling):	Fresh air, keep warm and still; request urgent medical treatment; Start artificial respiration immediately in case of apnoea.
First aid when absorption with food:	There is no special antidote known. Symptomatic treatment. vomiting should only be induced by a doctor. The product contains petroleum-based solvent. Whether rinsing of stomach is required, depends on toxicity of product. Use special hose for rinsing stomach.
Ventilation:	Adequate ventilation should be provided when using adhesives.
Respiratory Protection:	Up to 100 ppm not required. When exceeding 100 ppm, use oxygen breathing apparatus.
Eye protection:	Protective glasses for handling chemical products.
Protective clothing:	Clean protective clothes covering entire body, gloves made of Neopren or non-soluble materials.
Regulations for handling:	Handle materials carefully and properly. Avoid contacts with eyes, skin and inhaling of vapour.



SAFETY INSTRUCTIONS

CATALYSER FOR LENS BOND OPTICAL CEMENTS F-65 AND M-62 ACCORDING TO O.S.H.A.

Manufacturer:	SUMMERS OPTICAL, Fort Washington P.A. 190341
Trade name:	Catalyser for LENS BOND Optical Cement Types F-65 and M-62 (Methyl Ethyl Ketone Superoxide) C.A.S.
Chemical group:	Organic superoxide
Appearance:	Clear, oily liquid, Ketone smell
Specific gravity:	1.0840
Boiling point:	137°F resp. 58°C
Firefighting:	Use water or aerosol, drying agent, foam. Evacuate people from area and fight fire from safe distance. Keep area cool by means of water.
Resistance:	unstable
Storage:	Keep away from open flame, spark and inflammable materials.
Hazardous decomposition:	Decomposed products are inflammable!
Please note when handling leaking or treading out materials:	Use suitable protection clothes and eye-protection glasses or face protective shield.
Minor leakage:	Use sand for absorbing, then sweep up or remove with nonarcing tools.
Major defects:	Evacuate people from area and follow the procedures stated above.
Waste treatment:	Refer to data sheet Ketone-Superoxides.



FIRST AID

Swallowing with food:

LD₅₀ = 33 mg/l (rats) 4 hours.
Limit for a person of ca. 72.7 kg weight is approx. 0.47 l.
DO NOT INDUCE VOMITING!
Call doctor.

Eye contact:

Flush with plenty of water for about 15 minutes.
Call for medical treatment.

Skin contact:

Wash with water and soap. Call for medical treatment.

Inhaling:

TLV = 0.2 ppm.
Remove the person affected from the danger area and provide fresh air. Call for medical treatment. In case of stopped breathing start artificial respiration immediately.



SAFETY INSTRUCTIONS

CATALYSER FOR LENS BOND OPTICAL CEMENTS Type C-59 according to O.S.H.A.

Manufacturer:	SUMMERS OPTICAL, Fort Washington, P.A. 19034
Trade name:	CATALYSER for LENS BOND CEMENT Type C-59 (Tertiary-Butyl Perbenzoate) C.A.S.
Chemical group:	Organic superoxide
Appearance:	light-yellow or yellow liquid smelling mild and aromatic
Specific gravity:	1.038
Flash point:	200°F = 93°C
Fire-fighting:	Water, foam or drying agent
NOTE: (similar to oil fire)	Evacuate people from area, then fight fire from safe distance,
Resistance:	unstable
Storage:	Keep from inflammable materials. Store at temperatures below 100°F to maintain active oxygen ratio. Do not exceed 50°F to prevent catalyser from freezing.
Hazardous polymerisation:	Does not occur.
NOTE when handling spilled or leaking material:	Use suitable protective clothes, goggles or face-protective shield
Minor leakage:	Absorb with non-flammable material like Vermiculite or Perlite. Sweep up by using non-arcng tools.
Waste treatment:	Ignite the waste material in a flat, fire-resistant container from a safe distance by using an approx. 2 m-long torch.



FIRST AID

- Eye contact:** Flush with plenty of water for about 15 minutes.
Call doctor for medical treatment.
- Skin contact:** Wash with water and soap.
- Inhaling:** Provide fresh air for people involved. Call for doctor.



PRODUCT INFORMATION

COOLANT CONCENTRATE TC-13 RS

1. Product Description

This product is a fully synthetic, water-soluble cutting fluid concentrate. **TC-13 RS** additionally contains a corrosion inhibitor to prevent the corrosion of the tools. It is primarily used as a cooling lubricant concentrate for processing with plastic-bonded diamond pellets and CBN grinding tools.

2. Recommendd concentration

The ideal concentration of the aqueous suspension is about 1 – 2 %. If need be, it is possible to increase the concentration. However, it should not exceed 5 %.

3. Technical Data

Refractometer factor:	2.8
Color:	colourless to yellowish liquid
Boiling point:	about 100 ° C
Solidification point:	<-10 ° C
Density at 20 ° C:	1.05 to 1.11 g / cm ³
pH-value (1% solution):	approx. 10-12
Storage time:	max. 24 months

4. Properties

- water soluble
- transparent to yellowish solution
- mild odor
- conditional compatibility with defoamers and oily liquids
- avoid copper containing alloys in the coolant supply (plastic or stainless steel)

5. Packing

- 5 liter canister
- 10 liter canister
- 25 liter canister



PRODUKTINFORMATION

KÜHLSCHMIERKONZENTRAT TC - 950

1. GENERAL FACTS

Synthetic, water-based cooling lubricants are increasingly displacing the traditional mineral oil-based cooling lubricants in glass and metalworking. Synthetic coolants are free of oils and have a particularly good bacterial resistance, which significantly minimizes the after-additive with biocides. The significantly improved service life of these coolants significantly reduces the waste volume and thus the disposal costs.

The **TC-950** is a synthetic coolant concentrate developed for general grinding, high speed grinding, CNC machining as well as drilling and sawing of technical glass and metals. It is suitable for use in individual machines as well as in central systems. The excellent wetting properties and the exceptional good flow behavior of the removed material lead to a lower carry-out of the cooling lubricant, which significantly extends the service life.

TC-950 is water soluble, diethanolamine, phenol and nitrite free. It contains no mineral oil. According to the present Wastewater Technical Report, **TC-950** may, with the approval of the drained into the sewer system by the local water authority.

2. BENEFITS OF USING TC-950

- long life time
- better drainage behavior of the removed material
- better material removal rate
- increased feed
- ideal protection against microbial growth
- low-foaming work
- reliable corrosion protection

3. RECOMMENDED CONCENTRATION

- | | |
|--------------------------------|------|
| • edge processing: | 2% |
| • sawing, drilling, bevelling: | 2-3% |
| • high-speed grinding: | 3% |
| • CNC machining: | 3% |



4. TECHNICAL DATA

Density at 20 ° C according to DIN 51757:	1.163 - 1.166 g / ml
Refractive index at 20 ° C according to DIN 51433:	1.370 - 1.380
pH (3%) according to DIN 51369:	8.8 - 9.0
Odor:	neutral
Color:	slightly reddish

5. PACKAGING

5 kg plastic can
25 kg Canister
120 kg plastic drum

6. STORAGE

When stored in well-sealed packing drums and at temperatures of 5 – 40 °C,
TC - 950 can be kept for a minimum period of 2 years.



PRODUCT INFORMATION

COOLANT TC –910

1. General Facts

Synthetic cooling concentrate at standard quality for structural, safety, flat and mirror glass, mainly for edge and mirror bevel polishing.

TC –910 is water-soluble, free of mineral oils, diethanolamin and nitrites. It can be disposed in accordance with the regulations of the water authorities.

2. Recommended Concentration

- Edge polishing: 1 – 2%
- Bevel polishing: 3 – 4%

3. Technical Data

Specific gravity at 15°C:	1.047
Foam test / concentration 2%:	less foam
Rust-proofing test DIN 51360/2 2%:	2
pH (1:10):	8.9
Colour ASTM:	0.5
Odour:	neutral
COD 1%:	2.650 mg O ₂ /l
COD 2%:	4.750 mg O ₂ /l

4. Packaging

- 200 l one-way container
- 25 kg PE canister



PRODUCT INFORMATION

EVERFLO – SUSPENSION

Product Description

EVERFLO is particularly designed to provide buoyancy of particles in abrasive and polishing compounds, and prevent them from settling.

By adding EVERFLO the suspension does not run off the spindle, which results in shorter processing times. EVERFLO does not dry out. At any time machines can be easily cleaned by using a wet sponge.

EVERFLO is not toxic.

EVERFLO is not corrosive.

EVERFLO even provides buoyancy for heavier particles.

EVERFLO bound abrasive and polishing compounds adhere to the spindle at high speed.

EVERFLO can be used for application by means of brush or in circulating systems.

Application

The following start-up concentration is recommended:

- | | | | |
|----|---------------------|-----------------|--------|
| a) | circulating system: | finish-grinding | 1 : 10 |
| | | polishing: | 1 : 20 |
| b) | using brush: | grinding: | 1 : 5 |
| | | polishing: | 1 : 10 |

The optimal ratio should be found at individual processing.

Packaging

- 1-gallon plastic bottle
- 4-gallons / cardboard box



PRODUCT INFORMATION

DEFOAMER PB-4

Product Description

DEFOAMER PB-4 has been designed from our well-tried defoamer PB-3. This product is particularly suitable for defoaming coolants as well as polishing compounds based on cerium oxide.

By adding **DEFOAMER PB-4** foaming can be reduced considerably or even prevented.

Technical Data

Characterization:	alkyl polyalcylen glycol ether and fatty alcohol
Consistence:	liquid, slight smell
Colour:	light yellow
pH:	4.5
Emulsifiable:	with water

Application

DEFOAMER PB-4 is mainly applied for coolants and cerium-oxide based polishing compounds in circulating and individual systems.

Properties

DEFOAMER PB-4 avoids or reduces foaming of coolants and polishing suspensions.

Recommended Concentration

To start with: 50 – 100 ml/m³

Please add **DEFOAMER PB-4** into the circulation system, then allow the defoaming agent to distribute in order to achieve the defoaming effect. In case the defoaming process does not start after 5 minutes, as desired, please add another approx. 50 ml/m³.



Standard Values recommended

Dosage: approx. 20 – 50 ppm (1-2 teaspoons) to 100 l for polishing suspensions
approx. 50 – 100 ppm (2-4 teaspoons) to 1 m³ for coolants

Time for spreading: approx. 5 minutes

The optimal values should be found at individual processing.

Please note

The local water authorities allocated **DEFOAMER PB-4** Group 2, i.e. according to the Hazardous Goods Regulations it is not subject to special labelling.

Packaging

1-l PE-bottles



PRODUCT INFORMATION

PROTECTIVE LACQUER ILLMAR P4 transparent ILLMAR P4 black

1. Product Description

ILLMAR P4 is a liquid to medium-liquid artificial resin lacquer being used at optical applications for the protection of edges, available in **transparent and black**. **ILLMAR P4 transparent and black** contain the solvent Butylacetate.

2. Application

Protective varnish for polished or matt surfaces to be protected from mechanical and chemical affects as well as for protecting edges.

ILLMAR P4 black is particularly suitable for examining surfaces for impurities and accuracy.

It can also be used for glass susceptible to acids and weather conditions.

The varnish is applied by painting, spraying or dipping. It can only be diluted with the solvent acetone (see below).

3. Technical Data

Flowtime:	14 – 16 sec. / 20°C / 4 mm nozzle
Drying time:	max. 3 hours
Resistance to water:	good
Resistance to petroleum:	resistant
Curing time:	at least 12 hours
Solubility:	acetone

4. Please note

Above named varnish contains 60% flammable solvent. It should be applied providing adequate ventilation.

5. Delivery Units

1 l tin
5 l canister



PRODUCT INFORMATION

PROTECTIVE LACQUER Optiklack 9 spezial SO2 transparent / black

1. Product Description

Optiklack 9 spezial SO2 is an artificial resin lacquer with butylacetate used as solvent. A special artificial resin additive provides a high elasticity.

2. Application

This lacquer is used to provide protection and adhesion for the optical production. Due to its excellent adhesion elements contacted can be protected from water to remove them.

Furthermore, this lacquer can be used for polished or matt surfaces to protect them from chemical and mechanical affects.

Optiklack 9 spezial SO2 is applied by painting, spraying or dipping. This lacquer must only be diluted by using butylacetate.

3. Technical Data

Flowtime:	16– 20 sec. / 20°C / 4 mm nozzle
Drying time:	max. 3 hours
Resistance to water:	after 3 hours no change of lacquer film
Resistance to petroleum:	resistant
Curing time:	at least 12 hours
Solubility:	acetone

4. Please note

Above named varnish contains 55% flammable solvent.

5. Delivery Units

1 l tin
5 l canister
400 ml Spray can



PRODUCT INFORMATION

PROTECTIVE LACQUER M-LACK 10 transparent / black

1. Product Description

M-LACK 10 is a protective varnish containing spiritus as solvent. It is available in transparent and black.

2. Application

M-LACK 10 is used as protection when polished surfaces are being exposed mechanical processing. Furthermore, **M-LACK 10** can be used to prevent plaster tool, which is used in the optical production, from soaking water.

The varnish can be applied by painting, spraying or dipping. It can be thinned by spiritus.

3. Technical Data

Flowtime:	23 – 29 sec. / 20°C / 4 mm nozzle
Drying time:	max. 3 hours
Resistance to water:	after 3 hours no change of lacquer film
Curing time:	at least 12 hours
Solubility:	acetone, spiritus

4. Please note

Above named varnish contains 60% flammable solvent.

5. Delivery Units

- 1- 1 tin
- 5- 1 canister



PRODUCT INFORMATION

PROTECTIVE LACQUER PBJ 2002, transparent / black

1. Product Description

Special protective lacquer based on artificial resins and organic solvents. Due to its high quantity of solvents this lacquer is inflammable. PBJ 2002 is available in transparent and black. Dye free of any pigments is used for colouring the varnish.

2. Application

PROTECTIVE VARNISH PBJ 2002 is used for polished and matt surfaces. It stands out for its short drying time. It is dust-dry after 0.5 hours and fully cured after 1 – 2 hours. This varnish dries at room temperature.

Furthermore, this varnish can be used for lacquering small plano-optical components. Due to its short drying times it can be applied like a liquid blocking pitch.

When using this varnish please note that the surfaces to be treated must be clean, dry and without any fat. The varnish can be applied by painting, spraying or dipping.

3. Technical Data

Flowtime:	18 - 22 sec. / 20°C / 4 mm nozzle
Drying time:	max. 2 hours
Resistance to water:	good
Solubility:	acetone, spiritus, ethylacetate

4. Please note

Store in carefully sealed containers at room temperature. Do not expose direct sun. Provide adequate ventilation when handling this lacquer.

5. Delivery Units

1-l can
5-l canister



PRODUCT INFORMATION

OPTICAL LACQUER TLS blue / 2002

1. Product Description

OPTICAL VARNISH TLS blue / 2002 is based on artificial resins and organic solvents. As this lacquer contains a high quantity of solvent, it is flammable. Due to the use of a special plastic material the varnish film is transparent. Otherwise, it provides sufficient contrast to discover surface failures immediately.

2. Application

OPTICAL VARNISH TLS blue / 2002 is used for polishing plano-optical parts, particularly for contacting procedures. This varnish has a comparatively low drying time (dust-dry after approx. ½ hour, further processing possible after approx. 2 – 3 hours). It dries at room temperature.

When applying the varnish the surfaces to be treated must be clean, dry and free of any fat. The varnish can be applied by dipping or by means of brush.

3. Technical Data

Flowtime:	18 - 22 sec. / 20°C / 4 mm nozzle
Drying time:	max. 3 hours
Resistance to water:	good
Solubility:	acetone, spiritus, butylacetate

4. Please note

Store the varnish in sealed containers at room temperature.
Keep from direct sun radiation.
Provide for adequate ventilation.

5. Delivery Units

1-l can
5-l canister



PRODUCT INFORMATION

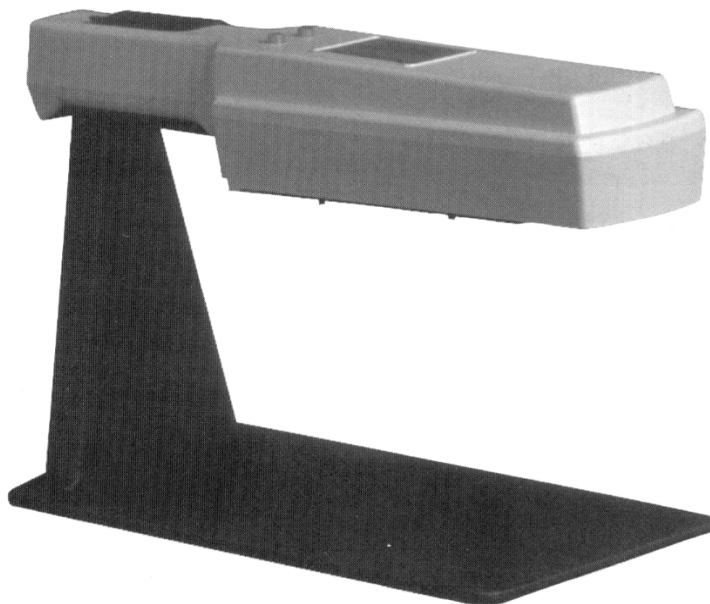
UV – LAMPS Types UVL 56, UVL 21

General Information

Our UV-lamps **UVL 56** and **UVL 21** are particularly used for pre-curing and full-curing UV-cements and adhesives, for small units and low quantities.

Type UVL 56

This 6-watt lamp can be used for curing lower quantities of components both as hand-held lamp or fixed by the stand, completing this device.



Technical Data

UV-wavelength:	365 nm
Power:	6 watts
Intensity:	750 microwatts / cm ² at 150 mm
Dimensions lamp:	approx. 350 mm x 90 mm x 70 mm
Dimensions stand:	approx. 320 mm x 150 mm

Delivery Units

Package contains

- hand-held lamp
- stand

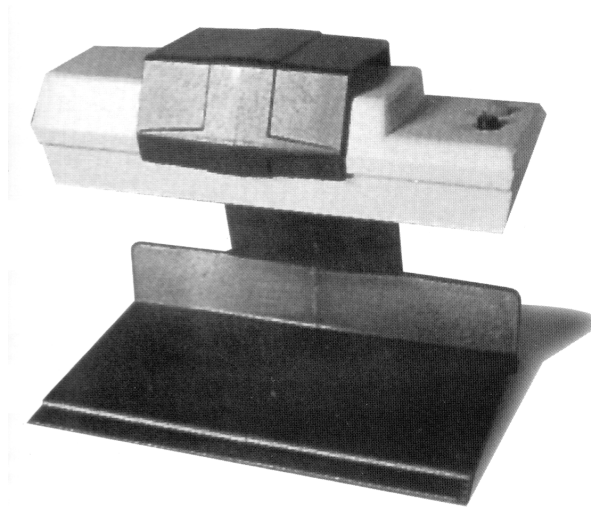
Date: 07/2016

This product information is not a specification. It is offered in good faith only as a general description of the product. All information is given without warranty or guarantee, and it is expressly understood and agreed that you assume, and hereby expressly release us from, all liability, in tort, contract or otherwise, incurred in connection with the use of this guide. Subject to alteration.



Type UVL 21

This ultraviolet lamp with a length of approximately 20 cm is suitable for small unit full-curing.



Technical Data

UV-wavelength:	365 nm
Intensity:	420 microwatts at 150 mm
Dimensions lamp:	approx. 200 mm x 70 mm x 50 mm
Dimensions stand:	approx. 190 mm x 120 mm

Delivery Units

- hand-held lamp
- stand



PRODUCT INFORMATION

LENS COATING HARDNESS TESTER KIT

1. General Information

This **TESTER KIT** is used for testing hardness and resistance of optical coatings in accordance with the standards MIL-C-00675, MIL-M-13508 and MIL-F-48616. The eraser inserts provided with the set are certified to conform to MIL-E-12397.



The kit contains two instruments, a brass instrument for testing severe abrasion resistance (contains a 1.13 kp / 2.5 lb spring) and a second aluminium instrument for testing moderate abrasion resistance (contains a 0.57 kp / 1.25 lb spring).

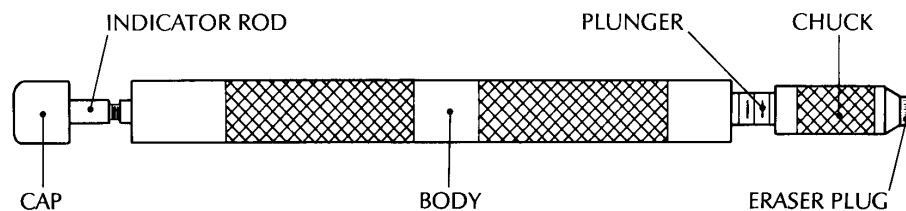
The kit also contains 2 additional rubber inserts, 2 sq. yards of cheesecloth meeting MIL-CCC-C-440, and a roll of tape meeting MIL-A-A113 Rev. C.

All pertinent certificates of conformance are included in the convenient carrying case.



2. Handling Instructions

Press down on the the body of the tester until the red indicator rod appears (red line). Rub the coated surface of the lens with strokes of about 2.5 cm /1 inch (shorter for small lenses) for 20 complete strokes. All strokes should be made on one path. Clean the lens with acetone and inspect for deterioration of the coating. When testing extremely curved lens surfaces, the test instrument must be held perpendicularly.



3. Care of the Tester Instrument

The eraser is pressure fitted in the tester. Before inserting a new eraser, remove the chuck and clean the chuck and plunger threads thoroughly.

Caution:

Do not push plunger without chuck in place, since this will change the spring tolerance.

Water may be used as a lubricant for the new plug.

As the eraser wears, more can be exposed by holding the cap at the end of the indicating rod and turning the chuck.

The tester is lubricated during assembly. If slight binding occurs after long use, a small amount of any good lubricant should be applied to the indicating rod and plunger.

If the tester is used frequently, it should be returned to us for recalibration after a year or so. With normal care, and occasional spring replacement, the hardness tester will last infinitely.



PRODUCT INFORMATION

ACCESSORIES

1. Beaumé spindles and graduated Cylinders

Required when aqueous suspensions are used for lapping and polishing glass. Measuring the concentration of the suspension several times a day can considerably reduce the quantity of abrasives and polishing agents which are required.

Available in the following ranges:

Range:	1000 – 1060,	160 mm length	}	Scale 1 g
	1060 – 1120,	160 mm length		
	1000 – 1100,	250 mm length	}	Scale 2 g
	1100 – 1200,	250 mm length		

Graduated cylinder for beaumé spindles: 250 mm

Packaging: 1 beaumé spindle with cylinder

2. Optic Hammer Conocal

Made of beach wood, it is used for departing cemented optical parts. An indispensable aid to be used in each kind of optical production.

Packaging: 1 hammer



PRODUCT INFORMATION

LISULOL

1. Product Description

LISULOL is a multi component lens edge laquer based on epoxy resins and polyamines, polyamides or their adducts as a curing component and a dye solution.

2. Technical Data

Color:	black
Gloss:	satin gloss
Delivery viscosity:	40 ± 5 s / DIN 53 211/6 mm / 23 ° C
Solids:	$76 \pm 2\%$ / DIN EN ISO 3251
Volume Solids:	$40 \pm 2\%$ / DIN 53 219 based on hardened paint including dye solution
Density wet:	1.60 ± 0.05 g / cm ³ / DIN EN ISO 2811
Density dry:	1.95 ± 0.05 g / cm ³ based on hardened paint including dye solution
Recommended wet film thickness:	50 microns
Dry film ceiling:	20 microns based on hardened paint including the dye solution
Theor. Yield:	approximately 16 m ² / kg at 20 microns dry film thickness based on hardened paint including the dye solution
Shelf life:	6 months in original unopened container
Recommended paint system:	Monolayer

The values given do not constitute a specification but is typical Failure data.



3. Processing instructions

Before processing:	Stir thoroughly
Material:	glass; a test coating is recommended!
Pre-treatment:	The surface must be free of grease and impurities.
Application:	spraying, brushing
Hardener:	19-0452-102135
Mixing ratio:	80: 20: 20 n weight with hardener 19-0452-102135 and dye solution 13-2181-105867
Dilution:	00-9576-100218
Working viscosity:	25-40 sec / DIN 53 211/4 mm / 23 ° C
Pot life:	about 8 hours at 20 ° C; The pot life may be shortened at higher temperatures.
Evaporation time:	about 15 minutes during oven drying (at 20 ° C)
Drying:	air drying or oven drying up to 140 ° C e.g. 1h 50 ° C for 1 hour RT e.g. 30 min. 90 ° C
Disposal:	For disposal, please refer to our material safety data sheet.
Cleaning:	The cleaning of the tools can be done with the dilution 00-9576-100218
Labelling:	information about marking, labelling and working hygiene can be found in our latest safety data sheets



PRODUCT INFORMATION

LENS TISSUES AND WIPES TYPE OCC

Product Description

The **OPTICAL LENS TISSUE OCC** is particularly suitable for the precision and ophthalmic industry. This 100% cotton tissue is lint-free, scratch-free and not chemically treated. Can be washed and re-used.

Our product **OCC 150** is available as twill weave cloth from roll.

Type **OCC 55** is silicon-free, 100% cotton and available in size pieces of approximately 50 x 50 cm.

Technical Data

	TYPE OCC 150	TYPE OCC 55
Material:	100% cotton	100% cotton
Structure:	weave cloth	silicon-free
Sizes:	from roll, width 1.18 m	piece size 50 x 50 cm
Colour:	yellow	white
Purity:	not chemically treated, no greasy components	
Properties:	lint-free, scratch-free, sponge-like	

Application

- Round optics
- Plano-optics
- Ophthalmics
- In pre-fabrication and finishing process
- In quality control
- After ultra-sonic cleaning
- Cleaning of ophthalmic lenses

Please note

The quality of the tissues will improve when being washed frequently (without any additional agents). The tissue will provide a higher cleaning effect.



PRODUCT INFORMATION

LENS TISSUES TYPE OCC 2010

Product Description

The **OPTICAL LENS TISSUE OCC 2010** is suitable for the precision and ophthalmic industry. This tissue is a lint-free and scratch-free fleece and not chemically treated. Can be washed and re-used.

This fleece is produced of two divers synthetic fibers, polyamide and polyester fibers. These synthetic fibers will be treated by a special water-jet treatment. The active surface of the fleece becomes bigger. The porous surface bonds the dirt in the fleece. It bonds in its micro porous structure hydrophilic and oleophilic particles.

Technical Data

Material: 100% synthetic
Structure: fleece
Sizes: piece size 38 x 40 cm
Colour: white

Purity: **not chemically treated, no greasy components, silicon-free**
Properties: **lint-free, scratch-free, sponge-like**

Application

- Round optics
- Plano-optics
- Ophthalmics
- In pre-fabrication and finishing process
- In quality control
- After ultra-sonic cleaning
- Cleaning of ophthalmic lenses
- Cleaning of coated optical and ophthalmic components

Please Note

The quality of the tissues will improve when being washed frequently (without any additional agents). The tissue will provide a higher cleaning effect.



PRODUCT INFORMATION

CLEAN ROOM CLOTH PB-S

1. Product Description

The **cleanroom cloth PB-S** is a special cloth for precision optics and semiconductor industries. It is a lint- and scratch-free, chemically treated special cloth with high cleaning efficiency.

The particular arrangement of yarns in textile structures lead to an increase in fluid intake per unit of time and thus enable both a comparatively faster implementation of cleanings, as well as less liquid residue on the surface after cleaning.

The edges of this cloth are cut with laser beam and fix it thermally on all four sides. The stitches are close-meshed which is especially conducive to the absorption of particles of small size. The polyester yarns have a high material strength, so that fiber breaks are rare during cleaning operations as compared to wipes with pulp or viscose even in these small diameters. The conformability of this knitted fabric to the topography of the machine or technical surfaces, enabling efficient precision cleaning in relatively little time.

2. Technical Data

The wipes are available in sheets of 23 x 23 cm or 40 x 40 cm. The cloths are washable without using a softener (possibly a few drops of vinegar).
Other sizes on request.

Thickness:	0.59 mm ISO 9073-2
Basis weight:	185 g / m ² ISO 9073-1
Cleaning efficiency (for thin layers of fat):	60.2 % per wipe
Particle abrasion (particles > 0.5 micron):	
after wiping	on surface Rz 5 microns: 0.92 k-Part / cm ² on surface Rz 39 micron: 3.12 k-Part / cm ²
Fluid intake:	410 g / m ²



3. Application

- Hand cleaning of optical components, for example, before coating with reflective or antireflective coatings
- Hand cleaning of optical components before cementing
- Hand cleaning of precision components
- Hand cleaning in quality control
- Cleaning of equipment in the semiconductor industry

4. Packing

- 10 pieces in plastic bag
- 50 pieces in plastic bag



PRODUCT INFORMATION

CLEAN ROOM CLOTH PB-M

1. Product Description

The **cleanroom cloth PB-M** is a special cloth for precision optics and semiconductor industries. It is a lint-free and scratch, chemically treated special cloth with high cleaning efficiency.

The arrangement of particularly thin yarns in textile structures lead to time-saving removal of thin layers of fat on polished surfaces of various sensitive and less sensitive materials.

The edges of this cloth are cut with laser beam and fix it thermally on all four sides. The mesh in **cleanroom cloth PB-M** have a particularly high mesh density which is especially conducive to the absorption of particles with very small dimensions. The polyester yarns have a high material strength, so that fiber breaks are rare during cleaning operations as compared to wipes with pulp or viscose even in these small diameters. The conformability of this knitted fabric to the topography of the machine or technical surfaces, enabling efficient precision cleaning in relatively little time.

2. Technical Data

The wipes are available in sheets of 10 x 10 cm, 20 x 20 cm or 25 x 25 cm. The cloths are washable without using a softener (possibly a few drops of vinegar). Other sizes on request.

Thickness:	0.32 mm ISO 9073-2
Basis weight:	160 g / m ² ISO 9073-1
Cleaning efficiency (for thin layers of fat):	90.0% per wipe
Particle abrasion (particles > 0.5 micron):	
after wiping	on surface Rz 5 microns: 0.58 k-Part / cm ² on surface Rz 39 micron: 6.80 k-Part / cm ²
Fluid intake:	256 g / m ²



3. Application

- Hand cleaning of optical components, for example, before coating with reflective or antireflective coatings
- Hand cleaning of precision components
- Hand cleaning in quality control
- Cleaning of equipment in the semiconductor industry

4. Packing

- 10 pieces in plastic bag
- 80 pieces in plastic bag