

## PRODUCTS OPTIMIZED FOR ADHESIVES APPLICATIONS

### NANOPOX® A SERIES



- Significantly improved fatigue performance
- Increase in toughness, reduced CTE
- Improved modulus, particularly high lap shear and peel strengths

PRODUCT NAME	BASE RESIN	CHARACTERIZATION	EEW [g/equiv.]	SIO2 CONTENT [wt%]	VISCOSITY 25 °C [Pa·s]
NANOPOX® A 410	DGEBA	standard type	295	40	45
NANOPOX® A 510	DGEBF	standard type, more flexible	275	40	20
NANOPOX® A 611	EEC	cycloaliphatic epoxy, UV-curable	220	40	2

Special tailor-made grades are available on request

### NANOCRYL® A SERIES



- Significantly improved tear resistance, fracture toughness and modulus
- Highly filled, transparent adhesives can be formulated
- Significantly improved adhesion to inorganic substrates (e.g. glass)

PRODUCT NAME	MONOMER	CHARACTERIZATION	SIO2 CONTENT [wt%]	VISCOSITY 25 °C [mPa·s]
NANOCRYL® A 210	HDDA	Hexandioldiacrylate	50	175
NANOCRYL® A 215	TPGDA	Tripropylenglycoldiacrylate	50	200
NANOCRYL® A 220	TMPTA	Trimethylolpropanetriacrylate	50	2500
NANOCRYL® A 223	TMPEOTA	Ethox. Trimethylolpropanetriacrylate	50	1000

Special tailor-made grades are available on request

### NANOPOL® A SERIES



- Significantly improved tear resistance, fracture toughness and modulus
- Highly filled, transparent adhesives can be formulated based on various reactive resins
- Uncritical solvents for easy processing

PRODUCT NAME	SOLVENT	SIO2 CONTENT [wt%]	VISCOSITY 25 °C [mPa·s]
NANOPOL® A 710	1-Methoxy-2-propyl acetate	50	20
NANOPOL® A 720	Butyl acetate	50	20

## PRODUCTS OPTIMIZED FOR DENTAL APPLICATIONS

### NANOCRYL® D SERIES



- Very high filler level at low viscosity
- Reduced shrinkage
- High stability under load
- Extended lifecycle of composite materials

PRODUCT NAME	MONOMER	MIXTURE	SIO2 CONTENT [wt%]	VISCOSITY 25 °C [mPa·s]
NANOCRYL® D 302	Hydroxy propyl methacrylate		60	150
NANOCRYL® D 303	Hydroxy ethyl methacrylate		60	150
NANOCRYL® D 321	Bisphenol A glycidyl dimethacrylate and Triethylene glycol dimethacrylate	2/1	50	20000
NANOCRYL® D 322	Urethane dimethacrylate and Triethylene glycol dimethacrylate	4/1	50	10000
NANOCRYL® D 323	Urethane dimethacrylate and Hydroxy ethyl methacrylate	9/1	50	15000

## PRODUCTS OPTIMIZED FOR ELECTRONIC APPLICATIONS

### NANOPOX® E SERIES



- Low viscosity (especially when combined with conventional fillers)
- Reduced cure shrinkage and thermal expansion
- Improves heat conductivity, by preventing sedimentation of micro particles
- Improvement of mechanical properties - fracture toughness, impact resistance and modulus
- Penetrates every fillament (glas -, carbon- & -, -basalt fibers, mica, ...)
- Improved scratch and abrasion resistance
- Good dielectrical properties - low DK and Df

PRODUCT NAME	BASE RESIN	CHARACTERIZATION	EEW	SIO2 CONTENT [wt%]	VISCOSITY 25 °C [Pa·s]
NANOPOX® E 430	DGEBA/F	No crystallization	290	40	30
NANOPOX® E 470	DGEBA	General purpose	295	40	45
NANOPOX® E 500	DGEBF	Low viscous and additional flexibility	275	40	20
NANOPOX® E 601	EEC	Cycloaliphatic formulations, cationic curing	225	40	2
NANOPOX® E 770	Epoxidized novolak	High Tg application	310	40	20*

\* at 50°C

### NANOPOL® A SERIES



- Significantly improved tear resistance, fracture toughness and modulus
- Highly filled, transparent adhesives can be formulated based on various reactive resins
- Suitable for CCL applications

PRODUCT NAME	SOLVENT	SIO2 CONTENT [wt%]	VISCOSITY 25 °C [mPa·s]
NANOPOL® A 710	1-Methoxy-2-propyl acetat	50	20
NANOPOL® A 720	n-Butylacetate	50	20

## NANOCRYL® A SERIES



- Significantly improved tear resistance, fracture toughness and modulus
- Highly filled, transparent adhesives can be formulated
- Significantly improved adhesion to inorganic substrates (e.g. glass)

PRODUCT NAME	MONOMER	CHARACTERIZATION	SIO2 CONTENT [wt%]	VISCOSITY 25 °C [mPa·s]
NANOCRYL® A 210	HDDA	Hexandioldiacrylate	50	175
NANOCRYL® A 215	TPGDA	Tripropylenglycoldiacrylate	50	200
NANOCRYL® A 220	TMPTA	Trimethylolpropanetriacrylate	50	2500
NANOCRYL® A 223	TMPEOTA	Ethox. Trimethylolpropanetriacrylate	50	1000

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## PRODUCTS OPTIMIZED FOR COMPOSITES APPLICATIONS

### NANOPOX® F SERIES



- Significantly improved fatigue performance
- Improved modulus and flexural strength, increase in toughness
- Significantly improved compressive strength
- Lower CTE, reduced shrinkage
- Very low viscosity, thus suitable for injection processes
- Improved surface quality, no fiber-printthrough (Class A)

PRODUCT NAME	BASE RESIN	CHARACTERIZATION	EEW [g/equiv.]	SIO2 CONTENT [wt%]	VISCOSITY 25 °C [mPa·s]
NANOPOX® F 400	DGEBA	standard type	295	40	45
NANOPOX® F 440	DGEBA/F	crystallization-free	290	40	30
NANOPOX® F 520	DGEBF	standard type	275	40	20
NANOPOX® F 631	EEC	for cycloaliphatic epoxy formulations, UV-curable	220	40	6
NANOPOX® F 700	epoxidized Novolak	high performance novolak, high Tg and modulus	310	40	20*

\* at 50°C

### ALBIPOX® F SERIES



- Outstanding fatigue performance
- Extremely tough and stiff resin systems
- Excellent fiber-wetting

PRODUCT NAME	BASE RESIN	CHARACTERIZATION	EEW [g/equiv.]	VISCOSITY AT 25°C [mPa·s]
ALBIPOX® F 080	DGEBA/F	standard type for anhydride cure; can be diluted down	330	70,000

Special tailor-made grades are available on request.

## ALBIDUR® F SERIES



- Improved toughness (fracture energy, fracture toughness, impact resistance)
- Significant higher energy absorption at sudden mechanical impact
- Superior mechanical properties at high and low temperatures
- Increased modulus and compressive strength
- Significantly improved fatigue performance
- No loss in glass transition temperature (T<sub>g</sub>)
- No reduced thermo dimensional stability

PRODUCT NAME	BASE RESIN	VISCOSITY AT 25°C [mPa·s]
ALBIDUR® F 061	DGEBA	70,000