ELPECAST®
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TR TECHNICAL REPORT

Casting compounds of the series Wepuran VT 3402 KK

Owing to their extremely high transparency the casting compounds of the series **Wepuran VT 3402 KK** are used in lighting electronics/LED technology and sensor technology, especially in applications where highest demands are placed on optical properties, for example for the potting/encapsulating of LEDs or optical sensors.

The casting compounds of the series **Wepuran VT 3402 KK** protect and insulate electronic components against extreme climatic influence and aggressive media as well as against mechanical attacks.

- Base: Polyurethane resin (UR)
- colourless, highly transparent and crystal-clear
- very good weather resistance, outstanding UV light stability, good thermal resistance
- operating temperature range **-65 to at least +90 °C [-85 to at least 194 °F]**
- very high optical transparency with low optical damping
- very good adhesion to almost all materials
- solvent-free/VOC-free (volatile organic compounds)
- high mechanical stability, thus very good protection against shock, impact and vibration
- resistant against water, moisture, condensate and numerous chemicals, bases, acids and oils
- mixing with dyestuff concentrates **FK 3432,** red, and **FK 3452,** blue results in coloured transparent casting compounds, e.g. for colour marking when light sources are potted (with the colour intensity being controlled through the mixing ratio; physical and electrical properties will not change).
- with the help of hazing paste **TP 3492 LS** different levels of light diffusion depending on the mixing ratio, can be achieved in the potting of light sources
- an even level of light diffusion can also be achieved by the opaque top coat **VT 3492 LS** which is applied over a surface encapsulated with a casting compound of the series **Wepuran VT 3402 KK**

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Selection chart: Casting compounds of the series Wepuran VT 3402 KK

	VT 3402 KK	VT 3402 KK-ALU	VT 3402 KK-NV	VT 3402 KK-NV-HE	VT 3402 KK-NV-HH	VT 3402 KK-NV-LT	VT 3402 KK-NV-SV-HB	VT 3402 KK-NV-UVP
low viscosity, easy flow	●	●	●	●	●	●	●	●
easy processing	●	—	●	●	—	●	●	●
processing time	●	●	●	●	●	●	●	●
low heat development when cured	●	●	●	●	●	●	●	●
electric insulation and climatic resistance	●	●	●	●	●	●	●	●
suitable for flex strips	●	—	●	●	—	●	●	●
outdoor use	●	●	●	●	●	●	●	●
underwater use	●	●	●	●	●	●	●	●
adhesion	●	●	●	●	●	●	●	●
adhesion on aluminium	●	●	●	—	●	●	●	●
hardly flammable	—	—	●	—	—	—	●	—
best flame class UL 94 HB	—	—	—	—	—	—	●	—
UV resistance	●	●	●	●	●	●	●	●
protection of base material against UV loads	—	●	—	●	●	—	●	●
thermal resistance / yellowing resistance under thermal load	●	●	●	●	●	●	●	●

● very well suited, very easy, high
● well suited, easy, average
● moderately suited, low
— not suited, not recommended

Please note that the information above is given as a non-binding recommendation. The suitability of a casting compound for a specific application may depend on different parameters such as the substrate condition, later exposure to loads other than those stated above etc.

Owing to excessive heat generation by power LEDs, the casting compounds of the series **Wepuran VT 3402 KK** are not suitable for coating this type of LEDs. Please follow the recommendations of your LED manufacturer with regard to the compatibility between different media / materials and verify the suitability by performing your own trials.

As with all polymers, temperature > 40 °C [104 °F] and high humidity (RH > 70 %) may cause hydrolytic degradation of polymers which may lead to discolouring, softening and stickiness or even dissolution. For this reason, the casting compounds of the series **Wepuran VT 3402 KK** are not suitable for applications in saunas and steam baths. As an alternative, one can use **Wepesil** casting compounds based on silicone (SR).

Characteristics

	Colour/ appear-ance	**Viscosity* at 20 °C** DIN EN ISO 3219 Component A Hardener (comp. B) Mixture	**Density at 20 °C** DIN EN ISO 2811-1 Component A Hardener (comp. B) Mixture	**Pot life of mixture** at 18–23 °C (Starting temp. 20 °C weighed qty. 500 g) double / tenfold viscosity
~~VT 3402 KK~~	colourless, clear	2670 ± 500 mPas ~~3800 ± 500 mPas~~ 2700 ± 500 mPas	~~1.10 ± 0,05 g/cm³~~ ~~1.12 ± 0,05 g/cm³~~ 1.11 ± 0,05 g/cm³	approx. 50 / 80 min
VT 3402 KK-ALU	colourless, clear.	2600 ± 300 mPas 1750 ± 250 mPas 2000 ± 300 mPas	1.06 ± 0,05 g/cm³ 1.15 ± 0,05 g/cm³ 1.11 ± 0,05 g/cm³	approx. 60 / 80 min
VT 3402 KK-NV	colourless, clear	1400 ± 300 mPas 400 ± 100 mPas 1100 ± 300 mPas	1.09 ± 0,05 g/cm³ 1.09 ± 0,05 g/cm³ 1.09 ± 0,05 g/cm³	approx. 25/ 50 min
VT 3402 KK-NV-HE	colourless, clear	530 ± 50 mPas 400 ± 100 mPas 500 ± 50 mPas	1.02 ± 0,05 g/cm³ 1.09 ± 0,05 g/cm³ 1.07 ± 0,05 g/cm³	approx. 80 /100 min
VT 3402 KK-NV-HH	colourless, clear	530 ± 50 mPas 1700 ± 100 mPas 900 ± 150 mPas	1.02 ± 0,05 g/cm³ 1.14 ± 0,05 g/cm³ 1.09 ± 0,05 g/cm³	approx. 2 h / 4 h
VT 3402 KK-NV-LT	colourless, clear	1500 ± 500 mPas 400 ± 100 mPas 1100 ± 300 mPas	1.12 ± 0,05 g/cm³ 1.09 ± 0,05 g/cm³ 1.11 ± 0,05 g/cm³	approx. 2 h / 4 h
VT 3402 KK-NV-SV-HB	colourless, klar	1100 ± 300 mPas 1200 ± 300 mPas 1300 ± 300 mPas	1.06 ± 0,05 g/cm³ 1.17 ± 0,05 g/cm³ 1.13 ± 0,05 g/cm³	approx. 70 / 85 min
VT 3402 KK-NV-UVP	colourless, clear	1600 ± 300 mPas 400 ± 100 mPas 1100 ± 300 mPas	1.09 ± 0,05 g/cm³ 1.09 ± 0,05 g/cm³ 1.09 ± 0,05 g/cm³	approx. 35 / 50 min
VT 3492 LS	colourless, milky	20000 ± 4000 mPas 400 ± 100 mPas 3000 ± 500 mPas	1.44 ± 0,05 g/cm³ 1.09 ± 0,05 g/cm³ 1.32 ± 0,05 g/cm³	approx. 70 / 115 min
FK 3432	red	1700 ± 300 mPas	1.00 ± 0,05 g/cm³	Pot life corresponds approximately to the pot life of the casting compound used.
FK 3452	blue	1700 ± 300 mPas	1.00 ± 0,05 g/cm³	
TP 3492 LS	colourless, milky	54000 ± 6000 mPas**	1.48 ± 0,05 g/cm³	

* measured with Haake RS 600, C 35/1°, D = 100 s^{-1}, viscosity measuring unit supplied by:
Thermo Fisher Scientific, Dieselstraße 4, 76227 Karlsruhe, Germany
Phone +49 721 4094-444, Fax +49 721 4094-300, www.thermo.com

** measured with Haake RS 600, C 20/1°, D = 50 s^{-1}

Indices:
ALU = especially for aluminium profiles
FK = dyestuff concentrate
HE = highly elastic
HH = high hardness
KK = crystal-clear
LS = light diffusing
LT = long pot life
NV = low viscosity
SV-HB = self-extinguishing in horizontal burning test (UL 94 HB)
TP = hazing paste
UVP = UV-protection
VT = casting compounds, transparent

Physical and mechanical properties

These properties are reached after 14 days storage at room temperature (18–23 °C [64.4–73.4 °F]).

Property	Test-method	VT 3402 KK	VT 3402 KK-ALU	VT 3402 KK-NV VT 3402 KK-NV-LT VT 3402 KK-NV-UVP	VT 3402 KK-NV-HE	VT 3402 KK-NV-HH	VT 3402 KK-NV-SV-HB	VT 3492 LS
Refractive index nTM	Monochromatic light (633 nm)	≈ 1.51	—	≈ 1.50	—	—	—	—
Double refraction		< 4 x 10^{-4}	—	< 4 x 10^{-4}	—	—	—	—
Shore-A hardness	DIN 53 505	65-75	> 90	65-75	40-50	> 90	65-75	80-90
	DIN ISO 7619-1	60-80	> 90	60-80	35-55	> 90	60-80	70-90
Shore-D hardness	DIN 53 505	<30	55-65	< 30	< 30	50-60 (75-85*)	< 30	30-40
	DIN ISO 7619-1	<35	55-75	< 20	< 20	40-60 (70-90*)	< 20	25-45
Water absorption	DIN EN ISO 62 24 h/23 °C	≈ 0.35 %	≈ 0.23	< 1 %	≈ 0.25 %	≈ 0.2 %	≈ 0.3 %	≈ 0.35 %
Hydrolytic resistance	500 h, 85 °C, 85 % r. F.	passed	passed	passed	passed	passed	passed	—
	500 h, 100 °C, 100 % r. F.	not passed	—	passed	—	—	—	—
Thermal cycling test	150 cycles 15 min/-40 °C 15 min/+85 °C	passed	passed	passed	passed	passed	passed	passed
Temperature shock	Based on IPC-TM-650, 2.6.71. -65 to +125 °C	passed	passed	passed	passed	passed	passed	passed
Glass transition temperature Tg	TMA (Thermo mechanical analysis)	≈ 30 °C	≈ 35 °C	≈ -10 °C	≈ 22 °C	≈ 30 °C	≈ 0 °C	≈ 5 °C
Coefficient of thermal expansion CTE	TMA (Thermo mechanical analysis) < Tg / > Tg	≈ 80 / 210 ppm/°C	≈ 95 / 200 ppm/°C	≈ 120 / 210 ppm/°C	≈ 100 / 230 ppm/°C	≈ 85 / 200 ppm/°C	≈ 90 / 220 ppm/°C	≈ 80 / 170 ppm/°C
Thermal class**	in acc. with DIN IEC 60 085	Y = 90 °C	Y = 90 °C	Y = 90 °C	Y = 90 °C	Y = 90 °C	Y = 90 °C	Y = 90 °C
Temperature index* (TI) in acc. with DIN EN 60216 (IEC 60216), as of 2001	Mass loss after 5000 h: 5 % 10% 20 % 50 %	 ≥ 120 °C ≥ 130 °C ≥ 145 °C ≥ 155 °C	 ≥ 135 °C ≥ 150 °C ≥ 165 °C ≥ 185 °C	 ≥ 110 °C ≥ 120 °C ≥ 140 °C ≥ 150 °C	 ≥ 120 °C ≥ 130 °C ≥ 140 °C ≥ 155 °C	 ≥ 125 °C ≥ 135 °C ≥ 145 °C ≥ 160 °C	 ≥ 110 °C ≥ 120 °C ≥ 135 °C ≥ 155 °C	—
	Mass loss after 20000 h: 5 % 10% 20 % 50 %	 ≥ 95 °C ≥ 105 °C ≥ 120 °C ≥ 130 °C	 ≥ 100 °C ≥ 115 °C ≥ 135 °C ≥ 155 °C	 ≥ 90 °C ≥ 100 °C ≥ 115 °C ≥ 125 °C	 ≥ 100 °C ≥ 110 °C ≥ 120 °C ≥ 130 °C	 ≥ 110 °C ≥ 115 °C ≥ 125 °C ≥ 140 °C	 ≥ 80 °C ≥ 95 °C ≥ 110 °C ≥ 125 °C	—

* The high hardness is reached after thermal curing, e.g. for 30 min at 125 °C [257 °F]

** can be used in a temperature range of -65 up to at least +90 °C [-85 up to at least 194 °F]. Both at the lower and upper ends of this range the performance and reliability of the material can be negatively affected in some applications. In these cases, additional pre-trials and tests are required.

Electrical properties

These properties are reached after 14 days storage at room temperature (18–23 °C [64.4–73.4 °F]).

Property	Test method	VT 3402 KK	VT 3402 KK-ALU	VT 3402 KK-NV VT 3402 KK-NV-LT VT 3402 KK-NV-UVP	VT 3402 KK-NV-HE	VT 3402 KK-NV-HH	VT 3402 KK-NV-SV-HB	VT 3492 LS
Dielectric strength	VDE 0303 part 21 DIN EN 60 243-1	≥ 70 kV/mm	≥ 27 kV/mm	≥ 50 kV/mm	≥ 25 kV/mm	≥ 35 kV/mm	≥30 kV/mm	≥ 40 kV/mm
Surface resistance	VDE 0303 part 30 DIN IEC 60 093	≥ 2×10^{14} Ohm						
Specific volume resistance	VDE 0303 part 30 DIN IEC 60 093	≥ 1.4×10^{15} Ohm x cm	≥ 1.9×10^{14} Ohm x cm	≥ 2.0×10^{12} Ohm x cm	≥ 2.4×10^{13} Ohm x cm	≥ 2.0×10^{13} Ohm x cm	≥ 2.0×10^{11} Ohm x cm	≥ 5.0×10^{12} Ohm x cm
Comparative tracking index*	DIN EN 60 112	CTI* > 600						

* CTI, tracking resistance

Optical properties

Extensive data on transmission and colorimetry, as well as photos on the yellowing behaviour of various casting resins at different temperatures and over certain period of times are included in the Technical Information sheet TI 15/19 “Optical properties under permanent temperature load for the ELPECAST® casting compounds of the series Wepuran VT 3402 KK.”

Processing

	Please read this technical report and the publications listed below carefully before using the product. These sheets are enclosed with the first shipment of product or sample.
MSDS	The corresponding material safety data sheet contains detailed information and characteristics on safety precautions, environmental protection, transport, storage, handling and waste disposal.
AI	Application information AI 3/1 “Processing instructions for the casting compounds of the series Wepuran VT 3402 KK“
TI	Technical information TI 15/2 ”Selection criteria and processing instructions for casting compounds”
TI	Technical information TI 15/3 “Protective measures when using chemicals including lacquers, casting compounds, thinners, cleaning agents“
TI	Technical information TI 15/10 “Processing of 2-pack systems“

Since the many different permutations make it impossible to evaluate the whole spectrum (parameters, reactions with materials used, chemical processes and machines) of processes and subsequent processes in all their variations, the parameters we recommend are to be viewed as guidelines only that were determined in laboratory conditions. We advise you to determine the exact process limitations within your production environment, in particular as regards compatibility with your specific follow-up processes, in order to ensure a stable fabrication process and products of the highest possible quality.

The specified product data is based upon standard processing conditions/test conditions of the mentioned norms and must be verified if necessary while observing suitable test conditions on processed products.

Feel free to contact our application technology department (ATD) if you have any questions or for a consultation.

Safety recommendation

➔ When using chemicals, the common precautions should be carefully noted.

Mixing

	Parts by weight Comp. A : hardener (comp. B)
~~VT 3402 KK~~ VT 3402 KK-NV VT 3402 KK-NV-LT VT 3402 KK-NV-UVP	1 : 1
VT 3402 KK-ALU VT 3402 KK-NV-HH	3 : 5
VT 3402 KK-NV-HE	1 : 2
VT 3402 KK-NV-SV-HB	4 : 7
VT 3492 LS	2 : 1

Stir VT 3492 LS before use

Auxiliary products recommended

- Accelerator B 4402
  reduces the curing time and the processing time, thus to be applied preferably with mixing and dosing units; stirred into component A prior to processing the casting compound
- Sealing mastic EH 13.271
  solvent-free paste for sealing jobs in electronics and electrical engineering, self-adhesive and permelastic
- Mould release agent EH 13.650
  solvent-, silicone- and grease-free, for pre-treating the surfaces of parts to be potted; after curing, the potting can be easily removed from the mould without residue
- Adhesion promoter EH 13.904 LED
  Good wetting performance even on critical base materials, e. g. silicone surfaces of LEDs; available for brushing or spraying
- Adhesion promoters EH 13.950/EH 13.951
  for improving the adhesion; **EH 13.950** is applied thinly to the parts that will come into contact with the casting compound while **EH 13.951** is mixed thoroughly with the casting compound prior to potting
  Cleaning agent R 13.780for the cleaning of work place and tools; cleaning should be effected immediately after processing as cleaning becomes increasingly difficult the further the curing process progresses and is impossible after final curing.

Drying/curing

The following specifications for a quantity of 25 g serve as a guideline:

		Room temperature (18-23 °C)	80 °C [176 °F]
~~VT 3402 KK~~ VT 3402 KK-ALU VT 3402 KK-NV VT 3402 KK-NV-HE VT 3402 KK-NV-HH VT 3402 KK-NV-SV-HB VT 3402 KK-NV-UVP	tack-free	24 h	1 h
	cured	14 days	2 h
VT 3402 KK-NV-LT	tack-free	24–48 h	4 h
	cured	14 days	8 h

The accelerator **B 4402** is recommended if a faster curing is required (see item “Auxiliary Products recommended”). Curing at higher temperatures may lead to yellowing of the casting compound.

Packaging

The packing units available are indicated in our offer which we will send you upon request.

Shelf life and storage conditions

Shelf life: In sealed original containers at least 6 months

Storage conditions: +5 °C to +25 °C [+41 °F to +77 °F]

Protect against humidity

Protect against frost

For warehousing reasons, isolated cases may occur where the shelf life upon shipment is less than the shelf life indicated in this technical report. However, it is ensured that our products have **at least** two-thirds of their shelf life remaining when they leave our company. Labels on containers show shelf life and storage conditions.

Disclaimer

All descriptions and images of our goods and products contained in our technical literature, catalogues, flyers, circular letters, advertisements, price lists, websites, data sheets and brochures, and in particular the information given in this literature are non-binding unless expressly stated otherwise in the Agreement. This shall also include the property rights of third parties if applicable.

The products are exclusively intended for the applications indicated in the corresponding technical data sheets. The advisory service does not exempt you from performing your own assessments, in particular as regards their suitability for the applications intended. The application, use and processing of our products and of the products manufactured by you based on the advice given by our Application Technology Department are beyond our control and thus entirely your responsibility. The sale of our products is effected in accordance with our current terms of sale and delivery.

Any questions? We would be pleased to offer you advice and assistance in solving your problems. Samples and technical literature are available upon request.

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