


Casting resins of the series Wepuran VT 3402 KK

Owing to their extremely high transparency the casting resins of the series **Wepuran VT 3402 KK** are used in lighting electronics 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.

Protecting against corrosion due to weathering and moisture and against mechanical attacks, the casting resins of the series **Wepuran VT 3402 KK** are used to seal, embed or encapsulate electronic components and assemblies.

- Base: Polyurethane resin (PUR)
- colourless, highly transparent and crystal-clear
- very good weather resistance, outstanding UV light stability, good thermal resistance
- operating temperature range **-40 to at least +90 °C**
- very high optical transparency with low optical damping
- very good adhesion to almost all materials
- solvent-free/VOC-free (volatile organic compounds), thus no attack of solvent-sensitive plastics and no unpleasant odour caused by solvents
- very low heat development and low volume shrinkage, thus suitable for potting sophisticated and shock-sensitive electronic components such as sensors or glass diodes
- 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 dye(stuff) concentrates **FK 3432**, red, **FK 3452**, blue and ~~**FK 3462 YG**, yellow-green, or **FK 3462 DG-P**, dark-green,~~ results in coloured transparent casting compounds, e.g. for colour marking when light sources are potted (with the colour intensity being controlled by means of the mixing ratio).
- with the help of hazing paste **TP 3492 LS** different levels of light diffusion depending on the mixing ratio can be achieved when potting 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 resin of the series VT 3402 KK

Selection chart: Casting resins 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-SB	VT 3402 KK-NV-SV	VT 3402 KK-NV-JVP
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 V-0	—	—	—	—	—	—	—	●	—
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 resin 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 resins 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.

Characteristics

	Colour/ appearance	Viscosity* at 20 °C DIN EN ISO 3219 Component A Component B Mixture	Density at 20 °C DIN EN ISO 2811-1 Component A Component 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-transp.	2670 ± 500 mPas 3800 ± 500 mPas 2700 ± 500 mPas	1.10 ± 0,05 g/cm ³ 1.12 ± 0,05 g/cm ³ 1.11 ± 0,05 g/cm ³	approx. 50 / 80 min
VT 3402 KK-ALU	colourless, clear-transp.	2600 ± 300 mPas 1750 ± 250 mPas 2000 ± 300 mPas	1.06 ± 0,05 g/cm ³ 1.15 ± 0,05 g/cm ³ 1.11 ± 0,05 g/cm ³	approx. 60 / 80 min
VT 3402 KK-NV	colourless, clear-transp.	1400 ± 300 mPas 400 ± 100 mPas 1100 ± 300 mPas	1.09 ± 0,05 g/cm ³ 1.09 ± 0,05 g/cm ³ 1.09 ± 0,05 g/cm ³	approx. 25/ 50 min
VT 3402 KK-NV-HE	colourless, clear-transp.	530 ± 50 mPas 400 ± 100 mPas 500 ± 50 mPas	1.02 ± 0,05 g/cm ³ 1.09 ± 0,05 g/cm ³ 1.07 ± 0,05 g/cm ³	approx. 80 /100 min
VT 3402 KK-NV-HH	colourless, clear-transp.	530 ± 50 mPas 1700 ± 100 mPas 900 ± 150 mPas	1.02 ± 0,05 g/cm ³ 1.14 ± 0,05 g/cm ³ 1.09 ± 0,05 g/cm ³	approx. 2 h / 4 h
VT 3402 KK-NV-LT	colourless, clear-transp.	1500 ± 500 mPas 400 ± 100 mPas 1100 ± 300 mPas	1.12 ± 0,05 g/cm ³ 1.09 ± 0,05 g/cm ³ 1.11 ± 0,05 g/cm ³	approx. 2 h / 4 h
VT 3402 KK-NV-SB	colourless, clear-transp.	1100 ± 300 mPas 1500 ± 300 mPas 1350 ± 300 mPas	1.07 ± 0,05 g/cm ³ 1.16 ± 0,05 g/cm ³ 1.12 ± 0,05 g/cm ³	approx. 70 / 85 min
VT 3402 KK-NV-SV	colourless, klar-transp	1100 ± 300 mPas 1200 ± 300 mPas 1300 ± 300 mPas	1.06 ± 0,05 g/cm ³ 1.17 ± 0,05 g/cm ³ 1.13 ± 0,05 g/cm ³	approx. 70 / 85 min
VT 3402 KK-NV-UVP	colourless, clear-transp.	1600 ± 300 mPas 400 ± 100 mPas 1100 ± 300 mPas	1.09 ± 0,05 g/cm ³ 1.09 ± 0,05 g/cm ³ 1.09 ± 0,05 g/cm ³	approx. 35 / 50 min
VT 3492 LS	colourless, milky	20000 ± 4000 mPas 400 ± 100 mPas 3000 ± 500 mPas	1.44 ± 0,05 g/cm ³ 1.09 ± 0,05 g/cm ³ 1.32 ± 0,05 g/cm ³	approx. 70 / 115 min
FK 3432	red	1700 ± 300 mPas	1.00 ± 0,05 g/cm ³	Pot life corresponds approximately to the pot life of the casting resin used.
FK 3452	blue	1700 ± 300 mPas	1.00 ± 0,05 g/cm ³	
FK 3462 YG	yellow-green	1700 ± 300 mPas	1.10 ± 0,05 g/cm ³	
FK 3462 DG-P	dark-green, light-transp.	1700 ± 300 mPas	1.00 ± 0,05 g/cm ³	
TP 3492 LS	colourless, milky	54000 ± 6000 mPas**	1.48 ± 0,05 g/cm ³	

* 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
 DG = dark-green
 FK = dye(stuff) concentrate
 HE = highly elastic
 HH = high hardness
 KK = crystal-clear
 LS = light diffusing
 LT = long pot life

NV = low viscosity
 P = pigment
 SB = hardly flammable
 SV = self-extinguishing
 TP = hazing paste
 UVP = UV-protection
 VT = casting compounds, transparent
 YG = yellow-green

Optical properties

Due to oxidative processes with oxygen, continuous use at the upper end of the temperature range may result in degradation of the casting resins of the series **Wepuran VT 3402 KK**. In spite of the yellow or brown discolouration – depending on the wave length – nevertheless high transmission grades are achieved (see fig. 1 and 2).

Upon request, we can provide extensive data on the transmission and colorimetry, as well as photos on the yellowing behaviour of various casting resins at different temperatures and over certain period of times. As an example, please find below the transmission graphs of **VT 3402 KK-NV** under a permanent thermal load of 80 and 100 °C.

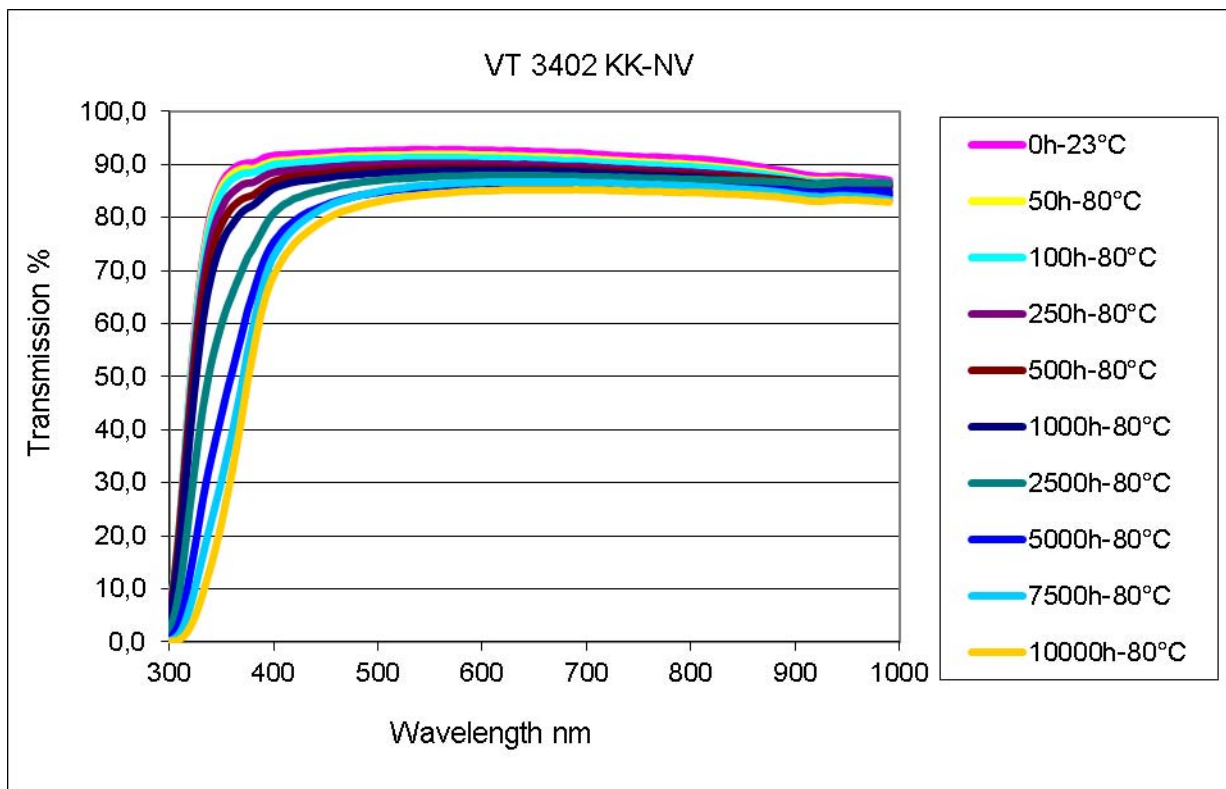


Fig. 1: Transmission of VT 3402 KK-NV after storage at 80 °C

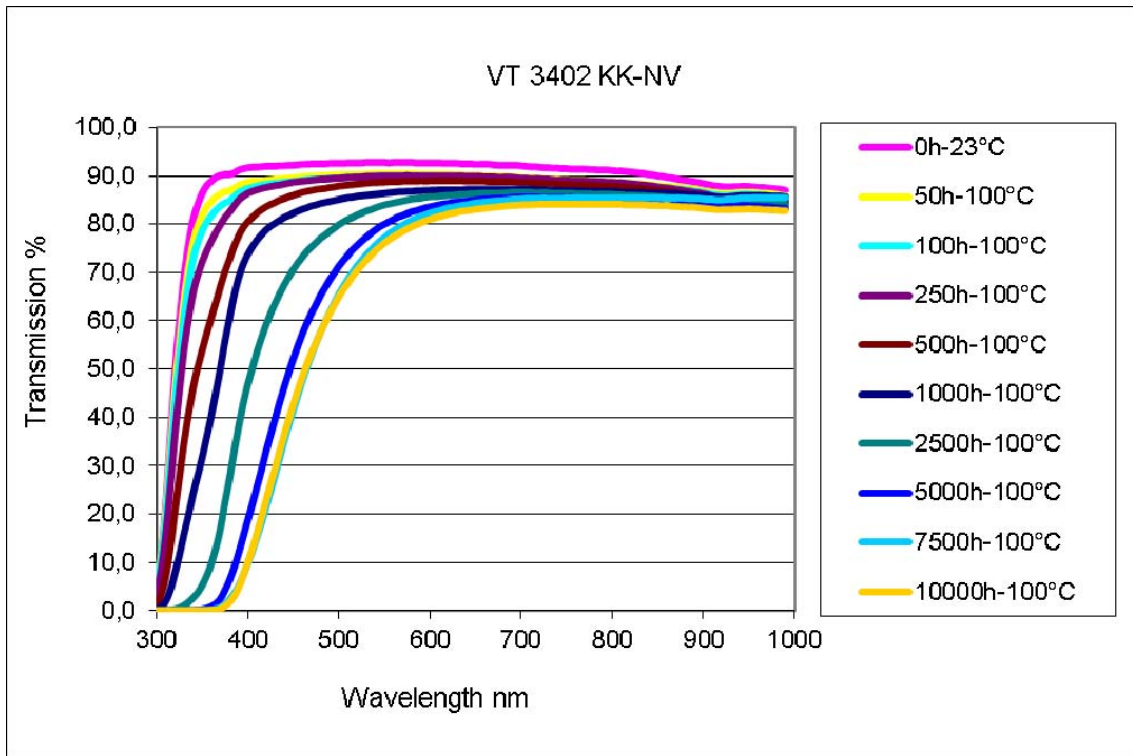
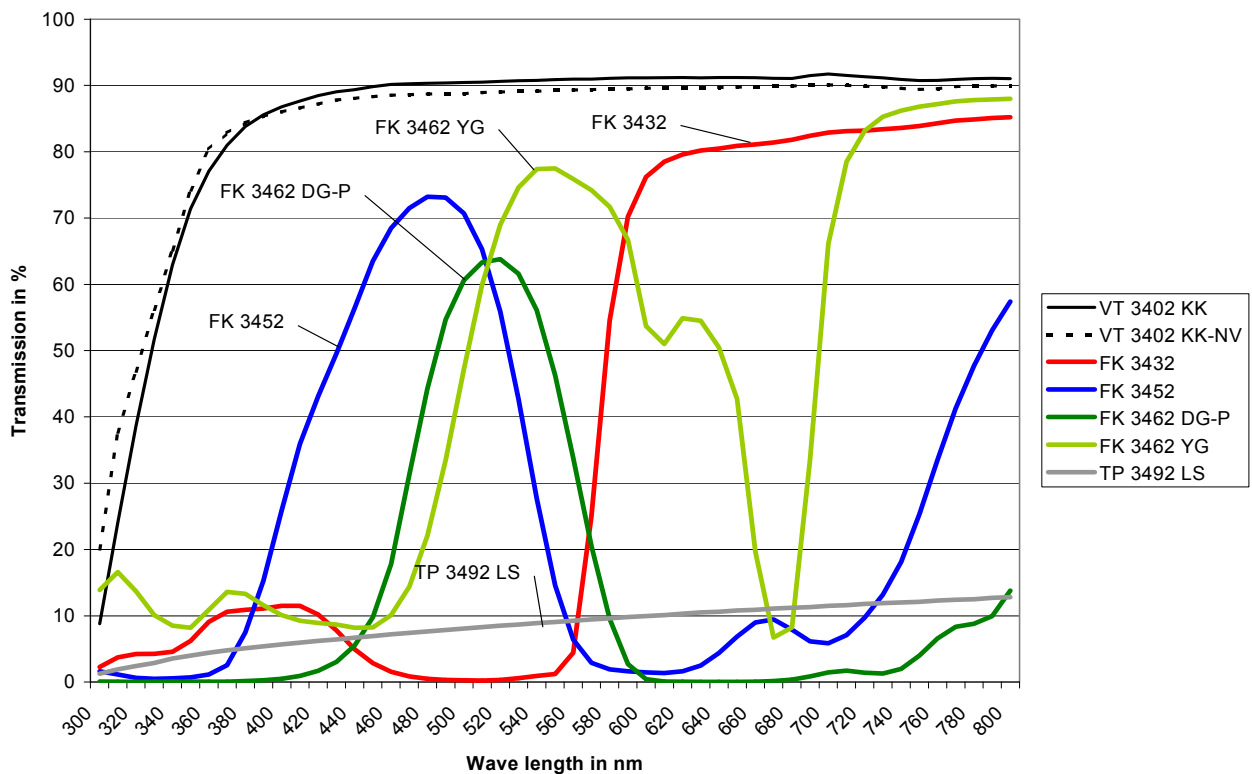


Fig. 2: Transmission of VT 3402 KK-NV after storage at 100 °C

Apart from the optical properties (see also fig. 3), neither the physical nor the electrical properties are affected by adding a dye(stuff) concentrate or the hazing paste.



Added quantity of dye(stuff) concentrate or hazing paste: 10 %, coating thickness approx. 2.5 mm, Transmission measured against air.

Fig. 3: Transmission of dye(stuff) concentrates and hazing paste compared to VT 3402 KK and VT 3402 KK-NV

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-JVP	VT 3402 KK-NV-HE	VT 3402 KK-NV-HH	VT 3402 KK-NV-SB	VT 3402 KK-NV-SV	VT 3492 LS
Refractive index n _{TM}	Monochromatic light (633 nm)	1.51	—	1.50	—	—	—	—	—
Double refraction		< 4 x 10 ⁻⁴	—	< 4 x 10 ⁻⁴	—	—	—	—	—
Shore-A hardness	DIN 53 505	90 ± 5	> 90	70 ± 5	48 ± 5	> 90	73 ± 5	65 ± 5	70 ± 5
Shore-D hardness	DIN 53 505	38 ± 5	80 ± 5	< 30	< 30	80 ± 5	< 30	< 30	35 ± 5
Water absorption	DIN EN ISO 62 24 h/23 °C	0.35 %	0.23	< 1 %	0.25 %	0.2 %	0.3 %	0.3 %	0.35 %
Hydrolytic resistance	500 h, 85 °C, 85 % r. F.	resistant	resistant	resistant	resistant	resistant	resistant	resistant	—
	500 h, 100 °C, 100 % r. F.	not resistant	—	resistant	—	—	—	—	—
Thermal cycling test	150 cycles 15 min/-40 °C 15 min/+85 °C	passed	passed	passed	passed	passed	passed	passed	passed
Glass transition temperature T _g	TMA (Thermo mechanical analysis)	approx. 30 °C	approx. 35 °C	approx. -10 °C	approx. 22 °C	approx. 30 °C	approx. 15 °C	approx. 0 °C	approx. 5 °C
Coefficient of thermal expansion CTE	TMA (Thermo mechanical analysis) < T _g / > T _g	approx. 80 / 210 ppm/°C	approx. 95 / 200 ppm/°C	approx. 120 / 210 ppm/°C	approx. 100 / 230 ppm/°C	approx. 85 / 200 ppm/°C	approx. 90 / 220 ppm/°C	approx. 90 / 220 ppm/°C	approx. 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	Y = 90 °C
Temperature index* (TI) in acc. with DIN EN 60216 (IEC 60216), as of 2001	Mass loss after 5000 h:								
	5 %	120 °C	135 °C	110 °C	120 °C	125 °C	110 °C	110 °C	—
10 %	130 °C	150 °C	120 °C	130 °C	135 °C	120 °C	120 °C	—	
20 %	145 °C	165 °C	140 °C	140 °C	145 °C	135 °C	135 °C	—	
50 %	155 °C	185 °C	150 °C	155 °C	160 °C	155 °C	155 °C	—	
	Mass loss after 20000 h:								
	5 %	95 °C	100 °C	90 °C	100 °C	110 °C	80 °C	80 °C	—
10 %	105 °C	115 °C	100 °C	110 °C	115 °C	95 °C	95 °C	—	
20 %	120 °C	135 °C	115 °C	120 °C	125 °C	110 °C	110 °C	—	
50 %	130 °C	155 °C	125 °C	130 °C	140 °C	125 °C	125 °C	—	

* can be used in a temperature range of **-40 up to at least + 90 °C** [-49 up to at least 194 °F]; a use down to -65 °C is possible. 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-SB	VT 3402 KK-NV-SV	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	33 kV/mm	30 kV/mm	40 kV/mm
Surface resistance	VDE 0303 part 30 DIN IEC 60 093	2 x 10 ¹⁴ Ohm							
Specific volume resistance	VDE 0303 part 30 DIN IEC 60 093	1.4 x 10 ¹⁵ Ohm x cm	1.9 x 10 ¹⁴ Ohm x cm	2.0 x 10 ¹² Ohm x cm	2.4 x 10 ¹³ Ohm x cm	2.0 x 10 ¹³ Ohm x cm	2.0 x 10 ¹² Ohm x cm	2.0 x 10 ¹¹ Ohm x cm	5.0 x 10 ¹² Ohm x cm
Comparative tracking index (CTI, tracking resistance)	DIN EN 60 112	CTI > 600*							

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 resins 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 observing suitable test conditions on processed printed circuit boards.

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 Component A : Component 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-SB	2 : 3
VT 3402 KK-NV-SV	4 : 7
VT 3492 LS	2 : 1



Stir VT 3492 LS before use

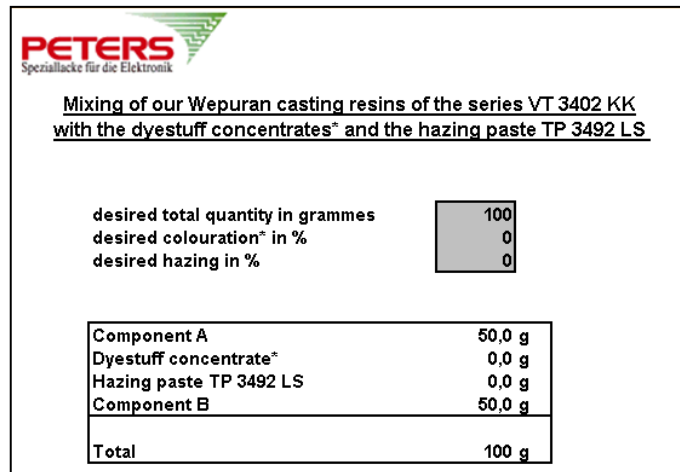
Auxiliary products recommended

- **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**
for the sealing of casting moulds and cable outlets, solvent-free, self-adhesive, permelastical, easily formed and temperature resistant
- **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 even in case of a difficult mould shape
- **Adhesion promoter EH 13.904 LED**
Good wetting performance even on critical base materials, e. g. silicone surfaces of LEDs; for an optimum adhesion with the base material in order to securely avoid light displacements by delamination of the casting resin; available for brushing or spraying
- **Adhesion promoters EH 13.950/EH 13.951**
for improving the adhesion of casting compounds and casting resins based on polyurethane or epoxy resin; **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 13.780**
for 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.

Processing of dye(stuff) concentrates and hazing paste

Dye(stuff) concentrates and hazing paste can be mixed with the casting resins of the series **Wepuran VT 3402 KK** in different mixing ratios. The quantity of component A and B of the casting resin to be applied changes accordingly. We provide a "Mix calculator" on our website www.peters.de that enables you to calculate the necessary quantities of the individual components fast and easily. The added quantity of dye(stuff) concentrates and hazing paste must not exceed a total of 40 %, for **VT 3402 KK-ALU**, **VT 3402 KK-NV-HE**, **VT 3402 KK-NV-HH**, und **VT 3402 KK-NV-SB** it must not exceed 20 %.

→ Do not mix the casting resin **Wepuran VT 3402 KK-NV-SV** with dye(stuff) concentrates or hazing paste as this will cause the UL approval to expire.



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Mixing of our Wepuran casting resins of the series VT 3402 KK with the dyestuff concentrates* and the hazing paste TP 3492 LS

desired total quantity in grammes
 desired colouration* in %
 desired hazing in %

Component A	50,0 g
Dyestuff concentrate*	0,0 g
Hazing paste TP 3492 LS	0,0 g
Component B	50,0 g
Total	100 g

Fig. 4: Input mask of a mix calculator (www.peters.de)

Examples of VT 3402 KK-NV:

	40 % colouring no hazing	20 % colouring 20 % hazing	no colouring 40 % hazing
Quantity component A	10 g	16 g	22 g
Quantity of dye(stuff) concentrate	40 g	20 g	-
Quantity of hazing paste	-	20 g	40 g
Quantity component B	50 g	44 g	38 g
Gesamtmenge	100 g	100 g	100 g



Stir TP 3492 LS before use

- Stir the dye(stuff) concentrate or the hazing paste into component A and then add component B.
- Add the hazing paste **TP 3492 LS** shortly before processing since otherwise the filler may settle.

Drying/curing

After approx. 24 hours at room temperature the casting resin is cured to an extent that it is no longer liquid or sticky; the item can then be processed. However, the final hardness is only achieved after 14 days.

Curing can be accelerated considerably by applying heat. 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-SB VT 3402 KK-NV-SV VT 3402 KK-NV-UVP	tack-free	24 h	1 h
	final hardness	14 days	2 h
VT 3402 KK-NV-LT	tack-free	24–48 h	4 h
	final hardness	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 resin.

Standard packaging

	Component A	Component B	Selling unit
VT 3402 KK	4 tins of 1 kg	4 cans of 1 kg	8 kg
VT 3402 KK-ALU VT 3402 KK-NV-HH	4 tins of 3 kg	4 cans of 5 kg	32 kg
	1 can of 15 kg	1 can of 25 kg	40 kg
VT 3402 KK-NV VT 3402 KK-NV-LT VT 3402 KK-NV-UVP	4 tins of 1 kg	4 cans of 1 kg	8 kg
	1 bucket of 5 kg	1 can of 5 kg	10 kg
	1 can of 25 kg	1 can of 25 kg	50 kg
VT 3402 KK-NV-HE	4 tins of 1 kg	4 cans of 2 kg	12 kg
	1 can of 14 kg	1 can of 28 kg	42 kg
VT 3402 KK-NV-SB	4 tins of 2 kg	4 cans of 3 kg	20 kg
	1 can of 20 kg	1 can of 30 kg	50 kg
VT 3402 KK-NV-SV	4 tins of 2 kg	4 cans of 3,5 kg	22 kg
VT 3492 LS	4 tins of 2 kg	4 cans of 1 kg	12 kg
FK 3432 FK 3452 FK 3462 YG FK 3462 DG-P	can of 1 kg	—	1 kg
TP 3492 LS	bottle of 1 kg	—	1 kg

Partial lots of the selling unit against surcharge.

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.

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