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PETERS
Speziallacke für die Elektronik

TR TECHNICAL REPORT

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Wepuran casting compounds of the series VU 4452, blue

Wepuran casting compound VU 4452/61 HE, of low viscosity
Wepuran casting compound VU 4452/71 HE, of medium viscosity

Index VU = casting compound, opaque
Index HE = high elasticity
Index 61 = mix ratio 6 : 1
Index 71 = mix ratio 7 : 1

- **high elasticity**
- **high temperature stability (Insulation class E = 120 °C)**
- **particularly suitable for use in sensor technology**

Please read this technical report and the material safety data sheet (MSDS) carefully before using the product.

1. General information

The Wepuran casting compounds of the series **VU 4452** are highly elastic and solvent-free 2-pack casting compounds based on polyurethane resins that already cure at room temperature.

2. Application

The Wepuran casting compounds of the series **VU 4452** are used as:

2.1 Casting compounds for sensor technology

2.2 Temperature-resistant sealing compounds

2.3 Casting and embedding materials for high-quality and shock-sensitive electronic components that must not be subjected to heat development in the curing phase or shrinkage/pressure load during operation, owing to thermal shocks (for instance sensors, glass diodes)

2.4 Sealing and embedding materials for heat sensors, heating elements, metal-cased capacitors, mini transformers, print transformers, cables and cable terminals

2.5 Protection of electric units and components from weather and moisture

2.6 Casting compounds for solenoids, ignition, induction and transformer coils

2.7 Casting compounds for hybrid integrated circuits

2.8 Casting compounds for HF parts, e.g. high frequency coils.

p.t.o.

3. Special notes

On account of their high elasticity, in conjunction with their unusually high temperature stability for highly elastic adjusted polyurethane resin casting compounds (insulation class E = 120°C), the Wepuran casting compounds of the series **VU 4452** can be employed in areas (e.g. sensor technology) which to date had been reserved for expensive silicone-rubber casting compounds.

Compared with **VU 4452/71 HE**, the Wepuran casting compound **VU 4452/61 HE** is of a low viscosity and can therefore also be applied for component geometries to which access is difficult.

For particularly high requirements regarding temperature stability (insulation class C > 180 °C) the use of the following silicone-rubber casting compounds is recommended:

VT 3601 E: 2-pack casting compound, **absolutely clear-transparent**; curing at room temperature, addition cross-linking, i.e. no separation products while curing; exceptionally high tear resistance; Insulation class C > 180 °C (short-term use possible up to 250 °C).

VU 4691 E: same as VT 3601 E, but **white-grey.**

VU 4692: 2-pack casting compound, **white-grey**, condensation cross-linking, medium viscosity, still good flowability, which is distinguished by an especially good thermal conductivity.

VU 4693: same as VU 4692, but **white**.

Special technical reports on these products are available and will be gladly provided upon request. In our manual these reports are filed under groups 3 and 4, respectively.

4. Characteristics

				VU 4452/61 HE	VU 4452/71 HE
4.1	**Colour/appearance**		:	blue	blue
4.2	**Viscosity at 25 °C** (measured with Haake VT 02/DK 1 *)				
	mixed	[dPas]	:	15 ± 3	26 ± 3
4.3	**Specific gravity at 20 °C** DIN 53 217, part 2				
	component A	[g/cm³]	:	1.09 ± 0.05	1.18 ± 0.05
	component B	[g/cm³]	:	1.23 ± 0.05	1.23 ± 0.05
	mixed	[g/cm³]	:	1.11 ± 0.05	1.20 ± 0.05
4.4	**Pot life of mixture** (at room temperature, approx. 18 - 23 °C; set-up quantity 500 g)	[min]	:	approx. 100	approx. 100

*Viscosity measuring unit supplied by: Haake Mess-Technik GmbH + Co
Dieselstr. 4, D - 76227 Karlsruhe
phone: +49 721 40 94 - 0
fax: +49 721 40 94 - 360, Telex: 7 826 739

5. Dangerous goods regulation

Detailed specifications of safety precautions, environmental protection, waste disposal, storage, handling, exhaust air regulations as well as other characteristics can be found in the material safety data sheet according to EEC 91/155.

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

6. Properties

The Wepuran casting compounds of the series **VU 4452** are distinguished by the following properties:

6.1 General properties

- already cure at room temperature
- solvent-free, therefore no attack of solvent-sensitive plastics and practically no perceivable odour

- very low heat development and shrinkage pressure in the curing phase
- low volume shrinkage after curing
- high elasticity to compensate material stress caused by thermal shocks
- compared with other polyurethane resin casting compounds with highly elastic adjustments extraordinarily high temperature stability (insulation class E = 120 °C)
- excellent dielectric properties in a wide temperature range
- good protection from shock, impact and vibration

6.2 Physical and mechanical properties

Property	Test method	Result	
		VU 4452/61HE	VU 4452/71 HE
Shore-A hardness after 14 days at room temperature	DIN 53 505	65 ± 5	70 ± 5
Shore-D hardness after 14 days at room temperature	DIN 53 505	14 ± 3	20 ± 3
Water absorption	24 h at 23 °C	approx. 1.8 %	approx. 1.9 %
Tensile strength $_{\varphi zm}$	DIN 53 455	2.5 MPa	2.5 MPa
Tensile strength $_{\varepsilon zm}$	DIN 53 455	44.8 %	44.6 %
E module	DIN 53 457	7.6 N/mm²	7.5 N/mm²
Insulation class	VDE 0530	E = 120 °C Limit temperature	E = 120 °C Limit temperature

6.3 Electrical properties

Property	Test method	Result	
		VU 4452/61 HE	VU 4452/71 HE
Dielectric strength	VDE 0303, part 2	46 kV/mm	36 kV/mm
Surface resistance	VDE 0303, part 3	2 x 10^{14} Ohm	2 x 10^{14} Ohm
Specific volume resistivity	VDE 0303, part 3	2 x 10^{10} Ohm x cm	1.3 x 10^{11} Ohm x cm
Tracking resistance	VDE 0303, part 3	CTI > 600	CTI > 600

7. Mixing ratio

VU 4452/61 HE: Component A : Component B = 6 : 1 (parts by weight)
VU 4452/71 HE: Component A : Component B = 7 : 1 (parts by weight)

The two components (resin component A and hardener component B) are already packed in the correct mixing ratio.
The volume of the container of component A is sufficient to accommodate the total quantity of component B.
For mixing we recommend using mechanical stirring equipment with a preferable stirring time of 10 minutes.

Our **Technical information sheet TI 15/10:** "Processing of 2-pack systems" gives detailed advice on correct mixing. We recommend your quality assurance department adopts major items adressed in **TI 15/10** in appropriate operating instructions. We would gladly send you **TI 15/10** on request. In our report manual, this technical information sheet is filed under group 15.

p.t.o.

ATTENTION: Components A and B should be stored in properly sealed containers away from moisture. Containers should be carefully sealed after use and turned through 180° to prevent moisture in the air reaching the contents as far as possible.

8. Processing

8.1 Manual processing

When processing the Wepuran casting compounds of the series **VU 4452** manually, casting is effected after complete and thorough mixing of the A and B components. As air pockets affect the final properties of the casting, make sure that no air is stirred into the compound during the mixing process. In order to remove any air pockets as effectively as possible, we suggest evacuating the casting compound before or after casting. The processing time (pot life) is about 100 minutes. During this period of time, the viscosity will increase. Therefore a batch volume should be chosen that allows perfect processing during the pot life of the mixture.

8.2. Processing in mixing and dispensing units

When using mixing and dispensing equipment the pot life is irrelevant. Since the mixing ratio (see Item 7 “Mixing ratio“) is indicated in parts by weight, the corresponding quantities to be dispensed when using volumetric mixing and dispensing equipment must be converted with the help of the specific gravities of component A and component B.
Reliable manufacturers of such equipment can be named upon request.

NOTE: See our **Technical Information sheet TI 15/2**: “Selection criteria and processing instructions for casting compounds/casting resins“ for more detailed information on processing, properties and application.

We would gladly send you **TI 15/2** upon request. In our report manual, this technical information sheet is filed under group 15.

9. Adjustment of viscosity

The Wepuran casting compounds of the series **VU 4452** are processed in the condition supplied.

ATTENTION: Do not add solvents or thinners to reduce the viscosity.

10. Auxiliary products

10.1 Sealing mastic

For the sealing of casting moulds and for cable outlets, we recommend using our sealing mastic **EH 13.271**, which is characterized by the following properties:
solvent-free, self-adhesive, permelastic, easily deformable and highly temperature-resistant.

10.2 Mould release agents

Pulyurethane resins (PUR) adhere well to almost all substrates. In order to be able to remove the casting compound from the mould after curing, the surfaces of the components to be casted must be pretreated with the mould release agent **EH 13.650**.

The aqueous release agent **EH 13.650** ensures a safe, clean and easy removal of the casting compound even in case of a complicated mould configuration. **EH 13.650** is solvent, silicone and grease-free.

Special technical reports for these products are available upon request. In our report manual, these technical reports are filed under group 13.

11. Cleaning

To clean tools, we recommend our cleaning agent **R 13.780**. Cleaning should take place immediately after processing, because cleaning becomes increasingly difficult the further the curing process progresses.

ATTENTION: Do not use the cleaning agent as a thinner or for cleaning hands.

A special technical report for this product is available on request. In our report manual, this technical report is filed under group 13.

12. Drying conditions

The curing time depends on the quantity of the casting compound applied per item. Smaller quantities require a longer period of time, larger quantities cure faster.

A quantity of 25 g will cure within approx. 24 hours at room temperature to such an extent that processing of the part can be continued. The final hardness (Shore-A hardness approx. 70) is achieved after about 10 days.

Curing can be accelerated considerably by applying heat. However, when selecting the temperature, the heat-sensitivity of the item in question must be taken into account.

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

Temperature	[°C]	:	80	100	120
Time (approx.)	[h]	:	4.5	3	2.5

After such a tempering process the final shore hardness is achieved.

13. Standard packaging

The Wepuran casting compounds of the series **VU 4452** are packed for delivery as follows:

13.1 Wepuran casting compound VU 4452/61 HE

Component A: 4 buckets of 6 kg = 24 kg in one carton
Component B: 4 cans of 1 kg = 4 kg in one carton
= 1 selling unit = 28 kg

13.2 Wepuran casting compound VU 4452/71 HE

Component A: bucket of 7 kg
Component B: can of 1 kg
= 1 selling unit = 8 kg

Partial lots of the selling units may be ordered, but will entail surcharges to cover repackaging costs.

14. Storage

In a cool, dry place, sealed original containers can be stored for at least 6 months.
In accordance with DIN EN ISO 9001, labels on containers show expiry dates.

ATTENTION: Temperatures in excess of +25 °C affect the storage stability. Opened containers must be sealed carefully after use to protect the contents from moisture and be consumed as soon as possible.

15. Further literature

In addition to the recommendations given in this technical report, we can provide our own technical publications which give highly detailed information on the application and processing of our products.

Report 103:
Protective lacquers and casting compounds for inserted printed circuit boards (in German)

Report 131 E:
New casting compounds and conformal coatings for sensor technology

Technical Information Sheet TI 15/2 E:
Selection criteria and processing advice for casting compounds/casting resins

Technical Information Sheet TI 15/10 E:
Processing of 2-pack systems

p.t.o.

16. Further products for the production of pcbs

Our production programme includes all special lacquers for the production of printed circuits:

16.1 Dewatering fluids:
For dehydration and preservation of printed circuit boards.

16.2 Water-dipping varnishes:
Dewatering varnishes for printed circuit boards with excellent protection against corrosion.

16.3 Solder flux lacquers:
For dip coating and roller coating processes against PCB corrosion.

16.4 Etch resists:
Resistant up to pH 10, strippable in caustic soda, UV and conventional curing.

16.5 Plating resists:
Resistant at all pH levels, UV and conventional curing.

16.6 ELPEMER photoresists:
Photo-sensitive etch and plating resists, aqueous-alkaline as well as polyalcohol-developable, strippable in caustic soda solution, for screen-printing, curtain coating and roller coating procedures.

16.7 Solder resists:
1- and 2-pack solder resists, available as low solvent content and solvent-free adjustments, non-bleeding, highly flexible, oven-drying, UV-curing, UV-sensitive.

16.8 ELPEMER photo-sensitive solder resists:
Photo-sensitive 2-pack solder resists, polyalcohol-developable and/or aqueous-alkaline developable, for the procedures screen-printing, curtain coating and electrostatic spraying.

16.9 Peelable solder resists:
Suitable for covering parts of circuit boards which should not be in direct contact with the solder bath such as gold contacts, card-edge connectors, tip contacts, through-platings in SMT-mixed assemblies, etc. Peelable before and/or after soldering process.

16.10 Via-hole fillers:
1-pack screen printing inks to fill via holes. Enables vacuum-incircuit test even for SMT-PCBs.

16.11 Marking inks, legend inks:
Conventional 1- and 2-pack inks as well as UV-curing systems.

16.12 ELPEMER photo-sensitive marking inks, legend inks:
Photo-sensitive 2-pack marking inks for the application in screen-printing; print is made in blank screen, so that no time-consuming preparation of a screen-stencil is required.

16.13 Carbon-conductive inks:
Substitute for gold at contact points; for the production of crossing tracks.

16.14 Auxiliary products for PCB-fabrication
This extensive range of products includes thinners, retarders, screen-openers, anti-static sprays, anti-static agents, screen-cleaning agents, cleaning agents for screen-washing units and lacquer-processing units.

16.15 Fluxing agents:
For hot-air-levelling and roller-tinning processes.

16.16 Cleaners:
For deoxidizing copper surfaces without metal degradation.

16.17 Defoamants:
For the elimination of foam in acid and weak alkaline baths; for defoaming in aqueous-alkaline developers; **silicone-free and biologically degradable**.

Special technical reports for these products are available on request.

17. Further products for the electronics/electrical engineering industries

For the production and processing of assembled printed circuits and for electrical engineering we recommend the following products:

17.1 Chip adhesives
1-pack systems, thermally curing, for fixing SMD components before wave soldering.

17.2 Solder pastes
Thermoplastic and conventional systems for fixing and connecting SMD components.

17.3 Conformal coatings
Protective lacquers for assembled PCBs on the basis of polyurethane, polyacryl and epoxy resins.

17.4 Casting compounds
Cold and thermal curing casting compounds for casting assembled PCBs, print and mini transformers, transformers and solenoids on the basis of epoxy, polyurethane and silicone-rubber.

17.5 Adhesives and adhesive lacquers
For numerous adhesion techniques in the electronics and the electrical engineering industries.

17.6 Casting resins
For impregnating and insulating of all kinds of coil shells, particularly for small anchors with a high number of revolutions.

17.7 Electro pastes
Cementing compounds for coil shells and solenoids, also for anchor and electro adhesives for the mechanical engineering industry.

17.8 Impregnating varnishes
Impregnating varnishes for all kinds of coil shells, particularly for transformer coils.

17.9 Auxiliary products for the electronics
Chipping lacquers, sealing agents, mould-release agents, cleaning agents, ink strippers, etc.

Special technical reports on these products are available on request.

Supplement to technical report for
Wepuran casting compounds
of the series

VU 4452

Edition LP 961303 E-0

14. Storage

In a cool, dry place, sealed original containers can be stored for at least **4** months.

In accordance with EN ISO 9001 / ISO 9001 labels on containers show expiry dates.

Temperatures in excess of +25 °C [77 °F] affect the storage stability. Opened containers must be sealed carefully after use to protect the contents from moisture and be consumed as soon as possible.

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