SILRES® 64558 VP

Silicone Resins

SILRES® 64558 VP is a toluene-based ready-to-use formulation on the basis of polysiloxanes and silicone resins. The product is preferably used as a binder in highly flexible composite tapes, or as an intermediate to manufacture silicone pressure-sensitive adhesive (PSA) formulations.

In composites tapes SILRES® 64558 VP contributes to the tapes' excellent electrical insulation properties and outstanding long-term heat resistance. Besides, composite tapes made with SILRES® 64558 VP are highly stable against environmental impacts, such as moisture, pollutants and UV light, and they can therefore be exposed continuously to constantly changing climatic conditions or UV radiation.

Properties

- Liquid, solvent-borne formulation
- Fast curing at elevated temperature, when catalyzed
- Gives a flexible touch-dry solid body, when fully cured

Specific features

- Condensation-curing
- Electrically insulating
- Fast curing under heat
- Heat resistant
- Hydrophobic
- Solvent-based
- UV & weathering-resistant

Technical data

General Characteristics

Property	Condition	Value	Method
Colour	-	colourless	-
Density	25 °C	approx. 0.95 g/cm^3	-
Solids content	-	approx. 40 wt. %	-
Supply form	-	toluene based solution	-
Viscosity, dynamic	25 °C | Brookfield, spindle 2 / 2,5 rpm	2100 mPa·s	DIN EN ISO 2555

These figures are only intended as a guide and should not be used in preparing specifications.

Applications

- Mica Tapes

Application details

- Manufacture of composite tapes (e.g. mica tapes, glass fibre tapes)
- Manufacture of silicone pressure-sensitive adhesive (PSA) formulations

Processing

Handling

SILRES® 64558 VP is supplied as a ready-to-use formulation that, depending on the respective application, needs to be catalyzed for further modification or for curing. As catalysts basic compounds and metal salts of acetylacetonate or of long-chained carboxylic acids proved most useful.

IMPORTANT: the pot life of the catalyzed SILRES® 64558 VP is limited, even at room temperature. We therefore recommend to add catalysts immediately before use and to process the catalyzed formulation within the next few hours. Please note: catalysis of SILRES® 64558 VP is most efficient with liquid catalysts and with catalysts that are soluble in toluene. Besides, the reaction speed depends on the type of catalyst selected, the catalyst amount and temperature.

The solids content of SILRES® 64558 VP is 40 wt.%. If necessary, the product can be diluted with additional solvents (toluene, xylene, THF, aliphatic hydrocarbons) to match specific process needs. In some cases adding up to 10 wt.% butanol or methylisobutylketone (MIBK) helps to modify both the reactivity and the wetting capability of the silicone resin formulation. SILRES® 64558 VP can also be blended with other silicone compounds in order to adapt the final reaction product to the respective application requirements.

Typical Applications

SILRES® 64558 VP is designed for the formulation of silicone pressure-sensitive adhesives (PSA) and for the manufacture of composite tapes. For both applications the product needs to be processed in the presence of a condensation curing catalyst and at elevated temperature.

1. Manufacture of Mica Tapes:
Fully cured SILRES® 64558 VP is a flexible touch-dry solid body. Since it additionally provides excellent electrical insulation properties, outstanding heat resistance, water repellency and long term stability against weathering, moisture and UV light, this silicone resin formulation is often used as a binder for flexible mica tapes.

For this particular application purpose WACKER's patent specification DE 10 2005 030 discloses a simple "in-situ process" sequence which avoids the time-consuming preparation of silicone PSA formulations typically used in the past:

1. SILRES® 64558 VP is diluted by additional solvent to form a silicone resin formulation with a solids content of about 10 - 20 wt.%.

2. Before processing the curing catalyst is added. Suitable catalysts are GENIOSIL® GF 91 or WACKER® Catalyst K83, which are applied in a quantity of typically 2 - 5 wt.% (based on the solids content of the silicone resin formulation). The catalyzed formulation is then immediately transferred to the impregnation reservoir of the process equipment.

3. For the impregnation of the glass cloth the fabric web is run through the impregnation reservoir.

4. Following to this, binder-free dry mica paper web is laminated to the wet glass cloth layer by a roller set.

5. After the SILRES® 64558 VP formulation has been soaked by the mica paper, the moist bilayer assembly is dried at moderate temperature (90 to 130 °C) in a circulating air oven to remove all solvents.

6. Finally, the laminate web is fully cured under heat (150 °C or higher), rolled up in layers on a hollow roll and cut into smaller sections to give mica tape rolls of desired width.

Typical curing conditions are listed in adjacent table above. Please note: manufacturing composite tapes is a complex process that needs a thorough control of various process parameters, such as temperature, catalyst quantity, nature of catalyst, solvent composition, machine specific conditions, etc. Therefore, the following indications are intended as a guide only, and we recommend running preliminary tests to optimize the particular process conditions.

Curing time, minutes Curing Temperature:	150 °C	200 °C
Catalyst quantity: 2 wt.%	15 min.	5 min.
Catalyst quantity: 3 wt.%	10 min.	3 min.
Catalyst quantity: 5 wt.%	3 min.	1 min.

Catalyst quantity given in % by weight, based on the solids content of the silicone resin formulation.

2. Manufacture of Silicone Pressure Sensitive Adhesive (PSA) Formulations:

Under heat and in the presence of catalysts that accelerate the condensation reaction if silanol groups, SILRES® 64558 VP can be converted into silicone PSA formulations. Suitable catalysts are basic compounds, such as alkali metal hydroxides, alkali metal alcoholates, tetraalkylammonium hydroxides or tetraalkylguanidinium salts, which are added in a quantity of 100 - 1000 ppm (based on the solids content of the reaction mixture).

The catalyzed blend is reacted for 1 - 3 hours at 100 - 120 °C to convert SILRES® 64558 VP into the silicone PSA compound. Silicone PSA formation is indicated by a steep increase of viscosity. The reaction is complete when viscosity remains constant for at least 15 minutes. Finally, the solids contents can be adjusted to the particular needs by either distilling off or adding solvent.

For an optimum balance of surface tack, adhesive strength and cohesive strength, the silicone PSA compound can be modified by adding some WACKER® A 232 (up to 25 wt.%, based on the solids content of the formulation) either before or after the conversion process.

Please note: reaction time and reaction temperature depend on the catalyst type and its amount used. We therefore recommend running preliminary tests to optimize the particular process conditions.

Packaging and storage

Storage

Store in a dry and cool place.

The 'Best use before end' date of each batch is shown on the product label.

Storage beyond the date specified on the label does not necessarily mean that the product is no longer usable. In this case however, the properties required for the intended use must be checked for quality assurance reasons.

Safety notes

SILRES® 64558 VP contains toluene. The solvent vapours must not be inhaled in high concentration. Work areas should therefore be well ventilated.

Comprehensive instructions are given in the corresponding Material Safety Data Sheets. They are available on request from WACKER subsidiaries or may be printed via WACKER web site http://www.wacker.com.

QR Code SILRES® 64558 VP

For technical, quality or product safety questions, please contact:

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