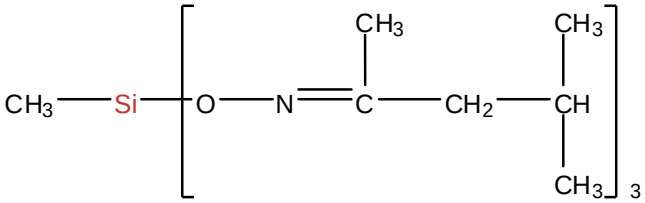
SiSiB® PC7133

Methyltris(methylisobutylketoxime)silane

Chemical Structure



Introduction

The problem with known tetrafunctional oximino silanes (i.e., e.g., those based on methyl ethyl ketoxime (MEKO) and acetone oxime) is that they are solids at room temperature. Since such compounds are very sensitive to moisture they decompose easily to semisolids which are difficult to handle. Thus, these materials have a poor shelf life and require special care in their packaging and transporting.

The known tetrafunctional and trifunctional oximino silanes (i.e., e.g., those based on MEKO and acetone oxime) have other drawbacks. Traditionally, when these materials have been combined with silicone polymers the resulting product has been opaque. This has substantially limited the applications in which these materials can be used.

As the applications in which room temperature curing compositions can be utilized continue to increase, the specific kinds of properties required of these compositions continue to change.

So we are continually looking for room temperature curing compositions having new desirable properties without the old undesirable properties like opacity and physical state limitations (solids). We have surprisingly discovered these silanes satisfy this need.

Methyl tris-(methyl isobutyl ketoximino) silane
Vinyl tris-(methyl isobutyl ketoximino) silane
Tetrakis-(methyl isobutyl ketoximino) silane

As currently used in sealant compounding, commercial tetra-functional oximino silanes are either mixed (dissolved) in trifunctional oximino silanes or dissolved in organic solvents.

In the former case solubility limits the level of tetrafunctional oximino silane in the trifunctional oximino silane to 35-40% at room temperature. This is disadvantageous

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because higher levels of tetrafunctional oximino silane increase cure rate and minimize (if not eliminate) the need for a catalyst.

In the latter case, solid tetrafunctional oximino silanes were mixed with hydrocarbons like toluene, benzene and xylene, organic ethers like diethylether and dibutylether, ketones and halogenated solvents to facilitate ease of handling in applications which require precise amounts of tetrafunctional oximino silane. Because some of these solvents are flammable and carcinogenic, further precautions must be taken to ensure the safety of personnel during processing. In addition, one must ensure that the vapor emissions from the finished sealant products generated during end use are safe for people and the environment. These precautions are both costly and time consuming.

Solubility is also a concern. That is, for example, at room temperature, tetrafunctional MEKO-based silane is only 50% soluble in toluene and in methyl ethyl ketoxime, 40% soluble in diethyl ether and 10% soluble in dibutyl ether. As a result, significant amounts of solvent may be required in the formulation. In addition, crystallization can occur at lower temperatures (i.e., during shipping in winter months) and at higher concentrations of the tetrafunctional oximino silane.

Because of this, there has been a long felt need in the industry for tetrafunctional oximino silanes which do not require organic solvents or mixing with trifunctional oximino silanes. We have surprisingly discovered that the novel tetrakis oximino silane, e.g. tetrakis-(methyl isobutyl ketoximino) silane is liquid and thus do not suffer with the same problems as their solid counterparts. These new silanes offer the ability to employ solvent-free formulations, if not significantly decrease solvent content in the composition. In addition, there is added flexibility and simplification when formulating room temperature moisture-curable silicone compositions. Because the new silanes are liquid tetrafunctional oximino silanes, one can add more of these silanes to increase the cure rate of the composition. The amount of other tetrafunctional oximino silanes which can be used in this type of silicone composition is limited by their solubility in the solvent.

In addition to the novel liquid tetrafunctional oximino silanes, we have also found that when these novel oximino silanes (tetra-oximino, tris-oximino or bis-oximino) are formulated with hydroxyl terminated polydimethylsiloxane (HTPDMS), an optically clear silicone rubber results. [From US5717052]

Typical Physical Properties

CAS No.:	37859-57-7
EINECS No.	423-580-0

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Methyltris(methylisobutylketoxime)silane

Formula	$C_{19}H_{39}N_3O_3Si$
Molecular Weight	385.6
Boiling Point	No data °C
Flash Point	Min. 63°C
Color and Appearance	Clear to straw liquid
Assay	Min. 90.0%
Total Low Boilers	Max. 6.0%
Total High Boilers	Max. 5.0%
MIBKO content	Max. 3.0%

Applications

SiSiB® PC7133 is used as a novel neutral curing agent in silicone sealant formulations.

Packing and Storage

SiSiB® PC7133 is supplied in net weight 180Kg steel drum or 900Kg IBC container.

In the unopened original container SiSiB® PC7133 has a shelf life of one year in a dry and cool place.

Notes

All information in the leaflet is based on our present knowledge and experience. We reserve the right to make any changes according to technological progress or further developments. Performance of the product described herein should be verified by testing.

We specifically disclaim any other express or implied warranty of fitness for a particular purpose or merchantability. We disclaim liability for any incidental or consequential damages.

Please send all technical questions concerning quality and product safety to: silanes@SiSiB.com.

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