Technical Data Sheet

Cohedur®
RS

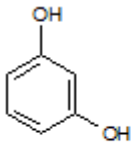
Specialty and Standard Chemicals

Function

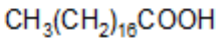
Cohedur® RS is a direct bonding agent for rubber to fabric and rubber to steel cord bonding.

Product description

Composition: homogeneous solidified melt of resorcinol and stearic acid in the ratio 2 : 1



Resorcinol



Stearic acid

Appearance: beige to slightly reddish brown lentil-shaped granules
Density: approximately 1.2 g/cm³

Property	Nominal value	Unit	Test method
Melting point	109.0 ± 3.0	°C	13 G
Content of resorcinol	67.0 ± 2.5	%	NIR spectroscopy

Use

Mode of action: Cohedur® RS is a component of the direct bonding system, also known as Cohedur® or RFS system. RFS bonding systems are multi-component systems. They are created by providing the rubber component with a resorcinol component, a methylene component, and reinforcing silica, e.g. Vulkasil® S.

The bonding effects of RFS systems result from a condensation reaction between the resorcinol and methylene components, which takes place during the vulcanization and is catalyzed by the silica.
The disadvantages of pure resorcinol, such as dust formation and poor dispersion, are eliminated by the special formulation of Cohedur® RS, a blend of resorcinol and stearic acid. The stearic acid serves as a dispersant.

As methylene component, Cohedur® A grades or hexamethylene tetramine (Cohedur® H 30 or Rhenogran® Hexa-80) are used. The bonding agents belonging to the Cohedur® range are most effective in such diene rubbers as natural rubber, SBR (e.g. Krylene®), BR (e.g. Buna® CB, Taktene®), NBR (e.g. Perbunan®, Krynac®), and CR (e.g. Baypren®). They also improve the adhesion substantially when used with polymers having a higher degree of saturation, e.g. EPDM (e.g. Buna® EP). Their use in conjunction with silicone rubber is not recommended. The most commonly used textile fibers, such as rayon, polyamide and polyester (with special spin finish), and brass- or zinc-plated steel cord can be bonded to rubber directly with the Cohedur® system.

Processing:

The temperature needed for fairly uniform dispersion of resorcinol in rubber is so high (> 120 °C) that resorcinol fumes cause inconvenience to operators. This difficulty, which arises with pure resorcinol, is not encountered when the special formulation of Cohedur® RS is used. Nevertheless, Cohedur® RS should be added to the other ingredients of the compound at a relatively early stage. As resorcinol is not freely soluble in rubber, blooming is possible. The risk of blooming is increased through the formation of resotropine when hexamethylene tetramine is also present. Cohedur® A grades in this respect are advantageous, because they form rubber-soluble adducts, thereby suppressing the blooming tendency of resorcinol.

A very important aspect is the selection of the curing system. Acceleration must be chosen to permit sufficient flow time for adhesion development before the scorch has proceeded too far.

For textile is bonding, good results have been achieved with conventional vulcanization systems, e.g. those which include 2.5 phr sulfur and sulfenamides as accelerators. Secondary acceleration by a guanidine accelerator (Vulkacit® D) is recommended. Ultra-accelerators have predominantly adverse effects on the adhesion. Sulfur has a decisive adhesion-promoting effect where bonding of rubber to steel cord is concerned. The adhesion therefore improves as the proportion of sulfur is increased (4 - 7 phr). Sulfenamides should be used as accelerators, Vulkacit® DZ (DCBS) giving the highest bond strength values. High zinc oxide levels promote the adhesion. Direct bonding compounds should not contain large amounts of stearic acid. Therefore the stearic acid content of Cohedur® RS should be taken into consideration.

After the methylene compound has been added, the temperature of the batch should be kept as low as possible (< 100 °C) to prevent a premature reaction with the resorcinol. Cohedur® bonding compounds can be cured by the usual methods at temperatures within a wide range, e.g. 130 - 190 °C. Press cures give the best adhesion values because the molding pressure forces the compound deep into the fabric or steel cord structure. Vulcanization in hot air, or steam, is possible also. To achieve a good contact between the compound and the fabric or steel cord the coating should be carried out under adequate pressure.

Vulcanizate Properties:

As a result of the condensation process, RFS bonding systems slightly raise the modulus, tensile strength, and the hardness of the vulcanizates, while reducing elongation at break.

Like all bonding systems containing resorcinol, combinations of Cohedur® RS with Cohedur® A grades, Cohedur® H 30 or Rhenogran® Hexa-80 give light-colored vulcanizates a reddish brown color, but this does not migrate to adjacent rubber layers in which the RFS system is not present. The discoloration can be reduced by adding titanium dioxide.

Dosage:

Typical levels of addition based on 100 parts by weight of elastomer are:

Cohedur® RS	3.4 phr	3.4 phr
Cohedur® A *)	2.3 phr	---
Cohedur® H 30	---	1.5 phr
Vulkasil® S	10 - 30 phr	10 - 30 phr

*) Cohedur® A 200; for Cohedur® A 250 the quantity must be doubled.

Solubility

Cohedur® RS is soluble in alkalis and insoluble in water.

Packaging

20 kg paper bag on 900 kg skid.

Storage stability

In original closed containers under cool (approximately 25 °C) and dry conditions 730 days from date of production.

Handling

For additional handling information on Cohedur® RS please consult current safety data sheet.

These raw material properties are typical and, unless specifically indicated otherwise, are not to be considered as delivery specification.

RheinChemie Additives

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