Technical Data Sheet

Cohedur®
H 30

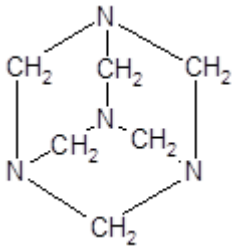
Specialty and Standard Chemicals

Function

Cohedur® H 30 is a direct bonding agent for rubber to fabric and rubber to steel cord bonding.
Hardening agent for reinforcing phenol formaldehyde resins.
Amine accelerator.

Product description

Composition: hexamethylene tetramine (HMT) with amorphous silica (about 3 %)



Appearance: white powder
Density: approximately 1.3 g/cm³

Property	Nominal value	Unit	Test method
Assay	≥ 95.0	%	2011-0582001-00
Ash content (at 800 °C)	2.5 ± 0.5	%	17 E
Sieve residue (0.063 mm)	≤ 0.8	%	DIN EN ISO 4610

Use

Mode of action: Cohedur® H 30 is a component of the direct bonding system, also known as RFS system. RFS bonding systems consist of resorcinol, e.g. Cohedur® RS and Rhenogran® Resorcin-80 or Cohedur® RK (specially developed for polychloroprene), a methylene component or formaldehyde donor, e.g. Cohedur® H 30, and silica, e.g. Vulkasil® S. The condensation reaction between these components takes place during vulcanization and thus provides the bonding effect.

This RFS system is most effective in diene rubbers like NR, SBR (e.g. Krylene®), BR (e.g. Buna® CB, Taktene®), NBR (e.g. Perbunan® NT, Krynac®), and CR (e.g. Baypren®). 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 the rubber directly with the RFS system. However, it should be noted that Cohedur® H 30 can cause damage to polyester fibers by aminolysis and corrosion of steel cord by the formation of ammonia in a humid atmosphere. Therefore replacement by Cohedur® A grades is recommended in these cases. Where zinc-plated steel cord is concerned, the addition of lead oxide (e.g. Rhenogran® PbO-80) improves the adhesion between metal and rubber.

A precondensed phenol formaldehyde resin, a so-called novolak (e.g. Rhenosin® RB), requires a formaldehyde donor like Cohedur® H 30 as a hardening agent to form the reinforcing resin. Formaldehyde reacts with phenols in the resin to form a separate interpenetrating network.

Cohedur® H 30 is also a slightly basic accelerator. It gives an immediate onset of cure but reacts fairly slowly. Compounds containing solely Cohedur® H 30 have an

unfavorable vulcanization plateau and reversion tendency. They can be activated and boosted by mercapto accelerators (e.g. Vulkacit® DM, Vulkacit® Merkapto).

Cohedur® H 30 serves as a secondary accelerator for compounds containing mercapto accelerator. It is used extensively in corresponding combinations.

Processing:

Cohedur® H 30 is easily dispersed in rubber, provided it is dry. Pure hexamethylene tetramine powder cakes together if stored for a fairly long time. The presence of 3 % silica keeps the powder free-flowing.

Due to the thermal sensitivity of the RFS bonding system, Cohedur® H 30 has to be added as a final ingredient of the mix together with sulfur and accelerators. Generally, blooming does not occur but in the presence of resorcinol, resotropine, a rubber-insoluble adduct, can be formed. The batch temperature should be kept as low as possible during the mixing process. Temperature-related difficulties are not encountered up to about 90 °C.

The selection of the curing system is an important aspect for bonding compounds. Accelerators must be chosen to permit sufficient flow time for adhesion development before the scorch has proceeded too far. For textile bonding, good results have been achieved with conventional vulcanization systems, e.g. those which include 2.5 phr sulfur and sulfenamides as accelerators. Where bonding of rubber to steel cord is concerned, adhesion 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.

RFS 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.

Vulcanizate Properties:

As a result of the condensation process, RFS bonding systems raise the modulus, tensile strength, and the hardness of the vulcanizate, while reducing elongation at break. This effect is increased because of the acceleration effect of Cohedur® H 30.

Cohedur® H 30 has no staining effect. However, because of the reaction with resorcinol, a light-colored compound will show a reddish-brown discoloration. This can be reduced by adding titanium dioxide.

Dosage:

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

Cohedur® H 30	1.5	phr
Cohedur® RS	3.4	phr
Vulkasil® S	15 (10 - 30)	phr

Typical levels of addition as an accelerator in phr:

Application		Cohedur® H 30	Additional accelerator		Sulfur
NR	thick-walled articles	0.7 - 1.5	---		2.5 - 4.0
	roll covers	0.35	0.35	Vulkacit® D	3.5
	as secondary accelerator	0.1 - 0.3 0.2 - 1	0.2 - 0.25 0.7 - 1.5	Vulkacit® Thiuram Vulkacit® Merkapto or Vulkacit® DM	2 - 2.5 2 - 3
SBR	as secondary accelerator	0.3 - 1.3	1 - 2	Vulkacit® Merkapto or Vulkacit® DM	1.6 - 2.3

Solubility

Cohedur® H 30 (active ingredient) is soluble in water, ethanol, and methylene chloride; slightly soluble in ethyl acetate, and acetone; and insoluble in aliphatic hydrocarbons.

Packaging

20 kg paper bag on 700 kg skid.

Storage stability

In original closed containers under cool (approximately 25 °C) and dry conditions 183 days from date of production.

Handling

For additional handling information on Cohedur® H 30 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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