

Vulkalent® G

Specialty and Standard Chemicals

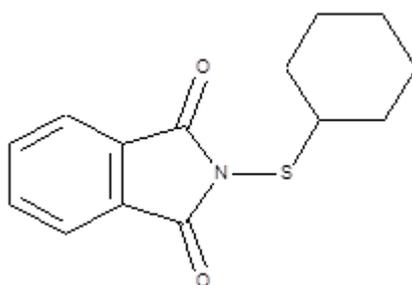
Function

Vulkalent® G is a highly effective retarder. It is more powerful than Vulkalent® E/C, especially in cases where sulfenamide accelerators are used.

Vulkalent® G is also a replasticizing agent.

Product description

Composition: N-cyclohexylthiophthalimide (CTP)



Appearance: beige crystalline powder
Density (at 20 °C): approximately 1.35 g/cm³

<u>Property</u>	<u>Nominal value</u>	<u>Unit</u>	<u>Test method</u>
Final melting point	≥ 89.0	°C	ASTM D 1519 A
Assay	≥ 95.0	%	RUC 331
Volatile matter	≤ 0.5	%	ASTM D 4571 (15-23)
Ash content	≤ 0.2	%	ASTM D 4574
Insoluble in toluene	≤ 2.0	%	ASTM D 4934
Sieve residue (0.85 mm)	≤ 3.0	%	ASTM D 5461
Sieve residue (2 mm)	≤ 0.05	%	ASTM D 5461

Use

Mode of action: Vulkalent® G greatly extends the scorch time, and therefore the flow time, of the compound before the start of vulcanization. The retarding effect is proportional to the amount used provided that Vulkalent® G is used at the recommended levels. Vulkalent® G does not affect the vulcanization curve. Thus, for example, it does not influence the steepness of the vulcanization curves obtained with sulfenamide accelerators. In contrast to organic acids Vulkalent® G does not extend the vulcanization time.

If the extension of the scorch time (e.g. the Mooney scorch time) is taken as measure of the effectiveness of a retarder, Vulkalent® G is most effective when used in conjunction with sulfenamide accelerators (Vulkacit® CZ, Vulkacit® NZ, Vulkacit® DZ). Here Vulkalent® G is several times more effective than Vulkalent® E/C and is considerably more effective than organic acids. For example, in compounds that are based on NR or SBR, contain N 330 black and a normal amount of sulfur, and are accelerated with Vulkacit® CZ or Vulkacit® NZ, Vulkalent® G is 2.5 - 3 times more effective than Vulkalent® E/C.

Vulkalent® G also has a considerable effect when used in conjunction with mercapto accelerators (Vulkacit® Merkpto, Vulkacit® DM). Here Vulkalent® G generally has a slightly better effect than Vulkalent® E/C and considerably more effect than organic acids.

Vulkalent® G is likewise effective in conjunction with other accelerators, e.g. Rhenocure® TMTD/C (with sulfur) and basic accelerators such as Rhenocure® D/EG-C.

The effect of Vulkalent® G is not determined entirely by the accelerator / sulfur system, however. Its retarding action also depends on the polymer (being powerful to very powerful in NR, NBR, and SBR, but less powerful in EPDM and IIR) and on the fillers (Vulkalent® G has a powerful effect in compounds containing reinforcing carbon blacks).

The sulfur level is another important factor. Vulkalent® G gives the best results when sulfur is used at the normal level of 1.5 - 3.0 phr, based on 100 phr rubber.

In thiuram cures (with little or no sulfur), Vulkalent® G is either ineffective or has very little effect. Vulkalent® G is not recommended for use in conjunction with crosslinking systems based on peroxides, resins, or metal oxides.

Processing: Vulkalent® G is easy to incorporate and disperses entirely satisfactorily. It has practically no influence on the viscosity of the compound.

Vulcanizate Properties: Experience gained so far indicates that Vulkalent® G has no effect on the ageing behavior of vulcanizates.

At the normal level of 0.1 - 0.4 phr, based on 100 phr rubber, Vulkalent® G has no effect on the mechanical properties of the vulcanizates (modulus, permanent set, rebound resilience, abrasion loss).

If it is necessary to use more than 0.4 phr Vulkalent® G, there may be a slight reduction in modulus, though this depends on the formulation. This reduction can be prevented by slightly increasing the sulfur or accelerator levels.

Vulkalent® G has not been known to cause contact staining. Light-colored vulcanizates containing Vulkalent® G may show a slight beige discoloration on prolonged exposure to sunlight or to ultraviolet radiation.

Vulkalent® G may cause blooming if it is used at fairly high levels (i.e. above 0.5 phr per 100 phr rubber). The efflorescence consists of phthalimide, a decomposition product of Vulkalent® G. The extent of any blooming, and the chances of it occurring, vary according to the composition of the compound (polymer, filler, accelerator, plasticizer). The efflorescence can generally be removed by washing the goods with water.

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

As a retarder 0.1 - 1.0 phr Vulkalent® G, in most cases 0.1 - 0.5 phr are used; as a replasticising agent 0.2 - 1.0 phr.

Application: As a retarder, Vulkalent® G is suitable for compounds based on NR, IR, BR, SBR (including oil-extended SBR), NBR, IIR, or EPDM, for which it can be used in conjunction with sulfur (or sulfur donors) and sulfenamide, mercapto, thiuram, dithiocarbamate, or basic accelerators. This retarder – especially if it is used in conjunction with sulfenamide accelerators – enables the processing safety of unvulcanized compounds to be varied within wide limits with a view to raising productivity (it permits high mixing temperatures and is suitable for compounds that are calendered, injection molded, or extruded).

Vulkalent® G is particularly suitable for maintaining or improving the storage stability of finalized compounds.

Vulkalent® G is suitable for tire compounds of all types (for tire treads, camelback, bead fillers, steel cord direct bonding compounds, sidewalls) and for compounds used in the production of technical goods of all kinds (conveyor belting, hose, profiles, sheet, footwear soling sheet, molded soles, dock fenders etc.).

In addition, Vulkalent® G can also be used to replasticize compounds that have been exposed to heat for too long and therefore cannot be molded or undergo additional processing without the risk of scorching.

Solubility

Vulkalent® G is easily soluble in acetone, ethyl acetate, methylene chloride; soluble in methanol; slightly soluble in n-heptane; insoluble in water.

Packaging

25 kg paper bag on 750 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 Vulkalent® G 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.

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LANXESS Deutschland GmbH
BU Rhein Chemie
Kennedyplatz 1
50569 Cologne, Germany
Phone: +49 (0)221 8885-0
E-Mail: rubber.additives@lanxess.com
<http://rch.lanxess.com>