

Technical Information Sheet

DeLink Technology

Description:

DeLink is a patented mixture of chemicals which can uncouple sulfur-sulfur crosslinks at ambient temperature with the assistance of the shearing action from any standard rubber mixing machines.

Intended Use:

DeLink can be used to recycle factory waste and discarded rubber products such as scrap tyres which have been ground to 20-40 mesh. The resultant material can be molded and vulcanized on its own, without the further addition of any vulcanizing agents or blended with other virgin compounds.

Product Feature:

DeLink can be used to devulcanize sulfur vulcanized natural and or synthetic rubber vulcanisates. It is safe and easy to use under ambient conditions.

Limitations:

It can only be applied on sulfur vulcanized scrap rubber.

Recommended Formulation:

It is recommended that a minimum of 2 parts of DeLink is used for every 100 parts by weight of the waste or scrap material.

<i>Typical Formulation</i>	<i>DeVulc</i>	<i>Green Rubber</i>
DeLink	2 parts	2 parts
Rubber Scrap	100 parts	
Tyre Crumb		100 parts
Raw Rubber		5 parts
Stearic Acid		2 parts

Scrap Material Preparation:

- Factory Waste:** It is recommended that the waste material is first ground or size reduced before it is used. It is preferred that the material is kept for 16 hours prior to devulcanization.
- Discarded Rubber Products:** Scrap rubber products such as tyres must preferably be ground to 20-40 mesh. At present, there are many tyre crumbing facilities throughout the world which grind scrap tyres into various crumb sizes. The crumb should be free of contaminants such as metal, fiber, and soil for best results to be obtained.

Machinery Required:

Standard rubber machinery providing shear can be used to recycle the scrap rubber.

- On a laboratory mill of friction ratio of 1:1.3, the DeLink process takes 8-10 minutes to complete.
- On a refiner mill the recommended friction ratio is 1:1.4-1.8. It is advisable to fix a return conveyor to the refiner to improve production efficiency, and a chiller to ensure that the material temperature is kept below 100°C.
- However, on a larger scale, a banbury, intermix, or twin screw extruder can be added on to the production line.

Instruction:

1. **Devulcanization Process:** The DeLink reaction is mechano-chemical. DeLink is added to the rubber scrap and allowed to react under shear until the material is devulcanised. It can take from 5-10 minutes for the reaction to complete depending on the machinery and the material used. The resultant material is called DeVulc.
2. **Mixing Process:** When using tyre crumb as the raw material, the DeVulc produced has high viscosity and is friable. Raw rubber and stearic acid are added and allowed to mix for a further 4 minutes. The rubber improves the green strength and the stearic acid acts as an internal lubricant allowing the resultant material, Green Rubber to have improved processing consistency.

Typical Properties:

Typical Physical Properties of Green Rubber (tyre crumb)and Glove DeVulc: *Technical data should be considered representative or typical only and should not be used for specification purposes.*

<i>Tensile Properties</i>	<i>DeVulc Reject Gloves</i>	<i>Green Rubber Tyre Crumbs (20-40#)</i>
M100 (MPa)	0.60	1.80
M300 (MPa)	1.50	6.90
TS (MPa)	12	9
EB (%)	900	350

The properties above refer to 100% DeVulc and Green Rubber. However, in actual practice DeVulc or Green Rubber can be compounded to meet customer's requirements, or it can be used in blends with original compounds. The proportion of DeVulc or Green Rubber to be used will depend on the processing, product specifications and cost considerations of the manufacturer.

Applications:

DeLink can be used to regenerate factory waste such as trimmings, flashes, scorched compounds such that they can be added back to the original compounds with minimal loss in properties.

Green Rubber that are produced from discarded products such as scrap tyres can be used in varying proportions in blends with original compounds to make a wide variety of products.

Examples of Potential Products:

Retread, bicycle tyres, motorbike tyres, solid tyres, conveyor beltings, molded products, sheeting materials, automotive parts, mats, and many others.

Benefits:

- Provides a very real prospect of zero waste rubber manufacturing environments with immediate cost-benefits.
- Provides manufacturers an opportunity to use recycled material to reduce cost while supporting a Green Environmental Policy.
- Provides a solution to national/global environmental efforts to reduce global waste concerns and to conserve relatively scarce raw materials through the recycling of scraps.

Disclaimer

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