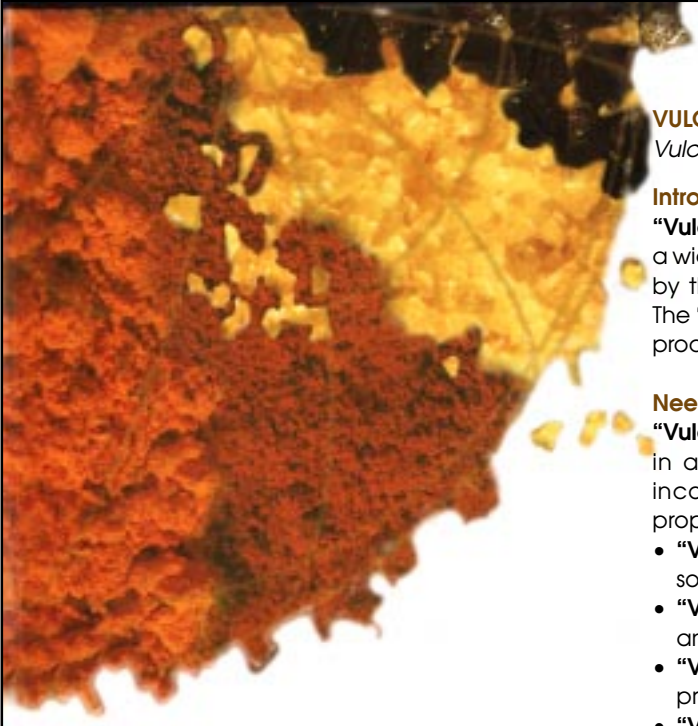
Vulcanol®

Vulcanised Vegetable Oils

Puneet Polymers



VULCANOL

Vulcanised Vegetable Oils - For Natural & Synthetic Rubbers

Introduction:

"Vulcanol" (Vulcanized vegetable oils) is the trade name encompassing a wide variety of vulcanized vegetable oils. These materials are produced by the reaction of vegetable oil with sulphur or sulphur monochloride. The **"Vulcanol"** range offers a wide choice of grades that can perform as processing aids, extenders or as a plasticizer for rubber base formulations.

Need of "Vulcanol®" in Rubber Compound

"Vulcanol" plays an important role in achieving specific set of properties in a rubber product, besides, felicitating smooth processing. The incorporation of **"Vulcanol"** in rubber compound offers following properties.

- **"Vulcanol"** can replace some or all of the plasticizer and process oils in some rubber compounds.
- **"Vulcanol"** acts as a processing aid that will improve mixing, extrusion and calendering.
- **"Vulcanol"** can act as an extending filler without impairing final physical properties.
- **"Vulcanol"** improves the green strength and dimensional stability of rubber preforms and profiles.
- **"Vulcanol"** develops a thixotropic rheology reducing temperature build up during mixing while improving compound flow.
- **"Vulcanol"** reduce swell and shrinkage resulting in a more dimensionally stable final product.
- **"Vulcanol"** can improve oil and ozone resistance in selected compounds.
- **"Vulcanol"** permits the incorporation of higher plasticizer levels while reducing their migration.

Areas of Application

"Vulcanol" may be used in the following application to enhance compound performance.

1. Printing rollers and blankets.
2. Eraser compounds.
3. Rubberized fabric.
4. Open cured profiles and hose.
5. Sponge & cellular goods.
6. Tubes and profiles.
7. Rubber threads
8. Seals, O-rings, Gaskets & Packing.

Types of **"Vulcanol"**

Based on the reaction of vegetable oil with sulphur or sulphur monochloride brown, amber or white **"Vulcanol"** are formed.

Base Oil (Primary raw material for "Vulcanol")

"Vulcanol" is produced primarily from castor or rapeseed oil. The **"Vulcanol"** derived from these oils are highly compatible with polar and non-polar elastomers. Castor oil grades tend to be firmer than the rapeseed grades. Some time they also affect the cure rate of a rubber compound and can depress the cure when loaded at levels over 25 phr. Castor oil imparts more polarity to the final product, which inherently improves extraction resistance by non-polar fluids. This higher polarity improves the solubility of castor oil grades in elastomers such as NBR, HNBR, ACM, etc. as well as compatibility with ester plasticizer.

Brown and Amber Grades

Brown and amber grades derive their color from the reaction of sulphur with a suitable base vegetable oil. They range in color from light amber to deep brown and can be used in any stock where light color is not a requirement. The brown and amber grades based on castor oil tend to be lighter in color and more translucent than the corresponding rapeseed oil grades.

White Grades

White grades are the result of the reaction of sulphur monochloride with a suitable base vegetable oil. White grades may have trace quantities of residual hydrochloric acid that may retard some cure systems. When using white grades, it is recommended that magnesium oxide be added to the formulation to neutralize the possible effects of the hydrochloric acid residue.

Comparision of Castor to Rapeseed based "Vulcanol"

Castor grades are firmer and take longer time to warm up, but flow very well at elevated temperatures.

- They have lighter color and typically require less pigment.
- They are slightly slower curing, especially at 25 phr and above.

- Castor grades have significantly better extraction resistance and over-all better physical test properties.
- Slower cure rate is helpful in better consolidation of thicker articles during cross - linking.

Explanation of Physical Properties.

Solvent Extract.

This parameter indicates the degree of cross-linking in the vulcanizates. It also gives and indication of the presence of extending oils. Acetone is the solvent of preference for rapeseed or soybean based vulcanizates. Castor based vulcanizates, however, are highly soluble in acetone and therefore petroleum ether is used as an extraction medium. High extraction is an indication of low cross-link density or oil extension, while low extraction indicates high cross-link density.

Free Sulphur

This parameter indicates the amount of un-reacted, or loosely bound, sulphur in a particular grade. High values of free sulphur can have an effect on final compound cure rates.

Extending oil or Filler

Some grades of **"Vulcanol"** have extending oils or fillers pre-incorporated to enhance performance in selected rubber compounds. The degree of extension or filler will be manifested in either the solvent extract or ash test data.

Ash

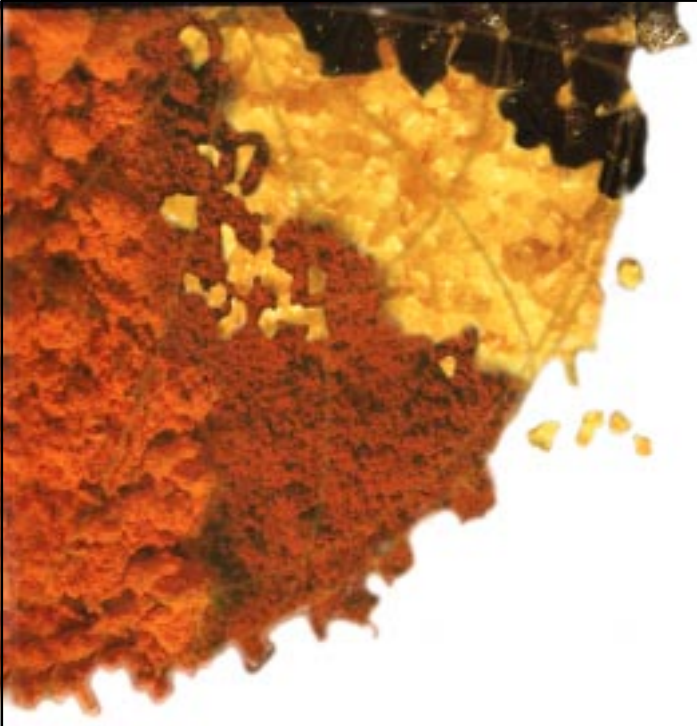
The amount of ash is indication of the amount of inert extending filler in a particular grade. Non-extended grades typically result in very low ash values<1%.

"Vulcanol®" Specifications:

VULCANOL GRADES	VEGETABLE OIL TYPE	ACETONE EXTRACT %	PETROLEUM ETHER EXTRACT %	ASH Max.%	SPECIFIC GRAVITY@ 20 DEG. C.	*SOLUBLE SULPHUR Max.%	FORM
BROWN G2	CASTOR	-	25-30	0.5	1.04±0.05	1.0	GRANULES
BROWN G5	CASTOR	-	15-20	0.5.	1.04±0.05	1.0	GRANULES
SOFTICE	CASTOR	-	30-35	0.5	1.04±0.05	1.0	GEL CAKE
NITREX	CASTOR	-	10-14	0.5	1.04±0.05	1.0	GRANULES
GOLDEN A	CASTOR	-	9-14	16-20	1.15±0.05	1.0	POWDER
BROWN BNH	RAPESEED	20-25	-	0.5	1.05±0.05	1.0	GRANULES
BROWN BN	RAPESEED	25-30	-	0.5	1.04±0.05	1.0	GRANULES
BROWN BN SOFT	RAPESEED	34-40	-	0.5	1.04±0.05	1.0	LUMPS
BROWN BE	RAPESEED	44-50	-	5.0	1.00±0.05	1.0	GRANULES
ERA WHITE	RAPESEED	14-20	-	8-12	1.10±0.05	0.05	POWDER
WHITE G	RAPESEED	14-20	-	8-12	1.10±0.50	0.05	POWDER
WHITE XL	RAPESEED	3.5-5.5	-	2.5-3.5	1.08±0.05	0.50	POWDER
WHITE SPL-32	RAPESEED	13-17	-	30-35	1.30±0.20	0.50	POWDER
WHITE MBA	RAPESEED	20-25	-	15-20	1.14±0.15	0.50	POWDER

Packing : 25 / 35 / 40 Kg. Cartons

** Acetone / Petroleum ether*



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