

GRAPHISTRENGTH[®] EPDM

CNT MASTERBATCH

TECHNICAL DATA SHEET

Description:

Graphistrength[®] EPDM master-batch is a CNT master-batch based on EPDM elastomer for elastomeric formulations that contains pre-dispersed MWCNT at a concentration of 17% by weight (20 parts).

Key features:

Graphistrength[®] EPDM master-batch is provided in sheet form with the following key characteristics.

Property	Method	Unit	Typical value ⁽¹⁾
MWCNT content	Ash content ⁽²⁾	wt%	17 ⁽³⁾
Mooney viscosity (ML1+4, 100°C)	ASTM D1646	M.U.	110 -130
Bulk density		g/cm ³	0.8-1

⁽¹⁾ Data not intended for specification purposes ⁽²⁾ 650°C in N2 atmosphere ⁽³⁾ Graphistrength[®] EPDM MB contains Graphistrength[®] MWNT with purity > 90 %

Benefits and applications:

The Graphistrength[®] master-batch is based on EPDM elastomer with low viscosity and an Ethylene content of 45% in weight.

This Graphistrength[®] master-batch is applicable for use in formulations for moulded and mechanical goods. Final MWCNT loadings in the final compounds are in the range 0,5 to 5 wt% depending on the host matrix characteristics other fillers, the targeted performances, processing methods and conditions.

The electric conductive properties obtained with Graphistrength[®] EPDM master-batch are outstandingly consistent and uniform.

Thanks to their low loading, and very small size, Graphistrength[®] MWCNT offer several additional advantages: smooth surface aspect, high preservation of the neat matrix's ductility and high improvement of its mechanical properties.

Graphistrength[®] base EPDM offers particular advantages for the formulation control due to high concentration of CNT in master-batch; and for the process, it offers the possibility to introduce NTC using common mixing equipment without special safety precautions.

Dilution and processing:

The use of Graphistrength[®] EPDM master-batch into final formulation will depend on the process technology. For molding applications (rings, gloves, flexible parts etc) the master-batch can be introduced in final formulation by cylinder, internal, conical, or other conventional mixing equipment.

This Graphistrength[®] master-batch can be used with peroxide system and other cure system.

The basic resin used in the master-batch (80% in mass) should be absolutely taken into account for the vulcanization/accelerator part in the final formulation.

The molded article becomes conductive after the vulcanization. There is no relation found between the resistance level of the elastomeric formulation and vulcanized article. The use of vulcanized articles is recommended to judge the electrical properties of the material.

Processing Guideline:

In internal mixer with Brabender rotors: preheating at 80°C, rotor speed at 100 rpm to rise 130°C at final, hold for 8 min. On open mill, preheating at 60°C, coefficient of friction > 1,2, mixing time of 12 min. For example, here are the results obtained with the following ingredients on open mill :

Ingredient		PHR	PHR	PHR
EPDM with Ethylen content of 48% and viscosity Mooney of 65 at 125°C		100	100	100
Carbon Black N 550		30	30	30
Naphthenic Oil		5	5	5
Graphistrength® MB EPDM		0	10	20
Peroxyde		8	8	8
Coagent peroxyde		2	2	2
Rhéology ODR 180° MH-ML (dN.m)	ISO 3417	90	121	123
t90 (min)		4.2	4.1	3.9
Mooney (100°C, ML1+4)	ISO 289-1	82	80	84
Réticulation : 10 min, 180°C				
Hardness (shore A)	ISO 7619-1	66	64	69
Elongation at break (%)	ISO 37	110	171	226
Tensile strength (MPa)	500 mm/min	4.7	9.1	9.9
Tear resistance (kN/m)	ISO 34-1	13.7	-	17.9
Abrasion resistance (%)	ISO 4649	41.6	-	20.0
Surface resistivity (ohm)		3.E+11	1.E+10	4.E+06
Volume resistivity (ohm.cm)	ISO 1853	2.E+11	9E+09	1.E+06

Versus a standard semi-impact recipe with Carbon Black, MWCNT introduction permits to improve some properties like the electrical conductivity and mechanical performances like Tensile properties, tear and abrasion resistance.

Safety and Handling:

Graphistrength® EPDM master-batch is provided in sheet form where MWCNT are strongly embedded. Graphistrength® EPDM master-batch doesn't present any specific health risk when using in rubber processing.

Graphistrength® EPDM master-batch is provided in 5 or 20 kg boxes as sheets. For big quantity, this master-batch can be delivered directly on pallet. The product is stable in its unopened original packaging when stored at normal temperatures, dried areas and no direct sunlight.

Consult the product SDS for additional information on properties, hazards and handling.

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