BRUGG CABLES
Well connected.

COMCROSS® BCR-LC

Product information

BCR-LC is a cross-linkable; EPDM/EPR based insulation compound designed for use in medium voltage power cables up to 49 kV, requiring good flexibility and high temperature resistance. Our closed, continuous compounding facility and microprocessor operated process control system ensure a compound of exceptional material consistence.
BCR-LC combines the quality consistency of a typical cross-linked PE, with the performance advantages of an elastomer particularly in such key characteristics flexibility, dimensional stability, and long-term ageing.
Customers can benefit from our extensive know-how and experience of specification compounding right through to cable manufacturing, backed by extensive R&D programmes, processing technology and material testing procedures beginning from raw material up to the finished cable, which results from embedding the compound activity within the BRUGG Cable Systems.

Characteristics

The typical values listed below representative of BCR-LC produced so far, and should be regarded as relating to a sample of average quality. They were compiled from test carried out on samples of granules and test plaques which had been pressed and cross-linked for 6 minutes at 185°C, followed by degassing for 16h at 80°C. Individual quality standards can be agreed upon through direct negotiation.

Designation	Test Standards	Unit	Typical Value
External characteristics			
Pourable granule		mm	4x4
Colour			salmon red
General characteristics			
Density (at 23°C)	DIN 53479	g/cm^3	1.22 ± 0.03
Moisture (trend to release 140°C/40 min)	K. Fischer, Coulometer	PPM	500 ± 500
Electrical characteristics			
Dielectric constant (23°C)	ASTM D 1513	---	2.49
Dielectric loss factor tan ∂ (23°C/50 Hz)	ASTM D 1531	---	20 10^{-4} + 20·10^{-4}
Dielectric loss factor tan ∂ (90°C/50 Hz)	ASTM D 1531	---	40 10^{-4} + 10·10^{-4}
Dielectric strength cable 95mm2 20/12 kV	50 Hz (63%-Value)	kV/mm	t.b.d.
Breakdown voltage		kV/mm	75
Mechanical characteristics			
Tensile strength	DIN 53 455	N/mm^2	18
Tensile strength aged(7d, 135 °C)		N/mm^2	18
Ultimate elongation	DIN 53 455	%	320
Ultimate elongation aged(7 d, 135 °C)		%	305
Hardness (Shore A)	DIN 53 505		65
Hot elongation (250°C, 20 N/cm2)	IEC 504 / Table 6	%	35
Permanent deformation		%	10
Fabrication characteristics			
Max. vulcanisation rate at 185°C	Monsanto Vulkameter	dNm	9 +10 / -1
Vulcanisation time (Rt. 90%)	Monsanto Vulkameter	min	2.6 ± 0.5
Viscosity (115 °C and 40 s-1)	Göttfert Viskoelastometer	Pa.s	5500 ± 500

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General recommendations

BCR-LC may be processed on CV-lines. For medium cables, semiconductive, conductor- and insulation-screens have to be applied and may be extruded using a tandem arrangement or with a triple extrusion head. The processing recommendations below are based upon manufacturing of a 20 kV, 95 mm^2 cable with a copper conductor.

Extrusionparameters

The recommended temperature settings given below, are depending upon screw design and extruder type. Optimum temperature profile for a given extruder must be determined experimentally. Shrinkage ratio hot/cold of BCR-LC on the line is ≤ 6%.
The mass-temperature of the insulation BCR-LC must not exceed 130°C! The insulation BCR-LC should pass a screen package of at least 125 µm.

General parameters	
Insulation-thickness	5.07 mm
Core diameter	11.8 mm
Extruder, water cooled	175 mm, 24 D
Screw	Nokia-Maillefer F78634.4, Single zone rubber screw
Temperatures	
Screw	50 °C
Z1	60 °C
Z2	90 °C
Z3	90 °C
Z4	90 °C
Z5	90 °C
Z6	90 °C
Z7	110 °C
Z8	110 °C
Z9	110 °C
Z10	110 °C
T-Head	120°C
T-Mass	129°C
Machine parameters	
Rotation Screw.	11.6 U / min
Pressure	373 bar
Screen-package (µm)	800/2x100/800
Line Speed	13.1 m/min
Motor	45 %

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Cross-Linking

BCR-LC can be handled as a CV-crosslinkable Polyethylene.

Pressure	Residence time	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8
13 bar N_2	3'40"	450°C	430°C	390°C	370°C	350°C	350°C	330°C	330°C

The surface-temperature of the cable must not exceed 275°C (depending from the outer semiconductive layer type) during the curing-processing. The recommended temperature settings are depending upon insulation thickness, used outer semiconductive and length of the given curing-zone. Optimum curing-temperature must be determined experimentally.

Handling and product safety

BCR-LC is an ecological compatible compound and there are no health or environment risks during processing. However as with all insulation material, care must be taken to avoid a build up of electrostatic charges. During cross-linking, gaseous by-products such as acetophenone, methane and 2-phenyl-propanol can be generated. Under normal processing conditions these should not exceed 100 mg per hour, and air extraction systems can be vented directly into atmosphere, according to current Swiss regulations. BCR-LC contains a lead ingredient and waste material should be disposed of according to local regulations. When considering the use of Comcross® BCR-LC, please review our latest Material Safety Data Sheet.

Storage and shelf life

Store product in cool warehouse away from direct sunlight, below 25°C. No changes in processing characteristics are expected after storage for periods well over one year.

Transport

BCR-LC should be transported in closed containers and protected from moisture and temperatures above 35°C.

Packing

BCR-LC is packaged in standard cardboard boxes, mounted on one-way pallets and protected by a PE-outerbag. The filling weight is 700 kg. BCR-LC is also available in Big-Bags (1000 kg) on special request.
The boxes are labelled as follows:
- Sender: BRUGG COMPOUND
- Designation of material: BCR-LC
- Product-number
- Batch number
- Net weight

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