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<p>■ Compound class Insulation / sheathing</p>	<p>■ Compound category </p>	<p>■ Flame retardant MDH</p>									
<p>■ Standards EN 50306-2</p>	<p>EN 50306-1 S2</p>										
<p>■ Operating temperature [C°] -40 to 125</p>	<p>■ Oil resistance level ★★★</p>										
<p>■ Typical applications <i>This compound with extra low temperature resistance and extra oil resistance is classified as hazard level 4, identification code M. It is an excellent choice for compact wiring systems, where a reduced wall thickness results in space and weight savings</i></p>											
 <p>Rolling Stock, Rapid Transit, Railways</p>											
<p>■ Features</p> <table border="0"> <tr> <td> Flame retardant</td> <td> Halogen-free</td> <td> Low smoke</td> </tr> <tr> <td> Oil resistant</td> <td> Abrasion resistant</td> <td> High temperature resistant</td> </tr> <tr> <td> Flexible</td> <td> Flexible at low temperatures</td> <td></td> </tr> </table>			 Flame retardant	 Halogen-free	 Low smoke	 Oil resistant	 Abrasion resistant	 High temperature resistant	 Flexible	 Flexible at low temperatures	
 Flame retardant	 Halogen-free	 Low smoke									
 Oil resistant	 Abrasion resistant	 High temperature resistant									
 Flexible	 Flexible at low temperatures										

PHYSICAL PROPERTIES

Physical properties	Unit	Typical value	Test method
Density *	g/cm ³	1.40	DIN EN ISO 1183-1A
Hardness *	Shore D	50	DIN ISO 7619-1
Melt Flow Index (190°C; 10kg)	g/10 min	3.9	DIN EN ISO 1133
Water absorption	Unit	Typical value	Test method
Water absorption after 168h at 70°C*	mg/cm ²	< 15	EN 50306-1

MECHANICAL PROPERTIES

Before crosslinking **	Unit	Typical value	Test method
Tensile strength	N/mm ²	>15	IEC 60811-501
Elongation at break	%	>200	IEC 60811-501

■ After crosslinking ***	Unit	Typical value	Test method
Tensile strength (150kGy)	N/mm ²	>16	IEC 60811-501
Elongation at break (150kGy)	%	>150	IEC 60811-501
■ After ageing in air oven 240h at 120°C ***	Unit	Typical value	Test method
Variation in tensile strength	%	<25	IEC 60811-401
Variation in elongation at break	%	<25	IEC 60811-401

THERMAL PROPERTIES ***

■ Low temperature tests	Unit	Typical value	Test method
Cold bend test at -40°C	-	No cracks	IEC 60811-504
Elongation at break at -40°C	%	>30	IEC 60811-505
Brittleness temperature (150kGy)	°C	-53,8	ASTM D 746-14
■ Heat tests	Unit	Typical value	Test method
Penetration 4h at 140°C	%	<50	IEC 60811-508
Heat shock 4h at 175°C	-	Pass	IEC 60811-509
Variation in tensile strength	%	< 25	IEC 60811-508
Variation in elongation at break	%	< 25	IEC 60811-508
Shrinkage test 1h at 120°C	%	<2	IEC 60811-502
■ Hot set test at 200°C / 15min / 0,2MPa	Unit	Typical value	Test method
Elongation under load	%	<60	IEC 60811-507
Residual elongation	%	< 10	IEC 60811-507

ELECTRICAL PROPERTIES *

■ Major electrical properties	Unit	Typical value	Test method
Electrical breakdown	-	No breakdown	EN 50264
Volume resistivity (at 23°C)	Ω cm	10 ¹⁵	IEC 60093
Volume resistivity (at 90°C)	Ω cm	>10 ¹²	IEC 60093

RESISTANCE ***

■ Fluid IRM 902 24h at 100°C	Unit	Typical value	Test method
Variation in tensile strength	%	<30	IEC 60811-404
Variation in elongation at break	%	<30	IEC 60811-404
■ Ozone resistance	Unit	Typical value	Test method
Method A 250ppm – 24h at 25°C	-	No cracks	EN 50305
Method B 200ppm – 72h at 40°C	-	No cracks	EN 50305

BURNING PROPERTIES *

■ Main burning properties	Unit	Typical value	Test method
LOI	%	32	ASTM D 2863 A
Halogen content	%	0	IEC 754-1
Temperature index	°C	250	ASTM D 2863 D
Toxicity index	-	2.6	EN 50305

■ Acid gas emission	Unit	Typical value	Test method
Corrosivity: pH (min.)	-	>4.5	IEC 60754-2
Conductivity (max.)	μS/mm	<4	IEC 60754-2

* pressed plaques
 ** extruded tapes
 *** cross-linked plaques or tapes

PROCESSING GUIDE

■ **Extruder Type**

Standard extruders for elastomeric or thermoplastic materials.

■ **Screw configuration**

Good results have been achieved with ‘halogen-free’ screws, PE-screws and barrier type screws (BM) having high flights and a L/D-ratio > 25:1. Screws having low shear are recommended

■ **Extrusion dies**

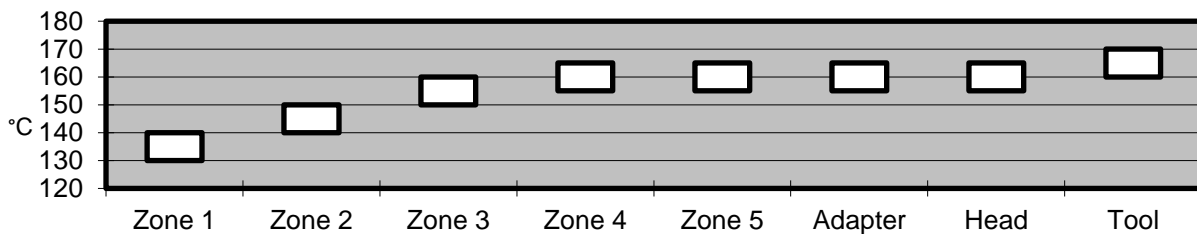
For isolation pressure tools, for jacketing tubing tools are recommended. Pressure extrusion may have effect on low temp. flexibility.

■ **Die opening**

Recommended die opening 5-10% below the required OD of the wire.

■ **Temperature profile extruder**

The profile shown below may vary slightly depending on extruder type, head design & output.



■ **Maximum mass temperature**

230°C

■ **Conductor pre-heating**

Usually required to improve elongation at break. Typically in the range of 100°C–140°C (to be optimized).

■ **Wire/conductor**

To achieve a good abrasion resistance, dynamic cut through and low temperature flexibility properties, concentric conductors are required.

■ **Quenching**

Quenching in a hot water bath (80°C) is recommended to improve elongation at break, although good results have also been achieved without hot water cooling.

■ **Drying**

Pre-drying to below 200 ppm humidity is recommended to avoid porosity

■ **Recommended colour master batches**

Well dispersed PE master batch 0,5-1,0%. For black jacket applications, UV resistance can be obtained by adding a higher level of master batch depending on requirements and type of carbon black master batch used.

CROSSLINKING INFORMATION

■ **Recommended radiation dose**

125-175 kGy

STORAGE INFORMATION

■ Form & packaging

Pellets in sizes 2.8mm
Moisture-resistant bags (25kg) & octabins (alu-innerliner, max. 1250kg)

■ Shelf life

1 year after production

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