Technical data sheet

Mecoline IS RDX 5242 F

Radiation cross-linkable PVDF flame retardant

■ Compound class	■ Compound category	■ Flame retardant
Insulation / sheathing	RDX	Halogenated

■ Standards		
NEMA WC 27500	SAE AS 81044/9	SAE AS 81044/12

■ Operating temperature [C°]	■ Oil resistance level
-50 to 150	★★★★★

■ **Typical applications**

This compound is an excellent choice for manufacturing insulated hook-up wires in military and aerospace industries (airframe wire) and component conductors for NEMA WC 27500 cables.

Marine, Aerospace, Defence

■ **Features**

- Flame retardant
- 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/cm³	**1.75**	DIN EN ISO 1183-1A
Hardness*	Shore D	**65**	DIN ISO 48-4
Water absorption after 24h at 23°C	mg/cm³	**0.5**	ASTM D-570

MECHANICAL PROPERTIES

■ Thermoplastic / before crosslinking **	Unit	Typical value	Test method
Melt Flow Index (230°C; 21,6kg)	g/10 min	**42**	DIN EN ISO 1133
■ After crosslinking * **	**Unit**	**Typical value**	**Test method**
Tensile strength (70-80kGy)	N/mm²	**>25**	IEC 60811-501
Elongation at break (70-80kGy)	%	**>175**	IEC 60811-501
■ After ageing in air oven 168h at 200°C* **	**Unit**	**Typical value**	**Test method**
Elongation at break	%	**>125**	IEC 60811-401

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THERMAL PROPERTIES***

■ Low temperature tests	Unit	Typical value	Test method
Low temperature flexibility -55°C	-	**No cracks**	ASTM D 2671 C
■ Heat tests	**Unit**	**Typical value**	**Test method**
Heat shock 4h at 250°C	%	**No cracks**	ASTM D 2671
Heat ageing 168h at 200°C Elongation at break	%	**>125**	ASTM D 638

ELECTRICAL PROPERTIES*

■ Major electrical properties	Unit	Typical value	Test method
Volume resistivity	Ω cm	**$>10^{11}$**	ASTM D 257
Dielectric strength	kV/mm	**>15**	ASTM D 2671

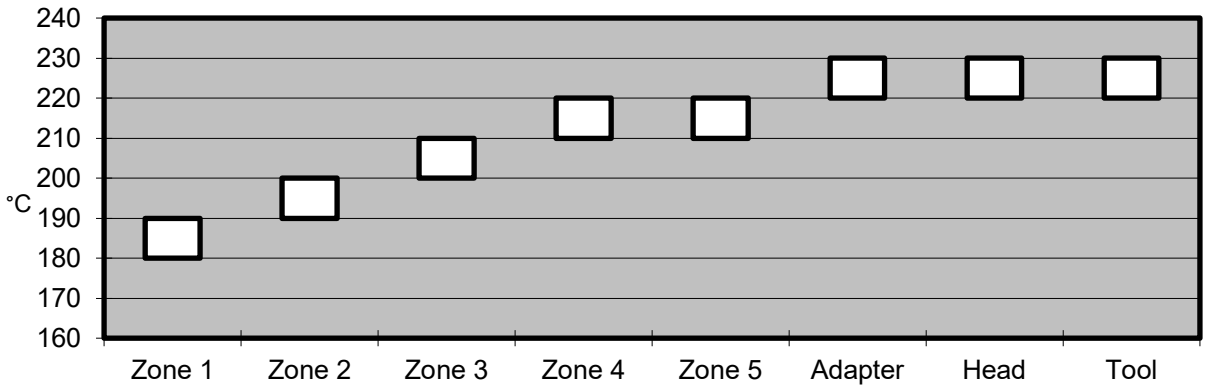
BURNING PROPERTIES*

■ Main burning properties	Unit	Typical value	Test method
LOI	%	**42**	ASTM D 2868
Burning rate	-	**V-0**	UL 94

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

PROCESSING GUIDE

■ **Extruder type**	Preferably use a small extruder, like 30 mm with L/D 25 – 30, to avoid long residence time and thus degradation of the polymers).
■ **Screw configuration**	Good results have been achieved on a Barrier type screw, having high flights. Also on halogen-free type, low friction screws good results have been achieved.
■ **Screw cooling**	Cooling the screw to around 80°C
■ **Extrusion dies**	If Outer Die is too small, you may get fluctuations in the OD of the wire (wavy surface). If Outer Die is too big this may result in a rough surface
■ **Die opening**	Outer Die : approx. 1 - 3% smaller than 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**	250°C
■ **Conductor pre-heating**	Pre-heating between 140°C-160°C to achieve maximum properties of elongation at break of the insulation.
■ **Wire/conductor**	Tin-coated
■ **Quenching**	Warm water in the first cooling section (80°C).
■ **Drying**	Pre-drying of Mecoline Compounds is normally not necessary provided that the compound has been stored in the original sealed bags under cool (max. 30°C) and dry conditions. Mecoline compounds used from open bags require pre-drying during 4–6 hours at 60–70°C.
■ **Recommended colour master batches**	We recommend to use high quality, well dispersed PVDF 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**	See below
■ **Radiation information**	Typical dose requirements are 250 kGy for the polyolefin primary insulation made from RDX 3144 plus (in a second crosslink run) 70 - 80 kGy max. for the RDX 4145 based secondary insulation layer In particular overdosing PVDF (above 80 - 90 kGy) results in radiation induced degradation and brittleness of the jacket, which will crack on bending. It is recommended to use electron beam (EB) accelerators with energies NOT higher than 800 keV. Practical tests confirmed, that Electrocurtain type EB machines at 300keV with a nitrogen purged process chamber provide the best crosslinking results regarding the yield of passes after the MIL aging tests, as the radiation impact is significantly reduced with the absence of oxygen. Nevertheless the access to a 300 keV EB accelerator with N2 purged process chamber might be very limited. A conventional EB radiation unit suitable for small wire processing will work as well satisfactorily with the above given energy limitation. In addition the product handling system (under beam handling system (UBHS) as well as pay-off and take-up) has to be adapted for such small wire regarding tension control, to avoid any stretch. Beside affecting the electrical resistance, excessive tension on the drums of the UBHS can flatten out the thin insulation on one side, thus, that the breakdown voltage will drop below spec. requirement.

STORAGE INFORMATION

■ **Form & packaging**	Pellets in sizes 3mm, Octabins (250-500kg)
■ **Shelf life**	1 year after production

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