PEBAX® for AUTOMOTIVE APPLICATIONS









PEBAX® POWDER

A UNIQUE THERMOPLASTIC POWDER – ELECTROSPRAY AND MINICOAT APPLICATION



PEBAX® PROPERTIES

HIGH WEATHERABILITY – FLEX-FATIGUE RESISTANT



PEBAX® APPLICATIONS

EXCEPTIONAL GRIP PROPERTIES – ROOF RACKS







A UNIQUE THERMOPLASTIC POWDER

- ELECTROSPRAY & MINICOAT APPLICATION



POWDER COATINGS



Thermoplastics



No chemical reaction during application.

➔ coating application is merely through physical change of state

Examples: RILSAN[®], PEBAX[®], PVC, Fluoropolymers...



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Thermosettings



Coating application involves chemical reaction

➔ optimized control of application conditions required to obtain optimized coating performance

Examples: FBE, Polyesters, Polyurethanes









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Electrostatic

Minicoat



PEBAX[®] can be applied by two types of processes



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APPLICATION PROCESS - ELECTROSPRAY





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\rightarrow Recommendations for application

- Use spray gun where negative voltage is applied (-50, -60 kV)
- PEBAX[®] coating is formed by subsequent heating of article at $170 \pm 5^{\circ}C$ (max oven temperature $175^{\circ}C$)
- To guarantee good performances, coating thickness will be between 200 to 250µm
- The following graph is given to estimate fusing time :



• A too long fusion time induces thermal degradation

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WHAT IS PEBAX®





 \rightarrow Molten state polycondensation

→ Effect of PE/PA ratio on the flexibility of the polymer

 \rightarrow Thermoplastic elastomer (TPE)

- \rightarrow Poly Ether Block Amide (eXtreme)
- \rightarrow Two phases structure
 - Polyamide : clear melting point (133°C à 172°C)
 - Polyether : very low glass transition temperature (-60°C) providing exceptional properties at low temperatures



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\rightarrow Two families depending on blocks types :



Polyamide blocks:

- PA12 \rightarrow Mechanical properties
- PA11 \rightarrow Mechanical properties & Biobased
- PA6 \rightarrow PA6 compatibility

Polyether blocks:

- PTMG \rightarrow Hydrophobic
- PEG \rightarrow Hydrophilic

→ Hydrophobic PEBAX[®] : Polyamide + Hydrophobic Polyether

- Used for their mechanical properties
- Applications : Sport, mechanical and automotive industry, E&E, processing aid.
- Applications : PA6 film modifier

→ Hydrophilic PEBAX[®] : Polyamide + Hydrophilic Polyether

- Used for their breathable and antistatic properties
- Applications : Breathable films, antistatic additives

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FLEXIBILITY



* Stability of mechanical properties due to the low Tg value





Flexibility maintained at low temperature

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Less moisture pick up than other polyamides = better dimensional stability



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- **Fatigue resistance** (with Ross Flex machine)
 - >280,000 cycles down to -20°C
 - for PEBAX[®] 33
 - Specimen size: 150x25x2mm

Angle 90 degree, 100cycles/min



Material	Ревах [®] 5533	TPU 95A
Resistance (cycles) at – 40°C	>50,000 (NB)	~2,000 (break)

→ Unbeatable flex fatigue resistance

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Conditions for a good weathering resistance

- Good Application process
- Primer
- Thickness of the PEBAX[®] coating:

> 200µm to ensure a good opacity to UV





New powder PEBAX[®] (under development) ♦ very good UV resistance

- Very low change of color
 - DI*<2
- Good gloss retention
 - > 65% at 65°

Improved mechanical properties

- Elongation at break ⁽¹⁾
- Stress at break ⁽¹⁾
- > 100%
- > 10 MPa
- Intrinsic viscosity of the polymer ⁽²⁾ decreased of less than 15%

2000 cyclic QUV A exposure (cycles: 4 hours UVA – 4 hours spray)



⁽¹⁾ ISO 527-3 Type 5 samples after 2000 cyclic QUV A exposure

⁽¹⁾ ISO 527-3 Type 5 / 50mm/min; ⁽²⁾ Internal test

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PEBAX® PROPERTIES AT A GLANCE



Property	Norm	Unit	Typical value
Melting point	ISO 1218	°C	147
VICAT point	ISO 306	°C	114
Specific gravity of the coating (20°C)	ISO 1183	-	1.20
SHORE D Hardness	ISO 868	immediate After 15s	50 47
Abrasion resistance Wheel H18, load 1KG, 1000 cycles	ISO 9352	mg	248
Salt spray test according to surface preparation recommended by ARKEMA	NF 41 002	-	Adhesion = 4 (NFT 58 112) after 1000h
Impact resistance	ASTM G14	J	0.89
<i>Tensile strength at yield Elongation at yield</i>	ASTM D 638	MPa %	~ 37 > 350
Water absorption @ 24 hrs	ISO 62/1	%	0.75
<i>Resistance to gritting by shot blasting</i> (Steel with primer, thickness 3mm, 500gr shot blasting)	D24 1702/199	97	Quotation 1 : excellent

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🗘 Qualified for :

• load carriers systems

🔆 Grades :

• Pebax® ES Black 9002





* Main reasons for choosing Pebax®

- Softness, Protects exterior paint
- Adhesion and tractional properties (grip)
- Easy processing
- Flexible technology: material is applicable to any kind of design (coated parts compete with cost advantages vs. injected molded parts)

** And a very good weathering resistance

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