

ISOSORBIDE BASED EPOXY FOR SUSTAINABLE POLYMER DEVELOPMENT

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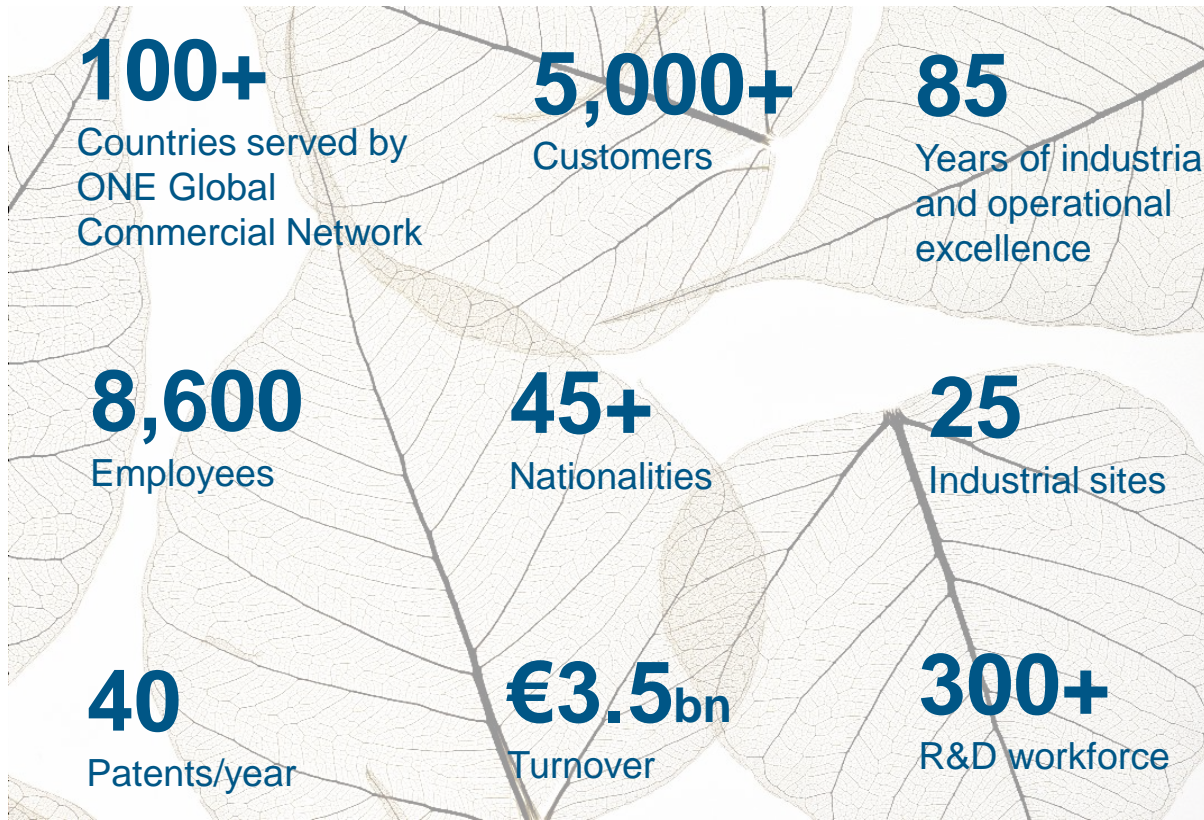
SOCIÉTÉ CHIMIQUE DE FRANCE (SCF 2023)



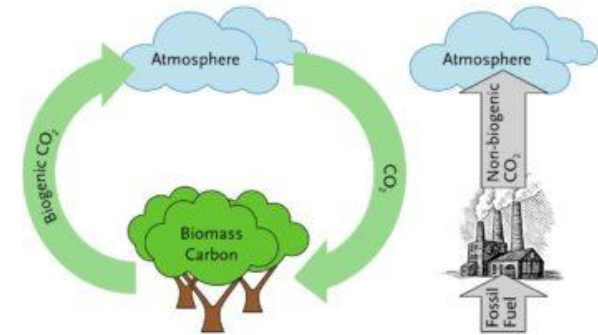
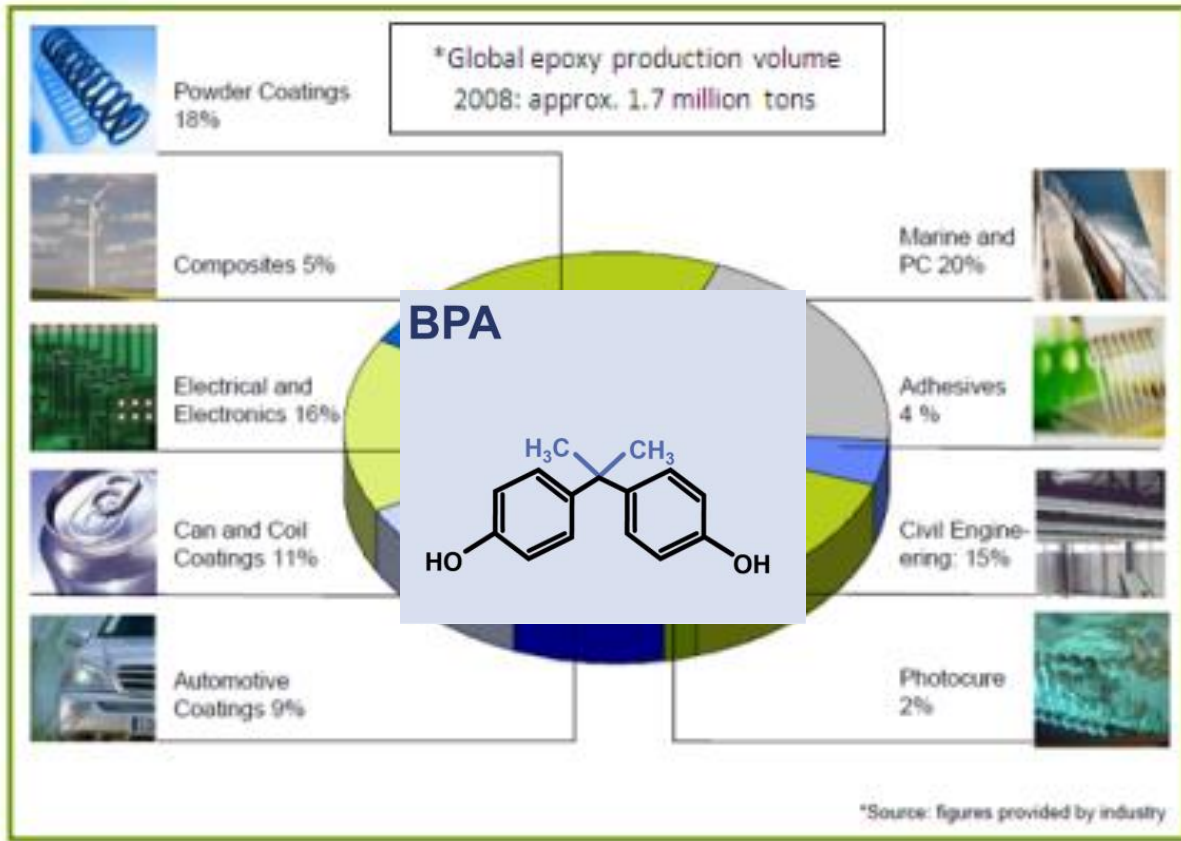
WHO ARE WE?



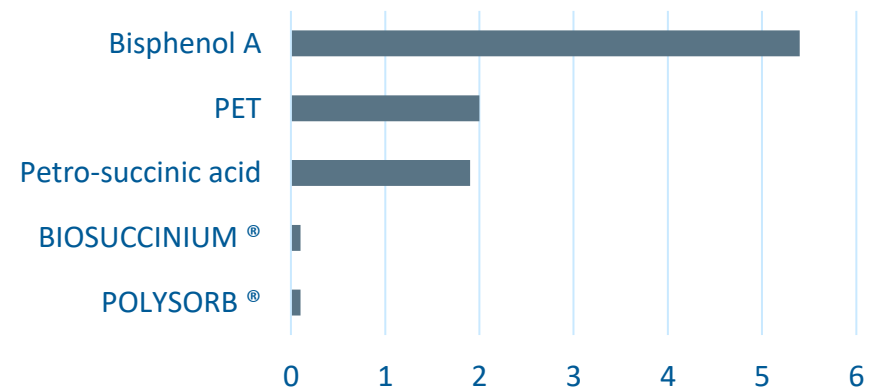
A GLOBAL LEADER OF PLANT-BASED INGREDIENTS



A FEW BACKGROUND ON EPOXY BUILDING BLOCKS.



Environmental footprint (kg CO₂ / kg product)



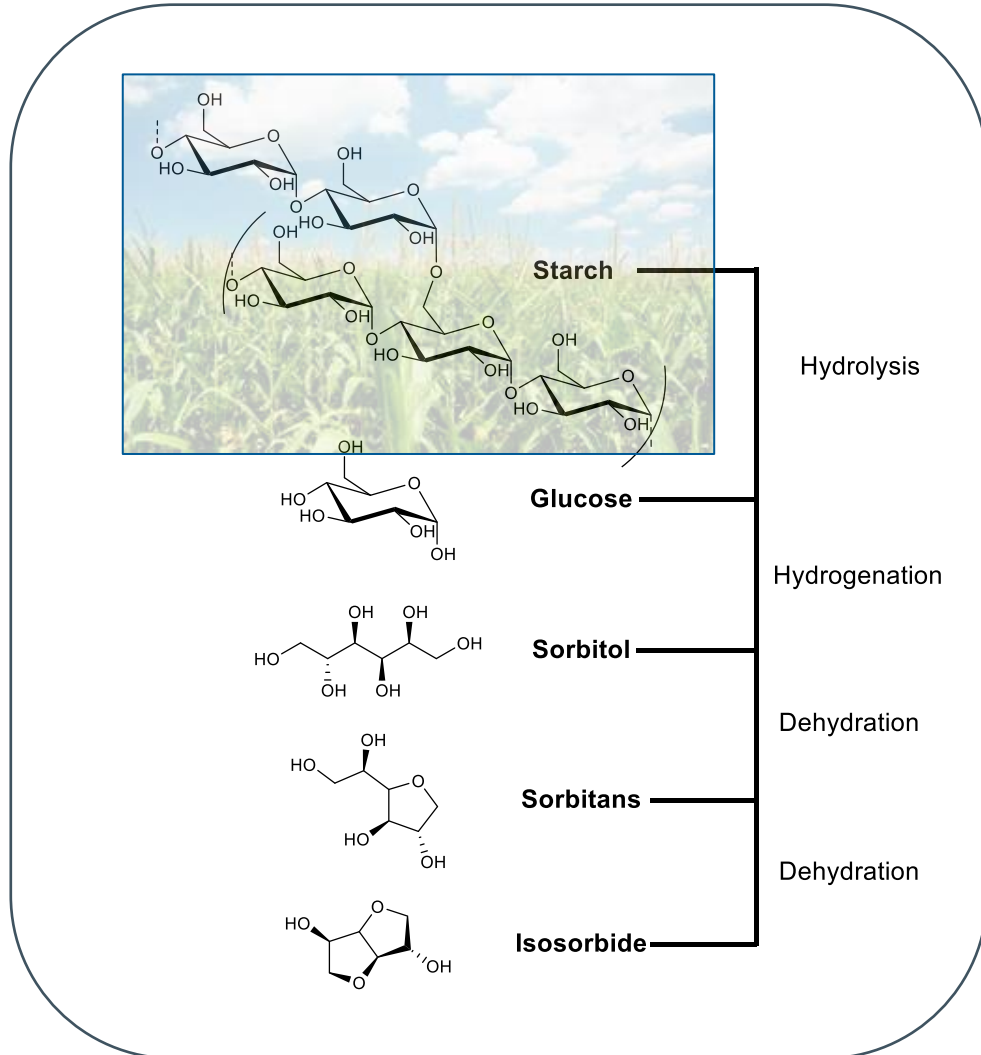
■ Environmental footprint (kg CO₂ / kg product)

Fossil feedstock sourcing / Health concerns.

95% of the Epoxy resins are based on Bisphenol A

FIRST THINGS FIRST : WHY ISOSORBIDE IN PERFORMANCE MATERIALS

How we make it



Safety-biobased, Green product



Non –toxic

Non endocrine disruptor

Food contact approved

Bio-based monomer



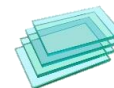
Enhanced polymer properties !



Thermal properties



High chemical resistance

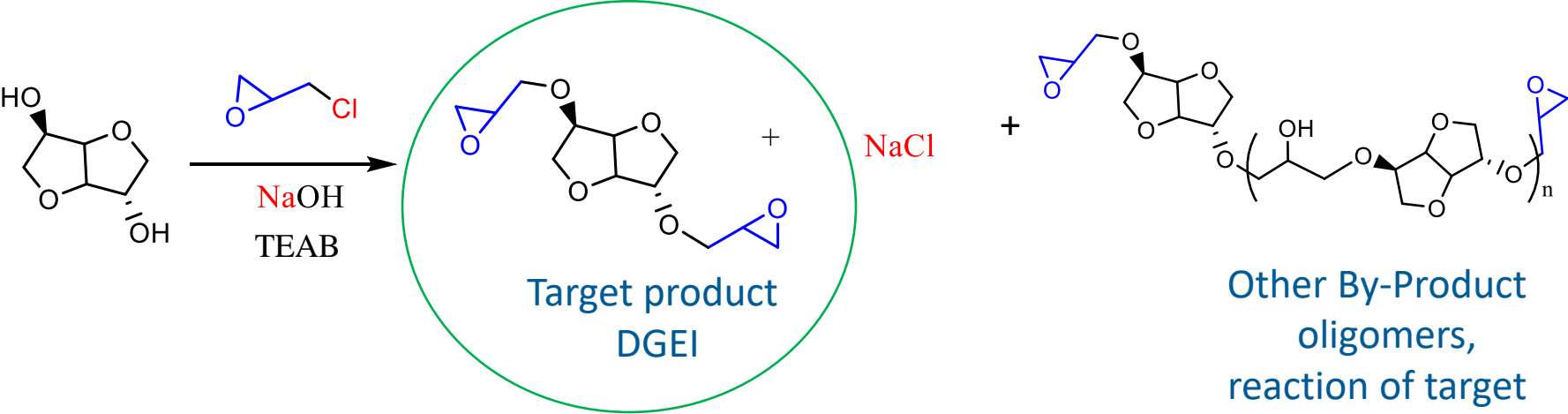


Optical performance

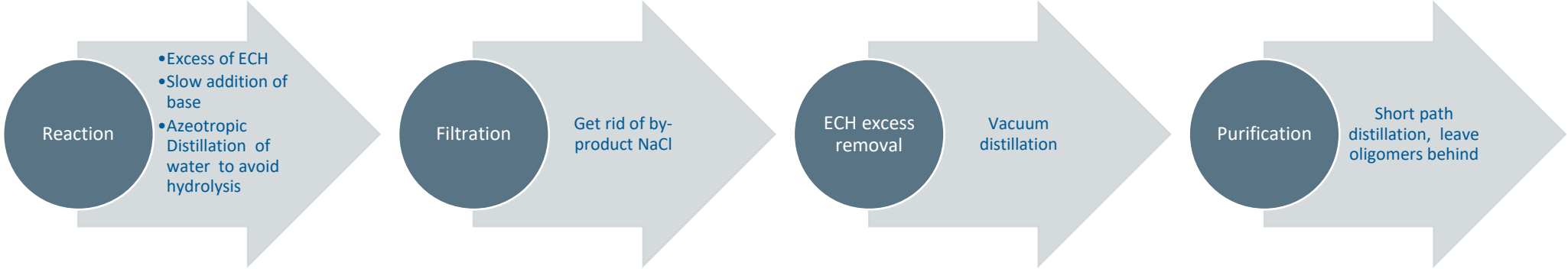


UV resistance

ISOSORBIDE BASED EPOXY SYNTHESIS

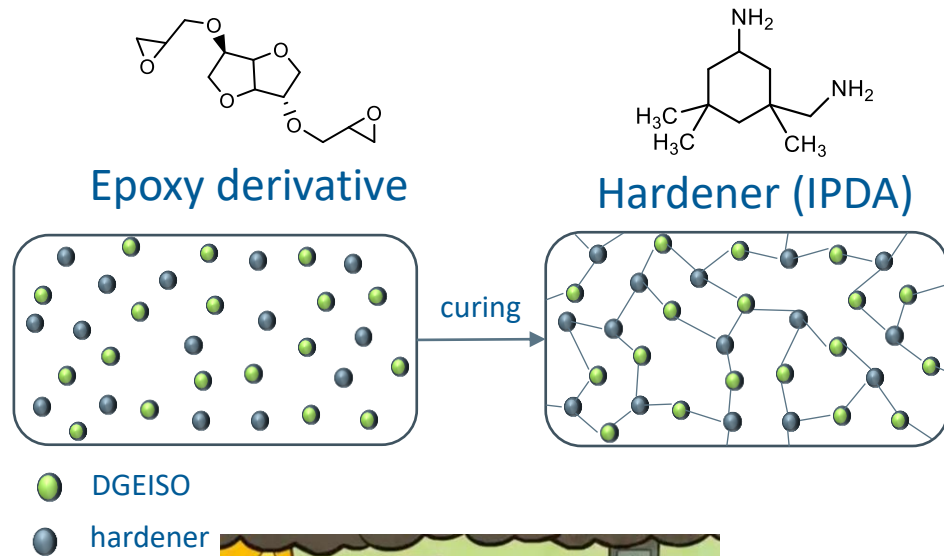


Process flowchart



PROBLEM TO TACKLE FOR A FAST INDUSTRIAL DEVELOPMENT

- A high reactivity



Curing : exothermic reaction

- Regulation issues

REACH : registration

« Monomers » = >50%w of the composition

➔ Fill a dossier

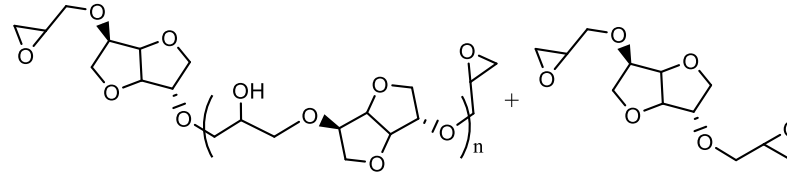
« Polymers » = Oligo/polymer >50%w of the composition ➔ No dossier needed



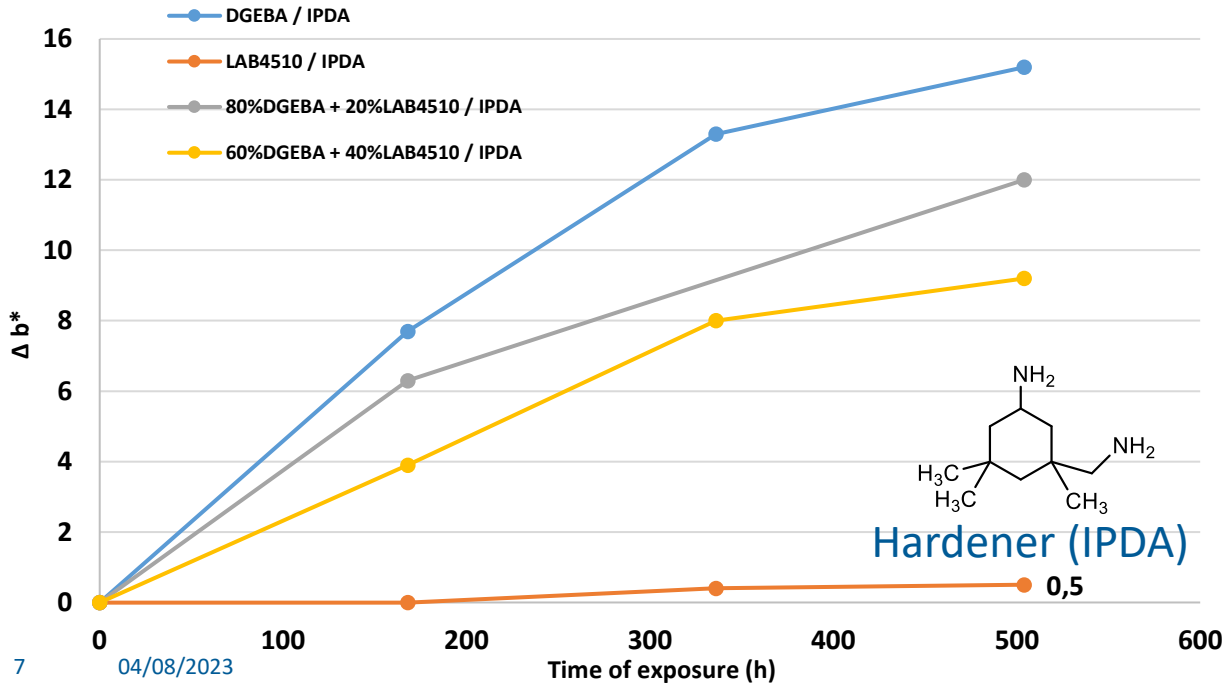
Long procedure
Quite costly

Keep Oligomers : kill two birds with one stone

ISOSORBIDE BASED EPOXY RESINS PROTOTYPE AND UV RESISTANCE



Average Molar mass (g/mol)	EEW (g/eq)	diepoxy isosorbide content (%w)	Viscosity at 25°C (mPa.s)	Total Chloride content (%)
360	185	49%	3200	0,4



Suitable for outdoor applications without yellowing/ fading of the coatings



Adhesion properties

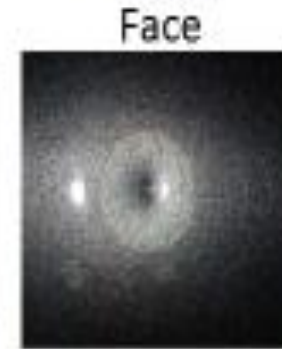


No peeling, excellent adhesion, flexibility

Impact test ISO 6272



DGEBA + IPDA



DGEISO + IPDA

No coating peeling after impact

COATING RESISTANCE

Scratch resistance

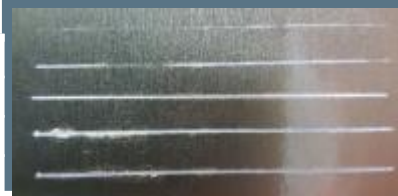
100% DGEBA

- *10 passages
- *20 passages
- *30 passages
- *40 passages
- *50 passages



80% DGEBA + 20% DGEISO

- *10 passages
- *20 passages
- *30 passages
- *40 passages
- *50 passages

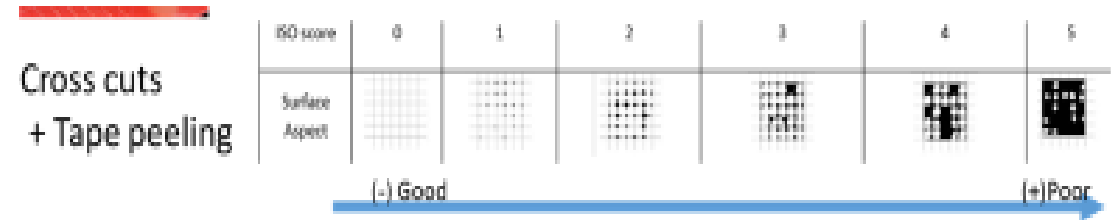
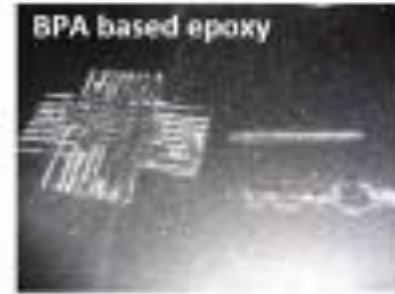


60% DGEBA + 40% DGEISO

- *10 passages
- *20 passages
- *30 passages
- *40 passages
- *50 passages



Cross cutter test ISO 2409



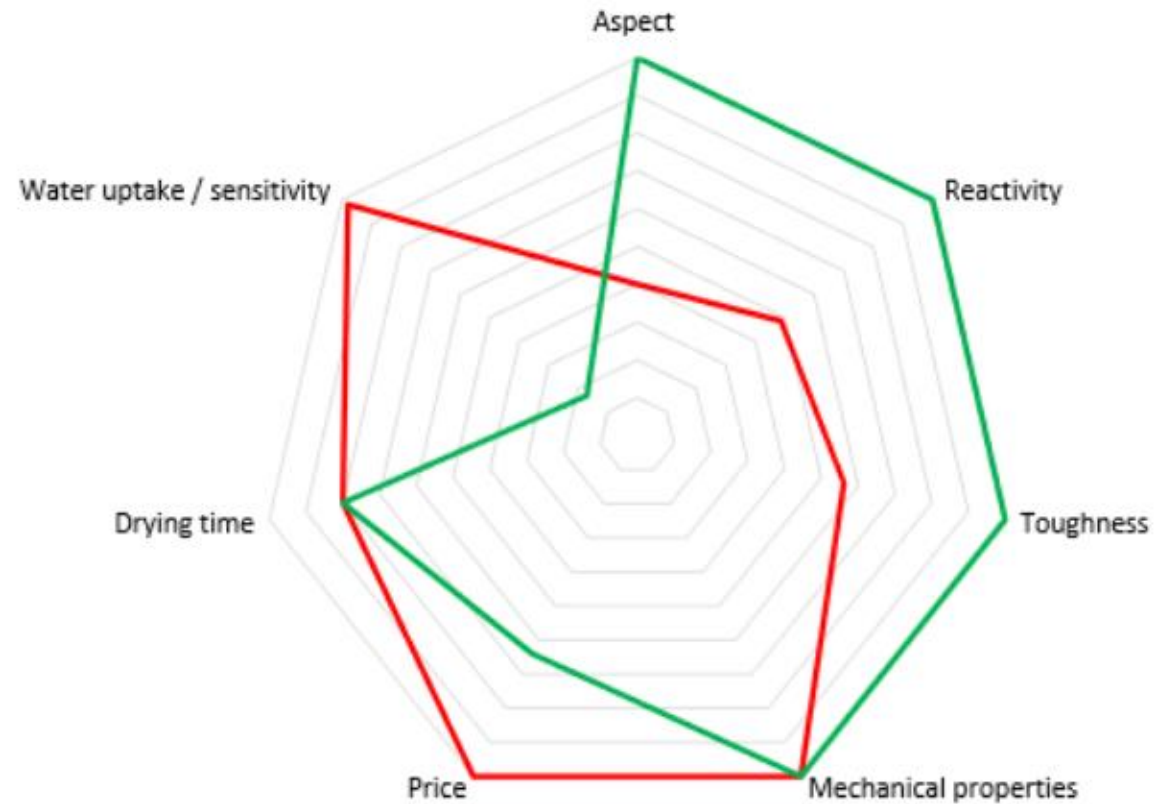
Excellent scratch resistance by adding Isosorbide based Epoxy in coatings

ISOSORBIDE BASED EPOXY RESINS COMPARED TO BPA

Comparative properties of epoxy with IPDA hardener

Bisphenol A based coating

Isosorbide based coating



TAKE HOME MESSAGE

- Why using Isosorbide in Coatings :
 - Helps greening Epoxy , 100% biobased resins
 - Safer Solutions
 - Brings new enhanced properties



Bending
resistance



Abrasion resistance



UV resistant



Adhesion



Improved aspect



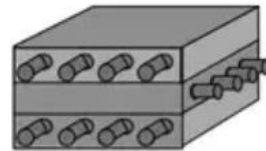
Scratch & Impact
resistant



Flooring



Paint and coating



Composites



Hydrogels



Porous material
Reinforcement

Thank you for listening !



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Any Questions ?