

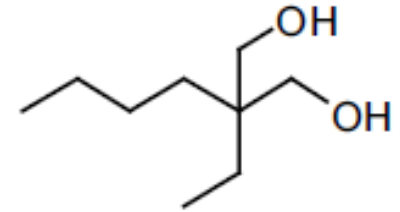


BEPD – butyl ethyl propane diol
– your glycol of choice for high performance polyester resins

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BEPD – your glycol of choice for high performance polyester resins

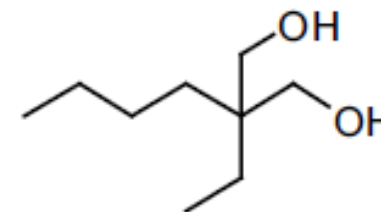
- ➔ The product
- ➔ Suitable polyester applications



BEPD

2-Butyl-2-Ethyl-1,3-Propanediol

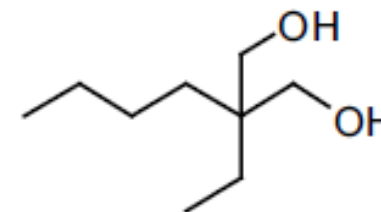
- ➔ Branched aliphatic diol with primary OH-groups
- ➔ Available as two grades:
 - BEPD (> 99%)
 - White crystalline solid ($T_m = 41\text{ C}$, $T_b = 262\text{ C}$)
 - $M_w = 160\text{ g/mol}$
 - BEPD70L (70 %, BEPD, 25% Neopentyl glycol, 5% water)
 - Liquid at room temperature
- ➔ FDA approved, EU food approval pending
- ➔ Commercially available, produced here in Europe
- ➔ Listed on all major inventories lists
 - REACH (EU)
 - DSL (Canada)
 - IECSC (China)
 - ENCS (Japan)
 - KECI (Republic of Korea)
 - TSCA (USA)



BEPD

Main features

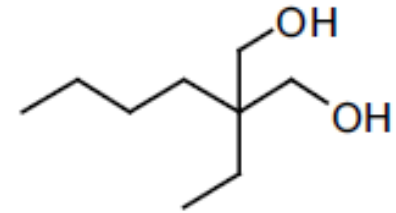
- ➔ **Branched aliphatic diol** with primary OH-groups
- ➔ White crystalline solid (Mp = 41 C)
- ➔ Branched structure offers a reduction of crystallinity in the polyester resin
 - Reduced or removed crystallinity brings
 - Increased **flexibility**/Decreased brittleness
 - Improved **adhesion** especially on metal
- ➔ Branched aliphatic structure brings
 - Increased hydrophobicity
 - Improved hydrolytical resistance
 - Improved outdoor durability
- ➔ In many cases also decreases polyester reaction time



Examples of applications

BEPD

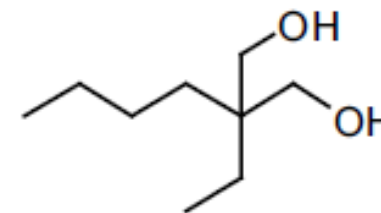
- ➔ Coil coatings
- ➔ Can coatings
- ➔ UPR/Gel coats
- ➔ Industrial coatings



BEPD in coil coatings

Replace conventional glycols with BEPD for

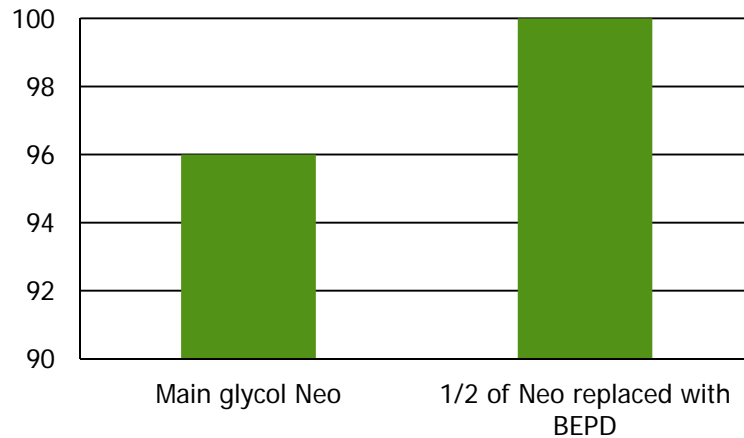
- ➔ Increased flexibility together with improved weather resistance and durability
- ➔ Increased concentration of Iso-phthalic acid without problems of crystallization
 - Further improving the outdoor durability
- ➔ Incorporating BEPD improves:
 - Stain resistance
 - Chemical resistance
 - Durability
 - Solubility of the resin (increased solid content)
 - Decreased viscosity of the paint
 - Detergent resistance



BEPD in coil coatings

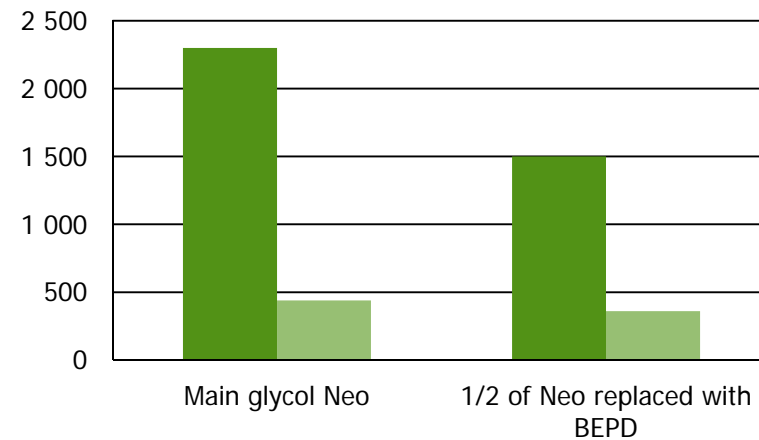
Results

Accelerated weathering resistance

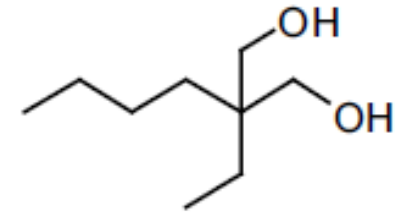


■ Gloss retention, % (QUV-A 4h/50 °C+4h 60 °C)

Effect on viscosity



■ Viscosity resin 60 % in Solvesso 150:PMA 3:1 at 23 C

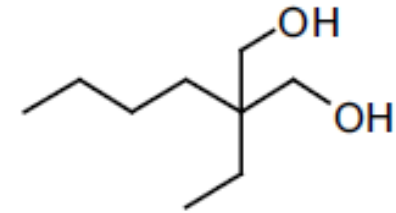


- ➔ Incorporation of BEPD in coil coatings improves gloss retention and outdoor resistance
- ➔ Reduces the use of solvents

BEPD in gel coats

BEPD for gel coats with high technical demands on durability

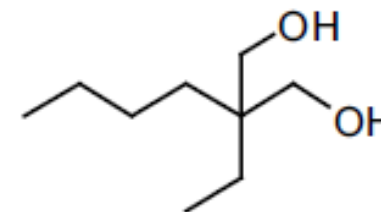
- ➔ Bulky side group protects the ester bonds towards hydrolysis and increases the hydrophobicity and hence decreases water absorption
- ➔ Exchange a part of the Neopentyl glycol with BEPD to:
 - Improve moisture and water resistance
 - Reduce yellowing and improve gloss retention
 - Increase flexibility and impact resistance
 - Reduced shrinkage during curing -> Improve dimension stability



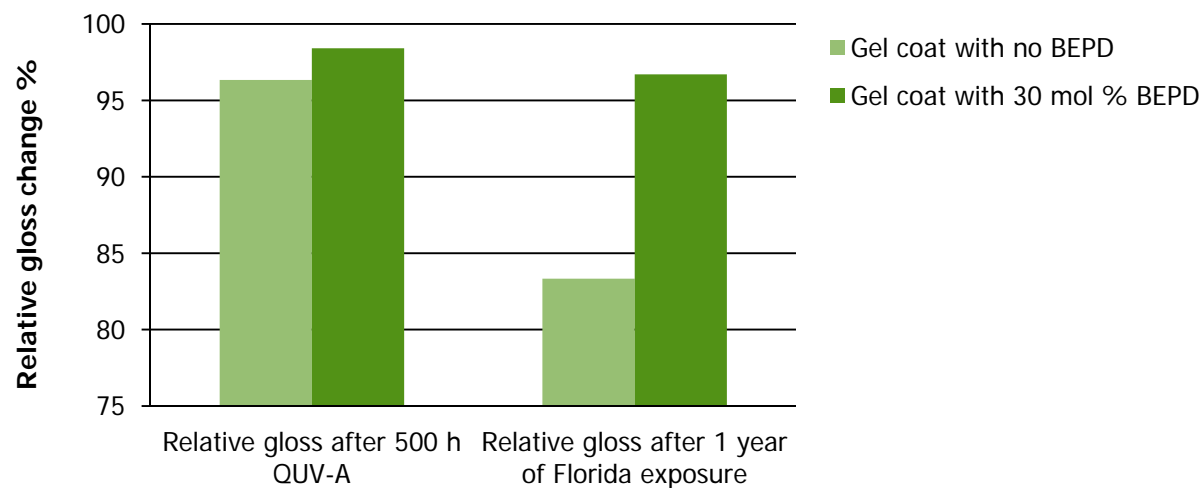
BEPD in gel coats

Results

- ➔ By incorporating BEPD in the gel coat the outdoor durability is significantly enhanced



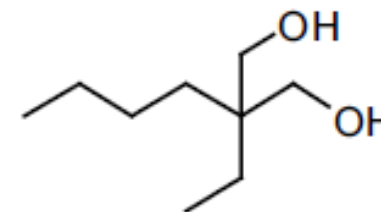
Outdoor durability of gel coats



BEPD in can coatings

Polyesters as an alternative to epoxy-phenolic systems

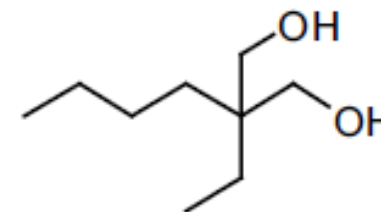
- ➔ Conventional diols offer poorer performance towards sterilization
 - Mainly solvent-borne can-coating formulations
 - Trend to move toward waterborne formulations
- ➔ BEPD improves hydrolysis resistance and resistance towards sterilization
- ➔ Including the flexibility of the polyester resins together with an improved adhesion to the metal
- ➔ BEPD is an ideal candidate monomer for polyester can coatings
- ➔ FDA approved as an indirect food additive and as a component for polyesters intended for direct contact with foodstuffs
- ➔ EU approval is ongoing



BEPD in polyester polyols for industrial coatings

BEPD for high performance polyester coatings

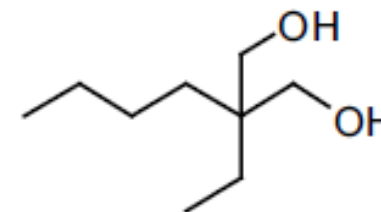
- ➔ Compared to diols such as Neopentyl glycol, 1,6-Hexanediol and 2-Methyl, 1,3-Propanediol (MPD) BEPD offers:
 - Shortened reaction time, better separation of condensation water
 - Increased solid content of the resin due to better interaction with the solvents
 - Excellent balance between hardness and flexibility
 - Significantly improved hydrolytical stability
 - Hydrophobicity – low surface energy
 - Removal of crystallinity
 - High gloss and good leveling of the coating



BEPD in polyester polyols for industrial coatings

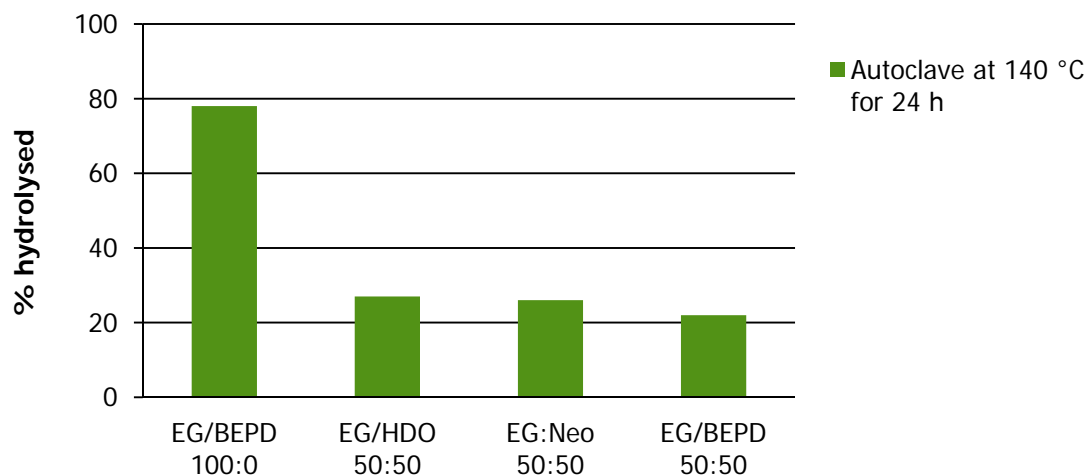
BEPD for high performance polyester coatings

➔ Compared to diols such as Neopentyl glycol, 1,6-Hexanediol and



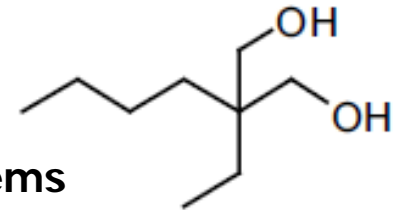
Hydrolysis resistance of adipic acid PE

Measured by increase in acid value



Conclusions

BEPD a premium glycol for high performance polyesters systems



- ➔ BEPD offers highly improved performance to polyesters in terms of:
 - Reduced crystallinity
 - Improved flexibility and adhesion to metal
 - Significantly improved hydrolysis and water resistance
 - Improved outdoor durability of the coating
- ➔ Highly suitable for coil coatings, can coatings and gel coats with high demand on performance



Thank you for your attention

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Visit our stand in

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