

## Application of REAXIS<sup>®</sup> catalysts for the synthesis of a saturated polyester resin

### Formulation

Raw Material	Supplier	Weight	Moles
Isophthalic Acid	Amoco	258 g	1.55 m
Terephthalic Acid	Merck	258 g	1.55 m
Trimellitic Anhydride	Amoco	28 g	0.15 m
Adipic Acid	Merck	162 g	1.11 m
Neopentylglycol	Evonik	88 g	1.16 m
Catalyst	REAXIS	0.6 g	0.05 %

### Procedure

Into a 1 l 4-necked flask, equipped with thermometer, inert gas sparge, agitator and distillation bridge, all raw materials with exception of the catalyst are fed. The mixture is heated to 140 °C and the agitation started when possible. The reactor is kept under a steady flow of nitrogen. At 140 °C the catalyst is added and the mixture heated further on to 240 - 245 °C step by step in order to maintain an overhead temperature of max. 98 °C. It has to be taken care that the loss of glycol is minimised. The temperature is held at 240 °C until the mixtures clears. The cook is continued until the acid value drops below 15 mg KOH/g. The resin is cooled and thinned with solvent naphtha and ethyleneglycol monomethyletheracetate to 60 % solids content.

## Results

The following table is showing the decrease of the acid value during the last 5 hours of the resin cook. This gives quite a good impression of the efficiency of the different REAXIS<sup>®</sup> catalysts.

Catalyst	Acid Value after h reaction time				
	11 h	12 h	13 h	14 h	15 h
REAXIS <sup>®</sup> C256	17	15	14	14	13
REAXIS <sup>®</sup> C248	18	15	13	13	-
REAXIS <sup>®</sup> C129 (0.1 %)	-	18	15	-	-

## Resin Properties

This table shows the final properties of the resin thinned to 60 % solids content. All catalysts give clear resins with good colour numbers, but it is clearly shown, that REAXIS<sup>®</sup> C256 is giving the highest degree of polycondensation indicated by the highest viscosity.

In opposite to this result, REAXIS<sup>®</sup> C129 gave good esterification results but the low viscosity indicates not satisfying condensation properties.

Catalyst	Iodine Colour No.	Turbidity (TE/F)	Viscosity (cP)
REAXIS <sup>®</sup> C256	2	2	2400
REAXIS <sup>®</sup> C248	1	2	1600
REAXIS <sup>®</sup> C129	1	2	1030