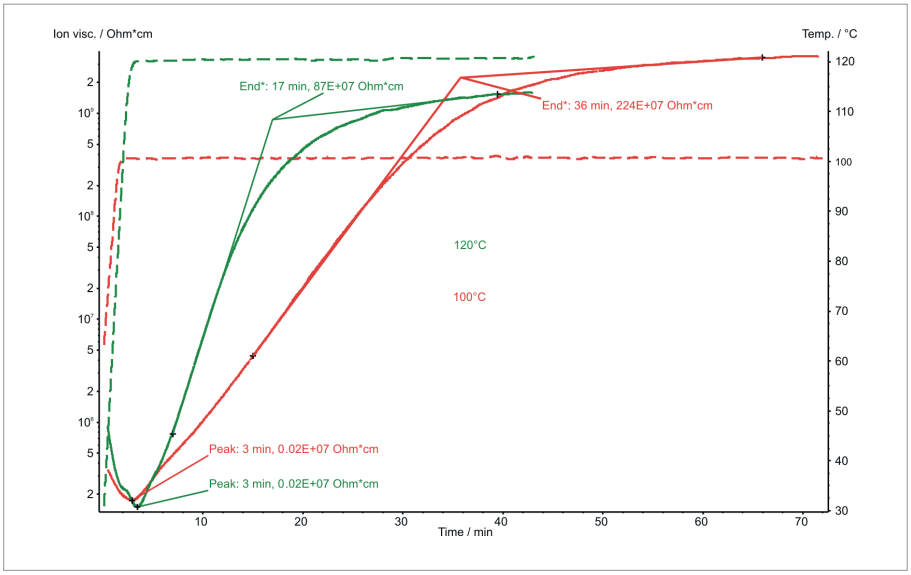
APPLICATION**SHEET**

Polymers · Automotive
DEA 230 *Epsilon*®

Epoxy Resin

Introduction

Epoxy or polyepoxide is a thermosetting epoxide polymer that cures (polymerizes and crosslinks) when mixed with a catalyzing agent or "hardener". Most common epoxy resins are produced from a reaction between epichlorohydrin and bisphenol-A. The first commercial attempts to prepare resins from epichlorohydrin occurred in 1927 in the United States. Credit for the first synthesis of bisphenol-A based epoxy resins is shared by Dr. Pierre Castan from Switzerland and Dr. S.O. Greenlee in the United States in 1936. The applications for epoxy based materials are extensive and include coatings, adhesives and composite materials such as those using carbon fiber and fiberglass reinforcements (although polyester, vinyl ester, and thermoplastic resins are also used for reinforced plastics).



Test Conditions

Temperature range:	test 1: 30°C ...100°C, isotherm test 2 : 30°C ... 120°C, isotherm
Heating/cooling rates:	10 K/min
Sample preparation:	resin: hardener = 100:3
Sensor:	IDEX (comb structure and electrode distance of 115 µm)
Frequency:	1 kHz
Atmosphere:	air (static)

Test Results

At the beginning of both tests, the ion viscosity decreased. This effect is due to softening of the sample because of the increase in temperature. After 3 minutes, the ion viscosity increased; this corresponds to the beginning of curing. The increase in ion viscosity is sharper for the measurement at 120°C compared to the measurement at 100°C, indicating a more reactive curing. Furthermore, the reaction finished earlier at 120°C than at 100°C (endset time of 17 minutes to 36 minutes). At the end of the reaction, the ion viscosity of the cured sample is higher at 100°C than at 120°C because of the positive influence of the temperature on the mobility of dipols of the cured sample.

NGB · Application Sheet 164 · E · 0722 · Technical specifications are subject to change.

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