Customer INFORMATION

BIODUR® Products GmbH

06/2018

New Products BIODUR® E 12A and BIODUR® AE 21 for Sheet Plastination

Dear BIODUR® customers

In sheet plastination, epoxy BIODUR® E 12 and plasticiser BIODUR® AE 20 are well adapted to the needs of the sandwich method. Recently, the new products BIODUR® E 12A and plasticiser BIODUR® AE 21 have been developed. Results of our laboratory tests show that these new products can be an improvement to E 12 and AE 20, especially with respect to application in the flat chamber method.

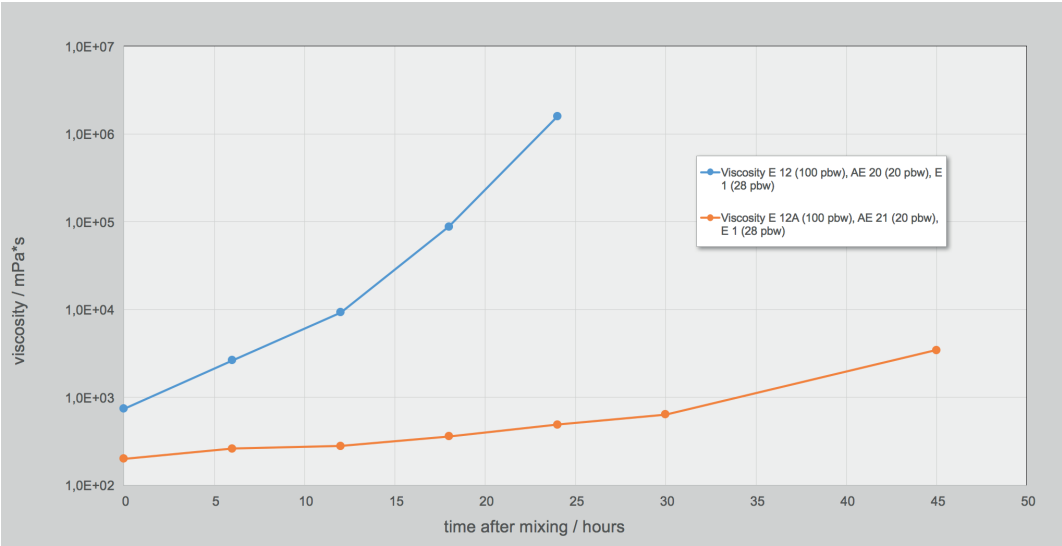
We received good results for transparent extremity slices with both, the flat chamber and the sandwich method:

Examples of transparent plastinated slices from a human upper extremity obtained with BIODUR® E 12 (left) or E 12A (right) in the flat chamber method.

Examples of transparent plastinated slices from a human upper extremity obtained with BIODUR® E 12 in the sandwich method (left) or with E 12A in the flat chamber method (right).

VISCOSITY

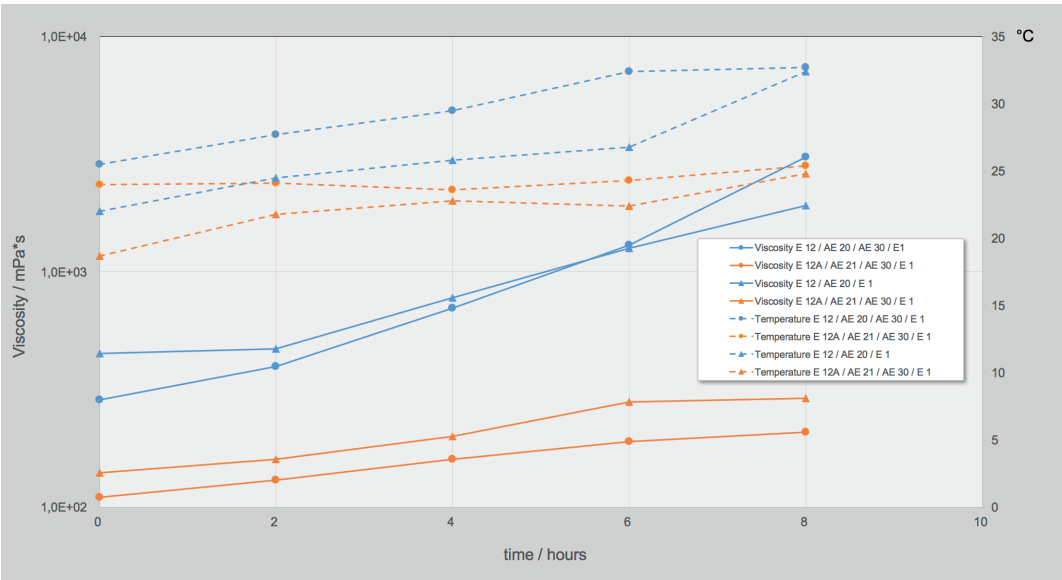
The viscosity of the BIODUR® E 12A mixture is significantly lower than that of the E 12 mixture:



Time-temperature curve of the reaction mixtures. Batches of 500 g each. Ambient temperature was 18–20°C.

IMPREGNATION OF EXTREMITY SLICES

The temporal plot of the viscosity and temperature during impregnation of extremity slices (d = 3 mm) is shown in the following diagram:



Viscosity and temperature of the impregnation mixtures. First run (circles) and second run (triangles). Total impregnation time: ca. 8 hours and ca. 9.5 hours, respectively. Viscosity was measured every 2 hours until 8 hours of impregnation time. Ambient temperature: 18–19°C.

The following process steps were done within one working day, at room temperature:

- *Mixing of epoxy, plasticiser, glass separator (if needed) and hardener. Total volume of all batches was approx. 1.5 litres each.*
- *Immersion of slices.*
- *Impregnation to a final pressure of 5 mbar or less, until only few bubbles were rising to the surface.*
- *Casting of the slices in a flat chamber or between sheets of polyester foil.*

CONCLUSIONS

Based on our present experience, we recommend the following mixtures:

For the sandwich method

E 12	100	parts by weight (pbw)
AE 20	20	pbw
E 1	28	pbw

For the flat chamber method (for impregnation and for filling the flat chamber)

E 12A	95	pbw
AE 21	15	pbw
AE 30	5	pbw
E 1	26	pbw

	BIODUR® E 12	BIODUR® E 12A
Refractive index @20 °C	1.54–1.55	1.55–1.56
Tendency to crystallise	medium	distinct
Colour and transparency of plastinated slices	Very good	Very good
Viscosity of impregnation mixture (room temperature)	Low in the beginning; rises to ca. 2,000 – 3,000 mPa*s during 8 h of impregnation	Does not exceed 500 mPa*s during 8 h of impregnation
Processing time after mixing with plasticiser and hardener E 1 (room temperature)	++ At least approx. 12 h (strongly depends on the batch dimensions!)	+++ >24 h (depends on the batch dimensions)
Particularly suitable for	Sandwich method (with AE 20 and E 1) Higher viscosity helps keeping air from entering the interstice between slice and foil	Flat chamber method (with AE 21, AE 30, and E 1) Lower viscosity facilitates filling of the flat chamber

Comparison of BIODUR® E 12 and E 12A. Batch size (or better: the height of the impregnation bath), thickness of the cut slices, and other parameters must be considered when adapting the above described procedures to individual sheet plastination projects.

For further information please contact our sales office at

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BIODUR® Products GmbH

Services, Polymers, Equipment & Auxiliaries for Plastination