

“New Generation PU Material in Window Encapsulation”

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Outline of Presentation

- Short Introduction
- Kinetics of PU- Reaction
- Material Properties
- Material Approval of OEMs
- Improved Testing of Material
- Conclusion

Short Introduction

History:

- The actual **aromatic systems** have been developed already mid 90's

ELASTOLIT R8919/101/OA48

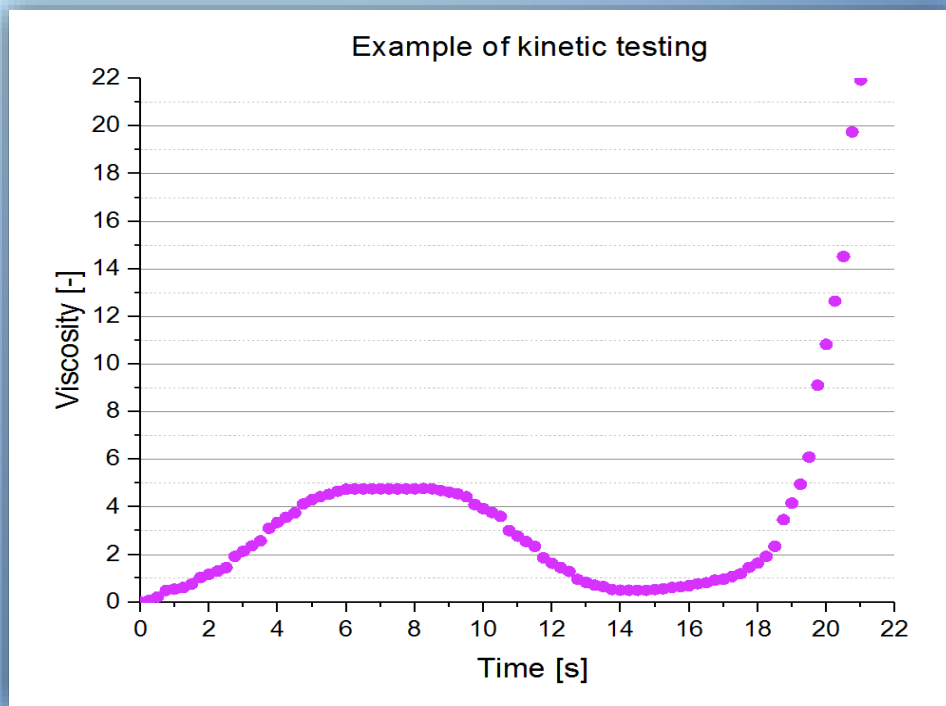
ELASTOLIT R8919/100/WE35

ELASTOLIT R8919/102/WE45

Challenge:

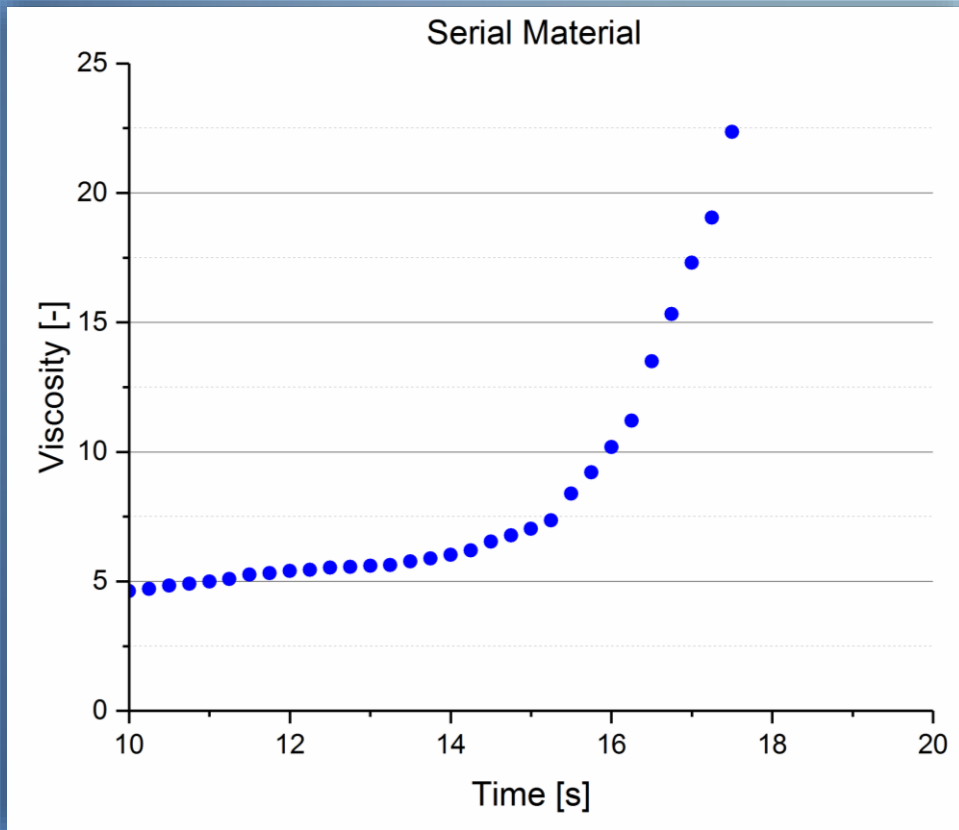
- At that moment, they were fully fulfilling the requirements, as most sunroofs had a limited weight of PU
- Development of systems having **improved flowability** for bigger molds, **global recipes, lower emissions**, being **REACH conform**,
- More recently, more and more large parts (in weight of PU) are coming into production **and keeping machine parameters at customers constant**
 - ☞ This requires longer shot times. Thus, improved flowability/ kinetics required

Kinetics of PU- Reaction



- Tests were conducted using ViscoPakt by HiTec Zang GmbH

Kinetics of PU- Reaction

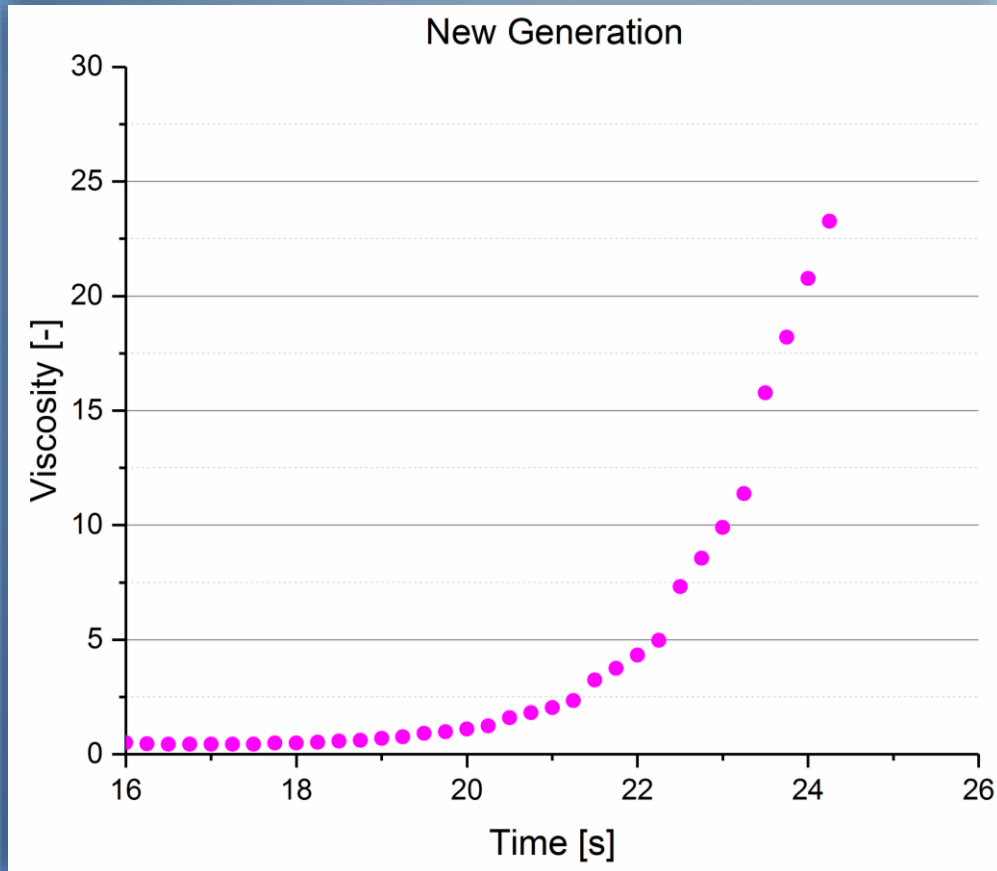


Determined under laboratory conditions

Flowability of serial material is limited by increasing viscosity even before hardening of material

Early increase of viscosity makes higher shot weights and filling of complex molds difficult

Kinetics of PU- Reaction

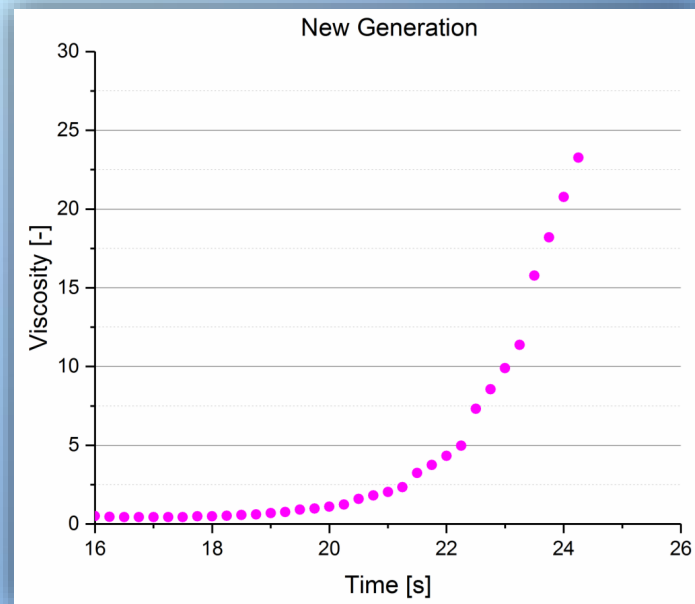
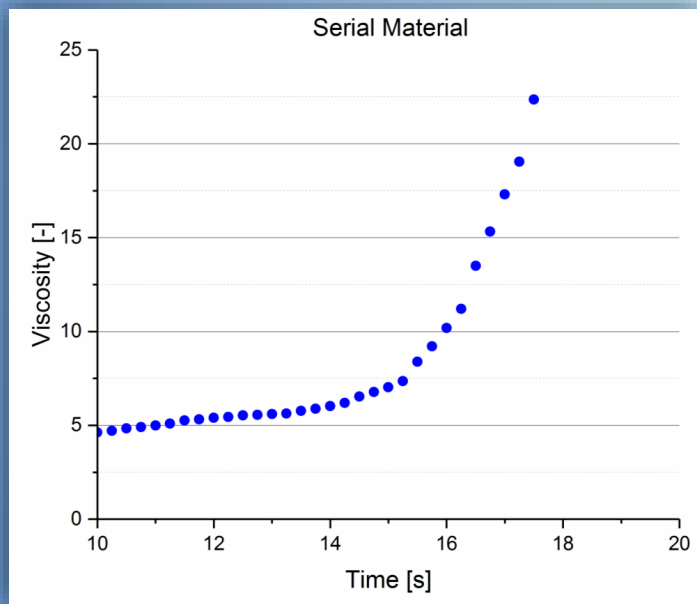


Determined under laboratory conditions

Completely new formulation with novel raw materials led to delayed reaction onset

→ viscosity is kept low and flowability could be improved

Kinetics of PU- Reaction



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ELASTOLIT R 8919/107

ELASTOLIT R 8919/108

ELASTOLIT R 8919/109

Material Properties

Property	Test method	unit	Serial Material	New Generation
Moulded density	ISO 1183-1	Kg/m ³	1060	1060
Shore A	ISO 7619-1	-	87	88
Tensile strength	DIN 53504	MPa	12	13
Elongation	DIN 53504	%	215	200
Tensile modulus	DIN 53504	MPa	28	26
Tear resistance	ISO 34-1,B (b)	N/mm	28	27
shrinkage	-	%	1,25	1,2

Material Properties

Property	unit	Serial Material	New Generation
Peel test 7 days	N/cm	88	90
Peel test after cataplasm ageing	N/cm	81	80

Material Properties

**Serial Material
(averaged values):**

VOC 200 ppm

FOG 830 ppm

Nonylphenol is detected

**New Generation
(averaged values):**

VOC 120 ppm

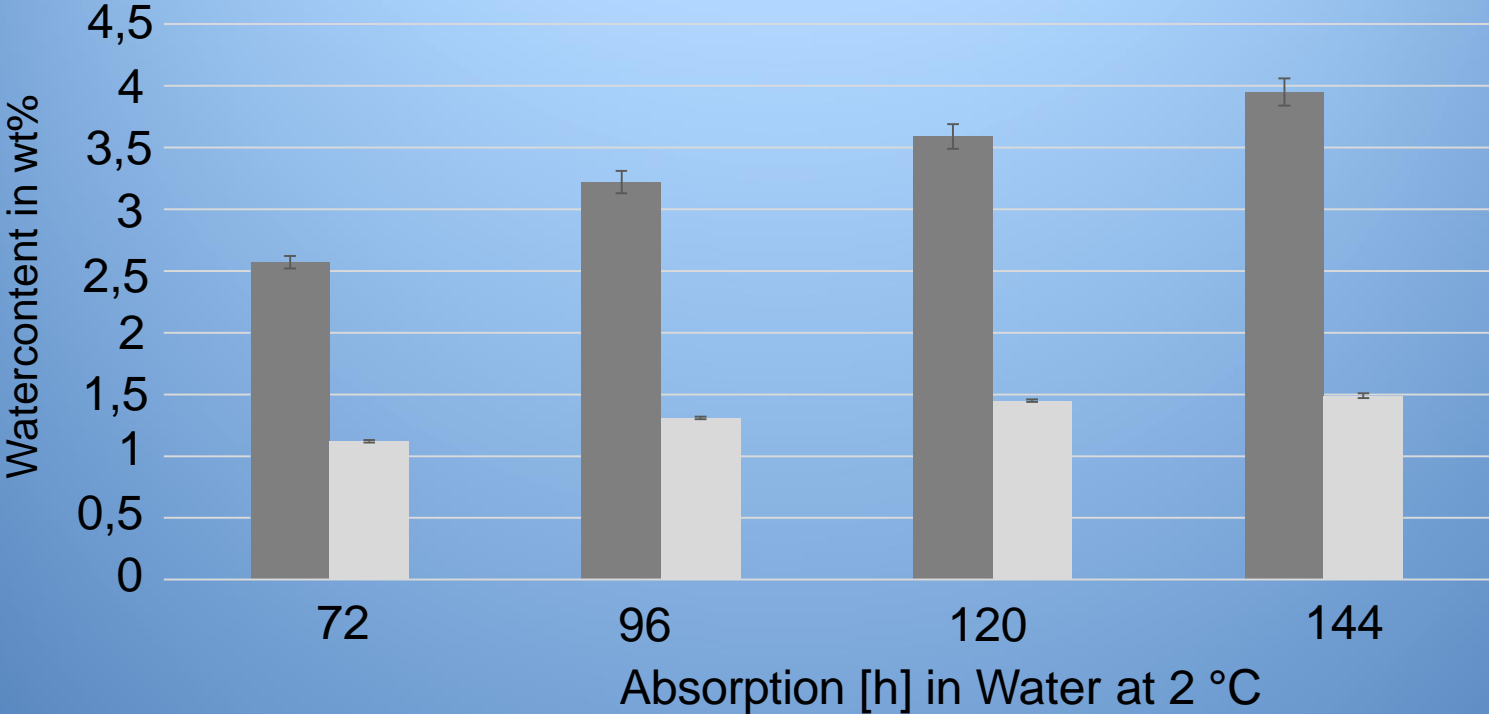
FOG 370 ppm

no Nonylphenol

→ lower emissions and absence of Nonylphenol are nowadays OEM requirements for new encapsulation projects

Material Properties

Watercontent after absorption in Water (2 °C) for Serial Material (dark grey) and New Generation (light grey)



Material Approval of OEMs

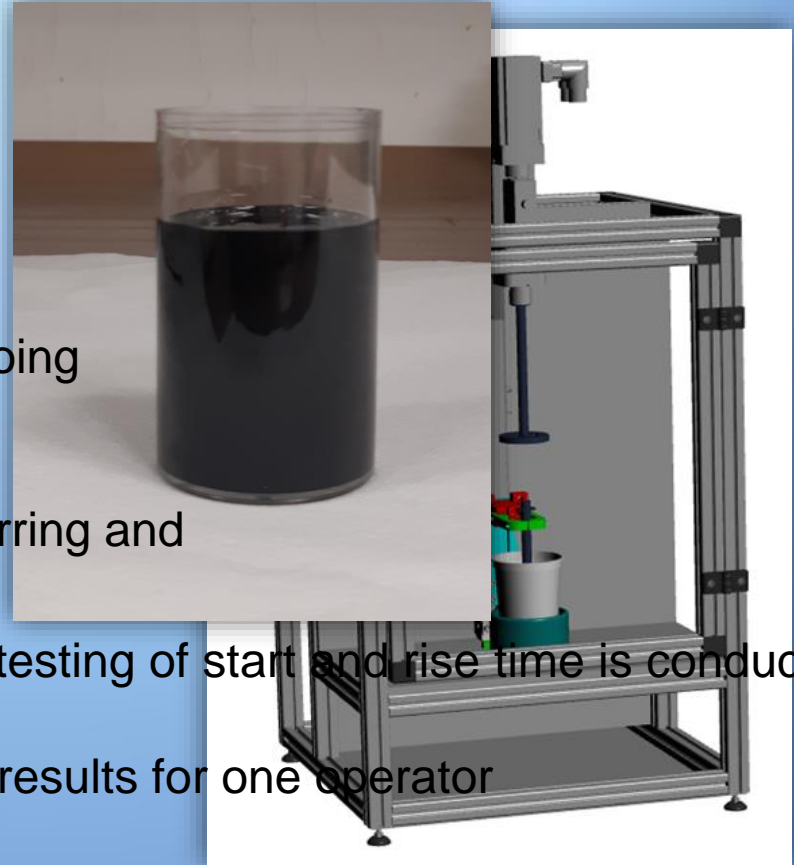


→ ***Further OEMs made specific project approvals, evaluate material, or purchase aliphatic material***

Improved Testing of Material



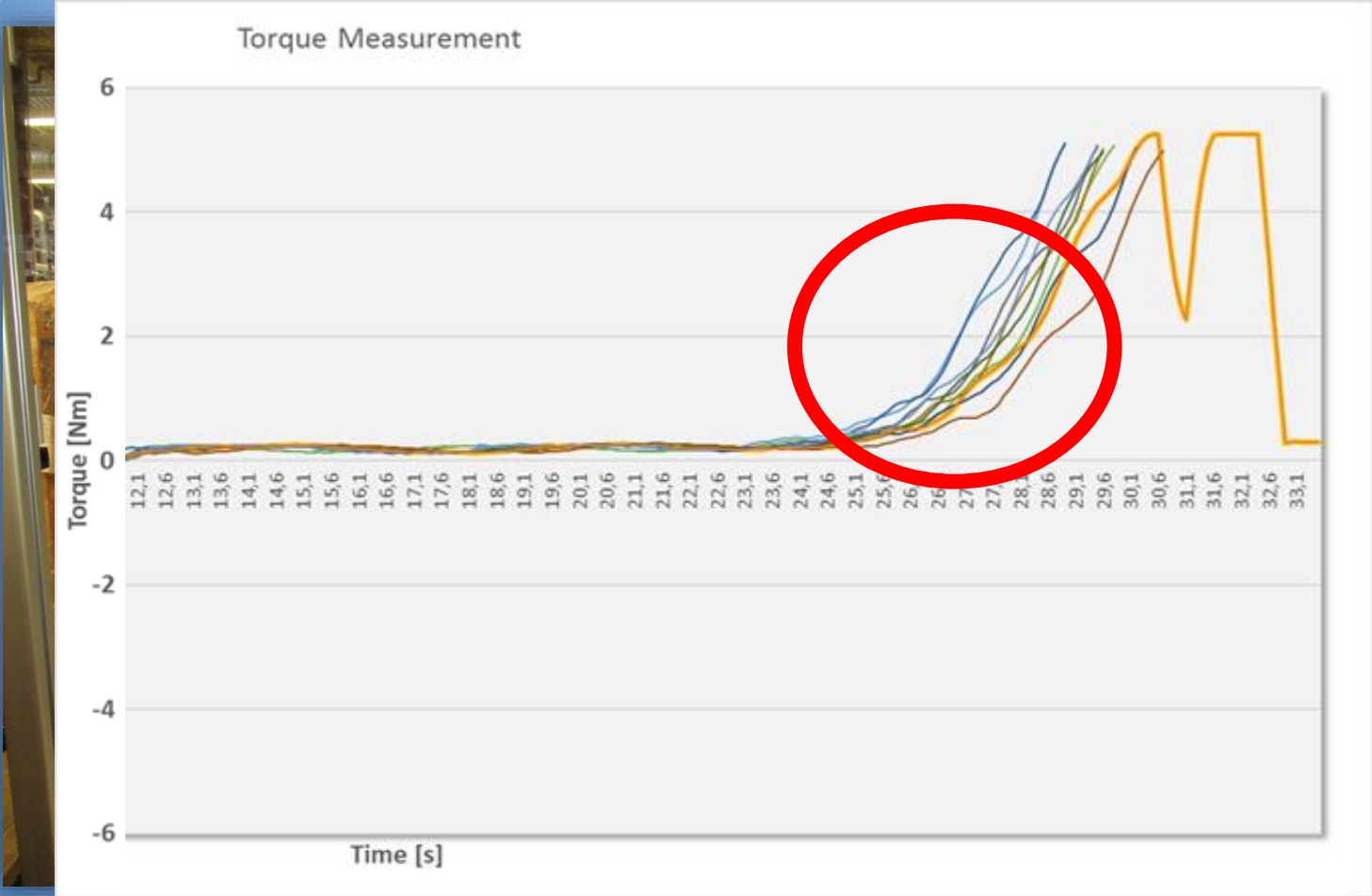
→
Manual testing for outgoing



Automated in-situ stirring and

- Manual testing of start and rise time is conducted
- Precise results for one operator
- Reproducibility for more operators is lower than in case of automatized testing

Improved Testing of Material



ing already
site

Conclusion

New Generation PU Material

- global PU systems with improved flowability, reduced emissions, and REACH conformity were successfully developed
- OEMs with interest in aromatic material already approved New Generation material
- BASF supports customers in questions of material approval at OEMs`

Improved QC Material Testing

- Novel testing method for quality control was developed
- Implementation as criterion for outgoing inspection is ongoing
- BASF supports customers in questions of material testing

Thank you for your attention!



We create chemistry