



SVEM: A Path Toward DOEs with Complex Models and Very Few Runs

SVEM = Self-Validated Ensemble Modeling / 2022-EU-30MP-945



1) Lohmann – company presentation

- 2) Complex DoE's with few runs - use of SVEM
- 3) Use cases
- 4) Summary

Lohmann at a glance

Lohmann Group

Turnover 2020:

668 Mio.€

Lohmann Tape Gruppe



Joint Venture:

Lohmann & Rauscher



**Lohmann Tape Group
turnover 2020:**

300 Mio.€

Success with brands and
bonding technologies for

170 years

Our Business Units

- BU Technical Products in the regions EMEA, Americas and Asia Pacific
- BU Hygiene

> 90%

customized products

**1.800
Employees**

from 80 nations

24 sites

State-of-the-art coating
lines & Technology
Centers in Europe, Asia
and America

Who we are: The Bonding Engineers



The Bonding Engineers' solutions from a single source

- Polymerization
- Formulation
- Coating | Laminating
- Processing
- Testing
- Applying

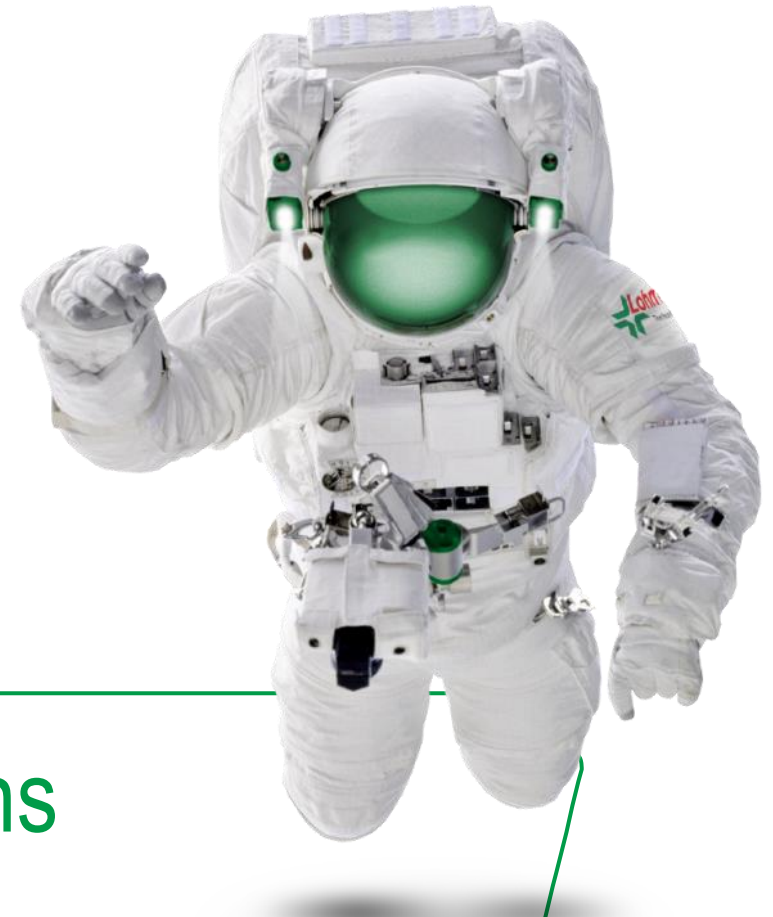


On-site mechanical integration of the adhesive solution:

Individual product development

- More than 90% customized solutions
- > 200 patents





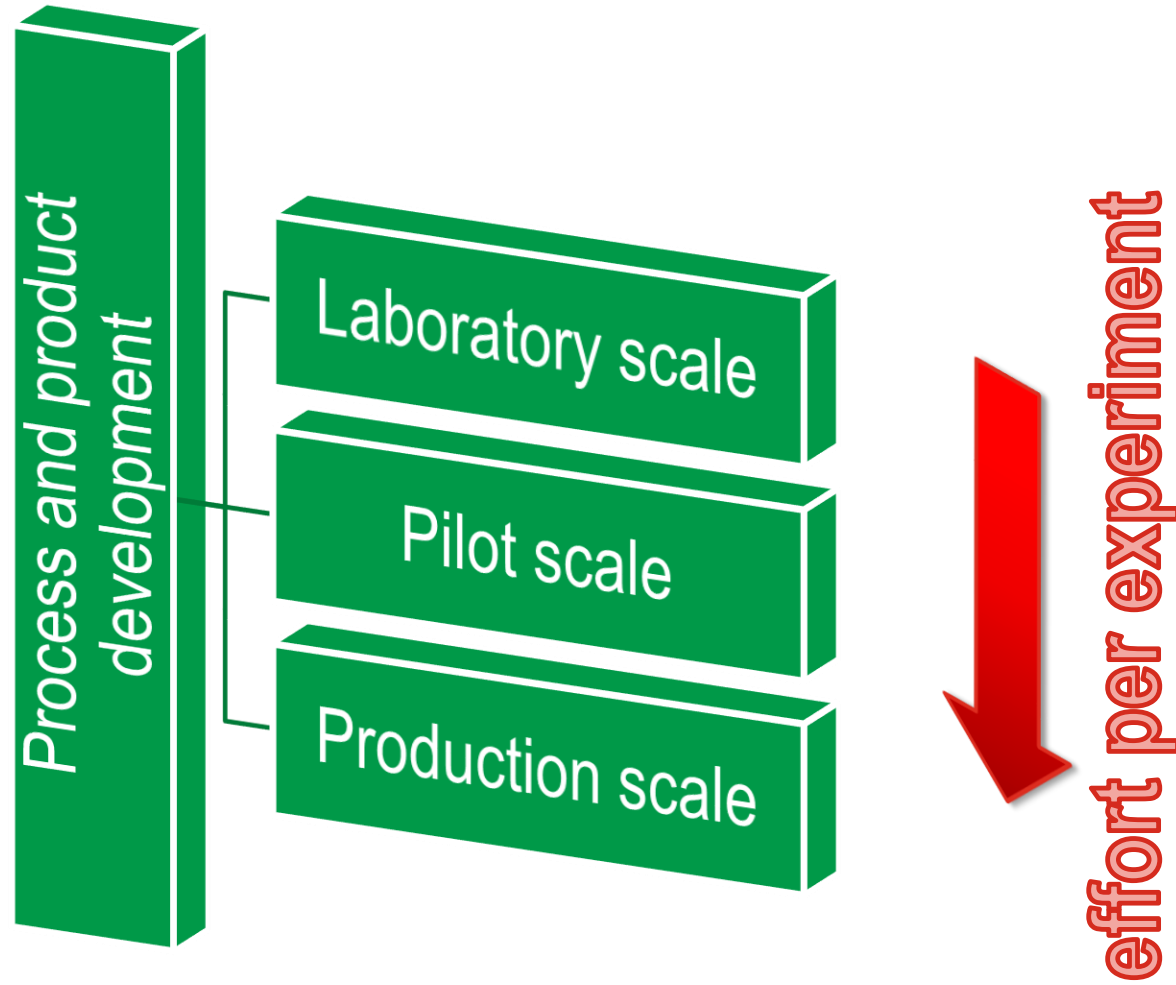
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Background



Background

The higher the effort per experiment the more critical are the number of experiments

Situations where number of experiments is critical

- experiments on pilot or production scale
- experiments on laboratory scale (long running experiments)
- complex model (full RSM) is required → optimization

**DoE's with few runs and
complex model / analysis**

Background – increasing efforts

Experiments on pilot / production scale

- Pilot / production scale for adhesive tapes:
 - Large amounts of raw materials needed and product produced
 - Laboratory scale < 1 kg 1 m²
 - Pilot scale 10 - 50 kg 25-100 m²
 - Production scale >100 >1000 m²

Background

Experiments on laboratory scale

- Complex models or large amount of factors
 - e.g. chemical reaction with ingredients and process parameters
 - long running experiments
 - Limited project time
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- Desirable to minimize experimental efforts as much as possible

Background

JMP Discovery Summit 2021

- Ramsey, Gottwalt, Lemkus - JMP Discovery Summit Europe 2021, "SVEM: A Paradigm Shift in Design and Analysis of Experiments (2021-EU-45MP-779)"
- Kay, Hersh - JMP Discovery Summit Europe 2021, "Re-Thinking the Design and Analysis of Experiments? (2021-EU-30MP-776)"

SVEM: solution for DoE with few experiments and complex problems?



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- 1) Lohmann at a glance
- 2) Lohmann Technology Center
- 3) Lohmann: our core markets

4) Summary



Summary

Kay, Hersh (JMP Discovery Summit Europe 2021)

"Re-Thinking the Design and Analysis of Experiments? (2021-EU-30MP-776)"

SVEM will change the way DoE is used

Opens a new way towards DoE's with minimalistic experimental runs at maximum gathering of information and insight



Thank you very much
for your attention!

