

A vertical decorative bar on the left side of the slide, composed of five horizontal stripes in red, green, blue, orange, and green from top to bottom.

Tribology in focus - process optimisation as a driver of competitiveness

11.04.2024

Mathias Schmeier | Raziol Zibulla & Sohn GmbH

5th WORKSHOP Forming and Punching

Introduction

Change in production processes

- Widespread use of modern press technology => higher stroke rates
- Progress of industrialisation in the pressing plant
- Shorter set-up times due to smaller batch sizes
- Increased use of integrated processes
- Scarcity of resources, sustainability, etc. => energy-optimised production

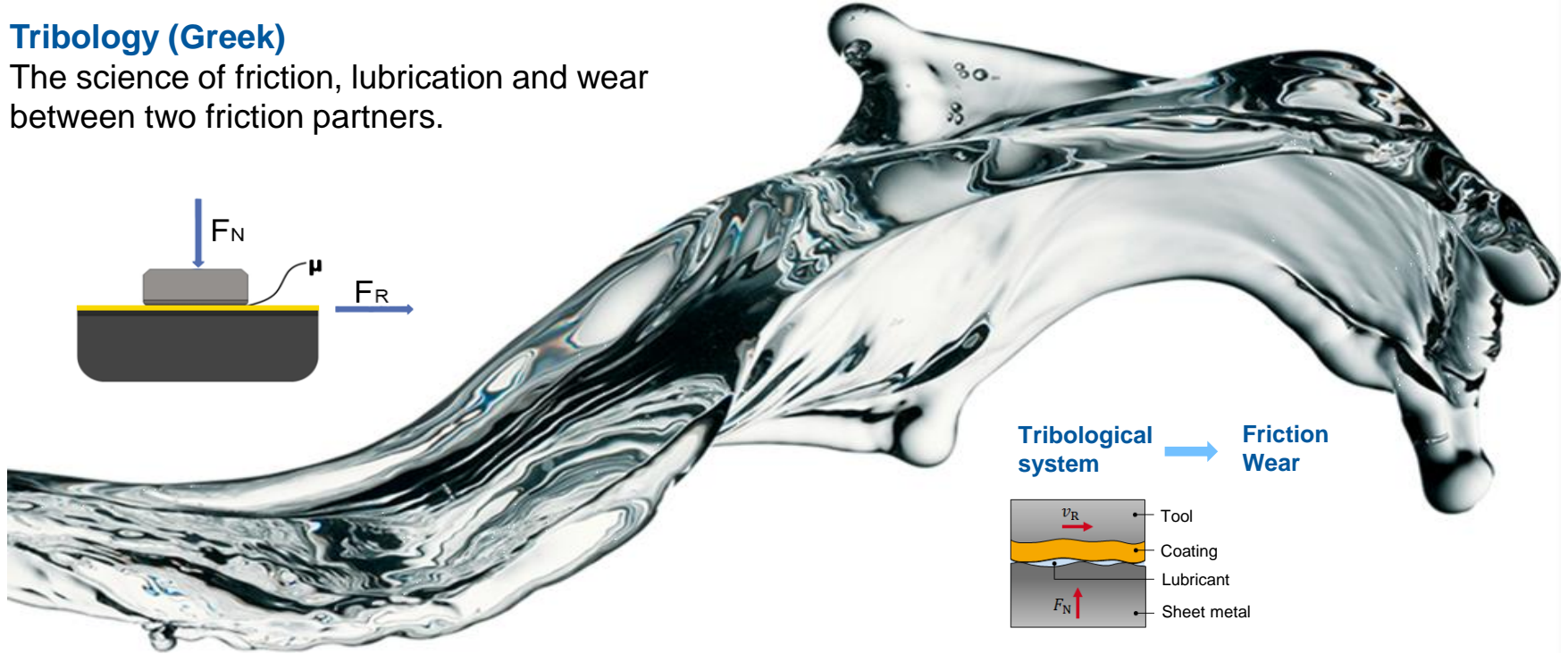
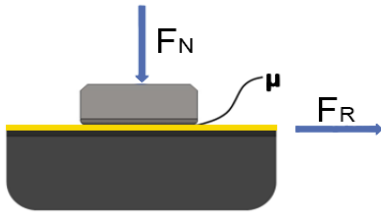


Tribology is a key focus for improving process conditions in sheet metal forming, as friction conditions have a major influence on process reliability.

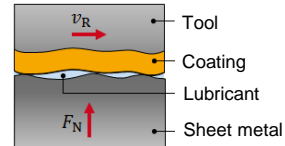


Tribology (Greek)

The science of friction, lubrication and wear between two friction partners.

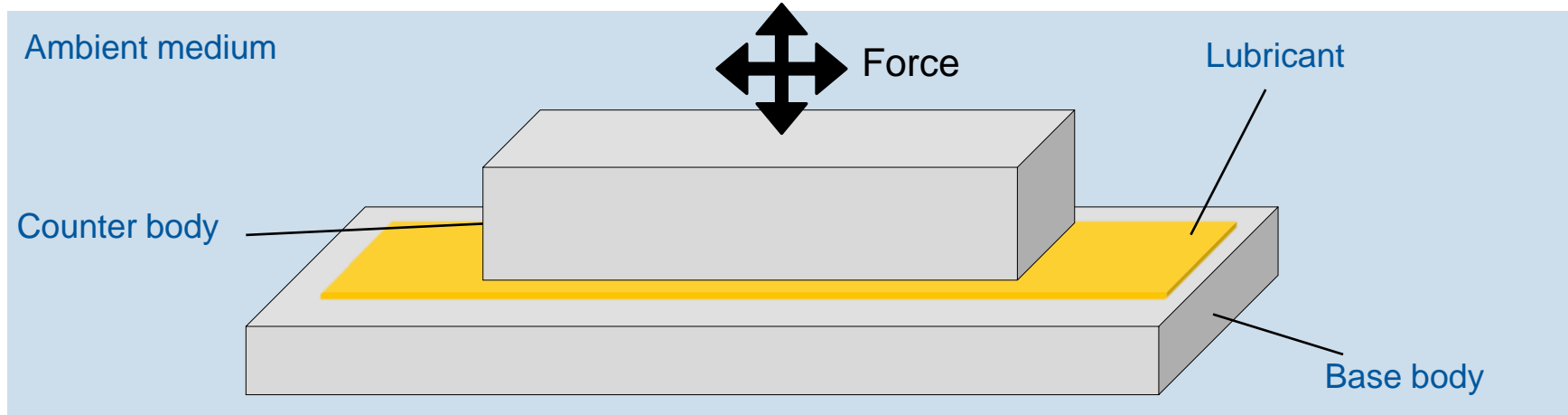


Tribological system → Friction Wear



Tribology (Greek)

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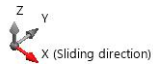
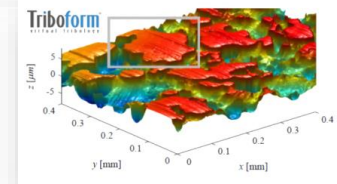
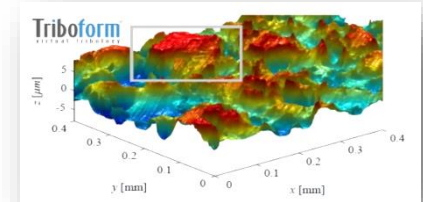
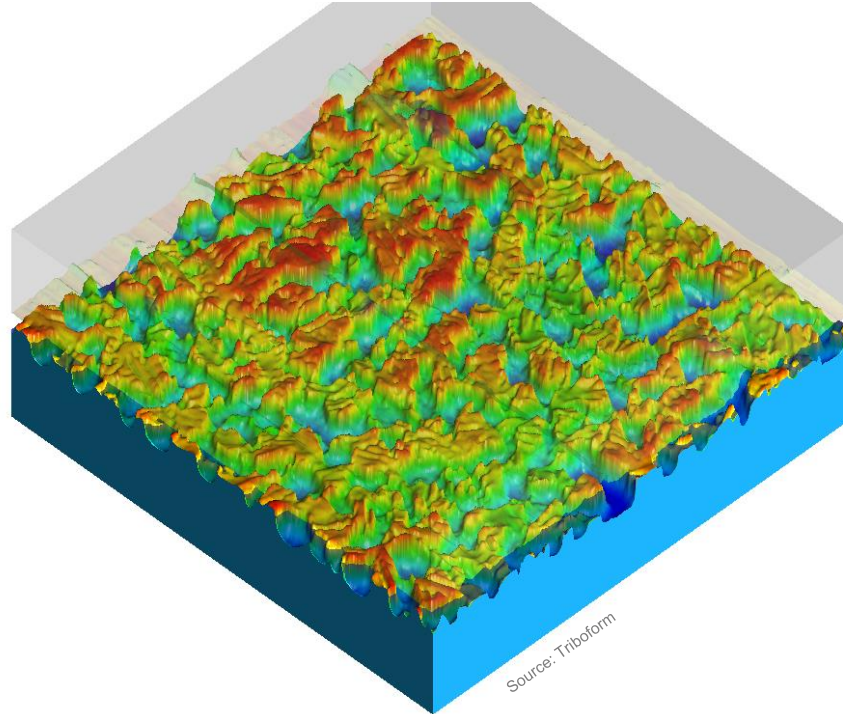


The science of tribology deals with **the causes and manifestations** of friction on the one hand, but also with the **consequences and possibilities of influencing** friction on the other.

Basics

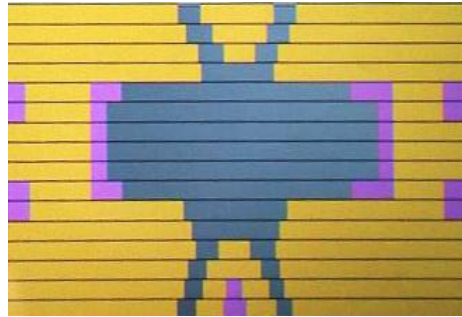
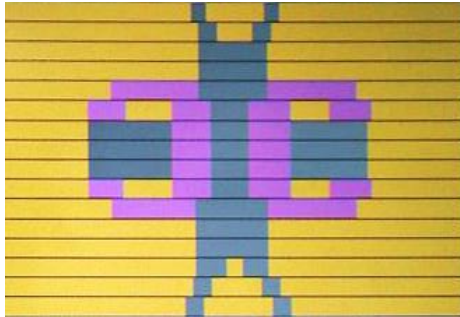
Smoothing behaviour of surfaces under pressure

Plastic changes have a direct influence on the stored lubricant volume!



TriboForm[®]
virtual tribology

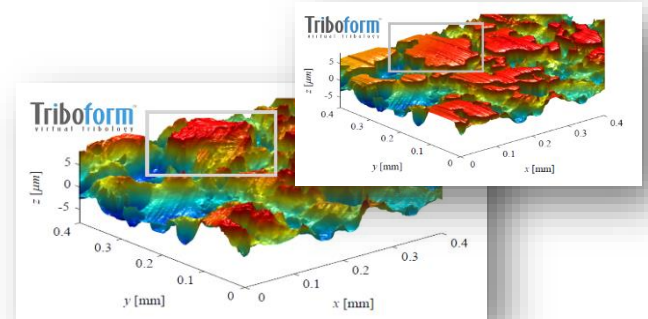
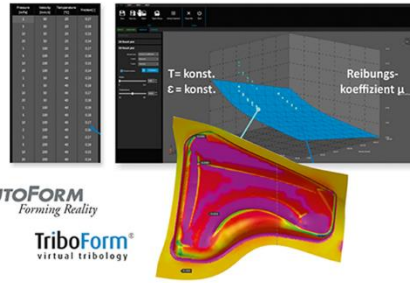
The lubrication pattern has a direct influence on the friction behaviour between the blank and the tool. The targeted use of lubricant means that the sink can be manufactured to the required quality.



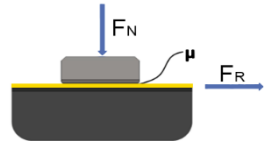
● approx. 0.6 g/m² ● approx. 0.3 g/m² ● dry

Basics

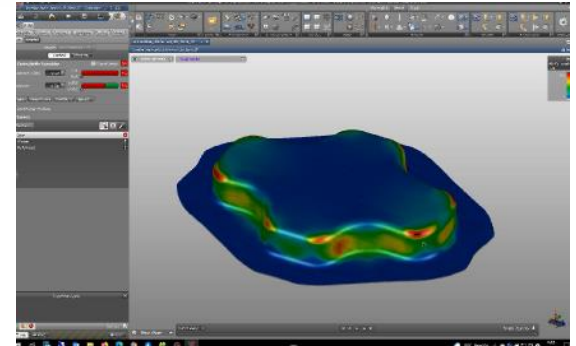
Tribology tests - Tribometer 5100 test system



**Raziol Tribometer 5100 and
TriboForm R4.0 AutoForm Forming R10**
for the optimisation of sheet metal forming
processes



Data for modelling tribological effects and application
in sheet metal forming simulation



Challenges in forming technology

Determination of friction states in the model test + transfer

Initial situation



Sheet metal



Tools & Coatings



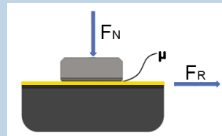
Lubricants



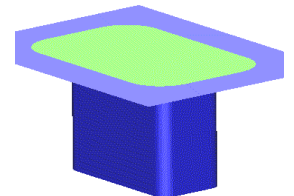
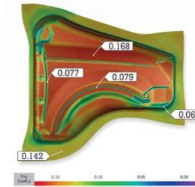
Strip drawing tests

Friction coefficient dependent on:

- lubrication
- contact pressure
- speed
- temperature
- surface
- ...



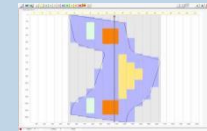
Simulation in tool shop



Optimisation of the Greasing



Control of the Greasing system

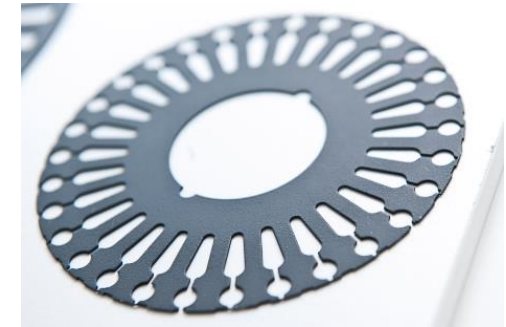
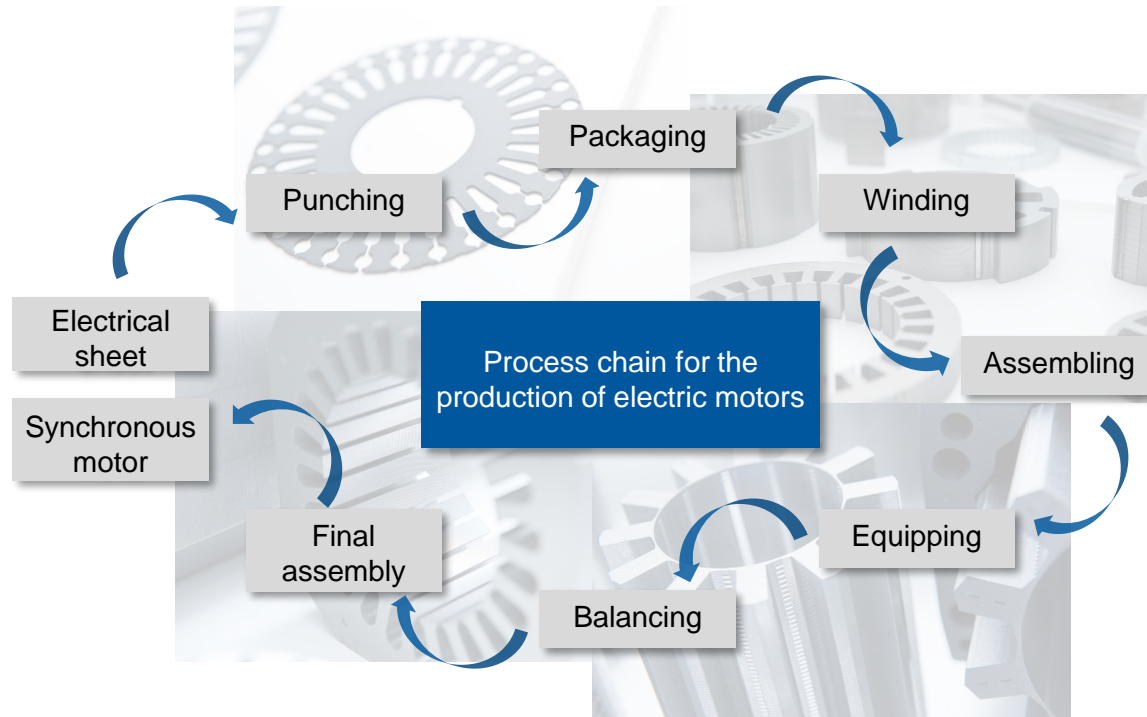


Try Out



Examples from application technology

Process chain for the production of electric motors

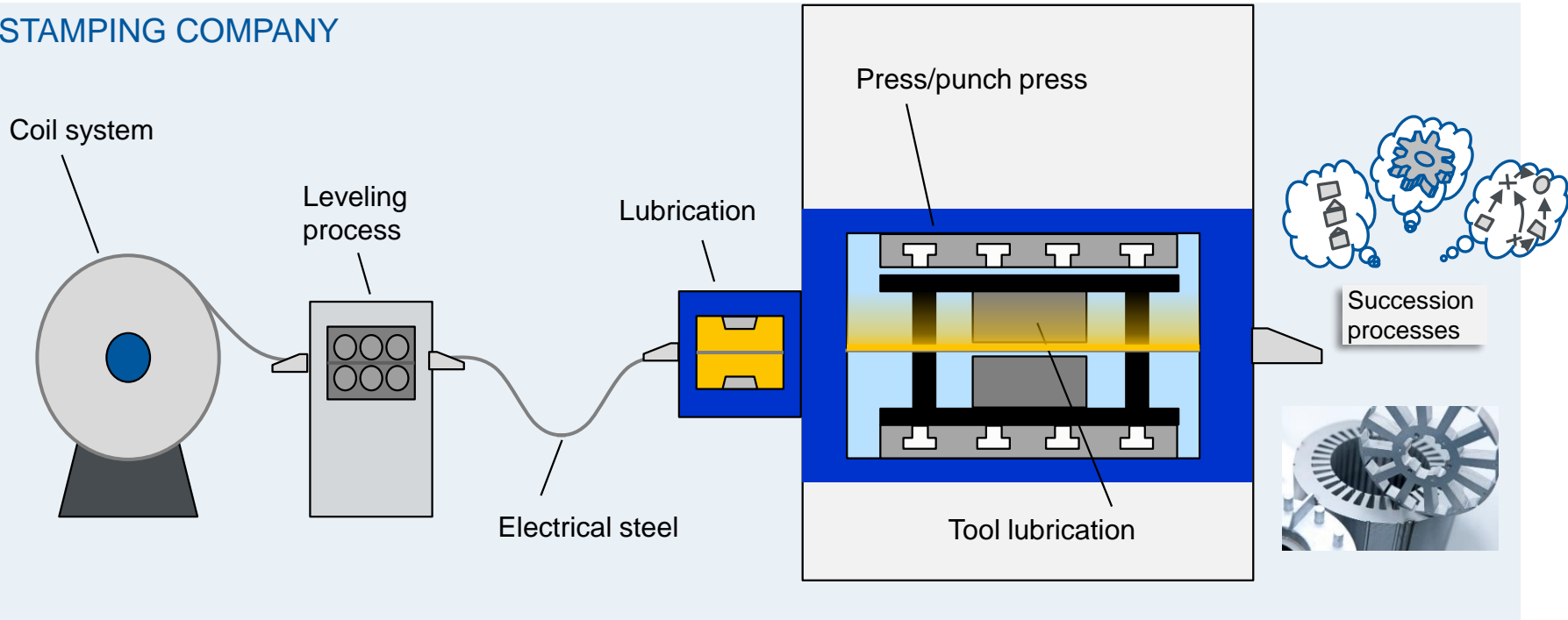


Source: Waasnet

Examples from application technology

The influence of the lubricant and the lubrication technology plays a major role

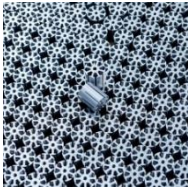
STAMPING COMPANY



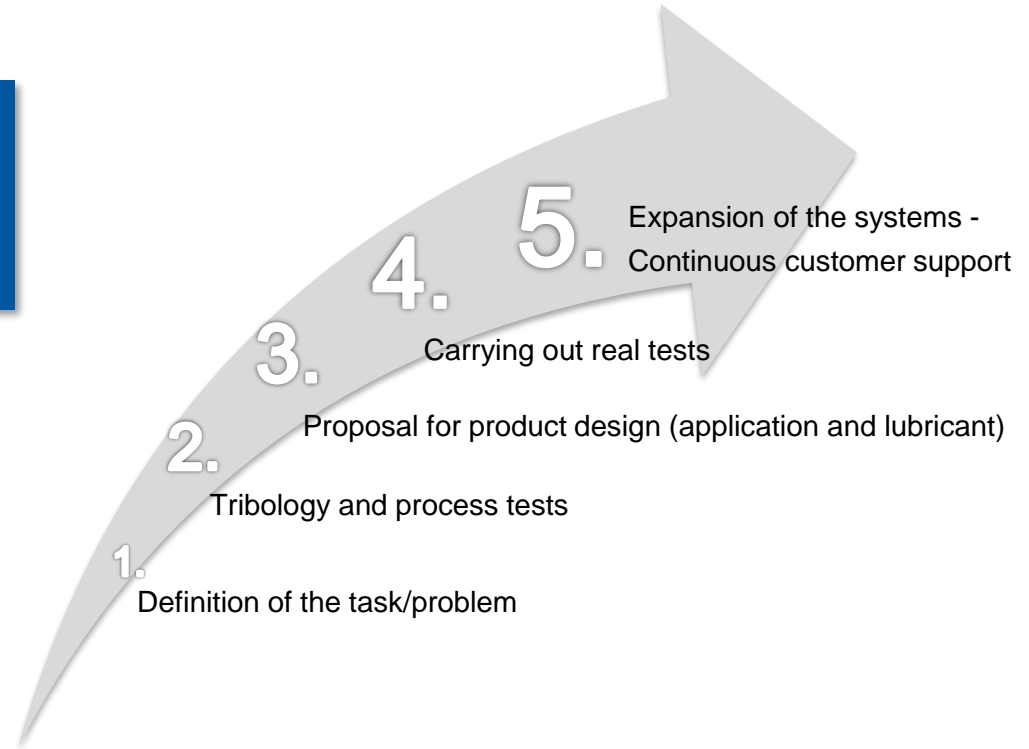
Examples from application technology

The customer's task

1. Reduction of the hazard potential
2. Ensuring quality
3. Cost reduction in production

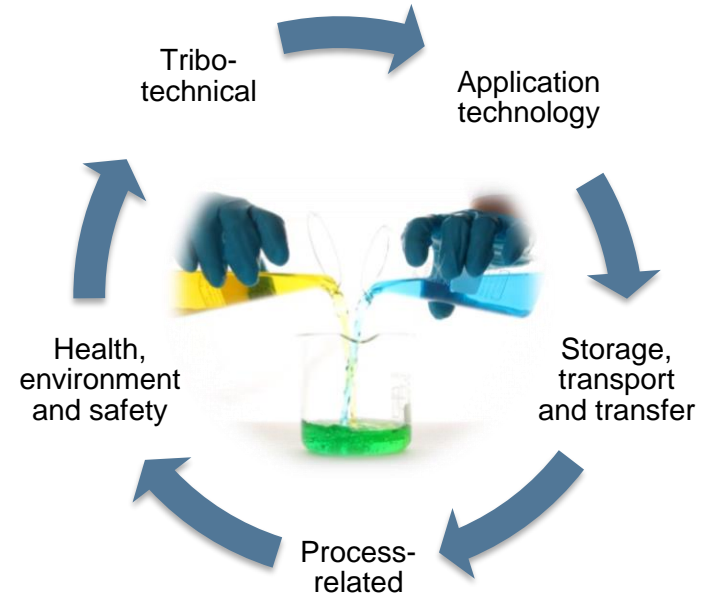
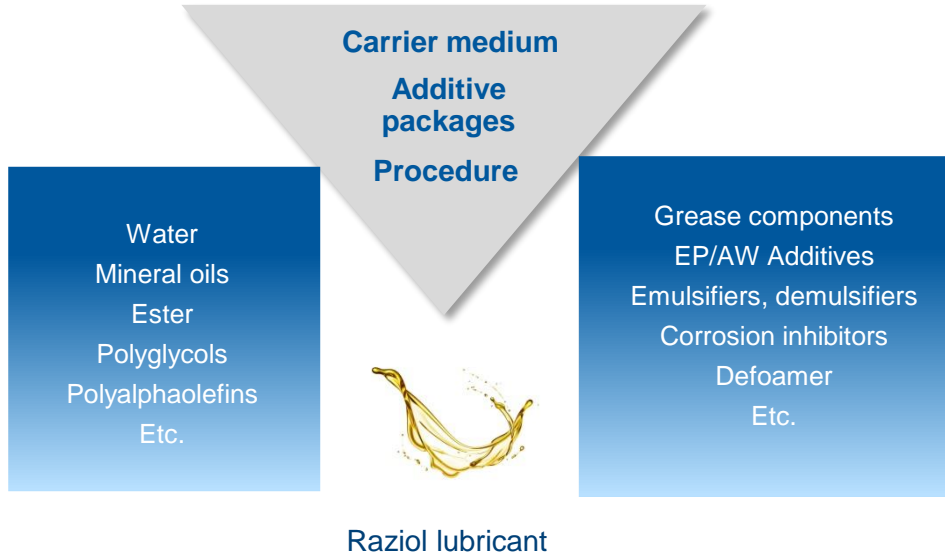


Source: Weasner



Basics


Criteria for optimum lubricant determination



Examples from application technology

Product design proposal for implementation (lubricant)

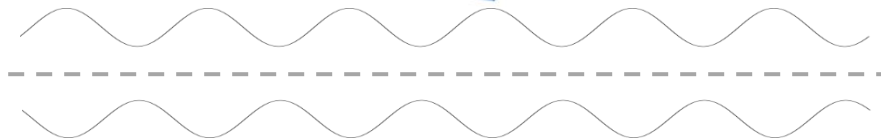
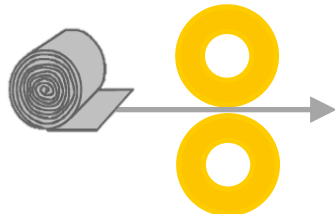
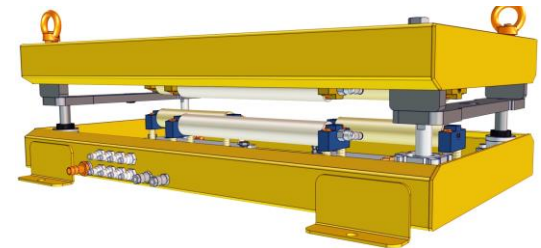
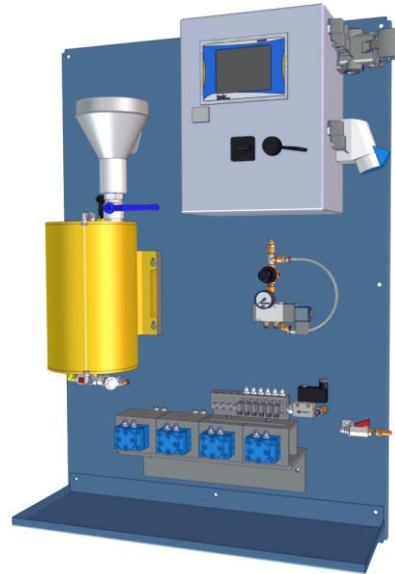
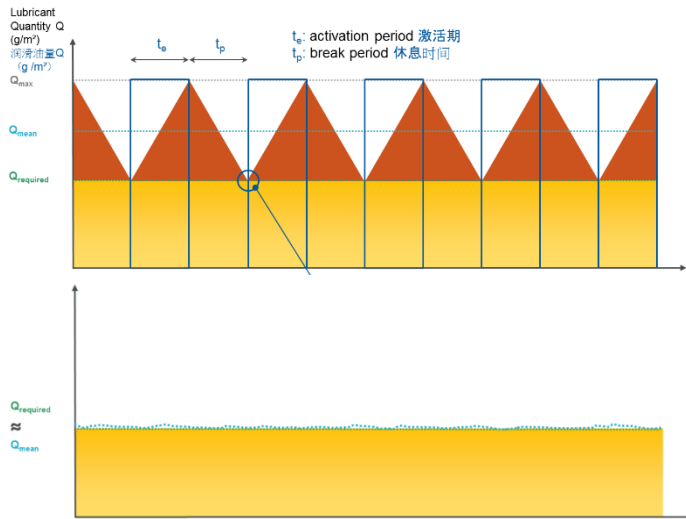


	Raziol approach
Viscosity (20°C)	3.3 mm ² /s
Flash point	84°C
Dangerous goods	no
TRbF 01	-/-
VOC-containing (EU)	0.0 g/l
Symbol	 GHS08 Danger



Examples from application technology

Proposal of the product design for implementation (application)



Examples from application technology

Press with mould and peripherals - Carrying out real tests

Straightener
Reel

Strip welding

Strip thickness
measurement

Feed

Lubrication

Press &
Packaging

Tool

Packing device



Provision of lubricant (special customer development)

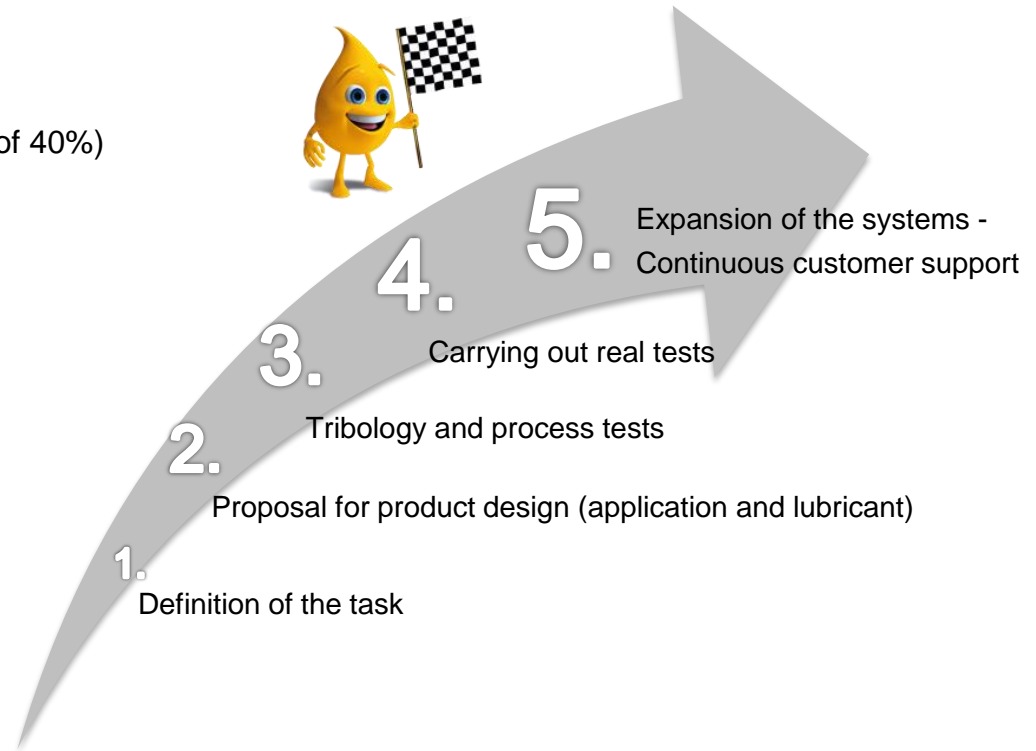


Example from application technology

Conclusion and comments

Result:

- Decreased oil consumption (lubricant reduction of 40%)
- Better conditions for follow-up processes
 - Reproducible oil quantities
- Documentation of consumption quantities
 - Integrated consumption recording
- Reduction of the risk potential for employees
- Cost reduction in the general process



Example from application technology

Lubricants for the production of bipolar plates

- Utilising the savings potential of tribology
- Enlarge process window
- Reduce the risk potential of employees
- Sustainable and energy-efficient production

We at Raziol support our customers in all aspects of tribology and lubrication technology.

We offer "**tailored lubricants**" especially for your application!



Example from application technology

Expertise of the Raziol company



- Development of customised, innovative lubricants for customers worldwide
- Provision of standard products, even in very small quantities
- Comprehensive knowledge in the field of additives and tribology
- Answering questions relating to chemicals legislation
- Close cooperation with the field of application technology
- Accompaniment of tests on site or via video conferencing
- Offering training on the topics of lubricants and chemicals legislation

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