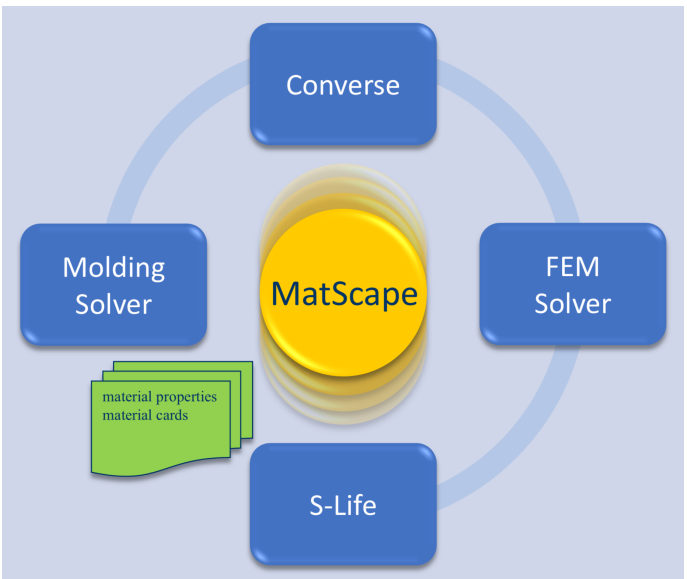
MatScape
Material Modeling Easy and Accurate



What is MatScape?

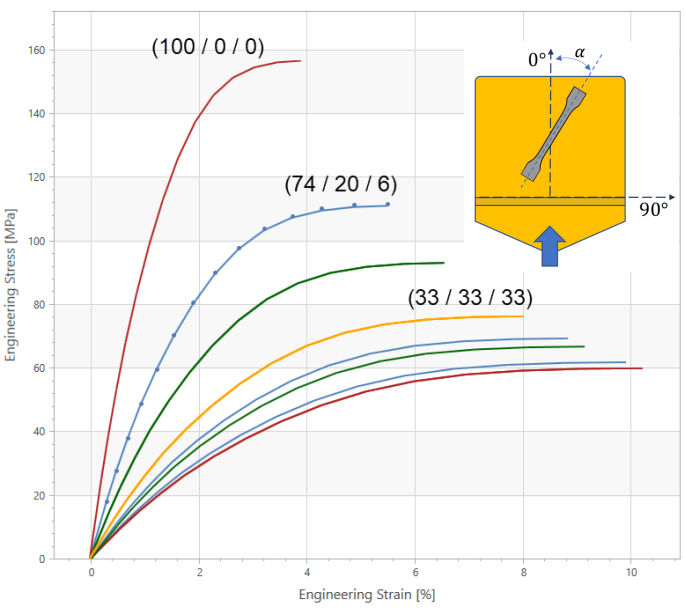
MatScape is the intelligent material modeling tool for the PART software suite. It provides material cards for proper FE analyses. In interaction with S-Life, MatScape provides strength properties to evaluate the performed FEA.

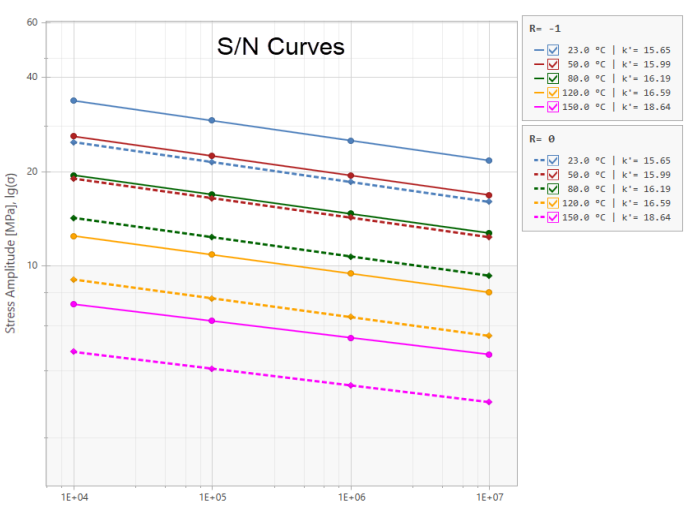
MatScape is an integral part of the PART software suite. In MatScape all material modeling technologies of the PART software suite are consolidated. Thus, it contains the "material intelligence" of the PART software suite.

MatScape is tailored to the specific needs of the computational engineer. It is easy to use and is limited to the functionalities that are directly related to the creation of FE analysis data and the evaluation of simulation results.

Plastics World

- High-quality manufacturer-authorized material data of various plastic raw material suppliers. Own materials can be added.
- Generation of stress-strain curves from single point data (Young's modulus, yield stress & strain)
- Easy process-guided creation of anisotropic and isotropic elastic and elasto-plastic material cards
- Curve editing tools and plausibility checks
- Predefined anisotropic and isotropic material cards
- Creation of S/N curves from static properties
- Weld line strength calculator
- Interface to Converse for creating part-specific anisotropic multiscale FE simulation models
- Interface to S-Life Plastics for static and cyclic strength assessment





Metals World

- Strength properties for more than 1600 material grades (steel, aluminum, cast iron) according to the material tables of the FKM guideline [1]. Own materials can be entered.
- Interface to S-Life FKM to perform static and cyclic strength assessment according to the FKM guideline

[1] N.N: Analytical Strength Assessment of Components in Mechanical Engineering in its 7th revised edition, Forschungskuratorium Maschinenbau, VDMA Verlag, Frankfurt am Main, Germany, 2020.

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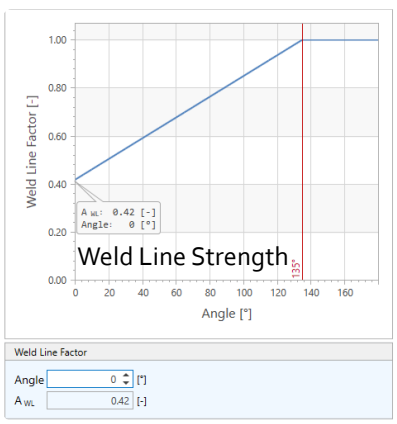
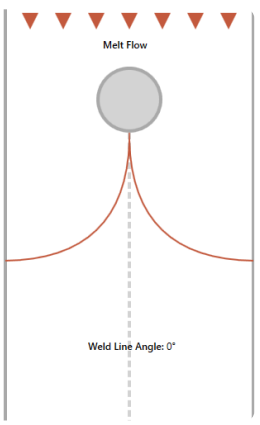
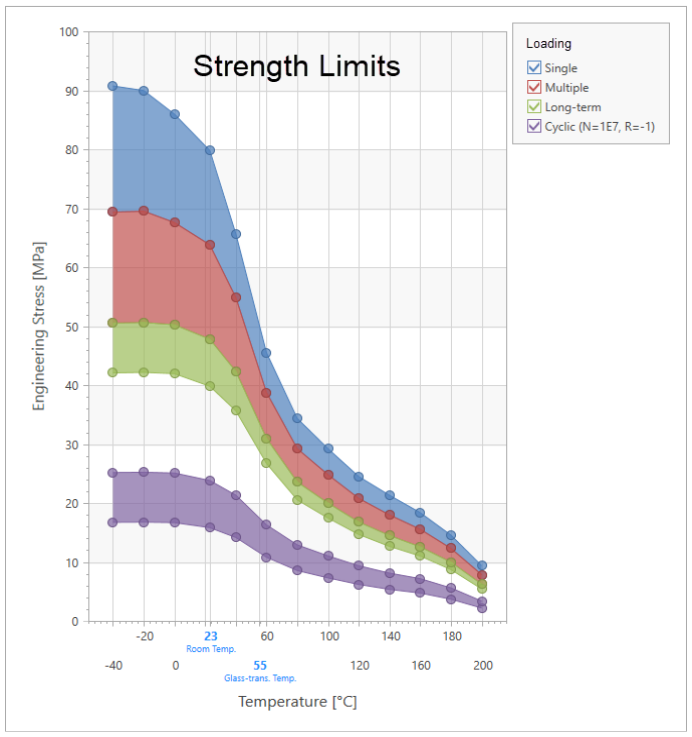
MatScape Reduces

- Costs for material testing, since valid material cards are already included or can be created from incomplete existing material data
- Costs for simulation execution (CPU time, license draw), since only native material models of the respective FE solver are used
- Development time, since reliable assessments can be made based on simulation results already in early development stages, when time-consuming material tests are not yet justifiable
- Part and rework costs, since over- or underdimensioning can be avoided through more accurate simulation results



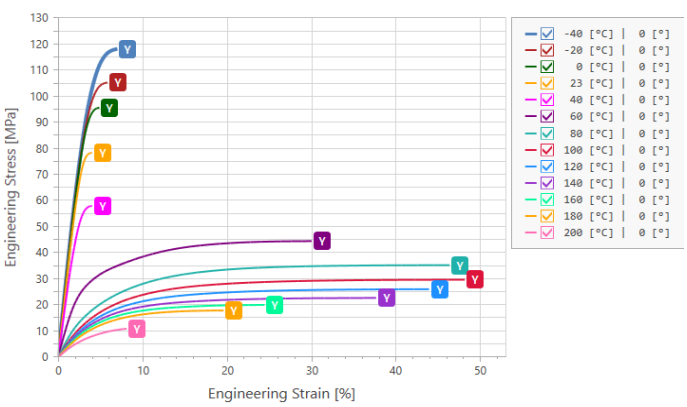




MatScape Increases

- Accuracy of simulation results, as important material characteristics (e.g. anisotropy) can be captured
- Reliability of the simulation results, since material cards are generated based on proper, standardized procedures
- Confidence in the simulation results, since open data handling (human-readable material cards) makes the applied procedures understandable and verifiable

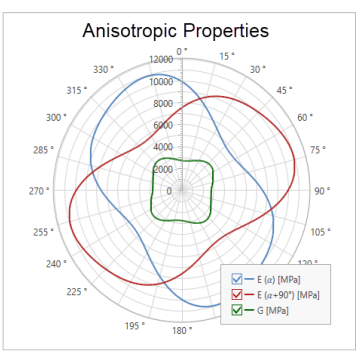
MatScape Use Cases



For our simulations, we use different material models. Also, a strength evaluation is required. MatScape provides the required functionalities for this, which gives us a great advantage.

Ionut-Iulian Ailinei
Corporate Quality & Environment
Continental Automotive, Romania

	100.0| 0.0| 0.0 (Micro Mech.)	100.0| 0.0| 0.0 (Jones)	100.0| 0.0| 0.0 (Puck)
E_{11} [MPa]	16756.38	16747.03	16747.03
E_{22} [MPa]	4447.85	3696.02	4549.82
E_{33} [MPa]	4447.85	0.00	0.00
ν_{12} [-]	0.311189	0.316434	0.316434
ν_{13} [-]	0.311189	0.000000	0.000000
ν_{23} [-]	0.455491	0.400000	0.400000
G_{12} [MPa]	1618.27	1380.34	1844.59
G_{13} [MPa]	1618.27	0.00	0.00
G_{23} [MPa]	1527.95	1320.01	1624.94
α_{11} [1E-6/K]	15.6755	0.0000	0.0000
α_{22} [1E-6/K]	47.8995	0.0000	0.0000
α_{33} [1E-6/K]	47.8995	0.0000	0.0000



Getting material data for simulation is often a challenge. With the help of MatScape, we can create meaningful material cards and evaluate component behavior even when the data is sparse.

Julian Kleih
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