IUC02 Framework for Curation and Distribution of Reference Datasets Example: Creep Data of Ni-Base Superalloys

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What are reference data? (our current view)

- Reference data represent specific materials (engineering alloys) regarding composition, processing and characterization
- Reference datasets must fulfill high quality standards, not only in measurement precision but also in comprehensive documentation of material, data processing and testing history (metadata), and
- They provide a metadata template that is suitable also for non-reference data

We look forward to your feedback on ref. data definitions and use - please follow the QR code or visit our booth!

Dimensions of a reference dataset (our current view)

Contents (MSE perspective)

"Fit for purpose" [1]

Requires identification of criteria for reference data in a community process (reference material / equipment / procedures / results / required documentation)

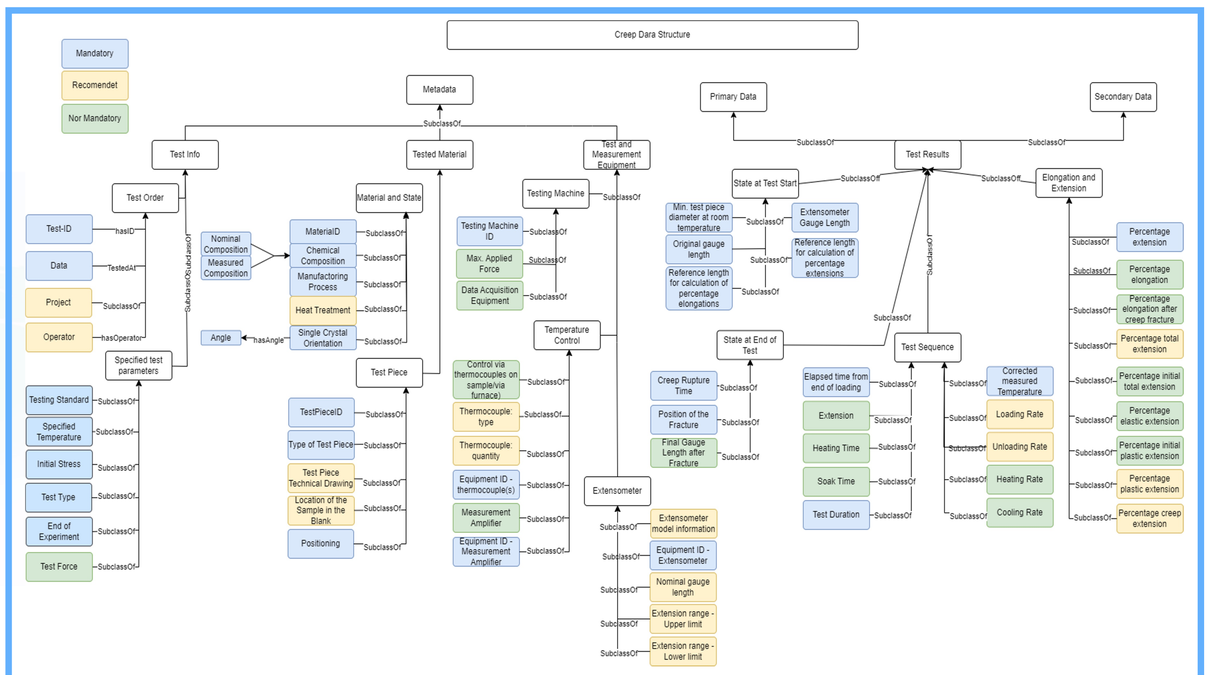
Shape (RDM perspective)

"Fit for use" [1]

Provides exemplary data sets employing the FAIR DO concept that conform to the FAIR principles and are agnostic to the digital infrastructure

Possible usages of reference data (our current view)

- Calibration/verification of measurement devices, procedures or algorithms
- Comparison of data for interpretation of individual measurement results
- Input for Machine Learning-based data analytics and for computational materials science (digital twin)
- Best practice examples for measurement and documentation procedures



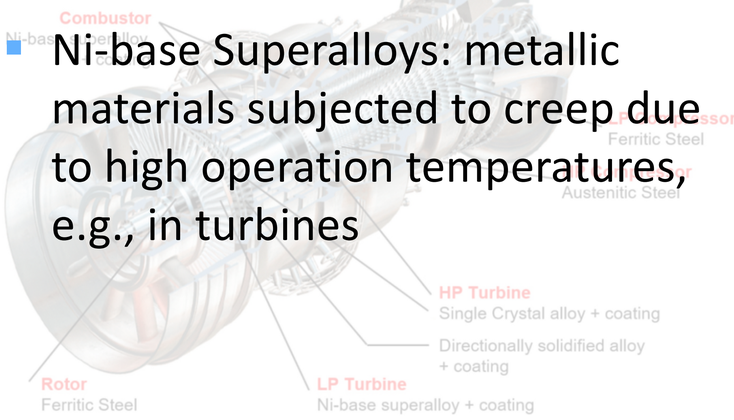
Extract from creep data structure including ranking

Current activities

- Agreement on data schema (glossary, controlled vocabulary and ranking) and guidelines for metadata
- Linking these activities with the development of workflows and infrastructure for transforming and distributing reference data in FAIR DO's and the future semantic representation (ontology)
- Design and implementation of a demonstrator
- BAM generates a dataset on creep of CMSX-6 (a single crystal Ni-Base Superalloy)

What are „creep" and „Ni-Base Superalloys"?

- Creep: a time dependent deformation of materials under an applied constant load
- Ni-base Superalloys: metallic materials subjected to creep due to high operation temperatures, e.g., in turbines



Reference

[1] Ariza, Angela et al., Datennachnutzung in der Praxis; DOI: 10.5281/zenodo.7568266