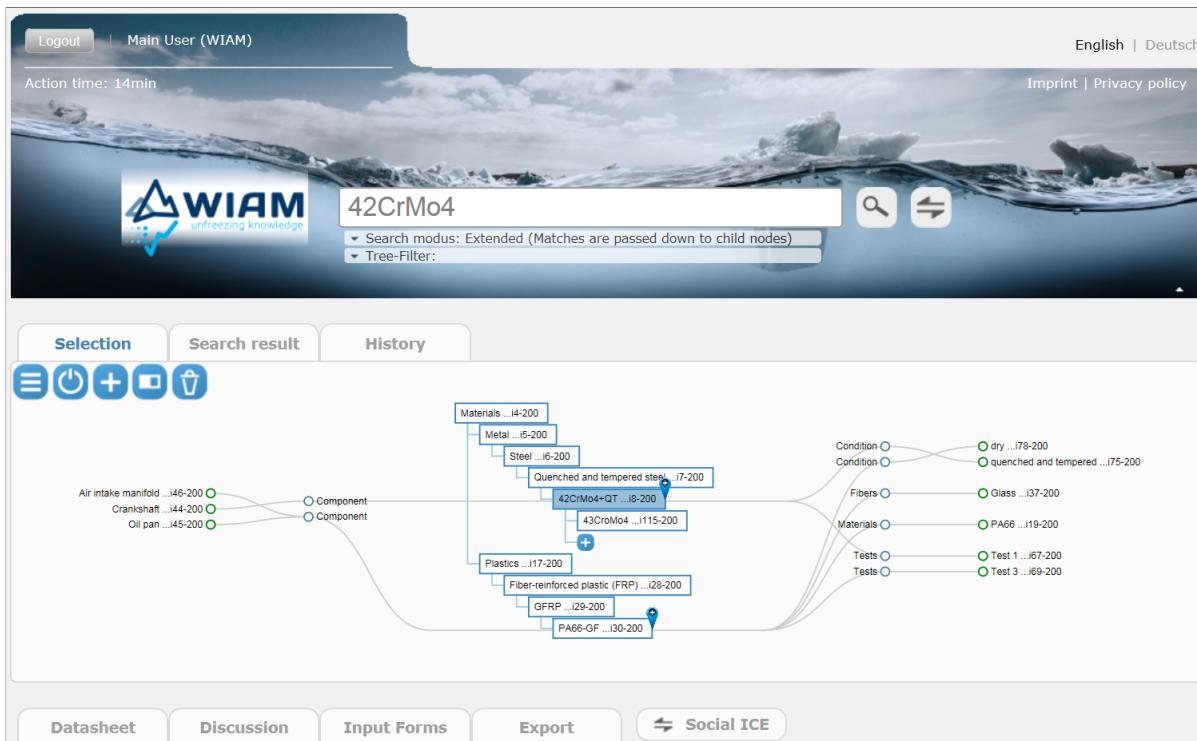


## Product data sheet WIAM® ICE

WIAM® ICE provides an efficient and fast access to information, data and specific values within a modern user interface.



The screenshot shows the WIAM ICE interface with a search bar at the top containing '42CrMo4'. Below the search bar is a tree diagram of search results. The tree starts with 'Materials ... I4-200' and branches into 'Metal ... I5-200', 'Steel ... I6-200', and 'Plastics ... I17-200'. Under 'Steel ... I6-200', there are further sub-nodes: 'Quenched and tempered steel ... I7-200', '42CrMo4-QT ... I8-200', '43CroMo4 ... I115-200', and 'GFRP ... I29-200'. Under 'Plastics ... I17-200', there is a node for 'PA66-GF ... I30-200'. To the left of the tree, three items are listed: 'Air intake manifold ... I46-200', 'Crankshaft ... I44-200', and 'Oil pan ... I45-200', each associated with a green circle icon. To the right of the tree, several categories are shown with their respective nodes: 'Condition' (dry ... I78-200, quenched and tempered ... I75-200), 'Fibers' (Glass ... I37-200), 'Materials' (PA66 ... I19-200), 'Tests' (Test 1 ... I67-200, Test 3 ... I69-200). At the bottom of the interface, there are tabs for 'Selection', 'Search result', 'History', and buttons for 'Datasheet', 'Discussion', 'Input Forms', 'Export', and 'Social ICE'.

WIAM® ICE offers solutions for quick and easy retrieval of individual information, for example, material characteristics, special features, alternative materials based on international standards as well as other corporate and external data pools. Through the use of customisable search criteria, search operations can be performed with uniform routines.

WIAM® ICE allows users to enter, manage and evaluate material, test, simulation and calculation data quickly and easily. Automated data imports, customisable approval processes and the customer-specific analysis of data are relevant for this functionality to map the workflow from the first test to the report.

For the product development process WIAM® offers solutions for the IT-based material comparison, the material selection and material substitution from one consistent data source, regardless of the type of materials such as metals, plastics, composites and others.

Data can be exchanged using various interfaces to other software and CAD/CAE programmes in order to promote the internetworking of the company.

Furthermore, employees can manage informal data and experience in independent discussions, which can also be used to expand the existing data and to document procedures and problem-solving processes.

As a result, the application of WIAM® ICE allows the company to continuously capture comprehensive knowledge processes and content of the company, and to provide authorized employees with an easy-to-handle user interface.

## Basic functionalities of WIAM® ICE

- Material-/component-/product-/supplier search by keywords (similar to Google® Search)
- Search for dependent and independent parameters with AND or OR combinations
- Unlimited number of independent data objects, e.g.:
  - Materials, products, test scenarios and specimen, suppliers, ...
- Appropriate structuring and exploration of data objects in trees
- Extension of data properties
  - Adding global material parameters, like additional chemical substance control or regulation conformance
  - Adding dependent parameters to material properties such as humidity and pressure
  - Extending release parameters for materials and parts like customer and/or product depending releases
  - Adding supplier information
  - Handling of any further organisational and structural data items and properties

Screenshot of the WIAM ICE interface showing the selection of a material (42CrMo4+QT ...i8-200) and its properties.

The interface includes tabs for Selection, Search result, History, and Settings. The main area shows the selected material's details, including its name, standard, and remarks. It also displays mechanical and physical properties tables.

**Material Details:**

Material number:	1.7225
Material name:	42CrMo4
Standard:	EN 10083-3
Remark:	Quenched and tempered steel for high loaded engine parts.
Revision valid:	1
Revision version:	1
Revision date:	2015/10/29

**Mechanical Properties:**

Temperature [°C]	Yield strength [MPa]	Ultimate tensile strength [MPa]	Elongation [%]...	Revision valid	Revision versio...	Revision date
23	900.0	1100.0	10	1	1	2015/10/29 (1) 2)
50	890.0	1090.0	11	1	1	2015/10/29 (1) 2)
100	850.0	1050.0	13	1	1	2015/10/29 (1) 2)
150	800.0	1000.0	16	1	1	2015/10/29 (1) 2)
200	700.0	900.0	21	1	1	2015/10/29 (1) 2)

**Physical Properties:**

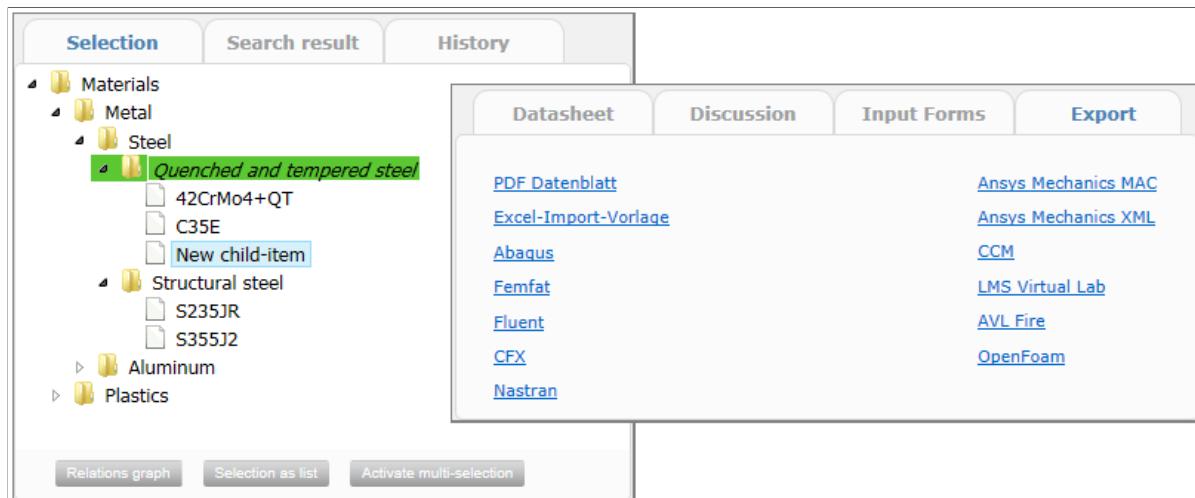
Temperature [°C]	Young's modulus [GPa]	Poisson's ratio	Density [kg/m³]	Revision valid	Revision editor	Revision versio...	Revision date
23	212000	0.28	7830	1	Main User (WIAM)	3	2016/11/14 (1) 2)
100	207000			1	Main User (WIAM)	3	2016/11/14 (1) 2)
200	199000			1	Main User (WIAM)	3	2016/11/14 (1) 2)
300	192000			1	Main User (WIAM)	3	2016/11/14 (1) 2)
700	184000			1	Main User (WIAM)	3	2016/11/14 (1) 2)

- Unlimited number of data-containers (tables) assigned to each data object
  - Materials master data, test result information, product data, supplier data, user management
- Unlimited number of data properties to be handled in each datacontainer:
  - Designations, material numbers, releases and validation information
  - Tensile strength, strain, etc. for material parameters
- Material comparison and substitution
- IT architecture based on java servlets with flexible webservers and databases
- Excel-import and export for bulk imports
- Creation of data properties and assignment to the individual data containers to be controlled by the user
- Reference to other data objects
- Revision and version history
- efficient summaries and evaluations
- Diagram displays
- PDF export of datasheets
- Flexible and unlimited crosslinking between data objects
- Flexible handling of parameters of the following types:
  - Numeric information as absolute value or within value range
  - Short terms and long text information

## Customizing

- Individual services for individual requirements
  - Selection of data objects from list, tree, relation graph, ...
  - Reporting with user-suitable profiles, e.g. datasheets for purchase, calculations, management, etc.
  - Integration in IT security concept
  - User management and single-sign-on
  - Haigh and SN-curve diagrams
  - Multilingual interface supporting any languages

Selection of data objects from tree and customized export:

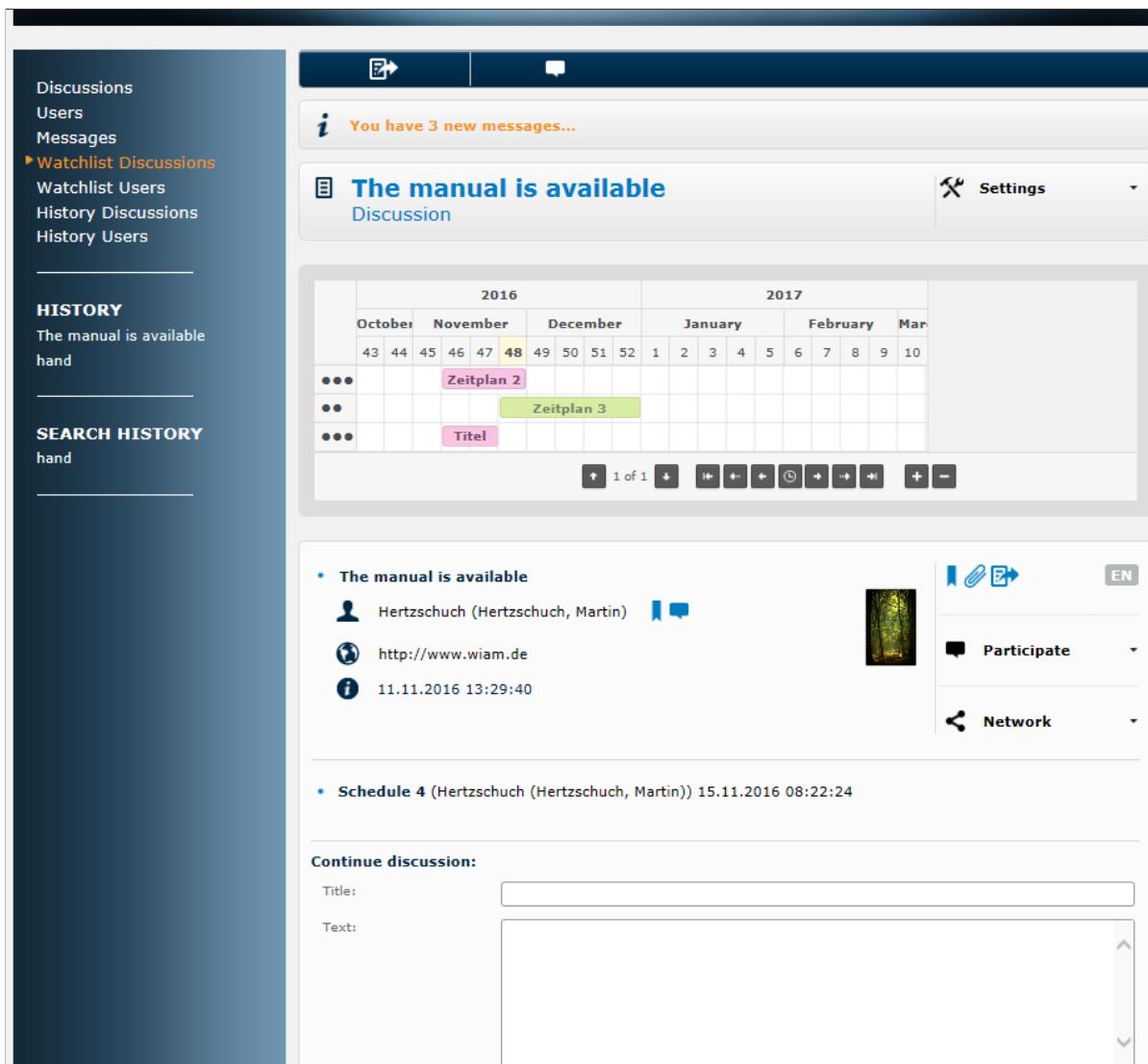


The screenshot shows the WIAM software interface. On the left, there is a tree view of material categories: Materials, Metal, Steel, Quenched and tempered steel (which is expanded to show 42CrMo4+QT, C35E, and New child-item), Structural steel (which is expanded to show S235JR and S355J2), Aluminum, and Plastics. At the bottom of the tree view are three buttons: Relations graph, Selection as list, and Activate multi-selection. To the right of the tree view is a large rectangular panel with four tabs at the top: Datasheet, Discussion, Input Forms, and Export. The Export tab is selected. Below the tabs is a grid of links, each with a blue underline. The links are arranged in two columns. The first column contains: PDF Datenblatt, Excel-Import-Vorlage, Abaqus, Femfat, Fluent, CFX, and Nastran. The second column contains: Ansys Mechanics MAC, Ansys Mechanics XML, CCM, LMS Virtual Lab, AVL Fire, and OpenFoam.

<a href="#">PDF Datenblatt</a>	<a href="#">Ansys Mechanics MAC</a>
<a href="#">Excel-Import-Vorlage</a>	<a href="#">Ansys Mechanics XML</a>
<a href="#">Abaqus</a>	<a href="#">CCM</a>
<a href="#">Femfat</a>	<a href="#">LMS Virtual Lab</a>
<a href="#">Fluent</a>	<a href="#">AVL Fire</a>
<a href="#">CFX</a>	<a href="#">OpenFoam</a>
<a href="#">Nastran</a>	

- Support of combination of data sets (e.g. from different departments, customers, suppliers, etc.)
- Flexible integration of services in user interfaces
  - Integrated user interfaces for experts, e.g. material engineers
  - Integrated user interfaces to efficiently and quickly access information and reports
  - Service architecture to integrate material selection and reporting into existing ERP, PDM, CAE solutions

## Experiences and networking of employees within user interface WIAM® Social ICE



The screenshot displays the WIAM Social ICE interface. On the left, a sidebar includes links for Discussions, Users, Messages, Watchlist Discussions (highlighted in orange), Watchlist Users, History Discussions, and History Users. Below this is a **HISTORY** section with a message: "The manual is available hand". Under **SEARCH HISTORY**, there is a link to "hand". The main content area shows a header with a message icon and the text "You have 3 new messages...". A blue box highlights "The manual is available" under the heading "Discussion". To the right is a "Settings" dropdown. Below the header is a calendar for 2016 and 2017. The month of November is highlighted in pink, labeled "Zeitplan 2". December is shown in light green, labeled "Zeitplan 3". January is shown in light blue, labeled "Titel". At the bottom of the calendar are navigation buttons. The main content area also shows a message from "Hertzschuch (Hertzschuch, Martin)" with a timestamp of "11.11.2016 13:29:40". It includes a small profile picture, a reply icon, and a share icon. To the right of the message are "Participate" and "Network" buttons. Below the message is a section titled "Continue discussion:" with fields for "Title:" and "Text:".

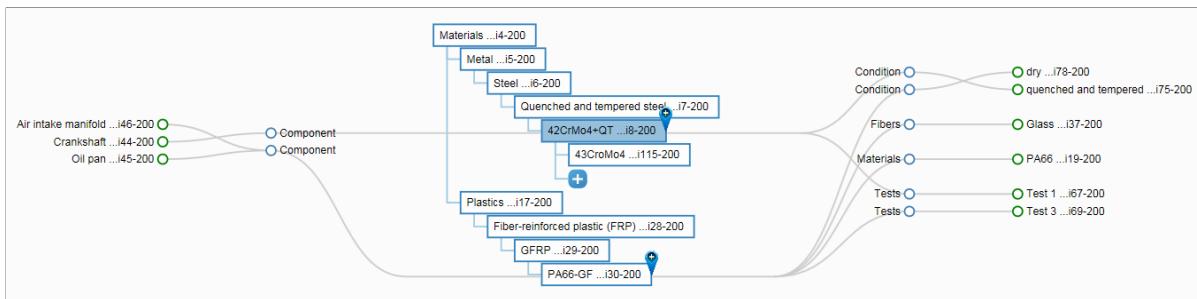
- Save remarks on datasheets, business objects, materials and much more
- Upload documents
- Automatic indexing of content and documents
- Automatically document questions and answers for business processes
- Create and manage working groups an material, product...projects
- Share experiences

## Pictures

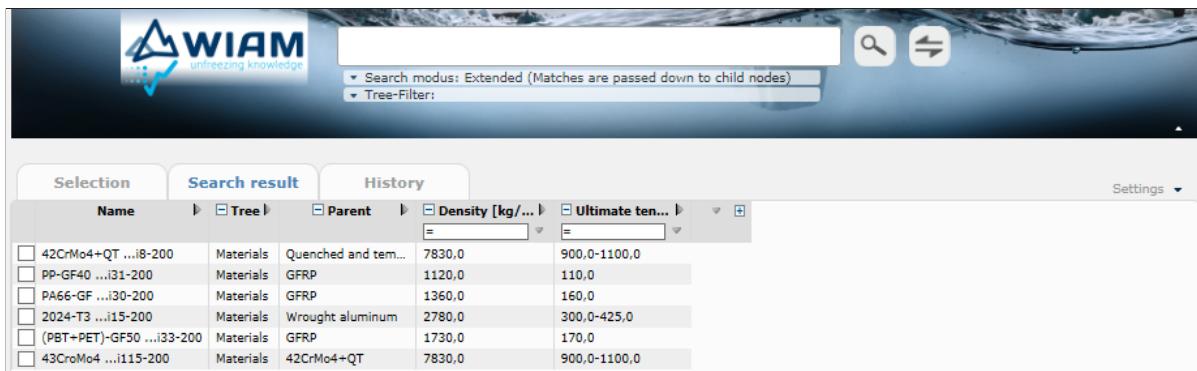
Editable data tables:

Mechanical properties									
	Condition	Temperature [°C]	Yield strength [MPa]	Ultimate tensile strength [MPa]	Elongation [%]	Remark	Source	Revision valid	Revision version
●	quenched and tem...	23	900.0	1100.0	10	Tensile test longi...	IMA Test Report...	1	
●	quenched and tem...	50	890.0	1090.0	11	Tensile test longi...	IMA Test Report...	1	
●	quenched and tem...	100	850.0	1050.0	13	Tensile test longi...	IMA Test Report...	1	
●	quenched and tem...	150	800.0	1000.0	16	Tensile test longi...	IMA Test Report...	1	
✓	quenched and tem...	200	700.0	900.0	21	Tensile test longi...	IMA Test Report...	1	
✓	quenched and tem...	23	900.0	1100.0	10	Tensile test longi...	IMA Test Report...	1	2
✓	quenched and tem...	50	890.0	1090.0	11	Tensile test longi...	IMA Test Report...	1	2
✓	quenched and tem...	100	850.0	1050.0	13	Tensile test longi...	IMA Test Report...	1	2
✓	quenched and tem...	150	800.0	1000.0	16	Tensile test longi...	IMA Test Report...	1	2
✓	quenched and tem...	200	700.0	900.0	21	Tensile test longi...	IMA Test Report...	1	2

Relations graph:



Property search and tabular comparison:



Name	Type	Condition	Density [kg/m³]	Ultimate tensile strength [MPa]
42CrMo4+QT ...i8-200	Materials	Quenched and tempered	7830.0	900.0-1100.0
PP-GF40 ...i31-200	Materials	GFRP	1120.0	110.0
PA66-GF ...i30-200	Materials	GFRP	1360.0	160.0
2024-T3 ...i15-200	Materials	Wrought aluminum	2780.0	300.0-425.0
(PBT+PET)-GF50 ...i33-200	Materials	GFRP	1730.0	170.0
43CrMo4 ...i15-200	Materials	42CrMo4+QT	7830.0	900.0-1100.0

WIAM® Expert ICE Diagrams:

