

# MaterialCenter Databanks

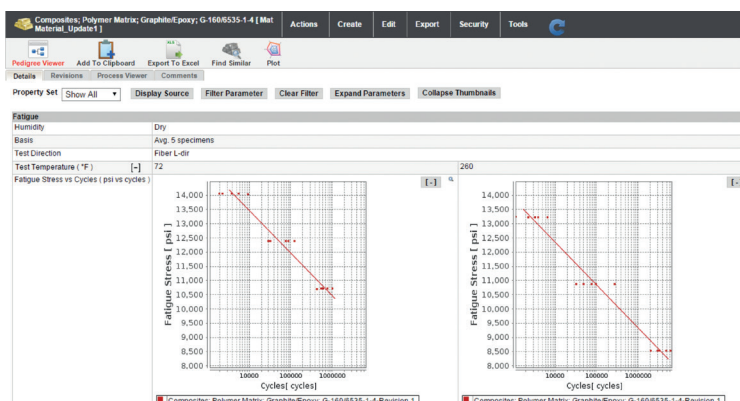
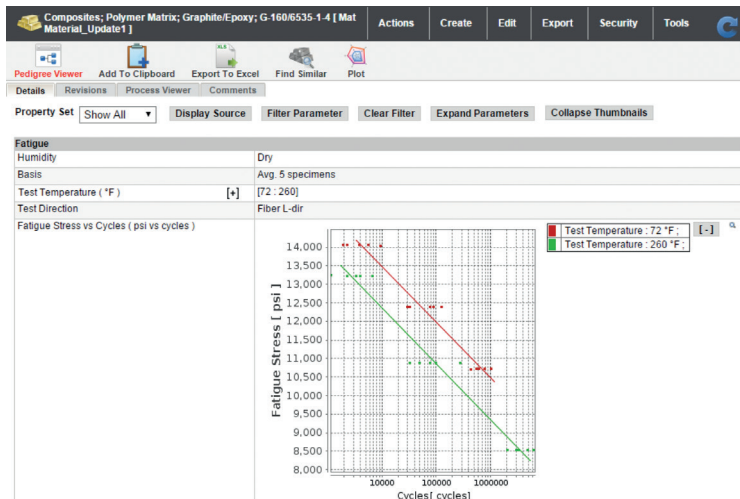
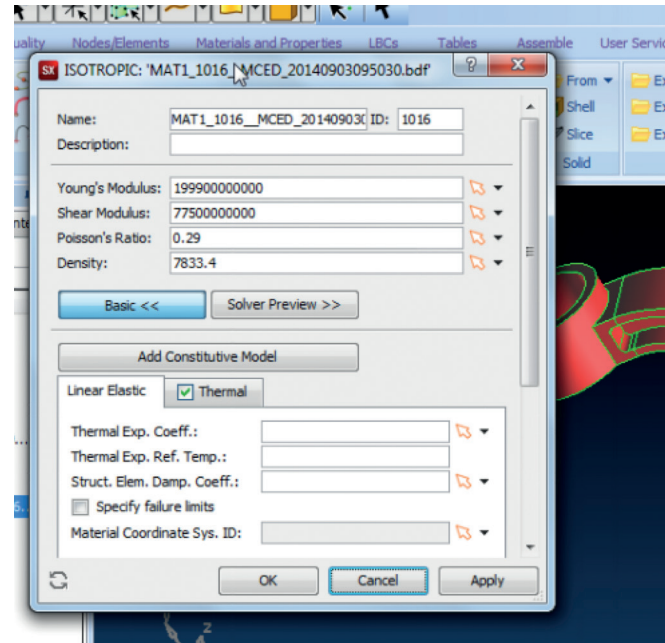
Secure, reliable, and fast access to material data

## Overview

To improve time-to-market in today's competitive environment, engineers need an easy-to-use method of comparing, evaluating, and analyzing the large number of materials alternatives commercially available.

The MaterialCenter Databanks are collections of technical materials information in electronic format. The databanks are developed and maintained through MSC's partnerships with premier sources of materials information. They provide a comprehensive source of property data for use by engineers for design and analysis.

The databanks listed below are available for use in MaterialCenter.



## Capabilities

- Interface with MaterialCenter to optimize searching, material down-selection, and data export.
- Convert units that adhere to ASTM E-380 standards.
- Export data to third-party client applications.
- Validate your company's materials with the latest test data and reference sources from industry.
- Provide designers and engineers with material information in a quick and traceable manner.

## Benefits

- Easily access high-quality, reliable material data from around the world to improve team efficiency and information workflow.
- Improve quality and consistency with engineering data derived from a single source.
- Reduce transcription errors with electronic data transfer.
- Increase the accuracy of predictive analysis, product design, and simulation using certified material data records for CAD, CAE, or PLM software.

## **Standards databanks – composites**

### **CMH-17 (MIL-HDBK-17), Material Sciences Corporation**

The CMH-17 (MIL-HDBK-17) Databank is based on MIL-HDBK-17F and is a collection of structural composite lamina and laminate materials. MIL-HDBK-17 was produced by the Air Force Materials Laboratory for the Department of Defense and the Federal Aviation Administration.

The MIL-HDBK-17 Databank offers:

- Standards composite material properties developed under sponsorship of the Department of Defense and Federal Aviation Administration.
- Contains data from over 200 tables in volumes 2F, 4F, 5F, and the appendix of MIL-HDBK-17-2F.
- Polymer-matrix composites of the following constituents:
  - Carbon/Bismaleimide
  - Carbon/Cyanate Ester
  - Carbon/Epoxy
  - Carbon/Polyetheretherketone
  - Carbon/Polyimide
  - E-Glass/Epoxy
  - Quartz/Bismaleimide
  - S-Glass/Epoxy
- Metal-matrix composites of the following constituents:
  - Alumina/SP AL
  - Silicon Carbide/Titanium
  - Titanium
- Ceramic-matrix composites of the following constituents:
  - Carbon/Carbon/CVI SiC
  - Oxide/Oxide
  - SiC/BN/Mi SiC
  - SiC/BN/Si3N4
  - SiC fiber/BN-SiC/MI SiC
  - SiC fiber/Carbon/SiC
- Over 1000 mechanical property curves for laminate systems:
  - Astroquartz/Polyimide
  - Boron/Epoxy
  - Fiberglass/Epoxy
  - Fiberglass/Modified DAP Polyester
  - Fiberglass/Phenolic
  - Fiberglass/Polyester
  - Fiberglass/Silicone

## **NCAMP Databank, National Institute for Aviation Research – Wichita State University**

The NCAMP Databank offers detailed design property values for composite material systems that are qualified by the National Center for Advanced Materials Performance (NCAMP). Material systems included are:

- Cytec 5320-1
  - T650 Unitape
  - T650 3k-PW
- Cytec (formerly ACG) MTM45-1
  - Style 6781 S2 Glass
  - 3K PW G30-500 Fabric
  - 12K HTS5631 Unidirectional (HTS40)
- Hexcel 8552
  - AS4 Unitape
  - AS4 PW
  - IM7 Unitape
- Newport NCT4708
  - 47108 Unitape
- TenCate TC250
  - 12k HTS40

## **Standards databanks – metals**

### **MMPDS-11 Databank, Battelle Memorial Institute**

The MMPDS Databank contains the highest quality, comprehensive, electronic property data on metal alloy systems available. Battelle Memorial Institute maintains this databank, validates data entry, and renders new test data. MMPDS is comprised of over 5,000 material records. The MMPDS-11 Databank update includes:

- CAE Model creation capabilities for various Isotropic material models (temperature-dependent, linear-elastic, and stress-strain curves).
- Over 10,000 new or updated stress-strain curve data.
- Over 2,000 new or updated property values for creep, fatigue, fracture, corrosion, and design allowables.

### **MMPDS-10 Databank, Battelle Memorial Institute**

With the MMPDS-10 Databank update:

- Over 100 tables of data that have been revised or added, as compared to MMPDS-08.
- 1,628 data points revised or added in the construction of isothermal curves for each of the constant exposure temperatures.
- 18 figures revised or added for load-control fatigue data.
- 10,092 changes or additions to full-range stress-strain curve data in 81,192 records.
- 20 figures revised or added for stress corrosion, torsional modulus, fracture, and creep and stress rupture data.

## MMPDS-08 Databank, Battelle Memorial Institute

The MMPDS-08 version contains:

- Bending Modulus Data
- Biaxiality Data
- Column Compression Data
- Creep and Stress Rupture Data
- Design Allowable Data
- Effect of Exposure Data
- Fatigue Data
- FCP Data
- Fracture Data
- Size-Condition Data
- Specification-Alloy-Form Data
- Stress-Strain Curve Data
- Stress Corrosion Data
- Torsional Modulus Data
- Weldability Data

These databases are derived from the following chapters in the MMPDS handbook.

- Chapter 1 – General Information
- Chapter 2 – Steel
- Chapter 3 – Aluminum
- Chapter 4 – Magnesium Alloys
- Chapter 5 – Titanium
- Chapter 6 – Heat-Resistance Alloys
- Chapter 7 – Miscellaneous Alloys and Hybrid Materials

The MMPDS-08 Databank currently contains Design Mechanical and Physical Property tables from the source document, most of the supporting data tables, and almost all the figures that represent the results of numerous different property tests.

These include raw or reduced curve data for tests such as tensile and compressive stress-strain (Ramberg-Osgood), fatigue, percent room temperature value versus temperature for various properties, like coefficient of thermal expansion and conductivity and specific heat versus temperature, and others. It features:

Materials	Records	Graphs
Steels	698	752
Aluminum alloys	3978	5524
Magnesium alloys	120	120
Titanium alloys	392	697
Heat-resistant alloys	240	498
Hybrid materials/ specialty alloys	186	204

- Mechanical and thermal constants and ample temperature and strain-dependent data for various forms and tempers. A large number of materials contain all properties required by the material models for analysis programs.
- Searchable by topic.

## Temperature-dependent databanks

MPDB temperature-dependent databank, Jahm Software, Inc.

This dynamic and rapidly growing databank was developed by JAHM, Software Inc. to provide data for engineering analysis.

- 2,722 materials and 23,197 sets of temperature dependent data in graphical format, fully pedigreed.
- Includes the following analysis-related properties as a function of temperature, and more:
  - Poisson's Ratio (337)
  - Tensile Yield Strength (1,033)
  - Elastic Modulus (947)
  - Coefficient of Thermal Expansion (1,289)
  - Shear Modulus (456)
  - Specific Heat (736)
- Material coverage includes but is not limited to:
  - Carbon compounds
  - Ceramics
  - Chemical elements
  - Ferrous and nonferrous metals
  - Insulation materials
  - Intermetallics
  - Plastics
  - Optical materials
  - Oxides
  - Salts
  - Semiconductor materials

## Senvol Database™ Databank

The Senvol Database™ is the first and most comprehensive database of industrial additive manufacturing (AM) machines and materials. The database contains data on over 1,000 AM machines and over 3,000 compatible AM materials. Included AM materials span polymers, metals, composites, ceramics, sand, and wax.

AM machine data includes information on:

- Manufacturer
- AM process
- Build envelope size
- Price range
- Compatible materials

AM material data includes information on:

- Material type (including similar materials)
- Material properties (including mechanical, thermal, and physical properties)
- Results for different machine modes
- Results for different post-processing conditions
- Compatible machines



Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

e-Xstream engineering, part of Hexagon's Manufacturing Intelligence division, provides Integrated Computational Materials Engineering (ICME) solutions to innovate and optimise product performance using the right materials and manufacturing process for the right application. Learn more at [e-Xstream.com](https://www.e-xstream.com). Hexagon's Manufacturing Intelligence division provides solutions that utilise data from design and engineering, production and metrology to make manufacturing smarter.

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