

*A new resource for engineers and designers seeking comprehensive material property data for metal powder components*



*Introducing:*

# The Global Powder Metallurgy Property Database

*Offering*

- *FREE ONLINE ACCESS*
- *24/7 AVAILABILITY ANYWHERE IN THE WORLD*
- *DATA OUTPUT COMPATIBLE WITH YOUR DESIGN PACKAGE*

[www.pmdatabase.com](http://www.pmdatabase.com)

*Developed in cooperation with the European and Japan Powder Metallurgy Associations*



Advancing  
Powder  
Metallurgy  
& Particulate  
Materials  
Worldwide

## Tap into a wealth of material property data right from the start of your design process.

The self-assurance to design with new materials and processes is born out of knowledge. Armed with abundant, definitive material property values that allow for head-to-head comparisons, you can confidently consider a departure from the comfortable, well-worn paths you're accustomed to, as you search for a payoff in more cost-effective alternatives and greater design flexibility.

Many designers and engineers in such industries as automotive, appliance, power tool, lawn and garden, among others, have long since discovered the cost-saving, performance-enhancing capabilities of powder metallurgy as a component-manufacturing technology. Now you can, too, thanks to this outstanding new resource: *the Global Powder Metallurgy Property Database*.

### One Common Data Source for Powder Metallurgy Materials

The Global Powder Metallurgy Property Database gathers in one place data from a wide range of sources around the world, representing many thousands of tests on hundreds of different powder metal material grades. Currently, it includes powder metallurgy steels, stainless steels, powder forged steels, and bearing alloys, but many more materials are scheduled to be added as time goes on.

The database tabulates a wide range of mechanical and physical properties. The data provides an average figure for performance under specific test conditions, displaying data from several sources. It also identifies the effect of variation in the processing conditions, including as-sintered, heat treated, and several compaction conditions.

## Features of the Global Powder Metallurgy Property Database

**FREE ACCESS**—Requires no investment or ongoing licensing costs; no need to limit who can use it

**ONLINE**—Access it anytime from wherever in the world your projects take you

**COMPATIBLE DATA OUTPUT**—Download formats work with your favorite design package; no lost productivity due to manual data entry

**INTUITIVE INTERFACE**—No learning curve so you can be productive from the very first time you use it

The screenshot shows the Powder Metal Database interface. The top navigation bar includes 'Change Password', 'Units Calculator', 'Print Page', and 'View Data Cart'. The main content area is divided into 'Shortcuts' and 'Results of Mechanical Property Search'. The 'Shortcuts' section has three search options: 'Search on Mechanical Properties', 'Search on Physical and Magnetic Properties', and 'Search on Fatigue Properties'. Below these are 'Search by Grade', 'Advanced Search', 'Link to suppliers', and 'PM Information'. The 'Results' section shows a table of material grades with columns for 'Grade Name', 'Material type', and 'UTS'. A red callout bubble points to the search options, listing '3 SEARCH OPTIONS: • BY PROPERTY (Mechanical, Physical, Fatigue), • BY MATERIAL GRADE, and • ADVANCED'. Another red callout bubble points to the 'Link to suppliers' button, labeled 'LINKS TO SUPPLIERS'. A third red callout bubble points to the 'PM Information' button, labeled 'P/M PRIMER'.

Grade Name	Material type	UTS
FL-05N20	Ferrous	12
FD-05N20	Ferrous	12
F-05C0/FC-0205	Ferrous	12
FLDN4C2-4905	Ferrous	12
FL-4905	Ferrous	9
FLDN2-4905	Ferrous	8
FLDN2-4908	Ferrous	6
FX-05C10/FX-1005	Ferrous	6
FL-4808	Ferrous	5

### Timely Information in a Useful Format

The database offers enormous flexibility in how you conduct your material property searches and in what format you choose to export the results of your efforts.

You can elect to search by property (mechanical properties, physical properties, or fatigue properties),



# Metallurgy Property Database:

**RELIABLE DATA**—Compiled by teams of independent experts so you can have confidence in the quality of your search results  
**WEB-BASED FOR ONGOING UPDATING**—No need to wait for a future software release for new materials or data sets to be added

**EXTENSIVE SUPPLIER LINKS**—Provides an easy process for locating and contacting fabricators when you're ready for the next step

Empty Data Cart ? Help On Plots ? Help on Reports ? Help

HELP SCREENS

	Ferrous
	Ferrous
	90 x 10 <sup>3</sup> PSI
	120 x 10 <sup>3</sup> PSI

**CROSS-PLOTTING FUNCTION**

**MANUFACTURING CONDITIONS**

Property	Value
Process and Settings	26 of 66
Double Process, Double Sintered	4 of 46
Conventional Temperature Sinter	40 of 46
Conventional Cooling	40 of 46
Heat Treated	42 of 46
Quenched and Tempered	12 of 46

**MECHANICAL PROPERTIES**

Property Range	< 6.8	6.8 - 6.7	6.7 - 6.6	6.6 - 6.5	6.5 - 6.4	> 6.3
Ultimate Tensile Strength (σ <sub>UTS</sub> ) [PSI]	38 - 46.5	50.2 - 56.2	52 - 100	55 - 141	75 - 107	93.6 - 208
Yield Strength (σ <sub>YS</sub> ) [PSI]			39 - 47.8	42 - 146	49 - 196	59.9 - 199
Elongation (%)	1.9 - 2.4	0.76 - 2.8	0.6 - 3.5	0.7 - 5.9		1.2 - 3.7
Young's Modulus (E) [PSI]			16000 - 20000	16000 - 20000	21000 - 21000	21000 - 24750
Poisson's Ratio (ν)			0.23 - 0.27	0.26 - 0.28	0.23 - 0.28	0.26 - 0.30
Compressive Yield Strength (σ <sub>YS</sub> ) [PSI]			147.7 - 94.2	41.5 - 120	48.4 - 175	
Transverse Rupture Strength (σ <sub>TRS</sub> ) [PSI]			106 - 106	116 - 221	145 - 272	
Charpy Impact Energy (FT-LBFT)	11.9 - 17.9	0.27 - 23.3	0.91 - 23.3	9.4 - 28.2	0.7 - 18.9	16.1
Hardness (HR15)	90 - 91.1	98.4 - 97.8	95.6 - 97.4	99.1		
Hardness (HR10)	96 - 96	100.8 - 99	97.9 - 79	74 - 93	86 - 90	90 - 91
Hardness (HR30)	100 - 100.9	100.8 - 97.9	113.1 - 70.9	143.1 - 71.1	97.7 - 71.8	106.9 - 72.1
Hardness (HRC)			35 - 41	39 - 45	42	45
Hardness (Vickers)	150 - 157	150 - 148	126 - 102	170 - 148	192 - 172	195 - 148
Hardness (Brinell)	120 - 107	109 - 127	100 - 101	100 - 101	100 - 100	100 - 103
Micro Hardness (Vickers)			653 - 770	520 - 770	580	600

**PHYSICAL PROPERTIES**

Property Range	< 6.8	6.8 - 6.7	6.7 - 6.6	6.6 - 6.5	6.5 - 6.4	> 6.3
Asotating Beams Fatigue Endurance (S <sub>N</sub> 50%) [MPa]		10.9 - 62.2	16.7 - 46.7			

**COEFFICIENTS OF THERMAL EXPANSION (CTE)**

Property Range	< 6.8	6.8 - 6.7	6.7 - 6.6	6.6 - 6.5	6.5 - 6.4	> 6.3
Coefficient of Thermal Expansion (CTE) at 100C [α (PPM/degC)]				19	16.3	16.9
Coefficient of Thermal Expansion (CTE) at 300C [α (PPM/degC)]				14.3	11.9	11.1
Coefficient of Thermal Expansion (CTE) at 400C [α (PPM/degC)]				12.4	11.3	11.1
Coefficient of Thermal Expansion (CTE) at 450C [α (PPM/degC)]				13.2	11.2	11
Thermal Conductivity [W/mK]				2.1	3.9	3.9

**DOWNLOAD OPTIONS**

Number of datasets	Min UTS [x10 <sup>3</sup> PSI]	Max UTS [x10 <sup>3</sup> PSI]	Min Yield [x10 <sup>3</sup> PSI]	Max Yield [x10 <sup>3</sup> PSI]	Min YM [x10 <sup>3</sup> PSI]	Max YM [x10 <sup>3</sup> PSI]
93	95.6	119	68	91.2	19400	23400
225	91.1	119	51.5	106	16200	22700
60	90.4	106	60.2	68.9	20500	23300
128	92.1	113	60	109	15500	22400
75	93	116	66	85	22400	22400
74	90.6	115	57.1	94.3	19800	21000
148	92.8	113	63.8	112	13900	17100
25	91.5	119	62.4	101	15000	20300
58	90.2	111	67.2	102	18900	18900
15	94.3	107	65.8	77.6	19800	21600
10	97.9	109	73.8	80.2	20000	21600
8	99.2	119	71.1	82.4	18900	22400
9	97	117	84	113		



by material grade designation, or by using an advanced search feature that lets you search by two factors—manufacturing conditions and up to six different properties.

Search results are displayed in tabular form. There is also a graphing function that lets you plot the results as a function of density. The graphical display also includes the linear regression equations for the plotted

lines. There is also a cross-plotting function that enables the graphing of any two mechanical data sets.

Best of all, your search results can be captured via a “shopping cart” and exported at the end of your session. You can print search result data, export and save it as a Microsoft Excel file, or export it to an FEA software file in a format compatible with ANSYS, ABAQUS, or NASTRAN software packages.

## *The Database is Just the Beginning*

The Global Powder Metallurgy Property Database is the culmination of an unprecedented collaborative effort by the world's three leading powder metallurgy trade associations. As representatives of a dynamic worldwide metal-forming industry, they realized that delivering comprehensive material property data into the hands of component designers and engineers in an easy, user-friendly way is the surest way to expand the market for their technology.

But it is only the first step. Although every effort has been made to ensure the quality of data it offers, the database is not a substitute for direct contact with a P/M parts manufacturer. So the database interface makes it easy for you to take the next step by offering convenient links to our supporting member companies, world-class manufacturers who produce components from the material grades you have identified. They'll be glad to discuss your product application with you and offer the full benefit of their expertise in this field.



*Take the first step now.  
Log on to the database,  
take a moment to register,  
and begin using this powerful  
FREE resource immediately.*