

Now available on-line—CINDAS Thermophysical Properties of Matter Database (TPMD)

The Thermophysical Properties of Matter Database (TPMD) is a web-based version of the Thermophysical Properties of Matter, the TPRC data series, from CINDAS LLC. It is a searchable on-line database that contains multiple thermo-physical and thermoradiative properties for metallic alloys and elements, nonmetallic liquids and solids, composites, ceramics, gases and coatings. In addition to the searchable data, the TPMD includes theories and measurements PDF documents with hundreds of pages of supplemental text for additional research.

Similar to other CINDAS databases, the Thermophysical Properties of Matter Database has an easy-to-navigate interface.

The TPMD database contains about 50,000 data curves with 73 properties for over 4,800 materials categorized into 79 general material groups that are updated regularly.

Recent Updates

New data on composite materials has been recently added to the TPMD. In all, 60 new composite materials were added. The new data covers 17 properties and consists of 255 curves and 121 data sets.

Interface Tools

Save – data for further analysis.

Copy – graphs with ease into PowerPoint.

Project and Manipulate – the database content live.

Interface Features

Find – material group or property group by browsing, or material name or property name by searching.

View – the effects on a given property with changes in temperature or other independent variable.

Compare – multiple data curves of different materials on a single graph.

References – are available for every graph and description in the show text feature.

Theories & Measurements - provide information on property definition and tests.

Search and Browse the Thermophysical Properties of Matter Database by

Material Group

(Composites, Ceramics, Coatings, Organic Compounds, etc.)

Material Name

(Borosilicate Glass, Glass Fiber/Silicone Resin, Graphite, etc.)

Property Group

(Thermophysical, Thermoradiative, Optical, etc.)

Property Name

(Normal Total Emittance, Thermal Conductivity, Viscosity, etc.)

The TPMD allows the user to search using the full or partial name of the property or material. The user can also browse the TPMD using the drop-down menu browse feature.

Searching and Browsing: Thermophysical Properties of Matter Database (TPMD) Finding Information

Search: Enter the full or partial name of the property or material.

Browse: Use the drop-down menu to find the property or material.

The Thermophysical Properties of Matter Database contains over 4800 materials in 79 material groups and 60 properties in 4 property groups.

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Browse By:
Material Group

or
Property Group

Search By:
Material Name

 e.g., ni Inco, Nickel Incoloy

or
Property Name

 e.g., electric, electric Resistivity

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Select Property Group: Thermophysical Properties (4 property groups)

Select Property Name:

- Coef. of Thermal Linear Expansion
- Density
- Density, kg m⁻³
- Enthalpy
- Glass Transition Temperature
- Lattice Parameter
- Lattice Parameter in m
- Liquidus Temperature
- Mean Coeff. of Thermal Linear Expansion
- Melting Threshold
- Moisture Linear Expansion
- Molar Heat Capacity
- Solidus Temperature
- Specific Heat, (At Constant Pressure)
- Specific Heat Capacity
- Specific Heat Capacity in J kg⁻¹ K⁻¹
- Thermal Conductivity
- Thermal Conductivity in W m⁻¹ K⁻¹
- Thermal Diffusivity
- Thermal Diffusivity in m² s⁻¹
- Thermal Linear Expansion
- Viscosity

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Customizing Information

Select: The independent variable.

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Select Property Group: Thermophysical Properties (4 property groups)

Select Property Name: Coeff. of Thermal Linear Expansion (22 properties)

Property Range
 Coeff. of Thermal Linear Expansion (10⁻⁶ K⁻¹) -256.6 - 1788.0

Select an Independent Variable, and then click the Show Graph or Show Text button.

Independent Variable	Minimum	Maximum
<input type="radio"/> Angle (degree)	14.4	74.7
<input type="radio"/> Fiber Volume Content (Vol. percent)	31.0	100.0
<input type="radio"/> Temperature (K)	0.5	3900.0

Viewing Information

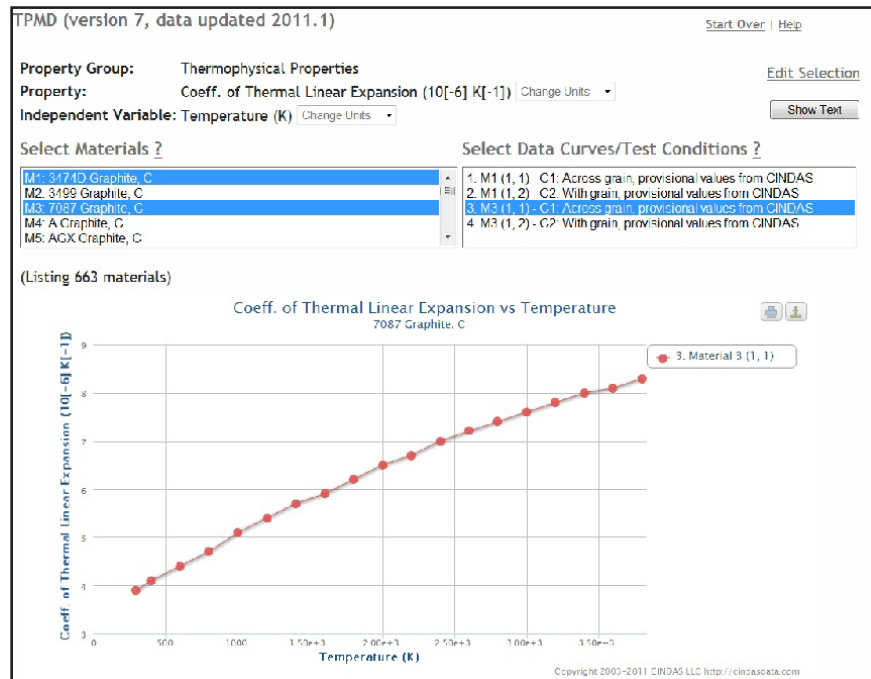
The TPMD allows the user to view a property of multiple materials on one graph.

Step 1: Select Materials.

Step 2: Select Data Curves or Test Conditions.

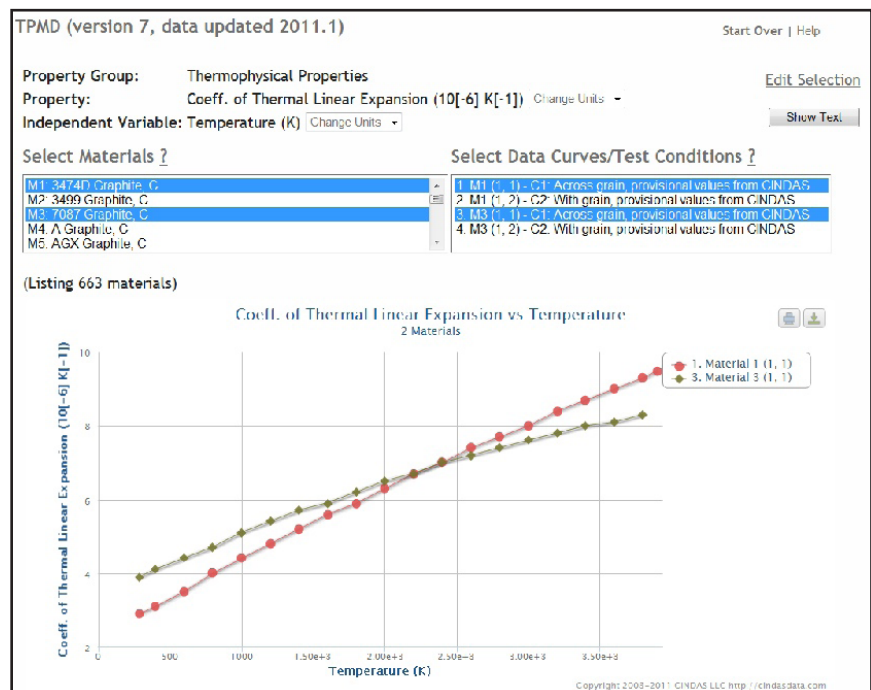
Step 3: If needed, you can also modify the Graph Parameters of the properties.

Note: At any time, the user can click on the "Show Text" button to see the values of the data points, text description, references, etc.



Results: Graphic and Numeric

- 49,985 data curves
- Color-coded data curves
- Multiple curves of different materials per graph
- Hovering cursor to show X and Y values of each data point
- Modifiable Y-axis and X-axis range of the graph



Material Groups

The over 4800 materials in the TPMD are conveniently subdivided into 79 material groups with drop down selection options for the specific

materials in each Material Group. Alternatively, you can reach a specific material by entering a keyword in the Material Name box.

Material	Number
Aggregate Mixes	30
Alloy Steels	129
Aluminum Alloys	120
Animal & Vegetable Natural Substances	35
Binary Mixtures of Oxides	56
Borides	56
Bromides	20
Carbides	56
Carbonates	22
Carbon Steels and Cast Iron	74
Ceramics and Glasses	111
Cermets	63
Chlorides	66
Chromium Alloys	17
Coatings:	
Anotized Conversion	31
Metallic Contact	127
Metallic Pigmented	15
Nonmetallic Inorganic Carbide Contact	19
Nonmetallic Inorganic Other Contact	36
Nonmetallic Inorganic Oxide Contact	82
Nonmetallic Inorganic Silicate or Titanate Contact	22
Nonmetallic Pigmented, Other Binders	101
Nonmetallic Pigmented, Others	17
Nonmetallic Pigmented, Potassium Silicate Binder	44
Nonmetallic Pigmented, Silicone Binder	66
Other Contact	51
Other Pigmented	33
Oxidized and Others Conversion	29
Pigmented, Trade Name	81
Resin Contact	47
Cobalt Aloys	29
Composites	141
Copper Alloys	82
Elements	152
Elements: Carbon, Graphite	145
Fabrics, Yars, and Hairs	6
Fluorides and Their Mixtures	80
Foods & Biological Materials	22
Gas Mixture, Monatomic and Polyatomic Systems	71

Material	Number
Gas Mixture, Monatomic Systems	18
Gas Mixture, Polyatomic Systems	112
Hydrides	18
Intermetallic Compounds, Mixtures	32
Intermetallics, Aluminides	7
Intermetallics, Beryllides	22
Intermetallics, Miscellaneous	147
Intermetallics, Silicides	28
Iodides	18
Magnesium, Manganese, Molybdenum and Niobium Alloys	72
Minerals, Rocks and Processed Mineral Substances	105
Miscellaneous Alloys and Mixtures	15
Miscellaneous Refractory Materials	82
Mixtures of Oxide and Nonoxide	17
Multiple Mixtures of Oxides	38
Nickel Alloys	92
Nitrates, Nitrides and Nitrites	42
Nonoxide Inorganic Mixtures	41
Organic Compounds	275
Other Nonferrous Binary Alloys	160
Other Nonferrous Multiple Alloys	75
Other Nonoxide Inorganic Compounds	38
Oxide Compounds: Calcium, Magnesium, Sodium Oxides	91
Oxide Compounds: Others	143
Phosphates	18
Polymers	126
Residues, Slags and Scales	9
Salts	20
Selenides and Tellurides	66
Semiconductors	16
Silicides	52
Single Oxides: Aluminum, Beryllium and Silicon Oxide	61
Single Oxides: Others	137
Stainless Steel	75
Sulfates	33
Sulfides and Their Mixtures	57
Systems & Stuctures	9
Titanium Alloys	41
Zirconium Alloys	22

Property Groups

The TPMD contains 73 different properties. These properties are separated into 4 easy-to-navigate property groups. Alternatively, you can search the property names by using keywords which would bring you directly to the property you are seeking.

Thermophysical Properties – 22 *Properties*

Thermoradiative Properties – 33 *Properties*

Optical Properties – 3 *Properties*

Other Properties – 15 *Properties*

Access

Costs of subscriptions to the CINDAS databases depend on the number of locations and the number of potential users at each location. Once subscribed, engineers, librarians, researchers, and scientists all have unlimited access to the databases by IP address/ranges.

Complete Packages

The most complete package for research and applications includes all three complementing databases:

ASMD – Aerospace Structural Metals Database

TPMD – Thermophysical Properties of Matter Database

MPMD – Microelectronics Packaging Materials Database

The CINDAS databases give the composition and describe the test conditions of each material. They also present specific conditions for each desired material plotted on a graph.

We Are Confident in Our Products

The TPMD is quick, efficient, and frequently updated, and is currently used by a growing list of universities, corporations and research facilities. Please visit www.cindasdata.com for a demo.