

### Now available on-line—CINDAS Aerospace Structural Metals Database (ASMD)

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The ASMD web-based database allows the user to instantly see the properties and relationships for 291 metal alloys with 97,679 data curves. This user-friendly interface enables ASMD subscribers to quickly select and compare the attributes of the alloys for which they are looking.

The ASMD provides numeric and graphic information as part of the database, including a comprehensive PDF consisting of additional information for each alloy.

### ASMD Users

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Universities	Course Material Aid
Technical Schools	Project Reference & Guide
Government Agencies	New Material Research
Aerospace Industry	Turbine Design
Automotive Industry	Developing Engines & Frame
Industrial Suppliers	Manufacturing, Machinery
Research Corporations	Research and Development

*And many others...*

### About the Data

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The ASMD was fully developed by CINDAS LLC from the widely used and highly respected Aerospace Structural Metals Handbook (ASMH).

CINDAS LLC completed and released the database under a Cooperative Research and Development Agreement (CRADA) with the United States Air Force Materials Directorate at Wright Patterson Air Force Base.

### Search and Browse the Aerospace Structural Metals Database by

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Material Group  
(Aluminum, Titanium, Nickel Alloys, Stainless Steels, etc.)

Material Name  
(Al6061, Ti-6Al-4V, AZ63A, etc.)

Property Group  
(Mechanical, Thermophysical, etc.)

Property Name  
(Yield Strength, Elongation, Fracture Toughness, etc.)

### Property Groups

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The ASMD contains 742 different properties. These properties are separated into 20 easy-to-navigate property groups. Alternatively, you can search the property names by using keywords which would bring you directly to the property you're interested in.

Thermophysical

Thermoradiative

Electrical and Nuclear

Mechanical Properties

Strength, Stress, Hardness, Fatigue & Crack Growth, Impact Energy, Strain, Area Reduction, Deformation and others

Temperature

Time, Life to Failure

Corrosion, Oxidation, and Weight Change

Length, Thickness, Diameter, Size, and Grain Size

Content of Component, Phase

*Plus others...*

## Searching and Browsing: Aerospace Structural Metals Database (ASMD) 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 Aerospace Structural Metals Database contains 291 metal alloys in 23 metal groups and 742 properties in 20 property groups.*

ASMD (version 2.5, data updated 2011.1) [Start](#) | [View](#) | [Material](#) | [Properties](#) | [Help](#) | [Help](#)

**Browse By:**  
Material Group:

**Search By:**  
Material Name:    
e.g., Inconel 718/Inconel

or

**Property Group:**

or

**Property Name:**    
e.g., elastic Elastic Modulus

ASMD (version 2.5, data updated 2011.1) [Start](#) | [View](#) | [Material](#) | [Properties](#) | [Help](#) | [Help](#)

Select Property Group: Mechanical Properties - Fatigue, Crack

(20 property groups)

Select Property Name:

- Alternating Pseudo Stress
- Cycles to First/Initiation Crack
- Delay Cycles
- Effective Crack Length
- Fatigue, Alternating Stress
- Fatigue, Crack Growth Rate
- Fatigue, Crack Growth Rate per Cycle
- Fatigue, Cyclic Stress
- Fatigue Limit/Endurance Limit
- Fatigue, Maximum Stress
- Fatigue, Mean Stress
- Fatigue Strength
- Fatigue Strength Ratio, Fatigue Strength/TS
- Fatigue Strength Ratio, Fatigue Strength/Fly
- Fatigue Stress
- Fatigue, Stress Amplitude
- Fatigue, Stress Range
- Fatigue, Torsional Strength
- Mean Stress
- Peak Pseudo Stress
- Percent of Fatigue Max. Stress, Ultimate Strength
- True Transverse Stress

## Customizing Information

**Select:** The independent variable.

ASMD (version 2.5, data updated 2011.1) [Start](#) | [View](#) | [Material](#) | [Properties](#) | [Help](#) | [Help](#)

Select Property Group: Mechanical Properties - Fatigue, Crack

(20 property groups)

Select Property Name: Fatigue, Alternating Stress

(22 properties)

**Property Range**  
Fatigue, Alternating Stress (ksi) -0.4 - 180.11

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

Independent Variable	Minimum	Maximum
<input type="checkbox"/> Cycles (cycles)	30506.47	321062.0
<input type="checkbox"/> Cycles to Failure (cycles)	981.4	57102513.61
<input type="checkbox"/> Cycles to First/Initiation Crack (cycles)	1733.36	93351.37
<input type="checkbox"/> Fatigue, Mean Stress (ksi)	-16.0	232.56
<input type="checkbox"/> Mean Stress (ksi)	0.0	99.26

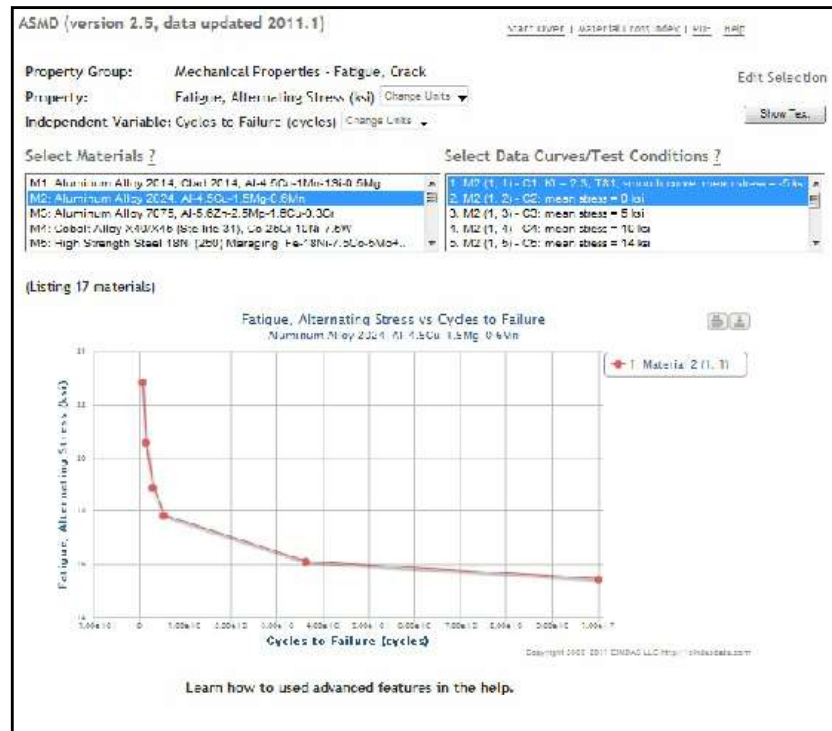
## Viewing Information

The ASMD 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.

*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

- 97,679 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
- Unit conversion package
  - Contains both English and SI units
  - Shows all typically used units for the variables
  - Allows both X-axis and Y-axis selection



## Materials Cross Index

The materials cross index contains the commercial and alternative designations for all the metal alloys in the database. This feature can be used to find the correct metal alloy when only the trade name or commercial designation is available.

Material Name	Commercial and Alternate Designations
1218, High Strength Steel H-11 Mod	H-11 Mod., AISI Type H-11, SAE Type H-11, UNS T20811, Al Tech Automotive A Carpenter No. 882, Chromu-V, Gofrel H-11, Hot Form No. 2
1220, High Strength Steel 18N (250) Maraging	18N 250 Grade Maraging Steel, UNS K92890, K92940, Almar 18 Nimark 250, Udimet 5-250, Vescomax 250
1222, High Strength Steel 18N-4Co	18N-4Co, UNS K91283 UNS K91283
1224, High Strength Steel 18N (200) Maraging	18 N Maraging Steel; 18N1-Co-Mo; 18N1 (300) Maraging; 18-8-7; Udimax 200 CUM Almar 18
1224, High Strength Steel 18N-1Co	18N-1Co, UNS K91283 Udimax 200, Almar 18
1227, High Strength Steel 18N (300) Maraging	18N Maraging Steel; 18N1-Co-Mo; 18-8-7; Vescomax 300 CUM; RSM 300, Almar 18 Mararc 300; 18N (300) Maraging Steel; 300 Grade Maraging Steel
1227, High Strength Steel 18N Steel	18N Steel
1227, High Strength Steel M50/M50N1 Steels	M50, AISI M50, Carpenter VIM-VAR M-50 Bearing Steel, Astroble M 50 High Speed Steel; Intron-1; Incolloy M50 VIM VAR Bearing Steel, Vesco M-50 High Speed Tool Steel, UNS T1350 (K881bb) M50N1 Intron-1; M50N1 VIM VAR Carburizing/Boiling and Gear Steel
1228, High Strength Steel Maraging T-250	Maraging T-250, Maraging MS 250, Maraging Free-Cu
1229, High Strength Steel AcrlMet 100	AcrlMet 100; No. KJ2580 H-15, H15, AISI H-15, Premium AISI H-15, ASTM H-15, SAE H-15, No. Dic V, No. Dic XL, No. Dic EBR (Crucials), Over Superior

## On-line Handbook

The Aerospace Structural Metals Database includes an interactive on-line version of the printed handbook. The on-line PDF handbook supplements the ASMD by providing additional information about the metal alloys.

- General Overview
- Commercial Designations
- Alternative Designations
- Metal Specifications
- Composition
- Heat Treatment
- Forms & Conditions
- Melting & Casting
- Fabrication
- Metal Treatments

*And many others...*

Aerospace Structural Metals Handbook
Non-Ferrous Alloys • AIWT

Author **K. Brown**

7475Al

**1 GENERAL**

Aluminum alloy 7475 is primarily an aerospace alloy used in a heat-treated condition. It is usually available as bare or clad sheet or as plate, but on occasions, extrusion and forgings have been made for special applications in place of its sister alloys, 7075 and 7175.

Alloy 7475 is basically a high purity version of 7075, i.e., it contains lower iron and silicon, and has marginally lower upper limits on copper and magnesium. Special proprietary processing may sometimes be given to 7475. The limits on chemical composition reduce the amounts of second phase constituents, which result in higher fracture toughness at the same level of strength and corrosion resistance. In over-aged tempers, for example, T7x, 7475 is resistant to exfoliation and stress corrosion. Most aerospace applications are for component requiring high strength and toughness at temperatures up to 300 F.

**1.01 Commercial Designations**  
7475 aluminum alloy

**1.02 Alternate Designations**  
UNS A97475

**1.03 Specifications**  
7475-T7351 plate: AMS 4202 [33]  
7475-T651 plate: AMS 4090 [34]

**1.04 Composition**  
1.04 [Table] Aluminum Association composition limits.

**1.05 Heat Treatment**  
Details of the heat treatments should be obtained, when required, from the specific supplier of the material due to possible differences in fabrication history, and consequent differences in response to heat treatments.

**1.06 Hardness**  
1.061 T61 sheet: R<sub>B</sub> 89;  
T761 sheet: R<sub>B</sub> 85;  
T7351 plate: R<sub>B</sub> 76 to 85.

**1.07 Forms and Conditions Available**  
Alloy 7475 is available as sheet (up to 0.25-inch thick) in both bare and clad forms, in either T61 or T761 tempers. It is also available in T7351, T7651, T76351 and T651 plate up to approximately 4-inches in thickness, and in extruded rods for the manufacture of cartridge cases. Producers and aerospace companies have also investigated the availability of 7475 structural forgings and extrusions; however, the data are not found in the open literature.

Al  
5.6 Zn  
2.2 Mg  
1.5 Cu  
0.21 Cr  
Low Si  
Fe  
Mn  
Ti

## We Are Confident in Our Products

The ASMD 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](http://www.cindasdata.com) for a demo.