



## ASM Aerospace Specification Metals Inc.

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### AISI Type 651 (19-9) Stainless Steel tested at 24°C

**Subcategory:** Ferrous Metal; Heat Resisting; Metal; Stainless Steel; T 600 Series Stainless Steel

**Key Words:** UNS K63198, AMS 5369, AMS 5526, AMS 5527, AMS 5720, AMS 5721, AMS 5722, ASTM A453, ASTM A457, ASTM 458, ASTM A477, SAE J467(19-9 DL), MIL SPEC MIL-S-46042

Component	Wt. %	Component	Wt. %	Component	Wt. %
C	0.28 - 0.35	Mo	1 - 1.75	S	Max 0.03
Cr	18 - 21	Nb	0.25 - 0.6	Si	0.3 - 0.8
Cu	Max 0.5	Ni	8 - 11	Ti	0.1 - 0.35
Fe	64	P	Max 0.04	W	1 - 1.75
Mn	0.75 - 1.5				

#### Material Notes:

60 mm diameter bar, warm rolled and stress relieved at 730°C for 8 hours with hardness of 220-241 HB

Physical Properties	Metric	English	Comments
Density	<u>7.94 g/cc</u>	0.287 lb/in <sup>3</sup>	

#### Mechanical Properties

Tensile Strength, Ultimate	<u>838 MPa</u>	122000 psi	
Tensile Strength, Yield	<u>579 MPa</u>	84000 psi	at 0.2% offset
Elongation at Break	<u>43 %</u>	43 %	in 50 mm
Reduction of Area	<u>55.5 %</u>	55.5 %	
Modulus of Elasticity	<u>200 GPa</u>	29000 ksi	Typical for stainless steel
Charpy Impact	<u>62 J</u>	45.7 ft-lb	V-Notch; Hot-Rolled/Stress Relieved at 650°C.
Machinability	<u>45 %</u>	45 %	Based on 100% machinability for AISI 1212 steel.

#### Thermal Properties

CTE, linear 20°C	<a href="#">15.3 <math>\mu\text{m}/\text{m}\cdot^\circ\text{C}</math></a>	8.5 $\mu\text{in}/\text{in}\cdot^\circ\text{F}$	at 21-93°C (70-200°F), 16.3 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$ at 21-205°C (70-400°F)
CTE, linear 250°C	<a href="#">16.7 <math>\mu\text{m}/\text{m}\cdot^\circ\text{C}</math></a>	9.28 $\mu\text{in}/\text{in}\cdot^\circ\text{F}$	at 21-315°C (70-600°F), 17.3 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$ at 21-425°C (70-800°F)
CTE, linear 500°C	<a href="#">17.6 <math>\mu\text{m}/\text{m}\cdot^\circ\text{C}</math></a>	9.78 $\mu\text{in}/\text{in}\cdot^\circ\text{F}$	at 21-540°C (70-1000°F), 18.0 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$ at 21-815°C (70-1500°F)
Specific Heat Capacity	<a href="#">0.42 <math>\text{J}/\text{g}\cdot^\circ\text{C}</math></a>	0.1 $\text{BTU}/\text{lb}\cdot^\circ\text{F}$	from 0-100°C (32-212°F)
Thermal Conductivity	<a href="#">13.5 <math>\text{W}/\text{m}\cdot\text{K}</math></a>	93.7 $\text{BTU}\cdot\text{in}/\text{hr}\cdot\text{ft}^2\cdot^\circ\text{F}$	at 21°C, 18.5 $\text{W}/\text{m}\cdot\text{K}$ at 425°C, 21.3 $\text{W}/\text{m}\cdot\text{K}$ at 650°C
Melting Point	1420 - 1435 °C	2590 - 2620 °F	
Solidus	<a href="#">1420 °C</a>	2590 °F	
Liquidus	<a href="#">1435 °C</a>	2620 °F	
Maximum Service Temperature, Air	<a href="#">780 °C</a>	1440 °F	Continuous Service
Maximum Service Temperature, Air	<a href="#">955 °C</a>	1750 °F	Intermittent Service

## **References** for this datasheet.

Some of the values displayed above may have been converted from their original units and/or rounded in order to display the information in a consistent format. Users requiring more precise data for scientific or engineering calculations can click on the property value to see the original value as well as raw conversions to equivalent units. We advise that you only use the original value or one of its raw conversions in your calculations to minimize rounding error.