



## ASM Aerospace Specification Metals Inc.

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Haynes® Multimet® alloy, 1.6 mm thick sheet, 1177°C heat treatment, rapid air cooled, tested at 1093°C

**Subcategory:** Iron Base; Metal; Superalloy

**Key Words:** AMS 5794, UNS R30155, AMS 5532, AMS 5768, AMS 5769, AMS 5795

| Component | Wt. %       | Component | Wt. %     | Component | Wt. %   |
|-----------|-------------|-----------|-----------|-----------|---------|
| C         | 0.08 - 0.16 | Fe        | 33        | Ni        | 19 - 21 |
| Cb + Ta   | 0.75 - 1.25 | Mn        | 1 - 2     | Si        | Max 1   |
| Co        | 18.5 - 21   | Mo        | 2.5 - 3.5 | W         | 2 - 3   |
| Cr        | 20 - 22.5   | N         | 0.1 - 0.2 |           |         |

### Material Notes:

Iron (Fe) content to balance. Recommended for use in applications involving high stress at temperatures up to 816°C (1500°F), and moderate stresses up to 1093°C (2000°F). Excellent oxidation resistance, good ductility, and is readily fabricated. Current applications include aircraft, including tailpipes and tailcones, afterburner parts, exhaust manifolds, combustion chambers, turbine blades, buckets and nozzles. Excellent service for high temperature bolts.

Data provided by the manufacturer, Haynes International, Inc.

| Physical Properties | Metric          | English                  | Comments         |
|---------------------|-----------------|--------------------------|------------------|
| Density             | <u>8.2 g/cc</u> | 0.296 lb/in <sup>3</sup> | at 22°C (71.6°F) |

### Mechanical Properties

|                            |               |           |                                     |
|----------------------------|---------------|-----------|-------------------------------------|
| Hardness, Brinell          | 159           | 159       | Converted from Rockwell B hardness. |
| Hardness, Knoop            | 176           | 176       | Converted from Rockwell B hardness. |
| Hardness, Rockwell B       | 92            | 92        |                                     |
| Hardness, Vickers          | 201           | 201       | Converted from Rockwell B hardness. |
| Tensile Strength, Ultimate | <u>90 MPa</u> | 13100 psi |                                     |
| Tensile Strength, Yield    | <u>58 MPa</u> | 8410 psi  | at 0.2% offset                      |
| Elongation at Break        | <u>38 %</u>   | 38 %      | in 50.8 mm                          |
| Poisson's Ratio            | 0.298         | 0.298     | RT                                  |

|  |       |       |       |
|--|-------|-------|-------|
| Poisson's Ratio                        | 0.319 | 0.319 | -78°C |
| Poissons Ratio at Elevated Temperature | 0.315 | 0.315 | 426°C |
| Poissons Ratio at Elevated Temperature | 0.325 | 0.325 | 650°C |
| Poissons Ratio at Elevated Temperature | 0.339 | 0.339 | 816°C |

### Electrical Properties

|                        |                        |                 |               |
|------------------------|------------------------|-----------------|---------------|
| Electrical Resistivity | <u>9.3e-005 ohm-cm</u> | 9.3e-005 ohm-cm | 22°C (71.6°F) |
|------------------------|------------------------|-----------------|---------------|

### Thermal Properties

|  |                     |                                   |                         |
|--|---------------------|-----------------------------------|-------------------------|
| CTE, linear 250°C                            | <u>15.3 μm/m-°C</u> | 8.5 μin/in-°F                     | 23-300°C (73.4-570°F)   |
| CTE, linear 250°C                            | <u>15.6 μm/m-°C</u> | 8.67 μin/in-°F                    | 23-400°C (73.4-750°F)   |
| CTE, linear 500°C                            | <u>16 μm/m-°C</u>   | 8.89 μin/in-°F                    | 23-500°C (73.4-930°F)   |
| CTE, linear 500°C                            | <u>16.7 μm/m-°C</u> | 9.28 μin/in-°F                    | 23-600°C (73.4-1110°F)  |
| CTE, linear 500°C                            | <u>17.2 μm/m-°C</u> | 9.56 μin/in-°F                    | 23-700°C (73.4-1290°F)  |
| CTE, linear 500°C                            | <u>17.5 μm/m-°C</u> | 9.72 μin/in-°F                    | 23-800°C (73.4-1470°F)  |
| CTE, linear 500°C                            | <u>17.8 μm/m-°C</u> | 9.89 μin/in-°F                    | 23-900°C (73.4-1650°F)  |
| CTE, linear 1000°C                           | <u>17.8 μm/m-°C</u> | 9.89 μin/in-°F                    | 23-1000°C (73.4-1830°F) |
| CTE, linear 1000°C                           | <u>18.4 μm/m-°C</u> | 10.2 μin/in-°F                    | 23-1100°C (73.4-2010°F) |
| Specific Heat Capacity                       | <u>0.435 J/g-°C</u> | 0.104 BTU/lb-°F                   | 21-100°C (69.8-212°F)   |
| Thermal Conductivity at Elevated Temperature | <u>15.9 W/m-K</u>   | 110 BTU-in/hr-ft <sup>2</sup> -°F | 300°C (570°F)           |
| Thermal Conductivity at Elevated Temperature | <u>17.3 W/m-K</u>   | 120 BTU-in/hr-ft <sup>2</sup> -°F | 400°C (750°F)           |
| Thermal Conductivity at Elevated Temperature | <u>18.6 W/m-K</u>   | 129 BTU-in/hr-ft <sup>2</sup> -°F | 500°C (930°F)           |
| Thermal Conductivity at Elevated Temperature | <u>20 W/m-K</u>     | 139 BTU-in/hr-ft <sup>2</sup> -°F | 600°C (1110°F)          |
| Thermal Conductivity at Elevated Temperature | <u>20 W/m-K</u>     | 139 BTU-in/hr-ft <sup>2</sup> -°F | 200°C (390°F)           |
| Melting Point                                | 1288 - 1354 °C      | 2350 - 2470 °F                    |                         |
| Solidus                                      | <u>1288 °C</u>      | 2350 °F                           |                         |
| Liquidus                                     | <u>1354 °C</u>      | 2470 °F                           |                         |

### Optical Properties

|                  |      |      |                               |
|------------------|------|------|-------------------------------|
| Emissivity (0-1) | 0.88 | 0.88 | at 1090°C (1995°F) (oxidized) |
|------------------|------|------|-------------------------------|

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.