**Introduction**

Super alloys or high performance alloys are available in a variety of shapes and contain elements in different combinations to obtain a specific result. These alloys are of three types that include iron-based, cobalt-based and nickel-based alloys. The nickel-based and cobalt-based super alloys are available as cast or wrought based alloys according to composition and application.

Super alloys have good oxidation and creep resistance and can be strengthened by precipitation hardening, solid-solution hardening and work hardening methods. They can also function under high mechanical stress and high temperatures and also in places that require high surface stability.

HASTELLOY(r) C276 is a wrought corrosion-resistant alloy that resists the development of grain boundary precipitates that degrade corrosion resistance.

The following datasheet provides an overview of HASTELLOY(r) C276.

**Chemical Composition**

The chemical composition of HASTELLOY(r) C276 is outlined in the following table.

|  |  |
| --- | --- |
| Element | Content (%) |
| Nickel, Ni | 57 |
| Molybdenum, Mo | 15-17 |
| Chromium, Cr | 14.5-16.5 |
| Iron, Fe | 4-7 |
| Tungsten, W | 3-4.50 |
| Cobalt, Co | 2.50 |
| Manganese, Mn | 1 |
| Vanadium, V | 0.35 |
| Silicon, Si | 0.080 |
| Phosphorus, P | 0.025 |
| Carbon, C | 0.010 |
| Sulfur, S | 0.010 |

**Physical Properties**

The following table shows the physical properties of HASTELLOY(r) C276.

|  |  |  |
| --- | --- | --- |
| Properties | Metric | Imperial |
| Density | 8.89 g/cm³ | 0.321 lb/in³ |
| Melting point | 1371°C | 2500°F |

**Mechanical Properties**

The mechanical properties of HASTELLOY(r) C276 are displayed in the following table.

|  |  |  |
| --- | --- | --- |
| Properties | Metric | Imperial |
| Tensile strength (@thickness 4.80-25.4 mm, 538°C/@thickness 0.189-1.00 in, 1000°F) | 601.2 MPa | 87200 psi |
| Yield strength (0.2% offset, @thickness 2.40 mm, 427°C/@thickness 0.0945 in, 801°F) | 204.8 MPa | 29700 psi |
| Elastic modulus (RT) | 205 GPa | 29700 ksi |
| Elongation at break (in 50.8 mm, @thickness 1.60-4.70 mm, 204°C/@thickness 0.0630-0.185 in, 399°F) | 56% | 56% |
| Hardness, Rockwell B (plate) | 87 | 87 |

**Thermal Properties**

The thermal properties of HASTELLOY(r) C276 are given in the following table.

|  |  |  |
| --- | --- | --- |
| Properties | Metric | Imperial |
| Thermal expansion co-efficient (@24-93°C/75.2-199°F) | 11.2 µm/m°C | 6.22 µin/in°F |
| Thermal conductivity (-168 °C) | 7.20 W/mK | 50.0 BTU in/hr.ft².°F |

**Other Designations**

Equivalent materials to HASTELLOY(r) C276 are as follows.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ASTM B366 | ASTM B574 | ASTM B622 | ASTM F467 | DIN 2.4819 |
| ASTM B575 | ASTM B626 | ASTM B619 | ASTM F468 |  |

**Fabrication and Heat Treatment**

**Annealing**

HASTELLOY(r) C276 is generally used in the solution treated condition. This alloy is soaked at 1121°C (2050°F) and then quenched in a rapid manner.

**Cold Working**

Conventional cold working procedures are used for cold working HASTELLOY(r).

**Welding**

HASTELLOY(r) C276 is capable of being welded by the commonly used welding methods. During the welding process excessive input of heat should be avoided. For corrosive applications this alloy is capable of being used in the “as-welded” condition without the need for more heat treatment.

**Forging**

Conventional methods are used to forge or hot-upset HASTELLOY(r) C276.

**Forming**

HASTELLOY(r) C276 can be formed by being cold worked using conventional techniques.

**Machinability**

HASTELLOY(r) C276 has good machinability characteristic.

**Heat Treatment**

HASTELLOY(r) C276 is solution heat treated at 1121°C (2050°F) and then quenched rapidly. In case of forging or hot forming, the parts should first be solution heat treated before usage.

**Hardening**

HASTELLOY(r) C276 is cold worked to be hardened.

**Hot Working**

Super alloy HASTELLOY(r) C276 is capable of being extruded or hot formed. After the hot forming process, this alloy should be solution heat treated.

**Aging**

Aging is not performed for HASTELLOY(r) C276 that is utilized in a solution treated condition.

**Applications**

HASTELLOY(r) C276 is used for desulphurization of flue gas equipment and for chemical process equipment.