

Alloy PK33

A nickel-chromium-cobalt precipitation-hardenable grade, PK33 is highly resistant to thermal shock and fatigue.

With the addition of molybdenum, Alloy PK33 has an exceptional combination of high temperature strength, creep-resistant and ductility.

PRODUCT FORMS

| PRODUCT FORM | SIZE RANGE FROM | SIZE RANGE TO |
|--------------------------|-----------------|---------------|
| Alloy PK33 round bar | 25 mm | 110 mm |
| Alloy PK33 sheet & plate | 0.91 mm | 3.25 mm |

Can't find the size you need? **Please contact us at onlinesales@neonickel.com**

CHEMICAL ANALYSIS

| % | NI | CR | CO | MO | AL | TI | FE | SI | MN | CU | C | ZR | S |
|-----|----|----|----|----|------|------|----|------|------|------|-------|-------|--------|
| Min | - | 16 | 12 | 5 | 1.70 | 1.50 | - | - | - | - | - | - | - |
| Max | 54 | 20 | 16 | 9 | 2.50 | 3 | 1 | 0.50 | 0.50 | 0.20 | 0.070 | 0.060 | 0.0050 |

APPLICATIONS

- Gas turbine welded structures
- Gas turbine hot sections
- Flame tubes
- Enclosures for industrial furnace hot sections
- Combustion chambers

ABOUT ALLOY PK33

Alloy PK33 is a superalloy which is highly resistant to thermal shock and thermal fatigue. It also offers superb weldability, meaning it is often used to combustion chambers, jet pipes and reheat systems for high performance gas turbine engines. Alloy PK33 sheet fabrications are normally out into service after completion of the two-stage heat treatment process. This heat treatment is usually carried out in air. Alloy PK33 is often used in high strength applications at elevated temperatures, such as in gas turbine hot sections or enclosures for industrial furnace hot sections.

PROPERTIES

| | |
|--------------------------------|------------------------|
| Density: | 8.21 g/cm ³ |
| Melting Range: | 1300 - 1345°C |
| Hardness: | HRB |
| Specific Heat Capacity: | 419 J/kg.°C |
| Electrical Resistivity: | 1.26 μΩ.m |
| Curie Temperature: | °C |

MECHANICAL & PHYSICAL PROPERTIES

| MECHANICAL & PHYSICAL PROPERTIES | 21.1°C | 93.3°C | 148.9°C | 204.4°C | 315.6°C | 371.1°C | 426.7°C | 537.8°C | 648.9°C | 700/760°C | 750°C | 815°C | 850°C | 900°C | 982°C |
|---|--------|--------|---------|---------|---------|---------|---------|---------|---------|-----------|-------|-------|-------|-------|--------|
| Ultimate Tensile Strength /MPa | 1127 | 1112 | 1112 | 1096 | 1065 | 1019 | 1019 | 973 | 957 | - | - | - | - | - | 170 |
| 0.2% Yield Strength /MPa | 664 | 648 | 648 | 618 | 602 | 587 | 587 | 587 | 571 | - | - | - | - | - | 108 |
| Reduction of area % | 41 | 39 | 39 | 39 | 40 | 42 | 42 | 44 | 40 | - | - | - | - | - | 82 |
| Elongation % | 33 | 33 | 33 | 35 | 38 | 40 | 40 | 37 | 31 | - | - | - | - | - | 79 |
| Charpy Impact V-notch /J | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Minimum Creep 0.0001% per hr | - | - | - | - | - | - | - | - | - | 409 | 286 | 170 | 90 | 46 | - |
| 10,000 hr Rupture Strength | - | - | - | - | - | - | - | - | - | 479 | 332 | 208 | 120 | 77 | - |
| Coefficient of Thermal Expansion / $\mu\text{m}/\text{m}^{\circ}\text{C}$ | - | 10.6 | - | 11.7 | 12.2 | 12.7 | - | 13.2 | 13.4 | - | - | - | - | - | 18.5 |
| Thermal Conductivity /kcal/(hr.m. $^{\circ}\text{C}$) | 9.718 | 10.836 | - | 11.868 | 13.33 | 14.792 | - | 15.824 | 17.826 | - | - | - | - | - | 23.392 |
| Modulus of Elasticity / GPa | 217 | 214 | - | 209 | 203 | 197 | - | 190 | 183 | - | - | - | - | - | 140 |

SPECIFICATIONS

Standards: MSRR 7070, 7952, 7181, 7182, 7166, 7195