Technical Data Sheet

# ATI 10242™ Alloy

## INTRODUCTION

ATI 10242™ alloy is an age-hardenable nickel-molybdenum-chromium alloy designed for use in moderately high temperature applications up to ~1400°F that require good elevated temperature strength, low thermal expansion, and good oxidation resistance. The strength stems from a long range ordering reaction during aging. This ordering reaction not only provides the alloy's strength, but also imparts excellent thermal stability.

## SPECIFICATIONS & CERTIFICATES

Contact us for information.

## CHEMICAL COMPOSITION

| | Ni | Mo | Cr | Fe | Co | Mn | Si | Al | C | B | Cu | P | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % w/w, min. | Balance | 24 | 7 | | | | | | | | | | |
| % w/w, max. | | 26 | 9 | 2 | 2.5 | 0.8 | 0.8 | 0.5 | 0.03 | 0.006 | 0.5 | 0.03 | 0.015 |

## PHYSICAL PROPERTIES

Melting Range: 2330-2500°F (1277-1371°C)
Density: 0.327 lbs/in$^3$ (9.05 g/cm$^3$)

## HEAT TREATMENT

ATI 10242™ alloy is typically supplied in the as-forged condition, unless otherwise specified. Annealing is typically performed between 1950-2050°F (1065-1120°C) followed by an air cool or faster. Larger section sizes will require faster cooling to achieve optimum property balance. Aging is achieved at temperatures of 1200°F (650°C) for a minimum of 24 hrs followed by air cooling. Because of the sluggish nature of the long range ordering reaction, aging times closer to 48 hrs are often employed for improved strength.

## HARDNESS

Hardness, like tensile properties, is a function of the precipitation or aging cycle. The hardness in the solution treated condition is approximately 15-20 HRc which increases upon aging to 33-39 HRc.

## FORGEABILITY

ATI 10242™ alloy has excellent forming characteristics and may be readily formed by conventional methods. The alloy is forgeable by conventional means in the temperature range of 2250°F to approximately 1700°F, more typically in the 2100°F to 1900°F range.

## MACHINABILITY

ATI 10242™ alloy is readily machinable in both the solution treated and age-hardened conditions. Conventional machining techniques used for nickel and iron based alloys may be used. Carbide tools are recommended. This alloy is reported to be gummy and work-harden during machining.



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## WELDABILITY

Satisfactory welds can be produced in both the solution treated and fully-aged conditions using inert gas-shielded arc, plasma arc, electron beam, and resistance welding techniques. The welding performance is similar to other high-temperature, nickel-base alloys.

## SPECIAL PRECAUTIONS

All lubricants or coolants, particularly sulfur-bearing fluids, should be removed prior to heat treating and welding.

## TYPICAL PROPERTIES

Room temperature tensile properties of solution treated and aged ATI 10242™ alloy:

| Ultimate Tensile Strength ksi (MPa) | Yield Strength ksi (MPa) | Elongation % | Reduction of Area % |
|---|---|---|---|
| 178 (1228) | 105 (724) | 50 | 60 |

Tensile properties of solution treated and aged ATI 10242™ alloy at 1200°F (650°C):

| Ultimate Tensile Strength ksi (MPa) | Yield Strength ksi (MPa) | Elongation % | Reduction of Area % |
|---|---|---|---|
| 135 (931) | 75 (517) | 40 | 40 |

The stress rupture life of solution treated and aged ATI 10242™ alloy at 1200°F (650°C) and 90ksi (621MPa) load is approximately 100hrs.

The thermal expansion coefficient from room temperature to 1200°F is between 6.5-7.0 in/in/°F (11.7-12.6 mm/mm/°C). Data are typical and should not be construed as maximum or minimum values for specification or for final design. Data on any particular piece of material may vary from those herein.



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