

## Inconel® 725 (UNS N07725) — Material Data Sheet

ASTM B637 · UNS N07725 · Alloy 725

*Age-hardenable nickel-chromium-molybdenum alloy, sour-service*

Age-hardened 625: the corrosion resistance of Inconel 625 with 150 ksi strength, NACE listed for sour service — the subsea and downhole fastener alloy.

|          |             |              |                                |
|----------|-------------|--------------|--------------------------------|
| TENSILE  | 150 ksi min | MOLYBDENUM   | 7.00–9.50 %                    |
| YIELD    | 120 ksi min | SOUR SERVICE | NACE MR0175 / ISO 15156 listed |
| HARDNESS | 43 HRC max  | MAGNETIC     | No                             |

### Nominal composition



Midpoints of the specification ranges, for orientation only. Limits are in the table.

### Chemical composition — Inconel® 725 (UNS N07725)

| Element            | Symbol | Min %   | Max % |
|--------------------|--------|---------|-------|
| Carbon             | C      | —       | 0.03  |
| Manganese          | Mn     | —       | 0.35  |
| Silicon            | Si     | —       | 0.20  |
| Phosphorus         | P      | —       | 0.015 |
| Sulfur             | S      | —       | 0.010 |
| Chromium           | Cr     | 19.00   | 22.50 |
| Molybdenum         | Mo     | 7.00    | 9.50  |
| Niobium + tantalum | Nb+Ta  | 2.75    | 4.00  |
| Titanium           | Ti     | 1.00    | 1.70  |
| Aluminium          | Al     | —       | 0.35  |
| Nickel             | Ni     | 55.0    | 59.0  |
| Iron               | Fe     | balance | —     |

Values per ASTM B637-16 Tables 1 and 3 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

### Physical properties (typical)

|                               |                                                    |
|-------------------------------|----------------------------------------------------|
| DENSITY                       | 0.300 lb/in <sup>3</sup> (8.31 g/cm <sup>3</sup> ) |
| MODULUS OF ELASTICITY         | 29.6 × 10 <sup>6</sup> psi (204 GPa)               |
| THERMAL EXPANSION (68–212 °F) | 7.1 µin/in·°F                                      |
| MAGNETIC                      | No                                                 |

### Heat treatment

Solution anneal at about 1900 °F, then age harden with a two-step treatment at about 1350 °F and 1150 °F. Hardness is held at or below 43 HRC for sour service.

### Mechanical properties — Inconel® 725 (UNS N07725)

| Condition and nominal diameter (in.) | Tensile strength, min (ksi) | Yield strength 0.2% offset, min (ksi) | Elongation, min (%) | Reduction of area, min (%) | Hardness   |
|--------------------------------------|-----------------------------|---------------------------------------|---------------------|----------------------------|------------|
| Solution treated and aged — all      | 150                         | 120                                   | 20                  | 35                         | 43 HRC max |

Values per ASTM B637-16 Tables 1 and 3 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Applicable standards

|                           |                                                                       |
|---------------------------|-----------------------------------------------------------------------|
| ASTM B637                 | Precipitation-hardening nickel alloy bars, forgings and forging stock |
| NACE MR0175 / ISO 15156-3 | Cracking-resistant alloys for sour service                            |
| API 6A / 17D              | Wellhead and subsea equipment that specifies this alloy               |

Forms we supply in Inconel 725

- Studs and stud bolts
- Hex and heavy hex bolts
- Nuts and washers
- Socket head cap screws
- Machined components from certified bar

Typical applications

- Subsea wellhead, hanger and connector bolting
- Downhole tools and packers in sour wells
- Riser and manifold fasteners
- Seawater and brine pump components
- High-strength fasteners where 625 is too soft