

ODIN44 440C | 1.4125 | X105CrMoV17 | S44004

Overview

ODIN44 attains the highest strength, hardness and wear resistance of all stainless steel grades. ODIN44 is further characterized by good corrosion resistance in mild domestic and industrial environments, including fresh water, organic materials, mild acids, and chemically processed materials.

Spray Forming

Due to the Spray Forming Process, ODIN44 exhibits premium material properties. In comparison to conventional 440C grade steel with coarse grains and brittle carbide networks, ODIN44 is characterized by a segregation free, uniform microstructure with fine grains and finely dispersed carbides. This leads typically to higher wear and corrosion resistance – ultimately prolonging the lifetime of your applications.

Sustainability

ODIN44 has minimal carbon footprint while offering premium steel quality.

Spray Forming is more resource efficient than conventional high quality steel production routes (e.g. ESR- or PM-steel). At the same time, *Asgaard Metals* ensures the use of 100% renewable energy and strives for closed-loop recycling with scrap rates near 100%. Lastly, THOR44 powder is simultaneously produced with ODIN44 as a by-product and is used for

various applications including Additive Manufacturing (3D Printing), Hot Isostatic Pressing (Powder Metallurgy) and cored wires for welding applications – further minimizing the overall footprint.

Applications

ODIN44 is available as billets that can be further processed into bars, rods, plates, sheets, or directly machined.

ODIN44 is a high-carbon martensitic stainless steel that can be tailored through dedicated heat treatments to adapt final properties such as hardness and wear resistance to your application.

Typical applications include:

- Ball and roller bearings
- Bushings
- Molds and dies
- Tools for textile components
- Valve parts and pumps
- Gears
- Dies and injection molds
- Hybrid 3D printing with THOR44
- Build plates for 3D printing
- ...

Due to its stainless properties, further excellent applications include:

- Food processing tools
- Cutlery with mirror finish
- High quality knife blades with excellent edge retention
- Surgical instruments
- Measuring instruments
- ...

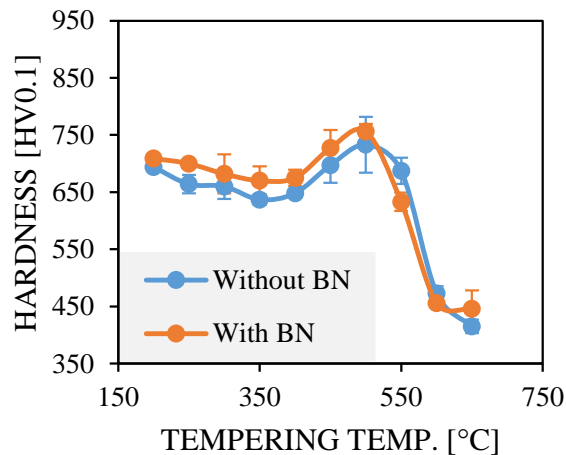
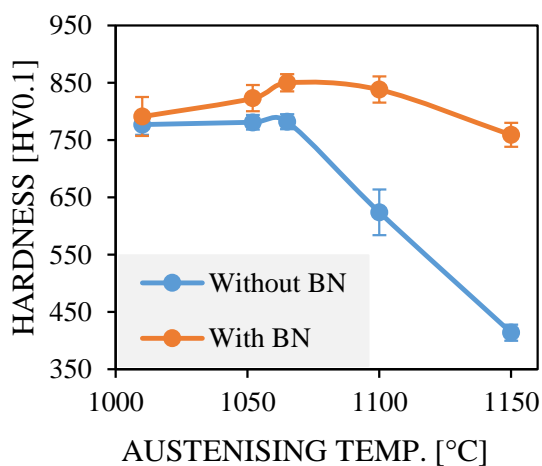
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CHEMICAL COMPOSITION	
ELEMENT	MASS FRACTION (W. - %)
Fe	Balance
C	0.95 – 1.20
Cr	16.00 – 18.00
Mo	≤ 0.75
Si	≤ 1.00
Mn	≤ 1.00

PHYSICAL PROPERTIES	
Density	7.80 g/cm ³
Melting range (T _{solidus} – T _{liquidus})	1285 – 1419 °C
Thermal conductivity	24.2 W/mK at 0 – 100°C
Thermal expansion	10.1 μm/m °C at 0 – 100°C

MECHANICAL PROPERTIES OF SPRAY FORMED BILLETS	
PROPERTIES	HEAT-TREATED
Rockwell hardness, ISO6508-1	Up to 61 HRC
Vickers hardness, ISO6507-1	HV _{0.1} ≤ 750
Carbide size	2 – 5 μm
Tensile strength	1790 – 2030 MPa
Elongation	3 – 4 %

HEAT TREATMENT



Left: Austenization chart. Right: Tempering hardness. BN: Boiling nitrogen as a cryogenic treatment.