MAKINO
Promise of Performance

Co21

Co-based Alloy Powder for Additive Manufacturing
90/45 µm, Gas Atomized
Designed for LMD

Chemical composition similar to UNS R30021, Stellite® 21

DESCRIPTION

Co21 is a gas atomized cobalt-based powder, engineered for additive manufacturing (AM).The material primarily consists of cobalt, chromium, and molybdenum, which offers high hardness properties and exhibits remarkable resistance to wear, corrosion, and galling, with work hardening properties. It is also able to retain these properties at elevated temperatures up to 600°C.

This material is a widely utilized cobalt-based alloy for coating applications. Its ternary molybdenum element content provides a high resistance to severe reducing or corrosive environments compared to other cobalt-based alloys. This material finds extensive use in the marine and moulding industries because of its durability in environments with complex chemical environments and its resistance to thermal and mechanical shocks.

KEY PROPERTIES

- High hardness
- Good wear resistance
- Excellent corrosion resistance
- Retains hardness at elevated temperatures

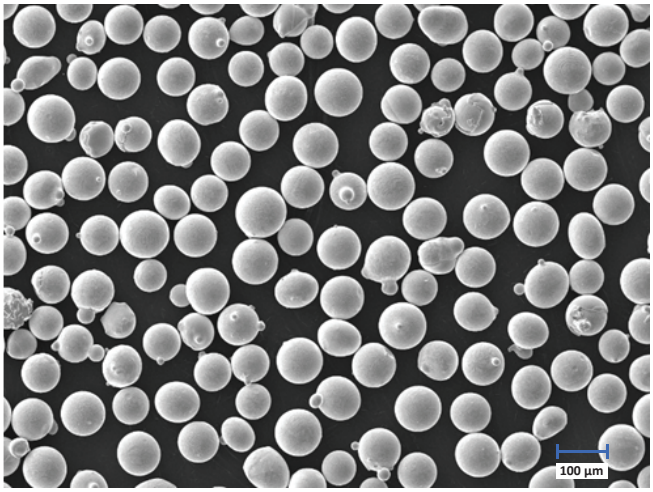
APPLICATIONS

- Hydraulic turbine components
- Mill rollers
- Hot forging dies
- Press moulds
- Pump, valve, vessel components

POWDER CHEMICAL COMPOSITION

Element	Min. (wt%)	Max. (wt%)
Co	Bal.	Bal.
Cr	27.0	29.0
Mo	4.8	5.5
Ni	2.0	3.0
Fe	-	3.0
Si	-	2.0
C	-	0.5
W	-	0.5
O	-	0.03

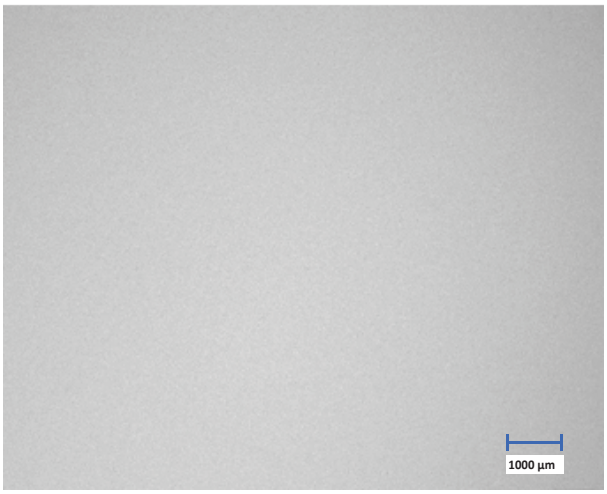
SEM IMAGE



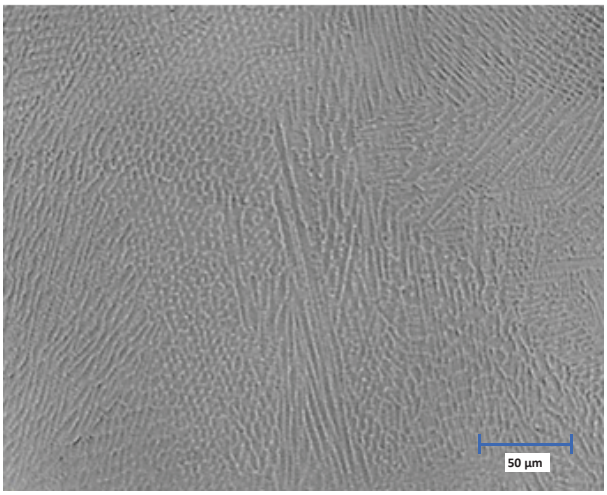
POWDER PROPERTIES (ISO 4490, ISO 3923-1)

Particle Size Range (µm)	Hall Flow (s/50g)	Apparent Density (g/cm³)
45 – 90	15.4	4.77

MICROGRAPHS



Polished Surface



Microstructure

PHYSICAL PROPERTIES

Average Defect Percentage (%)
< 0.1

MECHANICAL PROPERTIES (ISO 6507-1, ISO 6508-1, ASTM G99)

Hardness ($HV_{0.3}$)	Hardness (HRC)	Specific Wear Rate (mm^3/Nm)
443 ± 35	45 ± 2	1.74×10^{-4}

MELTING POINT

Celsius (°C)	Fahrenheit (°F)
1285 - 1410	2345 - 2570

PROCESS INFORMATION:

The properties reported in this Technical Data Sheet are applicable to Makino AM powders tested and distributed by Makino and processed on Makino LMD machine utilizing parameters in accordance with relevant operating guidelines (inclusive of setup conditions and maintenance). The properties are obtained by following recommended protocols. Further information regarding the methods used by Makino can be provided upon inquiry.

DISCLAIMER:

The data and information provided represent, to the best of our knowledge, standard or average values and do not constitute guarantees for upper and lower limit parameters. The recommended applications for the material disclosed are exclusively for illustrative purposes that help the reader to conduct their independent assessments. These suggestions are not intended to be expressed or implied warranties of suitability for the specified applications or any other purposes. The information included may be subject to change at any time without prior notification.

CONTACT US:

Our Safety Datasheet (SDS) is available upon request. For more information or support please contact Makino at sales-am@makino.com.sg or visit www.makino.com.sg

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