SENTESBİR

Copper and **Copper Alloy Powders**

for

Additive Manufacturing and **Cold Spray**

Powder Brands

PURESPHERE

Powders for AM

powders produced with gas atomising for Laser and Electron Beam Powder Bed Fusion (LPBF/EBPBF) and also Direct Energy Deposition (DED) Additive Manufacturing applications.

FORTECOAT

Powders for Thermal Spray

Powders for thermal spray and surfacing applications, including; Flame Spray, HVOF, PTA Welding, Laser Cladding, Plasma Spray and Cold Spray

Metal Powder Infrastructure

- 5 x Gas atomization 40-500 Kg
- 2 x Water atomization 300 Kg
- 1 x VIM Gas atomization 300 Kg

- Vibration Sieves
- Air Classifier

- Technologies:
  - Gas atomization: closed-coupled, free fall
  - Anti-satellite system
  - Hot gas atomization

- Particle size (µm):
  - 15-38
  - 15-45
  - 20-53
  - 20-106
  - 44-106
  - *customer specificication*

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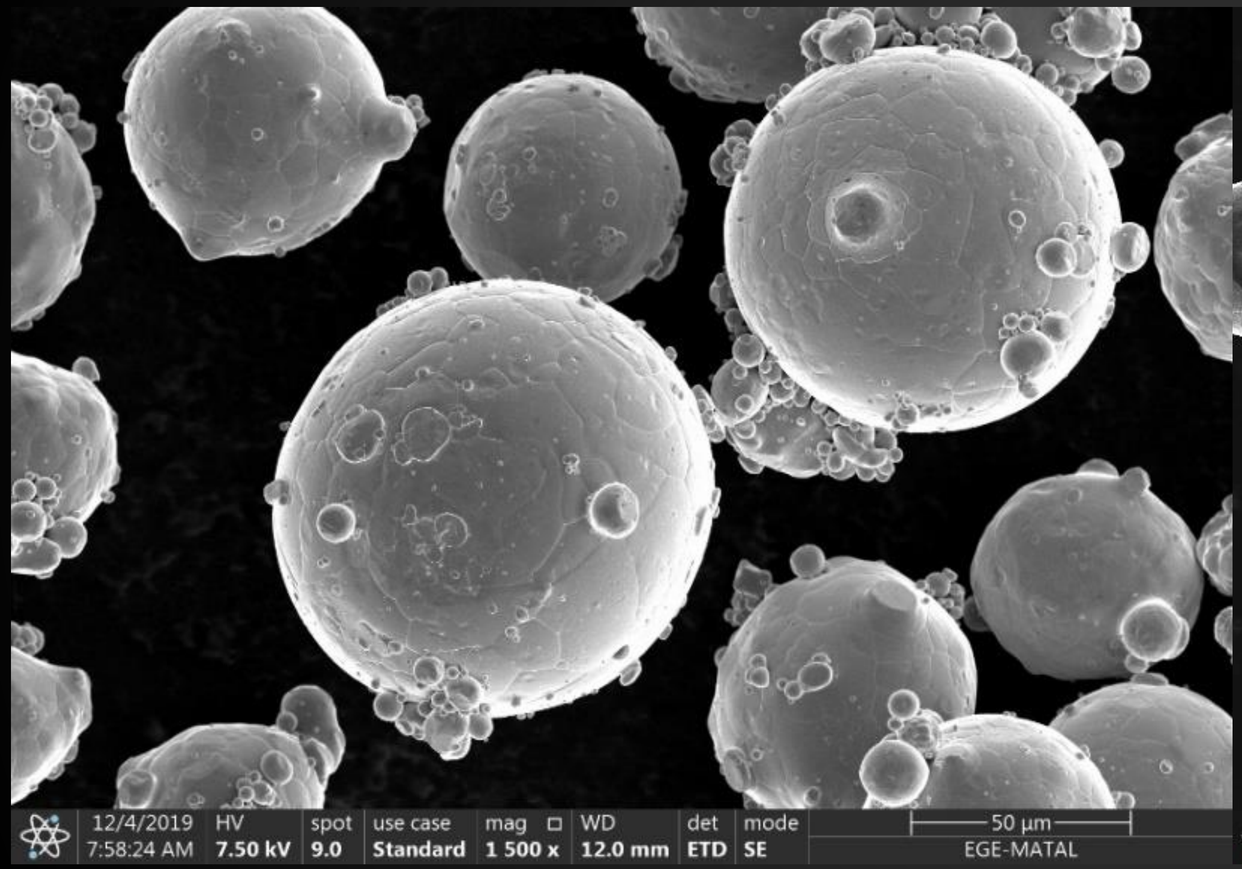
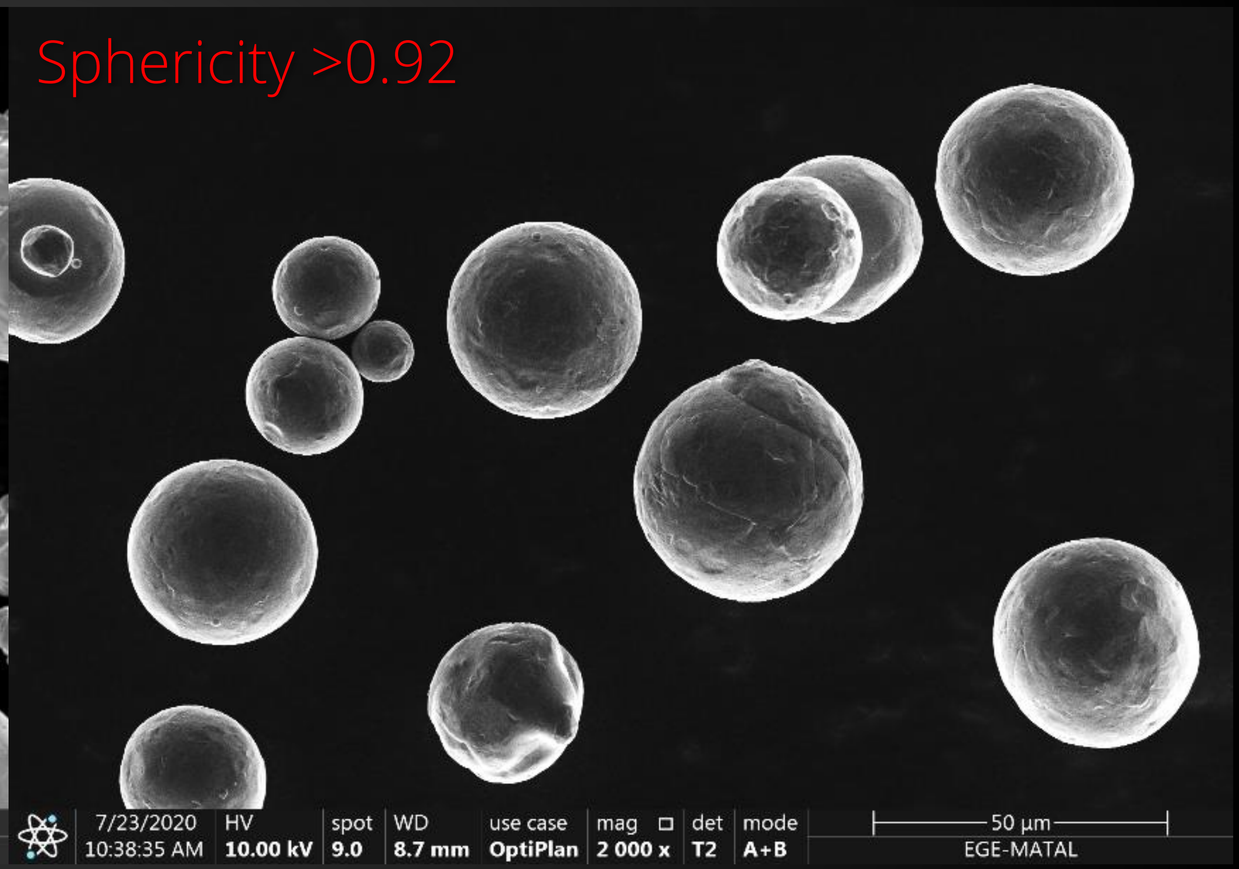
Effect of Anti Satellite system



Copper Powder produced
without Anti-Satellite System

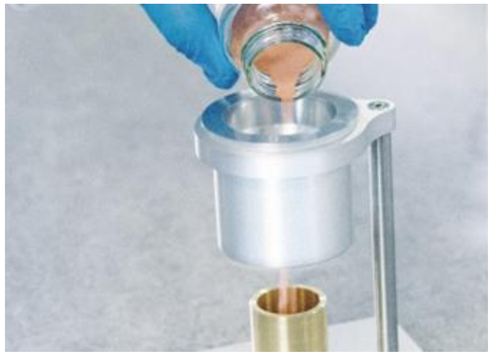


Copper Powder produced
with Anti-Satellite System

Powder Characterization & Metallurgical Lab

SENTESADDITIVE offers powder and metallurgical characterization lab services.
Our lab takes part in ASTM Proficiency Testing Programs

Test	Standard Test Method
Sampling	ASTM B215
Apparent Density	ASTM B212 (Hall) ASTM B217 (Carney)
Flowability	ASTM B213 (Hall) ASTM B214 (Carney)
Tap Density	ASTM B527
Particle Size Distribution by Light Scattering	ASTM B822 ISO 13320
Static Image Analysis*	ISO 13322-1
Dynamic Image Analysis*	ISO 13322-2
Sieve Analysis	ASTM B214
Angle of Repose	N/A
Oxygen in Aluminum and aluminum alloys	ASTM E2792
Oxygen in Copper and copper alloys	ASTM E2575
C, O, N, S Determination for Steel,iron, nickel,cobalt alloys	ASTM E1019
Elemental Analysis – Inorganic Elements ICP-OES	E1479-16
Sparc Atomic Emission Chemical Analysis	E826-14
STA Simultaneous Thermal Analysis	E794-06
Rockwell Hardness Test	ISO 6508-1, ASTM E18
Micro Vickers Hardness Test	ISO 6507-1
Tensile Test *	ASTM E8 / E8M
True Density by He of N Pycnometer*	ASTM B923
XRD Analysis*	
XRF Analysis*	
SEM – EDX microscopy *	
Surface Roughness *	



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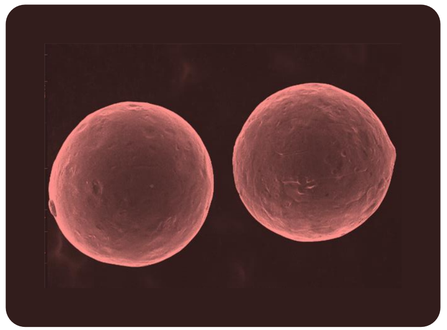
Pure Copper Powder Grades



Standard Gas Atomized

- 11000-07
- 11000-47 **HC Cu** *(High-conductivity copper)*

- Oxygen: 100-900 ppm
  900-2700ppm
- Chemical: P %0.015-0.040
  P none
- Hydrogen: 50 ppm max
- Typical Applications
  - LPBF
  - Cold Spray
  - Binder Jetting/Sinter-based AM

Oxygen-Hydrogen Free Gas Atomized

- 11000-17 **OFHC Cu** *(Oxygen-free high-conductivity copper)*

- Oxygen: 50-350 ppm
- Chemical: P none
- Hydrogen:10 ppm max
- Typical Applications
  - LPBF
  - EBM

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Copper Alloy Powder Grades

- CuSn Binary
- CuCrNiSi
- CuNiSi
- CuCrZn

Product Code	Alloy Design.	EN #	UNS #	Cu	Sn	Cr	Zr	Ni	Si	Others
12006	CuSn6	CW452K	C90200	Rem	6-8					P0.01-0.4
12010	CuSn10	CC480K	C90280	Rem	9-11					P0.01-0.4
12015	CuSn15		C91000	Rem	14-16					P0.01-0.4
12020	CuSn20		C91300	Rem	18-20					
11302	CuCrNiSi		C81540	Rem		0.2-0.5		2-3	0.4-0.8	Fe<0.15 Mn<0.1
11401	CuCrZr	CW106C	C18400	Rem		0.5-1.2	0.03-0.3		0.1	Fe<0.08
11205	CuNi2Si		C18000	Rem				1.6-2.5	0.4-0.8	