METALPINE
THE ART OF SPHERICAL POWDER

HIGHLY SPHERICAL – PORE FREE METAL POWDER

ISO 9001
EN 9100

High-quality powder for additive manufacturing and more ...

Material class	Name	Alt. Name	Material characteristics
Copper alloys	**MET Cu-OF**	C10200/CW008A/2.0040	High purity oxygen-free copper with the highest thermal and electrical conductivity (>99,9% Cu).
	MET CuNi2SiCr	C18000/CW111C/2.0855	Thermally curable low-alloyed copper alloy; higher strength and hardness but slightly decreased thermal and electrical conductivity compared to CuCr1Zr.
	MET CuCr1Zr	C18150/CW106C/2.1293	Hardenable copper alloy, combining high strength and hardness with good thermal and electrical conductivity.
	MET GRCop-42	GRCop-42/Cu2Cr4Nb	Dispersion-strengthened copper alloy with high strength, good conductivity, and resistivity against low cycle fatigue.
Stainless Steels	**MET 1.4306**	304L	Austenitic chromium-nickel steel with a low carbon content (<0,030%); higher content of chromium and nickel results in increased corrosion resistance than 1.4301 or 1.4307.
	MET 1.4404	316L	Austenitic chromium-nickel-molybdenum steel with a low carbon content (<0,030%); good resistance to chloric media and non-oxidizing acids.
	MET 1.4435	316L	Austenitic chromium-nickel-molybdenum steel with a low carbon content; good resistance to chloric media and non-oxidizing acids.
Nickel Alloys	**MET Ni**	Nickel/Pure Nickel	Highly electrical and thermal conductible material, is employed in extensive corrosive environments.
	MET Alloy K500	2.4375/N05500/NiCu30Al	High strength and hardness nickel-copper alloy with excellent corrosion resistance, suitable for marine technology and chemistry.
	MET IN718	2.4668/Inconel 718	Nickel-chromium-iron alloy with niobium, molybdenum, aluminium, and titanium, leading to outstanding mechanical properties and corrosion resistance.
	MET IN625	2.4856/Inconel 625	Low carbon nickel-chromium-molybdenum-niobium alloy enabling service temperatures from cryogenic to 982°C and outstanding corrosion resistance
Titanium Alloys	**MET Ti Grade 5**	Ti6Al4V/Ti64	Age hardenable titanium-aluminium-vanadium alloy offering an excellent combination of strength, toughness, and ductility with good biocompatibility
	MET Ti Grade 23	Ti6Al4V ELI/Ti64 ELI	"Extra low interstitials" by reduced oxygen and nitrogen content, used for medical and aerospace applications
	MET Ti Grade 2	Pure Ti / CP Ti	Pure titanium with excellent biocompatibility and a favourable strength to density ratio for high mechanical performance.
Molybdenum	**MET Mo**	Mo99%	High melting temperature and low thermal expansion coefficient enable operational temperatures up to 1900°C
Niobium	**MET Nb**	Nb99,8%	For high-temperature applications exceeding 1200°C and the biomedical field due to its high melting point (2468 °C), with outstanding osteogenic properties and low cytotoxicity.

Other materials on request

According to your needs, any metal or alloy can be atomized with our proprietary process. All products can be produced in narrow particle size distributions (PSD), as shown below; other PSDs are available on request.

PSD [µm]	$d10_{min}$ [µm]	$d90_{max}$ [µm]	Technology
5 - 20	4	22	Metal Injection Moulding
15 - 45	10	48	Binder Jetting/Laser Powder Bed Fusion
20 - 63	18	66	Laser Powder Bed Fusion
45 - 116	40	118	Electron Beam Powder Bed Fusion/DED
50 - 150	58	133	Directed Energy Deposition

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COMMISSION PROCESSING

Metalpine GmbH is your service partner for the high-quality production of spherical metal powders and related preparation processes.

lowest CO_2 impact

Powder production

We developed a unique powder production process to provide perfect spherical powders (patent pending). Any metal or alloy can be atomized according to your needs. Our processes are run with Argon 5.0 as atomization gas in a dust-free production environment to guarantee maximum product quality. All subsequent processes (production, classifying, screening, packaging) can be done under Argon atmosphere to ensure an oxygen-free production line.

Backup powder production and R&D plant

Supplementary to our production site in Graz, we have a second production line in Niklasdorf, Austria. The secondary plant is mainly dedicated to R&D but is available as a backup production line to increase flexibility for our customers.

Powder screening

We can screen your powder with various screening technologies at grain sizes ranging from 10 to 1000 microns.

Powder classifying

Our state-of-the-art classifiers can provide narrow particle size distributions, produce ultrafine powders, or remove dust from your powders.

Pore Free & highly spherical

"Pore Free" is defined with 0% pores and with "highly spherical" we understand a sphericity >0,9.

Packaging

With our 17 Sustainable Development Goals in mind, we try to reduce the amount of waste by offering different packaging than commonly used white bottles, which are thrown away after usage. Of course, we pack the powders according to our customer's needs and help to manage transport organization.

Laboratory Services

Our in-house laboratory measures particle size distributions with laser light scattering (ISO 13320) and digital image processing (ISO 13322-2). Additionally, we offer tab density measurements (ISO3953, ASTM B527) and flowability measurements by Hall Flow Meter (ISO 4490, ASTM B213). For more complex flowability problems, Schulze Ring Shear tests can be conducted by our university partners, and additionally, we offer analysis of our products in collaboration with certified laboratories.

Certification

Quality Management System according to **ISO 9001**

Aerospace accreditation **EN9100**

Comment for additional note

"Medical" Note 1:
This powder has not been developed, tested, or certified as a medical device according to Directive 93/42/EEC (MDD) or Regulation (EU) 2017/745 (MDR). It is not intended as a medical device, particularly for the purposes specified in Art. 2 No. 1 MDR. Insofar as you intend to use the powder as raw material for the manufacture of pharmaceutical products or medical devices (e.g., as raw material, which as material must meet the requirements of Annex 1, Chapter II MDR), the responsibility and liability for all analyses, tests, evaluations, procedures, risk assessments, conformity assessments, approval, and certification procedures as well as for all other official and regulatory measures required for this purpose shall lie solely with you both concerning the pharmaceutical product and/or medical device manufactured by you and about the properties, suitability, testing, evaluation, risk assessment, other requirements for the use of the powder as raw material. In this respect, the limitations of liability under our General Terms and Conditions and the system sales or material contracts shall apply.

"Dual Use" Note 2:
These goods are subject to the European or Austrian export license requirement when exported from the EU. Please note that a licensing requirement may also result from the final destination and the intended use of the goods (**dual use**).

Please send us your request

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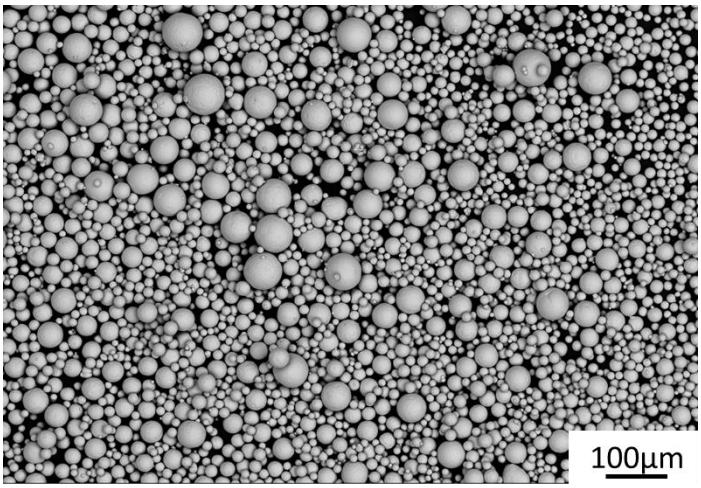
Copper Alloy: MET Cu-OF 99,9

overview - product table

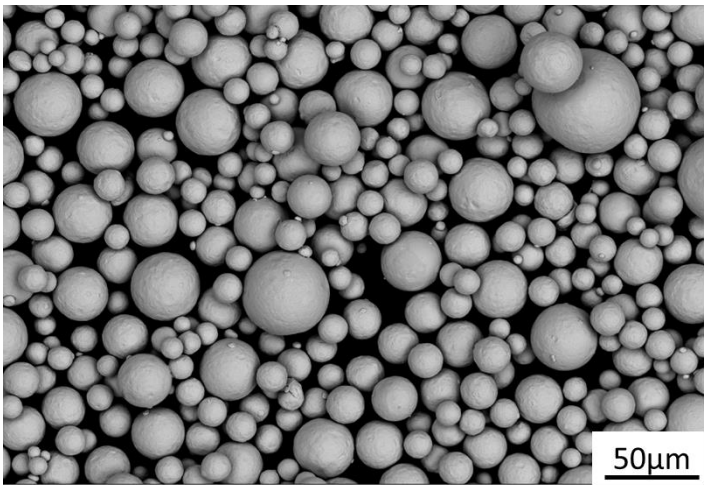
Alternative designation: C10200 / CW008A / 2.0040

Description and general material properties

MET Cu-OF is pure, oxygen-free Copper with a minimum of 99,9% Cu. It combines the advantages of Cu-ETP (= CW004A / 2.0065) and phosphor deoxidized Copper materials. The high pureness of the material combined with missing oxygen inclusions allows excellent electrical conductivity and is not affected by hydrogen embrittlement. Therefore, MET Cu-OF has better deformability and superior solder- and weldability than Cu-ETP. Typical applications are electrical and electronic components, for example, in the communication industry.



Scanning electron microscopy image of Cu-OF powder (100x)



Scanning electron microscopy image of Cu-OF powder (300x)

Powder properties

Chemical composition[1]		
Element	Min [wt%]	Max [wt%]
Pb		0,005
O		0,05
Bi		0,005
Cu	99,9	Balance

Powder characteristics		
Properties*	Min	Max
Flow rate [s/50g][2]		20
Apparent density [g/cm³][3]	4,6	

*exemplary values for PSD 15-45 µm[4]

1 – values taken from the powder material
2 – according to ASTM B213
3 – according to ASTM B212
4 – according to ASTM B214

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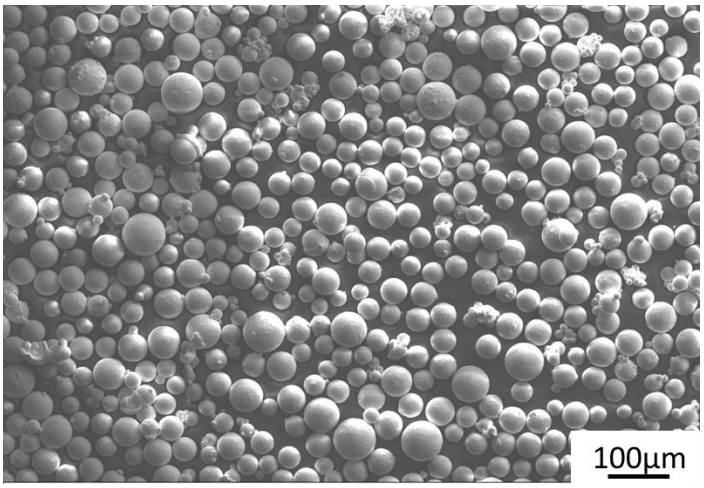
Copper Alloy: MET CuNi2SiCr

Alternative designation: C18000 / CW111C / 2.0855

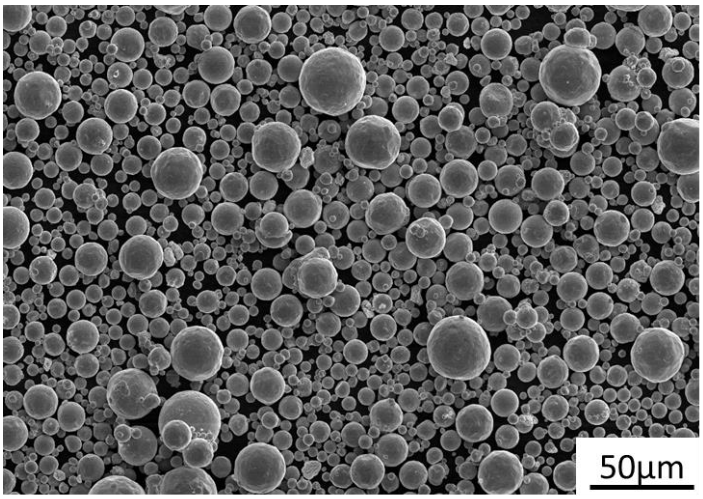
overview - product table

Description and general material properties

MET CuNi2SiCr is a thermally curable low-alloyed copper material with high stiffness, also at elevated temperatures. It offers good thermal and electrical conductivity, high corrosion resistance, and is well suited for wear and sliding applications.
The beryllium-free copper alloy is used for tooling, as mould insert, and for highly thermally stressed construction elements.



Scanning electron microscopy image of CuNi2SiCr powder (100x)



Scanning electron microscopy image of CuNi2SiCr powder (300x)

Powder properties

Chemical composition[1]		
Element	Min [wt%]	Max [wt%]
Ni	2,0	3,0
Si	0,5	0,8
Cr	0,2	0,5
Fe		0,15
Mn		0,1
Pb		0,02
Others total		0,1
Cu	Balance	Balance

Powder characteristics		
Properties*	Min	Max
Flow rate [s/50g][2]		15
Apparent density [g/cm³][3]	4,9	

*exemplary values for PSD 20 - 63 µm[4]

1 – values taken from the powder material
2 – according to ASTM B213
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4 – according to ASTM B214

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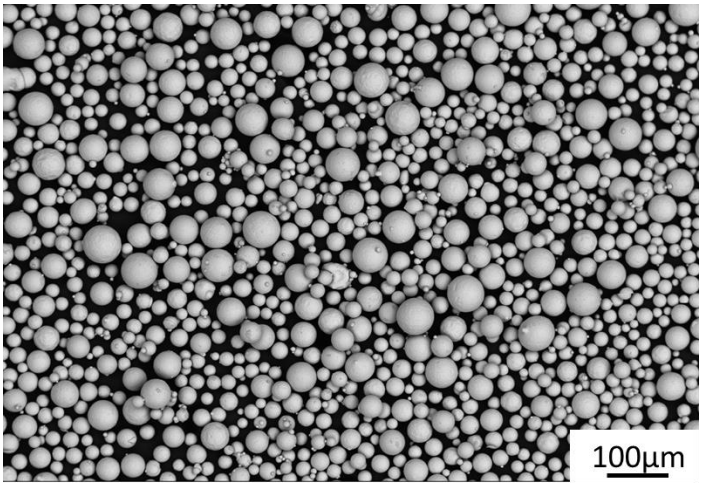
Copper Alloy: MET CuCr1Zr

overview - product table

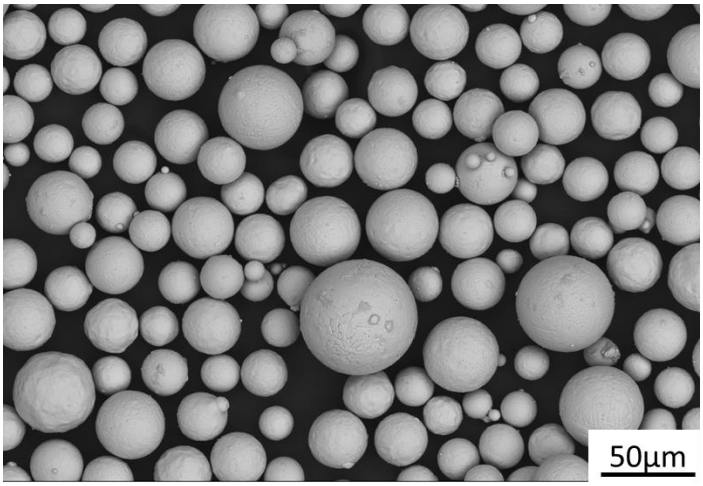
Alternative designation: C18150 / CW106C / 2.1293

Description and general material properties

MET CuCr1Zr is a hardenable copper alloy that combines high strength and hardness with excellent thermal resistance. It offers good thermal and electrical conductivity and good wear resistance.
Typically, the alloy is used for machinery construction and electrical applications, mold cooling inserts, and high-performance applications in the aerospace or automotive industry.



Scanning electron microscopy image of CuCr1Zr powder (100x)



Scanning electron microscopy image of CuCr1Zr powder (300x)

Powder characteristics

Chemical composition[1]		
Element	Min [wt%]	Max [wt%]
Cr	0,5	1,2
Zr	0,03	0,3
Fe		0,08
Si		0,1
Others total		0,2
Cu	Balance	Balance

Powder characteristics		
Properties*	Min	Max
Flow rate [s/50g][2]		15
Apparent density [g/cm³][3]	4,9	

*exemplary values for PSD 20 - 63 µm[4]

1 – values taken from the powder material
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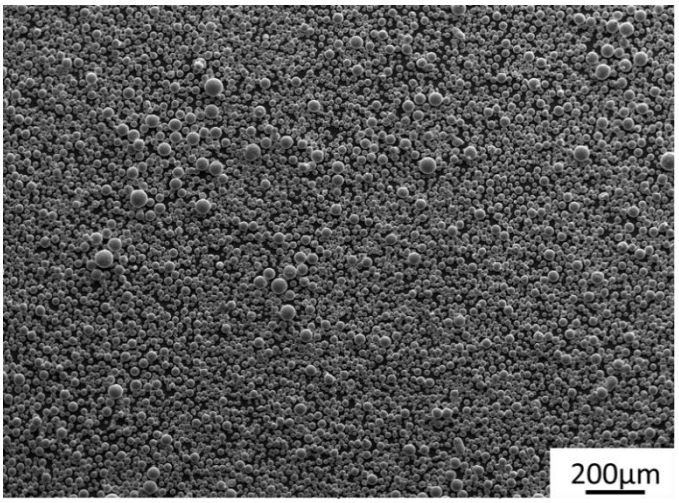
Copper Alloy: MET GRCop-42

overview - product table

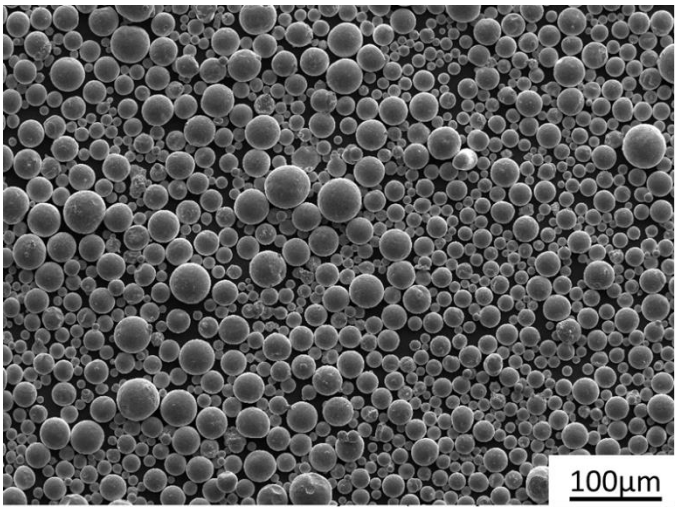
Alternative designation: GRCop-42 / Cu4Cr2Nb (at.%)

Description and general material properties

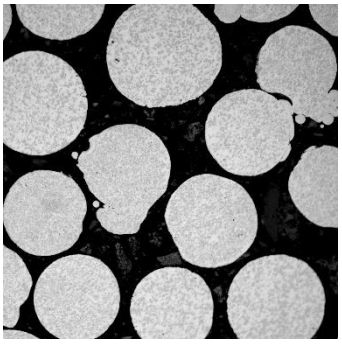
MET GRCop-42 is a dispersion-strengthened copper alloy with high strength and good resistivity against low cycle fatigue (LCF). With a conductivity reaching up to 75% of IACS, CuCrNb-alloys were initially designed for high heat flux applications, like combustion chambers and nozzles, and therefore offer high oxidation resistance in harsh environments.



Scanning electron microscopy image of GRCop-42 powder (137x)



Scanning electron microscopy image of GRCop-42 powder (300x)



Cross section of GRCop-42
PSD: 45-115µm

Powder characteristics

Chemical composition[1]		
Element	Min [wt%]	Max [wt%]
Cr	3,1	3,4
Nb	2,7	3,0*
O		0,04
Al		0,005
Fe		0,005
Si		0,005
Cu	Balance	Balance

* Cr/Nb ratio of 1,12-1,15

Powder characteristics		
Properties*	Min	Max
Flow rate [s/50g][2]		11
Apparent density [g/cm³][3]	5,0	

*exemplary values for PSD 20 - 63 µm[4]

1 – values taken from the powder material
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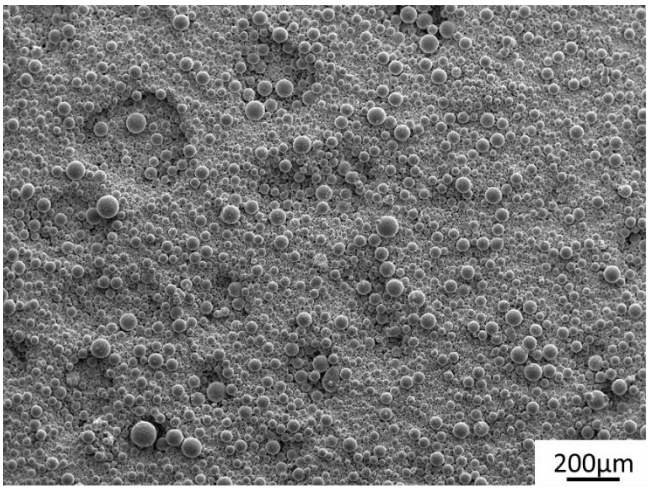
Stainless Steel: MET 1.4306

Alternative designation: 304L

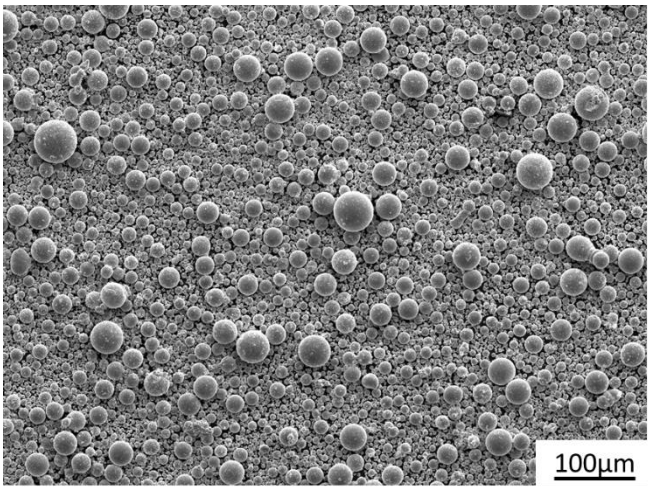
overview - product table

Description and general material properties

MET 304L is a stainless austenitic chromium-nickel steel with a low carbon content (<0,030%). The higher content of chromium and nickel results in increased corrosion resistance than 1.4301 or 1.4307
This steel is used mainly in the chemical and pharmaceutical industry; a high gloss surface finish can be achieved.



Scanning electron microscopy image of 304L powder (137x)



Scanning electron microscopy image of 304L powder (300x)

Powder characteristics

Chemical composition[1]		
Element	Min [wt%]	Max [wt%]
Cr	16,5	18,0
Ni	10,0	15,0
Mo	2,0	2,5
Mn		2,0
Si		0,75
Cu		0,5
Others total		0,2
Fe	Balance	Balance

Powder characteristics		
Properties*	Min	Max
Flow rate [s/50g][2]		18
Apparent density [g/cm³][3]	4,4	

*exemplary values for PSD 15 - 45 µm[4]

1 – values taken from the powder material
2 – according to ASTM B213
3 – according to ASTM B212
4 – according to ASTM B214

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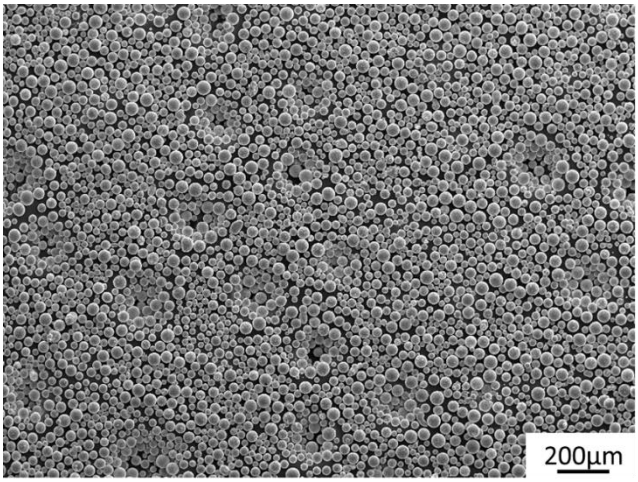
Stainless Steel: MET 1.4404

Alternative designation: 316L

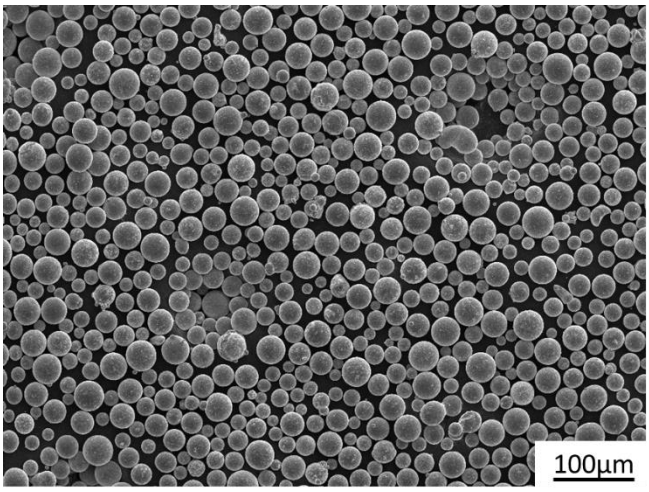
overview - product table

Description and general material properties

MET 316L is a stainless steel with low carbon content and good corrosion resistance.
It is commonly used in chemical and petrochemical industries, food processing, pharmaceutical equipment, medical devices, potable water, wastewater treatment, marine applications, and architectural applications near seashores or urban areas.



Scanning electron microscopy image of 316L powder (137x)



Scanning electron microscopy image of 316L powder (300x)

Powder characteristics

Chemical composition[1]		
Element	Min [wt%]	Max [wt%]
Cr	16,5	18,0
Ni	10,0	15,0
Mo	2,0	2,5
Mn		2,0
Si		0,75
Cu		0,5
Others total		0,2
Fe	Balance	Balance

Powder characteristics		
Properties*	Min	Max
Flow rate [s/50g][2]		18
Apparent density [g/cm³][3]	4.5	

*exemplary values for PSD 15 - 45 µm[4]

1 – values taken from the powder material
2 – according to ASTM B213
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4 – according to ASTM B214

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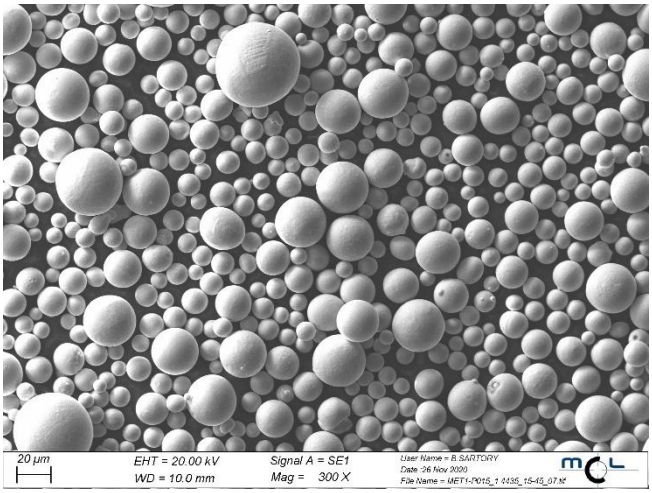
Stainless Steel: MET 1.4435

Alternative designation: 316L

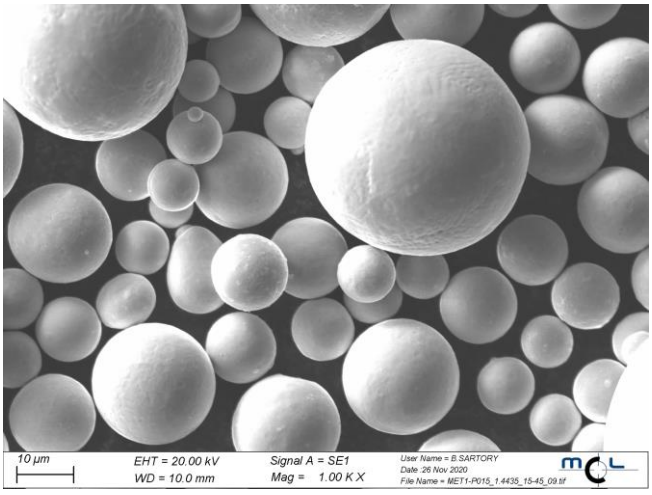
overview - product table

Description and general material properties

MET 316L is a stainless steel with very low carbon content and high corrosion resistance. Due to its resistance to many forms of corrosion and the excellent surface quality that can be achieved, it is mainly used in medical technology. Furthermore, it is used in chemical and petrochemical industries, food processing, pharmaceutical equipment, potable water, wastewater treatment, marine applications, and architectural applications near seashores or urban areas.



Scanning electron microscopy image of 1.4435 powder (300x)



Scanning electron microscopy image of 1.4435 powder (1.000x)

Powder characteristics

Chemical composition[1]		
Element	Min [wt%]	Max [wt%]
Cr	17,0	18,0
Ni	12,5	14,0
Mo	2,5	3,0
Mn		2,0
Si		0,75
Others total		0,2
Fe	Balance	Balance

Powder characteristics		
Properties*	Min	Max
Flow rate [s/50g][2]		12
Apparent density [g/cm³][3]	4,5	

*exemplary values for PSD 15 - 45 µm[4]

1 – values taken from the powder material
2 – according to ASTM B213
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4 – according to ASTM B214

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Technical Data Sheet
Datasheet_v0203 231020

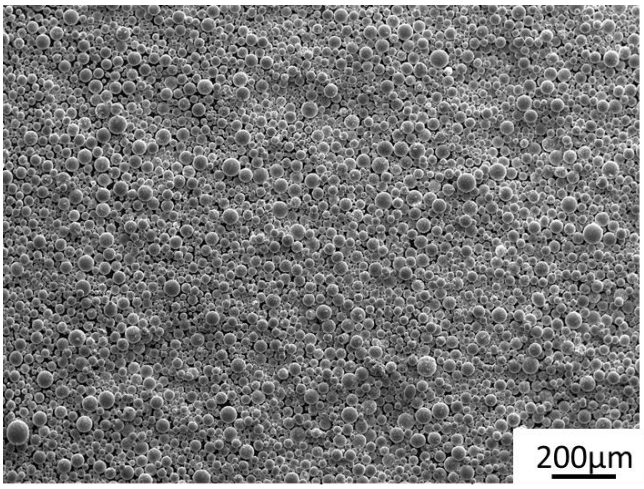
Nickel: MET Ni

Alternative designation: Nickel / Pure-Ni

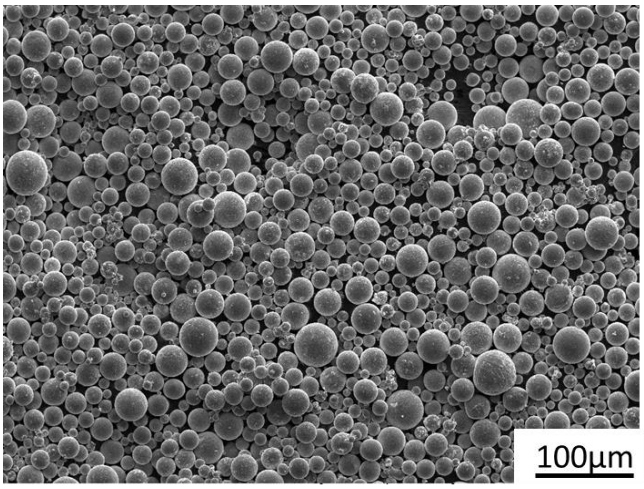
overview - product table

Description and general material properties

MET Ni is a highly thermal and electrically conductive material with outstanding corrosion resistance in extensive environments.
Typical applications are electrical, oil refining machinery, food processing industries, etc.



Scanning electron microscopy image of Nickel powder (137x)



Scanning electron microscopy image of Nickel powder (300x)

Powder characteristics

Chemical composition[1]		
Element	Min [wt%]	Max [wt%]
Ni	99.8	-
Cu		0.005
Fe		0.04
Mn		0.1
Si		0.04
C		0.02
S		0.002
O		0.02
Other		<0.1

Powder characteristics		
Properties*	Min	Max
Flow rate [s/50g][2]		11
Apparent density [g/cm³][3]	5,0	

*exemplary values for PSD 15 - 45 µm[4]

1 – values taken from the powder material
2 – according to ASTM B213
3 – according to ASTM B212
4 – according to ASTM B214

Important – please consider the “medical” note1 !

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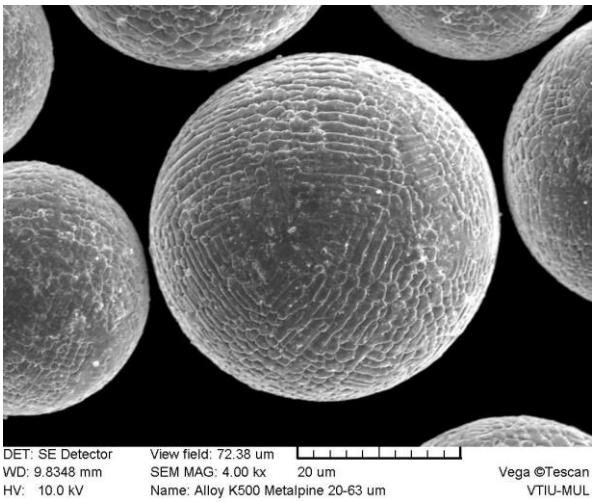
Nickel based: MET Alloy K500

overview - product table

Alternative designation: 2.4375 / N05500 / NiCu30Al

Description and general material properties

MET Alloy K500 is a nickel-copper alloy with extreme hardness and high tensile strength in temperatures lower than 650°C (1.202°F). The melting point of this material is 1.350°C (2.462°F). Due to its excellent corrosion resistance, the alloy is well-suited for marine and chemical applications.
Typical applications are springs, shafts, and fasteners for marine propellers, oil handling equipment, knives, scrapers, or springs.



Powder characteristics

Chemical composition[1]		
Element	Min [wt%]	Max [wt%]
Ni	63,0	
Cu	27,0	34,0
Al	2,2	3,5
Fe	0,5	2,0
Ti	0,3	1,0
Mn		1,5
Co		1,0
Si		0,5
C		0,2
Others total		0,17

Powder characteristics		
Properties*	Min	Max
Flow rate [s/50g][2]		11
Apparent density [g/cm³][3]	4,9	

*exemplary values for PSD 20 - 63 µm[4]

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4 – according to ASTM B214

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Technical Data Sheet
Datasheet_v0203 231020

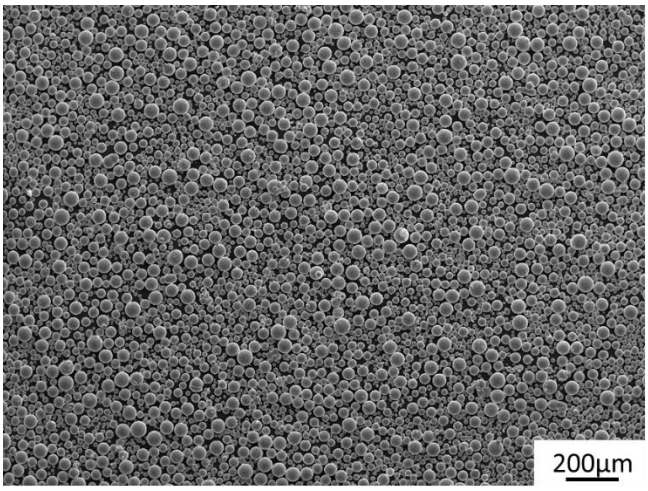
Nickel based: MET IN718

Alternative designation: 2.4668 / Inconel 718

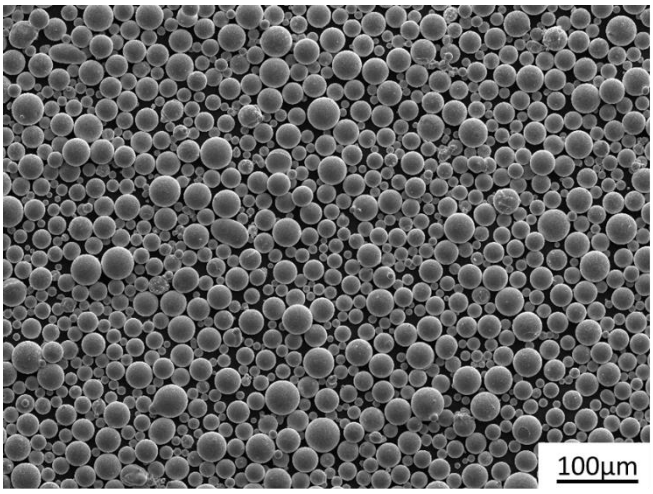
overview - product table

Description and general material properties

MET Inconel 718 is a high-strength, corrosion-resistant nickel chromium material used in a wide temperature range from cryogenic to high-temperature applications. The age-hardenable alloy can be readily fabricated, even into complex parts. In addition, its welding characteristics, especially its resistance to post-weld cracking, are outstanding.
The ease and economy with which MET IN718 can be fabricated, combined with good tensile, fatigue, creep, and rupture strength, have resulted in its use in many applications. Examples are components for liquid-fueled rockets, rings, casings, various formed sheet metal parts for aircraft and land-based gas turbine engines, and cryogenic tankage. It is also used for fasteners and instrumentation parts.



Scanning electron microscopy image of IN718 powder (137x)



Scanning electron microscopy image of IN718 powder (300x)

Powder characteristics

Chemical composition[1]		
Element	Min [wt%]	Max [wt%]
Ni	50,0	55,0
Cr	17,0	21,0
Nb	4,75	5,5
Mo	2,8	3,3
Ti	0,65	1,15
Co		1,0
Al	0,2	0,8
Si		0,35
Mn		0,35
Others total		0,5
Fe	Balance	Balance

Powder characteristics		
Properties*	Min	Max
Flow rate [s/50g][2]		11
Apparent density [g/cm³][3]	4,9	

*exemplary values for PSD 15 - 53 µm[4]

1 – values taken from the powder material
2 – according to ASTM B213
3 – according to ASTM B212
4 – according to ASTM B214

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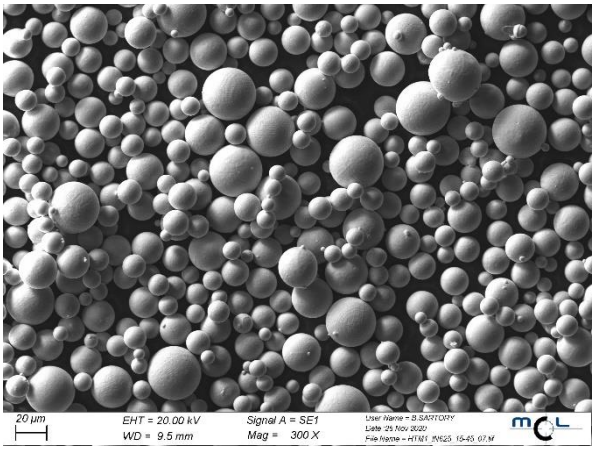
Nickel-based: MET IN625

overview - product table

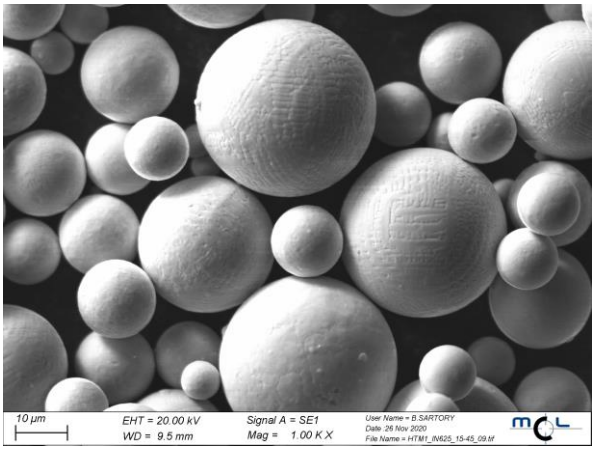
Alternative designation: 2.4856 / N06625 / Inconel 625

Description and general material properties

MET Inconel 625 is a nickel-based superalloy with high-strength properties and resistance to elevated temperatures. It also demonstrates excellent protection against corrosion and oxidation. Its ability to withstand high stress and a wide range of temperatures, both in and out of the water, and resist corrosion while exposed to highly acidic environments makes it a fitting choice for nuclear and marine applications.
Typical applications include seawater components, flare stacks, aircraft ducting systems, specialized seawater equipment, chemical process equipment, turbine shroud rings, engine thrust-reverser systems, and jet engine exhaust systems.



Scanning electron microscopy image of IN625 powder (300x)



Scanning electron microscopy image of IN625 powder (1.000x)

Powder characteristics

Chemical composition[1]		
Element	Min [wt%]	Max [wt%]
Cr	20,0	23,0
Mo	8,0	10,0
Nb	3,15	4,15
Fe		5,0
Co		1,0
Si		0,5
Mn		0,5
Others total		1,0
Ni	Balance	Balance

Powder characteristics		
Properties*	Min	Max
Flow rate [s/50g][2]		12
Apparent density [g/cm³][3]	4,8	

*exemplary values for PSD 20 - 63 µm[4]

1 – values taken from the powder material
2 – according to ASTM B213
3 – according to ASTM B212
4 – according to ASTM B214

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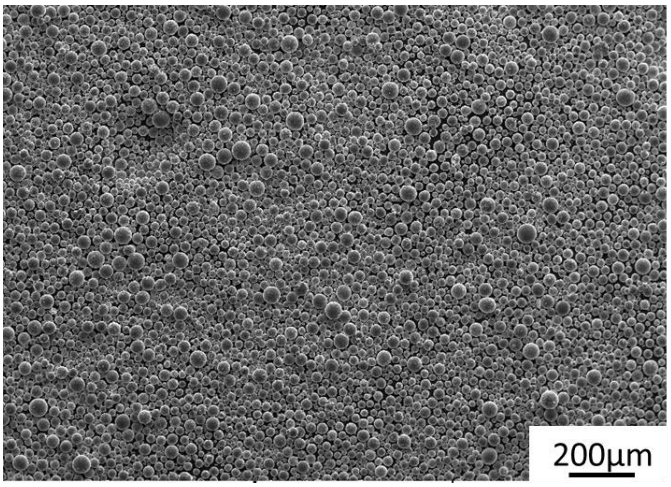
Titanium alloy: MET Ti Grade 5

Alternative designation: Ti6Al4V / Ti64

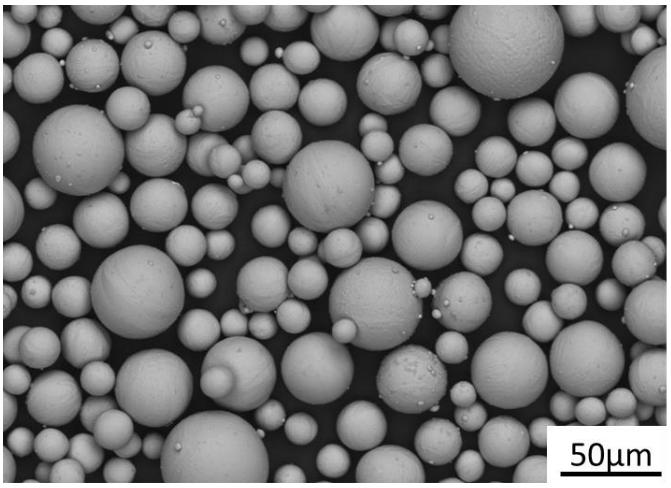
overview - product table

Description and general material properties

MET Ti6Al4V, or Grade 5 titanium, is the most used of all titanium alloys. Its usability lies in its many benefits. MET Ti6Al-4V may be heat treated to increase its strength. It can be used in welded construction at service temperatures of more than 300°C. This alloy offers its high strength at a light weight, useful formability, and high corrosion resistance.
MET Ti6Al-4V is used in many industries such as aerospace, medical, marine, and chemical processing industries, for example, in aircraft turbines, engine components, aircraft structural components, aerospace fasteners, high-performance automatic parts, marine applications, or even sports equipment.



Scanning electron microscopy image of Ti Grade 5 powder (139x)



Scanning electron microscopy image of Ti Grade 5 powder (300x)

Powder characteristics

Chemical composition[1]		
Element	Min [wt%]	Max [wt%]
Al	5,5	6,75
V	3,5	4,5
Fe		0,4
O		0,2
C		0,08
N		0,05
Ti	Balance	Balance

Powder characteristics		
Properties*	Min	Max
Flow rate [s/50g][2]		29
Apparent density [g/cm³][3]	2,5	

*exemplary values for PSD 20 - 63 µm[4]

1 – values taken from the powder material
2 – according to ASTM B213
3 – according to ASTM B212
4 – according to ASTM B214

Important – please consider the “dual use” note2 !

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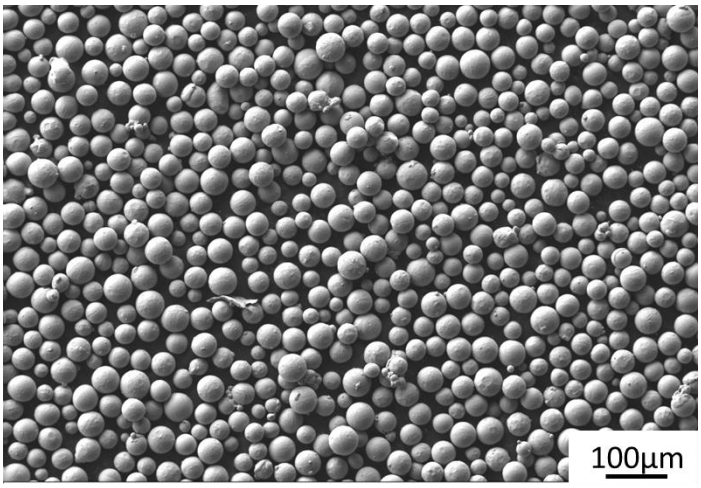
Titanium alloy: MET Ti Grade 23

Alternative designation: Ti6Al4V ELI/ Ti64-ELI

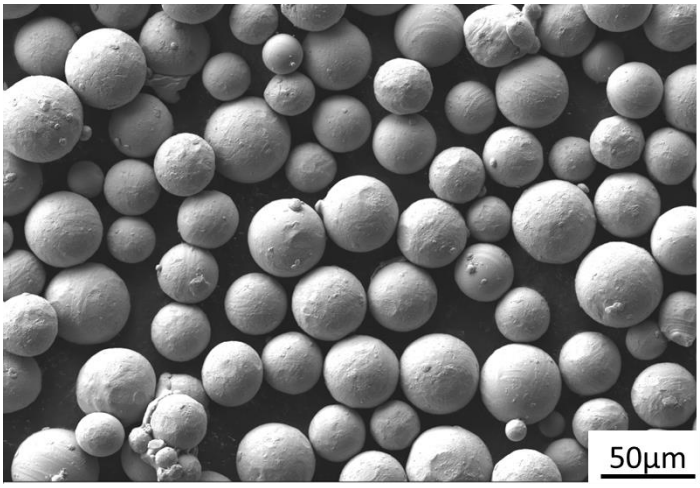
overview - product table

Description and general material properties

MET Ti6AL4V-ELI, or Grade 23 titanium, is the higher purity version of MET Ti6Al4V with excellent biocompatibility. It's the top choice for any situation where high strength, lightweight, good corrosion resistance, and high toughness are required. In addition, it has a superior damage tolerance to other alloys.
These benefits make MET Ti6AL4V-ELI the most requested titanium grade for dental and medical applications. Moreover, due to its biocompatibility, good fatigue strength, and low young's modulus, it can be used in biomedical applications or other surgical procedures such as implantable components.



Scanning electron microscopy image of Ti Grade 23 powder (100x)



Scanning electron microscopy image of Ti Grade 23 powder (300x)

Powder characteristics

Chemical composition[1]		
Element	Min [wt%]	Max [wt%]
Al	5,5	6,5
V	3,5	4,5
Fe		0,25
O		0,13
C		0,08
N		0,05
Ti	Balance	Balance

Powder characteristics		
Properties*	Min	Max
Flow rate [s/50g][2]		25
Apparent density [g/cm³][3]	2,5	

*exemplary values for PSD 15 - 45 µm[4]

1 – values taken from the powder material
2 – according to ASTM B213
3 – according to ASTM B212
4 – according to ASTM B214

Important – please consider the "medical" note1 and "dual use" note2 !

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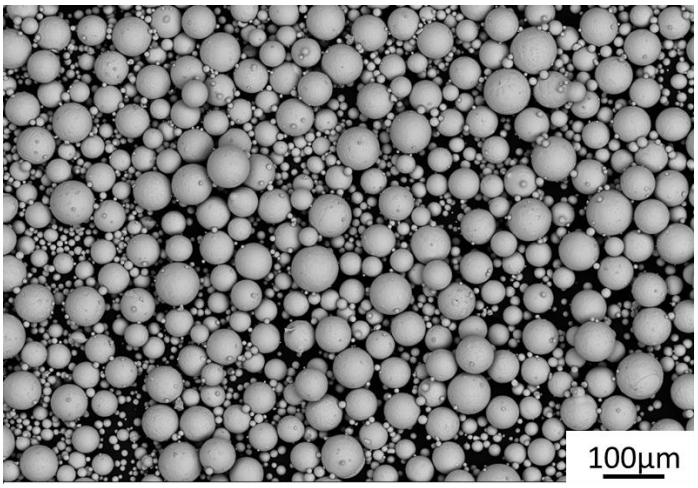
Molybdenum: MET Mo

overview - product table

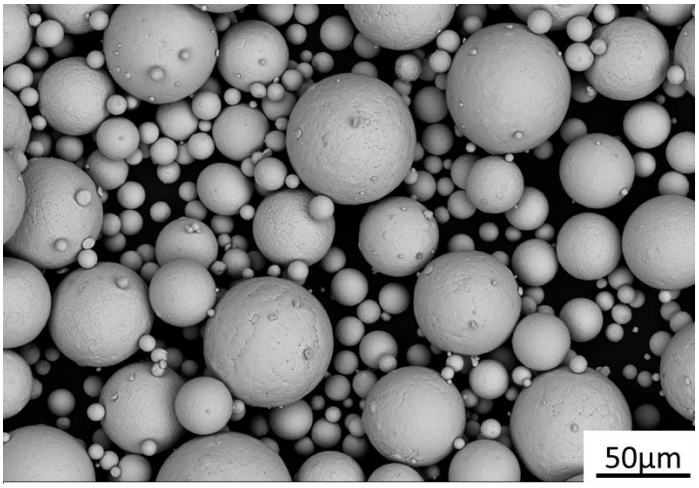
Alternative designation: Molybdenum / Mo99%

Description and general material properties

MET Mo 99% has one of the highest melting temperatures of all the elements (2.623°C), yet unlike most other high-melting-point metals, its density is only 25% greater than iron. As a result, its coefficient of thermal expansion is the lowest of the engineering materials, while its thermal conductivity exceeds all but a handful of elements. The operating temperature is up to 1.900°C.



Scanning electron microscopy image of Molybdenum powder (100x)



Scanning electron microscopy image of Molybdenum powder (300x)

Powder characteristics

Chemical composition		
Element	Min [wt%]	Max [wt%]
Mo	99	

Powder characteristics		
Properties*	Min	Max
Flow rate [s/50g][2]		12
Apparent density [g/cm³][3]	5,1	

*exemplary values for PSD 15 - 45 µm[4]

1 – values taken from the powder material
2 – according to ASTM B213
3 – according to ASTM B212
4 – according to ASTM B214

Important – please consider the "dual use" note2 !

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