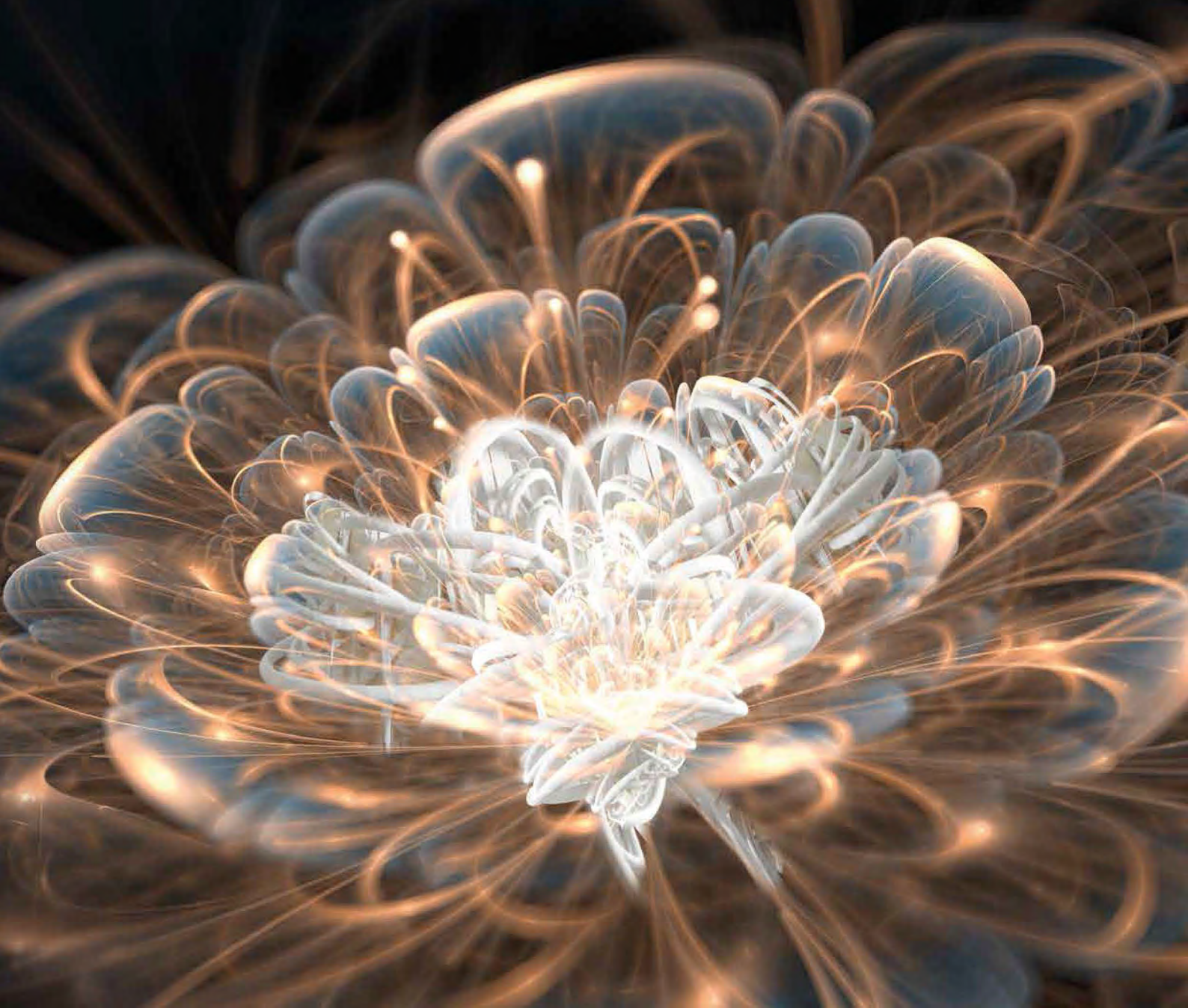


 **LEGOR**<sup>®</sup> GROUP Your jewelry technology provider

# POWmet<sup>®</sup>

POLVERI METALLICHE PER ADDITIVE MANUFACTURING  
METALLIC POWDERS FOR ADDITIVE MANUFACTURING



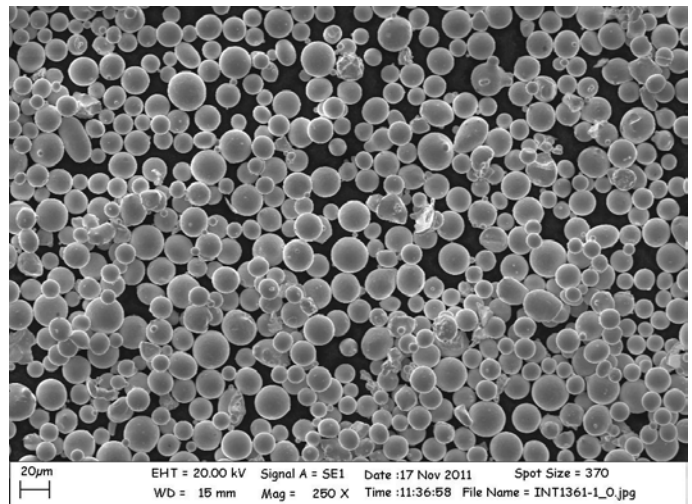
## 3N GOLD POWDER PM-AU101P

Powmet 750‰ (18 KT) 3N GOLD (Ni-free) powder, -30+10µm

### Technical datasheet

PM-AU101P is a gas atomized gold alloy powder at title 750‰ (18 Kt), specifically developed for laser melting applications. PM-AU101P is carefully prepared by using high purity gold (99.99%) and through a special atomizing process, that guarantees spherical powder particle geometry and maximizing the powder quality. Composition and size distribution (-30+10µm) have been designed to maximize energetic absorption from laser beam during the laser melting process. PM-AU101P can be used with success in all the laser melting machines. The powder offers excellent flowability; the as cast items produced are clean from oxide scales. It has extremely high shininess and lustrous color after finishing.

Powder Type	
Material	<b>Metallic Powder</b>
Typology	<b>Gold-based</b>
Production	<b>Gas-atomization</b>
Nominal size	<b>-30+10µm</b>
Morphology	<b>Spherical</b>
Color	<b>3N Gold</b>
Application	<b>Add. Manuf.</b>



Scanning electron microscopy (SEM) image of the powder (SE, 250x).

Chemical Composition (%wt.)	
Au	<b>75.0</b>
Others	<b>25.0</b>

Physical Properties	
Bulk density (g/cm <sup>3</sup> )	<b>15.20</b>
App. Density (g/cm <sup>3</sup> )	<b>approx. 9.34</b>
Tap. Density (g/cm <sup>3</sup> )	---
Flowability (sec./50g)	---

Size Distribution	
d <sub>10</sub> (µm)	---
d <sub>50</sub> (µm)	---
d <sub>90</sub> (µm)	---

All above reported data refer to the product in powder form and they are obtained using standard internal laboratory methods and procedures. All data could be subjected to changes without notice.

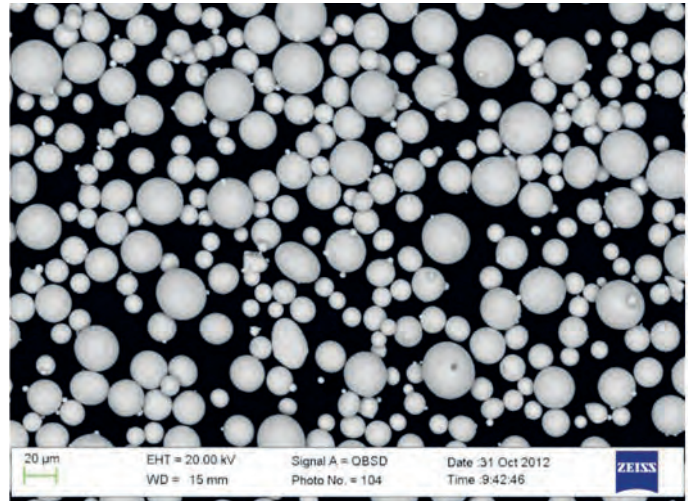
## PM-AU131P

Powmet 750‰ (18 KT) WHITE GOLD (Ni-free) powder, -30+10µm

### Technical datasheet

PM-AU131P is a gas atomized white gold alloy powder at title 750‰ (18 Kt), specifically developed for laser melting applications. PM-AU131P is carefully prepared by using high purity gold (99.99%) and through a special atomizing process, that guarantees spherical powder particle geometry and maximizing the powder quality. Composition and size distribution (-30+10µm) have been designed to maximize energetic absorption from laser beam during the laser melting process. PM-AU131P can be used with success in all the laser melting machines. The powder offers excellent flowability; the as cast items produced are clean from oxide scales. It has extremely high shininess and lustrous color after finishing.

Powder Type	
Material	<b>Metallic Powder</b>
Typology	<b>Gold-based</b>
Production	<b>Gas-atomization</b>
Nominal size	<b>-30+10µm</b>
Morphology	<b>Spherical</b>
Color	<b>White</b>
Application	<b>Add. Manuf.</b>



Scanning electron microscopy (SEM) image of the powder (SE, 600x).

Chemical Composition (%wt.)	
Au	<b>75.0</b>
Cu	<b>9.5</b>
Pd	<b>15.5</b>

Physical Properties	
Bulk density (g/cm <sup>3</sup> )	<b>15.80</b>
App. Density (g/cm <sup>3</sup> )	<b>approx. 7.5</b>
Tap. Density (g/cm <sup>3</sup> )	<b>approx. 9.2</b>
Flowability (sec./50g)	<b>---</b>

Size Distribution	
d <sub>10</sub> (µm)	<b>approx. 15</b>
d <sub>50</sub> (µm)	<b>approx. 23</b>
d <sub>90</sub> (µm)	<b>approx. 36</b>

All above reported data refer to the product in powder form and they are obtained using standard internal laboratory methods and procedures. All data could be subjected to changes without notice.

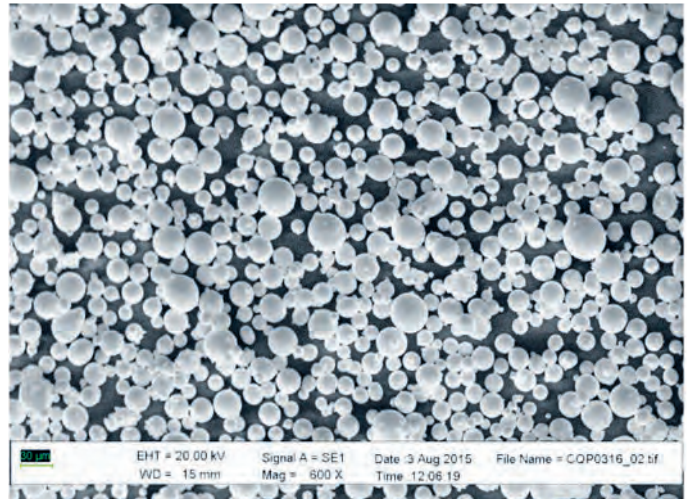
## PM-AG101P

Powmet 925‰ silver powder, -40+10µm

### Technical datasheet

PM-AG101P is a gas atomized silver alloy powder at title 925‰, specifically developed for laser melting applications. PM-AG101P is carefully prepared by using high purity silver (99.99%) and through a special atomizing process, that guarantees spherical powder particle geometry and maximizing the powder quality. Composition and size distribution (-40+10µm) have been designed to maximize energetic absorption from laser beam during the laser melting process. PM-AG101P can be used with success in all the laser melting machines. The powder offers excellent flowability; the as cast items produced are clean from oxide scales; it has extremely high shininess and lustrous color after finishing.

Powder Type	
Material	<b>Metallic Powder</b>
Typology	<b>AG 925</b>
Production	<b>Gas-atomization</b>
Nominal size	<b>-40+10µm</b>
Morphology	<b>Spherical</b>
Color	<b>Gray</b>
Application	<b>Add. Manuf.</b>



Scanning electron microscopy (SEM) image of the powder (SE, 600x).

Chemical Composition (%wt.)	
Ag	<b>93.0</b>
Cu + Others	<b>7.0</b>

Physical Properties	
Bulk density (g/cm <sup>3</sup> )	<b>10.40</b>
App. Density (g/cm <sup>3</sup> )	<b>approx. 5.0</b>
Tap. Density (g/cm <sup>3</sup> )	<b>approx. 5.9</b>
Flowability (sec./50g)	<b>---</b>

Size Distribution	
d <sub>10</sub> (µm)	<b>approx. 16</b>
d <sub>50</sub> (µm)	<b>approx. 25</b>
d <sub>90</sub> (µm)	<b>approx. 39</b>

All above reported data refer to the product in powder form and they are obtained using standard internal laboratory methods and procedures. All data could be subjected to changes without notice.

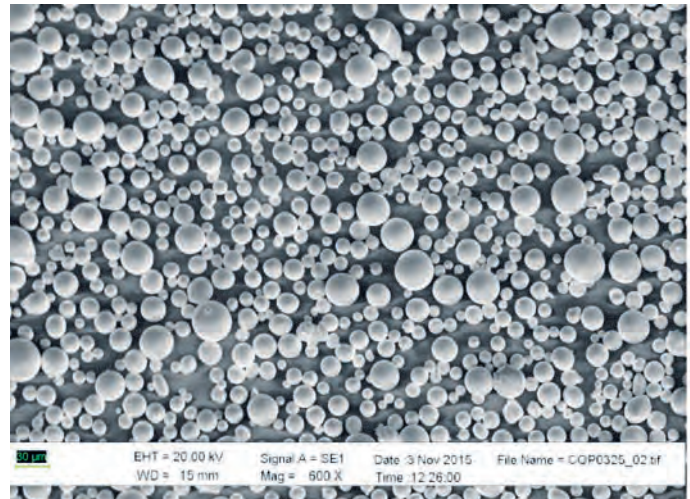
## PM-BR101P

Powmet bronze 90/10 powder, -35+10µm

### Technical datasheet

PM-BR101P is a gas atomized bronze powder (10% tin content), specifically developed for laser melting applications. PM-BR101P is carefully prepared by using a special atomizing process, that guarantees spherical powder particle geometry and maximizing the powder quality. Composition and size distribution (-35+10µm) have been designed to maximize energetic absorption from laser beam during the laser melting process. PM-BR101P can be used with success in all the laser melting machines. The powder offers excellent flowability; it has extremely high shininess and lustrous color after finishing. The alloy is not suitable for age-hardening.

Powder Type	
Material	<b>Metallic Powder</b>
Typology	<b>Bronze</b>
Production	<b>Gas-atomization</b>
Nominal size	<b>-35+10µm</b>
Morphology	<b>Spherical</b>
Color	<b>Reddish</b>
Application	<b>Add. Manuf.</b>



Scanning electron microscopy (SEM) image of the powder (SE, 600x).

Chemical Composition (%wt.)	
Cu	<b>90.0</b>
Sn	<b>10.0</b>

Physical Properties	
Bulk density (g/cm <sup>3</sup> )	<b>8.70</b>
App. Density (g/cm <sup>3</sup> )	<b>approx. 3.9</b>
Tap. Density (g/cm <sup>3</sup> )	<b>approx. 4.2</b>
Flowability (sec./50g)	<b>---</b>

Size Distribution	
d <sub>10</sub> (µm)	<b>approx. 16</b>
d <sub>50</sub> (µm)	<b>approx. 25</b>
d <sub>90</sub> (µm)	<b>approx. 38</b>

All above reported data refer to the product in powder form and they are obtained using standard internal laboratory methods and procedures. All data could be subjected to changes without notice.

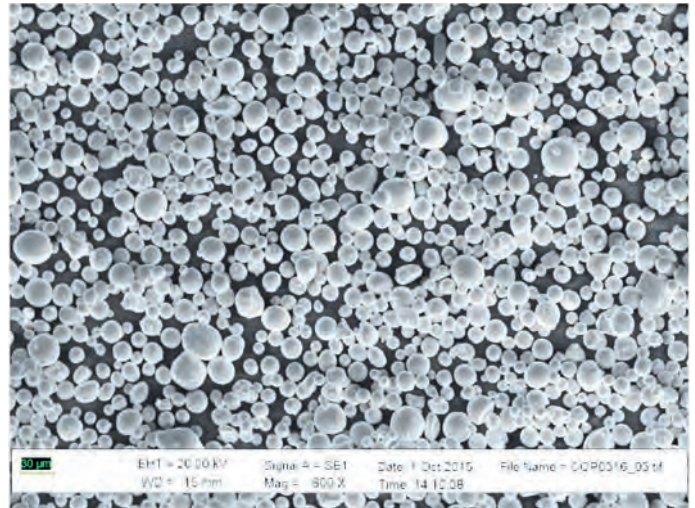
## PM-ST101P

Powmet AISI 316L steel powder, -45+10µm

### Technical datasheet

PM-ST101P is an austenitic stainless steel in form of powders with nominal particle size between 10 and 45µm. The product is generally used, by means of Selective Laser Melting process or comparable Additive Manufacturing technologies, for the production of components and functional parts which require high resistance to the oxidation and corrosion for mechanical and structural application. Due to the absence of cytotoxicity agents release, this alloy can find application also in the biomedical field, such as in the food and pharmaceutical sectors. The powder is carefully prepared by using a special atomizing process, that guarantees spherical powder particle geometry and maximizing the powder quality.

Powder Type	
Material	<b>Metallic Powder</b>
Typology	<b>AISI 316L</b>
Production	<b>Gas-atomization</b>
Nominal size	<b>-45+10µm</b>
Morphology	<b>Spherical</b>
Color	<b>Gray</b>
Application	<b>Add. Manuf.</b>



Scanning electron microscopy (SEM) image of the powder (SE, 600x).

Chemical Composition (%wt.)	
Fe	<b>Balance</b>
Cr	<b>16.0 – 18.0</b>
Ni	<b>10.0 – 14.0</b>
Mo	<b>2.0 – 2.5</b>
Mn	<b>&lt; 2.0</b>
Si	<b>&lt; 1.0</b>
P	<b>&lt; 0.045</b>
C	<b>&lt; 0.030</b>
S	<b>&lt; 0.030</b>

Physical Properties	
Bulk density (g/cm <sup>3</sup> )	<b>7.97</b>
App. Density (g/cm <sup>3</sup> )	<b>approx. 4.0</b>
Tap. Density (g/cm <sup>3</sup> )	<b>approx. 4.5</b>
Flowability (sec./50g)	<b>---</b>

Size Distribution	
d <sub>10</sub> (µm)	<b>approx. 18</b>
d <sub>50</sub> (µm)	<b>approx. 28</b>
d <sub>90</sub> (µm)	<b>approx. 40</b>

All above reported data refer to the product in powder form and they are obtained using standard internal laboratory methods and procedures. All data could be subjected to changes without notice.

Polveri purissime con titolo garantito e granulometria finissima e omogenea, studiate appositamente per i processi di *additive manufacturing* (STAMPA 3D) per il settore orafa e dentale.

Le polveri della **linea POWMET** vengono prodotte con un esclusivo processo di atomizzazione per ottenere **particelle perfettamente sferiche con una composizione chimica omogenea e un basso tenore di impurezze**. La polvere viene vagliata per garantire una distribuzione granulometrica tale da massimizzare la performance del materiale durante il processo produttivo.

Grazie a importanti investimenti in macchinari su larga scala e alla lunga esperienza in metallurgia e nei processi produttivi, LEGOR GROUP è in grado di far fronte a qualsiasi fabbisogno e di garantire **qualità costante sia nei piccoli sia nei grandi quantitativi**.

Fanno parte della **linea POWMET** le polveri preziose a titolo in **lega d'oro** e in **lega d'argento**, le polveri non preziose di **bronzo e acciaio** nonché le polveri di **cromo-cobalto** per applicazioni nel settore dentale.

Ultrapure metallic powders with a guaranteed title and extra-fine and homogenous particle size, specifically developed for *additive manufacturing* processes (3d print) for the goldsmith and dental sectors.

**POWMET line** powders are atomized via an exclusive process which allows to obtain **perfectly spherical particles with uniform chemical composition and low impurities content**. They are sieved to obtain a precise granulometric distribution suitable to maximize the material performance during the production process.

Thanks to investments in large-scale machineries and a proven expertise in metallurgy and in the production processes, LEGOR GROUP is able to cope with any requirements, guaranteeing **constant quality in both small and large quantities**.

**Powders belonging to POWMET are:** precious powders at title of **gold alloy and silver alloy**; non-precious powders of **bronze and steel**, as well as **chromium-cobalt** powders for the dental sector.

## IL VALORE AGGIUNTO DI POWMET

L'utilizzo delle polveri POWMET in processi di *additive manufacturing* garantisce una **qualità paragonabile a quella ottenuta con l'utilizzo dei prodotti MASTER ALLOY di LEGOR GROUP** nelle tecniche di produzione tradizionali, quali microfusione e lavorazione meccanica.

Scegliere POWMET per l'*additive manufacturing* si traduce in:

- maggiore libertà nel design di prodotto e nella personalizzazione
- riduzione del time-to-market
- semplificazione della fase di prototipazione
- semplificazione del processo in caso di produzione di piccole quantità e/o lotti



## POWMET ADDED VALUE

Using POWMET powders for *additive manufacturing* processes guarantees **quality standards comparable to those obtained by using LEGOR GROUP's MASTER ALLOY products** for the traditional production technics, such as microfusion and mechanical work.

Choosing POWMET for *additive manufacturing* means:

- more freedom in the product design and customizations
- time-to-market reduction
- easier prototyping stage
- easier process in case of small quantities/batches production



Traceability & Fashion  
AGR0092A

## RICERCA & SVILUPPO

Con il supporto di un laboratorio dotato di tecnologie sofisticate e tecnici altamente specializzati, LEGOR GROUP affianca attivamente i suoi Clienti nella messa a punto dei loro processi produttivi, per prodotti di qualità superiore.

Il laboratorio LEGOR GROUP offre inoltre i seguenti **servizi di analisi**:  
*Distribuzione granulometrica, Morfologia, Composizione chimica, Analisi elementare O/N, Analisi elementare C/S, Scorrevolezza, Densità apparente, Densità Tap, Punto di fusione, Misura colore, Microdurezza, Rugosità, Porosità, Densità bulk, Test meccanici.*

## TECNOLOGIE

- SEM/EDX, microscopio elettronico a scansione con sonda per microanalisi
- ICP-OES, spettrometro ad emissione ottica con plasma ad accoppiamento induttivo
- TG/DTA per analisi termiche e gravimetriche
- Titolatore per la determinazione potenziometrica dell'argento secondo la norma UNI EN 314227:1997
- Microdurometro Vickers
- Banco per prove di trazione
- Facilities per preparazione metallografica
- Microscopi metallografici
- Spettrofotometro per analisi colorimetriche
- Analizzatori elementari per la determinazione di singoli elementi (O, N, C, S)
- Camere climatiche per test di resistenza alla corrosione
- Granulometro laser per la determinazione del profilo granulometrico di polveri

## RESEARCH & DEVELOPMENT

Thanks to its internal laboratory, equipped with advanced technologies and highly specialized technicians, LEGOR GROUP endorses its Clients in the development of the production processes, to guarantee superior quality results.

LEGOR GROUP laboratory also provides the following **analysis services**:  
*Granulometric distribution, Morphology, Chemical composition, O/N elemental analysis, C/S elemental analysis, Flowability, Apparent density, Tap density, Melting point, Color measurement, Microhardness, Roughness, Porosity, Bulk density, Mechanical test.*

## TECHNOLOGIES

- SEM/EDX, scanning electron microscope with microanalysis probe
- ICP-OES inductively coupled plasma optical emission spectrometer
- TG/DTA for thermal and gravimetric analysis
- Titrator for potentiometric determination of silver in compliance with the UNI EN 314227:1997 standard
- Vickers microdurometer
- Tensile test machine
- Facilities for metallographic preparation
- Metallographic microscopes
- Spectrophotometer for colorimetric analyses
- Elementary analysers for determination of single elements (O, N, C, S)
- Climatic chambers for corrosion resistance tests
- Laser granulometer for determining granulometric profile of powders







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