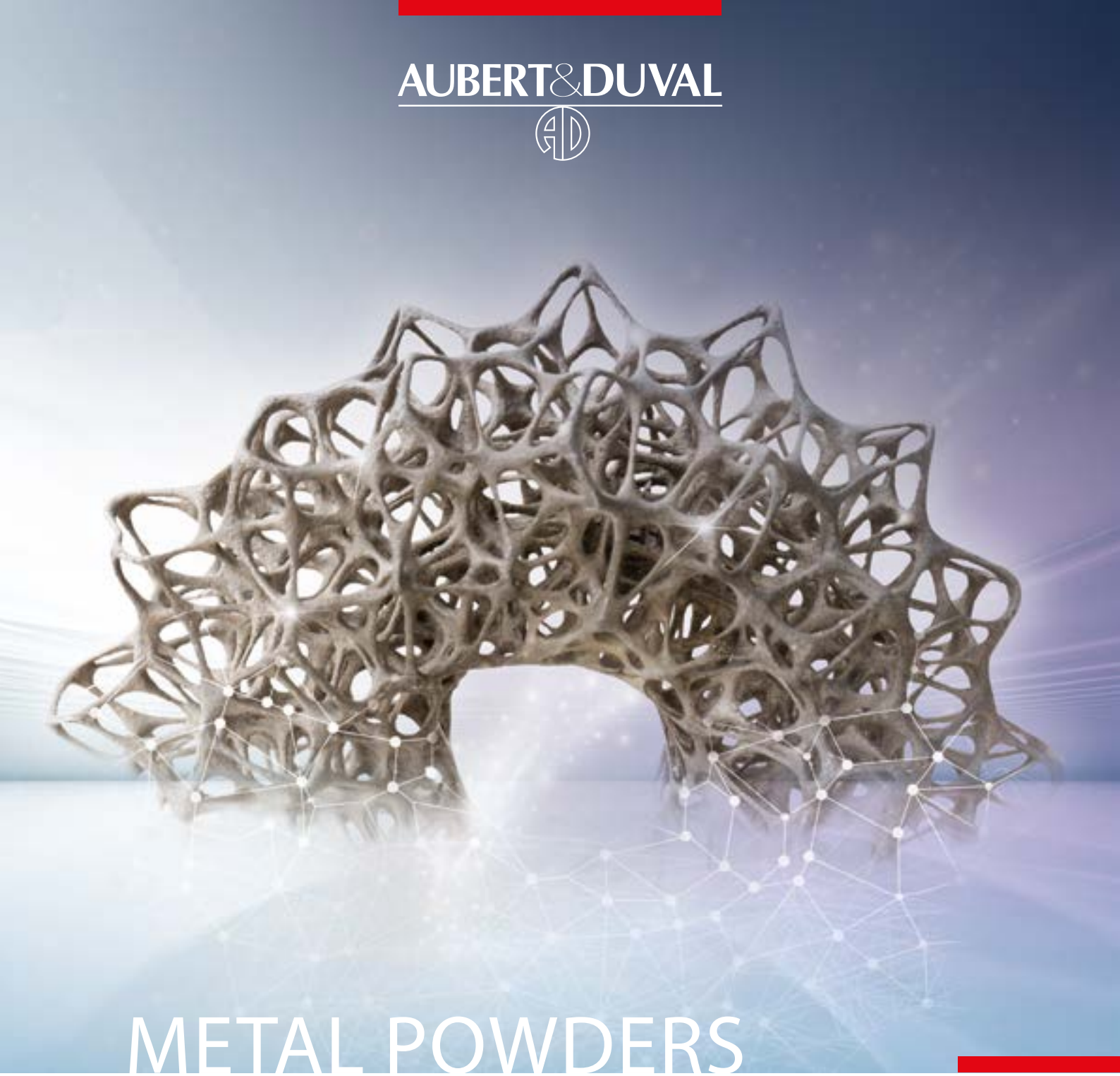
AUBERT&DUVAL



# METAL POWDERS
# FOR ADDITIVE MANUFACTURING

STELLAR
Metal powders by AUBERT & DUVAL

www.aubertduval.com

# Meeting the greatest of AM challenges

For almost a century, Aubert & Duval has been providing highly reliable metallurgical solutions that are developed, made and processed for the most critical industrial applications.

Thanks to our strong metallurgical expertise and long-standing experience since 1975 in powder atomization, we can support our customers to achieve success in their development and series production made by additive manufacturing.

## Stellar metal powders are tailored for the most demanding applications and markets

- Aeronautics
- Space Industry
- Energy
- Automotive/Motorsport

Additive manufacturing also called 3D printing, is a game-changing technology opening up new horizons for many markets. This fast-growing innovative technology leads to entirely new ways of designing and manufacturing complex parts, impossible to produce with conventional technologies.

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## The performance of our powders at the heart of your additive manufacturing success

With several decades of experience in powder metallurgy, Aubert & Duval has acquired a very thorough knowledge of design and optimization of metal powders in order to meet customers' most stringent requirements. Our core competencies include:

- Powder metallurgical expertise combined with state-of-art atomization technologies
- Large and scalable powder production capacity
- Customer-oriented services: flexibility and reactivity
- A mindset for continuous improvement and aerospace standards
- Stable and long-term partner
- Long-standing and leading supplier of aerospace critical parts
- R&D focused on innovative metallurgical solution through a collaborative approach

## Stellar metal powders are designed for the full range of additive manufacturing processes

### Powder Bed

- Laser Beam Melting
- Electron Beam Melting
- Binder jetting & sintering

### Blown Powders

- Laser Metal Depostion
- Cold Spray

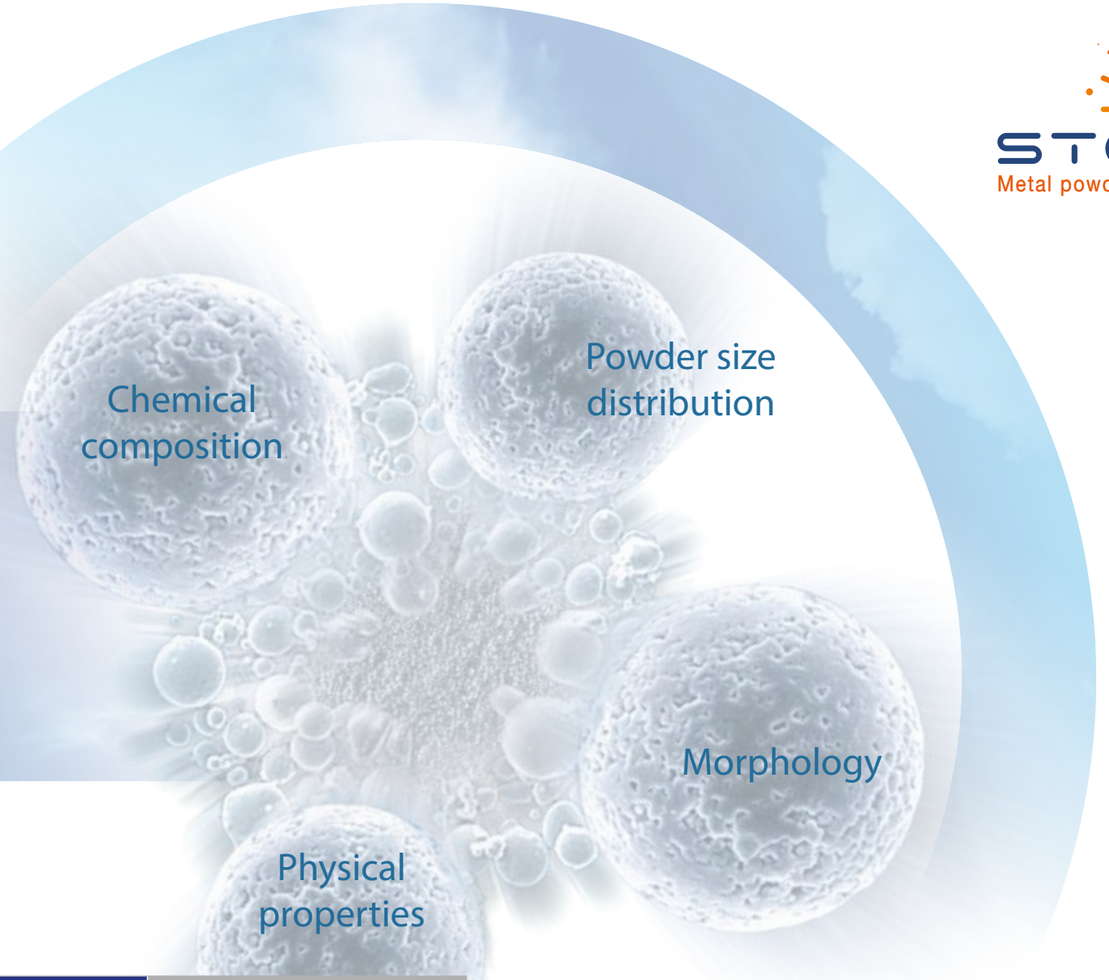
### Key benefits

- Design freedom
- Weight reduction
- Material savings
- No tools
- Less machining and assembly operations

# A know-how dedicated to your needs

As we are aware of each customer's requirement, we can offer tailored metal powder, designing the chemical and mechanical properties according to your specifications.

We support our customers in the definition of metal powder specifications in order to develop new metallurgical solutions to achieve targeted part performance.




## Stellar metal powders

Nickel and cobalt superalloys

| NiSA & CoSA | |
|---|---|
| A&D grade | Properties |
| Ni718 | • Excellent mechanical properties up to temperatures around 650°C / 1202°F<br>• Good resistance to high temperature oxidation |
| HX | • Excellent mechanical properties at high temperatures (1100°C / 2012°F )<br>• Very good resistance to oxidation |
| Ni625 | • Excellent mechanical properties at high temperatures up to 980°C / 1796°F<br>• Excellent corrosion resistance<br>• Good low temperature toughness |
| Ni247 | • High strength and superior creep resistance.<br>• Excellent mechanical properties at high temperatures up to 1000°C / 1832°F |
| Ni738 | • Excellent high temperature creep rupture strength (980°C / 1796°F) combined with hot corrosion resistance |
| ABD®-900AM | • For high temperatures up to 900°C / 1652°F<br>• Good strength and creep properties<br>• Good oxidation and corrosion resistance |
| AD730® | • For temperatures up to 750°C / 1382°F<br>• High strength, creep and fatigue properties |
| MHA3300® | • For temperatures up to 850°C / 1562°F<br>• Excellent low cycle fatigue and creep strength at high temperature<br>• Good oxidation resistance |

Special steels and Fe-alloys

| HPS | |
|---|---|
| A&D grade | Properties |
| X15TN® | Stainless martensitic steel with outstanding hardness (+58 HRC) and high corrosion resistance (PREN 23). |
| TS700 | Precipitation hardened tool steel with thermal resistance up to 700°C / 1292°F. |
| InvHard | Alloy with low thermal expansion coefficient combined with a high hardness. |
| 316L | Stainless steel with a low content of trace elements for nuclear applications. |

Titanium alloys

| Ti | |
|---|---|
| A&D grade | Properties |
| Ti6Al4V ELI* | • Light weight<br>• High strength and corrosion resistance |

* in partnership with Pyrogenesis

ABD® is a registered trademark of Alloyed
MHA3300® is a registered trademark of Mitsubishi Heavy Industries

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## Our offer includes

- Standard & customized compositions
- Tailored particle size distribution
- Packaging in plastic bottles or metallic containers,
- Handling, HSE and storage recommendations
- Flexible service

## Quality control

Since 1975, Aubert & Duval has developed a strong experience of high quality gas-atomized powders together with a high level of expertise and dedicated laboratory equipment ensuring the highest quality for its metal powders:

- Powder size distribution: sieving and laser diffraction
- Particle inspection: Optical microscope, SEM, Porosity and Morphology
- Chemical composition: Main elements, Gases and Trace elements
- Physical properties: Flowability, Apparent density and Tap density

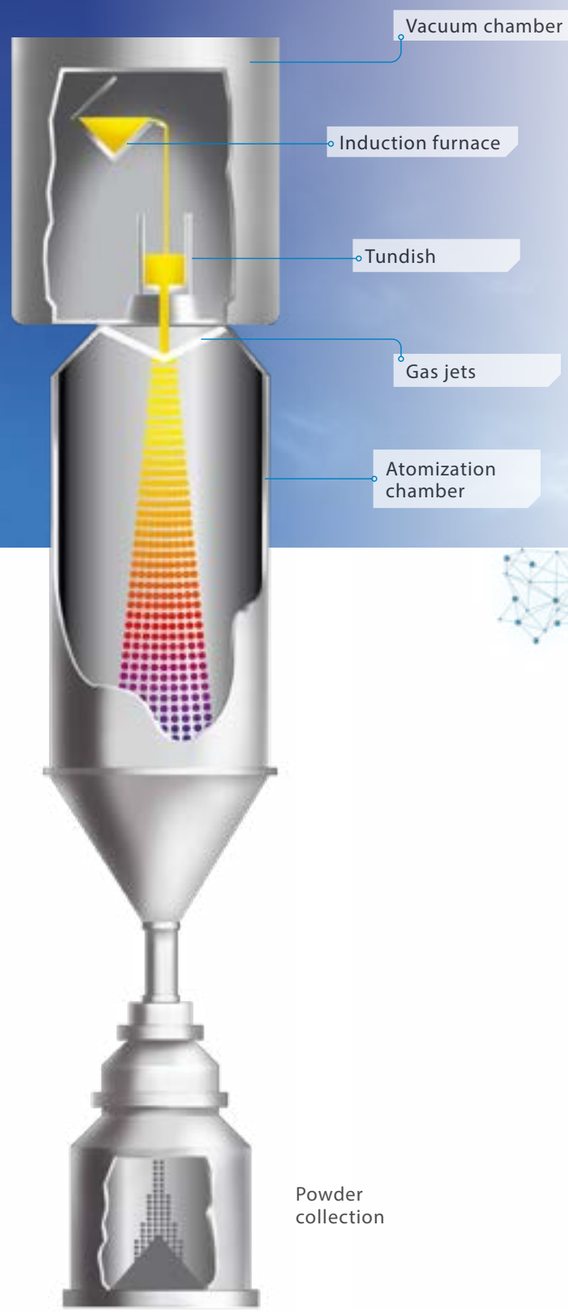
Our research centers and development teams support customers to develop new alloys and optimize powder characteristics to achieve the best material performance and processability for all additive manufacturing technologies.

Aubert & Duval partners with main global players to develop value-creating solutions.

# Our powder atomization process

Thanks to the most advanced technology in powder metallurgy and different scale of production units, Aubert & Duval can support you from first stages of development through industrial-scale production.

## VIM Gas Atomization

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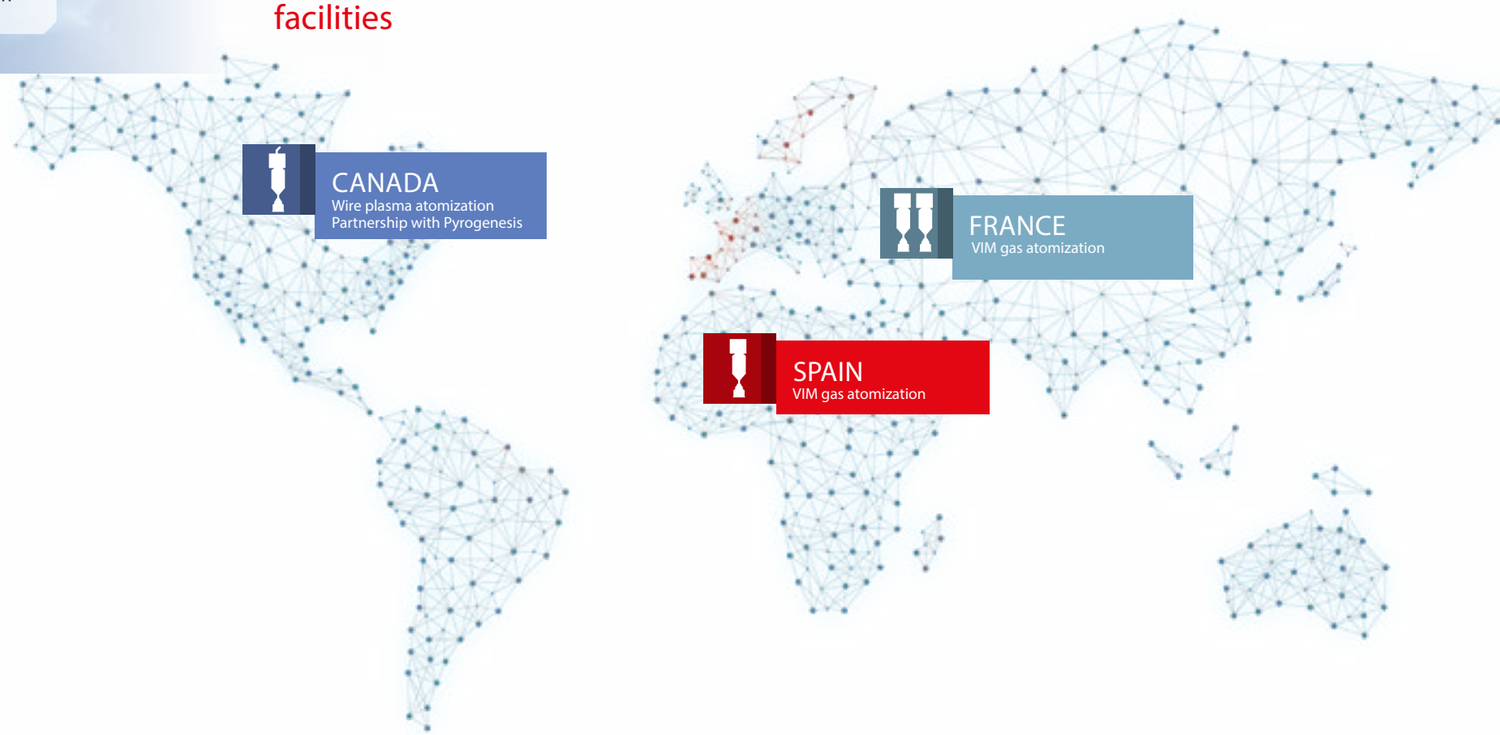
## Key features

- Melting in VIM furnace
- N- or Ar-atomization
- High cleanliness level
- Highly spherical powder morphology
- Fully controlled low oxygen and carbon levels
- Minimize satellites & internal porosities
- High stability and reproducibility
- Broad range of batch sizes

## Quality certifications

- EN 9100
- ISO 9001
- Customer accreditations

## Our production facilities



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Design by irweego www.irweego.com - Aubert & Duval - 11-2023
Design courtesy of Bathsheba Grossman - Photo credit: Michel Labelle
Printed in France - PEFC 10-31-1592



Contact : powder@aubertduval.com

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