

## Powder Atomization Plant Production of high-grade metal powder for additive manufacturing



# Powder Atomization Plant



## Technology

- Induction melting and refining of metals and alloys in crucible under vacuum to realize highest cleanliness
- Atomizing of liquid metal by means of pure argon or nitrogen with the option of hot gas atomization
- Complete vacuum tight system
- Exchangeable crucible for different heat sizes
- Alloying, sampling and temperature measurement under vacuum
- Anti-satellite system for highest powder quality
- Gas separation by treatment in cyclones and bag filters with the option of recycling of the inert gas
- Integrated powder analysis and classification
- Industry 4.0 solution:  
Intelligent Alarm Management “Smart Alarm”

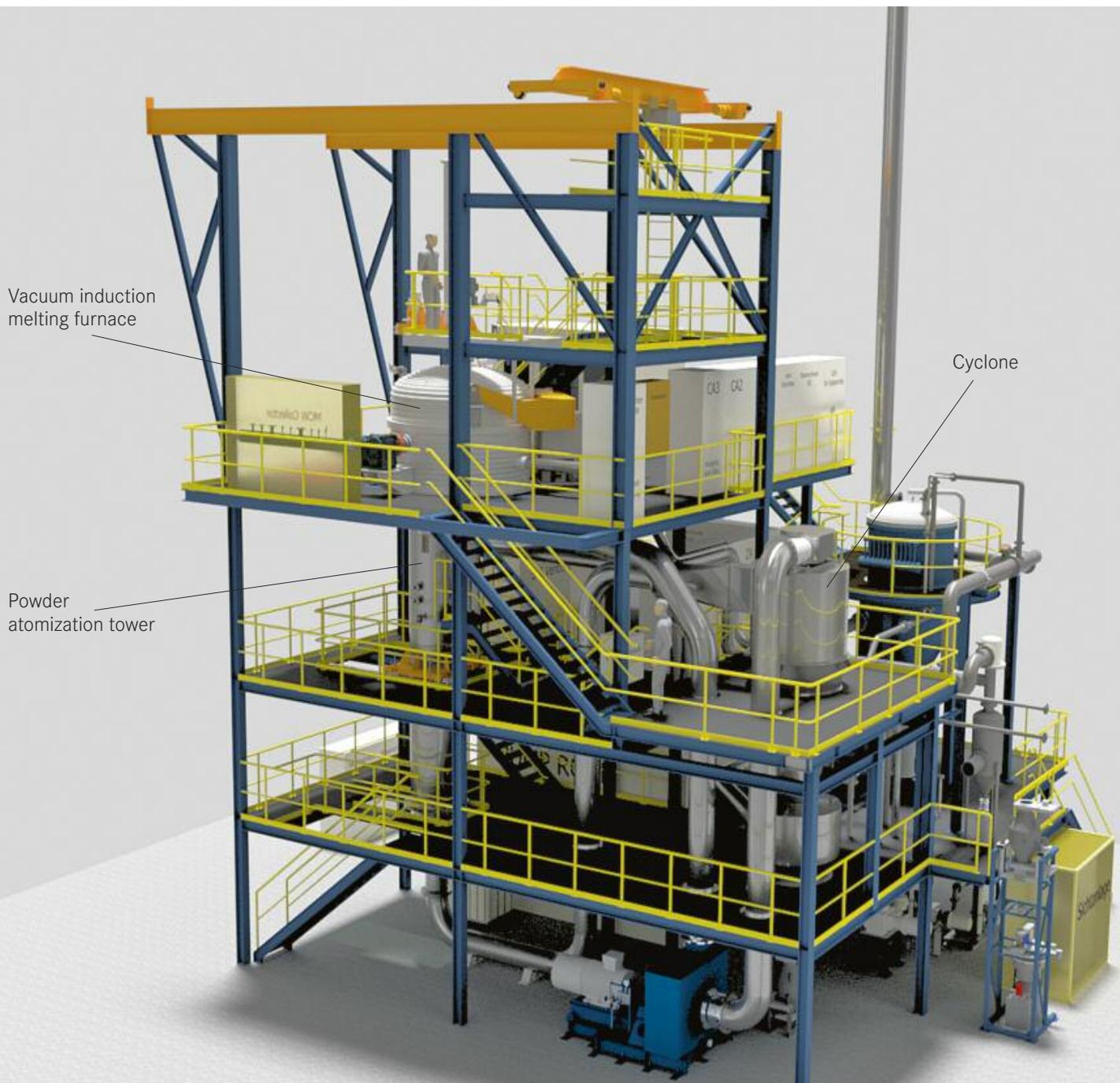
## Pilot plant

- Pilot plant with powder atomization plant and 3D printer (type: Laser based powder bed fusion) at SMS group location in Mönchengladbach
- Real-life production conditions for investigation of nozzle geometry, pressure, gas jet, temperatures and behavior of different metals
- Perfect setup for optimization of powder production and 3D printing for reproducible, high quality and minimized costs
- Development of know-how for industrial series production in additive manufacturing

*Vacuum induction melting furnace.*

# Your benefits

- Long lasting experience and numerous references in vacuum metallurgy and induction melting technology
- Powder production harmonized to needs of 3D printing
- Experience in order handling, execution and turnkey supply of plants worldwide
- Tailor-made financing packages



# Characteristics of metal powder for additive manufacturing

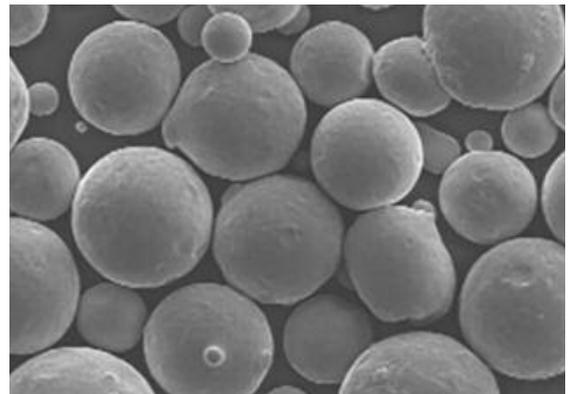


## Powder quality

- Defined grain sizes and distribution
- Particle size suitable for AM
- Spherical particle shape for good flow properties
- Satellite free shapes
- Minimized gas inclusion
- Fewer rates of over- and undersized particles
- Realization of specified chemical compositions

## Materials

Super alloys, Ni- alloys, CoCr-alloys, Stainless steels, Maraging steels, Cu-basis



*Image of metal powder taken on an SEM.*

*Sieve for powder classification.*



#### Industrial-scale pilot plant from SMS group:

- Operator know-how and production expertise
- In-house training for our customers
- Development of different steel grades for new AM powders

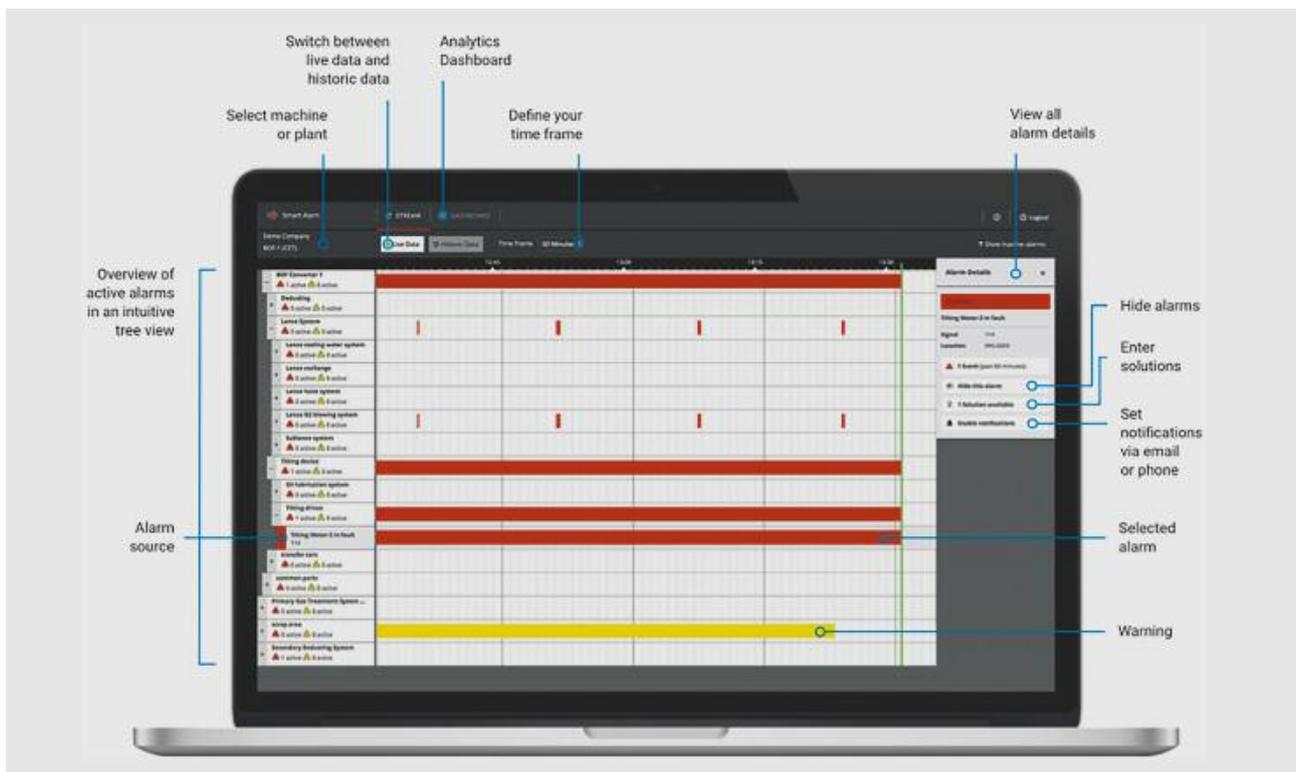
# Industry 4.0 solution – Intelligent Alarm Management „Smart Alarm“

## All alarms in an intelligent and clear interface

To reach the highest overall equipment effectiveness, it is very important for our customers to monitor the plant condition. Conventional visual display systems do not always meet this requirement on HMIs (Human Machine Interfaces). Our intelligent alarm management Smart Alarm combines all alarms in a structured graphical overview and allows fast and efficient troubleshooting for employees on site.

With an smart prioritization, a direct link-up with proposals for solutions, automated notifications and intelligent analyses, Smart Alarm puts a stop to lengthy fault analyses. To further increase your productivity, we are constantly working on our product.

- 
**Failure detection**  
 Detect the cause of a disturbance fast and effectively
- 
**Performance measuring**  
 Observe the results after maintenance activities.
- 
**Equipment availability**  
 Increase equipment availability by enabling immediate troubleshooting
- 
**Overview**  
 Monitor all production lines in one central system.
- 
**Transparency**  
 Get notified about critical alarms anytime and anywhere.
- 
**Knowledge transfer**  
 Document solutions for alarms right where they occur.



# eDoc: First step to a smart plant

## Digital documentation

The digitalization of technical plant documentation offers our customers new possibilities of efficiency increase and is an important step on the way to the 'smart plant'. Bills of materials, drawings and individual documents of equipment are integrated into one database.

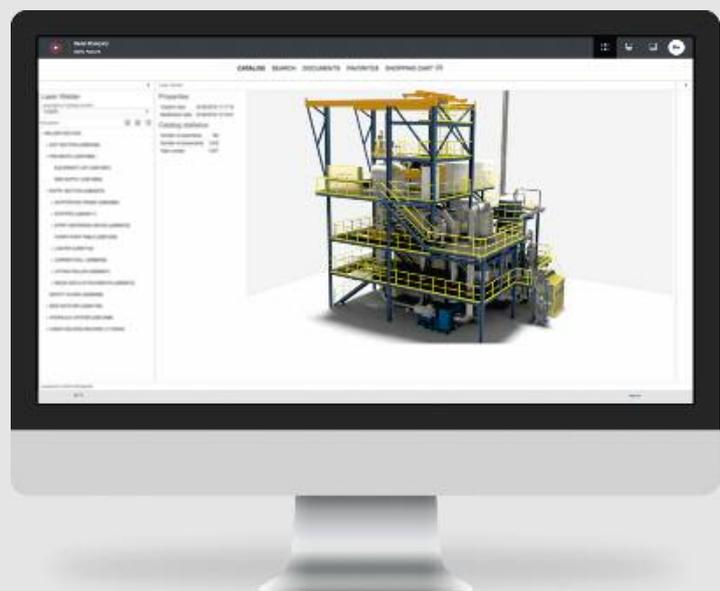
The provided interactive navigation in this data makes parts identification most easy. Additional information like operating instructions or technical data sheets become available on single-item level and mobile devices.

Time-consuming searches for necessary information belong to the past. Thus, one of the main benefits is an overall transparency from site to single part with a smart and fast navigation to the total equipment. An included RFQ function and interfaces to ERP systems enable eDoc to optimize sourcing of spare parts.

In addition to the possibility of quick enquiries, eDoc can be linked to other digital products of SMS group's Smart Maintenance Solutions as well.

## Your benefits:

- Overall plant transparency from site to single part via integrated data structures-/views
- Smart and fast navigation through the total equipment
- Part identification via equipment trees, drawings with hotspots and flexible search functions
- Improved parts management by same parts search functions



**SMS group GmbH**

Business Unit Forging Plants

Additive Manufacturing and Powder Metallurgy

Ohlerkirchweg 66

41069 Mönchengladbach, Germany

Phone: +49 2161 350-1656

[additive.manufacturing@sms-group.com](mailto:additive.manufacturing@sms-group.com)

[www.sms-group.com/additivemanufacturing](http://www.sms-group.com/additivemanufacturing)

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