ADDITIVE BY SANDVIK
FROM TITANIUM SPONGE TO FINISHED AM-COMPONENTS
SAFETY FIRST

"NEVER-WALK-BY"

Sandvik’s objective is zero harm to our people, the environment we work in, our customers and suppliers.
ADDITIVE BY SANDVIK
WORLD LEADING OSPREY™ METAL POWDERS

- The Power of Sandvik
- Powder By Sandvik: Leading Osprey™ powders
- Additive By Sandvik: Plan it – Print it – Perfect it
- Additive customer cases
THE POWER OF SANDVIK
SANDVIK GROUP
WORLD LEADING POSITION IN…

- METAL CUTTING
- MINING AND ROCK TECHNOLOGY
- ADDITIVE MANUFACTURING
- ADVANCED MATERIALS TECHNOLOGY

SALES IN OVER 160 COUNTRIES AROUND THE GLOBE

- 42,000 EMPLOYEES
- 100 BILLION SEK IN REVENUES
- 3.5 BILLION SEK ANNUAL R&D INVESTMENT
- 50 R&D CENTERS GLOBALLY
- 5,900 ACTIVE PATENTS

Figures refer to Group total 2018
PERFECTING THE ADDITIVE VALUE CHAIN
SINCE 1862…

1862 Founded by Göran Fredrik Göransson who managed to commercialize the Bessemer patent for steel production

1942 Coromant brand established, Development of cemented-carbide applications and products

1974 Osprey Metals Ltd is founded, based on spray-forming process

2002 Sandvik introduces powder program for Additive Manufacturing

2013 Establishment of R&D Center for Additive Manufacturing

2017 Business Unit for Additive Manufacturing established

2019 Sandvik’s powder business integrated in the Additive Manufacturing Division

✓ >150 years of metallurgical knowledge
✓ World-leading in powder for Additive Manufacturing
✓ >75 years of leading expertise in post processing, such as metal cutting, sintering, heat treatment and HIP
✓ All relevant printing techniques for metals in-house
✓ Northern Europe’s largest R&D Centre for advanced steels, powder-based and special alloys
✓ Trusted by the most demanding industries
LEADING AND WELL ESTABLISHED CAPABILITIES
ACROSS THE AM VALUE CHAIN

MATERIALS
- World leader in metallurgy
- Powder expert
- Osprey leading in metal powder for AM
- Widest range of AM-alloys

MANUFACTURING
- 3D design
- Several AM processes
- Center of Digital Excellence

POST PROCESSING
- World leader in metal cutting
- Sintering and HIP
- Other post processing

RELATED CAPABILITIES
- Testing and characterization
- Traceability and documentation
- Component know-how
- Customer base
- Distribution network
POWDER BY SANDVIK
WORLD LEADING OSPREY™ METAL POWDERS
POWDER BY SANDVIK
THE MATERIAL DIFFERENCE

• Wold leading Osprey™ metal powders for:
  • Additive Manufacturing (AM)
  • Metal Injection Moulding (MIM)
  • Hot Isostatic Pressing (HIP)

• More than 2000 grades:
The widest range of powder alloys

• Possibility to customize or optimize materials
to application or process

• In-house powder manufacturing capabilities
  • IGA: Inert Gas Atomization
  • VIGA: Vacuum Inert Gas Atomization
  • EIGA: Electrode Inert Gas Atomization (Coming 2020)

• From small lots for prototype development up to
  high volume batches for large scale production.
  • From 20 kg up to 3000 kg batches
POWDER DEVELOPMENT

ACCESS OUR EXPERTISE

• World-leading R&D and metallurgical know-how.
• Northern Europe’s largest R&D Centre for advanced steels, powder-based- and special alloys.
• In-house powder R&D with the possibility to develop powder to almost any customer requirement.
GAS ATOMIZED POWDER MANUFACTURING
BY SANDVIK

- Particle size: 5 – 80 micron
- 7 Inert Gas Atomization (IGA)
- Argon and Nitrogen atomizing
- Powder sizing

- Particle size: 15 – 500 micron
- 1 Vacuum Inert Gas Atomization (VIGA)
- 1 Electrode Inert Gas Atomization (EIGA)
- Argon and Nitrogen Atomizing
- Powder sizing
COMING SOON
TITANUIM POWDER

• 200 M SEK ($20 M) Investment
• Start of production in 2020
• Located in Sandviken, Sweden
MATERIALS BY SANDVIK
TITANIUM & ZIRCONIUM

Integrated manufacturing of Titanium and Zirconium products for the following application areas:

SOURCING OF RAW MATERIALS (SPONGE & ALLOYS)

INGOT PRODUCTION CAPABILITY
3 VAR FURNACES & AUXILLIARY EQUIPMENT

FORGING & ROLLING CAPABILITY
BAR PRODUCTION CAPABILITY

TUBE PRODUCTION CAPABILITY
SEAMLESS TUBING

OUR PRODUCT OFFER INCLUDES
- INGOTS
- BARS & BILLETs
- TUBES

For more information, please get in touch with Sandvik @:
inger.fjallstrom@sandvik.com
TITANIUM POWDERS

- State-of-the-art atomizing plant with electrode melting
  - Powder with low oxygen and nitrogen levels
- Dedicated downstream sieving, blending and packing facility
- High quality GA powders for Additive Manufacturing* and Hot Isostatic Pressing
- Osprey™ materials:
  - Grade 5, Grade 23
  - Other alloys available on request
- ISO 9001 certified
- AS9100 certification targeted in 2019

ELECTODE INERT GAS ATOMIZING (EIGA)
ADDITIVE BY SANDVIK
PLAN IT – PRINT IT – PERFECT IT
ADDITIVE BY SANDVIK

SANDVIK’S THREE PHASE PROCESS: PLAN IT – PRINT IT – PERFECT IT

**OUR OFFERING:**

**Advisory services**
We take you from idea to prototype – or serial production.

**Manufacturing services**
From rapid prototyping to serial production, we offer full service production of your component.

**Metal powder**
We offer the widest range of powder alloys for additive manufacturing around and can even customize materials.
SANDVIK AM CHECKLIST
TO IDENTIFY PRODUCTS SUITABLE FOR ADDITIVE MANUFACTURING

SELECTION CRITERIA:

- Complex shapes
- Expensive materials
- Smaller series
- Low weight
- Revolutionary designs
- Individual variations (tailored)
- Shorter lead-times and reduced NWC (spare-parts)
- Merging sub-parts into one component
- Productivity increase (reduced assembly time)
ADDITIVE CUSTOMER CASES
JUST IMAGINE…
WHAT ADDITIVE MANUFACTURING CAN DO

LEARN ABOUT SOME OF OUR ADDITIVE CUSTOMER CASES…

Link to YouTube
“With the new light-weight CoroMill® 390, produced with AM, the weight of the cutter body is reduced by >80%. Combined with new Silent Tools™ milling adaptors, this is an exceptional tooling combination for slender tooling. The solution limits the vibration tendencies and enables high productivity and good process security in demanding applications.”

THOMAS WIKGREN
PRODUCT MANAGER SHOULDER MILLING, SANDVIK COROMANT

DESIGN THE UNSEEN
OPTIMIZE PERFORMANCE

More than…

80%
REDUCED WEIGHT
compared to conventional 390

Up to…

200%
INCREASED PRODUCTIVITY

DESIGNERS: Per Wiklund, Johan Lindström, Anna Nordstrand
MATERIAL: Titanium alloy, Ti6Al4V
AM TECHNOLOGY: Powder Bed Fusion Laser
POST PROCESSING: Heat treatment and machining

200%
INCREASED PRODUCTIVITY

Link to Coromill® 390 film
SMASH-PROOF GUITAR

CUSTOMER CASE

“This guitar is a beast! Sandvik is obviously on top of their game. They put the work in, they do their hours. I can relate to that. The result is amazing. I gave everything I had, but it was impossible to smash.”

YNGWIE MALMSTEEN
ROCK LEGEND AND GUITAR VIRTUOSO

THE WORLD’S FIRST 3D PRINTED SMASH-PROOF GUITAR TESTED BY ROCK LEGEND YNGWIE MALMSTEEN

DESIGNERS: Drewman Guitars and Sandvik
MATERIAL: Titanium powder, Ti6Al4V
AM TECHNOLOGY: Powder Bed Fusion Laser
POST PROCESSING: Machining and blasting

ADDITIVE ARTISTRY
SMASH-PROOF MASTERPIECE

Link to film on You Tube!

Link to film on You Tube!
THANK YOU!

FOR FURTHER INFORMATION: ADDITIVE.SANDVIK