

 **impact**

WE. SPRAY. FUTURE.



+
20

**YEARS OF
EXPERIENCE**

+
100

**SYSTEMS INSTALLED
WORLDWIDE**

+
85%

EXPORT SHARE

WILLKOMMEN

WELCOME

BENVENUTO

The company, founded in 2010 and based in Germany, is a pioneer and technology leader for tailor-made solutions in the area of cold spray technology, a highly innovative process for metal coating and additive manufacturing.

Impact Innovations offers users from all over the world and various industries a wide-ranging service and product portfolio from basic research and R&D services to application-specific plant technology. A balanced mix of young, committed employees and experienced engineers form the basis of our company.

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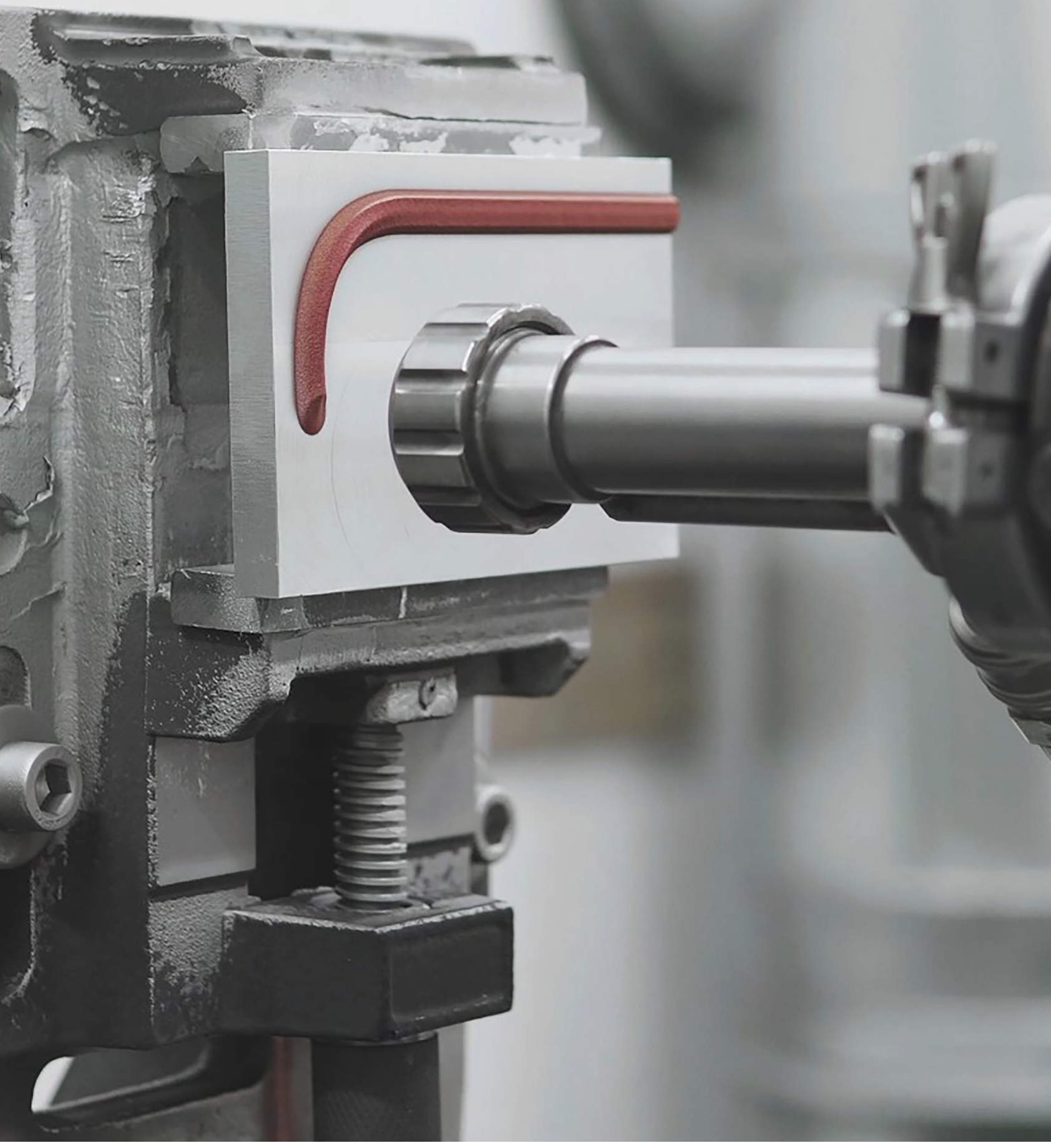
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PROCESS

COLD SPRAY

... THE MOST RECENT METHOD IN THE FIELD OF THERMAL SPRAYING



IMPACT INNOVATIONS

... PIONEER AND TECHNOLOGY LEADER

Compared to conventional thermal spray processes, the cold spray process from Impact Innovations reduces costs, minimizes processing steps and improves the deposition quality.

COST REDUCTION

- High deposition efficiency (almost no powder loss/waste)
- High deposition rates enable large quantities in a short time
- No complex surface preparation as pre-treatment
- Low post-processing costs due to conformal uniform layer build-up
- No masking required for many applications
- Use of inexpensive nitrogen as process gas
- Low maintenance and repair costs
- Powder can be recycled

DIGITALIZATION

- Siemens S7 software architecture / TIA portal
- Modular software architecture as basis for continuous developments
- 22" control panel with intuitive user interface
- Continuous monitoring and recording of all relevant process parameters
- Convenient recipe management system
- Possibility of remote maintenance
- Various communication interfaces for connection to higher level control systems

ENERGY OPTIMIZATION

- Energy savings especially compared to conventional manufacturing processes
- Thanks to near-net-shape production and no energy-consuming melting process and thanks to high efficiency (transfer efficiency, less overspray)

QUALITY IMPROVEMENT

- Optimized deposition efficiency (up to >99% possible)
- Homogeneous, very hard and dense coating (very low porosity) thanks to high kinetic energy
- High thermal and electrical conductivity (no oxides)
- Special nozzles and components avoid clogging
- Highest adhesion strength through mechanical and thermal bonding of the powder
- No oxides in coatings and low thermal stress due to low thermal impact
- Uniform coatings with low surface roughness

FLEXIBILITY

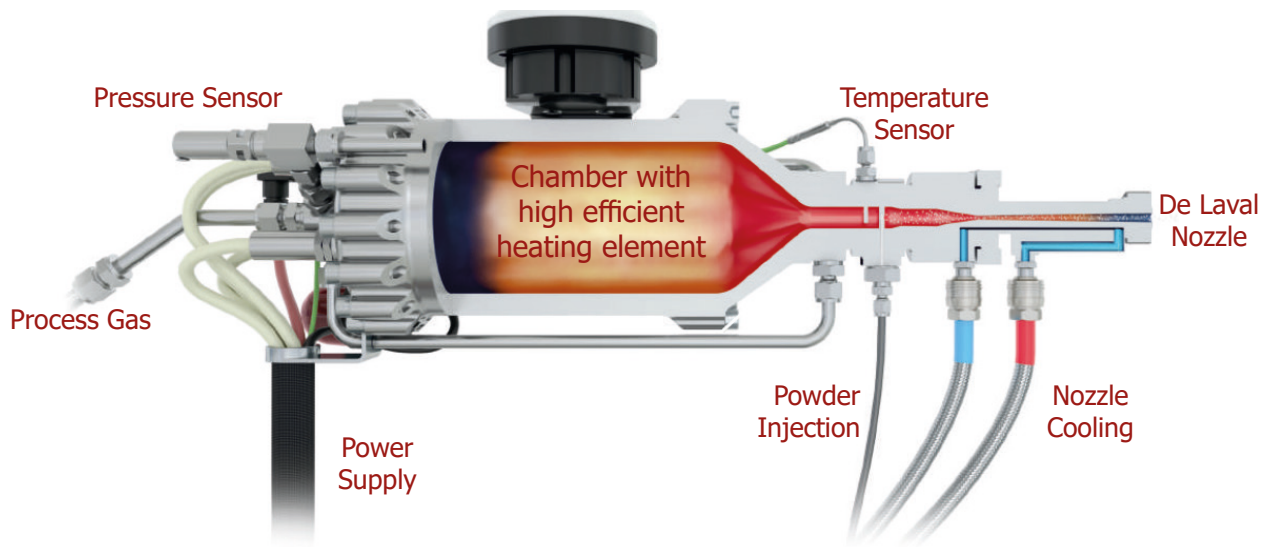
- Nearly no size restrictions of the component
- Coating of complex shapes or interior surfaces
- Feeding from up to 4 powder feeders
- Nitrogen, helium or mixtures of both process gases
- Processing of almost all metallic materials and alloys
- Combination of different materials
- Coating on ceramics, glass and thermoplastics
- Special powder mixtures, flexible parameter settings
- 100% modular system build-up

PROCESS STABILITY

- Assured process quality through monitoring and recording of all process-relevant parameters, sensors and controls on all critical system components
- Less potential sources of error than with other methods
- Low influence of environmental factors on the process
- High reproducibility

COLD SPRAY

... HOW DOES IT WORK?

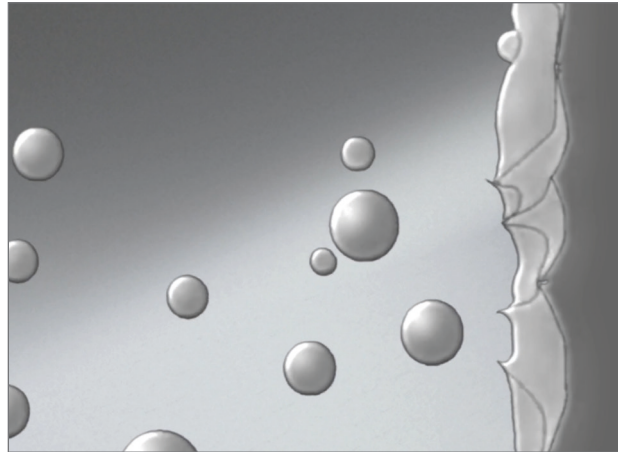


In comparison to conventional thermal spray processes, cold spraying offers special advantages, because the spraying material is neither fused nor melted during the process. Thus, the thermal influence on the coating and the substrate material is minimized.

The high kinetic energy of the particles and the high degree of deformation during the impact on the substrate that is connected with it, allows the manufacturing of homogeneous and very dense coatings. The range of coating thicknesses varies from just a few hundredths of a millimeter up to several centimeters. There are mainly metallic coatings produced,

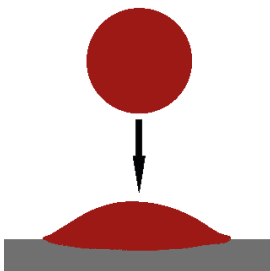
which physical and chemical properties barely differ from the properties of the base material. With the latest system technology of Impact Innovations a process gas - preferably nitrogen or helium - is put into a spray gun with a pressure of up to 60 bar and is heated up to a maximum temperature of 1100 °C. The subsequent expansion of the heated and high pressurized gas in a convergent-divergent nozzle (De Laval Nozzle) down to ambient pressure results in the acceleration of the process gas up to supersonic speed and, at the same time, in the cooling down of the gas to a temperature below 100 °C.

The metal powders are injected in the convergent section of the nozzle by using a powder feeding unit and carrier gas and are accelerated to a particle speed of up to 1200 m/s in the main gas stream. In the highly focused spray jet particles impinge the - in most cases untreated - surface of the component, deform the particles and form a strongly adhesive/cohesive and low-oxide coating.



PARTICLE VELOCITY INFLUENCE

... THE COATING PROCESS



..... LOW PARTICLE SPEED

The coating particle has hit the substrate at the minimum speed, creating a firm connection. This "critical speed" is different for each material.



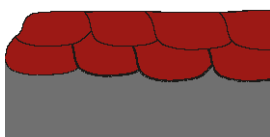
..... OPTIMAL PARTICLE SPEED

If the impact speed is higher than the "critical speed", the degree of deformation between the particle and the component is increased. The adhesion mechanism of the layer on the component improves.



..... HIGH PARTICLE SPEED

If the impact speed is too high and the "erosion speed" is reached, material is removed. No material build-up is possible.



..... FINAL COATING BUILD-UP

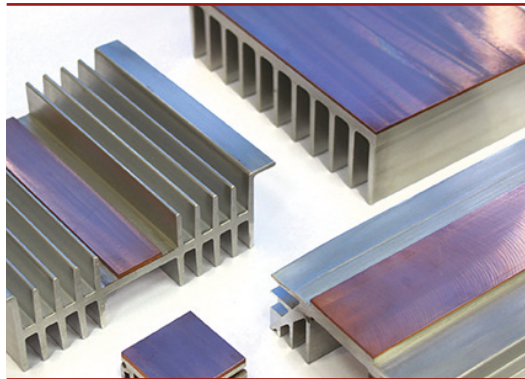
In order to produce dense and solid layers, the impact velocities of the particles must stay between the "critical speed" and the "erosion speed".

APPLICATIONS

... FROM COATING TO ADDITIVE MANUFACTURING

Wear and corrosion resistant coatings for Brake Discs, Cylinders and other components

Cold spraying is the most economic and efficient process for applying wear and corrosion resistant coatings in a single layer. On top of that the thermal impact is almost negligible and avoids any distortion of the coated substrate.



Hybrid Heat Sinks

Cold sprayed hybrid heat sinks have excellent mechanical and physical properties. They combine the excellent thermal conductivity of copper with the light weight and cost advantages of aluminium.

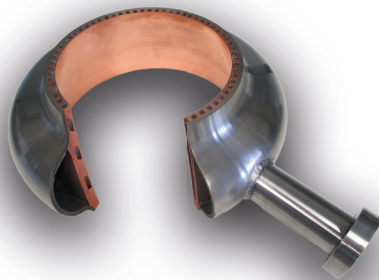
Induction Coatings for Cookware

When cold spraying inductive cookware, thin layers (< 1 mm) are used. There is also no thermal separation layer between aluminum cookware allowing direct heat transfer without any losses from oxides. High adhesion strength of the coating avoid delamination and corrosion.



Combustion Chambers & Rocket Nozzles

With the help of the Impact Spray System, combustion chambers and rocket nozzles can be produced in a very short time. Manufacturing of bi-metallics and cooling channels with smooth surfaces are the main advantages.



Nuclear / Energy Applications

The uniform and dense (almost porous-free) coating characteristics makes cold spraying an ideal technology for protective layers of different materials. Especially nickel coatings are common for corrosion resistance layers in nuclear applications.



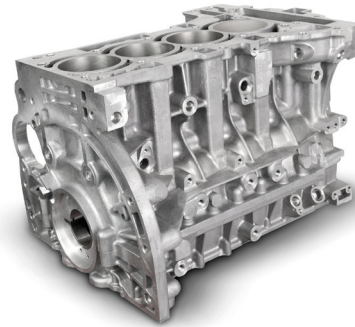
Hybrid Bus Bars

The Cold Spray System with a special powder injecting assembly can deposit flat copper track on aluminum busbars profile without masking.



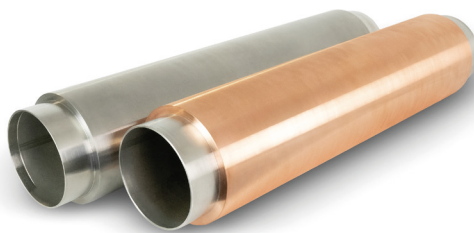
Crankcases

Cold spraying is the most efficient process for coating cylinders and valve seats for combustion engines by reducing necessary process steps to a minimum. On top of that it reduces emissions by 15-20% compared to existing coating technologies.



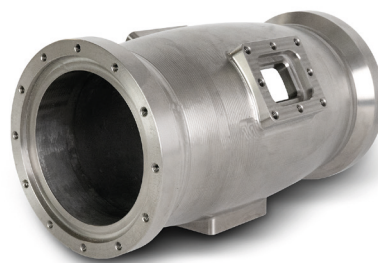
Sputter Targets

Sputtering is a physical process in which atoms are detached from a solid by bombarding them with high-energy ions and transforming into the gaseous state of aggregation. The production of sputter targets with cold spray is a cost-effective and sustainable solution.



Additive Manufacturing & Repair

With cold spraying, it is possible to combine a conventionally manufactured component with additively manufactured elements in some places. The production time of the manufactured or repaired part is significantly reduced and mechanical properties are similar to casted materials.



RESEARCH & DEVELOPMENT

... COLD SPRAY R&D CENTER

Our R&D team in the in-house “Cold Spray R&D Center” has set itself the goal of developing industrial solutions using the cold spray process in order to exceed the limits of existing technologies. The combination of R&D and plant manufacturing is one of the key factors for the successful implementation of the cold spray process in industry. As an established system manufacturer, we are able to offer our customers innovative development services in our in-house R&D laboratory.

We create added value in all project phases. Every successful cold spray application begins with the selection of the right material. The experts at our Cold Spray R&D Center work every day to improve the material-related layer properties and to qualify new materials for the cold spraying process. We would be happy to assist you in the selection of the right metallic powder, taking into account all technical and, of course, economic aspects, in order to implement your application.



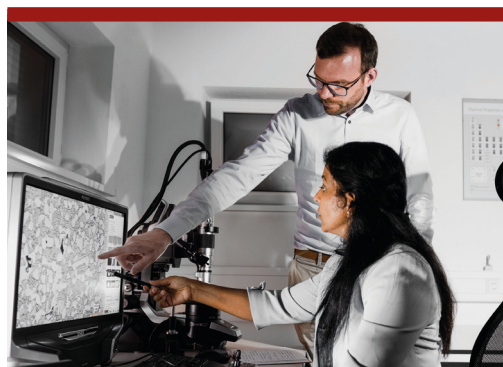
EFFICIENCY



We offer efficient development with complete technology transfer to your company.



EXPERIENCE



Our team of experts has a thorough understanding of the entire field of cold spraying.



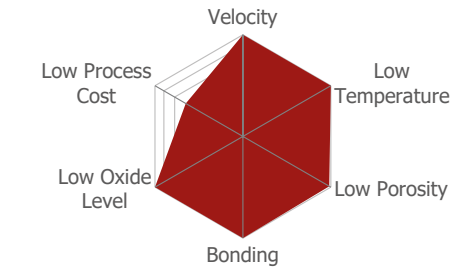
RESOURCES



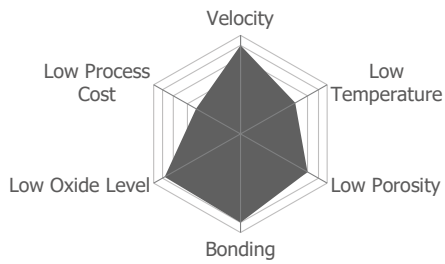
Reduce your own capacities and resources to develop or optimize your cold spray application.

COLD SPRAY COATING

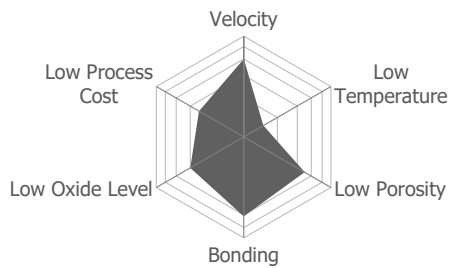
... THE HIGHEST QUALITY COATING AT LOWEST COSTS



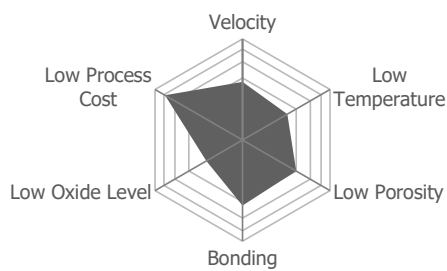
COLD SPRAY



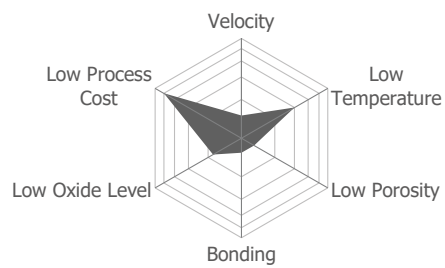
HVOF SPRAY



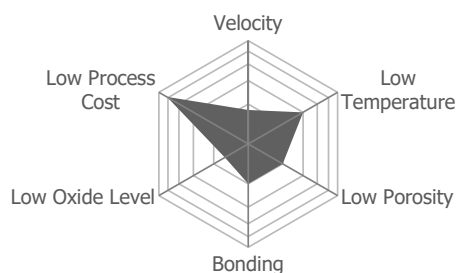
PLASMA SPRAY



ARC WIRE SPRAY



FLAME POWDER SPRAY



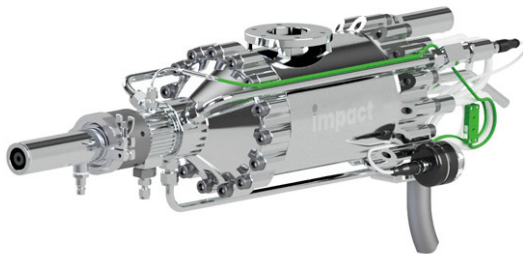
FLAME WIRE SPRAY

THE LATEST GENERATION

... THE IMPACT EvoCSII SYSTEM

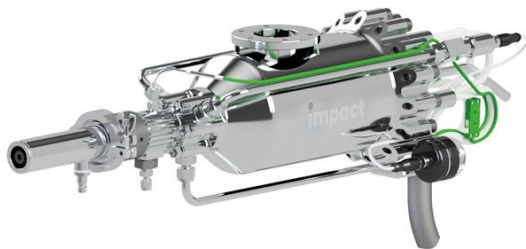
The new Impact Cold Spray System EvoCSII is especially designed for serial production and the associated high availability requirements. Thanks to a high number of sensors, intelligent data processing and a completely new software architecture, process reliability is increased significantly. All developments and experiences of the last ten years were used as the basis to design a perfectly coordinated plug and play solution. We always strive to offer our customers

consistently high quality for single part and series production based on a durable but also maintenance-friendly system architecture and through intelligent process control. The system layout of EvoCSII is modular, i.e. any changes of requirements can easily be adapted at a later point of time. In addition, the necessary interfaces for integration in system automations have already been integrated.



IMPACT GUN 6/11 EvoCSII

- Suitable for the entire range of cold gas spraying
- Process gas pressure up to 60 bar
- Process gas temperature up to 1100 °C
- Integrated heating with max. 44 kW heating capacity
- Air and water cooling of the nozzle possible



IMPACT GUN 5/8 EvoCSII

- Process gas pressure up to 50 bar
- Process gas temperature up to 800 °C
- Integrated heating with max. 34 kW heating capacity
- Compact and lightweight construction
- Air and water cooling of the nozzle possible



IMPACT ELECTRONIC CONTROL & GAS MANAGEMENT UNIT EvoCSII

- Internal power & gas distribution as well as to all system components
- Intelligent architecture of the system components “plug and play”
- Central process and safety control of all system components
- Interface for connection to a higher-level control unit
- Integrated data memory for process data recording



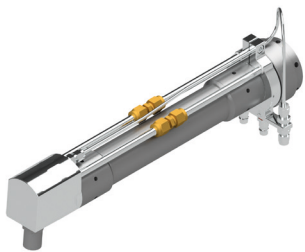
IMPACT POWDER FEEDER EvoCSII

- Uniform conveyance of the powder
- Powder supply from up to 4 powder feeders in parallel
- Conveyor discs can be exchanged
- Delivery pressure up to 80 bar
- Convenient changing and cleaning of the powder container



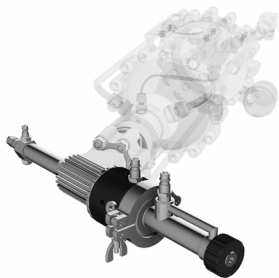
IMPACT WATER COOLING EvoCSII

- Adjustable cooling temperature
- Less nozzle wear
- Avoiding nozzle clogging
- More consistent coating result
- Fully integrated in the control system



ID COATING DEVICE

- Minimum coating diameter Ø70 mm
- Water cooled spray head and nozzle
- Central and axial injection of powder into the laval nozzle
- Standard device length 350 mm
- Customized device length upon request



ADDITIONAL COMPONENTS

Numerous additional system components are available to optimize the cold spray process and increase the productivity of the Impact cold spray system.



MAINTENANCE



CALIBRATION



TRAINING



SUPPORT

IMPACT INNOVATIONS

SERVICE & SUPPORT

... WE ARE HAPPY TO ASSIST YOU

It is our philosophy to respond to customer-specific requirements and to implement them through intelligent and systematic procedures. Service is an important component of our work philosophy. We try everything to handle the entire process, from customer service, calibration and maintenance work to on-site training and telephone support. With an Impact service contract, you not only get preferential access to our experienced specialists for preventive maintenance and remote diagnosis, but you also benefit from discounted rates. Talk to our experts and we will be happy to work

out an individual service contract with you in order to optimally meet the requirements of your company.

Benefits of the Impact Service Contract

- Priority service for your inquiries
- Preventive maintenance
- Calibration at a fixed price
- Customized support levels
- Remote diagnosis
- Discounted rates

GLOBAL NETWORK

... FIND OUR STRONG PARTNERS ALL OVER THE WORLD

Our Cold Spray Partners in Europe

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