



## Cold Spray Technology

*Anatolii Papyrin, Vladimir Kosarev, Sergey Klinkov, Anatolii Alkhimov, Vasily M. Fomin*

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The topic of this book is Cold Spray technology. Cold Spray is a process of applying coatings by exposing a metallic or dielectric substrate to a high velocity (300 to 1200 m/s) jet of small (1 to 50  $\mu\text{m}$ ) particles accelerated by a supersonic jet of compressed gas. This process is based on the selection of the combination of particle temperature, velocity, and size that allows spraying at the lowest temperature possible. In the Cold Spray process, powder particles are accelerated by the supersonic gas jet at a temperature that is always lower than the melting point of the material, resulting in coating formation from particles in the solid state. As a consequence, the deleterious effects of high-temperature oxidation, evaporation, melting, crystallization, residual stresses, gas release, and other common problems for traditional thermal spray methods are minimized or eliminated.

This book is the first of its kind on the Cold Spray process. **Cold Spray Technology** covers a wide spectrum of various aspects of the Cold Spray technology, including gas-dynamics, physics of interaction of high-speed solid particles with a substrate as well as equipment, technologies, and applications. **Cold Spray Technology** includes the results of more than 20 years of original studies (1984-2005) conducted at the Institute of Theoretical and Applied Mechanics of the Siberian Division of the Russian Academy of Science, as well as the results of studies conducted at most of the research centres around the world.

The authors' goal is threefold. The first goal is to explain basic principles and advantages of the Cold Spray process. The second goal is, to give practical information on technologies and equipment. The third goal is to present the current state of research and development in this field over the world.

The book provides coverage and data that will be of interest for users of Cold Spray technology as well as for other coating experts. At the present time the Cold Spray method is recognized by world leading scientists and specialists. A wide spectrum of research is being conducted at many research centres and companies in many countries.

- New approach to spray coatings
- Results are exceptionally pure coatings
- Low spray temperature without degradation of powder and substrate materials
- High productivity, high deposition efficiency
- High operational safety because of absence of high temperature gas jets, radiation and explosive gases.
- Excellent thermal and electrical conductivity
- Wide spectrum of applications because of important advantages of the process

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