



## Mathematical Modelling and the Measurements of Plasma Spraying Technology

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### Abstract

*The plasma spraying has a huge industrial development and users want much sophisticated properties of the deposit material. If plasma re-melting, purification and extractive metallurgy are still in their infancy, the results obtained are promising and raise a great interest for industrial developments. That is why a better knowledge of the phenomena involved is needed especially for modelling different plasma devices configurations which on taking into account chemical reactions, mixing, non-equilibrium effects, and if possible using 3-D configurations. But, due to complexity of the models and to the lot of assumptions the results have no meaning if they are not compared with the measurements and a lot of effort has to be done to computerize all used devices already available to initiate the systematic study of mixing of the cold gas with the plasma, of the reduced pressure spraying devices, of the particles injection and the behavior, of the heat transfer to electrodes or walls, of the chemical kinetic.*

*Now, after a brief description of the industrial developments of Wermal plasmas in the fields of extractive metallurgy and thermal spraying, the state of art of knowledge in various subjects is reviewed: the modelling of the plasmas, the plasma transport properties and the cold gas mixing, the modelling of plasma particle momentum and heat transfer measurements of the plasma jet velocity distributions and the temperatures measurements of the particles in the flight for the plasma jet : the surface temperature, the velocity, the size evolution, the trajectory etc. are correlated between the measurements and calculations. In the present paper, there is a comparative analysis between the mathematical modelling and actual measurements using experiments.*

**Keywords:** Plasma spraying, Modelling, Plasma measurement.

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