



## CERTIFICATE OF PARTICIPATION

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**Younès Benarioua**

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Co-authors:



## The effect of bath alloying elements on the properties of galvanized coatings

**Younès Benarioua**

Department of Mechanical Engineering, Faculty of Technology,  
University of M'sila, Bordj Bou Arréridj Road, 28000 M'sila, Algeria

Hot-dip galvanizing is one of the most widely used and effective techniques for protecting ferrous metals, particularly steel, from corrosion. This coating, generally obtained in a bath of liquid zinc or alloys, has excellent chemical properties in an aggressive environment and provides long-lasting protection for the steel against atmospheric contamination. During galvanizing, reactions occur at the interface between the galvanized steel and the molten zinc, forming a coating of intermetallic compounds considered as phases in the Fe-Zn binary system. The gamma, delta, zeta, and eta phases, obtained as sublayers, differ in composition and structure. The gamma phase occurs directly at the (coating/steel) interface, while the eta phase of pure zinc forms the outer surface of the coating. In terms of thickness and properties, the intermetallic layers forming the galvanized coating are influenced by numerous technological parameters. These factors include the bath temperature, the immersion time, the surface condition of the steel, and the chemical composition of the steel and the galvanizing bath. In this research, we selected a single parameter, the chemical composition of the galvanizing bath, and studied the effect of this parameter on the structural and mechanical properties of the intermetallic compounds constituting the overall coating layer. This study focuses on the production of galvanizing layers by varying the concentration of certain elements, particularly aluminum and lead, and on the characterization of the layers produced using various analytical and control methods.

**Key words :** zinc, galvanizing coatings, alloying elements, steel