B₄C and Fe-B Addition Influence on the Cavitation Resistance of the Plasma PTA Fe-Mn-Si Coating
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Abstract
The aim of this work is study the effect of the FeB and B₄C addition on the microstructure and cavitation resistance of the plasma PTA Fe-Mn-Si coating. The hardness of the iron-based alloy can be increased by adding a certain amount of carbides, such as B₄C and Fe-B, leading to formation of secondary phases of high hardness. Three alloys Fe-Mn-Si with B₄C and FeB additions were deposited by plasma transferred arc process in AISI 304 plates. The microstructure and dilution were analyzed by optical microscope and scanning electronic microscope. Mechanical properties were analyzed by microhardness and cavitation resistance were analyzed by ultrasonic ASTM G32 indirect method. It was found thus far that the addition of boron either by adding Fe-B, such as by adding B₄C caused an increase in the wettability of the alloy and consequently better deposition. We also observed a significant change in microstructure, forming higher levels of secondary phases and the formation of a hypoeutectic structure. There was also an increase of the hardness of coatings deposited with addition of boron. It was observed an increase on the cavitation resistance of the coating with FeB and B₄C addition.

Keywords: cavitation, boron, plasma transferred arc