Stellite alloy mixture hardfacing via laser cladding for control valve seat sealing surfaces

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A Stellite alloy mixture hardfacing via laser cladding for control valve seat sealing surfaces

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ABSTRACT

A Stellite alloy mixture hardfacing consisting of 70% Stellite 3 and 30% Stellite 21, is created via laser cladding for control valve seat sealing surfaces, aiming at enhancing hardness and wear resistance compared with Stellite 6, and improving cracking in laser cladding compared with Stellite 3. The Stellite alloy mixture hardfacing is made on 316 stainless steel substrate and does not show any cracking in liquid penetrant testing. The microstructure of the hardfacing is analyzed using SEM, EDS and XRD. The hardness, dry sliding wear resistance, cavitation-erosion resistance in NaOH solution and corrosion resistance in morpholine solution at pH 9.5 to simulate the amine environment of boiler feedwater service in power generation plants, are evaluated. The Stellite 6 hardfacing prepared with the same laser process parameters is also analyzed and tested under the same conditions for comparison. The experimental results and real industrial test demonstrate superior performance of the Stellite alloy mixture hardfacing to the Stellite 6 hardfacing for control valve seat sealing application.