

The Corrosion Resistance of P/M Alumix 431D Compacts

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Abstract : Aluminium alloys are an important class of engineering materials for structural applications. This is due to the fact that these alloys have many interesting properties, namely, low density, high ratio of strength to density, good thermal and electrical conductivity, good corrosion resistance as well as extensive capabilities for shaping processes. In case of classical PM technology a particular attention should be paid to the selection of appropriate parameters of compacting and sintering processes and to keeping them. The latter need arises from the high sensitivity of aluminium based alloy powders on any fluctuation of technological parameters, in particular those related to the temperature-time profile and gas flow. Only then the desired sintered compacts with residual porosity may be produced. Except high mechanical properties, the other profitable properties of almost fully dense sintered components could be expected. Among them is corrosion resistance, rarely investigated on PM aluminium alloys. Thus, in the current study the Alumix 431/D commercial, press-ready grade powder was used for this purpose. Sintered compacts made of it in different conditions (isothermal sintering temperature, gas flow rate) were subjected to corrosion experiments in 0,1 M and 0,5 M NaCl solutions. The potentiodynamic curves were used to establish parameters characterising the corrosion resistance of sintered Alumix 431/D powder, namely, the corrosion potential, the corrosion current density, the polarization resistance, the breakdown potential. The highest value of polarization resistance, the lowest value of corrosion current density and the most positive corrosion potential was obtained for Alumix431/D powder sintered at 600°C and for highest protective gas flow rate.

Keywords : aluminium alloys, sintering, corrosion resistance, industry

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