

## Processing Routes for Obtaining Novel High Performance Mn-containing PM Steels

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### Abstract

A Mn-containing master alloy (MA) has been specially designed, through thermodynamic and metallurgical criteria, for obtaining high performance low alloy PM steels by SPSS or DPDS. This MA exhibits improved characteristics with respect to ferromanganese and other Mn carriers for alloying PM steels preventing oxidation, keeping a high compressibility of the powder mixture and providing opportunities for low temperature processing. The improved sinterability through the formation of a transient liquid phase leads to dimensional stability and high reproducibility of mechanical properties after sintering at 1120°C. The microstructural development of the PM steels was studied during the sintering cycles. The final microstructure of these PM steels, after defined sintering cycles, was characterised by LOM while the mechanical properties of the consolidated materials were determined by tensile testing.