

A NEW APPROACH TO SINTERING FURNACE ATMOSPHERE CONTROL AND SINTER HARDENING BY GAS IMPINGEMENT COOLING

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ABSTRACT

Powder Metallurgy (P/M) is becoming an increasingly important part of the automotive industry. This increases the demand for reduced production costs and higher quality. It is appreciated throughout the industry that high quality components can only be produced by a high quality sintering process and sintering furnace atmosphere. Sinter hardening is also becoming an important area in the industry. As a result, furnace atmosphere control - including controlled delubrication, control of carbon potential in the sintering furnace and improved cooling speed - is making this complex process even more complicated. This paper addresses the issues in two of these three important steps of the sintering process by introducing newly developed technologies for carbon control and flexible cooling systems that can achieve the challenging hardness requirements in a sintering furnace. It also helps with furnace atmosphere selection for sintering and the optimization of furnace atmosphere gas usage.

INTRODUCTION

The sintering process is complicated in terms of process control, which has to take many factors into account. Although the “sintering process” is always considered to be responsible for the quality of the sintered parts, the powder metal science behind the process should also form part of the equation. While the cost of the control factors has been forcing producers to come up with new materials and process techniques, this has created more complexity in process control and demanded new technologies. The primary objective of this paper is therefore to give an overview of available and developing materials technology, sintering technologies and process functions.