

A COMPARATIVE REVIEW OF VARIOUS PIM BINDER SYSTEMS

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ABSTRACT

The binder is not only a necessary aid for promoting viscous flow in the feedstock during injection molding, but it should also maintain the shape of the green part after removal from the mold cavity. After moulding, the binder has to be removed carefully without impairing the integrity of the molded part. Even though the binder is just an intermediate processing aid it has considerable influence on the success of the Powder Injection Molding (PIM) Process. Thus, selection of an appropriate binder system is one of the critical steps of the PIM Process.

There are a number of commercial and patent binder systems in use, but detailed information about their composition and mixing is generally not revealed. In this paper, some of the important binder systems discussed in the literature have been reviewed. The mixing, molding and debinding behavior of these binders is being discussed.

INTRODUCTION

Binder compositions and the techniques applied for their removal (debinding) from the green compacts prior to sintering are usually the basis for the different PIM Processes. The binder performs two functions, i.e., it imparts to the flow characteristics of the feedstock during injection moulding and helps in retaining the complex shape of the part until some strength is attained during sinter bonding.

The binder is usually a multi-component organic material as no single organic compound satisfies the diverse requirements of the PIM feedstock. The requirements of the binder for PIM have been discussed in the literature [1 - 3]. There are a number of patented binder systems in use, but detailed information about their composition and mixing is generally not revealed. Some of the patent binder systems discussed in the literature is described in the subsequent paragraphs.