1.0 INTRODUCTION

The investment casting process involves making of a disposable wax pattern by the injection the industry. The study found that pattern die dimensions were estimated in industry by adjusting the part dimensions in order to account for dimensional changes associated with the wax and alloy systems.

The only equation used

In this study, relevant properties of materials and process variables that have an important effect on tooling dimensions are identified. The information contained in this q 1 was obtained from a review of the published literature related to the investment casting industry, food industry, dental industry, and chemical engineering literature. A review of waxes, shell materials, and investment casting alloys was conducted in order to identify constitutive models of those properties of the wax, shell, and alloy that need to be considered for accurate prediction of the final part dimensions. The most important factors that affect tooling allowances are given by the material (wax, shell, and alloy) thermophysical properties, material (wax, shell, and alloy) thermomechanical properties, process parameters, and the restraint due to geometrical features of the 8685 Tc qnd ga5 Tc system.

2.0 DIMENSIONAL CHANGES

Ito et al. (1996) attempted to find relationships between the physical properties of waxes and casting shrinkage. Their study was aimed at determining

Ohashi and Paffenbarger (1966) presented experimental data on the melting

$$\boldsymbol{s}_0 = 3K\left(\boldsymbol{e}_0 - 3\boldsymbol{e}_T\right)$$

3.3 Hot Deformation

Leadbetter (1979) presented a review on the hot deformation behavior of shell materials. The degree of shell deformation during dewaxing and shell firing was found to be proportional to the difference in thermal expansion because the shell may undergo unacceptable deformations when MOR is recorded. In order

treated as a liquid (Drezet and Rappaz, 1996). Below the coherency temperature, the dendrites form a coherent network that can support small stresses (Kim et al., 1995). Fluid convection properties such as plastic flow stress, sinkage, and volumetric expansion, rather than using computational models that determine local wax deformation. Although these data are excellent for designing proper handling methods of waxes during the preparation, melting, conditioning, and injection phases, property a to investment casters on wax systems cannot be used determine wax pattern deformation.

In the fourth section, we focused on identifying alloy material properties

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LIST OF ILLUSTRATIONS

Figure 3. Shell mold consists of backup stucco layers bonded together (Weddington et al., 199j Eprs bonded together (Wedding

Figure 1. Dimension D2 is restrained by cores used to make the holes in the part (Hockin, 1968).

Figure 2. There is a direct relationship between casting shrinkage and plastic flow stress (Ito et al., 1996).

Figure 5. During casting shell mold experiences severe temperature gradients across its thickness (McCallum and Lang, 1983).

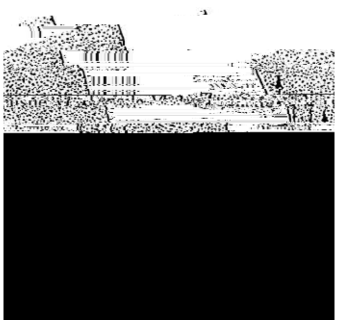

Figure 6. During casting, stresses within the shell are tensile inside and compressive on outside layers (Snow, 1995).