

ASPECTS REGARDING THE PROCESSING OF DIELECTRIC MATERIALS IN A MICROWAVE FIELD

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Abstract. *The paper includes the main results obtained in the domain of the processing of dielectric materials in a microwave field. It has the character of an applicative research, the obtained results being of practical use, with the main purpose of optimizing the functioning of some heating devices in a microwave field. This analysis is efficient but it implies the exact knowledge of the dielectric and thermal properties of the material that is to be processed, and also the dependence of these properties on the temperature. The main problem we follow is represented by the homogeneity of the field and, consequently, of the temperature in the material.*

Keywords: Electromagnetic field, microwaves, propagation, numerical modelling, optimization dielectrics

1. Introduction

The effect of the microwaves on the material depends a lot on the physical properties.

Studies concerning the processing of different products were made more recently by Paltin, 1992, S. Lefeuvre, 1993, performed studies on the properties of dielectric materials and the mode they influence the processing in a microwave field [1]. An analysis of the multimode applicators was presented by Metaxas and Meredith, 1994, [2].

They showed the mode of over positioning of the waves after three octagonal directions, developing successfully a simple technique of measurement of the modes in an empty cavity. This study was then extended by Chow Ting Chan and Reader, 1995, for a loaded cavity. D.C. Dibben, 1996 studied the results of the numerical modelling comparing them with the experimental results for more types of applicators, information which were subsequently used for the developing of complex calculation methods.

H.C. Reader, 1997, [3], developed a method for the determination of distribution of the electric field, which develops between the interior surfaces of the applicator – on the interior metallic surface of the applicator there is a tangential component

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