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Thermal field simulation of glass bending oven using finite volume method

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Bin Wang ; Jiangqi Long ; Ruibi Cai

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Abstract:

Gravimetric hot bending is the main method of automobile glass forming nowadays. In the bending oven which often equipped with electric radiative resistances, heat transfer is complex and convection, thermal conduction and radiation should be take into account accurately. The thermal field of glass bending oven, especially the temperature distribution of glass, impose key influence on the glass forming. Finite volume method (FVM) is used because of its advantages in numerical calculation of heat flux and transfer in this paper. FVM model of hot bending oven is built through the analysis of thermal interaction inside the oven and the reasons of parameters selection and setting are brought forward. The simulation precision is validated through the contrast between the numerical values and the experimental values.

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Contents

1. Introduction

There are two methods, namely press bending and gravimetric hot bending, for production of automobile glasses. Gravimetric hot bending is the process that the glass being heated to its soften temperature and dropped to the steel mould due to its own gravity [1]. Because of the high temperature of glasses, the effect of gravity can only be utilized. Meanwhile, in order to preserve better optical properties of the automobile glasses, especially of windscreen, the gravimetric hot bending is the only adoptable forming process nowadays [2].

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