Suction system from the self-induced mold cavity (Venturi)

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Our suction system's goal is to be a valid and more simple alternative to the application of traditional vacuum system. We generate a depression in the mold cavity using the movement of air developed by the metal entering in the mold. We have designed a particular auxiliary channel directly connected to the inlet metal in the mold. The metal inlet in the mold pushes the air in this channel in a Venturi striction to increase the air speed to ultrasonic values. This develops a pressure reduction in the expander and in the connected mold cavity. In this way we experience a suck effect from mold cavity. The Venturi valve can be applied to both hot and cold chamber.

KEYWORDS: SUCTION, VACUUM, VENTURI, POROSITY;

INTRODUCTION

System layout

The particularity of our system (Fig. 1) consists essentially in an auxiliary channel (A) for the generation of compressed air. This channel is directly connected to the inlet point of the mold and to the section reduction (C) to generate the Venturi effect. With this section reduction we observe an acceleration of air speed to ultrasonic values, and then a pression reduction in the expander. This expander is directly connected to the mold cavity by a suction channel (B) and for this we can suck air from the cavity.

Obviously, we need to let out the air from the mold.

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3. Easier to [redacted]
4. Gradual [redacted]
5. No need [redacted]
6. Fully cal [redacted]
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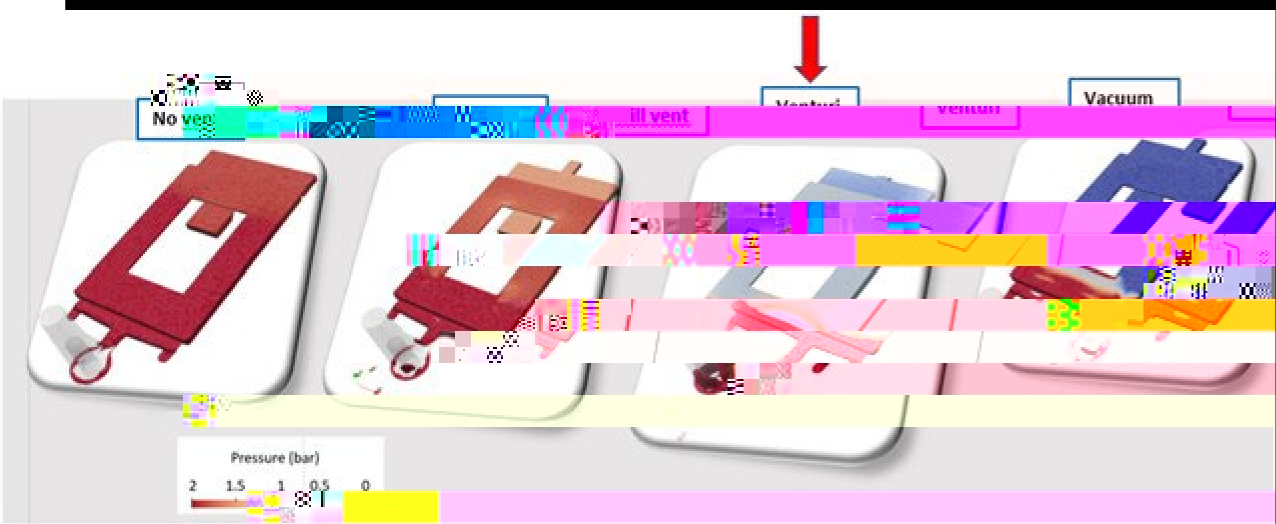

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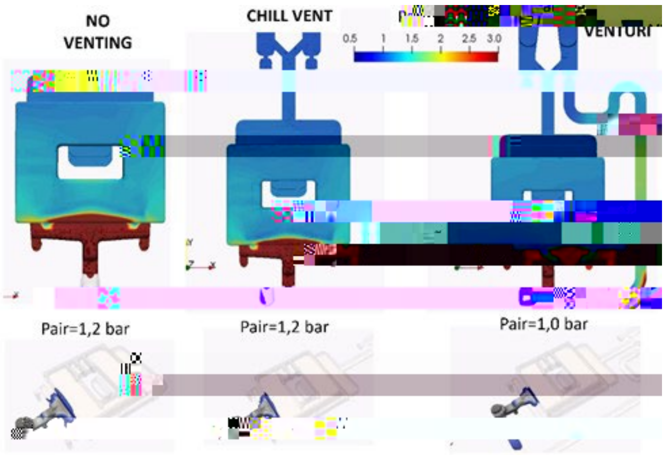

Fig.3 - Starting stage of filling (air pressure in cavity).

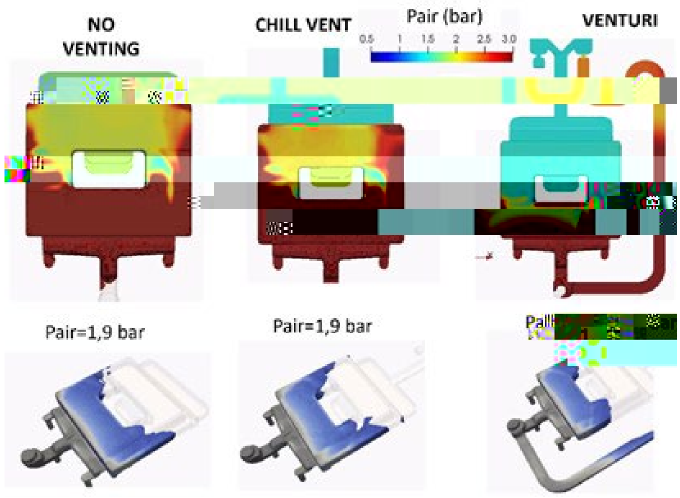

Fig.4 - Middle stage of filling (air pressure in cavity).

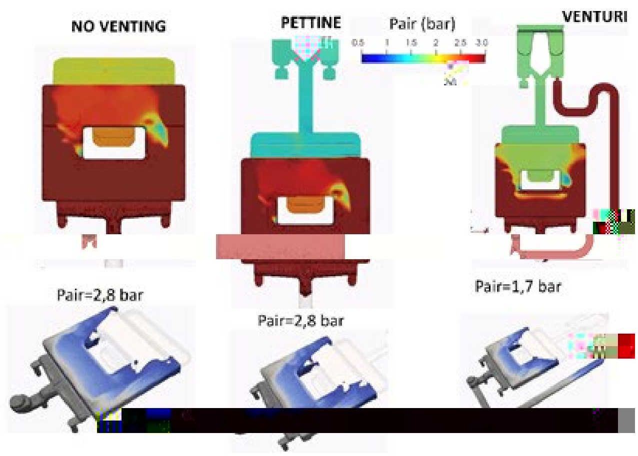

Fig.5 - Final stage of filling (air pressure in cavity).

In table 1 w [redacted]

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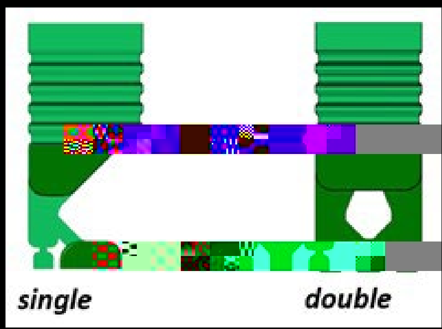
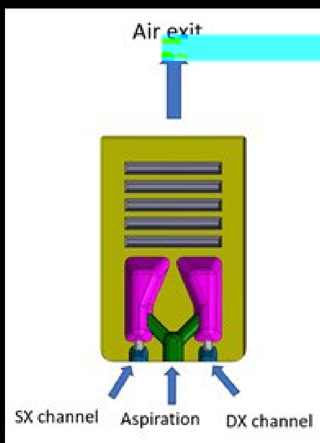
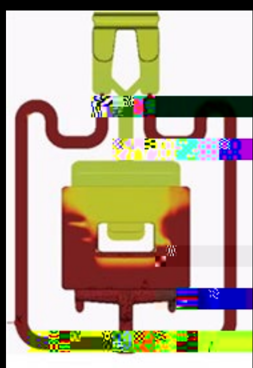
valve (Fig. [redacted]
measures a [redacted]







CASE STUDY

To test the Venturi system we have made many virtual test with numerical simulations in comparison with practical sampling either in cold and hot chamber. Interesting results are obtained for finned parts like a heatsinks where the filling is first in the thickness and after in the fins. These results are very close to the use of vacuum system (Fig. 9).

Another test was made with Zamak in which we can clearly see the different flow in the part using or not using the Venturi valve (Fig. 10)