KNOW-HOW FOR GAS ASSISTED INJECTION MOULDING TECHNOLOGY

CONTACT DETAILS:

Research Results Transfer Office-OTRI
University of Alicante
Tel.: +34 96 590 99 59
Email: areaempresas@ua.es
http://innoua.ua.es

ABSTRACT

In Gas-Assisted Injection Moulding (GAIM), gas is injected into a mould that has been partially filled with polymer. The gas drives the molten polymer core further into the mould, until it is filled completely. The penetrating gas leaves behind a polymer layer at the mould walls, yielding a product with a polymer skin and an inner gas channel. GAIM offers a number of advantages over conventional injection moulding. They mainly originate from the negligible pressure drop in the gas core: reduced clamp force, reduced sink marks, reduced residual stresses and shorter cycle times. The Chemical Engineering Department of the University of Alicante has applied successfully a complete CAE software package in order to give mould design guidelines and select the optimum process conditions. We are seeking companies to provide us our high experience, expertise and know-how to produce parts that demands the best quality.

ADVANTAGES AND INNOVATIVE ASPECTS

ADVANTAGES

Some of the potential benefits of gas-assist injection moulding are:

- Use of lower tonnage machines
- Lower injection pressures
- Improved part quality
- Reduced cycle time vs solid sections
- High strength to weight ratio
- Reduced/eliminated sink
- Less warpage
- Low moulded-in stress provides excellent dimensional stability
- Design flexibility
- Reduced tooling costs as a result of replacing hot runner systems with gas channels.

INNOVATION ASPECTS

Nowadays, commercial packages of Computer Simulation of Gas-Assisted Injection Moulding are available only for thin-walled moulded parts, which are simulated using a midplane model (2½D Hele-Shaw approach). Consequently, it is necessary to create a midplane representation of the complex thick mould cavity. However, for thick parts a midplane representation involves a considerable geometric simplification. Moreover, in some areas of the part it does not exist a unique midplane representation.

A methodology to choose the midplane representation which best fit with the results provided by a three-dimensional computer analysis of the filling stage (conventional moulding) performed with a 3D CAD model of the complex part has been developed and tested.

MARKET APPLICATIONS

Initial applications in gas-assist injection moulding were primarily closed channel parts such as automobile grab handles and lawn and garden furniture handles. As the technology has sophisticated, design techniques were applied to gas-assist injection moulding, the variety and complexity of applications increased. Next table list examples of these products

Table 1. Gas-Assist Injection Moulding

- Appliance handles
- Toy industry
- Automotive
  - accelerator pedal arms
  - air filter housings
  - door handles
  - mirror housings
  - oil filler duct
- Business machine chassis / housings
- Furniture: chairs, tables
- Television housings
- Golf club shafts
- Basketball backboards
- CD-ROM trays
- Bottle crates
- Copier panels
- Shower heads
- Washing machine agitators
- Window frames

COLLABORATION SOUGHT

Two types of cooperation are sought by the Department of Chemical Engineering of the University of Alicante:

- Consulting services for companies which are working or expect to work with GAIM.
- Instruct people interested in perform the tasks involved in gas assisted injection moulding.