The standardised HASCO mould system and 3D printed mould inserts permitting rapid, low-cost prototypes.
Two-cavity quick-change mould for prototype production

The idea

Ever shorter time-to-market cycles and an increasing number of variants, plus the associated reduction in production quantities, calls for prototypes that can be produced both rapidly and cost effectively.

State-of-the-art 3D printing is already in widespread use for single parts.

At K2013, it was also shown how this 3D technology can be used to build complete injection moulds for the production of injection moulded components, and hence more realistic prototypes in small batches.

HASCO's latest innovation is now a combination of the HASCO quick-change mould K3500/… and a mould insert produced by 3D printing.

An initial example

An easy-to-mount sealing plug was to be produced for the familiar HASCO clamping fixture A8001/… to seal the large number of threaded holes.

An initial cost analysis showed that sealing plugs of this type cannot be produced by the conventional route – or can only be produced in a highly cost-intensive manner.

Given the geometry of the solid design, with walls that are around 12mm thick, it had to be assumed that the plastic screw could not be produced conventionally with a standard injection moulding process.

A prototype mould was now required for a feasibility evaluation.

The project

Present-day 3D printing makes it possible to produce mould inserts for small production quantities by using the appropriate printing materials (e.g. so-called digital ABS grades).

In line with HASCO's motto of "Enabling with System", the HASCO quick-change mould K3500/… was combined with a 3D printed mould insert for this sealing screw application.

The screw to be produced was then redesigned, with a reduced wall thickness as the main priority.

The K3500/… quick-change mould was adapted for the use of slides, while the ejector system and mould insert size were adopted from the standard range.
Implementation

The project was conducted jointly by several project partners.

To ensure that the project could be implemented rapidly and inexpensively, the natural choice was to use HASCO’s extensive standardised component range.

The modular HASCO quick-change system K3500/… proved to be ideal for the mould unit. Together with the development team from HASCO’s Mold Base Division and the 3D printing experts at Stratasys GmbH, initial development techniques were discussed. Following this, the corresponding mould was developed and designed at HASCO and produced in cooperation with the own Prototyping & Services Department.

The parts of the cavity that shape the polymer, such as the inserts and slides, were printed by Stratasys in the plastics grades of digital ABS 5161 and 5131 in just six hours, using a Conax 500 system.

The optimisation and finishing of the printed mould inserts and the sampling of the mould were conducted by the mould-making and prototype specialists at canto Ing. GmbH in Lüdenscheid, who have been using 3D printing technology for many years.

The first sealing screws for mounting in the HASCO clamping unit A 8001 were then ready after a record time of only four days.

The project proved it’s possible to implement this innovative rapid-technology application through the consistent use of tried-and-tested standardised HASCO products, coupled with state-of-the art 3D printing.

The injection moulding of prototypes and very small batch production, using the target component material on a quick-change mould with a 3D printed cavity thus marks a rapid and low-cost addition to conventional methods.

Series production

The successful implementation of the prototype sealing screw and the results obtained using this method, were then used as a template for a series mould to produce bigger quantities.

This series mould was implemented in cooperation with the Werkzeugbau-Institut Südwestfalen. Conventionally produced steel mould inserts were compared with ones containing cavities produced by the Course 4 method.

Course 4 technology uses a copper bronze matrix with enhanced thermal conductivity, which also permits conformal cooling.

The cycle times achieved with Course 4 cavities were some 20% shorter than those for conventionally annealed steel inserts.
Project partners

HASCO Hasenclever GmbH + Co KG
www.hasco.com

Stratasys Ltd.
www.stratasys.com

canto Ing. GmbH
www.canto-web.de

Subject to technical modifications.
Please always check all the data against the product information we publish in the internet.