Flexible Sealing Element – Not only for Tobacco Friends

Hybrid Technology. Reliable molding of plastic onto metal inserts is not usually easy, and the risk of flash formation is quite high. An application using the flexible sealing element A4200 shows how a classic tobacco injection machine can be upgraded to the latest state of the art in spite of such challenges.

Fig. 1. The two Company Managers Jörg (r.) and Thomas Hömberg (l.), and Dirk Langenohl (Hasco, center) during problem analysis. The tamping machine for home use (small picture) injects the tobacco into the cigarette sleeve

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Smoking is and remains a costly habit. In order keep this pleasure (or addiction) affordable in future, an increasing number of smokers are using cigarette tamping machines. Via various suppliers to the cigarette industry, the owner-run company Hömberg GmbH Kunststofftechnik/Formenbau in Lüdenscheid, Germany, has offered a range of tamping and rolling machines **(Fig. 1)** to the international market for many years. However, all the machines have a weak spot: Until now, the tobacco tamper was made of POM, with a surface that assists tobacco transport. If the tamper breaks due to excessively fast or incorrect operation **(Fig. 2)**, the machine had to be scrapped and disposed of correctly – it is not possible to repair the POM component.

How to Obtain a Tight Cavity?

To solve this problem, the two business managers Jörg and Thomas Hömberg worked out a solution **(Fig. 1)** together with Hasco, the manufacturer of standardized mold elements and hot-runner specialist. When the idea materialized to use metal for the sensitive tamper, the first samples soon showed a clear increase in lifetime and strength. However, during production of the plastic-metal hybrid component – plastic is still needed to ensure smooth operation and flexibility of the part – a new problem arose: It was not possible to mold the article without flashing, so that each part required manual deflashing at considerable expense to ensure its correct function in the tamping machine.

The reason was detected quickly: The steel insert used in the mold could not be matched precisely to the required mold contour. This was due to dimensional tolerance differences of the metal inserts, which prevented the cavity from closing tightly – with the visible result of severe flashing. A flexible sealing element was needed, and Hasco built a new sealing insert using the red material A4200 (MurSeal, **Fig. 3**). This high temperature resistant plastic combines excellent strength and high elasticity to maintain its machined profile. Moreover, it is so resistant to temperatures and acids that it cannot be damaged by common injection molding materials. In this way, a reliable and damage-free seal between article and melt flow is ensured.

Careful Insertion and Centering

Its chemical composition prevents the sealing element from entering a bond with the injected plastic melt. Consequently, the service life of the flexible sealing element is determined not so much by the materi-

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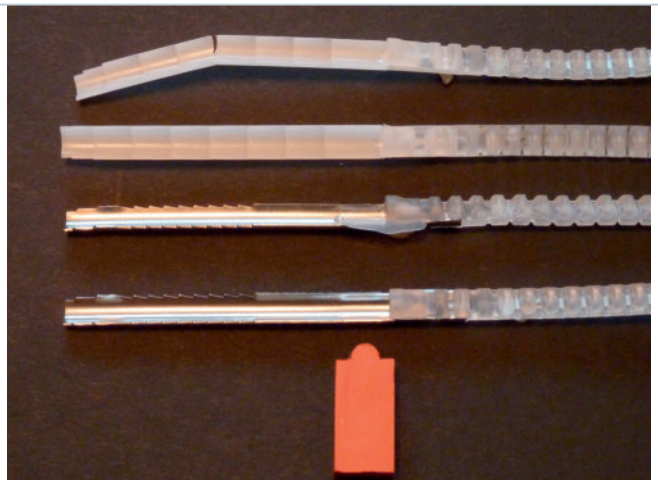

Fig. 2. The road from the fragile POM tamper (top) to the rugged overmolded metal tamper involved several detours

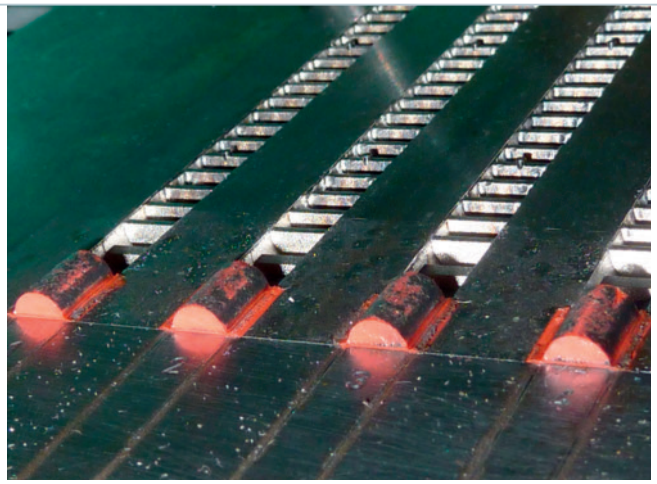

Fig. 3. The flexible sealing element A4200 prevents flashing in the injection mold

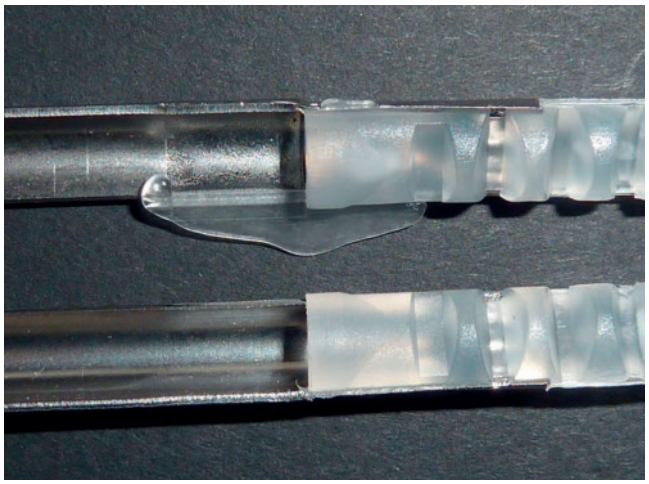

Fig. 4. Faults due to over-filling (top) now belong to the past (photos: Hasco)

al than by the geometry of the inserted part, and by the manner how the insert is introduced into and centered in the mold. A mistake during insertion could damage the sealing edges of the A4200.

The sealing element can be easily machined using freshly sharpened milling or turning cutters. Even the finest contours can be machined with utmost precision.

Conversion of the multi-cavity mold was easy, as a technician only had to replace the previous metal inserts with the new inserts made of the flexible red sealing element. The sealing element can be secured by means of screws, clamps, or a friction-locked joint with fixing pins. In this case, the sealing elements were attached with screws from the rear.

The final results satisfied all expectations, and the hybrid parts were produced flash free and without damage, enabling the over-molding of the metal insert with plastic POM without the any rework necessary **(Fig. 4)**. The tamping machine now works reliably and problems are a thing of the past.

A Start Has Been Made

The low reject rate and eliminated rework have cut the unit costs significantly, and both parties benefit from the metal tamper: Smokers can now inject the tobacco into the sleeve more easily, and the manufacturer Hömberg is no longer faced with complaints – as indicated so far.

Following the successful conclusion of this project, Hömberg has now started to examine the rest of their product portfolio for further optimization potentials. For example, the possibility of using the flexible sealing element for a two-component molded part is being investigated, because the A4200 could provide a damage-free seal between the two components. ■

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