

## **Rational aligning of castings**

The Dutch enterprise CIREX – the most important wax investment foundry throughout the world – stakes on the 4-column press systems from TOX<sup>®</sup> PRESSOTECHNIK for the sizing and aligning of castings.

When it comes to castings produced in a wax investment process, the Dutch specialist CIREX is the first-class name in the international field! The wax investment process is mainly used for the production of costly formed, i.e. complex components. Due to the relatively low tool cost, this process is already profitable with small quantities. For this process, the model gets first founded in wax. For major series, the wax model can also be made by injection moulding and provided then, as a kind of sealing, with a ceramic layer. Thereafter the casting moulds (smaller parts are also called clusters) are put into the autoclave. There the wax gets melted and the ceramic mouldings remain and are subjected to a sinter/baking process in another oven. Thereafter the correspondingly liquefied metal is cast into the ceramic mouldings. After cooling, the ceramic layer is knocked off and the castings close to contour and shape remain. Frank ten Tusscher, the responsible quality engineer at CIREX hereto explains: „When using the wax investment process, we can offer our design engineers a wide field of design possibilities but nevertheless we achieve a high accuracy of the parts. The tolerances obtained are in the range of a few decimillimeters and, last not least, the parts are precisely reproducible“.

### **Efficient and precise alignment of castings**

CIREX mainly supply pretentious serial components for automotive industries, for example casings for fuel pumps, closing mechanics for folding tops of carbriolets, engine components, but also components for machine building, medical technics, electro-technics and, above all, for the aeronautical industry. The castings are mainly made of steel or special steel. Although specially the wax investment process allows thin-wall and precise work pieces, the castings often need retouching work. This retouching work is usually done at the CIREX's branch in the Czech Republic where the control, aligning/sizing and surface finishing takes place. For adapting the capacities to the continuously increasing business trends, CIREX invested in an additional sizing press. After having already made good experiences with the existing sizing press produced by TOX<sup>®</sup> PRESSOTECHNIK GmbH & Co. KG, D-88250 Weingarten, and delivered through the Dutch subsidiary, Frank ten Tusscher and his colleagues decided again in favour of a TOX<sup>®</sup>-Press system: „Since years the existing press works in a most reliable and precise way. Its cycle times are, however, reduced to a minimum and we urgently need more capacity. And with the new press we also intend to do the alignment in the horizontal as well as in the vertical axis - a work for which we needed up to now two separate operations which is, of course, most time-consuming.“

### **More flexible and efficient by the integration of functions**

At the end of a thorough demand analysis and consultation with the application engineers from TOX<sup>®</sup> PRESSOTECHNIK, the decision was taken in favour of a 4-column press of series MAG. These presses are

distinguished by their optimal load distribution over the whole clamping surface and their minimal symmetrical deflection even under high load. The press type MAG 050 used here, has a tool area of 430 mm in length and is equipped with a TOX<sup>®</sup>-Powerpackage driving cylinder S 75 having a total stroke of 300 mm thereof 20 mm powerstroke. A drive with 750 kN power stroke force was chosen for the vertical tapping / calibrating, anticipating a potential future utilisation of the drive, which was limited by the controls setting to a maximum power stroke force of 493 kN, still making use of the full 6 bar air for the feed stroke (fast approach), ideal for short cycle times. For the horizontal aligning/sizing, a pneumohydraulic KT-system is installed which consists of two hydraulic cylinders driven by a TOX<sup>®</sup>-Pressure intensifier ES. This compact combination delivers pressforces up to 300 kN with a total stroke of 150 mm. As Frank ten Tusscher explains, these pressforces of 500 kN for vertical and 300 kN for horizontal operation, as well as the strokes, are optimal for this kind of operation and even have reserves for future alignment and sizing tasks. The design of the controls provides a manual/semiautomatic or an automatic process run and includes several check processes for different work pieces which are already in action or can be called when required. This offers a high flexibility in use and application in the full sense of a future-oriented investment.

In all respects, a profitable investment

Finally CIREX drew the conclusion: „Due to the new press and/or drive concept we achieved a significant productivity increase with considerable growth in flexibility. We have strongly reduced the cycle times due to a changed controlling of the press. Besides this, we can now determine the cycle sequence of the press: at first horizontal and then vertical alignment or viceversa, or only vertical or horizontal alignment, for which we also use the press. The change is practically effected without set-up. just by pressing a button, i.e. only the corresponding tool and/or the part holding fixture must be changed.“

### **Description of illustrations:**

Fig. 1 shows the general view of the custom press at the CIREX factory used for aligning; it includes a TOX<sup>®</sup>-4-Column-Press MAG 050 and two alignment units flanged to the left and the right side of it

Fig. 2 shows the tool installation area of 430 mm (between the columns) equipped with a base holding fixture for castings which can be aligned and/or sized here in horizontal and in vertical axis

Fig. 3 shows the modular kit system used for TOX<sup>®</sup>-Presses of series MAG; the 4-column press frames can be individually equipped with almost every press drive

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