Art castings of quality - Alfa foundry

Introduction

The Alfa company was founded in Eibar in Spain in 1920. The city was renowned for arms production and many factories were involved in this type of work including Alfa.

In 1922 Alfa decided to change focus and began to produce sewing machines. The quality was of a high standard and the company gained an exceptional reputation and expanded quickly. At this time it was decided to produce castings in-house and the Alfa foundry was founded.

This situation remained for a number of years, however in the 1970's import restrictions changed and the sewing machine market changed with many lower cost alternatives, particularly from far-eastern countries, becoming readily available.

Alfa Arte

During the 1980's the sewing machine business experienced increased competition and the company performed a major review of strategy resulting in the segmentation of its operations into a number of distinct businesses focusing on different market sectors such as automotive, aeronautics, defence, home appliances and art. This resulted in the formation of Alfa Arte as a separate business in 1993.

From these beginnings the art foundry developed and is now a highly regarded company throughout Europe. A focus on continuous process improvement and investment in new technologies has enabled Alfa Arte to maintain its position as a major supplier to the art sector, and currently produces a wide variety of art castings of various sizes in bronze, aluminium, stainless steel and other alloys, examples of which can be seen in Figures 1-3.

Figure 1

Figure 2

Figure 3

Traditionally the foundry used the lost wax process to obtain the definition and finish to the castings, however, the process was complicated and expensive. The lost wax process demanded an artistic clay reproduction, from which a plaster mould could be produced. After drying, the plaster mould had to be invested with wax to produce a wax replica, which could then be covered in ethyl silicate and refractory coating and dried. A number of coating layers of varying permeabities were required under carefully controlled drying procedures to produce the finished mould prior to casting. Although this process is well understood and has been used for many years for art castings it is time consuming and expensive.

Alfa needed to look at other processes to improve production, reduce costs but maintain the high standards and quality of its work.

In association with FOSECO, Alfa Arte considered the use of FENOTEC*, a low viscosity, alkaline-phenolic resole binder hardened by a liquid organic ester. This meant they could operate with a wide range of sands, have fast strip times, low nitrogen and provide a good casting finish. The introduction of the FENOTEC binder system enabled the foundry to cast difficult shapes in much reduced times with excellent results (figures 4 -10).

Figure 4

Figure 5

Figure 6

Figure 7

Figure 8

Figure 9

Figure 10

To provide further enhancement and cleanliness to the surface finish of the casting a refractory mould coating such as TENO* coating BBP2 is applied by spray or flow coating to ensure there are no runs, drips or brush marks.

Alfa Arte has embraced many of the newer advancements in foundry technology paying particular attention to correct fluxing (CUPREX*) and metal treatment practices. The use of SEDEX* ceramic foam filters has removed the risk of inclusions, a major problem with this type of casting requiring excellent surface finish, and ensured clean non-turbulent flow into the moulds avoiding the risk of re-oxidation.

To obtain optimum yield of cast metal and avoid the possibility of shrinkage problems KALMINEX* sleeves are now used in the FENOTEC moulds to a large degree.

Alfa Arte have also introduced the latest digitilzation technology from Japan, in this process the work of art or model is scanned using a laser projector and high resolution digital camera, to obtain a three dimensional digital image with an accuracy of up to 20 microns (figures 11 and 12). The image is stored on a computer and can subsequently be manipulated to add additional detail or re-scaled to larger or smaller dimensions. The image file can then be used to directly create a pattern using stereolithography or CNC machining technology. It would also be possible to use the data to directly machine the mould and cores required from a block of FENOTEC bonded sand. The pattern or mould can then be used to create the finished casting (figure 13), using standard foundry processes.

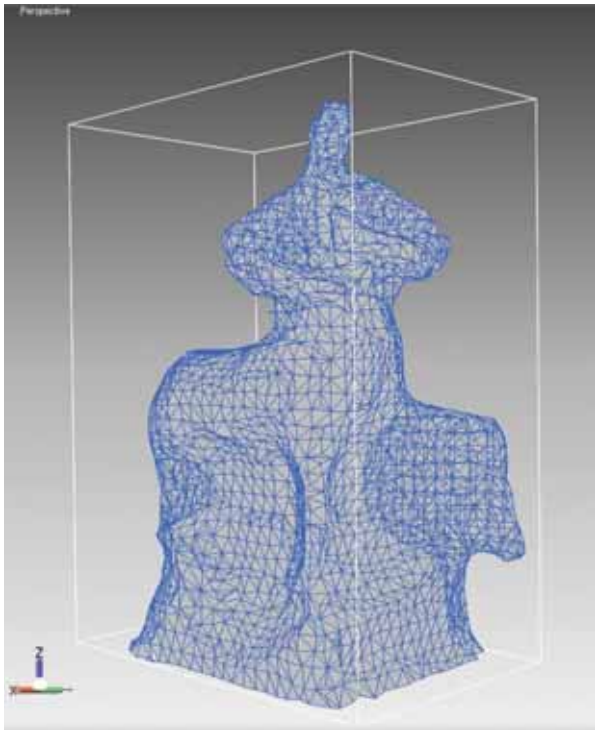

Figure 11

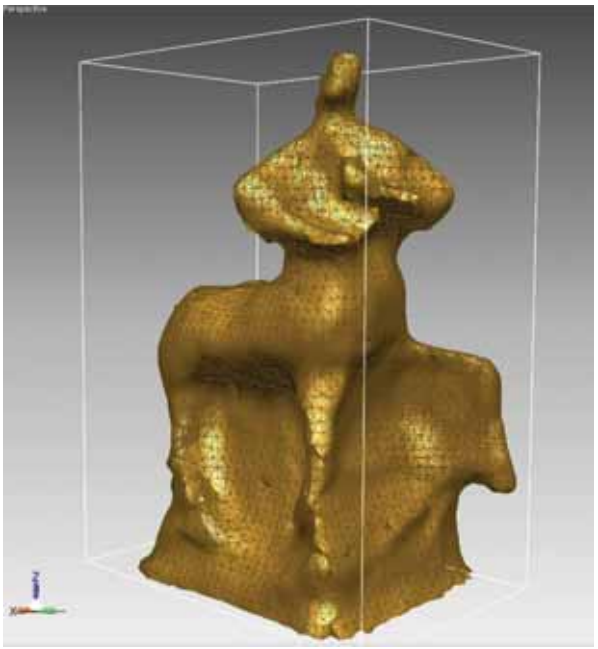

Figure 12

Figure 13

Conclusion

Alfa Arte is very conscious that to exist in this very competitive market it is necessary to keep pace with changing technologies, and this it has achieved by the introduction of up-to-date processes such as filtration, feeding and new moulding techniques in conjunction with FOSECO.

Acknowledgements
All photos courtesy of Alfa Arte