

# Case study

## Aristo-Cast, Inc.

3D printing to enable producing complex configurations for investment casting

### ARISTO CAST INVESTMENT CASTING



**COMPANY**  
Aristo-Cast, Inc.

**INDUSTRY**  
Investment casting

By using 3D printing investment casting shells, Aristo-Cast is able to make very intricate internal configurations on the casting that otherwise would not be possible, while reducing labor, time and with excellent quality.

*“Internal configurations and very complex cores are impossible to create in the conventional investment casting process. Now that we have the 130 in house, we can do it.”*

Jack Ziemba, CEO at Aristo-Cast, Inc

## SUMMARY

### CHALLENGE

Traditional manufacturing techniques for investment casting require the use of a pattern to build a shell over it, which is very labor intensive and thus time consuming. As each pattern can be consumed only once it is a quite costly process too. When it comes to small, complex and detailed internal channeling, it is extremely difficult or even impossible to produce using conventional investment casting shell building techniques.

### SOLUTION

3D printing investment casting shells directly with the Admaflex 130.

### RESULTS

- Eliminating the need for a pattern
- Reducing time, labor and cost
- Enabling casting of intricate internal detailed parts
- Directly competing with the metal 3D printing arena

### ARISTO-CAST, INC. - INTRODUCTION

Aristo-Cast is an award-winning investment casting source for both prototyping and production of an unlimited selection of alloys through blending the latest technology with old world craftsmanship. Since 1998 they have been producing 3D printed wax patterns and are a recognized leader in applying Additive Manufacturing to the investment casting process.

## CHALLENGE

Conventional investment casting requires cutting a cavity or 3D printing to create a pattern to build a ceramic shell over it. These traditional manufacturing techniques are very labor intensive and thus time consuming and costly. Moreover, producing a casting with a very intricate internal configuration is extremely difficult, if not impossible, utilizing conventional shell building procedures. It is only known for sure if the casting is perfect until after it is finished due to the lengthy process of coating, drying and re-coating before the cast can be poured.

## SOLUTION

3D printing a ceramic shell solves this all at once. The smaller and more difficult the internal configuration, the bigger the advantage to utilizing the ceramic 3D printing process. Some casts would even be impossible to produce without the Admaflex 130. In addition, 3D printing shells eliminates the need of a pattern, removing a great deal of work and cost that would normally precede the shell build process.

## RESULTS

Jack says:

*"There is no competition out there that is capable of doing what we're doing, utilizing the admaflex 130"*

Using 3D printed ceramics for investment casting is competing with the metal 3D printing process, but the advantage of casting is the availability of the wide selection of alloys that Aristo-Cast is able to cast. Where metal printing is still not refined to the degree of detecting micro porosity that could be detrimental to the function and integrity of the part, investment casting has existing standards that have been proven over many years. Looking at markets like aerospace and medical applications, it is just scratching the surface on what the possibilities of 3D printing investment casting shells are. It is not going to be too long a period of time before the industry itself is going to wake up to that too.

## COSTS

Capital expenditure on an Admatec 3D printer would be around a quarter million US\$, while direct metal 3D printing starts off at least at double that amount. To enter complex casting ability using Admatec equipment, providing metal end parts is therefore at a lot lower cost through investment casting than metal 3D printing.

Jack:

*"We at Aristo-Cast are convinced this is a good way to go".*

## PROCESS

### Cluster

10 minutes time



1<sup>st</sup> and 2<sup>nd</sup> dip (if dipped conventionally, this would take days by highly trained personnel to get the inner passageway)



Seal 1 day time

(traditional trees take 8 days to dip)



### Dewax/burnout

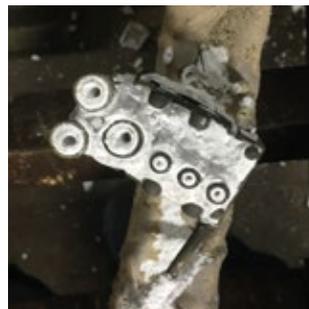
15 minutes time



### Casting Stainless Steel



### Knockoff



Admatec Europe, the company dedicated to making ceramic and metal 3D printing accessible for production and development.

**ADMATEC**