

VALUE SELLING APPROACH DESIGN SERVICES

# Case Study

## An alliance to ensure an ideal casting process

General Motors (GM) and ASK Chemicals formed an Alliance of strategic partners to manage and oversee a major series production process transfer



## >> Background

**In 2009, General Motors (GM) entered into a joint venture with the Uzbekistani government. The goal was to produce the 1.2L & 1.5L B-DOCH (Family AB Double Over Head Camshafts) cylinder head in Tashkent, at the newly built greenfield facility. In order to ensure their success, GM sought the assistance of strategic business partners on matters pertaining to employee training, process optimization and conversion.**

General Motors came to ASK Chemicals, a leading solution-based foundry consumable provider, to serve as project managers to ensure the seamless transition of their aluminum cylinder head series production line in Uzbekistan. A strategic alliance was created with two other corporations that contained specific expertise within the casting production process: Anderson Global (tooling provider) and Wolverine Bronze Co. (prototyping and testing facility). GM also played a key role by supplying an engineering team to support and oversee every step of the process.

Anderson Global is a leading global tooling provider and specializes in optimizing tooling designs. Wolverine Bronze Co. is a prototyping and testing facility. Here, they contain state-of-the-art equipment required to test and verify series production manufacturing processes.

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# >> Objectives

**ASK Chemicals, and the Alliance team, were tasked with the objective of seamlessly transferring the production on GM's aluminum head castings to the country of Uzbekistan. Several milestone achievements were identified in achieving the success of this project: complete casting and process optimization, regionally adapted solutions, employee training, and ongoing training and support. Within these latter goals were more highly specified targets to be addressed by the Alliance team:**

The Alliance team worked together on the following objective list. Below is a detailed outline of the customer requirements and the primary responsible party within the Alliance.

#### **ASK Chemicals:**

- Develop optimized casting and core designs utilizing simulation software.
- Reduce core and casting scrap considerably below 10%, but maximize production up-time and productivity.
- Ensure the process is seamlessly transferred to GM and GM Uzbekistan.

#### **Anderson Global:**

- Produce an optimized tooling build that would feature a core box, semi-permanent molds and auxiliary fixtures and gages.
- Semi-permanent molds must accommodate a Fata turntable production process.

#### **Wolverine Bronze Co. & ASK Chemicals**

- Establish a core strength range suitable within Uzbekistan's geographical climate.
- Ensure an efficient shakeout timing sequence.
- Guarantee efficient gating and riser removal plus cycle time and repeatability.

### What is the ASK Chemicals Value Selling Approach?

“It's a truly collaborative effort, first-and-foremost. The ASK value-adding model leverages our extensive knowledge-base and foundry experience in order to enhance process efficiencies. Sometimes it's also referred to as "solution selling". Here, the supplier works hand-in-hand with the customer to address their specific needs. The eventual outcome, as seen with GM Uzbekistan, is the efficient and successful completion of stated goals/requirements.”



## >> Solutions

**Leveraging their greatest assets the Alliance team developed a plan to meet GM's objective parameters. Ultimately, this stage was incredibly revealing, as it was a testament to the Alliance team's capabilities and expertise. Furthermore, it demonstrated the efficiency and speed at which solutions could be derived given thorough planning and testing. ASK Chemicals, for example, used simulation software to realistically demonstrate casting integrity. Thus, any problematic situations could be identified and remedied before actual production.**

### **ASK Chemicals:**

Simulation engineers at ASK used Arena-flow® software - widely considered the most accurate core shooting simulation system available - to design the entire core box from the ground-up: blow magazine, individual cores and box. Once designed to the ideal specifications, pouring simulations could commence:

- Magma® software was used to project both the metal fill-time and solidification time
- Potential porosity issues/rates were realized, as well as overall projected mechanical properties

### **Anderson Global:**

The physical tooling build occurred at Anderson Global and resulted in an optimized 100L production core box made from high-grade steel - produced on a Loramendi core machine.

- Auxiliary fixtures and gages were constructed of steel, renwood plastic and aluminum.

### **Wolverine Bronze Co.**

The pre-production prototype testing site was located at Wolverine Bronze Co. Here, their goal was to ensure an optimized casting production process while considering the available resources and climate of Uzbekistan.

- Core strength tests were conducted to ensure a statistical probability of success given regionally available resources and climate conditions.
- X-ray imaging, dimensional sectioning testing, CMM measurement analysis and metallurgical examination provided further insight.

### **ASK Chemicals: (Post Casting Process)**

- Developed a custom recipe to ensure complete sand removal from the casting
- Robotic automation system established to efficiently remove gating and risers
- Specification of production equipment run-off to ensure efficient cycle times
- Complete process documentation for easy knowledge-transfer

## >> Results

**After completing all phases of the project ASK Chemicals, alongside their Alliance partners, provided launch support and training to GM Uzbekistan. This took place in both the United States, as well as Tashkent and included the newly acquired foundry personnel.**

Today, the GM Uzbekistan plant is producing an average of 2,000 cylinder head castings per day. These go directly into the neighboring engine assembly plant and supply the Uzbekistani and Asian automotive market. The seamless production transfer was thanks to the dedication and process efficiency of the Alliance team, as well as GM and their support team.

The final process documentation delivered to GM Uzbekistan encompassed the results of the project and would serve as reference to their manufacturing site in the future:

- Flow diagrams
- Process control plans
- Tooling design manuals
- Core/casting process manuals

# >> About ASK CHEMICALS

**ASK Chemicals is one of the largest suppliers of complete solutions and tailor-made consultation services for the foundry industry. The core of our company's activity involves manufacturing all foundry consumables required for the production chain as well as providing optimum technical services in order to perfectly adapt our products to the processes on the customer's premises.**

Our wide product range contains binders for all core manufacturing processes, coatings, additives, feeders, filters, release agents, metallurgical products including inoculants, Mg treatment wires, inoculation wires and pre-alloys for iron casting. Core production and prototype development as well as a wide range of simulation services round off what the company has to offer.



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