

# For Nissin Kogyo, ESI ProCAST is an Indispensable Tool for Assuring Production Quality



## Challenge

To reduce vehicle weight, aluminum has replaced heavier metals previously used to manufacture brakes. Designs are constantly evolving yet the strength, performance and durability are expected to improve. Nissin Kogyo needed to meet the complex specifications set by OEMs, find a way to manufacture a wide variety of products, and produce high quality castings without any delay in production.

## Benefits

With ESI ProCAST, Nissin Kogyo could successfully cast complex shapes after upfront filling & solidification analysis using precise finite element technology. All possible defects were predicted with the highest accuracy. By introducing ESI ProCAST on a full-scale basis, Nissin Kogyo reduced their development time and trial production, allowing them to reach the market faster.

## Story

Nissin Kogyo Co. Ltd., established in 1953, develops, manufactures, and sells brake equipment for two- and four-wheeled vehicles. Honda Motor Co., Ltd. and Toyota Motor Corporation are among their largest customers. One of their main challenges is meeting crucial demands of such OEMs, including reducing the weight by using lightweight aluminum as an alternative without sacrificing performance and durability.

Brakes are the primary safety device of an automobile and at the same time are often visible and must be aesthetically pleasing. They typically experience temperatures of 200° - 300°C as a consequence of friction during braking and must function well under the adverse environments of dirt, water, snow and salt. The challenge for many manufacturers, such as Nissin Kogyo, is to deliver, in the shortest time,

optimal designs that meet the stringent requirements of automotive OEMs.

The level of defects Nissin Kogyo experienced in their product lines was too high and was delaying deliveries to their customers. With increase in production and product diversification, the problems amplified.

Their main task was to produce a "quality casting" (right size, shape, weight, strength) without internal defects and with a good after-machining surface finish. At the same time, the manufacturing process had to be designed to provide the highest possible yield. Nissin Kogyo realized that their success depended on understanding the casting process inside the mold cavity.

## Choosing the right simulation software

In 2002, Nissin Kogyo adopted ESI ProCAST. With its Finite Element Technology, it provided an accurate description of the complex casting surface, and the detail of the molten metal filling inside the mold cavity.

One of the challenges in casting is that the wall thickness is always non-uniform. ESI ProCAST captures this non-uniformity very well, which is important to Nissin Kogyo as their product portfolio is diverse and they need to accurately predict flow and solidification in several designs and process variants.

## Effective in-house implementation

By using ProCAST in the development cycle, Nissin Kogyo was able to produce high integrity castings and greatly reduce their scrap rate. By increasing production and diversifying their products, while maintaining quality, they gained the confidence of their customers. Future simulation work will focus on the design of molds, which compensate for change in geometry during solidification and cooling.

*"Before the introduction of ESI ProCAST, the percentage of defects was relatively high, leading to a smaller yield. It was impossible to accept this with an increase in production and the diversification of products. We were able to reduce the percentage of defects to a very large extent thanks to a high accuracy simulation tool like ProCAST."*

**Mr. Katsuhiko Ashida**  
Chief Engineer, Development Operations  
Nissin Kogyo Co. Ltd



for more information  
[www.nissinkogyo.co.jp/en/](http://www.nissinkogyo.co.jp/en/)

