

4C-Technologies Leverages SpaceClaim to Take Control of 3D Modeling for High-Pressure Die Casting

To avoid costly mistakes prior to the final die casting process, it is crucial to conduct Computational Fluid Dynamics (CFD) simulations to optimize the desired quality and develop problem-free production. These CFD simulations identify problems in advance like cold flows, internal porosities, erosion of the production tools, venting problems, etc. Simulations are conducted on 3D models, involving considerable manipulation of geometries.

SIMPLIFYING 3D MODELING TO ENHANCE SIMULATION

Before the CFD simulation process commences, extensive design, edit and manipulation of the 3D model is necessary. Runners and overflows have to be added and quite often the part itself has to be changed. It can include areas that need to be machined after the casting process and must be filled on the casting model. Examples are small holes or areas where machining allowance needs to be added.

4C-Technologies uses Flow3D® from Flow Science for CFD to simulate not only the metal-flow through the die, but also the flow of the air inside the die if this is considered necessary. This process ensures an unprecedented level of accuracy is achieved for even extremely complex shapes and designs.

Prior to using SpaceClaim®, Lars and his team used expensive CAD systems, which was constraining because the 4C-Technologies' casting experts had limited experience in 3D modeling. Third parties had to be relied on to create the 3D models, adding to the cost and slowing down the simulation process.

"SpaceClaim has reduced our time significantly on model simulation prep — SpaceClaim has literally beat out the expensive CAD systems for what we need to accomplish," said CEO and Founder of 4C-Technologies Lars F. Hansen.

SPACECLAIM PUTS 3D MODELING INTO THE HANDS OF 4C-TECHNOLOGIES' CASTING SPECIALISTS

SpaceClaim's ease of use and learning has enabled Lars to provide the right tool for the die-casting specialists to perform 3D modeling and eliminated the necessity for third party involvement.

Lars heard about SpaceClaim through CADSYS Scandinavia ApS, and was very impressed immediately with how flexible the software is in dealing with complex geometries. The lead time from early design to production-ready is shrinking and any production delays due to less than optimal designs are unacceptable. Using SpaceClaim and computer flow simulation of the high-pressure, die-casting process minimizes the risk for major failures and long delays.

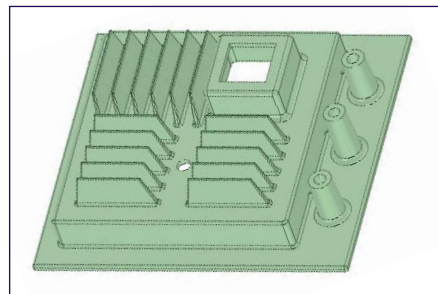


Figure 1: Aluminum heat sink for an electronic device. The part is produced by the high pressure die casting process. It is crucial that all the cooling ribs are pore free and perfectly filled.

ABOUT 4C-TECHNOLOGIES

4C-Technologies is an 18-year old consulting company that provides support to global customers producing and using high-pressure, die-cast products and products produced by gravity casting. The range of support includes guidance for cost effective design of die-casting and gravity casting components in aluminum, magnesium and zinc; design optimization to minimize production costs; 3D simulation of flow, solidification and stress/strains in casted components; and total design services including flow, strength and crash analysis.

Lars Feldager Hansen is the owner of 4C-Technologies and very involved in working directly with customers to ensure optimal results for their casted parts. Lars has extensive experience with die-cast metal parts including working for Ford Motor Company, Jaguar, Land Rover and Aston Martin. 4C-Technologies works with large and small companies and is an approved supplier to Nokia Mobile Phones. Through a joint venture with MMAA, Global 4C-Technologies has customers worldwide covering America, Europe, Asia, Australia and Africa.

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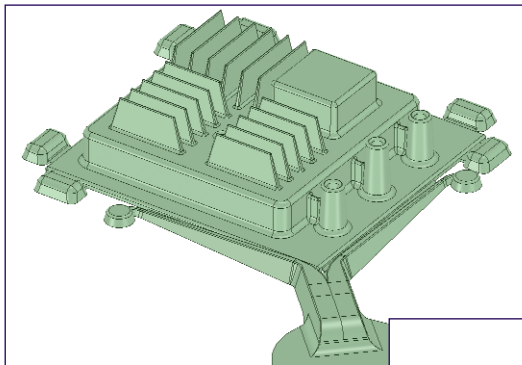
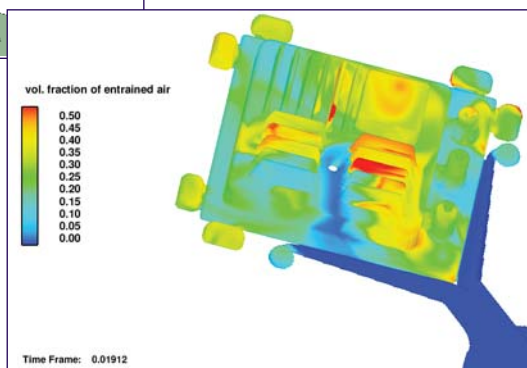


Figure 2: The part has been product matured towards the high pressure die casting process. Some holes have been removed and larger radii has been added. This is done in close cooperation with the customer. Using SpaceClaim this has been done in a few hours. In addition a runner and venting system has been applied to the part for the initial CFD analysis.

Figure 3: The first flow analysis shows some problematic areas in the red zones. These areas has been redesigned and the gating system changed to improve the flow in these areas. It normally takes 1-4 CFD analysis before a perfect result is achieved



“Through the elimination of third parties and enabling our casting experts to make the 3D modeling changes themselves, we have assured accuracy as the design moves through the process.” Lars Hansen.

COMMUNICATIONS WITH CUSTOMERS IMPROVED WITH SPACECLAIM

Close communications with customers is vital for Lars and his team to meet expectations and deliver the required result. Prior, they had to create complex 2D drawings, which was time consuming and often took

days. Now with SpaceClaim, changes are applied directly to the 3D model and the customer can visually understand the suggestions. The changes take minutes rather than days and have improved the overall communications process.

“4C-Technologies every year invests in many different types of high level software to ensure we continue to leverage the latest innovations. SpaceClaim has proven to be the best investment we have made for many years without question. We recommend it to our partners and suppliers.” Lars Hansen.

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Lars F. Hansen
CEO and Founder
4C-Technologies



150 Baker Ave. Ext., Concord, MA 01742 USA
Tel: +1 978.482.2100 Fax: +1 978.369.5864



Østre Allé 6, 9530 Støvring, Danmark
Tel: +45 7020 3572 Mob: +45 2035 9344
Fax: +45 9837 2255