



SUCCESS STORY

at ÇELIKEL DIE CASTING Istanbul / Turkey

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 Function Production Director

INTRODUCTION TO OUR COMPANY

Founded in Istanbul in 1968, Çelikel has achieved a stable and innovative growth over the past half century and has established its name as a reliable supplier for the rapidly changing global automotive industry. We convey our knowledge and experience to our customers with whom we work in full cooperation in design and product development prior to production. With our extensive design knowledge, we complete production in the most efficient way possible while maintaining a competitive edge in the market. Today, we continue to be a powerful force that strengthens the automotive industry by combining a keen business sense based on communication and cooperation, which we inherited from our founder, the late Osman Deniz, with our belief in creating a sustainable world in every aspect.

MAINLY PRODUCT GROUPS CAN BE DIVIDED TO THREE GROUPS:

- Structural Components (BIW)
- Powertrain Product
- E-Mobility Components

Product groups are in casting and machining operations with a state of the art technological machine park and equipment. 25 DCM with a clamping range of 560 t – 2200 t and 3 axis, 4 axis and 5 axis machining centres and of course all technological equipment such as Fondarex vacuum units with humidity sensors / jet coolers / squeeze pins etc. to maintain a sustainable production quality in each single part. We are proud to announce that, thanks to the Çelikel Visual Production system, automatic data collections corresponding quality / efficiency /

performance / scrap ratios lead to create tremendous efficiency and allows production of 15'000 t / 30 million products annually.

VISION OF NOWADAYS INDUSTRY

Personally in this die casting sector for 15 years, it is very easy to see and note that quality requirements rapidly increased while costs must be dramatically decreased!

Car manufacturers try to combine two or three parts into one by creating new designs. Reason of this is to decrease mould investment costs / less assembly operations in the line / easy to manage stocks etc. which are totally understandable business factors.

But from the die casting point of view; various type of complex projects come out. On this point, technological side-equipment usage becomes very significant because only the die casting machine rigidity can not help to create sustainable quality.

WHY THE NEED OF PROFESSIONAL VACUUM?

Vacuum die casting is the key factor to eliminate positive air pressure in front of the molten metal with smooth filling and better flow results can be achieved. In addition, sucking the air inside the cavities yields to dramatical porosity enhancement. In some cases end filling figures, have critical thickness values and more complex process should be designed in feasibility stage. In this case, jet cooling / squeeze pin addition and vacuum adaptation to the process are the key factors to reach customer requirements.

JUST TO GIVE TWO SPECIFIC EXAMPLES

- In e-mobility product casting, filling should be smooth, ingate velocities and intensifier pressure should be as low as possible to delay tool distortion. Even a 0,05 mm burr could create a short circuit while product is in function. In this case, positive air pressure in front of the molten metal should be entirely removed to let the molten metal fill the cavity without problems.
- In structural component casting; filling should be smooth but from the 1. phase to the end of filling, no air gaps should be involved in the molten metal. Not only for visual faults such as blistering after heat treatment; but also, for safety reasons as porosities will create less bending / yield / tensile strength values.

In summary, quality requirements increased in 15 years but die casters still have a chance to increase efficiency and quality at the same time by using vacuum systems / squeeze pin / jet cooling applications. More complex parts need to have more complex process designs in feasibility stages.

WHY THE CHOICE OF FONDAREX AS PARTNER FOR VACUUM?

Fondarex is the only vacuum system that we choose as a solution partner. There are plenty of reasons

we trust them, but to sum up:

- Best price / performance unit in the market
- Very effective and trained after sales service
- Very easy to perform maintenance activities
- Easy to discuss engineering solutions
- A strong company who is in the very centre of die casting industry
- User friendly interface

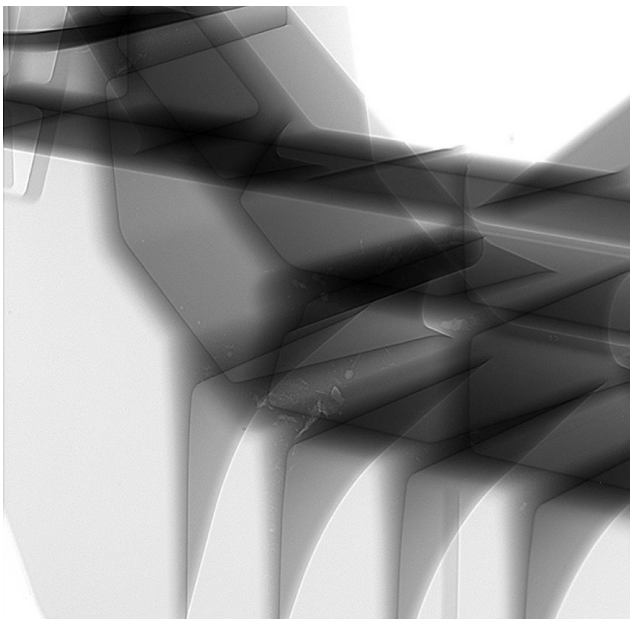
THE CASE STUDY

4,53 kg weight and 650 mm x 400 mm dimensions of structural component is casted by Vacuum Die casting operation.

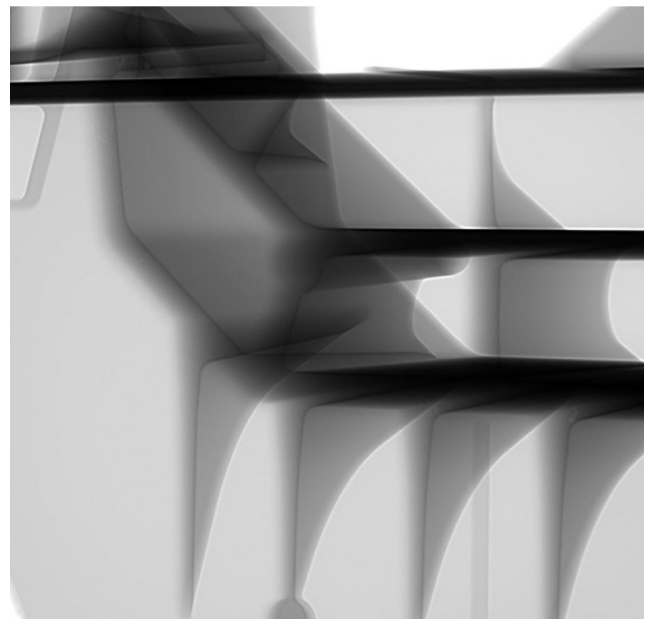
Without vacuum operation; it is almost not possible to reach neither porosity requirements nor desired mechanical strength values.

1 Maxi valve with 800 l tank capacity Fondarex Vacuum Unit is in service for this part.

Thanks to the Fondarex vacuum unit and valves we could achieve the best quality in an efficient manner to increase our productivity / quality / efficiency.



Without vacuum process



Vacuum operation activated