
ECRIMESA
GROUP

Design for MIM from previous process, an interchange need between MIM maker and final customer.

Moving forward to seize the industrial transformation.

CRIMESA GROUP

Location

LOCATED IN
SANTANDER
North Coast SPAIN

- 300 employees in total nowadays (IC + MIM + M)
- Start activities in 1964 (Investment Casting)

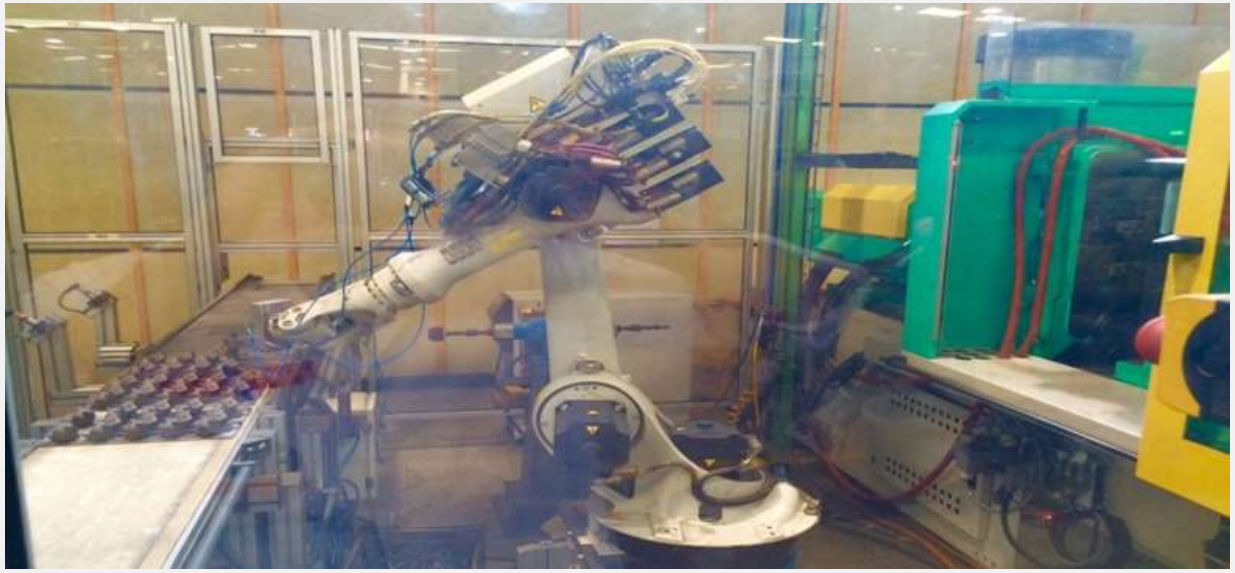
Services

- ECRIMESA: Investment Casting since 1964 (include Tool Shop and Heat Treatment plant).
- MIMECRISA: MIM production since 1994 (first MIM-Master continious MIM worldwide).
- MECANSA: MACHINING belonging to ECRIMESA group since 2005.
- AM: Developing branch.

Technology

12 Hydraulic and Electrical Injection machines

Different sizes and almost all with Robot arms or Full Robots



Technology

4 MIM MASTER lines for continuous debindering and sintering.

2 Vaccum sintering batch
Batch debinding and CIM sintering furnace

Piece design

- MIM SS Hinges able to open glass doors until 270º was developed from die injection zamak to 316L stainless Steel (to go to new markets)

Redesign together with final customer was needed to be able to produce MIM parts from earlier idea to MIM design without fails from binder-powder injection phase segregation that showed cosmetic and mechanical not enough quality

Piece design

- Final MIM Parts still showed complex changes of thin walls and big dimensions.

✓ Special sintering supports were needed to avoid / reduce distorsion as well as coining and dimensional control devices.

✓ Penetrant test was used internally as tool for process development and quality control.

✓ Parts belongs to the upper range of MIM parts weights (50-80 grams) and surface sintering dimensions.

Customer objectives.

- Produce HINGES in SS for new markets Where Die Casting is not good enough.
- Use MIM process as machining would be unaffordable.
- High cosmetic product.
- High corrosion and Strength to pass homologation of final product.

- Starting point agreed design was defined together with lower weigths and more complex to produced in MIM (assuming some update of the product design will be needed to become more MIM friendly.
- MIM moulds number 101865/6 were builts in ECRIMESA Tool shop.
- 3 Iteration of samples were needed.
- Second one was close to objetives to be able to produce the MIM parts and to be homologated.
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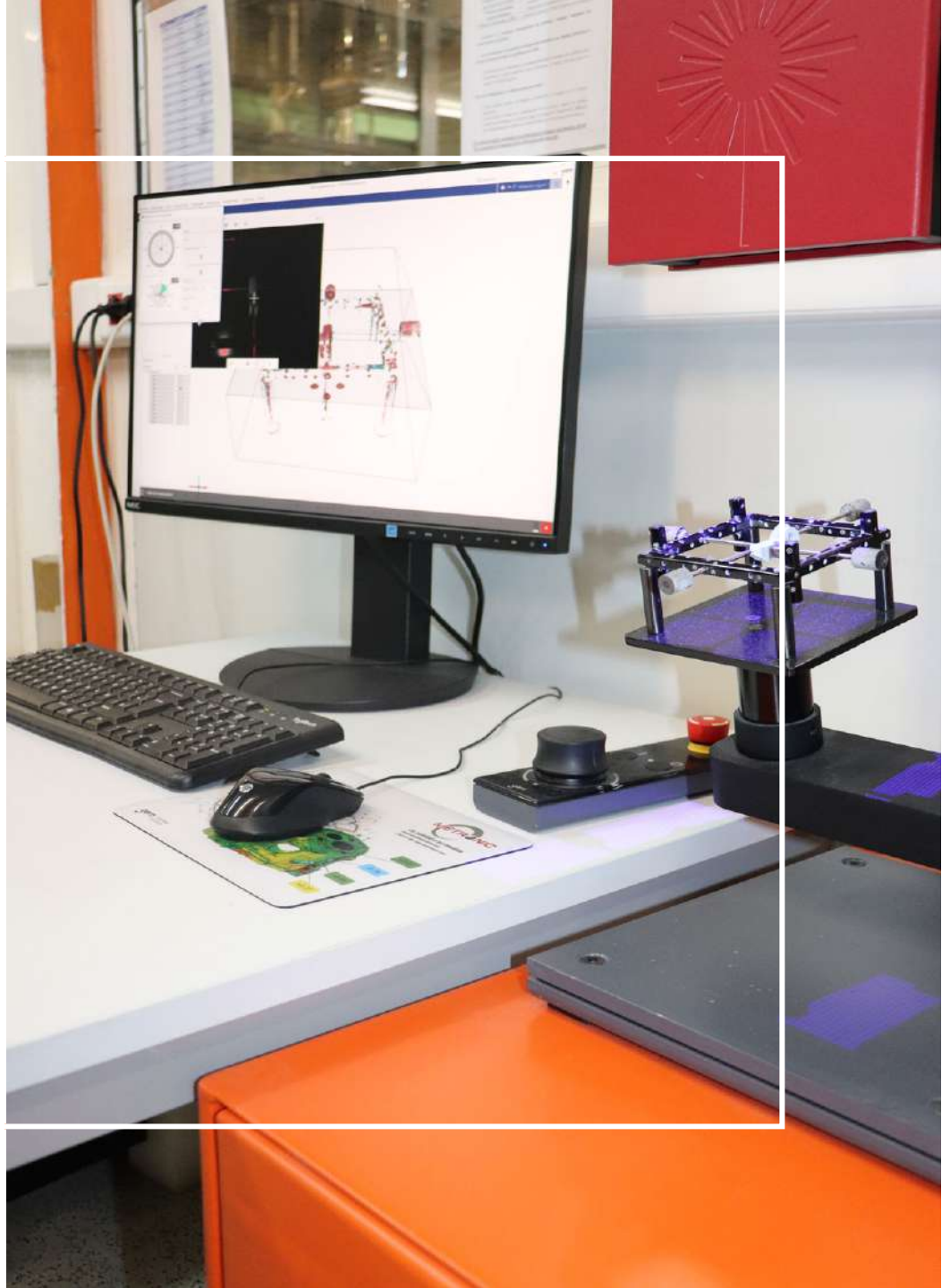
- Third Iteration (1 year in total) was to go to the safer margin.



Final pieces

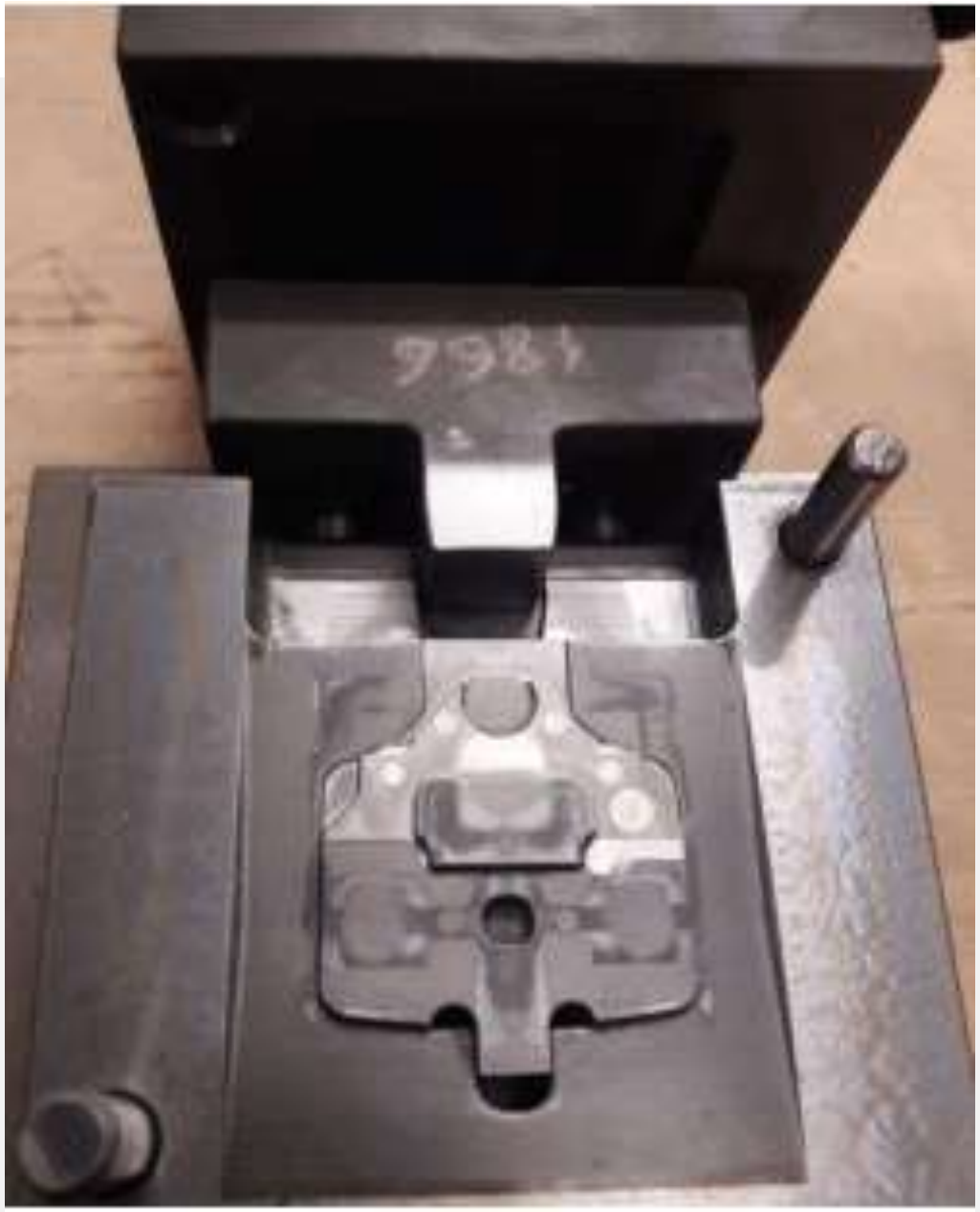
REFERENCE 101866 is the biggest one

- FIRST SAMPLE design weigthed 59 grams, second 63 grams and final one 82 grams.
- SECOND design look for better filling and mass comunitation as well as higher strength.
- THIRD final design look for stronger final product with 316L yield strength.
- External fase side remained same design from the beginning.

Final pieces

- Bigger part than its couple part but easier to sinter with just simple CIM support made in our CIM instalation.
- More difficult to inject with this design with thin walls at the center, thick areas close to injection points were located, 316LA BASF Master alloyed was used.
- To avoid cosmetic deffects at injection points area, injection system + injection parameters and part design was improved.

PRESS TOOL TO ACHIEVE FLATNESS and PERPENDICULARITY WAS DEVELOPED TO USE IN OUR FINISHING DEPARTMENT



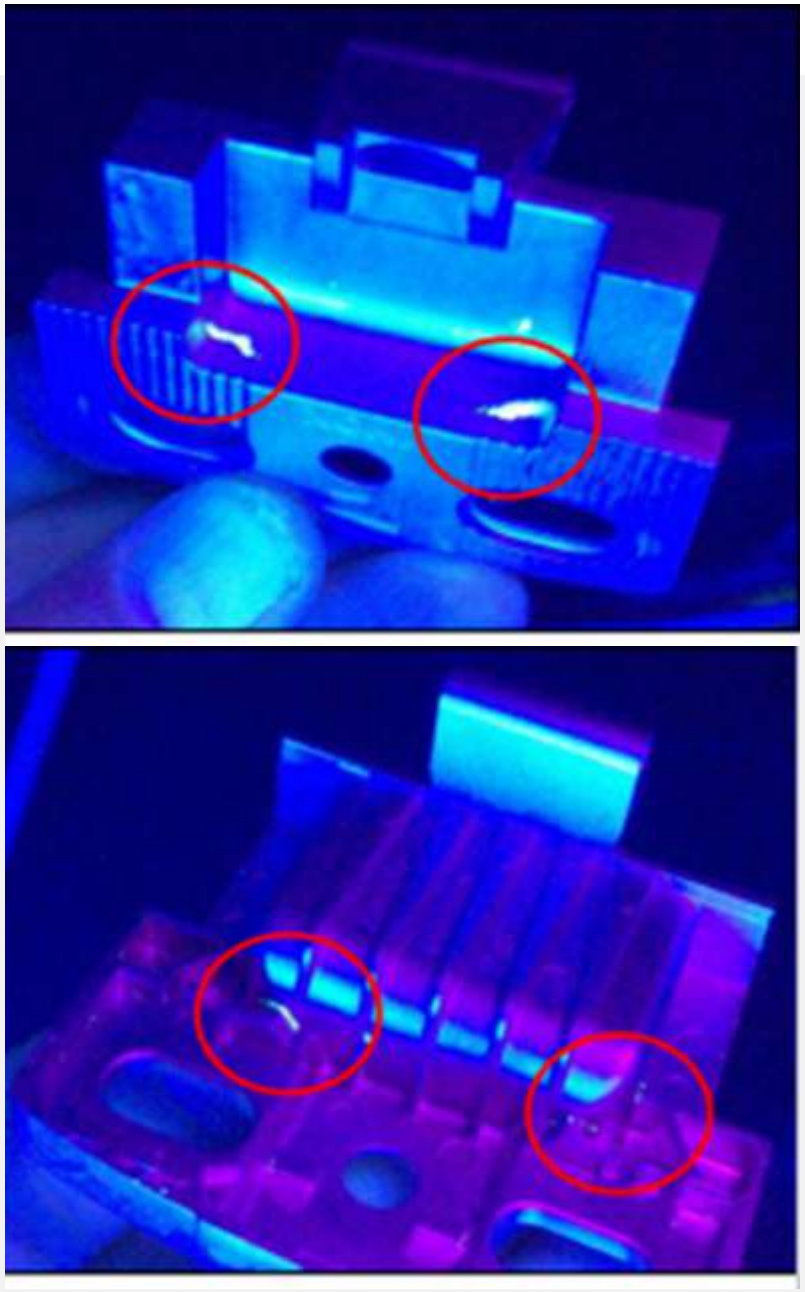
101865 the “smaller” one
Starting point was 38 grams and final one 47 grams.

Most of the modifications were done at hidden face.

SETTER were developed first machined and latter CIM with final ajustments.

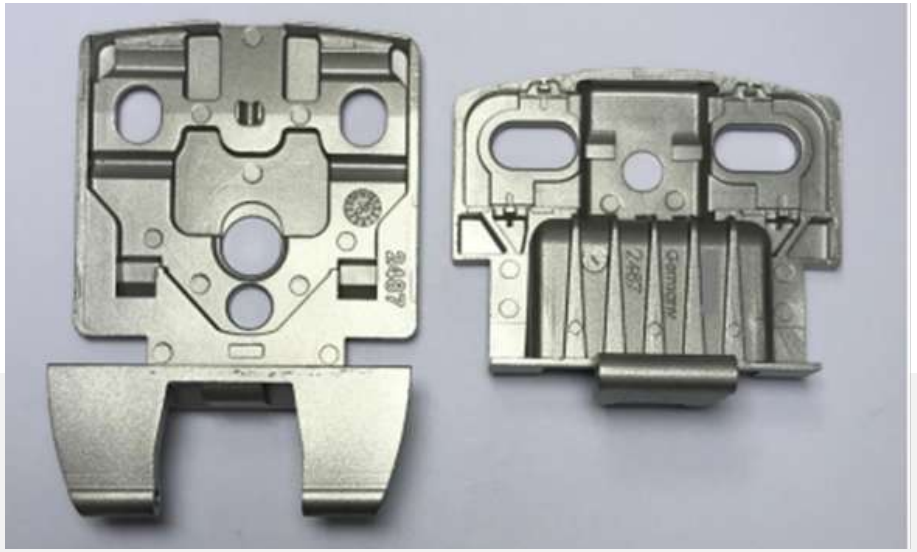
RIBS were added to increase strength of the MIM part during process and for the final product.

Still design number 2 showed phase segregation cracks by penetrant test.



Extra material RIBS added in generation 3 without defects.

Final product



Conclusions

- Close contact with final customer designer is needed to understand their needs.
- MIM process design rules should be know by customer.
- Experience helps to develop more complex parts.
- AM close to MIM as Filament or Binder Jetting in house will help to reduce sample cycle and mould / Part design iterations.

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