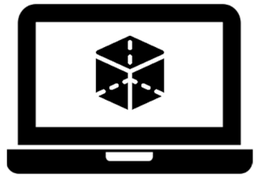
FOR DIE MAKERS AND PART DESIGNERS



CastleMIND and **CastleKEY** provide the ability to:

Optimize area and thickness of the ingates according to the expected quality specifications for the casting, its geometry, type of alloy and the performances of the die casting equipment.

Predict and evaluate the air venting performance both for passive (chill vent) or active (vacuum) configurations and suggest the optimal size for a given setup.

Supply information on how to make the mould perform to its maximum potential (through PQ² diagram analysis) according to the casting equipment and the operating conditions faced. It helps to decide whether it is necessary to modify the temperature of the die.

Optimize the plunger diameter and suggest the best process parameters for the given mould/machine combination.

Compile the machine parameters datasheet (injection strokes, plunger speed and pressure) as a guideline to be sent to the foundry or used for realistic filling simulations.

FOR THE FOUNDRYMEN

CastleMIND and **CastleKEY** provide the ability to:

Optimize production by providing optimal injection parameters, slow and fast shot speeds and strokes, shot sleeve diameter, furnace and die temperature in order to maximize part quality and reduce setup time

Easily identify the defect root cause due to the mould, the machinery or the process, and advise on solutions and improvements.

Increase overall casting quality (in terms of porosity, surface finishing and other defects)

Reduce scrap rate by increasing process reliability over time while reducing the harmful effects of alloy and mould temperature fluctuations, as well as injection performance instability.

Reduce die wear and soldering phenomena, frequently caused by poorly calculated and inadequate gating areas.

Reduce setup costs related to casting shape reviews needed to improve mould performances after the first sampling process.

Extend mould cycle life by optimizing both die geometry and process injection parameters in order to avoid washout, erosion and die wear phenomena.

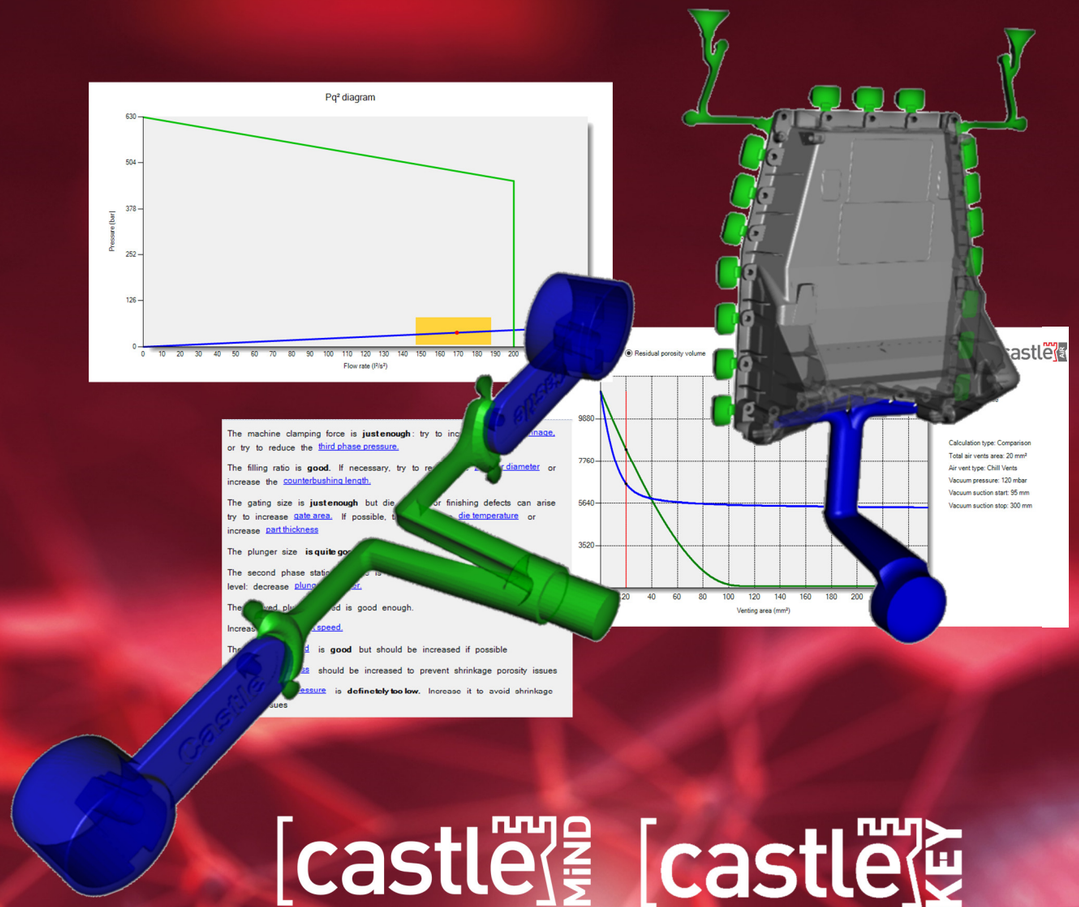
powered by

[PiQ²]
Developing Expertise

PiQ² srl
25123 Brescia · Via Branze, 45
T +39 030 6595058 · www.piq2.com · info@piq2.com

[PiQ²]

Developing Expertise



[castle MiND] [castle KEY]

MiND | KEY

SMART OPTIMIZATION

MiND KEY

The machine clamping force is **just enough**: try to increase machine tonnage, or try to reduce the third phase pressure.

The filling ratio is **good**. If necessary, try to reduce the plunger diameter or increase the counterbushing length.

The gating size is **just enough** but die erosion or finishing defects can arise try to increase gate area. If possible, try to increase die temperature or increase part thickness

The plunger size **is quite good**.

The second phase static pressure is **too low** to ensure the required porosity level: decrease plunger diameter.

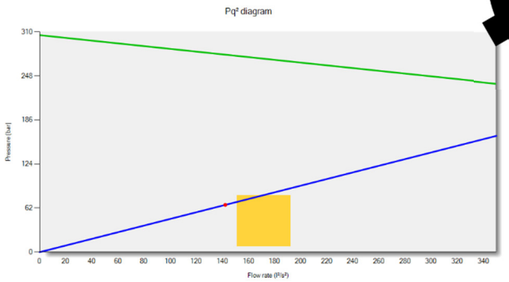
The allowed plunger speed is good enough.

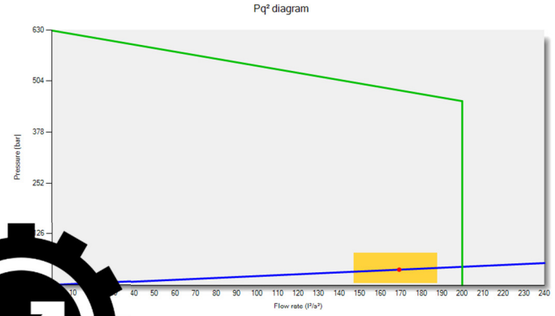
Increase the fast shot speed.

The slow shot speed is **good** but should be increased if possible

The gating thickness should be increased to prevent shrinkage porosity issues

The third phase pressure is **definetely too low**. Increase it to avoid shrinkage





The machine clamping force is **optimal**.

The filling ratio is **optimal**.

The gating size is **optimal**

The plunger size **is quite good**.

The second phase static pressure is **optimal**.

The allowed plunger speed is good enough.

Fast shot speed is **optimal**.

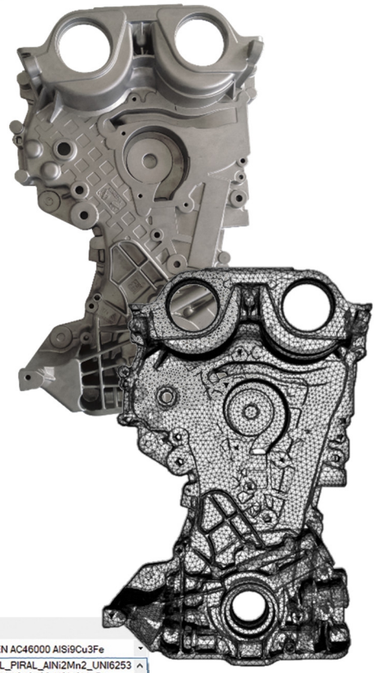
Venting area is optimal

The slow shot speed is **optimal**

The gating thickness is **optimal**

The third phase pressure is **optimal**. Increase it only if necessary

	CastleMIND	CastleKEY
3D CAD modelling capabilities	√	-
Geometry import format	Step, Parasolid, STL, Iges, ...	STL
3D Model healing and editing functions	√	-
Boolean operations on solids	√	-
Run simulation without CAD model	√	√
Direct data input from 3D model	√	√
HPDC Cold/Hot Chamber optimization	√	√
Presses, alloys and die materials database	√	√
Vacuum and ventings size optimization	√	√
Interactive practical optimization suggestions	√	√
Typical model preparation time	5 min	2 min
Typical simulation time	1 sec	1 sec
Typical training time	4 hours	2 hours
On-request customized databases/profiles	√	√
Automatic generation of simulation report	√	√
Data export for CastleBODY filling simulation	√	-



MiND KEY

PRACTICAL INTELLIGENCE FOR DIE CASTING

CastleMIND and **CastleKEY** are innovative software solutions that present advanced mathematical concepts within an interface designed to make the **software very user friendly**.

The software technical advantage arises from the use of mathematical rules, derived from **fluid dynamic principles**, beside **foundry or moulding experience** that evaluates and supplements the theoretical formulae.

The calculation output is expressed to make the **results comprehensible and useful** even for operators with no specific technical background.

The software is able to **identify both critical die design features and wrong process parameters**. It suggests how to optimize them to avoid or reduce quality issues during production.

All the hint and tips are provided in **common foundry language** rather than by numbers.