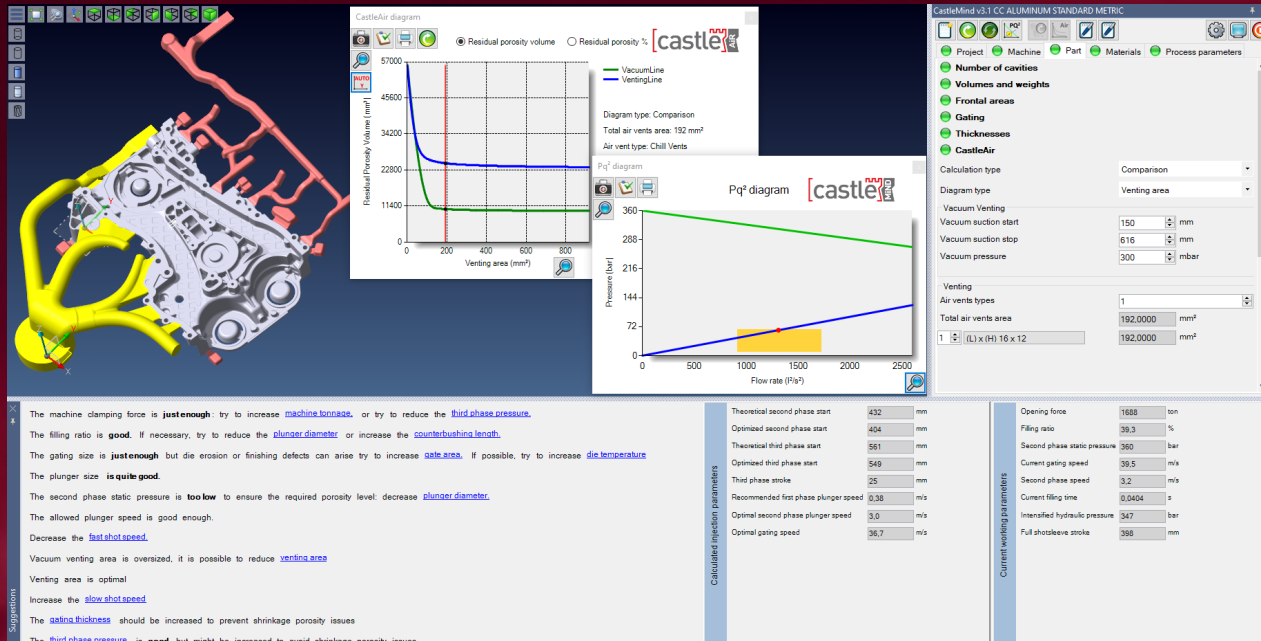
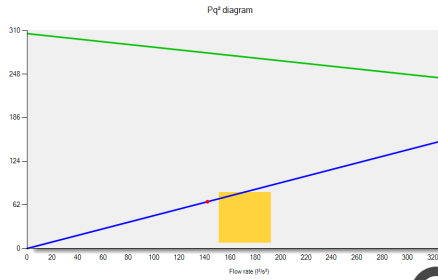


YOU'LL NEVER WORK ALONE



[castle] MIND

MIND



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

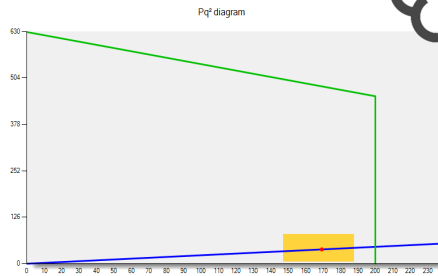
The allowed plunger speed is good enough.

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 **first phase pressure** is **definitely too low**. Increase it to avoid shrinkage porosity issues.



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.

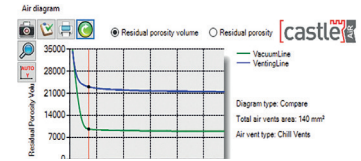
Fast shot speed is **optimal**.

Venting area is **optimal**.

The slow shot speed is **optimal**.

The gating thickness is **optimal**.

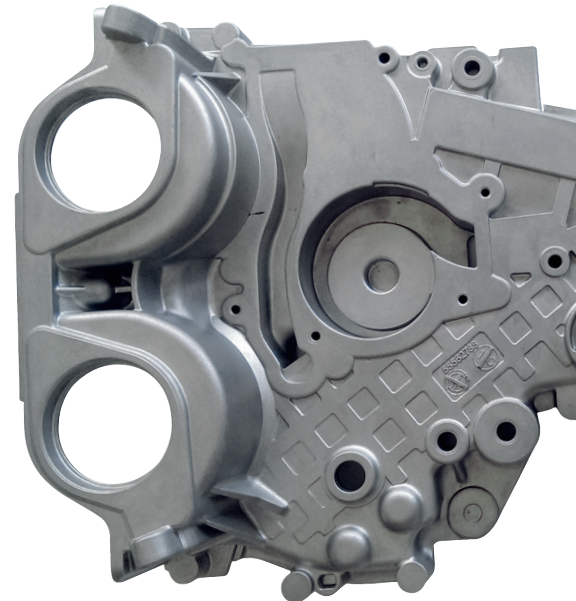
The third phase pressure is **optimal**. Increase it only if necessary.



Model		
Name	ITALPRESSE	ITALPRESSE IP1350SC
Suggested line press.	150	Buhler Evolution 53C
Dry shot speed	9.6	Buhler Evolution 66C
Max injection force	973.6	Buhler Evolution 84C
Max injection pressure	516	Buhler Evolution 84DL
Locking Force	1100	Buhler Evolution 94L
Typical second phase speed	3	Buhler Evolution 90C
Typical first phase speed	0.2	STP GDK200
Plunger		STP GDK400
Shot sleeve		STP GDK500
Loader		STP GDK560
		STP GDK750
		STP GDK802
		STP GDK850
		STP GDK900
		STP GDK1002
		STP GDK1350
		STP GDK1350
		TRULI2 1100
		IDRA OL150
		IDRA OL220 S
		IDRA OL2201
		IDRA OL320 S
		IDRA OL3201
		IDRA OL350S
		IDRA OL420
		IDRA OL560
		IDRA OL520 S
		IDRA OL600ST
		IDRA OL700S

PRACTICAL INTELLIGENCE FOR DIE CASTING

- ➔ **DATA IMPORT FROM A VARIETY OF CAD SYSTEMS**
(including Step, Parasolid, STL, IGES, SolidWorks™, SolidEdge™ and Catia™ and many others)
- ➔ **DIRECT DATA INPUT OF CASTING GEOMETRY**
(volumes, thicknesses, areas)
- ➔ **MODEL PREPARATION IN A MINUTE, OPTIMIZATION CALCULATION IN A SECOND**
- ➔ **OPTIMIZATION OF DIE DESIGN AND PERFORMANCE**
- ➔ **INTERACTIVE PRACTICAL SUGGESTIONS**
- ➔ **ADVANCED MATHEMATICAL CALCULATIONS ARE TRANSLATED INTO A USER FRIENDLY INTERFACE**
- ➔ **VENTING AND VACUUM CALCULATION AND OPTIMIZATION**



Castle MIND is an innovative software solution that presents advanced mathematical concepts within an interface designed to make the software very user friendly.

The software technical advantage stems from the use of mathematical rules derived from fluid dynamic principles and foundry or moulding experience that are used to evaluate and supplement the theoretical formulae.

The results of the calculations are expressed in a way that makes the results comprehensible and useful even for operators with no a specific technical background.

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

All the advice is provided in common foundry language rather than by numbers or formulas.

Part material

Alloy grade	EN AC46000	EN AC46000 AISi9Cu3Fe
Solid state density	2.74	AL_PIRAL_AINi2Mn2_UNI6253
Solid state temperature	525	EN AC43400 AISi10MgFe
Liquid state density	2.46	EN AC43500 AISi10MnMg
Liquid state temperature	590	EN AC44100 AISi12
Suggested furnace temperature	670	EN AC44300 AISi12Fe
Suggested die temperature	280	EN AC44400 AISi9Mg
		EN AC45000 AISi12Fe
		EN AC46000 AISi9Cu3Fe
		EN AC46100 AISi11Cu2Fe
		EN AC46200 AISi8Cu3
		EN AC46500 AISi9Cu3(Fe)
		EN AC47100 AISi12Cu1Fe
		EN AC51200 AlMg9
		EN AC51500 AlMg5Si2Mn
		MN4 AlMn4Si1
		SILAFONT36 AISi9MgMn
		CASTASIL37 AISi9Mn
		MAGSIMAL59 AlMg5Si2Mn
		MAGSIMAL33 AlMg5Si2Mn
		UNI3601 AISi8Cu3(Fe)
		UNI5075 AISi8Cu3Fe(Mg)
		A360 AISi9.5Mg0.5Fe
		A380 AISi8.5Cu3.5Fe
		A383 AISi10.5Cu2.5Fe
		A384 AISi11Cu3.8Fe
		A413 AISi12
		DIN 226D AISi9Cu3Fe
		DIN 231D AISi12Cu1Fe

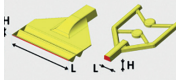
Required performances

Metal specific pressure	865	865	bar
Static safety factor	1.5	1.50	
Dynamic safety factor	1.6	1.60	
Discharge coefficient	0.6	0.60	
Surface finishing	Medium	Medium-high	
Allowed porosity	Medium	NOT DEFINED	
		Low	
		Medium-low	
		Medium	
		Medium-high	
		High	

Process parameters

Line pressure	150	150.0	bar
First phase speed	0.2	0.20	m/s
Second phase speed	3	3.8	m/s
Die temperature	271	271.0	°C
Critical die temperature	220	220.0	°C
Furnace temperature	690	690.0	°C
Critical furnace temperature	670	670.0	°C

Dimensions of air vent n° 1



Length (L)	16	14.0	mm
Thickness (H)	12	10.0	mm
Air vent area	192	140.00	mm²
Air vent type	Chill Vents	Vacuum/Valve	

CastleMind v3.0 CC ALUMINUM STANDARD METRIC

Project Machine Part Materials Process parameters

Cavities number

Volumes and weights

Frontal areas

Gating

Thicknesses

CastleAir

Calculation type	Venting	Compare	
Diagram type	Venting area	Venting area	
Vacuum			
Start vacuum	150	150	mm
Stop vacuum	616	616	mm
Vacuum pressure	300	300	mbar
Venting			
Air vents type	1	1	
Total air vents area	192	140.00	mm²
1 (L) x (H) 14 x 10	192	140.00	mm²

CASTLE MIND IS INNOVATION IN SIMULATION

Additional design tool for the casting die maker that:

- ➔ Applies highly advanced scientific and mathematical theories using well known terms in the foundry
- ➔ Provides extremely practical results in real time with no need to wait for days or hours.
- ➔ Not only identifies the problems but also suggests how to solve them
- ➔ Not only provides a simulation of a standard situation but it forecasts the real working scenario of the given tool on the given machine.

FOR DIE MAKERS AND PART DESIGNERS



CASTLE MIND provides the ability to:

Optimize dimension and shape of the gates in relation to the expected quality specifications for the casting, its geometry, type of alloy and the performance of the die casting equipment.

Predict and evaluate the air venting performance both for passive (chill vent) or active (vacuum) configuration and suggest

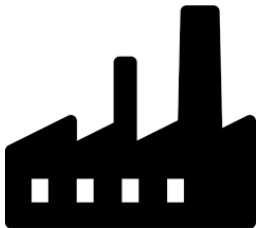
the optimal venting area for a given setup.

Supply information on how to make the mould perform to its maximum potential (through PQ² diagram) and according to the kind of installed equipment and the operating conditions faced. It helps to decide whether it is necessary to thermo regulate or raise the temperature of the die.

Optimizes the plunger diameter and gets the moulding 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



CASTLE MIND provides the ability to:

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

Facilitate the detection of a failure root cause whether because of the mould, the machinery or the process and advise

potential solutions.

Increase casting quality (also in terms of porosity and surface finishing) and, more importantly, to maintain it extremely stable over time being influenced in only a small way by temperature and alloy composition fluctuations, in addition to other indeterminable factors.

Reduce die wear and metallization phenomena, frequently caused by

poorly calculated and inadequate gating areas.

Reduce setup costs related to casting modifications needed due to defects detected (i.e. gate area changes) during the 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.

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25123 Brescia · Via Branze, 45

T +39 030 6595058 · www.piq2.com · info@piq2.com