Project Definition Information Sheet

(HPDC)

The objective of our MAGMAproject is to help you solve your casting defects issues, optimize your casting process and find a robust solution that fits to your needs. Using MAGMASOFT® & the related modules, we are going well beyond solidification modeling. We can compile and document step-by-step improvements and potential solutions - from a simple solidification simulation, to a full factorial design of experiments (DoE) or an autonomous optimization of your casting process using our well proven MAGMA APPROACH.

MAGMASOFT® is capable of considering many variables. In order to obtain the best results for your project, a detailed process description is required to fill up in this information sheet. If the exact values are not available, please estimate them closely. Please prepare the CAD file in .stl / .stp format for each component respectively and use the common coordinate system when you export from an assembly model. Please provide as cast model but if only machined model is available, please specify all the machined surfaces and drilled holes.

We will contact you shortly prior to starting the project to confirm these parameters.

Contact Name	
Company	
Phone No	
Email address	
Project name	
MAGMA Representative	
Objective of the project:	

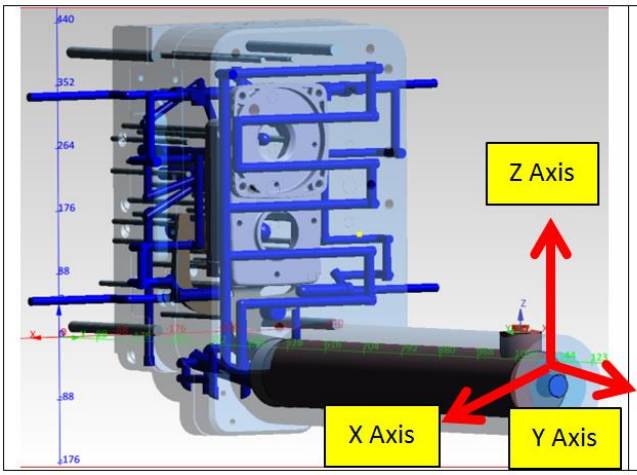
Part 1a: Project Details

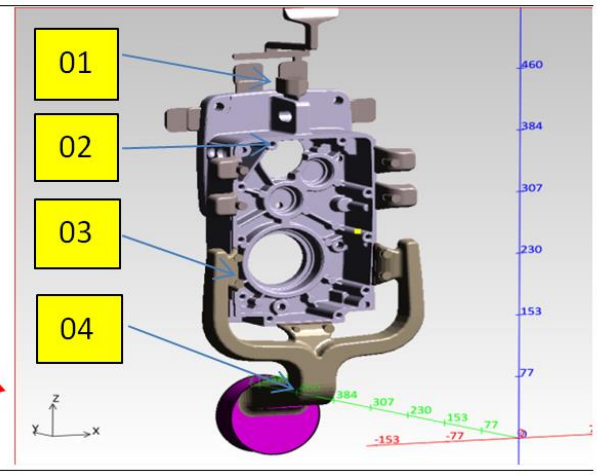
Please ☒ the appropriate box

Project name / Part number	
Drawing	☐ Yes ☐ No
Unit	☐ mm ☐ inch
Prepare solid CAD in single co-ordinate based on your purchased interface reader Please prepare the CAD file in .stl / .stp format for each component respectively	☐ STL ☐ Step

Please provide the CAD file as a zipped folder or upload on X Exchange

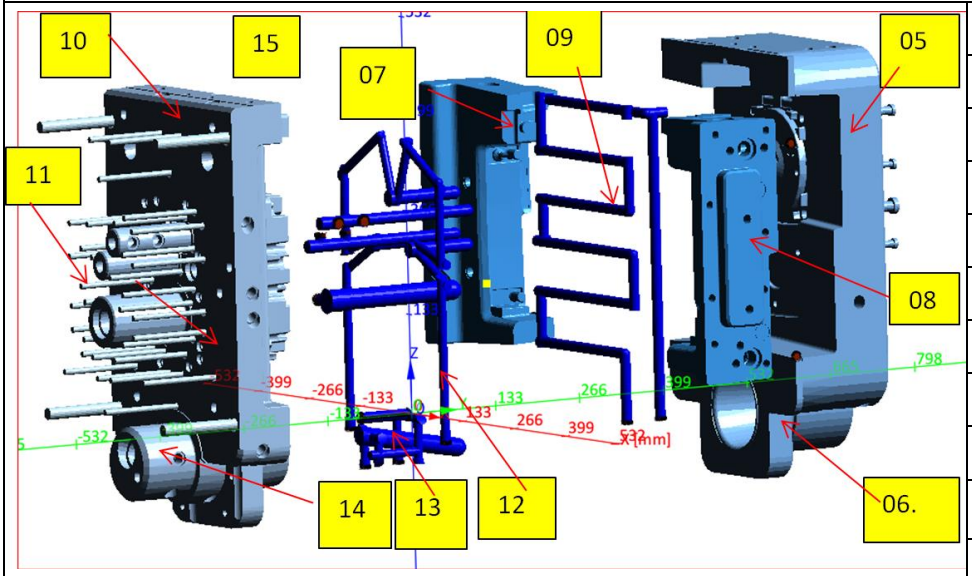
Breakdown of CAD / Geometry – Water tight with min errors:





01	Overflow
02	Casting
03	Ingate (s)
04	Runner

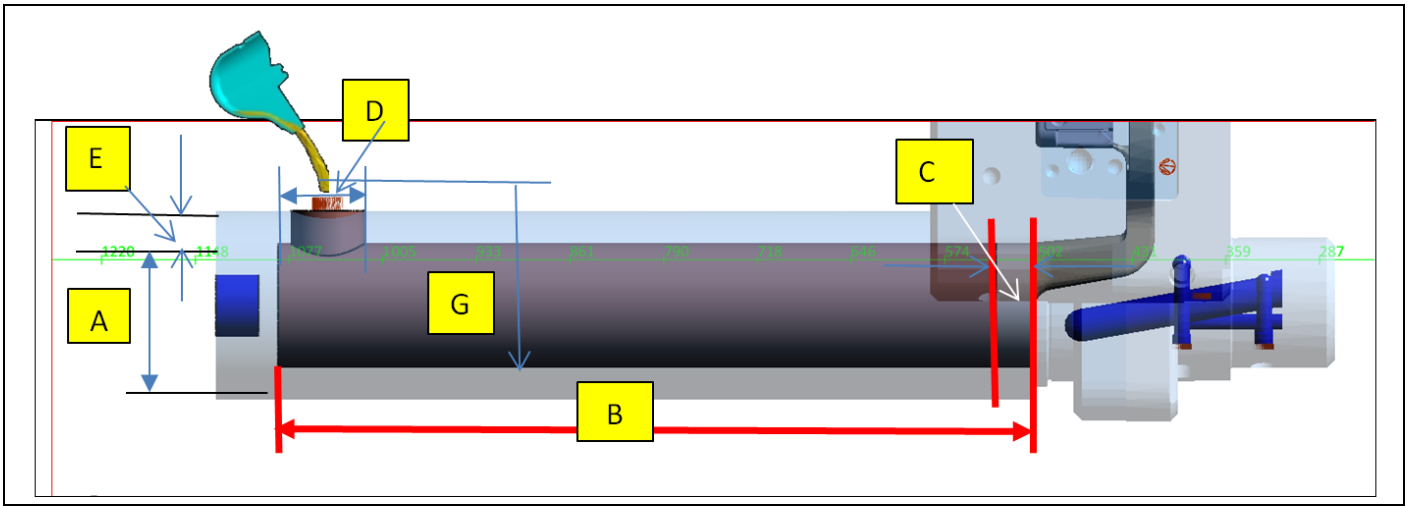
Note: Pls provide below as separate .stl/stp file (solid watertight model)



05	Fix Insert
06	Shot Bush
07	Slide Core 1
08	Slide Core 2
09	Fix Die Cool
10	Moving Insert
11	Eject pins(s)
12	Mov cool
13	Spreader cool
14	Spreader cone
15	Spot Cooling

Part 1b: Shot Sleeve Data/Definition

Please ☒ the appropriate box



Please provide sleeve dwg (if available).

LOC	Description of Shot Sleeve parameters	Value ☐ mm ☐ inch
"A"	Plunger Diameter	
"B"	Active Chamber Length (surface of pl to surface of spreader)	
"C"	Biscuit Thickness (average value)	
"D" (*)	Plunger position when pour hole is covered	
"E" (*)	Wall Thickness chamber	
"F" (*)	Distance between ladle lip and base of shot sleeve	

Part 1c: Ladle Definition (Optional (*))

Please ☒ the appropriate box

1. Pouring by Ladle ☐		2. Pouring by Lauder ☐	
Start Dosing	**(after die close)**	**Dosing Duration**	**(secs)**
Dosing Definition	**(secs) (*)**		
Dosing Time	**(secs) (*)**		
Dwell Time	**(secs) (*)**		

Cooling Definition :Fix & Moving dies and slide core inclusive of spot cooling INFLOW/OUTFLOW
Note : Pls indicate on your die drawing (.dwg) arrow direction of where the in flow and out flow **(Optional (*))**

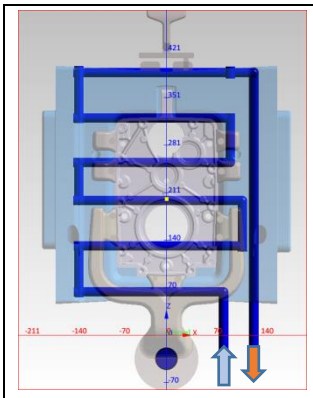
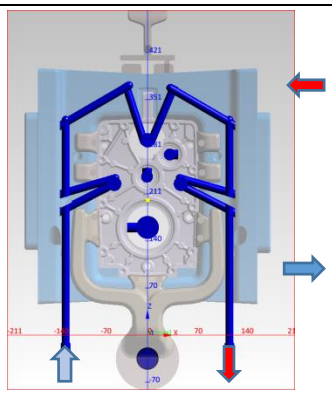
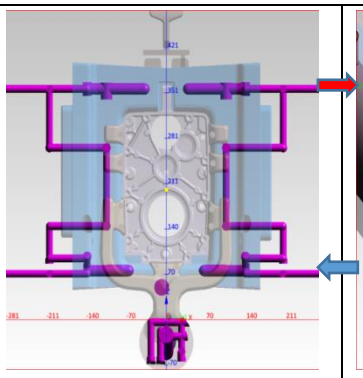
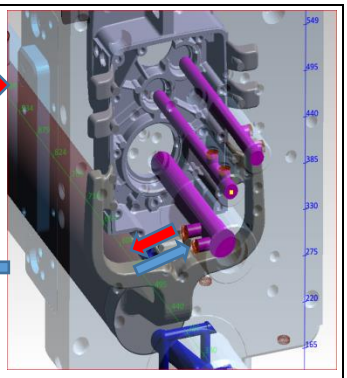
			

Figure 001 : Fix side cooling IN & OUT Flow (*)	Figure 002 : Moving side cooling IN & OUT Flow (*)	Figure 003 : Side Core IN & OUT Flow (*)	Figure 004 : Spot Cooling IN & OUT Flow * 3 (*)

Part 2a: Material Definitions

Please ☒ the appropriate box

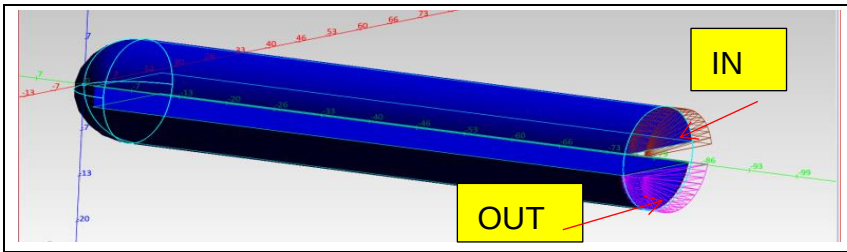
Description of Material	Material	Temperature °C
Cast		Initial:
Dies		Initial:
Side core		Initial:
Insert		Initial:
Plunger		Initial:
Medium of Cooling		Initial:
Medium of Heating		Initial:

Part 2b : Definition Die Cooling/Heating (Optional (*))

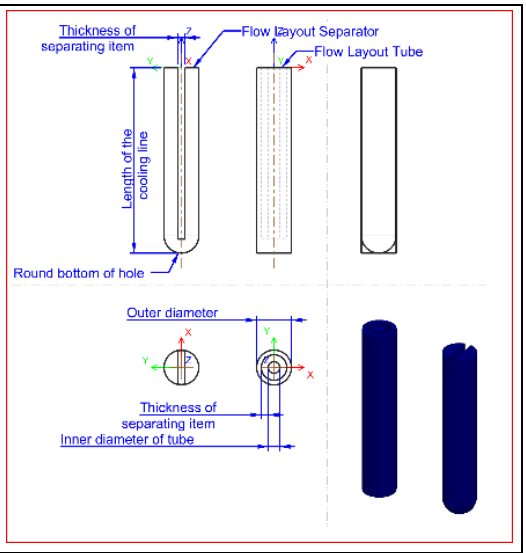
Please ☒ the appropriate box

Description of Cooling	Material	Temperature °C
Fix Cooling Channel ☐ Water → Flow rate: ☐ Oil → Flow rate:		Initial:
Mov Cooling Channel ☐ Water → Flow rate: ☐ Oil → Flow rate:		Initial:
Spot Cooling (mov1) ☐ Water → Flow rate: ☐ Oil → Flow rate:		Initial:
Slide Core 1 Channel ☐ Water → Flow rate: ☐ Oil → Flow rate:		Initial:
Slide Core 2 Channel ☐ Water → Flow rate: ☐ Oil → Flow rate:		Initial:

(Note : For more detail Time step for cooling pls refer to Appendix “A”)



Plain	Coordinate Plane	X/Y	Unit
D	**Outer Diameter**		**Mm (*)**
L	**Length of cooling line**		**Mm (*)**
W	**Thickness of separating Item**		**Mm (*)**
☐	Round bottom Hole (ROUNDED)		



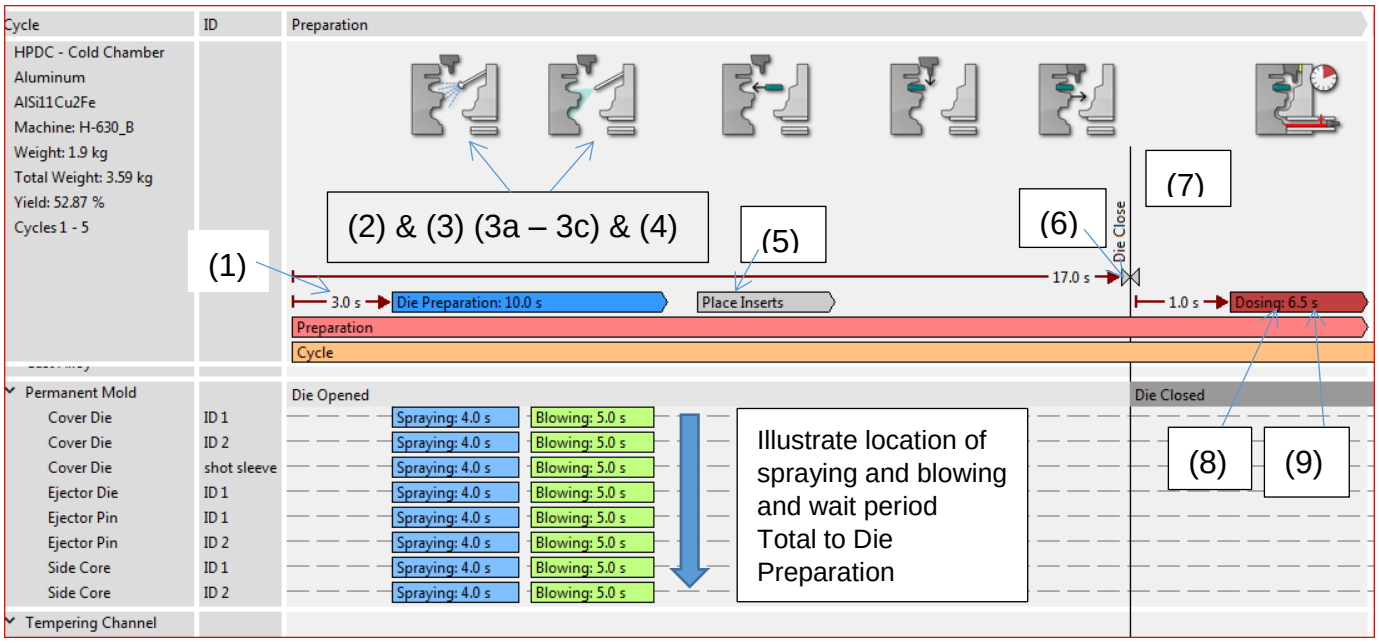
Please provide CAD file of spot cooling / Die Dwg to indicate location and depth and connection if they are connected as a loop. (Optional (*))

Part 3a: Process Parameter Set Up

Please ☒ the appropriate box

1. Spray via Nozzle (Cartridge) ☐	2. Spray via Copper Tube ☐

To Explain what is required for spray take a look at the notes above Time Line.

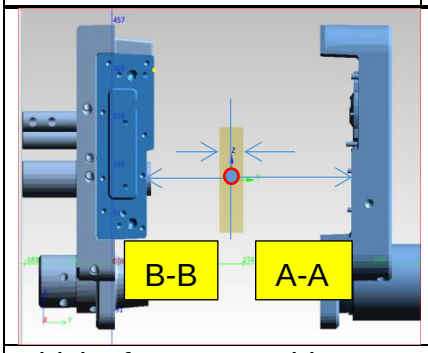
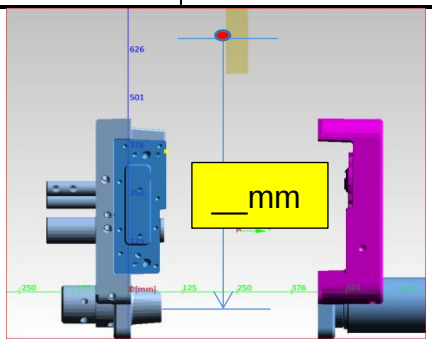


Description of Spray /Blow process and Insert loading	Cycle Time	Duration
☐ Spray ☐ Blow		
(1) Casting detect until Spray Head Down	sec	sec
(2) Fix Die (Insert)	sec	sec
(3) Mov Die (Insert)	asd sec	sec
(3a) Side core	a sec	sec
(3b) Side core	asd sec	sec
(4) Plunger Tip	sec	sec
☐ Spray ☐ Blow		
(2) Fix Die (Insert)	sec	sec
(3) Moving Die (Insert)	asd sec	sec
(3a) Slide Core	a sec	sec
(3b) Slide Core	asd sec	sec
(4) Spreader Cone	asd sec	sec
(5) Insert location	a mat	
(6) (Begin of Preparation – Die Closed)	asd sec	sec

(7)Start Dosing (after die closed)	a	sec	sec
(8) Dosing Time (Pour start to Pour end)	asd	sec	sec
(9) Dwell Time (Period of time metal in sleeve)	asd	sec	sec

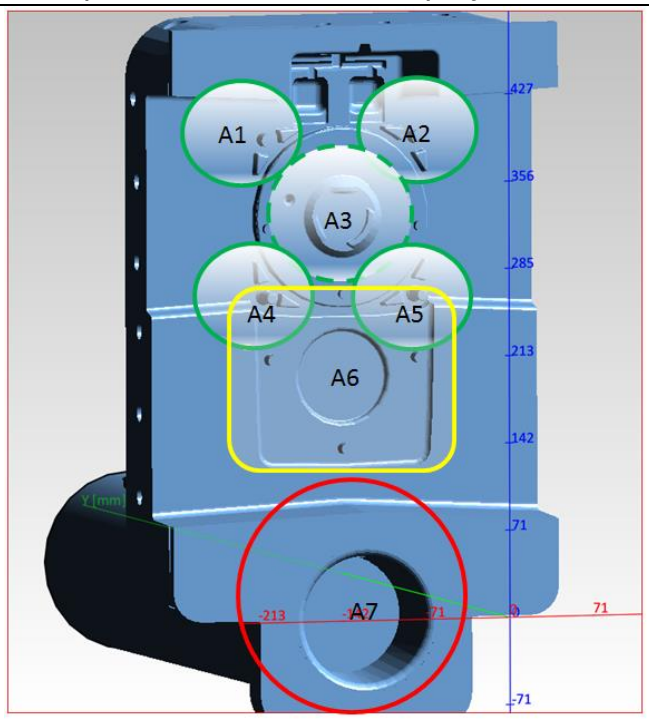
Part 3b: Die Preparation (Optional (*))

Please ☒ the appropriate box

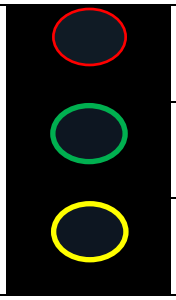
Type of Spray	Nozzle (Standard) ☐	Copper Cartridge ☐
		
Thick of spray cartridge		Shot_Center – to Cartridge Home:___mm
Width “A-A” mm (*)		
Width “B-B” mm (*)		

Part 3c: Fix Die Insert (Optional (*))

Please ☒ the appropriate box

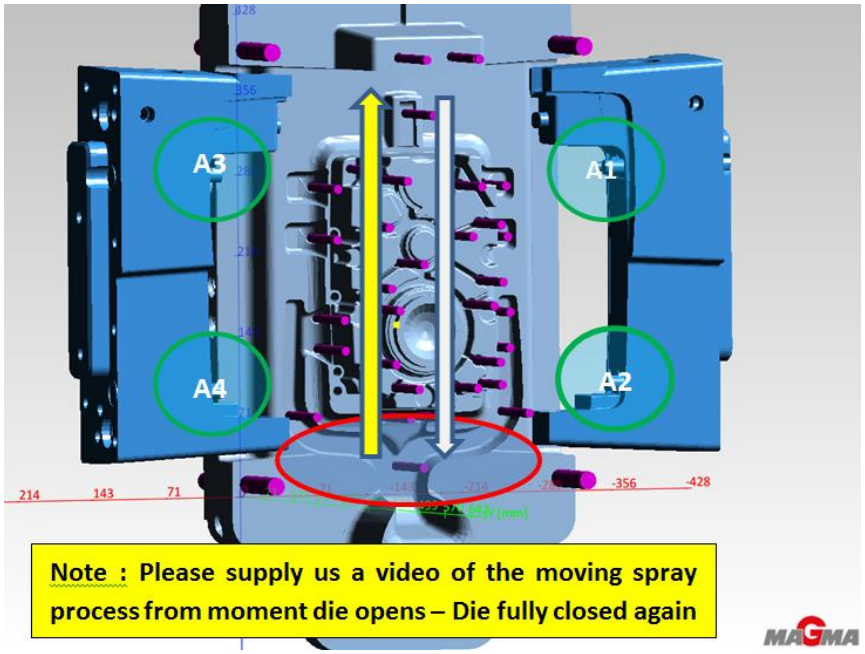
Please replace this picture with your CAD file of Fix Dies (and all related parts of dies related to spray on the fix side.	Which	Type of Spray
		Classical Spray
		Spray Surfaces
		Spray Nozzles
	Spray Surface (rectangular) Nozzle Spray (circle)	

Area	Spray (s)	Blow (s)
A1		
A2		
A3		
A4		
A5		
A6		
A7		

The above is just a illustration (example). Please provide us section of die where different kinds of spray is being applied as well as the video of spraying and blowing separately for the fix (1 video) and one other video for Moving side.		Heavy Spray Medium Spray Light Spray

Part 3d: Mov Die – Insert (includes slide core 1 & 2) (Optional (*))

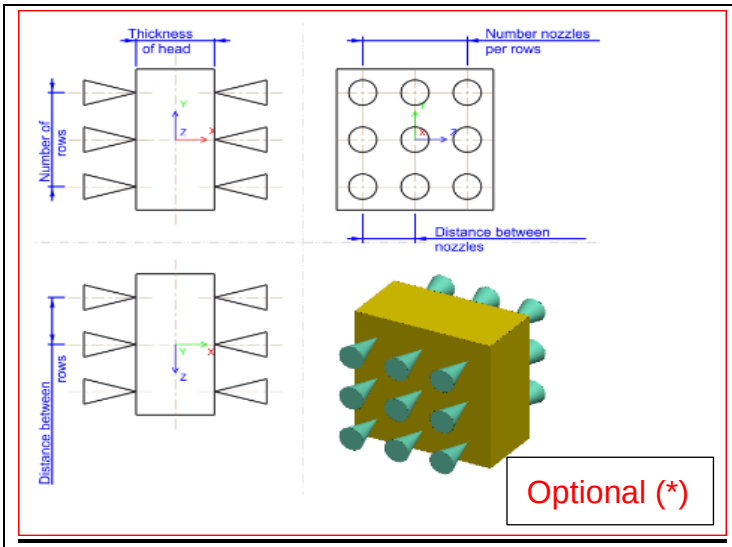
Please ☒ the appropriate box



Which	Type of Spray
	Classical Spray
	Spray Surfaces
	Spray Nozzles

Spray Surface (rectangular)
Nozzle Spray (circle)

Area	Spray (s)	Blow (s)
A1		
A2		
A3		
A4		
◯		
Sp D	mm	
Sp U	mm	



Number Nozzles per row - NN	(*)
Distance between Nozzles - DN	(*)
Number of Rows - NR	(*)
Distance between rows- DR	(*)
Thickness of Head - BH	(*)
Create circuits and nozzles on back side.	☐

Part 3e: Filling Definition

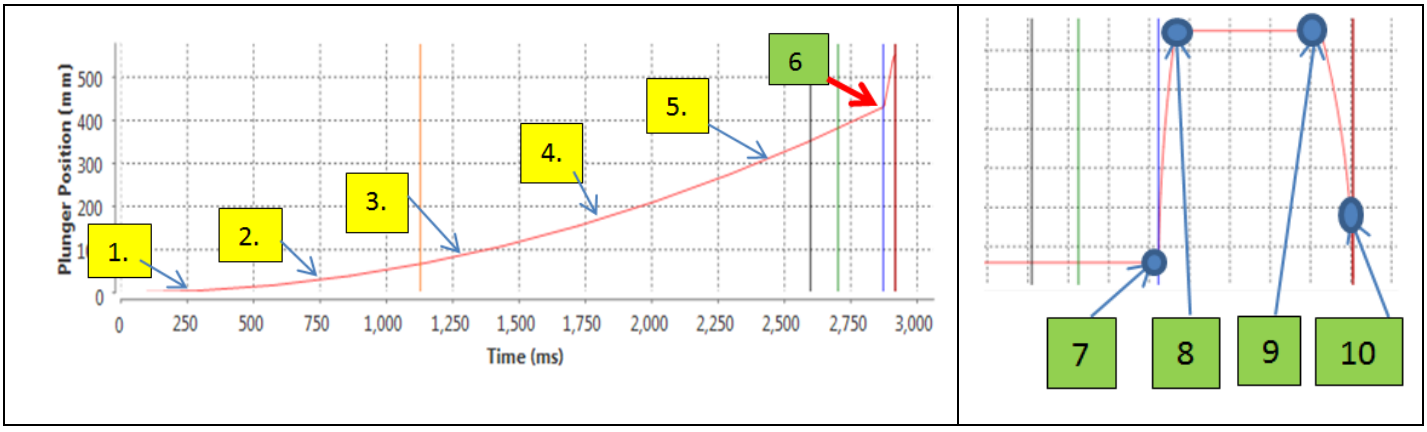
Please ☒ the appropriate box

Machine Type	Remarks	
Shot chamber length		mm
Sleeve Diameter		mm
Plunger position when pour hole is covered		mm
Holding furnace temperature (Dosing temperature)		C
1st phase Injection speed		m/s
Constant Velocity		m/s
Constant Acceleration		m/s
Max machine acceleration		sec
High Speed Switch over point		mm
Metal at the gate		mm
2nd phase Injection speed		m/s
Start deceleration at		mm
Deceleration Speed		m/s

*Please provide shot curve from machine together with this form.

Example of Shot Curve

(Optional Shot Curve) - (Advanced) – Multi-stage Injection system



*Please provide if available:

Point	1	2	3	4	5	6	7	8	9	10	Fml End
Speed–User Sel											
Position mm											
Shot Spd m/s											

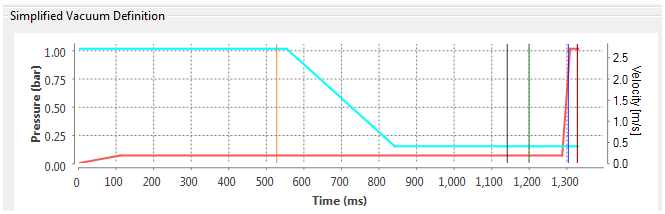
Hi Spd Change Point			
Dry Shot Stroke	mm	Pressure set up time	mm
Biscuit Size	mm	Press. Up Time	ms
Fwd Limit Stroke	mm	Total Cycle Time	sec

Intensification Definition (Ramp)

Starting Pressure [p(s)] (Accumulator Pressure)	bar
Pressure set up time (ST)	sec
Working Pressure [p (w)]	bar
Reduction Control time	Sec Start pressure reduction
Pressure Reduction time (RT)	Sec

Simplified Vacuum Control (If used than mandatory)

Rate of Evacuation		mbar
Final Vacuum Pressure		mbar
On Control – Time		secs
On Control – Plunger position		mm

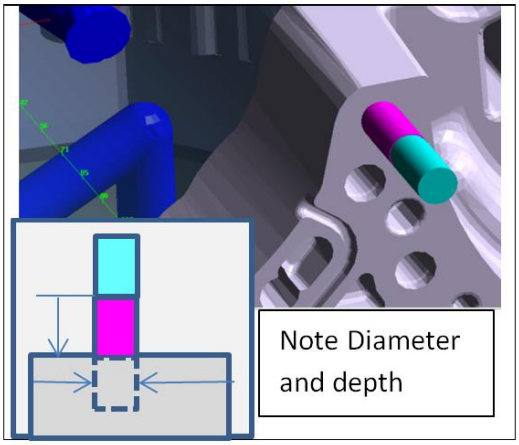


HPDC Machine – Cold Chamber

Machine Type (model/Brand)		Unit
Min Piston Diameter		mm
Max Piston Diameter		mm
Max Piston velocity		m/s
Max piston acceleration		m/s2
Locking Force		kN
Safety Factor		%
Distance between tie bars		mm
Max Hydraulic Injection Pressure		bar
Max. dynamic injection force		kN
Max multi Injection Force		kN

Local Squeezing Definition (provide location on CAD exact coordinates of Local Squeeze point (s)

Material	Diameter (mm)	Stroke (mm)	Mat ID
Squeeze Reservoir 1 #			
Squeeze Reservoir 2 #			
Continue	Start Time (s)	Duration (s)	Pressure (bar)
Squeeze Reservoir 1 #			
Squeeze Reservoir 2 #			



Die Opens & Casting Ejection Definition – Stress Analysis

Die Open by (time)		Sec	View of DC preferred
Die Open by (temp)		Centigrade	
Die Open by (Thermo)		Temp fall below	
Applicable with Stress Analysis			
Time to eject casting		sec	
Time reference			
Duration of ejection		sec	
Stroke of Ejection		sec	Video with safety gate opens

Please email the completed form and CAD file to us at project@magmasoft.com.sg or call us at +65 6564 3435 if you need assistance to complete the submission.

In addition, please feel free to share with us if you have the casting results, pictures of casting defects, microstructure or other technical information that you think might be helpful to kick start the project.

You may use MAGMA's upload/download tool for big file size upload thru our website (customer support section): https://www.magmasoft.com.sg/en/support/intro/

Note that you would need to register an account before you could access to the feature: https://www.magmasoft.com.sg/en/support/registration/

Please feel free to contact us should you have any queries.

Last updated on October 2019