

Agenda

- 1 **Novedades (Parte 1)**
- 2 **MyESI**
- 3 **FLEX TOKENS (licencias desde 2023)**
- 4 **FV Grifería – Presentación de Cliente-**
- 5 **Pausa para el Café**
- 6 **Buenas Prácticas (Parte 1)**
- 7 **Novedades (Parte 2)**
- 8 **Buenas Prácticas (Parte 2)**

Módulo de optimización en **QuikCAST**

Asistente en la elección del sistema de llenado y alimentación



Reunión de Usuarios 2024

Igor Pérez Villalobos | 19 septiembre 2024



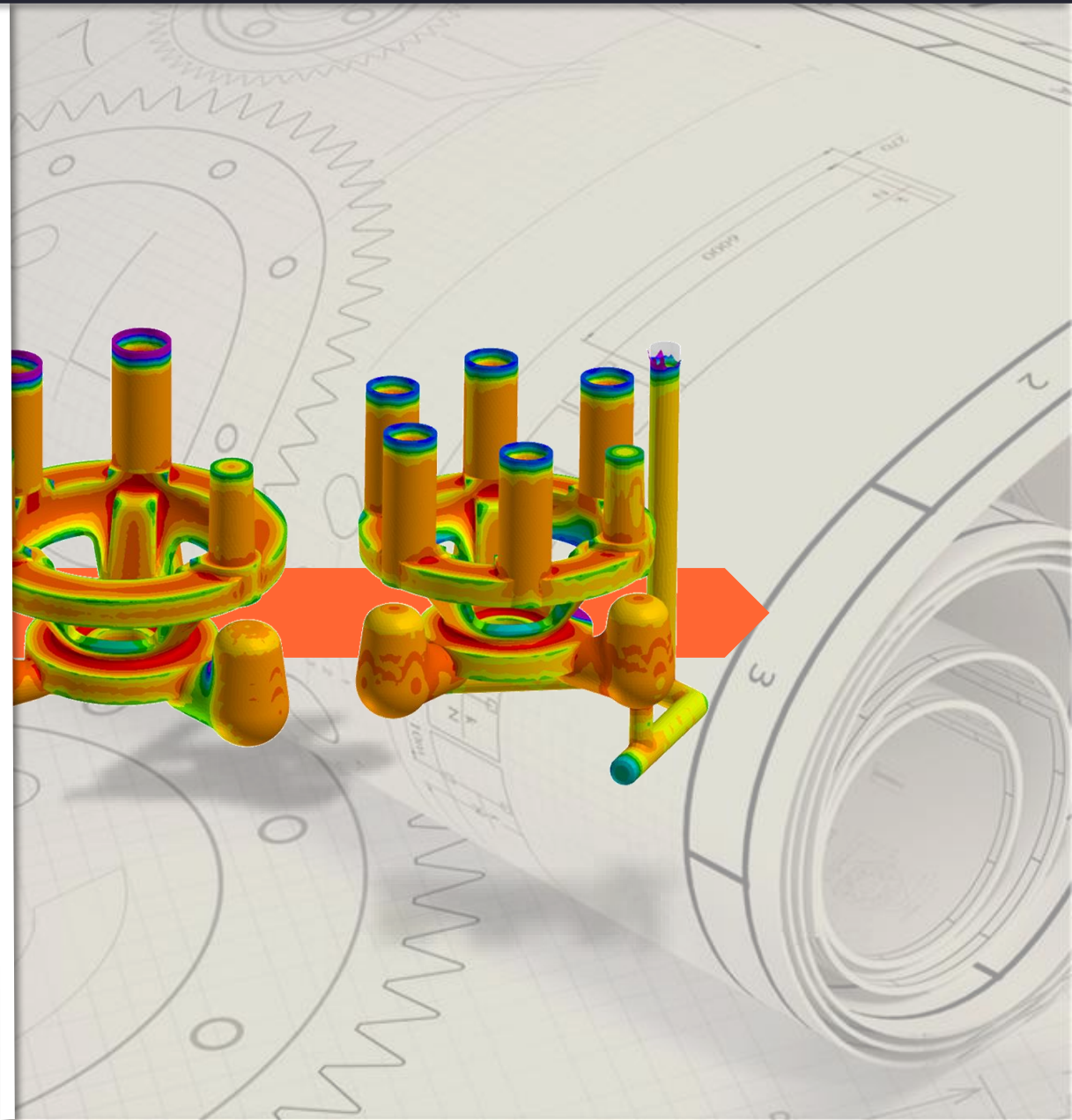
Funcionalidad MatID en el módulo de **Optimización de ProCAST™ y QuikCAST™**

Optimización del diseño

Seleccionar el mejor diseño

Pruebas automatizadas

Influencia del diseño



Agenda

1

Módulo de optimización: función MatID

2

Optimización del sistema de alimentación

3

Optimización del sistema de llenado

4

Ventajas y Conclusiones

Agenda

1

Módulo de optimización: función MatID

2

Optimización del sistema de alimentación

3

Optimización del sistema de llenado

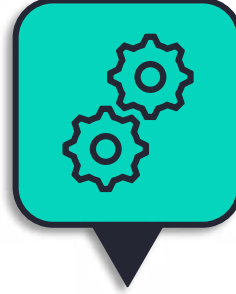
4

Ventajas y Conclusiones



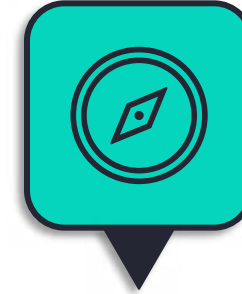
¿Valor Objetivo?

Obtener el mejor diseño para cumplir con un objetivo determinado (reducir porosidades, arrastre de aire, etc.)



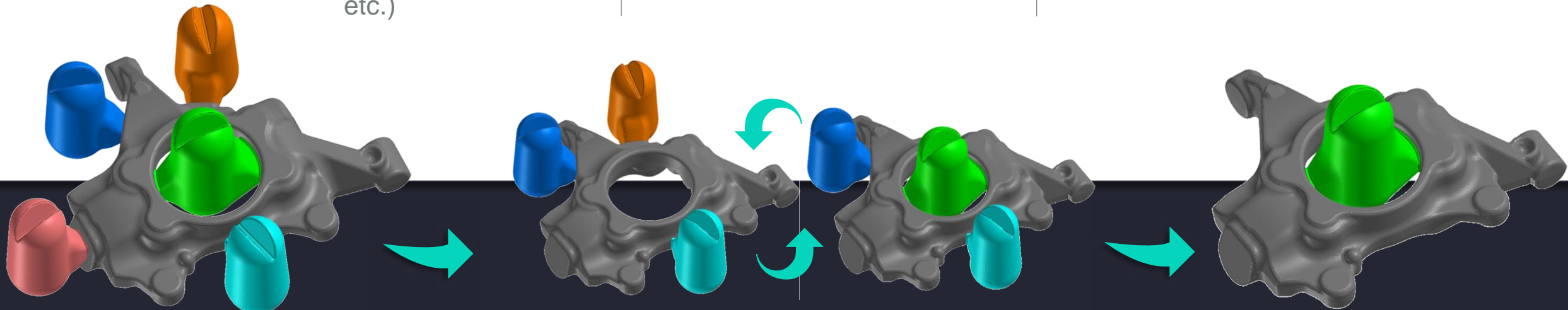
¿Método?

Asignar un material diferente a uno o más volúmenes



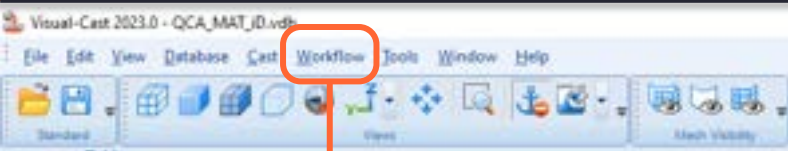
¿Dónde?

En el módulo de Optimización de ProCAST y QuikCAST

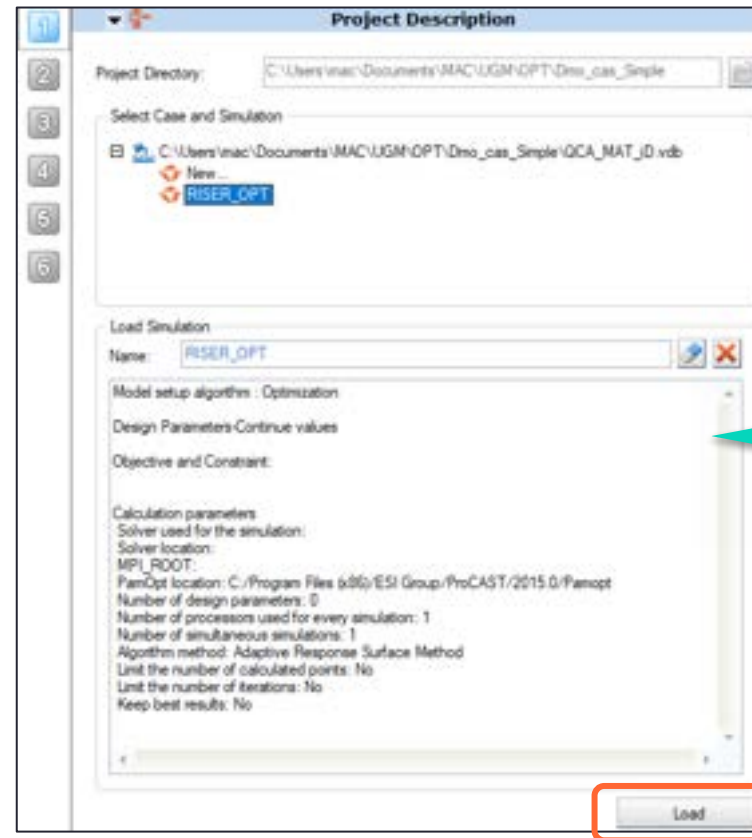
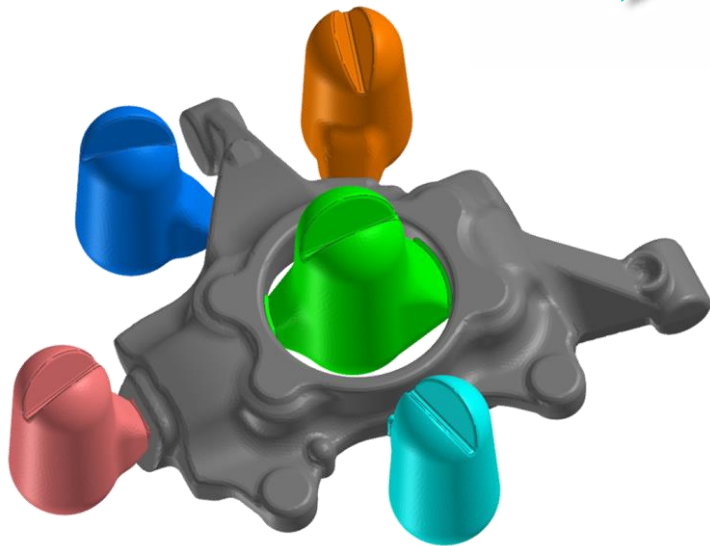




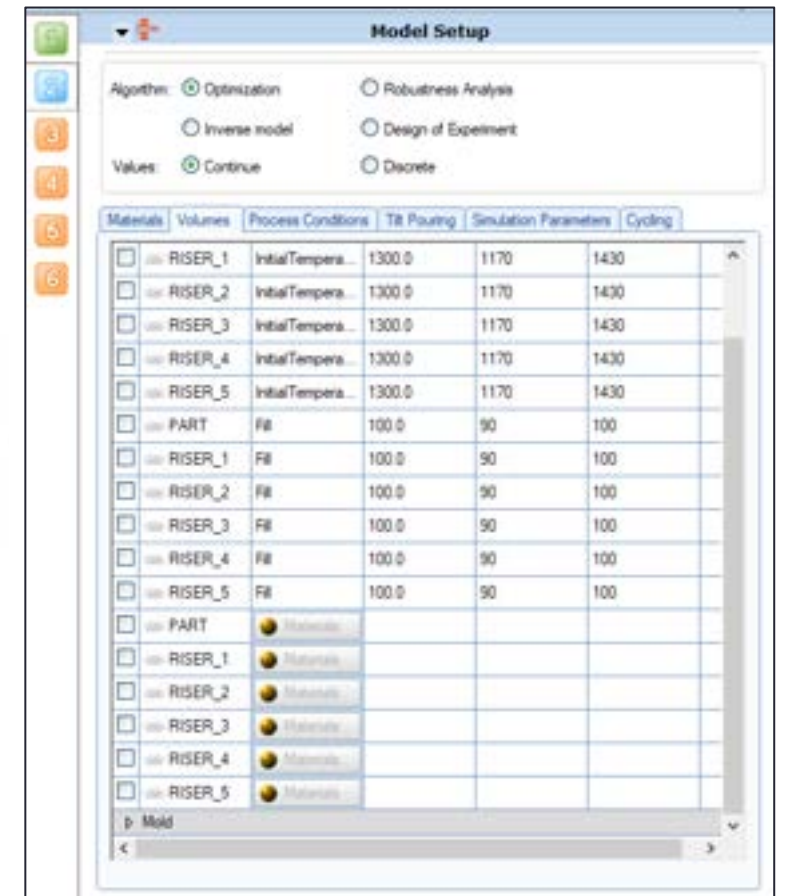
Módulo de optimización: función MatID



1 Abrir el "Workflow" optimización



2 Cargar un proyecto existente o crear uno nuevo





Módulo de optimización: función MatID

Volume	Initial Temp	Initial Temp	Initial Temp	Initial Temp
RISER_1	1300.0	1170	1430	
RISER_2	1300.0	1170	1430	
RISER_3	1300.0	1170	1430	
RISER_4	1300.0	1170	1430	
RISER_5	1300.0	1170	1430	
PART	100.0	90	100	
RISER_1	100.0	90	100	Materials
RISER_2	100.0	90	100	Materials
RISER_3	100.0	90	100	Materials
RISER_4	100.0	90	100	Materials
RISER_5	100.0	90	100	Materials

3 Comprobar el volumen para el que debe variar el material

4 Seleccionar materiales

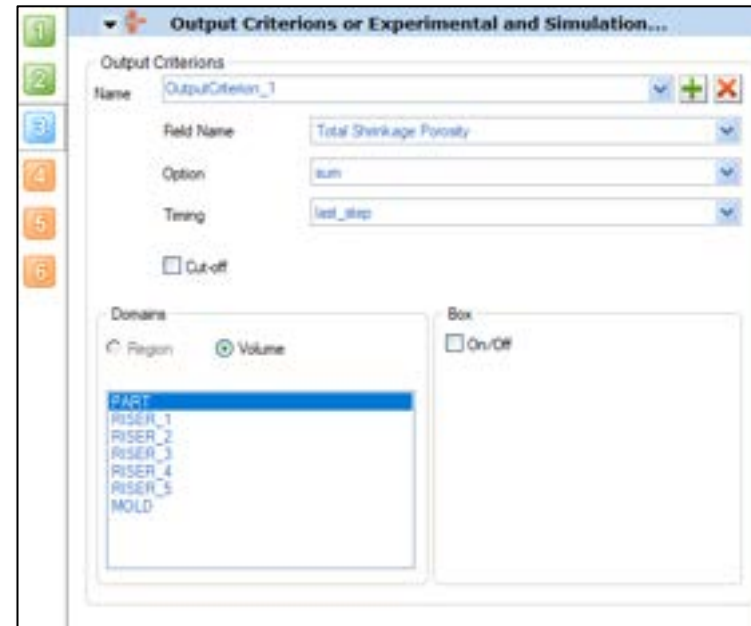
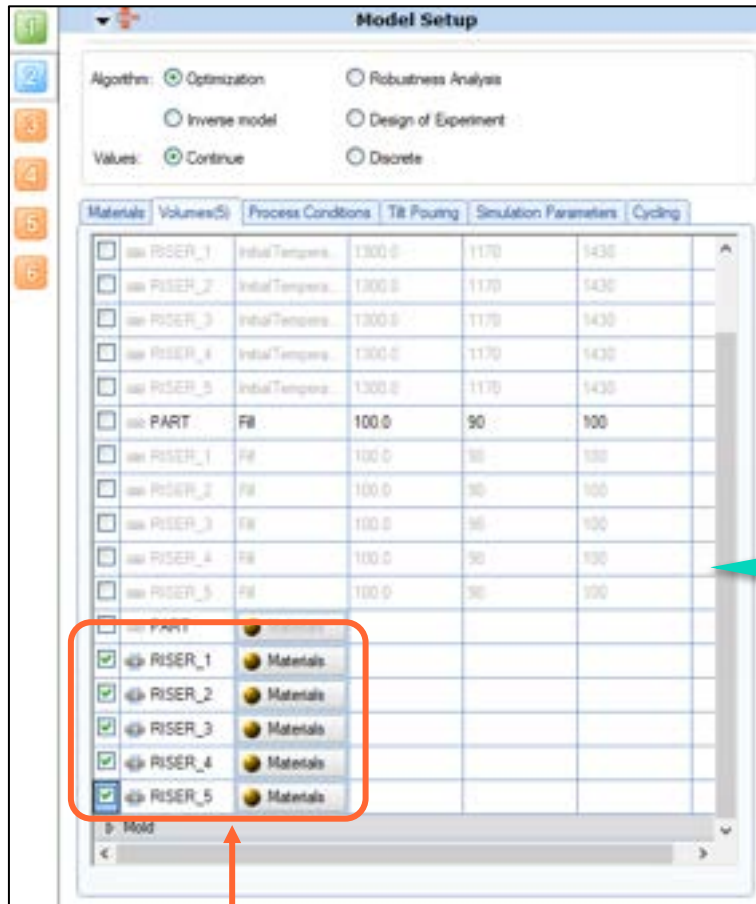
Type	Database	Category	Material	Fill %	Initial temp	Unit temp
Alloy	Model	CAST_IRON	GGG_40_MAC	100.0	1300.0	C

Type	Database	Category	Material	Fill %	Initial temp	Unit temp
Mold	Public	(SAND)	GREEN_SAND	100	20	C

5 Añadir el segundo material para el volumen



Módulo de optimización: función MatID



6 Replicar la metodología en los otros volúmenes de aleaciones y moldes, si los hay.



Módulo de optimización: función MatID

Model Setup

Algorithm: Optimization Robustness Analysis
 Inverse model Design of Experiment

Values: Continue Discrete

Materials	Volumes(S)	Process Conditions	Tilt Pouting	Simulation Parameters	Cycling
<input type="checkbox"/> RISER_1	Initial Tempera...	1300.0	1170	1430	
<input type="checkbox"/> RISER_2	Initial Tempera...	1300.0	1170	1430	
<input type="checkbox"/> RISER_3	Initial Tempera...	1300.0	1170	1430	
<input type="checkbox"/> RISER_4	Initial Tempera...	1300.0	1170	1430	
<input type="checkbox"/> RISER_5	Initial Tempera...	1300.0	1170	1430	
<input type="checkbox"/> PART	Fill	100.0	90	100	
<input type="checkbox"/> RISER_1	Fill	100.0	90	100	
<input type="checkbox"/> RISER_2	Fill	100.0	90	100	
<input type="checkbox"/> RISER_3	Fill	100.0	90	100	
<input type="checkbox"/> RISER_4	Fill	100.0	90	100	
<input type="checkbox"/> RISER_5	Fill	100.0	90	100	
<input checked="" type="checkbox"/> PART					
<input checked="" type="checkbox"/> RISER_1	Materials				
<input checked="" type="checkbox"/> RISER_2	Materials				
<input checked="" type="checkbox"/> RISER_3	Materials				
<input checked="" type="checkbox"/> RISER_4	Materials				
<input checked="" type="checkbox"/> RISER_5	Materials				

Output Criteria

Name: OutputCriteria_1

Field Name: Total Shrinkage Porosity

Option: sum

Timing: last_step

Cut-off

Domains: Region Volume

PART

Objectives and Constraints

Working Directory: C:\Users\mac\Documents\MAC\UGM\OPT\Dmo_cas_

Name	Field Na...	Option	Timing	Type	Stop...	Unit
<input checked="" type="checkbox"/> OutputC...	Total Shrn...	sum	last_s...	Minimize ...	0.0	m ³

Default stop calculation criteria value for porosity is 0.0

6 Replicar la metodología en los otros volúmenes de aleaciones y moldes, si los hay.



Módulo de optimización: función MatID

Model Setup

Algorithm: Optimization Robustness Analysis
 Inverse model Design of Experiment

Values: Continue Discrete

Materials	Volumes(S)	Process Conditions	Tilt Pouting	Simulation Parameters	Cycling
<input type="checkbox"/> RISER_1	Initial Tempera...	1300.0	1170	1430	
<input type="checkbox"/> RISER_2	Initial Tempera...	1300.0	1170	1430	
<input type="checkbox"/> RISER_3	Initial Tempera...	1300.0	1170	1430	
<input type="checkbox"/> RISER_4	Initial Tempera...	1300.0	1170	1430	
<input type="checkbox"/> RISER_5	Initial Tempera...	1300.0	1170	1430	
<input type="checkbox"/> PART	Fill	100.0	90	100	
<input type="checkbox"/> RISER_1	Fill	100.0	90	100	
<input type="checkbox"/> RISER_2	Fill	100.0	90	100	
<input type="checkbox"/> RISER_3	Fill	100.0	90	100	
<input type="checkbox"/> RISER_4	Fill	100.0	90	100	
<input type="checkbox"/> RISER_5	Fill	100.0	90	100	
<input checked="" type="checkbox"/> PART					
<input checked="" type="checkbox"/> RISER_1	Materials				
<input checked="" type="checkbox"/> RISER_2	Materials				
<input checked="" type="checkbox"/> RISER_3	Materials				
<input checked="" type="checkbox"/> RISER_4	Materials				
<input checked="" type="checkbox"/> RISER_5	Materials				

6 Replicar la metodología en los otros volúmenes de aleaciones y moldes, si los hay.

Output Criteria

Name: OutputCriteria_1

Field Name: Total Shrinkage Porosity

Option: sum

Termin: last_step

Domains: Region, Volume

Objective

Working Directory: C:\Users\...

Output Criteria

Name	Field Na...	Option
<input checked="" type="checkbox"/> OutputC...	Total Shrn...	sum

Simulation

Working directory: C:\Users\mac\Documents\MAC\UGMOPT\mo cas Simple\RISER OPT

Optimization (Continue Values)

Design Parameters | Objective and Constraints

Id	Name	Initial value	Bounds values
P1	RISER_1->Materials	GGG_40_MAC	[GGG_40_MAC ; GREEN_...
P2	RISER_2->Materials	GGG_40_MAC	[GGG_40_MAC ;]
P3	RISER_3->Materials	GGG_40_MAC	[GGG_40_MAC ;]
P4	RISER_4->Materials	GGG_40_MAC	[GGG_40_MAC ;]
P5	RISER_5->Materials	GGG_40_MAC	[GGG_40_MAC ;]

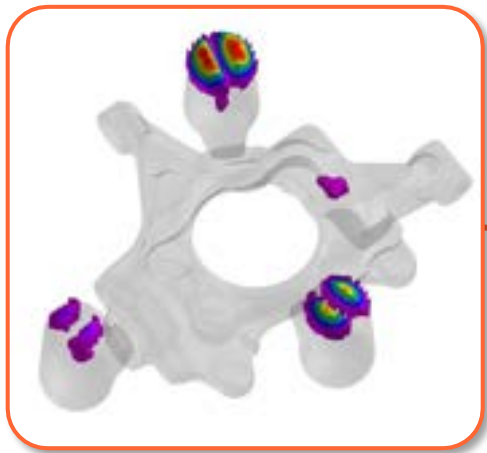
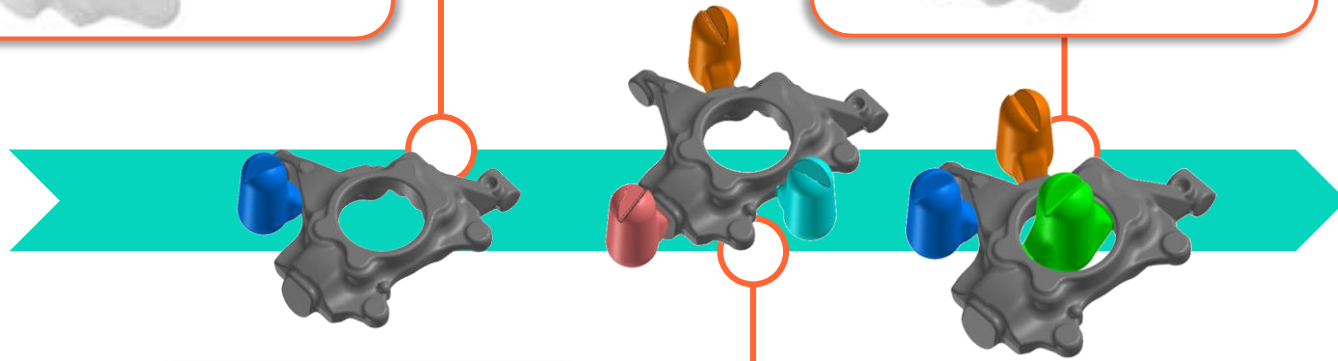
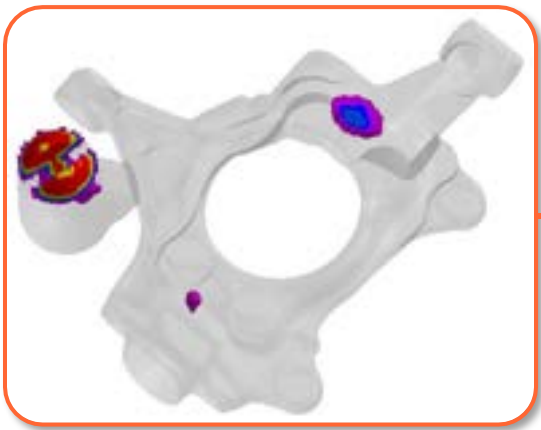
QC Windows calculation parameters | QC Linux calculation parameters

Parameter	Value
Solver used for the simulation	QuaCAST
Solver location	C:\Program Files\ESI Group\ProCAST20...
PanOpt location	C:\Program Files (x86)\ESI Group\ProCAS...
Number of design parameters	5
Number of processors used for every simul...	4
Number of simultaneous simulations	1
Algorithm method	Adaptive Response Surface Method
Limit the number of calculated points	No
Limit the number of iterations	No
Keep best results	Yes

Finalist | Terminate | Run



Módulo de optimización: función MatID



Agenda

1

Módulo de optimización: función MatID

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Optimización del sistema de alimentación

3

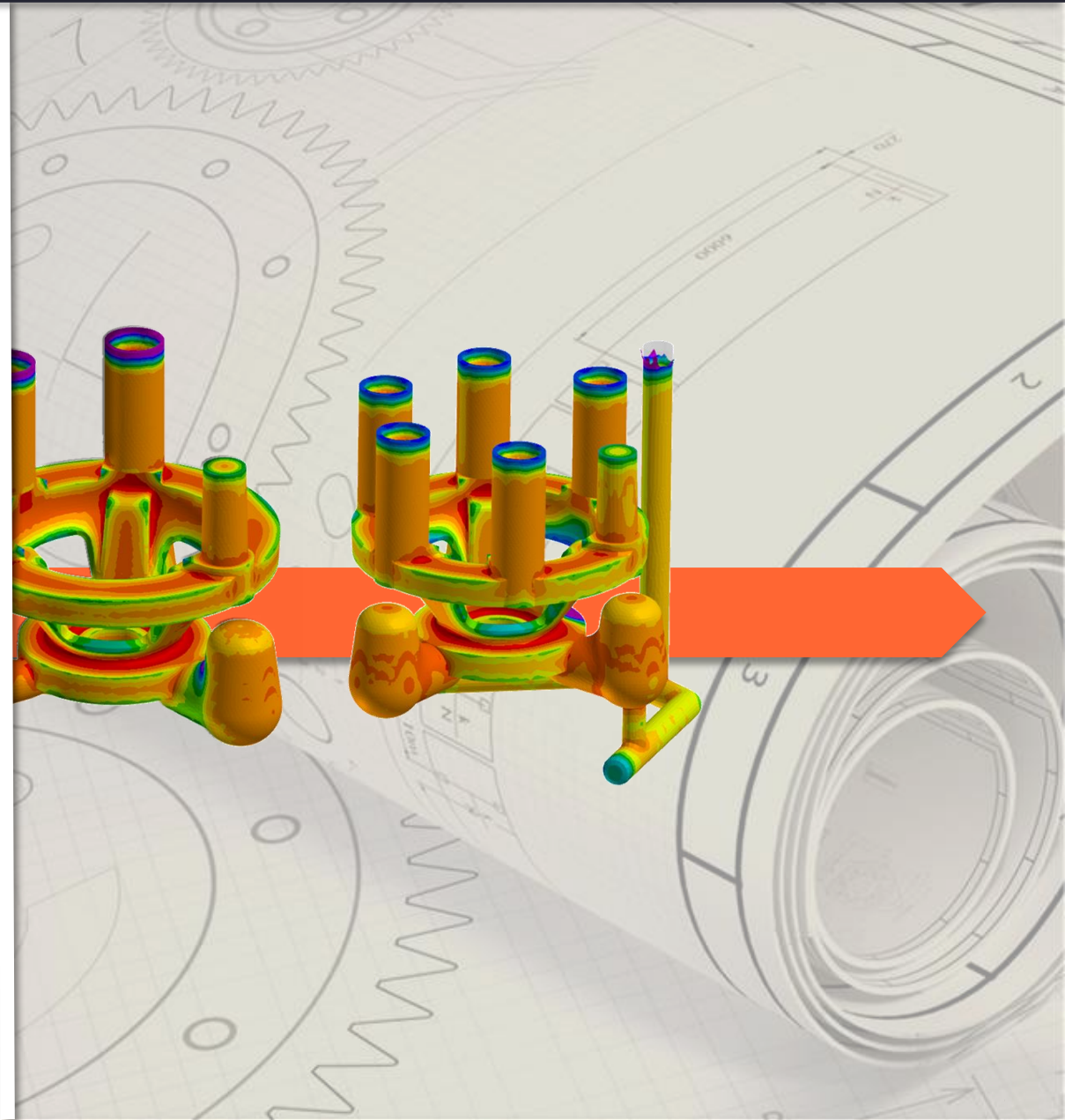
Optimización del sistema de llenado

4

Ventajas y Conclusiones

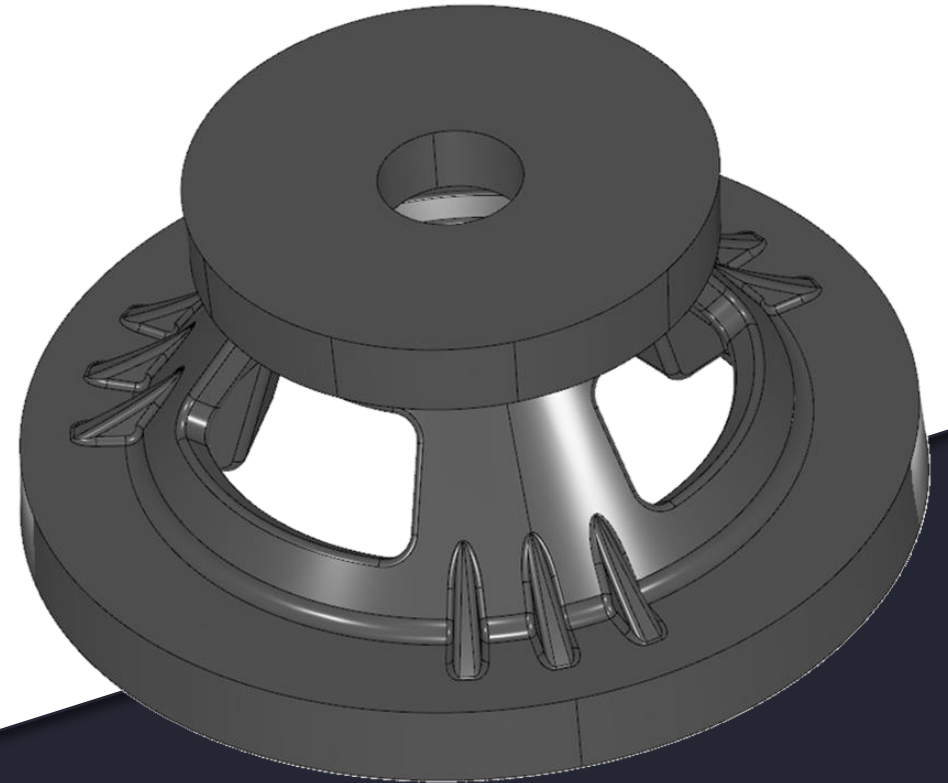
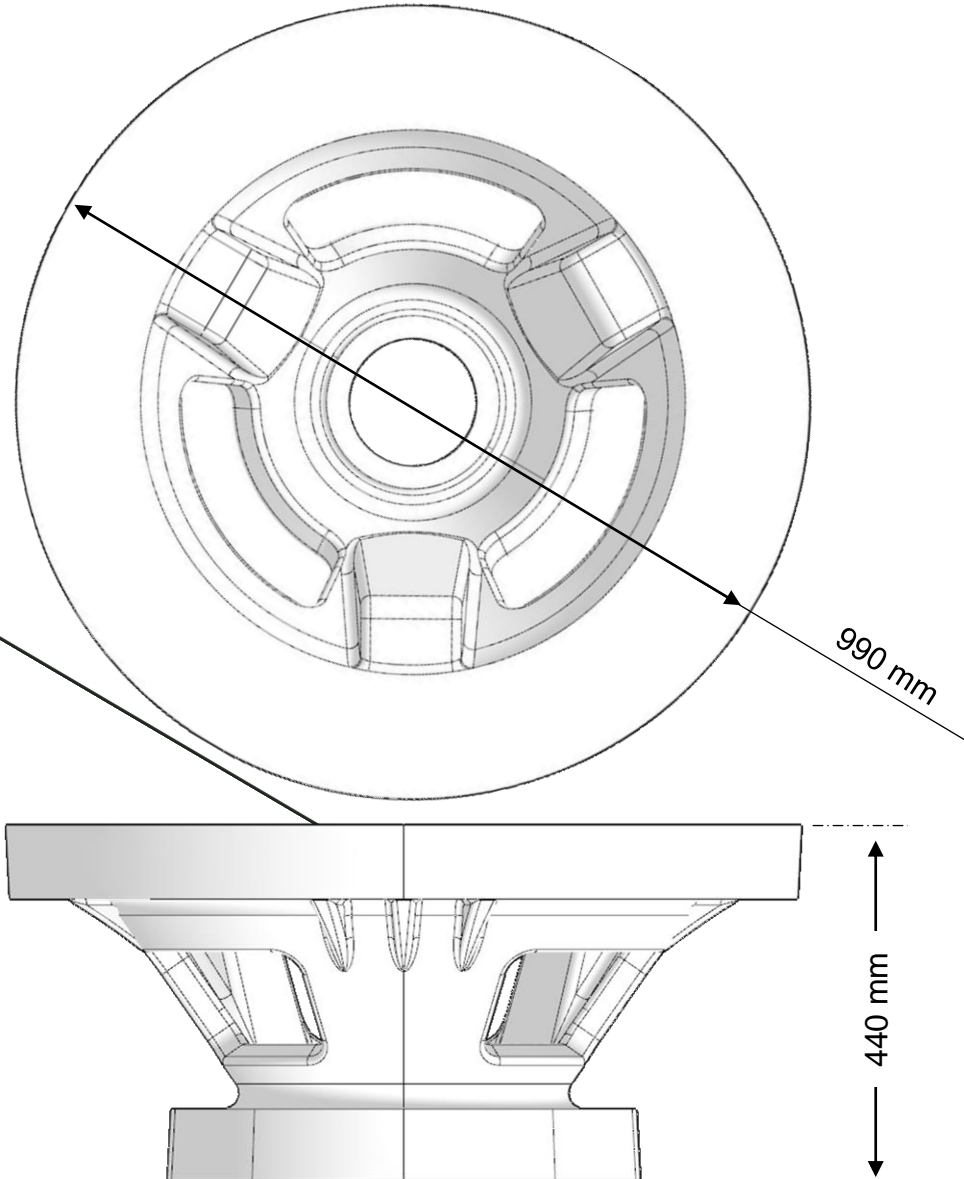


Optimice el número y el tamaño de las mazarotas y los enfriadores para garantizar una pieza sana



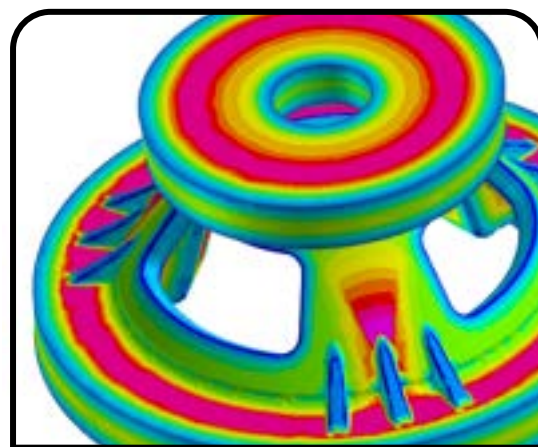


Cubre Pistón Acero inoxidable

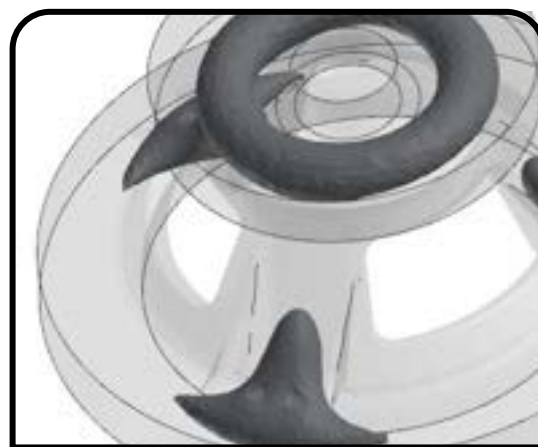




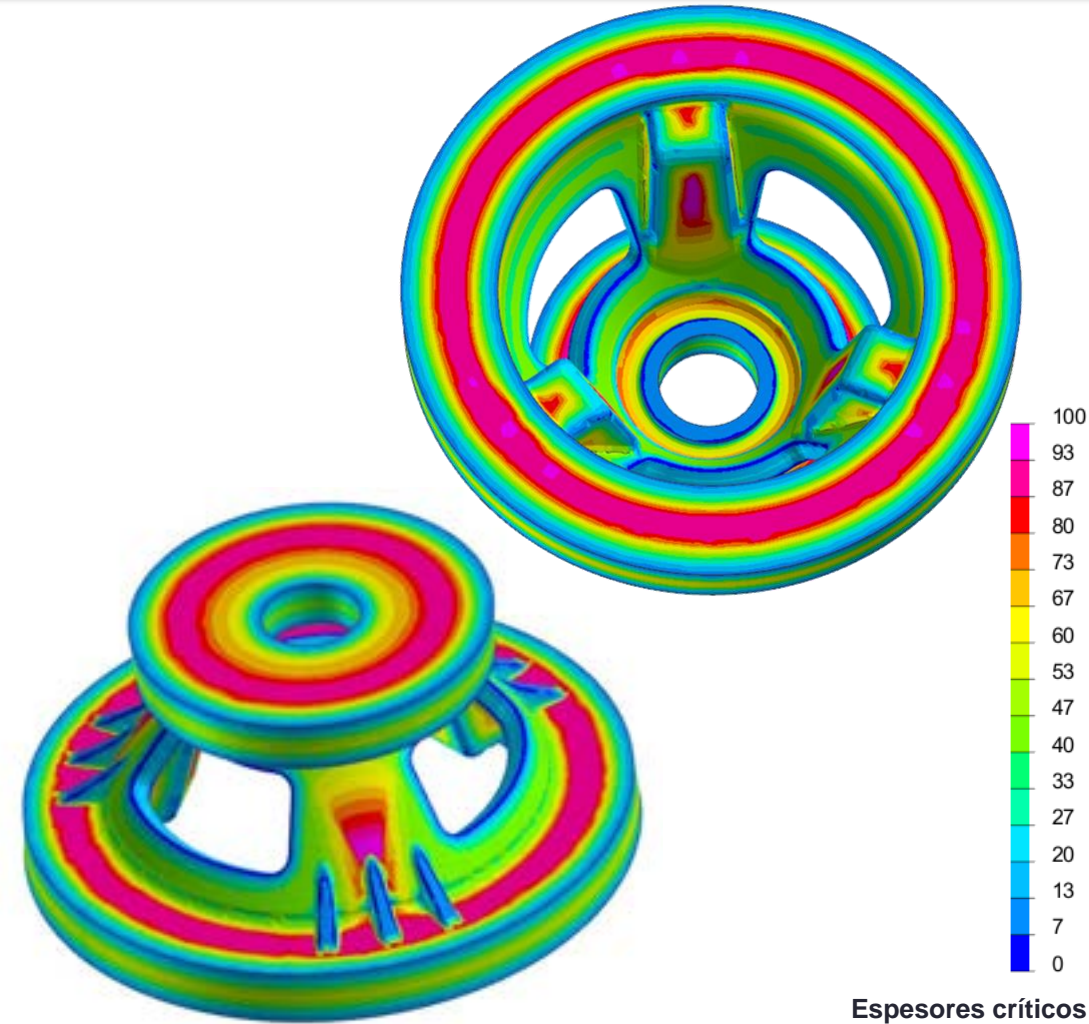
La pieza se analiza mediante el módulo de **Co-Diseño**



Enfoque geométrico



Enfoque térmico

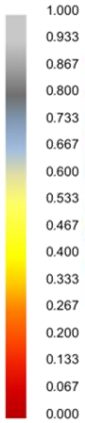


Espesores críticos

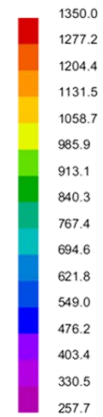
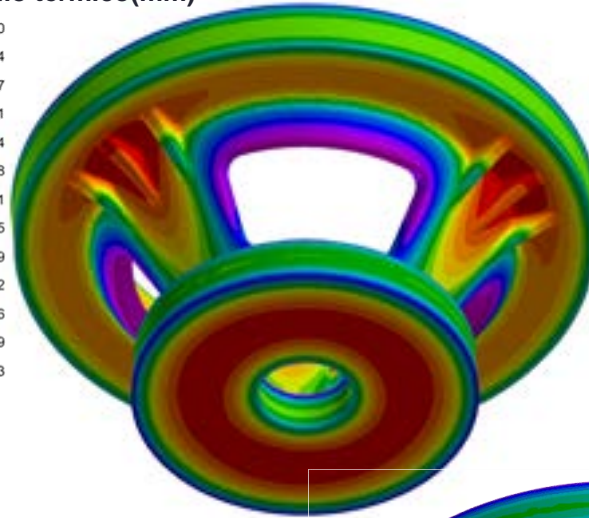


Fración sólida(%)

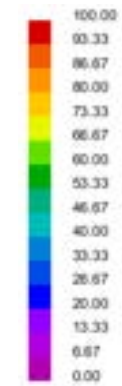
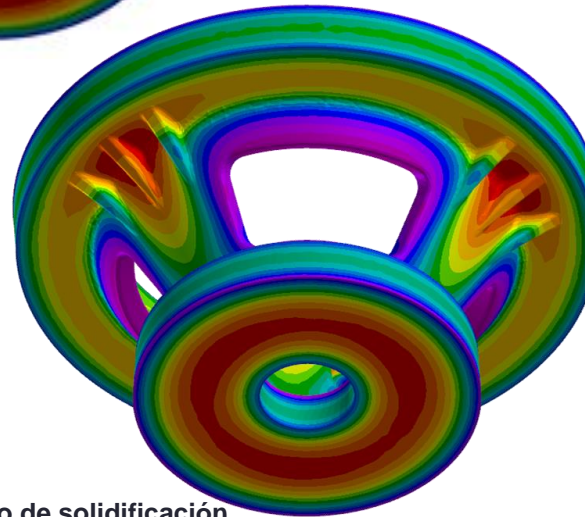
X-ray 85%



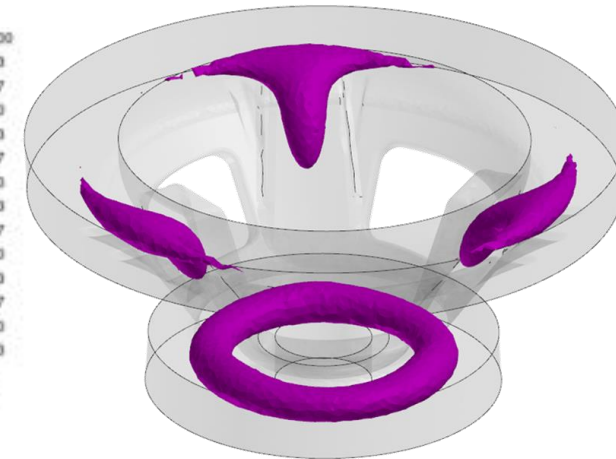
Módulo térmico(mm)



Tiempo de solidificación



Zonas de riesgo de porosidad

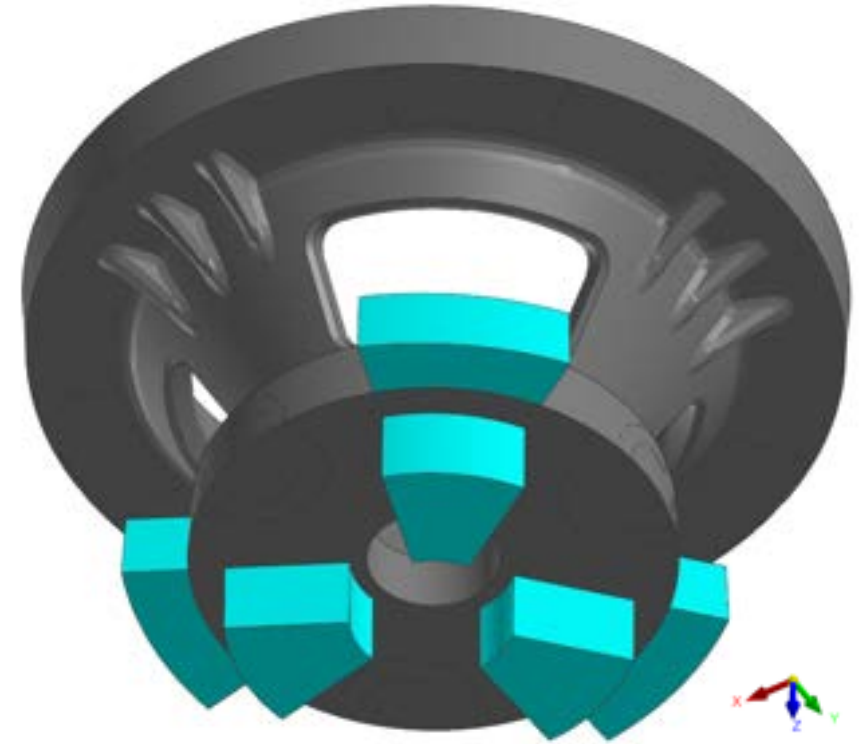
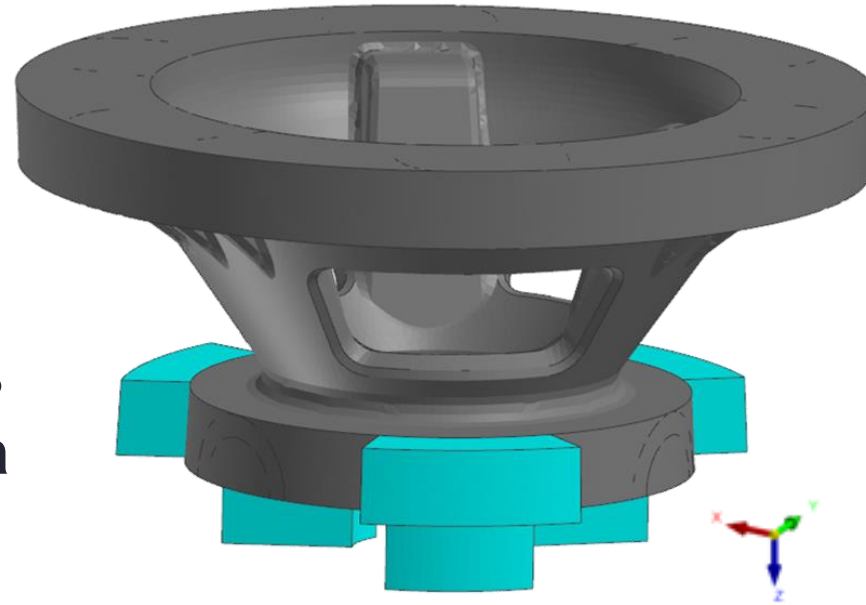
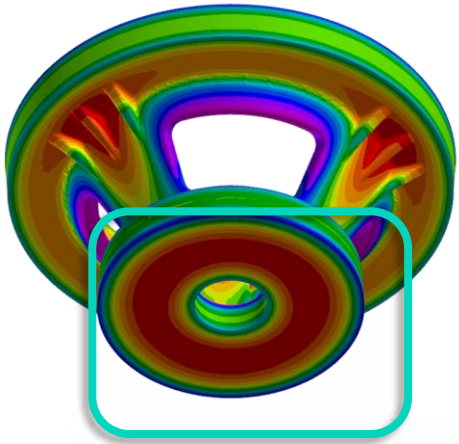


Enfoque térmico



Definición de mazarotas y enfriadores

Módulo térmico



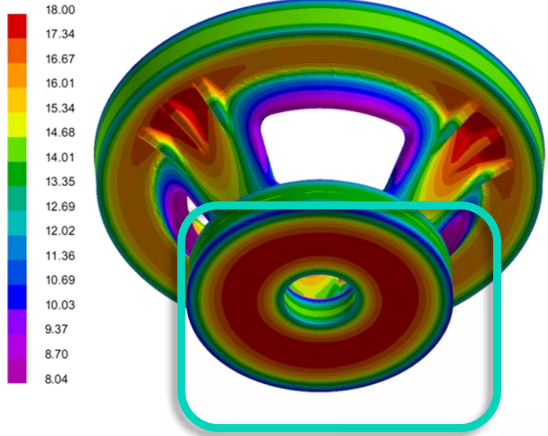
**Añadir Enfriadores
para direccionar la
solidificación**

Parte inferior

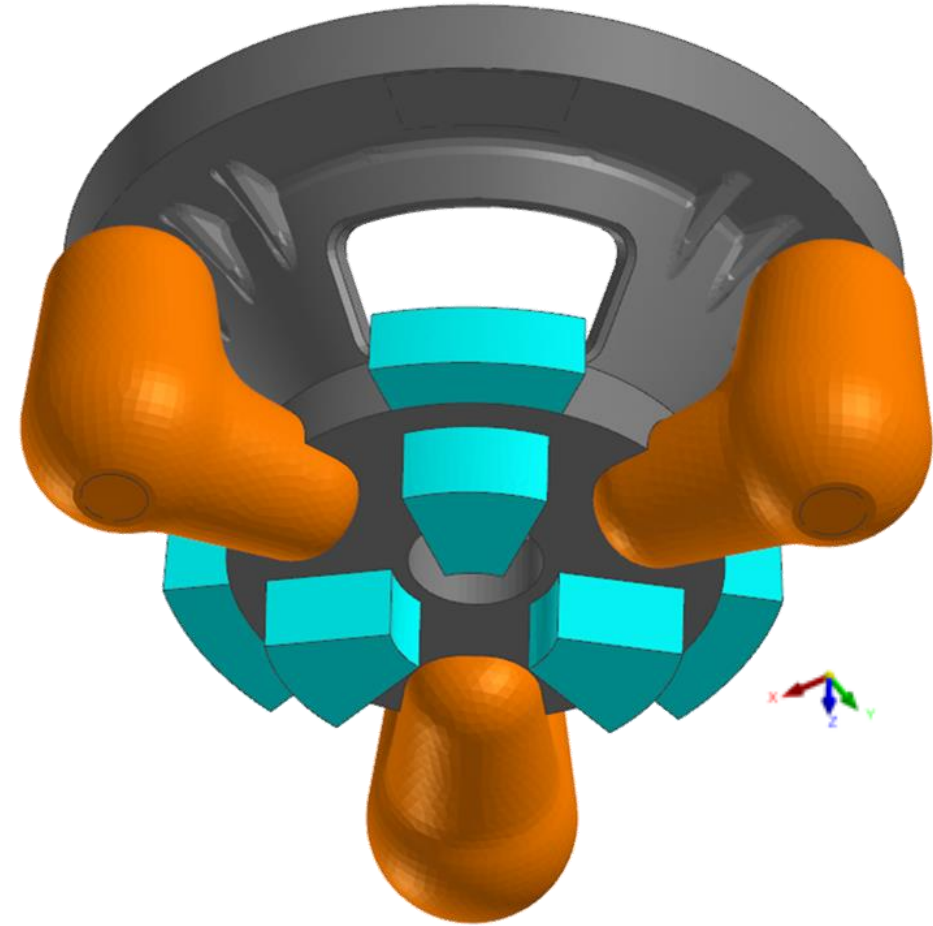
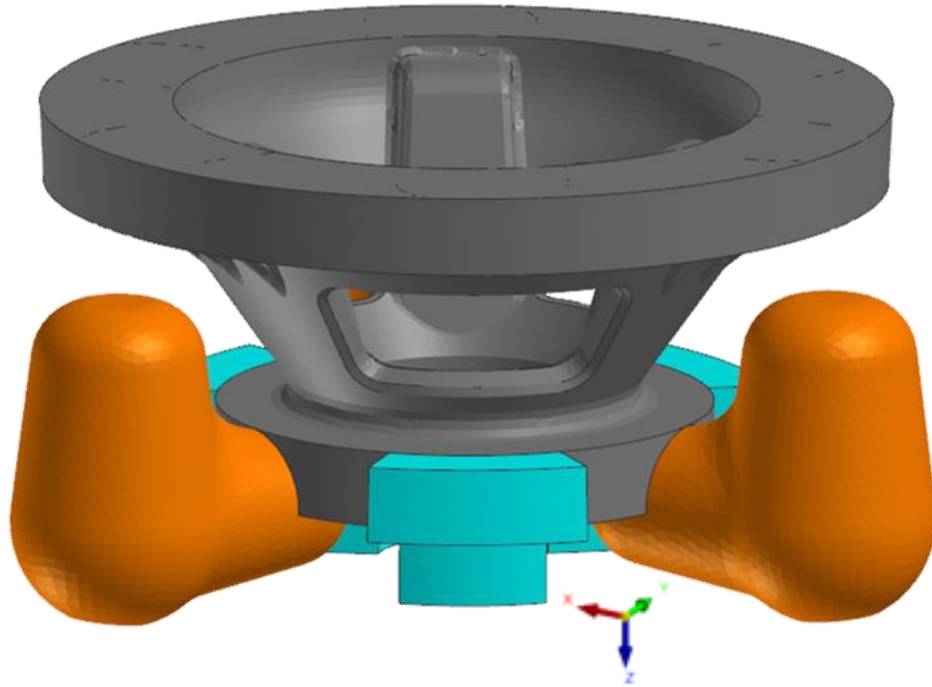


Definición de Mazarotas y Enfriadores

Módulo térmico



**Diseño de
Mazarotas**

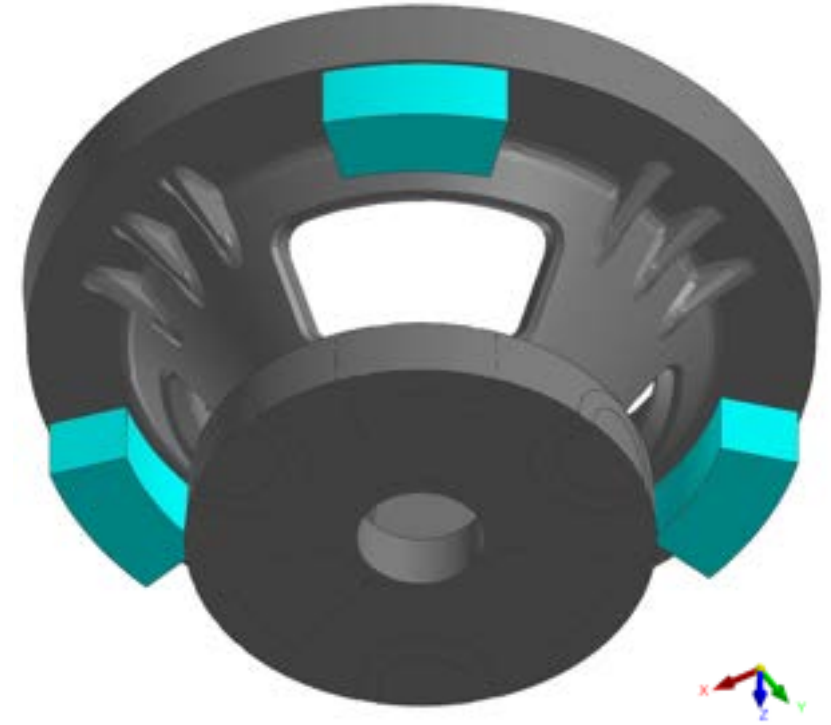
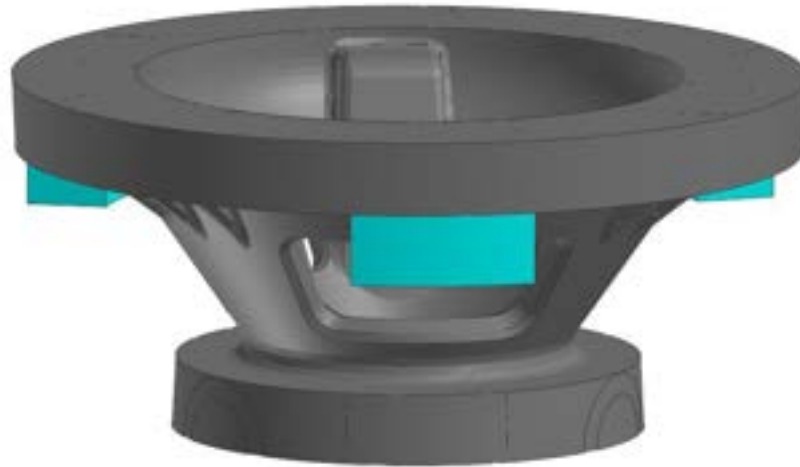
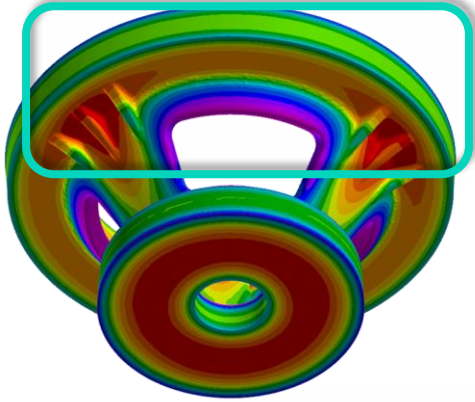


Parte inferior



Definición de Mazarotas y Enfriadores

Módulo térmico



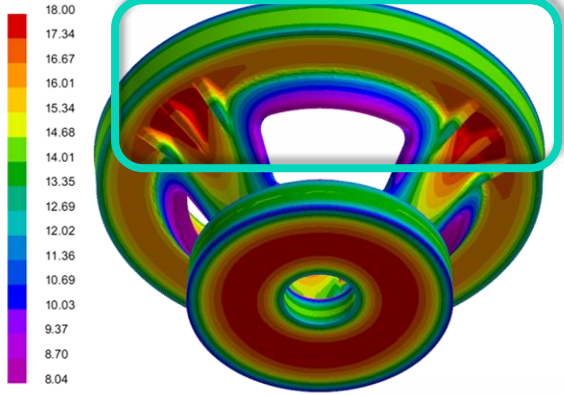
**Añadir Enfriadores
para direccionar la
solidificación**

Parte superior

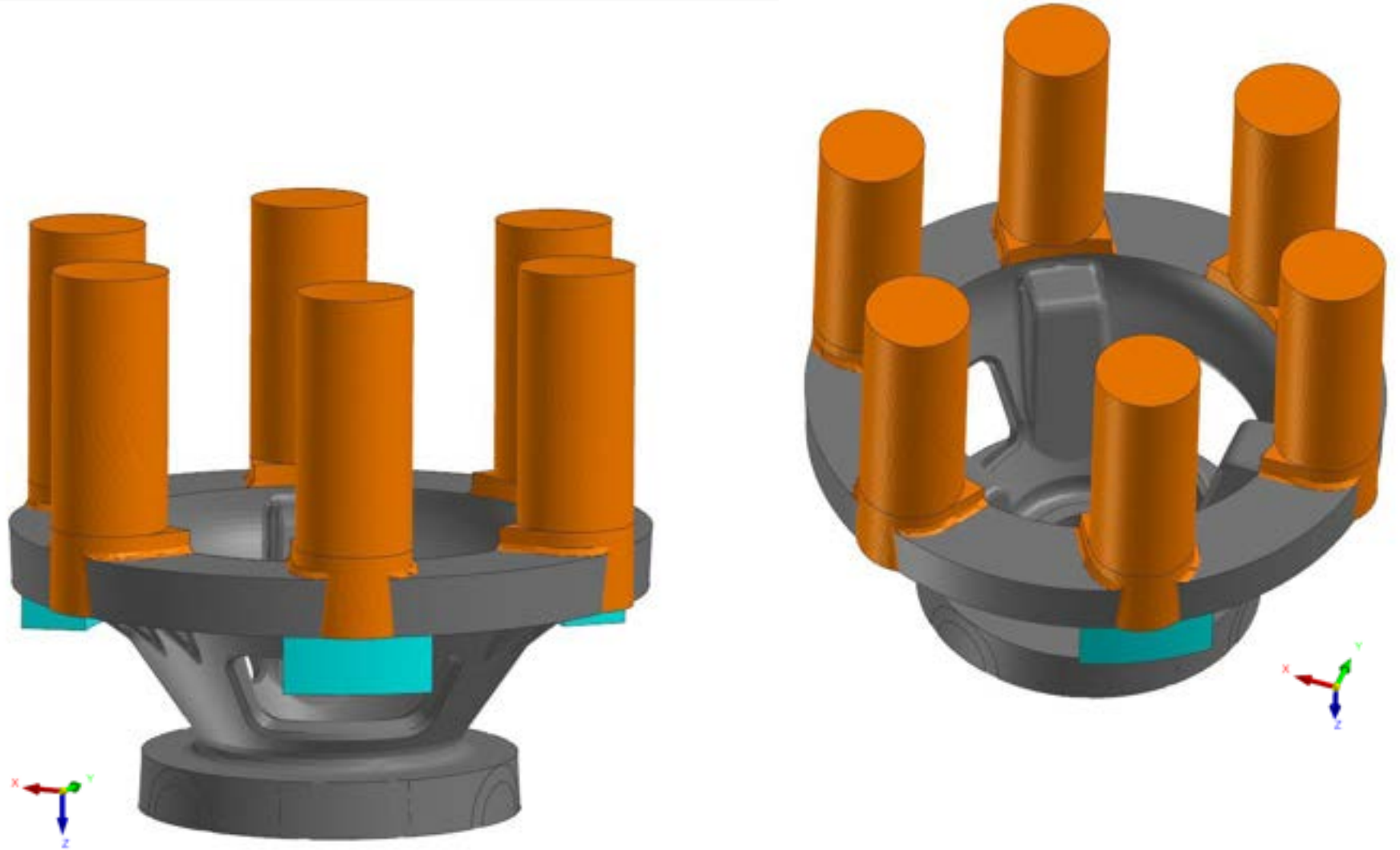


Definición de Mazarotas y Enfriadores

Módulo térmico



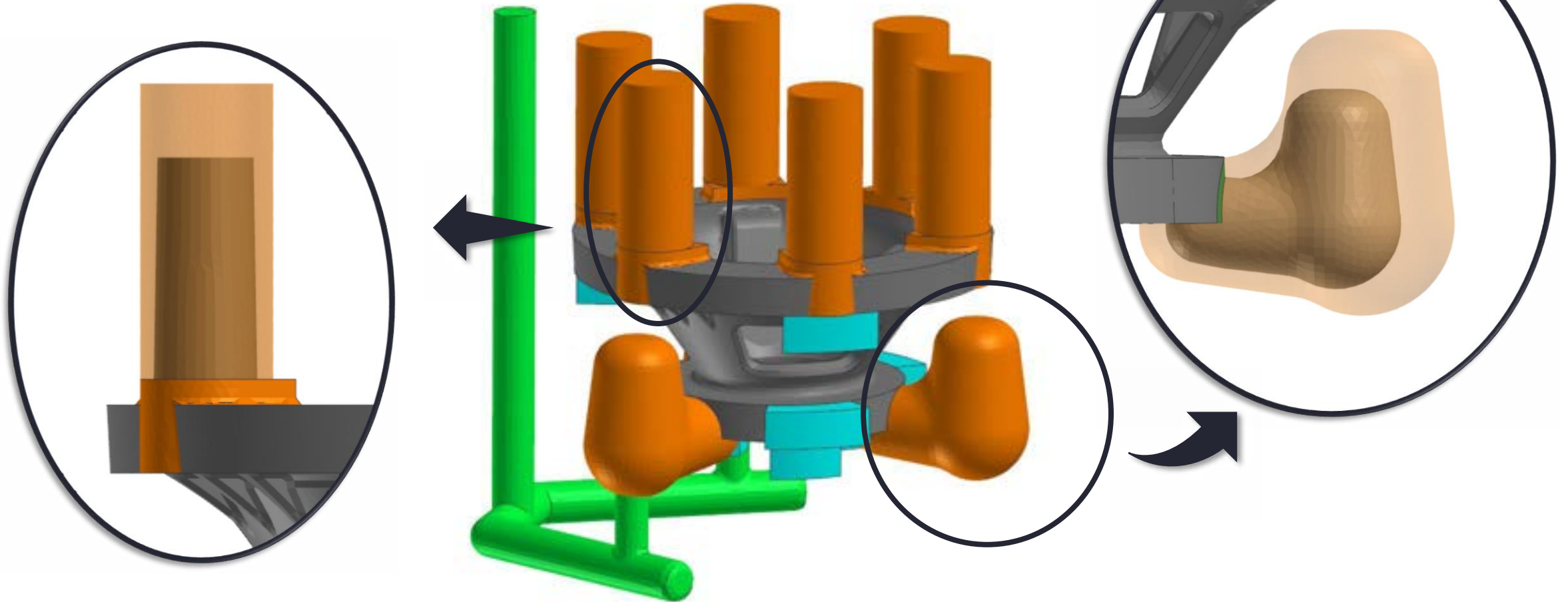
Diseño de Mazarotas

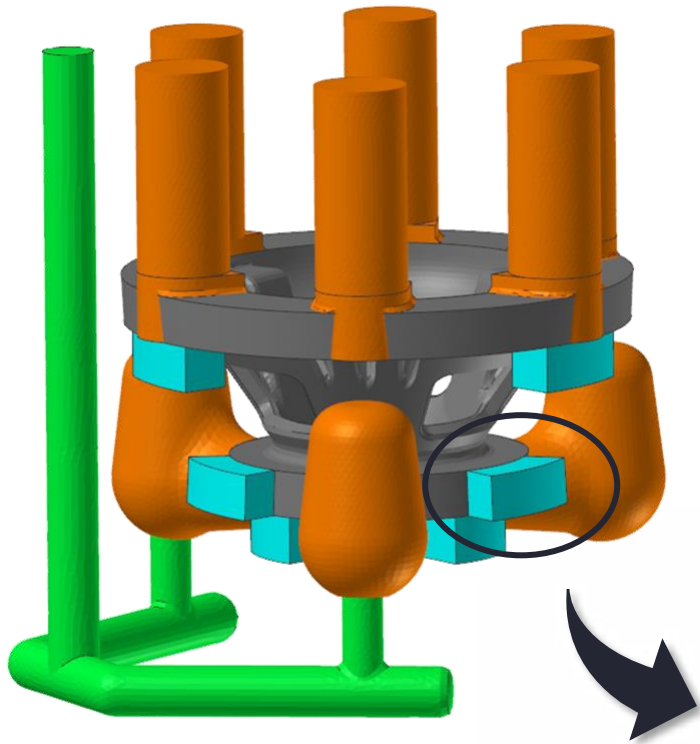


Parte superior



Geometría utilizada como entrada para el módulo de **Optimización**





Model Setup

Working directory: C:\Users\mac\Documents\MAC\UGM\OPT\test

Algorithm: Optimization Robustness Analysis
 Inverse model Design of Experiment

Values: Continue Discrete

Materials	Volumes()	Interface	HTC	Process Conditions	Tilt	Pouring	Simulation Parameters
<input type="checkbox"/>	REFROID_Ba...	FE	100.0	90	100		
<input type="checkbox"/>	REFROID_Ba...	FE	100.0	90	100		
<input type="checkbox"/>	REFROID_Ba...	FE	100.0	90	100		
<input type="checkbox"/>	REFROID_Ha...	FE	100.0	90	100		
<input type="checkbox"/>	REFROID_Ha...	FE	100.0	90	100		
<input type="checkbox"/>	REFROID_Ha...	FE	100.0	90	100		
<input type="checkbox"/>	REFROID_Ha...	FE	100.0	90	100		
<input checked="" type="checkbox"/>	REFROID_Ba...	Materials					
<input checked="" type="checkbox"/>	REFROID_Ba...	Materials					
<input checked="" type="checkbox"/>	REFROID_Ba...	Materials					
<input checked="" type="checkbox"/>	REFROID_Ba...	Materials					
<input checked="" type="checkbox"/>	REFROID_Ba...	Materials					
<input checked="" type="checkbox"/>	REFROID_Ha...	Materials					
<input checked="" type="checkbox"/>	REFROID_Ha...	Materials					
<input checked="" type="checkbox"/>	REFROID_Ha...	Materials					
<input type="checkbox"/>	MOULE	Materials					

Replace Material for volume REFROID_Ba_1

Coupled volume(s)

- A_Systeme_coulee
- A_PART
- A_MASS_Bas_fine_1
- A_MASS_Bas_large_1
- A_MASS_Bas_fine_2

Materials

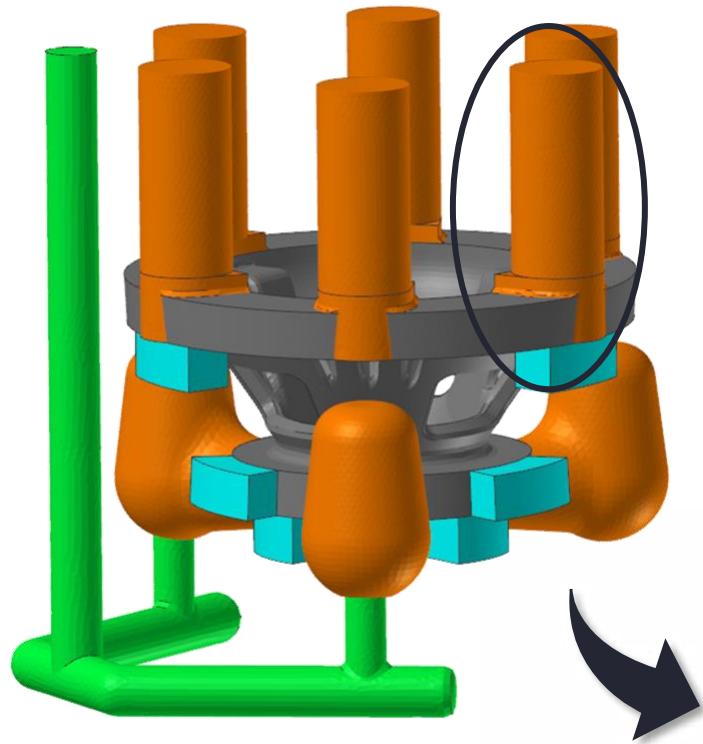
Initial Replace by

Type	Database	Category	Material	Fill %	Initial temp	Unit temp
Mold	Model	UnSorted	GREY_IRON	100.0	20.0	C
Mold	Public	(SAND)	GREEN_SAND	100	20	C

Fix first and last priority

Casting component (First priority) Mold (Last priority)

**Entrada de datos
para enfriadores**



Model Setup

Materials | Volumes(27) | Interface HTC | Process Conditions | TII Pairing | Simulation Pa...

Type	Database	Category	Material	Fil %	Initial temp	Unit temp
Alloy	Model	Fe	STAINLESS_STEEL	100.0	1550.0	C
Mold	Public	(SAND)	GREEN_SAND	100	20	C

Replace Material for volume A_MASS_Bas_large_2

Coupled volume(s)

- A_Systeme_coulee
- A_PART
- A_MASS_Bas_fine_1
- A_MASS_Bas_large_1
- A_MASS_Bas_fine_2

Materials

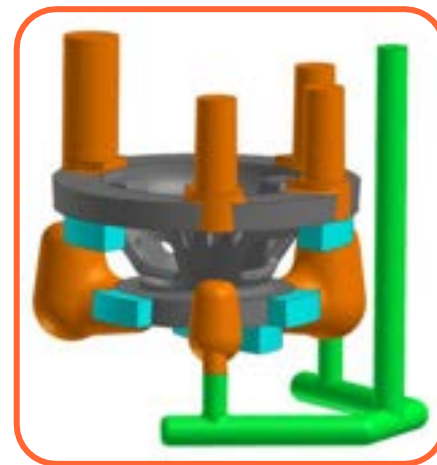
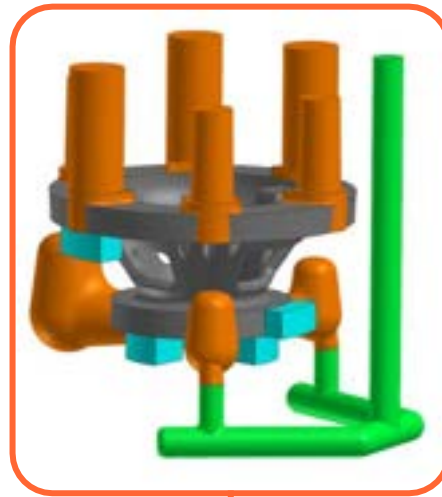
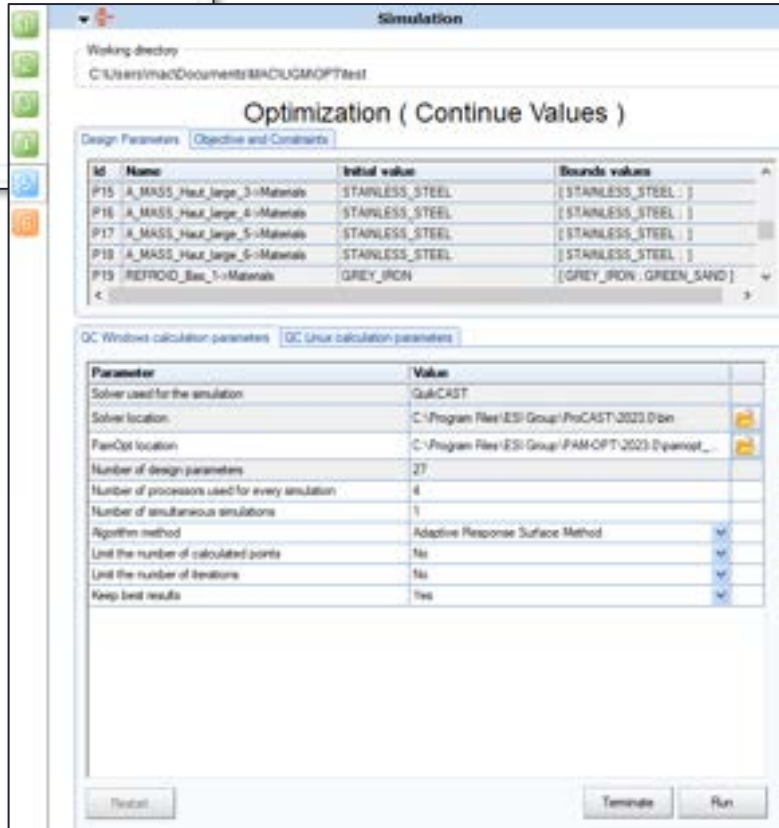
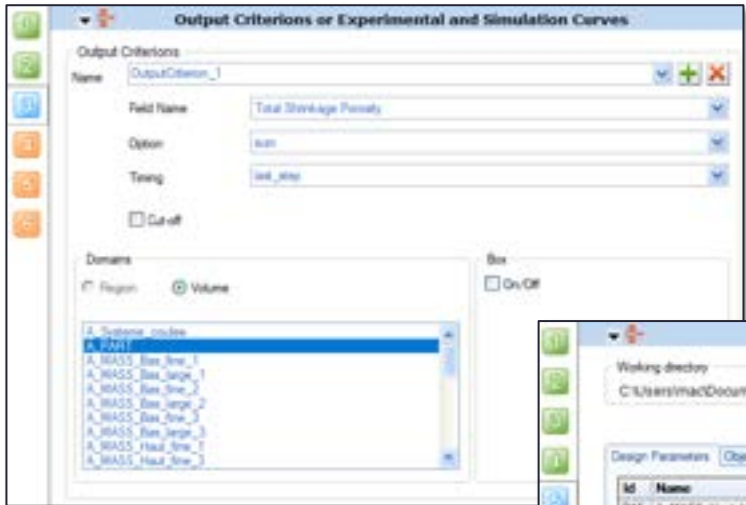
Initial Replace by

Fix first and last priority

Casting component (First priority) Mold (Last priority)

A_Systeme_coulee MOULE

Entrada de datos para mazarotas





Número de iteraciones

Variación de materiales para enfriadores:
Enfriador presente: GREY IRON
Ausencia de enfriador: Green Sand

Run	A_BOT...	A_BOT...	A_BOT...	A_BOT...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	BOTT...	BOTT...	BOTT...	BOTT...	BOTT...	BOTT...	TOP_C...	TOP_C...	TOP_C...	Obj (c)
7	Green S...	Green S...	Green S...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	GREY_I...	GREY_I...	Green S...	Green S...	GREY_I...	1785.5
8	STAINL...	STAINL...	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	GREY_I...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	GREY_I...	1779.3
9	Green S...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	GREY_I...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	GREY_I...	1811.6
10	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	GREY_I...	Green S...	GREY_I...	Green S...	Green S...	Green S...	GREY_I...	1755.5
11	STAINL...	STAINL...	Green S...	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	Green S...	GREY_I...	Green S...	GREY_I...	Green S...	GREY_I...	Green S...	GREY_I...	Green S...	GREY_I...	1715.3
12	Green S...	STAINL...	STAINL...	Green S...	STAINL...	STAINL...	Green S...	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	GREY_I...	GREY_I...	GREY_I...	GREY_I...	GREY_I...	Green S...	GREY_I...	GREY_I...	Green S...	1682.5
13	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	STAINL...	Green S...	GREY_I...	Green S...	Green S...	Green S...	Green S...	GREY_I...	GREY_I...	Green S...	1743.9
14	Green S...	STAINL...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	Green S...	Green S...	GREY_I...	Green S...	GREY_I...	Green S...	GREY_I...	Green S...	GREY_I...	1768.4
15	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	STAINL...	Green S...	Green S...	STAINL...	Green S...	Green S...	GREY_I...	GREY_I...	GREY_I...	Green S...	GREY_I...	GREY_I...	GREY_I...	GREY_I...	1723.0
16	STAINL...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	GREY_I...	Green S...	GREY_I...	GREY_I...	Green S...	GREY_I...	GREY_I...	Green S...	GREY_I...	1694.6
17	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	STAINL...	GREY_I...	GREY_I...	GREY_I...	Green S...	GREY_I...	GREY_I...	Green S...	Green S...	Green S...	1731.0
18	STAINL...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	STAINL...	Green S...	STAINL...	GREY_I...	GREY_I...	Green S...	GREY_I...	GREY_I...	GREY_I...	GREY_I...	GREY_I...	GREY_I...	1693.0
19	Green S...	STAINL...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	Green S...	STAINL...	GREY_I...	GREY_I...	Green S...	GREY_I...	GREY_I...	GREY_I...	Green S...	Green S...	Green S...	1737.1
20	Green S...	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	STAINL...	Green S...	Green S...	STAINL...	Green S...	GREY_I...	GREY_I...	Green S...	Green S...	GREY_I...	GREY_I...	GREY_I...	GREY_I...	1743.8
21	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	GREY_I...	GREY_I...	Green S...	GREY_I...	Green S...	Green S...	GREY_I...	GREY_I...	GREY_I...	1692.8
22	STAINL...	Green S...	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	GREY_I...	GREY_I...	Green S...	Green S...	GREY_I...	GREY_I...	GREY_I...	GREY_I...	Green S...	1704.3
23	STAINL...	STAINL...	Green S...	Green S...	STAINL...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	STAINL...	STAINL...	Green S...	Green S...	GREY_I...	Green S...	Green S...	Green S...	GREY_I...	GREY_I...	Green S...	1725.7
24	Green S...	Green S...	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	GREY_I...	GREY_I...	GREY_I...	GREY_I...	GREY_I...	Green S...	Green S...	Green S...	Green S...	1722.3
25	STAINL...	Green S...	Green S...	STAINL...	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	GREY_I...	GREY_I...	GREY_I...	GREY_I...	Green S...	Green S...	Green S...	1798.2
26	Green S...	STAINL...	STAINL...	Green S...	Green S...	Green S...	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	STAINL...	GREY_I...	Green S...	Green S...	GREY_I...	GREY_I...	Green S...	GREY_I...	GREY_I...	GREY_I...	1697.9
27	STAINL...	Green S...	STAINL...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	STAINL...	Green S...	GREY_I...	Green S...	Green S...	GREY_I...	Green S...	GREY_I...	Green S...	GREY_I...	Green S...	1746.9
28	Green S...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	STAINL...	Green S...	STAINL...	GREY_I...	Green S...	GREY_I...	Green S...	Green S...	Green S...	GREY_I...	Green S...	GREY_I...	1812.0
29	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	GREY_I...	Green S...	GREY_I...	Green S...	GREY_I...	Green S...	GREY_I...	Green S...	GREY_I...	1732.0
30	Green S...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	GREY_I...	GREY_I...	GREY_I...	Green S...	GREY_I...	Green S...	Green S...	1716.6
31	Green S...	Green S...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	GREY_I...	GREY_I...	GREY_I...	Green S...	GREY_I...	GREY_I...	Green S...	Green S...	1774.4

Variación de material para Mazarotas
Mazarota Presente : STAINLESS STEEL
Ausencia de Mazarota: Green Sand

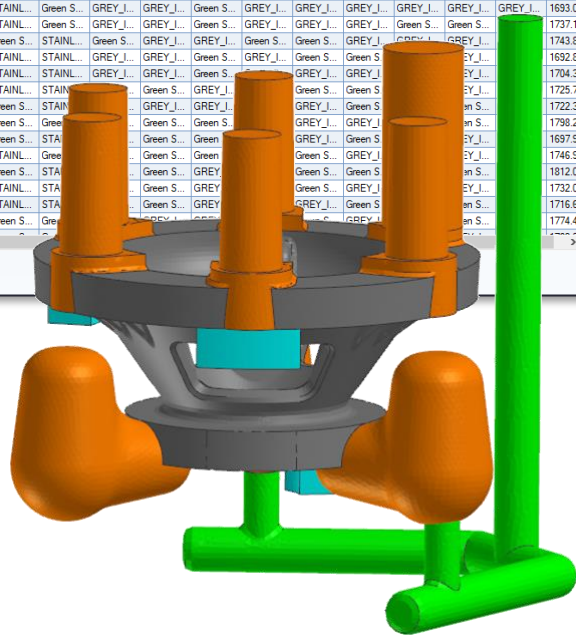
Objetivo : volumen de porosidad



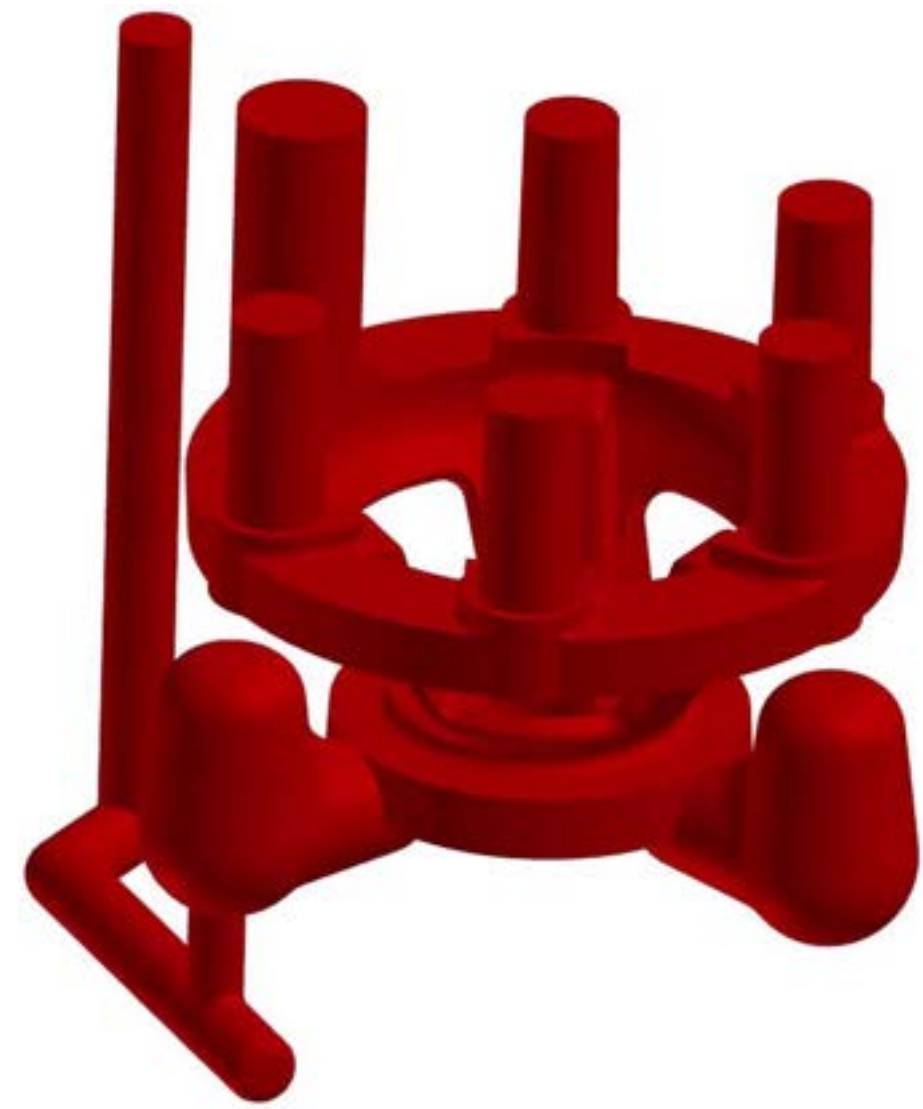
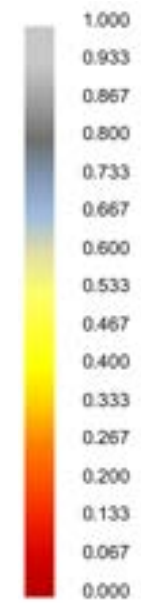
Resultados

Table Of Runs : C:\Users\mac\Documents\MAC\UGM\OPT\ProCAST\OPT_Chill_N_Riser

Run#	A_BOT...	A_BOT...	A_BOT...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	BOTT...	BOTT...	BOTT...	BOTT...	BOTT...	BOTT...	TOP_C...	TOP_C...	TOP_C...	Obj (c...	
7	Green S...	Green S...	Green S...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	Green S...	GREY_J...	Green S...	1785.5	
8	STAINL...	STAINL...	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	GREY_J...	Green S...	Green S...	Green S...	Green S...	Green S...	GREY_J...	Green S...	1779.3
9	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	1811.6
10	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	GREY_J...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	1755.5
12	Green S...	STAINL...	STAINL...	Green S...	STAINL...	STAINL...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	GREY_J...	GREY_J...	GREY_J...	Green S...	GREY_J...	GREY_J...	Green S...	1822.5
13	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	1743.9
14	Green S...	STAINL...	Green S...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	1768.4
15	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	STAINL...	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	1723.0
16	STAINL...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	GREY_J...	Green S...	GREY_J...	Green S...	GREY_J...	GREY_J...	Green S...	1694.6
17	STAINL...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	GREY_J...	Green S...	Green S...	Green S...	Green S...	1731.0
18	STAINL...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	GREY_J...	GREY_J...	GREY_J...	Green S...	1693.0
19	Green S...	STAINL...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	GREY_J...	Green S...	Green S...	Green S...	Green S...	1737.1
20	Green S...	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	STAINL...	Green S...	Green S...	STAINL...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	GREY_J...	GREY_J...	GREY_J...	Green S...	1743.8
21	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	GREY_J...	GREY_J...	GREY_J...	GREY_J...	Green S...	Green S...	Green S...	Green S...	1692.8	
22	STAINL...	Green S...	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	GREY_J...	Green S...	GREY_J...	GREY_J...	GREY_J...	GREY_J...	GREY_J...	Green S...	1704.3
23	STAINL...	STAINL...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	Green S...	Green S...	Green S...	1725.7
24	Green S...	Green S...	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	GREY_J...	Green S...	Green S...	Green S...	Green S...	1722.3
25	STAINL...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	1798.2
26	Green S...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	STAINL...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	1697.9
27	STAINL...	Green S...	STAINL...	Green S...	Green S...	STAINL...	STAINL...	Green S...	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	1746.9
28	Green S...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	1812.0
29	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	GREY_J...	GREY_J...	Green S...	1732.0
30	Green S...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	Green S...	Green S...	Green S...	1716.6
31	Green S...	Green S...	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	GREY_J...	Green S...	Green S...	Green S...	Green S...	1774.4



Fración sólida(%)
Cut-off 85%

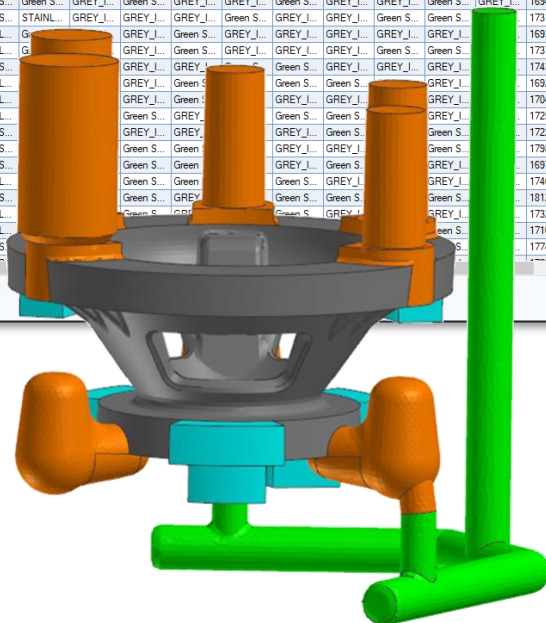




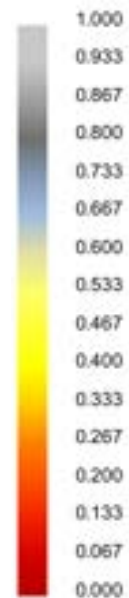
Resultados

Table Of Runs : C:\Users\mac\Documents\MAC\UGM\OPT\ProCAST\OPT_Chill_N_Riser

Run#	A_BOT...	A_BOT...	A_BOT...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	BOTT...	BOTT...	BOTT...	BOTT...	BOTT...	BOTT...	TOP_C...	TOP_C...	TOP_C...	Obj (e
7	Green S...	Green S...	Green S...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	Green S...	Green S...	GREY_J...	1785.5
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9	Green S...	Green S...	Green S...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	GREY_J...	Green S...	Green S...	Green S...	Green S...	Green S...	GREY_J...	1811.6
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11	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	1782.3
12	Green S...	STAINL...	STAINL...	Green S...	STAINL...	STAINL...	Green S...	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	GREY_J...	GREY_J...	Green S...	GREY_J...	GREY_J...	Green S...	1682.5
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24	Green S...	Green S...	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	GREY_J...	Green S...	Green S...	Green S...	GREY_J...	1722.3
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26	Green S...	STAINL...	STAINL...	Green S...	Green S...	Green S...	STAINL...	STAINL...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	GREY_J...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	1697.9
27	STAINL...	Green S...	STAINL...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	GREY_J...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	1746.9
28	Green S...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	GREY_J...	Green S...	Green S...	Green S...	Green S...	GREY_J...	1812.0
29	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	GREY_J...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	1732.0
30	Green S...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	GREY_J...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	1716.6
31	Green S...	Green S...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	GREY_J...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	1774.4



Fración sólida(%)
Cut-off 85%



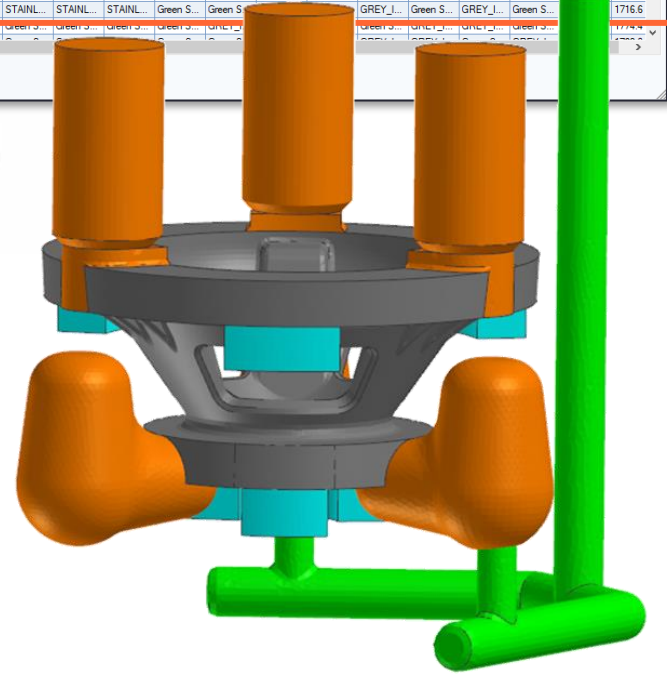
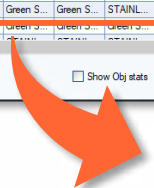


Resultados

Table Of Runs : C:\Users\mac\Documents\MAC\UGM\OPT\ProCAST\OPT_Chill_N_Riser

Run#	A_BOT...	A_BOT...	A_BOT...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	A_RIS...	BOTT...	BOTT...	BOTT...	BOTT...	BOTT...	BOTT...	TOP_C...	TOP_C...	TOP_C...	Obj (e
7	Green S...	Green S...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	Green S...	GREY_J...	1785.5	
8	STAINL...	STAINL...	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	1779.3	
9	Green S...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	1811.6	
10	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	1755.5	
11	STAINL...	STAINL...	Green S...	STAINL...	Green S...	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	GREY_J...	Green S...	Green S...	Green S...	GREY_J...	1715.3	
12	Green S...	STAINL...	STAINL...	Green S...	STAINL...	STAINL...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	GREY_J...	GREY_J...	Green S...	1822.5	
13	STAINL...	STAINL...	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	Green S...	1743.9	
14	Green S...	STAINL...	Green S...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	STAINL...	Green S...	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	1768.4	
15	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	STAINL...	STAINL...	Green S...	Green S...	Green S...	STAINL...	Green S...	Green S...	GREY_J...	GREY_J...	GREY_J...	1723.0	
16	STAINL...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	GREY_J...	Green S...	GREY_J...	GREY_J...	Green S...	1694.6	
17	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	GREY_J...	Green S...	Green S...	1731.0	
18	STAINL...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	GREY_J...	GREY_J...	1693.0	
19	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	GREY_J...	GREY_J...	1737.1	
20	Green S...	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	STAINL...	STAINL...	Green S...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	GREY_J...	GREY_J...	1743.8	
21	Green S...	Green S...	STAINL...	Green S...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	Green S...	GREY_J...	GREY_J...	1692.8	
22	STAINL...	Green S...	STAINL...	Green S...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	GREY_J...	GREY_J...	Green S...	GREY_J...	GREY_J...	1704.3	
23	STAINL...	STAINL...	Green S...	Green S...	STAINL...	Green S...	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	1725.7	
24	Green S...	Green S...	Green S...	Green S...	STAINL...	Green S...	Green S...	STAINL...	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	GREY_J...	GREY_J...	GREY_J...	GREY_J...	Green S...	1722.3	
25	STAINL...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	Green S...	GREY_J...	GREY_J...	1792.2	
26	Green S...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	STAINL...	Green S...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	GREY_J...	Green S...	Green S...	GREY_J...	GREY_J...	1697.9	
27	STAINL...	Green S...	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	Green S...	STAINL...	STAINL...	GREY_J...	Green S...	Green S...	GREY_J...	GREY_J...	1746.9	
28	Green S...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	GREY_J...	Green S...	Green S...	GREY_J...	GREY_J...	1812.0	
29	STAINL...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	GREY_J...	Green S...	GREY_J...	GREY_J...	GREY_J...	1774.2	
30	Green S...	STAINL...	STAINL...	Green S...	Green S...	STAINL...	Green S...	Green S...	STAINL...	STAINL...	STAINL...	STAINL...	STAINL...	GREY_J...	Green S...	GREY_J...	GREY_J...	GREY_J...	1716.6	

Best run values Show Obj stats



Fración sólida(%)
Cut-off 85%



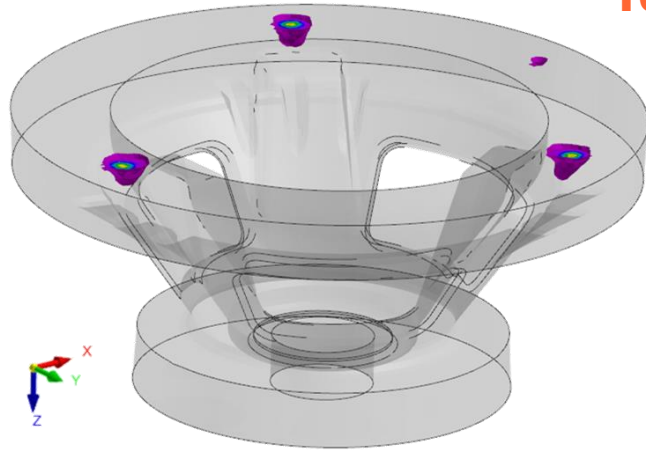


Resultados

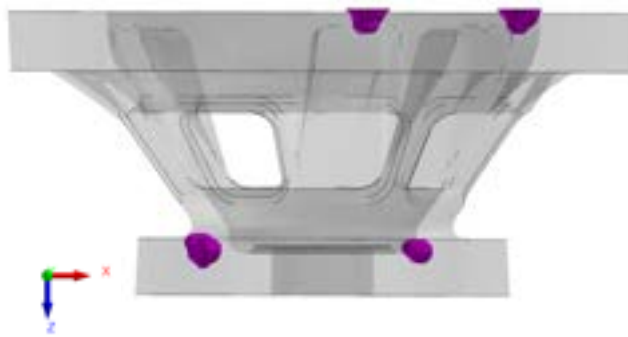
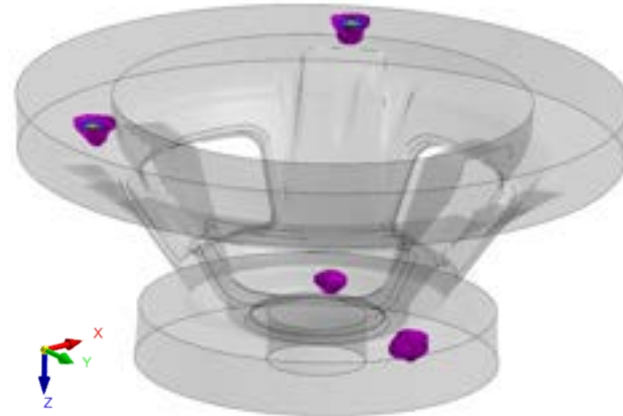
Ubicación de rechupes



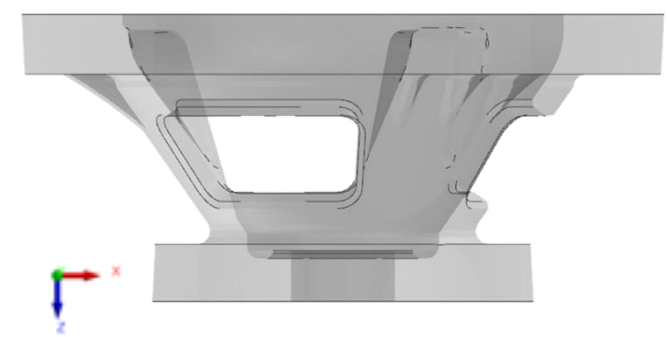
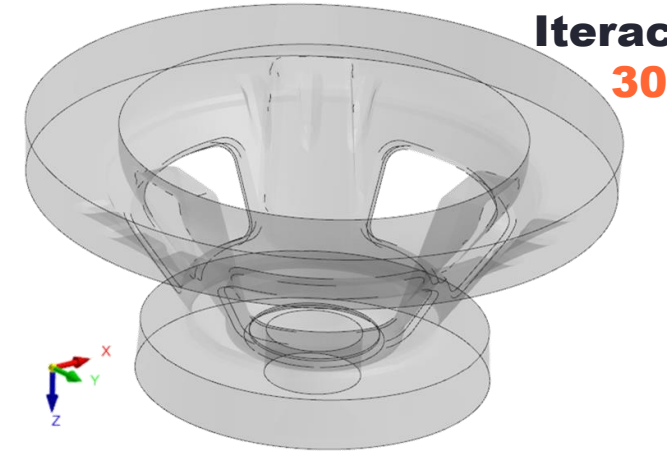
Iteración
10



Iteración
14



Mejores
resultados
Iteración
30



Agenda

1

Módulo de optimización: función MatID

2

Optimización del sistema de alimentación

3

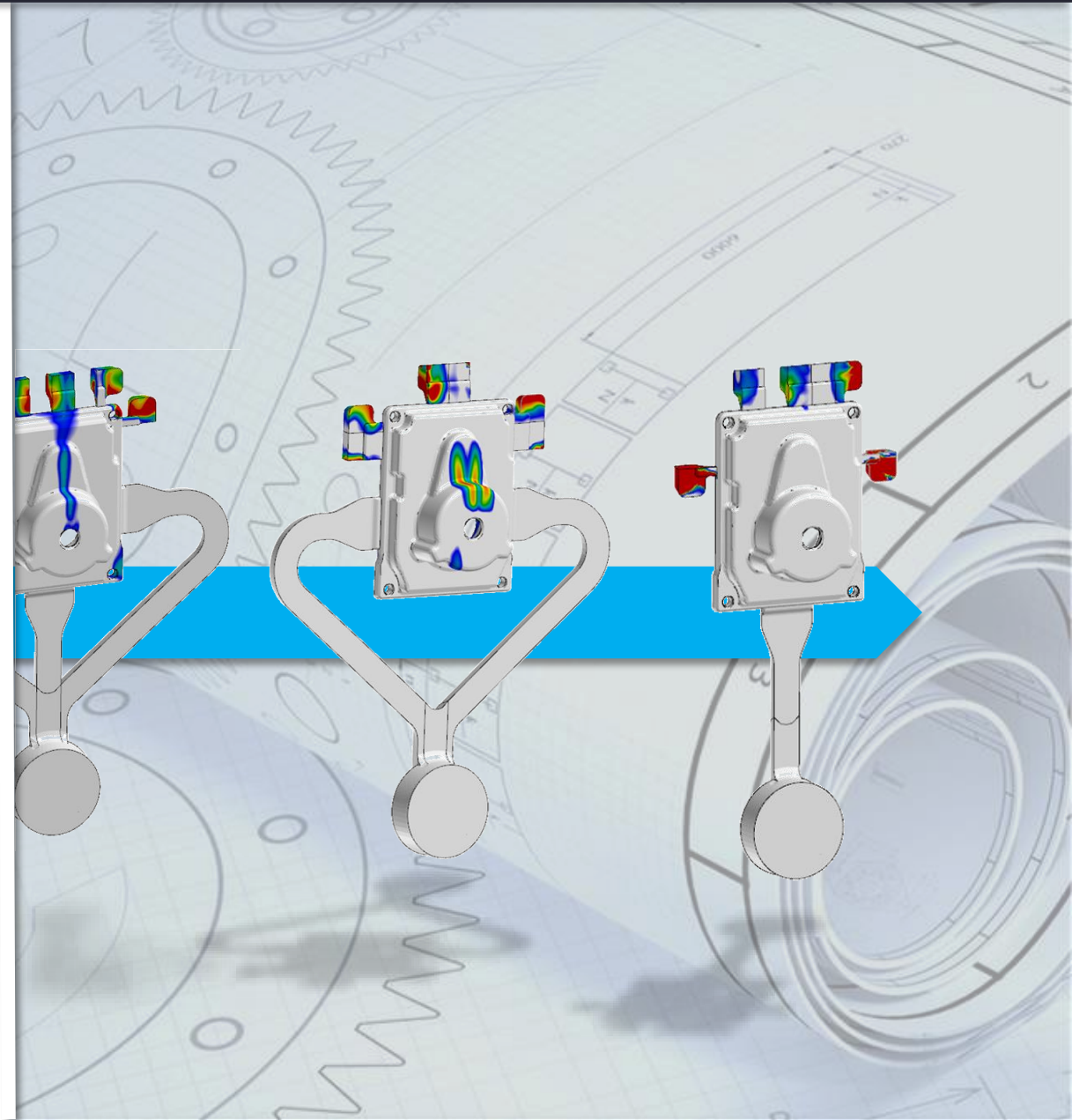
Optimización del sistema de llenado

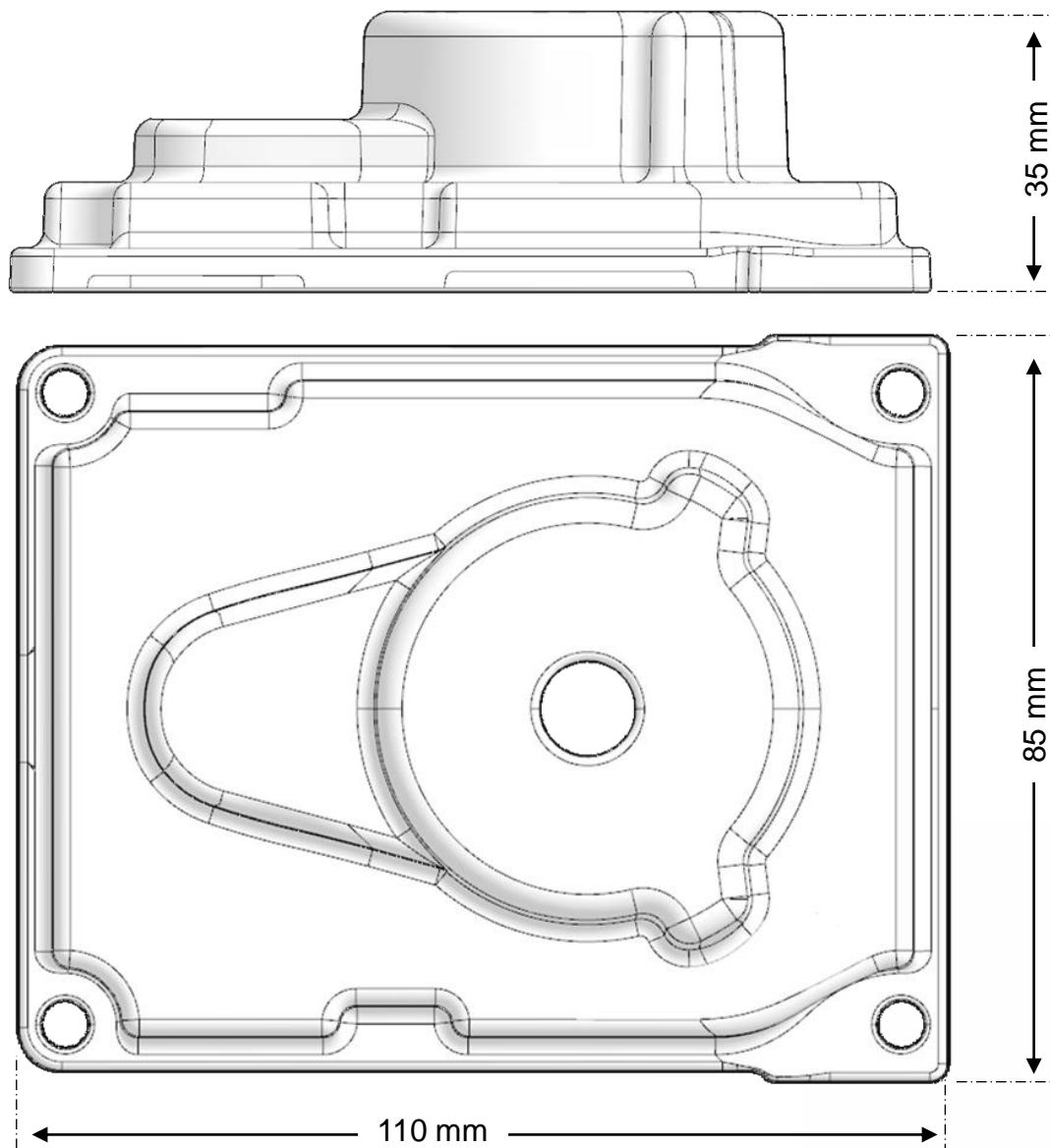
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Ventajas y Conclusiones



Optimizar el sistema de llenado y rebosaderos para reducir el atrapamiento de aire





Cover plate **AISI9Cu3**

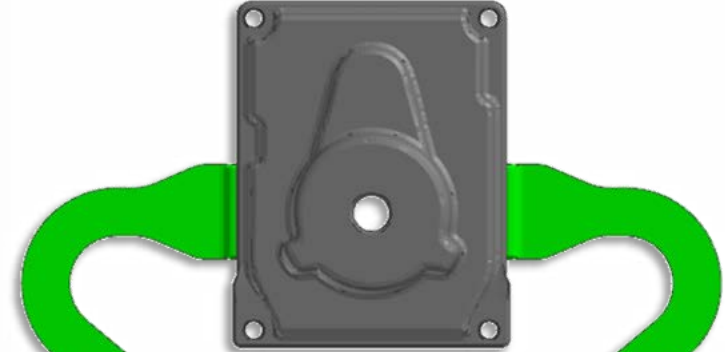




Entrada estrecha

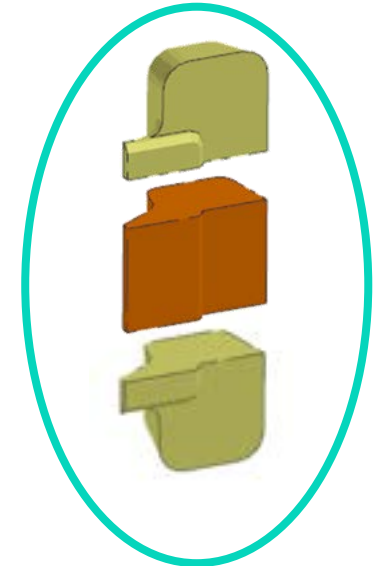
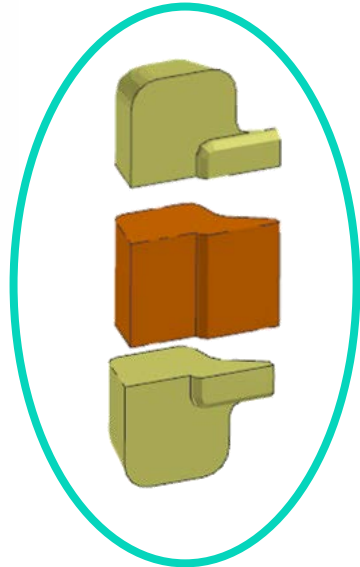
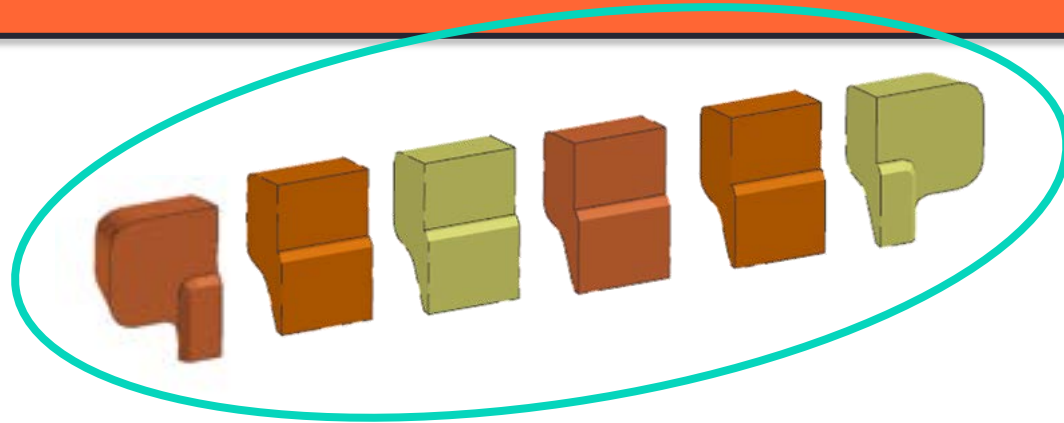


Entrada Ancha



Entradas Laterales

Optimización del sistema de llenado

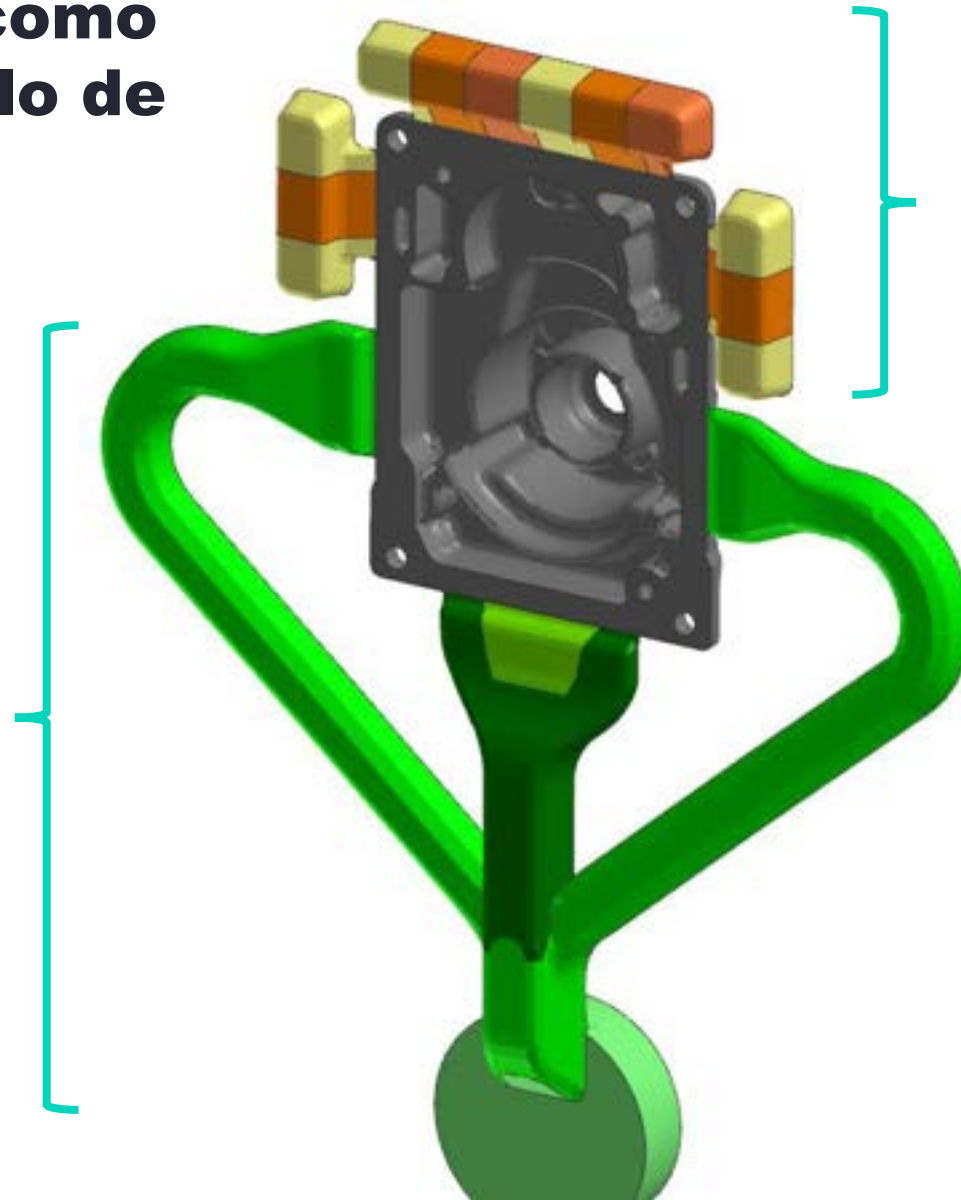


Optimización de los rebosaderos



Geometría utilizada como entrada para el módulo de Optimización

Optimización del sistema de llenado



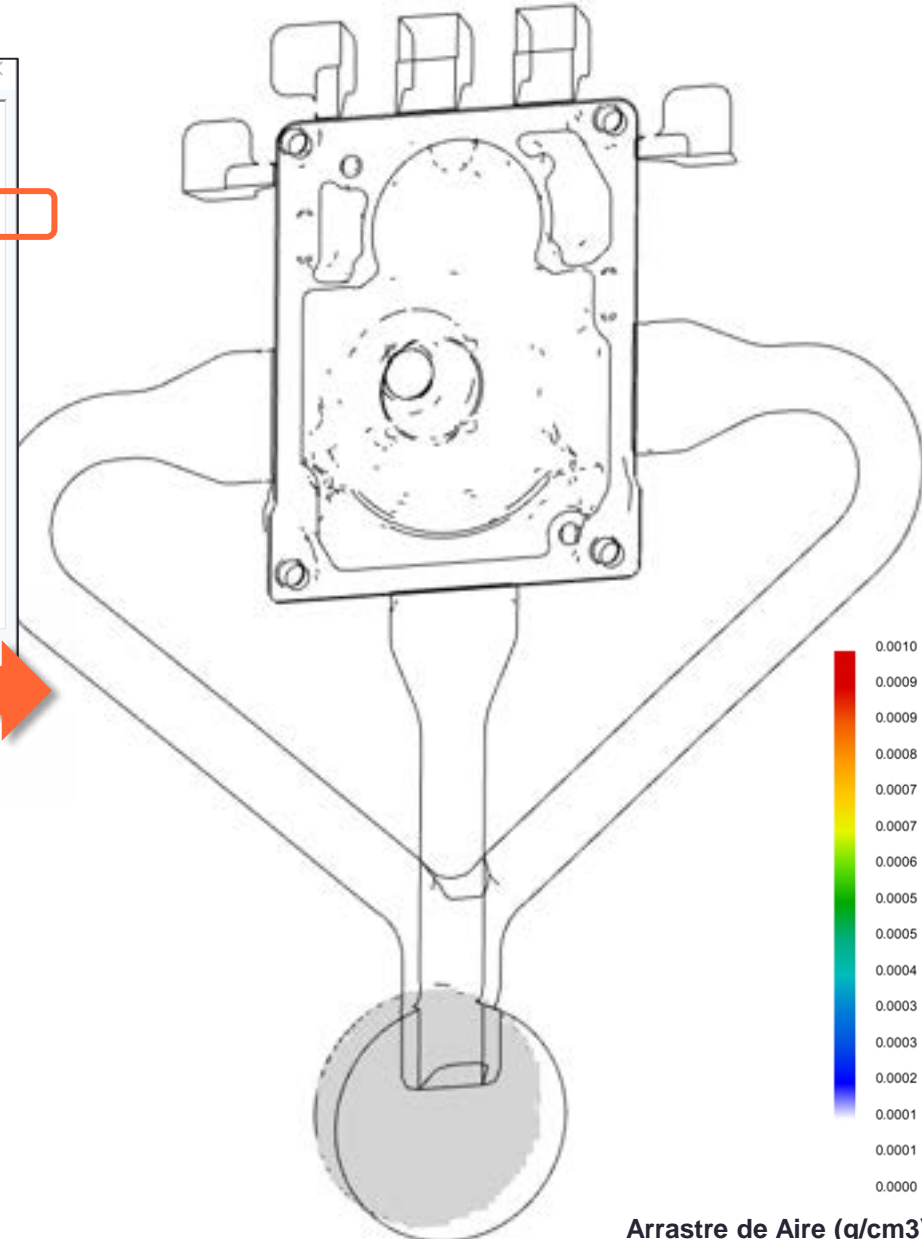
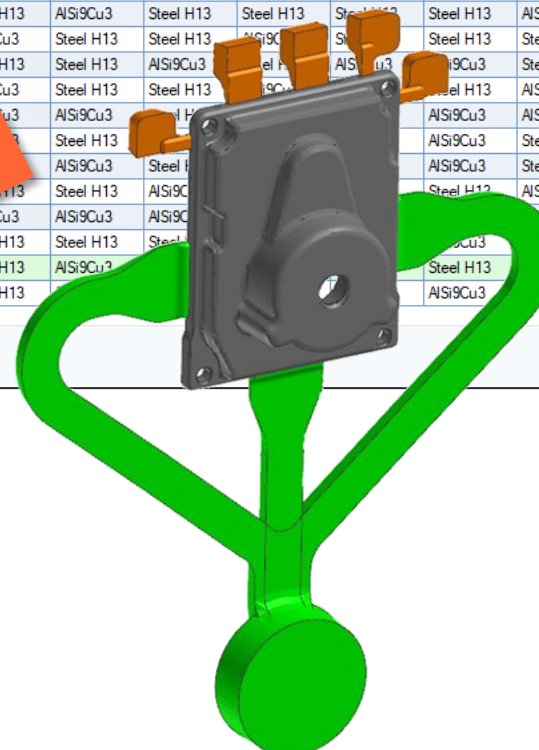
Optimización de los rebosaderos



Resultados

Table Of Runs : C:\Users\mac\Documents\MAC\UGM\OPT\OPT_HPDC\OPT_Gate_N_Overflow

Run#	A_GATE...	A_GATE...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_GATE...	Obj (g/...
1	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	0.0216798
2	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	0.0301733
3	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	0.0180457
4	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	0.0321166
5	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	0.0188383
6	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	0.0175994
7	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	0.0329915
9	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	0.0397429
11	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	Steel H13	Steel H13	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	Steel H13	Steel H13	Steel H13	0.0372757
12	Steel H13	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	Steel H13	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	0.0192908
13	Steel H13	Steel H13	Steel H13	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	0.0194619
15	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	0.0341672
16	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	0.0351252
17	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	0.0184025
18	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	0.032331
19	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	0.0208899
20	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	0.0361007
21	Steel H13	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	0.016164
23	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	Steel H13	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	0.0312391



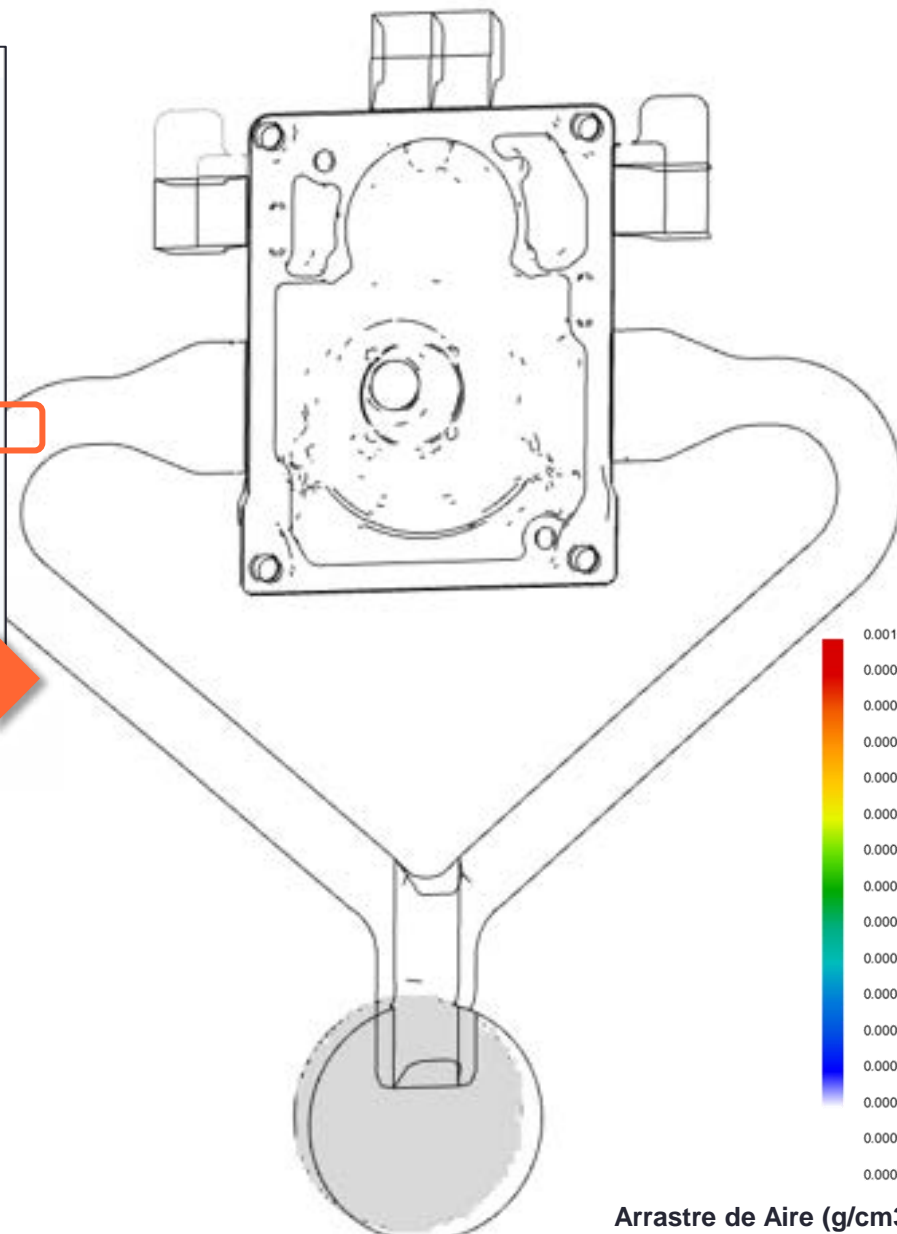
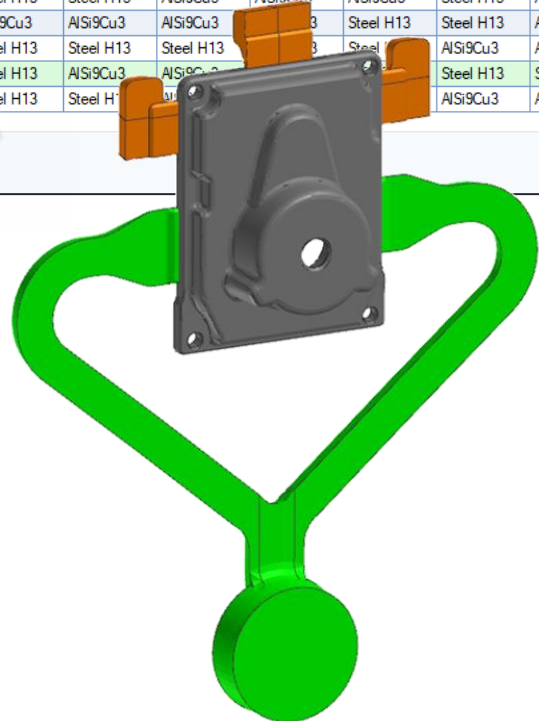


Resultados

Table Of Runs : C:\Users\mac\Documents\MAC\UGM\OPT\OPT_HPDC\OPT_Gate_N_Overflow

Run#	A_GATE...	A_GATE...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_GATE...	Obj (g/...
1	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	0.0216798
2	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	0.0301733
3	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	0.0190457
4	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	0.0321166
5	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	0.0188583
6	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	0.0175994
7	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	0.0329915
9	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	0.0397429
11	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	Steel H13	Steel H13	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	Steel H13	Steel H13	Steel H13	0.0372757
12	Steel H13	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	Steel H13	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	0.0192908
13	Steel H13	Steel H13	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	0.0194619
15	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	0.0341672
16	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	0.0351252
17	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	0.0184025
18	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	0.032331
19	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	0.0208899
20	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	0.0361007
21	Steel H13	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	Steel H13	0.016164
23	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	Steel H13	Steel H13	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	0.0312391

Best run values



Arrastre de Aire (g/cm3)

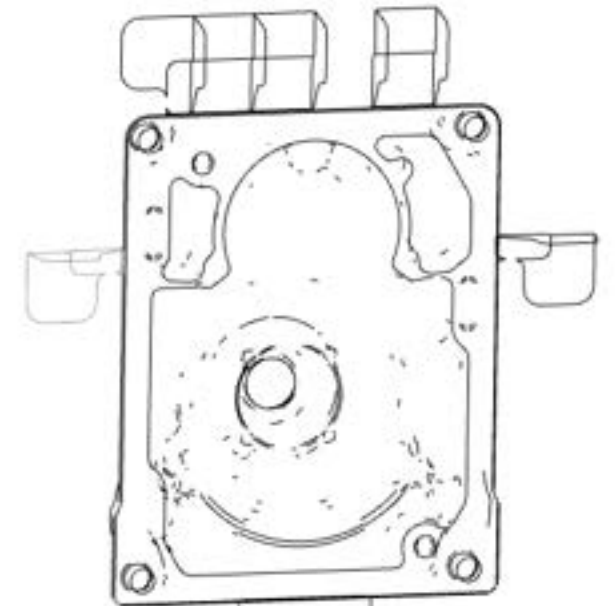
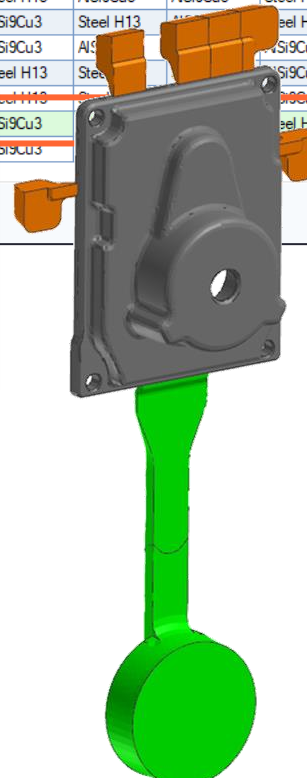


Resultados

Table Of Runs : C:\Users\mac\Documents\MAC\UGM\OPT\OPT_HPDC\OPT_Gate_N_Overflow

Run#	A_GATE...	A_GATE...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_OVER...	A_GATE...	Obj (g/...
1	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	0.0216798
2	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	0.0301733
3	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	0.0190457
4	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	0.0321166
5	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	0.0188583
6	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	0.0175994
7	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	0.0329915
9	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	0.0397429
11	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	Steel H13	Steel H13	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	Steel H13	Steel H13	Steel H13	0.0372757
12	Steel H13	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	Steel H13	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	0.0192908
13	Steel H13	Steel H13	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	0.0194619
15	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	0.0341672
16	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	0.0351252
17	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	0.0184025
18	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	0.032331
19	Steel H13	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	0.0208899
20	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	0.0301087
21	Steel H13	AlSi9Cu3	Steel H13	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	0.016164
23	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	Steel H13	Steel H13	Steel H13	Steel H13	Steel H13	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	AlSi9Cu3	Steel H13	0.0312391

Best run values



Arrastre de Aire (g/cm3)

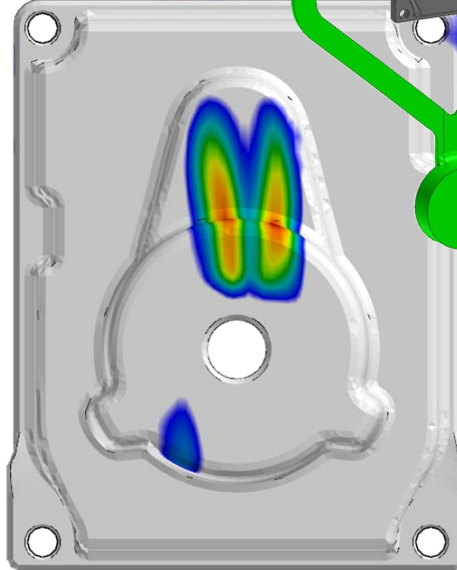


Resultados

Arrastre de Aire (g/cm³)



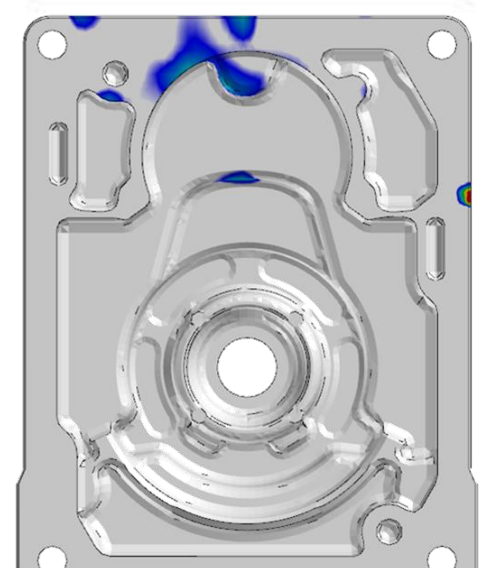
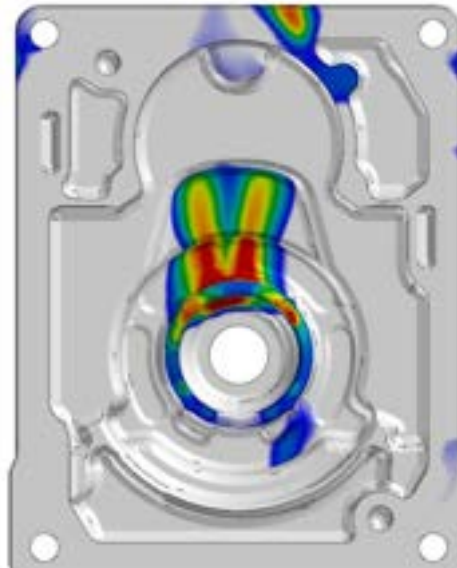
Iteración 4



Iteración 16



Mejores resultados Iteración 21



Agenda

1

Módulo de optimización: función MatID

2

Optimización del sistema de alimentación

3

Optimización del sistema de llenado

4

Ventajas y Conclusiones

Ventajas y Conclusiones

1 Probar distintos Diseños

Iteraciones automáticas para probar diferentes diseños sin tener que rehacer los modelos

2 Obtener el mejor diseño

Permite determinar el mejor diseño para cumplir un objetivo (reducir porosidades, etc.)

3 Optimizar el diseño existente

Permite optimizar el número, el tamaño y el posicionamiento de los elementos de fundición (cargas, enfriadores, rebosaderos, etc.)



¡Gracias!

Obrigado!

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