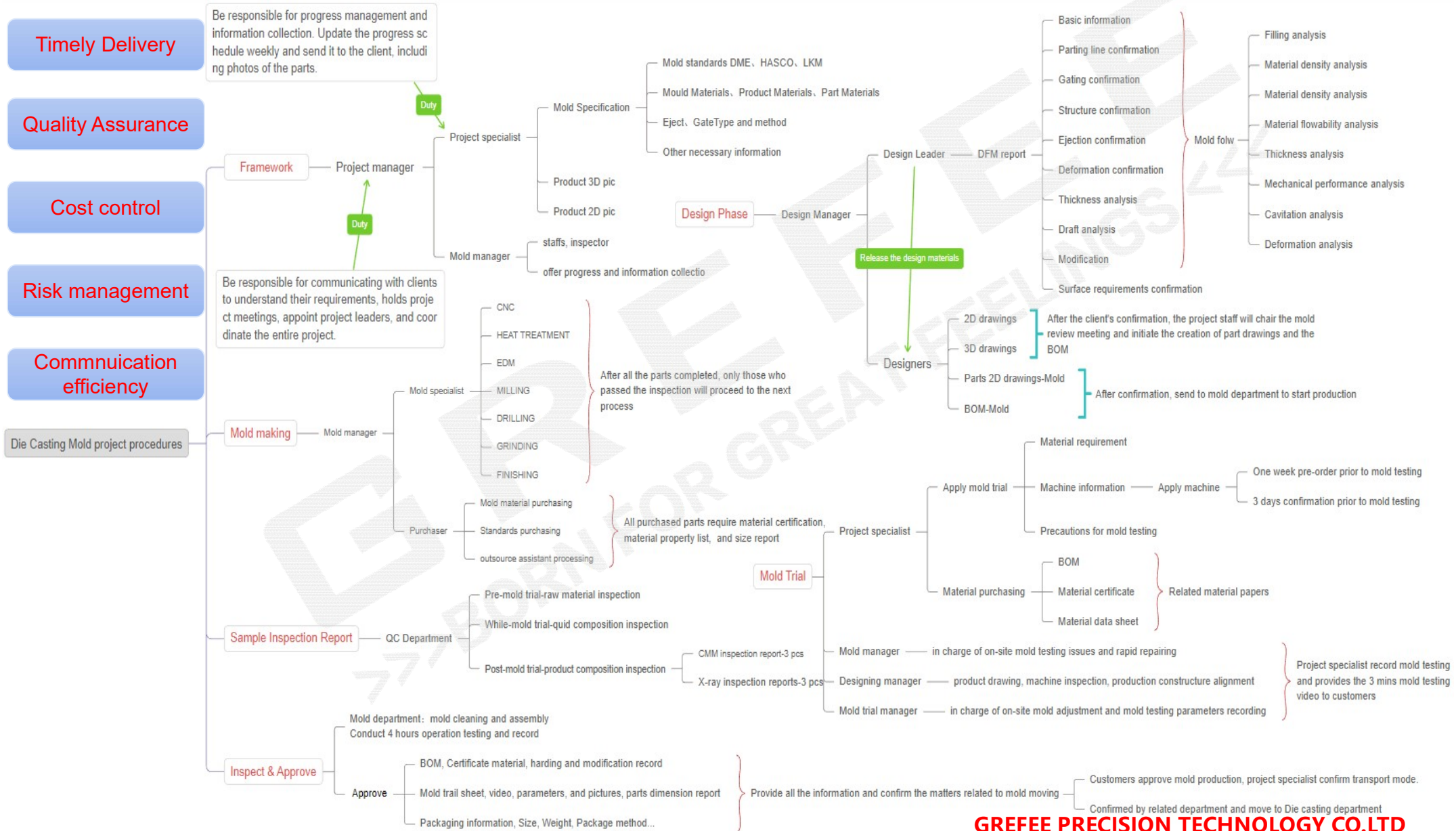


# Precise control, achieving excellent quality

- At **GREFEE**, a well-structured project management plan is the core of delivering excellence in every project. From RFQ to final delivery, effective project management is the key to success.
- GREFEE** aims to ensure that the mold design and manufacturing process meet customer requirements while ensuring the smooth progress of the project.



## DFM report and proposal before mold design for customers review

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Overview of castings

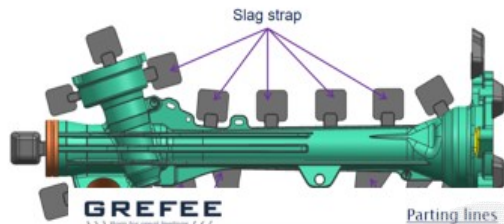
Customer:		Project Name	
Runner Type:	Cool RUNNER	Number Of Gate per Cavity:	1
Part Name:	38329180A_001-HOUSING_RACK_PINION	Surface finish:	SPI-B2
Tonnage:	1250T	Mold Structure & Steel:	SKD01
Thickness:	3.5mm	No. Of Slider Per Cavity:	5



Summary

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Gate and runner proposal



Gate location

Parting lines

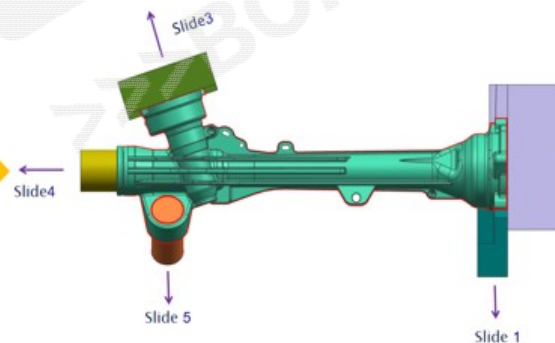
Die casting part

Parting Lines



Parting lines of slides

Structure



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Ejection proposal

Ejection

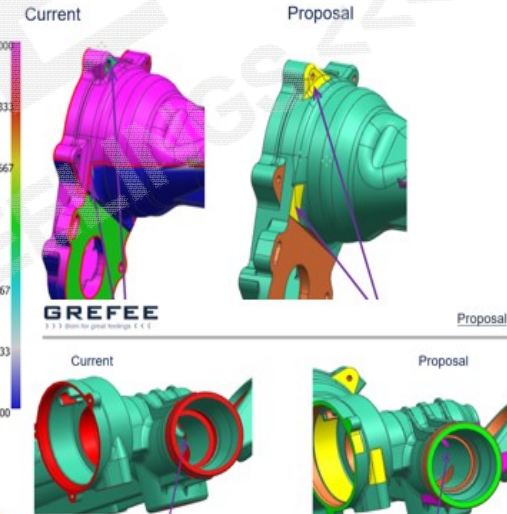


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Draft angle analysis

Φ10 Ejector pins - 9  
Φ8 Ejector pins - 1

Draft angle analysis

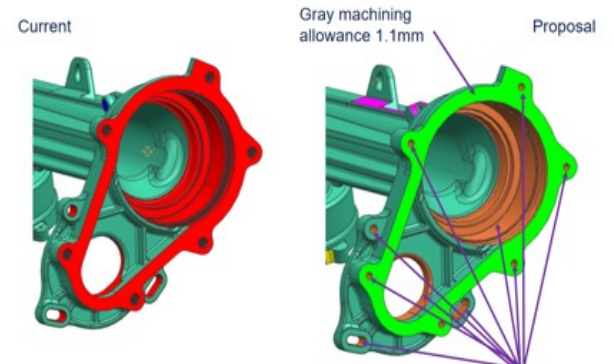


Proposal

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Process

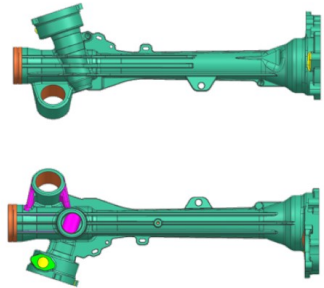
Process



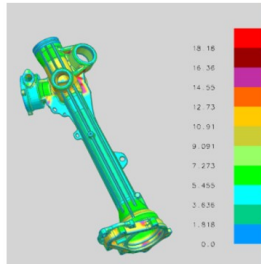


## Mold flow report and proposal before mold design for customer review and confirm

### Product model introduction



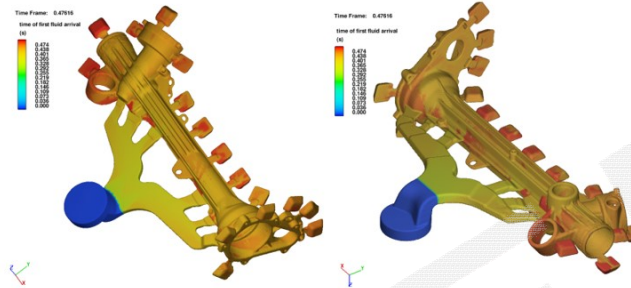
The product thickness is not uniform, the average thickness is 5.45mm. The specific thickness distribution as shown below.



Product thickness distribution

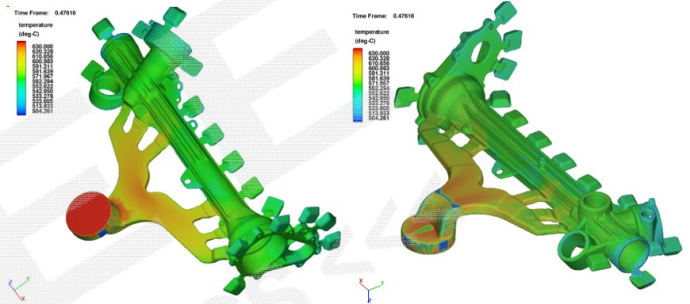
(Maximum Dimensions) : 480.8X292.0X146.8 (mm)

### Time of first fluid arrival



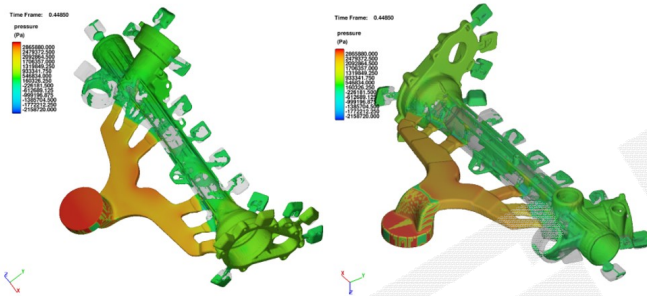
The metal fluid enters the cavity in good sequence when filling. For more information,

### Melt Temperature



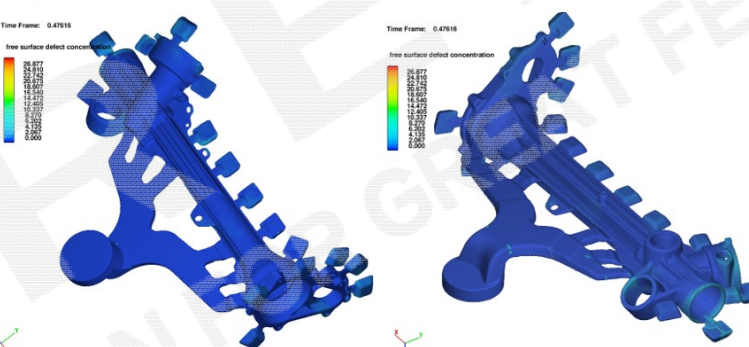
In the actual filling process, the temperature gradient of the metal fluid is regional, and no metal fluid over 40 degrees (497.3) lower than the solid phase line temperature (537.3 degrees) is found in the whole cavity area. The surface quality of the casting is good.

### The filling pressure of the inner sprue



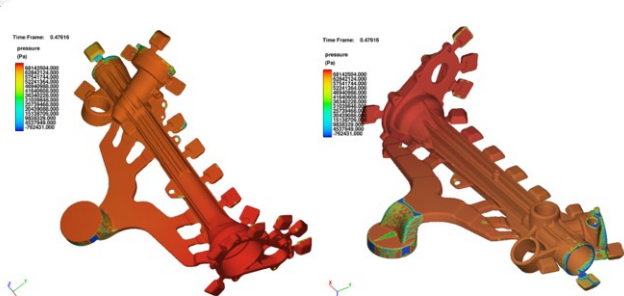
The filling pressure of the inner sprue is 0.93MPa

### Vol. fraction of entrained air

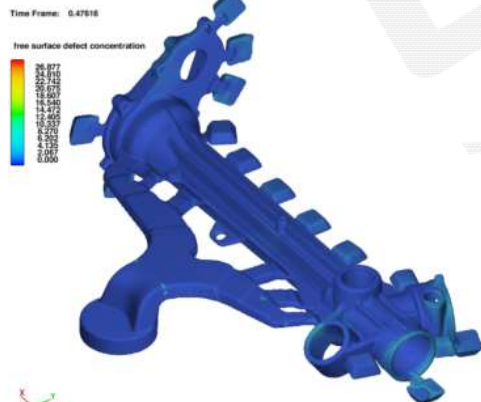


### 分析结果列示(Result tabulation)

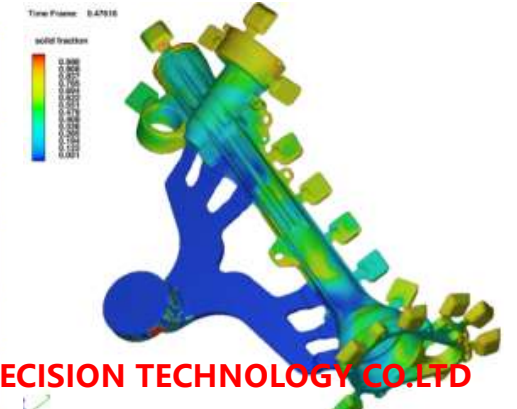
### Pressure



At the completion of filling, the pressure distribution of each position of cavity wall is uniform, and the filling pressure is between 61.5-59.3Mpa.



内容 Content	方案 proposal
充填时间 (Fill time) sec	0.3189
充填压力(Injection pressure) Mpa	64.04MP/cm2
温度(temperature) deg.C	大部分在615~670范围内(Mostly in the range of 615- 670)
卷气(Vol. fraction of entrained air)	见11页, 出现在产品和渣包上(See page 11, appears on the product and the overflow)
氧化(Surface defect concentration)	见12页, 出现在产品和渣包上(See page 12, appears on the product and the overflow)

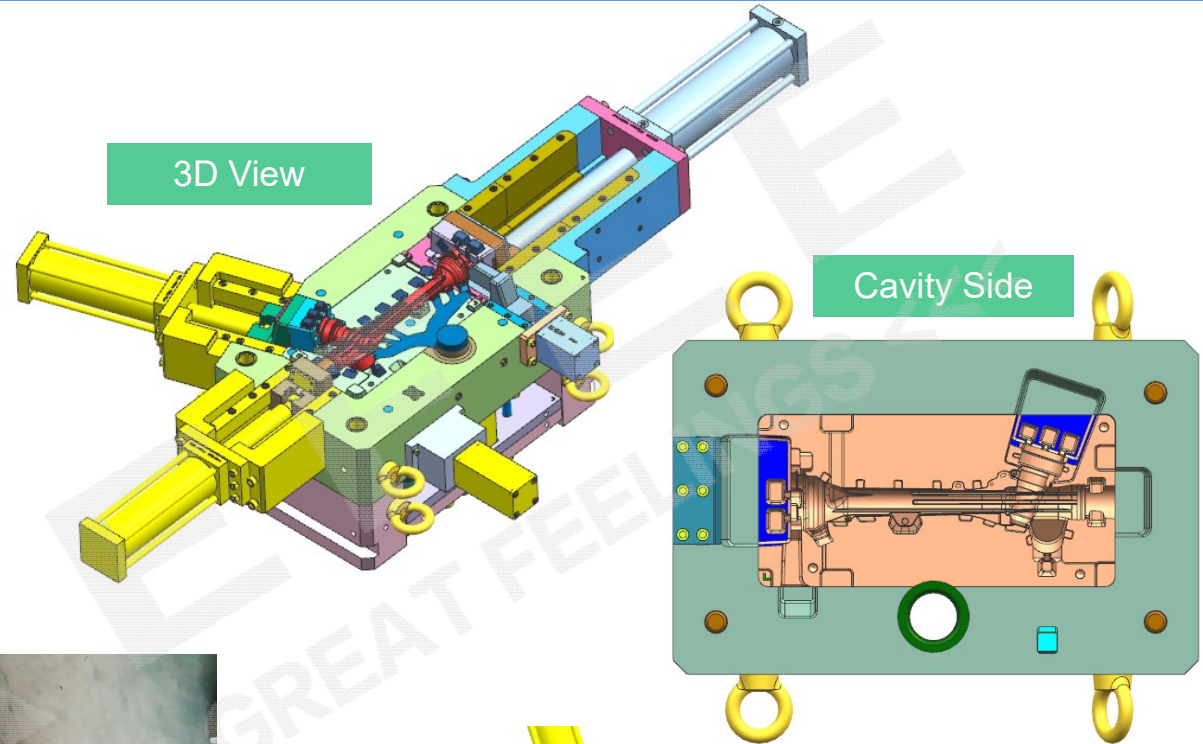




Provide 3D mold drawings to customers for confirmation before mold manufacturing

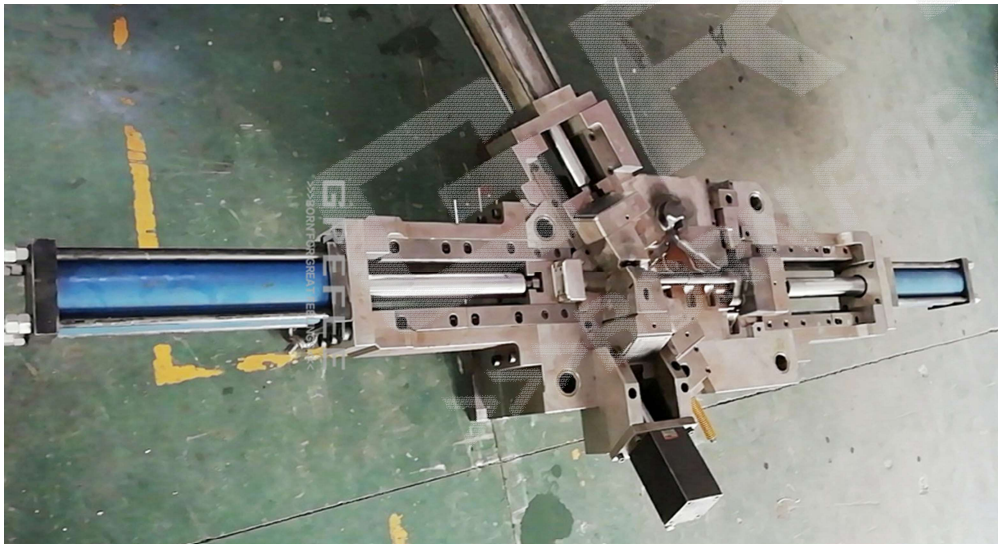


Detail review and confirm

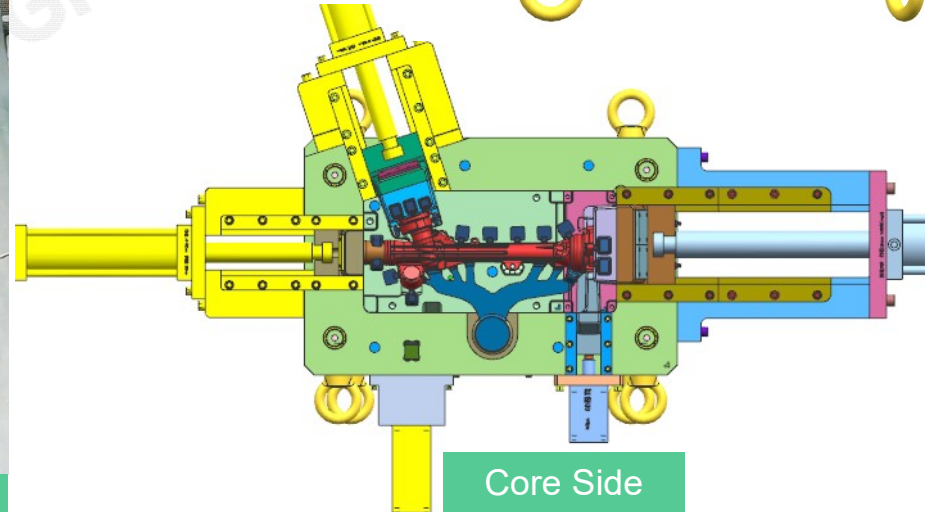


3D View

Cavity Side



Mold display



Core Side





## Meeting before Mold Trial

Related materials: Mold Trial Plan, Mold Trial Report, Product Drawings, Core Dimension Inspection Scheme, Inspection Tools, etc.

## Mold Trial Process

1

### Project Engineer:

- Hold a mold trial kick-off meeting to assign specific tasks. Understand the client's requirements clearly, explain the dimensional and product surface requirements as well as precautions. Confirm the mold trial time, materials, and the number of samples.
- Prepare the materials and equipment required for post-processing, including the packaging method and packaging specifications.

2

### Mold Department:

- Report the mold progress, confirm the mold completion time, and the debugging status of each mold structure. Check the client's requirements, including accessories like date stamps, have been processed properly. Conduct pressure tests on the mold water runner as required

3

### Die Casting Department:

- Get informed about the die casting equipment status, material temperature, etc.
- Confirm the matching information between the mold and die casting equipment, including counter-tie rods, sprayers, part pickers, etc.

4

### Machining Department:

- Familiarize with the mold trial products, understand the machining positions according to the drawings. Apply for accessories such as tools and fixtures, formulate the machining program in advance, and confirm the machining radius of the machine tool.

5

### Inspection Department:

- Get acquainted with the drawing information, key dimensions, and inspection standards in advance.
- Prepare relevant inspection tools, including plug gauges and thread inspection tools, and develop a full-size inspection report.

6

### Surface Treatment:

- Order the required raw materials in advance, understand the drawing information, confirm the spray-masking positions and methods.
- Adjust the spraying equipment, confirm the spraying thickness, and provide the inspection information required for surface treatment.

A

### Machine parameter setting

Based on the material properties, set reasonable machine parameters, molten aluminum temperature, cooling water temperature, and adjust supporting equipment such as robotic arms

B

### Mold Debugging

Spray the release agent, conduct a slow-pressure mold trial. Operate the equipment manually for more than 5 times to confirm that the mold adapts to the working environment, and adjust the number of slow-pressure injection shots

C

### Formal Mold Trial

Adopt the fast-pressure mode. Improve the process parameters according to the product integrity to reach the optimal production state and obtain the best parameters

D

### Video Recording

Record three complete sets of mold-making videos. Record the machine parameters, cooling water temperature, molten aluminum temperature, and the operating conditions of all supporting equipment

E

### Mold Trial Report

Complete the mold trial process, fill out the mold trial report sheet. The person-in-charge of each department should summarize the problems found during the mold trial based on the product conditions and provide a comprehensive modification plan



# Mold Trial Report



3 videos for mold trials



T1 Mold Photo



Mold Trial Products

Record the entire process of the mold trial site. Enter all data into the system and support the modification plan for product problem points

**广东顺博铝合金有限公司**  
质量证明书  
质量专用章

客户名称: 东莞市鑫博金属制品有限公司      日期: 2023/8/9

牌号	A380	炉号	2307E030	执行标准	技术标准						
化学成分含量 (%)											
化学元素	Si	Cu	Mg	Mn	Zn	Fe	Ni	Ti	Pb	Sn	Al
技术要求	7.5-9.5	3.0-4.0	≤0.10	≤0.50	≤3.0	≤1.30	≤0.50	—	≤0.10	≤0.35	余量
实测	8.67	3.28	0.08	0.21	0.78	0.84	0.072	0.046	0.047	0.017	余量
力学性能测试 (F)											
检验项目	外观检查	断面检验	料孔度	布氏硬度	抗拉强度	延伸率	备注				
检验规则	铝锭外观应清洁, 不允许有麻面、夹渣、油污及夹杂物, 但允许有轻微的氧化及轻微擦伤, 不允许有严重缺陷、熔渣及外来夹杂物。	铝锭断面检查应组织致密, 不允许有严重缩孔、熔渣及外来夹杂物。	铝锭料孔应不大于 JB/T7946.3-2017标准中的规定	≥80 HBW	≥180 Mpa	≥1.0%	其力学性能值为送检状态的检测结果				
检验结果	符合以上要求	铸锭组织致密, 未发现严重冶金缺陷	1级	86.3 HBW	190 Mpa	1.92%					
结论:	合格	合格	合格	合格	合格	合格					

制作: 李炳      审核: 朱要忠      审批: 谢菊

## Certificate of Quality for Raw Materials

**GREFEE Spectral Analysis Report**

样品名称: 铝合金      模型名称: 铝锭-类型曲线      **FPI**  
 牌号: A380      分析程序: KZ380      生产炉号: --

	Si	Cu	Fe	Pb	Cd	Zn	Mg	Sn	Ti	Mn	Cr	Ni	Be
Ave	8.94	3.20	0.8864	0.0379	0.0009	0.6870	0.0427	0.0119	0.0500	0.1505	0.0243	0.0704	<0.001
1	8.90	3.20	0.8892	0.0383	0.0008	0.6854	0.0415	0.0162	0.0516	0.1486	0.0234	0.0708	<0.001
2	8.99	3.05	0.8982	0.0363	0.0008	0.6715	0.0403	0.0113	0.0492	0.1534	0.0259	0.0661	<0.001
3	8.93	3.36	0.8719	0.0391	0.0010	0.7041	0.0464	0.0082	0.0491	0.1496	0.0236	0.0742	<0.001
Ave	<0.02	<0.002	<0.003	0.0145	0.0394	<0.005	0.0081	0.0084	<0.002	85.9			
1	<0.02	<0.002	<0.003	0.0146	0.0378	<0.005	0.0089	0.0085	<0.002	85.9			
2	<0.02	<0.002	<0.003	0.0140	0.0436	<0.005	0.0079	0.0086	<0.002	85.9			
3	<0.02	<0.002	<0.003	0.0150	0.0366	<0.005	0.0076	0.0082	<0.002	85.7			

检验员: 唐刚生  
 检验日期: 11/2/2024 3:29:02 PM  
 检验单位简介:  
 换算标准值: 1mg/kg=1ppm=0.0001%

## Furnace Aluminum Melt Composition Report



Product Weighing

## GREFEE Spectral Analysis Report

样品名称: 铝合金      模型名称: 铝锭-类型曲线      **FPI**  
 牌号: A380      分析程序: KZ380      生产炉号: --

	Si	Cu	Fe	Pb	Cd	Zn	Mg	Sn	Ti	Mn	Cr	Ni	Be
Ave	8.94	3.20	0.8864	0.0379	0.0009	0.6870	0.0427	0.0119	0.0500	0.1505	0.0243	0.0704	<0.001
1	8.90	3.20	0.8892	0.0383	0.0008	0.6854	0.0415	0.0162	0.0516	0.1486	0.0234	0.0708	<0.001
2	8.99	3.05	0.8982	0.0363	0.0008	0.6715	0.0403	0.0113	0.0492	0.1534	0.0259	0.0661	<0.001
3	8.93	3.36	0.8719	0.0391	0.0010	0.7041	0.0464	0.0082	0.0491	0.1496	0.0236	0.0742	<0.001
Ave	<0.02	<0.002	<0.003	0.0145	0.0394	<0.005	0.0081	0.0084	<0.002	85.9			
1	<0.02	<0.002	<0.003	0.0146	0.0378	<0.005	0.0089	0.0085	<0.002	85.9			
2	<0.02	<0.002	<0.003	0.0140	0.0436	<0.005	0.0079	0.0086	<0.002	85.9			
3	<0.02	<0.002	<0.003	0.0150	0.0366	<0.005	0.0076	0.0082	<0.002	85.7			

检验员: 唐刚生  
 检验日期: 11/2/2024 3:29:02 PM  
 检验单位简介:  
 换算标准值: 1mg/kg=1ppm=0.0001%

## Aluminum Ingot Composition Analysis

**GREFEE Spectral Analysis Report**

样品名称: 铝合金      模型名称: 铝锭-类型曲线      **FPI**  
 牌号: A380      分析程序: KZ380      生产炉号: --

	Si	Cu	Fe	Pb	Cd	Zn	Mg	Sn	Ti	Mn	Cr	Ni	Be
Ave	8.94	3.20	0.8864	0.0379	0.0009	0.6870	0.0427	0.0119	0.0500	0.1505	0.0243	0.0704	<0.001
1	8.90	3.20	0.8892	0.0383	0.0008	0.6854	0.0415	0.0162	0.0516	0.1486	0.0234	0.0708	<0.001
2	8.99	3.05	0.8982	0.0363	0.0008	0.6715	0.0403	0.0113	0.0492	0.1534	0.0259	0.0661	<0.001
3	8.93	3.36	0.8719	0.0391	0.0010	0.7041	0.0464	0.0082	0.0491	0.1496	0.0236	0.0742	<0.001
Ave	<0.02	<0.002	<0.003	0.0145	0.0394	<0.005	0.0081	0.0084	<0.002	85.9			
1	<0.02	<0.002	<0.003	0.0146	0.0378	<0.005	0.0089	0.0085	<0.002	85.9			
2	<0.02	<0.002	<0.003	0.0140	0.0436	<0.005	0.0079	0.0086	<0.002	85.9			
3	<0.02	<0.002	<0.003	0.0150	0.0366	<0.005	0.0076	0.0082	<0.002	85.7			

检验员: 唐刚生  
 检验日期: 11/2/2024 3:29:02 PM  
 检验单位简介:  
 换算标准值: 1mg/kg=1ppm=0.0001%

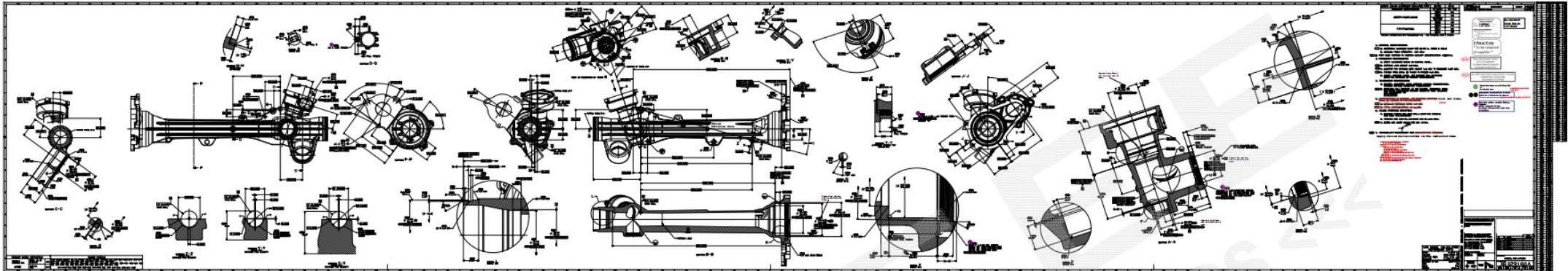
## Finished Product Composition Report



Weigh the product with slag pocket

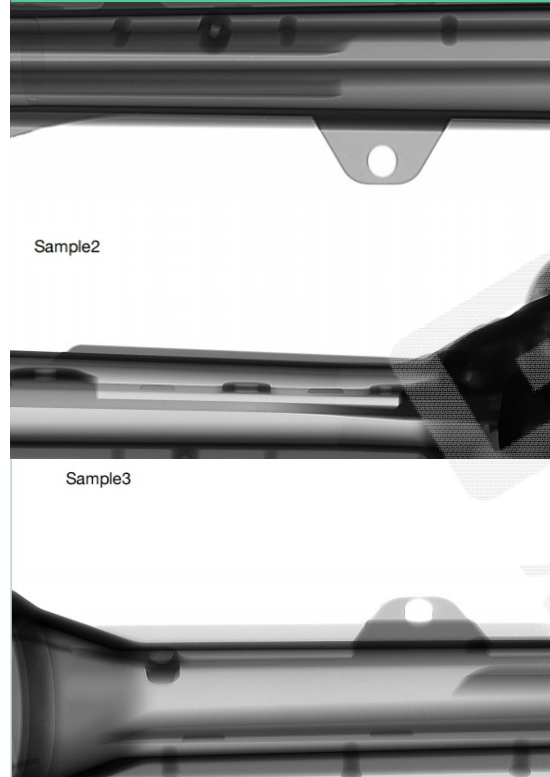


After the trial mold is completed, provide 3 pcs full-size inspection reports and 3 pcs X-ray inspection reports within 3 days



Sample1

## 3 pcs X-ray inspection reports



Sample2

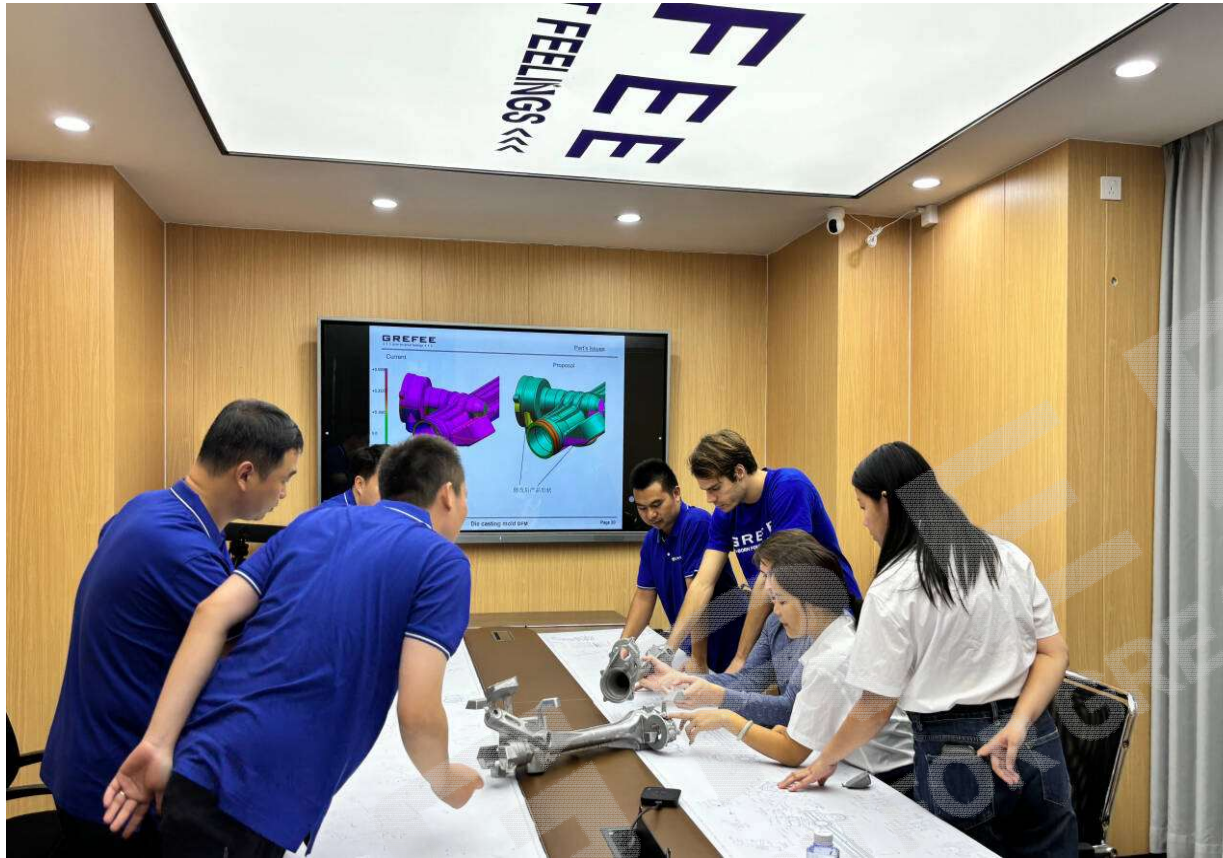
Sample3

## 3 pcs CMM inspection report

Theory	Actual	Deviation	Lower Tolerance	Upper Tolerance	Trend		
1 [D80 Version] Eval Feat = PT2_ASE	Z	-0.280	-0.286	-0.044	-0.1000	0.1000	OK
2 [D80 Version] Eval Feat = PT3_ASE	Z	-1.750	-1.761	0.021	-0.1000	0.1000	OK
3 [D80 Version] Eval Feat = PT4_ASE	Z	-0.280	-0.284	-0.45	-0.1000	0.1000	OK
4 [D80 Version] Eval Feat = PT5_ASE	Z	-0.280	-0.263	-0.070	-0.1000	0.1000	OK
3-2 [D80 Version] Eval Feat = PT6_ASE	Z	-0.280	-0.281	-0.020	-0.1000	0.1000	OK
4-2 [D80 Version] Eval Feat = PT7_ASE	Z	-0.280	-0.281	-0.040	-0.1000	0.1000	OK
4-3 [D80 Version] Eval Feat = PT7_ASE	Z	-0.280	-0.268	-0.032	-0.1000	0.1000	OK
5 [D80 Version] Eval Feat = PT9_ASE	Z	-1.750	-1.707	-0.043	-0.1000	0.1000	OK
6 [D80 Version] Eval Feat = PT10_ASE	Z	-0.280	-0.312	0.023	-0.1000	0.1000	OK
7 [D80 Version] Eval Feat = PT11_ASE	Z	-0.280	-0.315	0.015	-0.1000	0.1000	OK
8 [D80 Version] Eval Feat = PT12_ASE	Z	-2.100	-2.101	0.031	-0.1000	0.1000	OK
9-1 [D80 Version] Eval Feat = PT13_ASE	Z	-15.500	-15.521	-0.020	-0.1000	0.1000	OK
9-2 [D80 Version] Eval Feat = PT14_ASE	Z	-15.500	-15.491	-0.030	-0.1000	0.1000	OK
10-1 [D80 Version] Eval Feat = PT15_ASE	Z	-3.000	-3.034	0.034	-0.1000	0.1000	OK
10-2 [D80 Version] Eval Feat = PT15_ASE	Z	-0.280	-0.281	0.020	-0.1000	0.1000	OK
11 [D80 Version] Eval Feat = PT17_ASE	Z	-0.280	-0.312	0.032	-0.1000	0.1000	OK
12 [D80 Version] Eval Feat = PT18_ASE	Z	-2.000	-2.022	0.022	-0.1000	0.1000	OK
13 [D80 Version] Eval Feat = PT19_ASE	Z	-0.280	-0.281	-0.030	-0.1000	0.1000	OK
13-2 [D80 Version] Eval Feat = PT20_ASE	Z	-0.280	-0.287	-0.013	-0.1000	0.1000	OK
13-3 [D80 Version] Eval Feat = PT21_ASE	Z	-0.280	-0.281	-0.020	-0.1000	0.1000	OK
13-4 [D80 Version] Eval Feat = PT22_ASE	Z	-0.280	-0.284	-0.006	-0.1000	0.1000	OK
13-5 [D80 Version] Eval Feat = PT23_ASE	Z	-0.280	-0.289	-0.031	-0.1000	0.1000	OK
13-6 [D80 Version] Eval Feat = PT24_ASE	Z	-0.280	-0.281	0.021	-0.1000	0.1000	OK
13-7 [D80 Version] Eval Feat = PT25_ASE	Z	-0.280	-0.305	0.024	-0.1000	0.1000	OK
13-8 [D80 Version] Eval Feat = PT26_ASE	Z	-0.280	-0.310	0.020	-0.1000	0.1000	OK
13-9 [D80 Version] Eval Feat = PT27_ASE	Z	-1.750	-1.721	-0.021	-0.1000	0.1000	OK
13-10 [D80 Version] Eval Feat = PT28_ASE	Z	-0.280	-0.311	0.021	-0.1000	0.1000	OK
14-1 [D80 Version] Eval Feat = PT29_ASE	Z	-1.750	-1.721	-0.020	-0.1000	0.1000	OK
14-2 [D80 Version] Eval Feat = PT30_ASE	Z	-1.750	-1.719	-0.031	-0.1000	0.1000	OK



After mold trial, we will organize relevant personnel from various departments to conduct a summary and analysis of the mold trial project



GREFEE		Die casting mold trial report				模号	M0088	
项目名称	汽车转向轴	产品材料	A380	试模日期	06/18/2021	上模时间	8:15	
产品名称	B2_032_560_dae001- st	产品重量	2600g	模号/穴数	1*1	下模时间	12:25	
项目负责人	李工	试模次数	首次试模	机台吨位	380T	试模耗时	4H	
模具结构	是否先有复位	是 <input checked="" type="checkbox"/> 否 <input type="checkbox"/>	是否有局部增压	是 <input type="checkbox"/> 否 <input checked="" type="checkbox"/>	压射头直径 (mm)			65
	是否有嵌件	是 <input type="checkbox"/> 否 <input checked="" type="checkbox"/>	涂油缸数量和前置动作		/			
	是否抽真空	是 <input type="checkbox"/> 否 <input checked="" type="checkbox"/>	斜导柱数量和其它要求		/			
模温机设定	定模设定值	220 °C	定模测实际值	200 °C	动模设定值	°C	动模测实际值	°C
	组液温度	665 °C	周期时间	37.5 s	定模温度	°C		
	低速速度	0.15 m/s	空打时间	344 mm	喷嘴开始时间	s		
	高速速度	2.1 m/s	合模时间	6 s	模具清洗时间1	s		
	高速开始位置	285 mm	增压保持时间	2 s	脱模剂时间	5 s		
试模工艺	减速位置	/ mm	特选压力	89 Mpa	模具清洗时间2	s		
	升压时间	20 ms	料柄厚度	20 mm	喷嘴上升开始时间	s		
本次试模问题点				试模产品问题点				
模具上标识是否清楚	是 <input checked="" type="checkbox"/> 否 <input type="checkbox"/>	模具内部是否有开裂和龟裂痕迹	是 <input type="checkbox"/> 否 <input checked="" type="checkbox"/>	问题点描述	占比 %			
吊模孔是否可以打到位	是 <input checked="" type="checkbox"/> 否 <input type="checkbox"/>	模具内部是否有熔体	是 <input type="checkbox"/> 否 <input checked="" type="checkbox"/>	产品表面是否有冲隔、花斑	无			
吊模环是否与其它位置干涉	是 <input type="checkbox"/> 否 <input checked="" type="checkbox"/>	模具内部抛光是否达到要求	是 <input type="checkbox"/> 否 <input checked="" type="checkbox"/>	产品表面是否有气泡	无			
模具结构与机台是否匹配	是 <input checked="" type="checkbox"/> 否 <input type="checkbox"/>	模具上清渣部位是否顺畅	是 <input type="checkbox"/> 否 <input checked="" type="checkbox"/>	产品内部是否有溢料气孔	无			
模具进出水标识是否清晰	是 <input checked="" type="checkbox"/> 否 <input type="checkbox"/>	模具上清渣是否畅通到位	是 <input type="checkbox"/> 否 <input checked="" type="checkbox"/>	产品周边是否有溢料	无			
模具进出水是否顺畅	是 <input checked="" type="checkbox"/> 否 <input type="checkbox"/>	模具上顶出是否顺畅	是 <input type="checkbox"/> 否 <input checked="" type="checkbox"/>	产品局部是否有开裂、缩水	无			
模具进出水接头是否有漏水	是 <input type="checkbox"/> 否 <input checked="" type="checkbox"/>	模具是否有非机台因素跑铝情况	是 <input type="checkbox"/> 否 <input checked="" type="checkbox"/>	产品分型面是否有错位	无			
模具是否适应全自动生产	是 <input checked="" type="checkbox"/> 否 <input type="checkbox"/>	溢包排气是否有粘模现象	是 <input type="checkbox"/> 否 <input checked="" type="checkbox"/>	产品顶针位是否有缺憾	3			
特殊结构是否有标识	是 <input checked="" type="checkbox"/> 否 <input type="checkbox"/>	产品是否有粘模现象	是 <input type="checkbox"/> 否 <input checked="" type="checkbox"/>	产品是否有溢气现象	无			
试模过程是否有停机	是 <input type="checkbox"/> 否 <input checked="" type="checkbox"/>	溢包是否容易脱落	是 <input type="checkbox"/> 否 <input checked="" type="checkbox"/>	产品内外侧是否有拉伤	无			
后期试模需要注意问题点				产品平均重量是否符合要求	符合			
试模问题总结:								
部门	试模问题总结			改善方案		签字		
试模负责人								
项目负责人								
品质负责人								
模具工程师								

