Design for Manufacture Impeller -XXXXXX

Largest 5-Axis CNC
Machining Manufacturer
In South Of China

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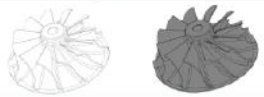
Part Spec & Requirement & Std Review

Part Machining Specification Form

Dongguan Zhihui Precision Technology Co., Limited

www.zhm5axis.com

1 Basic Information							
	Project Name		Project No.		Release Date		Part Name	
	Part No.		Part Qty					
	Applicable standards							
	Others							
2 Drawing Information							
	3D Drawing Name of Part	Impeller	3D Drawing No. of Part		3D Drawing Revision& Release Date		2D Drawing Name of Part	
	2D Drawing No. of Part	Impeller-xxxxxxx	2D Drawing Revision& Release Date		Part view			
	Others							
3 Material Information							
	Material Type	Aluminum Alloy	Material No.					
	Others							
4 Machining Process Details							
	Main Processing	CNC Machining	Cutting Tool Material		Cutting Tool Types		Datum References For Alignment	
	Toolpath Strategies		Spindle Speed		Coolant Type		Fixturing Method	
	Others							
5 Heat Treatment							
	Hardening Hardness		Tempering Type		Tempering Purpose			
	Others							
6 Surface Finish Information							
	Polishing&Level		Anodizing&Type		Coating&Type		Electroplated&Type& Color	
	Spray Paint &Type&Color		Sand Blasting&Type		Black Oxide&Type		Texture&Grade	

Parts machining process evaluation report

Dongguan Zhihui Precision Technology Co., Limited

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Basic Information

Customer Name | Customer No. | Report No. | Review Date

Products Name | Part Name Impeller | Part No. Impeller-xxxxxx | Part View 

Evaluation Dept. Marketing Team, Project Team,Engineering Team, Quality Team, Production Team.

Purpose Of Evaluation

Determine the feasibility, rationality and reliability of this precision 5-axis CNC parts machining process, ensure that the product can meet the design requirements and quality standards, identify and solve potential problems in advance, and provide technical support for formal production.

Basis of evaluation

Product design drawings, parts plus specifications and related technical documents, clear dimensional tolerances, shape and location tolerances, surface roughness, surface treatment requirements, delivery cycle and other specific requirements.

In-house CNC machining process specifications, standards and experience in machining similar products.

Relevant industry standards and specifications - 19001 Quality Management , Aerospace Industry AS9100 and Medical 13485 System Standard for Processing Related Sections

Content of the review

1	Drawing Review	Conclusion	Remark
1.1	Completeness: The drawings are complete in view, including main view, top view, side view and necessary sectional view, with comprehensive dimensioning, clear technical requirements and no obvious omissions.		
1.2	Accuracy: The dimension tolerance labeling is clear and reasonable, and there is no contradiction or conflict between the dimensions; the form and position tolerance meets the functional requirements of the product and is in line with the industry standard. For example, the positional tolerance of the key hole is ±0.05mm, which is within the machinable range. a		
2	**Design Requirements Understanding**		
2.1	Clearly the product is used for [specific equipment or scene], there are high requirements for the strength and wear resistance of the parts, and the surface needs to be treated with (specific surface treatment process).		

Specification reviewed and no problems and we will send the detailed DFM report later and the progress report as well.

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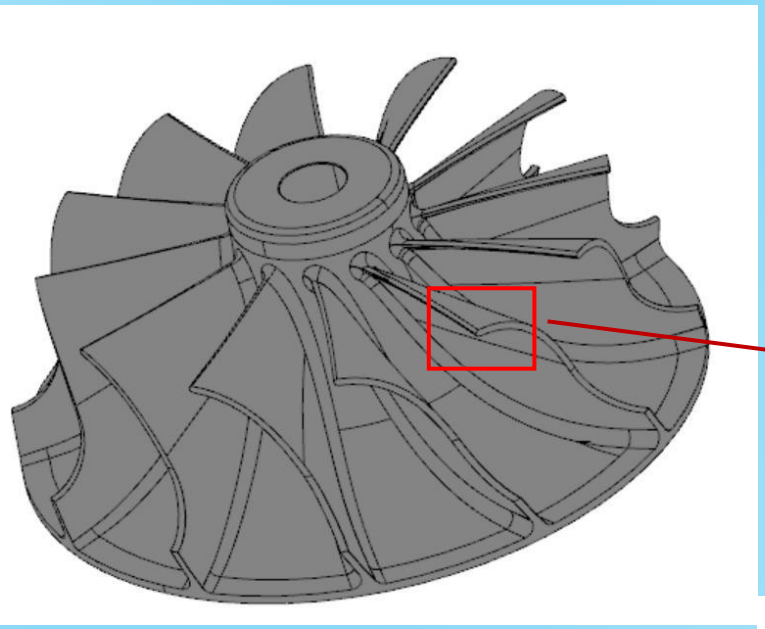
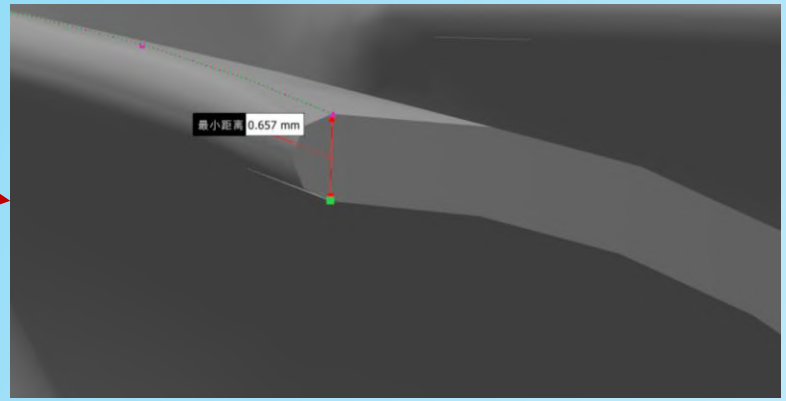
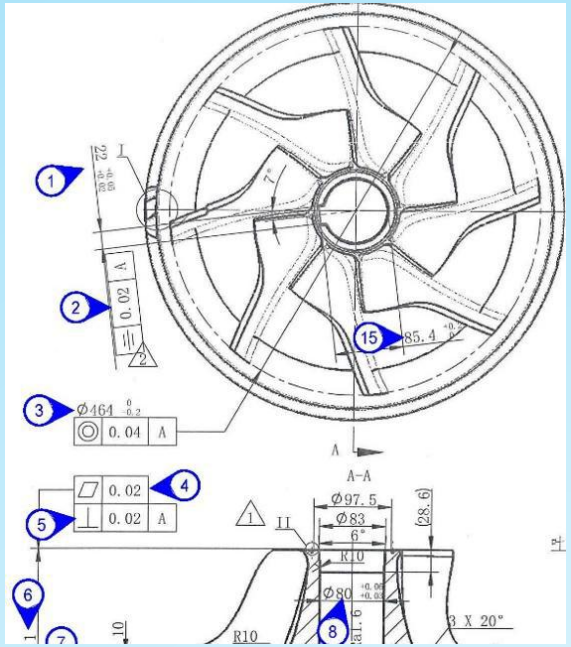
Data & 2D Drawing &Tolerance Review

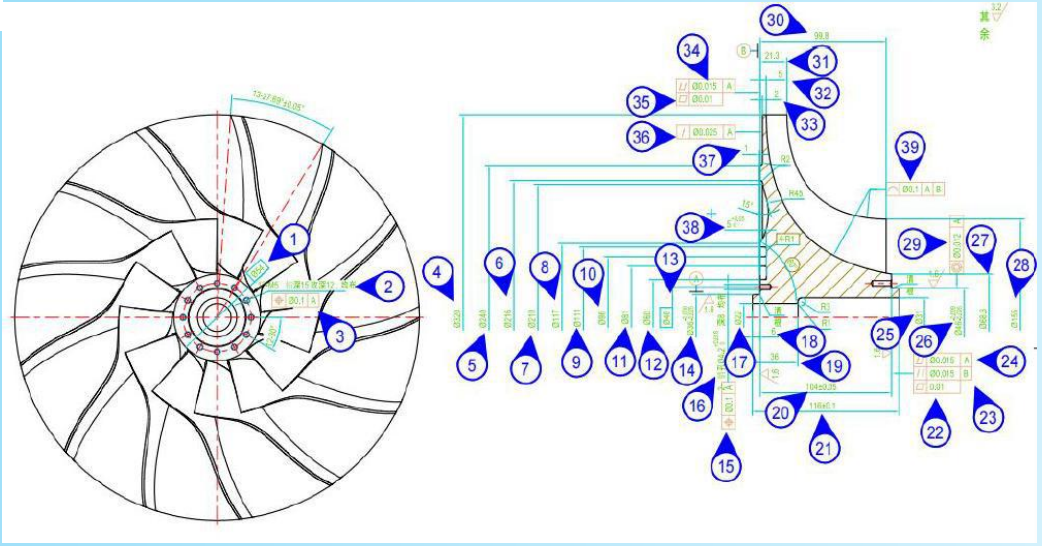


Thin wall and easy to cause the deformation





Symmetry and contour +/-0.002mm is difficult to achieve, can it be changed to +/-00.02mm?



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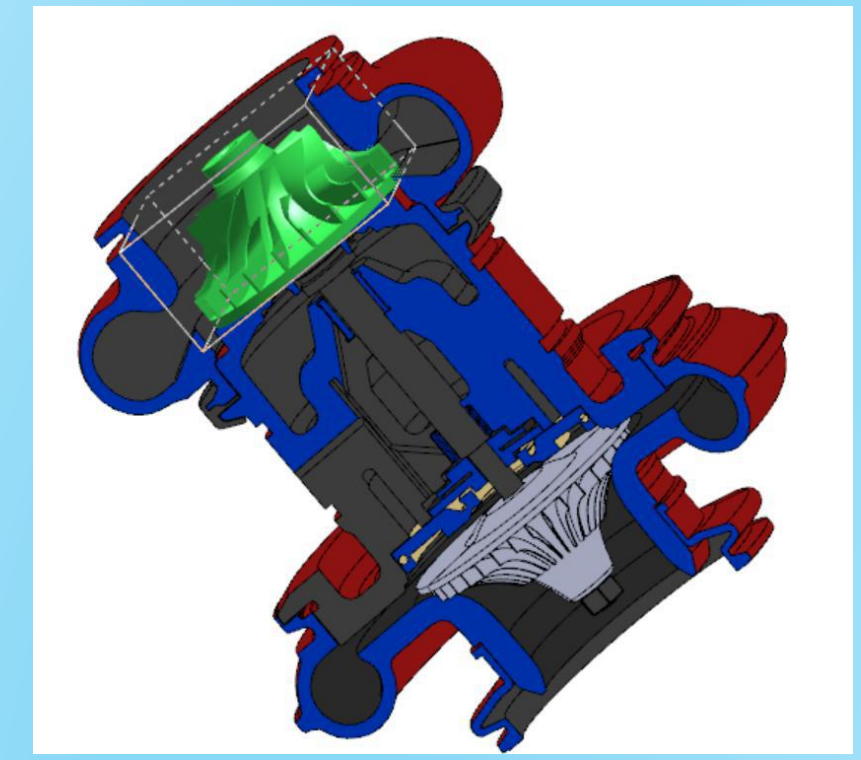
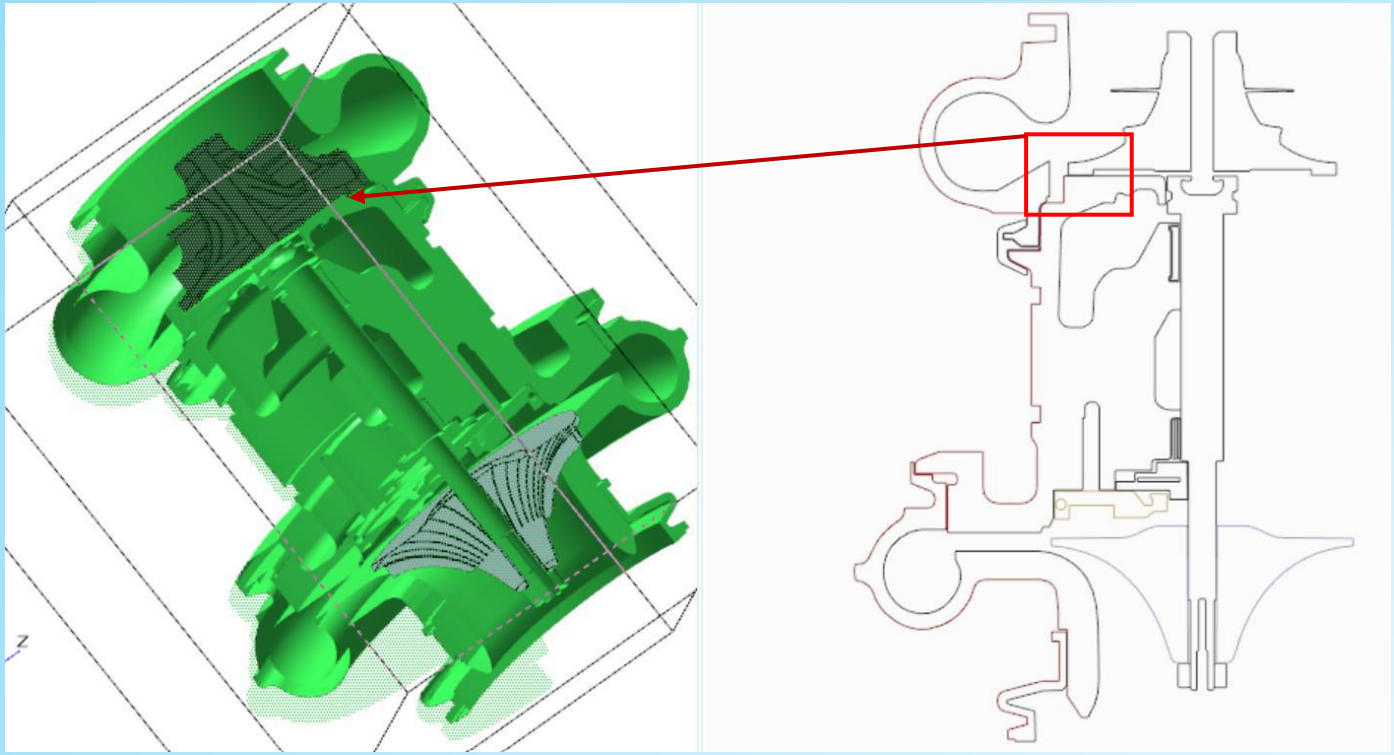
Assembly Check



Symmetry and contour +/-0.002mm is difficult to achieve, can it be changed to +/-00.02mm?

There is scratch risk since just small gaps here.



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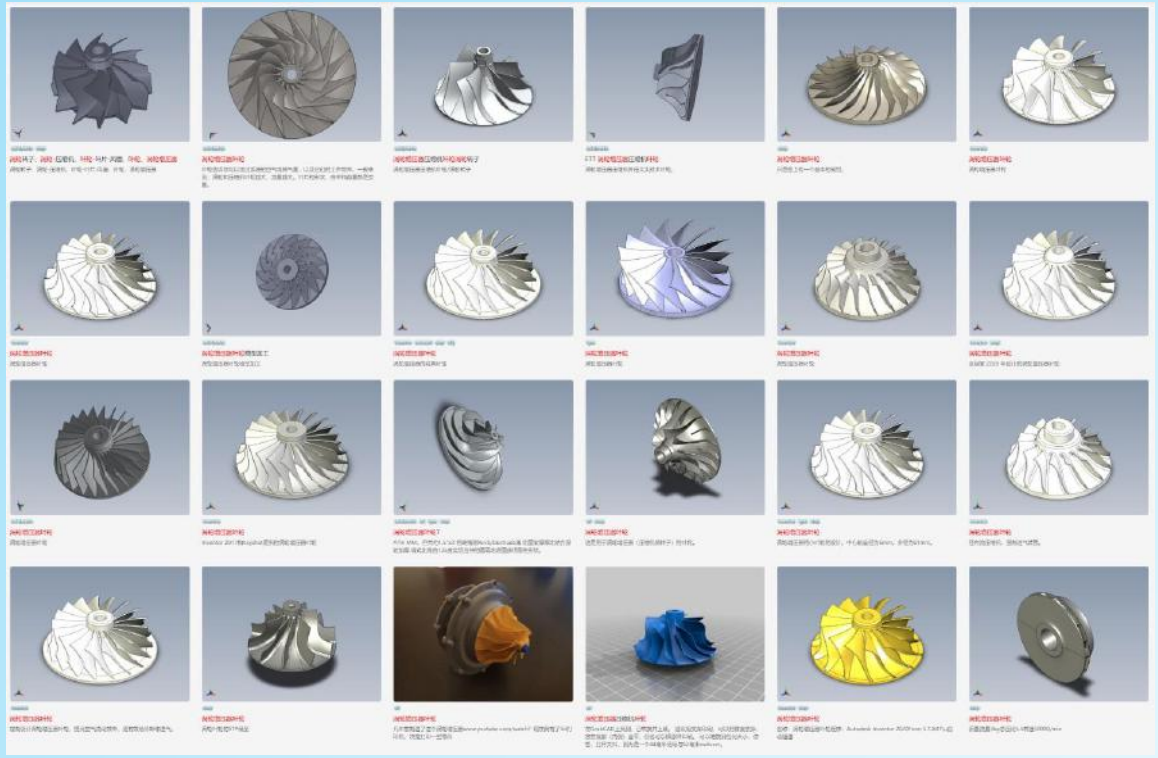
Machining Process Details

We pulled so many types of impeller parts that we had done before, and based on those, we developed a better machining process.



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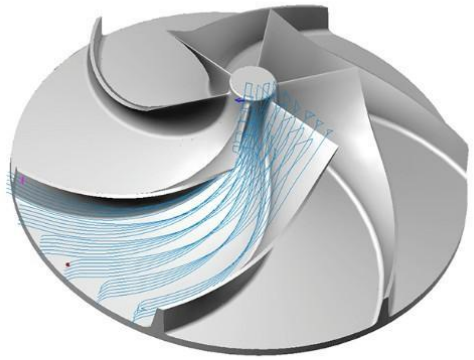
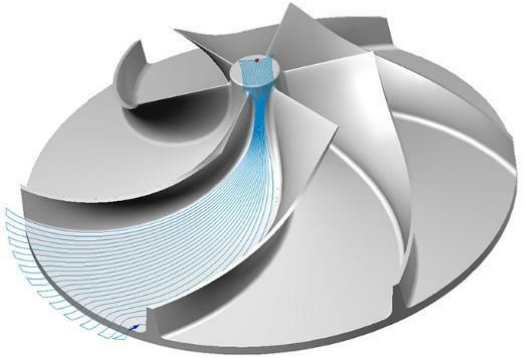
Machining Process Details

Process braiding and Toolpath Strategies are done in the manner shown below, please ask questions if you have any.

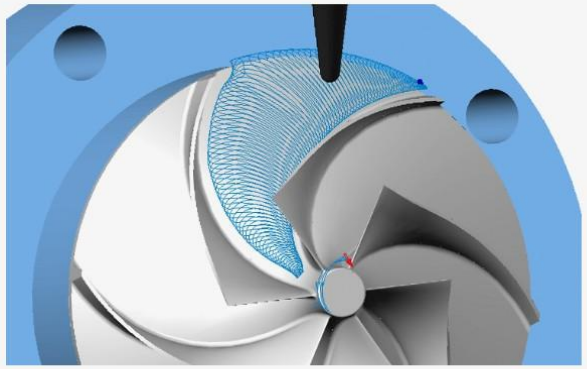


流道开粗

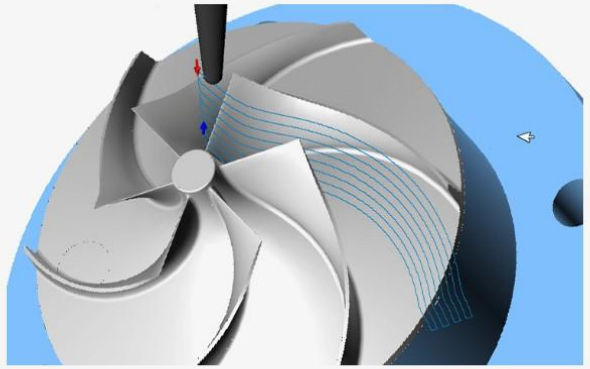
叶片加工



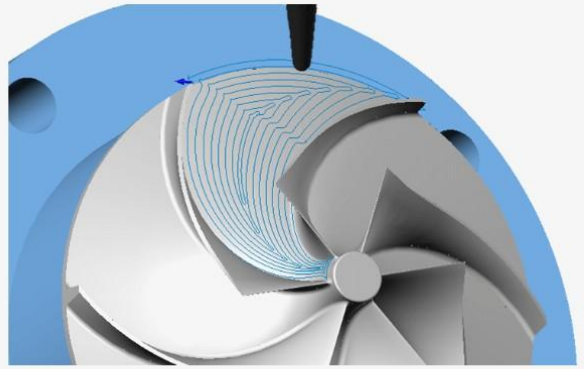
流道精加工



摆线开粗



区域划槽



区域环切

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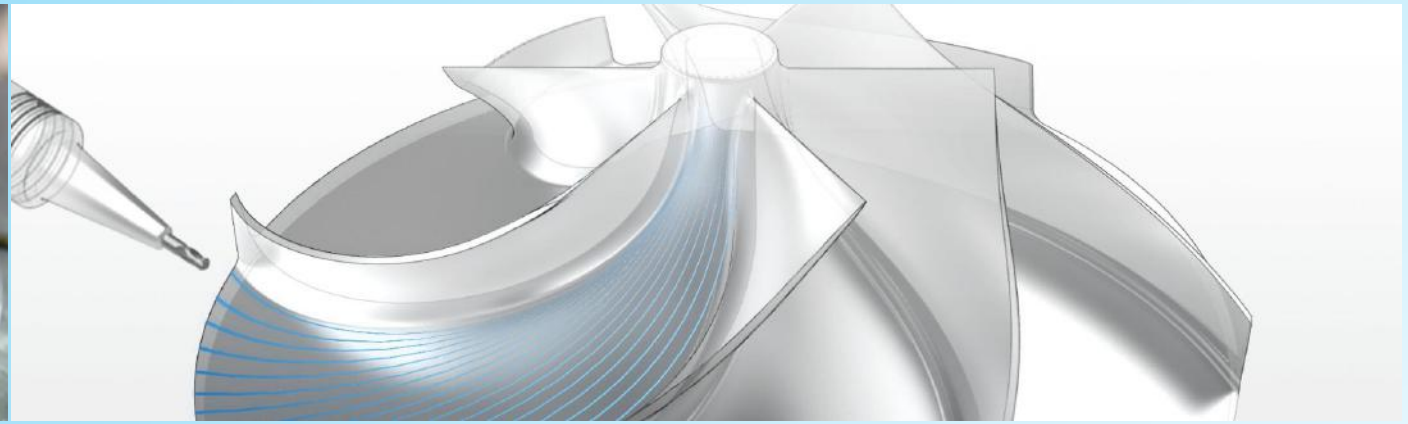
Material evaluation

We will use bar stock for roughing，This material is one of the more commonly used aluminum alloys, which is easy to process, has good toughness,
and has less internal stress after processing by our proven processing methods,
and we also have extensive experience in processing this material.

Material	Tensile Strength (MPa)	Hardness (Rockwell)	Density (g/cm^3)	Applications
Aluminum 6061	310	95 (B)	2.70	Aerospace, Automotive, Consumer Goods



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Heat Treatment

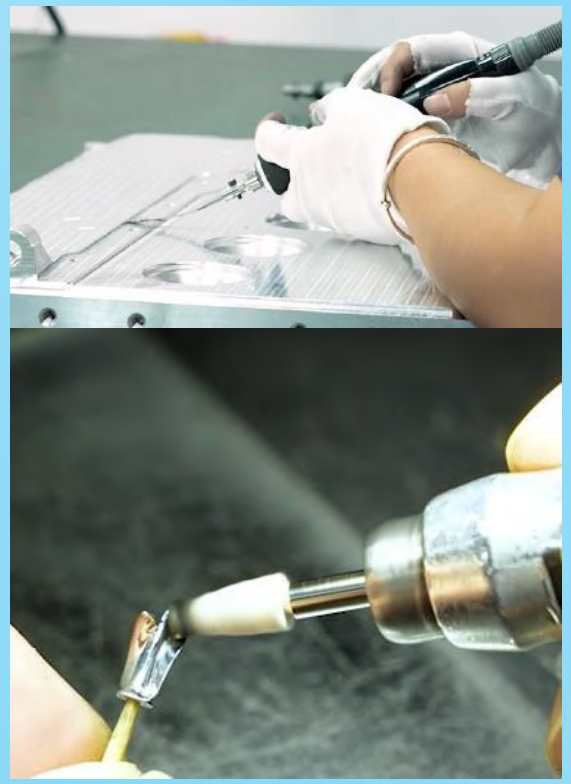
After rough machining we perform low temperature tempering to ensure internal structural stabilization and stress removal to ensure subsequent function and longevity in actual use.

Tempering Temperatures Chart

Color	Hardest	Approximate Temperature (°C)	Uses
Pale Straw	↑	230	Lathe tools, Scrapers, Scribers
Straw		240	Drills, Milling Cutters
Dark Straw		250	Taps & Dies, Punches, Reamers
Brown		260	Plane Blades, Shears, Lathe Centres
Brown/Purple		270	Scissors, Press Tools, Knives
Purple		280	Cold Chisels, Axes, Saws
Dark Purple	↓	290	Screwdrivers, Chuck Keys
Blue	Toughest	300	Springs, Spanners, Needles

Surface Finish

According the specifications this impeller need to do Deburring，Polishing， Anodizing



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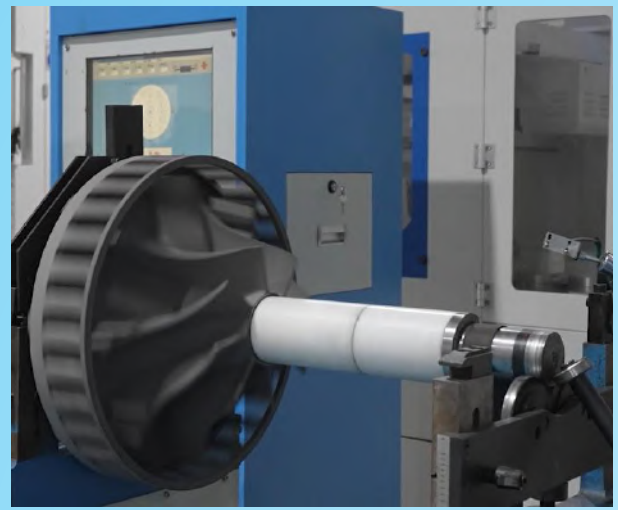
Inspection & Quality Control

After the completion of each process, we will test the workpiece,
the results of which are qualified before proceeding to the next process,
and after the completion of all processing procedures, we will also conduct a final inspection
and issue a complete inspection report.

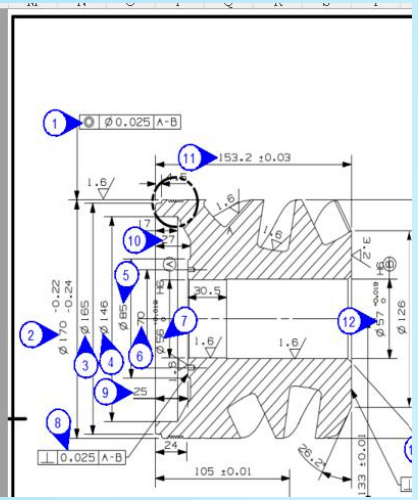


深圳市智汇美科技有限公司

FAI尺寸测量报告

Vendor(客户)		材质	/	工件名称	螺杆	Rev(版本)
/		硬度	/	工件号	001-001	A0
总数量/抽检数		1/PCS				
日期		2024/12/30		MEASURED DIMENSION(实测尺寸)		Whether to receive (是否接收)

DIM. #	DIMENSION	+ TOL.	- TOL.	SAMPLE 1	SAMPLE 2	SAMPLE 3	SAMPLE 4	SAMPLE 5	YES/NO	Measurement equipment 量测仪器
1⌀AB－面170	0.000	0.025	0.000	0.0028					YES	CMM
1⌀柱体 56－A至圆	0.000	0.025	0.000	0.0046					YES	CMM
1⌀柱体 56－A至圆	0.000	0.025	0.000	0.0221					YES	CMM
1⌀柱体 56－至柱体	0.000	0.025	0.000	0.0246					YES	CMM
2	170.000	-0.220	-0.240	#####					YES	CMM
3	165.000	0.500	-0.500	#####					YES	CMM
4	146.000	0.500	-0.500	#####					YES	CMM
5	85.000	0.300	-0.300	85.009					YES	CMM
6	70.000	0.300	-0.300	69.989					YES	CMM



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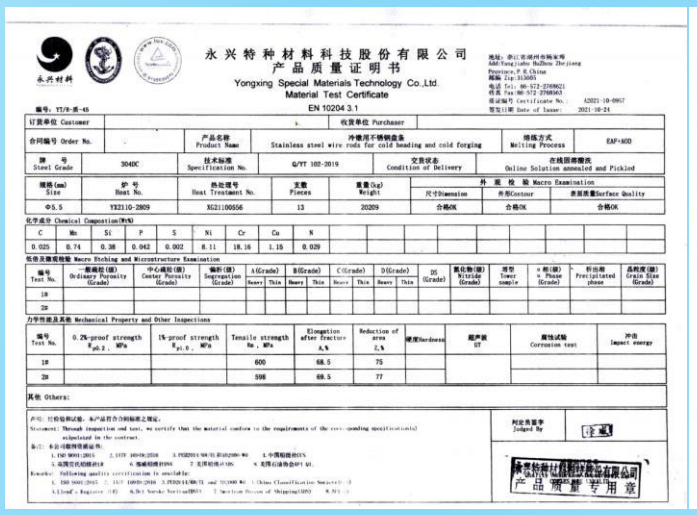
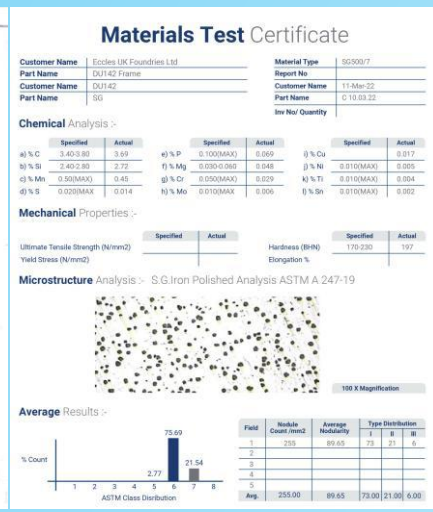
10 Documentation & Deliverables

After the workpiece passes the final inspection, we will package it and collect the required information together with the workpiece package for shipment, such as process program sheet, material certificate and test certificate, heat treatment certificate, dimensional test report, ROHS Declaration of Conformity and so on.



永兴特种材料科技股份有限公司
产品质量证明书
Yongxing Special Materials Technology Co.,Ltd.
Material Test Certificate
EN 10204 3.1



Materials Test Certificate

Customer Name: Eccles UK Foundries Ltd
Part Name: DU142 Frame
Customer Name: DU142
Part Name: SG
Material Type: SG500/7
Report No
Customer Name: 11-Mar-22
Part Name: C 10.03.22
Inv No/ Quantity

Chemical Analysis :-

	Specified	Actual		Specified	Actual		Specified	Actual
a) % C	3.40-3.80	3.69	e) % P	0.100(MAX)	0.069	i) % Cu		0.017
b) % Si	2.40-2.80	2.72	f) % Mg	0.030-0.060	0.048	j) % Ni	0.010(MAX)	0.005
c) % Mn	0.50(MAX)	0.45	g) % Cr	0.050(MAX)	0.029	k) % Ti	0.010(MAX)	0.004
d) % S	0.020(MAX	0.014	h) % Mo	0.010(MAX	0.006	l) % Sn	0.010(MAX)	0.002

Mechanical Properties :-

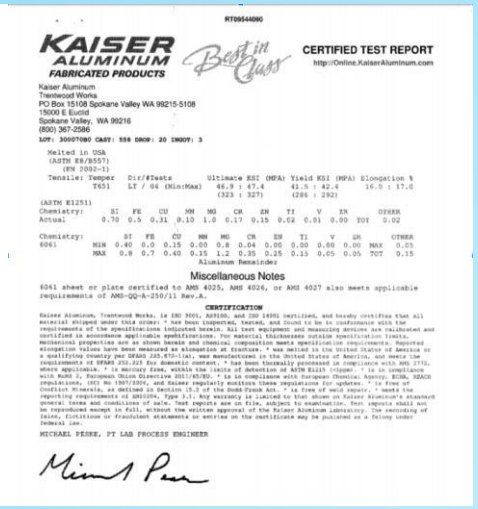
	Specified	Actual		Specified	Actual
Ultimate Tensile Strength (N/mm2)			Hardness (BHN)	170-230	197
Yield Stress (N/mm2)			Elongation %		

Microstructure Analysis :- S.G.Iron Polished Analysis ASTM A 247-19

100 X Magnification

Average Results :-

Field	Nodule Count /mm2	Average Nodularity	Type Distribution I	II	III
1	255	89.65	73	21	6
2					
3					
4					
5					
Avg.	255.00	89.65	73.00	21.00	6.00



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Kaiser Aluminum
Trentwood Works
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15000 E Euclid
Spokane Valley, WA 99216
(800) 367-2586

Miscellaneous Notes

6061 sheet or plate certified to AMS 4025, AMS 4026, or AMS 4027 also meets applicable requirements of AMS-QQ-A-250/11 Rev.A.

CERTIFICATION

MICHAEL PESKE, PT LAB PROCESS ENGINEER

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