

INSTRUCTIONS FOR MANUFACTURE AND ASSEMBLY OF THE REDESIGNED CROFT PARALLEL GRINDER

Design schematics of twenty-one components of the redesigned Croft grinder and two tables are listed below. It is advised that components be produced through the use of computer numerical control (CNC) machine tools to ensure accuracy of critical components such as the micrometer.

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Table 1. — List of the components of the redesigned Croft parallel grinder

Component number	Component name	Quantity	Material
A-1	Micrometer part 1	1	45#
A-2	Micrometer part 2	1	45#
A-3	Micrometer part 3	1	45#
B-1	Platform part 1	1	45#
B-2	Platform part 2	1	Aluminum alloy 6063
C	Support bracket	2	Aluminum alloy 6063
D	Knob	1	Aluminum alloy 6063
E-1	Upper ring bracket part 1	3	45#
E-2	Upper ring bracket part 2	3	45#
F	Specimen plate	1	Aluminum alloy 6063
G-1	Cylinder part 1	1	45#
G-2	Cylinder part 2	1	45#
H	Screw stem	1	45#
J	Weight	2	45#
K-1	Lower ring bracket part 1	3	45#
K-2	Lower ring bracket part 2	3	45#
L-1	Base plate part 1	1	Aluminum alloy 6063
L-2	Base plate part 2	3	Aluminum alloy 6063
M	Ball bearing	3	Austenite type 304
N	Abrading plate	1	Glass
O	Alignment socket	1	Aluminum alloy 6063

Note: (1) Component number of each component corresponds to that in Supplemental material 2 and 3; (2) Pitches of screw threads with the diameter of 64

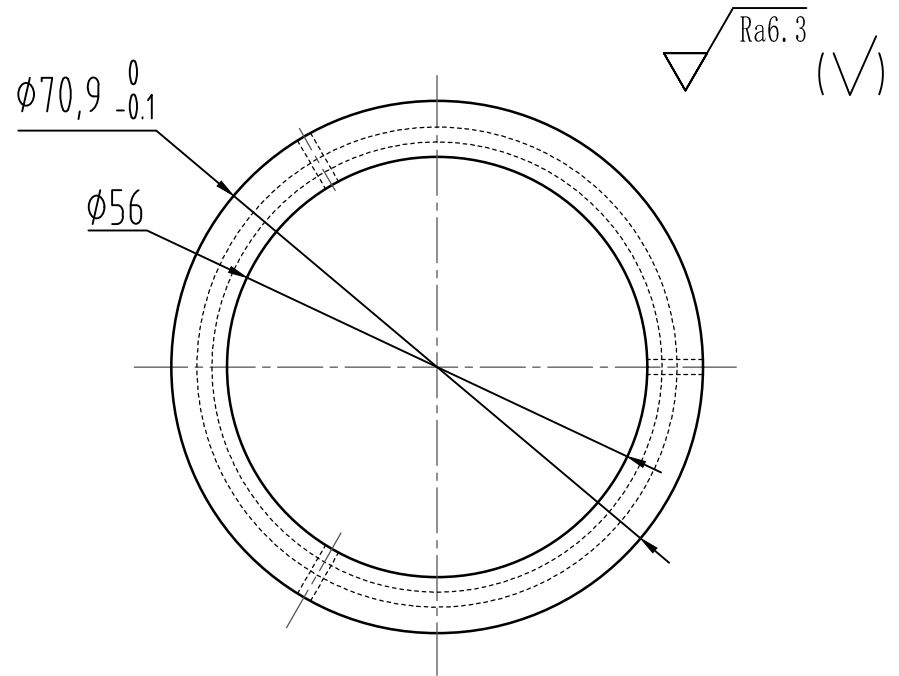
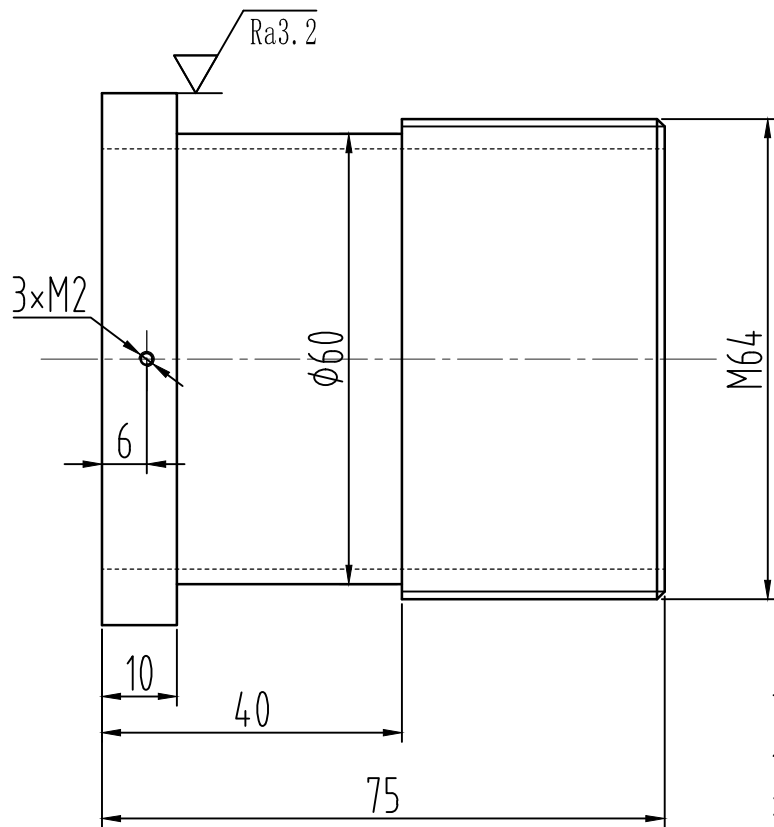
millimeters on components A-1 and A-3 are 1 millimeter; (3) Pitches of threads on components F and H are 1.25 micrometers; (4) Pitches of other threads are consistent with those of corresponding screws (Table 2).

Simplified cross section sketch (Supplemental material 2) shows a lateral view of the assembly of the redesigned Craft Parallel Grinder, with component numbers of components corresponding to those in Table 1. There are 5 kinds of screws involved for assembling the grinder (Table 2). Screw specifications are based on the standards of the International Organization for Standardization (ISO 1580:1994; ISO 7380:2004; ISO 10642:2004).

Table 2. —Screws for assembling the redesigned Croft parallel Grinder

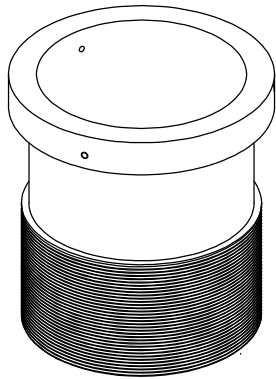
Name	Slotted pan head screw	Hexagon socket button head screw			Hexagon socket countersunk head screw
		M4*8	M4*10	M4*20	
Model	M2*8	M4*8	M4*10	M4*20	M3*12
Quantity	3	6	6	3	18
Fastened Components	A-1, A-2	A-3, B-2	L-1, L-	B-2, C	B-2, E-1, E-2
		B-1, B-2	2	B-2, D	K-1, K-2, L-1
Production Standard	ISO 1580:1994	ISO 7380:2004			ISO 10642:2004

Note: (1) Fastened components represent the components that should be attached with the described screws (see component numbers in Table 1); (3) ISO is the abbreviation of the International Organization for Standardization.



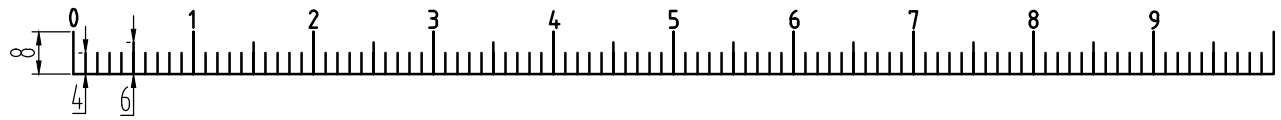
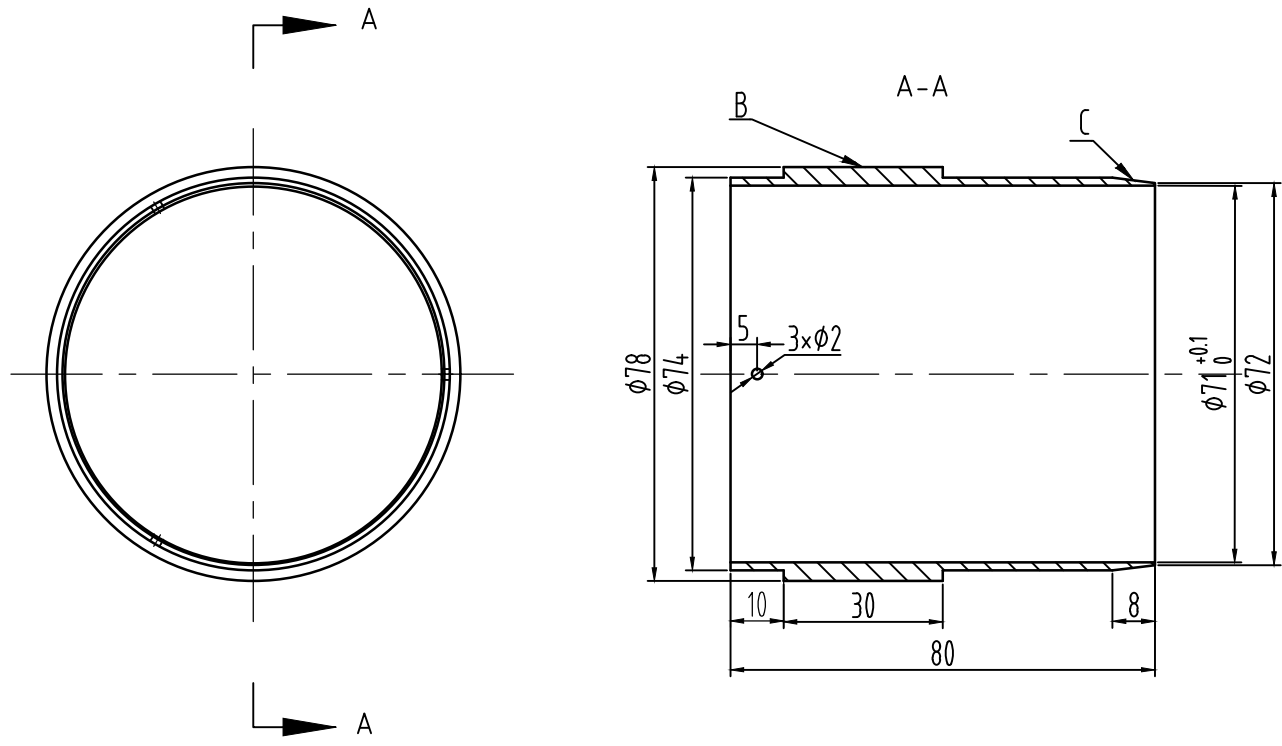
Technical requirements

1. Unspecified deviation equal to $\pm 0.1\text{mm}$.
2. Threaded wire size #10-24.



						45#			A-1 Micromber part 1
marker	places	partitioning	modification file no	sign	date				
design			standardization			static int flag	weight	scale	
								1:1	
approved by			approve			total:	21 pages	1 page	A4

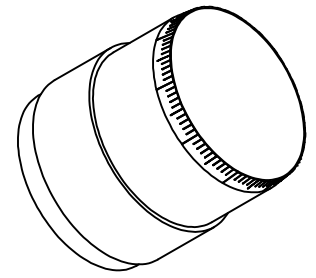
√ Ra6.3 (√)



Enlarged view of carven scale of C

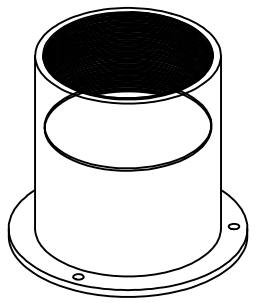
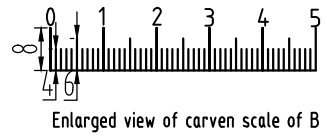
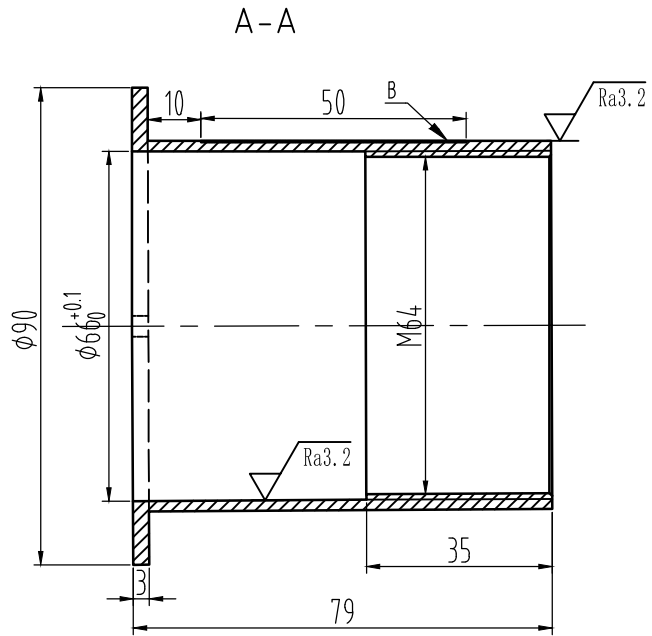
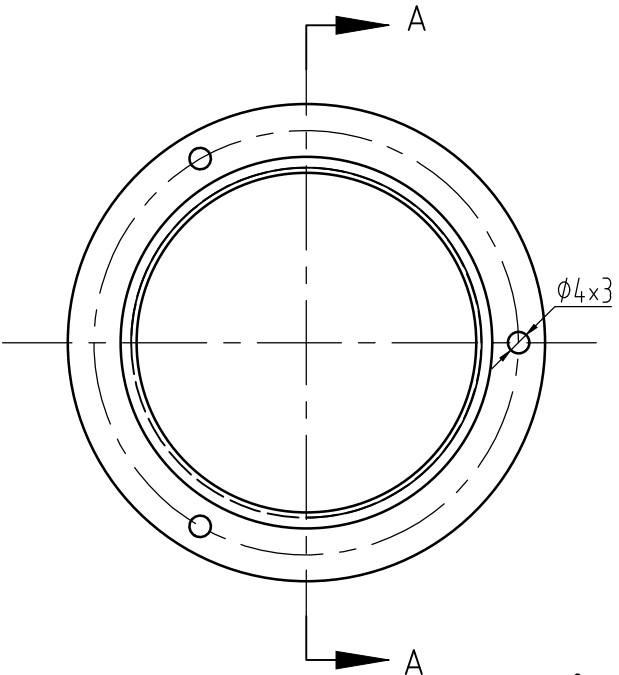
Technical requirements

1. Unspecified deviation equal to $\pm 0.1\text{mm}$.
2. Knurling decorated at B.
3. Scale lines etched at C.



						45#				
marker	places	partitioning	modification file no	sign	date				A-2 Micromber part 2	
design			standardization			static inf flag	weight	scale	A3	
									1:1	
approved by			approve			total:	21 pages	2 page		

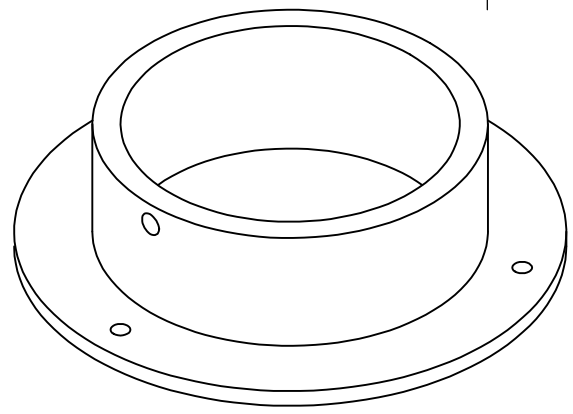
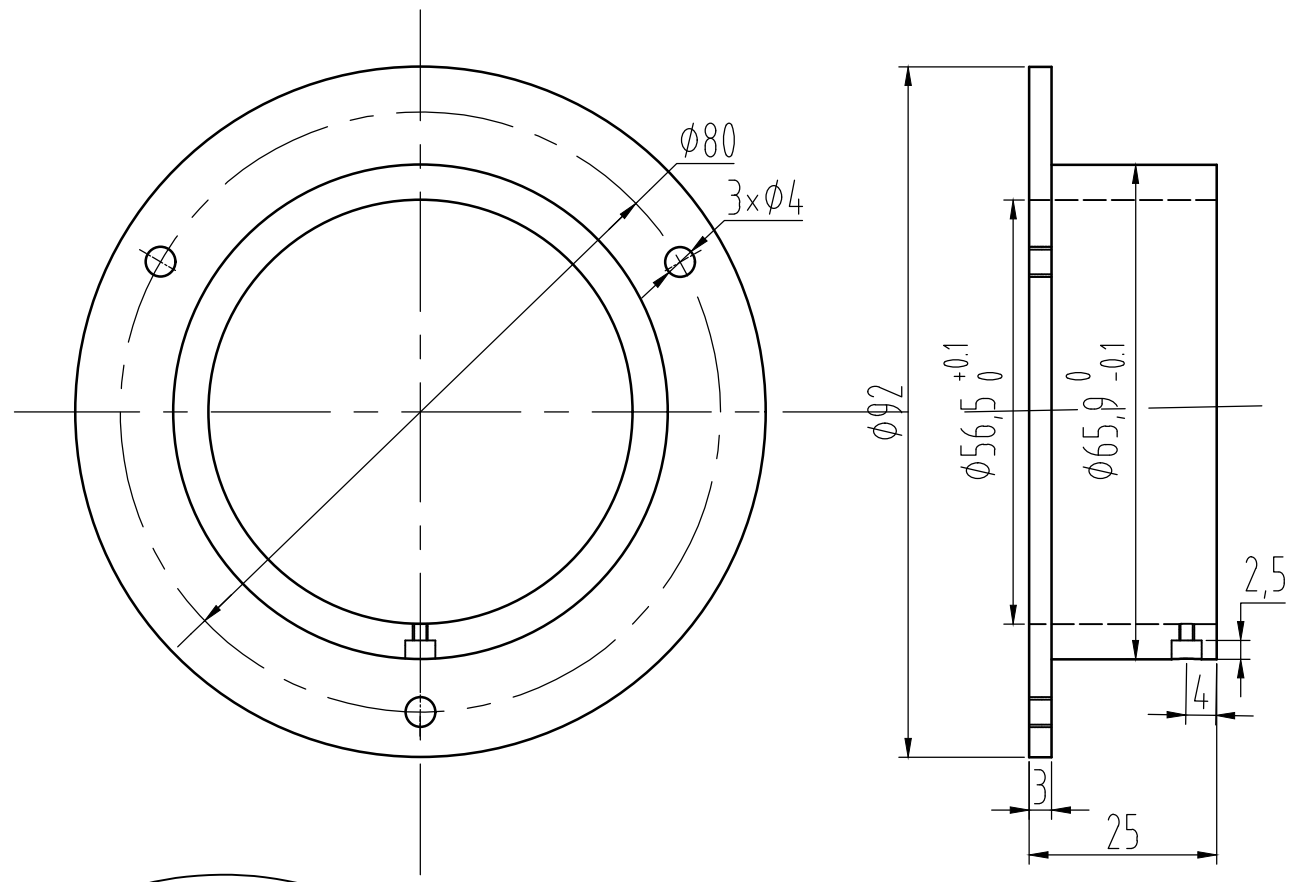
√ Ra6.3 (√)



- Technical requirements
1. Unspecified deviation equal to ± 0.1 mm.
 2. Threaded wire size #10-24.
 3. Scale lines etched at B.

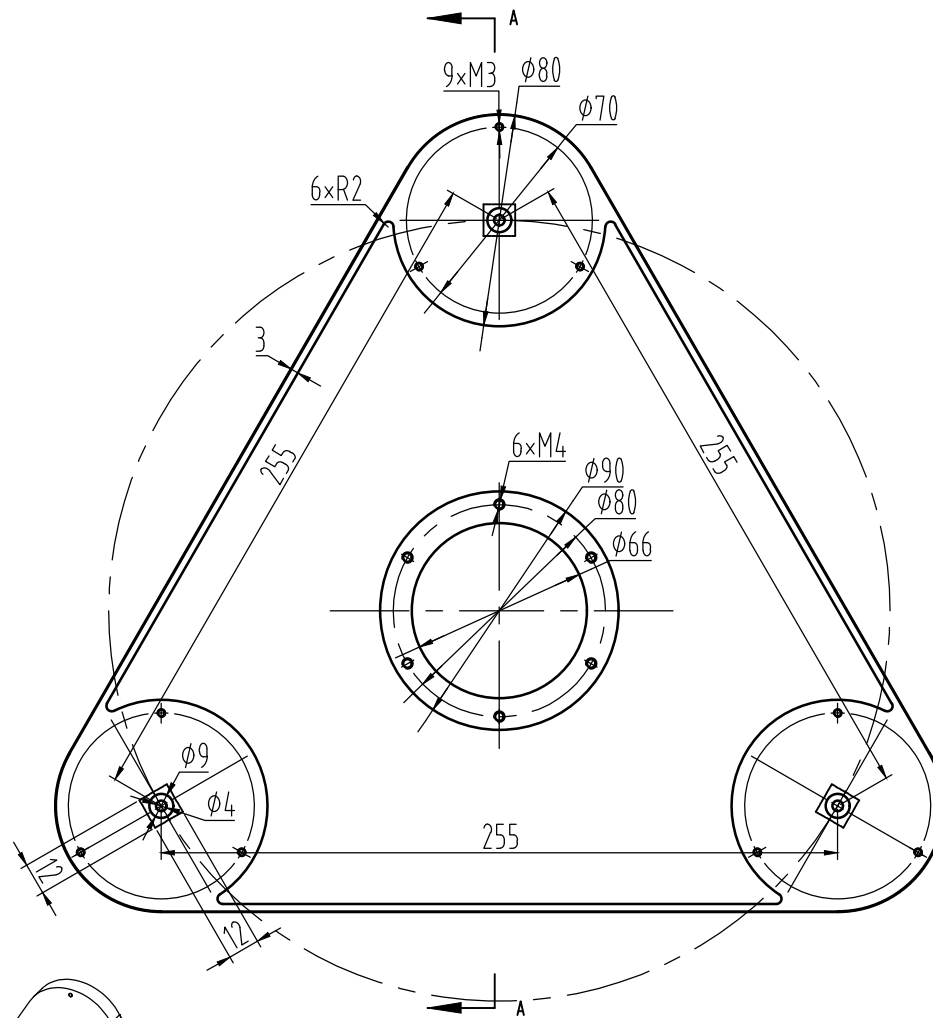
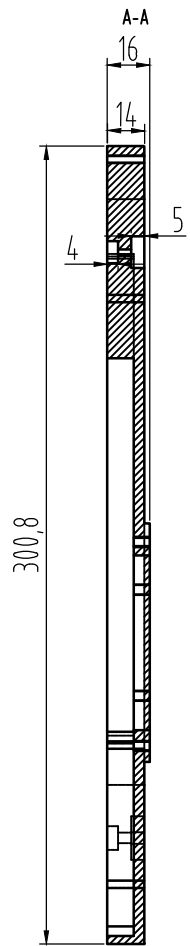
						45#				
									A-3 Micromber part 3	
marker	places	partitioning	modification file no	sign	date	static int flag		weight	scale	A3
design			standardization						1:1	
approved by			approve			total:	21 pages	3 page		

▽ Ra6.3 (✓)



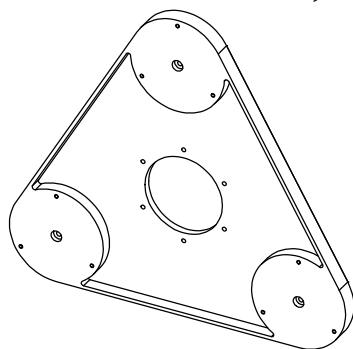
Technical requirement
Unspecified deviation equal to ±0.1mm.

						45#			B-1 Platform part 1
marker	places	partitioning	modification file no	sign	date				
design			standardization			static int flag	weight	scale	
								1:1	A4
approved by			approve			total:	21 pages	4 page	

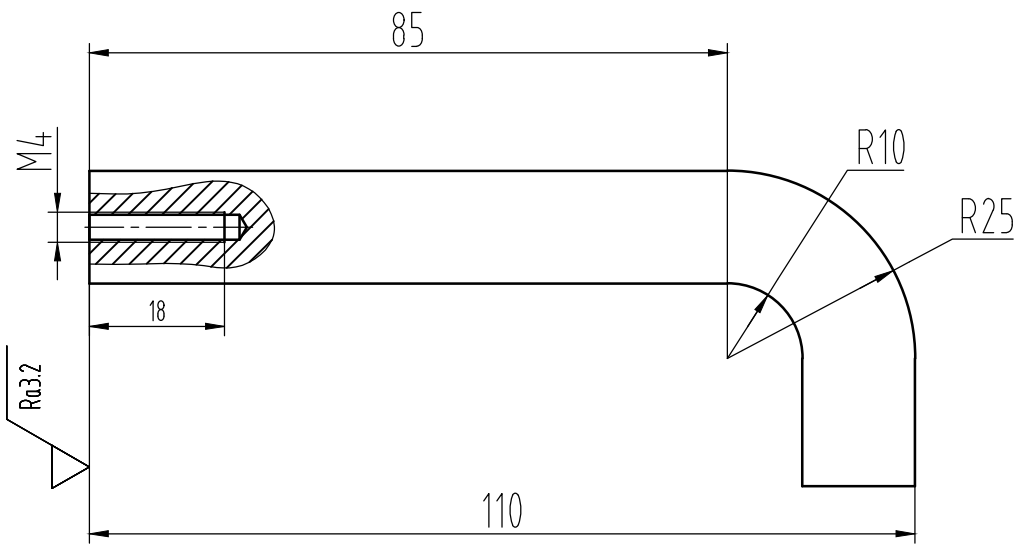


$\sqrt{\text{Ra6.3}}$ (V)

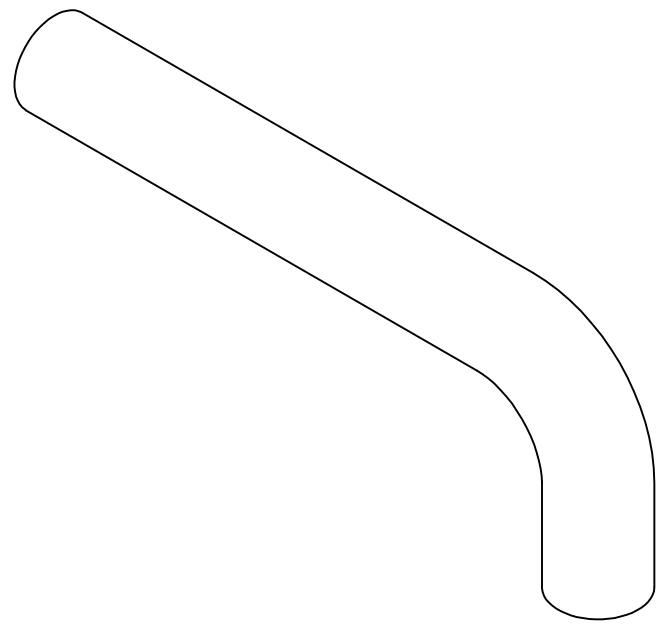
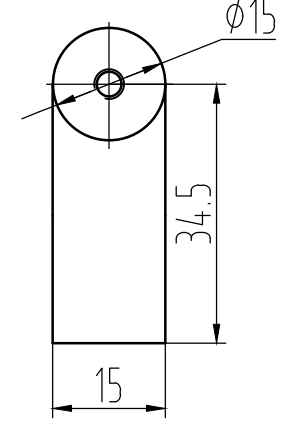
Technical requirement
Unspecified deviation equal to $\pm 0.1\text{mm}$.



						Aluminum alloy 6063				
									B-2 Platform part 2	
marker	places	partitioning	modification file no	sign	date	static inf flag		weight	scale	A3
design			standardization						1:2	
approved by						approve			total: 21 pages 5 page	

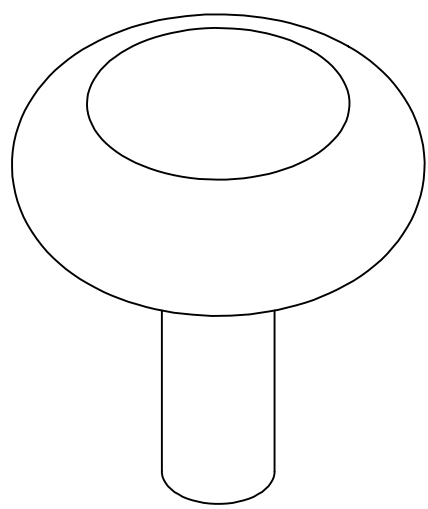
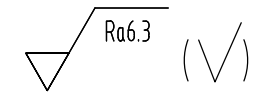
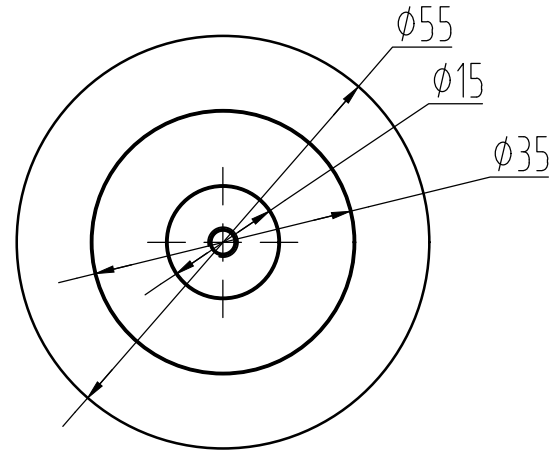
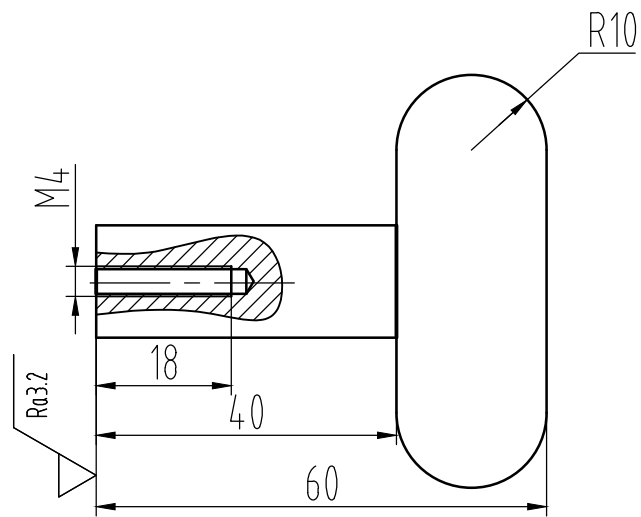


▽ Ra6.3 (√)



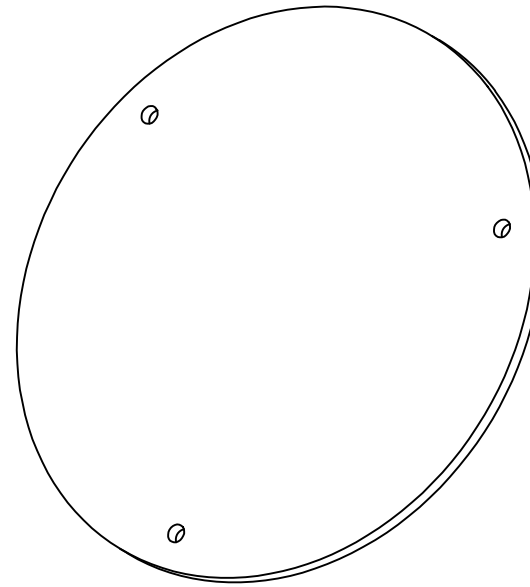
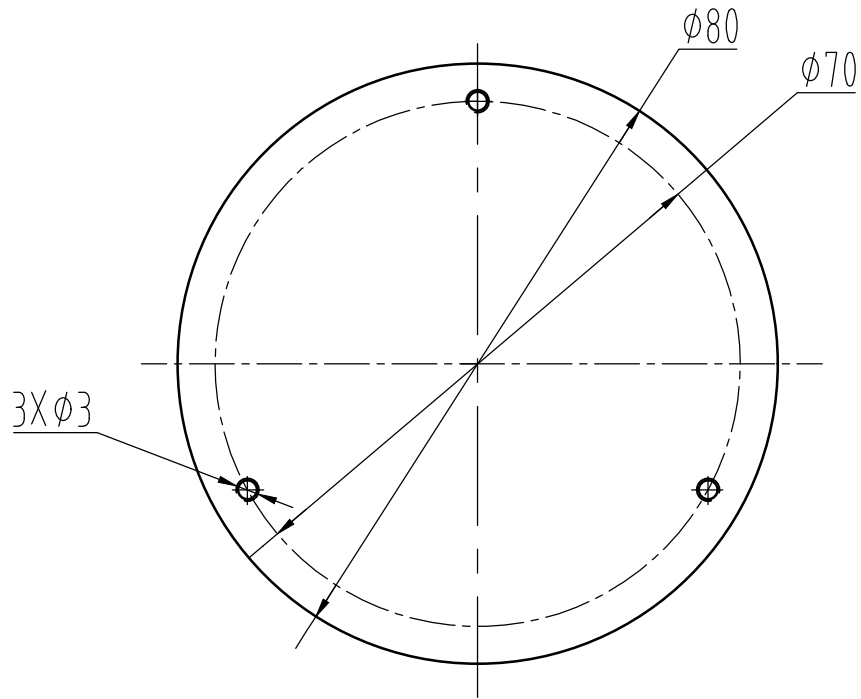
Technical requirement
 Unspecified deviation equal to $\pm 0.1\text{mm}$.

						Aluminum alloy 6063			
marker	places	partitioning	modification file no	sign	date				C Support bracket
design			standardization			static int flag	weight	scale	
								1:1	A4
approved by			approve			total:	21 pages	6 page	

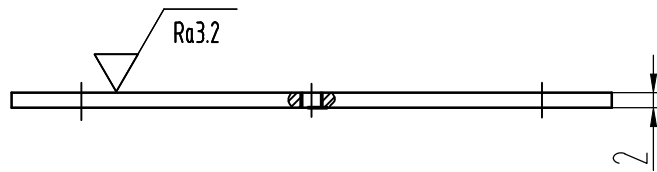


Technical requirement
 Unspecified deviation equal to $\pm 0.1\text{mm}$.

						Aluminum alloy 6063			
marker	places	partitioning	modification file no	sign	date				D Knob
design			standardization			static int flag	weight	scale	
								1:1	A4
approved by			approve			total:	21 pages	7 page	

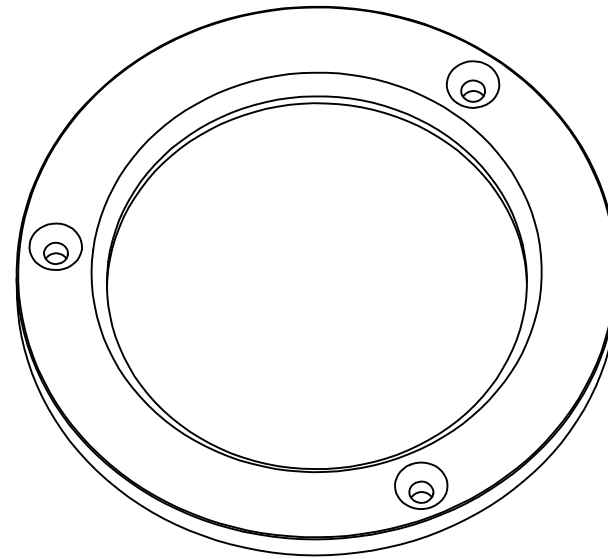
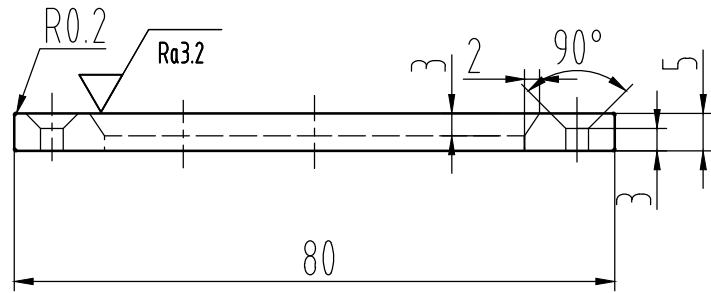


∇ Ra6.3 (✓)

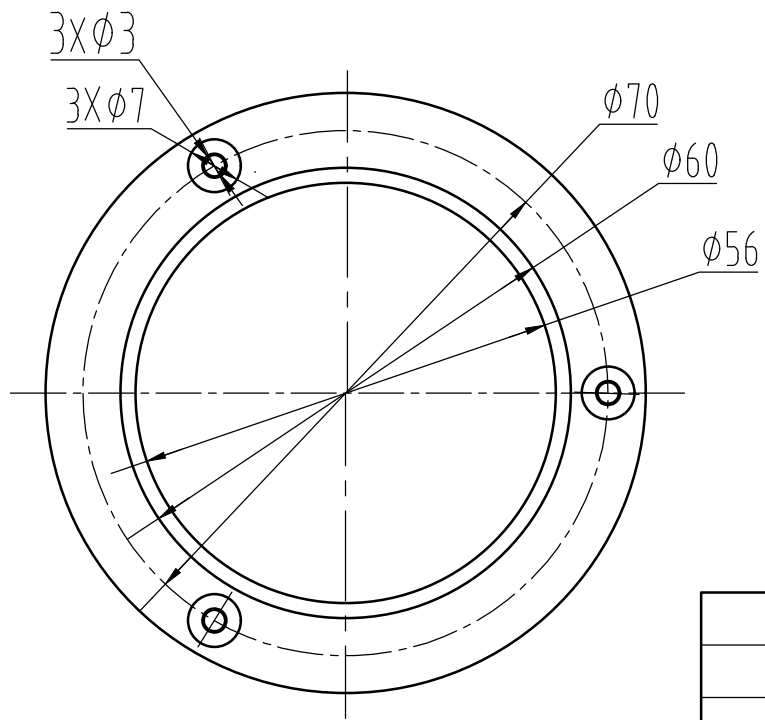


Technical requirement
Unspecified deviation equal to $\pm 0.1\text{mm}$.

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marker	places	partitioning	modification file no	sign	date				
design			standardization			static int flag	weight	scale	
								1:1	A4
approved by			approve			total:	21 pages	8 page	

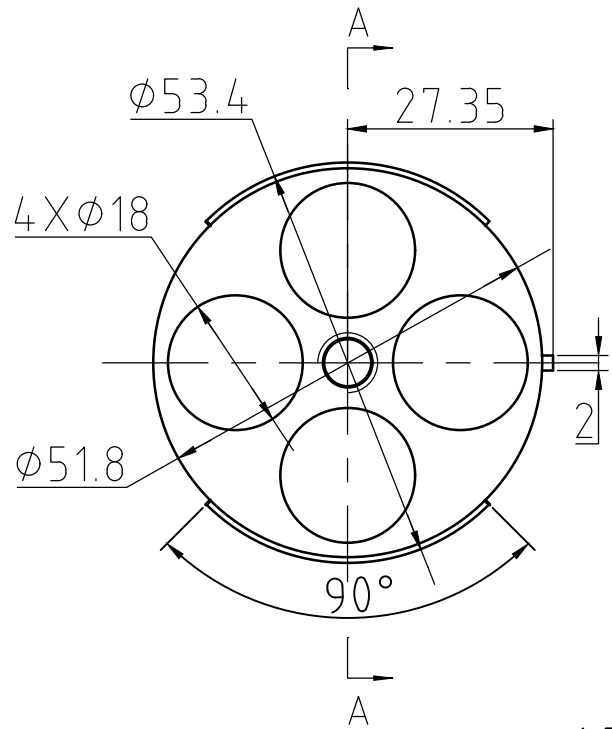


▽ Ra6.3 (√)

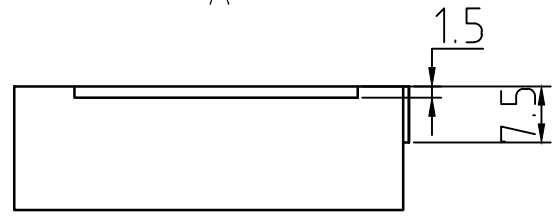
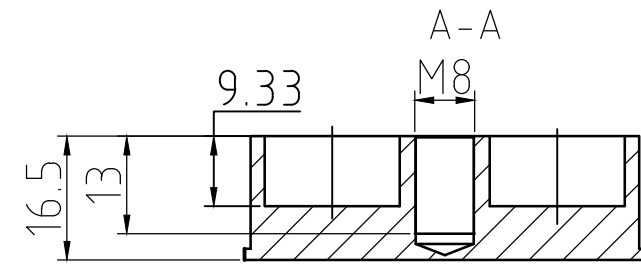


Technical requirement
Unspecified deviation equal to ±0.1mm.

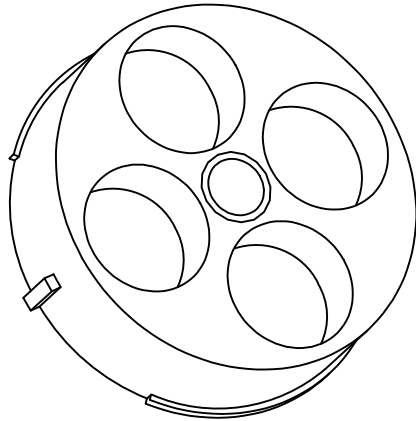
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marker	places	partitioning	modification file no	sign	date				E-2 Upper ring bracket part 2
design			standardization			static int flag	weight	scale	
								1:1	A4
approved by			approve			total:	21 pages	9 page	



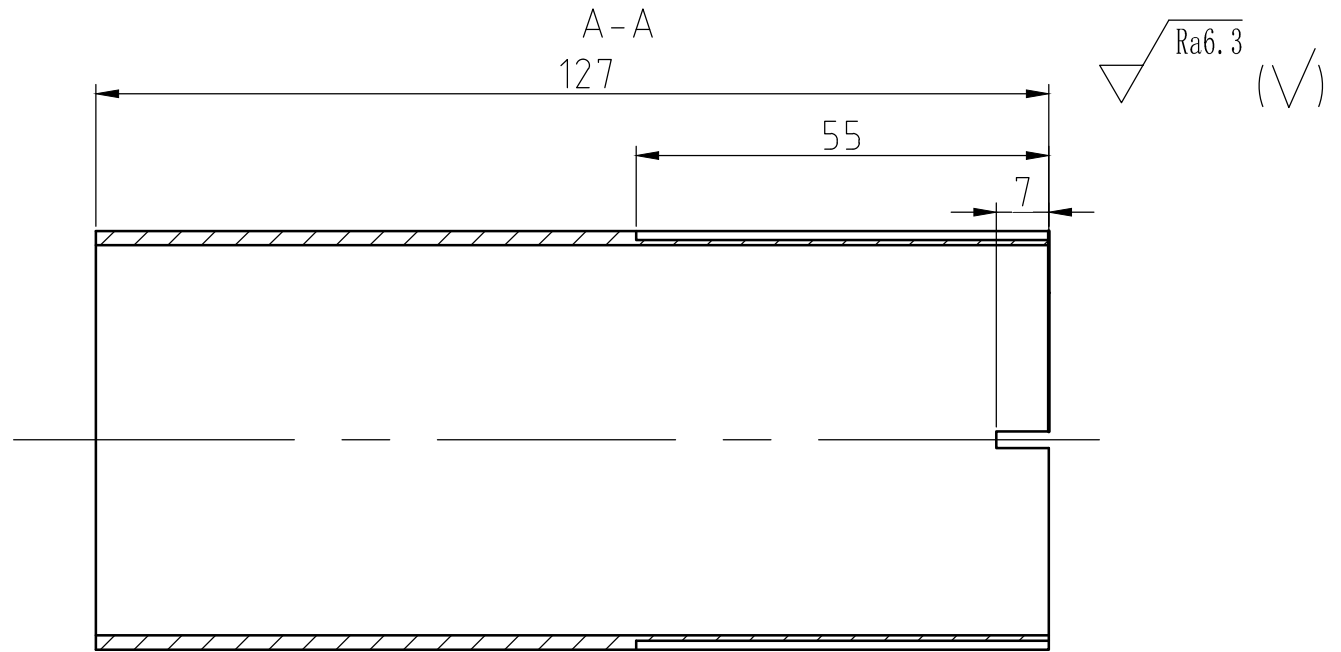
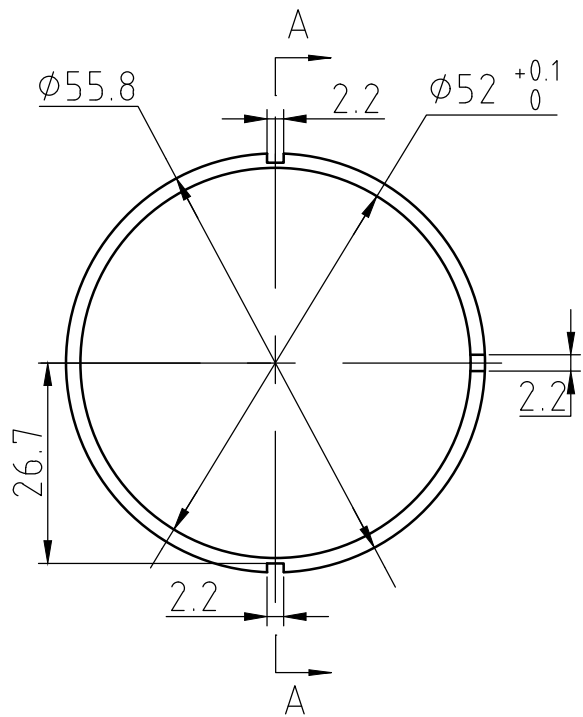
Ra6.3 (✓)



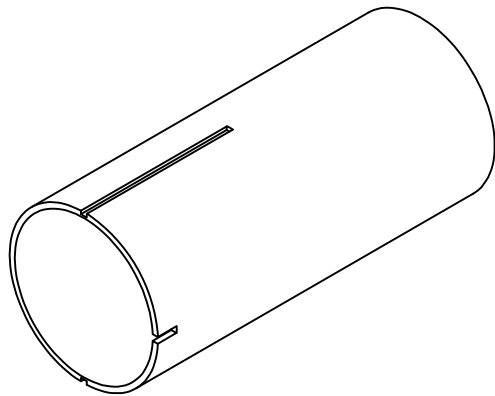
Technical requirement
 Unspecified deviation equal to $\pm 0.1\text{mm}$.



						Aluminum alloy 6063			F Specimen plate
marker	places	partitioning	modification file no	sign	date				
design			standardization			static int flag	weight	scale	A4
								1:1	
approved by			approve			total: 21 pages	10 page		

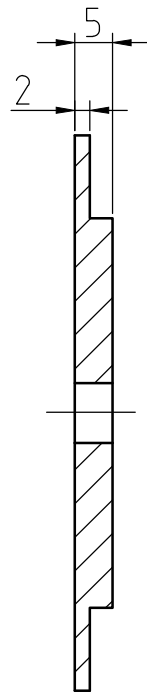
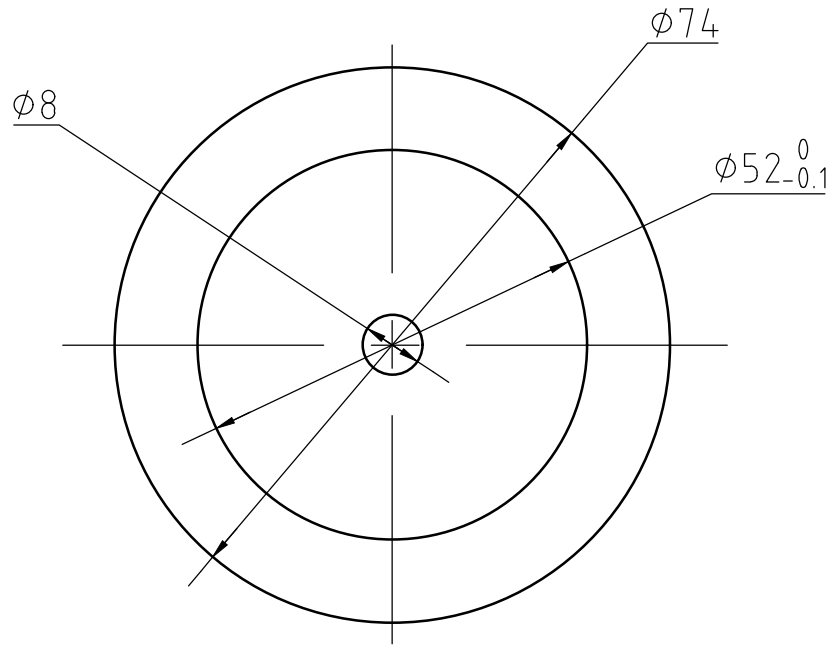


Technical requirement
 Unspecified deviation equal to $\pm 0.1\text{mm}$.

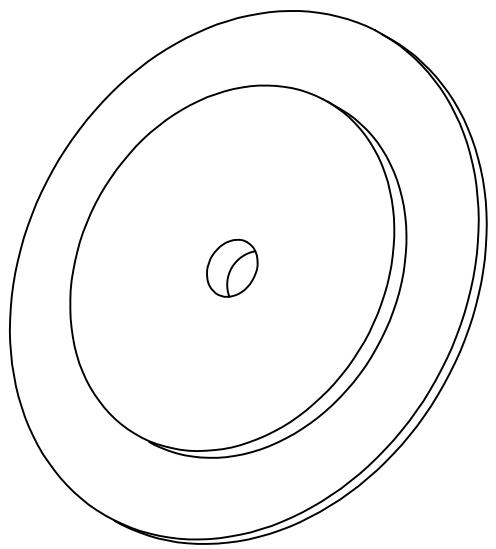


						45 #			
marker	places	partitioning	modification file no	sign	date				G-1 Cylinder part 1
design			standardization			static int flag	weight	scale	
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$\sqrt{Ra6.3}$ (✓)

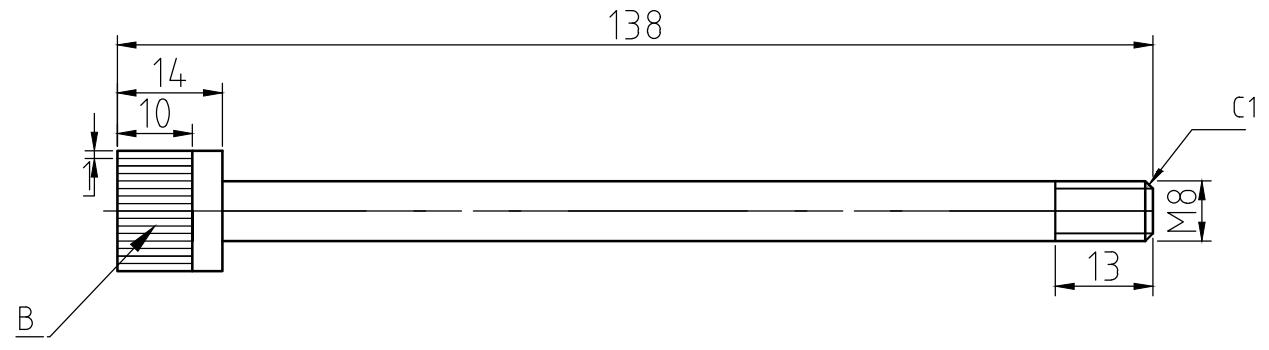
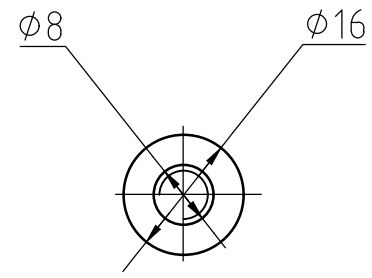


Technical requirement
Unspecified deviation equal to $\pm 0.1\text{mm}$.



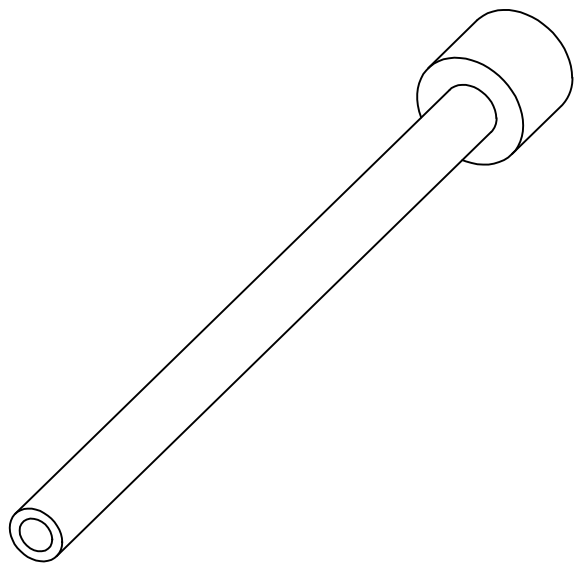
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design			standardization			static int flag	weight	scale	
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Ra6.3 (√)

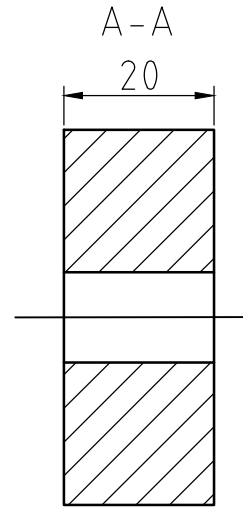
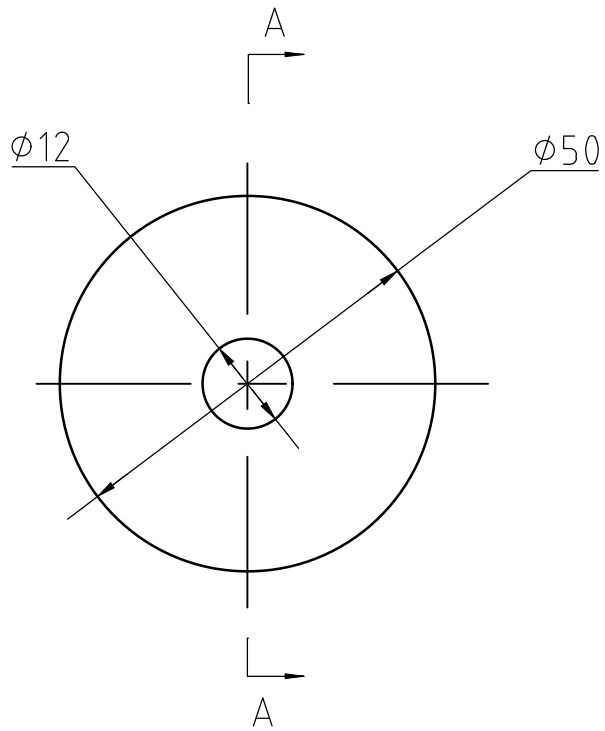


Technical requirements

1. Unspecified deviation equal to $\pm 0.1\text{mm}$.
2. Knurling decorated at B.

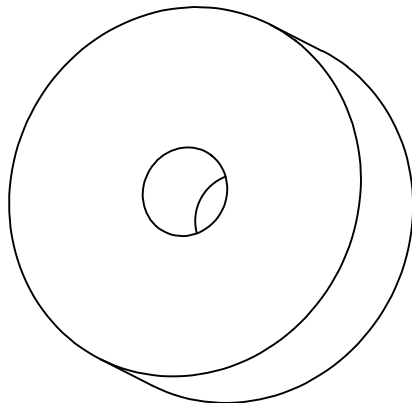


						45 #			H Screw stem
marker	places	partitioning	modification file no	sign	date				
design			standardization			static int flag	weight	scale	
								1:1	A4
approved by			approve			total:	21 pages	13 page	

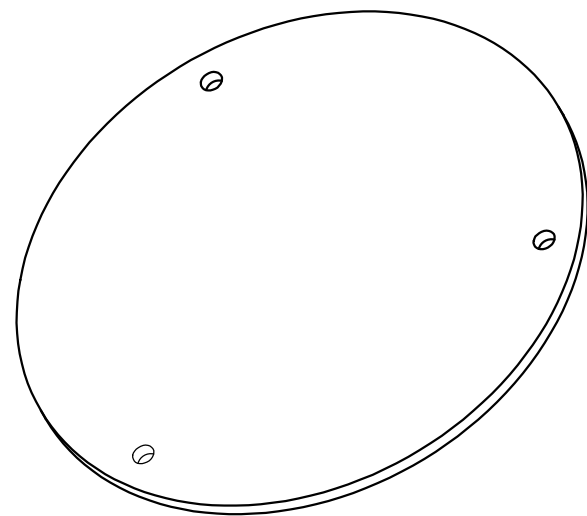
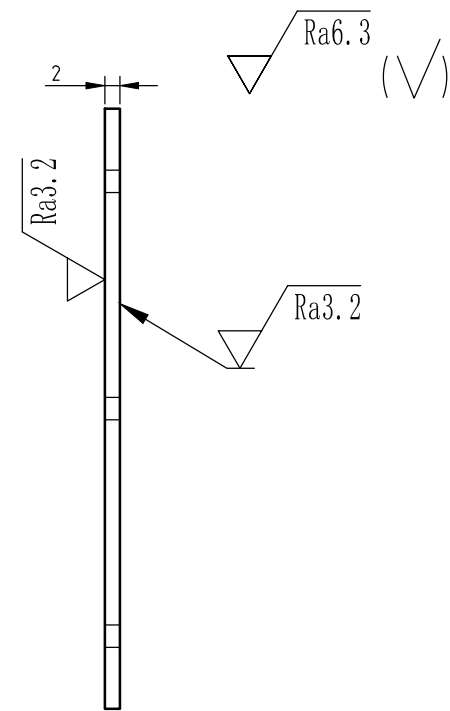
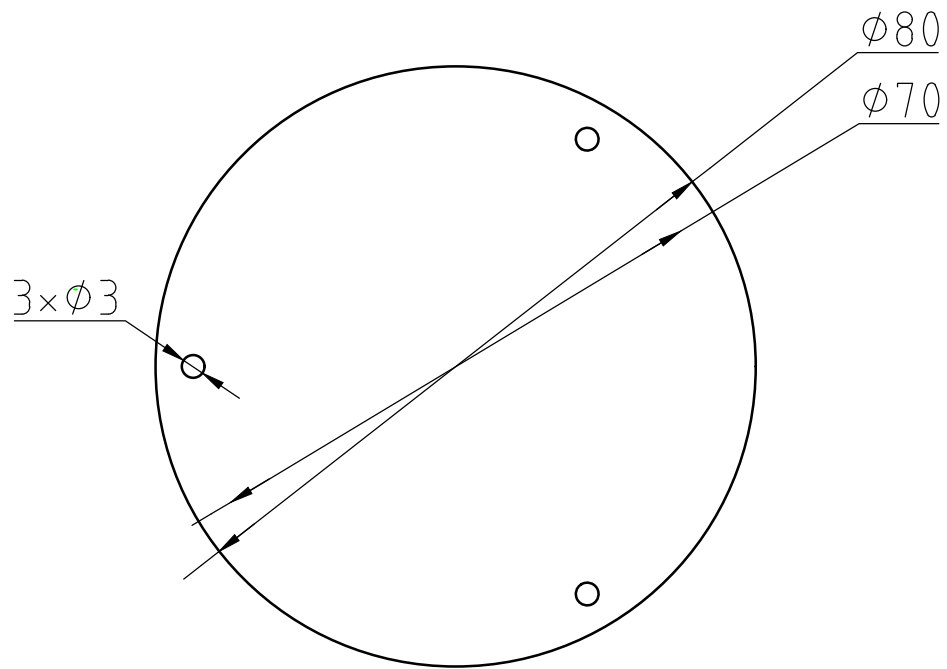


$\sqrt{\text{Ra6.3}}$ (✓)

Technical requirement
Unspecified deviation equal to $\pm 0.1\text{mm}$.

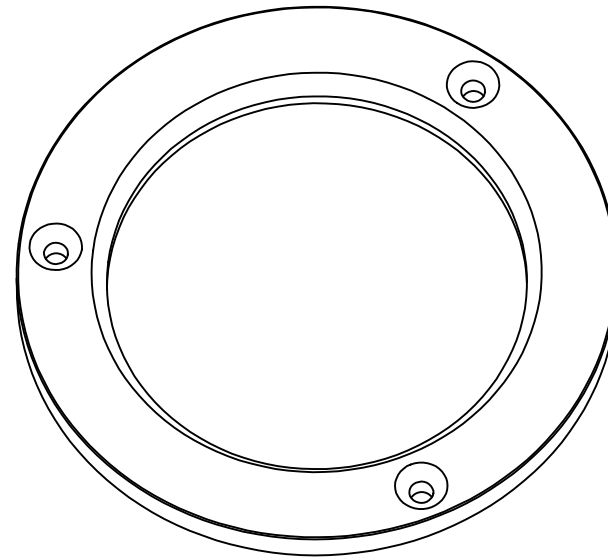
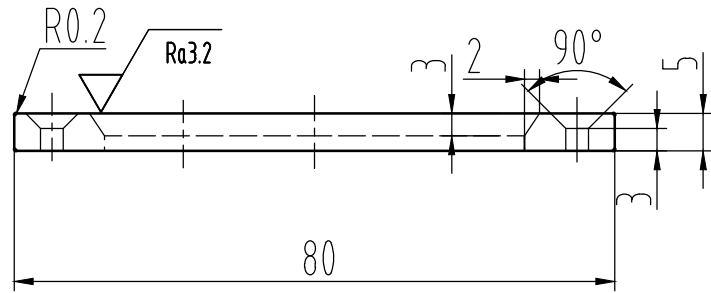


						45#			
marker	places	partitioning	modification file no	sign	date				J Weight
design			standardization			static int flag	weight	scale	
								1:1	A4
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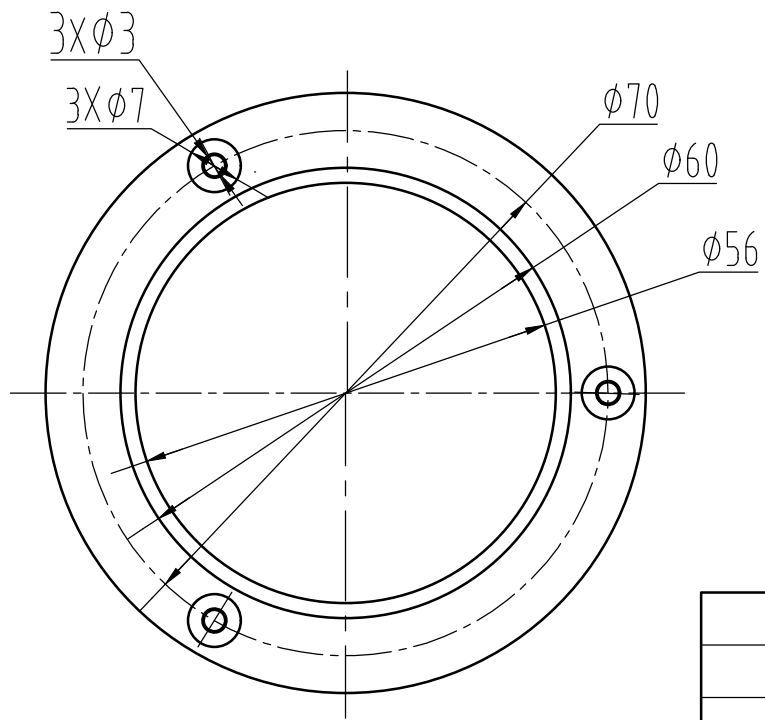


Technical requirement
 Unspecified deviation equal to $\pm 0.1\text{mm}$.

						45#			K-1 Lower ring bracket part 1
marker	places	partitioning	modification file no	sign	date				
design			standardization					1:1	A4
approved by			approve			total:	21 pages	15 page	

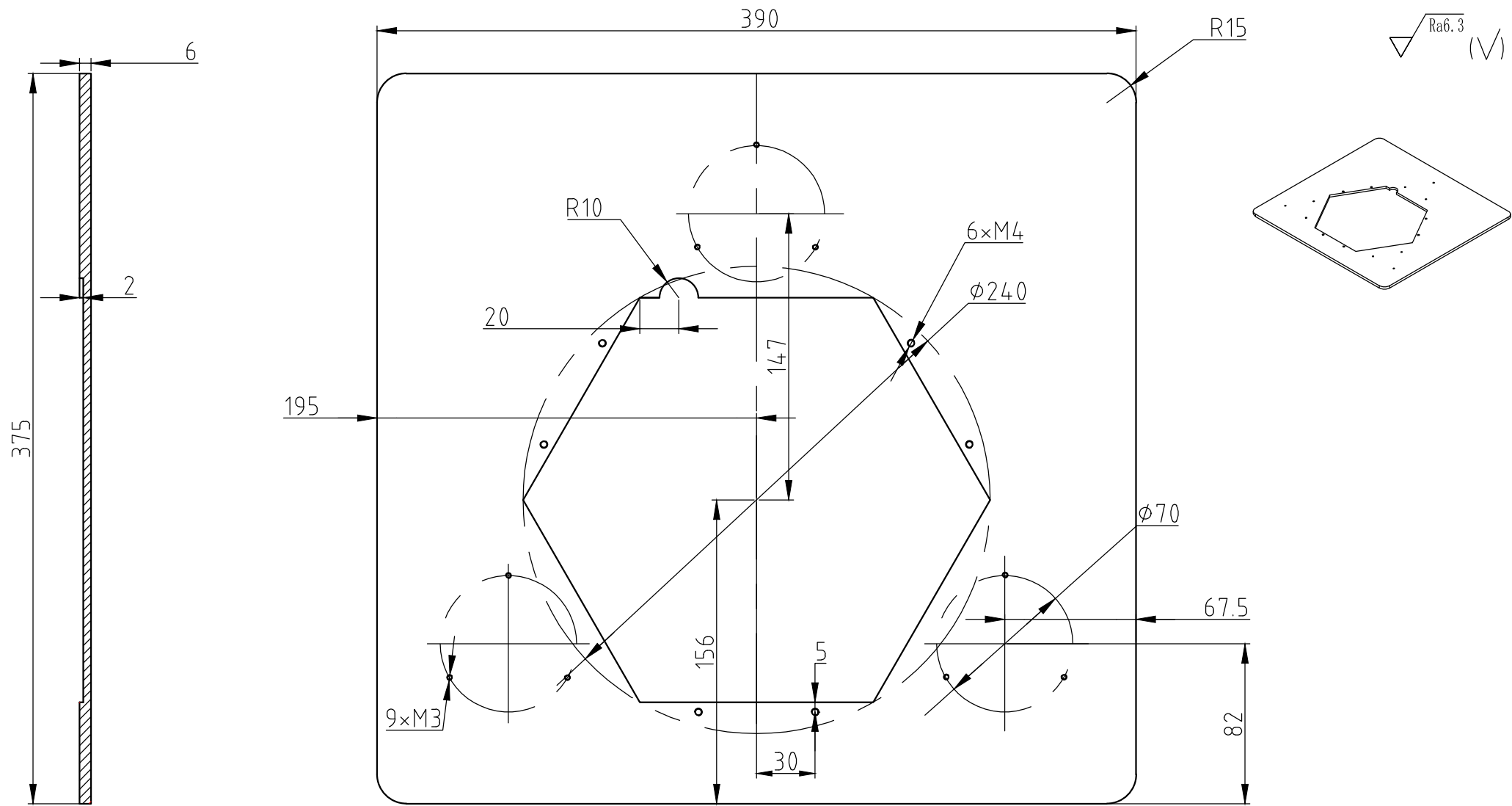


▽ Ra6.3 (√)



Technical requirement
Unspecified deviation equal to ±0.1mm.

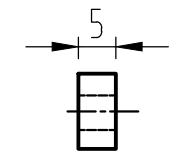
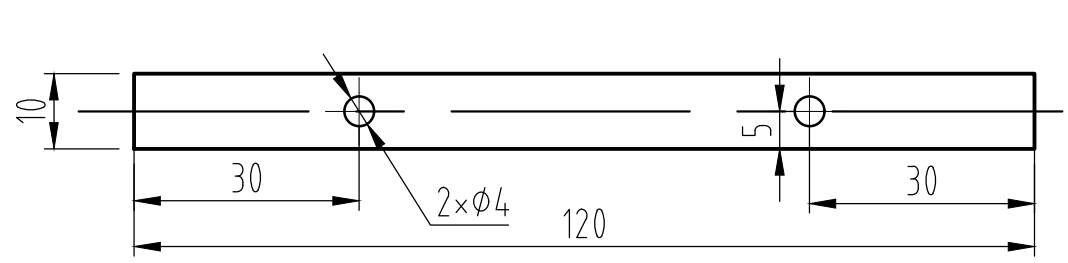
						45#			
marker	places	partitioning	modification file no	sign	date				K-2 Lower ring bracket part 2
design			standardization			static int flag	weight	scale	A4
								1:1	
approved by			approve			total:	21 pages	16 page	



Technical requirement
 Unspecified deviation equal to $\pm 0.1\text{mm}$.

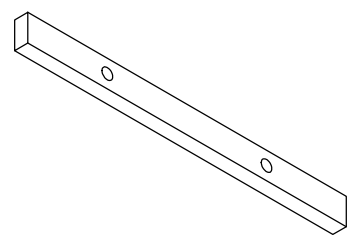
						Aluminum alloy 6063				
marker	places	partitioning	modification file no	sign	date				L-1 Base plate part 1	
design			standardization			static int flag	weight	scale	A3	
								1:2		
approved by			approve			total:	21 pages	17 page		

√ Ra6.3 (√)



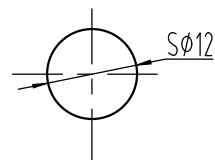
Technical requirement

Unspecified deviation equal to ±0.1mm.



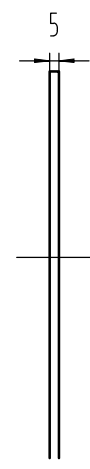
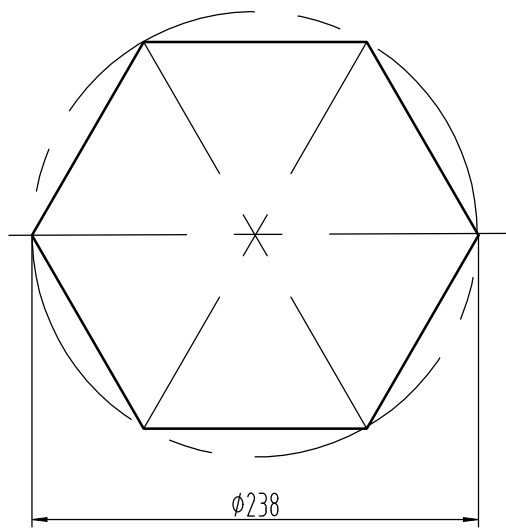
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marker	places	partitioning	modification file no	sign	date				L-2 Base plate part 2
design			standardization			static int flag	weight	scale	
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▽ Ra6.3 (√)

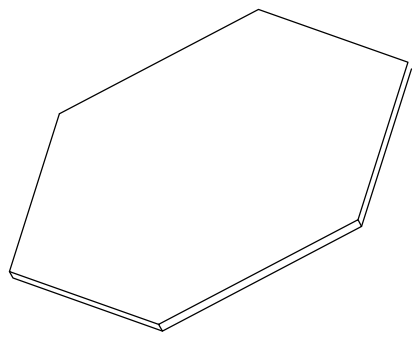


						304 Austenite Type			M ball bearing
marker	places	partitioning	modification file no	sign	date				
design			standardization			static int flag	weight	scale	A4
								1:1	
approved by			approve			total:	21 pages	19 page	

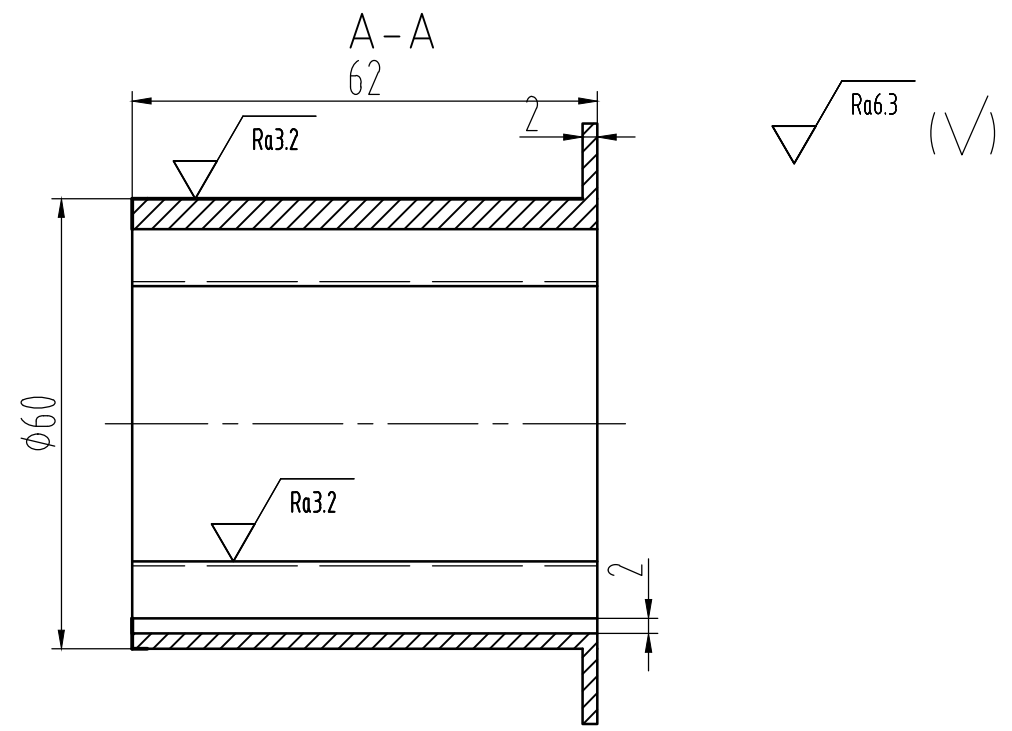
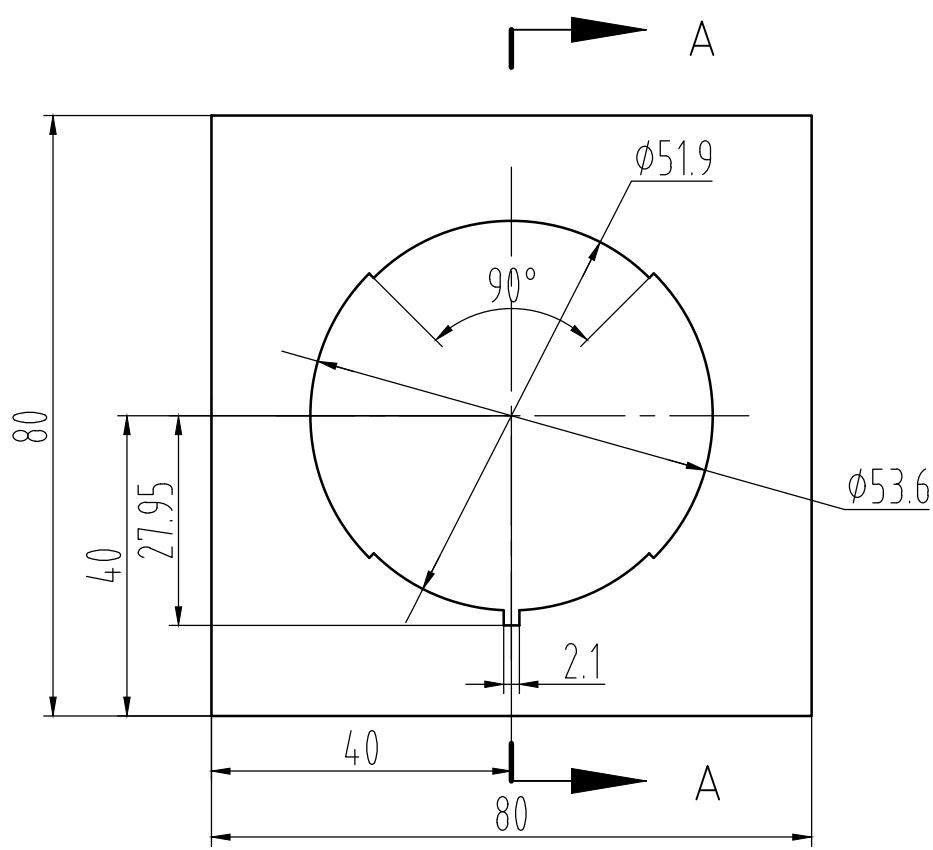
▽ Ra6.3 (V)



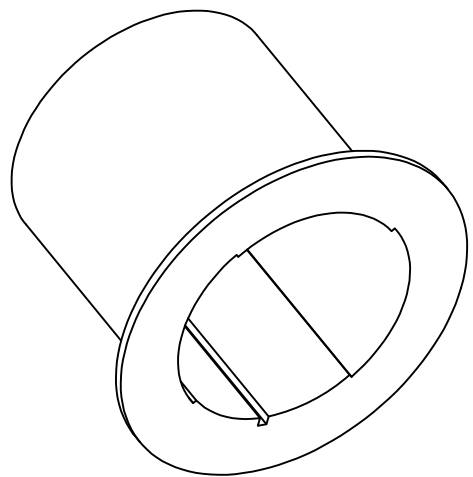
Technical requirement
 Unspecified deviation equal to $\pm 0.1\text{mm}$.



						Glass			N Abrasion plate
marker	places	partitioning	modification file no	sign	date				
design			standardization			static int flag	weight	scale	A4
								1:4	
approved by			approve			total:	21 pages	20 page	



Technical requirement
 Unspecified deviation equal to $\pm 0.1\text{mm}$.



						45#			0 Alignment socket		
marker	places	partitioning	modification file no	sign	date	static int flag		weight			scale
design			standardization						1:1	A4	
approved by			approve			total:	21 pages	21 page			