

BAB 6

KESIMPULAN

6.1. Kesimpulan

Penelitian mengenai optimasi manufaktur *acetabular cup* untuk mendapatkan waktu proses yang optimum dan nilai *surface roughness* (R_a) $< 2.00 \mu\text{m}$ dianggap berhasil dikerjakan. Penelitian ini menggunakan pendekatan metode kombinasi Taguchi—RSM untuk mendapatkan kondisi parameter permesinan optimal sehingga mendapatkan hasil respon yang optimum. Parameter pemotongan yang optimal untuk proses manufaktur *inner acetabular cup* adalah pada kondisi *spindle speed* 8000 rpm; *step over* 0,01 mm; *depth of cut* 0,55 mm; dan *feed rate* 1350 mm/min. Parameter permesinan ini akan menghasilkan nilai R_a optimum = $0,77 \mu\text{m}$ dan waktu proses permesinan (T_m) = 186.047,9695 sec. Penelitian ini lebih menekankan ke nilai *surface roughness* untuk mencapai standar ASTM ($\leq 2.00 \mu\text{m}$) sehingga parameter permesinan yang dipilih adalah penggunaan parameter permesinan dengan kondisi respon nilai R_a *inner acetabular cup* optimal.

Optimasi menggunakan kombinasi dari kedua metode ini lebih baik. Hal ini dikarenakan pendekatan ini berhasil mendapatkan nilai *surface roughness* dengan nilai *absolute error* yang lebih rendah dibandingkan penggunaan satu metode saja.

6.2. Saran

Penelitian ini dapat dijadikan sebagai acuan untuk pertimbangan pembuatan manufaktur komponen *acetabular cup*. Namun, hasil dari penelitian ini membutuhkan penelitian terkait lebih lanjut dalam melakukan proses optimasi dan penentuan faktor dengan beberapa level yang digunakan sehingga bisa didapatkan parameter pemotongan yang menghasilkan nilai respon lebih optimal dibandingkan dengan penelitian saat ini.

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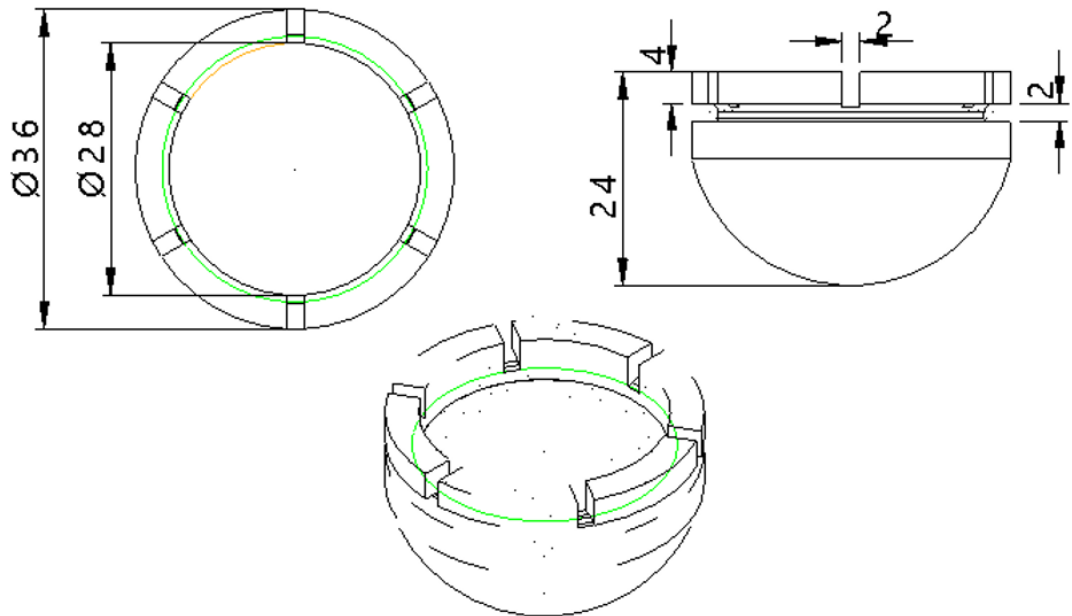
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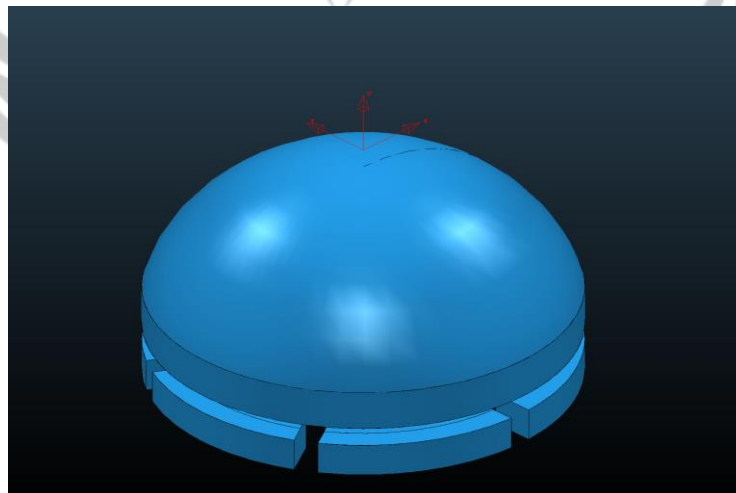


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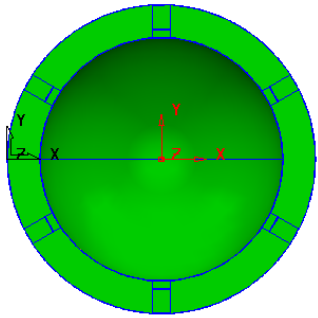
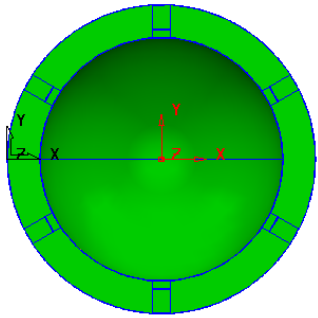
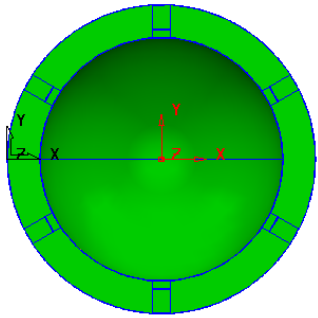
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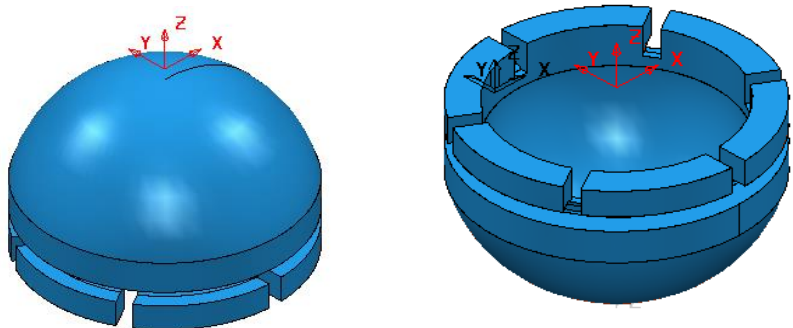
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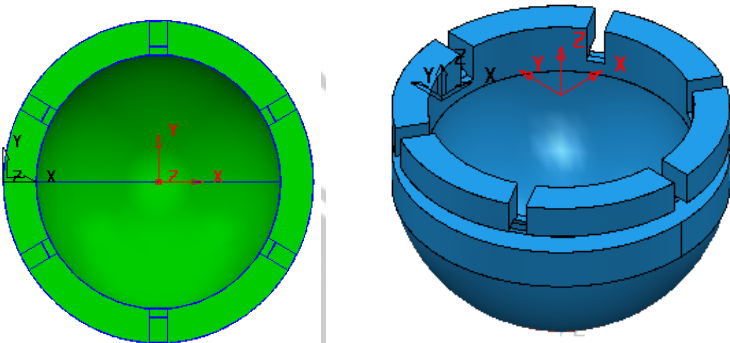
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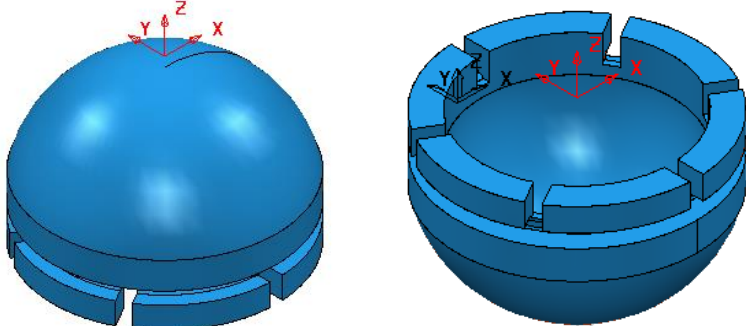
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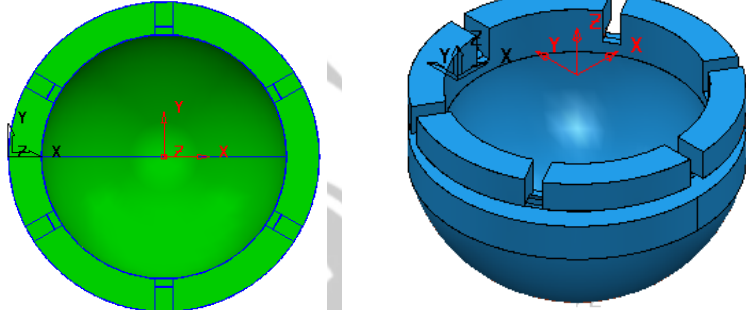
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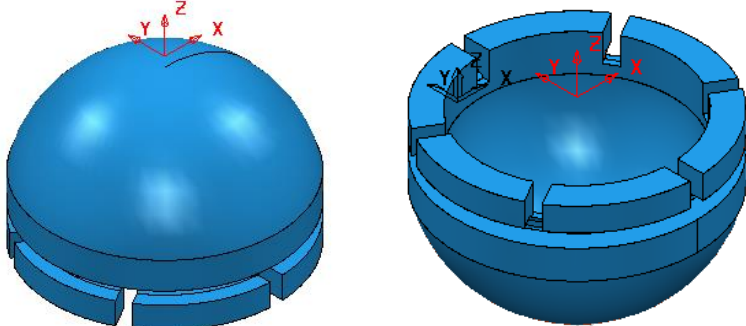
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MACHINING TIME			<table border="1"> <tr> <td colspan="2">TOTAL TIME :</td> <td>2.31.46</td> <td>3.04.02</td> </tr> <tr> <td colspan="2">ITEM IS :</td> <td colspan="2">NO HOLDER :</td> </tr> <tr> <td colspan="4">WORKPIECE CLAMPING SYSTEM</td> </tr> <tr> <td colspan="2">- VICE</td> <td colspan="2"></td> </tr> <tr> <td colspan="2">- EROWA HOLDER</td> <td colspan="2"></td> </tr> <tr> <td colspan="2">- JIG / TOP / BOTTOM PLATE</td> <td colspan="2"></td> </tr> <tr> <td colspan="2">- ASSY MOULD</td> <td colspan="2"></td> </tr> <tr> <td colspan="2">- SIDE CLAMP</td> <td colspan="2"></td> </tr> <tr> <td colspan="2">MADE BY</td> <td colspan="2">CHECKED BY</td> </tr> <tr> <td colspan="2">J.Wibowo</td> <td colspan="2">J.Wibowo</td> </tr> <tr> <td colspan="2">PAGE NR.</td> <td colspan="2">OF</td> </tr> </table>													TOTAL TIME :		2.31.46	3.04.02	ITEM IS :		NO HOLDER :		WORKPIECE CLAMPING SYSTEM				- VICE				- EROWA HOLDER				- JIG / TOP / BOTTOM PLATE				- ASSY MOULD				- SIDE CLAMP				MADE BY		CHECKED BY		J.Wibowo		J.Wibowo		PAGE NR.		OF	
TOTAL TIME :		2.31.46	3.04.02																																																								
ITEM IS :		NO HOLDER :																																																									
WORKPIECE CLAMPING SYSTEM																																																											
- VICE																																																											
- EROWA HOLDER																																																											
- JIG / TOP / BOTTOM PLATE																																																											
- ASSY MOULD																																																											
- SIDE CLAMP																																																											
MADE BY		CHECKED BY																																																									
J.Wibowo		J.Wibowo																																																									
PAGE NR.		OF																																																									
RUN DNC_PROG.		OPERATOR																																																									
START : WIB																																																											
END : WIB																																																											
TOTAL : min																																																											

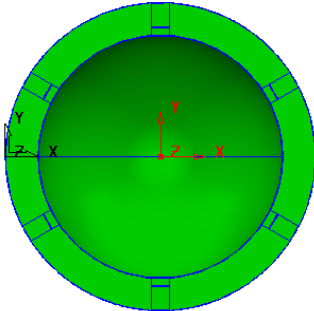
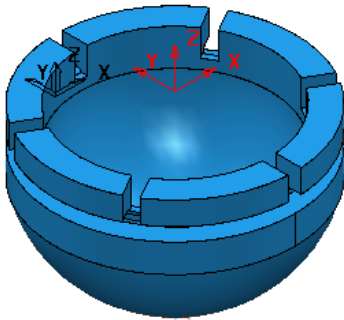
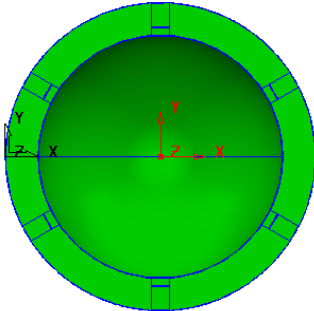
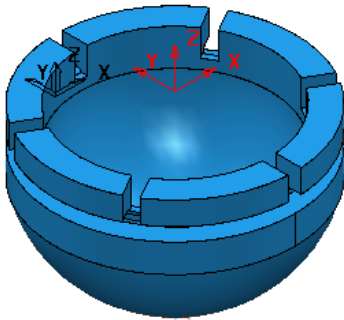
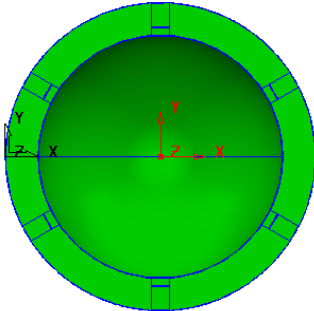
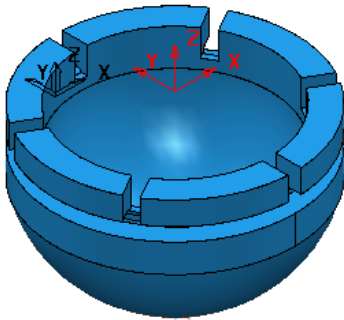
Lampiran 7. Program Report Hasil Permesinan 3 Inner

Machining CNC			<u>PROGRAM REPORT</u>						PROGRAM NAME :			PROJECT CODE :			
									3.i			Inner_3			
Machinery Division															
									E:/Titipan/cici/out/1B						
PRODUK NAME			PART NAME		CUSTOMER		PROGRAM	QUANTITY	MATERIAL			DATE		REVISION NR.	
Hip- Joint			Inner					1	UHMWPE			2019-03-14			
NO	PROGRAM NAME	TOOL NAME	Ø	TOOL TYPE	OH	HOLDER	Proses	STRATEGY	n	Vf	THICK.	TOOL OFFSET	TOOL NUMBER	EST. CUT TIME	ACTUAL CUT TIME
1	ROUGHING 1	EndMill 6	6	EndMill	35	TSFV 06 00 110 16	Roughing 1	Model Area Clearance	4200	1200	0,7	H	1	0:04:11	00.05.30
2	ROUGHING 2	Boll 6	4	Ball Nosed	40	D6 SC E3414 5801 0690	Roughing 2	Model Area Clearance	5300	2000	0,2	H	2	0:10:34	00.15.30
3	FINISH1	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 1	3D Offset Finishing	6000	1300	0	H	3	2:52:38	03.12.38
4	FINISH2	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 2	Steep and Shallow	7000	1400	0	H	4	0:29:59	00.35.00
NOTE :			SKETCH												
Refl. X0Y0 : CENTER BLOK Refl. Z0 : Top															
ITEM	ACT. DIMENSION	OK / NG													
1															
2															
3															
4															
5															
MACHINING TIME															
RUN DNC_PROG.		OPERATOR													
START :	WIB														
END :	WIB														
TOTAL :	min														
			TOTAL TIME :		3.37.22		04.08.38								
			ITEM IS :		NO HOLDER :										
			WORKPIECE CLAMPING SYSTEM												
			- VICE - EROWA HOLDER - JIG / TOP / BOTTOM PLATE - ASSY MOULD - SIDE CLAMP												
			MADE BY		CHECKED BY										
			<u>J.Wibowo</u>		<u>J.Wibowo</u>										
			PAGE NR.		OF										

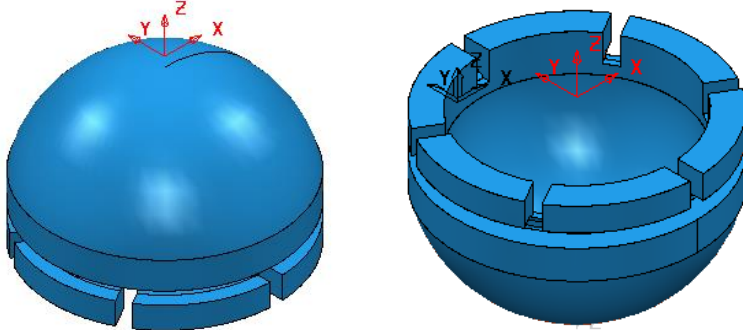
Lampiran 8. Program Report Hasil Permesinan 3 Outer

Machining CNC			<u>PROGRAM REPORT</u>						PROGRAM NAME :			PROJECT CODE :																																							
									3.0			Outer_3																																							
Machinery Division									E:/Titipan/cici/out/1B																																										
PRODUK NAME									PART NAME		CUSTOMER		PROGRAM	QUANTITY	MATERIAL			DATE		REVISION NR.																															
Hip- Joint			Outer					1	UHMWPE			2019-03-14																																							
NO	PROGRAM NAME	TOOL NAME	Ø	TOOL TYPE	OH	HOLDER	Proses	STRATEGY	n	Vf	THICK.	TOOL OFFSET	TOOL NUMBER	EST. CUT TIME	ACTUAL CUT TIME																																				
1	ROUGHING 1	EndMill 6	6	EndMill	35	TSFV 06 00 110 16	Roughing 1	Model Area Clearance	4200	1200	0,7	H	1	0:02:42	00.04.42																																				
2	ROUGHING 2	Boll 6	4	Ball Nosed	40	D6 SC E3414 5801 0690	Roughing 2	Model Area Clearance	5300	2000	0,2	H	2	0:06:57	00.07.57																																				
3	FINISH1	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 1	3D Offset Finishing	6000	1300	0	H	3	1:53:27	02.11.02																																				
4	FINISH2	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 2	Steep and Shallow	7000	1400	0	H	4	0:16:47	00.20.06																																				
NOTE :			SKETCH																																																
Reff. X0Y0 : CENTER BLOK																																																			
Reff. Z0 : Top																																																			
ITEM	ACT. DIMENSION	OK / NG																																																	
1																																																			
2																																																			
MACHINING TIME:			<table border="1"> <tr> <td>TOTAL TIME :</td> <td>2.19.53</td> <td>2.43.47</td> </tr> <tr> <td>ITEM IS :</td> <td colspan="2">NO HOLDER :</td> </tr> <tr> <td colspan="3">WORKPIECE CLAMPING SYSTEM</td> </tr> <tr> <td colspan="3">- VICE</td> </tr> <tr> <td colspan="3">- EROWA HOLDER</td> </tr> <tr> <td colspan="3">- JIG / TOP / BOTTOM PLATE</td> </tr> <tr> <td colspan="3">- ASSY MOULD</td> </tr> <tr> <td colspan="3">- SIDE CLAMP</td> </tr> <tr> <td colspan="3">MADE BY</td> <td>CHECKED BY</td> </tr> <tr> <td colspan="3">J.Wibowo</td> <td>J.Wibowo</td> </tr> <tr> <td colspan="3">PAGE NR.</td> <td>OF</td> </tr> </table>													TOTAL TIME :	2.19.53	2.43.47	ITEM IS :	NO HOLDER :		WORKPIECE CLAMPING SYSTEM			- VICE			- EROWA HOLDER			- JIG / TOP / BOTTOM PLATE			- ASSY MOULD			- SIDE CLAMP			MADE BY			CHECKED BY	J.Wibowo			J.Wibowo	PAGE NR.			OF
TOTAL TIME :	2.19.53	2.43.47																																																	
ITEM IS :	NO HOLDER :																																																		
WORKPIECE CLAMPING SYSTEM																																																			
- VICE																																																			
- EROWA HOLDER																																																			
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- SIDE CLAMP																																																			
MADE BY			CHECKED BY																																																
J.Wibowo			J.Wibowo																																																
PAGE NR.			OF																																																
RUN DNC_PROG.			OPERATOR																																																
START : WIB																																																			
END : WIB																																																			
TOTAL : min																																																			

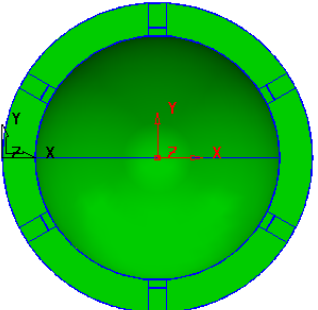
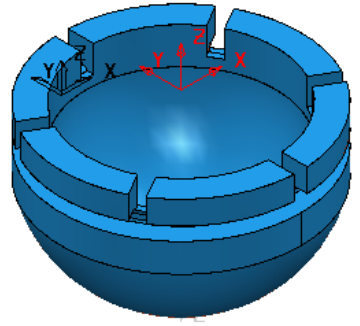
Lampiran 9. Program Report Hasil Permesinan 4 Inner

Machining CNC			<u>PROGRAM REPORT</u>						PROGRAM NAME :			PROJECT CODE :																																																																					
									4.i			Inner_4																																																																					
Machinery Division																																																																																	
									E:/Titipan/cici/out/1B																																																																								
PRODUK NAME			PART NAME		CUSTOMER		PROGRAM	QUANTITY	MATERIAL			DATE		REVISION NR.																																																																			
Hip- Joint			Inner					1	UHMWPE			2019-03-14																																																																					
NO	PROGRAM NAME	TOOL NAME	Ø	TOOL TYPE	OH	HOLDER	Proses	STRATEGY	n	Vf	THICK.	TOOL OFFSET	TOOL NUMBER	EST. CUT TIME	ACTUAL CUT TIME																																																																		
1	ROUGHING 1	EndMill 6	6	EndMill	35	TSFV 06 00 110 16	Roughing 1	Model Area Clearance	4200	1200	0,7	H	1	0:04:11	00.05.30																																																																		
2	ROUGHING 2	Boll 6	4	Ball Nosed	40	D6 SC E3414 5801 0690	Roughing 2	Model Area Clearance	5300	2000	0,2	H	2	0:10:34	00.15.30																																																																		
3	FINISH1	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 1	3D Offset Finishing	6000	1300	0	H	3	2:52:38	03.12.38																																																																		
4	FINISH2	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 2	Steep and Shallow	7500	1400	0	H	4	0:41:38	00.50.30																																																																		
<table border="1"> <tr> <td>NOTE:</td> <td>SKETCH</td> </tr> <tr> <td> Reff. X0Y0 : CENTER BLOK Reff. Z0 : Top </td> <td>   </td> </tr> </table>																NOTE:	SKETCH	Reff. X0Y0 : CENTER BLOK Reff. Z0 : Top	 																																																														
NOTE:	SKETCH																																																																																
Reff. X0Y0 : CENTER BLOK Reff. Z0 : Top	 																																																																																
ITEM		ACT. DIMENSION		OK / NG																																																																													
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4																																																																																	
5																																																																																	
MACHINING TIME																																																																																	
RUN DNC_PROG.		OPERATOR																																																																															
START :		WIB																																																																															
END :		WIB																																																																															
TOTAL :		min																																																																															
<table border="1"> <tr> <td colspan="2">TOTAL TIME :</td> <td colspan="2">3.49.01</td> <td colspan="2">04.24.08</td> </tr> <tr> <td colspan="2">ITEM IS :</td> <td colspan="4">NO HOLDER :</td> </tr> <tr> <td colspan="6">WORKPIECE CLAMPING SYSTEM</td> </tr> <tr> <td colspan="6">- VICE</td> </tr> <tr> <td colspan="6">- BROWA HOLDER</td> </tr> <tr> <td colspan="6">- JIG / TOP / BOTTOM PLATE</td> </tr> <tr> <td colspan="6">- ASSY MOULD</td> </tr> <tr> <td colspan="6">- SIDE CLAMP</td> </tr> <tr> <td colspan="2">MADE BY</td> <td colspan="4">CHECKED BY</td> </tr> <tr> <td colspan="2">J.Wibowo</td> <td colspan="4">J.Wibowo</td> </tr> <tr> <td colspan="2">PAGE NR.</td> <td colspan="4">OF</td> </tr> </table>																TOTAL TIME :		3.49.01		04.24.08		ITEM IS :		NO HOLDER :				WORKPIECE CLAMPING SYSTEM						- VICE						- BROWA HOLDER						- JIG / TOP / BOTTOM PLATE						- ASSY MOULD						- SIDE CLAMP						MADE BY		CHECKED BY				J.Wibowo		J.Wibowo				PAGE NR.		OF			
TOTAL TIME :		3.49.01		04.24.08																																																																													
ITEM IS :		NO HOLDER :																																																																															
WORKPIECE CLAMPING SYSTEM																																																																																	
- VICE																																																																																	
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- JIG / TOP / BOTTOM PLATE																																																																																	
- ASSY MOULD																																																																																	
- SIDE CLAMP																																																																																	
MADE BY		CHECKED BY																																																																															
J.Wibowo		J.Wibowo																																																																															
PAGE NR.		OF																																																																															

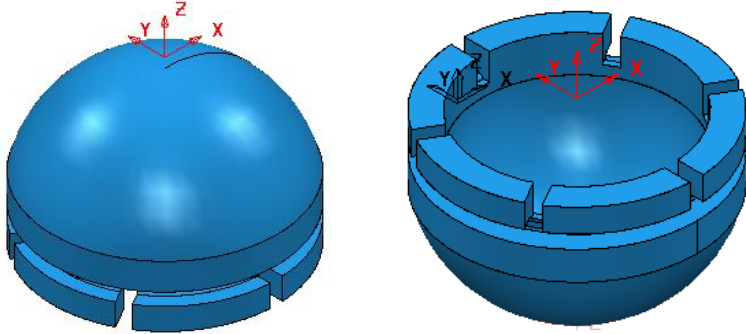
Lampiran 10. Program Report Hasil Permesinan 4 Outer

Machining CNC Machinery Division			PROGRAM REPORT						PROGRAM NAME :			PROJECT CODE :							
									4.o			Outer_4							
																			
									E:/Titipan/cici/out/1B										
PRODUK NAME			PART NAME		CUSTOMER		PROGRAM	QUANTITY	MATERIAL			DATE		REVISION NR.					
Hip- Joint			Outer					1	UHMWPE			2019-03-14							
NO	PROGRAM NAME	TOOL NAME	Ø	TOOL TYPE	OH	HOLDER	Proses	STRATEGY	n	Vf	THICK.	TOOL OFFSET	TOOL NUMBER	EST. CUT TIME	ACTUAL CUT TIME				
1	ROUGHING 1	EndMill 6	6	EndMill	35	TSFV 06 00 110 16	Roughing 1	Model Area Clearance	4200	1200	0,7	H	1	0:02:42	00.04.42				
2	ROUGHING 2	Boll 6	4	Ball Nosed	40	D6 SC E3414 5801 0690	Roughing 2	Model Area Clearance	5300	2000	0,2	H	2	0:06:57	00.07.57				
3	FINISH1	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 1	3D Offset Finishing	6000	1300	0	H	3	1:53:27	02.11.02				
4	FINISH2	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 2	Steep and Shallow	7500	1400	0	H	4	0:23:20	00.33.26				
NOTE: Reff. X0Y0 : CENTER BLOK Reff. Z0 : Top																SKETCH 		TOTAL TIME : 2.26.26 2.57.07 ITEM IS : NO HOLDER : WORKPIECE CLAMPING SYSTEM - VICE - EROWA HOLDER - JIG / TOP / BOTTOM PLATE - ASSY MOULD - SIDE CLAMP MADE BY CHECKED BY J.Wibowo J.Wibowo PAGE NR. OF	
MACHINING TIME																			
RUN DNC_PROG.		OPERATOR																	
START :		WIB																	
END :		WIB																	
TOTAL :		min																	

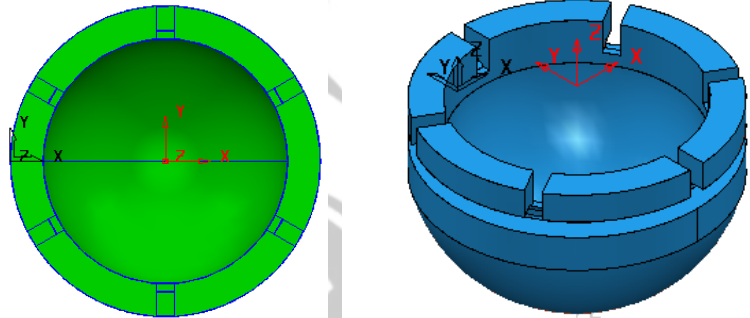
Lampiran 11. Program Report Hasil Permesinan 5 Inner

Machining CNC			<u>PROGRAM REPORT</u>						PROGRAM NAME :			PROJECT CODE :			
									5.i			Inner_5			
Machinery Division															
									E:/Titipan/cici/out/1B						
PRODUK NAME			PART NAME		CUSTOMER		PROGRAM	QUANTITY	MATERIAL			DATE		REVISION NR.	
Hip- Joint			Inner					1	UHMWPE			2019-03-14			
NO	PROGRAM NAME	TOOL NAME	Ø	TOOL TYPE	OH	HOLDER	Proses	STRATEGY	n	Vf	THICK.	TOOL OFFSET	TOOL NUMBER	EST. CUT TIME	ACTUAL CUT TIME
1	ROUGHING 1	EndMill 6	6	EndMill	35	TSFV 06 00 110 16	Roughing 1	Model Area Clearance	4200	1200	0,7	H	1	0:04:11	00.05.30
2	ROUGHING 2	Boll 6	4	Ball Nosed	40	D6 SC E3414 5801 0690	Roughing 2	Model Area Clearance	5300	2000	0,2	H	2	0:10:34	00.15.30
3	FINISH1	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 1	3D Offset Finishing	6000	1300	0	H	3	2:52:38	03.12.38
4	FINISH2	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 2	Steep and Shallow	7500	1300	0	H	4	0:37:40	00.45.10
NOTE :			SKETCH						TOTAL TIME :			3.45.03		04.18.48	
Ref. X0Y0 : CENTER BLOK			 						ITEM IS :			NO HOLDER :			
Ref. Z0 : Top															
ITEM	ACT. DIMENSION	OK / NG	WORKPIECE CLAMPING SYSTEM												
1			- VICE												
2			- EROWA HOLDER												
3			- JIG / TOP / BOTTOM PLATE												
4			- ASSY MOULD												
5			- SIDE CLAMP												
MACHINING TIME			MADE BY						CHECKED BY						
RUN DNC_PROG.															
START : WIB															
END : WIB															
TOTAL : min															
			<u>J.Wibowo</u>						<u>J.Wibowo</u>						
			PAGE NR.						OF						

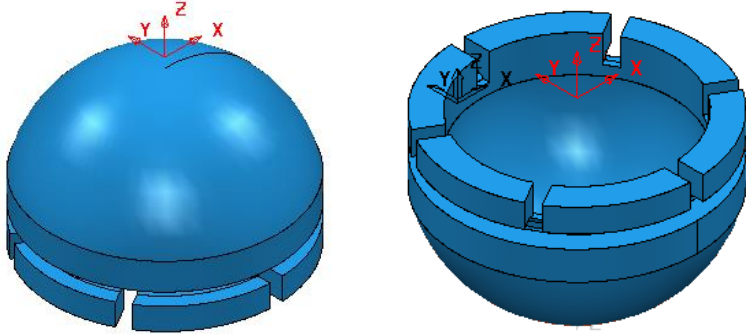
Lampiran 12. Program Report Hasil Permesinan 5 Outer

Machining CNC			<u>PROGRAM REPORT</u>						PROGRAM NAME :			PROJECT CODE :			
									5.0			Outer_5			
Machinery Division															
									E:/Titipan/cici/out/1B						
PRODUK NAME			PART NAME		CUSTOMER		PROGRAM	QUANTITY	MATERIAL			DATE		REVISION NR.	
Hip- Joint			Outer					1	UHMWPE			2019-03-14			
NO	PROGRAM NAME	TOOL NAME	Ø	TOOL TYPE	OH	HOLDER	Proses	STRATEGY	n	Vf	THICK.	TOOL OFFSET	TOOL NUMBER	EST. CUT TIME	ACTUAL CUT TIME
1	ROUGHING 1	EndMill 6	6	EndMill	35	TSFV 06 00 110 16	Roughing 1	Model Area Clearance	4200	1200	0,7	H	1	0:02:42	00.04.42
2	ROUGHING 2	Boll 6	4	Ball Nosed	40	D6 SC E3414 5801 0690	Roughing 2	Model Area Clearance	5300	2000	0,2	H	2	0:06:57	00.07.57
3	FINISH1	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 1	3D Offset Finishing	6000	1300	0	H	3	1:53:27	02.11.02
4	FINISH2	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 2	Steep and Shallow	7500	1300	0	H	4	0:29:39	00.48.26
NOTE :			SKETCH												
Refl. X0Y0 : CENTER BLOK Refl. Z0 : Top															
ITEM	ACT. DIMENSION	OK / NG													
1															
2															
3															
4															
5															
MACHINING TIME															
RUN DNC_PROG.		OPERATOR													
START :	WIB														
END :	WIB														
TOTAL :	min														
			TOTAL TIME :		2.32.45		3.12.07								
			ITEM IS :		NO HOLDER :										
			WORKPIECE CLAMPING SYSTEM												
			- VICE - EROWA HOLDER - JIG / TOP / BOTTOM PLATE - ASSY MOULD - SIDE CLAMP												
			MADE BY		CHECKED BY										
			<u>J.Wibowo</u>		<u>J.Wibowo</u>										
			PAGE NR.		OF										

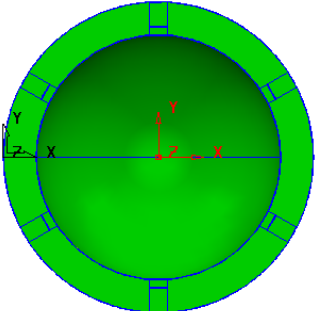
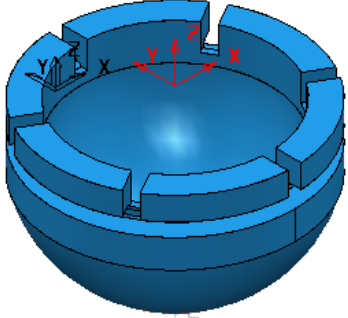
Lampiran 13. Program Report Hasil Permesinan 6 Inner

Machining CNC			<u>PROGRAM REPORT</u>						PROGRAM NAME :			PROJECT CODE :			
									6.i			Inner_6			
Machinery Division															
									E:/Titipan/cici/out/1B						
PRODUK NAME			PART NAME		CUSTOMER		PROGRAM	QUANTITY	MATERIAL			DATE		REVISION NR.	
Hip- Joint			Inner					1	UHMWPE			2019-03-14			
NO	PROGRAM NAME	TOOL NAME	Ø	TOOL TYPE	OH	HOLDER	Proses	STRATEGY	n	Vf	THICK.	TOOL OFFSET	TOOL NUMBER	EST. CUT TIME	ACTUAL CUT TIME
1	ROUGHING 1	EndMill 6	6	EndMill	35	TSFV 06 00 110 16	Roughing 1	Model Area Clearance	4200	1200	0,7	H	1	0:04:11	00.05.30
2	ROUGHING 2	Boll 6	4	Ball Nosed	40	D6 SC E3414 5801 0690	Roughing 2	Model Area Clearance	5300	2000	0,2	H	2	0:10:34	00.15.30
3	FINISH1	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 1	3D Offset Finishing	6000	1300	0	H	3	2:52:38	03.12.38
4	FINISH2	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 2	Steep and Shallow	7500	1350	0	H	4	0:30:53	00.40.16
NOTE :			SKETCH						TOTAL TIME :			3.38.16		04.13.54	
Ref. X0Y0 : CENTER BLOK									ITEM IS :			NO HOLDER :			
Ref. Z0 : Top															
ITEM	ACT. DIMENSION	OK / NG				WORKPIECE CLAMPING SYSTEM									
1						- VICE									
2						- EROWA HOLDER									
3						- JIG / TOP / BOTTOM PLATE									
4						- ASSY MOULD									
5						- SIDE CLAMP									
MACHINING TIME						MADE BY			CHECKED BY						
RUN DNC_PROG.			OPERATOR												
START : WIB															
END : WIB															
TOTAL : min															
						J.Wibowo			J.Wibowo						
						PAGE NR.			OF						

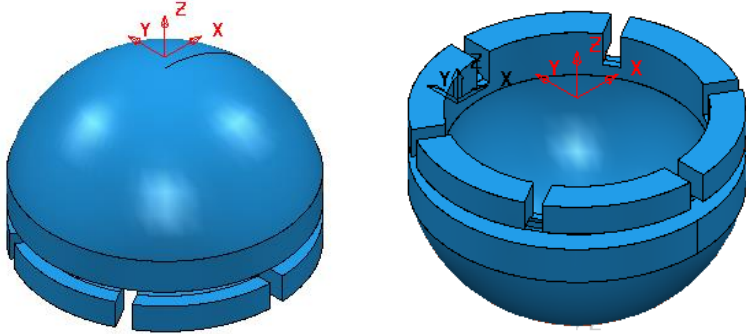
Lampiran 14. Program Report Hasil Permesinan 6 Outer

Machining CNC			<u>PROGRAM REPORT</u>						PROGRAM NAME :			PROJECT CODE :			
									6.0			Outer_6			
Machinery Division									E:/Titipan/cici/out/1B						
PRODUK NAME									PART NAME		CUSTOMER		PROGRAM	QUANTITY	MATERIAL
Hip- Joint			Outer					1	UHMWPE			2019-03-14			
NO	PROGRAM NAME	TOOL NAME	Ø	TOOL TYPE	OH	HOLDER	Proses	STRATEGY	n	Vf	THICK.	TOOL OFFSET	TOOL NUMBER	EST. CUT TIME	ACTUAL CUT TIME
1	ROUGHING 1	EndMill 6	6	EndMill	35	TSFV 06 00 110 16	Roughing 1	Model Area Clearance	4200	1200	0,7	H	1	0:02:42	00.04.42
2	ROUGHING 2	Boll 6	4	Ball Nosed	40	D6 SC E3414 5801 0690	Roughing 2	Model Area Clearance	5300	2000	0,2	H	2	0:06:57	00.07.57
3	FINISH1	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 1	3D Offset Finishing	6000	1300	0	H	3	1:53:27	02.11.02
4	FINISH2	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 2	Steep and Shallow	7500	1350	0	H	4	0:17:42	00.23.26
NOTE :			SKETCH												
Refl. X0Y0 : CENTER BLOK Refl. Z0 : Top															
ITEM	ACT. DIMENSION	OK / NG													
1															
2															
3															
4															
5															
MACHINING TIME															
RUN DNC_PROG.		OPERATOR													
START :		WIB													
END :		WIB													
TOTAL :		min													
			TOTAL TIME :		2.20.48		2.47.07								
			ITEM IS :		NO HOLDER :										
			WORKPIECE CLAMPING SYSTEM												
			- VICE - EROWA HOLDER - JIG / TOP / BOTTOM PLATE - ASSY MOULD - SIDE CLAMP												
			MADE BY		CHECKED BY										
			J.Wibowo		J.Wibowo										
			PAGE NR.		OF										

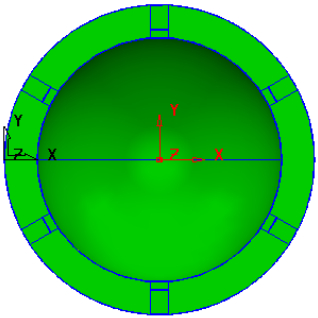
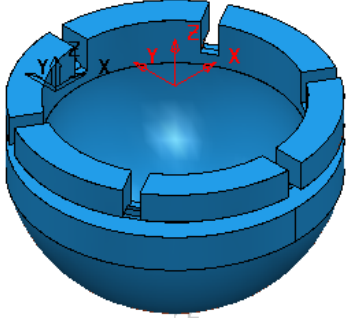
Lampiran 15. Program Report Hasil Permesinan 7 Inner

Machining CNC			<u>PROGRAM REPORT</u>						PROGRAM NAME :			PROJECT CODE :			
									7.i			Inner_7			
Machinery Division															
									E:/Titipan/cici/out/1B						
PRODUK NAME			PART NAME		CUSTOMER		PROGRAM	QUANTITY	MATERIAL			DATE		REVISION NR.	
Hip- Joint			Inner					1	UHMWPE			2019-03-14			
NO	PROGRAM NAME	TOOL NAME	Ø	TOOL TYPE	OH	HOLDER	Proses	STRATEGY	n	Vf	THICK.	TOOL OFFSET	TOOL NUMBER	EST. CUT TIME	ACTUAL CUT TIME
1	ROUGHING 1	EndMill 6	6	EndMill	35	TSFV 06 00 110 16	Roughing 1	Model Area Clearance	4200	1200	0,7	H	1	0:04:11	00.05.30
2	ROUGHING 2	Boll 6	4	Ball Nosed	40	D6 SC E3414 5801 0690	Roughing 2	Model Area Clearance	5300	2000	0,2	H	2	0:10:34	00.15.30
3	FINISH1	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 1	3D Offset Finishing	6000	1300	0	H	3	2:52:38	03.12.38
4	FINISH2	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 2	Steep and Shallow	8000	1350	0	H	4	0:40:52	00.55.43
NOTE :			SKETCH												
Ref. X0Y0 : CENTER BLOK Ref. Z0 : Top			 												
ITEM	ACT. DIMENSION	OK / NG													
1															
2															
3															
4															
5															
MACHINING TIME															
RUN DNC_PROG.		OPERATOR													
START :	WIB														
END :	WIB														
TOTAL :	min														
			TOTAL TIME :		3.48.15		04.29.21								
			ITEM IS :		NO HOLDER :										
			WORKPIECE CLAMPING SYSTEM												
			- VICE - EROWA HOLDER - JIG / TOP / BOTTOM PLATE - ASSY MOULD - SIDE CLAMP												
			MADE BY		CHECKED BY										
			J.Wibowo		J.Wibowo										
			PAGE NR.		OF										

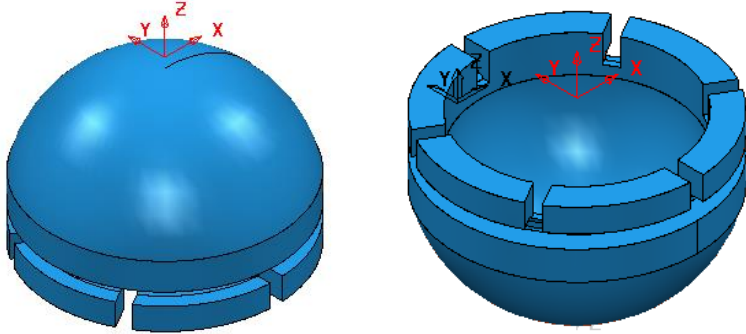
Lampiran 16. Program Report Hasil Permesinan 7 Outer

Machining CNC			<u>PROGRAM REPORT</u>						PROGRAM NAME :			PROJECT CODE :			
									7.o			Outer_7			
Machinery Division									E:/Titipan/cici/out/1B						
PRODUK NAME									PART NAME		CUSTOMER		PROGRAM	QUANTITY	MATERIAL
Hip- Joint			Outer					1	UHMWPE			2019-03-14			
NO	PROGRAM NAME	TOOL NAME	Ø	TOOL TYPE	OH	HOLDER	Proses	STRATEGY	n	Vf	THICK.	TOOL OFFSET	TOOL NUMBER	EST. CUT TIME	ACTUAL CUT TIME
1	ROUGHING 1	EndMill 6	6	EndMill	35	TSFV 06 00 110 16	Roughing 1	Model Area Clearance	4200	1200	0,7	H	1	0:02:42	00.04.42
2	ROUGHING 2	Boll 6	4	Ball Nosed	40	D6 SC E3414 5801 0690	Roughing 2	Model Area Clearance	5300	2000	0,2	H	2	0:06:57	00.07.57
3	FINISH1	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 1	3D Offset Finishing	6000	1300	0	H	3	1:53:27	02.11.02
4	FINISH2	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 2	Steep and Shallow	8000	1350	0	H	4	0:25:24	00.55.13
NOTE :			SKETCH												
Refl. X0Y0 : CENTER BLOK Refl. Z0 : Top															
ITEM	ACT. DIMENSION	OK / NG													
1															
2															
3															
4															
5															
MACHINING TIME															
RUN DNC_PROG.		OPERATOR													
START :	WIB														
END :	WIB														
TOTAL :	min														
			TOTAL TIME :		2.28.30		3.18.54								
			ITEM IS :		NO HOLDER :										
			WORKPIECE CLAMPING SYSTEM												
			- VICE - EROWA HOLDER - JIG / TOP / BOTTOM PLATE - ASSY MOULD - SIDE CLAMP												
			MADE BY		CHECKED BY										
			<u>J.Wibowo</u>		<u>J.Wibowo</u>										
			PAGE NR.		OF										

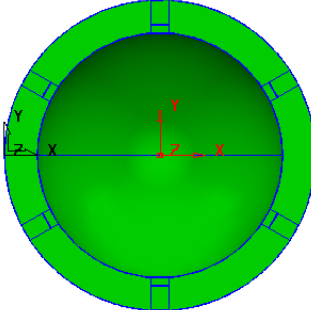
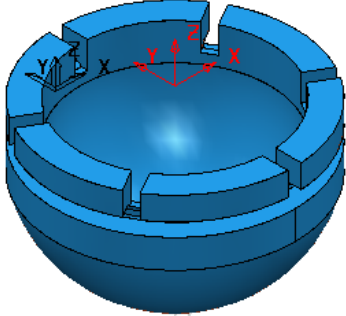
Lampiran 17. Program Report Hasil Permesinan 8 Inner

Machining CNC			<u>PROGRAM REPORT</u>						PROGRAM NAME :			PROJECT CODE :			
									8.i			Inner_8			
Machinery Division															
									E:/Titipan/cici/out/1B						
PRODUK NAME			PART NAME		CUSTOMER		PROGRAM	QUANTITY	MATERIAL			DATE		REVISION NR.	
Hip- Joint			Inner					1	UHMWPE			2019-03-14			
NO	PROGRAM NAME	TOOL NAME	Ø	TOOL TYPE	OH	HOLDER	Proses	STRATEGY	n	Vf	THICK.	TOOL OFFSET	TOOL NUMBER	EST. CUT TIME	ACTUAL CUT TIME
1	ROUGHING 1	EndMill 6	6	EndMill	35	TSFV 06 00 110 16	Roughing 1	Model Area Clearance	4200	1200	0,7	H	1	0:04:11	00.05.30
2	ROUGHING 2	Boll 6	4	Ball Nosed	40	D6 SC E3414 5801 0690	Roughing 2	Model Area Clearance	5300	2000	0,2	H	2	0:10:34	00.15.30
3	FINISH1	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 1	3D Offset Finishing	6000	1300	0	H	3	2:52:38	03.12.38
4	FINISH2	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 2	Steep and Shallow	8000	1400	0	H	4	0:34:45	00.46.43
NOTE :			SKETCH												
Ref. X0Y0 : CENTER BLOK Ref. Z0 : Top			 												
ITEM	ACT. DIMENSION	OK / NG													
1															
2															
3															
4															
5															
MACHINING TIME															
RUN DNC_PROG.		OPERATOR													
START :	WIB														
END :	WIB														
TOTAL :	min														
			TOTAL TIME :		3.42.08		04.20.21								
			ITEM IS :		NO HOLDER :										
			WORKPIECE CLAMPING SYSTEM												
			- VICE - EROWA HOLDER - JIG / TOP / BOTTOM PLATE - ASSY MOULD - SIDE CLAMP												
			MADE BY		CHECKED BY										
			J.Wibowo		J.Wibowo										
			PAGE NR.		OF										

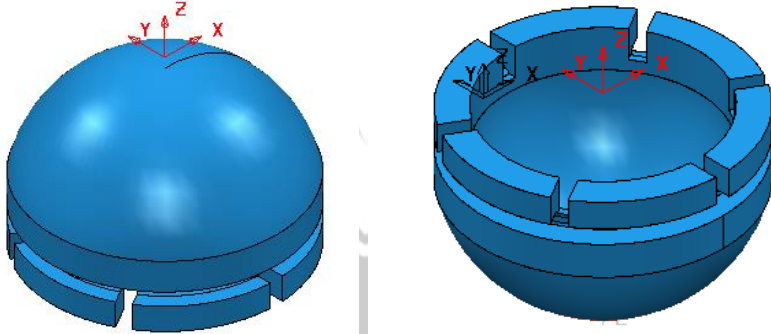
Lampiran 18. Program Report Hasil Permesinan 8 Outer

Machining CNC			<u>PROGRAM REPORT</u>						PROGRAM NAME :			PROJECT CODE :			
									8.o			Outer_8			
Machinery Division									E:/Titipan/cici/out/1B						
PRODUK NAME									PART NAME		CUSTOMER		PROGRAM	QUANTITY	MATERIAL
Hip- Joint			Outer					1	UHMWPE			2019-03-14			
NO	PROGRAM NAME	TOOL NAME	Ø	TOOL TYPE	OH	HOLDER	Proses	STRATEGY	n	Vf	THICK.	TOOL OFFSET	TOOL NUMBER	EST. CUT TIME	ACTUAL CUT TIME
1	ROUGHING 1	EndMill 6	6	EndMill	35	TSFV 06 00 110 16	Roughing 1	Model Area Clearance	4200	1200	0,7	H	1	0:02:42	00.04.42
2	ROUGHING 2	Boll 6	4	Ball Nosed	40	D6 SC E3414 5801 0690	Roughing 2	Model Area Clearance	5300	2000	0,2	H	2	0:06:57	00.07.57
3	FINISH1	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 1	3D Offset Finishing	6000	1300	0	H	3	1:53:27	02.11.02
4	FINISH2	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 2	Steep and Shallow	8000	1400	0	H	4	0:27:48	00.40.17
NOTE :			SKETCH												
Ref. X0Y0 : CENTER BLOK Ref. Z0 : Top															
ITEM	ACT. DIMENSION	OK / NG													
1															
2															
3															
4															
5															
MACHINING TIME															
RUN DNC_PROG.		OPERATOR													
START :		WIB													
END :		WIB													
TOTAL :		min													
			TOTAL TIME :		2.30.54		3.03.58								
			ITEM IS :		NO HOLDER :										
			WORKPIECE CLAMPING SYSTEM												
			- VICE - EROWA HOLDER - JIG / TOP / BOTTOM PLATE - ASSY MOULD - SIDE CLAMP												
			MADE BY		CHECKED BY										
			<u>J.Wibowo</u>		<u>J.Wibowo</u>										
			PAGE NR.		OF										

Lampiran 19. Program Report Hasil Permesinan 9 Inner

Machining CNC			<u>PROGRAM REPORT</u>						PROGRAM NAME :			PROJECT CODE :			
									9.i			Inner_9			
Machinery Division															
									E:/Titipan/cici/out/1B						
PRODUK NAME			PART NAME		CUSTOMER		PROGRAM	QUANTITY	MATERIAL			DATE		REVISION NR.	
Hip- Joint			Inner					1	UHMWPE			2019-03-14			
NO	PROGRAM NAME	TOOL NAME	Ø	TOOL TYPE	OH	HOLDER	Proses	STRATEGY	n	Vf	THICK.	TOOL OFFSET	TOOL NUMBER	EST. CUT TIME	ACTUAL CUT TIME
1	ROUGHING 1	EndMill 6	6	EndMill	35	TSFV 06 00 110 16	Roughing 1	Model Area Clearance	4200	1200	0,7	H	1	0:04:11	00.05.30
2	ROUGHING 2	Boll 6	4	Ball Nosed	40	D6 SC E3414 5801 0690	Roughing 2	Model Area Clearance	5300	2000	0,2	H	2	0:10:34	00.15.30
3	FINISH1	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 1	3D Offset Finishing	6000	1300	0	H	3	2:52:38	03.12.38
4	FINISH2	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 2	Steep and Shallow	8000	1300	0	H	4	0:32:27	00.56.22
NOTE :			SKETCH						TOTAL TIME :			3.39.50		04.30.00	
Ref. X0Y0 : CENTER BLOK			 						ITEM IS :			NO HOLDER :			
Ref. Z0 : Top															
ITEM	ACT. DIMENSION	OK / NG													
1															
2															
3															
4															
5															
MACHINING TIME															
RUN DNC_PROG.		OPERATOR													
START :		WIB													
END :		WIB													
TOTAL :		min													
			WORKPIECE CLAMPING SYSTEM												
			- VICE												
			- EROWA HOLDER												
			- JIG / TOP / BOTTOM PLATE												
			- ASSY MOULD												
			- SIDE CLAMP												
			MADE BY						CHECKED BY						
			<u>J.Wibowo</u>						<u>J.Wibowo</u>						
			PAGE NR.						OF						

Lampiran 20. Program Report Hasil Permesinan 9 Outer

Machining CNC			<u>PROGRAM REPORT</u>						PROGRAM NAME :			PROJECT CODE :			
									9.0			Outer_9			
Machinery Division									PowerMILL						
PRODUK NAME			PART NAME		CUSTOMER		PROGRAM	QUANTITY	MATERIAL			DATE		REVISION NR.	
Hip- Joint			Outer					1	UHMWPE			2019-03-14			
NO	PROGRAM NAME	TOOL NAME	Ø	TOOL TYPE	OH	HOLDER	Proses	STRATEGY	n	Vf	THICK.	TOOL OFFSET	TOOL NUMBER	EST. CUT TIME	ACTUAL CUT TIME
1	ROUGHING 1	EndMill 6	6	EndMill	35	TSFV 06 00 110 16	Roughing 1	Model Area Clearance	4200	1200	0,7	H	1	0:02:42	00.04.42
2	ROUGHING 2	Boll 6	4	Ball Nosed	40	D6 SC E3414 5801 0690	Roughing 2	Model Area Clearance	5300	2000	0,2	H	2	0:06:57	00.07.57
3	FINISH1	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 1	3D Offset Finishing	6000	1300	0	H	3	1:53:27	02.11.02
4	FINISH2	Boll 4	2	Ball Nosed	25	Haimer d4 BT 40	Finish 2	Steep and Shallow	8000	1300	0	H	4	0:18:09	00.31.10
NOTE :			SKETCH												
Ref. X0Y0 : CENTER BLOK Ref. Z0 : Top															
ITEM	ACT. DIMENSION	OK / NG													
1															
2															
3															
4															
5															
MACHINING TIME															
RUN DNC_PROG.		OPERATOR													
START :	WIB														
END :	WIB														
TOTAL :	min														
			TOTAL TIME :		2.21.15		2.54.51								
			ITEM IS :		NO HOLDER :										
			WORKPIECE CLAMPING SYSTEM												
			- VICE - EROWA HOLDER - JIG / TOP / BOTTOM PLATE - ASSY MOULD - SIDE CLAMP												
			MADE BY		CHECKED BY										
			J.Wibowo		J.Wibowo										
			PAGE NR.		OF										

Lampiran 21 . NC –Code outer pada percobaan 1

Roughing 1

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T1M6

N50G54G90

N60(Toolpath Name: ROUGHING 1_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 1)

N110(Tool Id: Boll 12_4)

N120(Coolant: None)

N130(Gauge Length: 150,0)

N140(Block:)

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N8070X13.371Y3.424

N8080X13.484Y2.934

N8090X13.661Y1.956

N8100X13.769Y.978

N8110X13.805Y0

N8120X13.769Y-.978

N8130X13.694Y-1.718

N8140X13.58Y-2.445

N8150X13.371Y-3.424

N8160X13.08Y-4.402

N8170X12.707Y-5.38

N8180X12.246Y-6.358

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N5810X14.183Y-10.736

N5820X13.78Y-11.249

N5830X13.367Y-11.738

N5840X12.921Y-12.227

N5850X12.227Y-12.919

N5860X11.355Y-13.694

N5870X10.736Y-14.183

N5880X10.271Y-14.526

N5890X9.457Y-15.059

N5900G0Z8.5

N5910G91G28Z0

N5920G49H0

N5930G28X0Y0

N5940M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T2M6

N50G54G90

N60(Toolpath Name: ROUGHING 2_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 2)

N110(Tool Id: Boll 6)

N120(Coolant: None)

N130(Gauge Length: 130,0)

N140(Block:)

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Roughing 2

N2460X13.842Y-5.694
N2470X13.615Y-6.215
N2480X13.345Y-6.78
N2490X13.042Y-7.345
N2500X12.707Y-7.91
N2510X12.336Y-8.475
N2520X11.864Y-9.124
N2530X11.477Y-9.605
N2540X10.981Y-10.17
N2550X10.452Y-10.712
N2560X9.887Y-11.235
N2570X9.322Y-11.712
N2580X8.745Y-12.147
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N4110X-8.757Y-15.702
N4120X-9.322Y-15.374
N4130X-9.887Y-15.018
N4140X-10.17Y-14.827
N4150X-10.734Y-14.424
N4160X-11.299Y-13.986
N4170X-11.621Y-13.715
N4180G0Z8.5
N4190G91G28Z0
N4200G49H0
N4210G28X0Y0
N4220M30

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z8.5
N40T3M6

Finishing 1

N50G54G90

N60(Toolpath Name: FINISH1_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

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N4170X-13.542Y-.417Z-6.976

N4180X-13.546Y-.218Z-6.975

N4190X-13.547Y-.004

N4200X-13.545Y.21Z-6.974

N4210X-13.539Y.446

N4220X-13.53Y.651Z-6.973

N4230X-13.519Y.855

N4240X-13.504Y1.059

N4250X-13.485Y1.279

N4260X-13.464Y1.491Z-6.974

N4270X-13.442Y1.683

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N1440X-4.616Y.425Z-.486

N1450X-4.764Y.439Z-.407

N1460X-4.91Y.453Z-.326

N1470X-5.043Y.465Z-.248

N1480X-5.174Y.478Z-.169

N1490X-5.246Y.485Z-.124

N1500G0Z8.5

N1510G91G28Z0

N1520G49H0

N1530G28X0Y0

N1540M30

Finishing 2

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH 2_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

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N6490X7.197Y-1.123

N6500X7.225Y-.931

N6510X7.247Y-.738

N6520X7.265Y-.544Z-2.913

N6530X7.283Y-.27Z-2.914

N6540X7.289Y-.095

N6550X7.29Y.048

N6560X7.286Y.192

N6570X7.279Y.335Z-2.913

N6580X7.27Y.478

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N5440X18.045Y-4.157Z-12.695
N5450X18.048Y-4.398Z-12.581
N5460X18.051Y-4.637Z-12.46
N5470X18.053Y-4.868Z-12.334
N5480X18.056Y-5.099Z-12.199
N5490X18.057Y-5.207Z-12.132
N5500G0Z8.5
N5510G91G28Z0
N5520G49H0
N5530G28X0Y0
N5540M30

Lampiran 22 . NC –Code outer pada percobaan 2

Roughing 1

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z8.5
N40T1M6
N50G54G90
N60(Toolpath Name: ROUGHING 1_1)
N70(Output:)
N80(Units: MM)
N90(Tool Coordinates: Tip)
N100(Tool Number: 1)
N110(Tool Id: Boll 12_4)
N120(Coolant: None)
N130(Gauge Length: 150,0)
N140(Block:)
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N8340G1X-3.003Y17.746

N8350G3X2.939Y-17.756I3.003J-17.746

N8360X13.504Y-11.898I-2.939J17.756

N8370X12.7Y-10.692I-.563J.496

N8380G1X7.901Y-12.321

N8390X7.824Y-12.352

N8400X7.75Y-12.391

N8410X7.219Y-12.716

N8420X6.358Y-13.167

N8430X5.38Y-13.595

N8440X4.402Y-13.944

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N5850X12.227Y-12.919

N5860X11.355Y-13.694

N5870X10.736Y-14.183

N5880X10.271Y-14.526

N5890X9.457Y-15.059

N5900G0Z8.5

N5910G91G28Z0

N5920G49H0

N5930G28X0Y0

N5940M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T2M6

N50G54G90

N60(Toolpath Name: ROUGHING 2_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

Roughing 2

N100(Tool Number: 2)
N110(Tool Id: Boll 6)
N120(Coolant: None)
N130(Gauge Length: 130,0)
N140(Block:)

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.
.

N2060G3X-3.303Y-16.092I-.076J.063
N2070G1X-3.384Y-16.017
N2080X-3.455Y-15.934
N2090G3X-3.64Y-15.814I-.257J-.195
N2100G2X-16.226Y0I3.643J15.814
N2110X16.231Y0I16.228J0
N2120X-3.64Y-15.814I-16.228J0
N2130X-3.89Y-15.612

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N4150X-10.734Y-14.424
N4160X-11.299Y-13.986
N4170X-11.621Y-13.715
N4180G0Z8.5
N4190G91G28Z0
N4200G49H0
N4210G28X0Y0
N4220M30

%

:0001

N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z8.5
N40T3M6
N50G54G90

Finishing 1

N60(Toolpath Name: FINISH1_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.

.

.

N3550X12.281Y-1.76

N3560X12.265Y-1.87

N3570X12.235Y-2.056

N3580X12.204Y-2.234

N3590X12.17Y-2.411

N3600X12.134Y-2.588Z-5.957

N3610X12.095Y-2.768

N3620X12.053Y-2.947

N3630X12.008Y-3.126

N3640X11.957Y-3.318Z-5.958

N3650X11.902Y-3.509

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.

N1410X-4.177Y.383Z-.7

N1420X-4.309Y.395Z-.639

N1430X-4.463Y.41Z-.564

N1440X-4.616Y.425Z-.486

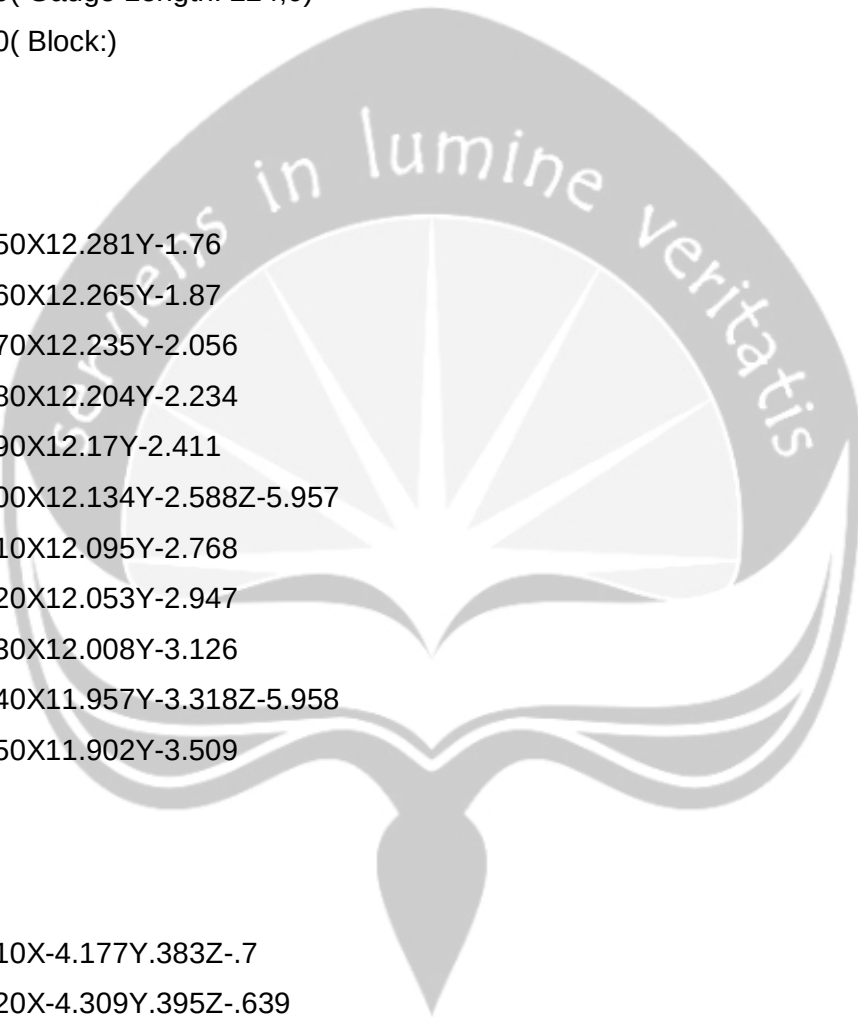
N1450X-4.764Y.439Z-.407

N1460X-4.91Y.453Z-.326

N1470X-5.043Y.465Z-.248

N1480X-5.174Y.478Z-.169

N1490X-5.246Y.485Z-.124



N1500G0Z8.5
N1510G91G28Z0
N1520G49H0
N1530G28X0Y0
N1540M30

Finishing 2

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH2)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.
. .
.

N8410X-1.689Y-1.854

N8420X-1.78Y-1.766

N8430X-1.861Y-1.678

N8440X-1.939Y-1.587

N8450X-1.992Y-1.519

N8460X-2.038Y-1.457

N8470X-2.082Y-1.394

N8480X-2.124Y-1.329

N8490X-2.16Y-1.274

N8500X-2.174Y-1.25

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. .
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N5510X1.423Y-4.503Z-.453

N5520X1.492Y-4.723Z-.326

N5530X1.561Y-4.943Z-.191

N5540X1.588Y-5.03Z-.135

N5550G0Z8.5

N5560G91G28Z0

N5570G49H0

N5580G28X0Y0

N5590M30

Lampiran 23 . NC –Code outer pada percobaan 3

Roughing 1

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T1M6

N50G54G90

N60(Toolpath Name: ROUGHING 1_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 1)

N110(Tool Id: Boll 12_4)

N120(Coolant: None)

N130(Gauge Length: 150,0)

N140(Block:)

.
. .
.

N2610X-9.782Y13.508

N2620X-8.803Y14.164

N2630X-7.825Y14.729

N2640X-7.336Y14.976

N2650X-6.358Y15.42

N2660X-5.38Y15.784

N2670X-4.402Y16.086

N2680X-3.424Y16.324

N2690X-2.934Y16.417

N2700X-1.956Y16.564

N2710X-.978Y16.648

N2720X0Y16.675

N2730X.978Y16.648

N2740X1.956Y16.564

N2750X2.445Y16.495

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N5830X13.367Y-11.738

N5840X12.921Y-12.227

N5850X12.227Y-12.919

N5860X11.355Y-13.694

N5870X10.736Y-14.183

N5880X10.271Y-14.526

N5890X9.457Y-15.059

N5900G0Z8.5

N5910G91G28Z0

N5920G49H0

N5930G28X0Y0

N5940M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

Roughing 2

N40T2M6

N50G54G90

N60(Toolpath Name: ROUGHING 2_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 2)

N110(Tool Id: Boll 6)

N120(Coolant: None)

N130(Gauge Length: 130,0)

N140(Block:)

.

.

.

N1620X10.516Y9.887

N1630X11.019Y9.322

N1640X11.299Y8.978

N1650X11.582Y8.611

N1660X11.864Y8.218

N1670X12.072Y7.91

N1680X12.429Y7.336

N1690X12.742Y6.78

N1700X12.994Y6.281

N1710X13.28Y5.65

N1720X13.506Y5.085

N1730X13.706Y4.52

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N4090X-7.91Y-16.147

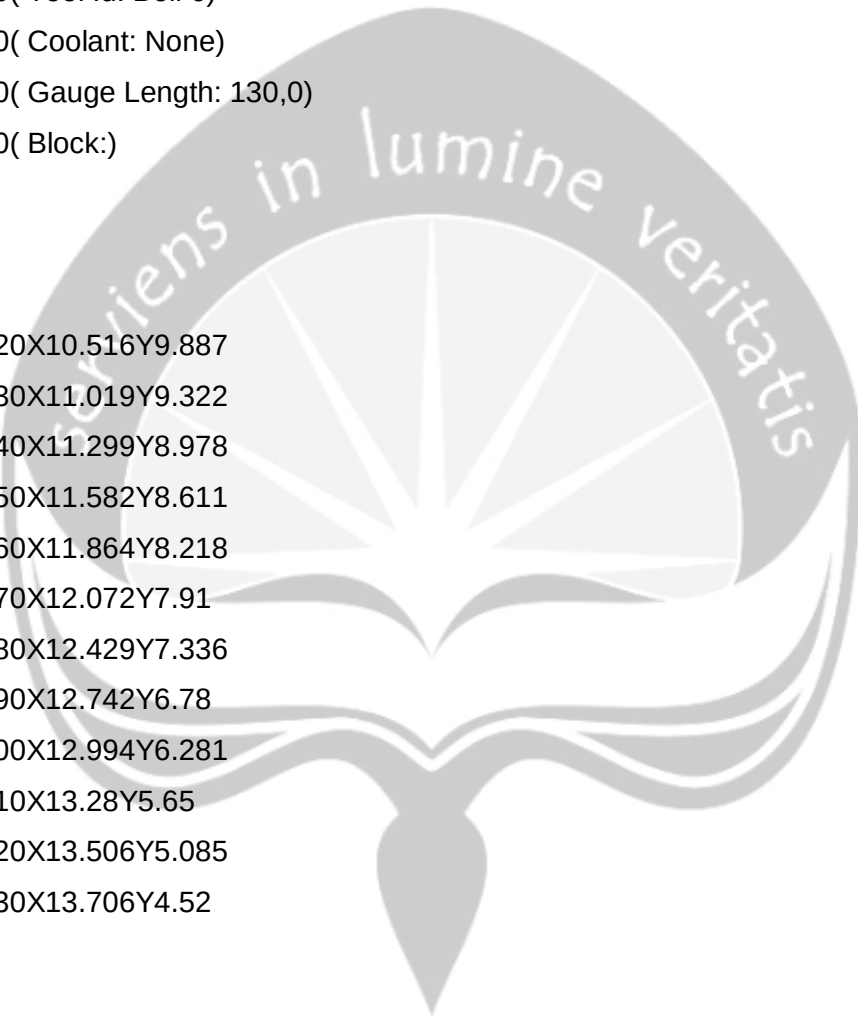
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N4110X-8.757Y-15.702

N4120X-9.322Y-15.374

N4130X-9.887Y-15.018

N4140X-10.17Y-14.827



N4150X-10.734Y-14.424

N4160X-11.299Y-13.986

N4170X-11.621Y-13.715

N4180G0Z8.5

N4190G91G28Z0

N4200G49H0

N4210G28X0Y0

N4220M30

Finishing 1

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH1_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.

.

.

N850X-.621Y12.075

N860X-.486Y12.081

N870X-.351Y12.086

N880X-.157Y12.09

N890X.03Y12.091

N900X.182Y12.09

N910X.333Y12.086

N920X.465Y12.082

N930X.598Y12.076

N940X.785Y12.066

N950X.916Y12.056

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N1450X-4.764Y.439Z-.407

N1460X-4.91Y.453Z-.326

N1470X-5.043Y.465Z-.248

N1480X-5.174Y.478Z-.169

N1490X-5.246Y.485Z-.124

N1500G0Z8.5

N1510G91G28Z0

N1520G49H0

N1530G28X0Y0

N1540M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH2_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.

Finishing 2

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.
N5400X-3.024Y-.796Z-1.752
N5410X-3.052Y-.674
N5420X-3.075Y-.558
N5430X-3.094Y-.44
N5440X-3.109Y-.323
N5450X-3.12Y-.204
N5460X-3.124Y-.134
N5470X-3.127Y-.07
N5480X-3.126Y.02
N5490X-3.124Y.129

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.
N3510X-4.455Y-.081Z-.613
N3520X-4.693Y-.085Z-.494
N3530X-4.924Y-.089Z-.371
N3540X-5.154Y-.093Z-.238
N3550X-5.277Y-.095Z-.164
N3560G0Z8.5
N3570G91G28Z0
N3580G49H0
N3590G28X0Y0
N3600M30

Lampiran 24 . NC –Code outer pada percobaan 4

Roughing 1

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z8.5
N40T1M6
N50G54G90

N60(Toolpath Name: ROUGHING 1_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 1)

N110(Tool Id: Boll 12_4)

N120(Coolant: None)

N130(Gauge Length: 150,0)

N140(Block:)

.

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.

N8450X3.563Y-14.183

N8460X2.934Y-14.324

N8470X1.956Y-14.488

N8480X.978Y-14.593

N8490X0Y-14.618

N8500X-.978Y-14.593

N8510X-1.956Y-14.488

N8520X-2.934Y-14.324

N8530X-3.561Y-14.183

N8540X-4.402Y-13.944

N8550X-5.135Y-13.694

N8560X-6.279Y-13.205

N8570X-7.223Y-12.716

N8580X-8.017Y-12.227

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N5810X14.183Y-10.736

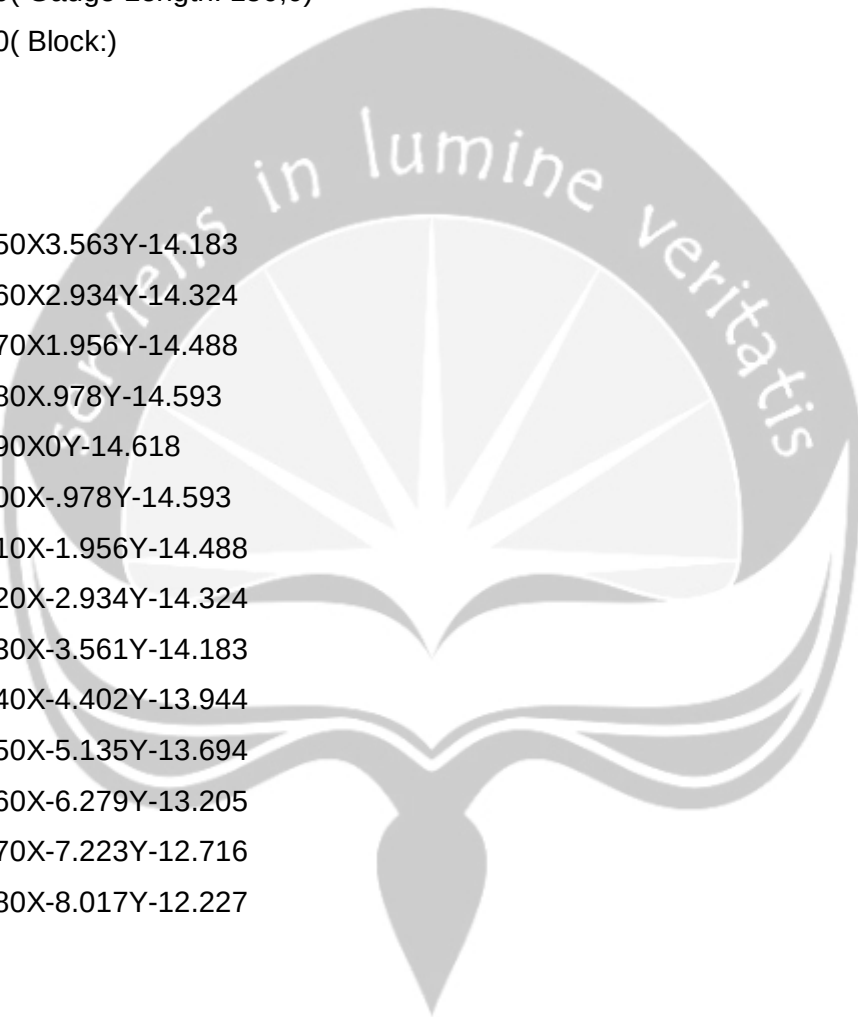
N5820X13.78Y-11.249

N5830X13.367Y-11.738

N5840X12.921Y-12.227

N5850X12.227Y-12.919

N5860X11.355Y-13.694



N5870X10.736Y-14.183
N5880X10.271Y-14.526
N5890X9.457Y-15.059
N5900G0Z8.5
N5910G91G28Z0
N5920G49H0
N5930G28X0Y0
N5940M30

Roughing 2

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T2M6

N50G54G90

N60(Toolpath Name: ROUGHING 2_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 2)

N110(Tool Id: Boll 6)

N120(Coolant: None)

N130(Gauge Length: 130,0)

N140(Block:)

.

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.

N7060X13.784Y-1.412

N7070X13.715Y-1.977

N7080X13.62Y-2.542

N7090X13.503Y-3.107

N7100X13.36Y-3.672

N7110X13.191Y-4.237

N7120X12.994Y-4.81

N7130X12.775Y-5.367

N7140X12.523Y-5.932

N7150X12.239Y-6.497

N7160X11.921Y-7.062

N7170X11.582Y-7.605

N7180X11.174Y-8.192

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N4130X-9.887Y-15.018

N4140X-10.17Y-14.827

N4150X-10.734Y-14.424

N4160X-11.299Y-13.986

N4170X-11.621Y-13.715

N4180G0Z8.5

N4190G91G28Z0

N4200G49H0

N4210G28X0Y0

N4220M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH1_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

Finishing 1

N140(Block:)

.
. .

N9400X6.158Y-6.038

N9410X6.06Y-6.137

N9420X5.938Y-6.255

N9430X5.814Y-6.371

N9440X5.722Y-6.454Z-3.512

N9450X5.629Y-6.536

N9460X5.484Y-6.658

N9470X5.355Y-6.763

N9480X5.217Y-6.87

N9490X5.148Y-6.922

N9500X5.078Y-6.974

N9510X5.007Y-7.025

.
. .

N1450X-4.764Y.439Z-.407

N1460X-4.91Y.453Z-.326

N1470X-5.043Y.465Z-.248

N1480X-5.174Y.478Z-.169

N1490X-5.246Y.485Z-.124

N1500G0Z8.5

N1510G91G28Z0

N1520G49H0

N1530G28X0Y0

N1540M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

Finishing 2

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH2_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.

.

.

N5670X4.468Y-.988Z-2.003

N5680X4.469Y-1.244Z-1.985

N5690X4.47Y-1.503Z-1.959

N5700X4.472Y-1.766Z-1.925

N5710X4.473Y-2.027Z-1.883

N5720X4.474Y-2.288Z-1.834

N5730X4.475Y-2.532Z-1.78

N5740X4.477Y-2.775Z-1.719

N5750X4.478Y-3.016Z-1.652

N5760X4.479Y-3.258Z-1.577

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N600X.495Y-4.682Z-.455

N610X.519Y-4.912Z-.328

N620X.543Y-5.141Z-.193

N630X.554Y-5.241Z-.131

N640G0Z8.5

N650G91G28Z0

N660G49H0

N670G28X0Y0

N680M30

Lampiran 25. NC –Code outer pada percobaan 5

Roughing 1

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T1M6

N50G54G90

N60(Toolpath Name: ROUGHING 1_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 1)

N110(Tool Id: Boll 12_4)

N120(Coolant: None)

N130(Gauge Length: 150,0)

N140(Block:)

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.

N220X-2.537Y15.161

N230X-1.956Y15.241

N240X-.978Y15.339

N250X0Y15.369

N260X.978Y15.339

N270X1.467Y15.296

N280X2.517Y15.161

N290X3.424Y14.984

N300X4.402Y14.724

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N5860X11.355Y-13.694

N5870X10.736Y-14.183

N5880X10.271Y-14.526

N5890X9.457Y-15.059

N5900G0Z8.5

N5910G91G28Z0

N5920G49H0

N5930G28X0Y0

N5940M30

Roughing 2

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T2M6

N50G54G90

N60(Toolpath Name: ROUGHING 2_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 2)

N110(Tool Id: Boll 6)

N120(Coolant: None)

N130(Gauge Length: 130,0)

N140(Block:)

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.

N810G1X-14.736Y.747F9999

N820G0Z-1.354

N830G1Z-6.624F3000

N840X-14.726Y.746F2000

N850G3X-14.62Y.837I.007J.099

N860G1X-14.597Y1.151
N870G0Z3.646
N880G1X-14.752Y-.238F9999
N890G0Z-1.354
N900G1Z-6.624F3000
N910X-14.741F2000
N920G3X-14.642Y-.139I0J.099
N930G1Y.146
N940G0Z3.646

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N4110X-8.757Y-15.702
N4120X-9.322Y-15.374
N4130X-9.887Y-15.018
N4140X-10.17Y-14.827
N4150X-10.734Y-14.424
N4160X-11.299Y-13.986
N4170X-11.621Y-13.715
N4180G0Z8.5
N4190G91G28Z0
N4200G49H0
N4210G28X0Y0
N4220M30

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z8.5
N40T3M6
N50G54G90
N60(Toolpath Name: FINISH1_1)
N70(Output:)
N80(Units: MM)

Finishing 1

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.

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.

N7460X6.597Y-1.487

N7470X6.578Y-1.57

N7480X6.556Y-1.659Z-2.711

N7490X6.53Y-1.762

N7500X6.502Y-1.865

N7510X6.473Y-1.967

N7520X6.446Y-2.055

N7530X6.418Y-2.142Z-2.712

N7540X6.389Y-2.228

N7550X6.343Y-2.357

N7560X6.294Y-2.486

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N1440X-4.616Y.425Z-.486

N1450X-4.764Y.439Z-.407

N1460X-4.91Y.453Z-.326

N1470X-5.043Y.465Z-.248

N1480X-5.174Y.478Z-.169

N1490X-5.246Y.485Z-.124

N1500G0Z8.5

N1510G91G28Z0

N1520G49H0

N1530G28X0Y0

N1540M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH2_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.

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.

N6410X-6.533Y-2.428

N6420X-6.575Y-2.308

N6430X-6.611Y-2.204

N6440X-6.645Y-2.099

N6450X-6.677Y-1.993

N6460X-6.707Y-1.887

N6470X-6.736Y-1.781Z-2.787

N6480X-6.783Y-1.592

N6490X-6.824Y-1.403

N6500X-6.859Y-1.22

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.

N8920X-4.405Y-.844Z-.573

N8930X-4.639Y-.888Z-.451

N8940X-4.866Y-.931Z-.324

N8950X-5.093Y-.973Z-.188

N8960X-5.181Y-.99Z-.133

N8970G0Z8.5

N8980G91G28Z0

N8990G49H0

N9000G28X0Y0

N9010M30

Lampiran 26 . NC –Code outer pada percobaan 6

Roughing 1

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T1M6

N50G54G90

N60(Toolpath Name: ROUGHING 1_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 1)

N110(Tool Id: Boll 12_4)

N120(Coolant: None)

N130(Gauge Length: 150,0)

N140(Block:)

.

.

.

N3200X8.86Y-14.118

N3210G0Z1.643

N3220G1X10.685Y-14.483F9999

N3230G0Z-3.357

N3240G1Z-9.043F3000

N3250G3X-2.711Y17.793I-10.685J14.483F1200

N3260G1X-3.003Y17.746

N3270G3X2.939Y-17.756I3.003J-17.746

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N5860X11.355Y-13.694

N5870X10.736Y-14.183

N5880X10.271Y-14.526

N5890X9.457Y-15.059

N5900G0Z8.5

N5910G91G28Z0

N5920G49H0

N5930G28X0Y0

N5940M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T2M6

N50G54G90

N60(Toolpath Name: ROUGHING 2_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 2)

N110(Tool Id: Boll 6)

N120(Coolant: None)

N130(Gauge Length: 130,0)

N140(Block:)

.

.

.

N5020X13.081Y6.036

Roughing 2

N5030X13.332Y5.46
N5040X13.553Y4.885
N5050X13.747Y4.31
N5060X13.914Y3.734
N5070X14.056Y3.159
N5080X14.173Y2.584
N5090X14.266Y2.008
N5100X14.335Y1.433
N5110X14.381Y.856
N5120X14.409Y-.009

.
. .
N4120X-9.322Y-15.374
N4130X-9.887Y-15.018
N4140X-10.17Y-14.827
N4150X-10.734Y-14.424
N4160X-11.299Y-13.986
N4170X-11.621Y-13.715
N4180G0Z8.5
N4190G91G28Z0
N4200G49H0
N4210G28X0Y0
N4220M30

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z8.5
N40T3M6
N50G54G90
N60(Toolpath Name: FINISH1_1)
N70(Output:)
N80(Units: MM)

Finishing 1

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.

.

.

N3930X4.017Y9.121

N3940X4.128Y9.071

N3950X4.239Y9.019

N3960X4.366Y8.958

N3970X4.491Y8.896

N3980X4.577Y8.852

N3990X4.663Y8.807

N4000X4.748Y8.761

N4010X4.803Y8.731

N4020X4.858Y8.701

N4030X4.912Y8.67Z-4.238

N4040X4.967Y8.639

.

.

.

N1450X-4.764Y.439Z-.407

N1460X-4.91Y.453Z-.326

N1470X-5.043Y.465Z-.248

N1480X-5.174Y.478Z-.169

N1490X-5.246Y.485Z-.124

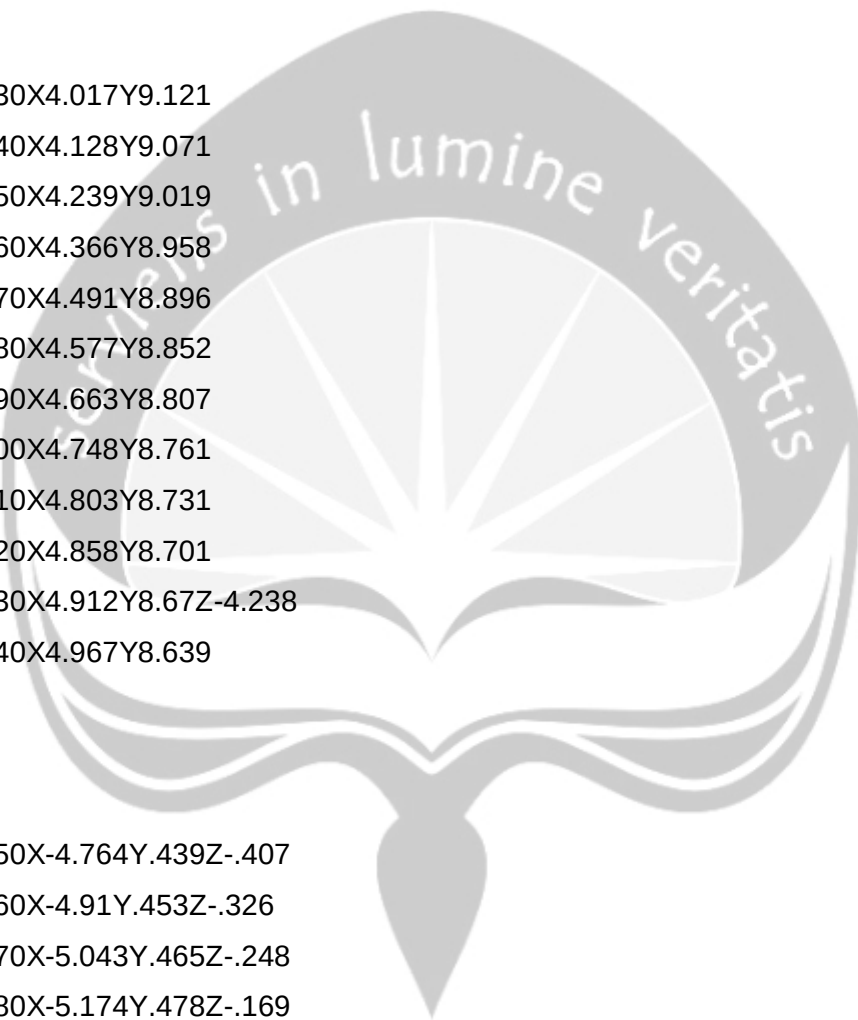
N1500G0Z8.5

N1510G91G28Z0

N1520G49H0

N1530G28X0Y0

N1540M30



%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH2_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.

.

.

N310X-.258Y5.652

N320X-.34Y5.648

N330X-.508Y5.635

N340X-.675Y5.616

N350X-.813Y5.598

N360X-.952Y5.577

N370X-1.108Y5.548

N380X-1.285Y5.509

N390X-1.439Y5.471

N400X-1.519Y5.449

.

.

.

N1620X18.045Y-4.157Z-12.695

N1630X18.048Y-4.398Z-12.581

N1640X18.051Y-4.637Z-12.46

N1650X18.053Y-4.868Z-12.334
N1660X18.056Y-5.099Z-12.199
N1670X18.057Y-5.207Z-12.132
N1680G0Z8.5
N1690G91G28Z0
N1700G49H0
N1710G28X0Y0
N1720M30

Lampiran 27 . NC –Code outer pada percobaan 7

Roughing 1

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z8.5
N40T1M6
N50G54G90
N60(Toolpath Name: ROUGHING 1_1)
N70(Output:)
N80(Units: MM)
N90(Tool Coordinates: Tip)
N100(Tool Number: 1)
N110(Tool Id: Boll 12_4)
N120(Coolant: None)
N130(Gauge Length: 150,0)
N140(Block:)
.
.
.
N8490X0Y-14.618
N8500X-.978Y-14.593
N8510X-1.956Y-14.488
N8520X-2.934Y-14.324
N8530X-3.561Y-14.183

N8540X-4.402Y-13.944

N8550X-5.135Y-13.694

N8560X-6.279Y-13.205

N8570X-7.223Y-12.716

N8580X-8.017Y-12.227

N8590X-8.721Y-11.738

.

.

.

N5850X12.227Y-12.919

N5860X11.355Y-13.694

N5870X10.736Y-14.183

N5880X10.271Y-14.526

N5890X9.457Y-15.059

N5900G0Z8.5

N5910G91G28Z0

N5920G49H0

N5930G28X0Y0

N5940M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T2M6

N50G54G90

N60(Toolpath Name: ROUGHING 2_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 2)

N110(Tool Id: Boll 6)

N120(Coolant: None)

N130(Gauge Length: 130,0)

Roughing 2

N140(Block:)

.
. .

N400G1Z-6.624F3000

N410X-12.901Y7.135F2000

N420G3X-12.765Y7.169I.051J.085

N430G1X-12.334Y7.888

N440G0Z3.646

N450G1X-13.281Y6.424F9999

N460G0Z-1.354

N470G1Z-6.624F3000

N480X-13.271Y6.419F2000

N490G3X-13.138Y6.463I.045J.088

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH1_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.
. .

N8000X-2.86Y7.928

Finishing 1

N8010X-2.774Y7.959

N8020X-2.703Y7.983

N8030X-2.632Y8.007

N8040X-2.561Y8.03

N8050X-2.494Y8.051

N8060X-2.441Y8.067

N8070X-2.388Y8.083

N8080X-2.333Y8.099

N8090X-2.28Y8.114

.

.

.

N1450X-4.764Y.439Z-.407

N1460X-4.91Y.453Z-.326

N1470X-5.043Y.465Z-.248

N1480X-5.174Y.478Z-.169

N1490X-5.246Y.485Z-.124

N1500G0Z8.5

N1510G91G28Z0

N1520G49H0

N1530G28X0Y0

N1540M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T3M6

N50G54G90

N60(Toolpath Name: FINSH2)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

Finishing 2

N110(Tool Id: Boll 4)
N120(Coolant: None)
N130(Gauge Length: 224,0)
N140(Block:)

.
.
.

N7250X1.25Y-2.071
N7260X1.197Y-2.102
N7270X1.143Y-2.131
N7280X1.053Y-2.176
N7290X.979Y-2.213
N7300X.938Y-2.231
N7310X.896Y-2.248
N7320X.838Y-2.271
N7330X.795Y-2.286
N7340X.753Y-2.301

.
.
.

N9120X-4.692Y-.49Z-.453
N9130X-4.922Y-.514Z-.327
N9140X-5.151Y-.537Z-.191
N9150X-5.248Y-.547Z-.131
N9160G0Z8.5
N9170G91G28Z0
N9180G49H0
N9190G28X0Y0
N9200M30

Lampiran 28 . NC –Code outer pada percobaan 8

Roughing 1

%
:0001
N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T1M6

N50G54G90

N60(Toolpath Name: ROUGHING 1_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 1)

N110(Tool Id: Boll 12_4)

N120(Coolant: None)

N130(Gauge Length: 150,0)

N140(Block:)

.

.

.

N8880X-11.249Y9.34

N8890X-10.76Y9.905

N8900X-9.906Y10.76

N8910X-9.339Y11.249

N8920X-8.721Y11.738

N8930X-8.314Y12.031

N8940X-7.825Y12.352

N8950X-7.223Y12.716

N8960X-6.279Y13.205

N8970X-5.135Y13.694

N8980X-4.402Y13.949

.

.

.

N5850X12.227Y-12.919

N5860X11.355Y-13.694

N5870X10.736Y-14.183

N5880X10.271Y-14.526

N5890X9.457Y-15.059

N5900G0Z8.5
N5910G91G28Z0
N5920G49H0
N5930G28X0Y0
N5940M30

Roughing 2

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T2M6

N50G54G90

N60(Toolpath Name: ROUGHING 2_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 2)

N110(Tool Id: Boll 6)

N120(Coolant: None)

N130(Gauge Length: 130,0)

N140(Block:)

.

.

.

N5850X-12.843Y-5.932

N5860X-13.09Y-5.367

N5870X-13.308Y-4.802

N5880X-13.498Y-4.237

N5890X-13.663Y-3.672

N5900X-13.802Y-3.107

N5910X-13.917Y-2.542

N5920X-14.009Y-1.977

N5930X-14.077Y-1.412

N5940X-14.122Y-.847

N5950X-14.145Y-.282

.
. .

N4150X-10.734Y-14.424

N4160X-11.299Y-13.986

N4170X-11.621Y-13.715

N4180G0Z8.5

N4190G91G28Z0

N4200G49H0

N4210G28X0Y0

N4220M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH1_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.
. .

N5220X-10.682Y4.009Z-5.187

N5230X-10.629Y4.149

N5240X-10.574Y4.287

Finishing 1

N5250X-10.518Y4.425
N5260X-10.433Y4.622Z-5.188
N5270X-10.356Y4.793
N5280X-10.276Y4.963
N5290X-10.193Y5.131
N5300X-10.113Y5.288

.
. .

N1460X-4.91Y.453Z-.326
N1470X-5.043Y.465Z-.248
N1480X-5.174Y.478Z-.169
N1490X-5.246Y.485Z-.124
N1500G0Z8.5
N1510G91G28Z0
N1520G49H0
N1530G28X0Y0
N1540M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH2)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

Finishing 2

.
. .
N190X-2.782Y-6.629
N200X-2.682Y-6.67
N210X-2.581Y-6.709Z-2.873
N220X-2.479Y-6.747
N230X-2.318Y-6.804
N240X-2.182Y-6.849Z-2.874
N250X-2.045Y-6.892
N260X-1.907Y-6.931
N270X-1.705Y-6.984
N280X-1.625Y-7.003

.
. .
N8530X18.056Y-5.099Z-12.199
N8540X18.057Y-5.207Z-12.132
N8550G0Z8.5
N8560G91G28Z0
N8570G49H0
N8580G28X0Y0
N8590M30

Lampiran 29 . NC –Code outer pada percobaan 9

Roughing 1

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z8.5
N40T1M6
N50G54G90
N60(Toolpath Name: ROUGHING 1_1)
N70(Output:)

N80(Units: MM)
N90(Tool Coordinates: Tip)
N100(Tool Number: 1)
N110(Tool Id: Boll 12_4)
N120(Coolant: None)
N130(Gauge Length: 150,0)
N140(Block:)

.
.
.
N2970X16.214Y3.913
N2980X16.419Y2.934
N2990X16.564Y1.956
N3000X16.65Y.978
N3010X16.683Y0
N3020X16.65Y-.978
N3030X16.564Y-1.956
N3040X16.419Y-2.934
N3050X16.214Y-3.913

.
.
.
N5870X10.736Y-14.183
N5880X10.271Y-14.526
N5890X9.457Y-15.059
N5900G0Z8.5
N5910G91G28Z0
N5920G49H0
N5930G28X0Y0
N5940M30

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49

Roughing 2

N30G0G90Z8.5
N40T2M6
N50G54G90
N60(Toolpath Name: ROUGHING 2_1)
N70(Output:)
N80(Units: MM)
N90(Tool Coordinates: Tip)
N100(Tool Number: 2)
N110(Tool Id: Boll 6)
N120(Coolant: None)
N130(Gauge Length: 130,0)
N140(Block:)
.
.
.
N2900X-3.808Y-15.267
N2910X-4.393Y-15.109
N2920X-5.072Y-14.896
N2930X-5.144Y-14.872
N2940G2X-15.736Y-.002I5.138J14.868
N2950G1Y.005
N2960G2X-5.675Y14.677I15.731J-.002
N2970G1X-5.528Y14.733
.
.
.
N4150X-10.734Y-14.424
N4160X-11.299Y-13.986
N4170X-11.621Y-13.715
N4180G0Z8.5
N4190G91G28Z0
N4200G49H0
N4210G28X0Y0
N4220M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH1_1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.

.

.

N5220X-10.682Y4.009Z-5.187

N5230X-10.629Y4.149

N5240X-10.574Y4.287

N5250X-10.518Y4.425

N5260X-10.433Y4.622Z-5.188

N5270X-10.356Y4.793

N5280X-10.276Y4.963

N5290X-10.193Y5.131

.

.

.

N1460X-4.91Y.453Z-.326

N1470X-5.043Y.465Z-.248

N1480X-5.174Y.478Z-.169

N1490X-5.246Y.485Z-.124

N1500G0Z8.5

N1510G91G28Z0

N1520G49H0

N1530G28X0Y0

N1540M30

Finishing 2

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z8.5

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH_2)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.

.

.

N8580X.495Y-4.682Z-.455

N8590X.519Y-4.912Z-.328

N8600X.543Y-5.141Z-.193

N8610X.554Y-5.241Z-.131

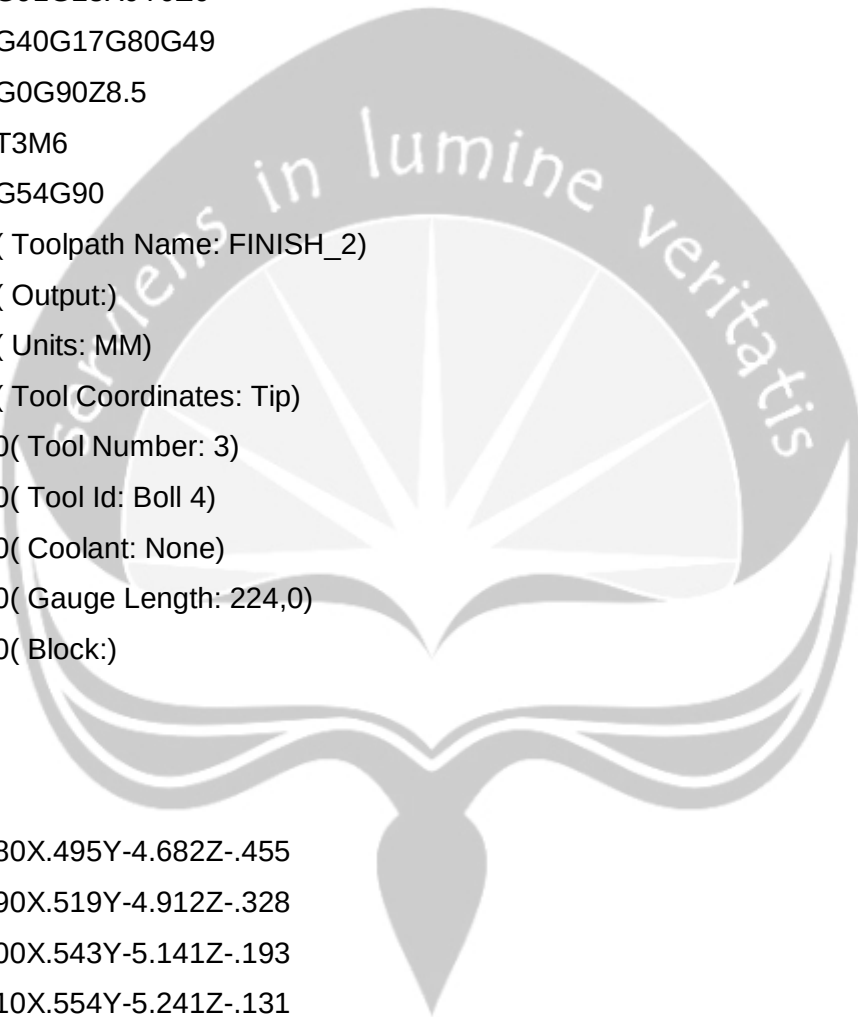
N8620G0Z8.5

N8630G91G28Z0

N8640G49H0

N8650G28X0Y0

N8660M30



Lampiran 30 . NC –Code inner pada percobaan 1

Roughing 1

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z10.

N40T1M6

N50G54G90

N60(Toolpath Name: ROUGHING 1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 1)

N110(Tool Id: Boll 12_4)

N120(Coolant: None)

N130(Gauge Length: 150,0)

N140(Block:)

.

.

.

N8210X-7.336Y7.503

N8220X-7.891Y6.917

N8230X-8.223Y6.519

N8240X-8.336Y6.378

N8250X-8.697Y5.881

N8260X-8.705Y5.869

N8270X-9.014Y5.38

N8280X-9.289Y4.891

N8290X-9.382Y4.699

N8300X-9.736Y3.919

.

.

.

N5830G2X.573Y.09I0J-.512

N5840X-.45Y.09I-.512J0
N5850X.061Y.602I.512J0
N5860G3X.667Y2.064I0J.856
N5870G2X.061Y3.525I1.461J1.461
N5880G0Z10.
N5890G91G28Z0
N5900G49H0
N5910G28X0Y0
N5920M30

Roughing 2

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z3.

N40T2M6

N50G54G90

N60(Toolpath Name: ROUGHING 2)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 2)

N110(Tool Id: Boll 6)

N120(Coolant: None)

N130(Gauge Length: 130,0)

N140(Block:)

.

.

.

N900G1X10.734Y6.327

N910X10.512Y6.497

N920X10.452Y6.551

N930X10.245Y6.78

N940X10.046Y7.062

N950X9.623Y7.627

N960X9.394Y7.91
N970X9.147Y8.192
N980X8.757Y8.605
N990X8.31Y9.04
N1000X7.91Y9.394
N1010X7.282Y9.887
N1020X6.78Y10.239

.
.
.
N4270X-2.147Y1.13
N4280X-2.26Y.885
N4290X-2.359Y.565
N4300X-2.412Y.282
N4310X-2.43Y0
N4320X-2.423Y-.106
N4330G0Z3.
N4340G91G28Z0
N4350G49H0
N4360G28X0Y0
N4370M30

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z3.
N40T3M6
N50G54G90
N60(Toolpath Name: FINISH1)
N70(Output:)
N80(Units: MM)
N90(Tool Coordinates: Tip)
N100(Tool Number: 3)
N110(Tool Id: Boll 4)

Finish 1

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.

.

.

N1540X-12.579Y4.002

N1550X-12.619Y3.87Z-3.338

N1560X-12.647Y3.78

N1570X-12.684Y3.654

N1580X-12.719Y3.528

N1590X-12.757Y3.389

N1600X-12.793Y3.25

N1610X-12.813Y3.171Z-3.337

N1620X-12.834Y3.084

N1630X-12.857Y2.988

N1640X-12.879Y2.892

N1650X-12.919Y2.708Z-3.336

N1660X-12.946Y2.575

N1670X-12.966Y2.47

N1680X-12.984Y2.378

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N5370X-15.577Y8.993

N5380X-15.573Y8.991Z-7.

N5390X-15.571Y8.99Z-6.999

N5400X-15.578Y8.994Z-7.002

N5410X-15.585Y8.999Z-7.001

N5420X-15.588Y9.Z-6.999

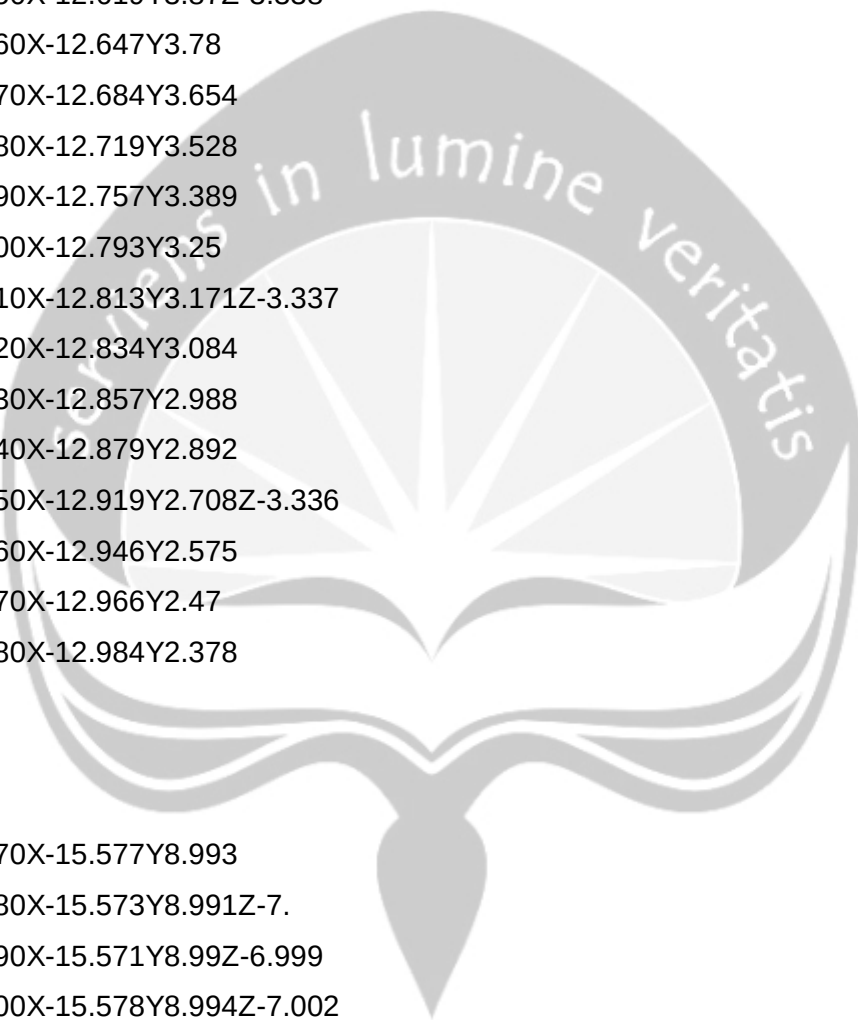
N5430Y8.999Z-7.

N5440X-15.586Y8.998Z-7.001

N5450X-15.583Y8.997

N5460X-15.582Y8.996Z-7.002

N5470G0Z3.



N5480G91G28Z0

N5490G49H0

N5500G28X0Y0

N5510M30

Finish 2

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z3.

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH2)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.

.

.

N2700X.635Y-3.017

N2710X.547Y-3.034

N2720X.457Y-3.049

N2730X.368Y-3.062

N2740X.28Y-3.074Z-20.334

N2750X.21Y-3.081Z-20.333

N2760X.127Y-3.084Z-20.334

N2770X.035Y-3.085

N2780X-.057

N2790X-.149Y-3.083

.

.
.
N9510X-16.007Y.794Z-.695
N9520X-16.041Y1.034Z-.581
N9530X-16.074Y1.27Z-.46
N9540X-16.107Y1.499Z-.334
N9550X-16.139Y1.727Z-.199
N9560X-16.154Y1.834Z-.132
N9570G0Z3.
N9580G91G28Z0
N9590G49H0
N9600G28X0Y0
N9610M30

Lampiran 31 . NC –Code inner pada percobaan 2

Roughing 1

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z10.
N40T1M6
N50G54G90
N60(Toolpath Name: ROUGHING 1)
N70(Output:)
N80(Units: MM)
N90(Tool Coordinates: Tip)
N100(Tool Number: 1)
N110(Tool Id: Boll 12_4)
N120(Coolant: None)
N130(Gauge Length: 150,0)
N140(Block:)

.
.
.

N3650G2X2.634Y3.336I-.488J-4.673

N3660G1X2.714Y3.274

N3670X2.924Y3.092

N3680X3.052Y2.966

N3690X3.293Y2.708

N3700X3.516Y2.435

N3710X3.616Y2.305

N3720X3.689Y2.197

N3730X3.751Y2.082

N3740X3.812Y1.95

N3750X3.936Y1.658

.

.

.

N5810G1X-.669Y1.307

N5820G3X.061Y.602I.73J.026

N5830G2X.573Y.09I0J-.512

N5840X-.45Y.09I-.512J0

N5850X.061Y.602I.512J0

N5860G3X.667Y2.064I0J.856

N5870G2X.061Y3.525I1.461J1.461

N5880G0Z10.

N5890G91G28Z0

N5900G49H0

N5910G28X0Y0

N5920M3

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z3.

N40T2M6

N50G54G90

Roughing 2

N60(Toolpath Name: ROUGHING 2)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 2)

N110(Tool Id: Boll 6)

N120(Coolant: None)

N130(Gauge Length: 130,0)

N140(Block:)

.

.

.

N6610X-7.368Y9.467

N6620X-7.494Y9.364

N6630X-7.904Y9.028

N6640X-8.201Y8.757

N6650X-8.304Y8.656

N6660X-8.641Y8.32

N6670X-8.757Y8.2

N6680X-9.023Y7.91

N6690X-9.304Y7.576

N6700X-9.367Y7.495

N6710X-9.657Y7.118

.

.

.

N4240X-1.695Y1.738

N4250X-1.864Y1.556

N4260X-2.068Y1.272

N4270X-2.147Y1.13

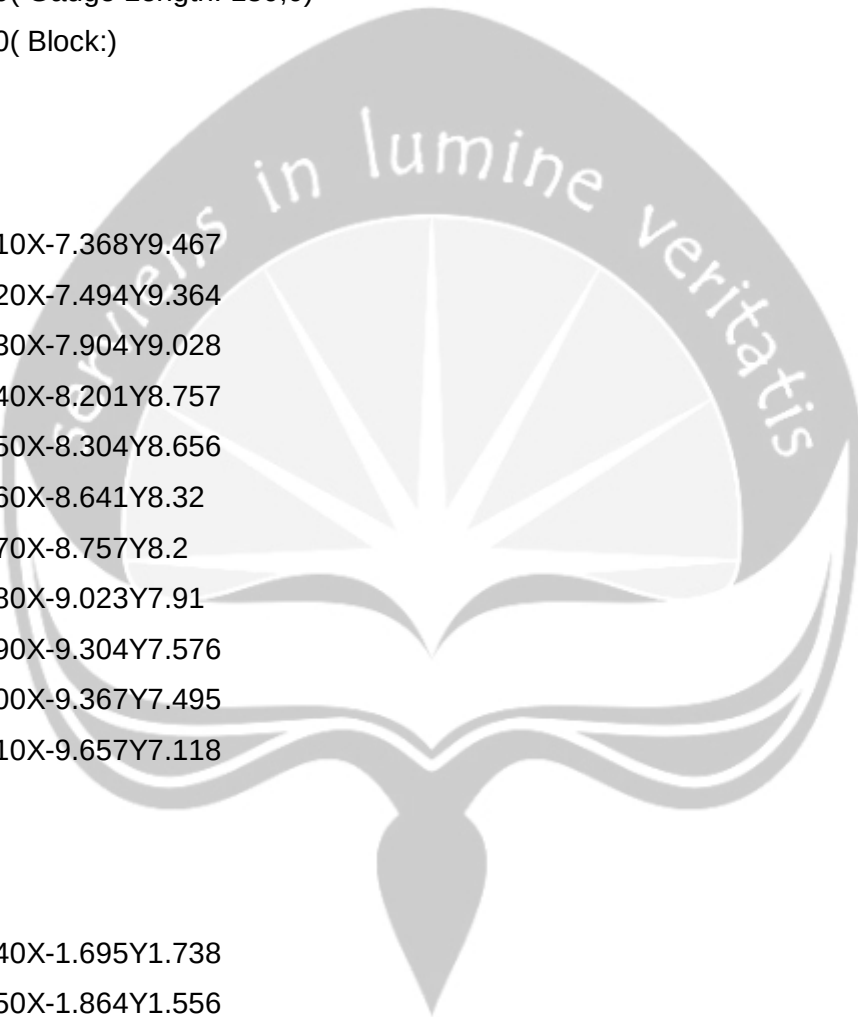
N4280X-2.26Y.885

N4290X-2.359Y.565

N4300X-2.412Y.282

N4310X-2.43Y0

N4320X-2.423Y-.106



N4330G0Z3.
N4340G91G28Z0
N4350G49H0
N4360G28X0Y0
N4370M30

Finish 1

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z3.
N40T3M6
N50G54G90
N60(Toolpath Name: FINISH1)
N70(Output:)
N80(Units: MM)
N90(Tool Coordinates: Tip)
N100(Tool Number: 3)
N110(Tool Id: Boll 4)
N120(Coolant: None)
N130(Gauge Length: 224,0)
N140(Block:)

.
. .
. .
N2030X4.79Y-12.3
N2040X4.888Y-12.261
N2050X5.048Y-12.196
N2060X5.167Y-12.147
N2070X5.285Y-12.095
N2080X5.425Y-12.033
N2090X5.546Y-11.978
N2100X5.667Y-11.922
N2110X5.787Y-11.864
N2120X5.911Y-11.802Z-5.89

N2130X6.035Y-11.739

.

.

.

N5410X-15.585Y8.999Z-7.001

N5420X-15.588Y9.Z-6.999

N5430Y8.999Z-7.

N5440X-15.586Y8.998Z-7.001

N5450X-15.583Y8.997

N5460X-15.582Y8.996Z-7.002

N5470G0Z3.

N5480G91G28Z0

N5490G49H0

N5500G28X0Y0

N5510M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z3.

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH2)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.

.

.

Finish 2

N1820X-12.46Y9.638
N1830X-12.756Y9.807
N1840X-12.962Y9.924
N1850X-12.969Y9.929
N1860X-12.978Y9.937
N1870X-12.981Y9.944
N1880X-12.978Y9.952
N1890X-12.969Y9.966
N1900X-12.961Y9.977
N1910X-12.767Y10.222
N1920X-12.673Y10.337
.
.
.
N9920X-15.447Y-8.91Z-.985
N9930X-15.489Y-9.146Z-.897
N9940X-15.532Y-9.382Z-.8
N9950X-15.574Y-9.618Z-.695
N9960X-15.617Y-9.856Z-.581
N9970X-15.659Y-10.091Z-.46
N9980X-15.7Y-10.319Z-.334
N9990X-15.741Y-10.545Z-.199
N10X-15.76Y-10.652Z-.132
N20G0Z3.
N30G91G28Z0
N40G49H0
N50G28X0Y0
N60M30

Lampiran 32 . NC –Code inner pada percobaan 3

Roughing 1

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49

N30G0G90Z10.

N40T1M6

N50G54G90

N60(Toolpath Name: ROUGHING 1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 1)

N110(Tool Id: Boll 12_4)

N120(Coolant: None)

N130(Gauge Length: 150,0)

N140(Block:)

.

.

.

N4810X-8.311Y6.412

N4820X-8.314Y6.409

N4830X-8.803Y5.733

N4840X-9.14Y5.349

N4850X-9.176Y5.298

N4860X-9.201Y5.241

N4870X-9.292Y4.945

N4880X-9.74Y3.913

N4890X-9.923Y3.424

N4900X-10.078Y2.934

N4910X-10.271Y2.175

N4920X-10.394Y1.467

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.

.

N5820G3X.061Y.602I.73J.026

N5830G2X.573Y.09I0J-.512

N5840X-.45Y.09I-.512J0

N5850X.061Y.602I.512J0

N5860G3X.667Y2.064I0J.856

N5870G2X.061Y3.525I1.461J1.461

N5880G0Z10.

N5890G91G28Z0

N5900G49H0

N5910G28X0Y0

N5920M30

Roughing 2

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z3.

N40T2M6

N50G54G90

N60(Toolpath Name: ROUGHING 2)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 2)

N110(Tool Id: Boll 6)

N120(Coolant: None)

N130(Gauge Length: 130,0)

N140(Block:)

.

.

.

N5410X2.542Y11.547

N5420X1.977Y11.659

N5430X1.412Y11.739

N5440X.847Y11.793

N5450X.282Y11.821

N5460X-.282

N5470X-.847Y11.793

N5480X-1.412Y11.739

N5490X-1.977Y11.659

N5500X-2.385Y11.582

N5510X-2.825Y11.483

N5520X-3.107Y11.408

.

.

.

N4270X-2.147Y1.13

N4280X-2.26Y.885

N4290X-2.359Y.565

N4300X-2.412Y.282

N4310X-2.43Y0

N4320X-2.423Y-.106

N4330G0Z3.

N4340G91G28Z0

N4350G49H0

N4360G28X0Y0

N4370M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z3.

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.

Finish 1

.
.
N740X10.75Y-7.376Z-9.565
N750X10.782Y-7.326Z-9.577
N760X10.822Y-7.263Z-9.592
N770X10.861Y-7.199Z-9.606
N780X10.901Y-7.135Z-9.617
N790X10.962Y-7.036Z-9.633
N800X11.02Y-6.942Z-9.645
N810X11.075Y-6.85Z-9.654
N820X11.131Y-6.758Z-9.661
N830X11.184Y-6.668Z-9.666
N840X11.237Y-6.577Z-9.668
N850X11.293Y-6.481

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.
.
N5410X-15.585Y8.999Z-7.001
N5420X-15.588Y9.Z-6.999
N5430Y8.999Z-7.
N5440X-15.586Y8.998Z-7.001
N5450X-15.583Y8.997
N5460X-15.582Y8.996Z-7.002
N5470G0Z3.
N5480G91G28Z0
N5490G49H0
N5500G28X0Y0
N5510M30

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z3.
N40T3M6

Finish 2

N50G54G90

N60(Toolpath Name: FINISH2)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.

.

.

N8560X12.743Y-3.441Z-4.1

N8570X12.796Y-3.24Z-4.102

N8580X12.834Y-3.086Z-4.103

N8590X12.862Y-2.969Z-4.104

N8600X12.879Y-2.89

N8610X12.9Y-2.797Z-4.105

N8620X12.921Y-2.698Z-4.106

N8630X12.973Y-2.436Z-4.107

N8640X13.023Y-2.151Z-4.11

N8650X13.062Y-1.902Z-4.111

N8660X13.099Y-1.626Z-4.113

.

.

.

N4320X0Y.015

N4330X.01Y.01

N4340X.014Y.002

N4350X.011Y-.007

N4360X.004Y-.012

N4370X-.007Y-.011

N4380X-.013Y-.005

N4390G0Z3.

N4400G91G28Z0
N4410G49H0
N4420G28X0Y0
N4430M30

Lampiran 33 . NC –Code inner pada percobaan 4

Roughing 1

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z10.

N40T1M6

N50G54G90

N60(Toolpath Name: ROUGHING 1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 1)

N110(Tool Id: Boll 12_4)

N120(Coolant: None)

N130(Gauge Length: 150,0)

N140(Block:)

.

.

.

N7910X-3.913Y-9.74

N7920X-3.424Y-9.922

N7930X-2.934Y-10.078

N7940X-2.171Y-10.271

N7950X-1.467Y-10.393

N7960X-.489Y-10.5

N7970X-.061Y-10.59

N7980X0Y-10.596

N7990X.061Y-10.59

N8000X.489Y-10.5

N8010X1.467Y-10.393

N8020X2.171Y-10.271

N8030X2.934Y-10.078

N8040X3.807Y-9.782

.

.

.

N5810G1X-.669Y1.307

N5820G3X.061Y.602I.73J.026

N5830G2X.573Y.09I0J-.512

N5840X-.45Y.09I-.512J0

N5850X.061Y.602I.512J0

N5860G3X.667Y2.064I0J.856

N5870G2X.061Y3.525I1.461J1.461

N5880G0Z10.

N5890G91G28Z0

N5900G49H0

N5910G28X0Y0

N5920M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z3.

N40T2M6

N50G54G90

N60(Toolpath Name: ROUGHING 2)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 2)

N110(Tool Id: Boll 6)

N120(Coolant: None)

Roughing 2

N130(Gauge Length: 130,0)

N140(Block:)

.

.

.

N2700X-.565Y-11.977

N2710X0Y-11.993

N2720X.565Y-11.977

N2730X1.13Y-11.939

N2740X1.742Y-11.864

N2750X1.977Y-11.828

N2760X2.542Y-11.718

N2770X3.107Y-11.583

N2780X3.672Y-11.416

N2790X4.237Y-11.218

N2800X4.802Y-10.988

N2810X5.367Y-10.724

.

.

.

N4250X-1.864Y1.556

N4260X-2.068Y1.272

N4270X-2.147Y1.13

N4280X-2.26Y.885

N4290X-2.359Y.565

N4300X-2.412Y.282

N4310X-2.43Y0

N4320X-2.423Y-.106

N4330G0Z3.

N4340G91G28Z0

N4350G49H0

N4360G28X0Y0

N4370M30

%

Finish 1

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z3.

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.

.

.

N6790X-8.741Y-9.89

N6800X-8.647Y-9.973Z-6.51

N6810X-8.591Y-10.022Z-6.509

N6820X-8.545Y-10.061

N6830X-8.499Y-10.099

N6840X-8.453Y-10.138Z-6.508

N6850X-8.407Y-10.177

N6860X-8.279Y-10.28

N6870X-8.151Y-10.382

N6880X-7.97Y-10.522

N6890X-7.826Y-10.63

N6900X-7.68Y-10.736

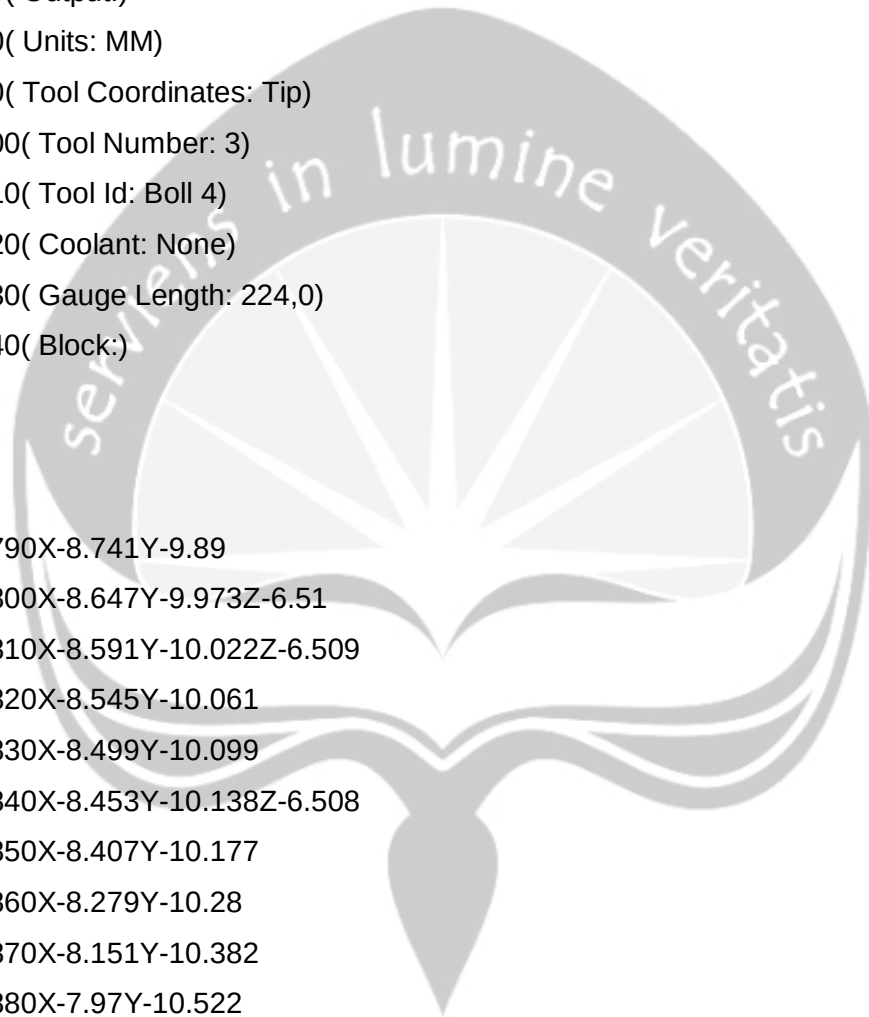
N6910X-7.532Y-10.839

N6920X-7.366Y-10.953

N6930X-7.185Y-11.072

N6940X-7.055Y-11.156

.



.
.
N5430Y8.999Z-7.
N5440X-15.586Y8.998Z-7.001
N5450X-15.583Y8.997
N5460X-15.582Y8.996Z-7.002
N5470G0Z3.
N5480G91G28Z0
N5490G49H0
N5500G28X0Y0
N5510M30

Finish 2

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z3.
N40T3M6
N50G54G90
N60(Toolpath Name: FINISH2)
N70(Output:)
N80(Units: MM)
N90(Tool Coordinates: Tip)
N100(Tool Number: 3)
N110(Tool Id: Boll 4)
N120(Coolant: None)
N130(Gauge Length: 224,0)
N140(Block:)

.
.
.
N9170X13.908Y-.532
N9180X13.903Y-.663
N9190X13.896Y-.794
N9200X13.888Y-.924

N9210X13.878Y-1.055
N9220X13.86Y-1.275
N9230X13.842Y-1.453
N9240X13.822Y-1.631
N9250X13.801Y-1.808
N9260X13.776Y-1.986

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.
.

N4200X-6.583Y-2.772
N4210X-6.492Y-2.98
N4220X-6.394Y-3.184
N4230X-6.29Y-3.386
N4240X-6.192Y-3.562
N4250G0Z3.
N4260G91G28Z0
N4270G49H0
N4280G28X0Y0
N4290M30

Lampiran 34. NC –Code inner pada percobaan 5

Roughing 1

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z10.

N40T1M6

N50G54G90

N60(Toolpath Name: ROUGHING 1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 1)

N110(Tool Id: Boll 12_4)

N120(Coolant: None)
N130(Gauge Length: 150,0)
N140(Block:)
N150(MIN X: -18,000)
N160(MIN Y: -18,000)
N170(MIN Z: -27,000)
N180(MAX X: 18,000)
N190(MAX Y: 18,000)
N200(MAX Z: 0,000)
N210(COORDINATE SYSTEM: Active Workplane)
N220(Datum - Tool Tip:)
N230(X: 0,000)
N240(Y: 0,000)
N250(Z: 10,000)
N260(Recommended length: 40,000)
N270(Number of Flutes: 4)
N280(Tool: Ball Nosed)
N290(DIAMETER: 6,000)
N300(Safety:)
N310(Tool Cutting Moves: Safe No Gouges)
N320(Tool Leads: Safe No Gouges)
N330(Tool Links: Safe No Gouges)
N340(Holder Cutting Moves: Safe No Collisions)
N350(Holder Leads: Safe No Collisions)
N360(Holder Links: Safe No Collisions)
N370(Toolpath: Offset Area Clearance)
N380(STEPOVER: 3,000)
N390(TOLERANCE:0,020)
N400(THICKNESS:0,700)
N410(Toolpath Stats:)
N420(LENGTH: 5906,716)
N430(TIME: 0/04/11)
N440(LIFTS: 34)
N450X-8.174Y-16.035S4200M3
N460G43Z5.H1

N470G1Z-.692F3000
N480G3G17X14.071Y11.223I8.174J16.035F1200
N490G1X13.788Y11.568
N500X13.497Y11.906
N510X13.495Y11.909
N520G3X-13.69Y-11.684I-13.495J-11.909
N530X-8.174Y-16.035I13.69J11.684
N540X-6.177Y-15.425I.683J1.339
N550G1X-6.174Y-15.421
N560G3X-6.783Y-13.427I-1.27J.702
N570G2X-14.92Y-.09I6.861J13.337
N580X15.077Y-.09I14.999J0
.
.
.
N340X-3.703Y-9.782
N350X-3.424Y-9.881
N360X-2.445Y-10.167
N370X-1.956Y-10.271
N380X-.978Y-10.41
N390X-.489Y-10.446
N400X0Y-10.458
N410X.489Y-10.446
N420X.978Y-10.41
N430X1.961Y-10.271
N440X2.445Y-10.167
N450X2.934Y-10.033
N460X3.697Y-9.782
N470X4.402Y-9.485
.
.
.
N5750X1.718Y3.083
N5760X1.467Y3.209
N5770X.978Y3.39

N5780X.489Y3.494
N5790X.061Y3.525
N5800G3X-.721Y2.77I-.052J-.729
N5810G1X-.669Y1.307
N5820G3X.061Y.602I.73J.026
N5830G2X.573Y.09I0J-.512
N5840X-.45Y.09I-.512J0
N5850X.061Y.602I.512J0
N5860G3X.667Y2.064I0J.856
N5870G2X.061Y3.525I1.461J1.461
N5880G0Z10.
N5890G91G28Z0
N5900G49H0
N5910G28X0Y0
N5920M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z3.

N40T2M6

N50G54G90

N60(Toolpath Name: ROUGHING 2)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 2)

N110(Tool Id: Boll 6)

N120(Coolant: None)

N130(Gauge Length: 130,0)

N140(Block:)

N150(MIN X: -18,000)

N160(MIN Y: -18,000)

N170(MIN Z: -27,000)

Roughing 2

N180(MAX X: 18,000)
N190(MAX Y: 18,000)
N200(MAX Z: 0,000)
N210(COORDINATE SYSTEM: Active Workplane)
N220(Datum - Tool Tip:)
N230(X: 0,000)
N240(Y: 0,000)
N250(Z: 3,000)
N260(Recommended length: 40,000)
N270(Number of Flutes: 3)
N280(Tool: Ball Nosed)
N290(DIAMETER: 4,000)
N300(Safety:)
N310(Tool Cutting Moves: Safe No Gouges)
N320(Tool Leads: Safe No Gouges)
N330(Tool Links: Safe No Gouges)
N340(Holder Cutting Moves: Safe No Collisions)
N350(Holder Leads: Safe No Collisions)
N360(Holder Links: Safe No Collisions)
N370(Toolpath: Offset Area Clearance)
N380(STEPOVER: 0,270)
N390(TOLERANCE:0,010)
N400(THICKNESS:0,200)
N410(Toolpath Stats:)
N420(LENGTH: 25223,976)
N430(TIME: 0/10/34)
N440(LIFTS: 517)
N450X-6.452Y-11.22S5300M3
N460G1G43Z-.81H2F3000
N470X-6.515Y-11.311F2000
N480X-6.865Y-11.817
.
.
.
N7500X4.315Y-10.49

N7510X4.638Y-10.348
N7520G3X5.755Y-9.773I-3.98J9.092
N7530G1X5.853Y-9.714
N7540G3X7.499Y-8.51I-5.691J9.511
N7550G1X7.515Y-8.496
N7560G3X5.496Y9.921I-7.505J8.497
N7570G1X5.363Y9.994
N7580X5.118Y10.121
N7590X4.563Y10.383
N7600X4.537Y10.394
N7610X4.037Y10.598
N7620X3.485Y10.793
N7630X3.458Y10.802
N7640X2.961Y10.948
.
.
.
N4230X-1.559Y1.862
N4240X-1.695Y1.738
N4250X-1.864Y1.556
N4260X-2.068Y1.272
N4270X-2.147Y1.13
N4280X-2.26Y.885
N4290X-2.359Y.565
N4300X-2.412Y.282
N4310X-2.43Y0
N4320X-2.423Y-.106
N4330G0Z3.
N4340G91G28Z0
N4350G49H0
N4360G28X0Y0
N4370M30

%
:0001

Finish 1

N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z3.
N40T3M6
N50G54G90
N60(Toolpath Name: FINISH1)
N70(Output:)
N80(Units: MM)
N90(Tool Coordinates: Tip)
N100(Tool Number: 3)
N110(Tool Id: Boll 4)
N120(Coolant: None)
N130(Gauge Length: 224,0)
N140(Block:)
.
.
.
N9340X8.095Y10.396
N9350X8.063Y10.421Z-8.286
N9360X8.03Y10.447Z-8.285
N9370X7.888Y10.555Z-8.283
N9380X7.715Y10.682Z-8.282
N9390X7.552Y10.797
N9400X7.388Y10.911
N9410X7.221Y11.022
N9420X7.053Y11.13
N9430X6.866Y11.246
N9440X6.696Y11.349
N9450X6.524Y11.448
N9460X6.352Y11.545
N9470X6.177Y11.639
N9480X5.979Y11.742

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N5370X-15.577Y8.993
N5380X-15.573Y8.991Z-7.
N5390X-15.571Y8.99Z-6.999
N5400X-15.578Y8.994Z-7.002
N5410X-15.585Y8.999Z-7.001
N5420X-15.588Y9.Z-6.999
N5430Y8.999Z-7.
N5440X-15.586Y8.998Z-7.001
N5450X-15.583Y8.997
N5460X-15.582Y8.996Z-7.002
N5470G0Z3.
N5480G91G28Z0
N5490G49H0
N5500G28X0Y0
N5510M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z3.

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH2)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.

.

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Finish 2

N450X-10.26Y13.979
N460X-10.381Y13.89
N470X-10.531Y13.775
N480X-10.654Y13.681
N490X-10.817Y13.553
N500X-10.979Y13.422
N510X-11.117Y13.308
N520X-11.214Y13.226
N530X-11.337Y13.12
N540X-11.456Y13.017
N550X-11.592Y12.897
.
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.
N6360X-.003
N6370X-.006Y-.002
N6380X-.005Y.002
N6390X-.002Y.003
N6400X.003Y.002
N6410Y-.002
N6420X-.001Y-.005
N6430X-.006Y-.003
N6440Y-.002
N6450G0Z3.
N6460G91G28Z0
N6470G49H0
N6480G28X0Y0
N6490M30

Lampiran 35 . NC –Code inner pada percobaan 6

Roughing 1

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z10.

N40T1M6

N50G54G90

N60(Toolpath Name: ROUGHING 1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 1)

N110(Tool Id: Boll 12_4)

N120(Coolant: None)

N130(Gauge Length: 150,0)

N140(Block:)

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.

N1630X3.832Y-1.906

N1640X3.758Y-2.072

N1650X3.672Y-2.225

N1660X3.55Y-2.394

N1670G2X.254Y-4.277I-3.794J2.813

N1680G1X.139Y-4.29

N1690X.016Y-4.296

N1700X-.152Y-4.29

N1710X-.266Y-4.279

N1720G2X-1.975Y-3.76I.474J4.636

N1730G3X-3.353Y-6.358I-.689J-1.299

N1740X.678Y-5.123I1.397J2.635

N1750X-.552Y-1.091I-2.633J1.4

N1760G2X-1.187Y-.032I.565J1.059

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.

N5790X.061Y3.525

N5800G3X-.721Y2.77I-.052J-.729

N5810G1X-.669Y1.307

N5820G3X.061Y.602I.73J.026
N5830G2X.573Y.09I0J-.512
N5840X-.45Y.09I-.512J0
N5850X.061Y.602I.512J0
N5860G3X.667Y2.064I0J.856
N5870G2X.061Y3.525I1.461J1.461
N5880G0Z10.
N5890G91G28Z0
N5900G49H0
N5910G28X0Y0
N5920M30

Roughing 2

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z3.
N40T2M6
N50G54G90
N60(Toolpath Name: ROUGHING 2)
N70(Output:)
N80(Units: MM)
N90(Tool Coordinates: Tip)
N100(Tool Number: 2)
N110(Tool Id: Boll 6)
N120(Coolant: None)
N130(Gauge Length: 130,0)
N140(Block:)

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. .
.
N2620G3X-11.116Y-4.51I.207J-.173
N2630G1X-11.068Y-4.629
N2640X-10.948Y-4.904

N2650X-10.734Y-5.362

N2660X-10.452Y-5.894

N2670X-10.088Y-6.497

N2680X-9.701Y-7.062

N2690X-9.603Y-7.191

N2700X-9.297Y-7.585

N2710X-9.04Y-7.891

N2720X-8.768Y-8.192

N2730X-8.495Y-8.475

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N4250X-1.864Y1.556

N4260X-2.068Y1.272

N4270X-2.147Y1.13

N4280X-2.26Y.885

N4290X-2.359Y.565

N4300X-2.412Y.282

N4310X-2.43Y0

N4320X-2.423Y-.106

N4330G0Z3.

N4340G91G28Z0

N4350G49H0

N4360G28X0Y0

N4370M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z3.

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH1)

N70(Output:)

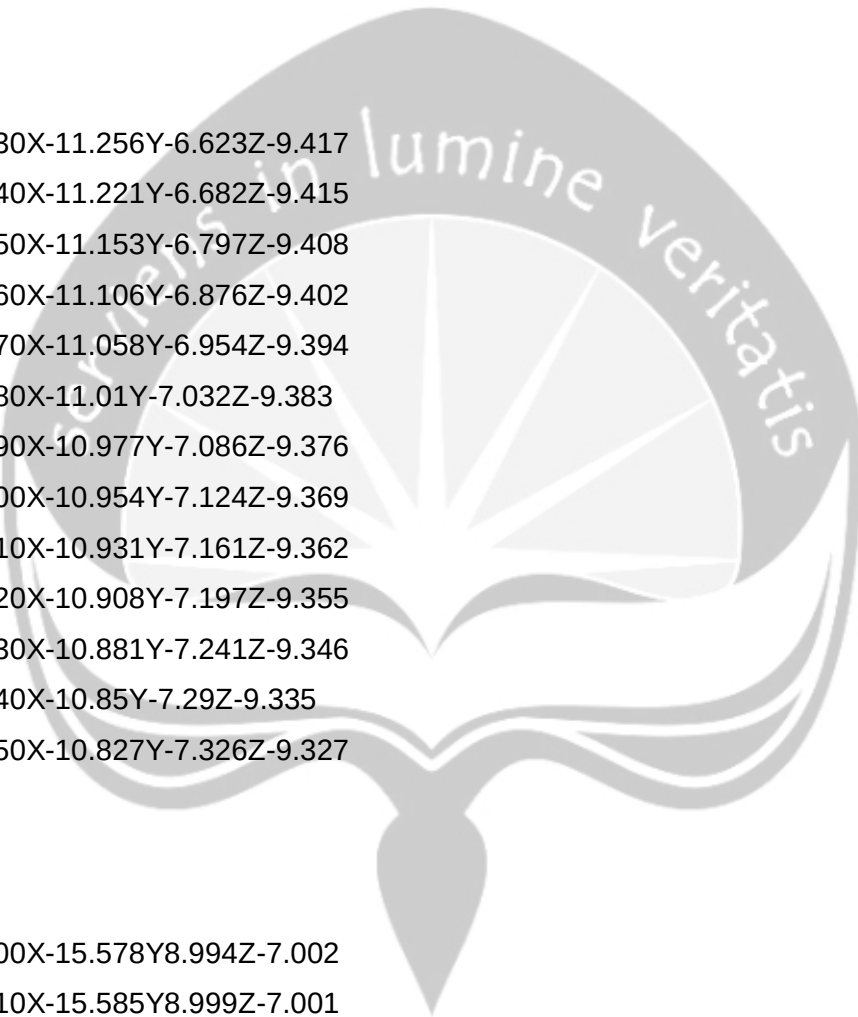
Finish 1

N80(Units: MM)
N90(Tool Coordinates: Tip)
N100(Tool Number: 3)
N110(Tool Id: Boll 4)
N120(Coolant: None)
N130(Gauge Length: 224,0)
N140(Block:)

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.

N9130X-11.256Y-6.623Z-9.417
N9140X-11.221Y-6.682Z-9.415
N9150X-11.153Y-6.797Z-9.408
N9160X-11.106Y-6.876Z-9.402
N9170X-11.058Y-6.954Z-9.394
N9180X-11.01Y-7.032Z-9.383
N9190X-10.977Y-7.086Z-9.376
N9200X-10.954Y-7.124Z-9.369
N9210X-10.931Y-7.161Z-9.362
N9220X-10.908Y-7.197Z-9.355
N9230X-10.881Y-7.241Z-9.346
N9240X-10.85Y-7.29Z-9.335
N9250X-10.827Y-7.326Z-9.327

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.
N5400X-15.578Y8.994Z-7.002
N5410X-15.585Y8.999Z-7.001
N5420X-15.588Y9.Z-6.999
N5430Y8.999Z-7.
N5440X-15.586Y8.998Z-7.001
N5450X-15.583Y8.997
N5460X-15.582Y8.996Z-7.002
N5470G0Z3.
N5480G91G28Z0



N5490G49H0

N5500G28X0Y0

N5510M30

Finish 2

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z3.

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH2)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

.

.

.

N940X-17.322Y-2.155

N950X-17.352Y-1.891

N960X-17.376Y-1.645

N970X-17.396Y-1.428

N980X-17.404Y-1.323

N1030X-17.436Y-.8

N1040X-17.442Y-.678

N1050X-17.446Y-.555

.

.

N4140X16.247Y-.945Z-.573

N4150X16.294Y-1.179Z-.45

N4160X16.34Y-1.406Z-.324
N4170X16.385Y-1.632Z-.188
N4180X16.403Y-1.72Z-.132
N4190G0Z3.
N4200G91G28Z0
N4210G49H0
N4220G28X0Y0
N4230M30

Lampiran 36 . NC –Code inner pada percobaan 7

Roughing 1

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z10.
N40T1M6
N50G54G90
N60(Toolpath Name: ROUGHING 1)
N70(Output:)
N80(Units: MM)
N90(Tool Coordinates: Tip)
N100(Tool Number: 1)
N110(Tool Id: Boll 12_4)
N120(Coolant: None)
N130(Gauge Length: 150,0)
N140(Block:)

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. .
.
N540X8.301Y-6.358
N550X8.803Y-5.641
N560X9.245Y-4.891
N570X9.488Y-4.402
N580X9.782Y-3.694
N590X10.036Y-2.934

N600X10.169Y-2.445

N610X10.357Y-1.467

N620X10.413Y-.978

N630X10.447Y-.489

N640X10.458Y0

N650X10.447Y.489

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.

N5800G3X-.721Y2.77I-.052J-.729

N5810G1X-.669Y1.307

N5820G3X.061Y.602I.73J.026

N5830G2X.573Y.09I0J-.512

N5840X-.45Y.09I-.512J0

N5850X.061Y.602I.512J0

N5860G3X.667Y2.064I0J.856

N5870G2X.061Y3.525I1.461J1.461

N5880G0Z10.

N5890G91G28Z0

N5900G49H0

N5910G28X0Y0

N5920M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z3.

N40T2M6

N50G54G90

N60(Toolpath Name: ROUGHING 2)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 2)

Roughing 2

N110(Tool Id: Boll 6)

N120(Coolant: None)

N130(Gauge Length: 130,0)

N140(Block:)

.

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.

N5240G3X7.967Y8.204I-11.295J-1.231

N5250G1X7.908Y8.261

N5260G3X6.382Y9.489I-7.512J-7.771

N5270G1X6.288Y9.552

N5280X6.082Y9.683

N5290X6.026Y9.718

N5300X5.79Y9.858

N5310X5.552Y9.994

N5320X5.493Y10.027

N5330X5.382Y10.088

N5340X5.338Y10.111

N5350G3X3.653Y10.835I-5.352J-10.133

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.

N4260X-2.068Y1.272

N4270X-2.147Y1.13

N4280X-2.26Y.885

N4290X-2.359Y.565

N4300X-2.412Y.282

N4310X-2.43Y0

N4320X-2.423Y-.106

N4330G0Z3.

N4340G91G28Z0

N4350G49H0

N4360G28X0Y0

N4370M30

Finish 1

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z3.

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

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.

N7580X-3.231Y-10.9Z-14.207

N7590X-3.07Y-10.911Z-14.265

N7600X-2.908Y-10.921Z-14.319

N7610X-2.737Y-10.931Z-14.374

N7620X-2.571Y-10.941Z-14.423

N7630X-2.404Y-10.949Z-14.469

N7640X-2.237Y-10.958Z-14.512

N7650X-2.057Y-10.966Z-14.553

N7660X-1.885Y-10.973Z-14.59

N7670X-1.712Y-10.98Z-14.624

N7680X-1.545Y-10.986Z-14.653

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N5410X-15.585Y8.999Z-7.001

N5420X-15.588Y9.Z-6.999

N5430Y8.999Z-7.
N5440X-15.586Y8.998Z-7.001
N5450X-15.583Y8.997
N5460X-15.582Y8.996Z-7.002
N5470G0Z3.
N5480G91G28Z0
N5490G49H0
N5500G28X0Y0
N5510M30

Finish 2

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z3.
N40T3M6
N50G54G90
N60(Toolpath Name: FINISH2)
N70(Output:)
N80(Units: MM)
N90(Tool Coordinates: Tip)
N100(Tool Number: 3)
N110(Tool Id: Boll 4)
N120(Coolant: None)
N130(Gauge Length: 224,0)
N140(Block:)

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.
.
N9560X2.317Y-5.28Z-19.367
N9570X1.663Y-5.537Z-19.363
N9580X1.12Y-5.704Z-19.348
N9590X.569Y-5.843Z-19.321
N9600X.346Y-5.887Z-19.308

N9610X.205Y-5.889Z-19.31
N9620X.067Y-5.886Z-19.311
N9630X-.139Y-5.884Z-19.312
N9640X-.344Y-5.878
N9650X-.548Y-5.858Z-19.313
N9660X-1.052Y-5.768Z-19.322

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N6350X-.214Y-.059Z-20.694
N6360X-.252Y-.112Z-20.693
N6370X-.264Y-.111
N6380X-.233Y-.051Z-20.694
N6390X-.197Y-.028Z-20.695
N6400G0Z3.
N6410G91G28Z0
N6420G49H0
N6430G28X0Y0
N6440M30

Lampiran 37 . NC –Code inner pada percobaan 8

Roughing 1

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z10.
N40T1M6
N50G54G90
N60(Toolpath Name: ROUGHING 1)
N70(Output:)
N80(Units: MM)
N90(Tool Coordinates: Tip)
N100(Tool Number: 1)
N110(Tool Id: Boll 12_4)

N120(Coolant: None)

N130(Gauge Length: 150,0)

N140(Block:)

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.

N430X-4.886Y9.292

N440X-5.38Y9.014

N450X-5.717Y8.803

N460X-6.394Y8.323

N470X-6.577Y8.174

N480X-6.847Y7.952

N490X-7.336Y7.507

N500X-7.825Y6.997

N510X-8.314Y6.409

N520X-8.803Y5.733

N530X-9.14Y5.349

N540X-9.176Y5.298

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N5800G3X-.721Y2.77I-.052J-.729

N5810G1X-.669Y1.307

N5820G3X.061Y.602I.73J.026

N5830G2X.573Y.09I0J-.512

N5840X-.45Y.09I-.512J0

N5850X.061Y.602I.512J0

N5860G3X.667Y2.064I0J.856

N5870G2X.061Y3.525I1.461J1.461

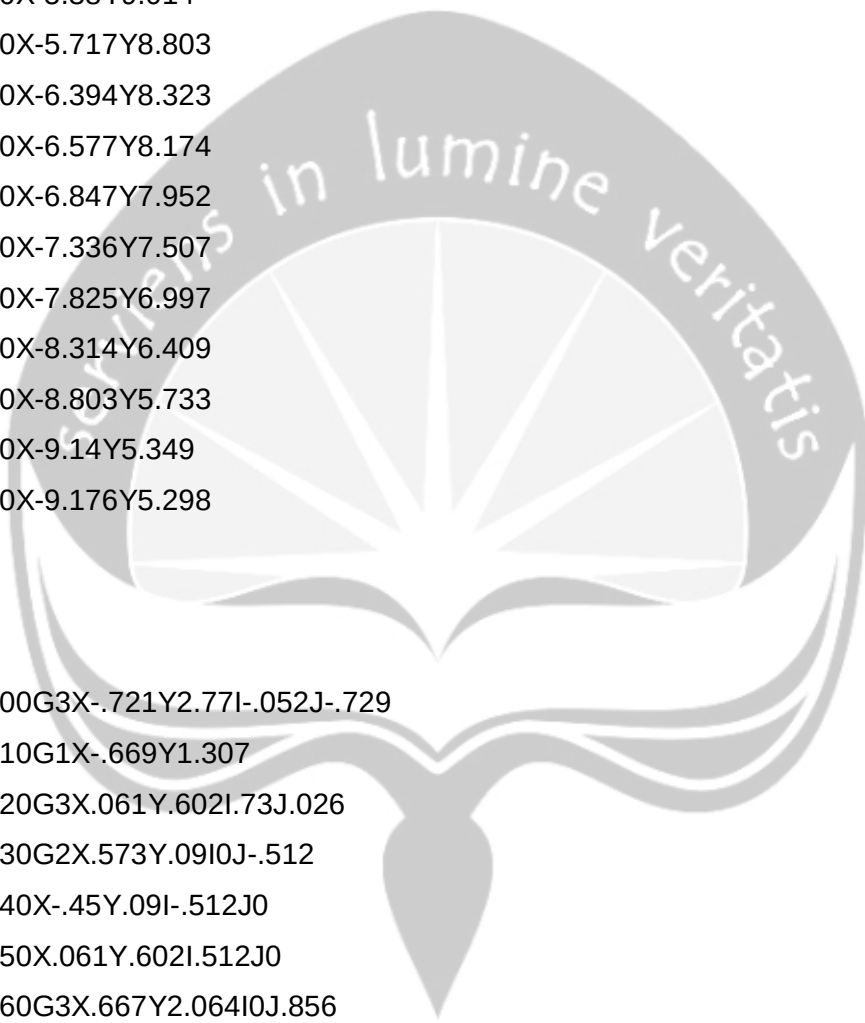
N5880G0Z10.

N5890G91G28Z0

N5900G49H0

N5910G28X0Y0

N5920M30



%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z3.

N40T2M6

N50G54G90

N60(Toolpath Name: ROUGHING 2)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 2)

N110(Tool Id: Boll 6)

N120(Coolant: None)

N130(Gauge Length: 130,0)

N140(Block:)

.

.

.

N8820G3X-9.045Y6.934I8.007J-7.786

N8830G1X-9.088Y6.877

N8840G3X-9.639Y6.081I8.115J-6.198

N8850G1X-9.75Y5.901

N8860X-10.052Y5.372

N8870X-10.065Y5.346

N8880X-10.325Y4.827

N8890X-10.552Y4.307

N8900X-10.757Y3.769

N8910X-10.931Y3.23

N8920X-11.075Y2.692

N8930X-11.192Y2.154

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N4260X-2.068Y1.272

N4270X-2.147Y1.13

N4280X-2.26Y.885

N4290X-2.359Y.565

N4300X-2.412Y.282

N4310X-2.43Y0

N4320X-2.423Y-.106

N4330G0Z3.

N4340G91G28Z0

N4350G49H0

N4360G28X0Y0

N4370M30

Finish 1

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z3.

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 3)

N110(Tool Id: Boll 4)

N120(Coolant: None)

N130(Gauge Length: 224,0)

N140(Block:)

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.

N5980X-10.358Y8.112Z-8.568

N5990X-10.382Y8.078Z-8.59

N6000X-10.416Y8.03Z-8.62

N6010X-10.45Y7.983Z-8.649

N6020X-10.501Y7.908Z-8.692
N6030X-10.536Y7.858Z-8.719
N6040X-10.571Y7.807Z-8.746
N6050X-10.606Y7.755Z-8.77
N6060X-10.641Y7.703Z-8.793
N6070X-10.676Y7.651Z-8.816
N6080X-10.72Y7.584Z-8.842

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.

N5400X-15.578Y8.994Z-7.002
N5410X-15.585Y8.999Z-7.001
N5420X-15.588Y9.Z-6.999
N5430Y8.999Z-7.
N5440X-15.586Y8.998Z-7.001
N5450X-15.583Y8.997
N5460X-15.582Y8.996Z-7.002
N5470G0Z3.
N5480G91G28Z0
N5490G49H0
N5500G28X0Y0
N5510M30

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z3.
N40T3M6
N50G54G90
N60(Toolpath Name: FINISH2)
N70(Output:)
N80(Units: MM)
N90(Tool Coordinates: Tip)
N100(Tool Number: 3)

Finish 2

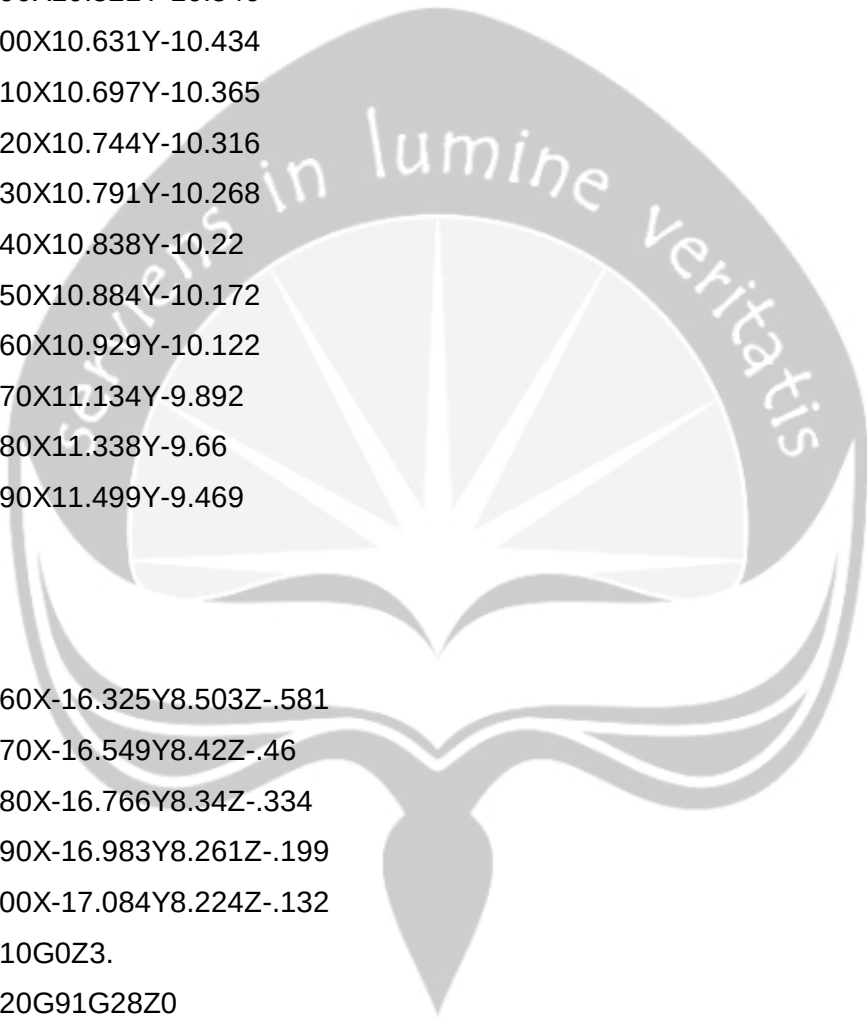
N110(Tool Id: Boll 4)
N120(Coolant: None)
N130(Gauge Length: 224,0)
N140(Block:)

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N7090X10.521Y-10.546
N7100X10.631Y-10.434
N7110X10.697Y-10.365
N7120X10.744Y-10.316
N7130X10.791Y-10.268
N7140X10.838Y-10.22
N7150X10.884Y-10.172
N7160X10.929Y-10.122
N7170X11.134Y-9.892
N7180X11.338Y-9.66
N7190X11.499Y-9.469

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N4760X-16.325Y8.503Z-.581
N4770X-16.549Y8.42Z-.46
N4780X-16.766Y8.34Z-.334
N4790X-16.983Y8.261Z-.199
N4800X-17.084Y8.224Z-.132
N4810G0Z3.
N4820G91G28Z0
N4830G49H0
N4840G28X0Y0
N4850M30



Lampiran 38 . NC –Code inner pada percobaan 9

Roughing 1

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z10.

N40T1M6

N50G54G90

N60(Toolpath Name: ROUGHING 1)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 1)

N110(Tool Id: Boll 12_4)

N120(Coolant: None)

N130(Gauge Length: 150,0)

N140(Block:)

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N5390G2X4.795Y5.6I-.458J-7.812

N5400G1X4.894Y5.517

N5410X5.046Y5.377

N5420G2X6.258Y3.967I-5.992J-6.377

N5430G1X6.371Y3.802

N5440X6.438Y3.694

N5450X6.554Y3.455

N5460G2X7.018Y2.275I-8.1J-3.866

N5470G1X7.044Y2.191

N5480G2X7.035Y-2.214I-6.978J-2.188

N5490G1X7.007Y-2.305

N5500G2X6.556Y-3.448I-8.658J2.753

N5510G1X6.474Y-3.62

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N5790X.061Y3.525

N5800G3X-.721Y2.77I-.052J-.729

N5810G1X-.669Y1.307

N5820G3X.061Y.602I.73J.026

N5830G2X.573Y.09I0J-.512

N5840X-.45Y.09I-.512J0

N5850X.061Y.602I.512J0

N5860G3X.667Y2.064I0J.856

N5870G2X.061Y3.525I1.461J1.461

N5880G0Z10.

N5890G91G28Z0

N5900G49H0

N5910G28X0Y0

N5920M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z3.

N40T2M6

N50G54G90

N60(Toolpath Name: ROUGHING 2)

N70(Output:)

N80(Units: MM)

N90(Tool Coordinates: Tip)

N100(Tool Number: 2)

N110(Tool Id: Boll 6)

N120(Coolant: None)

N130(Gauge Length: 130,0)

N140(Block:)

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Roughing 2

N6100G3X7.613Y6.813I-8.202J-6.081

N6110G1X7.562Y6.87

N6120X7.154Y7.293

N6130X7.132Y7.314

N6140X6.715Y7.699

N6150X6.322Y8.026

N6160X6.031Y8.247

N6170X5.633Y8.523

N6180X5.201Y8.794

N6190X5.174Y8.809

N6200X4.694Y9.073

N6210X4.401Y9.219

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N4280X-2.26Y.885

N4290X-2.359Y.565

N4300X-2.412Y.282

N4310X-2.43Y0

N4320X-2.423Y-.106

N4330G0Z3.

N4340G91G28Z0

N4350G49H0

N4360G28X0Y0

N4370M30

%

:0001

N10G91G28X0Y0Z0

N20G40G17G80G49

N30G0G90Z3.

N40T3M6

N50G54G90

N60(Toolpath Name: FINISH1)

Finish 1

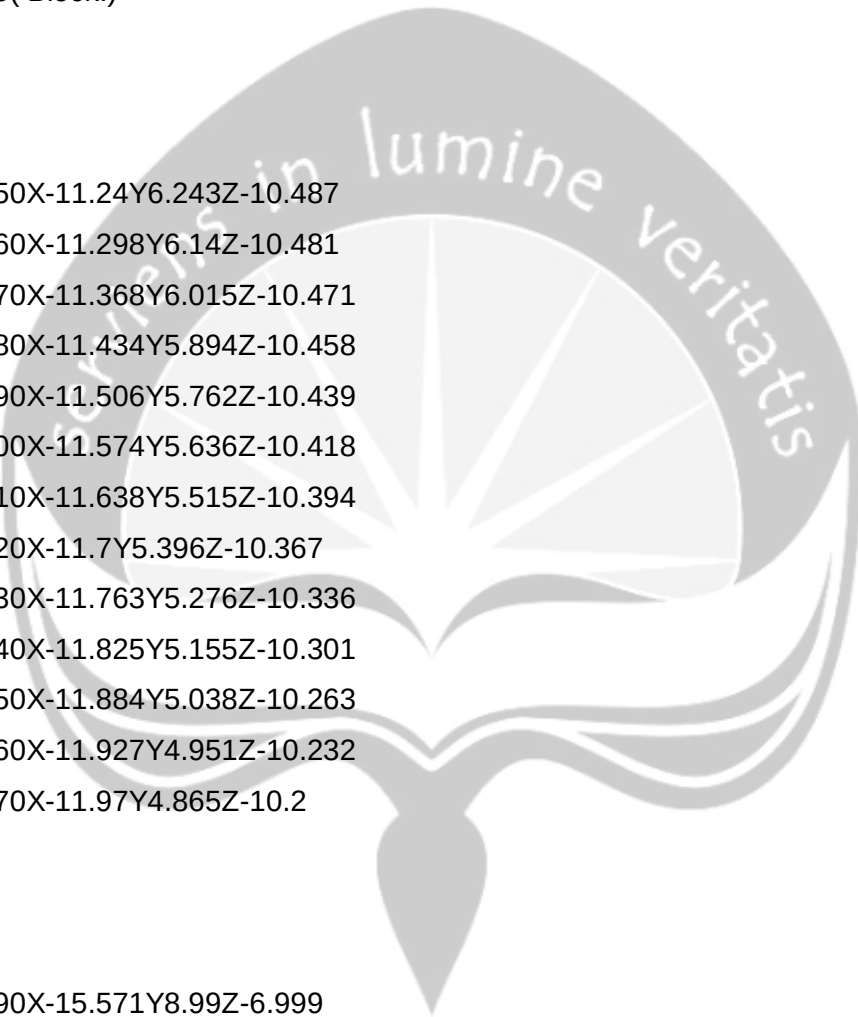
N70(Output:)
N80(Units: MM)
N90(Tool Coordinates: Tip)
N100(Tool Number: 3)
N110(Tool Id: Boll 4)
N120(Coolant: None)
N130(Gauge Length: 224,0)
N140(Block:)

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N6950X-11.24Y6.243Z-10.487
N6960X-11.298Y6.14Z-10.481
N6970X-11.368Y6.015Z-10.471
N6980X-11.434Y5.894Z-10.458
N6990X-11.506Y5.762Z-10.439
N7000X-11.574Y5.636Z-10.418
N7010X-11.638Y5.515Z-10.394
N7020X-11.7Y5.396Z-10.367
N7030X-11.763Y5.276Z-10.336
N7040X-11.825Y5.155Z-10.301
N7050X-11.884Y5.038Z-10.263
N7060X-11.927Y4.951Z-10.232
N7070X-11.97Y4.865Z-10.2

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N5390X-15.571Y8.99Z-6.999
N5400X-15.578Y8.994Z-7.002
N5410X-15.585Y8.999Z-7.001
N5420X-15.588Y9.Z-6.999
N5430Y8.999Z-7.
N5440X-15.586Y8.998Z-7.001
N5450X-15.583Y8.997
N5460X-15.582Y8.996Z-7.002



N5470G0Z3.
N5480G91G28Z0
N5490G49H0
N5500G28X0Y0
N5510M30

Finish 2

%
:0001
N10G91G28X0Y0Z0
N20G40G17G80G49
N30G0G90Z3.
N40T3M6
N50G54G90
N60(Toolpath Name: FINISH2)
N70(Output:)
N80(Units: MM)
N90(Tool Coordinates: Tip)
N100(Tool Number: 3)
N110(Tool Id: Boll 4)
N120(Coolant: None)
N130(Gauge Length: 224,0)
N140(Block:)

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N3110X11.396Y7.549
N3120X11.45Y7.505
N3130X11.499Y7.475Z-1.661
N3140X11.551Y7.45
N3150X11.606Y7.431Z-1.66
N3160X11.665Y7.414Z-1.661
N3170X11.713Y7.406Z-1.662
N3180X11.756Y7.405Z-1.661
N3190X11.791Y7.406Z-1.66

N3200X11.827Y7.409

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N5630X-1.802Y-6.912

N5640X-1.581Y-6.966

N5650X-1.359Y-7.012

N5660X-1.126Y-7.054

N5670X-.899Y-7.086

N5680X-.671Y-7.112

N5690X-.441Y-7.129

N5700X-.22Y-7.14

N5710X.001Y-7.143

N5720G0Z3.

N5730G91G28Z0

N5740G49H0

N5750G28X0Y0

N5760M30

