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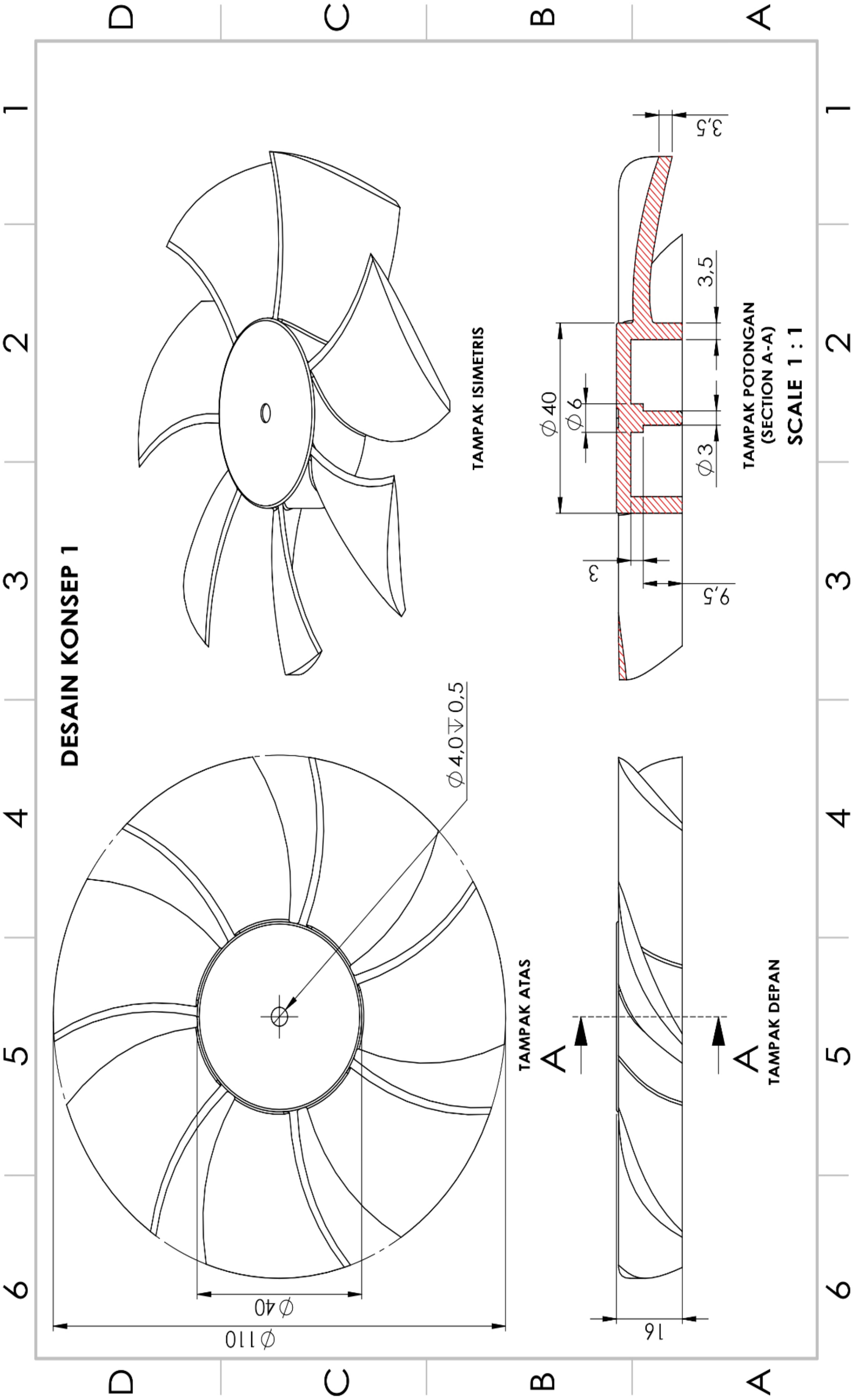
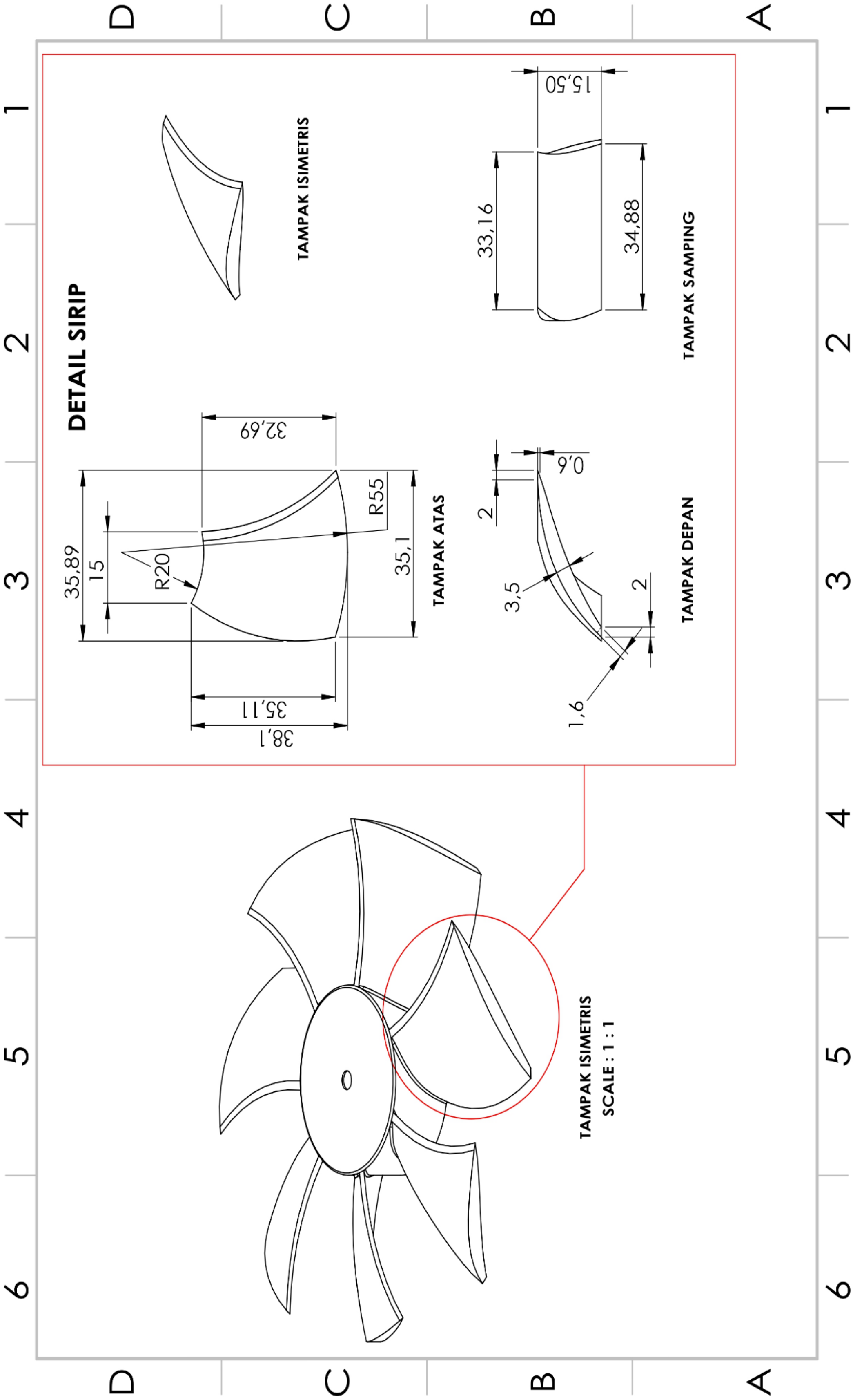
LAMPIRAN

Lampiran 1. Konsep *2D Drawing Propeller*

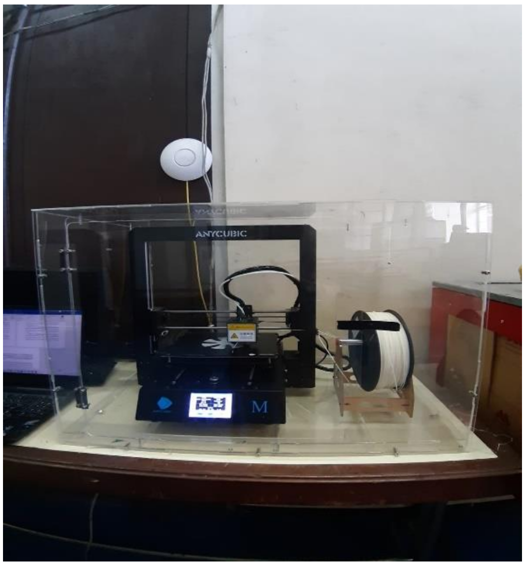


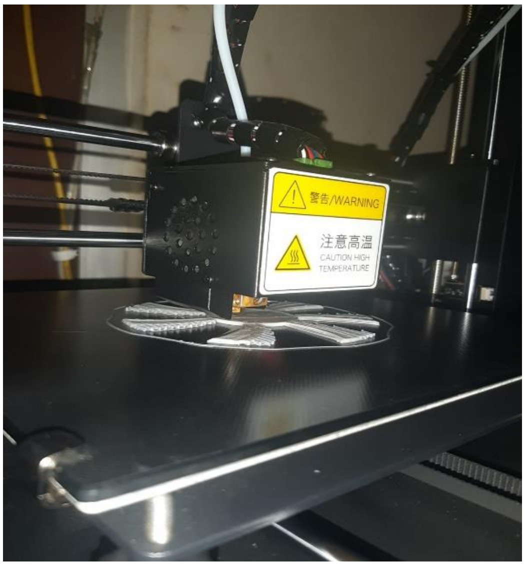
Lampiran 2. Konsep *2D Drawing Blade*

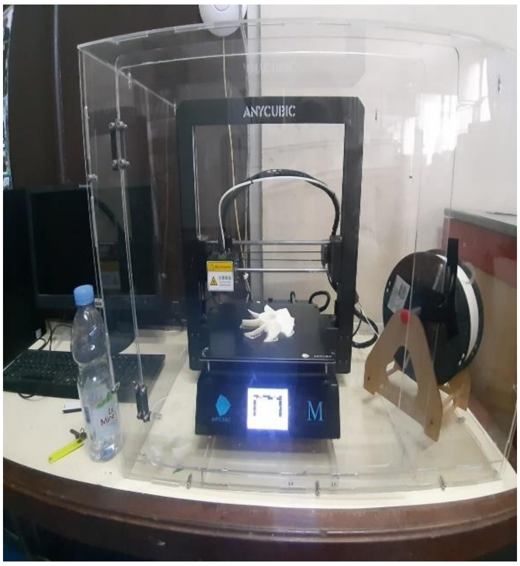


Lampiran 3. Proses Pencetakan Desain Produk pada PLA

Lampiran 4. Proses Pencetakan Desain Produk ABS







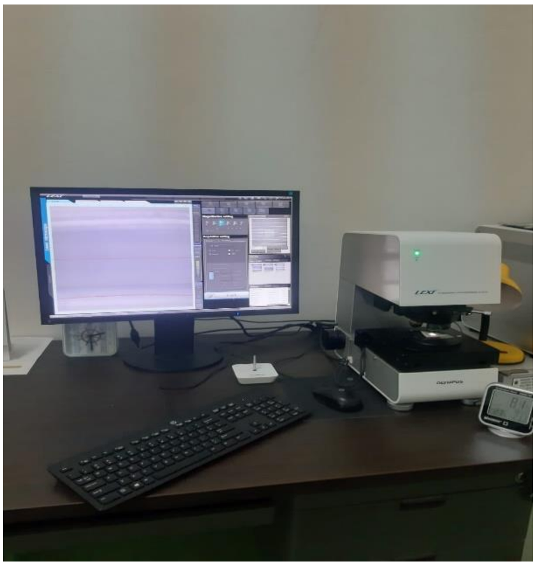
Lampiran 5. Data Waktu Pencetakan Material PLA

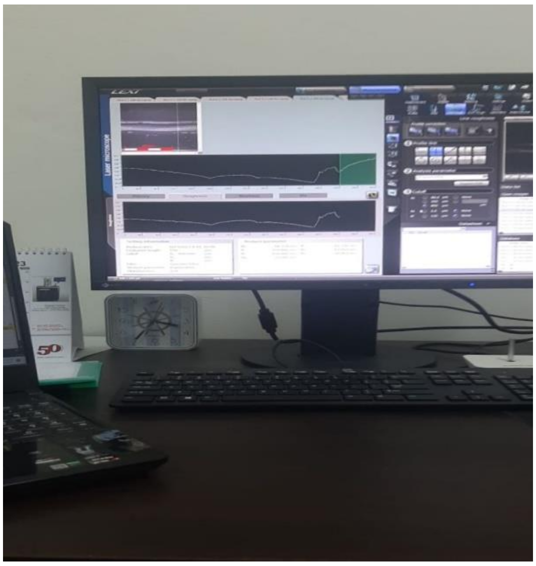
Eksp No.	*Layer thickness* (mm)	*Infill density* (%)	Respon parameter proses		
			Time slicer	Weight (gr)	Machine Time
1		60	08:23	37.1	08:20
2	0.1	80	08:34	39.8	08:31
3		100	09:24	41	09:15
4		60	04:18	35	04:10
5	0.2	80	04:32	38	04:25
6		100	04:40	39.1	04:33
7		60	02:56	34	02:58
8	0.3	80	03:14	35.8	03:10
9		100	03:32	36	03:30

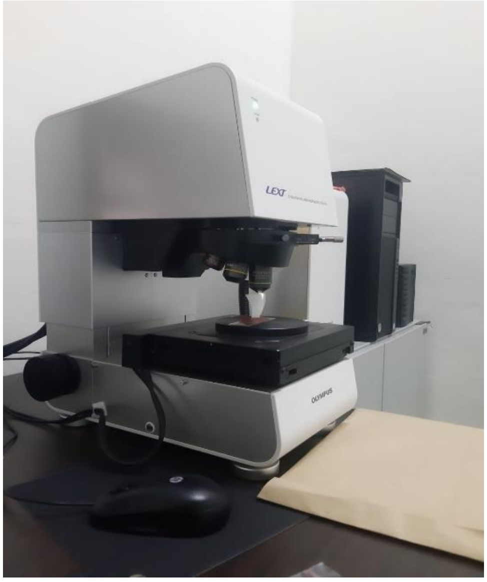
Lampiran 6. Data Waktu Pencetakan Material ABS

Eksp No.	*Layer thickness* (mm)	*Infill density* (%)	Respon proses pencetakan		
			Time slicer	Weight (gr)	Machine Time
1		60	06:11	37	06:04
2	0.1	80	06:49	38.6	06:41
3		100	07:20	39.1	07:10
4		60	03:28	35.4	03:35
5	0.2	80	03:39	36	03:32
6		100	03:45	37	03:48
7		60	02:20	34	02:20
8	0.3	80	02:26	35.1	02:27
9		100	02:35	36	02:40

Lampiran 7. Dokumentasi Penelitian



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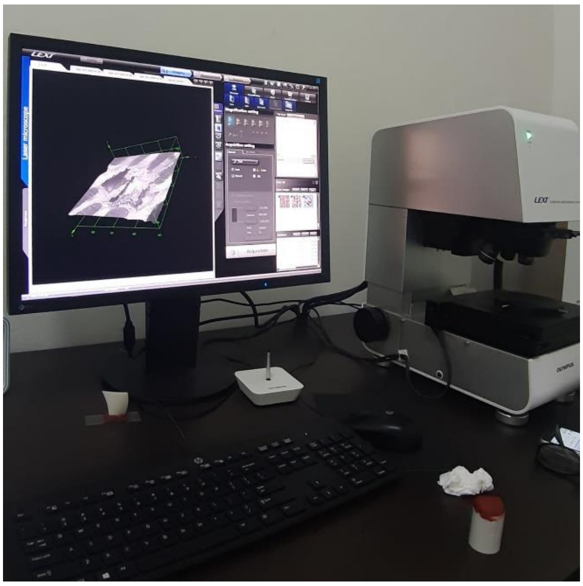
OLYMPUS




12M 4032x3024


12M 4032x3024

Lampiran 8. Data Pengujian *Roughness Cut off* 800 µm-ABS

Metode Gaussian Filter *Cut off* 800µm; Evaluation length 550 µm; ƛc 800 µm; ƛs None; ƛf None (ISO 4288)

Exp No.	Parameter proses divariasikan		Data *Roughness* (µm)					
	***Infill density* (ID) %**	***Layer thickness* (LT) mm**	**Ujung--1**	**Mean**	**S.D**	**Ujung--3**	**Mean**	**S.D**
1	60%	0.1	21.742	25.157	1.934	22.377	24.469	2.184
			25.835			22.338		
			25.758			24.869		
			25.919			25.219		
			26.532			27.540		
2		0.2	23.985	25.331	1.144	31.279	32.899	1.214
			26.218			33.271		
			25.616			33.005		
			24.291			32.360		
			26.546			34.581		
3		0.3	25.136	26.705	1.528	26.355	29.768	2.848
			27.040			29.199		
			27.253			29.726		
			25.284			29.290		
			28.813			34.268		
4	80%	0.1	22.895	24.517	1.263	15.371	18.926	2.080
			24.356			19.313		
			24.797			19.11		
			24.148			20.299		
			26.389			20.538		
5		0.2	25.032	26.231	1.294	28.847	27.379	1.916
			25.298			25.591		
			26.335			26.479		
			26.168			26.018		
			28.322			29.961		
6		0.3	26.811	28.561	1.559	28.878	33.425	3.682
			28.308			32.679		
			27.904			31.575		
			28.744			35.57		

			31.037			38.422		
7	100%	0.1	20.705	22.166	1.853	21.645	24.221	2.363
			20.937			24.799		
			22.093			23.373		
			21.778			23.343		
			25.317			27.945		
8		0.2	34.469	37.442	2.215	30.319	36.889	3.746
			38.482			38.68		
			37.744			37.615		
			36.222			38.207		
			40.291			39.626		
9		0.3	29.882	30.821	1.022	23.765	25.191	1.704
			30.407			23.234		
			30.366			26.75		
			30.927			27.014		
			32.525			25.191		

Lampiran 9. Data Pengujian *Roughness Cut off* 800 µm-PLA

Exp No.	Parameter proses		Data *Roughness* (µm)					
	Infill density **(ID) %**	***Layer thickness*** **(LT) mm**	**Ujung--1**	**Mean**	**S.D**	**Ujung--3**	**Mean**	**S.D**
1	60%	0.1	26.387	28.945	2.413	21.857	22.639	0.983
			27.770			23.111		
			28.095			21.909		
			29.800			22.169		
			32.675			24.148		
2		0.2	27.482	30.463	2.548	18.636	19.249	0.492
			28.761			18.831		
			31.357			19.527		
			30.597			19.456		
			34.119			19.793		
3		0.3	38.850	40.307	1.260	21.891	24.689	2.640
			39.512			22.534		
			41.300			24.267		
			39.983			26.746		
			41.890			28.006		
4	80%	0.1	21.944	23.290	1.118	22.035	23.013	0.794
			23.244			22.636		
			23.038			23.549		
			23.173			22.789		
			25.052			24.056		
5		0.2	22.994	24.531	1.669	28.816	32.623	2.266
			24.112			32.620		
			25.031			33.761		
			23.349			33.191		
			27.169			34.728		
6		0.3	36.279	39.183	1.914	18.005	23.336	3.741
			38.747			22.806		
			39.800			22.341		
			39.558			25.579		

			41.529			27.948		
7	100%	0.1	18.517	20.269	1.156	19.439	20.792	1.238
			20.173			20.229		
			20.342			20.472		
			20.570			21.080		
			21.743			22.741		
8		0.2	18.060	22.108	2.690	26.147	30.623	4.068
			21.952			28.297		
			21.598			27.646		
			23.708			34.995		
			25.224			36.030		
9		0.3	38.987	39.870	0.826	17.959	21.145	2.507
			40.454			19.629		
			39.560			21.431		
			39.361			22.158		
			40.988			24.548		

Lampiran 10. Data Pengujian Kekasaran *Cut off* 25 µm-ABS

Metode Gaussian Filter *Cut off* 25µm; Evaluation length 550 µm; ƛc 25µm; ƛs None; ƛf None (ISO 4287)

Exp No.	Parameter proses		Data Roughness						
	Infill density **(ID)%**	***Layer thickness*** **(LT) mm**	**Ujung--1**	**Mean**	**S.D**	**Ujung--3**	**Mean**	**S.D**	
1	60%	0.1	1.229	1.476	0.159	0.875	1.256	0.181	
			1.538			1.063			
			1.245			1.409			
			1.497			1.142			
			1.870			1.791			
2		0.2	0.677	0.944	0.181	0.870	1.104	0.049	
			0.976			1.006			
			1.134			0.933			
			0.773			1.027			
			1.161			1.683			
3		0.3	0.615	0.795	0.088	0.901	1.285	0.237	
			0.881			1.249			
			0.705			1.512			
			0.802			1.040			
			0.974			1.723			
4	80%	0.1	1.179	1.431	0.106	0.740	1.025	0.136	
			1.373			0.979			
			1.348			0.907			
			1.337			1.171			
			1.919			1.327			
5		0.2	0.904	1.116	0.100	0.958	1.226	0.043	
			1.098			1.061			
			1.185			1.056			
			0.986			1.133			
			1.409			1.921			
6		0.3	0.766	1.074	0.083	0.763	1.053	0.174	
			1.015			1.192			
			0.908			0.917			

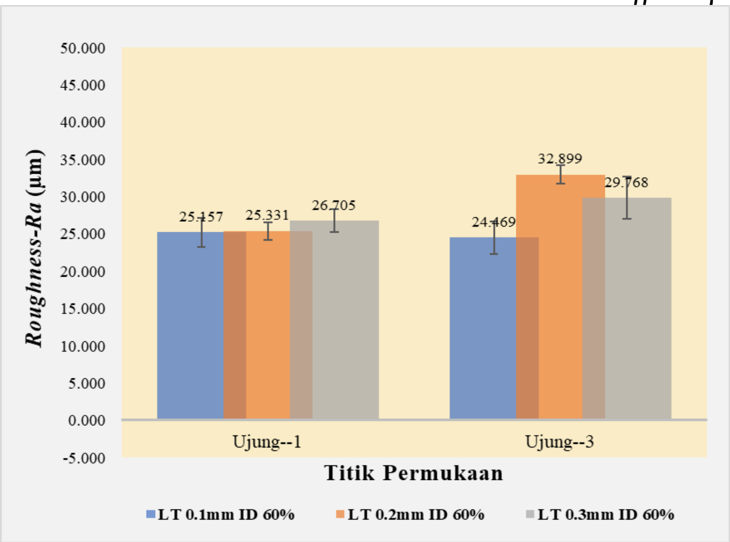
			1.071			0.871			
			1.608			1.522			
			1.037			0.894			
			1.206			0.986			
7		0.1	1.418	1.327	0.120	0.991	1.047	0.055	
			1.213			0.965			
			1.763			1.400			
			1.116			1.037			
			1.254			1.322			
8	100	0.2	1.314	1.426	0.147	1.344	1.342	0.062	
			1.533			1.228			
			1.915			1.779			
			0.798			0.698			
			0.933			0.811			
9		0.3	1.091	1.031	0.109	0.686	0.874	0.111	
			0.882			0.908			
			1.449			1.269			

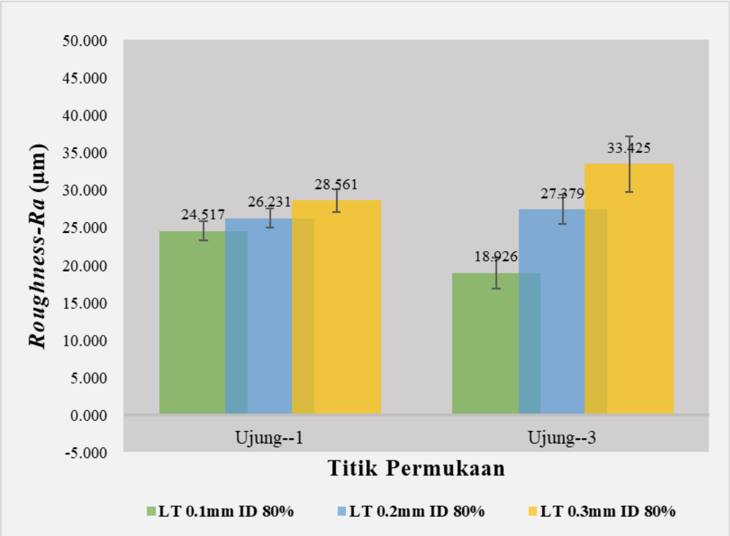
Lampiran 11. Data Pengujan *Roughness Cut off* 25 µm-PLA

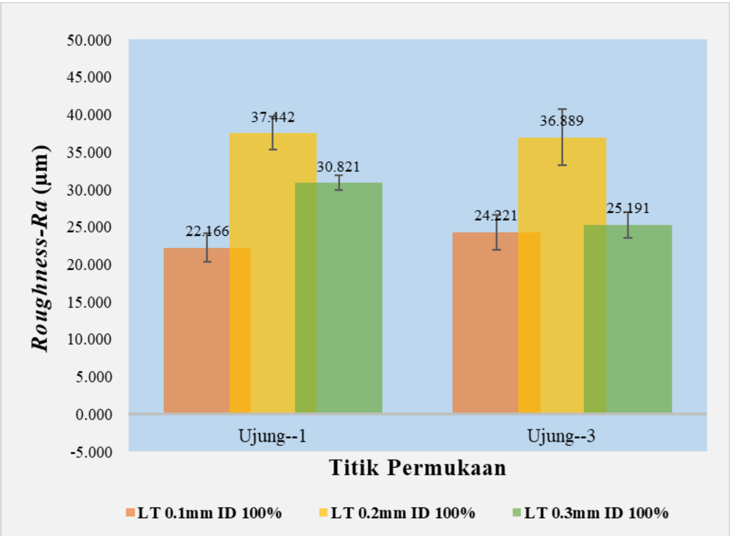
Exp No.	Parameter proses divariasikan		Data Roughness (µm)					
	Infill density **(ID) %**	***Layer thickness*** **(LT) mm**	**Ujung--1**	**Mean**	**S.D**	**Ujung--3**	**Mean**	**S.D**
1	60%	0.1	26.387	28.945	2.413	21.857	22.639	0.983
			27.770			23.111		
			28.095			21.909		
			29.800			22.169		
			32.675			24.148		
2		0.2	27.482	30.463	2.548	18.636	19.249	0.492
			28.761			18.831		
			31.357			19.527		
			30.597			19.456		
			34.119			19.793		
3		0.3	39.983	42.566	1.809	21.891	24.689	2.640
			42.976			22.534		
			42.184			24.267		
			42.654			26.746		
			45.035			28.006		
4	80%	0.1	21.944	23.290	1.118	22.035	23.013	0.794
			23.244			22.636		
			23.038			23.549		
			23.173			22.789		
			25.052			24.056		
5		0.2	22.994	24.531	1.669	28.816	32.623	2.266
			24.112			32.620		
			25.031			33.761		
			23.349			33.191		
			27.169			34.728		
6		0.3	36.279	39.183	1.914	18.005	23.336	3.741
			38.747			22.806		
			39.800			22.341		
			39.558			25.579		
			41.529			27.948		
7	100%	0.1	18.517	20.269	1.156	19.439	20.792	1.238
			20.173			20.229		

			20.342			20.472		
			20.570			21.080		
			21.743			22.741		
			18.060			26.147		
			21.952			28.297		
8		0.2	21.598	22.108	2.690	27.646	30.623	4.546
			23.708			34.995		
			25.224			36.030		
			38.987			17.959		
			40.454			19.629		
9		0.3	41.988	41.598	1.906	21.431	21.145	2.507
			42.731			22.158		
			43.828			24.548		

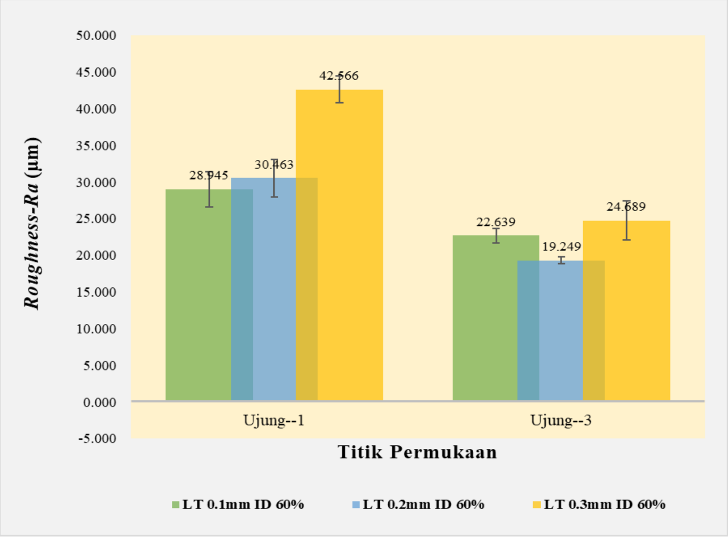
Lampiran 12. Grafik Hasil Kekasaran Permukaan ABS *Cut off* 800µm

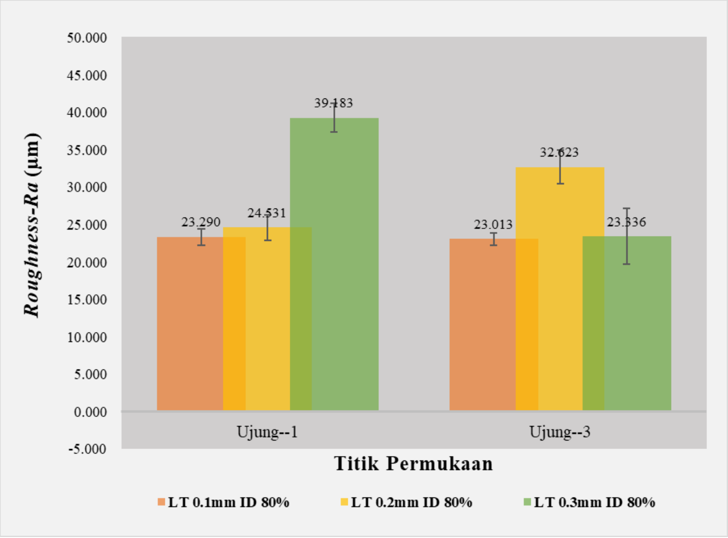


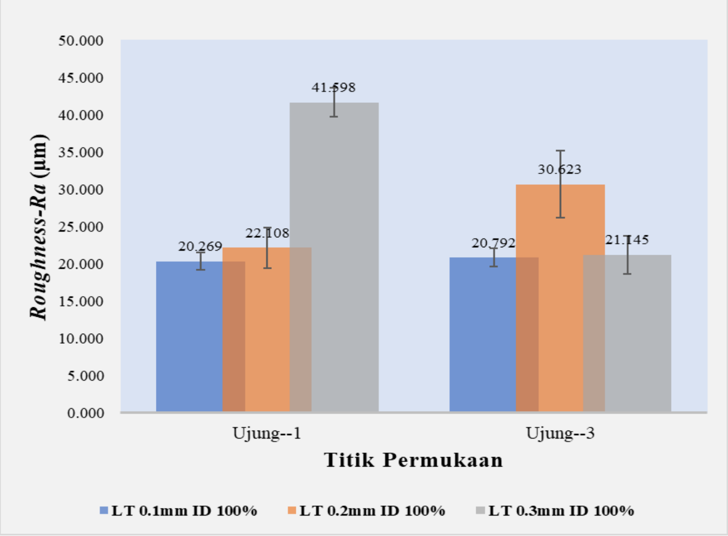




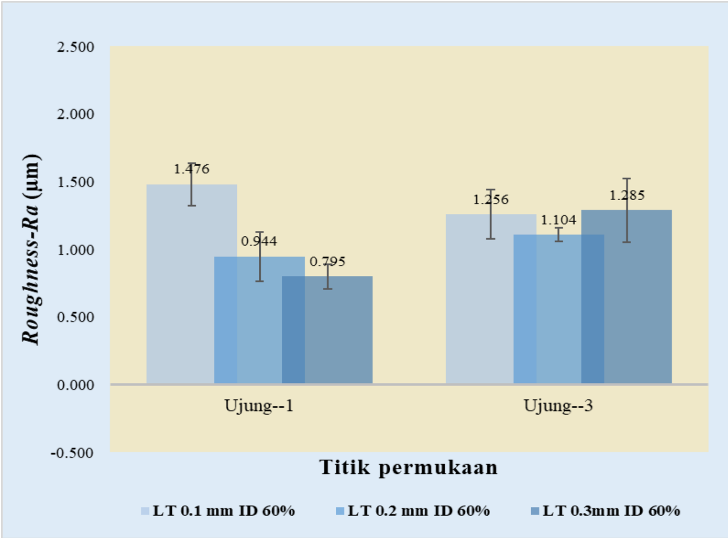
Lampiran 13. Grafik Hasil Kekasaran Permukaan PLA *Cut off* 800µm

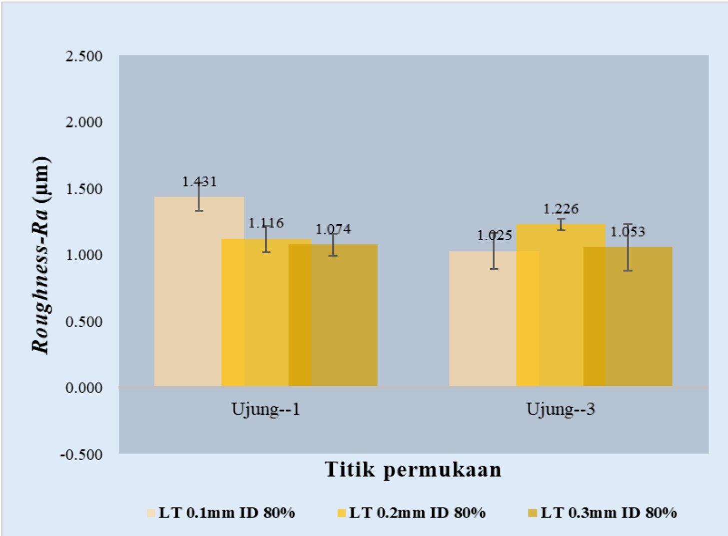


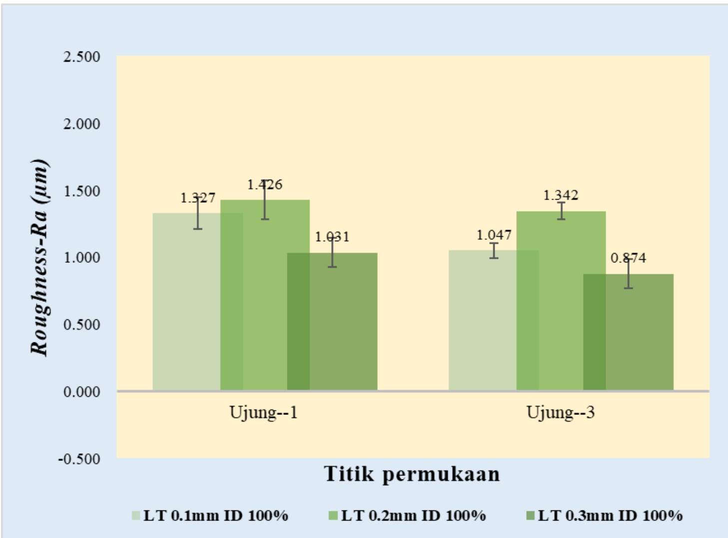




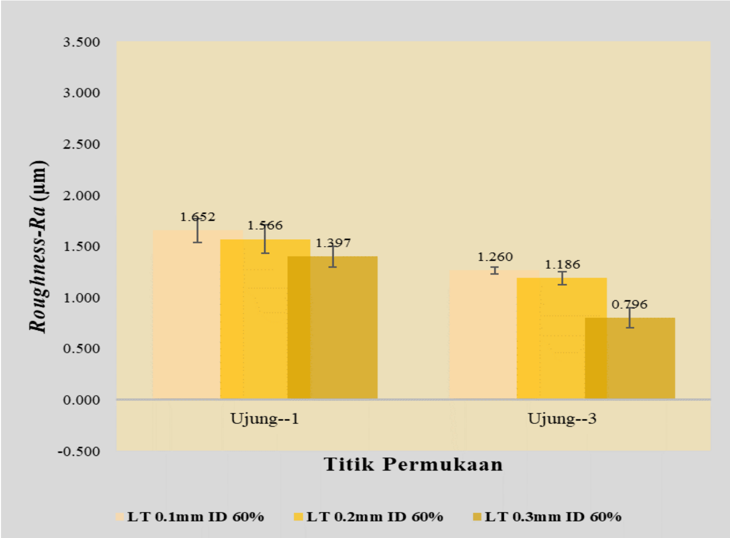
Lampiran 14. Grafik Hasil Kekasaran Permukaan ABS *Cut off* 25 µm

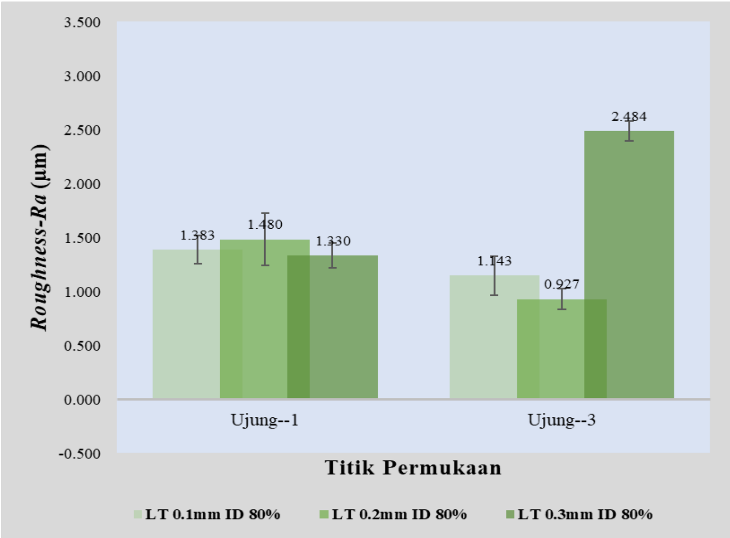


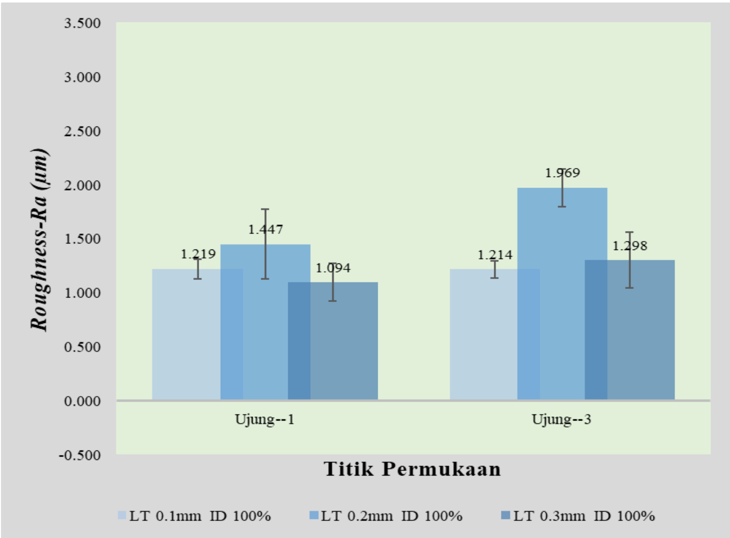




Lampiran 15. Grafik Hasil Kekasaran Permukaan PLA *Cut off* 25 µm

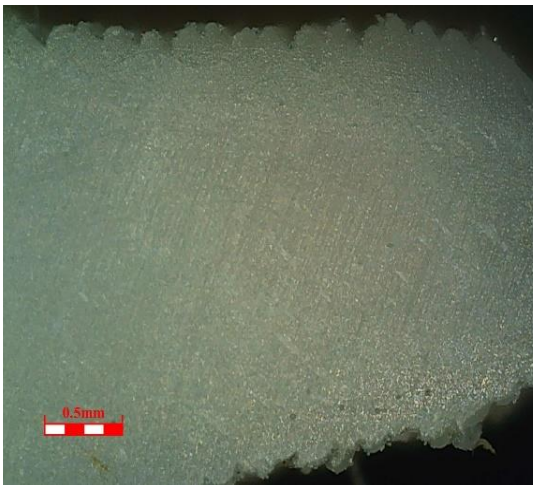




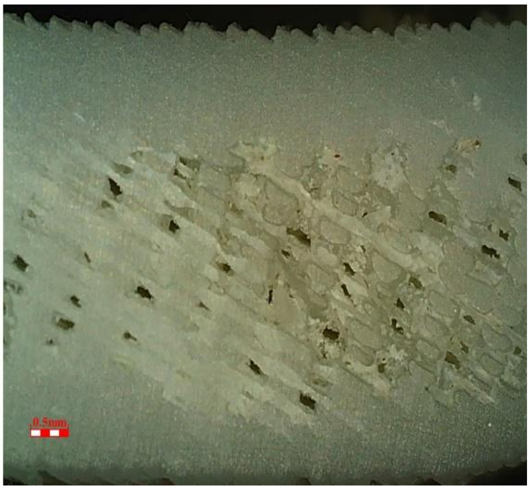


Lampiran 16. Hasil Foto *Morphology* Permukaan ABS

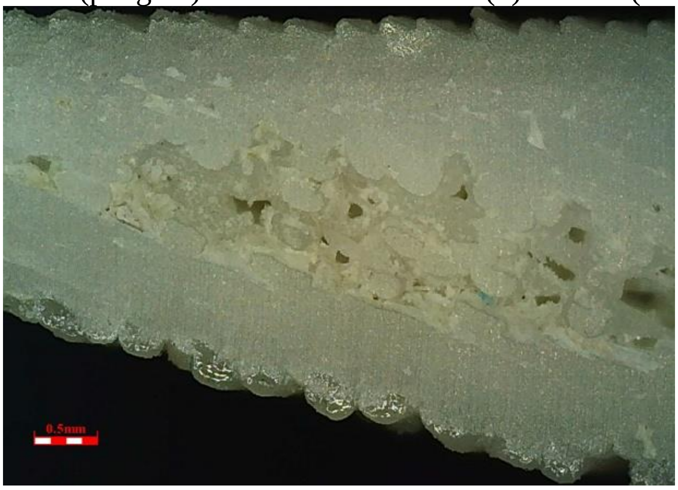
ABS LT 0.1 mm ID 60%



(a) Titik A (pangkal)

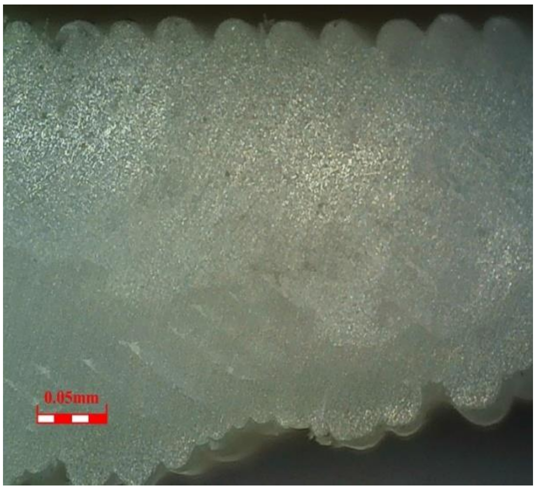


(b) Titik B (tengah)



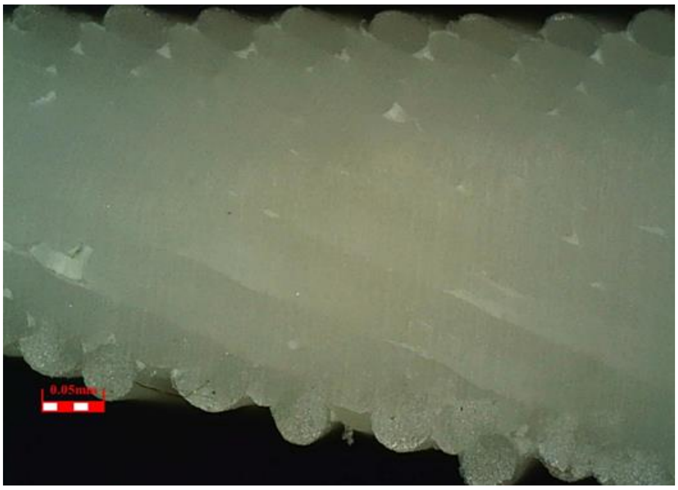
(c) Titik C (ujung)

ABS LT 0.2 mm ID 60%



(a) Titik A (pangkal)

(b) Titik B (tengah)



(c) Titik C (ujung)

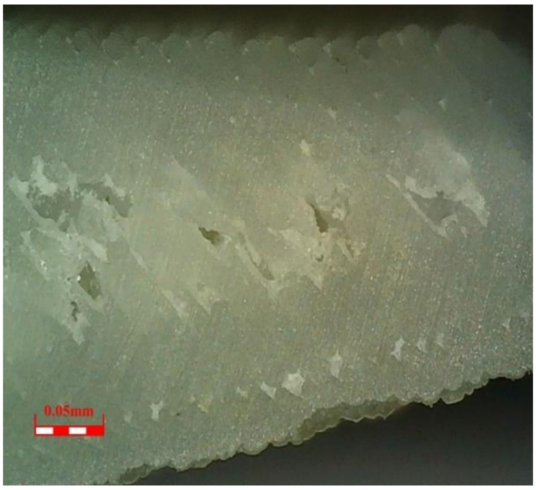
ABS LT 0.3 mm ID 60%

(a) Titik A (pangkal)

(b) Titik B (tengah)

(c) Titik C (ujung)

ABS LT 0.1 mm ID 80%

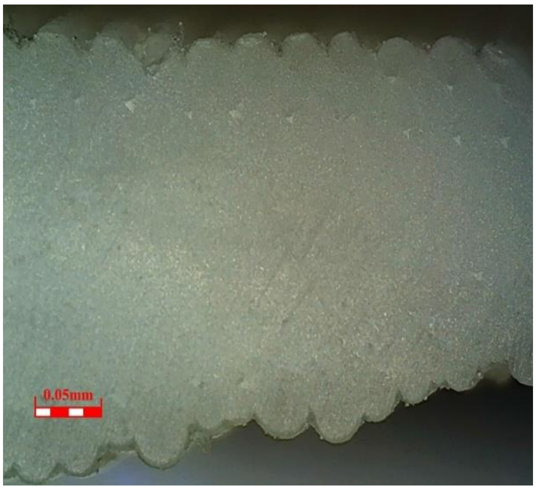


(a) Titik A (pangkal)

(b) Titik B (tengah)

(c) Titik C (ujung)

ABS LT 0.2 mm ID 80%

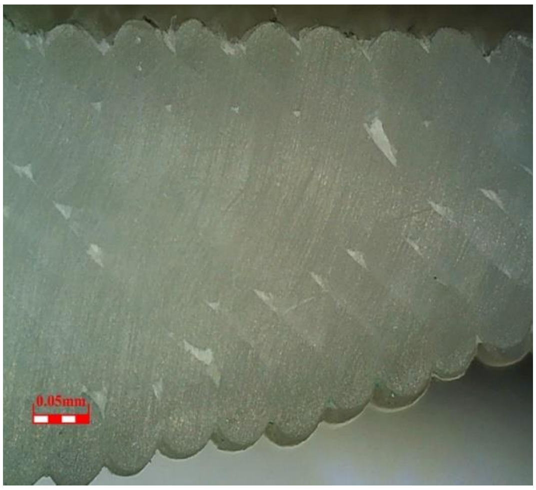


(a) Titik A (pangkal)

(b) Titik B (tengah)

(c) Titik C (ujung)

ABS LT 0.3 mm ID 80%



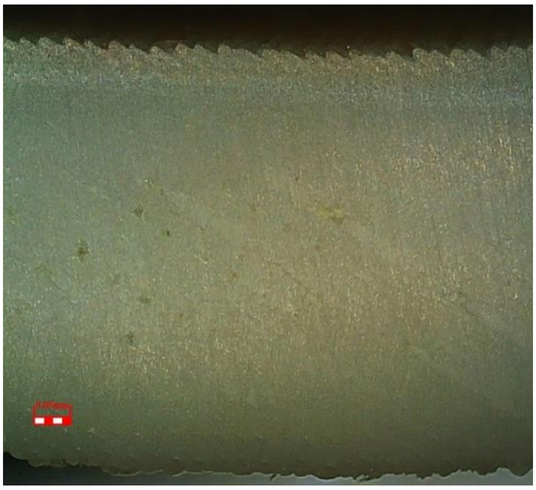
(a) Titik A (pangkal)

(b) Titik B (tengah)

(c) Titik C (ujung)

ABS LT 0.1 mm ID 100%

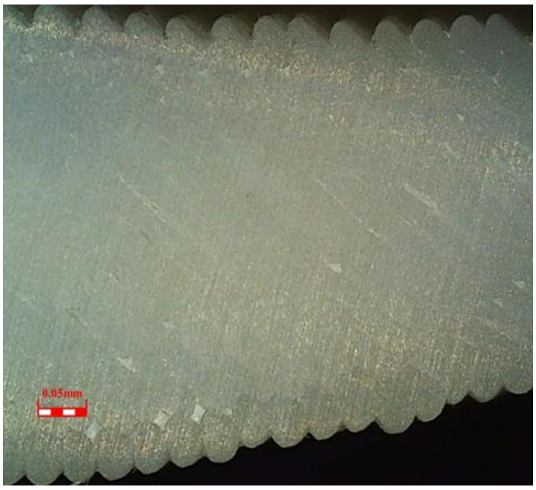
(a) Titik A (pangkal)



(b) Titik B (tengah)

(c) Titik C (ujung)

ABS LT 0.2 mm ID 100%

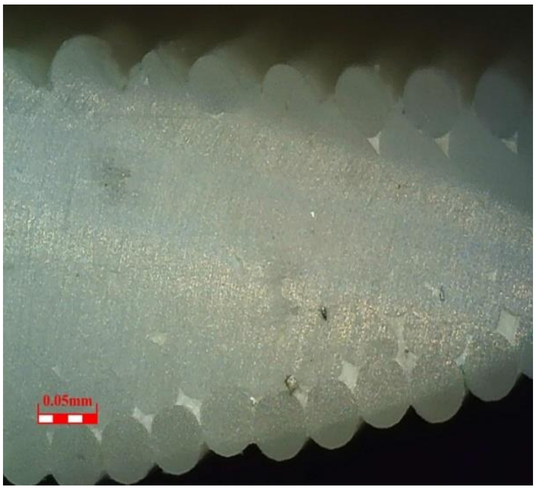


(a) Titik A (pangkal)

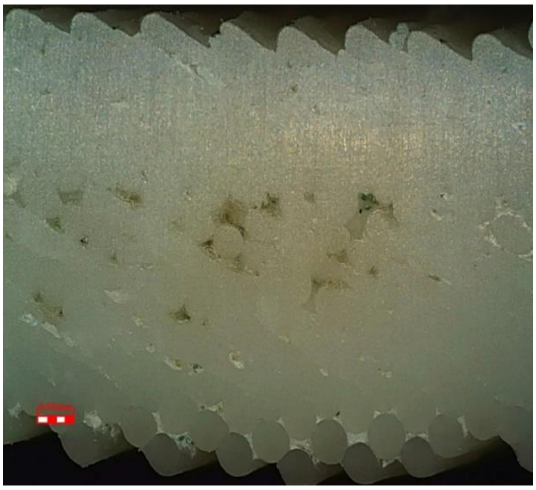
(b) Titik B (tengah)

(c) Titik C (ujung)

ABS LT 0.3 mm ID 100%



(a) Titik A (pangkal)

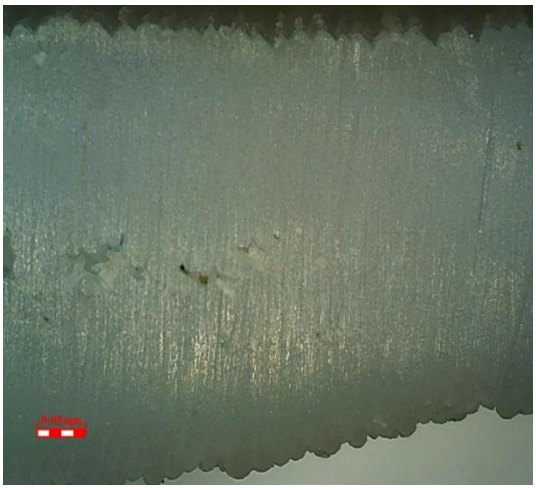


(b) Titik B (tengah)

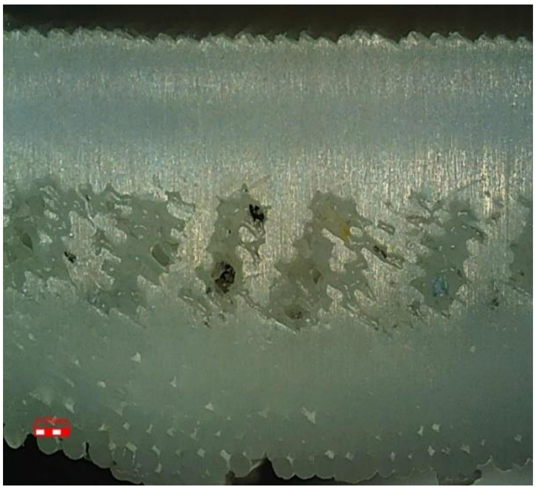
(c) Titik C (ujung)

Lampiran 17. Hasil Foto *Morphology* Permukaan PLA

PLA LT 0.1 mm ID 60%



(a) Titik A (pangkal)

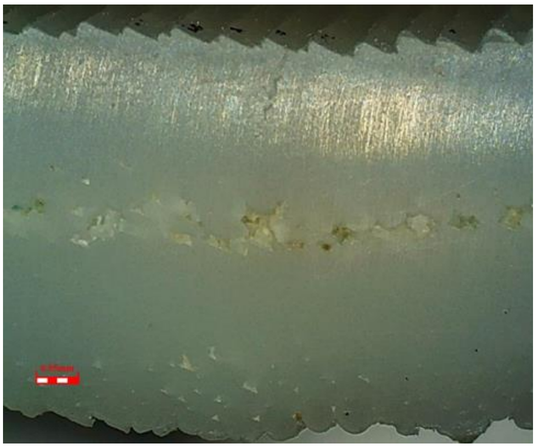


(b) Titik B (tengah)

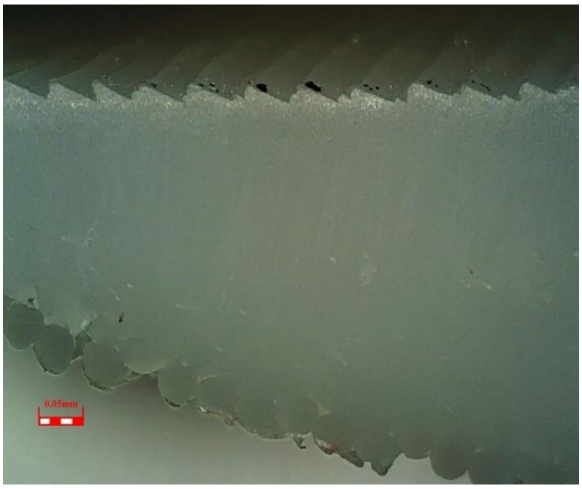
(c) Titik C (ujung)

PLA LT 0.2 mm ID 60%

(a) Titik A (pangkal)

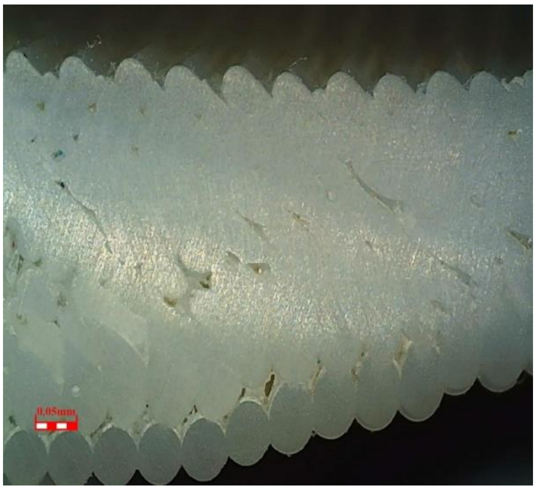


(b) Titik B (tengah)

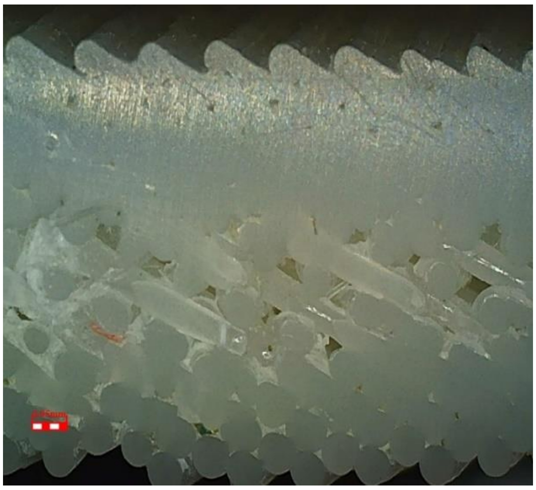


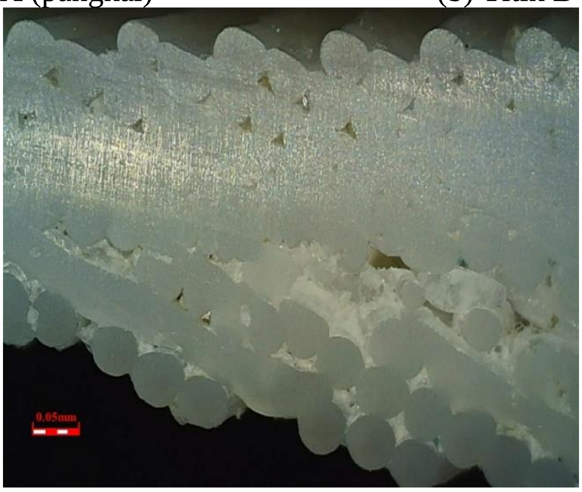
(c) Titik C (ujung)

PLA LT 0.3 mm ID 60%



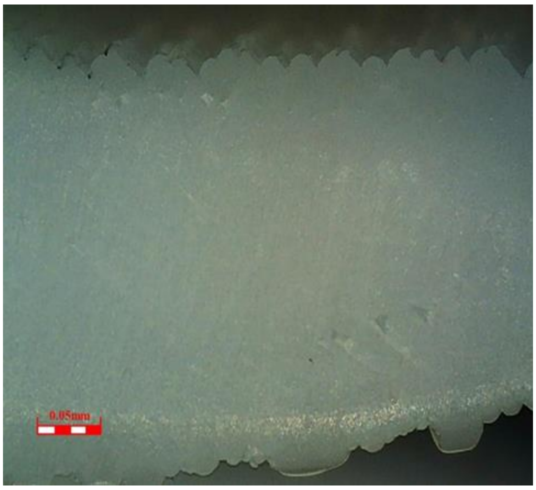
(a) Titik A (pangkal)


(b) Titik B (tengah)



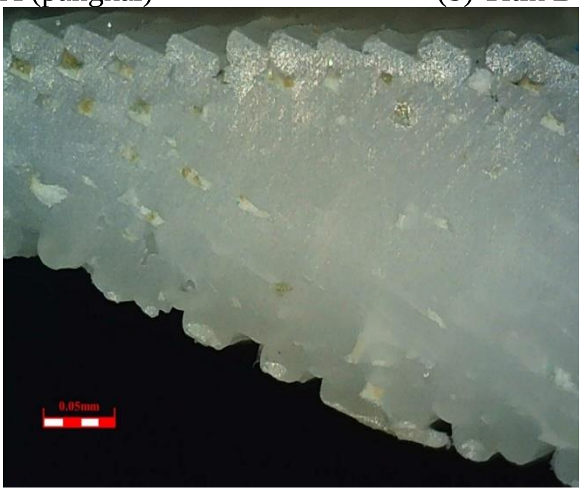
(c) Titik C (ujung)

PLA LT 0.1 mm ID 80%



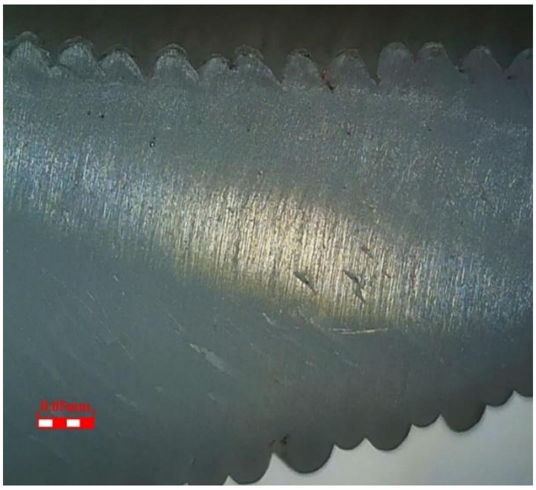
(a) Titik A (pangkal)

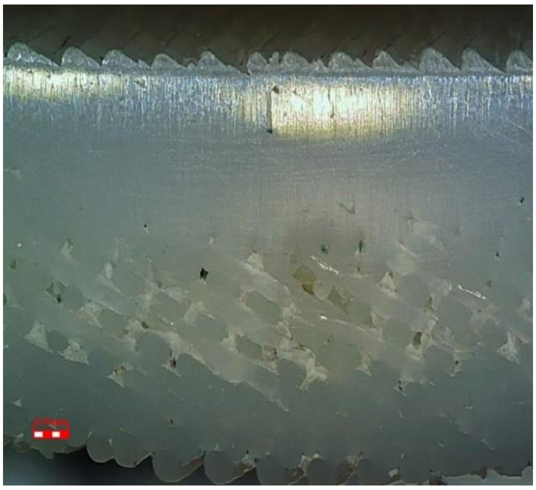

(b) Titik B (tengah)



(c) Titik C (ujung)

PLA LT 0.2 mm ID 80%


(a) Titik A (pangkal)


(b) Titik B (tengah)

(c) Titik C (ujung)

PLA LT 0.3 mm ID 80%

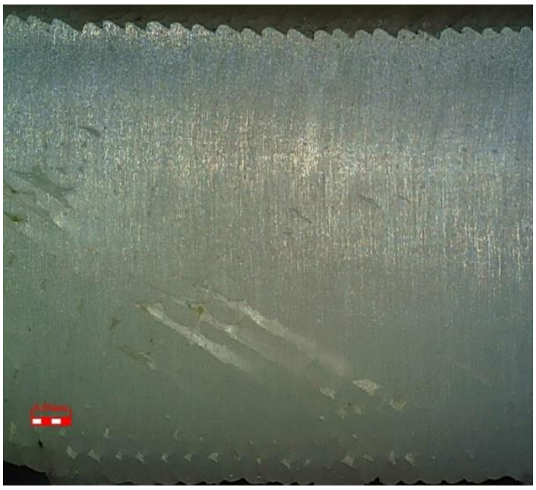
(a) Titik A (pangkal)

(b) Titik B (tengah)

(c) Titik C (ujung)

PLA LT 0.1 mm ID 100%

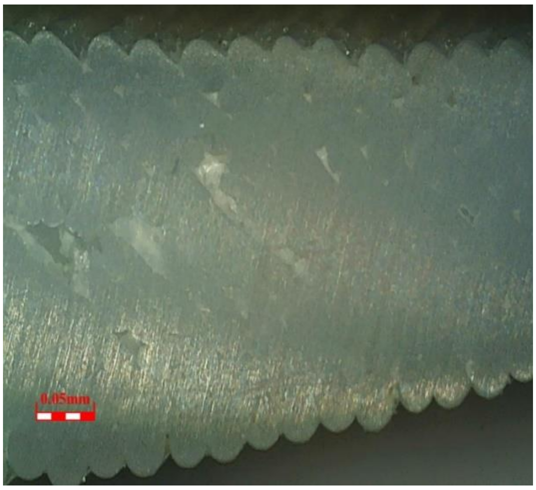
(a) Titik A (pangkal)



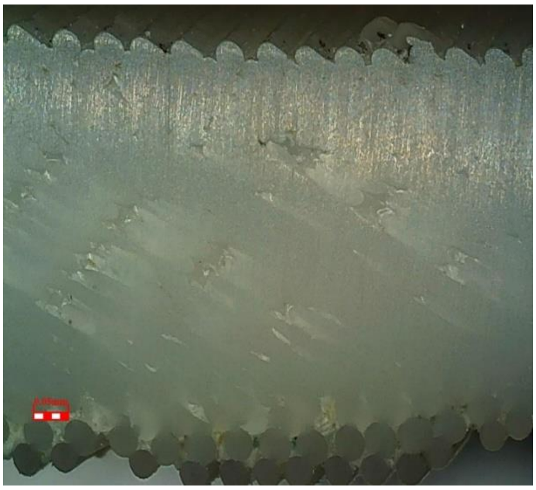
(b) Titik B (tengah)

(c) Titik C (ujung)

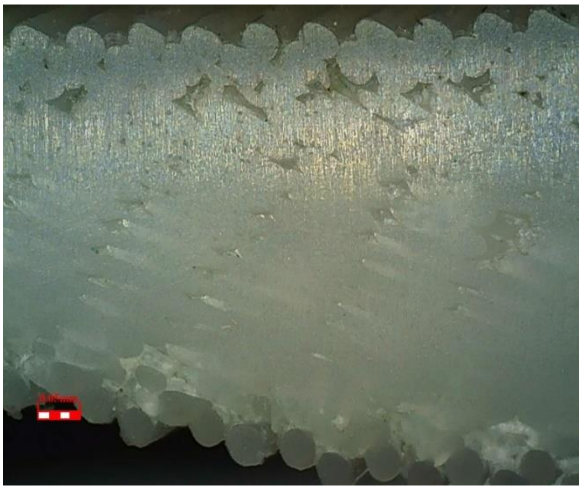
PLA LT 0.2 mm ID 100%



(a) Titik A (pangkal)

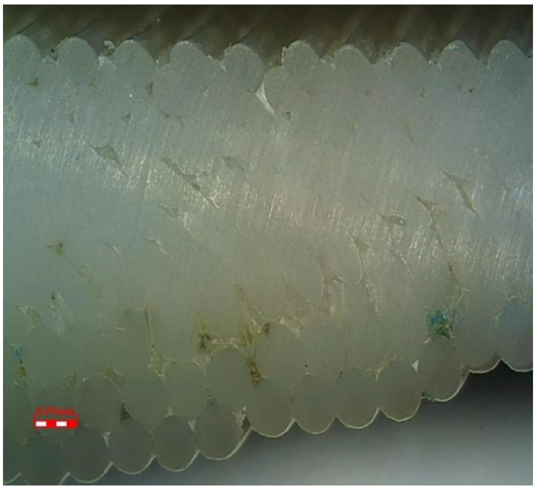


(b) Titik B (tengah)

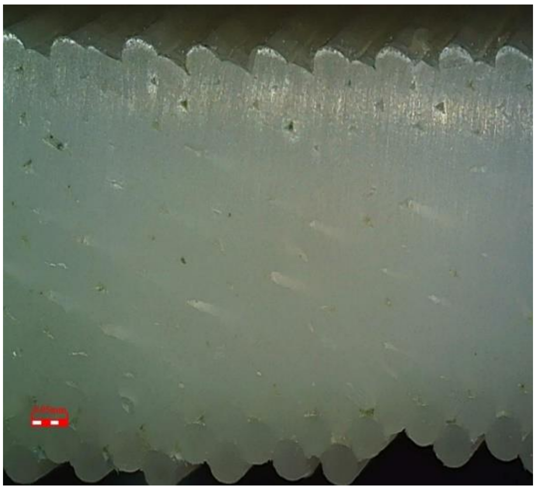


(c) Titik C (ujung)

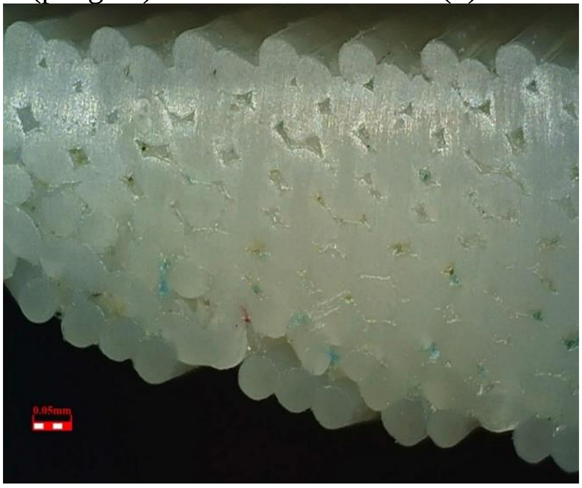
PLA LT 0.3 mm ID 100%



(a) Titik A (pangkal)



(b) Titik B (tengah)

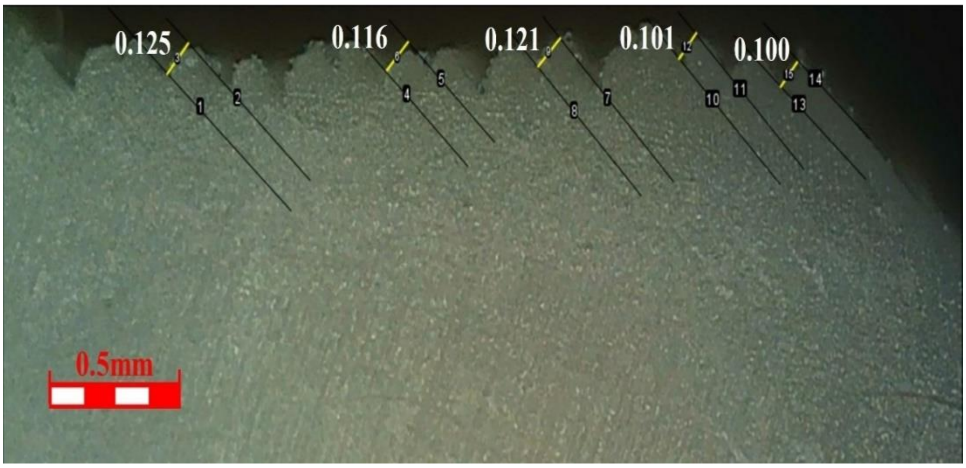


(c) Titik C (ujung)

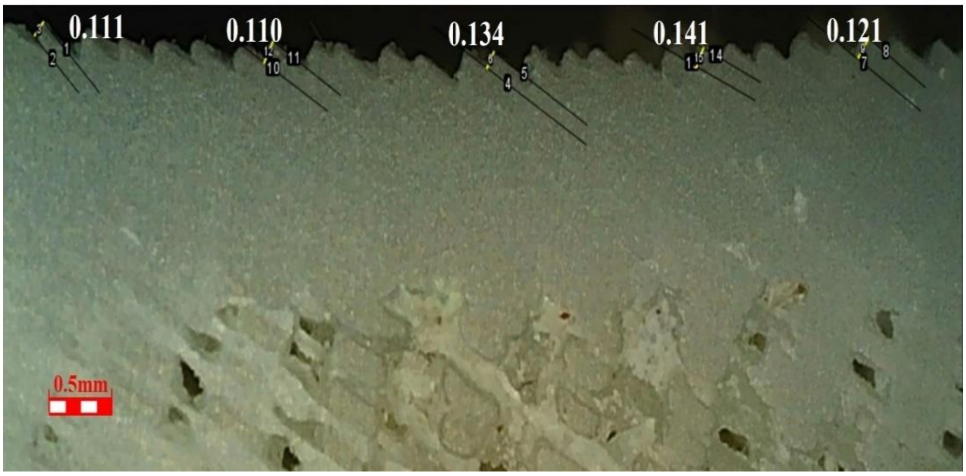
Lampiran 18. Hasil Pengukuran *Dimensional Layer Image-J*

ABS

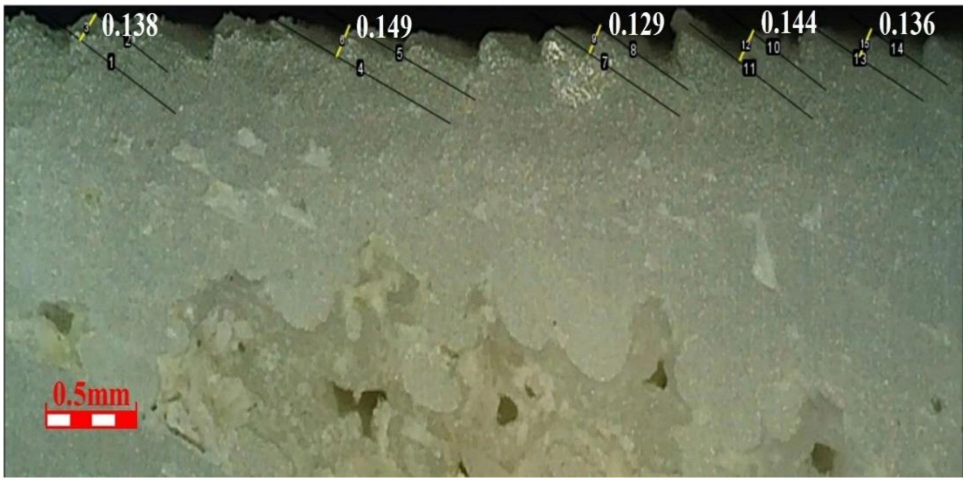
***Layer thickness* (LT) 0.1 mm**



(a) Titik pangkal

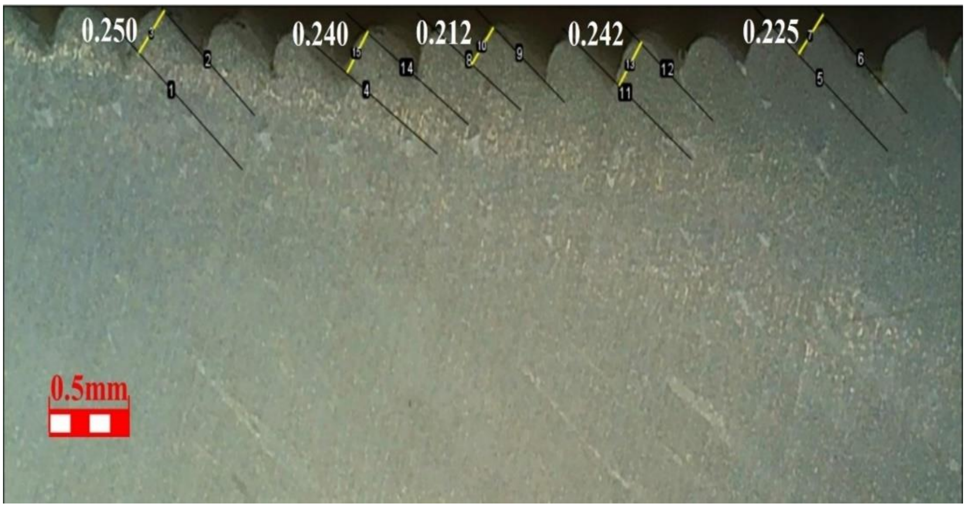


(b) Titik tengah

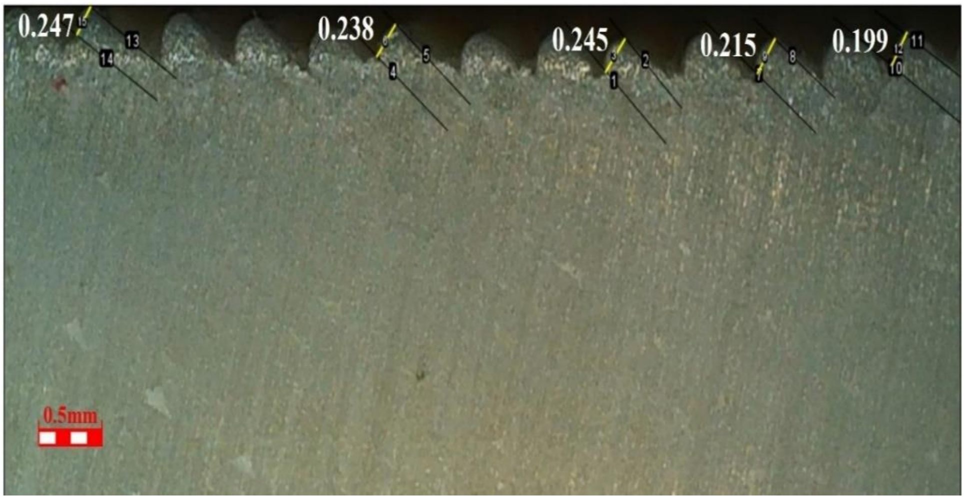


(c) Titik ujung

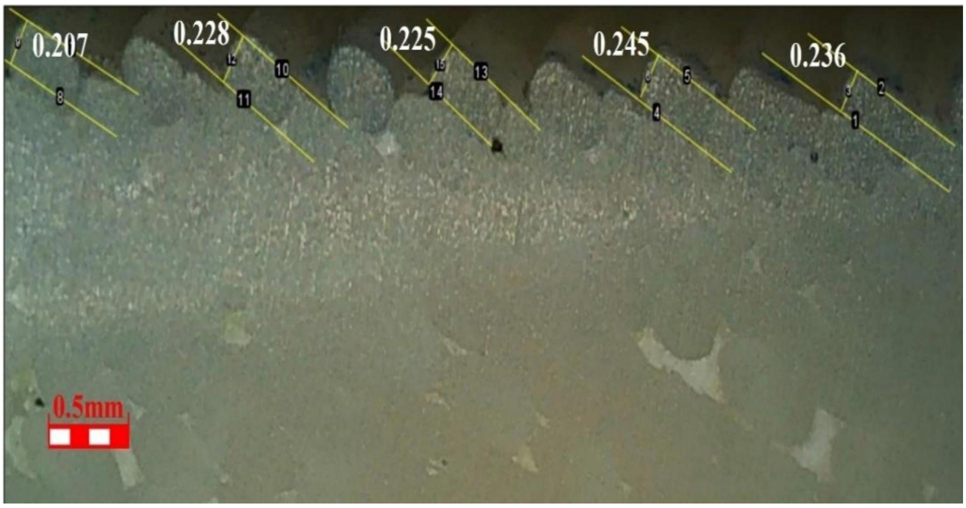
***Layer thickness* (LT) 0.2 mm**



(a) Titik pangkal

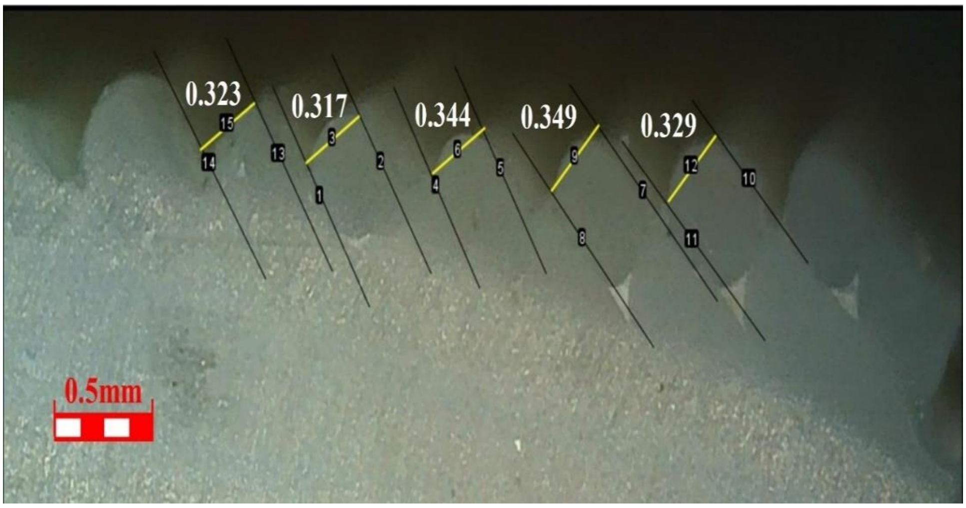


(b) Titik tengah

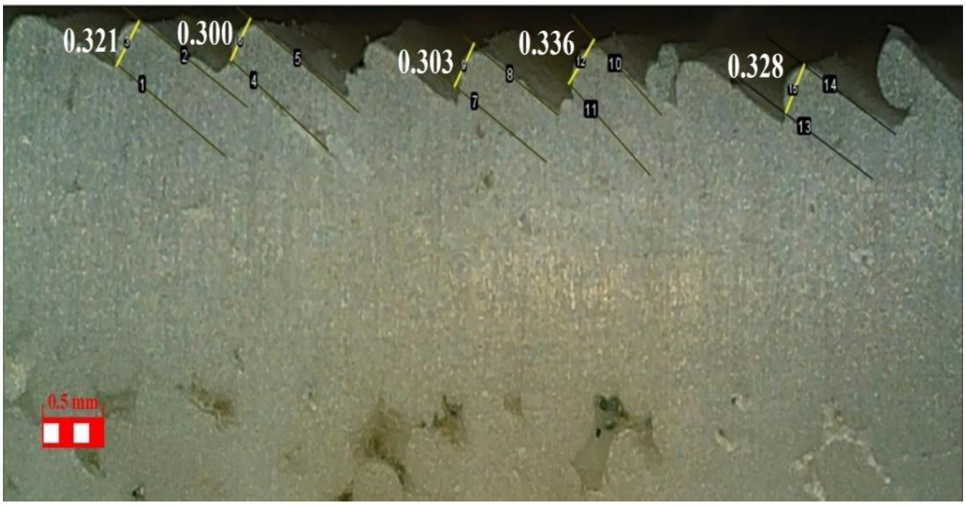


(c) Titik ujung

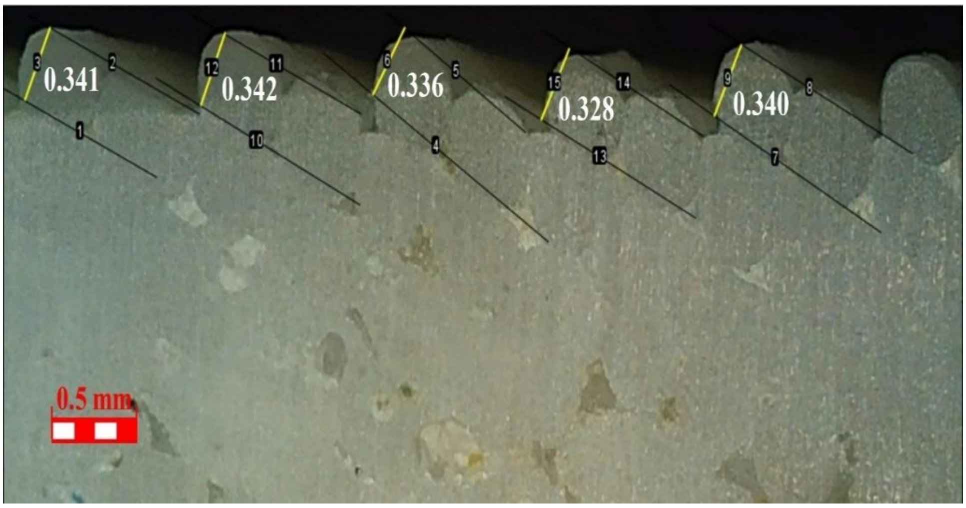
***Layer thickness* (LT) 0.3 mm**



(a) Titik pangkal

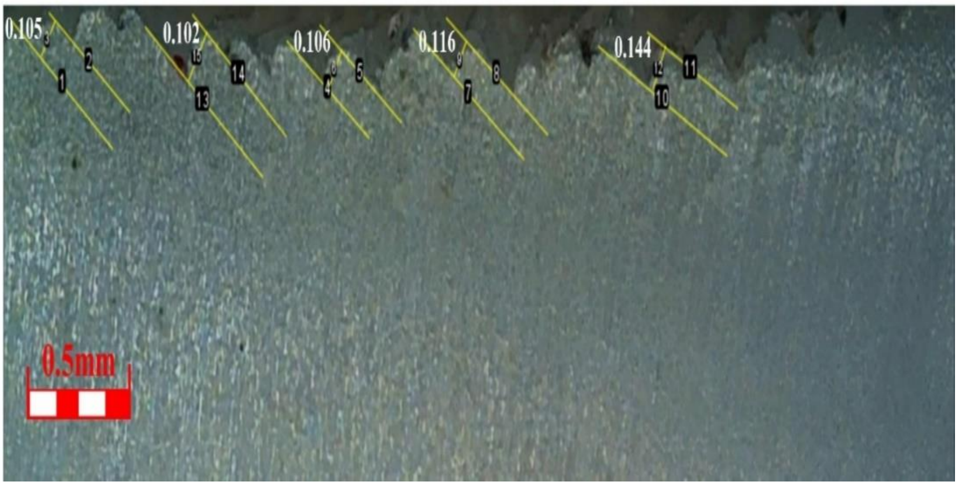


(b) Titik tengah

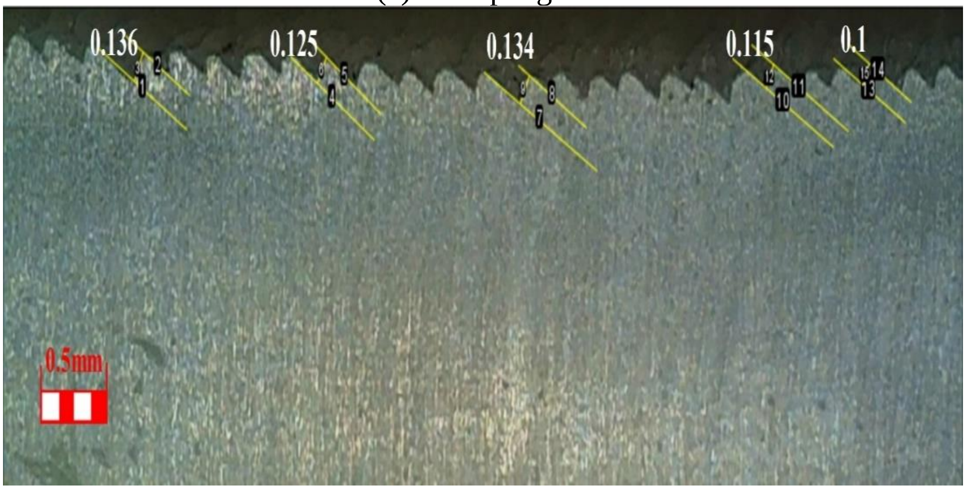


(c) Titik ujung

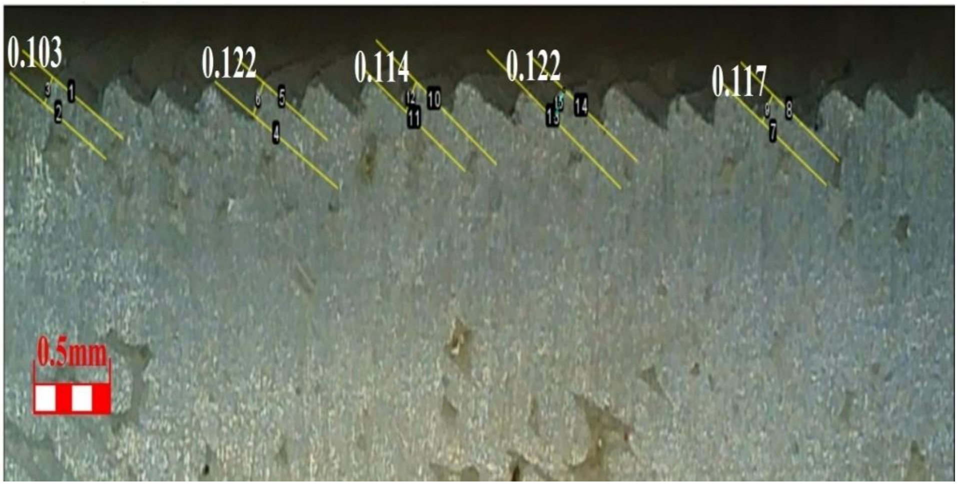
PLA
***Layer thickness* (LT) 0.1 mm**



(a) Titik pangkal

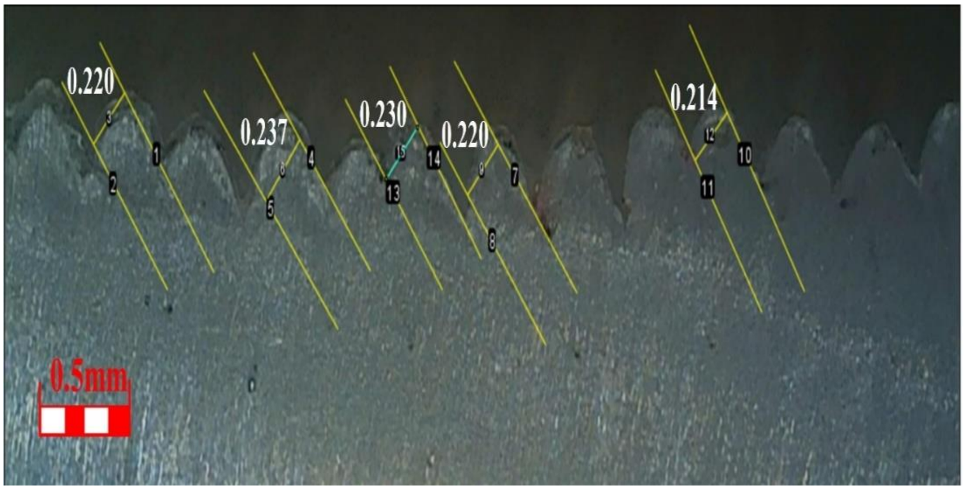


(b) Titik tengah

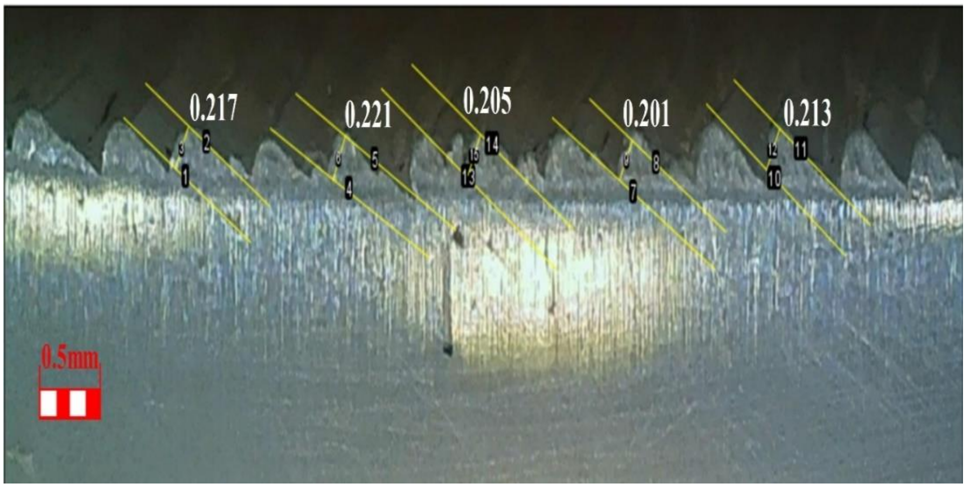


(c) Titik ujung

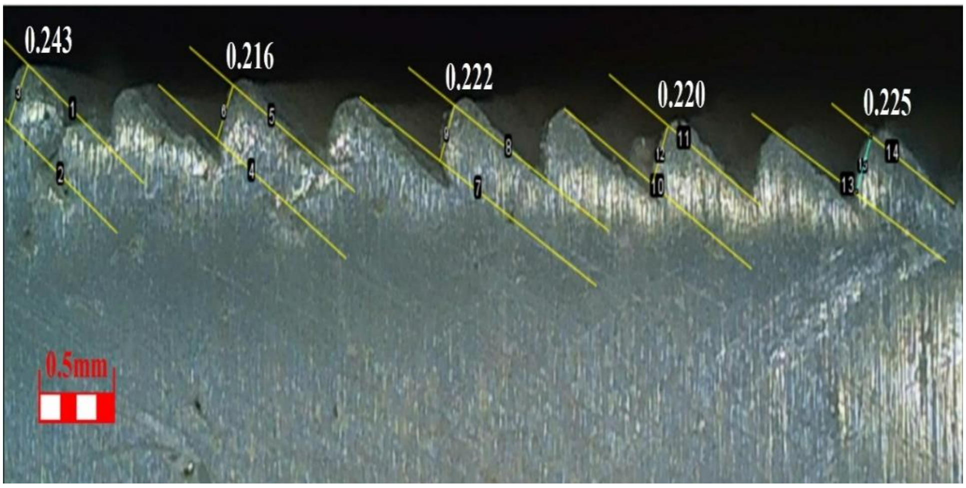
Layer thickness **(LT) 0.2 mm**



(a) Titik pangkal

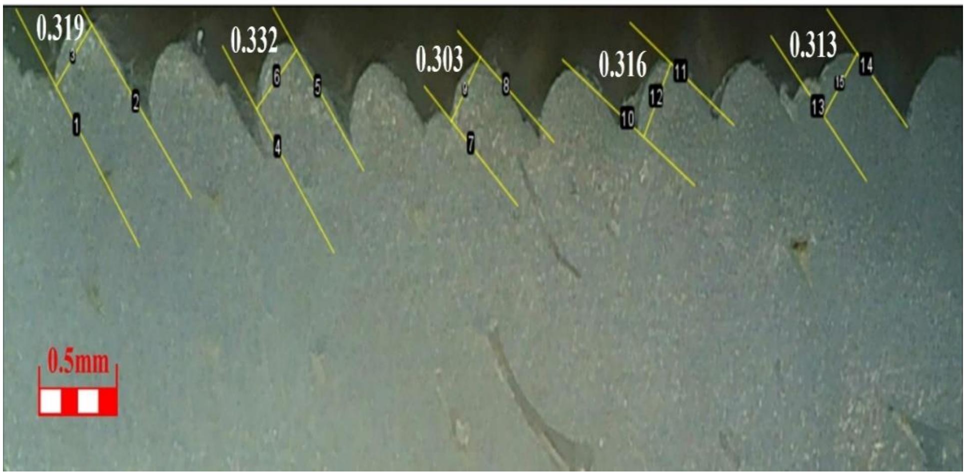


(b) Titik tengah

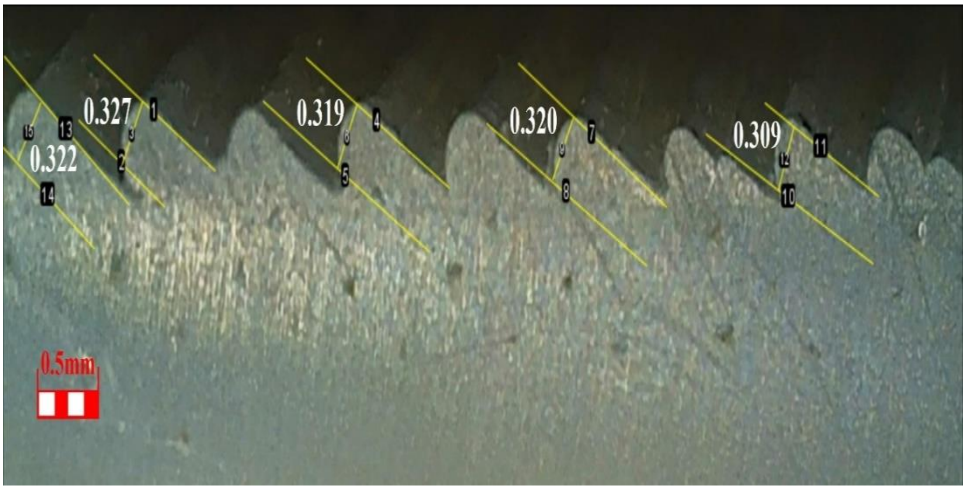


(c) Titik ujung

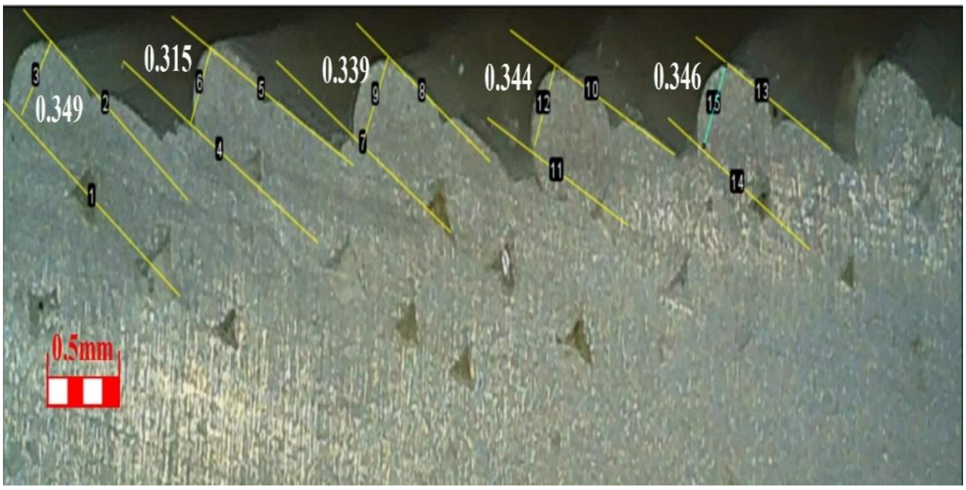
***Layer thickness* (LT) 0.3 mm**



(a) Titik pangkal



(b) Titik tengah



(c) Titik ujung