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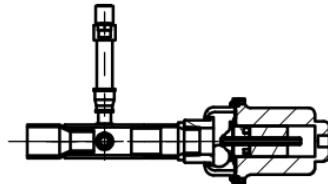
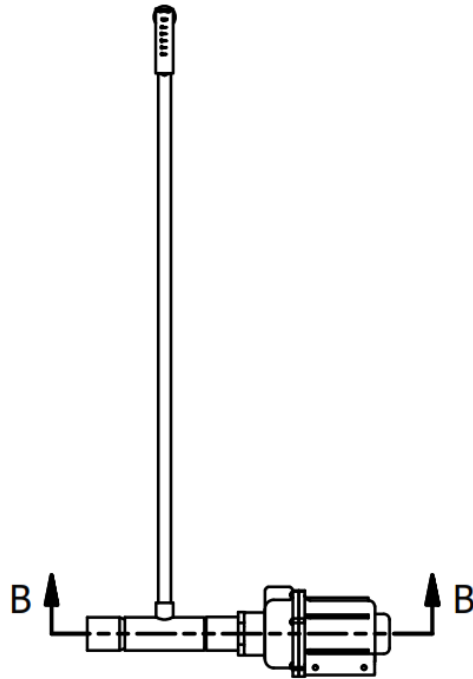
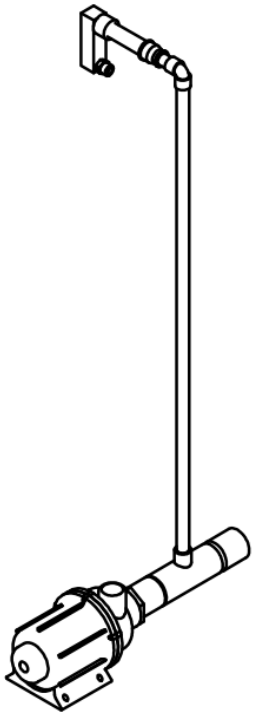
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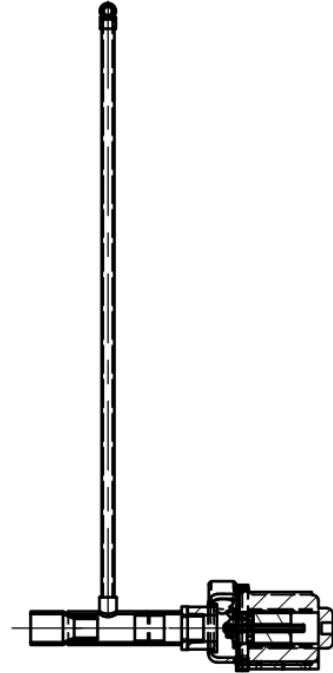
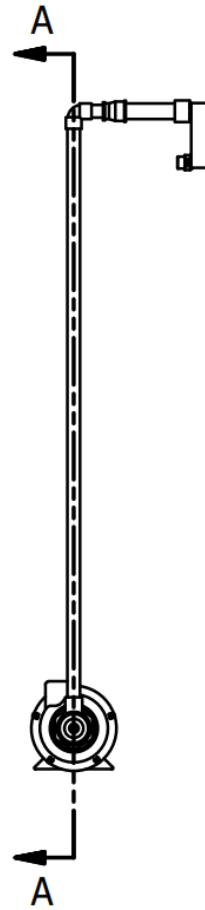
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LAMPIRAN

Lampiran 1. Desain DIYM O₂ Rs

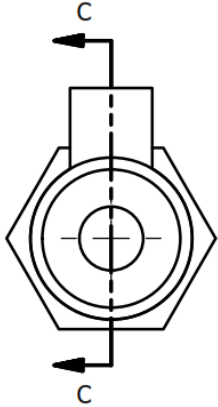
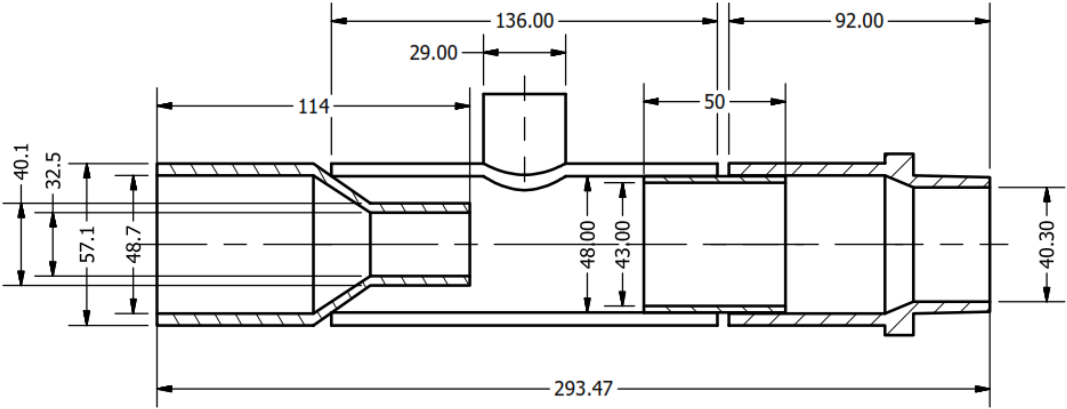
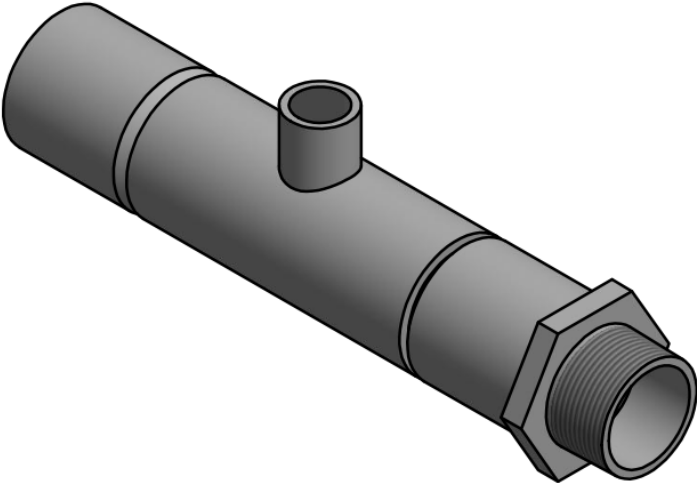


Potongan B-B
Skala 1/10



Potongan A-A
Skala 1 /10

Lampiran 2. Nozzle DIYM O₂ Rs



Potongan C-C
Skala 1/2

Lampiran 3. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 0,5 L/menit dengan pompa 160-watt nozzle 1 inch

Pompa 160-Watt 1 Inch											
0.5 Lpm											
	1/125s				1/160s				1/200s		
	Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)		
	Ulangan				Ulangan				Ulangan		
	1	2	3		1	2	3		1	2	3
Average	7.90E-03	8.73E-03	5.49E-03	Average	1.02E-02	6.38E-03	6.36E-03	Average	9.66E-03	6.43E-03	6.48E-03
Mean	0.007	0.008	0.005	Mean	0.01	0.006	0.006	Mean	0.009	0.006	0.006
SD	0.01	0.012	0.007	SD	0.013	0.008	0.008	SD	0.012	0.009	0.009
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.146	0.13	0.12	Max	0.161	0.114	0.178	Max	0.149	0.118	0.162

Lampiran 4. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 1,5 L/menit dengan pompa 160-watt nozzle 1 inch

Pompa 160-Watt 1 Inch											
1.5 Lpm											
	1/125s				1/160s				1/200s		
	Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)		
	Ulangan				Ulangan				Ulangan		
	1	2	3		1	2	3		1	2	3
Average	1.94E-02	6.86E-03	9.00E-03	Average	1.29E-02	7.32E-03	7.88E-03	Average	1.72E-02	8.54E-03	9.11E-03
Mean	0.019	0.007	0.009	Mean	0.012	0.007	0.008	Mean	0.017	0.008	0.009
SD	0.045	0.009	0.013	SD	0.02	0.012	0.01	SD	0.036	0.013	0.013
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	1.022	0.148	0.174	Max	0.234	0.19	0.203	Max	1.235	0.303	0.164

Lampiran 5. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 2,5 L/menit dengan pompa 160-watt nozzle 1 inch

Pompa 160-Watt 1 Inch											
2.5 Lpm											
	1/125s				1/160s				1/200s		
	Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)		
	Ulangan				Ulangan				Ulangan		
	1	2	3		1	2	3		1	2	3
Average	0.016692	0.006496	0.008945	Average	0.015429	0.006604	0.010362	Average	0.018133	0.008254	0.010258
Mean	0.016	0.006	0.009	Mean	0.015	0.006	0.011	Mean	0.018	0.008	0.01
SD	0.032	0.011	0.011	SD	0.029	0.011	0.018	SD	0.037	0.016	0.016
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.756	0.204	0.138	Max	0.672	0.346	0.321	Max	0.661	0.432	0.373

Lampiran 6. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 0,5 L/menit dengan pompa 160-watt nozzle ¾ inch

Pompa 160-Watt ¾ Inch											
0,5 Lpm											
1/125s				1/160s				1/200s			
Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)			
Ulangan				Ulangan				Ulangan			
	1	2	3		1	2	3		1	2	3
Average	0.005123	0.005922	0.005722	Average	0.006653	0.004536	0.005609	Average	0.005708	0.00505	0.00577
Mean	0.005	0.006	0.005	Mean	0.006	0.005	0.005	Mean	0.005	0.005	0.006
SD	0.006	0.007	0.007	SD	0.009	0.006	0.006	SD	0.007	0.007	0.007
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.054	0.088	0.08	Max	0.097	0.086	0.07	Max	0.093	0.095	0.085

Lampiran 7. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 1,5 L/menit dengan pompa 160-watt nozzle ¾ inch

Pompa 160-Watt ¾ Inch											
1,5 Lpm											
1/125s				1/160s				1/200s			
Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)			
Ulangan				Ulangan				Ulangan			
	1	2	3		1	2	3		1	2	3
Average	0.006762	0.004777	0.007306	Average	0.007688	0.005206	0.006626	Average	0.007485	0.005592	0.008854
Mean	0.007	0.005	0.007	Mean	0.007	0.005	0.007	Mean	0.007	0.005	0.008
SD	0.009	0.006	0.009	SD	0.011	0.008	0.008	SD	0.011	0.009	0.013
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.127	0.082	0.091	Max	0.136	0.092	0.086	Max	0.229	0.118	0.193

Lampiran 8. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 2,5 L/menit dengan pompa 160-watt nozzle ¾ inch

Pompa 160-Watt ¾ Inch											
2,5 Lpm											
1/125s				1/160s				1/200s			
Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)			
Ulangan				Ulangan				Ulangan			
	1	2	3		1	2	3		1	2	3
Average	7.22E-03	4.79E-03	7.78E-03	Average	6.62E-03	5.12E-03	7.02E-03	Average	7.43E-03	6.12E-03	8.21E-03
Mean	0.007	0.005	0.008	Mean	0.006	0.005	0.007	Mean	0.007	0.006	0.009
SD	0.01	0.007	0.009	SD	0.009	0.008	0.01	SD	0.011	0.012	0.013
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.122	0.123	0.097	Max	0.086	0.083	0.244	Max	0.129	0.294	0.165

Lampiran 9. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 0,5 L/menit dengan pompa 160-watt nozzle ½ inch

Pompa 160-Watt 1/2 Inch											
0,5 Lpm											
	1/125s			1/160s			1/200s				
	Area gelembung dalam (mm)			Area gelembung dalam (mm)			Area gelembung dalam (mm)				
	1	Ulangan 2	3	1	Ulangan 2	3	1	Ulangan 2	3		
Average	6.43E-03	4.93E-03	5.14E-03	Average	5.69E-03	4.66E-03	4.66E-03	Average	6.65E-03	5.78E-03	6.05E-03
Mean	0.006	0.005	0.005	Mean	0.006	0.005	0.005	Mean	0.006	0.005	0.006
SD	0.008	0.006	0.006	SD	0.007	0.006	0.005	SD	0.008	0.007	0.007
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.102	0.068	0.062	Max	0.084	0.054	0.046	Max	0.094	0.097	0.063

Lampiran 10. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 1,5 L/menit dengan pompa 160-watt nozzle ½ inch

Pompa 160-Watt 1/2 Inch											
1,5 Lpm											
	1/125s			1/160s			1/200s				
	Area gelembung dalam (mm)			Area gelembung dalam (mm)			Area gelembung dalam (mm)				
	1	Ulangan 2	3	1	Ulangan 2	3	1	Ulangan 2	3		
Average	0.007081	0.005409	0.00716	Average	0.006848	0.00515	0.007399	Average	0.008455	0.005242	0.00681
Mean	0.007	0.005	0.007	Mean	0.007	0.005	0.007	Mean	0.008	0.005	0.007
SD	0.009	0.007	0.009	SD	0.009	0.01	0.009	SD	0.012	0.007	0.008
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.188	0.099	0.098	Max	0.123	0.435	0.091	Max	0.18	0.106	0.101

Lampiran 11. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 2,5 L/menit dengan pompa 160-watt nozzle ½ inch

Pompa 160-Watt 1/2 Inch											
2,5 Lpm											
	1/125s			1/160s			1/200s				
	Area gelembung dalam (mm)			Area gelembung dalam (mm)			Area gelembung dalam (mm)				
	1	Ulangan 2	3	1	Ulangan 2	3	1	Ulangan 2	3		
Average	0.008855	0.005092	0.008056	Average	0.008353	0.004758	0.008398	Average	0.008712	0.006382	0.009863
Mean	0.008	0.005	0.008	Mean	0.008	0.005	0.008	Mean	0.008	0.006	0.01
SD	0.012	0.007	0.011	SD	0.012	0.007	0.011	SD	0.012	0.011	0.014
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.182	0.116	0.107	Max	0.143	0.179	0.13	Max	0.251	0.195	0.207

Lampiran 12. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 0,5 L/menit dengan pompa 200-watt nozzle 1 inch

Pompa 200-Watt 1 Inch											
0,5 Lpm											
1/125s				1/160s				1/200s			
Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)			
Ulangan				Ulangan				Ulangan			
	1	2	3		1	2	3		1	2	3
Average	0.004548	0.005187	0.004884	Average	0.007388	0.005543	0.004744	Average	0.005192	0.006064	0.004484
Mean	0.005	0.005	0.005	Mean	0.007	0.006	0.005	Mean	0.005	0.006	9.07E-04
SD	0.004	0.006	0.005	SD	0.007	0.006	0.005	SD	0.005	0.009	2.72E-04
Min	1.02E-04	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.042	0.089	0.059	Max	0.065	0.073	0.046	Max	0.091	0.163	9.07E-05

Lampiran 13. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 1,5 L/menit dengan pompa 200-watt nozzle 1 inch

Pompa 200-Watt 1 Inch											
1,5 Lpm											
1/125s				1/160s				1/200s			
Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)			
Ulangan				Ulangan				Ulangan			
	1	2	3		1	2	3		1	2	3
Average	0.0072	0.006829	0.005108	Average	0.005319	0.007177	0.005995	Average	0.005391	0.0085	0.00599
Mean	0.007	0.007	0.005	Mean	0.005	0.007	0.006	Mean	0.005	0.008	0.006
SD	0.008	0.008	0.006	SD	0.005	0.009	0.006	SD	0.006	0.012	0.006
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.109	0.111	0.09	Max	0.058	0.126	0.056	Max	0.055	0.211	0.059

Lampiran 14. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 2,5 L/menit dengan pompa 200-watt nozzle 1 inch

Pompa 200-Watt 1 Inch											
2,5 Lpm											
1/125s				1/160s				1/200s			
Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)			
Ulangan				Ulangan				Ulangan			
	1	2	3		1	2	3		1	2	3
Average	0.007704	0.007135	0.00613	Average	0.006223	0.007888	0.006015	Average	0.006111	0.011446	0.006455
Mean	0.007	0.007	0.006	Mean	0.006	0.008	0.006	Mean	0.006	0.012	0.006
SD	0.008	0.009	0.006	SD	0.007	0.011	0.007	SD	0.006	0.022	0.007
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.07	0.193	0.059	Max	0.079	0.17	0.095	Max	0.081	0.493	0.141

Lampiran 15. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 0,5 L/menit dengan pompa 200-watt nozzle ¾ inch

Pompa 200-Watt ¾ Inch											
0,5 Lpm											
1/125s				1/160s				1/200s			
Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)			
Ulangan				Ulangan				Ulangan			
	1	2	3		1	2	3		1	2	3
Average	0.00805	0.004939	0.00631	Average	0.008543	0.005198	0.006114	Average	0.007156	0.006333	0.008328
Mean	0.008	0.005	0.006	Mean	0.008	0.005	0.006	Mean	0.007	0.006	0.009
SD	0.012	0.007	0.008	SD	0.013	0.007	0.008	SD	0.01	0.01	0.013
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.153	0.085	0.107	Max	0.276	0.069	0.093	Max	0.106	0.287	0.161

Lampiran 16. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 1,5 L/menit dengan pompa 200-watt nozzle ¾ inch

Pompa 200-Watt ¾ Inch											
1,5 Lpm											
1/125s				1/160s				1/200s			
Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)			
Ulangan				Ulangan				Ulangan			
	1	2	3		1	2	3		1	2	3
Average	1.07E-02	5.86E-03	9.23E-03	Average	8.83E-03	5.95E-03	7.67E-03	Average	1.36E-02	7.39E-03	1.10E-02
Mean	0.011	0.006	0.009	Mean	0.009	0.006	0.008	Mean	0.014	0.007	0.011
SD	0.025	0.01	0.014	SD	0.015	0.01	0.014	SD	0.035	0.013	0.022
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.853	0.223	0.242	Max	0.252	0.148	0.244	Max	0.987	0.215	0.541

Lampiran 17. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 2,5 L/menit dengan pompa 200-watt nozzle ¾ inch

Pompa 200-Watt ¾ Inch											
2,5 Lpm											
1/125s				1/160s				1/200s			
Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)			
Ulangan				Ulangan				Ulangan			
	1	2	3		1	2	3		1	2	3
Average	0.012365	0.005916	0.010549	Average	0.010825	0.005806	0.008699	Average	0.010023	0.008243	0.009629
Mean	0.012	0.006	0.011	Mean	0.003	0.006	0.009	Mean	0.01	0.008	0.01
SD	0.034	0.011	0.024	SD	0.014	0.01	0.019	SD	0.036	0.018	0.029
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	1.127	0.3	0.723	Max	0.02	0.143	0.365	Max	2.553	0.611	0.931

Lampiran 18. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 0,5 L/menit dengan pompa 200-watt nozzle ½ inch

Pompa 200-Watt 1/2 Inch											
0,5 Lpm											
1/125s				1/160s				1/200s			
Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)			
			Ulangan				Ulangan				Ulangan
	1	2	3		1	2	3		1	2	3
Average	0.006581	0.006427	0.004572	Average	0.008137	0.006799	0.005507	Average	0.00699	0.007385	0.00544
Mean	0.006	0.006	0.005	Mean	0.008	0.007	0.005	Mean	0.007	0.008	0.005
SD	0.006	0.007	0.004	SD	0.009	0.009	0.006	SD	0.007	0.012	0.006
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05

Lampiran 19. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 1,5 L/menit dengan pompa 200-watt nozzle ½ inch

Pompa 200-Watt 1/2 Inch											
1,5 Lpm											
1/125s				1/160s				1/200s			
Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)			
			Ulangan				Ulangan				Ulangan
	1	2	3		1	2	3		1	2	3
Average	0.006415	0.00622	0.006157	Average	0.005401	0.007443	0.006102	Average	0.009302	0.011003	0.007541
Mean	0.006	0.006	0.006	Mean	0.005	0.008	0.006	Mean	0.009	0.01	0.007
SD	0.006	0.008	0.006	SD	0.006	0.011	0.007	SD	0.011	0.012	0.008
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.064	0.148	0.052	Max	0.054	0.349	0.068	Max	0.164	0.16	0.069

Lampiran 20. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 2,5 L/menit dengan pompa 200-watt nozzle ½ inch

Pompa 200-Watt 1/2 Inch											
2,5 Lpm											
1/125s				1/160s				1/200s			
Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)			
			Ulangan				Ulangan				Ulangan
	1	2	3		1	2	3		1	2	3
Average	0.011924	0.005221	0.008627	Average	0.012857	0.009163	0.008557	Average	0.01284	0.008853	0.01003
Mean	0.012	0.006	0.009	Mean	0.013	0.008	0.009	Mean	0.012	0.009	0.01
SD	0.012	0.007	0.009	SD	0.014	0.012	0.008	SD	0.015	0.017	0.01
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.105	0.128	0.067	Max	0.141	0.16	0.1	Max	0.198	0.559	0.088

Lampiran 21. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 0,5 L/menit dengan pompa 250-watt nozzle 1 inch

Pompa 250-Watt 1 Inch											
0,5 Lpm											
1/125s				1/160s				1/200s			
Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)			
Ulangan				Ulangan				Ulangan			
	1	2	3		1	2	3		1	2	3
Average	0.006027	0.006091	0.006463	Average	0.006584	0.0063	0.005903	Average	0.006435	0.006653	0.006155
Mean	0.006	0.006	0.007	Mean	0.007	0.006	0.006	Mean	0.006	0.007	0.006
SD	0.006	0.007	0.007	SD	0.007	0.008	0.006	SD	0.006	0.008	0.007
Min	9.80E-05	9.90E-05	9.90E-05	Min	9.90E-05	9.90E-05	9.90E-05	Min	9.90E-05	9.90E-05	9.90E-05
Max	0.05	0.082	0.052	Max	0.065	0.104	0.061	Max	0.051	0.088	0.053

Lampiran 22. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 1,5 L/menit dengan pompa 250-watt nozzle 1 inch

Pompa 250-Watt 1 Inch											
1,5 Lpm											
1/125s				1/160s				1/200s			
Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)			
Ulangan				Ulangan				Ulangan			
	1	2	3		1	2	3		1	2	3
Average	0.008725	0.006333	0.007567	Average	0.007921	0.007415	0.007183	Average	0.008762	0.009695	0.008791
Mean	0.008	0.006	0.008	Mean	0.008	0.007	0.007	Mean	0.009	0.009	0.009
SD	0.01	0.008	0.008	SD	0.008	0.009	0.008	SD	0.009	0.013	0.011
Min	9.90E-05	9.90E-05	9.90E-05	Min	9.90E-05	9.90E-05	9.90E-05	Min	9.90E-05	9.90E-05	9.90E-05
Max	0.142	0.085	0.115	Max	0.078	0.115	0.061	Max	0.101	0.161	0.12

Lampiran 23. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 2,5 L/menit dengan pompa 250-watt nozzle 1 inch

Pompa 250-Watt 1 Inch											
2,5 Lpm											
1/125s				1/160s				1/200s			
Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)			
Ulangan				Ulangan				Ulangan			
	1	2	3		1	2	3		1	2	3
Average	0.010149	0.005724	0.007552	Average	0.011006	0.008147	0.009314	Average	0.009388	0.011784	0.009028
Mean	0.01	0.006	0.008	Mean	0.011	0.008	0.01	Mean	0.009	0.012	0.009
SD	0.011	0.009	0.009	SD	0.011	0.011	0.009	SD	0.009	0.018	0.009
Min	9.90E-05	9.90E-05	9.90E-05	Min	9.90E-05	9.90E-05	9.90E-05	Min	9.90E-05	9.90E-05	9.90E-05
Max	0.12	0.191	0.094	Max	0.107	0.152	0.085	Max	0.072	0.381	0.085

Lampiran 24. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 0,5 L/menit dengan pompa 250-watt nozzle ¾ inch

Pompa 250-Watt ¾ Inch											
0,5 Lpm											
1/125s			1/160s			1/200s					
Area gelembung dalam (mm)			Area gelembung dalam (mm)			Area gelembung dalam (mm)					
Ulangan			Ulangan			Ulangan					
	1	2	3		1	2	3		1	2	3
Average	0.005603	0.005444	0.00527	Average	0.006116	0.005989	0.005804	Average	0.007187	0.006748	0.006082
Mean	0.005	0.005	0.005	Mean	0.006	0.006	0.006	Mean	0.007	0.007	0.001
SD	0.006	0.006	0.005	SD	0.007	0.008	0.006	SD	0.008	0.009	8.16E-04
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	4.54E-04
Max	0.065	0.073	0.06	Max	0.056	0.144	0.055	Max	0.067	0.155	1.81E-04

Lampiran 25. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 1,5 L/menit dengan pompa 250-watt nozzle ¾ inch

Pompa 250-Watt ¾ Inch											
1,5 Lpm											
1/125s			1/160s			1/200s					
Area gelembung dalam (mm)			Area gelembung dalam (mm)			Area gelembung dalam (mm)					
Ulangan			Ulangan			Ulangan					
	1	2	3		1	2	3		1	2	3
Average	8.52E-03	5.60E-03	7.34E-03	Average	8.33E-03	9.05E-03	6.72E-03	Average	1.23E-02	8.63E-03	9.25E-03
Mean	0.008	0.005	0.008	Mean	0.008	0.008	0.007	Mean	0.011	0.009	0.009
SD	0.009	0.007	0.009	SD	0.01	0.012	0.008	SD	0.013	0.013	0.01
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.077	0.116	0.104	Max	0.081	0.315	0.067	Max	0.158	0.209	0.102

Lampiran 26. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 2,5 L/menit dengan pompa 250-watt nozzle ¾ inch

Pompa 250-Watt ¾ Inch											
2,5 Lpm											
1/125s			1/160s			1/200s					
Area gelembung dalam (mm)			Area gelembung dalam (mm)			Area gelembung dalam (mm)					
Ulangan			Ulangan			Ulangan					
	1	2	3		1	2	3		1	2	3
Average	0.011406	0.005616	0.008165	Average	0.009965	0.007052	0.011673	Average	0.015844	0.007306	0.011863
Mean	0.011	0.006	0.008	Mean	0.01	0.008	0.012	Mean	0.014	0.007	0.012
SD	0.012	0.008	0.008	SD	0.012	0.011	0.011	SD	0.018	0.011	0.012
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.101	0.172	0.068	Max	0.082	0.2	0.085	Max	0.191	0.217	0.089

Lampiran 27. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 0,5 L/menit dengan pompa 250-watt nozzle ½ inch

Pompa 250-Watt 1/2 Inch											
0,5 Lpm											
1/125s				1/160s				1/200s			
Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)			
Ulangan				Ulangan				Ulangan			
	1	2	3		1	2	3		1	2	3
Average	0.00414	0.006627	0.003489	Average	0.00716	0.007841	0.00379	Average	0.004124	0.00759	0.003545
Mean	0.004	0.006	0.003	Mean	0.007	0.009	0.004	Mean	0.004	0.007	0.003
SD	0.004	0.008	0.004	SD	0.007	0.014	0.004	SD	0.005	0.011	0.004
Min	1.06E-04	1.00E-04	1.00E-04	Min	1.02E-04	1.02E-04	1.02E-04	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.047	0.074	0.026	Max	0.044	0.175	0.031	Max	0.054	0.131	0.064

Lampiran 28. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 1,5 L/menit dengan pompa 250-watt nozzle ½ inch

Pompa 250-Watt 1/2 Inch											
1,5 Lpm											
1/125s				1/160s				1/200s			
Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)			
Ulangan				Ulangan				Ulangan			
	1	2	3		1	2	3		1	2	3
Average	0.0054	0.007206	0.003372	Average	0.004869	0.006814	0.003872	Average	0.006499	0.014064	0.010383
Mean	0.006	0.007	0.003	Mean	0.006	0.007	0.004	Mean	0.006	0.014	0.008
SD	0.006	0.009	0.003	SD	0.008	0.011	0.004	SD	0.007	0.023	0.01
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.094	0.106	0.023	Max	0.101	0.131	0.021	Max	0.102	0.528	0.084

Lampiran 29. Data gelembung pompa MBG pada berbagai kecepatan bukaan lensa pada kecepatan aliran udara 2,5 L/menit dengan pompa 250-watt nozzle ½ inch

Pompa 250-Watt 1/2 Inch											
2,5 Lpm											
1/125s				1/160s				1/200s			
Area gelembung dalam (mm)				Area gelembung dalam (mm)				Area gelembung dalam (mm)			
Ulangan				Ulangan				Ulangan			
	1	2	3		1	2	3		1	2	3
Average	0.007084	0.006333	0.005036	Average	0.00864	0.011906	0.004098	Average	0.007605	0.008035	0.005604
Mean	0.007	0.006	0.005	Mean	0.01	0.009	0.004	Mean	0.008	0.011	0.006
SD	0.008	0.008	0.005	SD	0.018	0.015	0.005	SD	0.009	0.028	0.007
Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05	Min	9.07E-05	9.07E-05	9.07E-05
Max	0.058	0.143	0.024	Max	0.228	0.2	0.036	Max	0.085	0.771	0.054

Lampiran 30. Data peningkatan konsentrasi oksigen pada berbagai kecepatan laju aliran udara pompa 160-watt nozzle 1 inch

Pompa 160-Watt 1 Inch												
0.5 Lpm				1.5 Lpm				2.5 Lpm				
Peningkatan Oksigen (mg/L)				Peningkatan Oksigen (mg/L)				Peningkatan Oksigen (mg/L)				
Ulangan				Ulangan				Ulangan				
Waktu	1	2	Average	Waktu	1	2	Average	Waktu	1	2	3	Average
0	0.06	0.02	0.04	0	0.22	0.02	0.12	0	0.00	0.01	0.03	0.01
5	1.65	0.36	1.01	5	1.15	0.16	0.66	5	0.61	0.54	0.64	0.60
10	1.68	0.79	1.24	10	2.28	1.1	1.69	10	2.27	1.83	1.88	1.99
15	2.08	1.11	1.60	15	3.05	1.83	2.44	15	3.36	2.8	3.13	3.10
20	2.41	1.41	1.91	20	3.65	2.58	3.12	20	4.18	3.58	3.73	3.83
25	2.81	1.76	2.29	25	4.17	3.15	3.66	25	4.75	4.12	4.32	4.40
30	3.00	2.1	2.55	30	4.61	3.68	4.15	30	5.08	4.49	4.71	4.76
35	3.23	2.33	2.78	35	4.92	4.01	4.47	35	5.28	4.8	4.99	5.02
40	3.56	2.64	3.10	40	5.21	4.43	4.82	40	5.46	4.86	5.19	5.17
45	3.72	2.91	3.32	45	5.42	4.52	4.97	45	5.59	5.01	5.3	5.30
50	3.96	3.1	3.53	50	5.57	4.75	5.16	50	5.66	5	5.37	5.34
55	4.12	3.31	3.72	55	5.71	4.84	5.28	55	5.78	5.18	5.41	5.46
60	4.29	3.46	3.88	60	5.82	4.92	5.37					
65	4.44	3.61	4.03	65	5.92	4.98	5.45					
70	4.57	3.72	4.15									
75	4.73	3.9	4.32									
80	4.81	4.16	4.49									
85	4.91	4.22	4.57									
90	5.00	4.27	4.64									
95	5.01	4.39	4.70									
100	5.20	4.41	4.81									
105	5.21	4.51	4.86									
110	5.21	4.56	4.89									
115	5.37	4.75	5.06									
120	5.22	4.77	5.00									
125	5.36	4.81	5.09									
130	5.45	4.89	5.17									
135	5.48	4.91	5.20									
140	5.38	4.96	5.17									
145	5.48	4.98	5.23									
150	5.51	5.06	5.29									
155	5.53	5.03	5.28									

Lampiran 31. Data peningkatan konsentrasi oksigen pada berbagai kecepatan laju aliran udara pompa 160-watt nozzle ¾ inch

Pompa 160-Watt 3/4 Inch											
0.5 Lpm				1.5 Lpm				2.5 Lpm			
Peningkatan Oksigen (mg/L)				Peningkatan Oksigen (mg/L)				Peningkatan Oksigen (mg/L)			
Ulangan				Ulangan				Ulangan			
Waktu	1	2	Average	Waktu	1	2	Average	Waktu	1	2	Average
0	0.00	0.05	0.03	0	0.00	0.09	0.05	0	0.46	0.06	0.26
5	0.28	0.57	0.43	5	0.76	1.08	0.92	5	0.77	0.94	0.86
10	0.80	0.98	0.89	10	1.66	1.86	1.76	10	1.56	1.95	1.76
15	1.28	1.39	1.34	15	2.48	2.55	2.52	15	2.63	2.78	2.71
20	1.74	1.81	1.78	20	3.09	3.08	3.09	20	3.23	3.25	3.24
25	2.06	2.24	2.15	25	3.59	3.47	3.53	25	3.75	3.77	3.76
30	2.33	2.52	2.43	30	3.98	3.67	3.83	30	4.11	4.05	4.08
35	2.56	2.71	2.64	35	4.30	4.07	4.19	35	4.53	4.22	4.38
40	2.90	2.78	2.84	40	4.52	4.28	4.40	40	5.13	4.48	4.81
45	3.19	3.15	3.17	45	4.71	4.39	4.55	45	5.50	4.59	5.05
50	3.35	3.34	3.35	50	4.94	4.54	4.74	50	5.65	4.69	5.17
55	3.54	3.57	3.56	55	5.05	4.73	4.89	55	5.7	4.78	5.24
60	3.76	3.76	3.76	60	5.21	4.77	4.99	60	5.89	4.85	5.37
65	3.87	3.72	3.80	65	5.24	4.84	5.04	65	5.94	4.91	5.43
70	3.97	3.90	3.94	70	5.30	5.08	5.19	70	6.04	4.89	5.47
75	4.15	3.95	4.05	75	5.41	4.94	5.18				
80	4.28	4.19	4.24	80	5.45	5.02	5.24				
85	4.37	4.25	4.31	85	5.57	5.07	5.32				
90	4.42	4.34	4.38	90	5.50	5.10	5.30				
95	4.48	4.40	4.44	95	5.45	5.21	5.33				
100	4.67	4.51	4.59	100	5.57	5.15	5.36				
105	4.72	4.56	4.64	105	5.63	5.24	5.44				
110	4.83	4.58	4.71								
115	4.92	4.72	4.82								
120	4.93	4.66	4.80								
125	5.01	4.76	4.89								
130	5.01	4.80	4.91								
135	5.10	4.82	4.96								
140	5.07	4.91	4.99								
145	5.17	5.01	5.09								
150	5.26	4.97	5.12								
155	5.24	4.99	5.12								
160	5.28	5.06	5.17								
165	5.33	5.13	5.23								

**Lampiran 32. Data peningkatan konsentrasi oksigen pada berbagai kecepatan laju aliran udara pompa
160-watt nozzle ½ inch**

Pompa 160-Watt 1/2 Inch											
0.5 Lpm				1.5 Lpm				2.5 Lpm			
Peningkatan Oksigen (mg/L)			Peningkatan Oksigen (mg/L)			Peningkatan Oksigen (mg/L)			Peningkatan Oksigen (mg/L)		
Ulangan			Ulangan			Ulangan			Ulangan		
Waktu	1	2	Average	Waktu	1	2	Average	Waktu	1	2	Average
0	0.08	0.09	0.085	0	0.00	0.03	0.02	0	0.00	0.01	0.01
5	0.33	0.3	0.315	5	0.98	1.02	1.00	5	0.78	1.39	1.09
10	0.61	0.69	0.65	10	1.91	1.91	1.91	10	2.04	2.36	2.20
15	0.94	1.01	0.975	15	2.55	2.53	2.54	15	3.03	3.14	3.09
20	1.16	1.34	1.25	20	3.14	3.13	3.14	20	3.80	3.71	3.76
25	1.59	1.63	1.61	25	3.62	3.6	3.61	25	4.30	4.29	4.30
30	1.76	1.85	1.805	30	4.05	3.99	4.02	30	4.70	4.52	4.61
35	1.99	2.1	2.045	35	4.33	4.37	4.35	35	4.98	4.66	4.82
40	2.23	2.4	2.315	40	4.56	4.54	4.55	40	5.10	4.90	5.00
45	2.45	2.58	2.515	45	4.80	4.93	4.87	45	5.27	4.90	5.09
50	2.66	2.76	2.71	50	4.89	5.03	4.96	50	5.43	4.95	5.19
55	2.83	3.00	2.915	55	5.10	4.99	5.05	55	5.51	5.06	5.29
60	2.94	3.28	3.11	60	5.15	5.14	5.15	60	5.52	5.13	5.33
65	3.18	3.37	3.275	65	5.29	5.1	5.20	65	5.54	5.12	5.33
70	3.41	3.46	3.435	70	5.36	5.3	5.33	70	5.64	5.14	5.39
75	3.45	3.55	3.5	75	5.42	5.28	5.35				
80	3.47	3.69	3.58	80	5.47	5.29	5.38				
85	3.64	3.8	3.72	85	5.39	5.27	5.33				
90	3.82	3.84	3.83	90	5.48	5.19	5.34				
95	3.93	3.96	3.945	95	5.54	5.41	5.48				
100	3.84	4.07	3.955								
105	3.92	4.15	4.035								
110	4.00	4.14	4.07								
115	3.99	4.34	4.165								
120	4.07	4.32	4.195								
125	4.13	4.34	4.235								
130	4.16	4.27	4.215								
135	4.1	4.25	4.175								
140	4.28	4.38	4.33								
145	4.34	4.27	4.305								
150	4.37	4.51	4.44								
155	4.43	4.50	4.465								

**Lampiran 33. Data peningkatan konsentrasi oksigen pada berbagai kecepatan laju aliran udara pompa
200-watt nozzle 1 inch**

Pompa 200-Watt 1 Inch															
0.5 Lpm					1.5 Lpm					2.5 Lpm					
Peningkatan Oksigen (mg/L)					Peningkatan Oksigen (mg/L)					Peningkatan Oksigen (mg/L)					
Ulangan					Ulangan					Ulangan					
Waktu	1	2	3	Average	Waktu	1	2	3	Average	Waktu	1	2	3	Average	
0	0.00	0.00	0.02	0.00	0	0.00	0.01	0.03	0.01	0	0.00	0.13	0.12	0.07	
5	0.10	0.19	0.2	0.15	5	1.13	0.68	0.56	0.91	5	1.26	0.31	1.46	0.79	
10	0.55	0.64	0.61	0.60	10	2.15	1.64	1.53	1.90	10	2.57	1.63	2.53	2.10	
15	1.01	1.12	1.03	1.07	15	2.69	2.39	2.18	2.54	15	3.43	2.68	3.46	3.06	
20	1.37	1.43	1.34	1.40	20	3.36	2.96	2.9	3.16	20	4.05	3.47	3.93	3.76	
25	1.66	1.77	1.61	1.72	25	3.83	3.47	3.29	3.65	25	4.48	4.03	4.29	4.26	
30	2.00	2.12	1.97	2.06	30	4.09	3.88	3.61	3.99	30	4.97	4.53	4.56	4.75	
35	2.40	2.42	2.25	2.41	35	4.32	4.14	4.04	4.23	35	4.78	4.8	4.74	4.79	
40	2.74	2.67	2.44	2.71	40	4.56	4.39	4.23	4.48	40	5.16	5.02	4.88	5.09	
45	3.01	2.96	2.68	2.99	45	4.75	4.69	4.42	4.62	45	5.33	5.12	5.07	5.23	
50	3.20	3.16	2.81	3.18	50	4.80	4.8	4.6	4.80	50	5.34	5.16	5.14	5.25	
55	3.46	3.33	2.94	3.40	55	4.90	4.85	4.7	4.88	55	5.46	5.31	5.3	5.39	
60	3.64	3.44	3.07	3.54	60	5.00	5.04	4.72	5.02	60	5.33	5.53	5.1	5.43	
65	3.80	3.59	3.34	3.70	65	5.05	5.16	4.94	5.11	65	5.23	5.4	5.09	5.32	
70	3.89	3.75	3.41	3.82	70	5.18	5.31	4.95	5.25	70	5.31	5.55	5.21	5.43	
75	4.08	3.89	3.51	3.99	75	5.18	5.32	4.96	5.25	75	5.16	5.62	5.2	5.39	
80	4.22	4.00	3.59	4.11	80	5.28	5.37	5.03	5.33	80	5.41	5.57	5.31	5.49	
85	4.34	4.07	3.68	4.21	85	5.27	5.34	5.02	5.31	85	5.40	5.5	5.37	5.45	
90	4.33	4.17	3.81	4.25	90	5.31	5.35	5.08	5.33	90	5.43	5.62	5.46	5.53	
95	4.51	4.29	3.91	4.40	95	5.27	5.43	5.08	5.35						
100	4.58	4.39	3.97	4.49											
105	4.62	4.53	4.07	4.58											
110	4.73	4.55	4.11	4.64											
115	4.72	4.59	4.11	4.66											
120	4.86	4.62	4.15	4.74											
125	4.95	4.70	4.21	4.83											
130	5.05	4.78	4.31	4.92											
135	5.05	4.81	4.3	4.93											
140	5.12	4.87	4.31	5.00											

145	5.12	4.94	4.36	5.03
150	5.20	4.97	4.37	5.09
155	5.21	4.98	4.42	5.10
160	5.26	5.10	4.52	5.18
165	5.30	5.13	4.51	5.22
170	5.30	5.12	4.56	5.21
175	5.34	5.23	4.55	5.29
180	5.43	5.15	4.63	5.29
185	5.37	5.23	4.62	5.30
190	5.39	5.25	4.62	5.32
195	5.43	5.19	4.66	5.31
200	5.38	5.28	4.66	5.33
205	5.36	5.30	4.68	5.33
210	5.44	5.28	4.71	5.36
215	5.50	5.29	4.71	5.40
220	5.42	5.32	4.65	5.37

**Lampiran 34. Data peningkatan konsentrasi oksigen pada berbagai kecepatan laju aliran udara pompa
200-watt nozzle ¾ inch**

Pompa 200-Watt 3/4 Inch													
0.5 Lpm				1.5 Lpm					2.5 Lpm				
Peningkatan Oksigen (mg/L)				Peningkatan Oksigen (mg/L)					Peningkatan Oksigen (mg/L)				
Ulangan				Ulangan					Ulangan				
Waktu	1	2	Average	Waktu	1	2	3	Average	Waktu	1	2	3	Average
0	0.00	0.04	0.02	0	0.00	0.03	0.03	0.02	0	0.00	0.01	0.2	0.01
5	0.32	0.36	0.34	5	0.50	0.45	0.44	0.46	5	0.17	0.61	0.4	0.39
10	0.81	0.74	0.78	10	1.44	1.45	1.36	1.42	10	1.49	1.81	1.19	1.65
15	1.23	1.08	1.16	15	2.08	2.21	2.09	2.13	15	2.62	2.69	2.24	2.66
20	1.56	1.42	1.49	20	2.76	2.61	2.53	2.63	20	3.41	3.32	2.88	3.37
25	1.94	1.80	1.87	25	3.21	3.34	3.10	3.22	25	3.81	3.86	3.51	3.84
30	2.05	2.03	2.04	30	3.58	3.16	3.43	3.39	30	4.21	4.17	3.99	4.19
35	2.29	2.21	2.25	35	3.91	3.78	3.73	3.81	35	4.48	4.43	4.39	4.46
40	2.67	2.49	2.58	40	4.14	3.95	3.86	3.98	40	4.65	4.59	4.59	4.62
45	2.87	2.73	2.80	45	4.40	4.06	4.15	4.20	45	4.73	4.83	4.69	4.78
50	3.17	2.98	3.08	50	4.42	4.35	4.35	4.37	50	4.9	4.98	4.81	4.94
55	3.36	3.13	3.25	55	4.46	4.49	4.39	4.45	55	4.80	5.01	4.94	4.90
60	3.54	3.31	3.43	60	4.72	4.64	4.58	4.65	60	5.14	5.03	4.99	5.09
65	3.74	3.45	3.60	65	4.82	4.78	4.68	4.76	65	5.16	5.06	5.02	5.11
70	3.93	3.58	3.76	70	4.74	4.16	4.68	4.53	70	5.22	5.19	5.1	5.21
75	4.16	3.66	3.91	75	4.97	4.20	4.76	4.64	75	5.23	5.22	5.04	5.23
80	4.27	3.74	4.01	80	5.00	4.69	4.74	4.81	80	5.22	5.24	5.19	5.23
85	4.40	3.84	4.12	85	4.99	4.68	4.87	4.85					
90	4.50	3.96	4.23	90	4.95	4.66	4.91	4.84					
95	4.55	4.08	4.32	95	5.14	5.04	4.93	5.04					
100	4.63	4.16	4.40	100	5.06	4.97	4.93	4.99					
105	4.68	4.29	4.49	105	5.08	4.87	4.91	4.95					
110	4.83	4.32	4.58	110	5.16	5.12	4.94	5.07					
115	4.83	4.39	4.61										
120	4.86	4.38	4.62										
125	5.11	4.42	4.77										
130	4.99	4.46	4.73										
135	5.01	4.56	4.79										
140	5.05	4.54	4.80										
145	5.14	4.60	4.87										
150	5.05	4.67	4.86										
155	5.14	4.67	4.91										
160	5.17	4.68	4.93										
165	5.32	4.71	5.02										
170	5.25	4.75	5.00										
175	5.29	4.78	5.04										
180	5.28	4.76	5.02										
185	5.24	4.79	5.02										

190	5.46	4.85	5.16
195	5.43	4.83	5.13
200	5.27	4.91	5.09
205	5.41	4.85	5.13
210	5.53	4.90	5.22

**Lampiran 35. Data peningkatan konsentrasi oksigen pada berbagai kecepatan laju aliran udara pompa
200-watt nozzle ½ inch**

Pompa 200-Watt 1/2 Inch											
0.5 Lpm				1.5 Lpm				2.5 Lpm			
Peningkatan Oksigen (mg/L)				Peningkatan Oksigen (mg/L)				Peningkatan Oksigen (mg/L)			
Ulangan				Ulangan				Ulangan			
Waktu	1	2	Average	Waktu	1	2	Average	Waktu	1	2	Average
0	0.00	0.00	0.00	0	0.14	0.02	0.08	0	0.00	0.07	0.04
5	0.74	0.74	0.74	5	0.49	0.43	0.46	5	0.18	0.28	0.23
10	1.25	1.23	1.24	10	1.15	1.08	1.12	10	1.77	1.64	1.71
15	1.37	1.31	1.34	15	2.01	1.85	1.93	15	2.84	2.54	2.69
20	1.68	1.58	1.63	20	2.63	2.46	2.55	20	3.77	3.30	3.54
25	1.85	1.80	1.83	25	3.24	2.92	3.08	25	4.39	3.77	4.08
30	2.17	2.00	2.09	30	3.74	3.31	3.53	30	4.83	4.11	4.47
35	2.47	2.21	2.34	35	4.24	3.60	3.92	35	5.13	4.32	4.73
40	2.90	2.59	2.75	40	4.62	3.95	4.29	40	5.37	4.62	5.00
45	3.06	2.74	2.90	45	4.86	4.12	4.49	45	5.51	4.73	5.12
50	3.33	2.95	3.14	50	4.98	4.30	4.64	50	5.68	4.81	5.25
55	3.38	3.05	3.22	55	5.13	4.51	4.82	55	5.72	4.90	5.31
60	3.53	3.15	3.34	60	5.27	4.56	4.92	60	5.79	5.02	5.41
65	3.63	3.31	3.47	65	5.41	4.59	5.00	65	5.87	4.90	5.39
70	3.72	3.40	3.56	70	5.53	4.77	5.15	70	5.86	4.93	5.40
75	3.81	3.54	3.68	75	5.52	4.77	5.15	75	5.87	4.98	5.43
80	3.84	3.60	3.72	80	5.65	4.77	5.21	80	5.87	5.02	5.45
85	3.95	3.69	3.82	85	5.57	4.88	5.23	85	5.91	5.03	5.47
90	4.07	3.84	3.96	90	5.64	4.92	5.28				
95	4.15	3.93	4.04	95	5.80	4.99	5.40				
100	4.21	3.95	4.08	100	5.78	4.94	5.36				
105	4.26	4.03	4.15	105	5.78	4.90	5.34				
110	4.45	4.04	4.25	110	5.87	5.03	5.45				
115	4.48	4.07	4.28								
120	4.54	4.12	4.33								
125	4.61	4.15	4.38								
130	4.64	4.20	4.42								
135	4.70	4.31	4.51								
140	4.73	4.36	4.55								
145	4.75	4.41	4.58								
150	4.86	4.42	4.64								
155	4.94	4.46	4.70								
160	4.93	4.50	4.72								
165	5.08	4.52	4.80								
170	5.01	4.53	4.77								
175	4.98	4.51	4.75								
180	5.05	4.54	4.80								
185	5.19	4.57	4.88								

190	5.08	4.62	4.85
195	5.25	4.63	4.94

Lampiran 36. Data peningkatan konsentrasi oksigen pada berbagai kecepatan laju aliran udara pompa 250-watt nozzle 1 inch

Pompa 250-Watt 1 Inch											
0.5 Lpm				1.5 Lpm				2.5 Lpm			
Peningkatan Oksigen (mg/L)				Peningkatan Oksigen (mg/L)				Peningkatan Oksigen (mg/L)			
Ulangan				Ulangan				Ulangan			
Waktu	1	2	Average	Waktu	1	2	Average	Waktu	1	2	Average
0	0.03	0.04	0.035	0	0.18	0.03	0.11	0	0.16	0.02	0.09
5	0.56	0.67	0.615	5	0.41	0.19	0.30	5	1.03	0.67	0.85
10	0.96	0.84	0.9	10	1.53	1.31	1.42	10	2.53	1.78	2.16
15	1.38	0.99	1.185	15	2.39	2.14	2.27	15	3.43	2.81	3.12
20	1.8	1.35	1.575	20	3.08	2.93	3.01	20	4.09	3.64	3.87
25	2.09	1.79	1.94	25	3.58	3.48	3.53	25	4.6	4.03	4.32
30	2.39	2.16	2.275	30	4.09	3.93	4.01	30	4.86	4.57	4.72
35	2.71	2.49	2.6	35	4.42	4.25	4.34	35	5.19	4.98	5.09
40	2.93	2.72	2.825	40	4.68	4.63	4.66	40	5.35	5.08	5.22
45	3.15	2.95	3.05	45	4.82	4.76	4.79	45	5.47	5.11	5.29
50	3.41	3.21	3.31	50	5.04	4.89	4.97	50	5.52	5.18	5.35
55	3.55	3.38	3.465	55	5.16	5.10	5.13	55	5.61	5.32	5.47
60	3.72	3.6	3.66	60	5.27	5.22	5.25	60	5.65	5.4	5.53
65	3.92	3.85	3.885	65	5.30	5.37	5.34	65	5.7	5.43	5.57
70	4.08	4.03	4.055	70	5.36	5.42	5.39	70	5.67	5.55	5.61
75	4.16	4.13	4.145	75	5.40	5.44	5.42	75	5.72	5.49	5.61
80	4.31	4.26	4.285	80	5.48	5.51	5.50	80	5.73	5.55	5.64
85	4.42	4.31	4.365	85	5.46	5.63	5.55				
90	4.51	4.5	4.505	90	5.48	5.58	5.53				
95	4.56	4.77	4.665	95	5.55	5.62	5.59				
100	4.68	4.75	4.715	100	5.53	5.67	5.60				
105	4.73	4.94	4.835								
110	4.82	5.03	4.925								
115	4.89	5.12	5.005								
120	4.91	5.12	5.015								
125	4.94	5.18	5.06								
130	4.98	5.31	5.145								
135	5.08	5.35	5.215								
140	5.14	5.28	5.21								
145	5.25	5.37	5.31								
150	5.25	5.47	5.36								
155	5.27	5.41	5.34								
160	5.27	5.44	5.355								
165	5.3	5.49	5.395								
170	5.34	5.51	5.425								
175	5.44	5.44	5.44								

Lampiran 37. Data peningkatan konsentrasi oksigen pada berbagai kecepatan laju aliran udara pompa 250-watt nozzle ¾ inch

Pompa 250-Watt 3/4 Inch											
0.5 Lpm				1.5 Lpm				2.5 Lpm			
Peningkatan Oksigen (mg/L)				Peningkatan Oksigen (mg/L)				Peningkatan Oksigen (mg/L)			
Ulangan				Ulangan				Ulangan			
Waktu	1	2	Average	Waktu	1	2	Average	Waktu	1	2	Average
0	0.13	0.39	0.26	0	0.33	0.31	0.32	0	0.26	0.23	0.25
5	0.32	0.86	0.59	5	0.6	1.15	0.88	5	0.53	0.70	0.62
10	1.03	1.21	1.12	10	1.43	1.98	1.71	10	1.93	2.05	1.99
15	1.39	1.54	1.47	15	2.34	2.85	2.60	15	2.99	2.93	2.96
20	1.69	1.81	1.75	20	2.95	3.26	3.11	20	3.75	3.57	3.66
25	1.92	2.04	1.98	25	3.46	3.62	3.54	25	4.30	4.15	4.23
30	2.16	2.31	2.24	30	3.75	3.96	3.86	30	4.68	4.57	4.63
35	2.41	2.54	2.48	35	4.27	4.25	4.26	35	5.00	4.91	4.96
40	2.61	2.68	2.65	40	4.55	4.41	4.48	40	5.23	5.06	5.15
45	2.78	2.91	2.85	45	4.7	4.6	4.65	45	5.34	5.17	5.26
50	3.08	3.11	3.10	50	4.88	4.68	4.78	50	5.45	5.22	5.34
55	3.17	3.3	3.24	55	5.08	4.87	4.98	55	5.56	5.39	5.48
60	3.42	3.41	3.42	60	5.13	4.93	5.03	60	5.65	5.46	5.56
65	3.62	3.6	3.61	65	5.25	5.02	5.14				
70	3.72	3.67	3.70	70	5.36	5.12	5.24				
75	3.94	3.82	3.88	75	5.4	5.14	5.27				
80	4.03	3.93	3.98	80	5.46	5.24	5.35				
85	4.11	4.02	4.07	85	5.48	5.14	5.31				
90	4.19	4.16	4.18	90	5.52	5.25	5.39				
95	4.46	4.2	4.33								
100	4.56	4.26	4.41								
105	4.59	4.27	4.43								
110	4.67	4.35	4.51								
115	4.74	4.42	4.58								
120	4.74	4.44	4.59								
125	4.76	4.54	4.65								
130	4.83	4.95	4.89								
135	4.97	4.97	4.97								
140	5.08	4.99	5.04								
145	5.02	5.02	5.02								

**Lampiran 38. Data peningkatan konsentrasi oksigen pada berbagai kecepatan laju aliran udara pompa
250-watt nozzle ½ inch**

Pompa 250-Watt 1/2 Inch											
0.5 Lpm				1.5 Lpm				2.5 Lpm			
Peningkatan Oksigen (mg/L)				Peningkatan Oksigen (mg/L)				Peningkatan Oksigen (mg/L)			
Ulangan				Ulangan				Ulangan			
Waktu	1	2	Average	Waktu	1	2	Average	Waktu	1	2	Average
0	0.00	0.02	0.01	0	0.00	0.02	0.01	0	0.00	0.04	0.02
5	0.24	0.28	0.26	5	1.18	1.34	1.26	5	0.95	1.48	1.22
10	0.59	1.02	0.81	10	1.94	2.12	2.03	10	1.86	2.65	2.26
15	0.86	1.4	1.13	15	2.68	2.81	2.75	15	2.94	3.46	3.20
20	1.22	1.73	1.48	20	3.23	3.28	3.26	20	4.08	4.03	4.06
25	1.49	2.1	1.80	25	3.68	3.76	3.72	25	4.64	4.36	4.50
30	1.79	2.36	2.08	30	4.10	4.12	4.11	30	4.89	4.60	4.75
35	2.07	2.59	2.33	35	4.37	4.41	4.39	35	5.5	4.83	5.17
40	2.29	2.84	2.57	40	4.60	4.68	4.64	40	5.74	5.01	5.38
45	2.60	3.02	2.81	45	4.74	4.86	4.80	45	5.87	5.11	5.49
50	2.69	3.25	2.97	50	4.88	5.05	4.97	50	6.11	5.32	5.72
55	2.85	3.45	3.15	55	5.06	5.20	5.13	55	6.19	5.28	5.74
60	3.04	3.64	3.34	60	5.27	5.29	5.28	60	6.07	5.35	5.71
65	3.24	3.78	3.51	65	5.29	5.45	5.37	65	6.06	5.38	5.72
70	3.32	3.92	3.62	70	5.36	5.48	5.42	70	6.08	5.38	5.73
75	3.32	4.05	3.69	75	5.43	5.46	5.45	75	6.22	5.47	5.85
80	3.55	4.13	3.84	80	5.41	5.60	5.51				
85	3.66	4.28	3.97	85	5.61	5.72	5.67				
90	3.83	4.51	4.17	90	5.65	5.69	5.67				
95	3.99	4.52	4.26	95	5.72	5.65	5.69				
100	4.03	4.67	4.35	100	5.67	5.66	5.67				
105	4.05	4.69	4.37	105	5.76	6.02	5.89				
110	4.14	4.75	4.45								
115	4.33	4.77	4.55								
120	4.42	4.86	4.64								
125	4.44	4.92	4.68								
130	4.53	4.94	4.74								
135	4.57	5.07	4.82								
140	4.59	5.01	4.80								
145	4.67	5.11	4.89								
150	4.75	5.2	4.98								
155	4.74	5.15	4.95								
160	4.83	5.18	5.01								
165	4.75	5.22	4.99								
170	4.79	5.25	5.02								
175	4.84	5.29	5.07								
180	4.81	5.3	5.06								
185	4.74	5.31	5.03								

Lampiran 39. Parameter kualitas air pada perlakuan DIYM O₂ Rs

Sampling	Suhu		DO		Salinitas		pH		TSS		Fosfat		Nitrit		Nitrat		Amonia		Alkalinitas	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
1	27.3	27.2	4.45	4.28	35.54	35.88	7.68	7.70	69	73	0.08	0.13	0.10	0.08	0.16	0.19	0.22	0.70	98.09	80.4
2	29.1	28.8	4.51	4.45	35.49	35.70	7.78	7.62	78	87	1.49	1.22	0.04	2.44	0.24	0.55	1.04	0.34	100.5	96.48
3	28.3	28.2	4.47	4.58	35.29	34.39	7.59	7.51	93	89	0.12	0.20	0.25	0.26	0.23	0.62	0.12	0.18	96.48	112.56
4	28.5	28.3	4.61	4.57	34.85	37.02	7.61	7.37	89	91	0.14	0.16	0.19	0.19	0.35	0.23	0.14	0.22	100.5	102.51
5	28.4	28.7	4.30	5.16	33.01	31.44	7.57	7.25	77	88	0.22	0.21	0.19	0.20	0.18	0.32	0.24	0.27	100.5	100.5
6	28.2	28.5	4.70	4.79	31.89	31.26	7.42	7.22	82	88	0.23	0.39	0.11	0.17	0.23	0.31	0.10	0.16	100.5	112.56
7	27.6	27.6	4.17	4.12	31.35	30.88	7.45	7.28	61	77	0.10	0.17	0.14	0.12	0.22	0.27	0.07	0.18	104.52	104.52
8	26.5	26.9	3.67	3.73	31.04	29.98	7.73	7.18	77	84	0.20	0.14	0.12	0.12	0.21	0.21	0.05	0.10	100.5	96.48
9	28.1	28.3	3.77	4.32	26.47	26.33	7.19	7.06	82	67	0.15	0.15	0.10	0.06	0.19	0.20	0.07	0.09	100.5	100.5
10	30.2	30.3	3.26	4.08	27.78	25.71	7.39	7.12	93	82	0.19	0.15	0.10	0.10	0.21	0.22	0.09	0.10	100.5	120.6
11	27	27.5	3.98	4.44	28.10	27.90	7.77	7.47	82	93	0.17	0.13	0.09	0.06	0.22	0.22	0.05	0.07	100.5	92.46
12	27.1	27.5	4.10	4.62	26.91	26.80	7.95	7.62	103	93	0.15	0.18	0.09	0.09	0.23	0.19	0.06	0.10	92.46	100.5
13	28.1	28.8	4.14	4.28	24.95	25.26	7.26	7.35	89	86	0.17	0.18	0.14	0.14	0.45	1.69	0.19	0.16	104.52	100.5
Avg	28.03	28.20	4.16	4.42	30.97	30.66	7.57	7.37	82.69	84.46	0.26	0.26	0.13	0.31	0.24	0.40	0.19	0.20	100.01	101.58
Min	26.50	26.90	3.26	3.73	24.95	25.26	7.19	7.06	61.00	67.00	0.08	0.13	0.04	0.06	0.16	0.19	0.05	0.07	92.46	80.40
Max	30.20	30.30	4.70	5.16	35.54	37.02	7.95	7.70	103.00	93.00	1.49	1.22	0.25	2.44	0.45	1.69	1.04	0.70	104.52	120.60

Lampiran 40. Paraemter Kualitas Air Root Blower

Perlakuan Rootblower																				
Sampling	Suhu		DO		Salinitas		pH		TSS		Fosfat		Nitrit		Nitrat		Amonia		Alkalinitas	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
1	27.0	27.2	4.35	4.57	35.66	36.27	7.70	7.65	66	49	0.16	0.21	0.07	0.07	0.12	0.18	0.43	0.98	92.46	78.39
2	28.2	8.4	4.53	4.34	35.73	36.15	7.70	7.66	83	94	2.10	1.38	3.30	0.04	0.55	0.23	0.22	1.12	108.54	104.52
3	27.4	27.7	4.32	4.31	35.58	35.61	7.55	7.45	82	91	0.11	0.05	0.25	0.19	0.36	0.78	0.13	0.19	128.64	104.52
4	27.8	27.8	4.56	4.67	35.07	35.13	7.46	7.36	83	96	0.17	0.20	0.18	0.19	0.32	0.23	0.13	0.20	104.52	104.52
5	28	28.2	3.90	4.19	33.26	33.18	7.28	7.34	82	67	0.17	0.13	0.17	0.13	0.22	0.21	0.25	0.18	116.58	100.50
6	27.7	27.7	4.03	4.48	31.27	31.87	7.26	7.24	86	93	0.22	0.08	0.19	0.16	0.27	0.24	0.11	0.26	104.52	108.54
7	27.1	27.3	4.22	2.81	31	31.38	7.37	7.21	73	81	0.16	0.13	0.10	0.13	0.22	0.26	0.13	0.12	104.52	96.48
8	26.4	27.4	3.77	3.79	30.02	30.02	7.22	7.23	76	76	0.11	0.18	0.18	0.17	0.22	0.19	0.06	0.12	100.50	100.50
9	27.6	27.7	4.60	3.95	26.47	26.46	7.17	7.16	88	73	0.21	0.22	0.09	0.07	0.19	0.17	0.08	0.06	104.52	120.60
10	29.7	29.9	3.67	3.32	27.82	27.96	7.23	7.08	88	84	0.16	0.10	0.08	0.06	0.23	0.16	0.07	0.09	100.50	120.60
11	27	27.2	4.20	3.83	28.06	28.17	7.6	7.41	102	96	0.15	0.15	0.07	0.08	0.25	0.34	0.02	0.06	104.52	100.50
12	27.2	27.1	4.28	3.97	26.95	27.00	7.72	7.77	101	86	0.12	0.16	0.07	0.08	0.22	0.17	0.07	0.06	100.50	96.48
13	27.9	28.3	3.57	3.74	25.13	25.28	7.29	7.29	91	78	0.14	0.20	0.16	1.28	0.49	0.45	0.15	0.14	100.50	100.50
Avg	27.62	26.30	4.15	39.56	30.92	31.11	7.43	7.37	84.69	81.85	0.31	0.25	0.38	0.20	0.28	0.28	0.14	0.28	105.45	102.82
Min	26.40	8.40	3.57	2.81	25.13	25.28	7.17	7.08	66.00	49.00	0.11	0.05	0.07	0.04	0.12	0.16	0.02	0.06	92.46	78.39
Max	29.70	29.90	4.60	467.00	35.73	36.27	7.72	7.77	102.00	96.00	2.10	1.38	3.30	1.28	0.55	0.78	0.43	1.12	128.64	120.60

Lampiran 41. Performa Budidaya

Performa Budidaya	DIYM O ₂ ^{Rs}					Root Blower				
	1	2	3	4	Average	1	2	3	4	Average
Pertambahan bobot (g/ekor)	15.8	20.26	16.29	15.48	16.96	13.65	12.6	15.31	14.17	13.93
Sintasan (%)	65	75	72.84	82.72	73.89	91.3	91.35	78.47	82.71	85.96
Ukuran (g/ekor)	15.38	18.52	14.99	14.08	15.75	12.05	12.15	13.70	12.66	12.64
Produksi (kg)	100	93.6	120	116.5	107.53	110	111	107.5	104.7	108.30
Produktivitas (kg/m ³)	5	4.68	6	5.83	5.38	5.5	5.55	5.37	5.23	5.41