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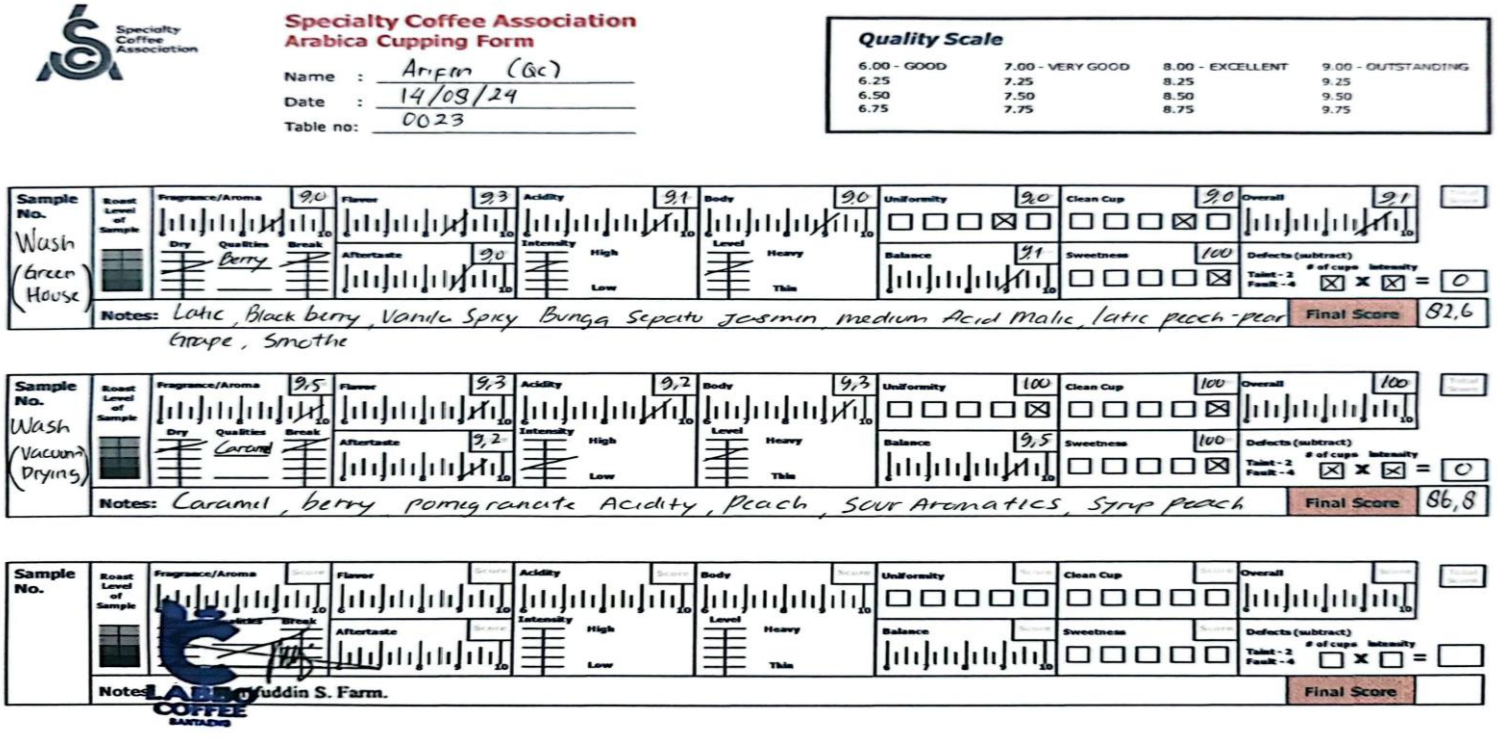
LAMPIRAN

Lampiran 1 *Cupping test*



Specialty Coffee Association
Arabica Cupping Form

Name : Arifin (QC)
Date : 14/09/24
Table no: 0023

Quality Scale

6.00 - GOOD	7.00 - VERY GOOD	8.00 - EXCELLENT	9.00 - OUTSTANDING
6.25	7.25	8.25	9.25
6.50	7.50	8.50	9.50
6.75	7.75	8.75	9.75

Sample No.	Fragrance/Aroma	Flavor	Acidity	Body	Uniformity	Clean Cup	Overall	Defects (subtract)	Final Score
Wash (Green House)	9,0	9,3	9,1	9,0	10	10	9,1	0	82,6
Wash (Vacuum Drying)	9,5	9,3	9,2	9,3	10	10	10	0	86,8

Notes: Latic, Black berry, Vanila Spicy, Bunga Sepatu, Jasmin, medium Acid Malic, latic peach-pear Grape, Smothe

Notes: Caramel, berry, pomegranate Acidity, Peach, Sour Aromatics, Syrup Peach

Notes: Syafuddin S. Farm.

This form is designed and intended to be used in conjunction with the SCA Protocol for Cupping Specialty Coffee.

Lampiran 2 Hasil pengambilan data

Table 2. Data temperatur pendinginan tanpa menggunakan pompa vakum

Menit	T_{in} Kompresor	T_{out} kompresor	T_{in} Kondensor	T_{out} Kondensor	T_{in} Katup Ekspansi	T_{out} Katup Ekspansi	T_{in} Evaporator	T_{out} Evaporator
0	27.64	27.86	27.73	27.52	27.66	27.51	27.1	27.75
10	10.6780	32.6746	33.4656	29.1234	28.9127	5.7533	4.7552	4.1845
20	5.3618	34.4379	34.9574	30.3836	28.9596	-9.5384	-10.2076	-10.2889
30	6.2631	36.7897	35.9288	31.3580	29.3779	-11.2388	-11.7143	-11.9495
40	6.2688	39.1852	36.8768	32.2716	30.1010	-11.1636	-11.7054	-12.8424
50	7.1442	40.0875	37.2131	27.8850	27.4322	-14.8355	-15.5359	-15.3307
60	8.1660	42.1914	38.0559	26.5774	25.4959	-13.6024	-14.1077	-14.2822
70	7.1291	42.3121	38.1230	27.7108	25.5308	-19.0254	-19.7592	-14.2953
80	7.5912	43.6130	38.3213	28.4865	25.3962	-21.0081	-21.7184	-14.2999
90	7.9613	46.4447	38.7630	29.0524	25.6463	-21.5672	-22.2097	-14.6237
100	8.0187	48.5959	39.2482	29.5215	25.9506	-21.8879	-22.5173	-17.2915
110	8.3121	50.5260	40.2749	29.9914	25.9695	-22.0869	-22.6921	-18.2255
120	8.0190	51.9558	40.9966	30.4453	26.2075	-22.3667	-22.8843	-18.7370
Rata-rata	9.1195	41.2826	36.9196	29.2559	27.1262	-11.9275	-12.5536	-10.0179

Siklus Kompresi Uap									
Menit	**h1**	**h2**	**h3**	**h4**	**Q out (kj/kg)**	**Q in (kj/kg)**	**COP Aktual**	**ṁ (kg/s)**	**W in (kj/kg)**
0	0	0	0	0	0	0	0	0	0
10	404.9068	431.6746	240.4253	240.4253	191.2493	164.4815	6.1448	0.00460	0.1232
20	401.9171	433.5036	241.3402	241.3402	192.1633	160.5768	5.0837	0.00390	0.1232
30	402.4447	435.4318	242.3519	242.3519	193.0798	160.0928	4.8532	0.00373	0.1232
40	402.4478	437.4315	243.5795	243.5795	193.8521	158.8684	4.5412	0.00352	0.1232
50	402.9293	438.4806	238.4220	238.4220	200.0586	164.5073	4.6273	0.00347	0.1232
60	403.4996	439.7531	236.1513	236.1513	203.6018	167.3483	4.6161	0.00340	0.1232
70	402.9210	439.8497	236.9691	236.9691	202.8806	165.9519	4.4938	0.00334	0.1232
80	403.1752	440.8904	237.4179	237.4179	203.4725	165.7573	4.3950	0.00327	0.1232
90	403.3787	444.0226	237.9891	237.9891	206.0335	165.3896	4.0692	0.00303	0.1232
100	403.4112	447.0343	238.5305	238.5305	208.5038	164.8808	3.7797	0.00282	0.1232
110	403.5873	449.4052	238.8726	238.8726	210.5326	164.7146	3.5950	0.00269	0.1232
120	403.4114	449.6912	239.3896	239.3896	210.3016	164.0218	3.5441	0.00266	0.1232
Rata-rata	403.9962	439.5736	239.2127	239.2127	201.3108	163.8826	4.4786	0.0034	0.1232

Table 3. Data temperatur pendinginan tanpa menggunakan pompa vakum

Menit	T_{in} Kompresor	T_{out} kompresor	T_{in} Kondensor	T_{out} Kondensor	T_{in} Katup Ekspansi	T_{out} Katup Ekspansi	T_{in} Evaporator	T_{out} Evaporator
0	27.81	27.85	27.84	27.76	27.77	27.81	27.62	27.55
10	13.0841	33.7384	34.4510	30.2825	28.5447	2.3977	1.1425	4.7138
20	6.7067	39.3031	36.7694	30.6257	26.7609	-12.9649	-14.2660	-6.4605
30	7.7313	43.8567	39.3891	31.5471	27.3043	-14.3400	-15.8352	-7.1912
40	8.3470	46.4581	40.8141	32.4891	28.2794	-14.2668	-15.9714	-7.3896
50	9.7197	47.7873	41.3788	33.2899	28.9671	-14.4485	-16.5119	-7.8838
60	10.1653	48.2966	40.7921	33.7843	29.3085	-16.1966	-18.7596	-7.5099
70	10.3921	47.0523	37.9377	33.7862	29.2815	-20.2345	-23.4029	-8.2414
80	10.7441	48.0216	38.0528	33.8644	27.9322	-20.8372	-21.6975	-8.4842
90	11.3723	50.0251	39.6628	31.7467	27.6423	-16.6024	-18.1862	-8.6761
100	11.9283	49.7150	39.5717	26.1201	24.7476	-19.1809	-20.9339	-7.8931
110	13.4677	47.1009	37.9013	26.6852	24.7453	-19.5718	-20.8935	-9.8033
120	14.0516	45.4081	36.8567	27.2911	24.3366	-18.2690	-20.6391	-9.6503
130	14.1967	44.5299	36.7011	27.9922	24.4208	-17.0820	-19.3027	-10.0853
140	15.5823	43.5988	36.0858	28.5603	25.0261	-18.4302	-21.8706	-9.9560
150	15.9856	43.2951	35.9595	29.0542	25.5532	-18.6632	-22.1440	-9.3986
160	15.1248	43.9343	37.1735	31.5298	25.8697	-10.9878	-14.4228	-13.3900
170	15.8333	43.1208	35.8962	29.9740	25.6328	-16.9318	-20.5098	-11.2364
180	15.5989	43.0751	35.9305	30.5756	25.9941	-18.3590	-21.6210	-10.3776
Rata-rata	13.0443	44.0088	37.3244	30.3662	26.7430	-13.5347	-15.6950	-6.3876
Rata-rata 120 menit	10.6425	45.5636	38.6315	30.9594	27.3209	-15.3762	-17.1629	-7.0391

Siklus Kompresi Uap									
Menit	**h1**	**h2**	**h3**	**h4**	**Q out (kj/kg)**	**Q in (kj/kg)**	**COP**	**ṁ (kg/s)**	**W in (kj/kg)**
0	0	0	0	0	0	0	0	0	0
10	406.25	432.74	240.98	240.98	191.76	165.27	6.24	0.0047	0.1232
20	402.56	437.58	239.94	239.94	197.64	162.62	4.64	0.0035	0.1232
30	402.94	441.09	241.00	241.00	200.09	161.94	4.25	0.0032	0.1232
40	403.61	444.04	242.38	242.38	201.66	161.23	3.99	0.0030	0.1232
50	404.36	445.90	243.49	243.49	202.41	160.87	3.87	0.0030	0.1232
60	404.60	446.62	244.12	244.12	202.50	160.48	3.82	0.0029	0.1232
70	404.74	444.87	244.10	244.10	200.77	160.63	4.00	0.0031	0.1232
80	404.95	446.23	243.15	243.15	203.08	161.80	3.92	0.0030	0.1232
90	405.29	449.45	241.37	241.37	208.07	163.91	3.71	0.0028	0.1232
100	405.56	448.92	235.25	235.25	213.67	170.31	3.93	0.0028	0.1232
110	406.48	444.94	235.67	235.67	209.27	170.81	4.44	0.0032	0.1232
120	406.83	443.04	235.82	235.82	207.22	171.01	4.72	0.0034	0.1232
130	406.90	442.05	236.39	236.39	205.66	170.51	4.85	0.0035	0.1232
140	407.59	440.88	237.21	237.21	203.67	170.38	5.12	0.0037	0.1232
150	407.79	440.64	237.93	237.93	202.71	169.87	5.17	0.0038	0.1232
160	407.36	441.15	239.95	239.95	201.20	167.41	4.96	0.0036	0.1232
170	407.72	440.50	238.62	238.62	201.87	169.09	5.16	0.0038	0.1232
180	407.60	440.46	239.33	239.33	201.13	168.27	5.12	0.0037	0.1232
Rata-rata	406.16	442.02	239.75	239.75	202.27	166.42	4.64	0.0033	0.1167
Rata-rata 120 menit	404.85	443.79	240.61	240.61	203.18	164.24	4.29	0.0032	0.1232

Table 4. Data Temperatur dan Tekanan Chamber Pada Proses Pengeringan Beku lalu Vakum (B-5LV)

Menit	Tekanan	Temperatur
0	760	-3.452
10	35	-0.056
20	27	1.928
30	27	3.751
40	26	4.910
50	25	5.627
60	24	6.147
70	24	6.555
80	23	6.882
90	23	7.217
100	23	7.548
110	23	7.846
120	23	8.167
130	23	8.518
140	23	8.986
150	23	9.611
160	23	10.292
170	23	10.755
180	23	11.372
190	23	12.804
200	23	13.242
210	23	13.438
220	23	13.702
230	23	14.086
240	23	14.340
250	23	14.553
260	22	14.756
270	22	14.918
280	22	15.083
290	22	15.247
300	22	15.442
310	22	16.386
320	22	16.582
330	22	16.655
340	22	16.785
350	22	16.972
360	22	17.075
370	22	17.194
380	22	17.299
390	22	17.431
400	22	17.517
410	22	17.607
420	22	17.675
430	22	17.196
440	22	17.341
450	22	17.384
460	22	17.400
470	22	17.457
480	22	17.497
490	22	17.508
500	22	17.517
510	22	17.537
520	22	17.579
530	22	17.570
540	22	17.561
550	22	17.615
560	22	17.683
570	22	17.718
580	22	17.726
590	22	17.773
600	22	17.829
610	22	17.910
620	22	17.968
630	22	18.044
640	22	18.114
650	22	18.176
660	22	18.226
670	22	18.279
680	22	18.266
690	22	18.299
700	22	18.331
710	22	18.370
720	22	18.459
730	22	18.559
740	22	18.559
750		22	18.652
760		22	18.738
770		22	18.813
780		22	18.876
790		22	18.985
800		22	19.115
810		22	19.138
820		22	19.170
830		22	19.490
840		22	19.878

Table 5. Data Temperatur dan Tekanan Chamber Pada Proses Pengeringan Beku Vakum Hingga -5 °C (B-5V)

Menit	Tekanan	Temperatur
0	760	27.027
10	23	19.194
20	22	7.111
30	21	2.016
40	20	0.596
50	19	-0.648
60	18	-1.608
70	18	-2.972
80	17	-3.735
90	17	-5.044
100	16	-1.847
110	16	1.441
120	15	3.585
130	16	5.046
140	17	6.149
150	17	6.925
160	18	7.660
170	18	8.513
180	18	9.360
190	19	9.552
200	19	10.322
210	20	11.536
220	21	12.355
230	21	13.143
240	22	13.701
250	22	14.225
260	22	14.656
270	23	15.057
280	23	15.447
290	23	15.829
300	23	16.121
310	23	15.955
320	23	16.214
330	23.5	16.483
340	23.5	16.765
350	23.5	17.061
360	23.5	17.290
370	23.5	17.366
380	24	17.544
390	24	17.768
400	24.5	17.599
410	24.5	17.723
420	24.5	17.884
430	25	17.947
440	25	17.995
450	25	18.040
460	25	18.101
470	25	18.140
480	25	18.152
490	25	18.172
500	25	18.209
510	25	18.239
520	25	18.244
530	25	18.221
540	25	18.173
550	25	18.140
560	25	18.099
570	25	18.090
580	25	18.065
590	25	18.008
600	25	17.922
610	25	17.847
620	25	17.778
630	25	17.715
640	25	17.697
650	25	17.678
660	25	17.685
670	25	17.694
680	25	17.701
690	25	17.733
700	25	17.768
710	25	17.756
720	25	17.756
730	25	17.725
740	25	17.717
750	25	17.736
760	25	17.749
770	25	17.770
780	25	17.775
790	25	17.761
800	25	17.767
810	25	17.846
820	25	18.115
830	25	18.116
840	25	18.118

Table 6. Data Temperatur dan Tekanan Chamber Pada Proses Pengeringan Beku vakum 20 jam (BV)

Menit	Tekanan	Temperatur
0	760	27.567
10	31	19.329
20	28	6.376
30	26	1.756
40	25	-0.773
50	24	-1.623
60	23	-2.862
70	22	-3.782
80	22	-4.474
90	21	-4.556
100	20	-4.648
110	19	-4.691
120	19	-4.749
130	19	-4.813
140	18	-4.851
150	18	-4.838
160	18	-4.959
170	18	-5.044
180	18	-5.069
190	17	-5.122
200	17	-5.184
210	17	-5.235
220	17	-5.300
230	17	-5.357
240	17	-5.451
250	17	-5.568
260	17	-5.587
270	17	-5.658
280	17	-5.721
290	16	-5.751
300	16	-5.812
310	16	-5.933
320	16	-5.888
330	16	-6.054
340	16	-6.106
350	16	-6.208
360	16	-6.278
370	16	-6.361
380	16	-6.453
390	16	-6.517
400	15.5	-6.583
410	15.5	-6.643
420	15.5	-6.703
430	15	-6.687
440	15	-6.746
450	15	-6.806
460	15	-6.866
470	15	-6.925
480	15	-6.985
490	15	-7.045
440	15	-6.746
450	15	-6.806
460	15	-6.866
470	15	-6.925
480	15	-6.985
490	15	-7.045
500	15	-7.105
510	15	-7.164
520	15	-7.224
530	15	-7.284
540	15	-7.343
550	15	-7.403
560	15	-7.463
570	15	-7.523
580	15	-7.582
590	15	-7.909
600	15	-7.702
610	15	-7.761
620	15	-7.821
630	15	-7.881
640	15	-7.940
650	15	-8.000
660	15	-8.060
670	15	-8.120
680	15	-8.179
690	15	-8.239
700	15	-8.299
710	15	-8.358
720	15	-8.418
730	15	-8.711
740	15	-8.537
750	15	-8.597
760	15	-8.657
770	15	-8.717
780	14	-8.776
790	14	-8.836
800	14	-8.896
810	14	-8.905
820	14	-8.805
830	14	-8.643
840	14	-8.619
850	14	-8.764
860	14	-9.024
870	14	-9.084
880	14	-9.143
890	14	-9.203
900	14	-9.263
910	14	-9.323
920	14	-9.382
930	14	-9.442
940	13	-9.502
950	13	-9.561
960	13	-9.621
970	13	-9.681
980	13	-9.774
990	13	-9.957
1000	13	-9.860
1010	13	-9.920
1020	13	-9.979
1030	13	-10.039
1040	13	-10.099
1050	13	-10.158
1060	13	-10.218
1070	13	-10.278
1080	13	-10.338
1090	13	-10.397
1100	13	-10.457
1110	13	-10.517
1120	13	-10.576
1130	13	-10.636
1140	13	-10.696
1150	13	-10.755
1160	13	-10.815
1170	13	-10.875
1180	13	-10.935
1190	13	-10.994
1200	13	-11.054

Table 7. Data Temperatur dan Tekanan Chamber Pada Proses Pengeringan Vakum (V)

Menit	Tekanan	Temperatur
0	760	21.415
10	16	21.370
20	15	21.393
30	14	21.526
40	14	21.617
50	14	21.666
60	15	21.684
70	16	21.727
80	16	21.743
90	17	21.749
100	17	21.753
110	17	21.763
120	18	21.762
130	19	21.777
140	20	21.562
150	20	21.682
160	20	21.590
170	20	21.789
180	20	21.860
190	19	21.861
200	19	21.899
210	20	21.633
220	20	21.675
230	20	21.721
240	20	21.657
250	20	21.689
260	21	21.693
270	21	21.712
280	21	21.755
290	21	21.783
300	21	21.828
310	21	21.843
320	21	21.735
330	21.5	21.766
340	22	21.806
350	22	21.857
360	22.5	21.801
370	22.5	21.851
380	22.5	21.904
390	22.5	21.961
400	22.5	22.020
410	22.5	22.080
420	22.5	21.975
430	22	21.836
440	22	21.789
450	22	21.836
460	23	21.891
470	23	21.945
480	23	22.006
490	23	18.172
500	23	21.789
510	23	21.836
520	23	21.789
530	23	21.837
540	23	21.892
550	23	21.945
560	23	22.007
570	24	22.064
580	24	21.790
590	24	21.837
600	24	21.892
610	24	21.946
620	24	22.007
630	24	22.065
640	24	21.790
650	24	21.838
660	24	21.790
670	24	21.838
680	24	21.893
690	24	21.947
700	25	22.008
710	25	22.066
720	25	21.790
730	25	21.839
740	25	17.717
750	25	21.948
760	25	21.790
770	25	21.839
780	25	21.894
790	25	21.948
800	25	22.009
810	25	22.067
820	25	21.791
830	25	21.840
840	25	21.791

Table 8. Data kadar air pada setiap metode pengeringan

PENGERINGAN BEKU LALU VAKUM (B-5LV)	
Kadara Air setelah Pengeringan (%) (alat)	
Waktu (Jam)	Rata-Rata
0	31.0
3	29.0
5	25.0
7	18.0
14	12.5

PENGERINGAN BEKU VAKUM HINGGA -5°C (B-5V)	
Kadara Air setelah Pengeringan (%) (alat)	
Waktu (Jam)	Rata-Rata
0	31.0
3	27.5
5	21.8
7	16.8
14	12.2

PENGERINGAN VAKUM (V)	
Kadara Air setelah Pengeringan (%) (alat)	
Waktu (Jam)	Rata-Rata
0	31.0
3	28.0
5	22.5
7	17.2
14	12.5

PENGERINGAN BEKU VAKUM (BV)	
Kadara Air setelah Pengeringan (%) (alat)	
Waktu (Jam)	Rata-Rata
0	31.0
3	29.7
5	27.3
7	25.0
14	17.0
20	12.5

Lampiran 3 Referensi perhitungan

Table 1. Freon™ 134a Saturation Properties—Temperature Table (continued)

Temp [°C]	Pressure	Volume [m³/kg]		Density [kg/m³]		Enthalpy [kJ/kg]			Entropy [kJ/(kg)(K)]		Temp [°C]
	kPa (abs)	Liquid v_f	Vapor v_g	Liquid $1/v_f$	Vapor $1/v_g$	Liquid h_f	Latent h_{fg}	Vapor h_g	Liquid s_f	Vapor s_g	
−39	53.88	0.0007	0.3441	1411.8	2.906	149.6	225.3	374.9	0.8020	1.7641	−39
−38	56.74	0.0007	0.3279	1408.9	3.050	150.9	224.7	375.5	0.8073	1.7627	−38
−37	59.72	0.0007	0.3125	1406.0	3.200	152.1	224.0	376.2	0.8126	1.7613	−37
−36	62.83	0.0007	0.2980	1403.1	3.356	153.4	223.4	376.8	0.8178	1.7599	−36
−35	66.07	0.0007	0.2843	1400.2	3.518	154.6	222.8	377.4	0.8231	1.7586	−35
−34	69.43	0.0007	0.2713	1397.4	3.686	155.9	222.2	378.1	0.8283	1.7573	−34
−33	72.93	0.0007	0.2590	1394.5	3.861	157.1	221.5	378.7	0.8336	1.7561	−33
−32	76.58	0.0007	0.2474	1391.5	4.042	158.4	220.9	379.3	0.8388	1.7548	−32
−31	80.36	0.0007	0.2365	1388.6	4.229	159.7	220.3	379.9	0.8440	1.7536	−31
−30	84.29	0.0007	0.2260	1385.7	4.424	160.9	219.6	380.6	0.8492	1.7525	−30
−29	88.37	0.0007	0.2162	1382.8	4.625	162.2	219.0	381.2	0.8544	1.7513	−29
−28	92.61	0.0007	0.2069	1379.8	4.833	163.5	218.3	381.8	0.8595	1.7502	−28
−27	97.02	0.0007	0.1981	1376.9	5.049	164.7	217.7	382.4	0.8647	1.7491	−27
−26	101.58	0.0007	0.1896	1373.9	5.273	166.0	217.1	383.1	0.8698	1.7481	−26
−25	106.32	0.0007	0.1817	1371.0	5.504	167.3	216.4	383.7	0.8750	1.747	−25
−24	111.22	0.0007	0.1741	1368.0	5.743	168.6	215.7	384.3	0.8801	1.746	−24
−23	116.31	0.0007	0.1669	1365.0	5.991	169.8	215.1	384.9	0.8852	1.745	−23
−22	121.57	0.0007	0.1601	1362.0	6.247	171.1	214.4	385.5	0.8903	1.744	−22
−21	127.02	0.0007	0.1536	1359.0	6.511	172.4	213.7	386.2	0.8954	1.7431	−21
−20	132.67	0.0007	0.1474	1356.0	6.784	173.7	213.1	386.8	0.9005	1.7422	−20
−19	138.50	0.0007	0.1415	1353.0	7.066	175.0	212.4	387.4	0.9055	1.7413	−19
−18	144.54	0.0007	0.1359	1349.9	7.357	176.3	211.7	388.0	0.9106	1.7404	−18
−17	150.78	0.0007	0.1306	1346.9	7.658	177.6	211.0	388.6	0.9157	1.7395	−17
−16	157.23	0.0007	0.1255	1343.8	7.968	178.9	210.4	389.2	0.9207	1.7387	−16
−15	163.90	0.0007	0.1207	1340.8	8.288	180.2	209.7	389.8	0.9257	1.7379	−15
−14	170.78	0.0007	0.1160	1337.7	8.618	181.5	209.0	390.4	0.9307	1.7371	−14
−13	177.89	0.0007	0.1116	1334.6	8.958	182.8	208.3	391.1	0.9357	1.7363	−13
−12	185.22	0.0008	0.1074	1331.5	9.309	184.1	207.6	391.7	0.9407	1.7356	−12
−11	192.79	0.0008	0.1034	1328.4	9.671	185.4	206.9	392.3	0.9457	1.7348	−11
−10	200.60	0.0008	0.0996	1325.3	10.044	186.7	206.2	392.9	0.9507	1.7341	−10
−9	208.65	0.0008	0.0959	1322.1	10.428	188.0	205.4	393.5	0.9557	1.7334	−9
−8	216.95	0.0008	0.0924	1319.0	10.823	189.3	204.7	394.1	0.9606	1.7327	−8
−7	225.50	0.0008	0.0890	1315.8	11.231	190.7	204.0	394.7	0.9656	1.7321	−7
−6	234.32	0.0008	0.0858	1312.6	11.650	192.0	203.3	395.3	0.9705	1.7314	−6
−5	243.39	0.0008	0.0828	1309.4	12.082	193.3	202.5	395.9	0.9755	1.7308	−5
−4	252.74	0.0008	0.0798	1306.2	12.526	194.6	201.8	396.4	0.9804	1.7302	−4
−3	262.36	0.0008	0.0770	1303.0	12.983	196.0	201.1	397.0	0.9853	1.7295	−3
−2	272.26	0.0008	0.0743	1299.8	13.454	197.3	200.3	397.6	0.9902	1.729	−2
−1	282.45	0.0008	0.0718	1296.5	13.937	198.7	199.6	398.2	0.9951	1.7284	−1
0	292.93	0.0008	0.0693	1293.3	14.435	200.0	198.8	398.8	1.0000	1.7278	0
1	303.70	0.0008	0.0669	1290.0	14.946	201.3	198.0	399.4	1.0049	1.7273	1
2	314.77	0.0008	0.0646	1286.7	15.472	202.7	197.3	400.0	1.0098	1.7267	2
3	326.16	0.0008	0.0624	1283.4	16.013	204.0	196.5	400.5	1.0146	1.7262	3
4	337.85	0.0008	0.0604	1280.1	16.569	205.4	195.7	401.1	1.0195	1.7257	4
5	349.87	0.0008	0.0583	1276.7	17.140	206.8	194.9	401.7	1.0244	1.7252	5
6	362.21	0.0008	0.0564	1273.4	17.726	208.1	194.2	402.3	1.0292	1.7247	6
7	374.88	0.0008	0.0546	1270.0	18.329	209.5	193.4	402.8	1.0340	1.7242	7
8	387.88	0.0008	0.0528	1266.6	18.948	210.8	192.6	403.4	1.0389	1.7238	8
9	401.23	0.0008	0.0511	1263.2	19.583	212.2	191.8	404.0	1.0437	1.7233	9
10	414.92	0.0008	0.0494	1259.8	20.236	213.6	190.9	404.5	1.0485	1.7229	10
11	428.97	0.0008	0.0478	1256.3	20.906	215.0	190.1	405.1	1.0533	1.7224	11
12	443.37	0.0008	0.0463	1252.9	21.594	216.4	189.3	405.6	1.0582	1.722	12
13	458.11	0.0008	0.0448	1249.4	22.301	217.7	188.5	406.2	1.0630	1.7216	13
14	473.25	0.0008	0.0434	1245.9	23.026	219.1	187.6	406.8	1.0678	1.7212	14
15	488.78	0.0008	0.0421	1242.3	23.770	220.5	186.8	407.3	1.0726	1.7208	15
16	504.68	0.0008	0.0408	1238.8	24.533	221.9	185.9	407.8	1.0773	1.7204	16
17	520.98	0.0008	0.0395	1235.2	25.317	223.3	185.1	408.4	1.0821	1.72	17
18	537.67	0.0008	0.0383	1231.6	26.121	224.7	184.2	408.9	1.0869	1.7196	18
19	554.76	0.0008	0.0371	1228.0	26.945	226.1	183.3	409.5	1.0917	1.7192	19
20	572.25	0.0008	0.0360	1224.4	27.791	227.5	182.5	410.0	1.0964	1.7189	20
21	590.16	0.0008	0.0349	1220.7	28.659	228.9	181.6	410.5	1.1012	1.7185	21

Table 1. Freon™ 134a Saturation Properties—Temperature Table (continued)

Temp [°C]	Pressure	Volume [m³/kg]		Density [kg/m³]		Enthalpy [kJ/kg]			Entropy [kJ/(kg)(K)]		Temp [°C]
	kPa (abs)	Liquid v_f	Vapor v_g	Liquid $1/v_f$	Vapor $1/v_g$	Liquid h_f	Latent h_{fg}	Vapor h_g	Liquid s_f	Vapor s_g	
22	608.49	0.0008	0.0338	1217.0	29.549	230.4	180.7	411.0	1.1060	1.7182	22
23	627.25	0.0008	0.0328	1213.3	30.462	231.8	179.8	411.6	1.1107	1.7178	23
24	646.44	0.0008	0.0318	1209.6	31.399	233.2	178.9	412.1	1.1155	1.7175	24
25	666.06	0.0008	0.0309	1205.9	32.359	234.6	178.0	412.6	1.1202	1.7171	25
26	686.13	0.0008	0.0300	1202.1	33.344	236.1	177.0	413.1	1.1250	1.7168	26
27	706.66	0.0008	0.0291	1198.3	34.354	237.5	176.1	413.6	1.1297	1.7165	27
28	727.64	0.0008	0.0283	1194.4	35.389	238.9	175.2	414.1	1.1345	1.7161	28
29	749.04	0.0008	0.0274	1190.6	36.451	240.4	174.2	414.6	1.1392	1.7158	29
30	771.02	0.0008	0.0266	1186.7	37.540	241.8	173.3	415.1	1.1439	1.7155	30
31	793.43	0.0008	0.0259	1182.8	38.657	243.3	172.3	415.6	1.1487	1.7151	31
32	816.28	0.0008	0.0251	1178.8	39.802	244.8	171.3	416.1	1.1534	1.7148	32
33	839.66	0.0009	0.0244	1174.9	40.975	246.2	170.3	416.6	1.1581	1.7145	33
34	863.53	0.0009	0.0237	1170.8	42.179	247.7	169.3	417.0	1.1628	1.7142	34
35	887.91	0.0009	0.0230	1166.8	43.413	249.2	168.3	417.5	1.1676	1.7138	35
36	912.80	0.0009	0.0224	1162.7	44.679	250.6	167.3	418.0	1.1723	1.7135	36
37	938.20	0.0009	0.0218	1158.6	45.977	252.1	166.3	418.4	1.1770	1.7132	37
38	964.14	0.0009	0.0211	1154.5	47.308	253.6	165.3	418.9	1.1817	1.7129	38
39	990.60	0.0009	0.0205	1150.3	48.672	255.1	164.2	419.3	1.1864	1.7125	39
40	1017.61	0.0009	0.0200	1146.1	50.072	256.6	163.2	419.8	1.1912	1.7122	40
41	1045.16	0.0009	0.0194	1141.9	51.508	258.1	162.1	420.2	1.1959	1.7119	41
42	1073.26	0.0009	0.0189	1137.6	52.980	259.6	161.0	420.6	1.2006	1.7115	42
43	1101.93	0.0009	0.0184	1133.3	54.490	261.1	159.9	421.1	1.2053	1.7112	43
44	1131.16	0.0009	0.0178	1128.9	56.040	262.7	158.8	421.5	1.2101	1.7108	44
45	1161.01	0.0009	0.0174	1124.5	57.630	264.2	157.7	421.9	1.2148	1.7105	45
46	1191.41	0.0009	0.0169	1120.0	59.261	265.7	156.6	422.3	1.2195	1.7101	46
47	1222.41	0.0009	0.0164	1115.6	60.934	267.3	155.4	422.7	1.2242	1.7097	47
48	1253.95	0.0009	0.0160	1111.0	62.652	268.8	154.3	423.1	1.2290	1.7093	48
49	1286.17	0.0009	0.0155	1106.4	64.415	270.4	153.1	423.5	1.2337	1.709	49
50	1319.00	0.0009	0.0151	1101.8	66.225	271.9	151.9	423.8	1.2384	1.7086	50
51	1352.44	0.0009	0.0147	1097.1	68.084	273.5	150.7	424.2	1.2432	1.7082	51
52	1386.52	0.0009	0.0143	1092.4	69.992	275.1	149.5	424.6	1.2479	1.7077	52
53	1421.23	0.0009	0.0139	1087.6	71.952	276.6	148.3	424.9	1.2527	1.7073	53
54	1456.58	0.0009	0.0135	1082.8	73.966	278.2	147.0	425.3	1.2574	1.7069	54
55	1492.59	0.0009	0.0132	1077.9	76.035	279.8	145.8	425.6	1.2622	1.7064	55
56	1529.26	0.0009	0.0128	1072.9	78.162	281.4	144.5	425.9	1.2670	1.7059	56
57	1566.61	0.0009	0.0124	1067.9	80.348	283.0	143.2	426.2	1.2717	1.7055	57
58	1604.63	0.0009	0.0121	1062.8	82.596	284.6	141.9	426.5	1.2765	1.705	58
59	1643.35	0.0009	0.0118	1057.7	84.908	286.3	140.5	426.8	1.2813	1.7044	59
60	1682.76	0.0010	0.0115	1052.5	87.287	287.9	139.2	427.1	1.2861	1.7039	60
61	1722.88	0.0010	0.0111	1047.2	89.735	289.5	137.8	427.4	1.2909	1.7033	61
62	1763.72	0.0010	0.0108	1041.8	92.255	291.2	136.4	427.6	1.2957	1.7028	62
63	1805.28	0.0010	0.0105	1036.4	94.851	292.9	135.0	427.9	1.3006	1.7021	63
64	1847.47	0.0010	0.0103	1030.9	97.526	294.5	133.6	428.1	1.3054	1.7015	64
65	1890.54	0.0010	0.0100	1025.3	100.283	296.2	132.1	428.3	1.3102	1.7009	65
66	1934.36	0.0010	0.0097	1019.6	103.125	297.9	130.6	428.5	1.3151	1.7002	66
67	1978.94	0.0010	0.0094	1013.8	106.058	299.6	129.1	428.7	1.3200	1.6995	67
68	2024.28	0.0010	0.0092	1008.0	109.085	301.3	127.5	428.8	1.3249	1.6987	68
69	2070.42	0.0010	0.0089	1002.0	112.212	303.0	126.0	429.0	1.3298	1.6979	69
70	2117.34	0.0010	0.0087	995.9	115.442	304.8	124.4	429.1	1.3347	1.6971	70
71	2165.08	0.0010	0.0084	989.7	118.783	306.5	122.7	429.2	1.3397	1.6963	71
72	2213.63	0.0010	0.0082	983.4	122.239	308.3	121.1	429.3	1.3446	1.6954	72
73	2263.01	0.0010	0.0079	977.0	125.818	310.1	119.4	429.4	1.3496	1.6945	73
74	2313.23	0.0010	0.0077	970.4	129.527	311.8	117.6	429.5	1.3547	1.6935	74
75	2364.31	0.0010	0.0075	963.7	133.373	313.7	115.8	429.5	1.3597	1.6924	75
76	2416.25	0.0010	0.0073	956.9	137.366	315.5	114.0	429.5	1.3648	1.6913	76
77	2469.08	0.0011	0.0071	949.9	141.514	317.3	112.2	429.5	1.3699	1.6902	77
78	2522.79	0.0011	0.0069	942.7	145.830	319.2	110.3	429.4	1.3750	1.689	78
79	2577.42	0.0011	0.0067	935.4	150.324	321.0	108.3	429.3	1.3801	1.6877	79
80	2632.97	0.0011	0.0065	927.8	155.010	322.9	106.3	429.2	1.3854	1.6863	80
81	2689.46	0.0011	0.0063	920.1	159.904	324.9	104.2	429.1	1.3906	1.6849	81
82	2746.90	0.0011	0.0061	912.1	165.022	326.8	102.1	428.9	1.3959	1.6834	82

Table 2. Freon™ 134a Superheated Vapor—Constant Pressure Table (continued)

V = Volume in m³/kg H = Enthalpy in kJ/kg S = Entropy in kJ/(kg)(K) v_s = Velocity of Sound in m/sec

C_p = Heat Capacity at Constant Pressure in kJ/(kg)(°C) C_p/C_v = Heat Capacity Ratio (Dimensionless)

Temp [°C]	Pressure = 50.00 kPa (abs) V	H	S	C_p	C_p/C_v	v_s		Pressure = 60.00 kPa (abs) V	H	S	C_p	C_p/C_v	v_s	Temp [°C]
-40.43	0.00071	147.9	0.7944	1.2399	1.5046	811.8	SAT LIQ	0.00071	152.2	0.8130	1.2476	1.5040	795.3	-36.91
-40.43	0.36914	374.0	1.7661	0.7424	1.1483	143.6	SAT VAP	0.31114	376.2	1.7611	0.7533	1.1493	144.2	-36.91
-40	0.36982	374.3	1.7675	0.7430	1.1480	143.7		—	—	—	—	—	—	-40
-35	0.37864	378.1	1.7833	0.7495	1.1440	145.3		0.31397	377.7	1.7672	0.7555	1.1477	144.8	-35
-30	0.38745	381.8	1.7990	0.7564	1.1404	146.9		0.32134	381.5	1.7830	0.7618	1.1436	146.4	-30
-25	0.39604	385.6	1.8144	0.7635	1.1370	148.5		0.32873	385.3	1.7986	0.7683	1.1400	148.0	-25
-20	0.40469	389.5	1.8297	0.7708	1.1340	150.0		0.33591	389.2	1.8140	0.7752	1.1366	149.6	-20
-15	0.41339	393.3	1.8449	0.7784	1.1311	151.5		0.34317	393.0	1.8292	0.7823	1.1334	151.1	-15
-10	0.42194	397.3	1.8599	0.7860	1.1284	153.0		0.35039	397.0	1.8443	0.7896	1.1306	152.6	-10
-5	0.43048	401.2	1.8748	0.7938	1.1260	154.5		0.35753	400.9	1.8592	0.7971	1.1279	154.1	-5
0	0.43898	405.2	1.8895	0.8017	1.1236	155.9		0.36470	404.9	1.8740	0.8047	1.1254	155.6	0
5	0.44743	409.2	1.9041	0.8097	1.1215	157.3		0.37189	409.0	1.8887	0.8124	1.1230	157.0	5
10	0.45579	413.3	1.9186	0.8177	1.1194	158.7		0.37893	413.1	1.9032	0.8202	1.1208	158.4	10
15	0.46425	417.4	1.9330	0.8257	1.1175	160.1		0.38595	417.2	1.9176	0.8280	1.1188	159.8	15
20	0.47259	421.5	1.9473	0.8338	1.1156	161.5		0.39308	421.3	1.9319	0.8359	1.1168	161.2	20
25	0.48100	425.7	1.9614	0.8420	1.1139	162.8		0.40000	425.5	1.9461	0.8439	1.1150	162.6	25
30	0.48948	430.0	1.9755	0.8501	1.1122	164.2		0.40700	429.8	1.9602	0.8519	1.1132	163.9	30
35	0.49776	434.2	1.9895	0.8582	1.1106	165.5		0.41408	434.1	1.9742	0.8599	1.1116	165.3	35
40	0.50607	438.5	2.0034	0.8664	1.1091	166.8		0.42105	438.4	1.9881	0.8679	1.1100	166.6	40
45	0.51440	442.9	2.0172	0.8745	1.1076	168.1		0.42808	442.7	2.0020	0.8759	1.1085	167.9	45
50	0.52274	447.3	2.0309	0.8826	1.1062	169.4		0.43497	447.1	2.0157	0.8839	1.1070	169.2	50
55	0.53107	451.7	2.0445	0.8907	1.1049	170.7		0.44189	451.6	2.0293	0.8919	1.1056	170.5	55
60	0.53937	456.2	2.0580	0.8988	1.1036	171.9		0.44883	456.1	2.0429	0.8999	1.1043	171.8	60
65	0.54765	460.7	2.0715	0.9068	1.1024	173.2		0.45579	460.6	2.0563	0.9079	1.1030	173.0	65
70	0.55586	465.3	2.0848	0.9148	1.1012	174.4		0.46275	465.1	2.0697	0.9158	1.1018	174.3	70
75	0.56402	469.9	2.0981	0.9228	1.1001	175.7		0.46970	469.7	2.0830	0.9237	1.1006	175.5	75
80	0.57241	474.5	2.1113	0.9307	1.0990	176.9		0.47642	474.4	2.0962	0.9316	1.0995	176.7	80
85	0.58072	479.2	2.1245	0.9386	1.0979	178.1		0.48356	479.1	2.1094	0.9394	1.0984	177.9	85
90	0.58893	483.9	2.1375	0.9464	1.0969	179.3		0.49020	483.8	2.1225	0.9472	1.0973	179.1	90
95	0.59737	488.6	2.1505	0.9543	1.0959	180.5		0.49727	488.5	2.1355	0.9550	1.0963	180.3	95
100	0.60533	493.4	2.1635	0.9620	1.0949	181.7		0.50403	493.3	2.1484	0.9627	1.0953	181.5	100
105	0.61387	498.3	2.1763	0.9697	1.0940	182.8		0.51099	498.2	2.1613	0.9703	1.0944	182.7	105
110	0.62189	503.1	2.1891	0.9774	1.0931	184.0		0.51787	503.0	2.1741	0.9780	1.0934	183.9	110
115	—	—	—	—	—	—		0.52466	507.9	2.1868	0.9855	1.0925	185.0	115

Gambar 54 *Thermodynamic properties refrigerant* R134a

TABLE B.1.1 (*continued*)
Saturated Water

		Enthalpy, kJ/kg			Entropy, kJ/kg-K		
Temp. (°C)	Press. (kPa)	Sat. Liquid h_f	Evap. h_{fg}	Sat. Vapor h_g	Sat. Liquid s_f	Evap. s_{fg}	Sat. Vapor s_g
0.01	0.6113	0.00	2501.35	2501.35	0	9.1562	9.1562
5	0.8721	20.98	2489.57	2510.54	0.0761	8.9496	9.0257
10	1.2276	41.99	2477.75	2519.74	0.1510	8.7498	8.9007
15	1.705	62.98	2465.93	2528.91	0.2245	8.5569	8.7813
20	2.339	83.94	2454.12	2538.06	0.2966	8.3706	8.6671
25	3.169	104.87	2442.30	2547.17	0.3673	8.1905	8.5579
30	4.246	125.77	2430.48	2556.25	0.4369	8.0164	8.4533
35	5.628	146.66	2418.62	2565.28	0.5052	7.8478	8.3530
40	7.384	167.54	2406.72	2574.26	0.5724	7.6845	8.2569
45	9.593	188.42	2394.77	2583.19	0.6386	7.5261	8.1647
50	12.350	209.31	2382.75	2592.06	0.7037	7.3725	8.0762
55	15.758	230.20	2370.66	2600.86	0.7679	7.2234	7.9912
60	19.941	251.11	2358.48	2609.59	0.8311	7.0784	7.9095
65	25.03	272.03	2346.21	2618.24	0.8934	6.9375	7.8309
70	31.19	292.96	2333.85	2626.80	0.9548	6.8004	7.7552
75	38.58	313.91	2321.37	2635.28	1.0154	6.6670	7.6824
80	47.39	334.88	2308.77	2643.66	1.0752	6.5369	7.6121
85	57.83	355.88	2296.05	2651.93	1.1342	6.4102	7.5444
90	70.14	376.90	2283.19	2660.09	1.1924	6.2866	7.4790
95	84.55	397.94	2270.19	2668.13	1.2500	6.1659	7.4158
100	101.3	419.02	2257.03	2676.05	1.3068	6.0480	7.3548
105	120.8	440.13	2243.70	2683.83	1.3629	5.9328	7.2958
110	143.3	461.27	2230.20	2691.47	1.4184	5.8202	7.2386
115	169.1	482.46	2216.50	2698.96	1.4733	5.7100	7.1832
120	198.5	503.69	2202.61	2706.30	1.5275	5.6020	7.1295
125	232.1	524.96	2188.50	2713.46	1.5812	5.4962	7.0774
130	270.1	546.29	2174.16	2720.46	1.6343	5.3925	7.0269
135	313.0	567.67	2159.59	2727.26	1.6869	5.2907	6.9777
140	361.3	589.11	2144.75	2733.87	1.7390	5.1908	6.9298
145	415.4	610.61	2129.65	2740.26	1.7906	5.0926	6.8832
150	475.9	632.18	2114.26	2746.44	1.8417	4.9960	6.8378
155	543.1	653.82	2098.56	2752.39	1.8924	4.9010	6.7934
160	617.8	675.53	2082.55	2758.09	1.9426	4.8075	6.7501
165	700.5	697.32	2066.20	2763.53	1.9924	4.7153	6.7078
170	791.7	719.20	2049.50	2768.70	2.0418	4.6244	6.6663
175	892.0	741.16	2032.42	2773.58	2.0909	4.5347	6.6256
180	1002.2	763.21	2014.96	2778.16	2.1395	4.4461	6.5857
185	1122.7	785.36	1997.07	2782.43	2.1878	4.3586	6.5464
190	1254.4	807.61	1978.76	2786.37	2.2358	4.2720	6.5078

Gambar 55 Tabel Saturated water

Lampiran 4 Dokumentasi penelitian

Gambar 56 Pengambilan Ceri Kopi di Kabupaten Bantaeng

Gambar 57 Pencucian biji kopi

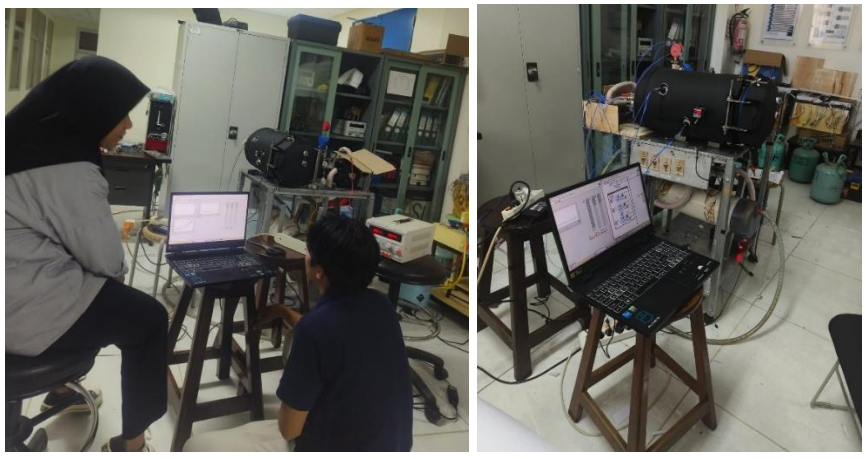


Gambar 58 Pemasangan dan Pengecatan Rangka


Gambar 59 Pemasangan dan Pengelasan Sambungan Pipa Tembaga

Gambar 60 Pembuatan dan Pemasangan Kondensor

Gambar 61 Pemasangan Alat ukur



Gambar 62 Dokumentasi Pengambilan Data

Gambar 63 Sebelum Dikeringkan

Gambar 64 Setelah Dikeringkan