

LAMPIRAN

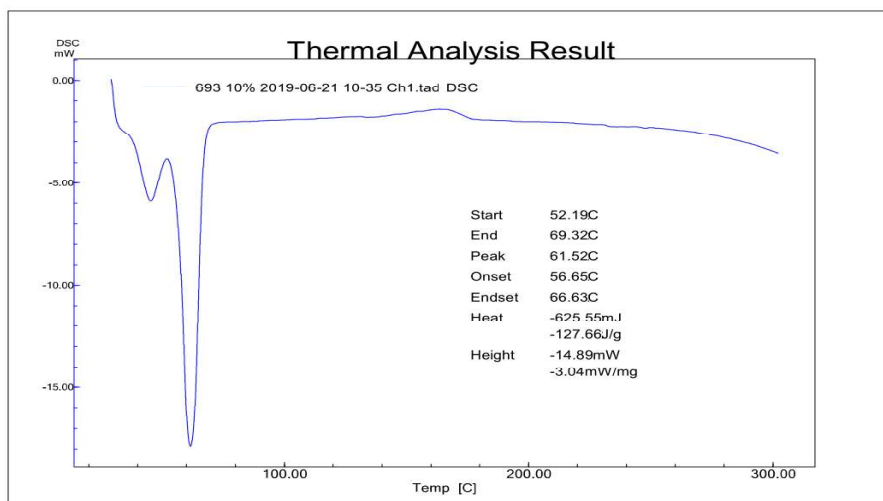
Lampiran I. Hasil DSC Paraffin Wax dengan Serbuk Tembaga Fraksi Massa 10%

RDP/5.10.2/LPPT
Rev 0

2. 10%

[File Information]		[Temp Program]	
File Name:	693 10% 2019-06-21 10-35 Ch1.tad	Start Temp [°C]	30
Sample Name:	10%	Temp Rate [°C/min]	10
Lot No:	693	Hold Temp [°C]	300
Acquisition Date	2019/06/21	Hold Time [min]	0
Acquisition Time	10:35:54(+0700)	Gas	Nitrogen
Detector:	DSC-60		
Serial No:	C30935200137SA		
Operator:	Heri		
Atmosphere:	Nitrogen		
Flow Rate:	30[ml/min]		
Cell:	Aluminum Seal		
Sample Weight:	4.900[mg]		
Molecular Weight:	0.00		

[Analysis Result]	
[DSC Peak]	1
Peak	
[°C]	61.52
Onset	
[°C]	56.65
Endset	
[°C]	66.63
Heat	
mJ	-625.55
J/g	-127.66
Height	
mW	-14.89
mW/mg	-3.04



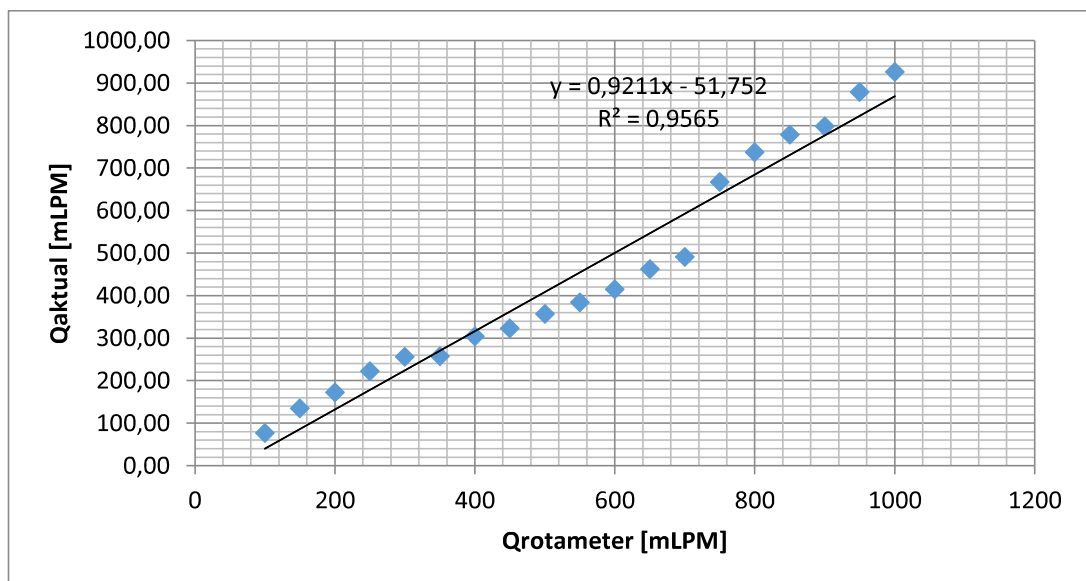
Lampiran II. UDF Densitas Campuran *Paraffin Wax* dengan Serbuk Tembaga
Fraksi Massa 10%

```
#include "udf.h"

DEFINE_PROPERTY(density_udf,c,t)
{
real d;
real lf=C_LIQF(c,t);/*liquid fraction*/
if(lf==0)
d=934;
else if(lf==1)
d=823.3;
else
d=823.3*lf+(1-lf)*934;
return d;
}
```

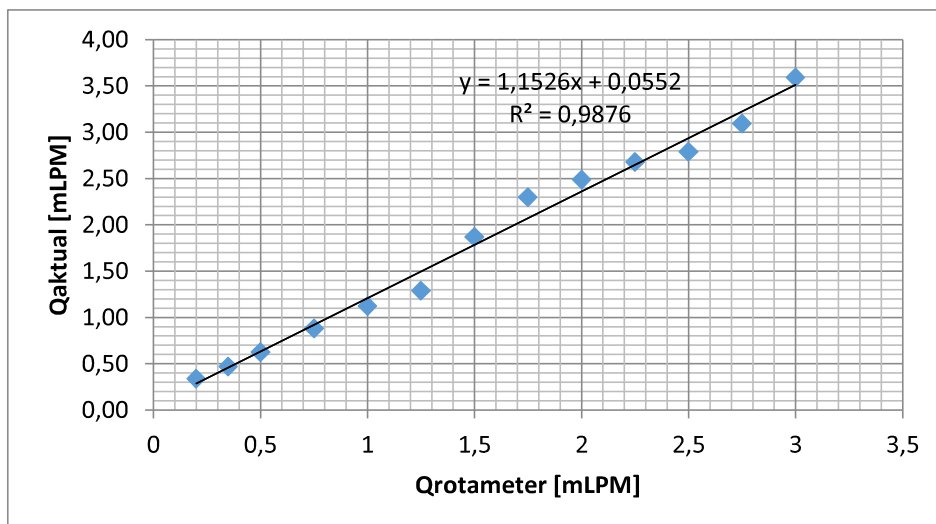
Lampiran III. Hasil Kalibrasi pada Rotameter 0.1 mLPM - 1 LPM

No.	Rotameter	DC Power Supply		Debit Aktual		Suhu Air		mLPM	mLPM
		Voltase	Arus	Volume	Waktu	Awal	Akhir	Q rotameter	Q aktual
	[mLPM]	[Volt]	[Ampere]	[mL]	[detik]	[°C]	[°C]		
1	100	8,5	1,28	100	78,16	27	27	100	76,77
2	150	8,5	1,26	100	44,6	27	27	150	134,53
3	200	8,5	1,23	100	34,83	27	27	200	172,27
4	250	8,5	1,2	100	27	27	27	250	222,22
5	300	8,5	1,23	100	23,45	27	27	300	255,86
6	350	8,5	1,2	100	23,29	27	27	350	257,62
7	400	8,5	1,19	100	19,7	27	27	400	304,57
8	450	8,5	1,18	100	18,55	27	27	450	323,45
9	500	8,5	1,17	100	16,82	27	27	500	356,72
10	550	8,5	1,16	100	15,62	27	27	550	384,12
11	600	8,5	1,15	100	14,45	27	27	600	415,22
12	650	8,5	1,14	100	12,97	27	27	650	462,61
13	700	8,5	1,12	100	12,22	27	27	700	491,00
14	750	8,5	1,06	100	8,99	27	27	750	667,41
15	800	8,5	1,05	100	8,14	27	27	800	737,10
16	850	8,5	1,03	100	7,71	27	27	850	778,21
17	900	8,5	1,02	100	7,52	27	27	900	797,87
18	950	8,5	1,01	100	6,83	27	27	950	878,48
19	1000	8,5	0,99	100	6,48	27	27	1000	925,93



Lampiran IV. Hasil Kalibrasi pada Rotameter 1 LPM – 3 LPM

No	Rotameter	DC Power Supply		Debit Aktual		Suhu Air		LPM
		Voltase	Arus	Volume	Waktu	Awal	Akhir	
	[LPM]	[Volt]	[Ampere]	[mL]	[detik]	[°C]	[°C]	Q rotameter
1	0,2	1,8	0,4	100	17,66	28	28	0,2
2	0,35	2,1	0,42	100	12,79	28	28	0,35
3	0,5	2,6	0,44	100	9,6	28	28	0,5
4	0,75	3,9	0,51	100	6,81	28	28	0,75
5	1	4,6	0,56	100	5,34	28	28	1
6	1,25	5,5	0,62	100	4,66	28	28	1,25
7	1,5	6,1	0,67	100	3,21	28	28	1,5
8	1,75	7	0,74	100	2,61	28	28	1,75
9	2	8	0,81	100	2,41	28	28	2
10	2,25	8,9	0,89	100	2,24	28	28	2,25
11	2,5	10,1	0,95	100	2,15	28	28	2,5
12	2,75	10,8	1	100	1,94	28	28	2,75
13	3	11,8	1,06	100	1,67	28	28	3



Lampiran V. Profil Temperatur *inlet charging* variasi 0.6 LPM

((massflowinlet transient 326 0)(time 5 60 120 180 240 300 360 420 480 540 600
660 720 780 840 900 960 1020 1080 1140 1200 1260 1320 1380 1440 1500 1560
1620 1680 1740 1800 1860 1920 1980 2040 2100 2160 2220 2280 2340 2400 2460
2520 2580 2640 2700 2760 2820 2880 2940 3000 3060 3120 3180 3240 3300 3360
3420 3480 3540 3600 3660 3720 3780 3840 3900 3960 4020 4080 4140 4200 4260
4320 4380 4440 4500 4560 4620 4680 4740 4800 4860 4920 4980 5040 5100 5160
5220 5280 5340 5400 5460 5520 5580 5640 5700 5760 5820 5880 5940 6000 6060
6120 6180 6240 6300 6360 6420 6480 6540 6600 6660 6720 6780 6840 6900 6960
7020 7080 7140 7200 7260 7320 7380 7440 7500 7560 7620 7680 7740 7800 7860
7920 7980 8040 8100 8160 8220 8280 8340 8400 8460 8520 8580 8640 8700 8760
8820 8880 8940 9000 9060 9120 9180 9240 9300 9360 9420 9480 9540 9600 9660
9720)(temperature 301.574 306.242 310.034 313.535 316.550 319.176 321.413
323.455 325.205 326.859 328.317 329.484 330.554 331.624 332.402 333.180
333.763 334.152 334.833 335.222 335.417 336.195 336.681 336.973 337.070
337.167 337.751 338.042 338.140 338.626 338.723 338.918 339.112 339.209
339.598 339.696 339.987 339.987 340.279 340.376 340.474 340.668 340.765
340.765 341.057 341.154 341.252 341.446 341.641 341.738 341.738 341.835
341.835 341.835 342.127 342.224 342.419 342.419 342.516 342.613 342.710
342.808 342.905 343.294 343.488 343.586 343.780 343.877 344.169 344.266
344.461 344.753 344.850 344.850 344.947 345.531 345.822 346.114 346.114
346.503 346.503 346.600 346.600 346.600 346.892 347.184 347.184 347.184
347.476 347.670 347.670 348.156 348.254 348.351 348.837 348.837 349.032
349.226 349.323 349.421 349.615 349.810 349.810 349.907 350.004 350.004
350.101 350.490 350.685 350.879 351.074 351.171 351.268 351.560 351.755
352.144 352.338 352.533 353.311 353.894 353.894 353.894 353.991 353.991
353.991 354.089 354.089 354.186 354.283 354.478 354.672 354.672 354.769
354.769 354.867 355.061 355.256 355.450 355.547 355.645 356.034 356.228
356.228 356.325 356.520 356.812 356.909 357.006 357.201 357.395 357.590
357.784 357.881 357.979 358.173 358.368 358.368 358.659 358.659 358.757
358.757 359.048 359.340))

Lampiran VI. Profil Temperatur *inlet charging* variasi 0.9 LPM

((massflowinlet transient 358 0)(time 5 60 120 180 240 300 360 420 480 540 600
660 720 780 840 900 960 1020 1080 1140 1200 1260 1320 1380 1440 1500 1560
1620 1680 1740 1800 1860 1920 1980 2040 2100 2160 2220 2280 2340 2400 2460
2520 2580 2640 2700 2760 2820 2880 2940 3000 3060 3120 3180 3240 3300 3360
3420 3480 3540 3600 3660 3720 3780 3840 3900 3960 4020 4080 4140 4200 4260
4320 4380 4440 4500 4560 4620 4680 4740 4800 4860 4920 4980 5040 5100 5160
5220 5280 5340 5400 5460 5520 5580 5640 5700 5760 5820 5880 5940 6000 6060
6120 6180 6240 6300 6360 6420 6480 6540 6600 6660 6720 6780 6840 6900 6960
7020 7080 7140 7200 7260 7320 7380 7440 7500 7560 7620 7680 7740 7800 7860
7920 7980 8040 8100 8160 8220 8280 8340 8400 8460 8520 8580 8640 8700 8760
8820 8880 8940 9000 9060 9120 9180 9240 9300 9360 9420 9480 9540 9600 9660
9720 9780 9840 9900 9960 10020 10080 10140 10200 10260 10320 10380 10440
10500 10560 10620 10680) (Temperature 302.935 305.561 307.700 309.451
310.910 312.174 313.341 314.216 314.994 315.869 316.258 316.842 317.425
317.912 318.301 318.592 318.787 319.176 319.565 319.857 320.051 320.246
320.537 320.926 321.024 321.413 321.510 321.704 321.996 322.288 322.385
322.677 322.774 323.066 323.163 323.455 323.552 323.747 324.136 324.330
324.622 324.719 324.914 325.205 325.497 325.594 325.789 325.886 326.081
326.372 326.567 326.664 326.859 327.053 327.248 327.345 327.637 327.637
328.026 328.220 328.415 328.609 328.804 329.095 329.290 329.484 329.776
329.776 329.776 330.068 330.360 330.554 330.749 331.040 331.332 331.527
331.721 332.013 332.305 332.402 332.596 332.888 333.083 333.472 333.763
333.958 334.055 334.444 334.639 334.639 334.930 335.125 335.319 335.514
335.708 335.903 336.000 336.292 336.486 336.681 336.875 336.875 337.070
337.264 337.362 337.751 338.042 338.042 338.334 338.334 338.626 338.918
339.209 339.404 339.501 339.793 339.987 340.182 340.279 340.571 340.765
340.960 341.057 341.252 341.543 341.835 341.835 341.932 342.127 342.321
342.516 342.613 342.808 343.099 343.197 343.586 343.683 343.780 343.877
344.1693 44.266 344.364 344.655 345.044 345.336 345.433 345.822 345.920
346.211 346.406 346.503 346.600 346.795 346.989 347.184 347.378 347.573

347.670 347.962 348.156 348.545 348.545 348.740 348.837 349.129 349.323
349.518 349.615 349.810 349.810 349.907 350.296 350.393 350.588 350.782
350.879 351.657 351.657 351.949))