LAMPIRAN

A. Lampiran Perhitungan

1. Densitas (ρ)

$$\rho = \frac{\text{massa piknometer isi} - \text{massa piknometer kosong}}{\text{volume piknometer}}$$

Dimana : ρ = massa jenis / densitas (gr/ml)

Tabel 3. Data Perhitungan Densitas

Uji	assa Piknometer Isi (gr)	Massa Piknometer Kosong (gr)	olume Piknometer (ml)
1.	52,37	27,21	25
2.	52,29	27,21	25
3.	52,19	27,21	25
4.	52,25	27,21	25
5.	52,17	27,21	25

a.) ρ1 (P = 30 kg/cm^2) = $\rho = \frac{(52{,}37-27{,}21)\ gr}{25\ ml} = 1{,}0064\ gr/ml$

b.) ρ2 (P = 40 kg/cm^2) = $\rho = \frac{(52{,}29-27{,}21)\ gr}{25\ ml} = 1{,}0032\ gr/ml$

c.) ρ3 (P = 50 kg/cm^2) = $\rho = \frac{(52{,}19-27{,}21)\ gr}{25\ ml} = 0{,}9992\ gr/ml$

d.) ρ4 (P = 60 kg/cm^2) = $\rho = \frac{(52{,}25-27{,}21)\ gr}{25\ ml} = 1{,}0016\ gr/ml$

e.) ρ5 (P = 70 kg/cm^2) = $\rho = \frac{(52{,}17-27{,}21)\ gr}{25\ ml} = 0{,}9984\ gr/ml$

2. Viskositas (μ)

$$\mu = \frac{tx \times \rho x}{t0 \times \rho 0} \times \mu_0$$

Keterangan :

- μ_x : viskositas sampel (Cp)
- μ_0 : viskositas air (Cp)
- t_x : waktu sampel (s)
- t_0 : waktu air (s)
- ρ_x : densitas sampel (g/ml)
- ρ_0 : densitas air (g/ml)

Tabel 4. Data Perhitungan Viskositas

Uji	Densitas sampel (gr/ml)	Densitas air (gr/ml)	Waktu sampel (s)	Waktu air (s)
1.	1,0064	1	0,94	0,8
2.	1,0032	1	0,91	0,8
3.	0,9992	1	0,87	0,8
4.	1,0016	1	0,89	0,8
5.	0,9984	1	0,84	0,8

a) μ1 (P = 30 kg/cm^2) = $\frac{0{,}94 \ x \ 1{,}0064 \ gr/ml}{0{,}8 \ x \ 1 \ gr/ml}$ x 1,002 cp = 1,18489 cp = 0,0011849 Pa.s

b) μ2 (P = 40 kg/cm^2) = $\frac{0{,}91 \ x \ 1{,}0032 \ gr/ml}{0{,}8 \ x \ 1 \ gr/ml}$ x 1,002 cp = 1,14342 cp = 0,0011434 Pa.s

c) μ3 (P = 50 kg/cm^2) = $\frac{0{,}87 \ x \ 0{,}9992 \ gr/ml}{0{,}8 \ x \ 1 \ gr/ml}$ x 1,002 cp = 1,09142 cp = 0,0010914 Pa.s

d) μ4 (P = 60 kg/cm^2) = $\frac{0{,}89 \ x \ 1{,}0016 \ gr/ml}{0{,}8 \ x \ 1 \ gr/ml}$ x 1,002 cp = 1,11651 cp = 0,0011165 Pa.s

e) μ5 (P = 70 kg/cm^2) = $\frac{0{,}84 \ x \ 0{,}9984 \ gr/ml}{0{,}8 \ x \ 1 \ gr/ml}$ x 1,002 cp = 1,04832 cp = 0,0010483 Pa.s

3. Kadar Air (*Moisture Content*)

$$Kadar\ Air = \frac{B - C}{B}\ x\ 100\%$$

Dengan keterangan berikut :

B = berat cawan + sampel awal (mg)

C = berat awan + sampel setelah dioven 1 jam (mg)

Tabel 5. Data Perhitungan Kadar Air *(Moisture Content)*

Uji	Tekanan	Plate	B (gr)	C (gr)
1.	30 kg/cm^2	1	740	520
		2	640	460
		3	600	440
2.	40 kg/cm^2	1	770	490
		2	650	480
		3	630	470
3.	50 kg/cm^2	1	820	630
		2	780	570
		3	670	520
4.	60 kg/cm^2	1	860	660
		2	800	650
		3	770	630
5.	70 kg/cm^2	1	880	680
		2	810	640
		3	790	630

a) MC 1

Platte 1 = $\frac{(740-520)\ gram}{740\ gram}$ x 100 % = 29,730 %

Platte 2 = $\frac{(640-460)\ gram}{640\ gram}$ x 100 % = 28,125 %

Platte 3 = $\frac{(600-440)\ gram}{600\ gram}$ x 100 % = 26.667 %

b) MC 2

Platte 1 = $\frac{(770-550)\ gram}{770\ gram}$ x 100 % = 28,571 %

Platte 2 = $\frac{(650-480)\ gram}{650\ gram}$ x 100 % = 26,154 %

Platte 3 = $\frac{(630 - 470)\ gram}{630\ gram}$ x 100 % = 25,397 %

c) MC 3

Platte 1 = $\frac{(820 - 630)\ gram}{820\ gram}$ x 100 % = 23,171 %

Platte 2 = $\frac{(780 - 610)\ gram}{780\ gram}$ x 100 % = 21,795 %

Platte 3 = $\frac{(670 - 530)\ gram}{670\ gram}$ x 100 % = 20,896 %

d) MC 4

Platte 1 = $\frac{(860 - 670)\ gram}{860\ gram}$ x 100 % = 22,093 %

Platte 2 = $\frac{(800 - 650)\ gram}{800\ gram}$ x 100 % = 21,25 %

Platte 3 = $\frac{(770 - 630)\ gram}{770\ gram}$ x 100 % = 20,779 %

e) MC 5

Platte 1 = $\frac{(880 - 690)\ gram}{880\ gram}$ x 100 % = 21,591 %

Platte 2 = $\frac{(810 - 640)\ gram}{810\ gram}$ x 100 % = 20,988 %

Platte 3 = $\frac{(790 - 630)\ gram}{790\ gram}$ x 100 % = 20,253 %

4. Perhitungan α

$$\alpha = \frac{Kp.A^2.\ -\Delta P}{\mu.\ Cs}$$

Tabel 6. Data Perhitungan Tahanan Filter Cake (α)

Uji	Kp (S/m^6)	A (m^2)	-ΔP (N/ m^2)	μ (Pa.s)	Cs kg/ m^3)
1.	1825,6	0,2209	2.941.995	0,0011849	201,88
2.	2611,2	0,2209	3.922.660	0,0011434	201,88
3.	2600,2	0,2209	4.903.325	0,0010914	201,88
4.	2589,2	0,2209	5.883.990	0,0011165	201,88
5.	2574,3	0,2209	6.864.655	0,0010483	201,88

a) **α** 1 (P = 30 kg/cm^2) = $\frac{1825{,}6\ S/m6 \text{ x } (0{,}2209\ m^2)^2 \text{ x } 2.941.995\ N/m^2}{0{,}001185\ Pa.s\ x\ 201{,}88\ kg/m^3}$ = 2.191.278.887,90 m/kg

b) α 2 (P = 40 kg/cm^2) = $\frac{2611{,}2\ {}^{S}/_{m}6 \text{ x } (0{,}2209\ m^2)^2 \text{x } 3.922.660\ N/m^2}{0{,}0011434\ Pa.s\ x\ 201{,}88\ kg/m^3}$ = 4.330.550.934,24 m/kg

c) α 3 (P = 50 kg/cm^2) = $\frac{2600{,}2\ {}^{S}/_{m}6 \text{ x } (0{,}2209\ m^2)^2 \text{ x } 4.903.325\ N/m^2}{0{,}0010914\ Pa.s\ x\ 201{,}88\ kg/m^3}$ = 5.647.206.351,61 m/kg

d) α 4 (P = 60 kg/cm^2) = $\frac{2589{,}2\ {}^{S}/_{m}6 \text{ x } (0{,}2209\ m^2)^2 \text{ x } 5.883.990\ N/m^2}{0{,}0011165\ Pa.s\ x\ 201{,}88\ kg/m^3}$ = 6.596.340.087,61 m/kg

e) α 5 (P = 70 kg/cm^2) = $\frac{2574{,}3\ {}^{S}/_{m}6 \text{ x } (0{,}2209\ m^2)^2 \text{ x } 6.864.655\ N/m^2}{0{,}0010483\ Pa.s\ x\ 201{,}88\ kg/m^3}$ = 8.149.146.629,19 m/kg

5. Tahanan Medium Filter (Rm)

$$Rm = \frac{B\ A(-\Delta P)}{\mu} \quad \text{..... (4)}$$

Dimana :

R_m = tahanan medium filter (m^{-1}) μ = viskositas (Pa.s)

$-\Delta P$ = *pressure drop* (N/ m^2) A = luas filter (m^2)

B = Intersep ($^{S}/_{m^3}$)

Tabel 7. Data Perhitungan Tahanan Medium Filter (Rm)

Uji	B ($^{S}/_{m^3}$)	A (m^2)	-ΔP (N/m^2)	μ (Pa.s)
1.	1825,6	0,2209	2.941.995	0,0011849
2.	2611,2	0,2209	3.922.660	0,0011434
3.	2600,2	0,2209	4.903.325	0,0010914
4.	2589,2	0,2209	5.883.990	0,0011165
5.	2574,3	0,2209	6.864.655	0,0010483

a) Rm 1 = $\frac{1825{,}6\ {}^{S}/_{m}6\ x\ 0{,}2209\ m^2\ x\ 2.941.995\ N/m^2}{0{,}001185\ Pa.s}$ = 2,425 E+12 1/m

b) Rm 2 = $\frac{2611{,}2\ {}^{S}/_{m}6\ x\ 0{,}2209\ m^2\ x\ 3.922.660\ N/m^2}{0{,}0011434\ Pa.s}$ = 4,312 E+12 1/m

c) Rm 3 = $\frac{2600{,}2\ {}^{S}/_{m}6\ x\ 0{,}2209\ m^2\ x\ 4.903.325\ N/m^2}{0{,}0010914\ Pa.s}$ = 5,804 E+12 1/m

d) Rm 2 = $\frac{2589{,}2\ {}^{S}/_{m}6\ x\ 0{,}2209\ m^2\ x\ 5.883.990\ N/m^2}{0{,}0011165\ Pa.s}$ = 6,992 E+12 1/m

e) Rm 2 = $\frac{2574{,}3\ {}^{S}/_{m}6\ x\ 0{,}2209\ m^2\ x\ 6.864.655\ N/m^2}{0{,}0010483\ Pa.s}$ = 9,072 E+12 1/m

B. Lampiran Foto

Gambar 7. Penimbangan Lumpur

Gambar 8. Cake pada *filter cloths*

Gambar 9. Pengoprasian alat *filter press*

Gambar 10. Alat Filtrasi Gambar

Gambar 11. Cake yang telah di oven

Gambar 12. Larutan PAC