PERHITUNGAN

1. Menentukan densitas produk

Berat piknometer kosong : 62,1 gram

Berat piknometer + air : 162,64 gram

$$\rho_{air} = \frac{(\text{berat piknometer + air}) - (\text{Berat piknometer kosong})}{\text{V air}}$$

$$1 \text{ gr/ml} = \frac{(162{,}64 - 62{,}1) \text{ gram})}{\text{V air}}$$

$$1 \text{ gr/ml} = \frac{100{,}54 \text{ gram}}{\text{V air}}$$

Vair = 100,54 ml

Tabel 13. Data berat piknometer + sampel

Run	Berat katalis (gram)	Berat piknometer + sampel	
		200 ^oC	250 ^oC
1	5	147,66	151,80
2	10	147,98	147,76
3	15	148,05	149,04
4	20	149,25	150,11
5	25	149,14	148,90

- Pada suhu 200 ^oC

  Berat piknometer + sampel kat.5 gram : 147,66 gram

$$\rho_{sampel} = \frac{(\text{berat piknometer + sampel}) - (\text{Berat piknometer kosong})}{\text{V air}}$$

$$= \frac{(147{,}66 - 62{,}1\ ) \text{ gram}}{100{,}54 \text{ ml}}$$

$$= \frac{85{,}56 \text{ gram}}{100{,}54 \text{ ml}}$$

$$= 0{,}851 \text{ gr/ml}$$

- Pada suhu 250 ^{o}C

  Berat piknometer + sampel kat.5 gram : 151,80 gram

$$\rho_{sampel} = \frac{(\text{berat piknometer + sampel}) - (\text{Berat piknometer kosong})}{\text{V air}}$$

$$= \frac{(151{,}80 - 62{,}1)\ \text{gram}}{100{,}54\ \text{ml}}$$

$$= \frac{89{,}7\ \text{gram}}{100{,}54\ \text{ml}}$$

$$= 0{,}892\ \text{gr/ml}$$

2. Menentukan nilai Spgr

- Pada suhu 200 ^{o}C

$$Spgr_{\text{kat.5 gr}} = \frac{\rho\ sampel}{\rho\ air}$$

$$= \frac{0{,}851\ gr/ml}{1\ gr/ml}$$

$$= 0{,}851$$

- Pada suhu 250 ^{o}C

$$Spgr_{\text{kat.5 gr}} = \frac{\rho\ sampel}{\rho\ air}$$

$$= \frac{0{,}892\ gr/ml}{1\ gr/ml}$$

$$= 0{,}892$$

3. Menentukan ^{o}API

- Pada suhu 200 ^{o}C

$$^{o}\text{API}_{\text{kat.5 gr}} = \frac{141{,}5}{\text{spgr}} - 131{,}5$$

$$= \frac{141{,}5}{0{,}851} - 131{,}5$$

$$= 166{,}275 - 131{,}5$$

$$= 34{,}78$$

- Pada suhu 250 ^{o}C

^{o}API $_{kat.5\ gr}$ $= \frac{141,5}{spgr} - 131,5$

$= \frac{141,5}{0,892} - 131,5$

$= 158,63 – 131,5$

$= 27,13$

Untuk perhitungan nilai densitas, spgr dan ^{o}API katalis 10 gr, 15 gr, 20 gr dan 25 gr dapat dilihat pada tabel dibawah ini.

Tabel 14. Data Analisa *Crude Oil*

Run	**Berat katalis (gram)**	**Berat jenis (gr/ml)**		***spgr***		**^{o}API**	
		200^{o}C	**250 ^{o}C**	**200 ^{o}C**	**250 ^{o}C**	**200 ^{o}C**	**250 ^{o}C**
1	5	0,851	0,892	0,851	0,892	34,78	27,13
2	10	0,854	0,852	0,854	0,852	34,19	34,58
3	15	0,855	0,865	0,855	0,865	34,0	32,08
4	20	0,867	0,875	0,867	0,875	31,71	30,21
5	25	0,866	0,863	0,866	0,863	31,89	32,46

4. Menentukan massa produk

a. Pada temperatur operasi 200 ^{o}C

- Massa produk katalis 5 gram $= \rho_{sampel}$ x volume produk
  $= 0,851$ gr/ml x 296 ml
  $= 251,896$ gram
- Massa produk katalis 10 gram $= \rho_{sampel}$ x volume produk
  $= 0,854$ gr/ml x 317 ml
  $= 270,718$ gram
- Massa produk katalis 15 gram $= \rho_{sampel}$ x volume produk
  $= 0,855$ gr/ml x 370 ml
  $= 316,35$ gram

- Massa produk katalis 20 gram = ρ_{sampel} x volume produk
  = 0,864 gr/ml x 430 ml
  = 371,52 gram
- Massa produk katalis 25 gram = ρ_{sampel} x volume produk
  = 0,866 gr/ml x 310 ml
  = 268,46 gram

b. Pada temperatur operasi 250 ^{o}C

- Massa produk katalis 5 gram = ρ_{sampel} x volume produk
  = 0,892 gr/ml x 490 ml
  = 437,08 gram
- Massa produk katalis 10 gram = ρ_{sampel} x volume produk
  = 0,852 gr/ml x 550 ml
  = 468,6 gram
- Massa produk katalis 15 gram = ρ_{sampel} x volume produk
  = 0,865 gr/ml x 697 ml
  = 602,905 gram
- Massa produk katalis 20 gram = ρ_{sampel} x volume produk
  = 0,875 gr/ml x 653 ml
  = 571,375 gram
- Massa produk katalis 25 gram = ρ_{sampel} x volume produk
  = 0,863 gr/ml x 565 ml
  = 487,595 gram

5. Menentukan % Yield

a. Pada temperatur 200 ^{o}C

- % Yield kat.5 gr $= \frac{\text{massa produk}}{\text{massa umpan}}$ x 100%
  $= \frac{251{,}896 \text{ gram}}{1000 \text{ gram}}$ x 100 %
  = 25,19 %

- % Yield kat.10 gr $= \frac{\text{massa produk}}{\text{massa umpan}}$ x 100%

  $= \frac{270{,}718 \text{ gram}}{1000 \text{ gram}}$ x 100 %

  = 27,07 %

- % Yield kat.15 gr $= \frac{\text{massa produk}}{\text{massa umpan}}$ x 100%

  $= \frac{316{,}35 \text{ gram}}{1000 \text{ gram}}$ x 100 %

  = 31,64 %

- % Yield kat.20 gr $= \frac{massa\ produk}{massa\ umpan}$: x 100%

  $= \frac{371{,}52 \ gram}{1000 \ gram}$ x 100 %

  = 37,15 %

- % Yield kat.25 gr $= \frac{massa\ produk}{massa\ umpan}$ x 100%

  $= \frac{268{,}46 \ gram}{1000 \ gram}$ x 100 %

  = 26,85 %

b. Pada temperatur 250 ^{o}C

- % Yield kat.5 gr $= \frac{\text{massa produk}}{\text{massa umpan}}$ x 100%

  $= \frac{437{,}08 \text{ gram}}{1000 \text{ gram}}$ x 100 %

  = 43,71 %

- % Yield kat.10 gr $= \frac{\text{massa produk}}{\text{massa umpan}}$ x 100%

  $= \frac{468{,}6 \text{ gram}}{1000 \text{ gram}}$ x 100 %

  = 46,86 %

- % Yield kat.15 gr $= \frac{\text{massa produk}}{\text{massa umpan}}$ x 100%

  $= \frac{602{,}905 \quad \text{gram}}{1000 \text{ gram}}$ x 100 %

  = 60,29 %

- % Yield kat.20 gr $= \frac{massa\ produk}{massa\ umpan}$: x 100%

  $= \frac{571{,}375 \quad gram}{1000\ gram}$ x 100 %

  = 57,14 %

- % Yield kat.25 gr $= \frac{massa\ produk}{massa\ umpan}$ x 100%

  $= \frac{487{,}595 \quad gram}{1000\ gram}$ x 100 %

  = 48,76 %

Tabel 15. Persen yield terhadap produk pada suhu 200 ^{o}C dan 250 ^{o}C

Run	**Berat katalis (gram)**	**Persen Yield (%)**	
		200 ^{o}C	**250 ^{o}C**
1.	5	25,19	43,71
2.	10	27,07	46,86
3.	15	31,64	60,29
4.	20	37,15	57,14
5.	25	26,85	48,76