

# **Lampiran 1. Tabel Data Tanggal Pengujian**

Lampiran 1. 1 Data Pengujian Pada Full Absorber Batu Candi (Temple Stone) 04 November 2023

| Pukul     | E <sub>globe</sub><br>(lux)<br>x 100 | E <sub>globe</sub><br>(W/m <sup>2</sup> )<br>(X0,0079) | E <sub>rata-rata</sub><br>(W/m <sup>2</sup> ) | T <sub>abs</sub> (°C) |      |               | T <sub>kaca</sub> (°C) |      |      |      |                                |                               | T <sub>in</sub> | T <sub>out</sub> | T <sub>avg</sub> | T <sub>ling</sub> | Volume<br>Air<br>Tawar<br>(ml) | ΔV<br>(ml) | Δm<br>(gram) | pH Air<br>Tawar<br>yang<br>dihasilkan | Efisiensi<br>Distilasi<br>(%) |  |  |
|-----------|--------------------------------------|--|---|-----------------------|------|---------------|------------------------|------|------|------|--------------------------------|-------------------------------|-----------------|------------------|------------------|-------------------|--------------------------------|------------|--------------|---------------------------------------|-------------------------------|--|--|
|           |                                      |  |   | Titik                 |      | Rata-<br>rata | Titik                  |      |      |      | Rata-<br>rata<br>kaca<br>dalam | Rata-<br>rata<br>kaca<br>luar |                 |                  |                  |                   |                                |            |              |                                       |                               |  |  |
|           |                                      |  |   | 1                     | 2    |               | Dalam                  |      | Luar |      |                                |                               |                 |                  |                  |                   |                                |            |              |                                       |                               |  |  |
| 10:00     | 420                                  | 331,8  | 331,8   | 56,2                  | 58,3 | 57,3          | 51,1                   | 51,3 | 51,2 | 52,1 | 51,2                           | 51,65                         | 32,8            | -                | 34               | 36,2              | -                              |            |              |                                       |                               |  |  |
| 10:20     | 483                                  | 381,5  | 356,6   | 62,6                  | 64,1 | 63,4          | 60,8                   | 61,2 | 61,3 | 61,7 | 61                             | 61,5                          |                 | -                |                  | 38,7              | -                              |            |              |                                       |                               |  |  |
| 10:40     | 526                                  | 415,5  | 386   | 68,7                  | 70,4 | 69,6          | 66,9                   | 66,5 | 67,1 | 66,8 | 66,7                           | 66,95                         |                 | -                |                  | 43,6              | -                              |            |              |                                       |                               |  |  |
| 11:00     | 490                                  | 387,1  | 386,5   | 63,4                  | 60,2 | 61,8          | 63,5                   | 63,2 | 63,4 | 62,5 | 63,35                          | 62,95                         |                 | -                |                  | 41,4              | -                              |            |              |                                       |                               |  |  |
| 11:20     | 512                                  | 404,4  | 395,4   | 67,1                  | 66,5 | 66,8          | 65,2                   | 65,1 | 64,3 | 65,2 | 65,15                          | 64,75                         |                 | 32,5             |                  | 42,5              | 63                             | 63         | 61           |                                       |                               |  |  |
| 11:40     | 495                                  | 391  | 393,2   | 71,3                  | 69,8 | 70,6          | 58,7                   | 57,9 | 58,7 | 57,9 | 58,3                           | 58,3                          |                 | 33,9             |                  | 41,8              | 114                            | 51         | 50           |                                       |                               |  |  |
| 12:00     | 467                                  | 368,9  | 381   | 69,7                  | 72,4 | 71,1          | 56,2                   | 57,1 | 56,2 | 56,8 | 56,65                          | 56,5                          |                 | 35,4             |                  | 38,2              | 146                            | 32         | 31           | 7,1                                   | 40,9 %                        |  |  |
| 12:20     | 458                                  | 361,8  | 371,4   | 73,8                  | 75,7 | 74,8          | 56,6                   | 56,4 | 56,5 | 55,7 | 56,5                           | 56,1                          |                 | 34,8             |                  | 37,7              | 165                            | 19         |              |                                       |                               |  |  |
| 12:40     | 386                                  | 304,9  | 338,1   | 70,4                  | 73,2 | 71,8          | 52,7                   | 53,2 | 52,4 | 53,1 | 52,95                          | 52,75                         |                 | 36,3             |                  | 34,8              | 218                            | 53         |              |                                       |                               |  |  |
| 13:00     | 419                                  | 331  | 334,5   | 73,6                  | 76,8 | 75,2          | 62,3                   | 61,9 | 61,8 | 62,2 | 62,1                           | 62                            |                 | 35,7             |                  | 36,1              | 253                            | 35         |              |                                       |                               |  |  |
| 13:20     | 397                                  | 313,6  | 324   | 75,2                  | 73,6 | 74,4          | 54,9                   | 55,3 | 55,2 | 55,4 | 55,1                           | 55,3                          |                 | 34,1             |                  | 35,3              | 292                            | 39         |              |                                       |                               |  |  |
| 13:40     | 401                                  | 316,7  | 320,3   | 74,5                  | 75,1 | 74,8          | 61,6                   | 60,8 | 60,7 | 62,3 | 61,2                           | 61,5                          |                 | 33,5             |                  | 35,9              | 338                            | 46         |              |                                       |                               |  |  |
| 14:00     | 384                                  | 303,36   | 311,8   | 71,3                  | 74,8 | 73,1          | 59,7                   | 59,6 | 59,7 | 58,9 | 59,65                          | 59,3                          |                 | 32,1             |                  | 33,6              | 381                            | 43         |              |                                       |                               |  |  |
| rata-rata |                                      | 354,74   |   | 69,57                 |      |               |                        |      |      |      |                                |                               | 59,22           |                  |                  |                   |                                |            |              |                                       |                               |  |  |







Lampiran 1.5 Data Pengujian pada ½ Absorber Batu Candi (*Temple Stone*) 06 November 2023

| Pukul     | E <sub>globe</sub><br>(lux)<br>x 100 | E <sub>globe</sub><br>(W/m <sup>2</sup> )<br>(X0,0079) | E <sub>rata-rata</sub><br>(W/m <sup>2</sup> ) | T <sub>abs</sub> (°C) |      |               | T <sub>kaca</sub> (°C) |      |      |      |                                |                               | T <sub>in</sub> | T <sub>out</sub> | T <sub>avg</sub> | T <sub>ling</sub> | Volume<br>Air<br>Tawar<br>(ml) | ΔV<br>(ml) | Δm<br>(gram) | pH Air<br>Tawar<br>yang<br>dihasilkan | Efisiensi<br>Distilasi<br>(%) |  |  |
|-----------|--------------------------------------|--|---|-----------------------|------|---------------|------------------------|------|------|------|--------------------------------|-------------------------------|-----------------|------------------|------------------|-------------------|--------------------------------|------------|--------------|---------------------------------------|-------------------------------|--|--|
|           |                                      |  |   | Titik                 |      | Rata-<br>rata | Titik                  |      |      |      | Rata-<br>rata<br>kaca<br>dalam | Rata-<br>rata<br>kaca<br>luar |                 |                  |                  |                   |                                |            |              |                                       |                               |  |  |
|           |                                      |  |   | 1                     | 2    |               | Dalam                  |      | Luar |      |                                |                               |                 |                  |                  |                   |                                |            |              |                                       |                               |  |  |
| 10:00     | 432                                  | 341,28   | 341,2   | 61,6                  | 62,3 | 62,0          | 54,2                   | 54,9 | 55,2 | 55,7 | 54,55                          | 55,45                         | 33,5            | -                | 34               | 37,1              | -                              |            | 7,3          | 26,81 %                               |                               |  |  |
| 10:20     | 476                                  | 376,04   | 358,6   | 63,1                  | 63,8 | 63,5          | 55,3                   | 56,5 | 56,7 | 57,6 | 55,9                           | 57,15                         |                 | -                |                  | 38,6              | -                              |            |              |                                       |                               |  |  |
| 10:40     | 521                                  | 411,59   | 385,1   | 66,4                  | 65,2 | 65,8          | 58,9                   | 60,2 | 61,2 | 60,5 | 59,55                          | 60,85                         |                 | -                |                  | 40,5              | -                              |            |              |                                       |                               |  |  |
| 11:00     | 558                                  | 440,82   | 412,9   | 67,7                  | 68,1 | 67,9          | 60,4                   | 61,8 | 62,2 | 62,8 | 61,1                           | 62,5                          |                 | -                |                  | 42,4              | -                              |            |              |                                       |                               |  |  |
| 11:20     | 573                                  | 452,67   | 432,8   | 68,2                  | 68,9 | 68,6          | 66,5                   | 66,2 | 67,7 | 68,3 | 66,35                          | 68                            |                 | 33,8             | 42,9             | 78                | 78                             | 77         |              |                                       |                               |  |  |
| 11:40     | 589                                  | 465,31   | 449   | 72,2                  | 72,7 | 72,5          | 68,3                   | 70,4 | 69,8 | 71,1 | 69,35                          | 70,45                         |                 | 33,2             | 43,7             | 122               | 44                             | 42         |              |                                       |                               |  |  |
| 12:00     | 578                                  | 456,62   | 452,8   | 71,8                  | 71,4 | 71,6          | 69,9                   | 66,5 | 68,3 | 67,4 | 68,2                           | 67,85                         |                 | 35,1             | 43,1             | 168               | 46                             | 44         |              |                                       |                               |  |  |
| 12:20     | 537                                  | 424,23   | 438,5   | 68,3                  | 67,5 | 67,9          | 63,8                   | 62,4 | 65,1 | 62,7 | 63,1                           | 63,9                          |                 | 35,8             | 41,3             | 235               | 67                             |            |              |                                       |                               |  |  |
| 12:40     | 496                                  | 391,84   | 415,1   | 65,9                  | 66,2 | 66,1          | 63,2                   | 60,8 | 63,4 | 64,5 | 62                             | 63,95                         |                 | 36,4             | 39,8             | 297               | 62                             |            |              |                                       |                               |  |  |
| 13:00     | 485                                  | 383,15   | 399,1   | 64,5                  | 64,9 | 64,7          | 64,2                   | 61,5 | 64,8 | 62,7 | 62,85                          | 63,75                         |                 | 34,1             | 39,2             | 370               | 73                             |            |              |                                       |                               |  |  |
| 13:20     | 471                                  | 372,09   | 385,6   | 62,3                  | 63,7 | 63,0          | 58,1                   | 56,2 | 57,1 | 59,3 | 57,15                          | 58,2                          |                 | 33,5             | 38,4             | 484               | 114                            |            |              |                                       |                               |  |  |
| 13:40     | 458                                  | 361,82   | 373,7   | 61,4                  | 62,1 | 61,8          | 58,3                   | 56,9 | 56,7 | 55,6 | 57,6                           | 56,15                         |                 | 32,3             | 37,9             | 543               | 59                             |            |              |                                       |                               |  |  |
| 14:00     | 422                                  | 333,38   | 353,5   | 59,7                  | 60,6 | 60,2          | 55,3                   | 53,8 | 54,8 | 55,1 | 54,55                          | 54,95                         |                 | 32,1             | 36,2             | 568               | 25                             |            |              |                                       |                               |  |  |
| rata-rata |                                      | 400,83   |   | 65,79                 |      |               |                        |      |      |      |                                |                               |                 | 60,94            |                  |                   |                                |            |              |                                       |                               |  |  |











## **Lampiran 2. Tabel Perhitungan Tanggal Pengujian**



$$\begin{aligned}\dot{V}_{alat} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{381 \text{ ml}}{4 \text{ jam}} = 95,25 \text{ ml/jam}\end{aligned}$$

$$\begin{aligned}\dot{V} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{381 \text{ ml}}{4 \text{ jam} \times 60 \text{ menit} \times 60 \text{ s}} = 0,0264538 \text{ ml/s} = 2,64 \times 10^{-5} \text{ l/s} \\ &= 2,64 \times 10^{-8} \text{ m}^3/\text{s}\end{aligned}$$

$$\rho = \frac{\dot{m}_p}{\dot{V}} \rightarrow \dot{m}_p = \rho \times \dot{V}$$

$$\rho_1 = \frac{\Delta m}{\Delta v} = \frac{61}{63} = 0,968253 \frac{\text{g}}{\text{cm}^3} = 968,254 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_2 = \frac{\Delta m}{\Delta v} = \frac{50}{51} = 0,980392 \frac{\text{g}}{\text{cm}^3} = 980,39 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_3 = \frac{\Delta m}{\Delta v} = \frac{31}{32} = 0,96875 \frac{\text{g}}{\text{cm}^3} = 968,75 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{rata-rata} = 972,465 \text{ kg/m}^3$$

$$\dot{m}_p = \rho \times \dot{V}$$

$$= 972,465 \text{ kg/m}^3 \times 2,64 \times 10^{-8} \text{ m}^3/\text{s} = 0,000025729 \text{ kg/s}$$

$$A_d = \text{Panjang (m)} \times \text{Lebar (m)} = 0,97 \text{ m} \times 0,765 \text{ m} = 0,74205 \text{ m}^2$$

$$C_{p\text{air}} = 69^\circ\text{C} = 4,189 \text{ kJ/kgK}$$

$$h = C_{p\text{air}} \times \Delta T = 4,189 \text{ kJ/kgK} \times (69^\circ\text{C} - 59^\circ\text{C}) = 41,89 \text{ kJ/kg}$$

$$G_{rata-rata} = 354,74 \text{ W/m}^2$$

Efisiensi Distilasi :

$$\eta_d = \frac{\dot{m}_p \times h_{fg}}{A_d \times G} \times 100 \%$$

$$= \frac{0,000025729 \text{ kg/s} \times 41,89 \times 10^3 \text{ J/kg}}{0,74205 \text{ m}^2 \times 354,74 \text{ W/m}^2} \times 100\% = 40,9 \%$$



$$\begin{aligned}\dot{V}_{alat} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{376 \text{ ml}}{4 \text{ jam}} = 94 \text{ ml/jam}\end{aligned}$$

$$\begin{aligned}\dot{V} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{376 \text{ ml}}{4 \text{ jam} \times 60 \text{ menit} \times 60 \text{ s}} = 0,026111 \text{ ml/s} = 2,61 \times 10^{-5} \text{ l/s} \\ &= 2,61 \times 10^{-8} \text{ m}^3/\text{s}\end{aligned}$$

$$\rho = \frac{\dot{m}_p}{\dot{V}} \rightarrow \dot{m}_p = \rho \times \dot{V}$$

$$\rho_1 = \frac{\Delta m}{\Delta v} = \frac{55}{56} = 0,982142 \frac{\text{g}}{\text{cm}^3} = 982,142 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_2 = \frac{\Delta m}{\Delta v} = \frac{49}{51} = 0,960784 \frac{\text{g}}{\text{cm}^3} = 960,784 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_3 = \frac{\Delta m}{\Delta v} = \frac{33}{35} = 0,942857 \frac{\text{g}}{\text{cm}^3} = 942,857 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{rata-rata} = 961,928 \text{ kg/m}^3$$

$$\dot{m}_p = \rho \times \dot{V}$$

$$= 961,928 \text{ kg/m}^3 \times 2,61 \times 10^{-8} \text{ m}^3/\text{s} = 0,000025117 \text{ kg/s}$$

$$A_d = \text{Panjang (m)} \times \text{Lebar (m)} = 0,97 \text{ m} \times 0,765 \text{ m} = 0,74205 \text{ m}^2$$

$$C_{p\text{air}} = 64,8^\circ\text{C} = 4,187 \text{ kJ/kgK}$$

$$h = C_{p\text{air}} \times \Delta T = 4,187 \text{ kJ/kgK} \times (64,8^\circ\text{C} - 58,1^\circ\text{C}) = 28,05 \text{ kJ/kg}$$

$$G_{rata-rata} = 354,74 \text{ W/m}^2$$

Efisiensi Distilasi :

$$\eta_d = \frac{\dot{m}_p \times h_{fg}}{A_d \times G} \times 100 \%$$

$$= \frac{0,000025117 \text{ kg/s} \times 28,05 \times 10^3 \text{ J/kg}}{0,74205 \text{ m}^2 \times 354,74 \text{ W/m}^2} \times 100\% = 26,76 \%$$





$$\begin{aligned}\dot{V}_{alat} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{369 \text{ ml}}{4 \text{ jam}} = 92,25 \text{ ml/jam}\end{aligned}$$

$$\begin{aligned}\dot{V} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{369 \text{ ml}}{4 \text{ jam} \times 60 \text{ menit} \times 60 \text{ s}} = 0,025625 \text{ ml/s} = 2,56 \times 10^{-5} \text{ l/s} \\ &= 2,56 \times 10^{-8} \text{ m}^3/\text{s}\end{aligned}$$

$$\rho = \frac{\dot{m}_p}{\dot{V}} \rightarrow \dot{m}_p = \rho \times \dot{V}$$

$$\rho_1 = \frac{\Delta m}{\Delta v} = \frac{50}{51} = 0,980392 \frac{\text{g}}{\text{cm}^3} = 980,392 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_2 = \frac{\Delta m}{\Delta v} = \frac{34}{36} = 0,944444 \frac{\text{g}}{\text{cm}^3} = 944,444 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_3 = \frac{\Delta m}{\Delta v} = \frac{33}{34} = 0,941176 \frac{\text{g}}{\text{cm}^3} = 941,176 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{rata-rata} = 955,337 \text{ kg/m}^3$$

$$\dot{m}_p = \rho \times \dot{V}$$

$$= 955,337 \text{ kg/m}^3 \times 2,56 \times 10^{-8} \text{ m}^3/\text{s} = 0,00002448 \text{ kg/s}$$

$$A_d = \text{Panjang (m)} \times \text{Lebar (m)} = 0,97 \text{ m} \times 0,765 \text{ m} = 0,74205 \text{ m}^2$$

$$C_{p\text{air}} = 61^\circ\text{C} = 4,186 \text{ kJ/kgK}$$

$$h = C_{p\text{air}} \times \Delta T = 4,186 \text{ kJ/kgK} \times (61^\circ\text{C} - 57^\circ\text{C}) = 16,74 \text{ kJ/kg}$$

$$G_{rata-rata} = 354,74 \text{ W/m}^2$$

Efisiensi Distilasi :

$$\eta_d = \frac{\dot{m}_p \times h_{fg}}{A_d \times G} \times 100 \%$$

$$= \frac{0,00002448 \text{ kg/s} \times 16,74 \times 10^3 \text{ J/kg}}{0,74205 \text{ m}^2 \times 354,74 \text{ W/m}^2} \times 100\% = 15,56 \%$$



$$\begin{aligned}\dot{V}_{alat} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{571 \text{ ml}}{4 \text{ jam}} = 142,75 \text{ ml/jam}\end{aligned}$$

$$\begin{aligned}\dot{V} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{571 \text{ ml}}{4 \text{ jam} \times 60 \text{ menit} \times 60 \text{ s}} = 0,039652 \text{ ml/s} = 3,96 \times 10^{-5} \text{ l/s} \\ &= 3,96 \times 10^{-8} \text{ m}^3/\text{s}\end{aligned}$$

$$\rho = \frac{\dot{m}_p}{\dot{V}} \rightarrow \dot{m}_p = \rho \times \dot{V}$$

$$\rho_1 = \frac{\Delta m}{\Delta v} = \frac{83}{85} = 0,97647 \frac{\text{g}}{\text{cm}^3} = 976,47 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_2 = \frac{\Delta m}{\Delta v} = \frac{47}{48} = 0,979166 \frac{\text{g}}{\text{cm}^3} = 979,16 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_3 = \frac{\Delta m}{\Delta v} = \frac{44}{46} = 0,956521 \frac{\text{g}}{\text{cm}^3} = 956,52 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{rata-rata} = 970,719 \text{ kg/m}^3$$

$$\dot{m}_p = \rho \times \dot{V}$$

$$= 970,719 \text{ kg/m}^3 \times 3,96 \times 10^{-8} \text{ m}^3/\text{s} = 0,00003849 \text{ kg/s}$$

$$A_d = \text{Panjang (m)} \times \text{Lebar (m)} = 0,97 \text{ m} \times 0,765 \text{ m} = 0,74205 \text{ m}^2$$

$$C_{p_{air}} = 73,5^\circ\text{C} = 4,192 \text{ kJ/kgK}$$

$$h = C_{p_{air}} \times \Delta T = 4,186 \text{ kJ/kgK} \times (73,5^\circ\text{C} - 62,5^\circ\text{C}) = 46,11 \text{ kJ/kg}$$

$$G_{rata-rata} = 400,83 \text{ W/m}^2$$

Efisiensi Distilasi :

$$\eta_d = \frac{\dot{m}_p \times h_{fg}}{A_d \times G} \times 100 \%$$

$$= \frac{0,00003849 \text{ kg/s} \times 46,11 \times 10^3 \text{ J/kg}}{0,74205 \text{ m}^2 \times 400,83 \text{ W/m}^2} \times 100\% = 59,66 \%$$

Lampiran 2.5 Data Pengujian Dan Perhitungan Pada ½ Absorber Batu Candi (*Temple Stone*) 06 November 2023

| Pukul     | E <sub>globe</sub><br>(lux)<br>x 100 | E <sub>globe</sub><br>(W/m <sup>2</sup> )<br>(X0,0079) | E <sub>rata-rata</sub><br>(W/m <sup>2</sup> ) | T <sub>abs</sub> (°C) |      |               | T <sub>kaca</sub> (°C) |      |      |      |                                |                               | T <sub>in</sub> | T <sub>out</sub> | T <sub>avg</sub> | T <sub>ling</sub> | Volume<br>Air<br>Tawar<br>(ml) | ΔV<br>(ml) | Δm<br>(gram) | pH Air<br>Tawar<br>yang<br>dihasilkan | Efisiensi<br>Distilasi<br>(%) |  |  |
|-----------|--------------------------------------|--|---|-----------------------|------|---------------|------------------------|------|------|------|--------------------------------|-------------------------------|-----------------|------------------|------------------|-------------------|--------------------------------|------------|--------------|---------------------------------------|-------------------------------|--|--|
|           |                                      |  |   | Titik                 |      | Rata-<br>rata | Titik                  |      |      |      | Rata-<br>rata<br>kaca<br>dalam | Rata-<br>rata<br>kaca<br>luar |                 |                  |                  |                   |                                |            |              |                                       |                               |  |  |
|           |                                      |  |   | 1                     | 2    |               | Dalam                  |      | Luar |      |                                |                               |                 |                  |                  |                   |                                |            |              |                                       |                               |  |  |
| 10:00     | 432                                  | 341,28   | 341,2   | 61,6                  | 62,3 | 62,0          | 54,2                   | 54,9 | 55,2 | 55,7 | 54,55                          | 55,45                         | 33,5            | -                | 34               | 37,1              | -                              |            | 7,3          | 26,81 %                               |                               |  |  |
| 10:20     | 476                                  | 376,04   | 358,6   | 63,1                  | 63,8 | 63,5          | 55,3                   | 56,5 | 56,7 | 57,6 | 55,9                           | 57,15                         |                 | -                |                  | 38,6              | -                              |            |              |                                       |                               |  |  |
| 10:40     | 521                                  | 411,59   | 385,1   | 66,4                  | 65,2 | 65,8          | 58,9                   | 60,2 | 61,2 | 60,5 | 59,55                          | 60,85                         |                 | -                |                  | 40,5              | -                              |            |              |                                       |                               |  |  |
| 11:00     | 558                                  | 440,82   | 412,9   | 67,7                  | 68,1 | 67,9          | 60,4                   | 61,8 | 62,2 | 62,8 | 61,1                           | 62,5                          |                 | -                |                  | 42,4              | -                              |            |              |                                       |                               |  |  |
| 11:20     | 573                                  | 452,67   | 432,8   | 68,2                  | 68,9 | 68,6          | 66,5                   | 66,2 | 67,7 | 68,3 | 66,35                          | 68                            |                 | 33,8             | 42,9             | 78                | 78                             | 77         |              |                                       |                               |  |  |
| 11:40     | 589                                  | 465,31   | 449   | 72,2                  | 72,7 | 72,5          | 68,3                   | 70,4 | 69,8 | 71,1 | 69,35                          | 70,45                         |                 | 33,2             | 43,7             | 122               | 44                             | 42         |              |                                       |                               |  |  |
| 12:00     | 578                                  | 456,62   | 452,8   | 71,8                  | 71,4 | 71,6          | 69,9                   | 66,5 | 68,3 | 67,4 | 68,2                           | 67,85                         |                 | 35,1             | 43,1             | 168               | 46                             | 44         |              |                                       |                               |  |  |
| 12:20     | 537                                  | 424,23   | 438,5   | 68,3                  | 67,5 | 67,9          | 63,8                   | 62,4 | 65,1 | 62,7 | 63,1                           | 63,9                          |                 | 35,8             | 41,3             | 235               | 67                             |            |              |                                       |                               |  |  |
| 12:40     | 496                                  | 391,84   | 415,1   | 65,9                  | 66,2 | 66,1          | 63,2                   | 60,8 | 63,4 | 64,5 | 62                             | 63,95                         |                 | 36,4             | 39,8             | 297               | 62                             |            |              |                                       |                               |  |  |
| 13:00     | 485                                  | 383,15   | 399,1   | 64,5                  | 64,9 | 64,7          | 64,2                   | 61,5 | 64,8 | 62,7 | 62,85                          | 63,75                         |                 | 34,1             | 39,2             | 370               | 73                             |            |              |                                       |                               |  |  |
| 13:20     | 471                                  | 372,09   | 385,6   | 62,3                  | 63,7 | 63,0          | 58,1                   | 56,2 | 57,1 | 59,3 | 57,15                          | 58,2                          |                 | 33,5             | 38,4             | 484               | 114                            |            |              |                                       |                               |  |  |
| 13:40     | 458                                  | 361,82   | 373,7   | 61,4                  | 62,1 | 61,8          | 58,3                   | 56,9 | 56,7 | 55,6 | 57,6                           | 56,15                         |                 | 32,3             | 37,9             | 543               | 59                             |            |              |                                       |                               |  |  |
| 14:00     | 422                                  | 333,38   | 353,5   | 59,7                  | 60,6 | 60,2          | 55,3                   | 53,8 | 54,8 | 55,1 | 54,55                          | 54,95                         |                 | 32,1             | 36,2             | 568               | 25                             |            |              |                                       |                               |  |  |
| rata-rata |                                      | 400,83   |   | 65,79                 |      |               |                        |      |      |      |                                |                               |                 | 60,94            |                  |                   |                                |            |              |                                       |                               |  |  |

$$\begin{aligned}\dot{V}_{alat} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{568 \text{ ml}}{4 \text{ jam}} = 142 \text{ ml/jam}\end{aligned}$$

$$\begin{aligned}\dot{V} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{568 \text{ ml}}{4 \text{ jam} \times 60 \text{ menit} \times 60 \text{ s}} = 0,0394444 \text{ ml/s} = 3,94 \times 10^{-5} \text{ l/s} \\ &= 3,94 \times 10^{-8} \text{ m}^3/\text{s}\end{aligned}$$

$$\rho = \frac{\dot{m}_p}{\dot{V}} \rightarrow \dot{m}_p = \rho \times \dot{V}$$

$$\rho_1 = \frac{\Delta m}{\Delta v} = \frac{77}{78} = 0,987179 \frac{\text{g}}{\text{cm}^3} = 987,17 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_2 = \frac{\Delta m}{\Delta v} = \frac{42}{44} = 0,954545 \frac{\text{g}}{\text{cm}^3} = 954,54 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_3 = \frac{\Delta m}{\Delta v} = \frac{44}{46} = 0,956217 \frac{\text{g}}{\text{cm}^3} = 956,21 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{rata-rata} = 966,082 \text{ kg/m}^3$$

$$\dot{m}_p = \rho \times \dot{V}$$

$$= 966,082 \text{ kg/m}^3 \times 3,94 \times 10^{-8} \text{ m}^3/\text{s} = 0,0000381 \text{ kg/s}$$

$$A_d = \text{Panjang (m)} \times \text{Lebar (m)} = 0,97\text{m} \times 0,765\text{m} = 0,74205\text{m}^2$$

$$C_{p\text{air}} = 65^\circ\text{C} = 4,186 \text{ kJ/kgK}$$

$$h = C_{p\text{air}} \times \Delta T = 4,187 \text{ kJ/kgK} \times (65^\circ\text{C} - 60^\circ\text{C}) = 20,93 \text{ kJ/kg}$$

$$G_{rata-rata} = 400,83 \text{ W/m}^2$$

Efisiensi Distilasi :

$$\eta_d = \frac{\dot{m}_p \times h_{fg}}{A_d \times G} \times 100 \%$$

$$= \frac{0,0000381 \text{ kg/s} \times 20,93 \times 10^3 \text{ J/kg}}{0,74205 \text{ m}^2 \times 400,83 \text{ W/m}^2} \times 100\% = 26,81 \%$$



$$\begin{aligned}\dot{V}_{alat} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{564 \text{ ml}}{4 \text{ jam}} = 141 \text{ ml/jam}\end{aligned}$$

$$\begin{aligned}\dot{V} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{564 \text{ ml}}{4 \text{ jam} \times 60 \text{ menit} \times 60 \text{ s}} = 0,0391667 \text{ ml/s} = 3,91 \times 10^{-5} \text{ l/s} \\ &= 3,91 \times 10^{-8} \text{ m}^3/\text{s}\end{aligned}$$

$$\rho = \frac{\dot{m}_p}{\dot{V}} \rightarrow \dot{m}_p = \rho \times \dot{V}$$

$$\rho_1 = \frac{\Delta m}{\Delta v} = \frac{67}{68} = 0,985294 \frac{\text{g}}{\text{cm}^3} = 985,29 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_2 = \frac{\Delta m}{\Delta v} = \frac{42}{44} = 0,954545 \frac{\text{g}}{\text{cm}^3} = 954,54 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_3 = \frac{\Delta m}{\Delta v} = \frac{34}{36} = 0,944444 \frac{\text{g}}{\text{cm}^3} = 944,44 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{rata-rata} = 961,428 \text{ kg/m}^3$$

$$\dot{m}_p = \rho \times \dot{V}$$

$$= 961,428 \text{ kg/m}^3 \times 3,91 \times 10^{-8} \text{ m}^3/\text{s} = 0,00003765 \text{ kg/s}$$

$$A_d = \text{Panjang (m)} \times \text{Lebar (m)} = 0,97 \text{ m} \times 0,765 \text{ m} = 0,74205 \text{ m}^2$$

$$C_{p\text{air}} = 62^\circ\text{C} = 4,186 \text{ kJ/kgK}$$

$$h = C_{p\text{air}} \times \Delta T = 4,186 \text{ kJ/kgK} \times (62^\circ\text{C} - 58,8^\circ\text{C}) = 13,39 \text{ kJ/kg}$$

$$G_{rata-rata} = 400,83 \text{ W/m}^2$$

Efisiensi Distilasi :

$$\eta_d = \frac{\dot{m}_p \times h_{fg}}{A_d \times G} \times 100 \%$$

$$= \frac{0,00003765 \text{ kg/s} \times 13,39 \times 10^3 \text{ J/kg}}{0,74205 \text{ m}^2 \times 400,83 \text{ W/m}^2} \times 100\% = 16,94 \%$$





$$\begin{aligned}\dot{V}_{alat} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{598 \text{ ml}}{4 \text{ jam}} = 149,5 \text{ ml/jam}\end{aligned}$$

$$\begin{aligned}\dot{V} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{598 \text{ ml}}{4 \text{ jam} \times 60 \text{ menit} \times 60 \text{ s}} = 0,041527 \text{ ml/s} = 4,15 \times 10^{-5} \text{ l/s} \\ &= 4,15 \times 10^{-8} \text{ m}^3/\text{s}\end{aligned}$$

$$\rho = \frac{\dot{m}_p}{\dot{V}} \rightarrow \dot{m}_p = \rho \times \dot{V}$$

$$\rho_1 = \frac{\Delta m}{\Delta v} = \frac{93}{94} = 0,989361 \frac{\text{g}}{\text{cm}^3} = 989,36 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_2 = \frac{\Delta m}{\Delta v} = \frac{63}{64} = 0,984375 \frac{\text{g}}{\text{cm}^3} = 984,37 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_3 = \frac{\Delta m}{\Delta v} = \frac{52}{53} = 0,981132 \frac{\text{g}}{\text{cm}^3} = 981,13 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{rata-rata} = 984,956 \text{ kg/m}^3$$

$$\dot{m}_p = \rho \times \dot{V}$$

$$= 984,956 \text{ kg/m}^3 \times 4,15 \times 10^{-8} \text{ m}^3/\text{s} = 0,000040903 \text{ kg/s}$$

$$A_d = \text{Panjang (m)} \times \text{Lebar (m)} = 0,97\text{m} \times 0,765\text{m} = 0,74205\text{m}^2$$

$$C_{p\text{air}} = 76^\circ\text{C} = 4,194 \text{ kJ/kgK}$$

$$h = C_{p\text{air}} \times \Delta T = 4,194 \text{ kJ/kgK} \times (76^\circ\text{C} - 64^\circ\text{C}) = 50,32 \text{ kJ/kg}$$

$$G_{rata-rata} = 414,38 \text{ W/m}^2$$

Efisiensi Distilasi :

$$\eta_d = \frac{\dot{m}_p \times h_{fg}}{A_d \times G} \times 100 \%$$

$$= \frac{0,00040903 \text{ kg/s} \times 50,32 \times 10^3 \text{ J/kg}}{0,74205 \text{ m}^2 \times 414,38 \text{ W/m}^2} \times 100\% = 66,9 \%$$

Lampiran 2.8 Data Pengujian Dan Perhitungan pada ½ Absorber Batu Candi (*Temple Stone*) 22 November 2023

| Pukul     | E <sub>globe</sub><br>(lux)<br>x 100 | E <sub>globe</sub><br>(W/m <sup>2</sup> )<br>(X0,0079) | E <sub>rata-rata</sub><br>(W/m <sup>2</sup> ) | T <sub>abs</sub> (°C) |      |               | T <sub>kaca</sub> (°C) |      |      |      |                                |                               | T <sub>in</sub> | T <sub>out</sub> | T <sub>avg</sub> | T <sub>ling</sub> | Volume<br>Air<br>Tawar<br>(ml) | ΔV | Δm  | pH Air<br>Tawar<br>yang<br>dihasilkan | Efisiensi<br>Distilasi<br>(%) |  |  |
|-----------|--------------------------------------|--|---|-----------------------|------|---------------|------------------------|------|------|------|--------------------------------|-------------------------------|-----------------|------------------|------------------|-------------------|--------------------------------|----|-----|---------------------------------------|-------------------------------|--|--|
|           |                                      |  |   | Titik                 |      | Rata-<br>rata | Titik                  |      |      |      | Rata-<br>rata<br>kaca<br>dalam | Rata-<br>rata<br>kaca<br>luar |                 |                  |                  |                   |                                |    |     |                                       |                               |  |  |
|           |                                      |  |   | 1                     | 2    |               | Dalam                  |      | Luar |      |                                |                               |                 |                  |                  |                   |                                |    |     |                                       |                               |  |  |
| 10:00     | 476                                  | 376  | 376   | 60,2                  | 61,4 | 60,8          | 60,1                   | 61,7 | 62,3 | 62,8 | 60,9                           | 62,8                          | 34,1            | -                | 35               | 38,6              | -                              |    | 7,3 | 43,10 %                               |                               |  |  |
| 10:20     | 491                                  | 387,8  | 381,9   | 63,7                  | 64,1 | 63,9          | 63,8                   | 64,5 | 64,1 | 65,2 | 64,15                          | 64,65                         |                 | -                |                  |                   | 39,3                           | -  |     |                                       |                               |  |  |
| 10:40     | 507                                  | 400,5  | 391,2   | 65,1                  | 66,7 | 65,9          | 64,6                   | 65,7 | 65,3 | 66,1 | 65,15                          | 65,7                          |                 | -                |                  |                   | 39,8                           | -  |     |                                       |                               |  |  |
| 11:00     | 534                                  | 421,8  | 406,5   | 69,2                  | 71,5 | 70,4          | 67,2                   | 66,1 | 66,5 | 67,4 | 66,65                          | 66,95                         |                 | -                |                  |                   | 40,8                           | -  |     |                                       |                               |  |  |
| 11:20     | 572                                  | 451,8  | 429,1   | 72,6                  | 73,1 | 72,9          | 68,7                   | 67,5 | 67,3 | 68,1 | 68,1                           | 67,7                          |                 | 34,1             |                  | 42,7              | 86                             | 86 |     |                                       | 85                            |  |  |
| 11:40     | 596                                  | 470,8  | 449,9   | 80,8                  | 81,3 | 81,1          | 72,4                   | 71,3 | 71,7 | 72,9 | 71,85                          | 72,3                          |                 | 35,3             |                  | 44,2              | 143                            | 57 |     |                                       | 55                            |  |  |
| 12:00     | 584                                  | 461,3  | 455,6   | 79,3                  | 79,9 | 79,6          | 70,1                   | 69,6 | 70,2 | 70,8 | 69,85                          | 70,5                          |                 | 35,7             |                  | 43,6              | 187                            | 44 |     |                                       | 43                            |  |  |
| 12:20     | 561                                  | 443,1  | 449,3   | 77,4                  | 78,2 | 77,8          | 69,5                   | 67,8 | 68,4 | 69,2 | 68,65                          | 68,8                          |                 | 36,5             |                  | 42,2              | 254                            | 67 |     |                                       |                               |  |  |
| 12:40     | 542                                  | 428,1  | 438,7   | 70,9                  | 71,8 | 71,4          | 58,3                   | 57,4 | 57,9 | 58,6 | 57,85                          | 58,25                         |                 | 36,8             |                  | 41,4              | 316                            | 62 |     |                                       |                               |  |  |
| 13:00     | 516                                  | 407,6  | 423,1   | 70,1                  | 70,7 | 70,4          | 61,7                   | 60,2 | 60,6 | 59,5 | 60,95                          | 59,5                          |                 | 35,2             |                  | 40,1              | 375                            | 59 |     |                                       |                               |  |  |
| 13:20     | 497                                  | 392,6  | 407,8   | 68,5                  | 69,2 | 68,9          | 55,4                   | 56,8 | 56,3 | 55,1 | 56,1                           | 55,7                          |                 | 34,8             |                  | 39,9              | 428                            | 53 |     |                                       |                               |  |  |
| 13:40     | 483                                  | 381,5  | 394,6   | 64,4                  | 65,8 | 65,1          | 53,6                   | 52,5 | 53,8 | 52,2 | 53,05                          | 53                            |                 | 33,7             |                  | 39,3              | 511                            | 83 |     |                                       |                               |  |  |
| 14:00     | 461                                  | 364,1  | 379,3   | 61,8                  | 62,4 | 62,1          | 52,1                   | 51,7 | 51,4 | 52,7 | 51,9                           | 52,05                         | 33              |                  | 37,5             | 583               | 72                             |    |     |                                       |                               |  |  |
| rata-rata |                                      | 414,38   |   | 70,00                 |      |               |                        |      |      |      |                                |                               | 62,70           |                  |                  |                   |                                |    |     |                                       |                               |  |  |

$$\begin{aligned}\dot{V}_{alat} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{583 \text{ ml}}{4 \text{ jam}} = 145,75 \text{ ml/jam}\end{aligned}$$

$$\begin{aligned}\dot{V} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{583 \text{ ml}}{4 \text{ jam} \times 60 \text{ menit} \times 60 \text{ s}} = 0,0404861 \text{ ml/s} = 4,04 \times 10^{-5} \text{ l/s} \\ &= 4,04 \times 10^{-8} \text{ m}^3/\text{s}\end{aligned}$$

$$\rho = \frac{\dot{m}_p}{\dot{V}} \rightarrow \dot{m}_p = \rho \times \dot{V}$$

$$\rho_1 = \frac{\Delta m}{\Delta v} = \frac{85}{86} = 0,988372 \frac{\text{g}}{\text{cm}^3} = 988,37 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_2 = \frac{\Delta m}{\Delta v} = \frac{55}{57} = 0,964912 \frac{\text{g}}{\text{cm}^3} = 964,91 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_3 = \frac{\Delta m}{\Delta v} = \frac{43}{44} = 0,977272 \frac{\text{g}}{\text{cm}^3} = 977,27 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{rata-rata} = 976,852 \text{ kg/m}^3$$

$$\dot{m}_p = \rho \times \dot{V}$$

$$= 976,852 \text{ kg/m}^3 \times 4,04 \times 10^{-8} \text{ m}^3/\text{s} = 0,00003954 \text{ kg/s}$$

$$A_d = \text{Panjang (m)} \times \text{Lebar (m)} = 0,97\text{m} \times 0,765\text{m} = 0,74205\text{m}^2$$

$$C_{p\text{air}} = 70^\circ\text{C} = 4,19 \text{ kJ/kgK}$$

$$h = C_{p\text{air}} \times \Delta T = 4,19 \text{ kJ/kgK} \times (70^\circ\text{C} - 62^\circ\text{C}) = 33,52 \text{ kJ/kg}$$

$$G_{rata-rata} = 414,38 \text{ W/m}^2$$

Efisiensi Distilasi :

$$\eta_d = \frac{\dot{m}_p \times h_{fg}}{A_d \times G} \times 100 \%$$

$$= \frac{0,00003954 \text{ kg/s} \times 33,52 \times 10^3 \text{ J/kg}}{0,74205 \text{ m}^2 \times 414,38 \text{ W/m}^2} \times 100\% = 43,10 \%$$



$$\begin{aligned}\dot{V}_{alat} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{575 \text{ ml}}{4 \text{ jam}} = 143,75 \text{ ml/jam}\end{aligned}$$

$$\begin{aligned}\dot{V} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{575 \text{ ml}}{4 \text{ jam} \times 60 \text{ menit} \times 60 \text{ s}} = 0,0399306 \text{ ml/s} = 3,99 \times 10^{-5} \text{ l/s} \\ &= 3,99 \times 10^{-8} \text{ m}^3/\text{s}\end{aligned}$$

$$\rho = \frac{\dot{m}_p}{\dot{V}} \rightarrow \dot{m}_p = \rho \times \dot{V}$$

$$\rho_1 = \frac{\Delta m}{\Delta v} = \frac{81}{82} = 0,987804 \frac{\text{g}}{\text{cm}^3} = 987,8 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_2 = \frac{\Delta m}{\Delta v} = \frac{53}{55} = 0,963636 \frac{\text{g}}{\text{cm}^3} = 963,63 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_3 = \frac{\Delta m}{\Delta v} = \frac{45}{47} = 0,957446 \frac{\text{g}}{\text{cm}^3} = 957,44 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{rata-rata} = 969,629 \text{ kg/m}^3$$

$$\dot{m}_p = \rho \times \dot{V}$$

$$= 969,629 \text{ kg/m}^3 \times 3,99 \times 10^{-8} \text{ m}^3/\text{s} = 0,00003871 \text{ kg/s}$$

$$A_d = \text{Panjang (m)} \times \text{Lebar (m)} = 0,97 \text{ m} \times 0,765 \text{ m} = 0,74205 \text{ m}^2$$

$$C_{p\text{air}} = 62^\circ\text{C} = 4,186 \text{ kJ/kgK}$$

$$h = C_{p\text{air}} \times \Delta T = 4,186 \text{ kJ/kgK} \times (62^\circ\text{C} - 58^\circ\text{C}) = 16,76 \text{ kJ/kg}$$

$$G_{rata-rata} = 414,38 \text{ W/m}^2$$

Efisiensi Distilasi :

$$\eta_d = \frac{\dot{m}_p \times h_{fg}}{A_d \times G} \times 100 \%$$

$$= \frac{0,00003871 \text{ kg/s} \times 16,76 \times 10^3 \text{ J/kg}}{0,74205 \text{ m}^2 \times 414,38 \text{ W/m}^2} \times 100\% = 21 \%$$

# **Lampiran 3. Tabel Data Referensi yang Digunakan**

Lampiran 3. 1 Tabel Termodinamika Yang Digunakan

| Temp.<br>$T$ °C | Sat.<br>Press.<br>$P_{sat}$ kPa | Sat.<br>Liquid<br>$v_f$ | Sat.<br>Vapor<br>$v_g$ | Sat.<br>Liquid<br>$u_f$ | Evap.<br>$u_{fg}$ | Sat.<br>Vapor<br>$u_g$ | Sat.<br>Liquid<br>$h_f$ | Evap.<br>$h_{fg}$ | Sat.<br>Vapor<br>$h_g$ | Sat.<br>Liquid<br>$s_f$ | Evap.<br>$s_{fg}$ | Sat.<br>Vapor<br>$s_g$ |
|-----------------|---------------------------------|-------------------------|------------------------|-------------------------|-------------------|------------------------|-------------------------|-------------------|------------------------|-------------------------|-------------------|------------------------|
| 0.01            | 0.6117                          | 0.001000                | 206.00                 | 0.000                   | 2374.9            | 2374.9                 | 0.001                   | 2500.9            | 2500.9                 | 0.0000                  | 9.1556            | 9.1556                 |
| 5               | 0.8725                          | 0.001000                | 147.03                 | 21.019                  | 2360.8            | 2381.8                 | 21.020                  | 2489.1            | 2510.1                 | 0.0763                  | 8.9487            | 9.0249                 |
| 10              | 1.2281                          | 0.001000                | 106.32                 | 42.020                  | 2346.6            | 2388.7                 | 42.022                  | 2477.2            | 2519.2                 | 0.1511                  | 8.7488            | 8.8999                 |
| 15              | 1.7057                          | 0.001001                | 77.885                 | 62.980                  | 2332.5            | 2395.5                 | 62.982                  | 2465.4            | 2528.3                 | 0.2245                  | 8.5559            | 8.7803                 |
| 20              | 2.3392                          | 0.001002                | 57.762                 | 83.913                  | 2318.4            | 2402.3                 | 83.915                  | 2453.5            | 2537.4                 | 0.2965                  | 8.3696            | 8.6661                 |
| 25              | 3.1698                          | 0.001003                | 43.340                 | 104.83                  | 2304.3            | 2409.1                 | 104.83                  | 2441.7            | 2546.5                 | 0.3672                  | 8.1895            | 8.5567                 |
| 30              | 4.2469                          | 0.001004                | 32.879                 | 125.73                  | 2290.2            | 2415.9                 | 125.74                  | 2429.8            | 2555.6                 | 0.4368                  | 8.0152            | 8.4520                 |
| 35              | 5.6291                          | 0.001006                | 25.205                 | 146.63                  | 2276.0            | 2422.7                 | 146.64                  | 2417.9            | 2564.6                 | 0.5051                  | 7.8466            | 8.3517                 |
| 40              | 7.3851                          | 0.001008                | 19.515                 | 167.53                  | 2261.9            | 2429.4                 | 167.53                  | 2406.0            | 2573.5                 | 0.5724                  | 7.6832            | 8.2556                 |
| 45              | 9.5953                          | 0.001010                | 15.251                 | 188.43                  | 2247.7            | 2436.1                 | 188.44                  | 2394.0            | 2582.4                 | 0.6386                  | 7.5247            | 8.1633                 |
| 50              | 12.352                          | 0.001012                | 12.026                 | 209.33                  | 2233.4            | 2442.7                 | 209.34                  | 2382.0            | 2591.3                 | 0.7038                  | 7.3710            | 8.0748                 |
| 55              | 15.763                          | 0.001015                | 9.5639                 | 230.24                  | 2219.1            | 2449.3                 | 230.26                  | 2369.8            | 2600.1                 | 0.7680                  | 7.2218            | 7.9898                 |
| 60              | 19.947                          | 0.001017                | 7.6670                 | 251.16                  | 2204.7            | 2455.9                 | 251.18                  | 2357.7            | 2608.8                 | 0.8313                  | 7.0769            | 7.9082                 |
| 65              | 25.043                          | 0.001020                | 6.1935                 | 272.09                  | 2190.3            | 2462.4                 | 272.12                  | 2345.4            | 2617.5                 | 0.8937                  | 6.9360            | 7.8296                 |
| 70              | 31.202                          | 0.001023                | 5.0396                 | 293.04                  | 2175.8            | 2468.9                 | 293.07                  | 2333.0            | 2626.1                 | 0.9551                  | 6.7989            | 7.7540                 |
| 75              | 38.597                          | 0.001026                | 4.1291                 | 313.99                  | 2161.3            | 2475.3                 | 314.03                  | 2320.6            | 2634.6                 | 1.0158                  | 6.6655            | 7.6812                 |
| 80              | 47.416                          | 0.001029                | 3.4053                 | 334.97                  | 2146.6            | 2481.6                 | 335.02                  | 2308.0            | 2643.0                 | 1.0756                  | 6.5355            | 7.6111                 |
| 85              | 57.868                          | 0.001032                | 2.8261                 | 355.96                  | 2131.9            | 2487.8                 | 356.02                  | 2295.3            | 2651.4                 | 1.1346                  | 6.4089            | 7.5435                 |
| 90              | 70.183                          | 0.001036                | 2.3593                 | 376.97                  | 2117.0            | 2494.0                 | 377.04                  | 2282.5            | 2659.6                 | 1.1929                  | 6.2853            | 7.4782                 |
| 95              | 84.609                          | 0.001040                | 1.9808                 | 398.00                  | 2102.0            | 2500.1                 | 398.09                  | 2269.6            | 2667.6                 | 1.2504                  | 6.1647            | 7.4151                 |
| 100             | 101.42                          | 0.001043                | 1.6720                 | 419.06                  | 2087.0            | 2506.0                 | 419.17                  | 2256.4            | 2675.6                 | 1.3072                  | 6.0470            | 7.3542                 |
| 105             | 120.90                          | 0.001047                | 1.4186                 | 440.15                  | 2071.8            | 2511.9                 | 440.28                  | 2243.1            | 2683.4                 | 1.3634                  | 5.9319            | 7.2952                 |
| 110             | 143.38                          | 0.001052                | 1.2094                 | 461.27                  | 2056.4            | 2517.7                 | 461.42                  | 2229.7            | 2691.1                 | 1.4188                  | 5.8193            | 7.2382                 |
| 115             | 169.18                          | 0.001056                | 1.0360                 | 482.42                  | 2040.9            | 2523.3                 | 482.59                  | 2216.0            | 2698.6                 | 1.4737                  | 5.7092            | 7.1829                 |
| 120             | 198.67                          | 0.001060                | 0.89133                | 503.60                  | 2025.3            | 2528.9                 | 503.81                  | 2202.1            | 2706.0                 | 1.5279                  | 5.6013            | 7.1292                 |

Lampiran 3.2 Tabel Densitas Air Yang Digunakan

| Temp. | Density (0-100°C at 1 atm, >100 °C at saturation pressure) |                      |                      |                       |                        | Specific weight   |                      | Thermal expansion coefficient |
|-------|--|----------------------|----------------------|-----------------------|------------------------|-------------------|----------------------|-------------------------------|
|       | [°C]   | [g/cm <sup>3</sup> ] | [kg/m <sup>3</sup> ] | [sl/ft <sup>3</sup> ] | [lbm/ft <sup>3</sup> ] | [lbm/gal(US liq)] | [kN/m <sup>3</sup> ] |                               |
| 35    | 0.9940326  | 994.03               | 1.9287               | 62.0554               | 8.2956                 | 9.7481            | 62.055               | 3.45                          |
| 40    | 0.9922152  | 992.22               | 1.9252               | 61.9420               | 8.2804                 | 9.7303            | 61.942               | 3.84                          |

## DAFTAR BERAT JENIS AIR

| Temperatur (t°C) | Berat Jenis | Temperatur (t°C) | Berat Jenis |
|------------------|-------------|------------------|-------------|
| 20               | 0,9982      | 30               | 0,9957      |
| 21               | 0,9980      | 31               | 0,9954      |
| 22               | 0,9978      | 32               | 0,9951      |
| 23               | 0,9976      | 33               | 0,9947      |
| 24               | 0,9973      | 34               | 0,9944      |
| 25               | 0,9971      | 35               | 0,9941      |
| 26               | 0,9968      | 36               | 0,9937      |
| 27               | 0,9965      | 37               | 0,9934      |
| 27,5             | 0,9964      | 38               | 0,9930      |
| 28               | 0,9963      | 39               | 0,9926      |
| 29               | 0,9960      | 40               | 0,9922      |



**Lampiran 4. Gambar Distilasi Air  
Laut Tenaga Surya Tipe Kolektor  
Plat Datar yang Dibuat**



Lampiran 4. 1 Tampak Depan Dari Alat Distilasi yang Dibuat Pada Saat Pengujian



Lampiran 4.2 Tampak Samping Dari Alat Distilasi Yang Dibuat Pada Saat Pengujian



Lampiran 4.3 Tampak Belakang Dari Alat Distilasi Yang Dibuat Pada Saat Pengujian



Lampiran 4.4 Distilasi Air Laut Tenaga Surya Tipe Kolektor Plat Datar *Full Absorber*

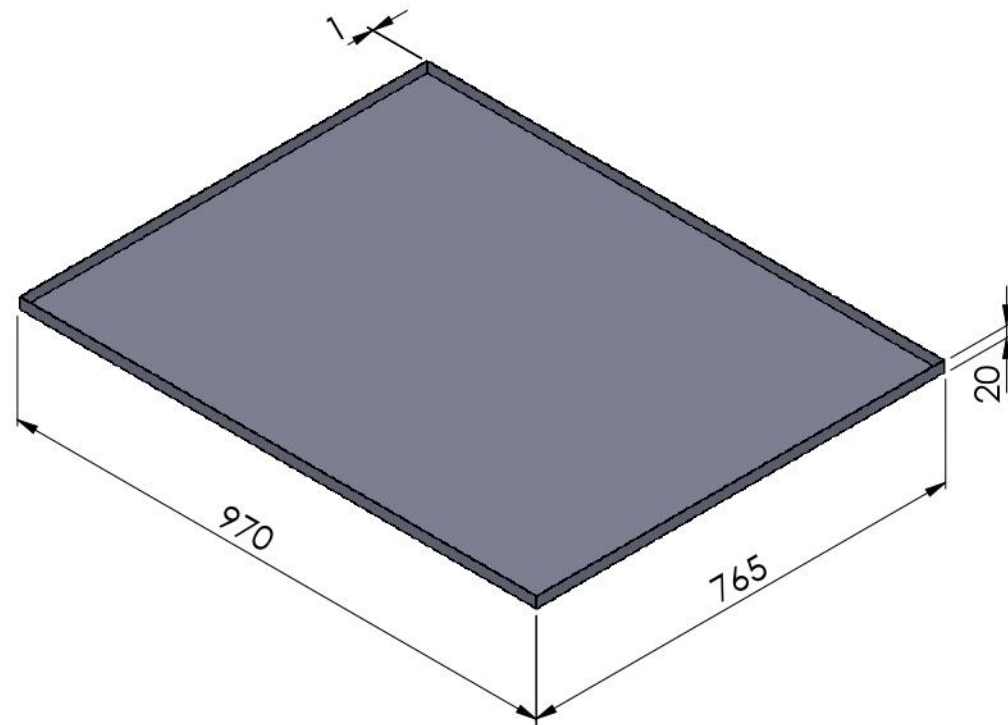


Lampiran 4.5 Distilasi Air Laut Tenaga Surya Tipe Kolektor Plat Datar 1/2  
*Absorber*

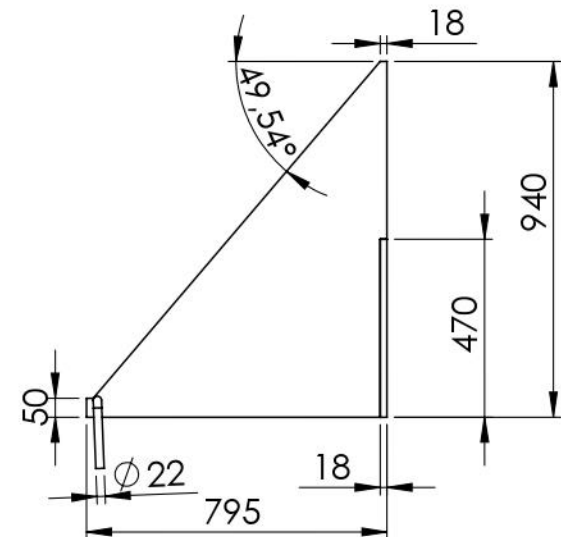
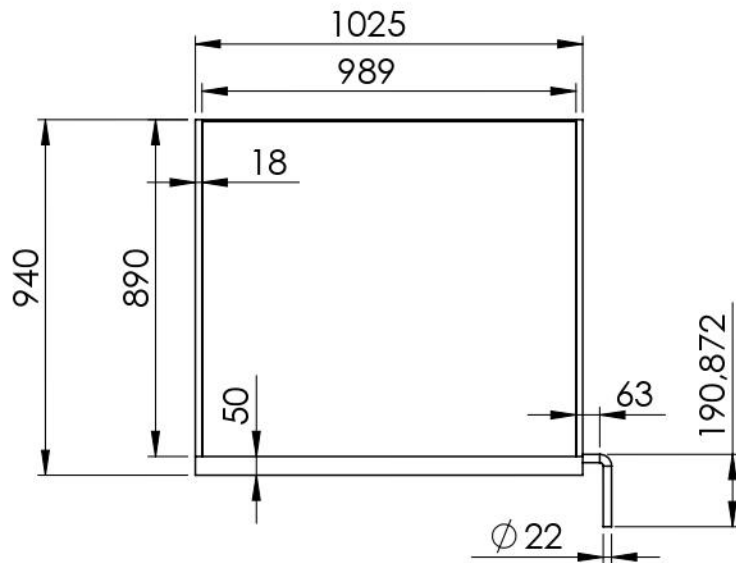
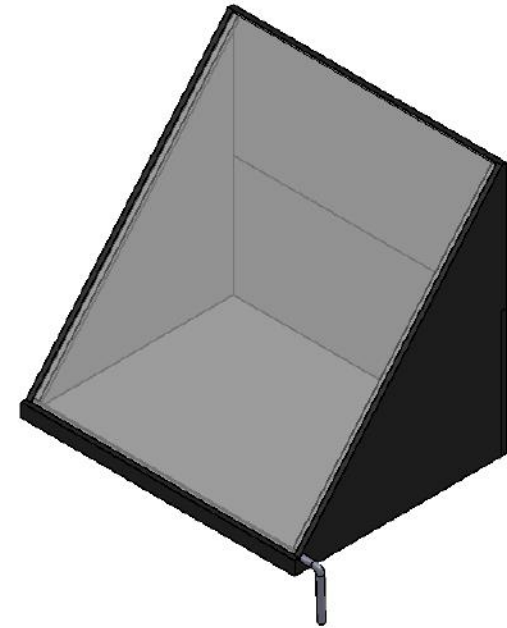
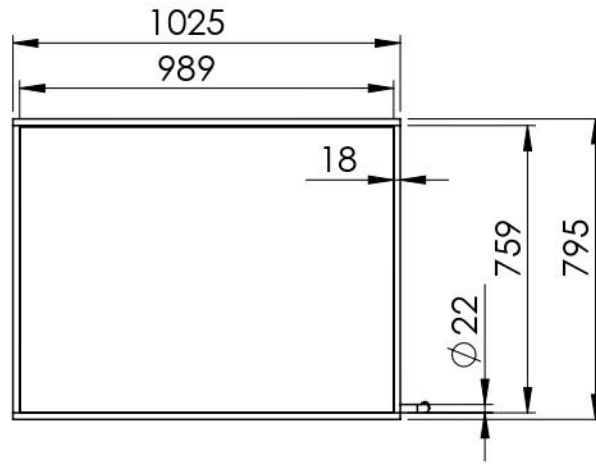


Lampiran 4.6 Distilasi Air Laut Tenaga Surya Tipe Kolektor Plat Datar Tanpa  
*Absorber*

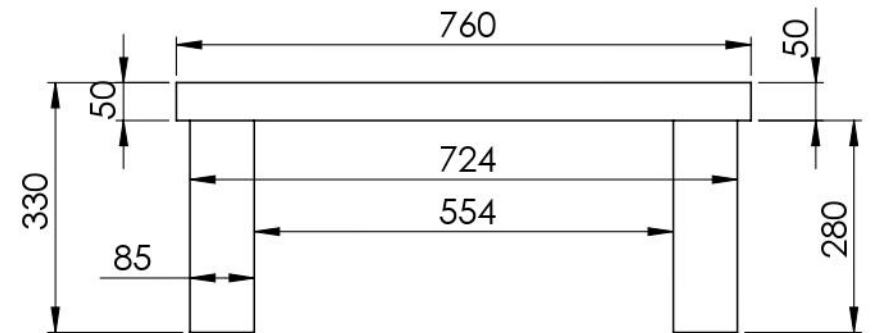
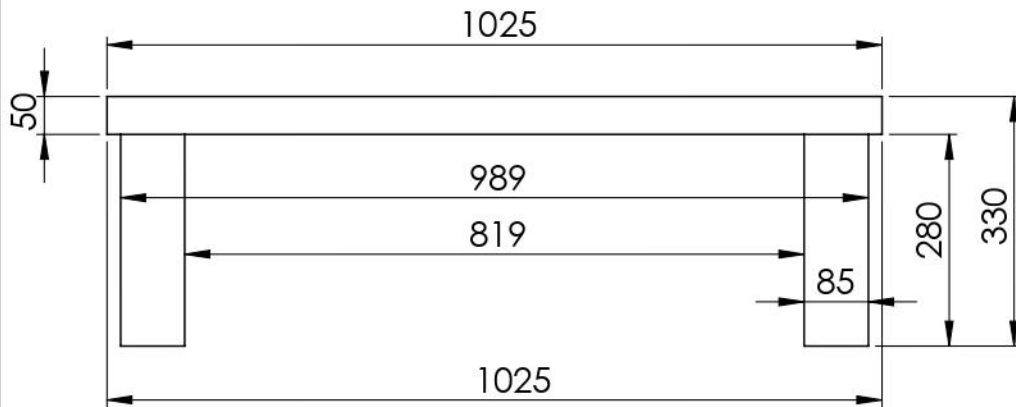
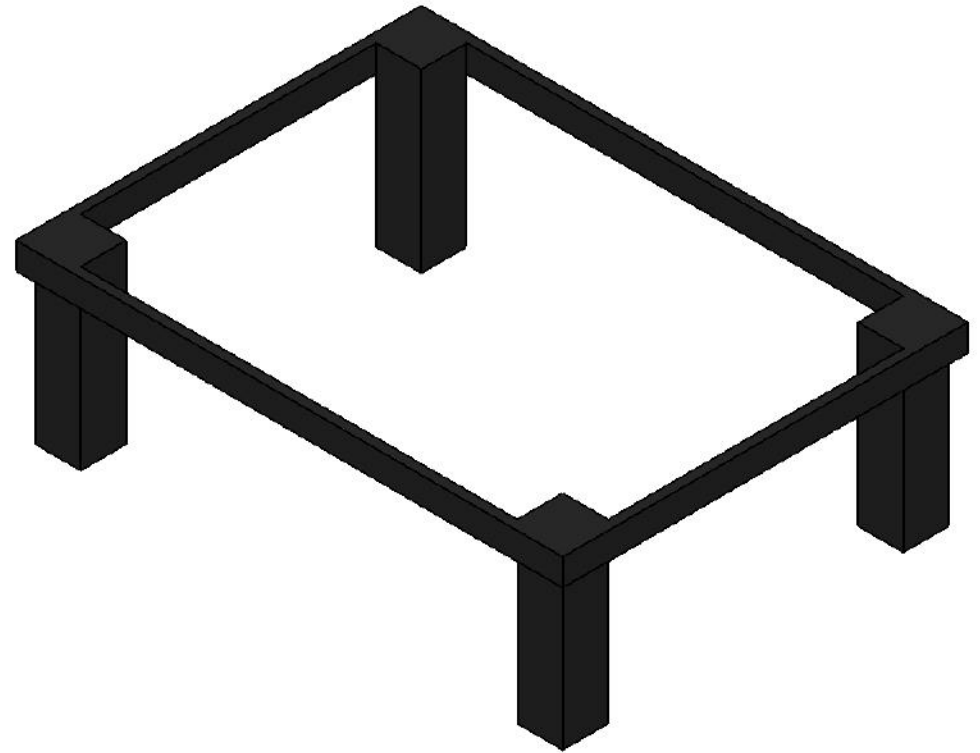
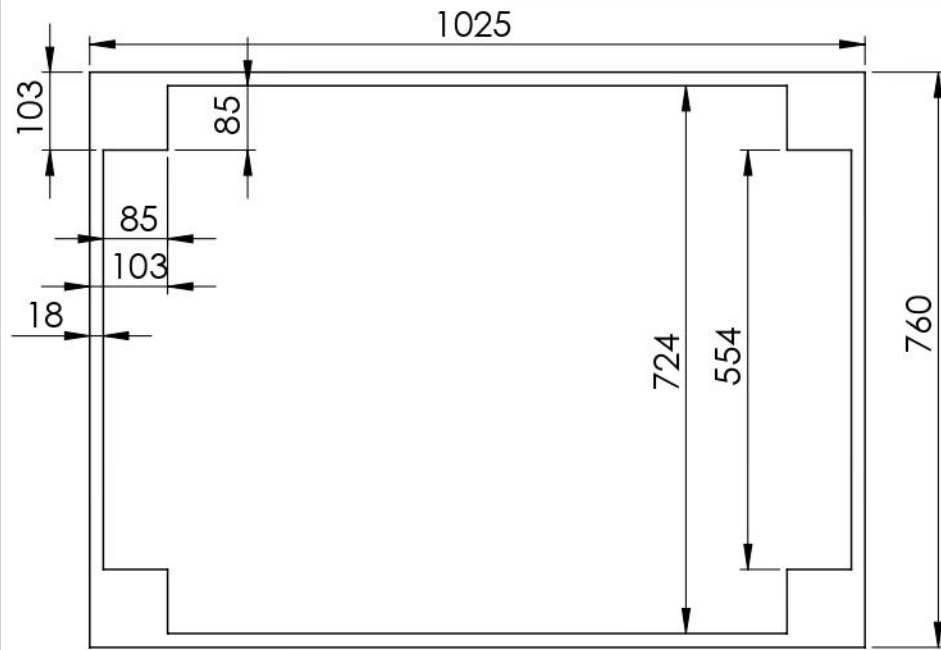
**Lampiran 5. Desain dari Distilasi  
Tenaga Surya Tipe Kolektor Plat  
Datar yang Dibuat**



|   |                |                        |              |    |
|---|----------------|------------------------|--------------|----|
| ISOMETRI  | Skala : 1:10   | Dibuat : Muhamad Yusup | Peringatan : |    |
|   | Satuan : mm    | NPM : 41187001170021   |              |    |
|   | Tgl : 14/07/21 | Diperiksa :            |              |    |
| JURUSAN TEKNIK MESIN<br>UNIVERSITAS ISLAM "45" BEKASI |                | PLAT <i>ABSORBER</i>   | TA           | A4 |

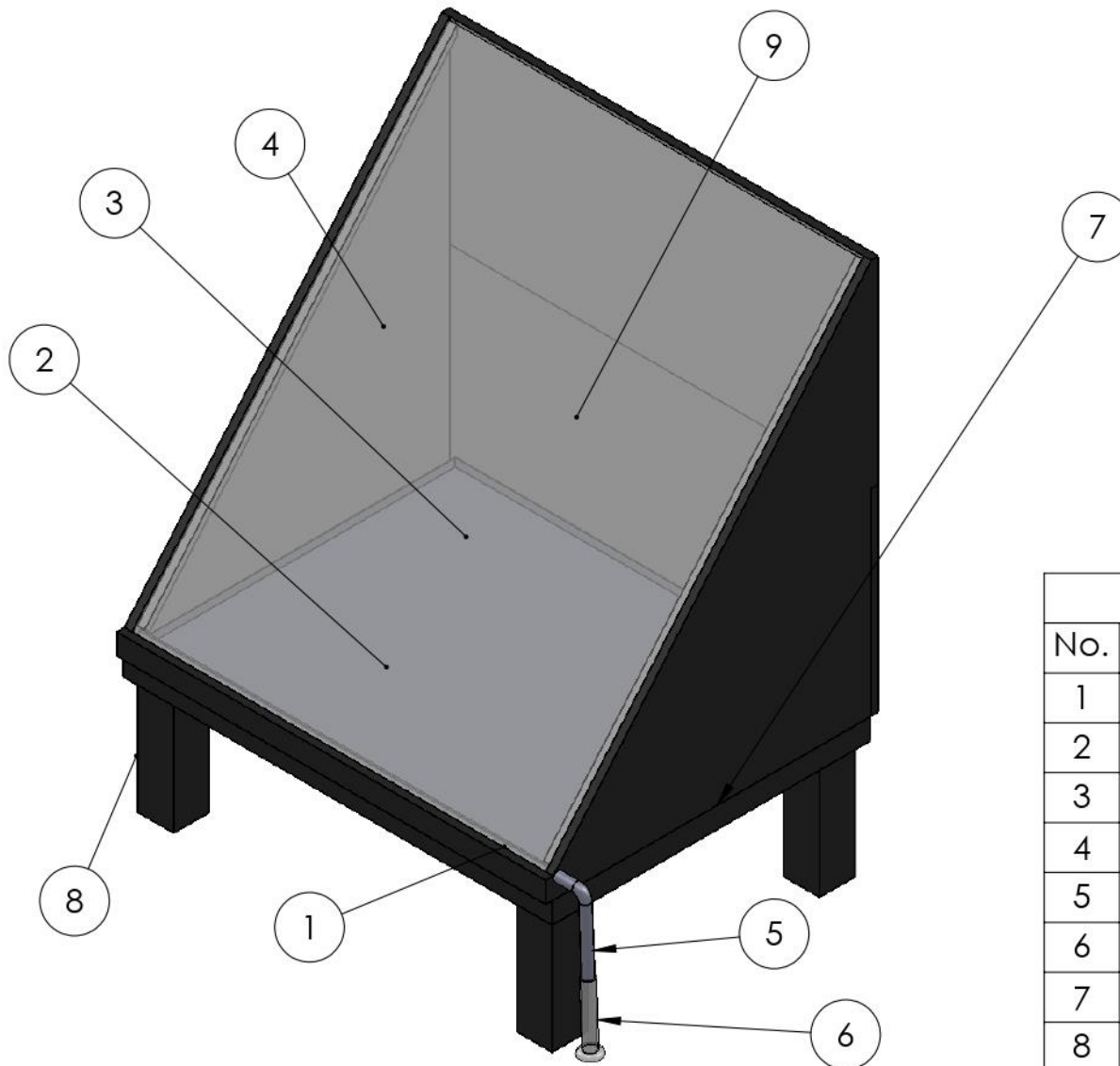


|   |                |                        |              |    |
|---|----------------|------------------------|--------------|----|
| Proyeksi<br>Amerika                                   | Skala : 1:20   | Dibuat : Muhamad Yusup | Peringatan : |    |
|   | Satuan : mm    | NPM : 41187001170021   |              |    |
|   | Tgl : 14/07/21 | Diperiksa :            |              |    |
| JURUSAN TEKNIK MESIN<br>UNIVERSITAS ISLAM "45" BEKASI |                | Rangka Destilator      | TA           | A4 |



|   |                |                        |              |    |
|---|----------------|------------------------|--------------|----|
| Proyeksi<br>Amerika                                   | Skala : 1:10   | Dibuat : Muhamad Yusup | Peringatan : |    |
|   | Satuan : mm    | NPM : 41187001170021   |              |    |
|   | Tgl : 14/07/21 | Diperiksa :            |              |    |
| JURUSAN TEKNIK MESIN<br>UNIVERSITAS ISLAM "45" BEKASI |                | Dudukan Destilator     | TA           | A4 |





List Komponen

| No. | Nama                        | Material             | Jumlah |
|-----|-----------------------------|----------------------|--------|
| 1   | Kanal Air Tawar             | PVC                  | 1      |
| 2   | Plat <i>Absorber</i>        | Aluminium            | 1      |
| 3   | Kaca Penutup                | <i>Crystal Glass</i> | 1      |
| 4   | <i>Insulation</i>           | <i>Thermoshield</i>  | 1      |
| 5   | Saluran Air Keluar          | PVC                  | 1      |
| 6   | Gelas Ukur                  | Plastik              | 1      |
| 7   | Rangka Destilator           | Triplek Blokmin      | 1      |
| 8   | Dudukan Destilator          | Triplek Blokmin      | 1      |
| 9   | Pintu Masuk <i>Absorber</i> | Material             | 1      |

|   |                |                         |              |    |
|---|----------------|-------------------------|--------------|----|
| Proyeksi<br>Amerika                                   | Skala : 1:12   | Dibuat : Muhamad Yusup  | Peringatan : |    |
|   | Satuan : mm    | NPM : 41187001170021    |              |    |
|   | Tgl : 14/07/21 | Diperiksa :             |              |    |
| JURUSAN TEKNIK MESIN<br>UNIVERSITAS ISLAM "45" BEKASI |                | Destilator Tenaga Surya | TA           | A4 |