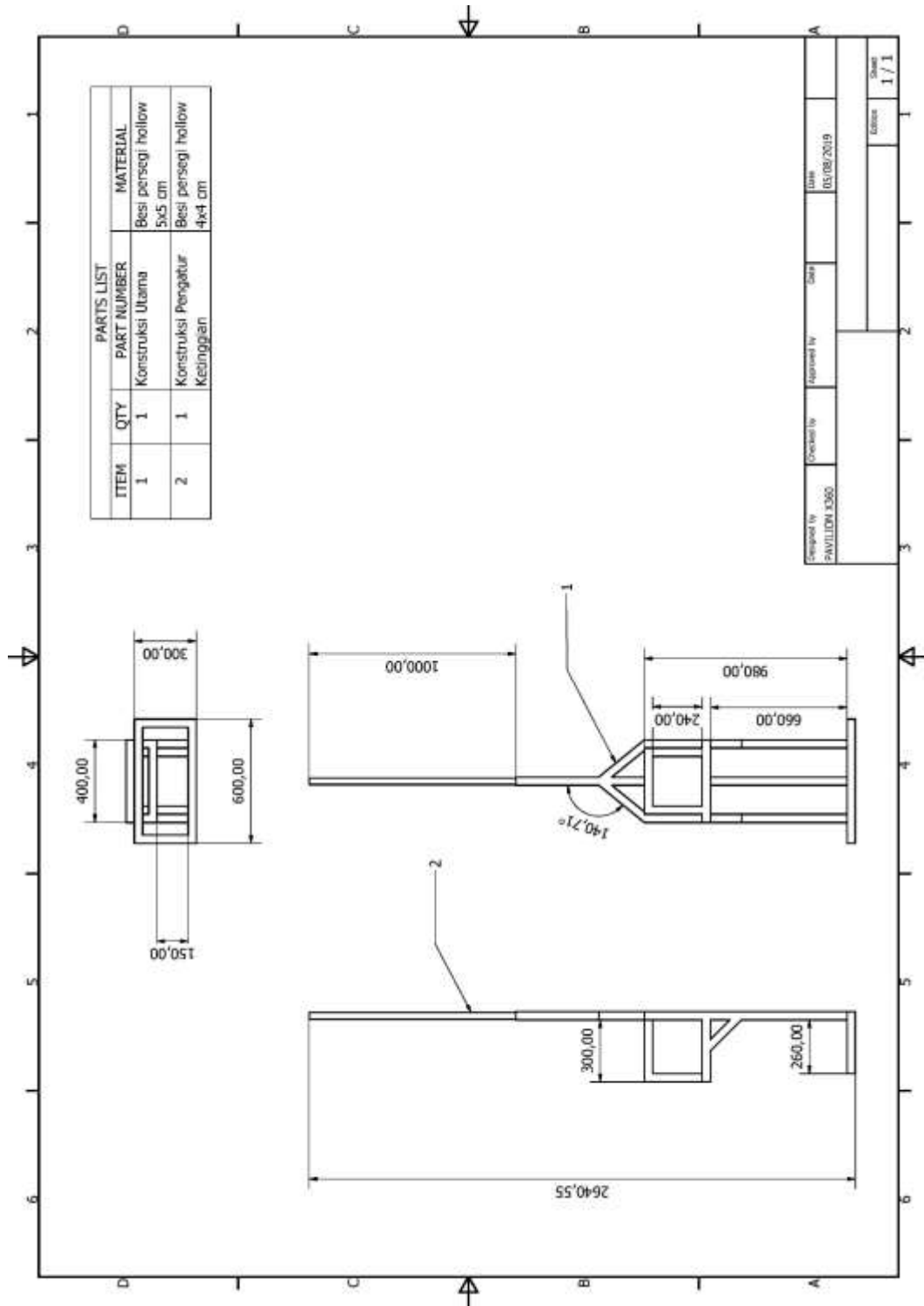
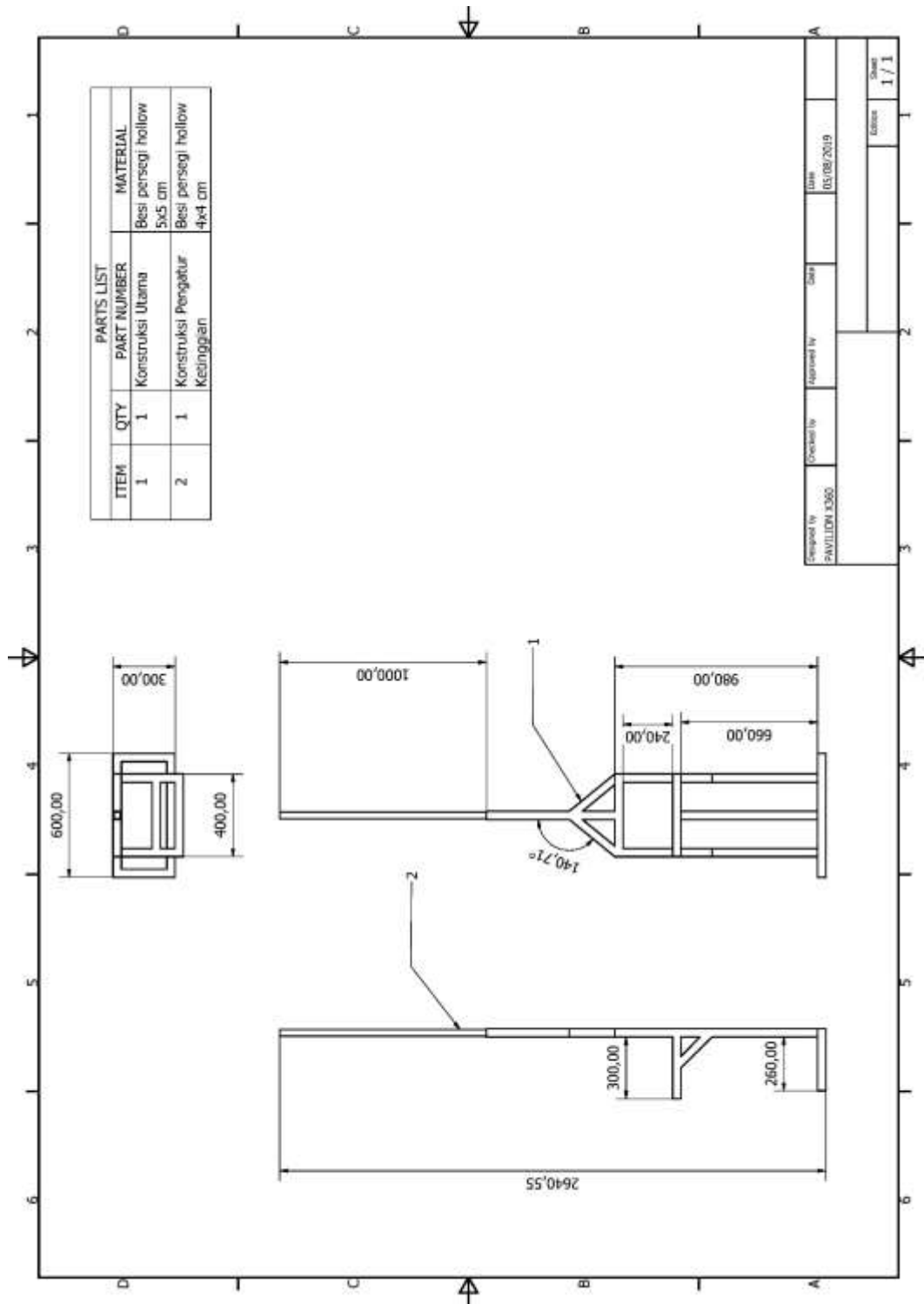


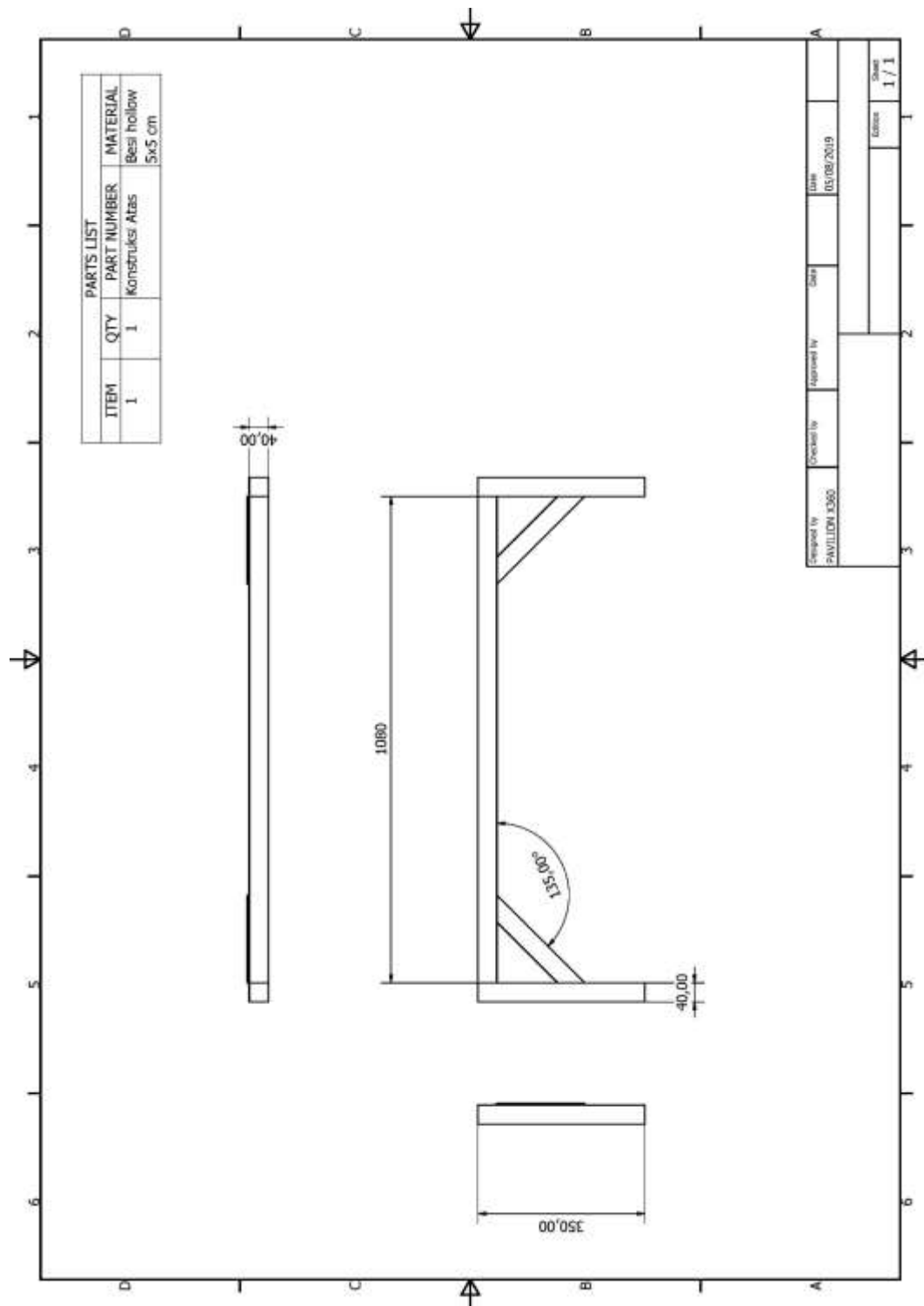
LAMPIRAN

Lampiran 1 Gambar kerja *support frame* kanan

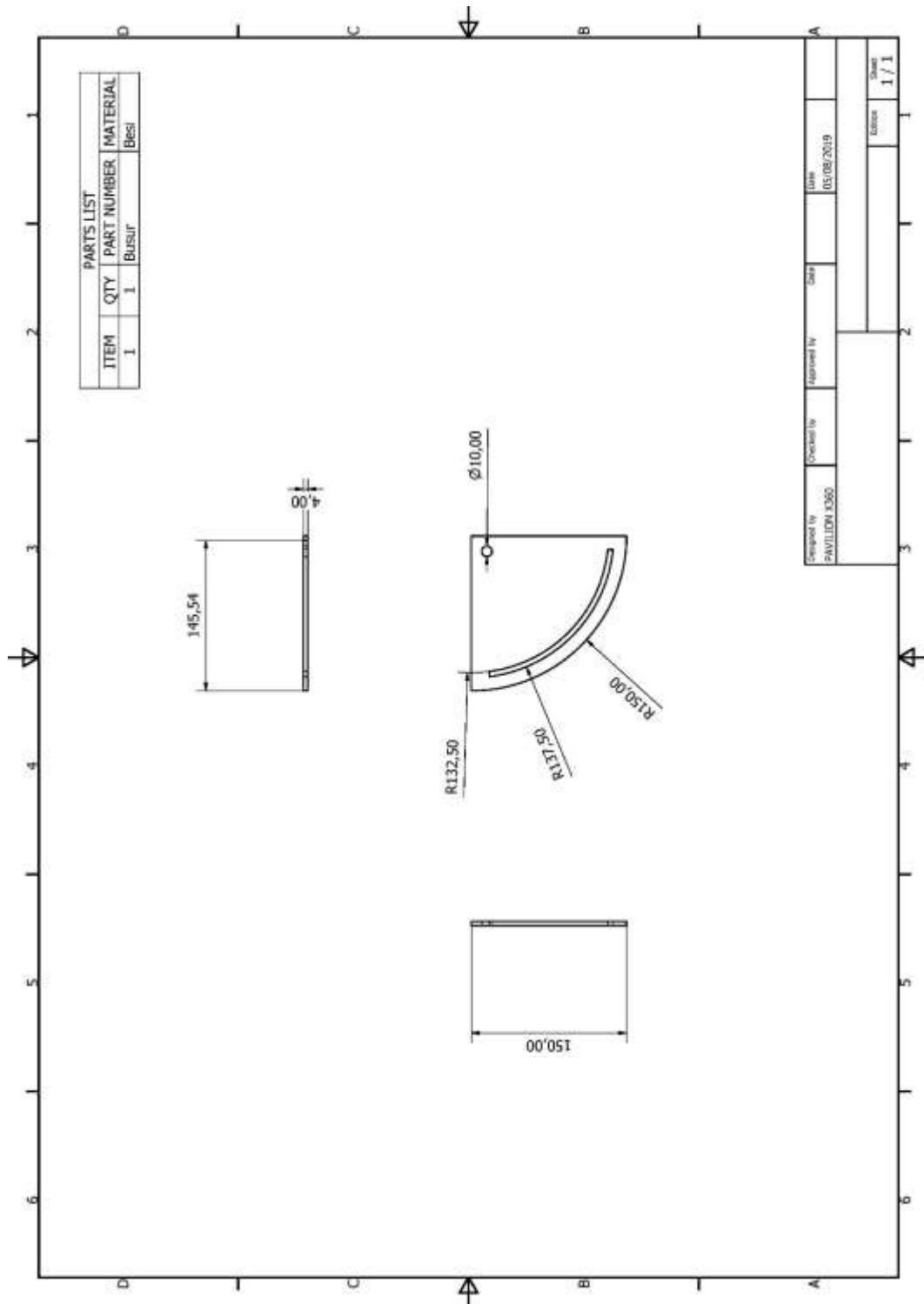


Lampiran 2 Gambar kerja *support frame* kiri

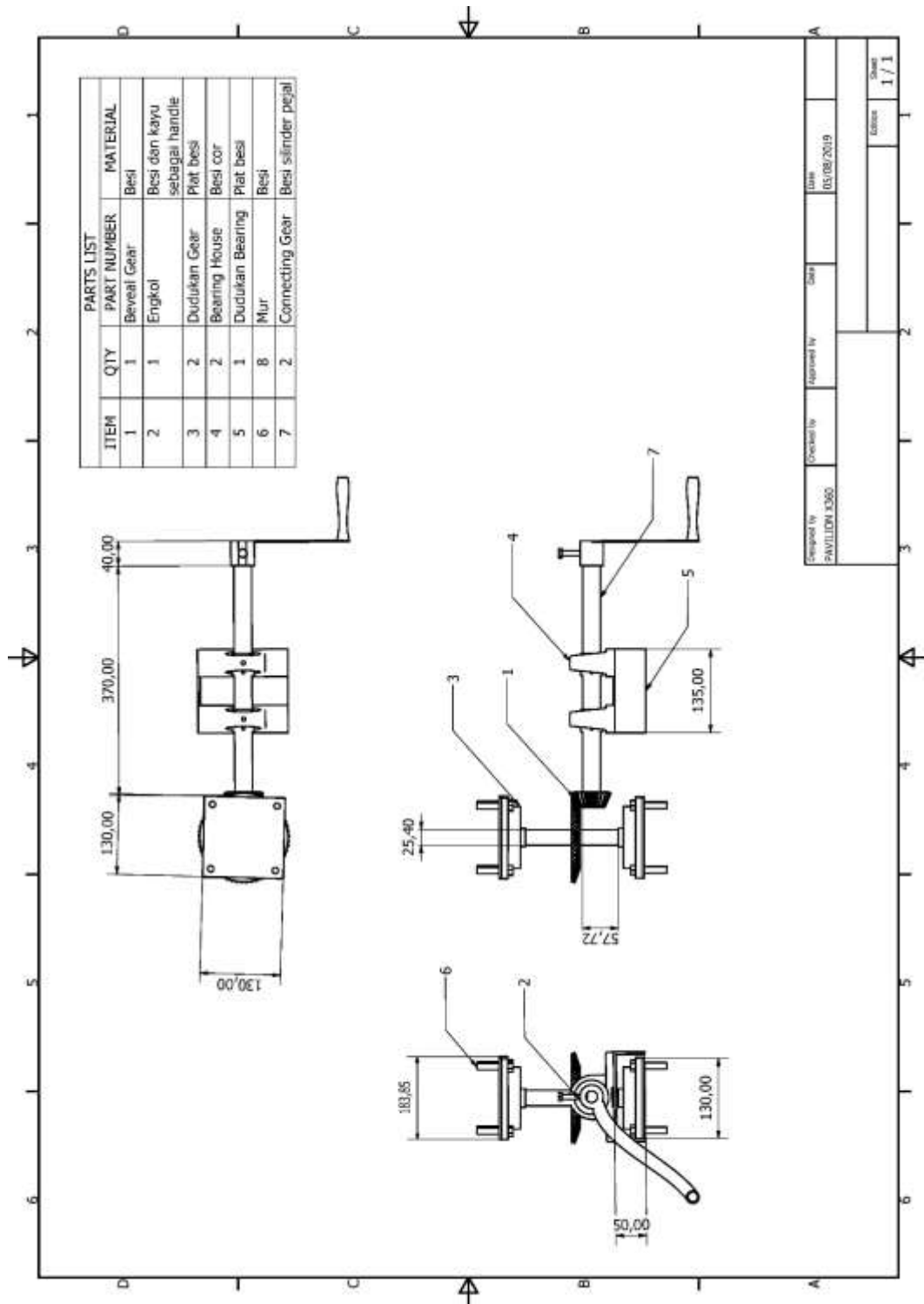


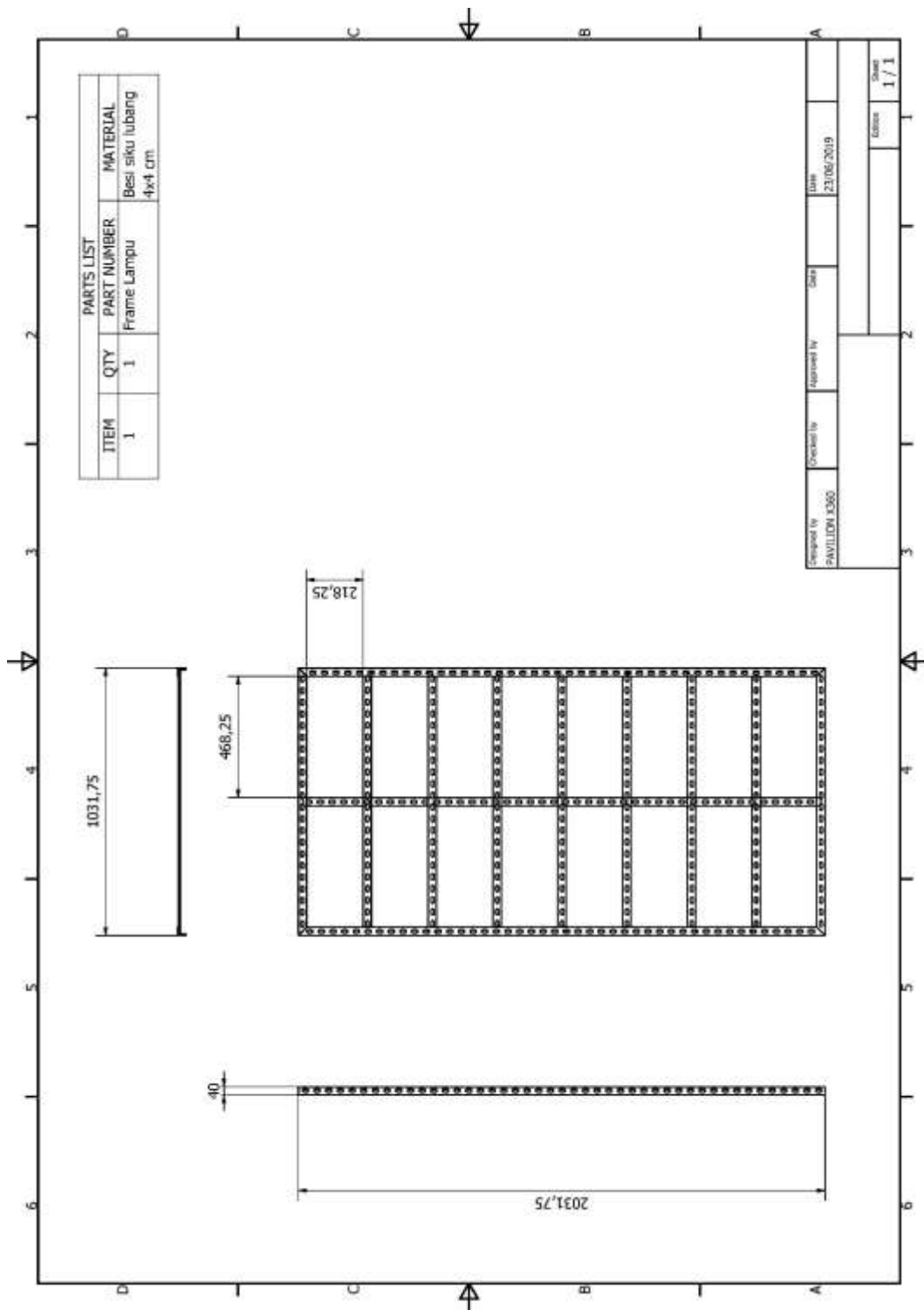
Lampiran 3 Gambar kerja *support frame* atas

Lampiran 4 Gambar kerja sistem pengatur kemiringan



Lampiran 5 Gambar kerja sistem pengatur ketinggian



Lampiran 6 Gambar kerja *frame* lampu

Lampiran 8 Data hasil uji pada posisi A variasi ketinggian 10 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 15/07/2019 14:59 | 1276,9 |
| 2 | 15/07/2019 15:00 | 1276,9 |
| 3 | 15/07/2019 15:01 | 1276,9 |
| 4 | 15/07/2019 15:02 | 1276,9 |
| 5 | 15/07/2019 15:03 | 1276,9 |
| 6 | 15/07/2019 15:04 | 1276,9 |
| 7 | 15/07/2019 15:05 | 1276,9 |
| 8 | 15/07/2019 15:06 | 1276,9 |
| 9 | 15/07/2019 15:07 | 1276,9 |
| 10 | 15/07/2019 15:08 | 1085,6 |

Lampiran 9 Data hasil uji pada posisi A variasi ketinggian 15 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 15/07/2019 17:21 | 1276,9 |
| 2 | 15/07/2019 17:22 | 1276,9 |
| 3 | 15/07/2019 17:23 | 1276,9 |
| 4 | 15/07/2019 17:24 | 1276,9 |
| 5 | 15/07/2019 17:25 | 1276,9 |
| 6 | 15/07/2019 17:26 | 1276,9 |
| 7 | 15/07/2019 17:27 | 1276,9 |
| 8 | 15/07/2019 17:28 | 1276,9 |
| 9 | 15/07/2019 17:29 | 1276,9 |
| 10 | 15/07/2019 17:30 | 1276,9 |

Lampiran 10 Data hasil uji pada posisi A variasi ketinggian 20 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 15/07/2019 17:37 | 1070,6 |
| 2 | 15/07/2019 17:38 | 1129,4 |
| 3 | 15/07/2019 17:39 | 1120,6 |
| 4 | 15/07/2019 17:40 | 1084,4 |
| 5 | 15/07/2019 17:41 | 1120,6 |
| 6 | 15/07/2019 17:42 | 1099,4 |
| 7 | 15/07/2019 17:43 | 1119,4 |
| 8 | 15/07/2019 17:44 | 1085,6 |
| 9 | 15/07/2019 17:45 | 1100,6 |
| 10 | 15/07/2019 17:46 | 1099,4 |

Lampiran 11 Data hasil uji pada posisi A variasi ketinggian 22 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 02/08/2019 23:37 | 916,9 |
| 2 | 02/08/2019 23:38 | 905,6 |
| 3 | 02/08/2019 23:39 | 906,9 |
| 4 | 02/08/2019 23:40 | 956,9 |
| 5 | 02/08/2019 23:41 | 925,6 |
| 6 | 02/08/2019 23:42 | 908,1 |
| 7 | 02/08/2019 23:43 | 949,4 |
| 8 | 02/08/2019 23:44 | 884,4 |
| 9 | 02/08/2019 23:45 | 911,9 |
| 10 | 02/08/2019 23:46 | 896,9 |

Lampiran 12 Data hasil uji pada posisi B variasi ketinggian 10 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 15/07/2019 15:10 | 1069,4 |
| 2 | 15/07/2019 15:11 | 1125,6 |
| 3 | 15/07/2019 15:12 | 1066,9 |
| 4 | 15/07/2019 15:13 | 1118,1 |
| 5 | 15/07/2019 15:14 | 1131,9 |
| 6 | 15/07/2019 15:15 | 1114,4 |
| 7 | 15/07/2019 15:16 | 1134,4 |
| 8 | 15/07/2019 15:17 | 1116,9 |
| 9 | 15/07/2019 15:18 | 1133,1 |
| 10 | 15/07/2019 15:19 | 1140,6 |

Lampiran 13 Data hasil uji pada posisi B variasi ketinggian 15 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 15/07/2019 17:04 | 971,9 |
| 2 | 15/07/2019 17:05 | 953,1 |
| 3 | 15/07/2019 17:06 | 989,4 |
| 4 | 15/07/2019 17:07 | 984,4 |
| 5 | 15/07/2019 17:08 | 1005,6 |
| 6 | 15/07/2019 17:09 | 1006,9 |
| 7 | 15/07/2019 17:10 | 1004,4 |
| 8 | 15/07/2019 17:11 | 959,4 |
| 9 | 15/07/2019 17:12 | 988,1 |
| 10 | 15/07/2019 17:13 | 1006,9 |

Lampiran 14 Data hasil uji pada posisi B variasi ketinggian 20 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 15/07/2019 17:51 | 755,6 |
| 2 | 15/07/2019 17:52 | 774,4 |
| 3 | 15/07/2019 17:53 | 779,4 |
| 4 | 15/07/2019 17:54 | 780,6 |
| 5 | 15/07/2019 17:55 | 791,9 |
| 6 | 15/07/2019 17:56 | 758,1 |
| 7 | 15/07/2019 17:57 | 793,1 |
| 8 | 15/07/2019 17:58 | 776,9 |
| 9 | 15/07/2019 17:59 | 746,9 |
| 10 | 15/07/2019 18:00 | 766,9 |

Lampiran 15 Data hasil uji pada posisi B variasi ketinggian 22 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 02/08/2019 23:24 | 714,4 |
| 2 | 02/08/2019 23:25 | 693,1 |
| 3 | 02/08/2019 23:26 | 699,4 |
| 4 | 02/08/2019 23:27 | 681,9 |
| 5 | 02/08/2019 23:28 | 689,4 |
| 6 | 02/08/2019 23:29 | 684,4 |
| 7 | 02/08/2019 23:30 | 714,4 |
| 8 | 02/08/2019 23:31 | 701,9 |
| 9 | 02/08/2019 23:32 | 684,4 |
| 10 | 02/08/2019 23:33 | 726,9 |

Lampiran 16 Data hasil uji pada posisi C variasi ketinggian 10 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 15/07/2019 15:22 | 1275,6 |
| 2 | 15/07/2019 15:23 | 1274,4 |
| 3 | 15/07/2019 15:24 | 1243,1 |
| 4 | 15/07/2019 15:25 | 1263,1 |
| 5 | 15/07/2019 15:26 | 1203,1 |
| 6 | 15/07/2019 15:27 | 1254,4 |
| 7 | 15/07/2019 15:28 | 1269,4 |
| 8 | 15/07/2019 15:29 | 1214,4 |
| 9 | 15/07/2019 15:30 | 1229,4 |
| 10 | 15/07/2019 15:31 | 1224,4 |

Lampiran 17 Data hasil uji pada posisi C variasi ketinggian 15 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 15/07/2019 16:52 | 904,4 |
| 2 | 15/07/2019 16:53 | 948,1 |
| 3 | 15/07/2019 16:54 | 935,6 |
| 4 | 15/07/2019 16:55 | 939,4 |
| 5 | 15/07/2019 16:56 | 914,4 |
| 6 | 15/07/2019 16:57 | 925,6 |
| 7 | 15/07/2019 16:58 | 958,1 |
| 8 | 15/07/2019 16:59 | 938,1 |
| 9 | 15/07/2019 17:00 | 954,4 |
| 10 | 15/07/2019 17:01 | 950,6 |

Lampiran 18 Data hasil uji pada posisi C variasi ketinggian 20 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 15/07/2019 18:09 | 754,4 |
| 2 | 15/07/2019 18:10 | 781,9 |
| 3 | 15/07/2019 18:11 | 785,9 |
| 4 | 15/07/2019 18:12 | 766,9 |
| 5 | 15/07/2019 18:13 | 780,6 |
| 6 | 15/07/2019 18:14 | 759,4 |
| 7 | 15/07/2019 18:15 | 738,1 |
| 8 | 15/07/2019 18:16 | 759,4 |
| 9 | 15/07/2019 18:17 | 771,9 |
| 10 | 15/07/2019 18:18 | 739,4 |

Lampiran 19 Data hasil uji pada posisi C variasi ketinggian 22 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 02/08/2019 23:12 | 658,1 |
| 2 | 02/08/2019 23:13 | 686,9 |
| 3 | 02/08/2019 23:14 | 699,4 |
| 4 | 02/08/2019 23:15 | 716,9 |
| 5 | 02/08/2019 23:16 | 729,4 |
| 6 | 02/08/2019 23:17 | 730,6 |
| 7 | 02/08/2019 23:18 | 705,6 |
| 8 | 02/08/2019 23:19 | 743,1 |
| 9 | 02/08/2019 23:20 | 715,6 |
| 10 | 02/08/2019 23:21 | 731,9 |

Lampiran 20 Data hasil uji pada posisi D variasi ketinggian 10 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 15/07/2019 15:32 | 1276,9 |
| 2 | 15/07/2019 15:33 | 1276,9 |
| 3 | 15/07/2019 15:34 | 1276,9 |
| 4 | 15/07/2019 15:35 | 1276,9 |
| 5 | 15/07/2019 15:36 | 1276,9 |
| 6 | 15/07/2019 15:37 | 1276,9 |
| 7 | 15/07/2019 15:38 | 1276,9 |
| 8 | 15/07/2019 15:39 | 1276,9 |
| 9 | 15/07/2019 15:40 | 1276,9 |
| 10 | 15/07/2019 15:41 | 1276,9 |

Lampiran 21 Data hasil uji pada posisi D variasi ketinggian 15 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 15/07/2019 16:37 | 1068,1 |
| 2 | 15/07/2019 16:38 | 1038,1 |
| 3 | 15/07/2019 16:39 | 1100,6 |
| 4 | 15/07/2019 16:40 | 1108,1 |
| 5 | 15/07/2019 16:41 | 1100,6 |
| 6 | 15/07/2019 16:42 | 1091,9 |
| 7 | 15/07/2019 16:43 | 1093,1 |
| 8 | 15/07/2019 16:44 | 1063,1 |
| 9 | 15/07/2019 16:45 | 1098,1 |
| 10 | 15/07/2019 16:46 | 1085,6 |

Lampiran 22 Data hasil uji pada posisi D variasi ketinggian 20 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 15/07/2019 18:21 | 834,4 |
| 2 | 15/07/2019 18:22 | 876,9 |
| 3 | 15/07/2019 18:23 | 870,6 |
| 4 | 15/07/2019 18:24 | 861,9 |
| 5 | 15/07/2019 18:25 | 829,4 |
| 6 | 15/07/2019 18:26 | 881,9 |
| 7 | 15/07/2019 18:27 | 833,1 |
| 8 | 15/07/2019 18:28 | 828,1 |
| 9 | 15/07/2019 18:29 | 840,6 |
| 10 | 15/07/2019 18:30 | 878,1 |

Lampiran 23 Data hasil uji pada posisi D variasi ketinggian 22 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 02/08/2019 22:58 | 770,6 |
| 2 | 02/08/2019 22:59 | 800,6 |
| 3 | 02/08/2019 23:00 | 776,9 |
| 4 | 02/08/2019 23:01 | 776,9 |
| 5 | 02/08/2019 23:02 | 750,6 |
| 6 | 02/08/2019 23:03 | 761,9 |
| 7 | 02/08/2019 23:04 | 764,4 |
| 8 | 02/08/2019 23:05 | 790,6 |
| 9 | 02/08/2019 23:06 | 748,1 |
| 10 | 02/08/2019 23:07 | 785,6 |

Lampiran 24 Data hasil uji pada posisi E variasi ketinggian 10 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 15/07/2019 15:45 | 1276,9 |
| 2 | 15/07/2019 15:46 | 1276,9 |
| 3 | 15/07/2019 15:47 | 1276,9 |
| 4 | 15/07/2019 15:48 | 1276,9 |
| 5 | 15/07/2019 15:49 | 1276,9 |
| 6 | 15/07/2019 15:50 | 1276,9 |
| 7 | 15/07/2019 15:51 | 1276,9 |
| 8 | 15/07/2019 15:52 | 1276,9 |
| 9 | 15/07/2019 15:53 | 1276,9 |
| 10 | 15/07/2019 15:54 | 1276,9 |

Lampiran 25 Data hasil uji pada posisi E variasi ketinggian 15 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 15/07/2019 16:25 | 1009,4 |
| 2 | 15/07/2019 16:26 | 996,9 |
| 3 | 15/07/2019 16:27 | 1001,9 |
| 4 | 15/07/2019 16:28 | 999,4 |
| 5 | 15/07/2019 16:29 | 971,9 |
| 6 | 15/07/2019 16:30 | 1011,9 |
| 7 | 15/07/2019 16:31 | 1021,9 |
| 8 | 15/07/2019 16:32 | 1019,4 |
| 9 | 15/07/2019 16:33 | 1005,6 |
| 10 | 15/07/2019 16:34 | 1029,4 |

Lampiran 26 Data hasil uji pada posisi E variasi ketinggian 20 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 15/07/2019 18:40 | 974,4 |
| 2 | 15/07/2019 18:41 | 1020,6 |
| 3 | 15/07/2019 18:42 | 990,6 |
| 4 | 15/07/2019 18:43 | 984,4 |
| 5 | 15/07/2019 18:44 | 986,9 |
| 6 | 15/07/2019 18:45 | 985,6 |
| 7 | 15/07/2019 18:46 | 1033,1 |
| 8 | 15/07/2019 18:47 | 1035,6 |
| 9 | 15/07/2019 18:48 | 1001,9 |
| 10 | 15/07/2019 18:49 | 1034,4 |

Lampiran 27 Data hasil uji pada posisi E variasi ketinggian 22 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 02/08/2019 22:38 | 833,1 |
| 2 | 02/08/2019 22:39 | 818,1 |
| 3 | 02/08/2019 22:40 | 813,1 |
| 4 | 02/08/2019 22:41 | 825,6 |
| 5 | 02/08/2019 22:42 | 790,6 |
| 6 | 02/08/2019 22:43 | 836,9 |
| 7 | 02/08/2019 22:44 | 828,1 |
| 8 | 02/08/2019 22:45 | 790,6 |
| 9 | 02/08/2019 22:46 | 798,1 |
| 10 | 02/08/2019 22:47 | 789,4 |

Lampiran 28 Data hasil uji pada posisi F variasi ketinggian 10 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 15/07/2019 16:00 | 1276,9 |
| 2 | 15/07/2019 16:01 | 1276,9 |
| 3 | 15/07/2019 16:02 | 1276,9 |
| 4 | 15/07/2019 16:03 | 1276,9 |
| 5 | 15/07/2019 16:04 | 1276,9 |
| 6 | 15/07/2019 16:05 | 1276,9 |
| 7 | 15/07/2019 16:06 | 1276,9 |
| 8 | 15/07/2019 16:07 | 1276,9 |
| 9 | 15/07/2019 16:08 | 1276,9 |
| 10 | 15/07/2019 16:09 | 1276,9 |

Lampiran 29 Data hasil uji pada posisi F variasi ketinggian 15 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 15/07/2019 16:15 | 1075,6 |
| 2 | 15/07/2019 16:16 | 1054,4 |
| 3 | 15/07/2019 16:17 | 1106,9 |
| 4 | 15/07/2019 16:18 | 1114,4 |
| 5 | 15/07/2019 16:19 | 1100,6 |
| 6 | 15/07/2019 16:20 | 1046,9 |
| 7 | 15/07/2019 16:21 | 1065,6 |
| 8 | 15/07/2019 16:22 | 1044,4 |
| 9 | 15/07/2019 16:23 | 1100,6 |
| 10 | 15/07/2019 16:24 | 1069,9 |

Lampiran 30 Data hasil uji pada posisi F variasi ketinggian 20 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 15/07/2019 18:53 | 969,4 |
| 2 | 15/07/2019 18:54 | 994,4 |
| 3 | 15/07/2019 18:55 | 984,4 |
| 4 | 15/07/2019 18:56 | 954,4 |
| 5 | 15/07/2019 18:57 | 990,6 |
| 6 | 15/07/2019 18:58 | 983,1 |
| 7 | 15/07/2019 18:59 | 943,1 |
| 8 | 15/07/2019 19:00 | 959,4 |
| 9 | 15/07/2019 19:01 | 994,4 |
| 10 | 15/07/2019 19:02 | 991,9 |

Lampiran 31 Data hasil uji pada posisi F variasi ketinggian 22 cm

| Menit ke- | Tanggal Jam, GMT +07:00 | Radiasi, W/m ² |
|-----------|-------------------------|---------------------------|
| 1 | 02/08/2019 22:48 | 794,4 |
| 2 | 02/08/2019 22:49 | 798,1 |
| 3 | 02/08/2019 22:50 | 788,1 |
| 4 | 02/08/2019 22:51 | 791,9 |
| 5 | 02/08/2019 22:52 | 800,6 |
| 6 | 02/08/2019 22:53 | 774,4 |
| 7 | 02/08/2019 22:54 | 765,6 |
| 8 | 02/08/2019 22:55 | 761,9 |
| 9 | 02/08/2019 22:56 | 776,9 |
| 10 | 02/08/2019 22:57 | 789,4 |

Program Studi Teknik Mesin

Lembar Persetujuan Naskah Publikasi dan Abstrak Tugas Akhir (TA)

Judul TA :

Judul Naskah Publikasi : Rancang Bangun Solar Simulator untuk Pemanas Air Tenaga Surya

Nama Mahasiswa: Elfhat Mustaqim

NIM : 20150130173


Pembimbing 1: Muhammad Nadjib, S.T., M.Eng.

Pembimbing 2: Tito Hadji Agung S., S.T., M.T.

Hal yang dimintakan persetujuan *:

- | | | | |
|-----------------------------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------------|
| <input checked="" type="checkbox"/> Abstrak berbahasa Indonesia | <input checked="" type="checkbox"/> Naskah Publikasi | <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> Abstrak berbahasa Inggris | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |


*beri tanda ✓ di kotak yang sesuai


Tanda Tangan
Elfhat Mustaqim

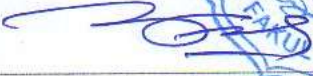
Tanggal 26 September 2019

Persetujuan Dosen Pembimbing dan Program Studi

Disetujui


Tanda Tangan
Muhammad Nadjib, S.T., M.Eng.

Tanggal 29/9 2019


Tanda Tangan
Beri Paripurna Kamiel, S.T., M.Eng.Sc., Ph.D.

Tanggal 29/9/2019

Formulir persetujuan ini mohon diletakkan pada lampiran terakhir pada naskah TA.