

# LAMPIRAN

## Polystyrene

PROPERTY	UNITS	CONDITIONS	VALUE	REFERENCE	
Compressibility coefficient	bar <sup>-1</sup>	298 K - $T_g$ $T_g$ - 593 K	2.7-4.9( $\times 10^{-5}$ ) 5.3-11.3( $\times 10^{-5}$ )	(2)	
Critical heat flux, combustion	kW m <sup>2</sup>	-	13	(2)	
Density $\rho$	g cm <sup>-3</sup> g cm <sup>-3</sup> g cm <sup>-3</sup> K <sup>-1</sup>	Amorphous Crystalline $d\rho/dT$ < $T_g$ > $T_g$	1.04-1.065 1.111-1.127 -2.65 $\times 10^{-4}$ -6.05 $\times 10^{-4}$	(1, 4, 5)	
Dielectric constant	-	At 1 kHz Amorphous Crystalline	2.49-2.55 2.61	(1, 4, 5) (1, 4)	
Dielectric loss	-	At 1 kHz Amorphous Crystalline	15 $\times 10^{-4}$ 3 $\times 10^{-4}$	(5)	
Diffusion coefficient $D_0$	cm <sup>2</sup> s <sup>-1</sup> ( $\times 10^{-7}$ )	Solvent Temp. (K) M.W. (kg mol <sup>-1</sup> )		(1)	
		Acetone	293	1,200-2,450	1.18-0.80
		Benzene	298	1.32-3.9	27.9-17.2
		Butanone	293	180-5,500	6.4-0.81
		Carbon tetrachloride	300	82-1,100	4.43-1.04
		Cyclohexane	303	90	4.0
		Cyclohexanone	298	200	5.2
		Dioxane	303	79.8	3.10
		Ethyl acetate	293	117-596	6.23-2.45
		Ethyl benzene	300	770	0.96
		Tetrahydrofuran	303	198-570	13.41-8.02
		Toluene	293	140-2,850	4.30-0.74
Enthalpy of fusion	kJ mol <sup>-1</sup>	-	8.37-10	(1, 2, 4)	
Entropy of fusion	kJ K <sup>-1</sup> mol <sup>-1</sup>	-	0.0153-0.0168	(2)	
Friction coefficient	-	-	0.38	(5)	
G factor	mol J <sup>-1</sup> ( $\times 10^{-8}$ )	Cross-linking G(X) Scission G(S)	7.14-19.2 3.53-7.14	(10)	
Glass transition temperature	K	-	373	(2, 4, 5)	

**TABLE A.4** Thermophysical Properties  
of Gases at Atmospheric Pressure<sup>a</sup>

$T$ (K)	$\rho$ (kg/m <sup>3</sup> )	$c_p$ (kJ/kg·K)	$\mu \cdot 10^7$ (N·s/m <sup>2</sup> )	$\nu \cdot 10^6$ (m <sup>2</sup> /s)	$k \cdot 10^3$ (W/m·K)	$\alpha \cdot 10^6$ (m <sup>2</sup> /s)	$Pr$
<b>Air, <math>M = 28.97</math> kg/kmol</b>							
100	3.5562	1.032	71.1	2.00	9.34	2.54	0.786
150	2.3364	1.012	103.4	4.426	13.8	5.84	0.758
200	1.7458	1.007	132.5	7.590	18.1	10.3	0.737
250	1.3947	1.006	159.6	11.44	22.3	15.9	0.720
300	1.1614	1.007	184.6	15.89	26.3	22.5	0.707
350	0.9950	1.009	208.2	20.92	30.0	29.9	0.700
400	0.8711	1.014	230.1	26.41	33.8	38.3	0.690
450	0.7740	1.021	250.7	32.39	37.3	47.2	0.686
500	0.6964	1.030	270.1	38.79	40.7	56.7	0.684
550	0.6329	1.040	288.4	45.57	43.9	66.7	0.683
600	0.5804	1.051	305.8	52.69	46.9	76.9	0.685
650	0.5356	1.063	322.5	60.21	49.7	87.3	0.690
700	0.4975	1.075	338.8	68.10	52.4	98.0	0.695
750	0.4643	1.087	354.6	76.37	54.9	109	0.702
800	0.4354	1.099	369.8	84.93	57.3	120	0.709
850	0.4097	1.110	384.3	93.80	59.6	131	0.716
900	0.3868	1.121	398.1	102.9	62.0	143	0.720
950	0.3666	1.131	411.3	112.2	64.3	155	0.723
1000	0.3482	1.141	424.4	121.9	66.7	168	0.726
1100	0.3166	1.159	449.0	141.8	71.5	195	0.728
1200	0.2902	1.175	473.0	162.9	76.3	224	0.728
1300	0.2679	1.189	496.0	185.1	82	257	0.719
1400	0.2488	1.207	530	213	91	303	0.703
1500	0.2322	1.230	557	240	100	350	0.685
1600	0.2177	1.248	584	268	106	390	0.688
1700	0.2049	1.267	611	298	113	435	0.685
1800	0.1935	1.286	637	329	120	482	0.683
1900	0.1833	1.307	663	362	128	534	0.677
2000	0.1741	1.337	689	396	137	589	0.672
2100	0.1658	1.372	715	431	147	646	0.667
2200	0.1582	1.417	740	468	160	714	0.655
2300	0.1513	1.478	766	506	175	783	0.647
2400	0.1448	1.558	792	547	196	869	0.630
2500	0.1389	1.665	818	589	222	960	0.613
3000	0.1135	2.726	955	841	486	1570	0.536
<b>Ammonia (NH<sub>3</sub>), <math>M = 17.03</math> kg/kmol</b>							
300	0.6894	2.158	101.5	14.7	24.7	16.6	0.887
320	0.6448	2.170	109	16.9	27.2	19.4	0.870
340	0.6059	2.192	116.5	19.2	29.3	22.1	0.872
360	0.5716	2.221	124	21.7	31.6	24.9	0.872
380	0.5410	2.254	131	24.2	34.0	27.9	0.869

**TABLE A-2**

Ideal-gas specific heats of various common gases

(a) At 300 K

Gas	Formula	Gas constant, $R$ kJ/kg·K	$c_p$ kJ/kg·K	$c_v$ kJ/kg·K	$k$
Air	—	0.2870	1.005	0.718	1.400
Argon	Ar	0.2081	0.5203	0.3122	1.667
Butane	C <sub>4</sub> H <sub>10</sub>	0.1433	1.7164	1.5734	1.091
Carbon dioxide	CO <sub>2</sub>	0.1889	0.846	0.657	1.289
Carbon monoxide	CO	0.2968	1.040	0.744	1.400
Ethane	C <sub>2</sub> H <sub>6</sub>	0.2765	1.7662	1.4897	1.186
Ethylene	C <sub>2</sub> H <sub>4</sub>	0.2964	1.5482	1.2518	1.237
Helium	He	2.0769	5.1926	3.1156	1.667
Hydrogen	H <sub>2</sub>	4.1240	14.307	10.183	1.405
Methane	CH <sub>4</sub>	0.5182	2.2537	1.7354	1.299
Neon	Ne	0.4119	1.0299	0.6179	1.667
Nitrogen	N <sub>2</sub>	0.2968	1.039	0.743	1.400
Octane	C <sub>8</sub> H <sub>18</sub>	0.0729	1.7113	1.6385	1.044
Oxygen	O <sub>2</sub>	0.2598	0.918	0.658	1.395
Propane	C <sub>3</sub> H <sub>8</sub>	0.1885	1.6794	1.4909	1.126
Steam	H <sub>2</sub> O	0.4615	1.8723	1.4108	1.327

Note: The unit kJ/kg·K is equivalent to kJ/kg·°C.

Source: *Chemical and Process Thermodynamics 3/E* by Kyle, B. G., © 2000. Adapted by permission of Pearson Education, Inc., Upper Saddle River, NJ.

Table 2-18. Examples of Thermal Properties of TPs (properties of some common materials included for comparison)

Plastics (morphology)	Density g/cm <sup>3</sup> (lb./ft. <sup>3</sup> )	Melt Temperature T <sub>m</sub> , °C (°F)	Glass Transition Temperature T <sub>g</sub> , °C (°F)	Thermal	Heat Capacity cal/g °C (BTU/lb. °F)	Thermal Diffusivity 10 <sup>-4</sup> cm <sup>2</sup> /s 10 <sup>-3</sup> ft. <sup>2</sup> /hr.	Thermal Expansion 10 <sup>-4</sup> cm/cm °C (10 <sup>-4</sup> in./in. °F)
				Conductivity (10 <sup>-4</sup> cal/s · cm °C) (BTU/lb. °F)			
PP (C)	0.9 (56)	168 (334)	5 (41)	2.8 (0.068)	0.9 (0.004)	3.5 (1.36)	81 (45)
HDPE (C)	0.96 (60)	134 (273)	-110 (-166)	12 (0.290)	0.9 (0.004)	13.9 (5.4)	59 (33)
PTFE (C)	2.2 (137)	330 (626)	-115 (-175)	6 (0.145)	0.3 (0.001)	9.1 (3.53)	70 (39)
PA (C)	1.13 (71)	260 (500)	50 (122)	5.8 (0.140)	0.075 (0.003)	6.8 (2.64)	80 (44)
PET (C)	1.35 (84)	250 (490)	70 (158)	3.6 (0.087)	0.45 (0.002)	5.9 (2.29)	65 (36)
ABS (A)	1.05 (66)	105 (221)	102 (215)	3 (0.073)	0.5 (0.002)	3.8 (1.47)	60 (33)
PS (A)	1.05 (66)	100 (212)	90 (194)	3 (0.073)	0.5 (0.002)	5.7 (2.2)	50 (28)
PMMA (A)	1.20 (75)	95 (203)	100 (212)	6 (0.145)	0.56 (0.002)	8.9 (3.45)	50 (28)
PC (A)	1.20 (75)	266 (510)	150 (300)	4.7 (0.114)	0.5 (0.002)	7.8 (3.0)	68 (38)
PVC (A)	1.35 (84)	199 (390)	90 (194)	5 (0.121)	0.6 (0.002)	6.2 (2.4)	50 (28)
Aluminum	2.68 (167)	1,000		3000 (72.5)	0.23	4900 (1900)	19 (10.6)
Copper/bronze	8.8 (549)	1,800		4500 (109)	0.09	5700 (2200)	18 (10)
Steel	7.9 (493)	2,750		800 (21.3)	0.11	1000 (338)	11 (6.1)
Maple wood	0.45 (28.1)	400 (burns)		3 (0.073)	0.25	27 (10.5)	60 (33)
Zinc alloy	6.7 (418)	800		2500 (60.4)	0.10	3700 (1430)	27 (15)

\* = Crystalline resin, A = Amorphous resin.

**Table 10.1** Coefficients for Equation (10.13)

Geometry	Gr Pr = Ra	<i>c</i>	<i>m</i>
Vertical planes and cylinders	$10^4-10^9$	0.59	0.25
	$10^9-10^{13}$	0.10	0.3333
Horizontal cylinders	$0-10^{-5}$	0.4	0
	$10^{-5}-10^4$	0.85	0.188
	$10^4-10^9$	0.53	0.25
	$10^9-10^{12}$	0.13	0.3333
Spheres	$0-10^{12}$	0.60	0.25
Upper surface of horizontal heated plates; plate is hotter than surroundings ( $T_S > T_\infty$ ) or lower surface of horizontal cooled plates ( $T_S < T_\infty$ )	$2 \times 10^4-8 \times 10^6$	0.54	0.25
	$8 \times 10^6-10^{11}$	0.15	0.3333
Lower surface of horizontal heated plates ( $T_S > T_\infty$ ) or upper surface of horizontal cooled ( $T_S < T_\infty$ ) plates	$10^5-10^{11}$	0.58	0.2

# Formech 686

## Floor Standing Vacuum Forming Machine

Featuring a power table, Formech's 686 makes light work of the most demanding applications. Pre-stretch provides a more uniform material thickness for deep moulds whilst auto-level signals to the user the material is ready to form. Rapid response quartz heaters

with 6 independently controllable zones provides accurate heat control for consistent, high definition results. Intuitive colour touch screen interface and 20 nameable presets provide ultimate user convenience and ease of use.



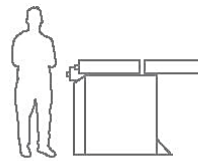
> Watch the video

### Key Features

- PLC control with 5" colour touch screen control
- 20 Programme Memory
- Quartz heaters with variable standby
- 6 independently controllable heating zones
- Power Table
- Pre-Stretch
- Auto-level
- Vacuum Gauge
- Dry rotary vane pump 16m3/HR

### Options

- Reducing windows
- Pyrometer
- Cooling fan system
- Cooling Bolster
- Reel Feed
- Spare parts kit



### Technical Specifications

Forming area (mm / inches)		Sheet Size (mm / inches)		Max Depth of Draw	Max Material Thickness	Heating Zones	Heater type	
646 x 620mm / 25.5 x 24.5"		686 x 660mm / 27 x 26"		325mm / 12.8"	Sheet: *6mm / 0.25" Reel: 1.8mm/0.07"	6	Quartz	
Width	Height	Depth	Weight	Single Phase Power Requirements	Europe – 3 Phase Power Requirements	USA – 3 Phase Power Requirements	Power Consumption	Air Requirements
960mm / 37.8"	1170mm / 46.1"	1800mm / 70.9"	260kg / 573lbs	208-240V / 40A	380-415V / 32A	208-220V / 40A	8.0kW	80 PSI / 5 bar

\*certain materials over 4mm thick may require turning the sheet mid-cycle

### Formech 686 customers include:

- Brunel University (Education – UK)
- Domus Academy (Education/Design – Italy)
- Lockheed Martin (Aerospace – USA)
- RAF (Royal Air Force – UK)
- Skoda (Automotive – Czech Republic)
- Mechachrome (Automotive – France)
- Raytheon (Defence R&D – UK)
- Revision Military (Defence R&D – USA)
- Xerox (R&D – USA)
- Jim Marshall Speakers (Prototyping – USA)
- Neurospin (Neuroimaging research – France)
- Microsoft (Electronics – USA)
- Google (Electronics – USA)
- Milan Cerny - Sklotex Plasty (Trade Former – Czech Republic)
- Polyfoam Kautschuk GmbH (Trade former – Germany)
- Kaleidoscope (Prototype Packaging – USA)
- Biofire Defense (Hospital & Medical – USA)
- Chuck Steel Ltd (Film & Video – UK)

For more information and product videos [formech.com](http://formech.com)

ch machine features and specifications are subject to change without notice as part of our continual product development programme.

# STRIP HEATERS

## STRIP HEATERS—ONE TERMINAL AT EACH END



S-1430/120 shown smaller than actual size.



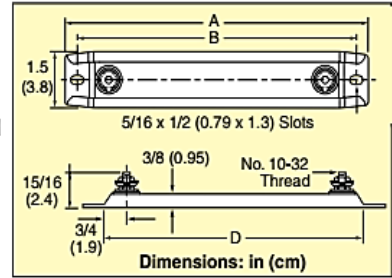
- ✓ 1½" (3.8 cm) Wide
- ✓ Rugged, Reliable, Premium Quality
- ✓ 150 to 2250 Watt
- ✓ UL Component Recognized and CSA Certified

OMEGALUX® "S" Series strip heaters are supplied with either a rust-resisting iron or chrome steel sheath to a width of 1½" (3.8 cm). Selecting the sheath material depends upon the process and

environment that the heaters would be exposed too. The "S" series features one terminal on each end conforming in many applications. Additional strip heater application guidelines are available from OMEGA.

### SPECIFICATIONS

**Sheath Material:** Rust resisting iron and chrome steel  
**Max Sheath Temp:** Iron 399°C (750°F), chrome steel 649°C (1200°F)  
**Power:** 120 or 240 Vac



**CAUTION AND WARNING**  
 Fire and electrical shock may result if products are used improperly or installed or used by non-qualified personnel. See inside back cover for additional warnings.

### To Order

Dimensions: in (cm)			Rust-Resisting Iron Sheath			Chrome Steel Sheath			Wt. lb (kg)
A	B	D	Watts	W/in <sup>2</sup> †	Model No.	Watts	W/in <sup>2</sup> †	Model No.	
8 (20)	7 (18)	6½ (17)	150	10	S-815*	250	17	S-802*	0.63 (0.16)
9½ (24)	8½ (22)	8 (20)	200	10	S-920*	300	15	S-903*	0.75 (0.34)
12 (30)	11 (28)	10½ (27)	250	9	S-1225*	250	9	S-1202*	0.94 (0.43)
12 (30)	11 (28)	10½ (27)	—	—	—	500	17	S-1205*	0.94 (0.43)
14 (36)	13 (33)	12½ (32)	300	8	S-1430*	500	14	S-1405*	1.06 (0.48)
15½ (39)	14½ (36)	13¾ (35)	325	8	S-1532*	500	12	S-1505*	1.19 (0.54)
17½ (45)	16½ (43)	16¾ (42)	375	8	S-1837*	500	10	S-1805*	1.44 (0.65)
17½ (45)	16½ (43)	16¾ (42)	500	10	S-1850*	750	15	S-1807*	1.44 (0.65)
17½ (45)	16½ (43)	16¾ (42)	—	—	—	1000	20	S-1801*	1.44 (0.65)
19½ (50)	18½ (47)	18 (46)	500	9	S-1950*	500	9	S-1905*	1.5 (0.68)
19½ (50)	18½ (47)	18 (46)	—	—	—	750	13	S-1907*	1.57 (0.71)
19½ (50)	18½ (47)	18 (46)	—	—	—	1000	18	S-1901*	1.57 (0.71)
21 (53)	20 (51)	19½ (50)	500	8	S-2050*	500	9	S-2005*	1.75 (0.79)
23¾ (60)	22¾ (58)	22¼ (57)	250	4	S-2425*	500	7	S-2405*	1.88 (0.85)
23¾ (60)	22¾ (58)	22¼ (57)	500	7	S-2450*	750	10	S-2407*	1.88 (0.85)
23¾ (60)	22¾ (58)	22¼ (57)	—	—	—	1000	14	S-2401*	1.88 (0.85)
23¾ (60)	22¾ (58)	22¼ (57)	—	—	—	1500	21	S-2415*	1.88 (0.85)
25½ (65)	24½ (62)	24 (61)	750	10	S-2575*	1000	12	S-2501*	2.01 (0.91)
26¾ (68)	25¾ (65)	25¼ (64)	700	8	S-2670*	750	9	S-2607*	2.13 (0.97)
30¾ (77)	29¾ (75)	28 (71)	750	8	S-3075*	750	8	S-3007*	2.13 (0.97)
33¾ (85)	32¾ (82)	31 (79)	750	7	S-3375*	1000	10	S-3301*	2.63 (1.2)
35¾ (91)	34¾ (88)	33¾ (85)	1000	7	S-3610*	1000	9	S-3601*	2.83 (1.3)
38¾ (98)	37¾ (95)	36 (91)	1000	8	S-3810*	1000	8	S-3801*	3.0 (1.4)
42¾ (108)	41¾ (105)	40 (102)	1250	9	S-4312*	1000	11	S-4301*	3.38 (1.5)

\* Designate voltage, i.e.; insert "120" or "240" for voltage. Additional strip heater models available with other widths and configurations. Contact OMEGA.

† To determine maximum allowable watt density, see Figures online.

**Ordering Examples:** S-1405/120, 120 Vac, strip heater with chrome steel sheath and one terminal at each end.  
 S-815/120, 120 Vac strip heater with rust-resisting iron sheath and one terminal at each end.





FC8291/01

## Specifications

### Design

- Color: Cherry red

### Performance

- Input power (IEC): 1000 W
- Suction power (max): 240 W
- Vacuum (max): 20 kPa
- Airflow (max): 26.6 l/s
- Noise level (Lc IEC): 84 dB

### Filtration

- Dust capacity: 1.6 L
- Exhaust filter: Microfilter
- Motor filter: Sourcing Pad

### Usability

- Action radius: 6 m
- Cord length: 4 m
- Tube type: Plastic 2-P tube
- Handgrip: Ergonomic grip with air slider
- Carrying handle: Top
- Tube coupling: Conical
- Park or storage assist: Vertical and horizontal
- Wheel type: Plastic
- Power control

### Nozzles and accessories

- Standard nozzle: Hard floor only nozzle
- Accessories included: Crevice tool, Small nozzle

### Sustainability

- Packaging: > 75% recycled materials
- User manual: 100% recycled paper

### Weight and dimensions

- Weight of product: 4 kg
- Dimensions of product (LxWxH): 337x260x233 mm

Philips CompactGo  
Vacuum cleaner with bag

1000 W



FC8291/01

Powerful inside and compact on the outside

Variable power available without taking up space

The new Philips CompactGo vacuum cleaner will make cleaning easier for you. It is powerful, easy to carry, maneuver and store. You can enjoy better cleaning results in an easy way.

#### Powerful cleaning performance

- Hard floor nozzle
- Small nozzle and Crevice tool
- 900 W motor

#### Freedom to move

- Light weight and compact, giving you the freedom to move

#### Compact storage

- Small sized appliance for compact storage

#### Ultimate convenience

- Washable dust bag
- Variable power settings



Version: 4.0.1

Specifications are subject to change without notice.  
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or their respective owners.

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**PHILIPS**



# Ball Bearings

6000 Series  
Single Row, Deep Groove, Conrad Type

Bearing Number	Nominal Bearing Dimensions						Preferred Shoulder Diameters			
	<i>d</i>		<i>D</i>		<i>B</i>		<i>r*</i>	<i>da</i> (in)		<i>Da</i> (in)
	mm	inch	mm	inch	mm	inch	inch	min	max	max
6000	10	0.3937	26	1.0236	8	0.3150	0.012	0.472	0.512	0.949
6001	12	0.4724	28	1.1024	8	0.3150	0.012	0.551	0.611	1.024
6002	15	0.5906	32	1.2598	9	0.3543	0.012	0.669	0.749	1.181
6003	17	0.6693	35	1.3780	10	0.3937	0.012	0.748	0.847	1.299
6004	20	0.7874	42	1.6535	12	0.4724	0.024	0.945	1.005	1.496
6005	25	0.9843	47	1.8504	12	0.4724	0.024	1.142	1.182	1.693
6006	30	1.1811	55	2.1654	13	0.5118	0.039	1.378	1.438	1.969
6007	35	1.3780	62	2.4409	14	0.5512	0.039	1.575	1.635	2.244
6008	40	1.5748	68	2.6772	15	0.5906	0.039	1.772	1.872	2.480
6009	45	1.7717	75	2.9528	16	0.6299	0.039	1.969	2.108	2.756
6010	50	1.9685	80	3.1496	16	0.6299	0.039	2.165	2.305	2.953
6011	55	2.1654	90	3.5433	18	0.7087	0.039	2.421	2.528	3.287
6012	60	2.3622	95	3.7402	18	0.7087	0.039	2.618	2.719	3.484
6013	65	2.5591	100	3.9370	18	0.7087	0.039	2.815	2.876	3.681
6014	70	2.7559	110	4.3307	20	0.7874	0.039	3.012	3.172	4.075
6015	75	2.9528	115	4.5276	20	0.7874	0.039	3.209	3.369	4.272
6016	80	3.1496	125	4.9213	22	0.8661	0.039	3.406	3.585	4.665
6017	85	3.3465	130	5.1181	22	0.8661	0.039	3.602	3.782	4.862
6018	90	3.5433	140	5.5118	24	0.9449	0.059	3.858	4.058	5.197
6019	95	3.7402	145	5.7087	24	0.9449	0.059	4.055	4.275	5.394
6020	100	3.9370	150	5.9055	24	0.9449	0.059	4.252	4.452	5.591
6021	105	4.1339	160	6.2992	26	1.0236	0.079	4.528	4.728	5.906
6022	110	4.3307	170	6.6929	28	1.1024	0.079	4.724	4.905	6.299
6024	120	4.7244	180	7.0866	28	1.1024	0.079	5.118	5.299	6.693
6026	130	5.1181	200	7.8740	33	1.2992	0.079	5.512	5.851	7.480
6028	140	5.5118	210	8.2677	33	1.2992	0.079	5.906	6.245	7.874
6030	150	5.9055	225	8.8583	35	1.3780	0.079	6.339	6.698	8.425
6032	160	6.2992	240	9.4488	38	1.4961	0.079	6.732	7.131	9.016
6034	170	6.6929	260	10.2362	42	1.6535	0.079	7.126	7.663	9.803
6036	180	7.0866	280	11.0236	46	1.8110	0.079	7.520	8.195	10.591
6038	190	7.4803	290	11.4173	46	1.8110	0.079	7.913	8.589	10.984
6040	200	7.8740	310	12.2047	51	2.0079	0.079	8.307	9.121	11.772

\*Maximum fillet which corner radius of bearing will clear.

Note: Limiting speeds are lower with contact seals. For more information, contact NSK Engineering.

# Digital Temperature Controllers E5CZ

## Next-generation Digital Temperature Controller

- Depth of only 78 mm.
- Various temperature inputs: thermocouple, platinum resistance thermometer, infrared temperature sensor, and analog inputs.
- Auto-tuning and self-tuning are available. Auto-tuning is possible even while self-tuning is being executed.
- Heating or heating/cooling control is available.
- Start/stop function.
- CE marking and UL/CSA approval.
- Models with optional functions and current output added to the series.



48 × 48 × 78 mm (W × H × D)



Refer to the "Safety Precautions" on page 52.

## Ordering Information

### List of Models

Size	Power supply voltage	Number of alarm points	Control output	Option Unit	Model
1/16 DIN 48 × 48 × 78 mm (W × H × D)	100 to 240 VAC	2	Relay	Not Available	E5CZ-R2
			Voltage for driving SSR	Not Available	E5CZ-Q2
			Relay	Available	E5CZ-R2M
			Voltage for driving SSR	Available	E5CZ-Q2M
			Current	Available	E5CZ-C2M
	24 VAC/VDC	2	Relay	Available	E5CZ-R2MD
			Voltage for driving SSR	Available	E5CZ-Q2MD
			Current	Available	E5CZ-C2MD

## Specifications

### Ratings

Power supply voltage	100 to 240 VAC, 50/60 Hz	24 VAC/VDC, 50/60 Hz
Operating voltage range	85% to 110% of rated supply voltage	
Power consumption	7 VA	5 VA, 3 W
Sensor input	Thermocouple: K, J, T, E, L, U, N, R, S, B Platinum resistance thermometer: Pt100, JPt100 Infrared temperature sensor: 10 to 70°C, 60 to 120°C, 115 to 165°C, 140 to 260°C Voltage input: 0 to 50 mV	
Control output	Relay output	SPST-NO, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations
	Voltage output	12 VDC $+15\%$ / $-20\%$ (PNP), max. load current: 21 mA, with short-circuit protection circuit
	Current output	4 to 20 mA DC, load: 600 $\Omega$ max., resolution: approx. 2,600
Alarm output	SPST-NO, 250 VAC, 1 A (resistive load), electrical life: 100,000 operations	
Event input	Contact input	ON: 1 k $\Omega$ max., OFF: 100 k $\Omega$ min.
	Non-contact input	ON: Residual voltage: 1.5 V max., OFF: Leakage current: 0.1 mA max. Outflow current: Approx. 7 mA per point
Control method	2-PID control or ON/OFF control	
Setting method	Digital setting using front panel keys	
Indication method	7-segment digital display and single-lighting indicators Character height: PV: 10.0 mm; SV: 6.5 mm	
Other functions	According to Controller model	
Ambient operating temperature	-10 to 55°C (with no condensation or icing)	
Ambient operating humidity	25% to 85%	
Storage temperature	-25 to 65°C (with no condensation or icing)	

## Steel plate Material comparision

Steel Grade	China GB	Japan JIS		America ASTM	Germany		
	Mark	Mark	Standard Number	Specification	Specification	Material Number	Standard Number
Carbon Steel Plate	Q235-F	SS41	G3101	A36	USt37-2	1.0112	DIN17100
	Q235	SS41	G3101	A283-C	RSt37-2	1.0114	DIN17100
	Q255A	SS50	G3101	A283-D	(RSt42-2)	1.0134	DIN17100
	(A3R)	SPV24	G3115	A285-C			
	20g	SB42	G3103	A515.Cr60	H II	1.0425	DIN17155
	(15g)	SB35	G3103	A515.Cr55	H I	1.0345	DIN17155
	(25g)	SB46	G3103	A515.Cr65	HIII	1.0435	DIN17155
	25	SM41A	G3103				DIN17100
Low Content Alloy Steel Plate	16Mn	SM50-B.C	G3106		St52-3	1.0841	DIN17155
	16MnR	SM41B	G3106	A299/A537- I . II	17Mn4 19Mn5	1.0841 1.8045	
	16MngC	SPV36	G3115		St52-3		
	15MnVR	SPV36 (WELTEN50)	G3115	A225Gr.A.B	WStE39	1.8930	
	15MnVgC			(A633-GR.B)			
	15MnVNTR	(K-TEN62M)		A302-GR.B			
18MnMoNbR			A533-Gr.A.I				
Heat-resisting Steel Plate	16Mo	SB46M	G3103	A204-Gr A.B	15 Mo3	1.5414	DIN17155
	12CrMo	SCMV1	G4109	A387-Gr.2			
	15CrMo	SCMV2	G4109	A387-Gr.12	13 CrMo44	1.7335	DIN17155
	12Cr2Mo1	SVMV4	G4109	A387-Gr.22	10 Mo910	1.7362	DIN17155
Low Temperature Resistant Steel Plate	16MnR	SLA24B	G3126	A516-Gr55	TTSTE26	1.0463	SEW089
	15MnVR	SLA33A		A516-Gr60	TTSTE29	1.0488	
	15MnVNTR			A516-Gr65 A516-Gr70	TTSTE32 TTSTE36	1.0851 1.0859	
	09Mn2VR			A203-GrA.B	TTST41V TTST35V	1.0437	SEW680
	(06A1NbCuN)			A203-GrD.E	10Ni14	1.5637	SEW680
Stainless Acid-resisting Steel Plate	(20mN23a1)			A553-Gr. I . II A353	X8Ni9	1.5662	SEW680
	0Cr13	SUS405 SUS410S	G4304 G4305	A320-405 A320-410S	X7Cr13	1.4000	DIN17440
	(1Cr13)	SUS403 SUS410	G4304 G4305	A320-403 A320-410	X10Cr13	1.4006	DIN17440
	(1Cr17)	SUS430	G4304 G4305	A320-430	X8Cr17	1.4016	DIN17440
	0Cr18Ni9	SUS304	G4304 G4305	A320-304	X5CrNi189	1.4301	DIN17440
	(1Cr18Ni9)	SUS302	G4304 G4305	A320-302	X5CrNi189	1.4301	DIN17440
	0Cr18Ni9Ti 1Cr18Ni9Ti	SUS321	G4304 G4305	A320-321	X10CrNiTi189	1.4541	DIN17440

	0Cr18Ni12Mo2Ti	SUS316	G4304 G4305	A320-316			
	0Cr18Ni12Mo3Ti	SUS317	G4304 G4305	A320-317			
	00Cr18Ni10	SUS304L	G4304 G4305	A320-304L	X2CrNi189	1.4306	DIN17440
	00Cr17Ni14Mo2	SUS316L	G4304 G4305	A320-316L	X2CrNiMo1810	1.4404	DIN17440
	00Cr17Ni14Mo3	SUS317L	G4304 G4305	A320-317L			
	(1Cr18Ni11Nb)	SUS347	G4304 G4305	A320-347	X10CrNiNb189	1.4550	DIN17440
	Cr15Ni20	SUS310	G4304 G4305	A320-310			

## Thermocouple types

ANSI Calibration Code	Positive Leg	Negative Leg	Recommended Temp. Range °F(°C) of Prot. TC**	Application Information
J	Iron ThermoKanthal JP*	Constantan* Cupron* Advance* ThermoKanthal JN*	32 to 1400 (0 to 760)	Suitable for vacuum, reducing, or inert atmospheres, oxidizing atmospheres with reduced life. Iron oxidizes rapidly above 1000°F (538°C) so only heavy gauge wire is recommended for high temperature. Bare elements should not be exposed to sulphurous atmospheres above 1000°F (538°C).
K	Chromel* Tophel* T1* ThermoKanthal KP*	Alumel* Nial* T2* ThermoKanthal KN*	32 to 2300 (0 to 1260)	Recommended for continuous oxidizing or neutral atmospheres. Mostly used above 1000°F (530°C). Subject to failure if exposed to sulphur. Preferential oxidation of chromium in positive leg at certain low oxygen concentrations causes "green rot" and large negative calibration drifts most serious in the 1500 - 1900°F range (816 — 1038°C). Ventilation or inert-sealing of the protection tube can prevent this.
T	Copper	Constantan* Cupron* Advance*	—300 to + 700 (—184 to +371)	Useable in oxidizing, reducing, or inert atmospheres as well as vacuum. Not subject to corrosion in moist atmospheres. Limits of error published for sub-zero temperature ranges.
E	Chromel* Tophel* T1* ThermoKanthal KP*	Constantan* Cupron* Advance* ThermoKanthal JN*	32 to 1600 (0 to 871)	Recommended for continuously oxidizing or inert atmospheres. Sub-zero limits of error not established. Highest thermoelectric output of common calibrations.
R	Platinum— 13% Rhodium	Platinum	100 to 2700 (538 to 1482)	Recommended for high temperature. Must be protected with non-metallic protection tube and ceramic insulators. Continued high temperature usages causes grain growth which can lead to mechanical failure. Negative calibration drift caused by rhodium diffusion to pure leg as well as from rhodium volatilization. Type R is used in industry; type S in the laboratory
S	Platinum— 10% Rhodium	Platinum		
B	Platinum— 30% Rhodium	Platinum— 6% Rhodium	1600 to 3100 (871 to 1705)	Similar as R & S but output is lower. Also less susceptible to grain growth and drift.
M	Nickel	Nickel— 18% Molybdenum	32 to 2250 (0 to 1287)	High temperature applications in inert or vacuum atmosphere. Useful in many hydrogen applications. Continuous cycling causes excessive grain growth.
C	Tungsten- 5% Rhenium(W-5Re)	Tungsten- 26% Rhenium (W-26Re)	32 to 4200 (0 to 2315)	Very high temperature applications in inert or vacuum. Preferred over Tungsten/Tungsten—26% Rhenium because less brittle at low temperatures.
W	Tungsten- 3% Rhenium (W-3Re)	Tungsten- 25% Rhenium (W-25Re)	32 to 4200 (0 to 2315)	The ductility of the W3Re leg is superior to pure Tungsten, but not as good as W5Re. This combination has highest output of the 3 common Tungsten Rhenium calibrations from 1860 to 4200°F.
N	Nicrosil*** 14.5% Chromium 1.4% Silicon .1% Magnesium Balance Nickel	Nisil*** 4.2% Silicon .1% Magnesium Balance Nickel	32 to 2300 (0 to 1260)	Can be used in applications where Type K elements have shorter life and stability problems due to oxidation and the development of "Green Rot"
None	Platinel* 5355	Platinel* 7674	32 to 2300 (0 to 1260)	Noble metal combination which approximates Type K curve but has much improved oxidation resistance. Should be treated as any noble metal calibration.



### JIS G3101 SS400 steel plate/sheet for general purpose structural steels

JIS G3101 SS400 steel plate/sheet, JIS G3101 SS400 steel plate/sheet, under JISG3101 standard, we can regard SS400 steel plate/sheet for general purpose structural steel.

JIS G3101 SS400 is a technical delivery conditions for general purpose structural steel. JIS G3101 SS400 is a type of steel sheet under JIS standard which is used to build ship, bridge, belongs to high strength sheet. JIS G3101 SS400 is equivalent to DIN:St37-2, EN S235JR, ASTM:A283C and UNI:FE360B.

SS400 JIS3101	Comparison of steel grades	
	BS 4360	40(A)B
	CSAG40-21	230 G
	IS	IS 226
	JIS 3106	SM 400 A
	ISO 630	Fe 360 B
	ASTM	A 36/A 283 C

#### Chemical Composition

Grade	Chemical Composition, % by weight				
	C. max	Si. max	Manganese	P. max	S. max
SS400	-	-	-	0.050	0.050

#### Mechanical Properties

Grade	Yield Strength min. (Mpa)		Tensile Strength MPa	Elongation min. %			Impact Resistance min.[J]
	Thickness <16 mm	Thickness ≥16mm		Thickness <5mm	Thickness 5-16mm	Thickness ≥16mm	
SS400	245	235	400-510	21	17	21	-

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# S200 UL 489 Series

# Miniature circuit breakers

## ABB S200 UL 489 Series



### Description

The S200 Series miniature circuit breaker offers a compact solution for protection requirements. The S200U AND S200UP devices are UL 489 tested current limiting and DIN rail mounted.

The S200U and S200UP is available with application-specific trip characteristics to provide maximum circuit protection.

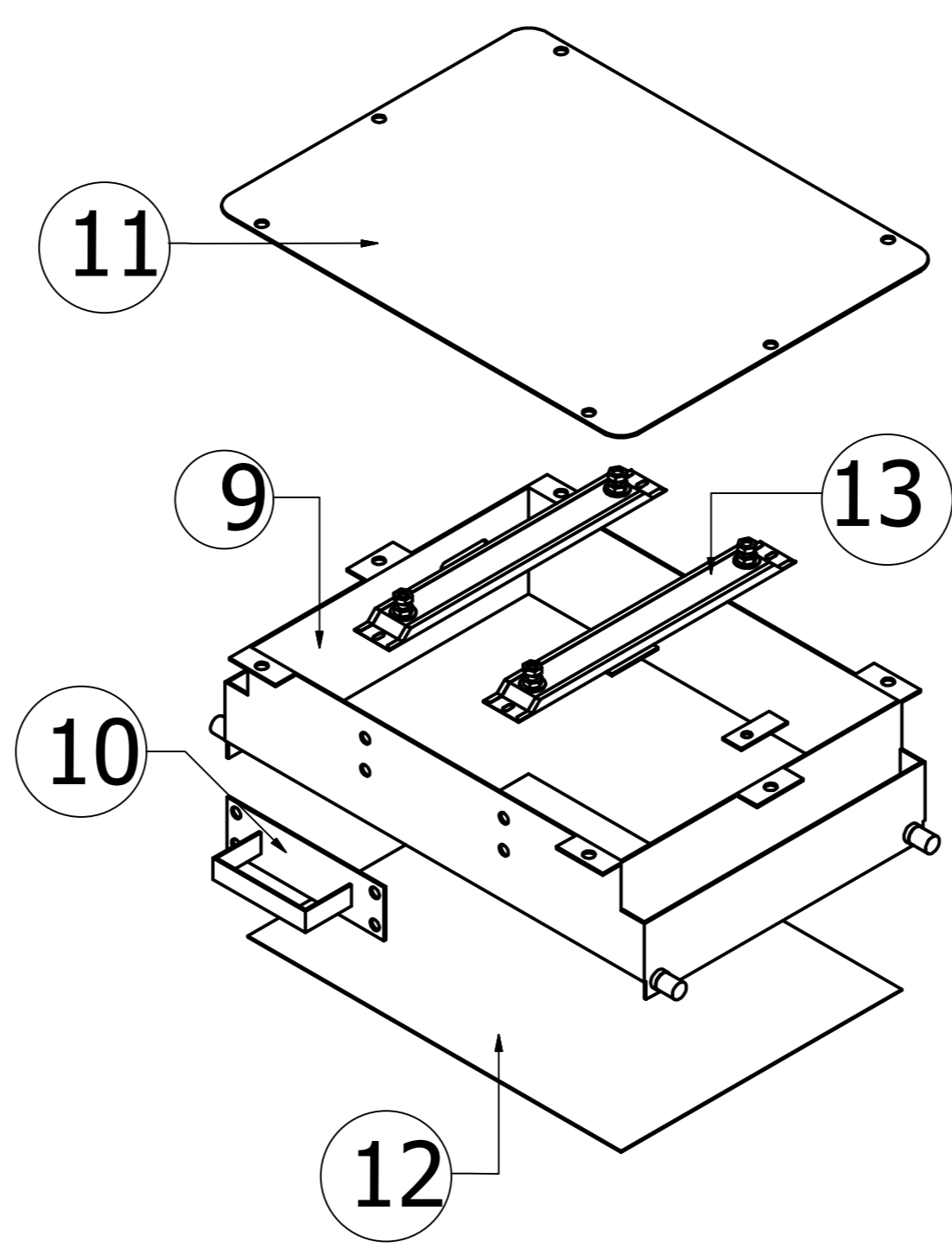
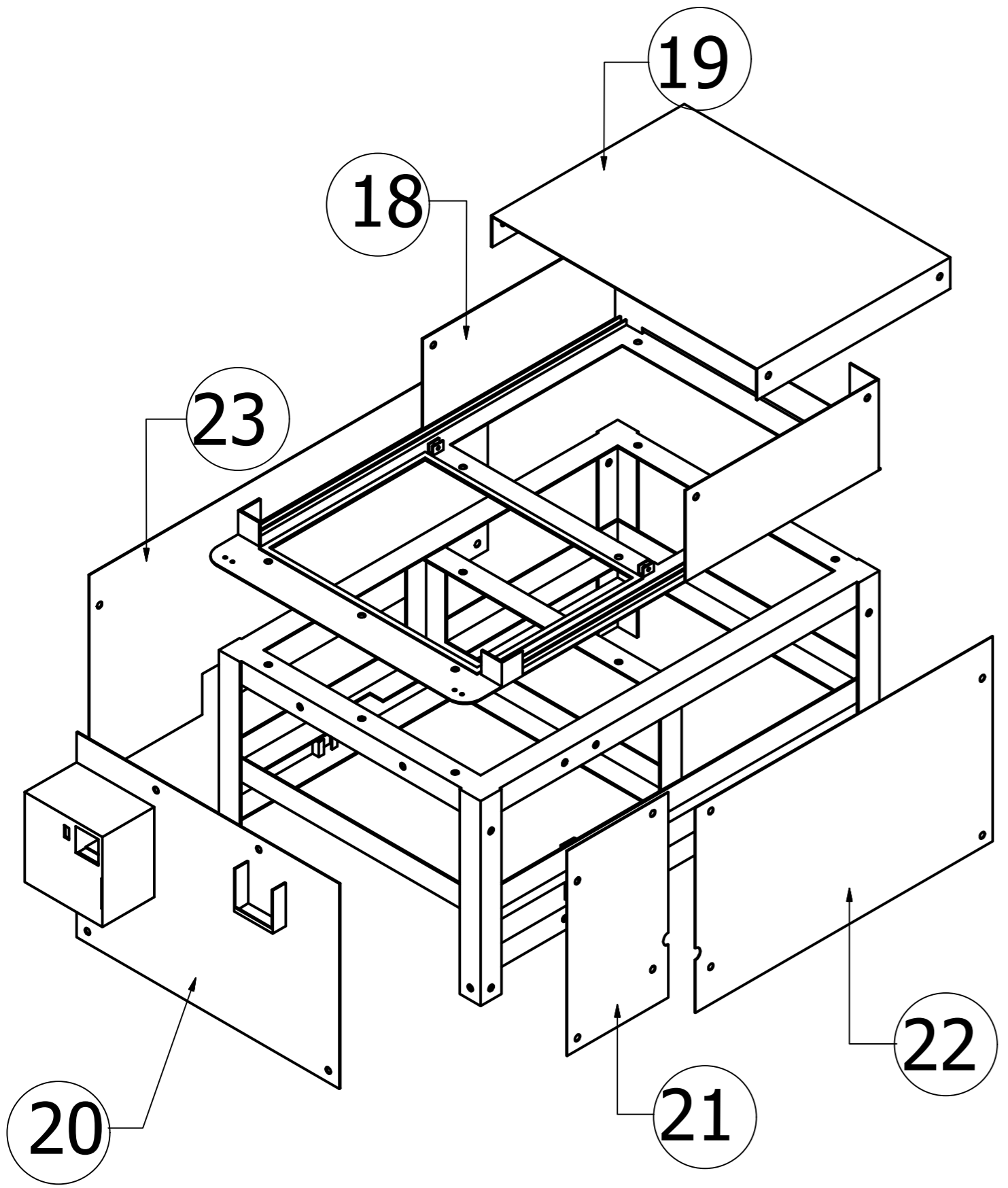
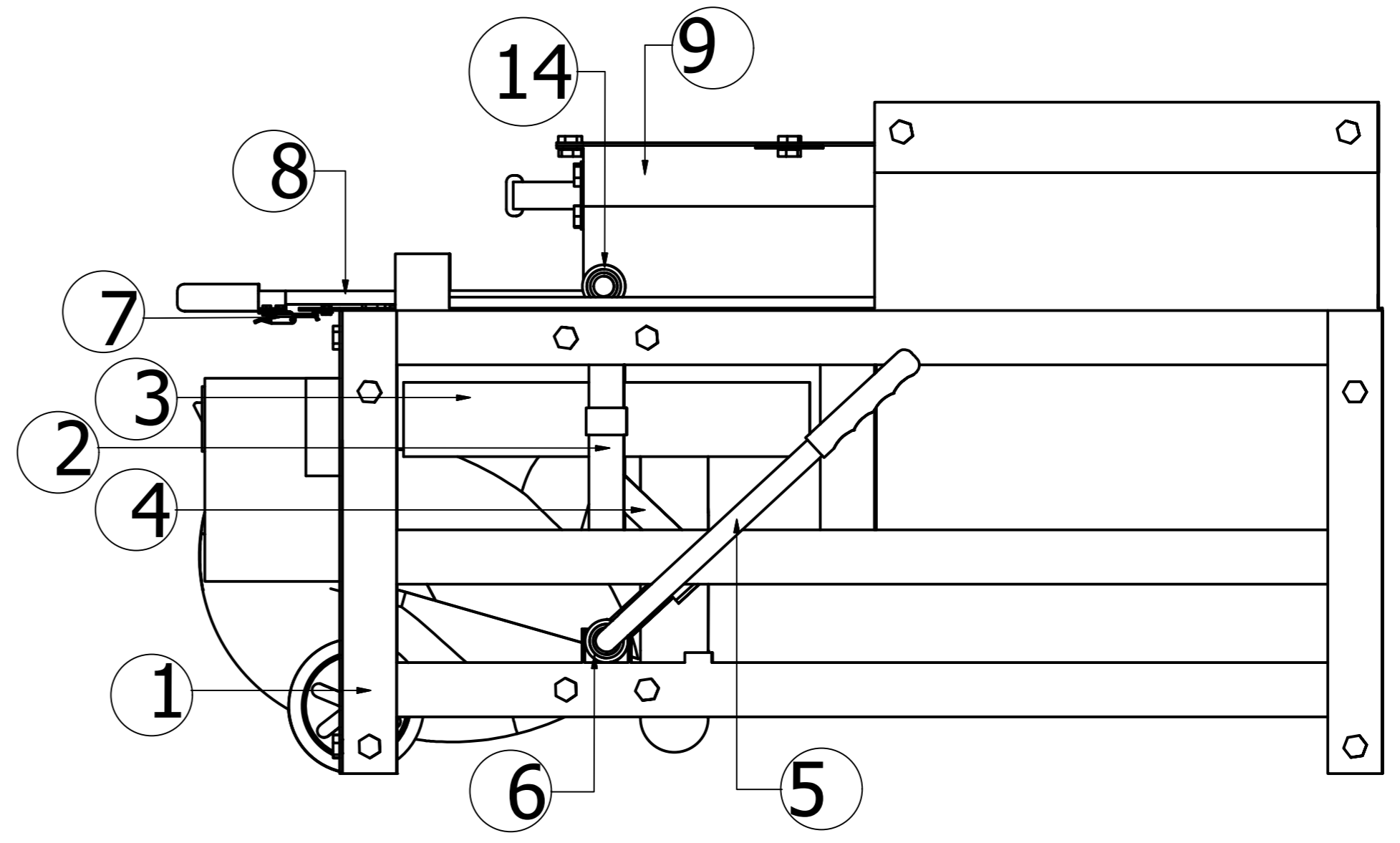
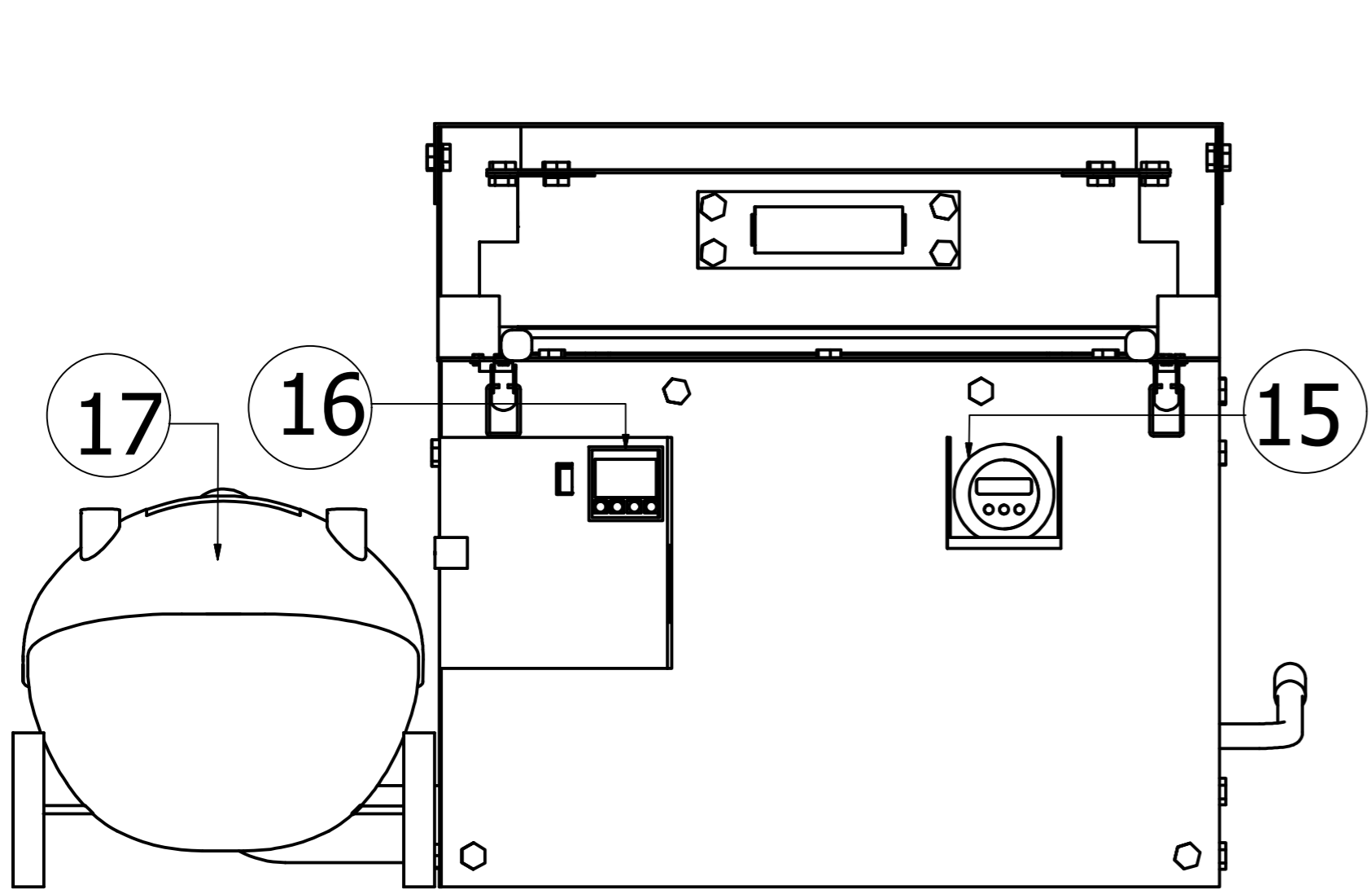
The breakers offer thermal-magnetic trip protection according to K and Z characteristics.

For the worldwide market, the breakers carry UL, CSA, IEC, CE and many other agency approvals and certifications.

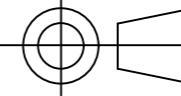
### Features

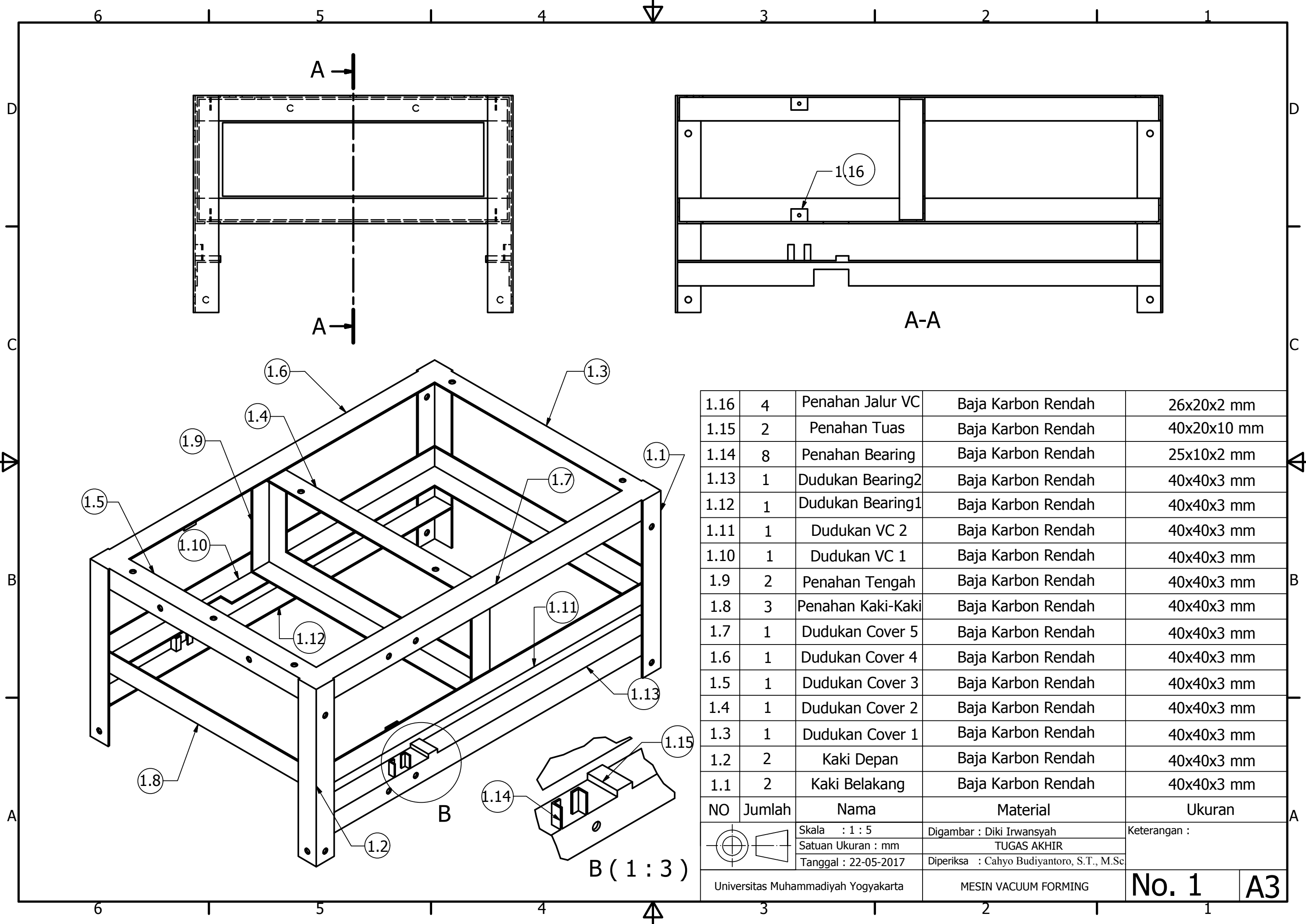
- UL current limiting
- Fast breaking time (2.3 – 2.5 ms)
- Bus connection system
- Wide range of accessories
- Available with variable depth handle mechanism
- CE certified and marked
- DIN rail mounting
- Finger safe terminals
- Multi-function terminals
- Suitable for reverse feed but S200UDC has polarity
- UL 489 Listed - branch circuit protective device. UL File #E212323

	S200U	S200UP	SU200PR	S200UDC
Amperage	0.2 – 63	0.2 – 25	0.2 – 35A ; 40 – 63A	1 – 63
Voltage	240 VAC	480Y/277VAC	480Y/277 VAC ; 240 VAC	60-125 VDC
Poles	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4	1, 2
Trip characteristics	K, Z	K, Z	K	K, Z
Interrupting ratings	Up to 25 kA: IEC 60947-2 10 kA: UL 489 10 kA: CSA 22.2 No. 5	Up to 25 kA: IEC 60947-2 10 kA: UL 489 10 kA: CSA 22.2 No. 5	10kA: UL489 10kA: CSA 22.2 No.5	14 kA: UL489 14 kA: CSA 22.2 No. 5
Auxiliary contacts	Yes	Yes	Yes	Yes
Bell alarm	Yes	Yes	Yes	Yes
Shunt trip	Yes	Yes	Yes	Yes
Bus bar	Yes	Yes	No	Yes

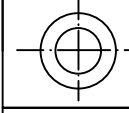


23	1	Cover Kiri	Plat Eser	JIS G3101-SS41	1 mm
22	1	Cover Kanan 2	Plat Eser	JIS G3101-SS41	1 mm
21	1	Cover Kanan 1	Plat Eser	JIS G3101-SS41	1 mm
20	1	Cover Depan	Plat Eser	JIS G3101-SS41	2 mm
19	1	Cover Atas 2	Plat Eser	JIS G3101-SS41	2 mm
18	1	Cover Atas 1	Plat Eser	JIS G3101-SS41	2 mm
17	1	Vacuum Cleaner		FC8291/01	
16	1	Thermocontrol		E5CZ-R2 AC100-240	
15	1	Stopwatch		Digital	
14	4	Bearing Heater		6002	
13	2	Heater		Strip Heater	
12	1	Plat Aluminium	Plat	AA 1100	1 mm
11	1	Penutup Kotak	Plat Eser	JIS G3101-SS41	2 mm
10	1	Pegangan Kotak	Plat Eser	JIS G3101-SS41	2 mm
9	1	Kotak Pemanas	Plat Eser	JIS G3101-SS41	2 mm
8	1	Clamp	Plat Strip	JIS G3101-SS41	10x5 mm
7	2	Clamp Toggle		Overval Medium	
6	2	Bearing Tuas		6002	
5	1	Tuas	Besi Pejal	JIS G3112	Ø16 mm
4	2	Plat Pengangkat	Plat Strip	JIS G3101-SS41	20x5 mm
3	1	Vacuum Chamber	Plat Eser	JIS G3101-SS41	2 mm
2	4	Plat Jalur VC	Plat Eser	JIS G3101-SS41	2 mm
1	1	Frame (Rangka)	Profil Siku	JIS G3101-SS 400	40x40x3 mm
NO	Jumlah	Nama	Tipe	Standarisasi	Ukuran

 Skala : 1 : 5  
 Satuan Ukuran : mm  
 Tanggal : 27-05-2017  
 Digambar : Diki Irwansyah  
 TUGAS AKHIR  
 Diperiksa : Cahyo Budiyanoro, S.T., M.Sc.  
 Universitas Muhammadiyah Yogyakarta  
 MESIN VACUUM FORMING  
 Keterangan :  
 No. A2



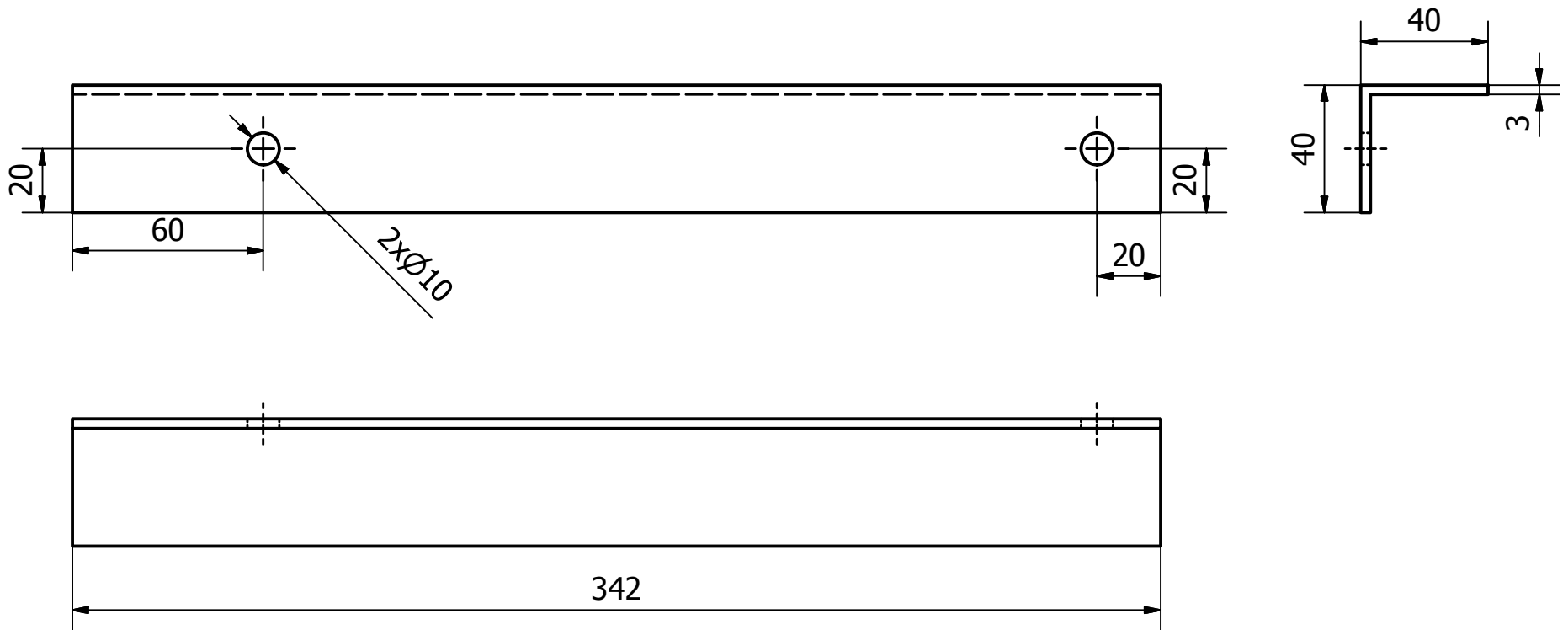
1.16	4	Penahan Jalur VC	Baja Karbon Rendah	26x20x2 mm
1.15	2	Penahan Tuas	Baja Karbon Rendah	40x20x10 mm
1.14	8	Penahan Bearing	Baja Karbon Rendah	25x10x2 mm
1.13	1	Dudukan Bearing2	Baja Karbon Rendah	40x40x3 mm
1.12	1	Dudukan Bearing1	Baja Karbon Rendah	40x40x3 mm
1.11	1	Dudukan VC 2	Baja Karbon Rendah	40x40x3 mm
1.10	1	Dudukan VC 1	Baja Karbon Rendah	40x40x3 mm
1.9	2	Penahan Tengah	Baja Karbon Rendah	40x40x3 mm
1.8	3	Penahan Kaki-Kaki	Baja Karbon Rendah	40x40x3 mm
1.7	1	Dudukan Cover 5	Baja Karbon Rendah	40x40x3 mm
1.6	1	Dudukan Cover 4	Baja Karbon Rendah	40x40x3 mm
1.5	1	Dudukan Cover 3	Baja Karbon Rendah	40x40x3 mm
1.4	1	Dudukan Cover 2	Baja Karbon Rendah	40x40x3 mm
1.3	1	Dudukan Cover 1	Baja Karbon Rendah	40x40x3 mm
1.2	2	Kaki Depan	Baja Karbon Rendah	40x40x3 mm
1.1	2	Kaki Belakang	Baja Karbon Rendah	40x40x3 mm
NO	Jumlah	Nama	Material	Ukuran


 Skala : 1 : 5  
 Satuan Ukuran : mm  
 Tanggal : 22-05-2017

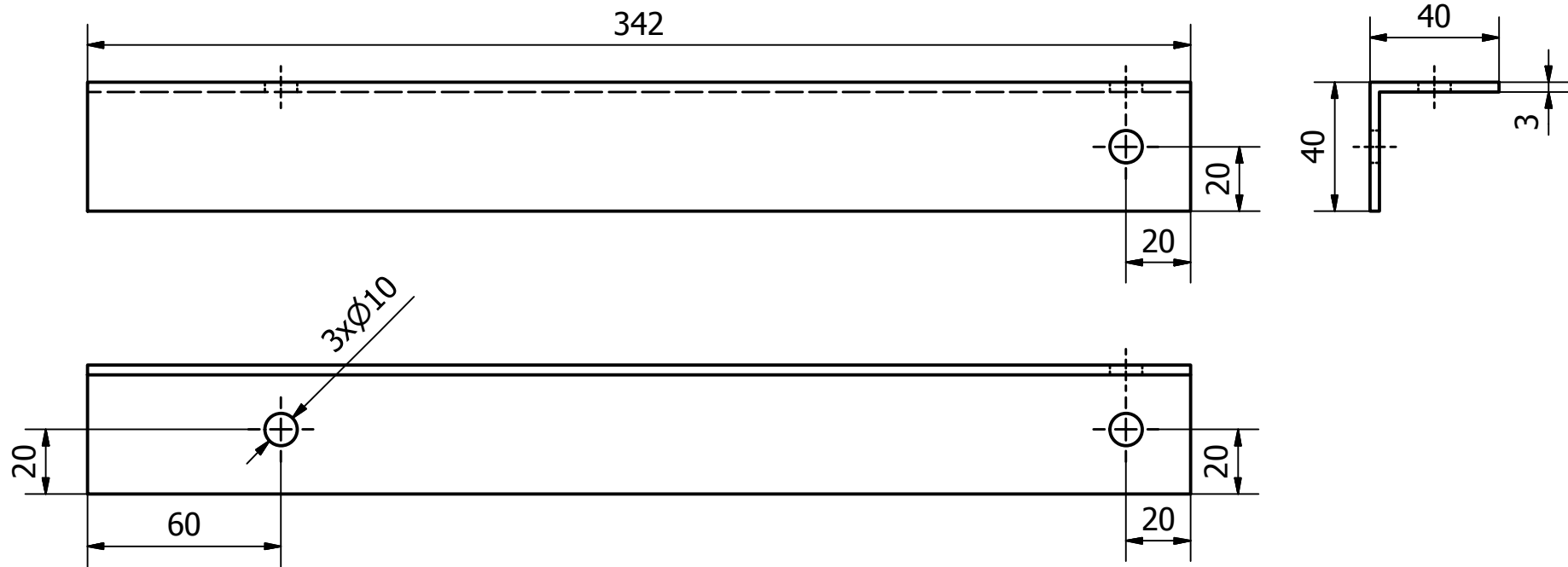
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 TUGAS AKHIR  
 Diperiksa : Cahyo Budiyanoro, S.T., M.Sc

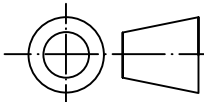
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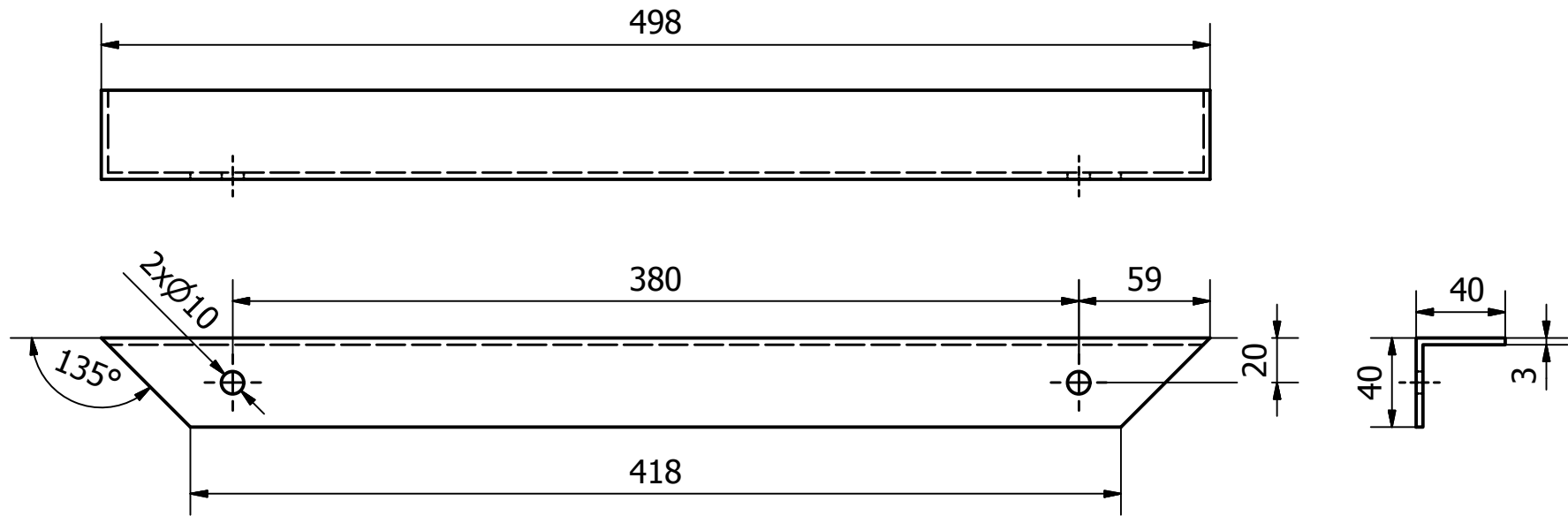
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**No. 1**    **A3**



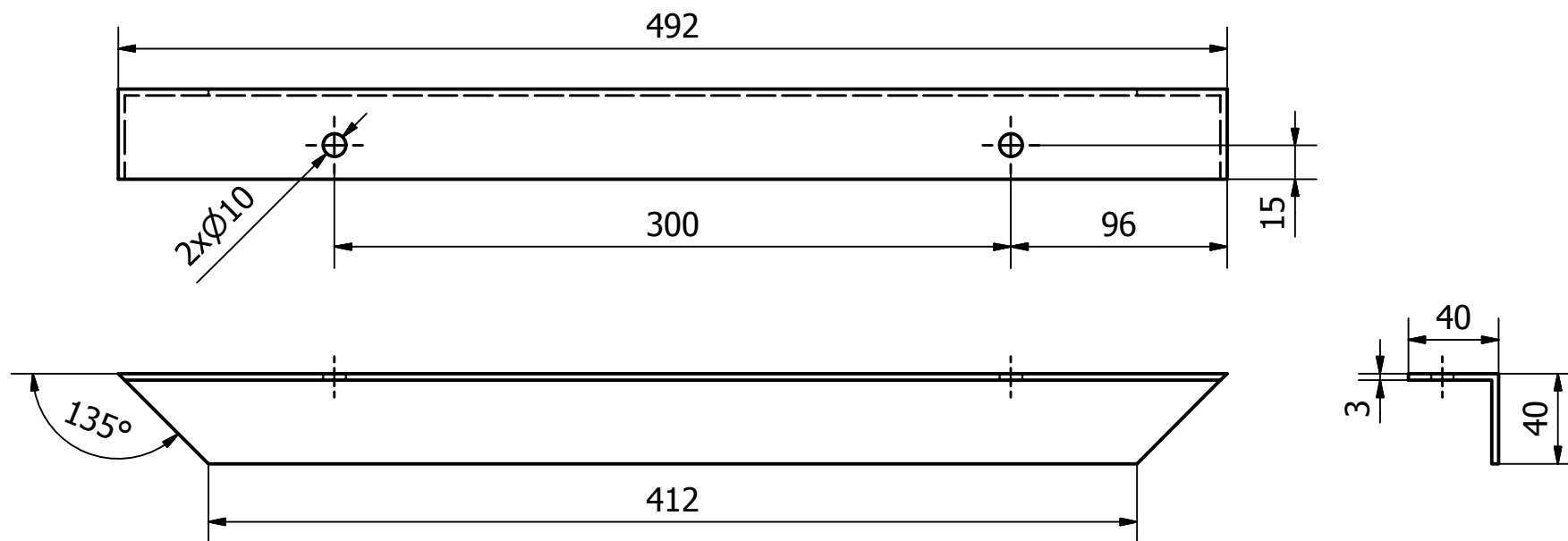
2	Kaki Belakang	Baja Karbon Rendah	1.1	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 1	A4



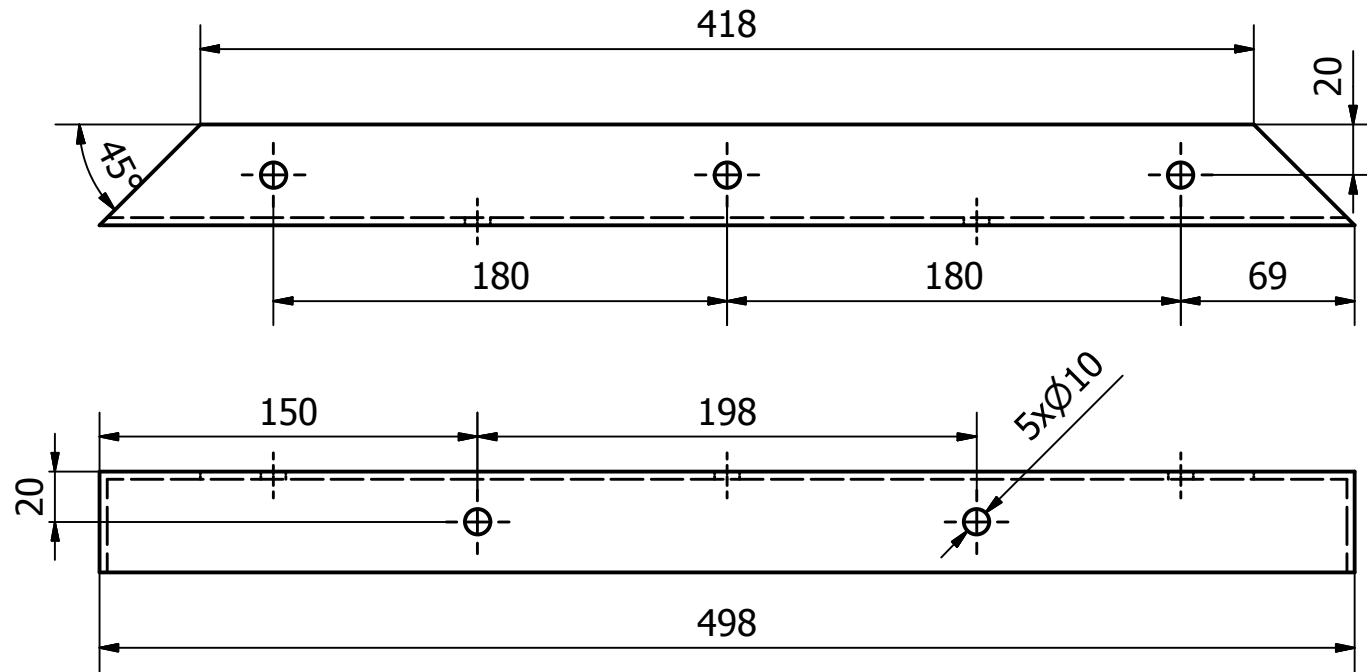
2	Kaki Depan	Baja Karbon Rendah	1.2	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyantoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 1	A4

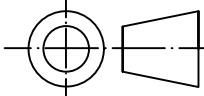


1	Dudukan Cover 1	Baja Karbon Rendah	1.3	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 3	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	<b>No. 1</b>	<b>A4</b>

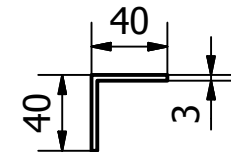
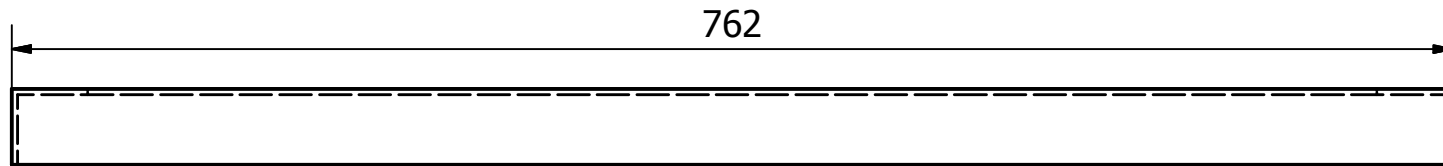
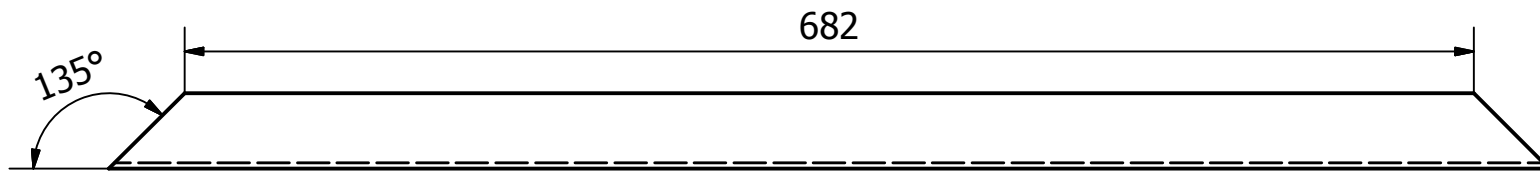


1	Dudukan Cover 2	Baja Karbon Rendah	1.4
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 3	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 1   A4

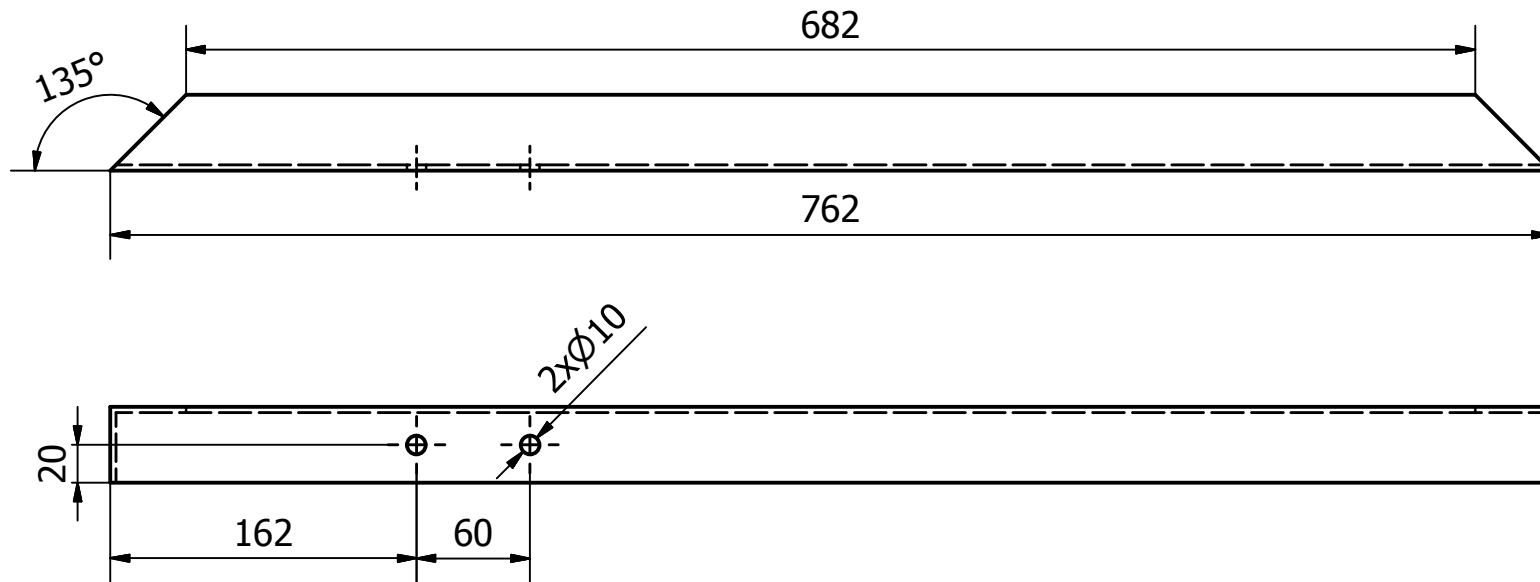


1	Dudukan Cover 3	Baja Karbon Rendah	1.5
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 3	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 1
			A4

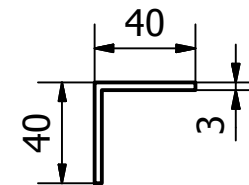
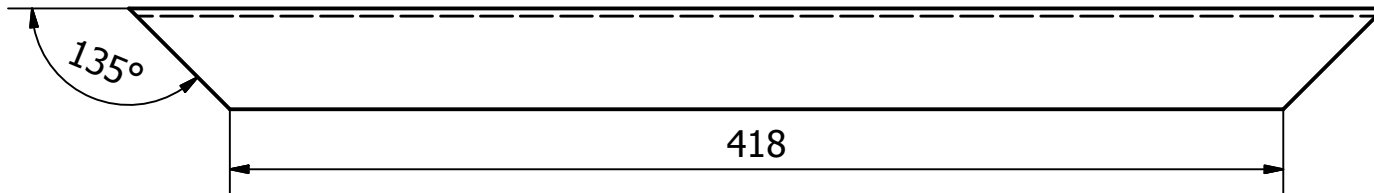
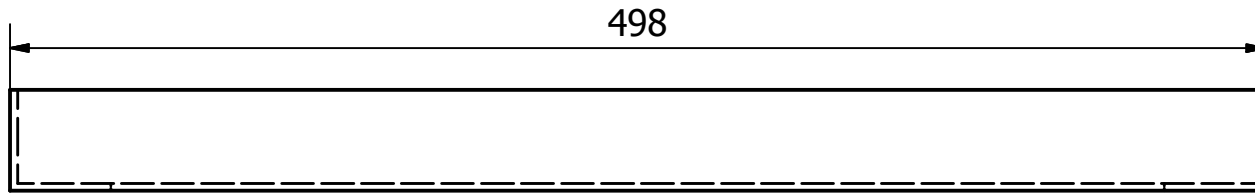


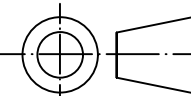


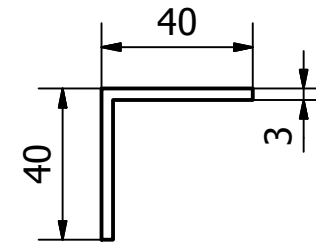
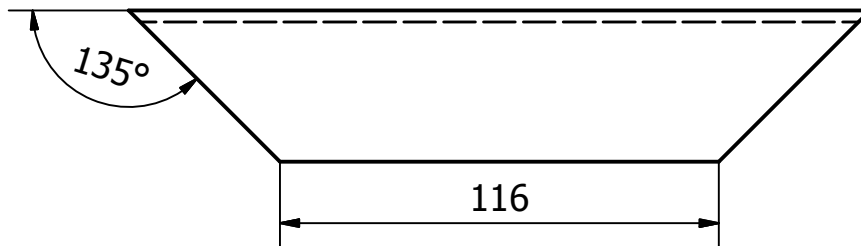
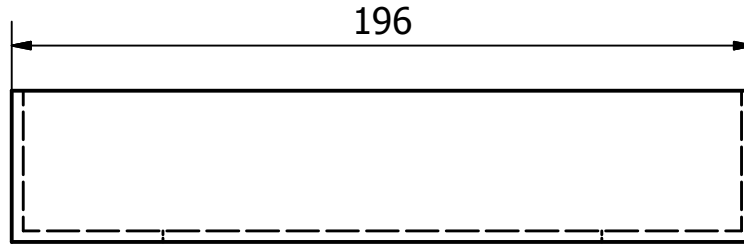
1	Dudukan Cover 4	Baja Karbon Rendah	1.6	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 4	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 1	A4



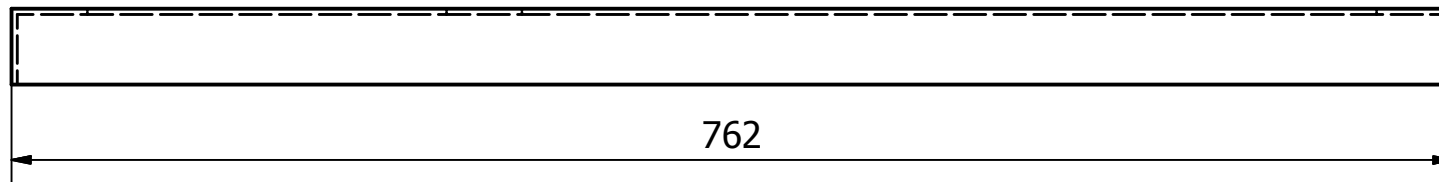
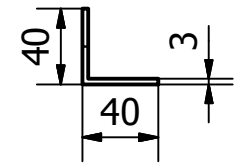
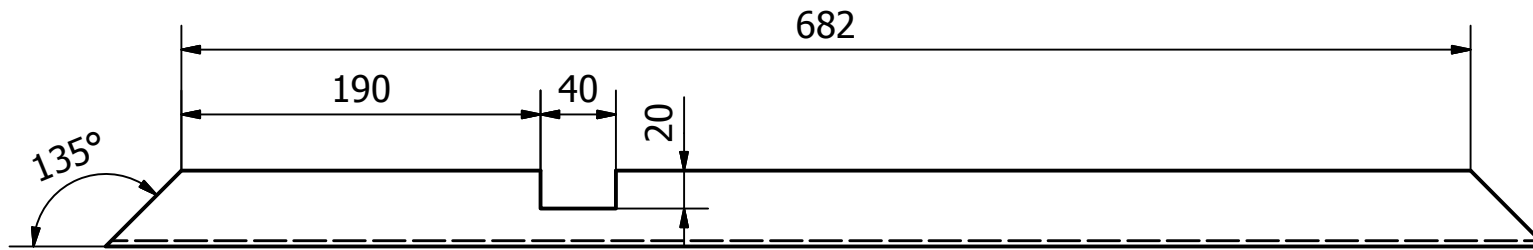
1	Dudukan Cover 5	Baja Karbon Rendah	1.7	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 4	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 1	A4



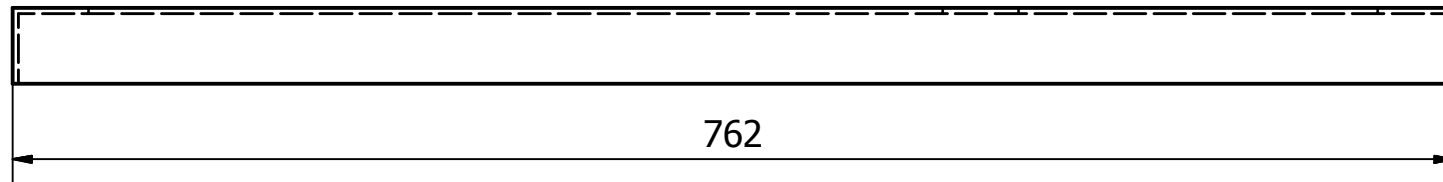
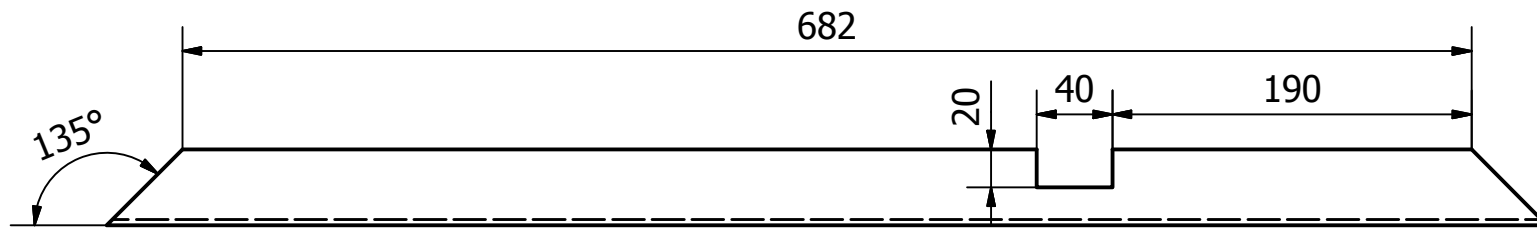
3	Penahan Kaki-kaki	Baja Karbon Rendah	1.8	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 3	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 1	A4



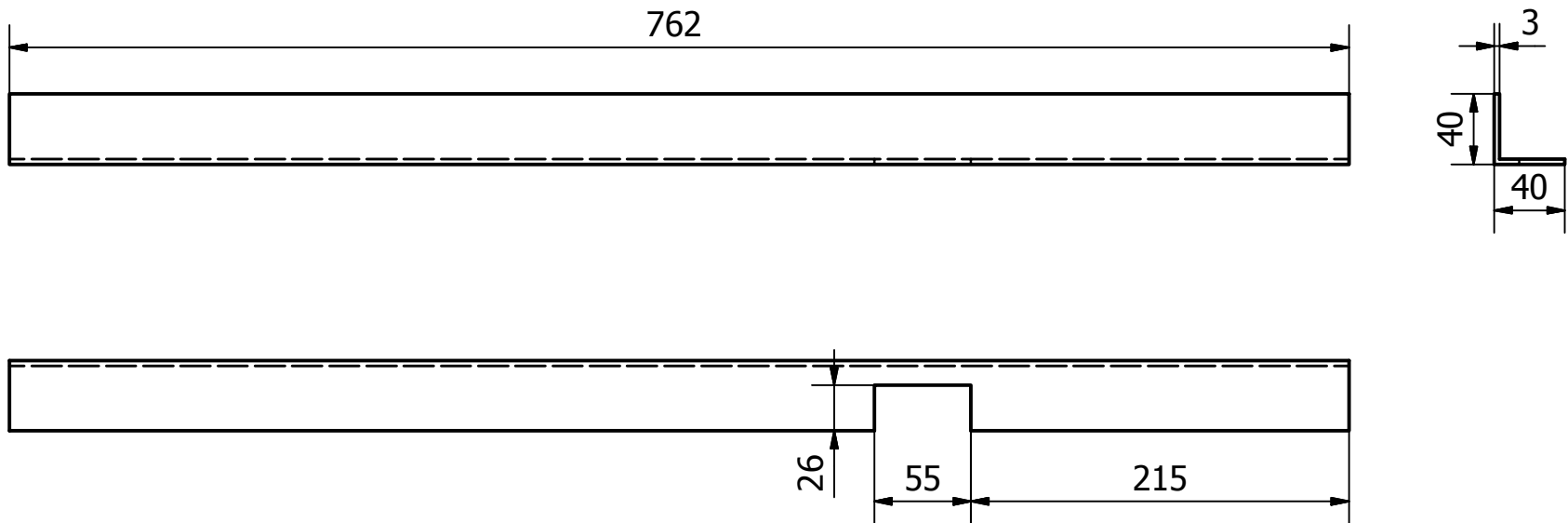
2	Penahan Tengah	Baja Karbon Rendah	1.9	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 1	A4



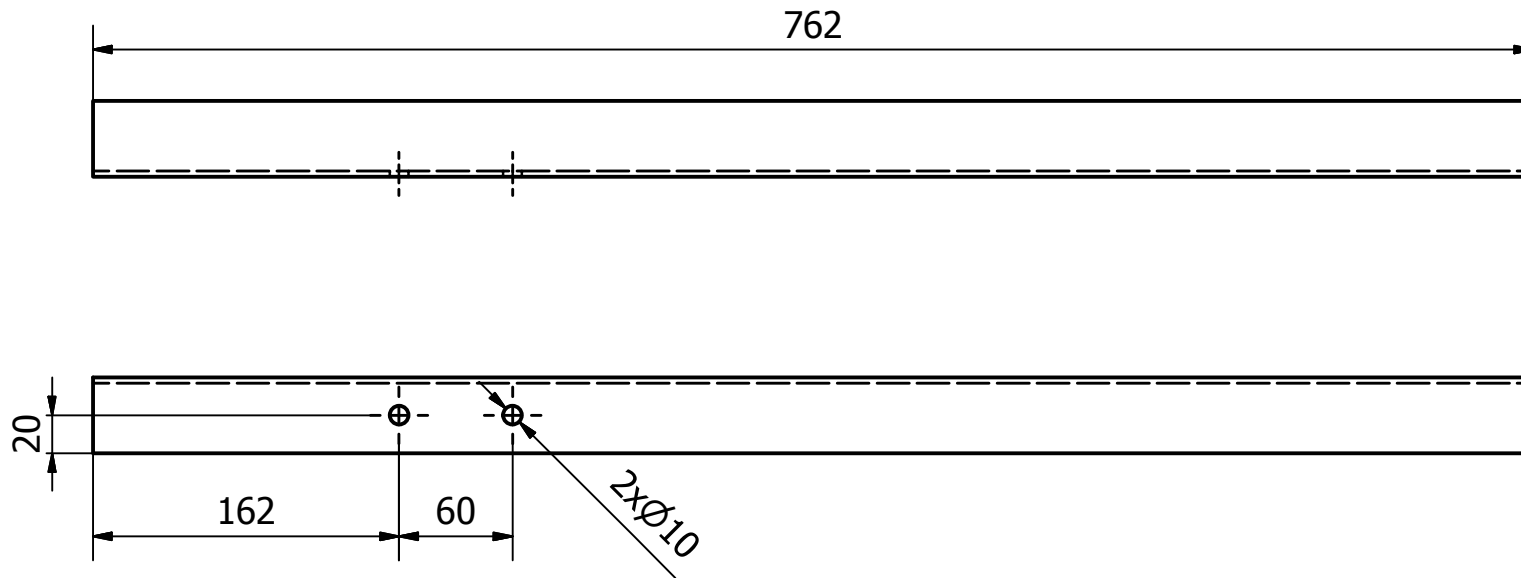
1	Dudukan VC 1	Baja Karbon Rendah	1.10	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 4	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 1	A4



1	Dudukan VC 2	Baja Karbon Rendah	1.11	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 4	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 1	A4

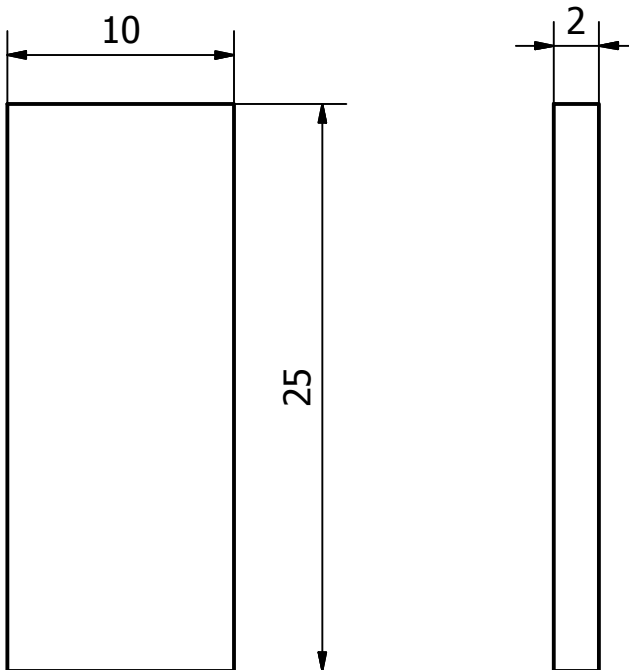


1	Dudukan Bearing1	Baja Karbon Rendah	1.12	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 4	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 1	A4

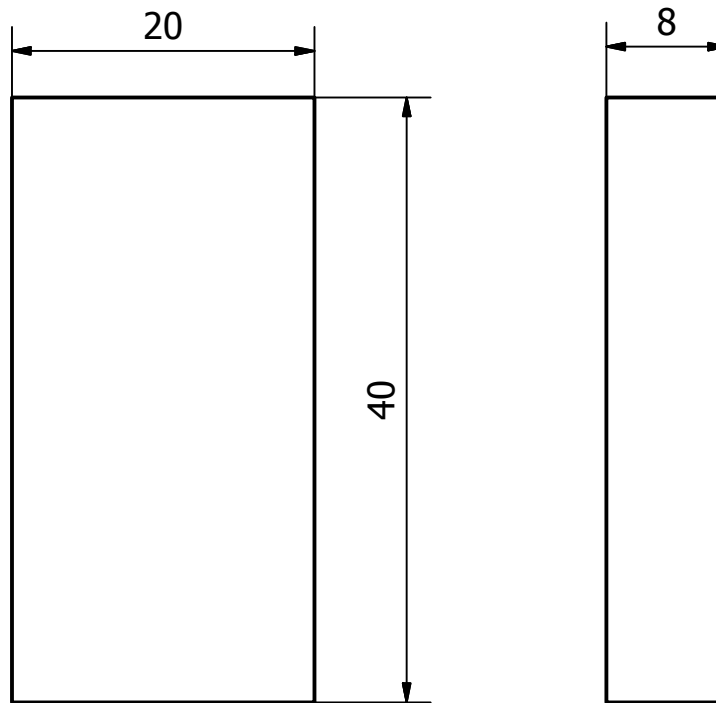


1	Dudukan Bearing2	Baja Karbon Rendah	1.13	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 4	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 1	A4

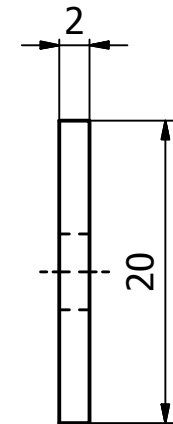
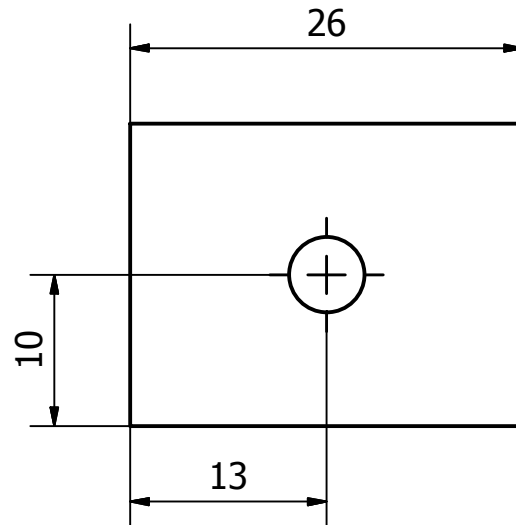




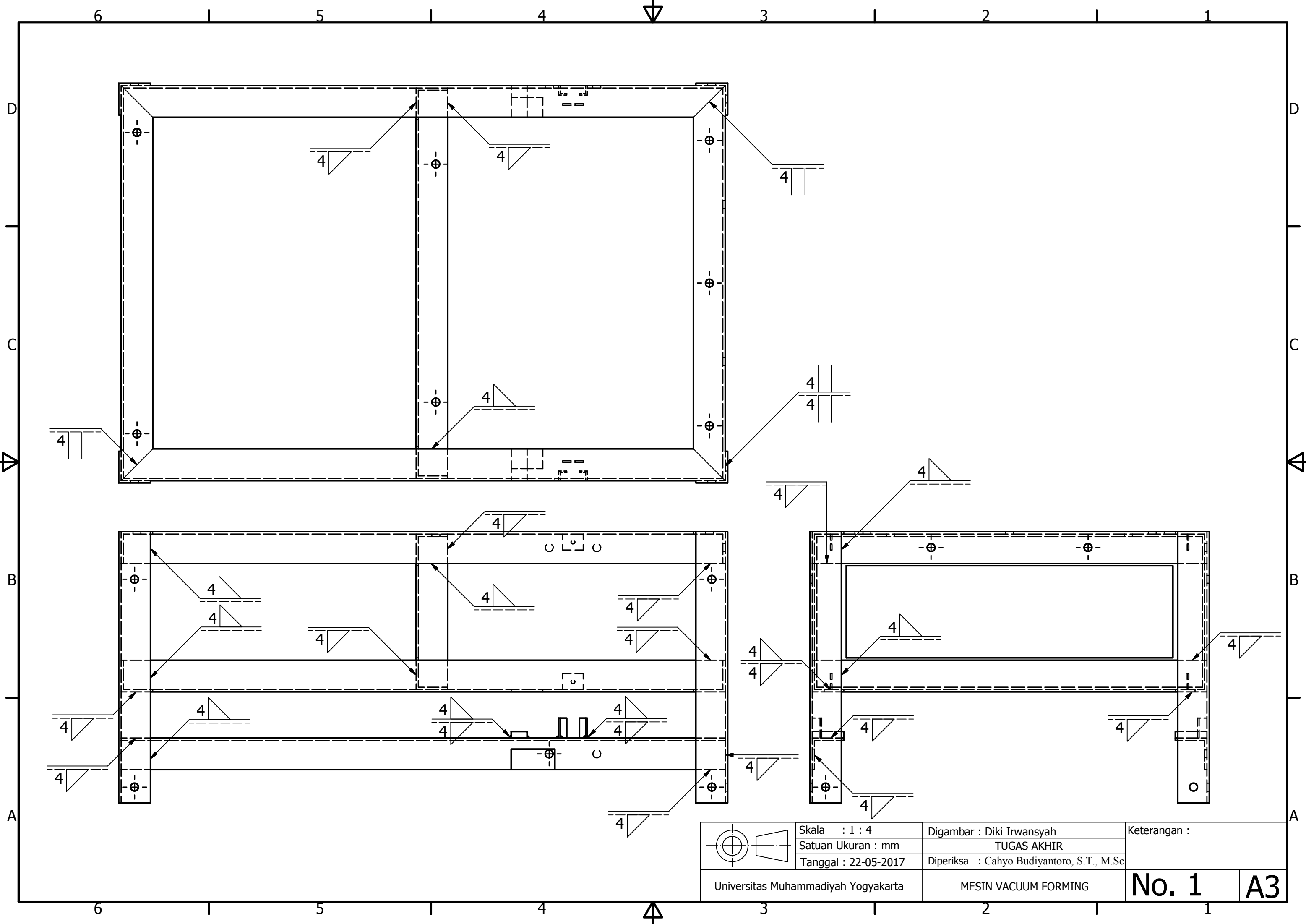
8	Penahan Bearing	Baja Karbon Rendah	1.14	
Jumlah	Nama	Material	No. Barang	
	Skala : 3 : 1	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 1	A4



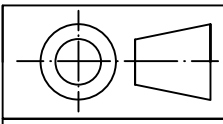
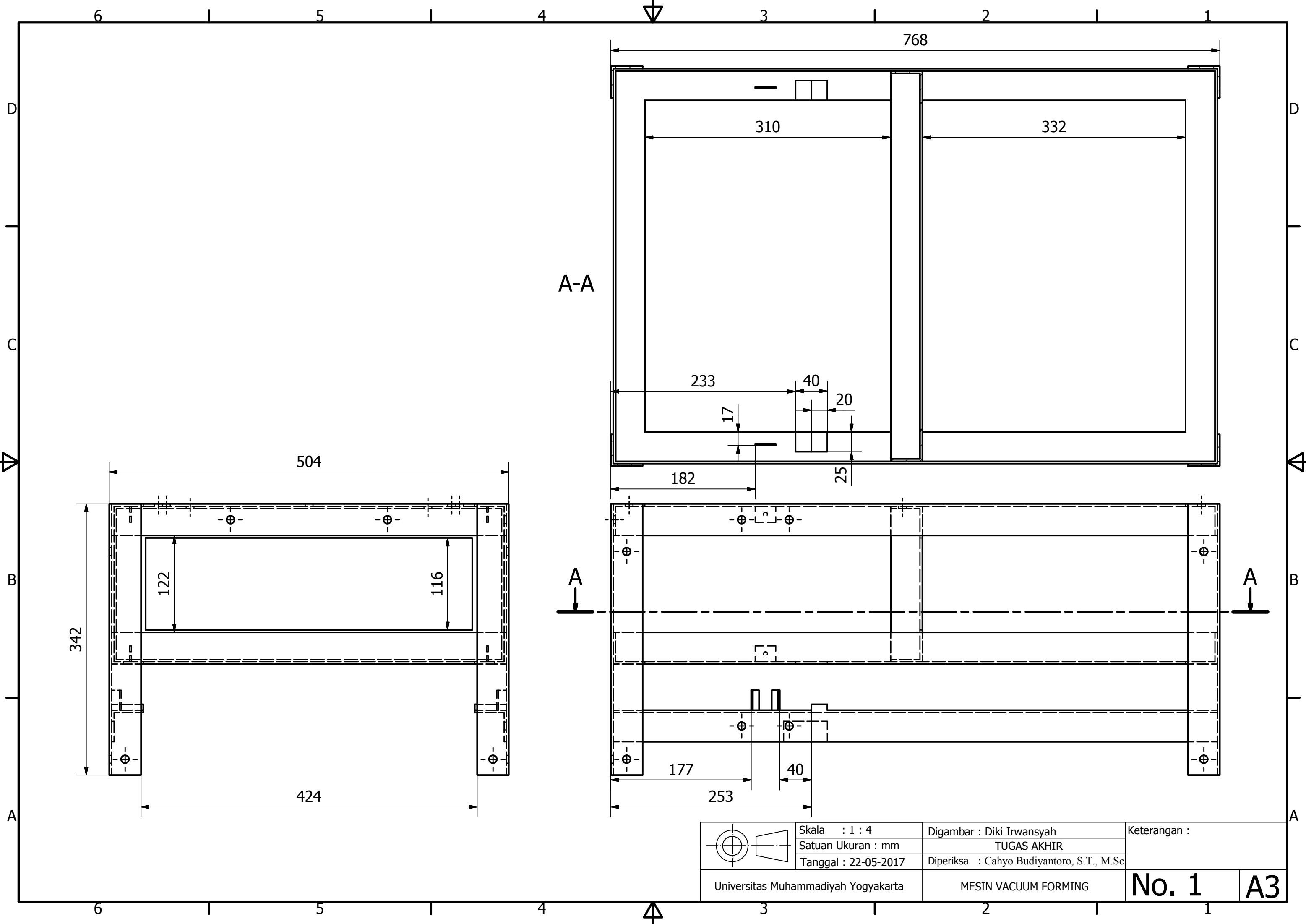
2	Penahan Tuas	Baja Karbon Rendah	1.15	
Jumlah	Nama	Material	No. Barang	
	Skala : 2 : 1	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
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4	Penahan Jalur VC	Baja Karbon Rendah	1.16	
Jumlah	Nama	Material	No. Barang	
	Skala : 2 : 1	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 1	A4



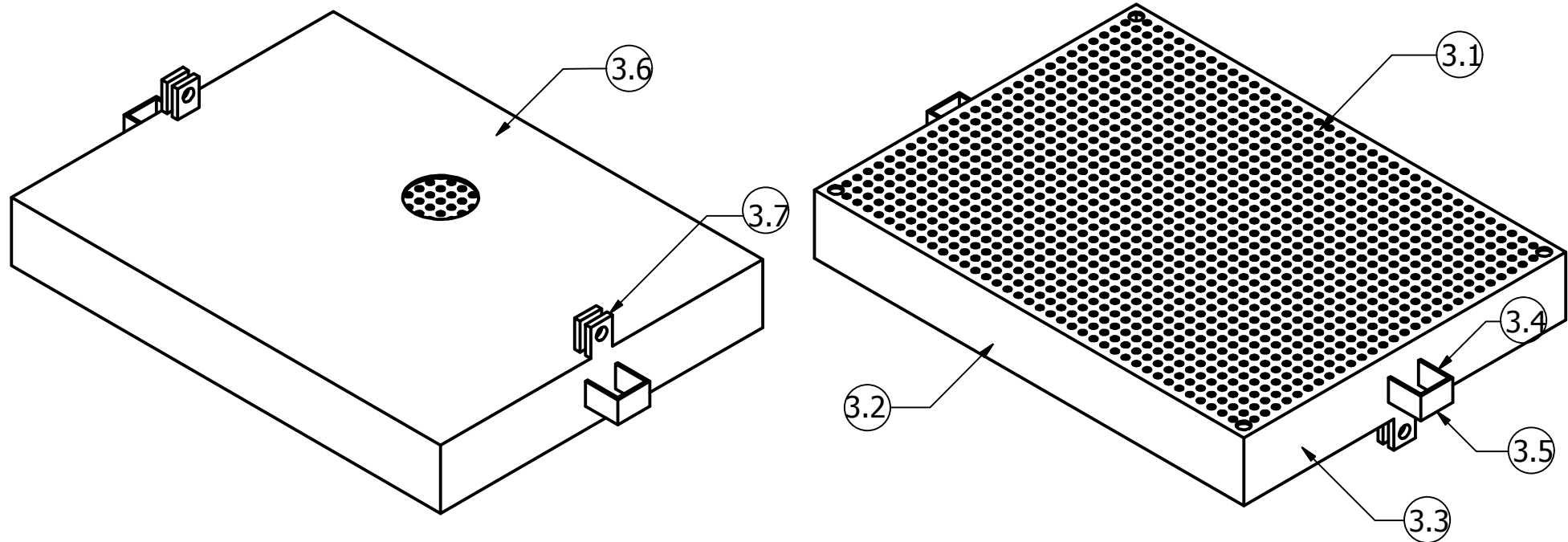
	Skala : 1 : 4	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta	MESIN VACUUM FORMING	<b>No. 1</b>	<b>A3</b>



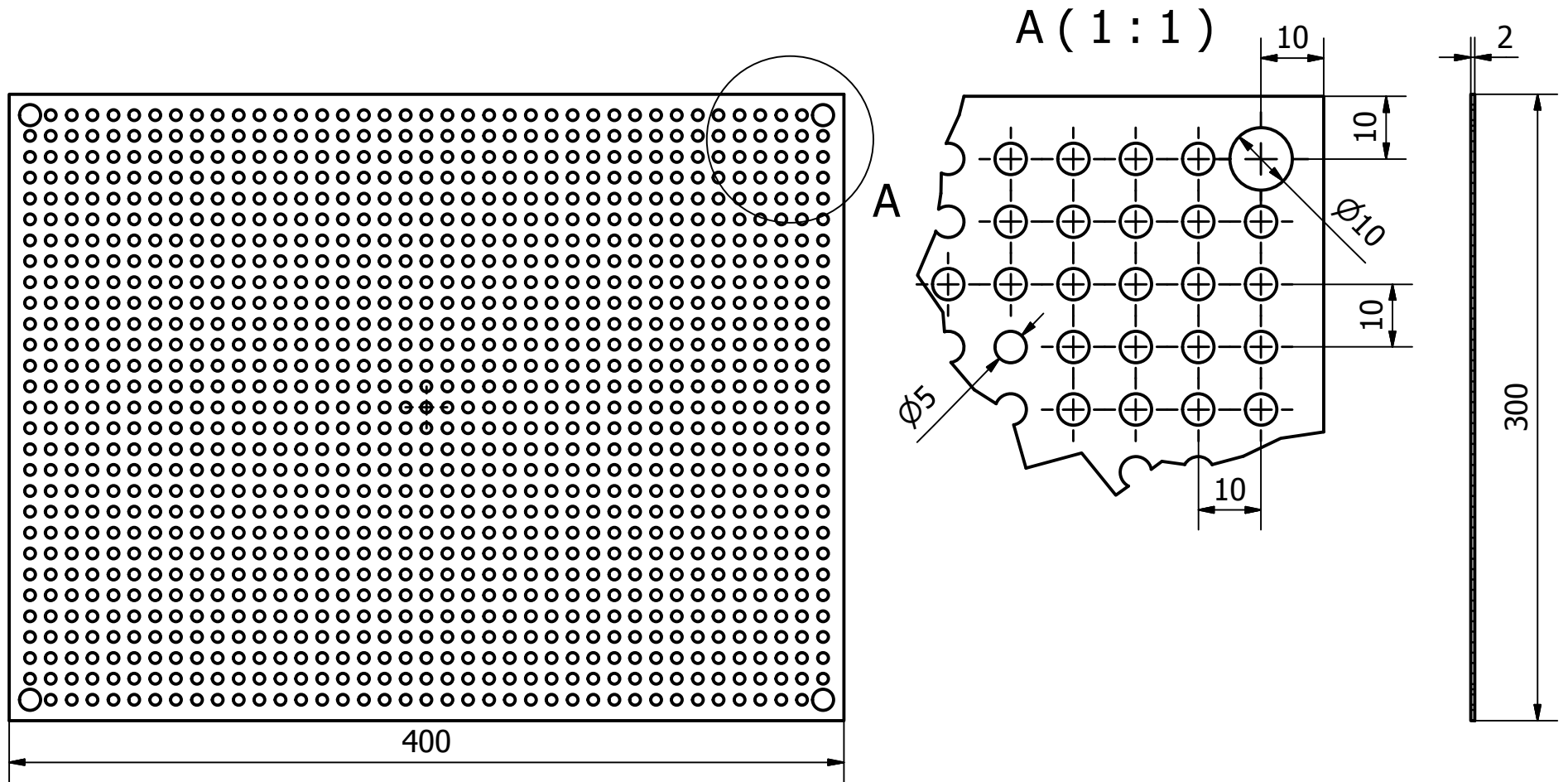
Skala : 1 : 4	Digambar : Diki Irwansyah	Keterangan :
Satuan Ukuran : mm	TUGAS AKHIR	
Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	

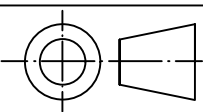


4	Plat Jalur VC	Baja Karbon Rendah	2	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc.		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 2	A4

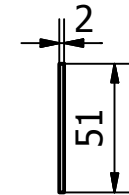
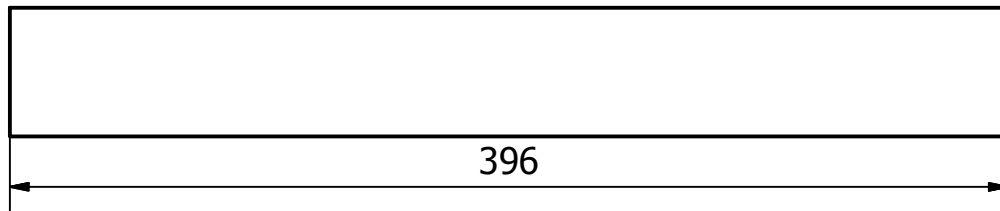


3.7	4	Plat Penghubung	Baja Karbon Rendah	400x300x2 mm	
3.6	1	Plat Bawah	Baja Karbon Rendah	25x20x5 mm	
3.5	2	Plat Jalur 2	Baja Karbon Rendah	30x20x2 mm	
3.4	4	Plat Jalur 1	Baja Karbon Rendah	28x20x2 mm	
3.3	2	Plat Samping 2	Baja Karbon Rendah	300x51x2 mm	
3.2	2	Plat Samping 1	Baja Karbon Rendah	396x51x2 mm	
3.1	1	Plat Berlubang	Baja Karbon Rendah	400x300x2 mm	
NO	Jumlah	Nama	Material	Ukuran	
	Skala : 1 : 4		Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm		TUGAS AKHIR		
	Tanggal : 22-05-2017		Diperiksa : Cahyo Budiyantoro, S.T., M.Sc.		
Universitas Muhammadiyah Yogyakarta			MESIN VACUUM FORMING	No. 3	A4

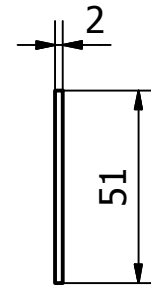
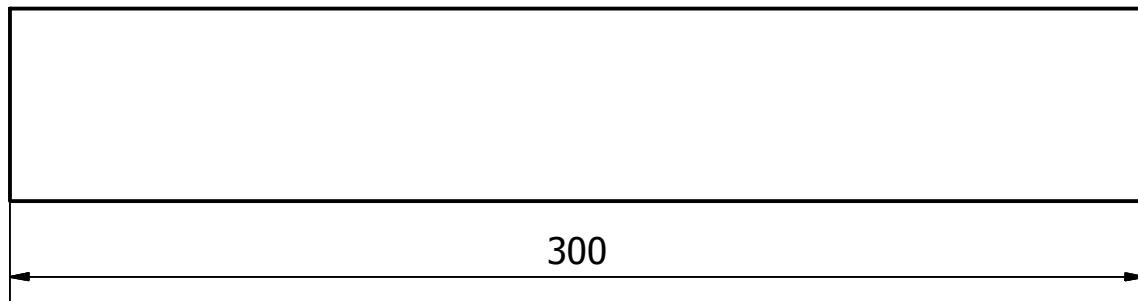


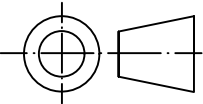
1	Plat Berlubang	Baja Karbon Rendah	3.1	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 3	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc.		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 3	A4

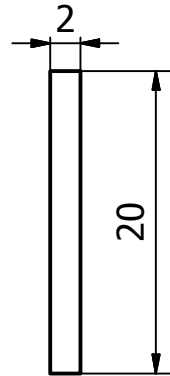
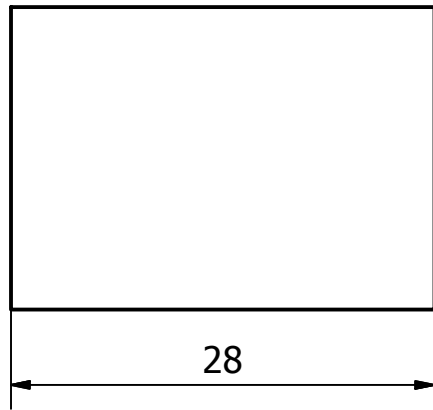




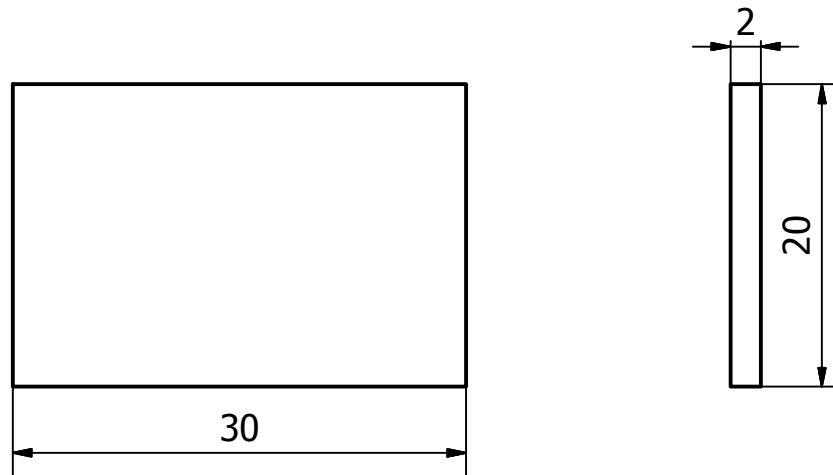
2	Plat Samping 1	Baja Karbon Rendah	3.2	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 3	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc.		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 3	A4



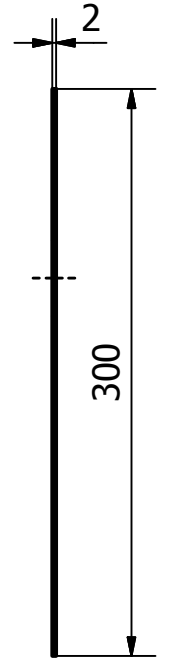
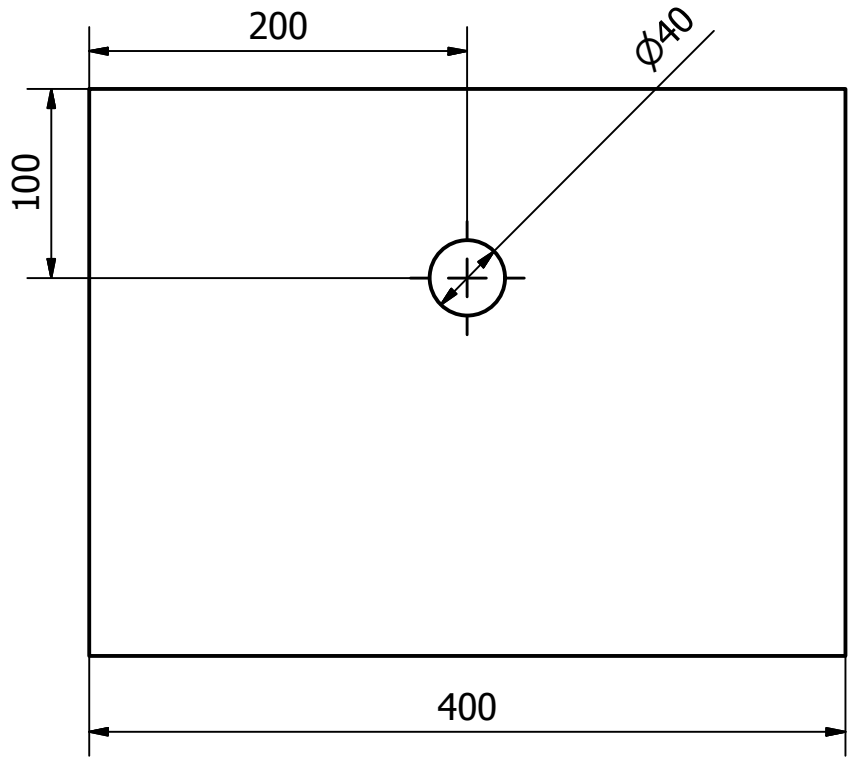
2	Plat Samping 2	Baja Karbon Rendah	3.3	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc.		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 3	A4



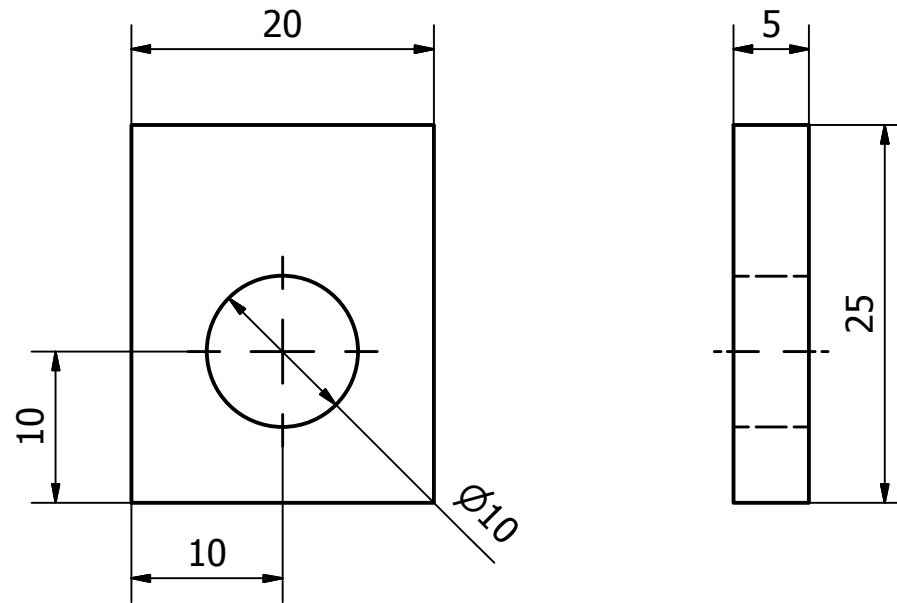
4	Plat Jalur 1	Baja Karbon Rendah	3.4	
Jumlah	Nama	Material	No. Barang	
	Skala : 2 : 1	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 3	A4



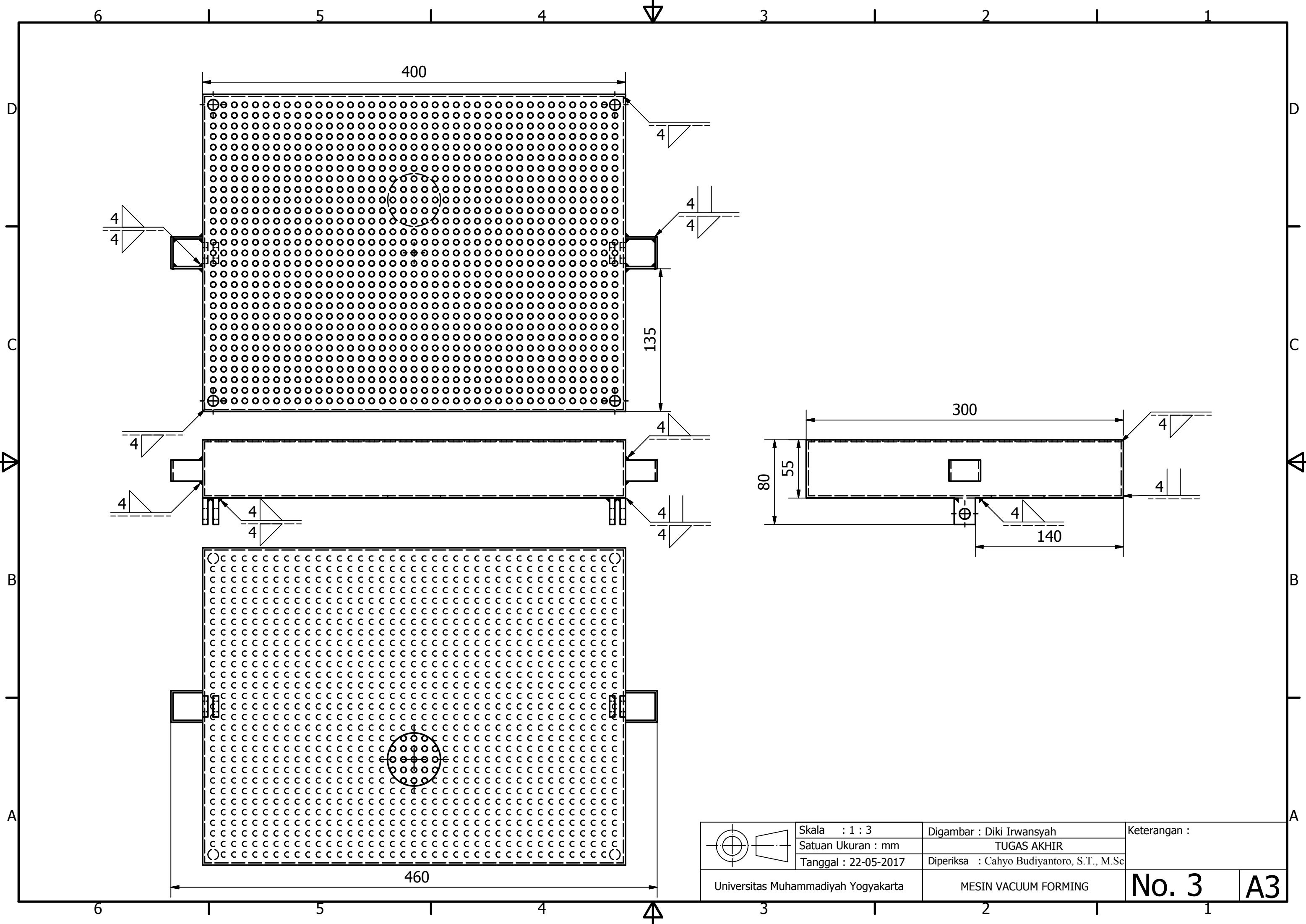
2	Plat Jalur 2	Baja Karbon Rendah	3.5	
Jumlah	Nama	Material	No. Barang	
	Skala : 2 : 1	Digambar : Diki Irwansyah	Keterangan :	
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	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
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1	Plat Bawah	Baja Karbon Rendah	3.6	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyantoro, S.T., M.Sc		
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4	Plat Penghubung	Baja Karbon Rendah	3.7	
Jumlah	Nama	Material	No. Barang	
	Skala : 2 : 1	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 3	A4



6 5 4 3 2 1

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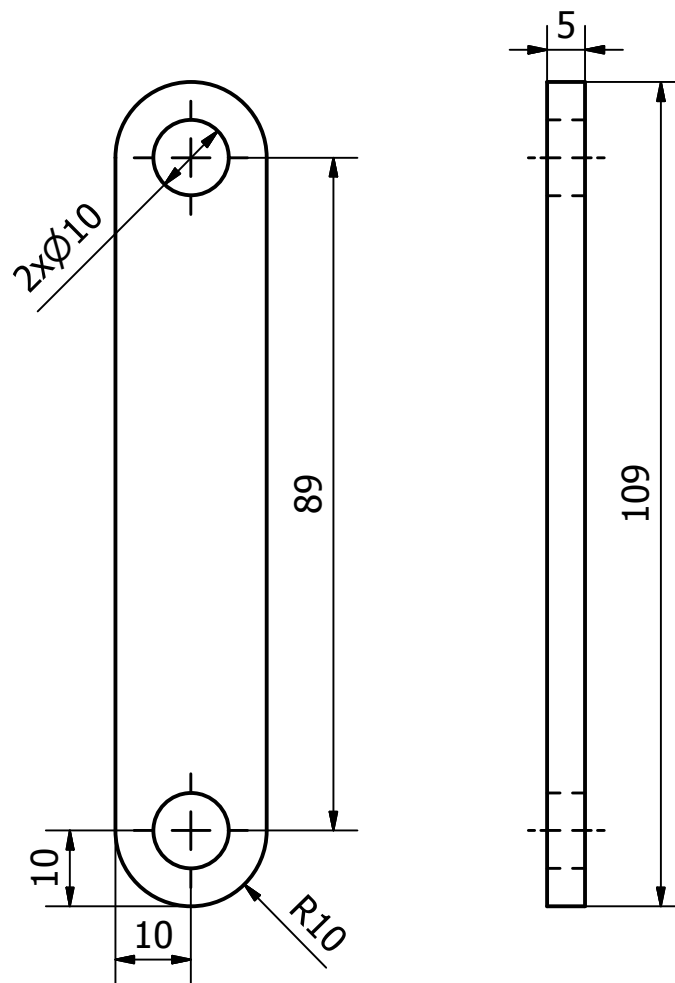
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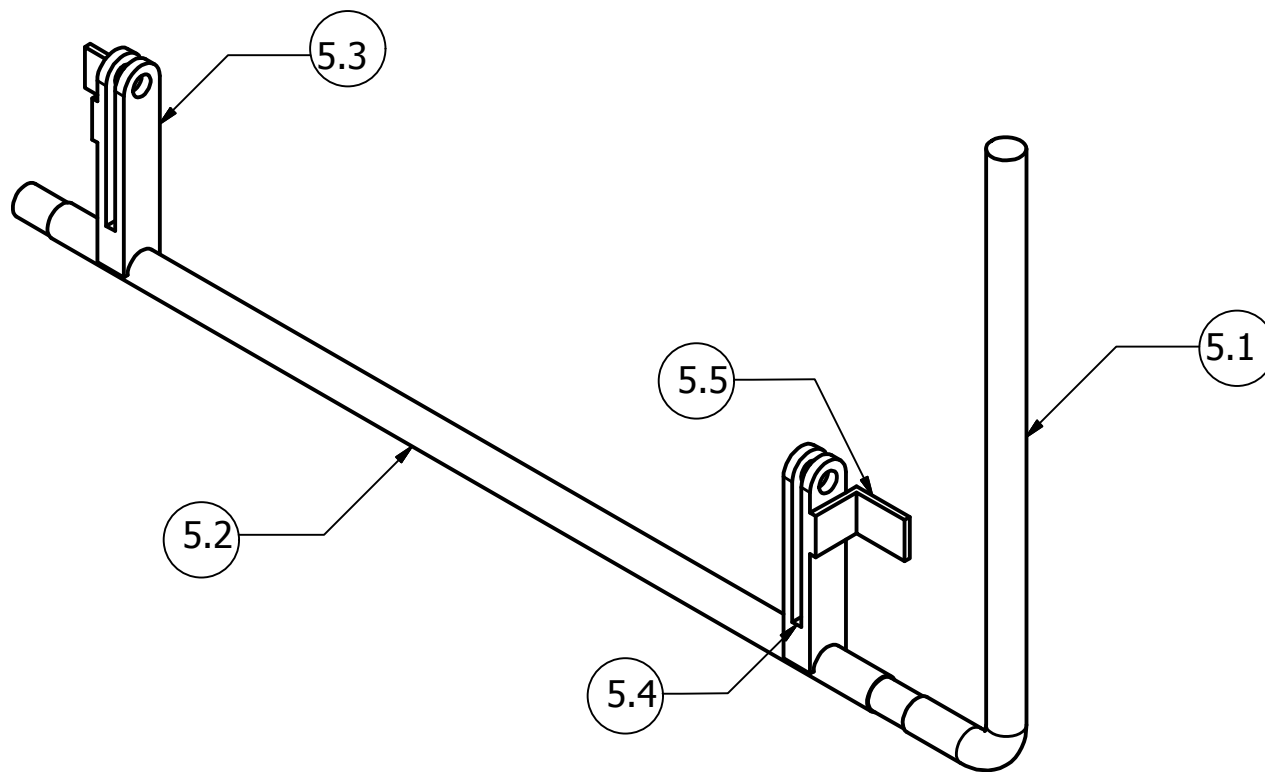
6 5 4 3 2 1

	Skala : 1 : 3	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta	MESIN VACUUM FORMING	No. 3	A3	

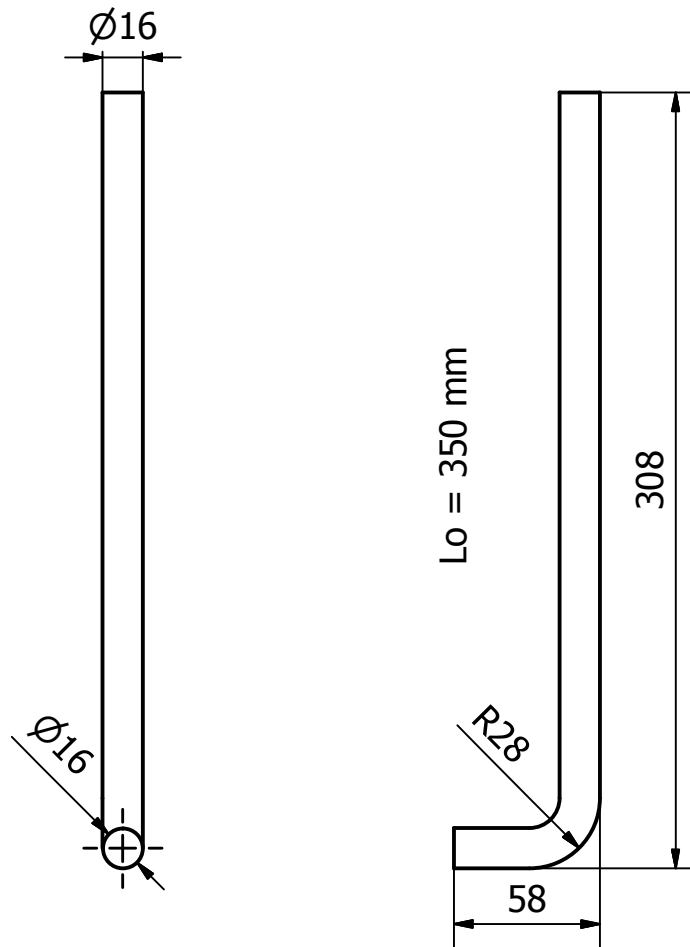


2	Plat Pengangkat	Baja Karbon Rendah	4	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 1	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 4	A4

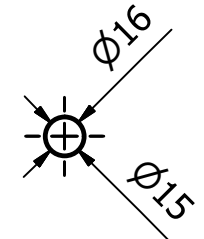
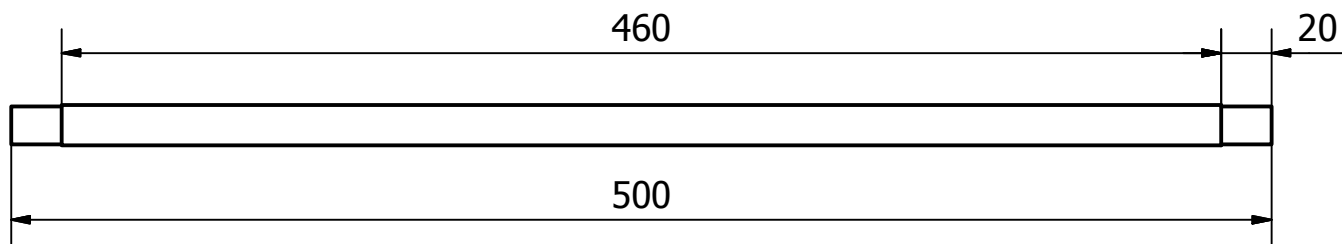


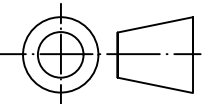


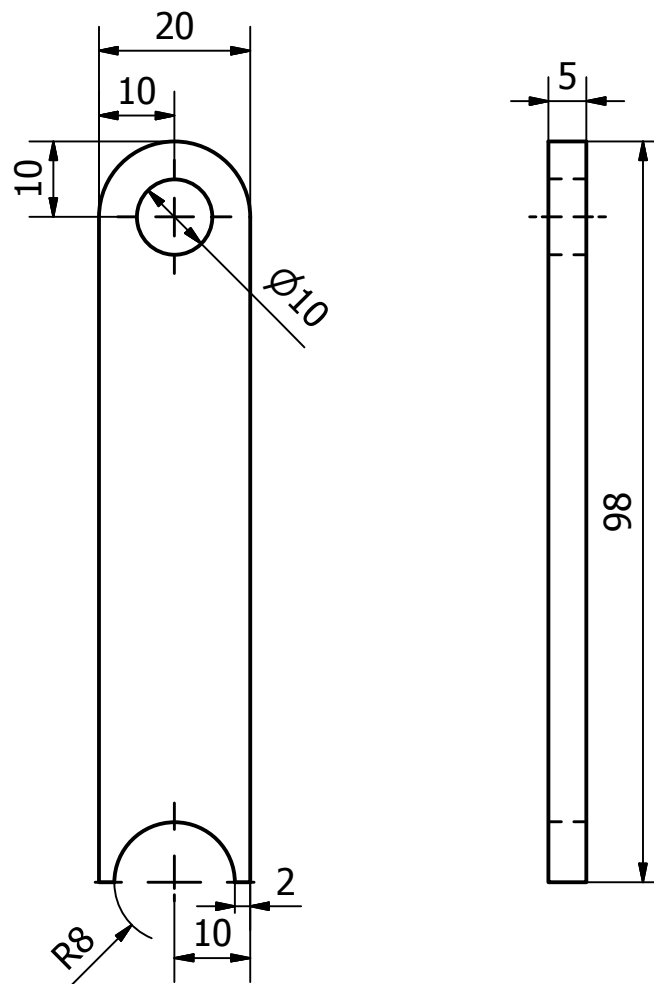
5.5	2	Penahan Tuas	Baja Karbon Rendah	30 x 26 x 3 mm	
5.4	2	Plat Penyambung	Baja Karbon Rendah	20 x 20 x 5 mm	
5.3	4	Plat Pengangkat	Baja Karbon Rendah	98 x 20 x 5 mm	
5.2	1	Poros	Baja Karbon Rendah	Ø16 mm	
5.1	1	Tuas	Baja Karbon Rendah	Ø16 mm	
NO	Jumlah	Nama	Material	Ukuran	
	Skala : 1 : 3		Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm		TUGAS AKHIR		
	Tanggal : 22-05-2017		Diperiksa : Cahyo Budiyantoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta			MESIN VACUUM FORMING	No. 5	A4



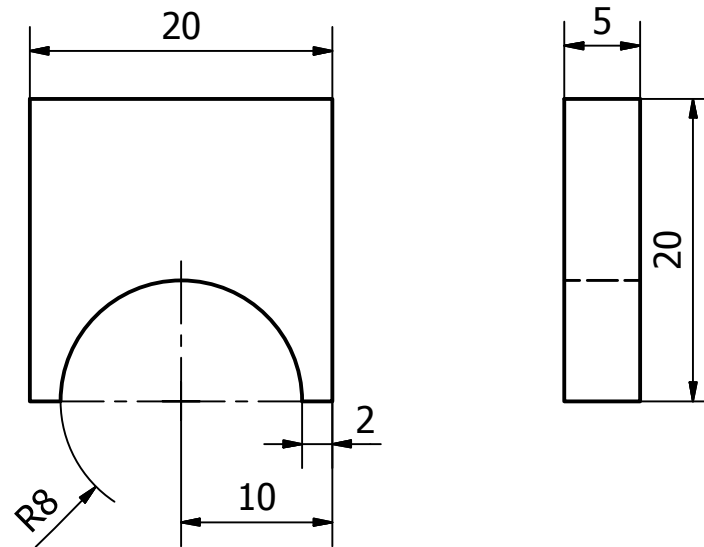
1	Tuas	Baja Karbon Rendah	5.1	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 3	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 5	A4



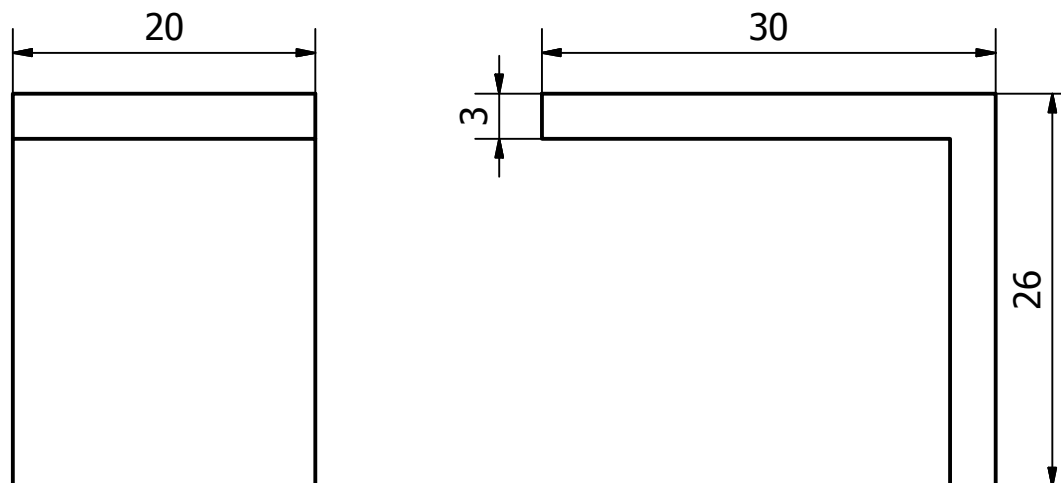
1	Poros	Baja Karbon Rendah	5.2	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 3	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	<b>No. 5</b>	<b>A4</b>



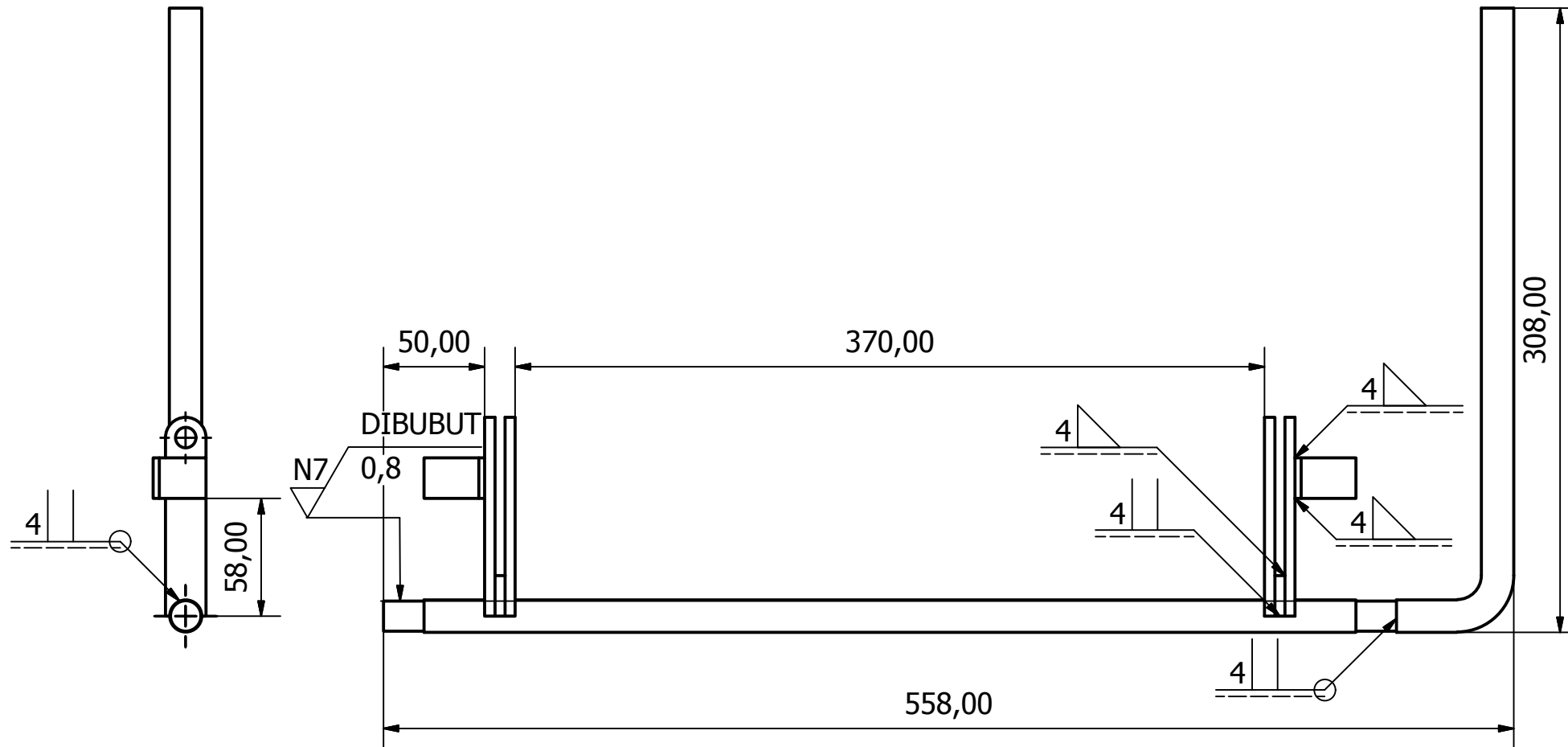
4	Plat Pengangkat	Baja Karbon Rendah	5.3
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 1	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	<b>No. 5</b>   <b>A4</b>



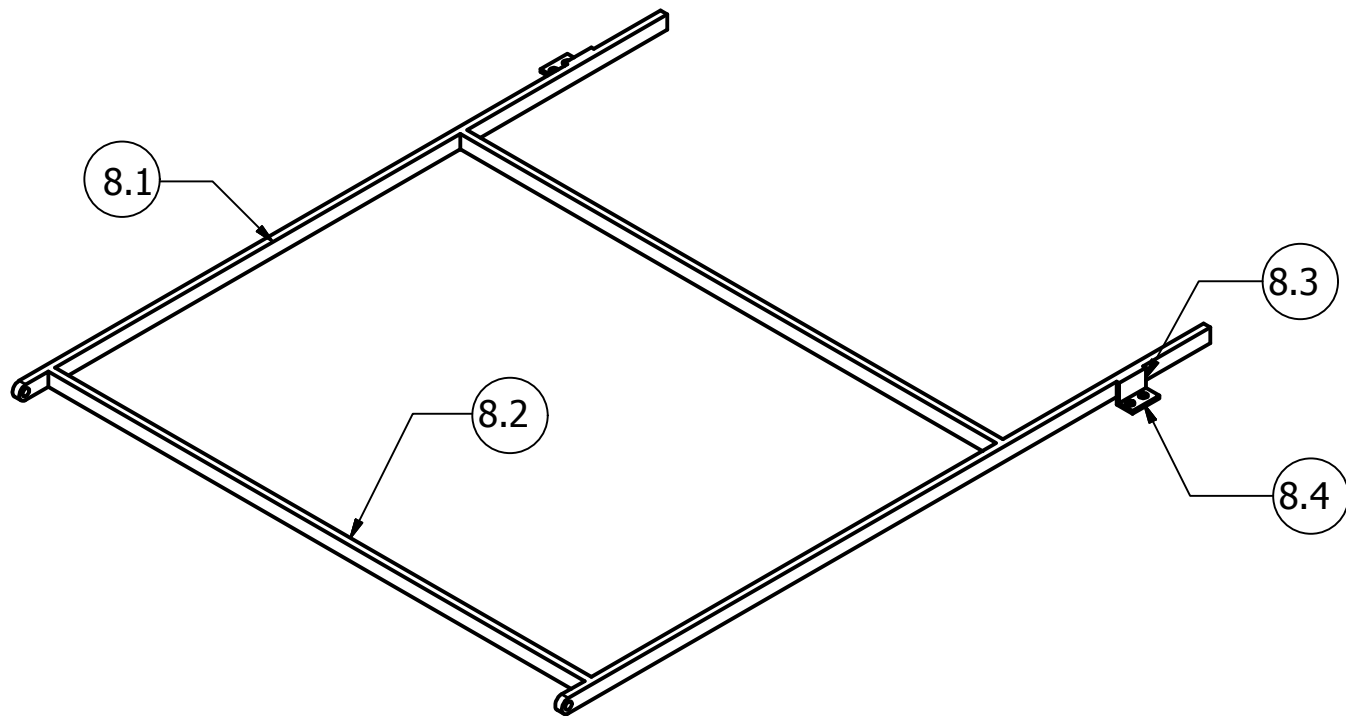
2	Plat Penyambung	Baja Karbon Rendah	5.4
Jumlah	Nama	Material	No. Barang
	Skala : 2 : 1	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 5   A4



2	Penahan Tuas	Baja Karbon Rendah	5.5	
Jumlah	Nama	Material	No. Barang	
	Skala : 2 : 1	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	<b>No. 5</b>	<b>A4</b>

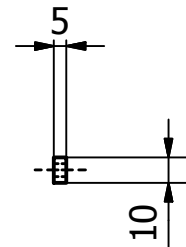
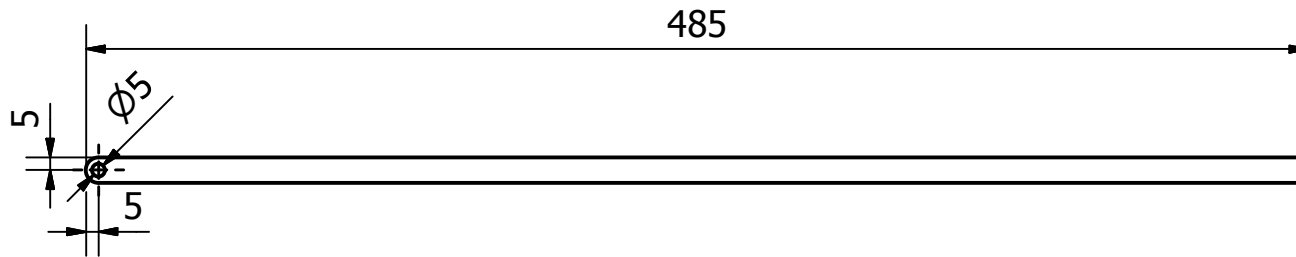


	Skala : 1 : 3	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc.		
Universitas Muhammadiyah Yogyakarta	MESIN VACUUM FORMING	No. 5	A4	

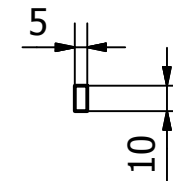
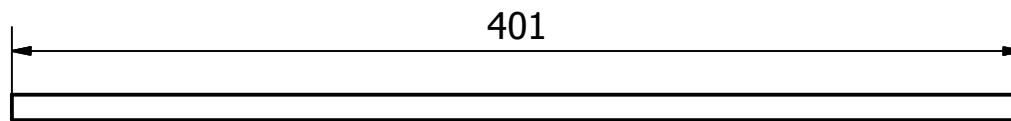


8.4	2	Plat Berlubang	Baja Karbon Rendah	20x12x2 mm	
8.3	2	Plat penghubung	Baja Karbon Rendah	20x13x2 mm	
8.2	2	Plat Penyanggah	Baja Karbon Rendah	401x10x5 mm	
8.1	2	Plat Pegangan	Baja Karbon Rendah	480x10x5 mm	
NO	Jumlah	Nama	Material	Ukuran	
	Skala : 1 : 2		Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm		TUGAS AKHIR		
	Tanggal : 22-05-2017		Diperiksa : Cahyo Budiyanoro, S.T., M.Sc.		
Universitas Muhammadiyah Yogyakarta			MESIN VACUUM FORMING	No. 8	A4

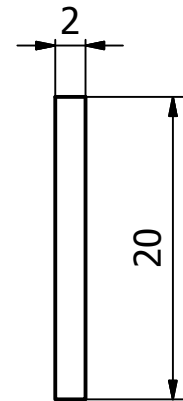
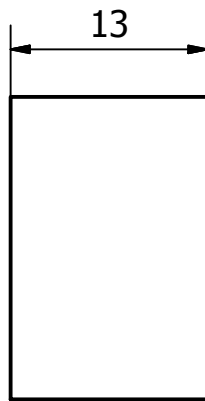




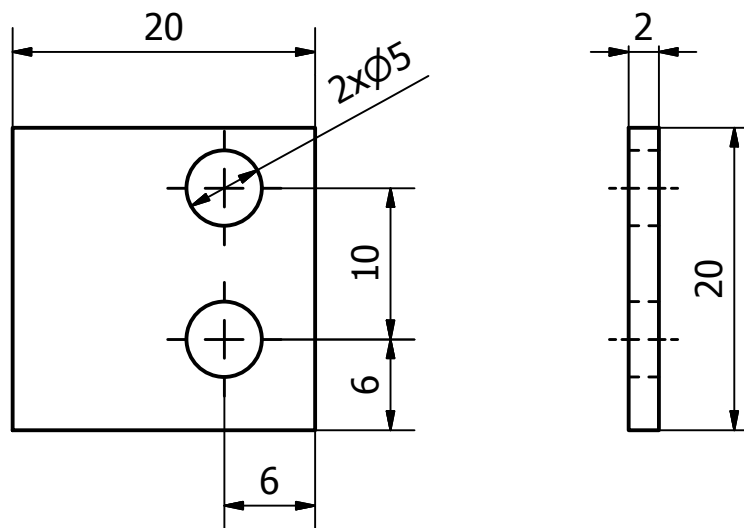
2	Plat Pegangan	Baja Karbon Rendah	8.1	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 3	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 8	A4



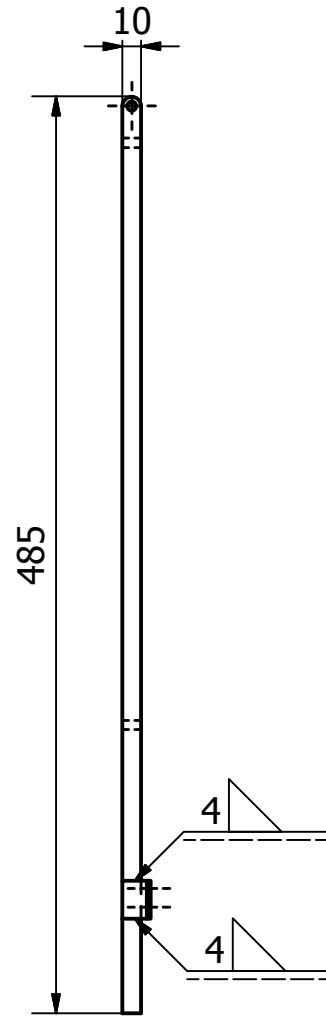
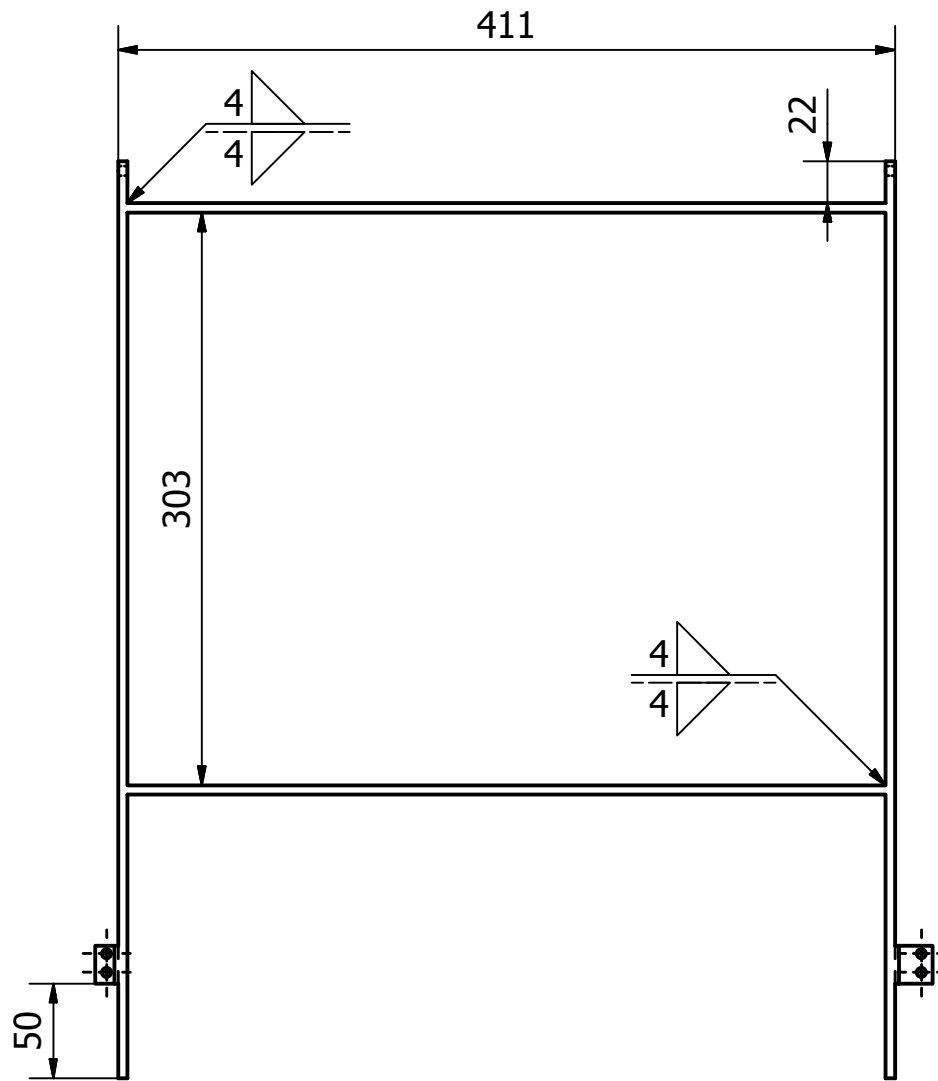
2	Plat Penyanggah	Baja Karbon Rendah	8.2	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 3	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 8	A4

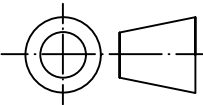


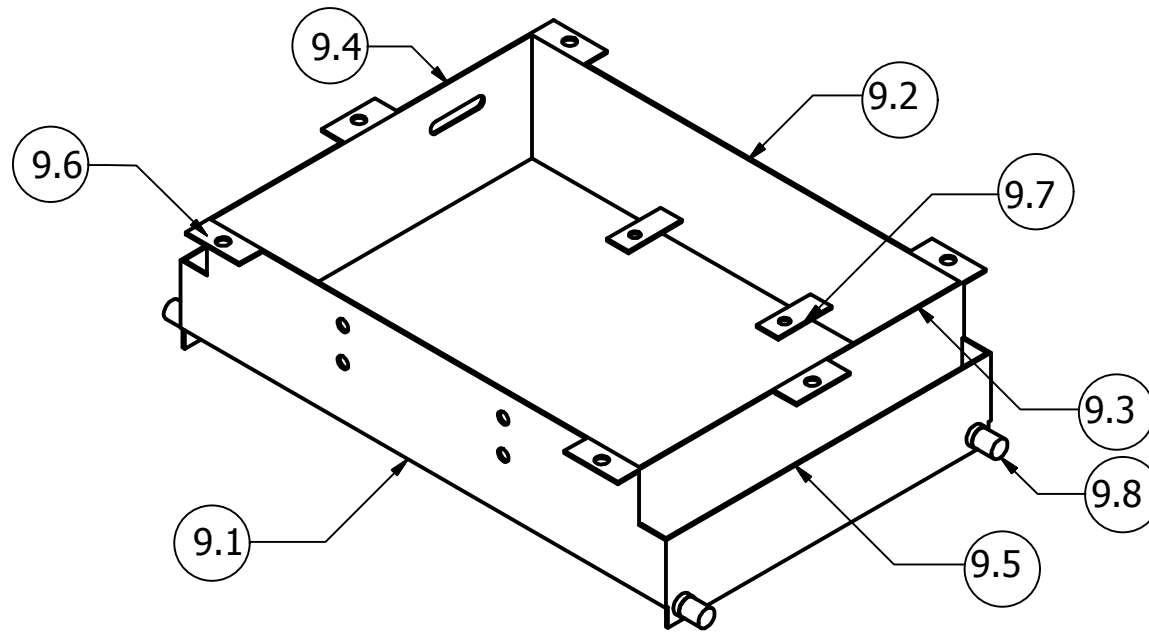
2	Plat Penghubung	Baja Karbon Rendah	8.3	
Jumlah	Nama	Material	No. Barang	
	Skala : 2 : 1	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 8	A4



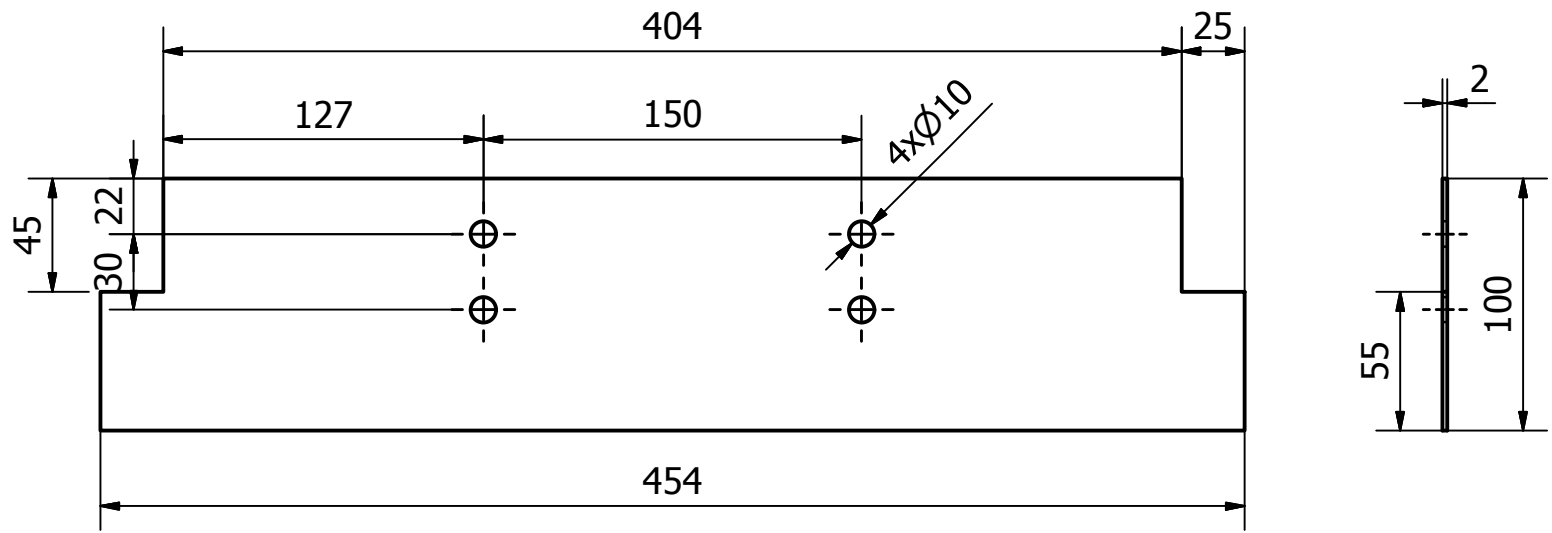
2	Plat Berlubang	Baja Karbon Rendah	8.4	
Jumlah	Nama	Material	No. Barang	
	Skala : 2 : 1	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 8	A4



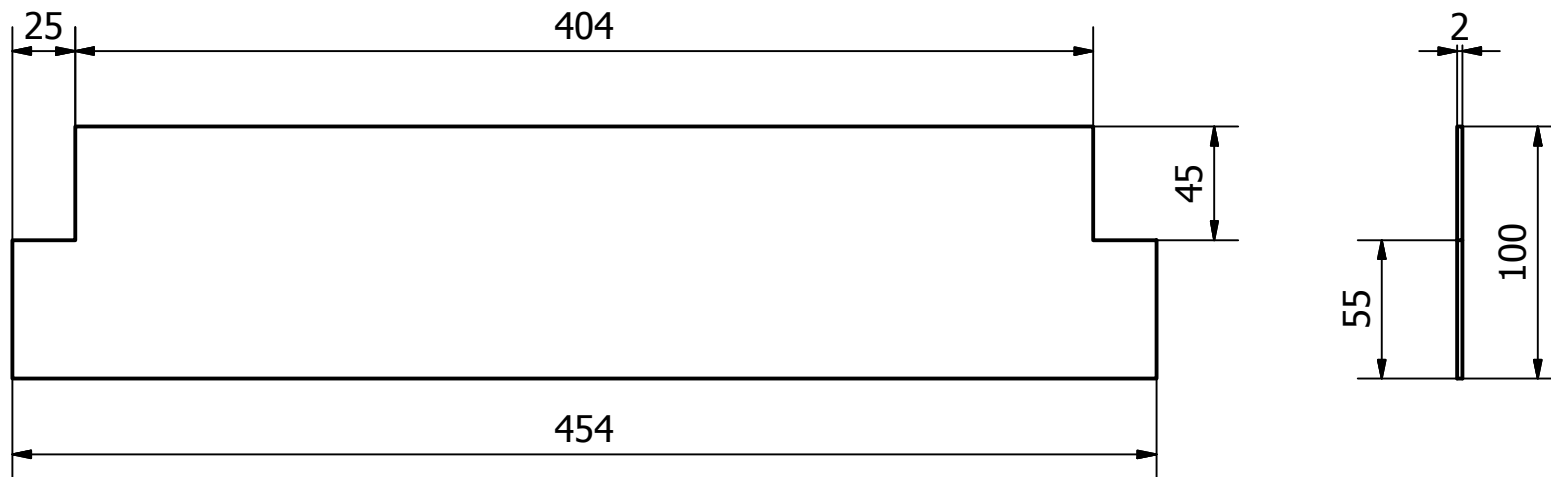
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	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyantoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta	MESIN VACUUM FORMING	No. 8	A4	



9.8	4	Poros Bearing	Baja Karbon Rendah	Ø16	
9.7	4	Plat Heater	Baja Karbon Rendah	50x20x2 mm	
9.6	6	Plat Penutup Atas	Baja Karbon Rendah	50x20x2 mm	
9.5	2	Plat Poros Bearing	Baja Karbon Rendah	300x72x2 mm	
9.4	1	Plat Kiri	Baja Karbon Rendah	300x100x2 mm	
9.3	1	Plat Kanan	Baja Karbon Rendah	300x100x2 mm	
9.2	1	Plat Belakang	Baja Karbon Rendah	454x100x2 mm	
9.1	1	Plat Depan	Baja Karbon Rendah	454x100x2 mm	
NO	Jumlah	Nama	Material	Ukuran	
	Skala : 1 : 5		Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm		TUGAS AKHIR		
	Tanggal : 22-05-2017		Diperiksa : Cahyo Budiyantoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta			MESIN VACUUM FORMING	No. 9	A4

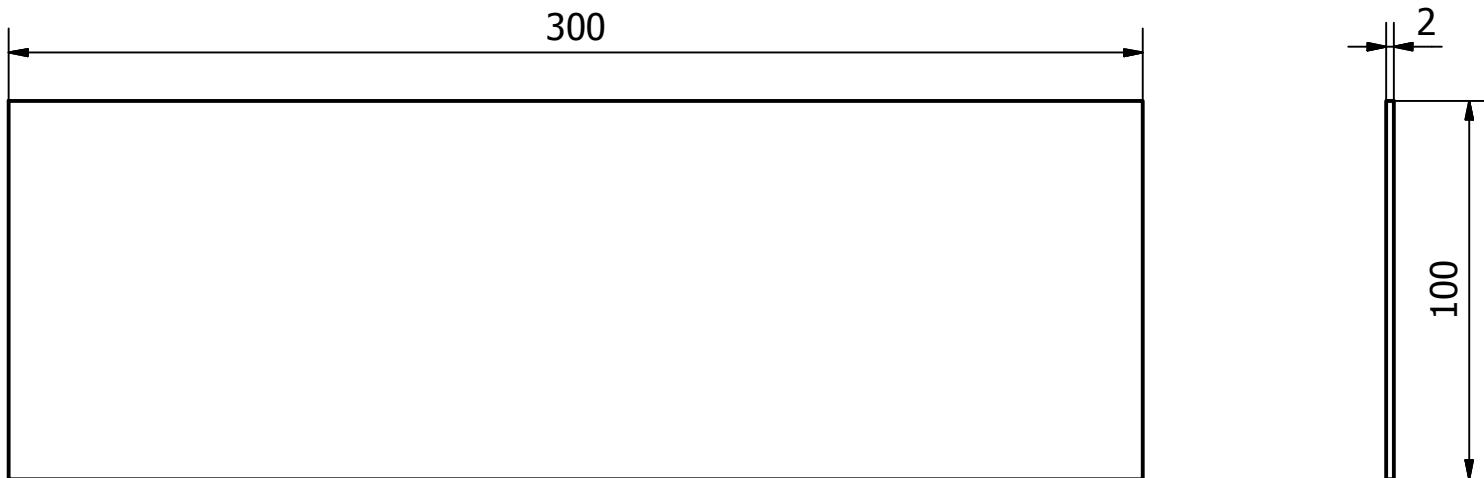


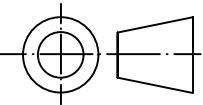
1	Plat Depan	Baja Karbon Rendah	9.1	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 3	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 9	A4

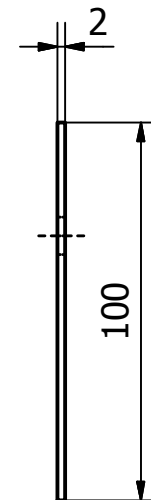
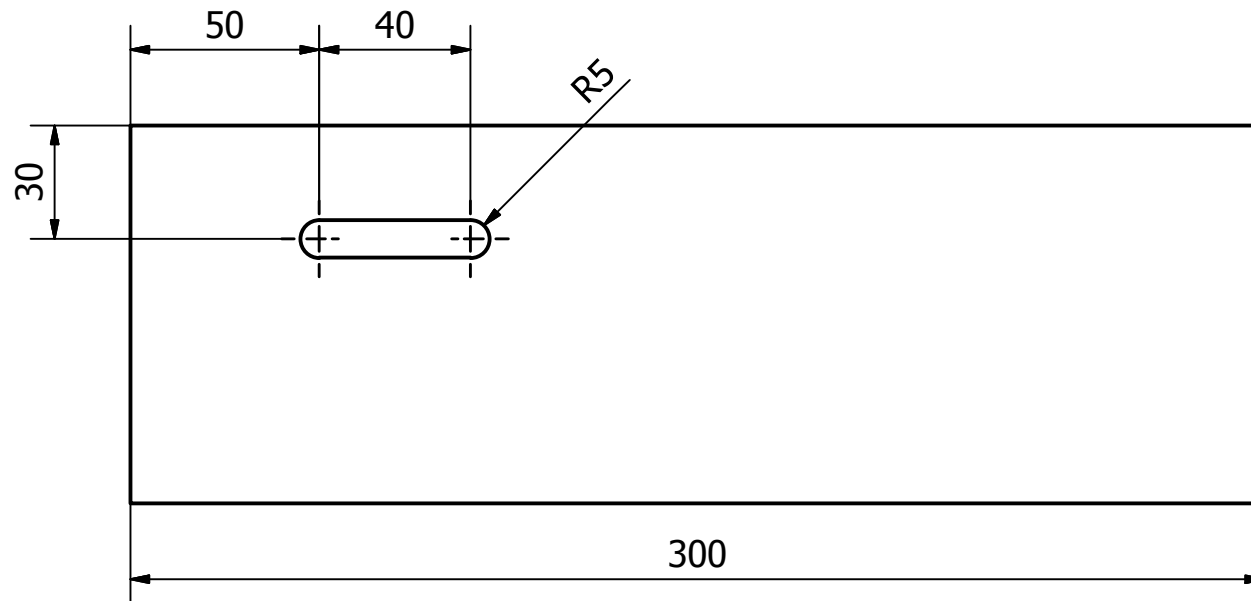


1	Plat Belakang	Baja Karbon Rendah	9.2
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 3	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 9
			A4

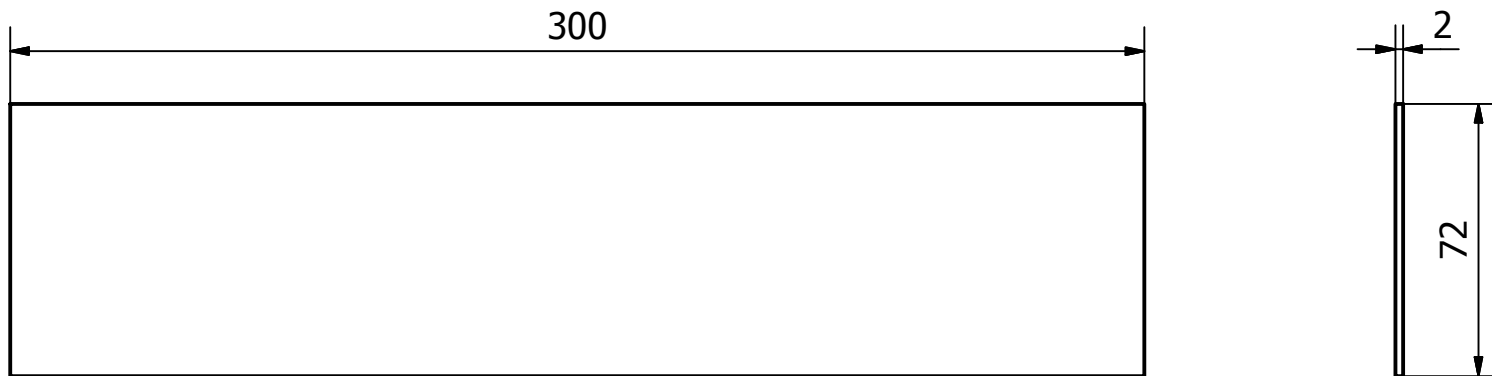




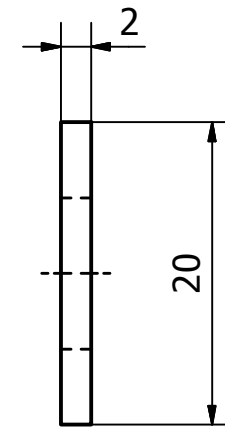
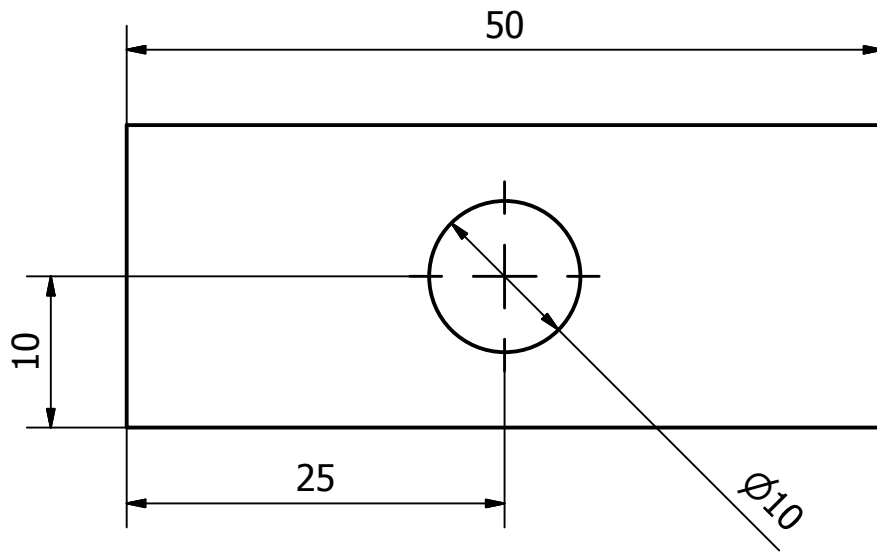
1	Plat Kanan	Baja Karbon Rendah	9.3	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 9	A4

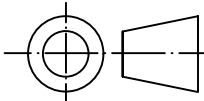


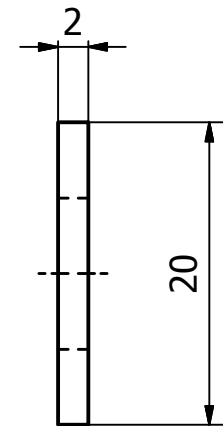
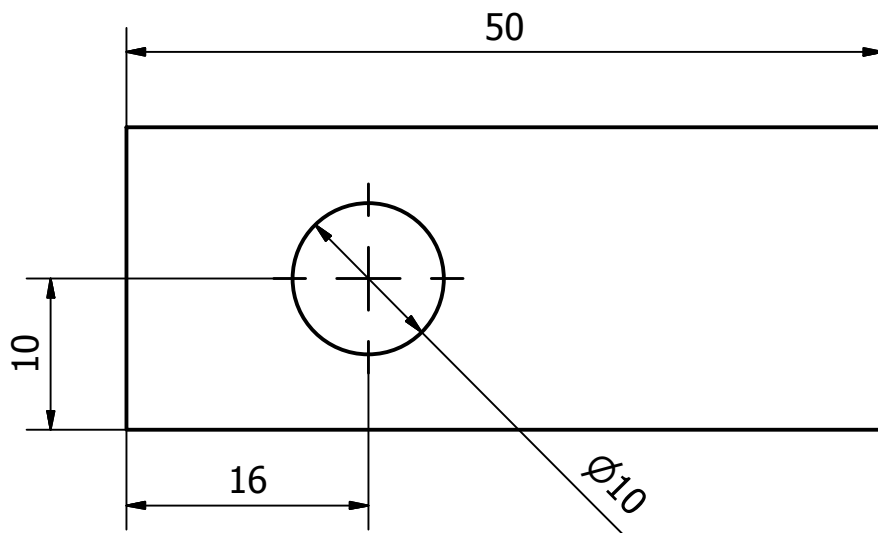
1	Plat Kiri	Baja Karbon Rendah	9.4	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
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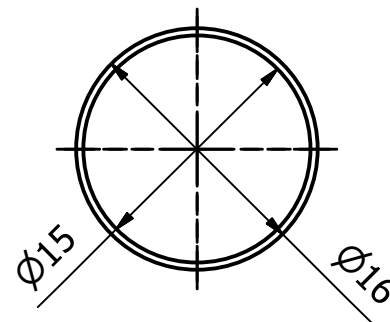
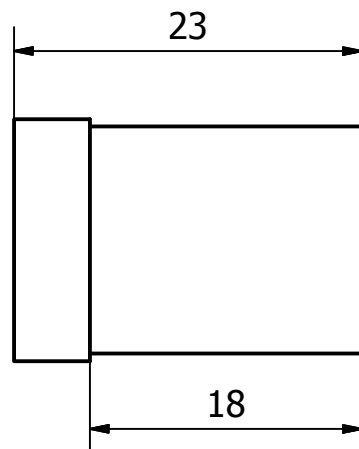
2	Plat Poros Bearing	Baja Karbon Rendah	9.5	
Jumlah	Nama	Material	No. Barang	
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 9	A4

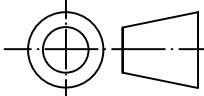


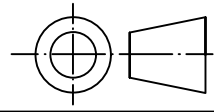
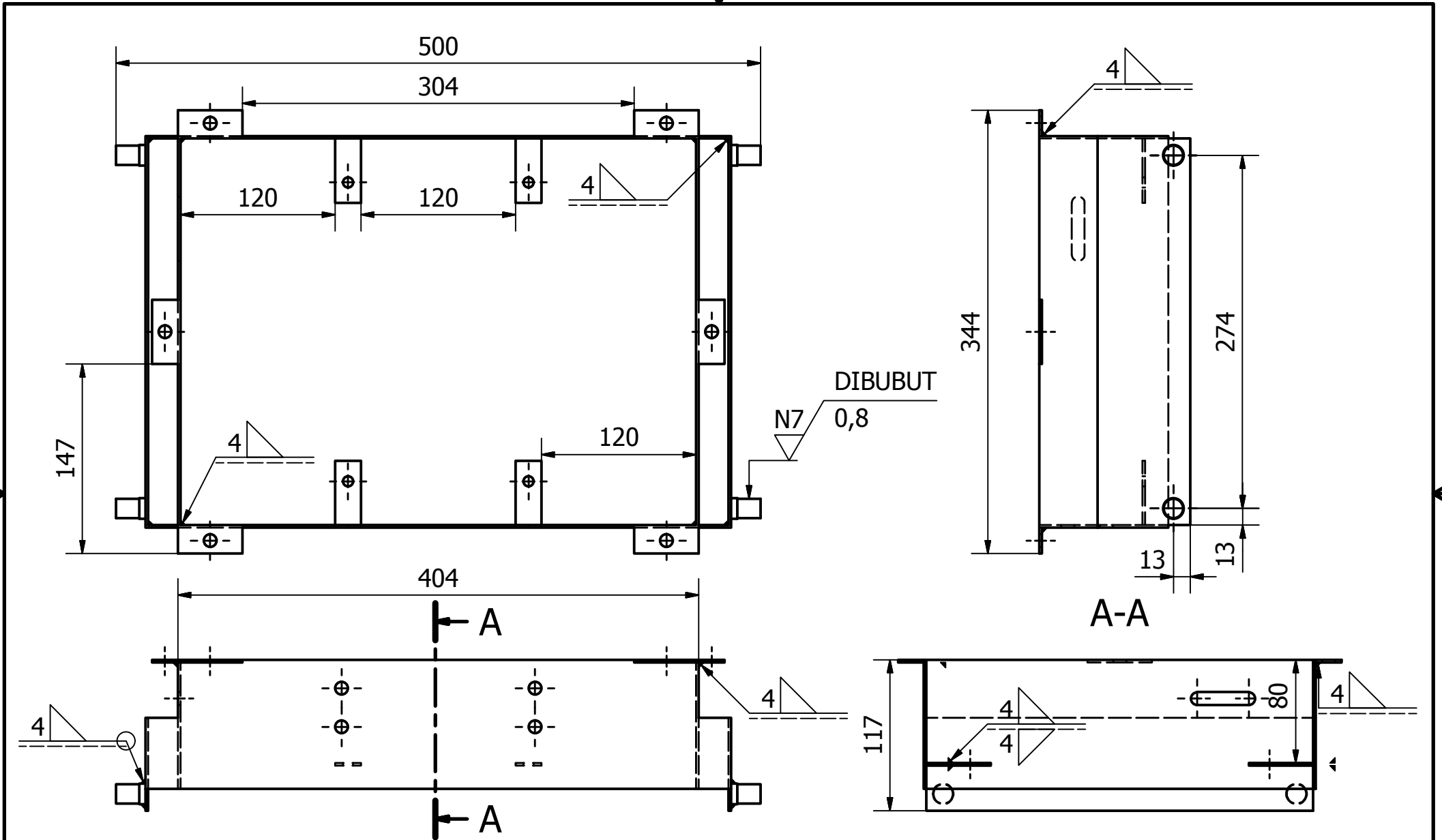
6	Plat Penutup Atas	Baja Karbon Rendah	9.6	
Jumlah	Nama	Material	No. Barang	
	Skala : 2 : 1	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
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4	Plat Heater	Baja Karbon Rendah	9.7	
Jumlah	Nama	Material	No. Barang	
	Skala : 2 : 1	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
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4	Poros Bearing	Baja Karbon Rendah	9.8
Jumlah	Nama	Material	No. Barang
	Skala : 2 : 1	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 9   A4



Skala : 1 : 4  
 Satuan Ukuran : mm  
 Tanggal : 22-05-2017

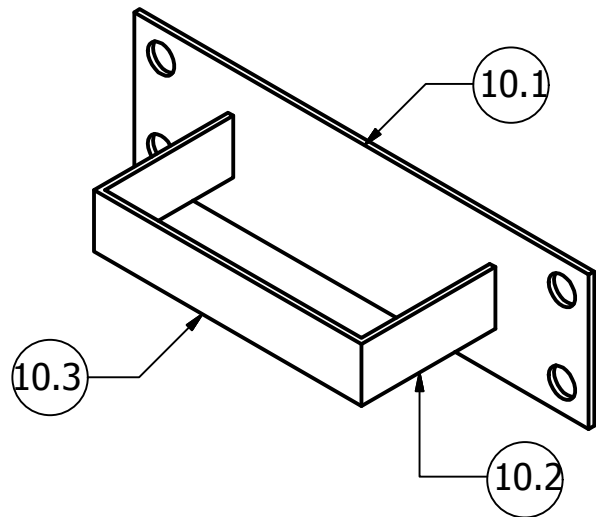
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 Diperiksa : Cahyo Budiyanoro, S.T., M.Sc

Keterangan :

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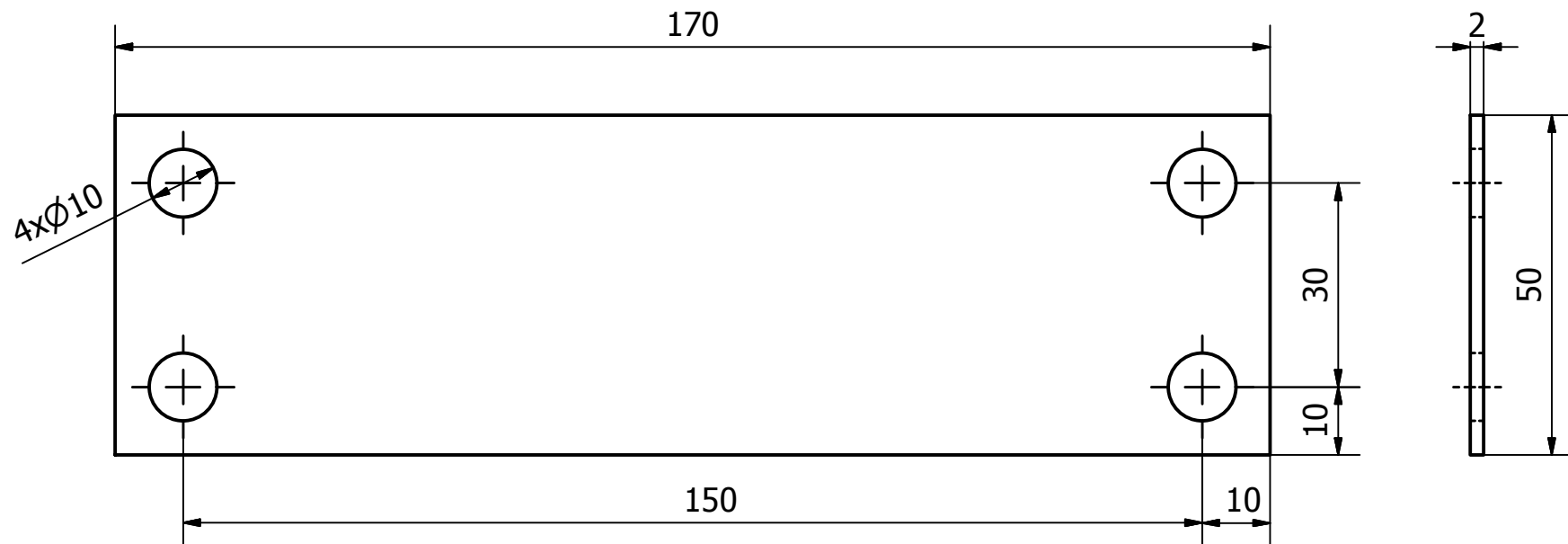
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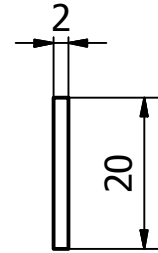
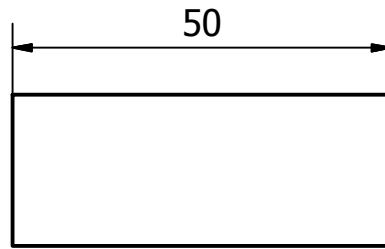


10.3	1	Plat Pegangan	Baja Karbon Rendah	96x20x2 mm
10.2	2	Plat Penghubung	Baja Karbon Rendah	30x20x2 mm
10.1	1	Plat Berlubang	Baja Karbon Rendah	170x50x2 mm
NO	Jumlah	Nama	Material	Ukuran
	Skala : 1 : 2		Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm		TUGAS AKHIR	
	Tanggal : 22-05-2017		Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta			MESIN VACUUM FORMING	No. 10   A4

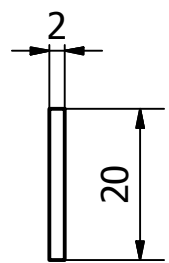
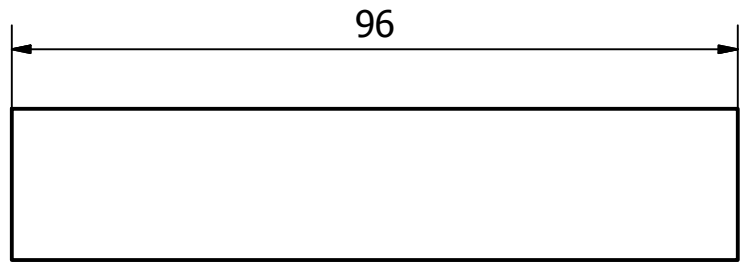


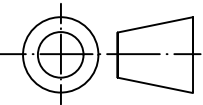


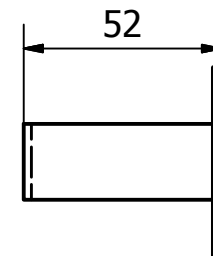
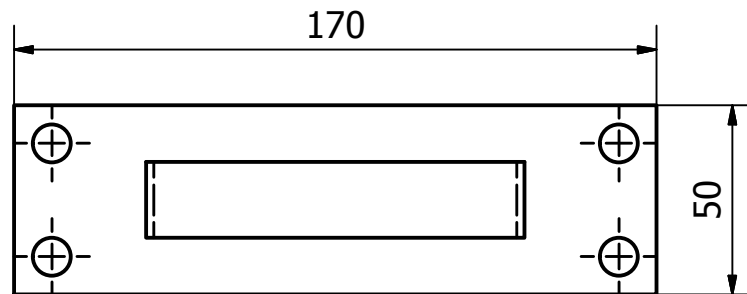
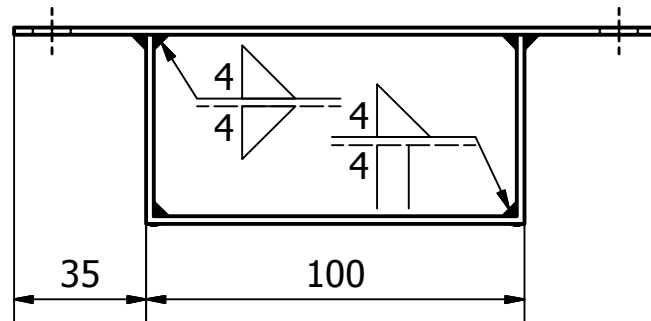
1	Plat Berlubang	Baja Karbon Rendah	10.1
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 1	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	<b>No. 10</b>   <b>A4</b>

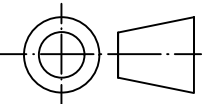


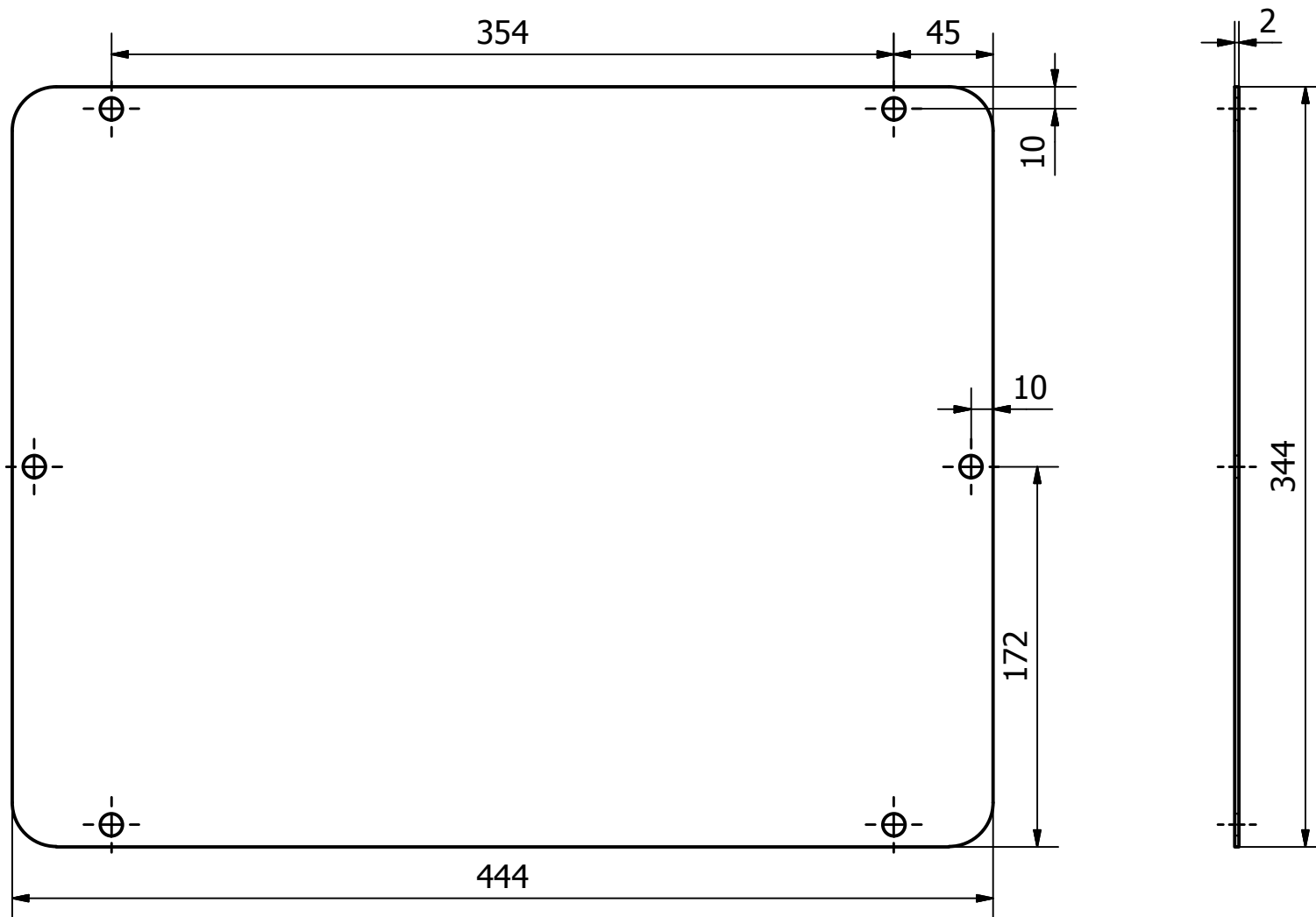
2	Plat Penghubung	Baja Karbon Rendah	10.2
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 1	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 10   A4

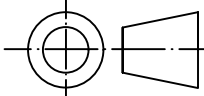


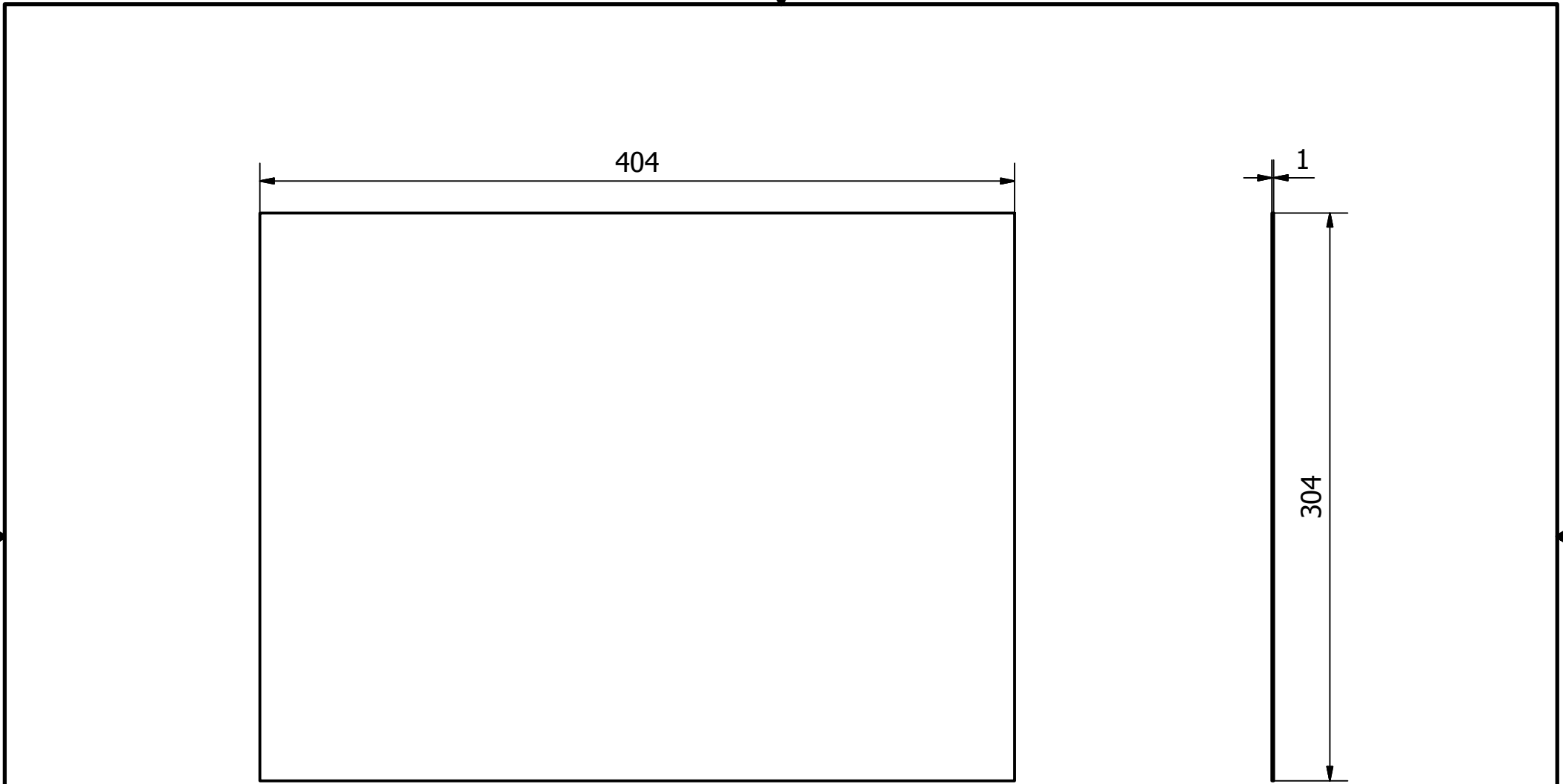
1	Plat Pegangan	Baja Karbon Rendah	10.3
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 1	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
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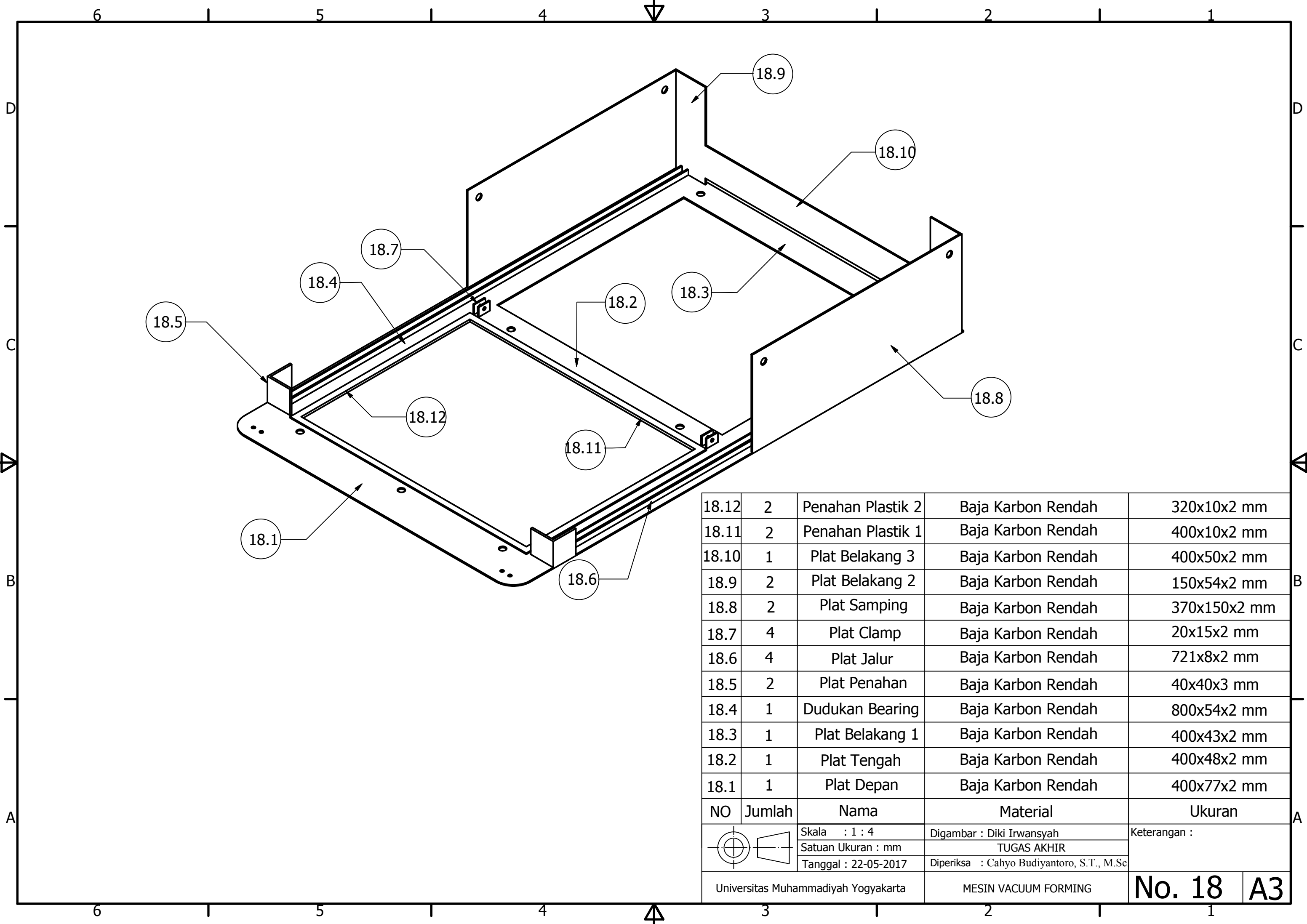
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm	TUGAS AKHIR		
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta	MESIN VACUUM FORMING		No. 10	A4



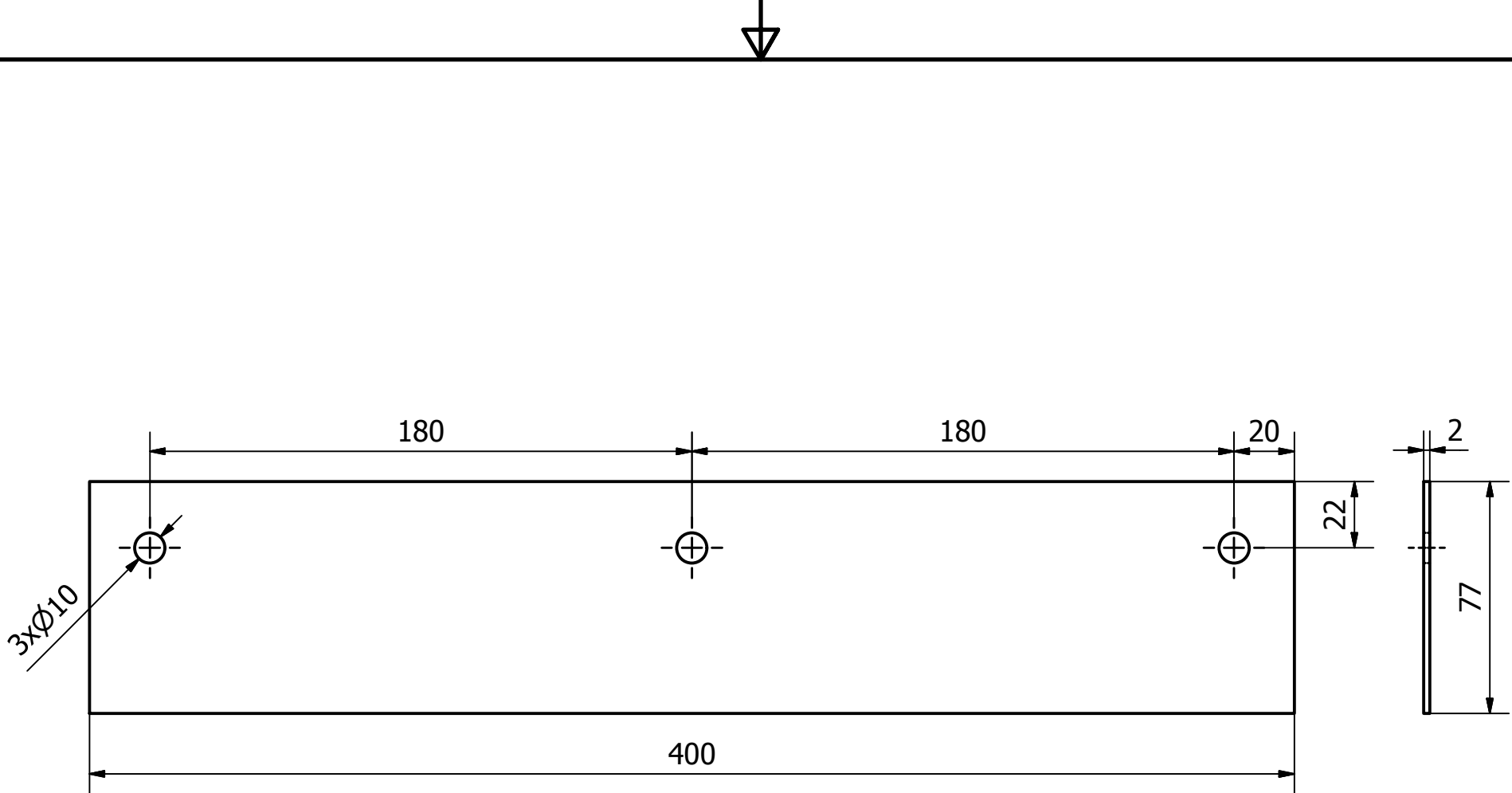
1	Penutup Kotak	Baja Karbon Rendah	11
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 3	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	<b>No. 11</b>   <b>A4</b>



1	Plat Aluminium	Baja Karbon Rendah	12
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 3	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 12   A4

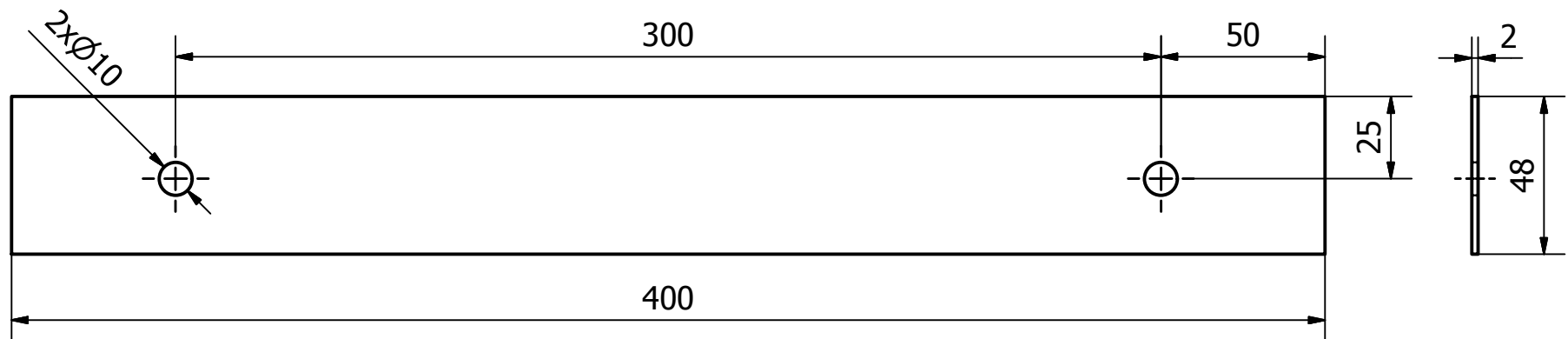


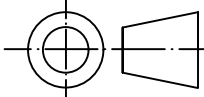
18.12	2	Penahan Plastik 2	Baja Karbon Rendah	320x10x2 mm
18.11	2	Penahan Plastik 1	Baja Karbon Rendah	400x10x2 mm
18.10	1	Plat Belakang 3	Baja Karbon Rendah	400x50x2 mm
18.9	2	Plat Belakang 2	Baja Karbon Rendah	150x54x2 mm
18.8	2	Plat Samping	Baja Karbon Rendah	370x150x2 mm
18.7	4	Plat Clamp	Baja Karbon Rendah	20x15x2 mm
18.6	4	Plat Jalur	Baja Karbon Rendah	721x8x2 mm
18.5	2	Plat Penahan	Baja Karbon Rendah	40x40x3 mm
18.4	1	Dudukan Bearing	Baja Karbon Rendah	800x54x2 mm
18.3	1	Plat Belakang 1	Baja Karbon Rendah	400x43x2 mm
18.2	1	Plat Tengah	Baja Karbon Rendah	400x48x2 mm
18.1	1	Plat Depan	Baja Karbon Rendah	400x77x2 mm
NO	Jumlah	Nama	Material	Ukuran
		Skala : 1 : 4	Digambar : Diki Irwansyah	Keterangan :
		Satuan Ukuran : mm	TUGAS AKHIR	
		Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta			MESIN VACUUM FORMING	<b>No. 18</b>   <b>A3</b>

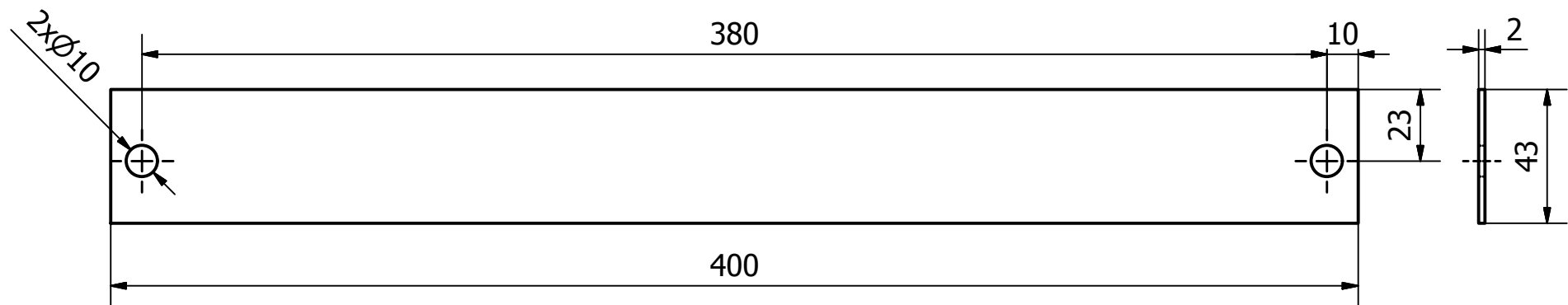


1	Plat Depan	Baja Karbon Rendah	18.1
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	<b>No. 18</b>   <b>A4</b>

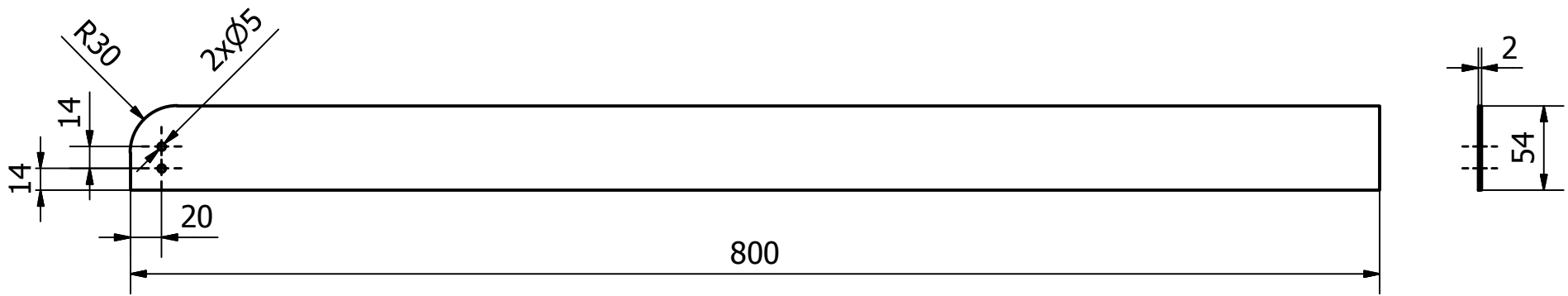




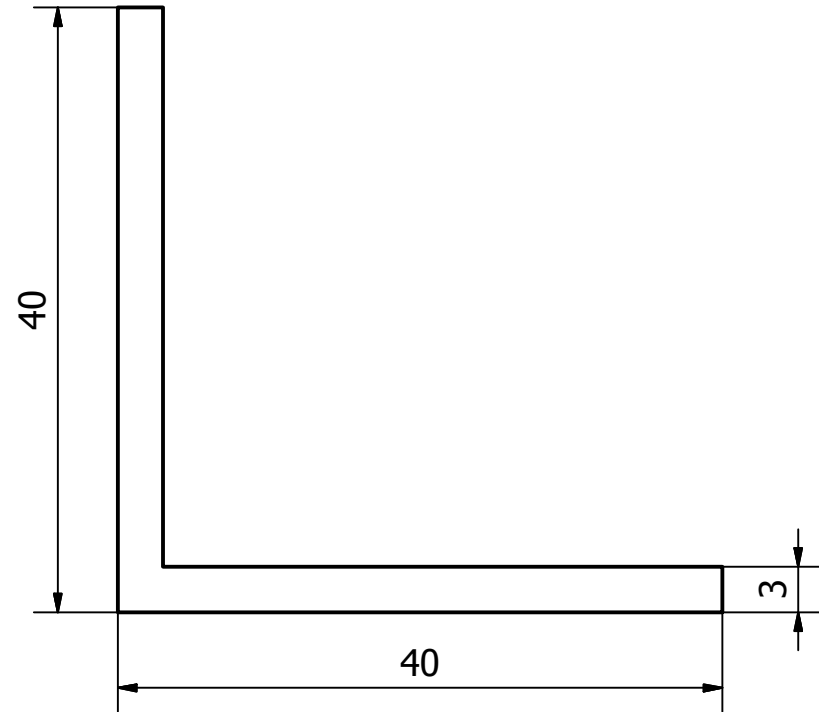
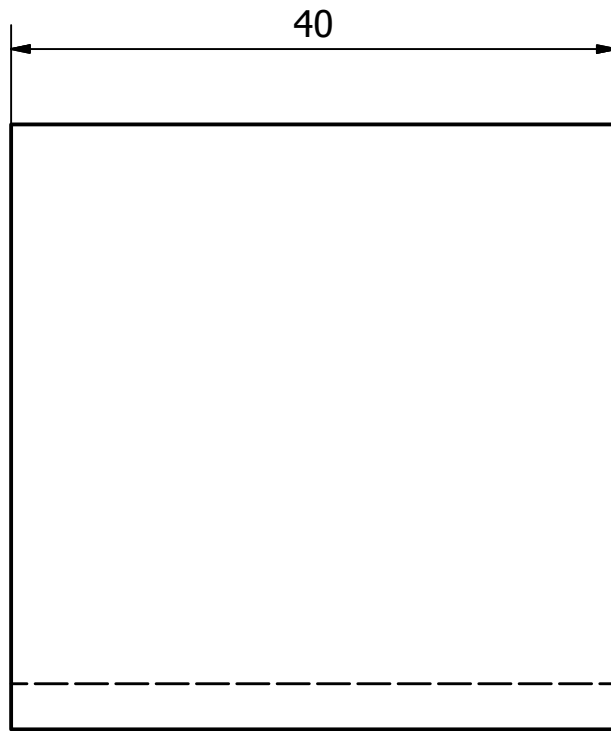
1	Plat Tengah	Baja Karbon Rendah	18.2
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 18   A4



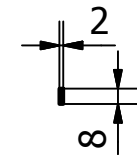
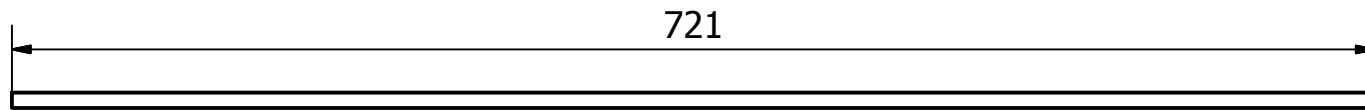
1	Plat Belakang 1	Baja Karbon Rendah	18.3
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	<b>No. 18</b>   <b>A4</b>

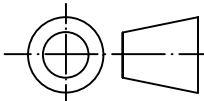


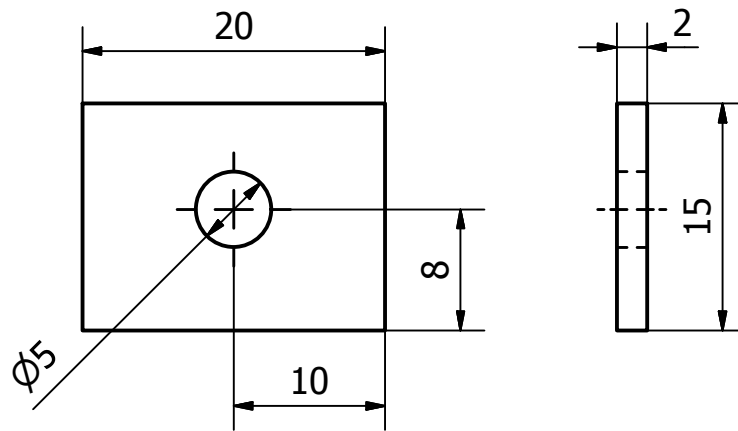
1	Dudukan Bearing	Baja Karbon Rendah	18.4
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 4	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 18   A4



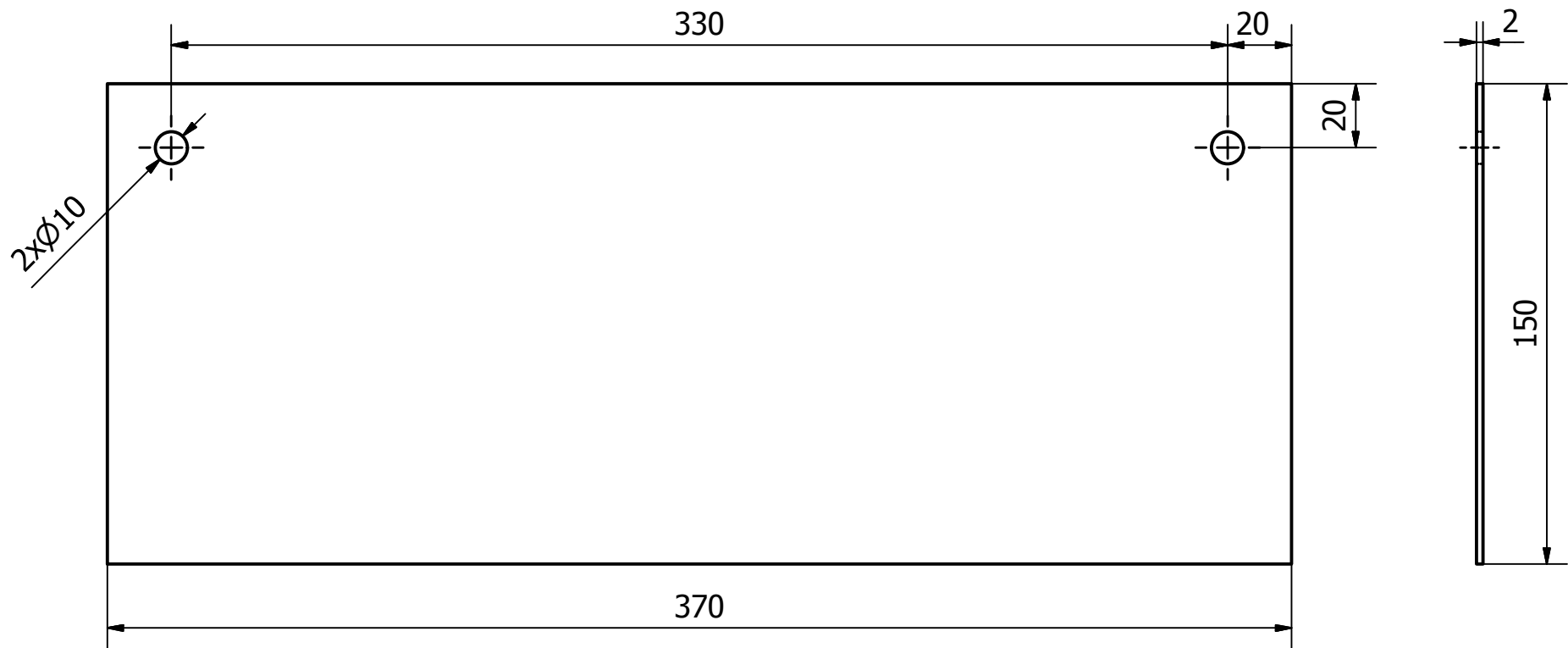
2	Plat Penahan	Baja Karbon Rendah	18.5
Jumlah	Nama	Material	No. Barang
	Skala : 2 : 1	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 18   A4

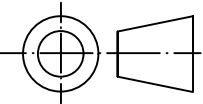


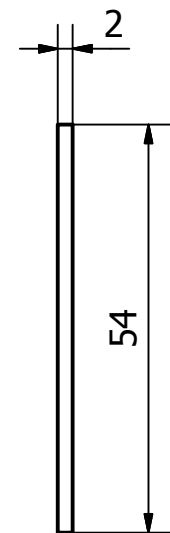
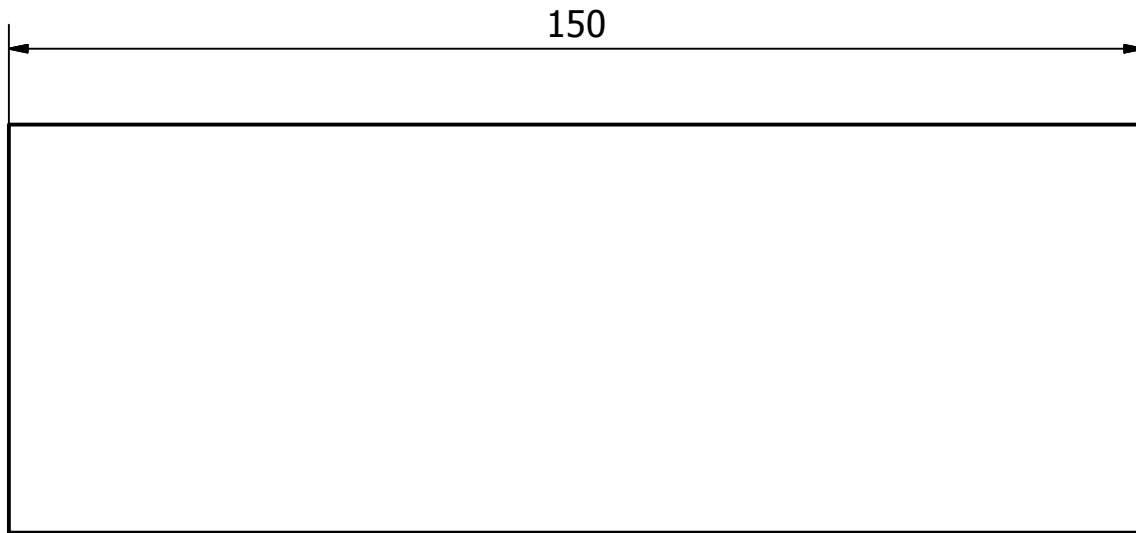
4	Plat Jalur	Baja Karbon Rendah	18.6
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 4	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
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4	Plat Clamp	Baja Karbon Rendah	18.7
Jumlah	Nama	Material	No. Barang
	Skala : 2 : 1	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 18   A4

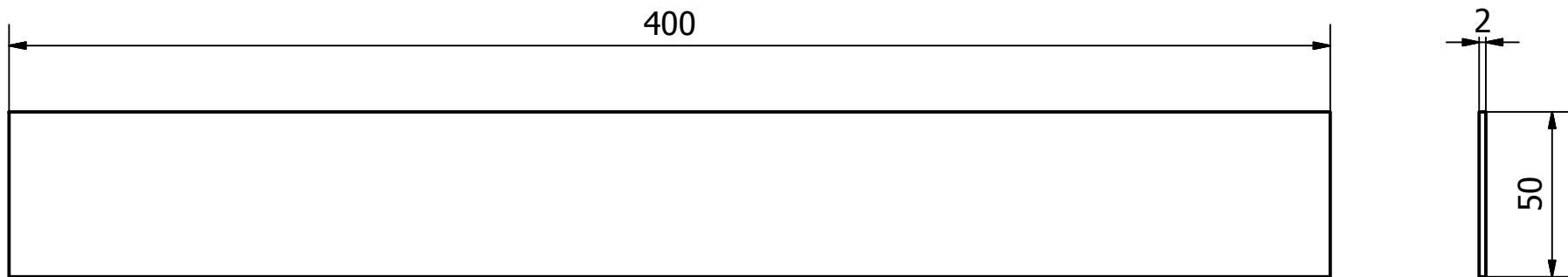


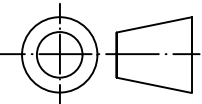
2	Plat Samping	Baja Karbon Rendah	18.8
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyantoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 18   A4

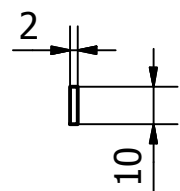
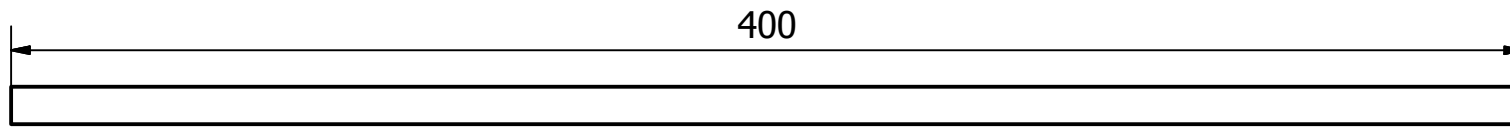


2	Plat Belakang 2	Baja Karbon Rendah	18.9
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 1	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 18   A4

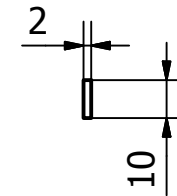
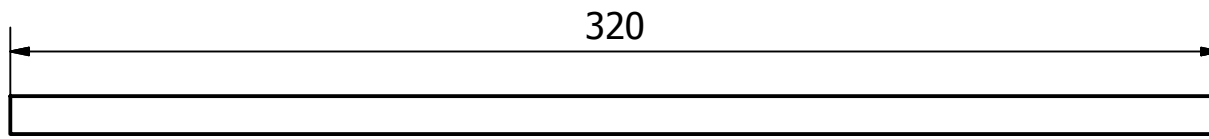




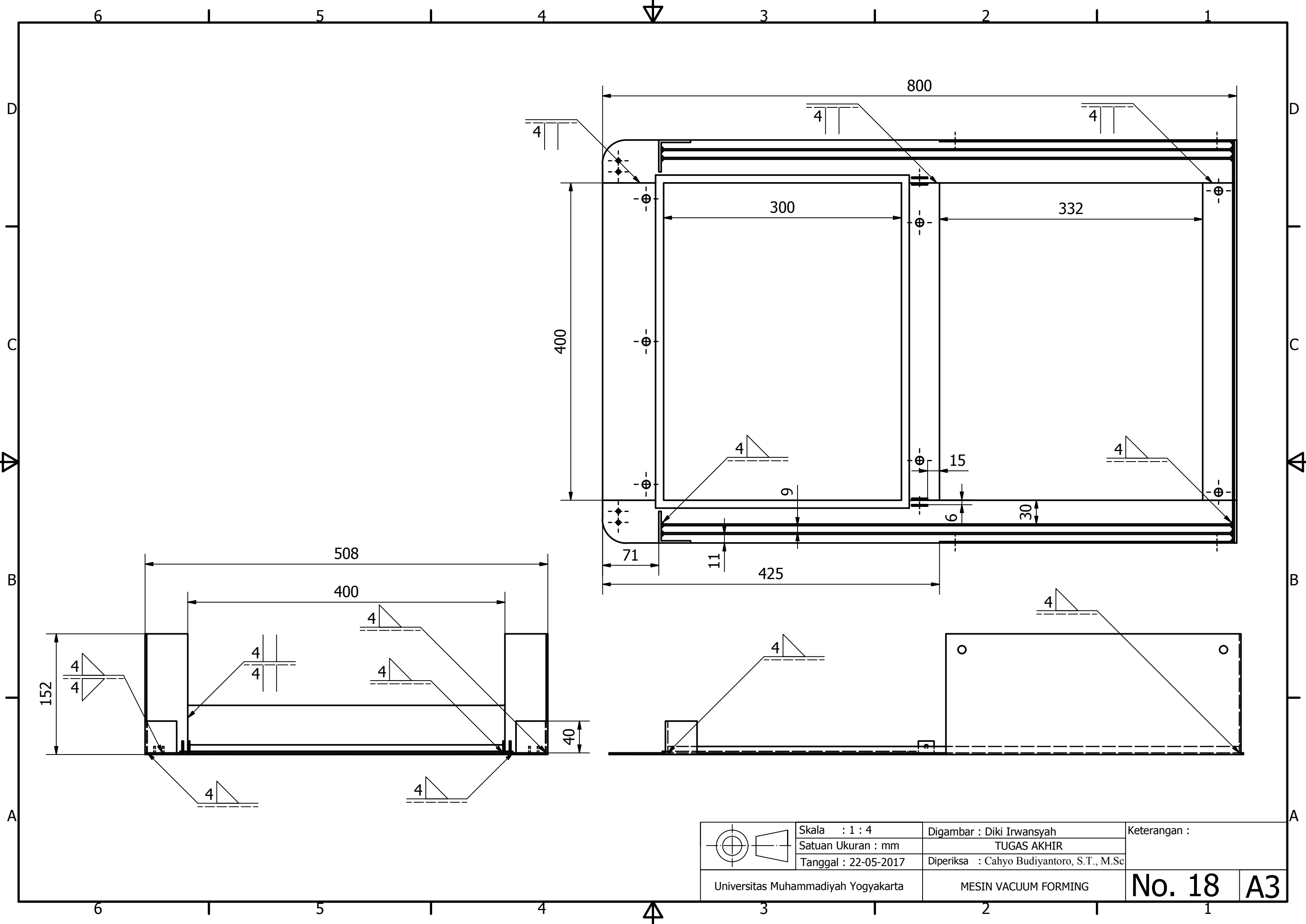
1	Plat Belakang 3	Baja Karbon Rendah	18.10
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	<b>No. 18</b>   <b>A4</b>



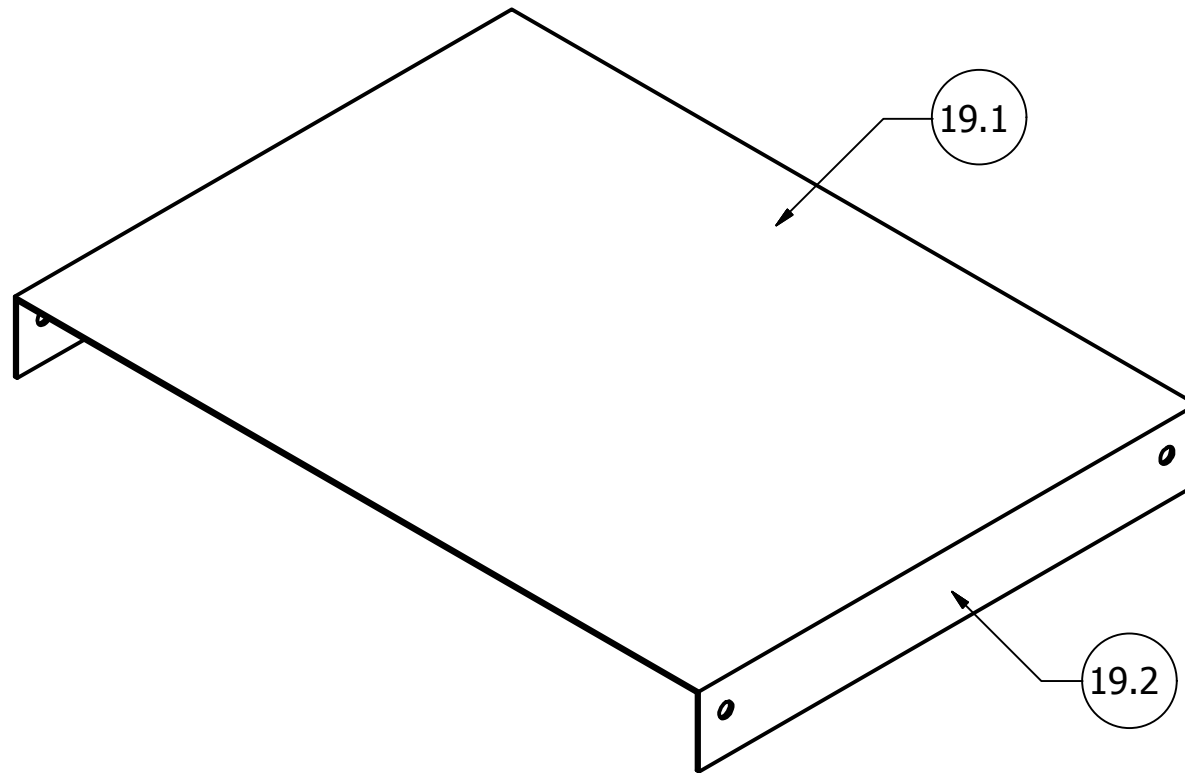
2	Penahan Plastik 1	Baja Karbon Rendah	18.11
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
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2	Penahan Plastik 2	Baja Karbon Rendah	18.12
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	<b>No. 18</b>   <b>A4</b>



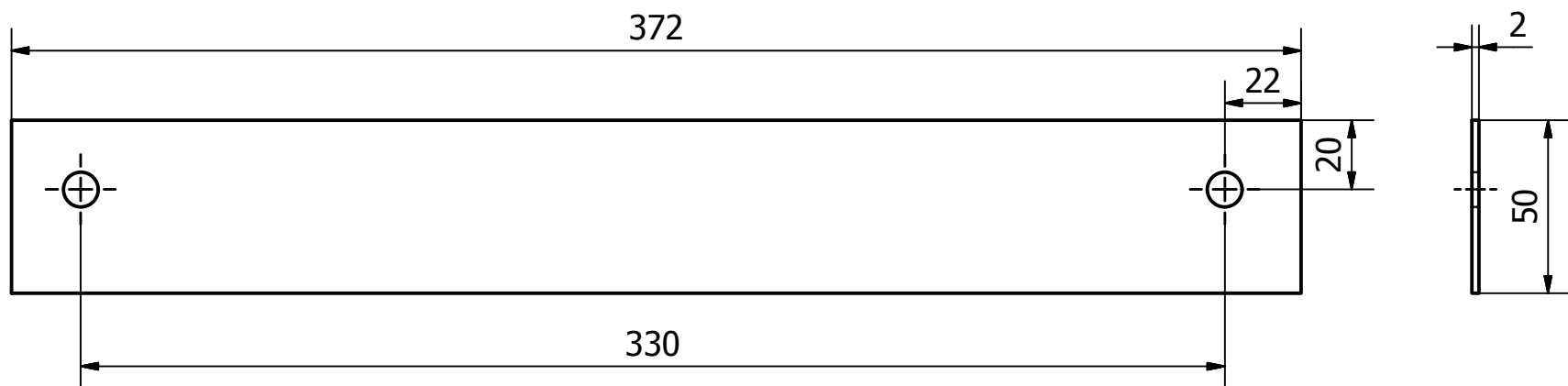
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	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	<b>No. 18</b> <b>A3</b>



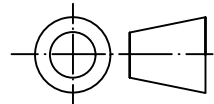
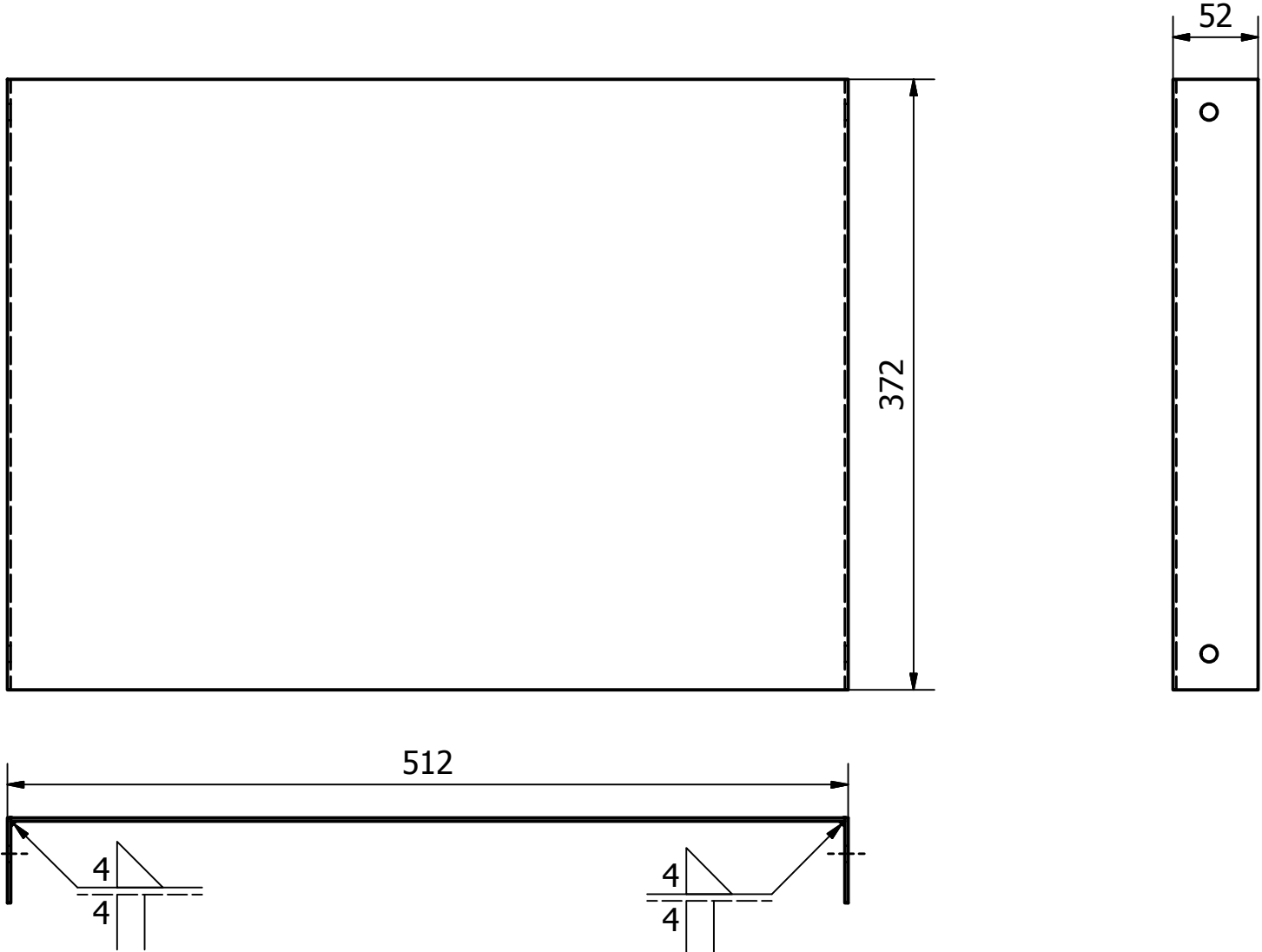
19.2	2	Plat Samping	Baja Karbon Rendah	372x50x2 mm	
19.1	1	Plat Atas	Baja Karbon Rendah	512x371x2 mm	
NO	Jumlah	Nama	Material	Ukuran	
	Skala : 1 : 4		Digambar : Diki Irwansyah	Keterangan :	
	Satuan Ukuran : mm		TUGAS AKHIR		
	Tanggal : 22-05-2017		Diperiksa : Cahyo Budiyanoro, S.T., M.Sc		
Universitas Muhammadiyah Yogyakarta			MESIN VACUUM FORMING	<b>No. 19</b>	<b>A4</b>



1	Plat Atas	Baja Karbon Rendah	19.1
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 4	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	<b>No. 19</b>   <b>A4</b>



2	Plat Samping	Baja Karbon Rendah	19.2
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	<b>No. 19</b>   <b>A4</b>



Skala : 1 : 4  
 Satuan Ukuran : mm  
 Tanggal : 22-05-2017

Digambar : Diki Irwansyah  
 TUGAS AKHIR  
 Diperiksa : Cahyo Budiyanoro, S.T., M.Sc

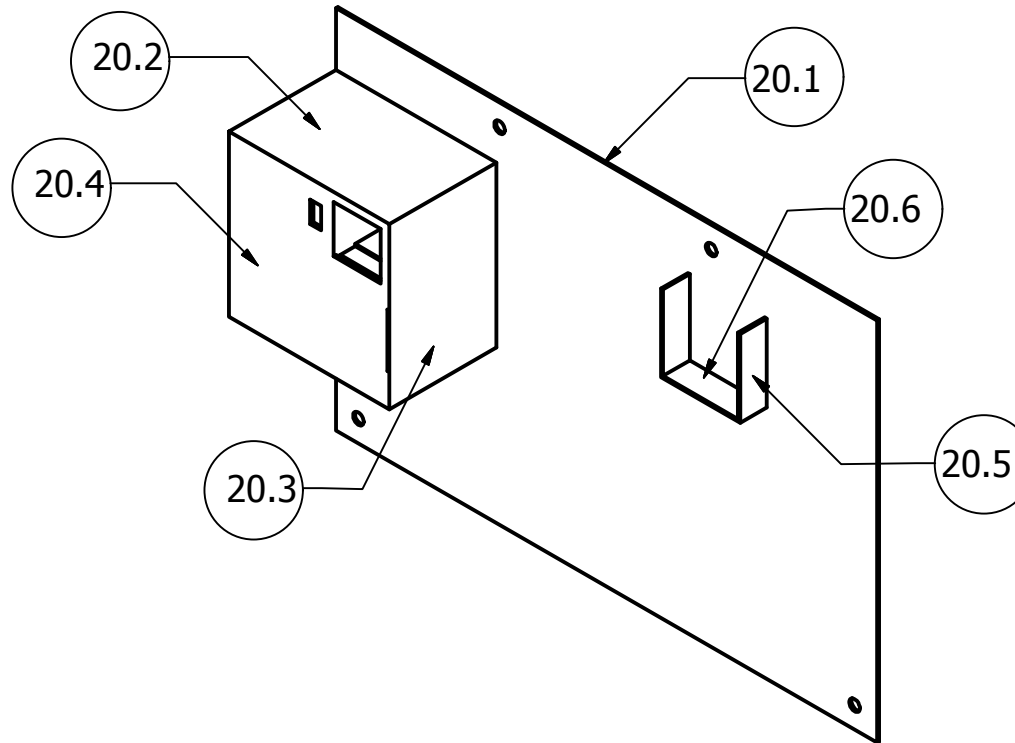
Keterangan :

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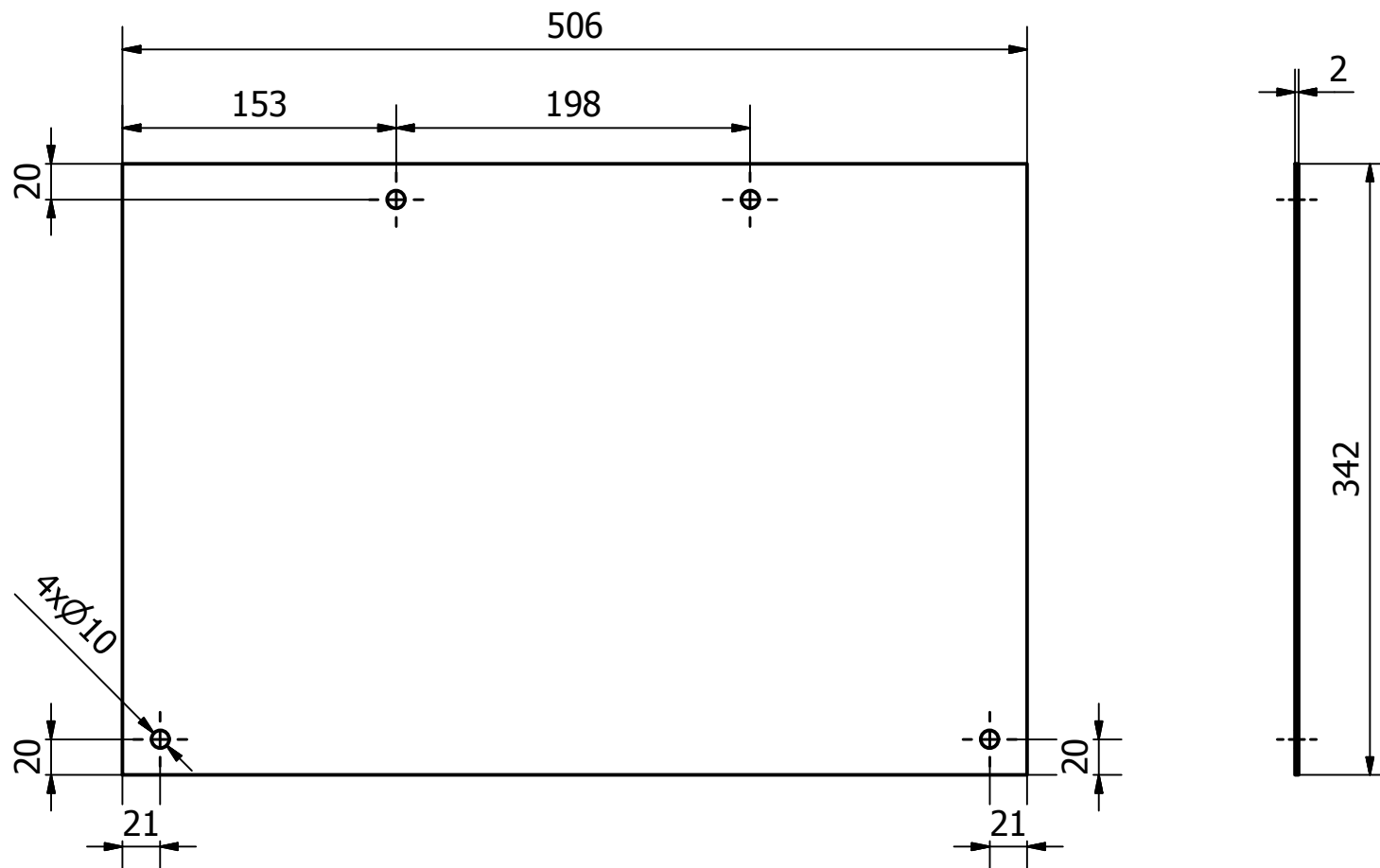
MESIN VACUUM FORMING

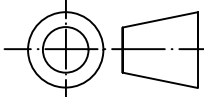
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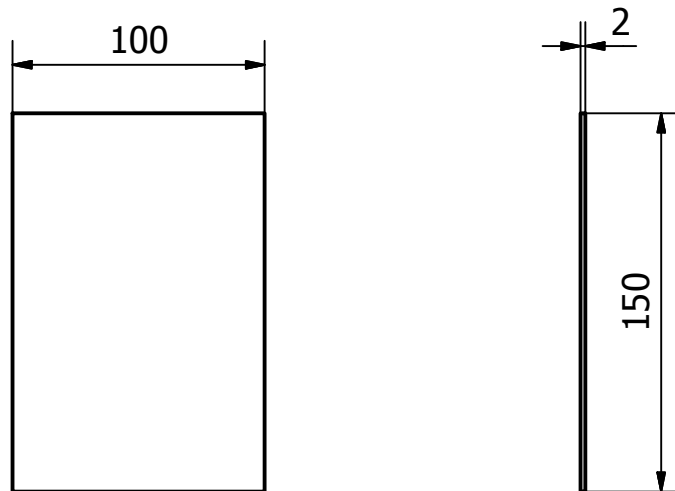




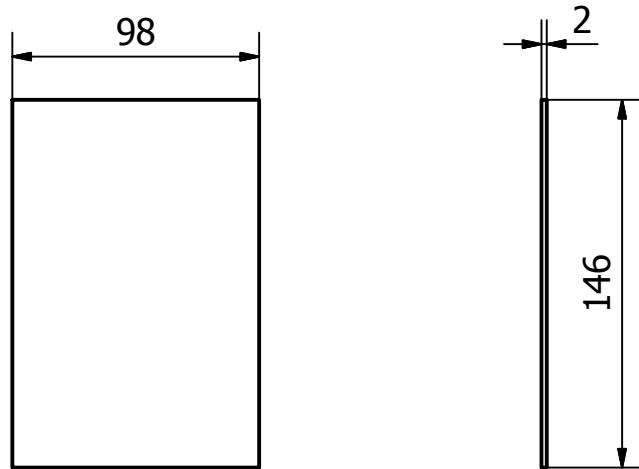
20.6	1	Dudukan 4	Baja Karbon Rendah	74x25x2 mm
20.5	2	Dudukan 3	Baja Karbon Rendah	70x25x2 mm
20.4	1	Penutup	Baja Karbon Rendah	150x146x2 mm
20.3	2	Dudukan 2	Baja Karbon Rendah	146x98x2 mm
20.2	2	Dudukan 1	Baja Karbon Rendah	150x100x2 mm
20.1	1	Plat Cover Depan	Baja Karbon Rendah	504x342x2 mm
NO	Jumlah	Nama	Material	Ukuran
	Skala : 1 : 3		Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm		TUGAS AKHIR	
	Tanggal : 22-05-2017		Diperiksa : Cahyo Budiyantoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta			MESIN VACUUM FORMING	No. 20
				A4



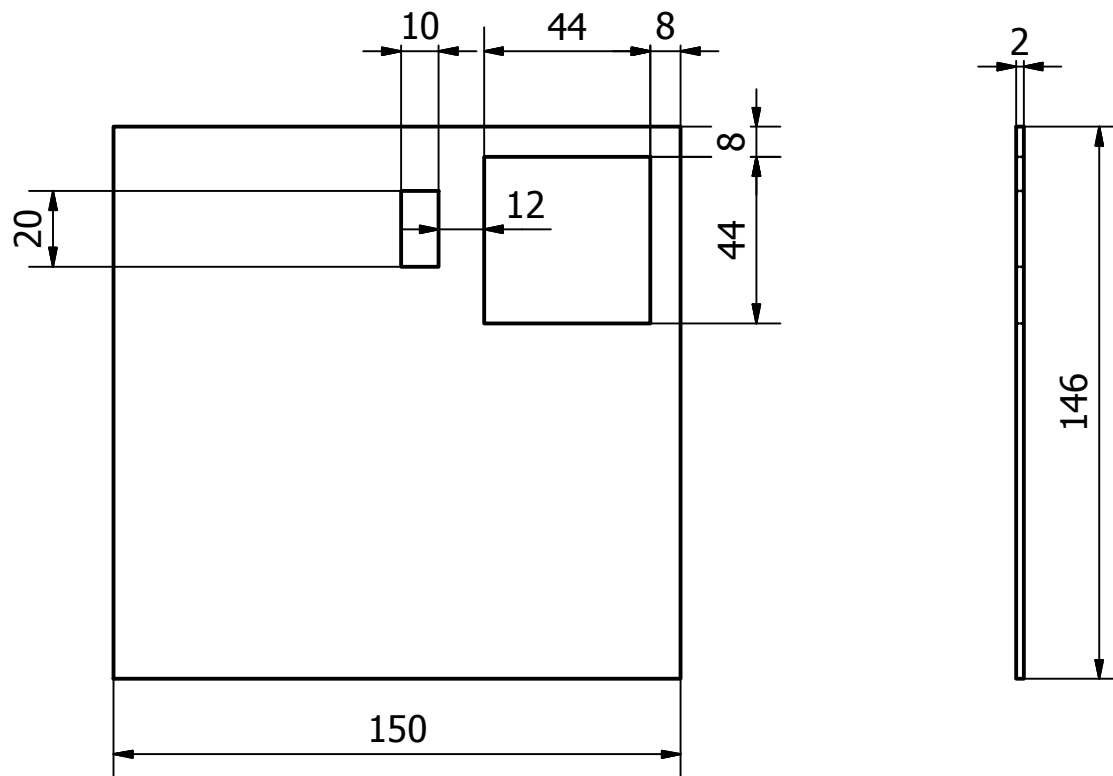
1	Plat Cover Depan	Baja Karbon Rendah	20.1
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 4	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 20   A4



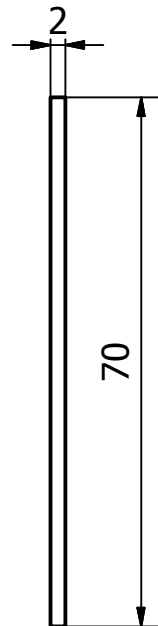
2	Dudukan 1	Baja Karbon Rendah	20.2
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 3	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 20   A4



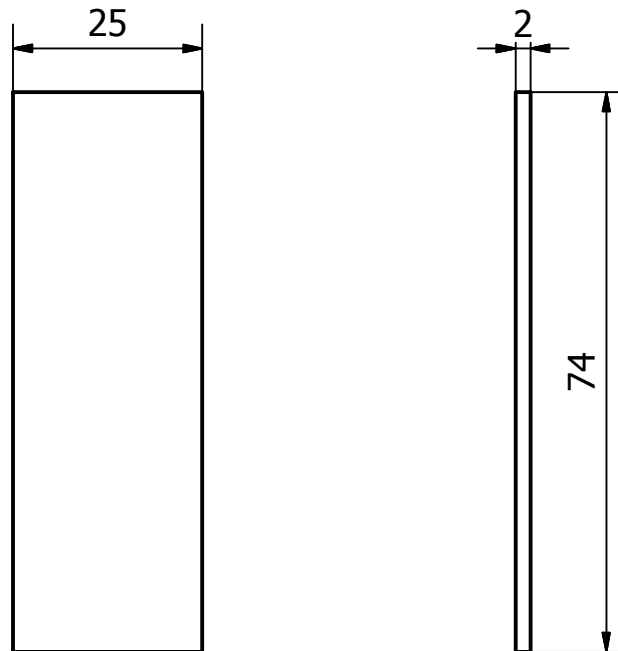
2	Dudukan 2	Baja Karbon Rendah	20.3
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 3	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 20   A4



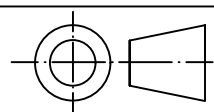
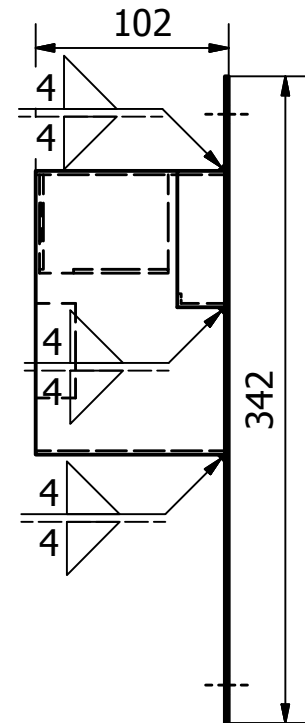
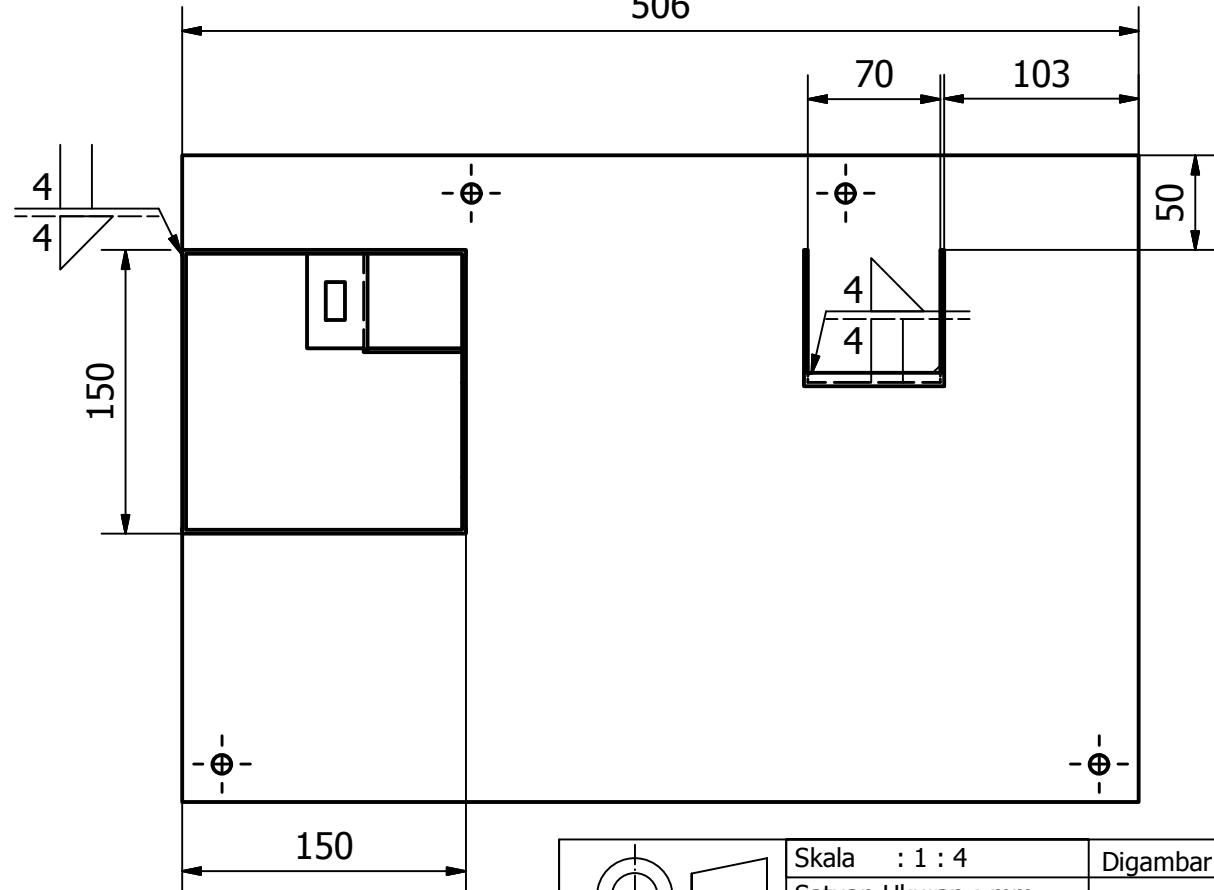
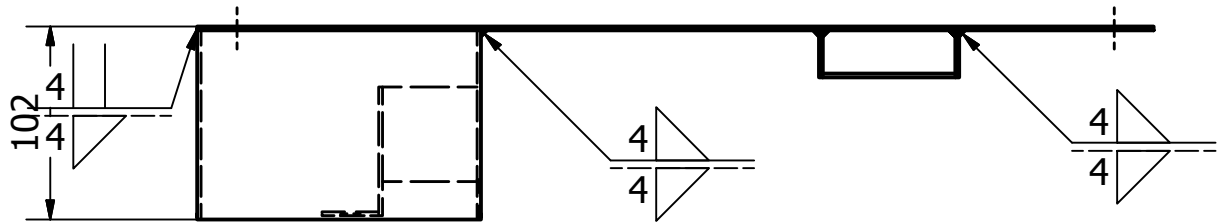
1	Penutup	Baja Karbon Rendah	20.4
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 2	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 20   A4



2	Dudukan 3	Baja Karbon Rendah	20.5
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 1	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 20   A4



1	Dudukan 4	Baja Karbon Rendah	20.6
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 1	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	No. 20   A4



Skala : 1 : 4  
 Satuan Ukuran : mm  
 Tanggal : 22-05-2017

Digambar : Diki Irwansyah  
 TUGAS AKHIR  
 Diperiksa : Cahyo Budiyantoro, S.T., M.Sc

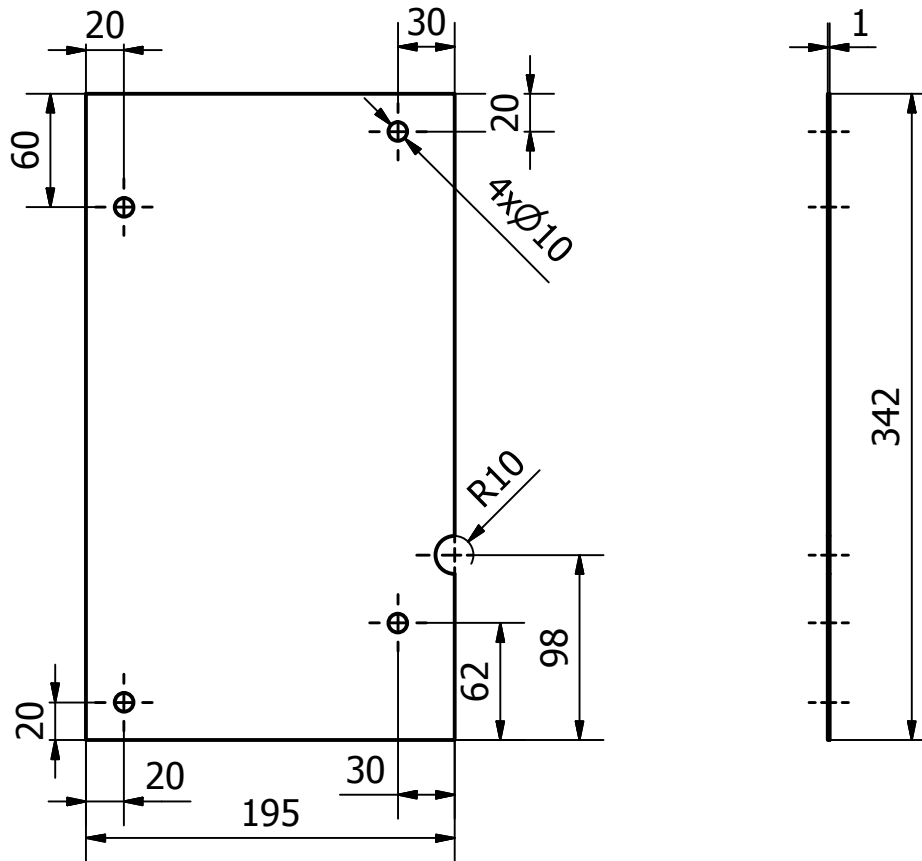
Keterangan :

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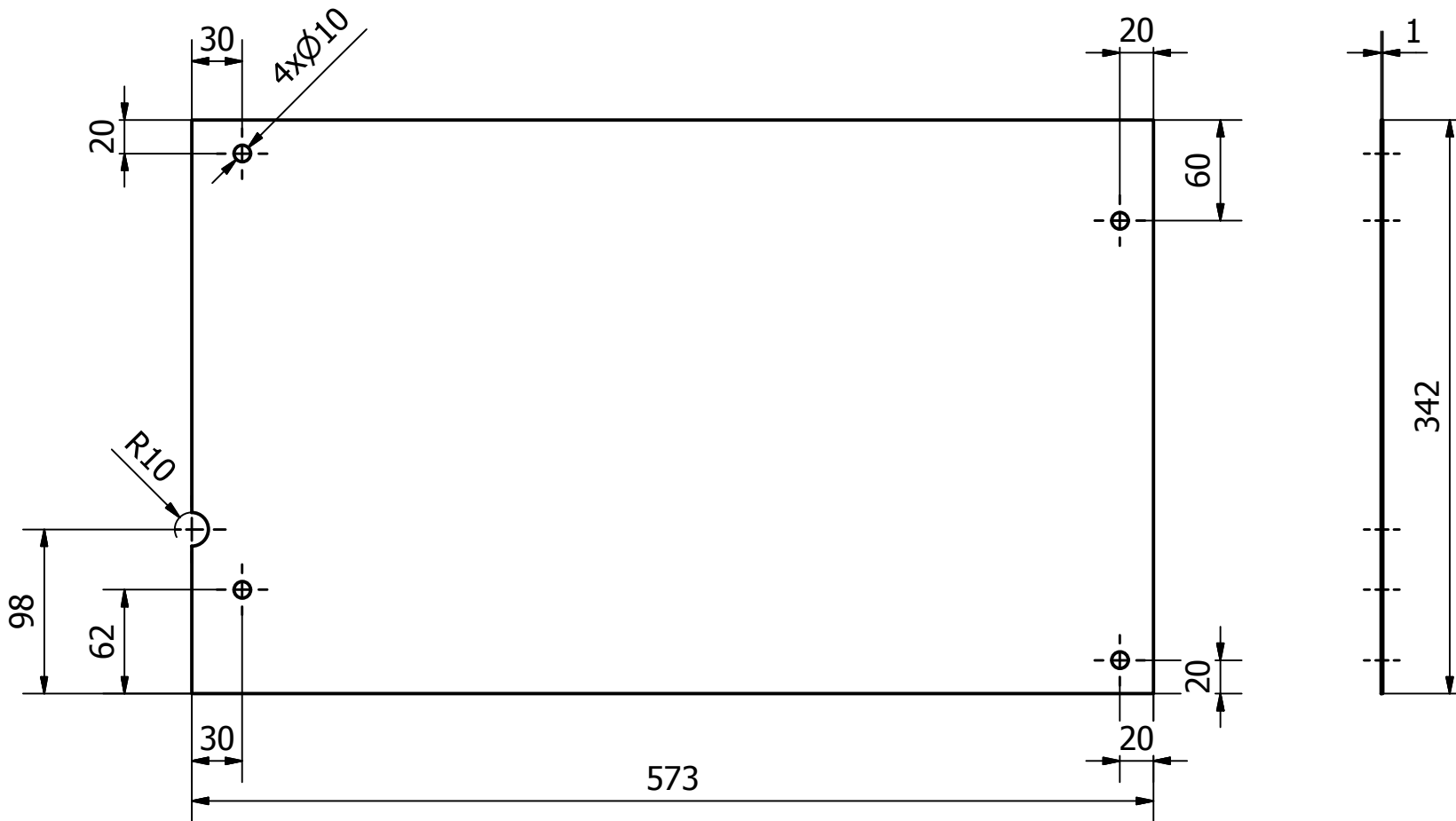
MESIN VACUUM FORMING

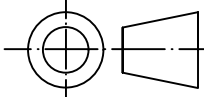
No. 20 A4

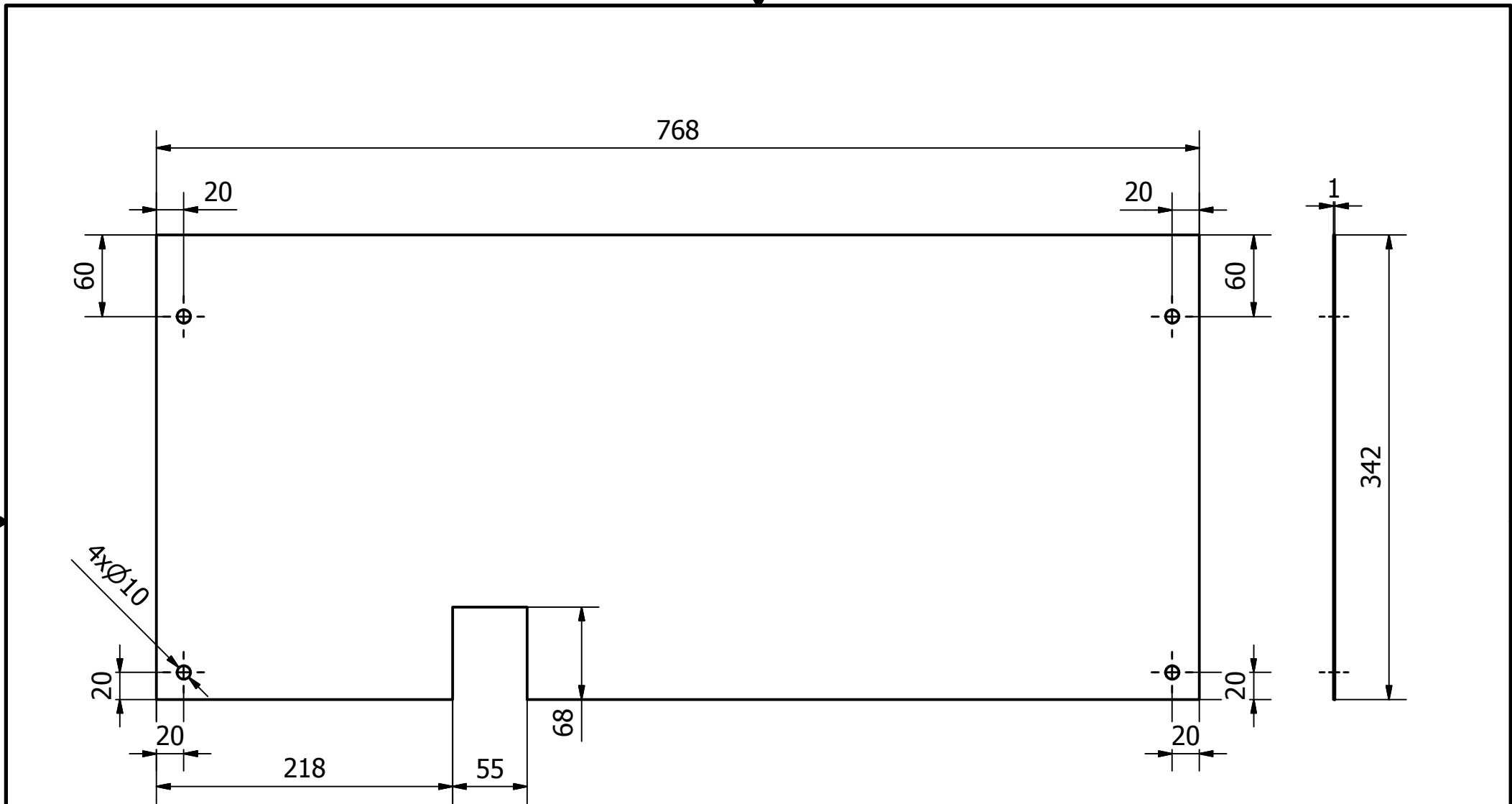




1	Cover Kanan 1	Baja Karbon Rendah	21
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 4	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
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1	Cover Kanan 2	Baja Karbon Rendah	22
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 4	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
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1	Cover Kiri	Baja Karbon Rendah	23
Jumlah	Nama	Material	No. Barang
	Skala : 1 : 4	Digambar : Diki Irwansyah	Keterangan :
	Satuan Ukuran : mm	TUGAS AKHIR	
	Tanggal : 22-05-2017	Diperiksa : Cahyo Budiyanoro, S.T., M.Sc	
Universitas Muhammadiyah Yogyakarta		MESIN VACUUM FORMING	<b>No. 23</b>   <b>A4</b>