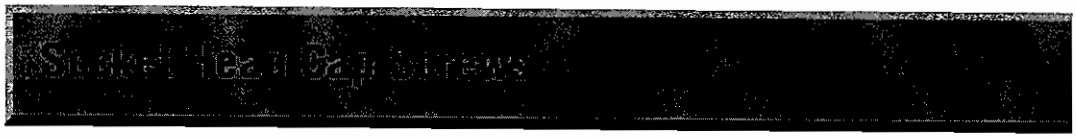
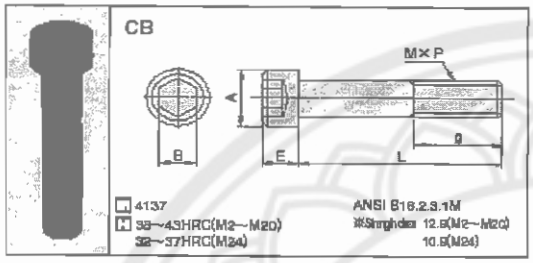
ภาคผนวก

ภาคผนวก ก
ตารางส่วนประกอบของแม่พิมพ์

ตารางที่ 1 Dimensions of Socket Head Cap Screws





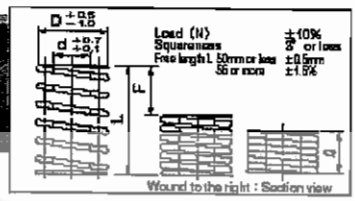
d	Catalog No. Type M—L	$ Unit Price *less	*or more	Quantity
Full Thread	CB 2- 5	0.20	0.15	1000
	8			
	10	0.25	0.20	
	12			
	15	0.30	0.25	
Full Thread	CB 2.6- 5	0.20	0.15	1000
	8			
	10	0.25	0.20	
	12			
	15	0.30	0.25	
Full Thread	CB 3- 5			800
	6			
	8			
	10			
	12	0.04	0.03	
	14			
	16			600
	18			
	20			
	22	0.05	0.04	
	25			
18	30	0.07	0.06	200
	35			
	40	0.08	0.07	
	45	0.13	0.12	
	50			500
	55	0.20	0.19	
	60	0.80	0.59	
	65	0.85	0.84	
Full Thread	CB 4- 5			800
	6			
	8			
	10			
	12			
	14	0.04	0.03	400
Full Thread	15			
	16			
	18			
	20			
	22			200
	25			
	30	0.05	0.04	
	35	0.06	0.05	100
	40	0.07	0.06	
	45	0.08	0.07	
20	50	0.09	0.08	
	55	0.18	0.17	200
	60	0.20	0.19	
	65	0.40	0.39	
	70	0.45	0.44	100
	75	0.50	0.49	
Full Thread	CB 5- 5	0.10	0.09	1000
	6			400
	8			600
	10			
	12			
	14			400
Full Thread	15	0.03	0.03	
	16			
	18			
	20			
	22			200
	25			
	30	0.05	0.04	
22	35	0.06	0.05	100
	40	0.07	0.06	
	45	0.08	0.07	100

d	Catalog No. Type M—L	$ Unit Price *less	*or more	Quantity
	CB 5- 50	0.08	0.08	
	55	0.09	0.09	
	60	0.12	0.11	
	65	0.13	0.12	
	70	0.14	0.13	
	75	0.16	0.15	
	80	0.19	0.18	
22	85	0.30	0.29	100
	90			
	95	0.50	0.49	
	100			
	110	0.85	0.84	
	120	0.75	0.74	
	130	0.85	0.84	
	140	0.95	0.94	
	CB 6- 6	0.15	0.14	600
	8	0.05	0.04	400
	10			600
	12			
	14	0.04	0.03	
	15			400
Full Thread	16			
	18			600
	20			
	22	0.05	0.04	
	25			
	30	0.06	0.05	
	35	0.07	0.06	
	40	0.08	0.07	
	45	0.09	0.08	
	50	0.10	0.09	
	55	0.11	0.10	
	60	0.12	0.11	
	65	0.14	0.13	
	70	0.15	0.14	
24	75	0.18	0.15	
	80	0.19	0.18	100
	85	0.20	0.19	
	90	0.21	0.20	
	95	0.25	0.24	
	100	0.28	0.27	
	110	0.40	0.39	
	120	0.80	0.78	
	130	1.00	0.98	
	140	1.30	1.28	
	150	1.50	1.48	
	CB 8- 8	0.15	0.14	
	10			200
	12			
	15			
	16			
Full Thread	18	0.06	0.07	
	20			
	22			
	25			
	30	0.09	0.08	
	35	0.09	0.08	
	40	0.10	0.09	100
	45	0.11	0.10	
	50	0.12	0.11	
	55	0.14	0.13	
	60	0.18	0.15	
28	65	0.16	0.15	
	70	0.19	0.18	
	75	0.21	0.20	
	80	0.25	0.24	
	85	0.30	0.29	
	90	0.32	0.31	

d	Catalog No. Type M—L	$ Unit Price *less	*or more	Quantity
	CB 8- 95	0.39	0.34	
	100			100
	110	0.44	0.42	
	120	0.51	0.49	
28	130	0.73	0.69	
	140	0.78	0.78	
	150	0.90	0.88	50
	160	1.20	1.18	
	200	2.45	2.43	
	CB 10- 10	0.18	0.15	
	12			
	15	0.13	0.12	
	20	0.11	0.10	
Full Thread	25	0.12	0.11	
	30	0.14	0.12	
	35	0.14	0.13	100
	40	0.15	0.13	
	45	0.16	0.15	
	50	0.18	0.17	
	55	0.20	0.19	
	50	0.23	0.22	
	55	0.25	0.24	
	70	0.28	0.26	
	75	0.30	0.29	
	80	0.34	0.32	
	85	0.37	0.35	
	90	0.39	0.37	
32	95	0.43	0.41	50
	100			
	110	0.51	0.49	
	120	0.60	0.58	
	130	0.71	0.69	
	140	0.78	0.77	
	150	0.89	0.88	
	160	1.04	1.02	
	170	1.14	1.12	
	180	1.93	1.91	20
	190	2.25	2.23	
	200	2.39	2.36	
	210	2.82	2.80	
	CB 12- 15	0.25	0.24	
	20			
	25	0.20	0.19	
Full Thread	30	0.21	0.20	100
	35	0.22	0.21	
	40	0.23	0.22	
	45	0.25	0.24	
	50	0.27	0.26	
	55	0.30	0.29	
	60	0.33	0.32	
	65	0.35	0.33	50
	70	0.38	0.36	
	75	0.40	0.38	
	80	0.44	0.42	
	85	0.54	0.52	
	90	0.57	0.55	
	95	0.59	0.57	
	100	0.69	0.67	40
	110	0.69	0.67	
36	120	0.79	0.74	
	130	0.87	0.85	
	140	0.99	0.94	
	150	1.04	1.02	30
	160	1.21	1.19	
	170	1.32	1.30	
	180	1.44	1.42	
	190	1.54	1.52	
	200	1.68	1.66	
	210	1.80	1.88	
	220	2.08	2.04	
	230	2.22	2.20	20
	240	2.36	2.33	
	250	2.50	2.48	
	260	2.68	2.64	
	270	7.10	7.00	
	280	7.80	7.50	
	290	8.10	8.00	
	CB 16- 20	0.58	0.54	
	25			
	30	0.47	0.45	50
	35			
Full Thread	40	0.48	0.48	
	45	0.59	0.48	
	50	0.54	0.52	40
	55	0.58	0.57	

d	Catalog No. Type M—L	$ Unit Price *less	*or more	Quantity
	CB 16- 60	0.63	0.61	40
	65	0.67	0.65	
	70	0.72	0.70	
	75	0.76	0.74	30
	80	0.80	0.78	
	85	0.85	0.83	
	90	0.89	0.87	
	95	0.95	0.93	25
	100			
	110	1.08	1.06	
	120	1.21	1.19	
	130	1.39	1.37	
	140	1.45	1.43	20
	150	1.57	1.55	
	160	1.76	1.74	
40	170	2.06	2.04	
	180	2.24	2.22	
	190	2.40	2.38	
	200	2.54	2.52	
	210	2.88	2.86	
	220	3.10	3.07	
	230	3.30	3.27	
	240	3.53	3.50	
	250	3.74	3.72	10
	260	3.90	3.87	
	270	7.10	7.00	
	280	7.60	7.50	
	290	8.10	8.00	
	300	8.20	8.10	
	310	8.40	8.30	
	320	8.80	8.60	
	CB 20- 40	0.98	0.96	
	45	1.00	0.98	30
	50	1.03	1.01	
	55	1.09	1.07	
Full Thread	60	1.15	1.13	
	65	1.52	1.19	
	70	1.26	1.24	
	75	1.52	1.50	20
	80	1.38	1.36	
	85	1.48	1.46	
	90	1.55	1.53	
	95	1.63	1.61	
	100			
	110	1.81	1.79	15
	120	1.99	1.97	
	130	2.20	2.18	
52	140	2.40	2.38	
	150	2.68	2.64	
	160	3.01	2.98	
	170	3.24	3.21	
	180	3.46	3.43	
	190	3.80	3.77	10
	200	4.00	3.96	
	210	4.50	4.46	
	220	4.65	4.61	
	230	4.80	4.68	
	240	5.14	5.09	
	250	5.38	5.31	
	CB 24- 50	2.08	2.06	20
	60	2.18	2.16	
Full Thread	70	2.33	2.31	15
	80	2.48	2.43	
	90	2.62	2.59	
	100	2.84	2.81	
	110	3.07	3.03	
60	120	3.28	3.24	10
	130	3.50	3.47	
	140	3.64	3.61	
	150	3.92	3.90	

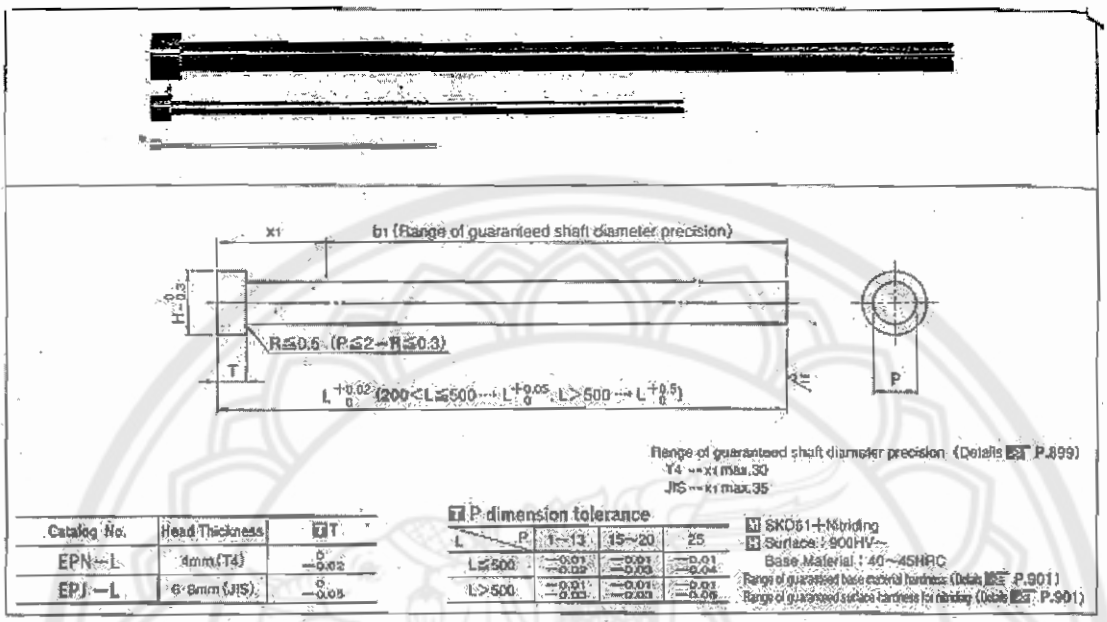
ตารางที่ 2 Details and Dimensions of Coil Springs



D	d	L	N/mm {kgf/mm} (Spring Constant)	Solid height	F=L×60% F/mm	N {kgf}	Catalog No. Type D—L	Unit Price Qty. 1~9
31	21	35	28.02{2.86}	14	17.5	490.3 {50}	SWR31— 35	2.35
		40	24.51{2.50}	16	20		40	2.45
		45	21.77{2.22}	18	22.5		45	2.55
		50	19.61{2.00}	20	25		50	2.65
		55	17.83{1.82}	22	27.5		55	2.75
		60	16.37{1.67}	24	30		60	2.85
		65	15.09{1.54}	26	32.5		65	2.95
		70	14.02{1.43}	28	35		70	3.00
		75	13.08{1.33}	30	37.5		75	3.10
		80	12.25{1.25}	32	40		80	3.20
		90	10.88{1.11}	36	45		90	3.40
		100	9.80{1.00}	40	50		100	3.60
		110	8.92{0.91}	44	55		110	3.70
		120	8.13{0.83}	48	60		120	3.85
		125	7.84{0.80}	50	62.5		125	3.95
		130	7.55{0.77}	52	65		130	4.05
		140	6.96{0.71}	56	70		140	4.25
		150	6.57{0.67}	60	75		150	4.35
		160	6.17{0.63}	64	80		160	4.55
		170	5.78{0.59}	68	85		170	4.65
		175	5.58{0.57}	70	87.5		175	4.75
		180	5.49{0.56}	72	90		180	4.80
		190	5.19{0.53}	76	95		190	5.00
		200	4.90{0.50}	80	100		200	5.10
		250	3.92{0.40}	100	125		250	5.85
		300	3.23{0.33}	120	150		300	6.65
37	26	40	29.41{3.00}	16	20	588.4 {60}	SWR37— 40	3.10
		45	26.18{2.67}	18	22.5		45	3.20
		50	23.53{2.40}	20	25		50	3.30
		55	21.40{2.18}	22	27.5		55	3.40
		60	19.61{2.00}	24	30		60	3.50
		65	18.10{1.85}	26	32.5		65	3.60
		70	16.78{1.71}	28	35		70	3.70
		75	15.69{1.60}	30	37.5		75	3.80
		80	14.70{1.50}	32	40		80	3.85
		90	13.04{1.33}	36	45		90	4.05
		100	11.76{1.20}	40	50		100	4.25
		110	10.68{1.09}	44	55		110	4.35
		120	9.80{1.00}	48	60		120	4.45
		125	9.41{0.96}	50	62.5		125	4.55
		130	9.02{0.92}	52	65		130	4.65
		140	8.43{0.86}	56	70		140	4.75
		150	7.84{0.80}	60	75		150	4.80
		160	7.35{0.75}	64	80		160	4.90
		170	6.96{0.71}	68	85		170	5.00
		175	6.76{0.69}	70	87.5		175	5.10
		180	6.57{0.67}	72	90		180	5.20
		190	6.17{0.63}	76	95		190	5.30
		200	5.88{0.60}	80	100		200	5.40
		250	4.70{0.48}	100	125		250	6.35
		300	3.92{0.40}	120	150		300	7.30

D	d	L	N/mm {kgf/mm} (Spring Constant)	Solid height	F=L×60% F/mm	N {kgf}	Catalog No. Type D—L	Unit Price Qty. 1~9
43	31	50	33.34{3.40}	20	25	833.6 {85}	SWR43— 50	3.95
		60	27.79{2.83}	24	30		60	4.05
		70	23.82{2.43}	28	35		70	4.15
		80	20.84{2.13}	32	40		80	4.25
		90	18.52{1.89}	36	45		90	4.35
		100	16.67{1.70}	40	50		100	4.45
		110	15.16{1.55}	44	55		110	4.55
		120	13.89{1.42}	48	60		120	4.70
		130	12.82{1.31}	52	65		130	4.85
		140	11.91{1.21}	56	70		140	4.95
		150	11.11{1.13}	60	75		150	5.10
		160	10.42{1.06}	64	80		160	5.20
		170	9.81{1.00}	68	85		170	5.30
		180	9.26{0.94}	72	90		180	5.50
		190	8.77{0.89}	76	95		190	5.70
		200	8.34{0.85}	80	100		200	5.90
		225	7.41{0.76}	90	112.5		225	6.40
		250	6.67{0.68}	100	125		250	6.90
		275	6.06{0.62}	110	137.5		275	7.40
		300	5.56{0.57}	120	150		300	7.80
46	33	50	43.14{4.40}	20	25	1078.7 {110}	SWR46— 50	4.05
		60	35.99{3.67}	24	30		60	4.15
		70	30.79{3.14}	28	35		70	4.25
		80	26.96{2.75}	32	40		80	4.35
		90	23.92{2.44}	36	45		90	4.45
		100	21.57{2.20}	40	50		100	4.55
		110	19.61{2.00}	44	55		110	4.65
		120	17.94{1.83}	48	60		120	4.75
		125	17.25{1.76}	50	62.5		125	4.80
		130	15.57{1.69}	52	65		130	4.90
		140	15.39{1.57}	56	70		140	5.00
		150	14.41{1.47}	60	75		150	5.10
		175	12.35{1.26}	70	87.5		175	5.40
		200	10.78{1.10}	80	100		200	5.70
		225	9.61{0.98}	90	112.5		225	5.95
		250	8.62{0.88}	100	125		250	6.25
		275	7.84{0.80}	110	137.5		275	6.55
		300	7.15{0.73}	120	150		300	6.90
50	36	50	52.96{5.40}	20	25	1323.9 {135}	SWR50— 50	4.80
		60	44.13{4.50}	24	30		60	5.00
		70	37.83{3.86}	28	35		70	5.15
		80	33.10{3.38}	32	40		80	5.30
		90	29.42{3.00}	36	45		90	5.45
		100	26.48{2.70}	40	50		100	5.60
		110	24.07{2.45}	44	55		110	5.80
		120	22.06{2.25}	48	60		120	6.00
		130	20.37{2.08}	52	65		130	6.40
		140	18.91{1.93}	56	70		140	7.00
		150	17.65{1.80}	60	75		150	7.35
		175	15.13{1.54}	70	87.5		175	8.30
		200	13.24{1.35}	80	100		200	9.30
		225	11.77{1.20}	90	112.5		225	10.25
		250	10.59{1.08}	100	125		250	11.20
		275	9.63{0.98}	110	137.5		275	12.10
		300	8.83{0.90}	120	150		300	13.00
		350	7.57{0.77}	140	175		350	15.00
		400	6.62{0.68}	160	200		400	17.00

ตารางที่ 3 Dimensions of Straight Ejector Pins



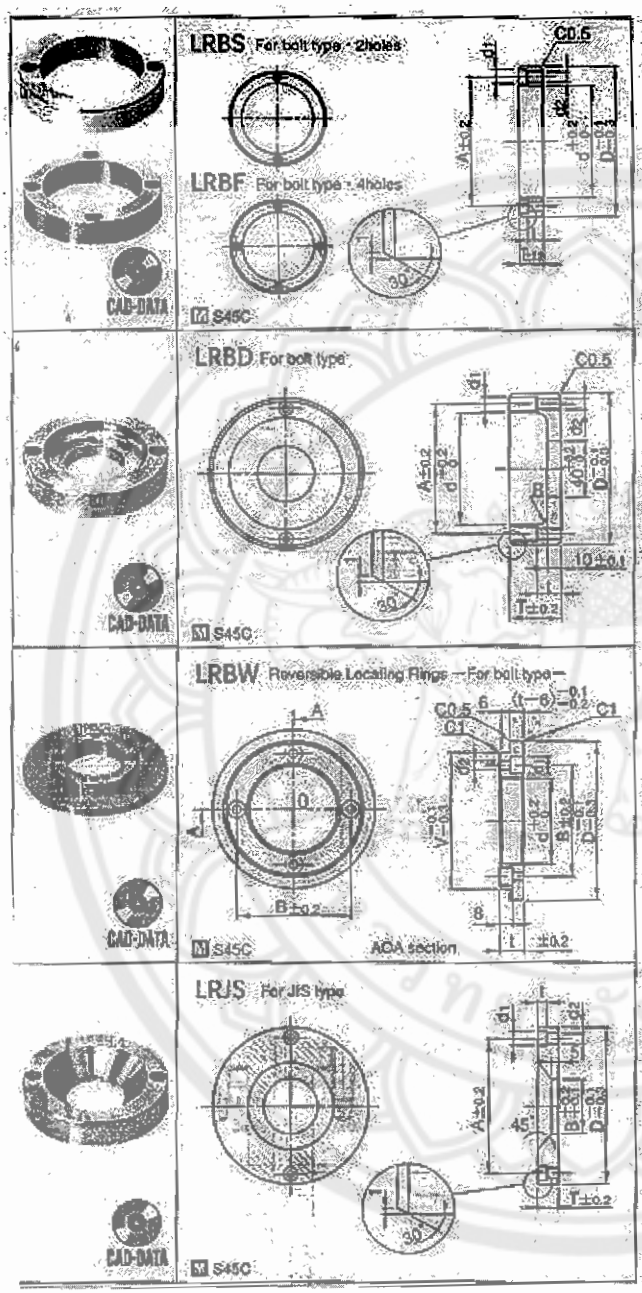
Catalog No.	Head Thickness	T
EPN-L	4mm (T4)	0 −0.02
EPJ-L	6·8mm (JIS)	0 −0.05

L \ P	1~13	15~20	25
L≦500	−0.01 −0.09	−0.01 −0.03	−0.01 −0.04
L>500	−0.01 −0.03	−0.01 −0.03	−0.01 −0.06

4mm head		JIS head		Catalog No. Type		P	L 0.01mm increments (When L>500, then 0.1mm increments)
H	T	H	T	4mm head	JIS head		
3	4	—	—	EPN-L	—	1 1.1 1.2 1.3 1.4	50.00 ~ 150.00
						1.5	50.00 ~ 200.00
4						1.6 1.7 1.8 1.9	
						2	50.00 ~ 300.00
5						2.1 2.2 2.3 2.4	50.00 ~ 200.00
						2.5	50.00 ~ 350.00
6						2.6 2.7 2.8 2.9	50.00 ~ 200.00
						3	50.00 ~ 400.00
7						3.5	
		8	6		EPJ-L	4	50.00 ~ 400.00 (500.00)
8						4.5	
		9				5	50.00 ~ 500.00 (600.0)
9						5.5	50.00 ~ 500.00
		10				6	50.00 ~ 500.00 (700.0)
10		11				6.5	
						7	
11		13	8			8	50.00 ~ 500.00 (800.0)
15		15				10	
17		17				12	
18		18				(13)	50.00 ~ 500.00 (1000.0)
20		20				15	
21		21				16	
—	—	25		—		20	50.00 ~1000.0
		30				25	

① Figures in parentheses for L dimension is applicable for EPJ-L only.
② P(13) — Applicable for EPN-L only.
③ Please order with head thickness 4mm type (EPN-L), since P≦3.5 for the old standard (EPJL) for JIS head types is T=4.
Ex.: (Old) EPJL2-240 → (Revised) EPN-L2-240

ตารางที่ 4 Dimensions of Locating Rings



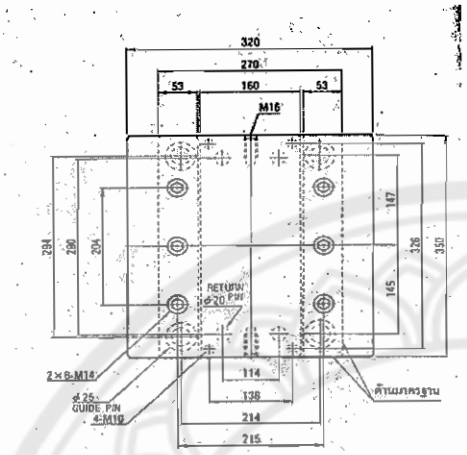
Bolt hole d2	Bolt hole d1	t	d	A	Catalog No. Type	Catalog No. D	T
M5	5.5	9	5	40	50	LRBS 2holes	60	10 15 20 25
			3	70	85		100	10 15 20 25 30
			8					
M6	6.5	11	3	80	95	LRBF 4holes	110	10 15 20
			8					
			3	90	105		120	10 15 20 25
			8					
M8	9	14	6	110	130		150	15 20 25

Bolt hole d2	Bolt hole d1	t	R	d	A	Catalog No. Type	Catalog No. D	T
M6	6.5	11	9	5	70	85	LRBD	100	15 20 35 40 45
			20	10				
			9	5	90	105		120	15 20 35 40 45
			20	10				

Bolt hole d2	Bolt hole d1	d	B	V	D	t	Catalog No. Type	Catalog No. No.
M5	5.5	9	40	50	60	100	14	LRBW	100
							16		100-16
M6	6.5	11	70	85	100	120	14		120
							16		120-16
						130	14		130
							16		130-16

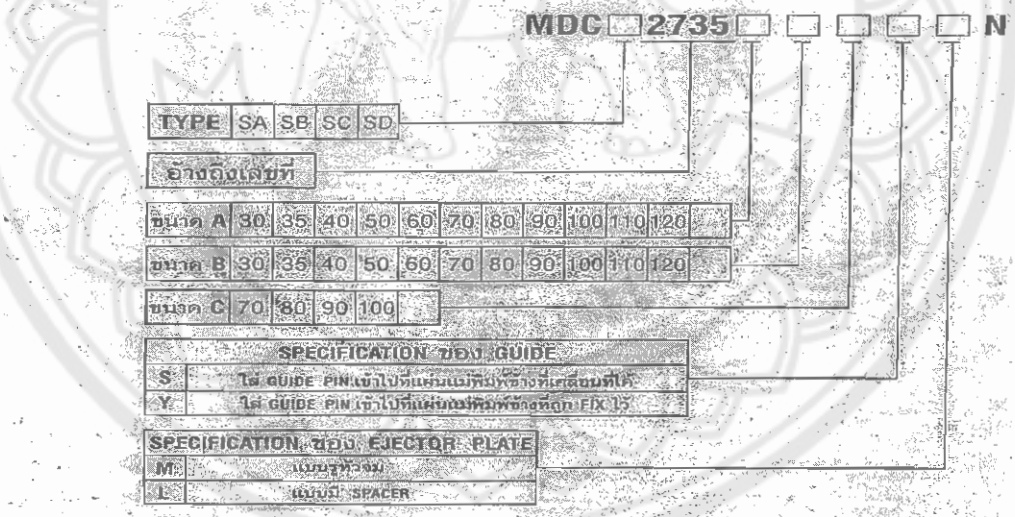
Bolt hole d2	Bolt hole d1	t	A	Catalog No. Type	Catalog No. D	T	B
M6	6.6	11	6.6	85	LRJS	100	15 20 25	35 40 50 35 40
						120	15 20	35 40 50
M8	9	14	8.6	100		150	15 20	

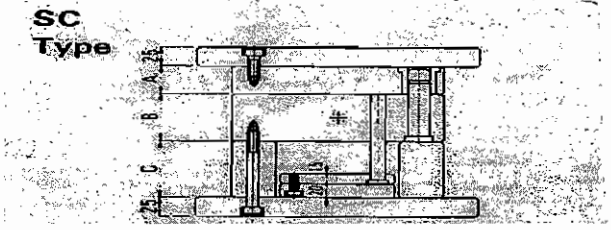
ตารางที่ 5 Dimensions of Two Plate Type



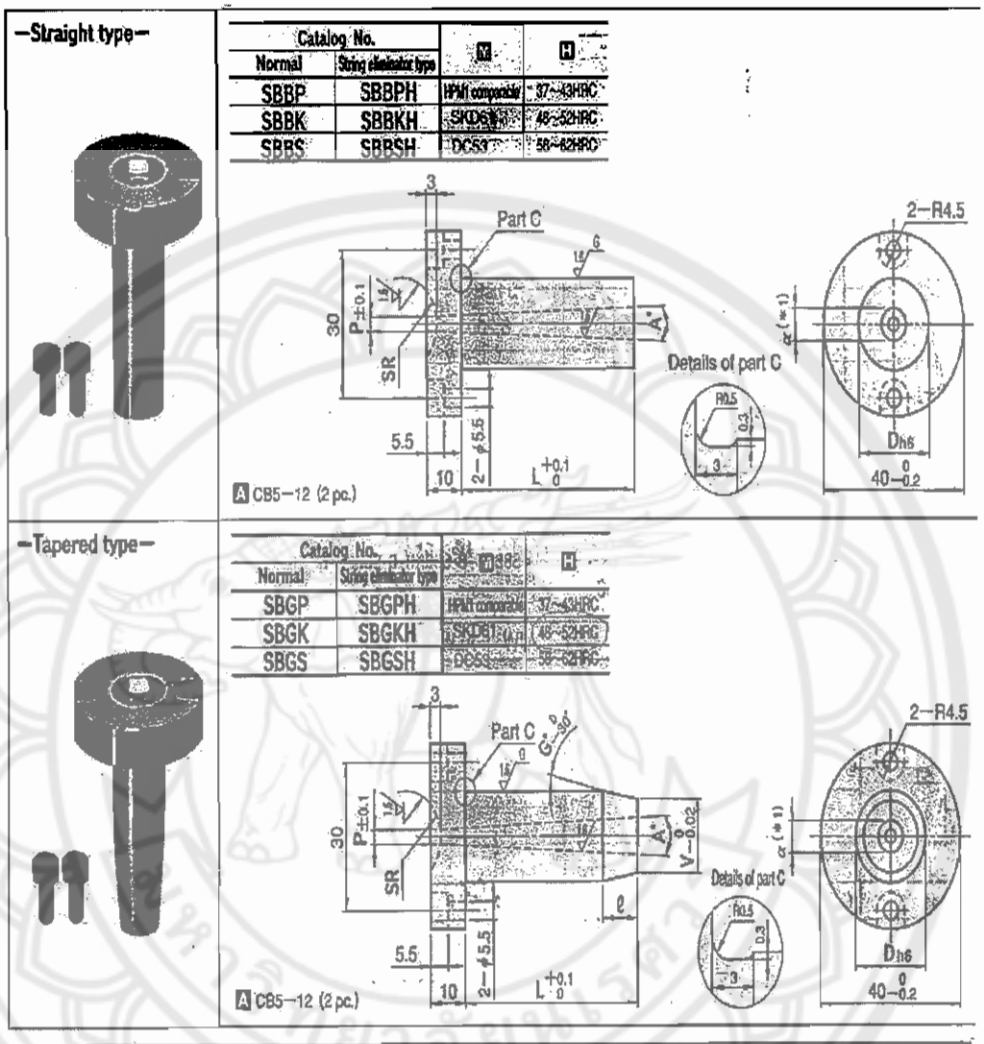
- แบบ M เป็นแบบที่ใช้โดยทั่วไป
- แบบ L เป็นแบบที่ใส่ Ejector Pins โดยใส่ Spacer Ring เข้าไประหว่าง Ejector Plate กับ Ejector Retainer Plate เพื่อให้เหลือช่องว่าง ซึ่งจะใช้ในกรณีที่ต้องการความแม่นยำในการปลดชิ้นงานเป็นพิเศษ

● วิธีการสั่ง ORDER : กรุณาสั่งตามหัวข้อสำคัญที่เขียนไว้ข้างล่าง



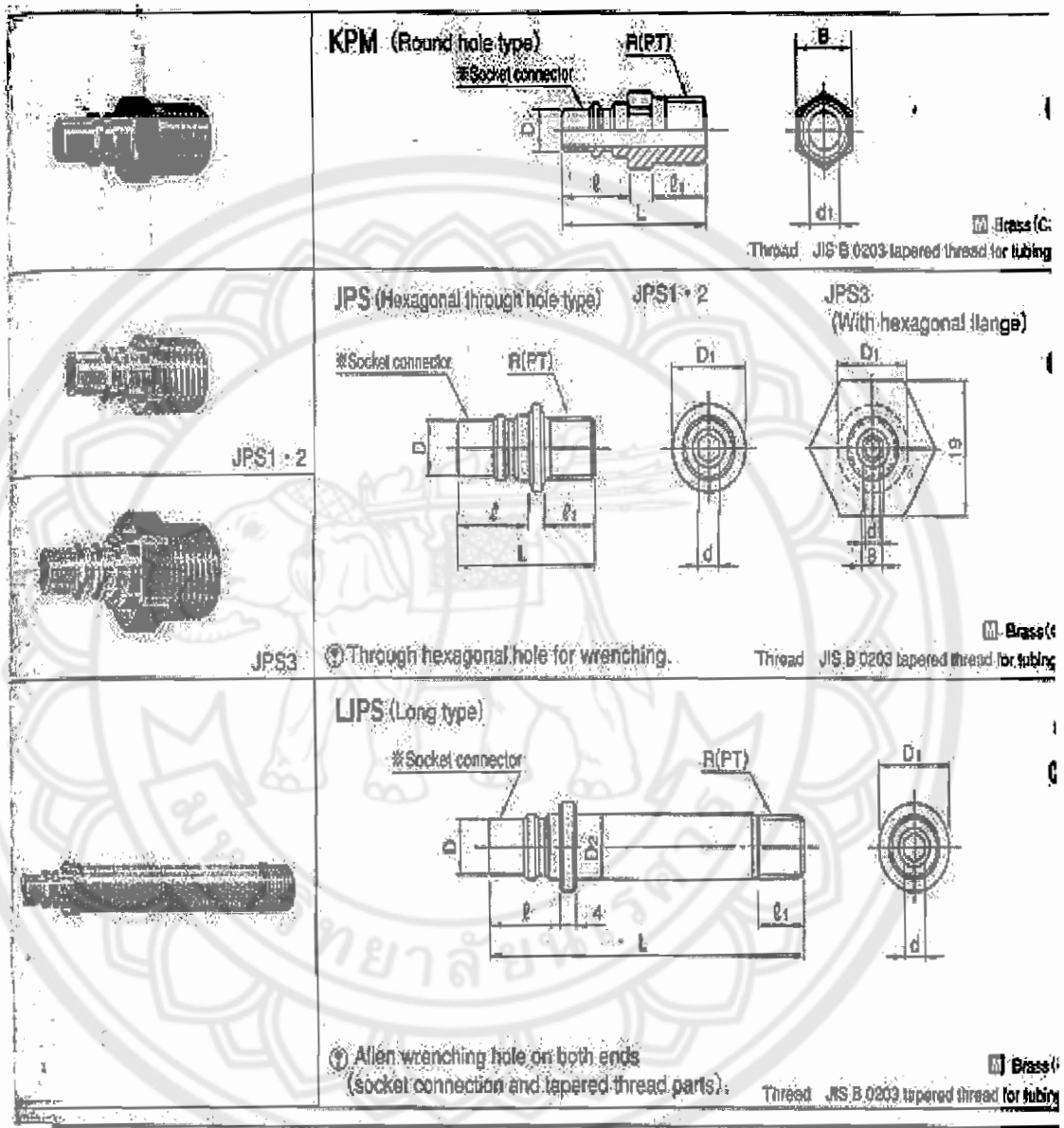


ตารางที่ 6 Dimensions of Sprue Bushings



Dh6		Catalog No. Type		D	L(*2) 0.1mm increments	SR	P	A*	V 0.1mm increments
8	0 −0.009	—Straight type—		8(*5)	0~ 50.0	0 11	2 2.5 3 3.5	1 2 3	D>V≧α+2
		Normal	String eliminator type						
10		(HPM compatible) SBBP	SBBPH	10		0	2 (*3,4) 2.5(*3) 3 (*3)	1(*3)	
		(SKD61) SBBK	SBBKH						
		(DC53) SBBS	SBBSH			11	3.5		
13	0 −0.011	—Tapered type—		13	0~100.0	12	4 4.5	2	Available for tapered type only
		Normal	String eliminator type						
16		(HPM compatible) SBGP	SBGPH	16		13	5 5.5	3	
		(SKD61) SBGK	SBGKH						
		(DC53) SBGS	SBGSH			16	6		
20	0 −0.013			20(*6)	0~150.0	20(*4)	6.5 7 8	4	

ตารางที่ 7 Specification of Mold Couplers



D	D1	Inner dia. d	Allen wrench hole Od	L	ℓ	ℓ1	Tapered thread R(PT)	Catalog No. Type	No.	Unit price 1~9
6	9	6	○5	31	15	10	1/8	KPM	1	220
				34		13	1/4		2	220
				35		14	3/8		3	250
8	13	8	○5	27	15	9	1/8	JPS	1	250
	14			29		11	1/4		2	250
10	13	10	○5	37	16	12	3/8		3	350

D1	D2	Allen wrench hole Od	ℓ	ℓ1	Tapered thread R(PT)	Catalog No. Type	No.	L 5mm increments	L 10mm incr
14	10	○5	15	9	1/8	LJPS (Long type)	1	40~90	100~2
	13.2			11	1/4		2		

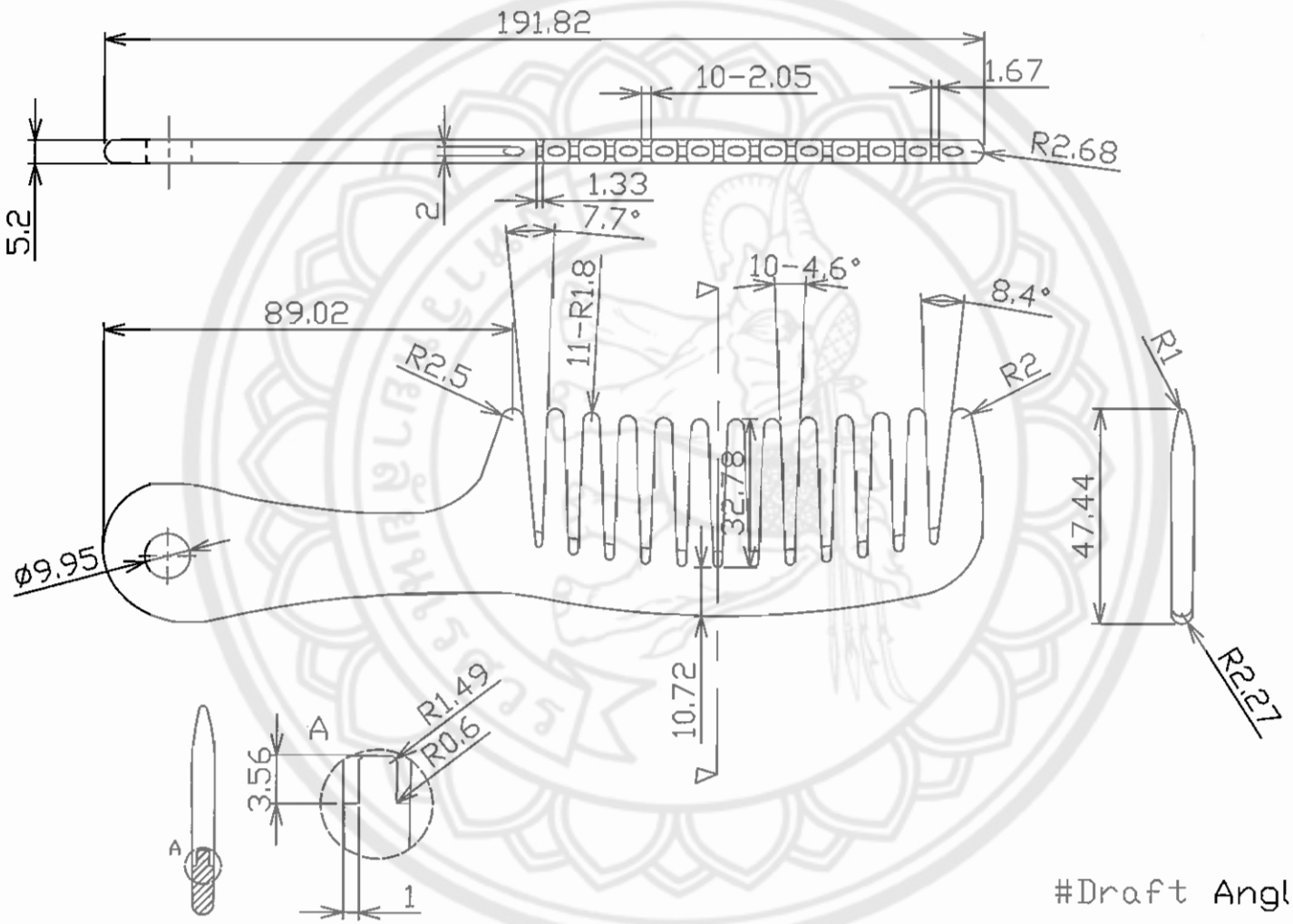
ภาคผนวก ข

Drawing

PARTS LIST.

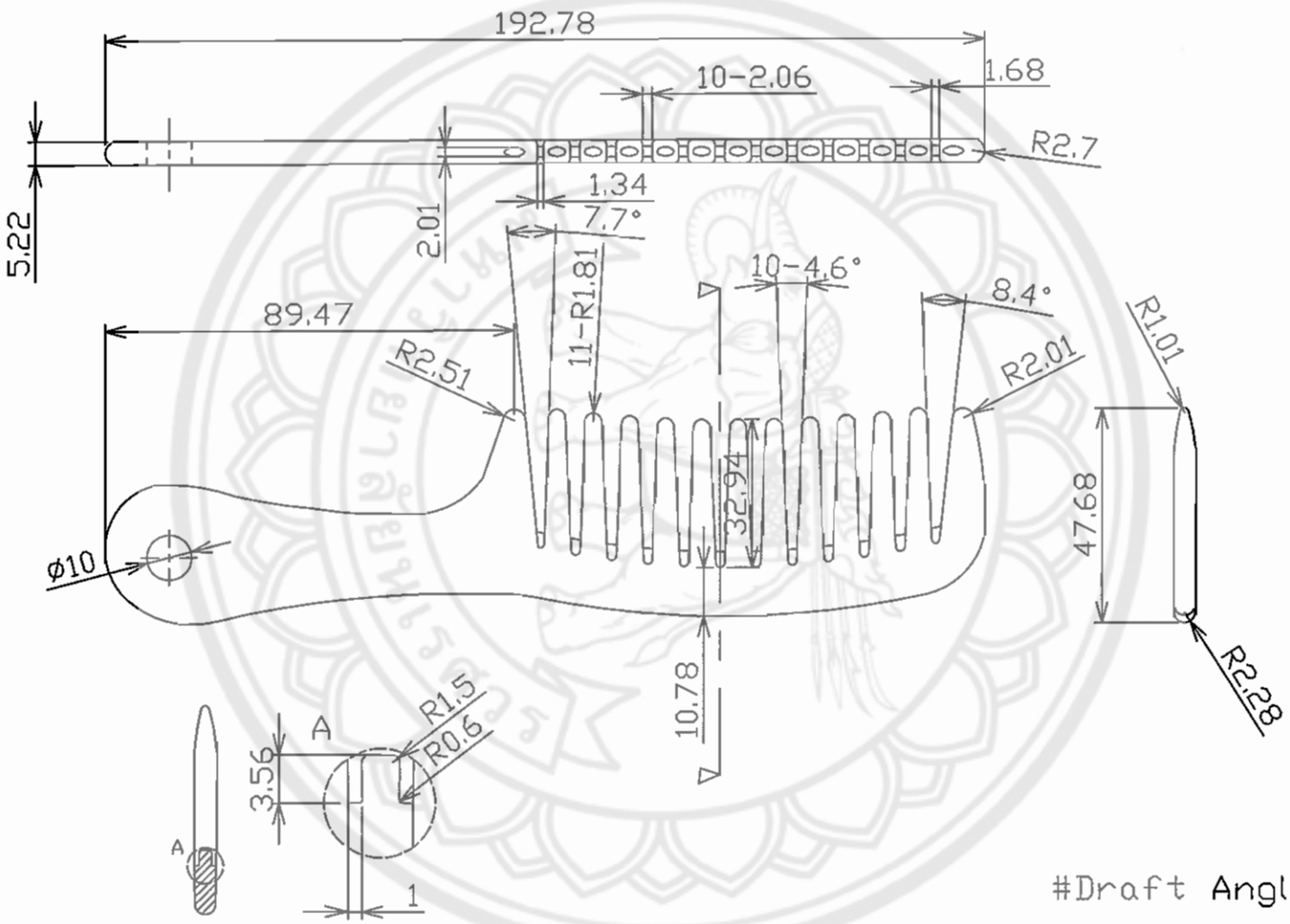
PRODUCTS NAME	COMB	WRITER	ANAN NUPAO.	PAGE	1/1
				DATE	21/02/2004

PARTS NO.	DWG NO.	PARTS NAME	MATERIAL	DESCRIPTION	Q'TY	REMARK
1		MOLD BASE	S55C	MDC SC2735-405060 S-MN	1 SET	FUTABA
2		COIL SPRING		SRW31-60	4 PCS.	MISUMI
3	09	LOCATING RING	S45C	LRBS100-15	1	MISUMI
4	10	SPRUE BUSHING	HPM1	SBBP16-55-SR16-P4-A2-BIR3	1	MISUMI
5		EJECTOR PIN 01	SKD61	EPN-L4-83.5	6	MISUMI
6		EJECTOR PIN 02	SKD61	EPN-L4-79	1	MISUMI
7		EJECTOR PIN 03	SKD61	EPN-L5-83	4	MISUMI
8	07	SUPPORT PILLARS	S45C	ø30x60	4	PROJECT
9		COOLING AND HEAT CONLLING COMPONENTS		KPM1	8	MISUMI
10		RETURN PIN	SUJ2	ø20X90	4	MISUMI
11		GUIDE PIN	SUJ2	ø25X87	4	MISUMI
12		SOCKET HEAD SCREW		M16x29	2	MISUMI
13		SOCKET HEAD SCREW		M14x90	6	MISUMI
14		SOCKET HEAD SCREW		M14x30	6	MISUMI
15		SOCKET HEAD SCREW		M8x35 (CB8-35)	12	MISUMI
16		SOCKET HEAD SCREW		M8x22 (CB8-22)	6	MISUMI
17		SOCKET HEAD SCREW		M6x16	2	MISUMI
18		SOCKET HEAD SCREW		M5x20	4	MISUMI
19		SOCKET HEAD SCREW		M5x12	2	MISUMI

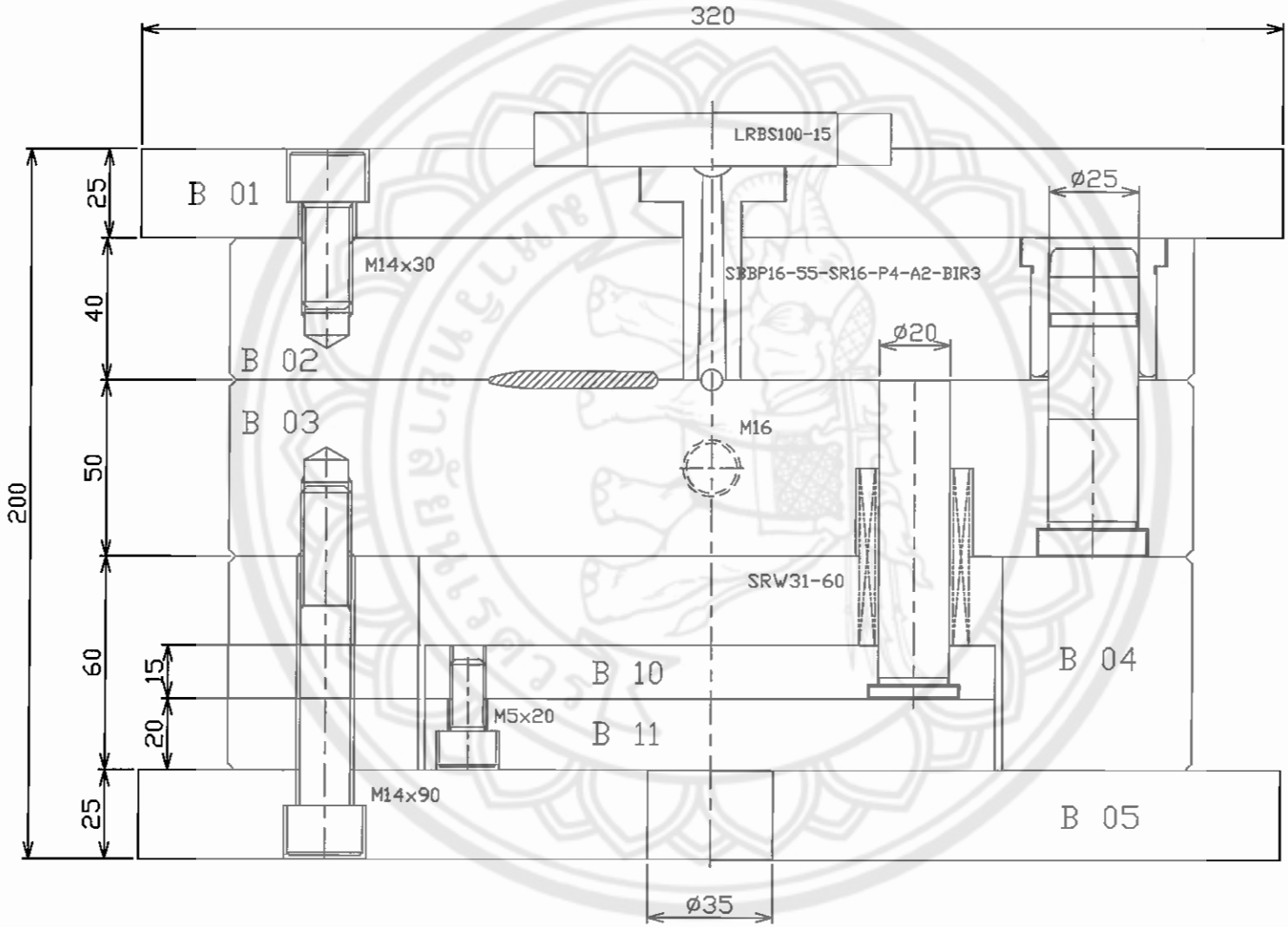


#Draft Angle 3

FACULTY OF ENGINEERING NARESUAN UNIVERSITY	Design and Manufacturing Process Planing of Plastics Mold for Comb	MECHANICAL ENGINEERING	
		UNIT: M.M. / SCALE: NOT TO SCALE	TITLE: COMB
		CA (MS=1.005)	PART NAME: COMB(PRODUCT)
		CELLULOSEACETATE / MATERIAL / DATE: XXXXX	STD.DRAWING: JIS / Q'TY / DRAW: XXXXXX / REMARK: XXXXXX
			DWG.NO: 01



FACULTY OF ENGINEERING NARESUAN UNIVERSITY	Design and Manufacturing Process Planing of Plastics Mold for Comb	MECHANICAL ENGINEERING	
		UNIT: M.M. / SCALE: NOT TO SCALE	TITLE: COMB
		CA (MS=1.005)	PART NAME: SCALE COMB
		CELLULOSEACETATE / 1	STD.DRAWING: JIS
		MATERIAL / Q'TY	DWG.NO: 02
		DATE: 21/02/2004 / DRAW: ANAN	REMARK

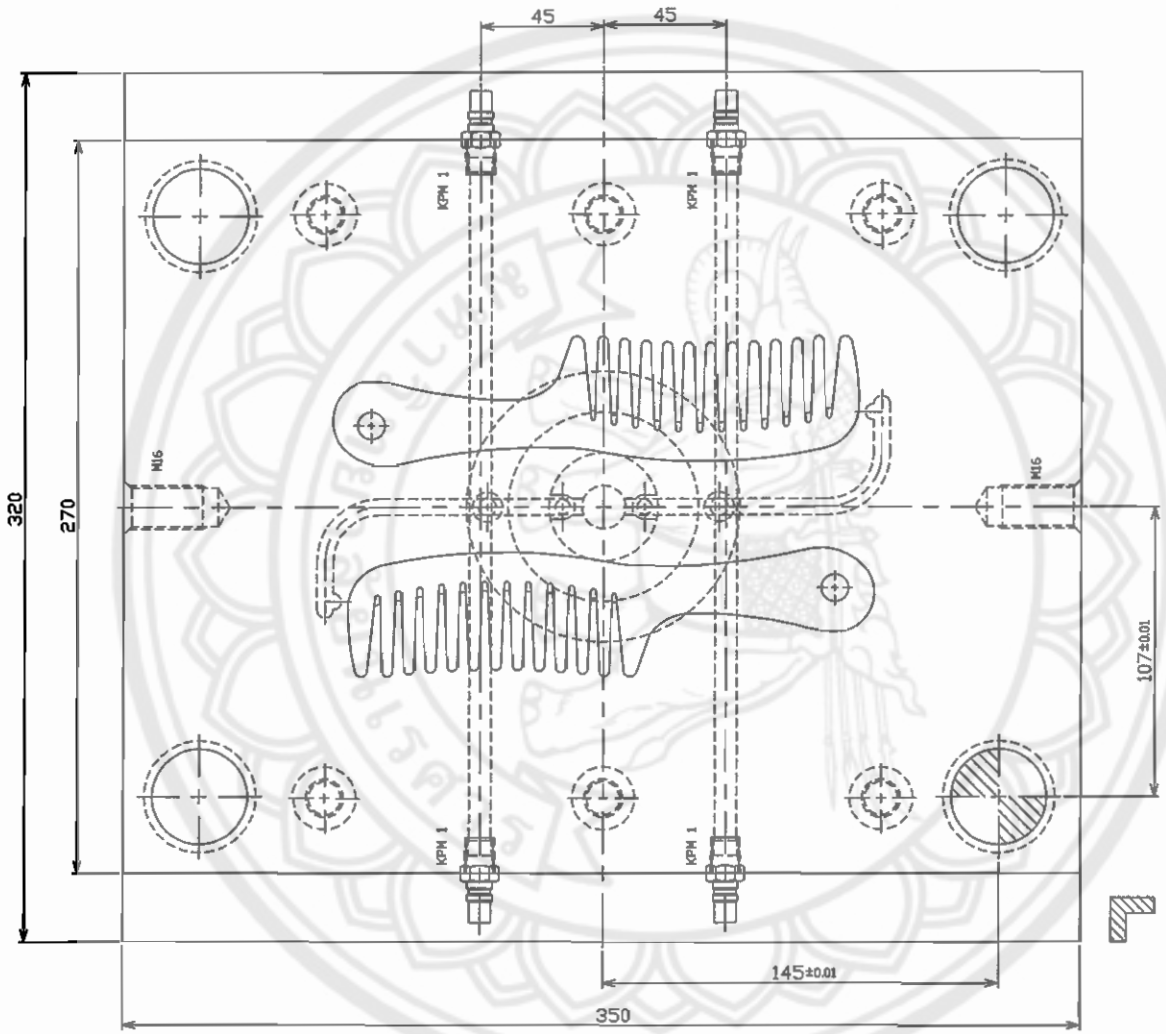


FACULTY OF ENGINEERING
NARESUAN UNIVERSITY

Design and Manufacturing Process
Planing of Plastics Mold for Comb

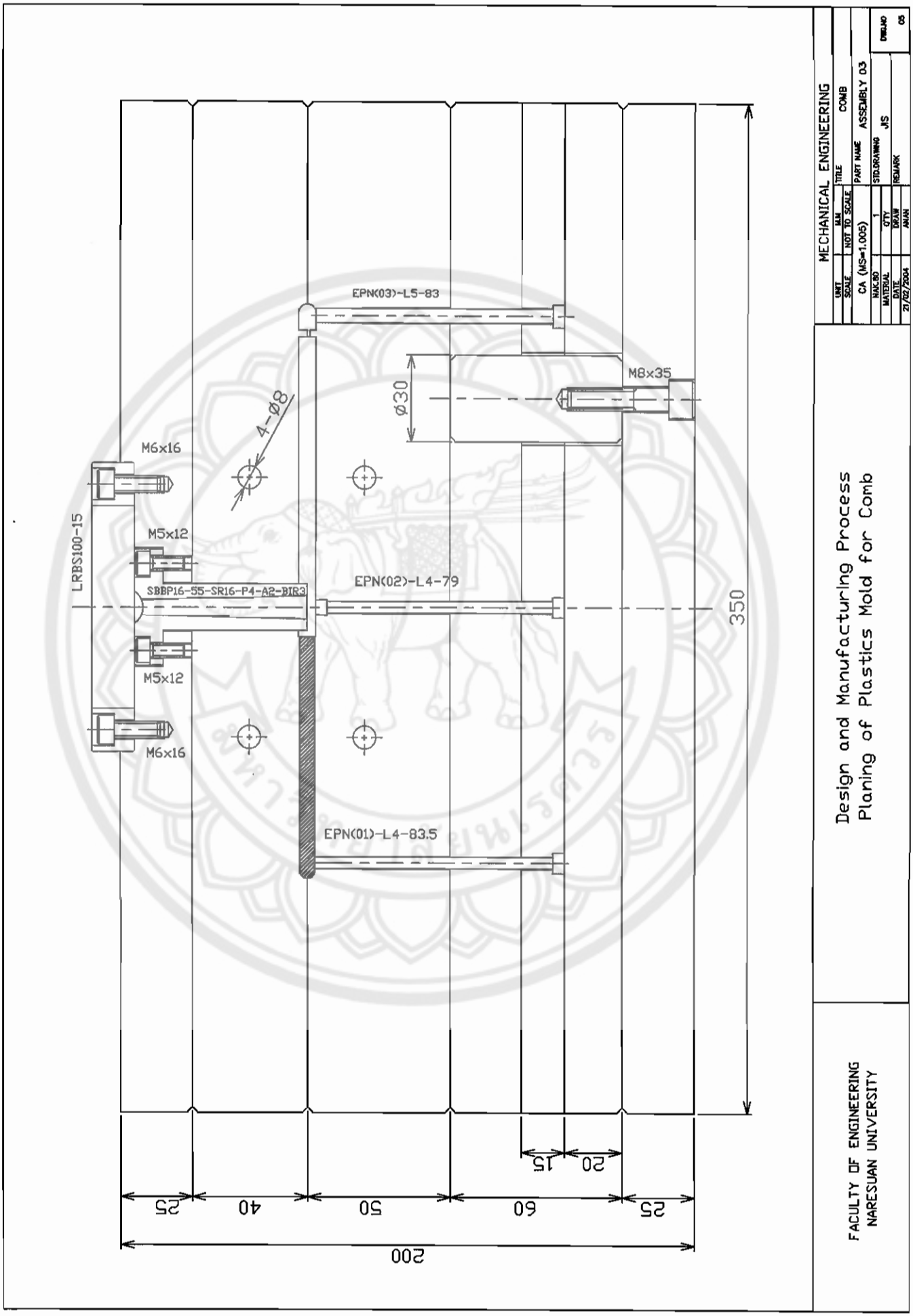
MECHANICAL ENGINEERING

UNIT	M.M	TITLE	COMB
SCALE	NOT TO SCALE		
CA (MS=1.005)		PART NAME	ASSEMBLY 01
S55C	1	STD.DRAWING	JIS
MATERIAL	Q'TY		DWG.NO
DATE	DRAW	REMARK	03
21/02/2004	ANAN		



MDC SC2735-405060 S-MN

FACULTY OF ENGINEERING NARESUAN UNIVERSITY	Design and Manufacturing Process Planing of Plastics Mold for Comb	MECHANICAL ENGINEERING	
		UNIT: M.M. / SCALE: NOT TO SCALE	TITLE: COMB
		CA (MS=1.005)	PART NAME: ASSEMBLY 02
		NAK.80 / 1	STD.DRAWING: JIS
		MATERIAL / QTY	DWG.NO: 04
		DATE: 21/02/2004 / DRAW: ANAN	REMARK


EPN(03)-L5-83
M8x35
ø30
4-ø8
M6x16
M5x12
LRBS100-15
SBBP16-55-SR16-P4-A2-BIR3
EPN(02)-L4-79
M5x12
M6x16
EPN(01)-L4-83.5
350
200
25
40
50
60
25
15
20
MECHANICAL ENGINEERING
UNIT
MM
SCALE
NOT TO SCALE
CA (MS=1.005)
MAT.NO
MATERIAL
DATE
21/02/2004
TITLE
COMB
PART NAME
ASSEMBLY 03
STD.DRAWING
JIS
QTY
1
DRAW
AMAN
REMARK
DWG.NO
05
Design and Manufacturing Process
Planing of Plastics Mold for Comb
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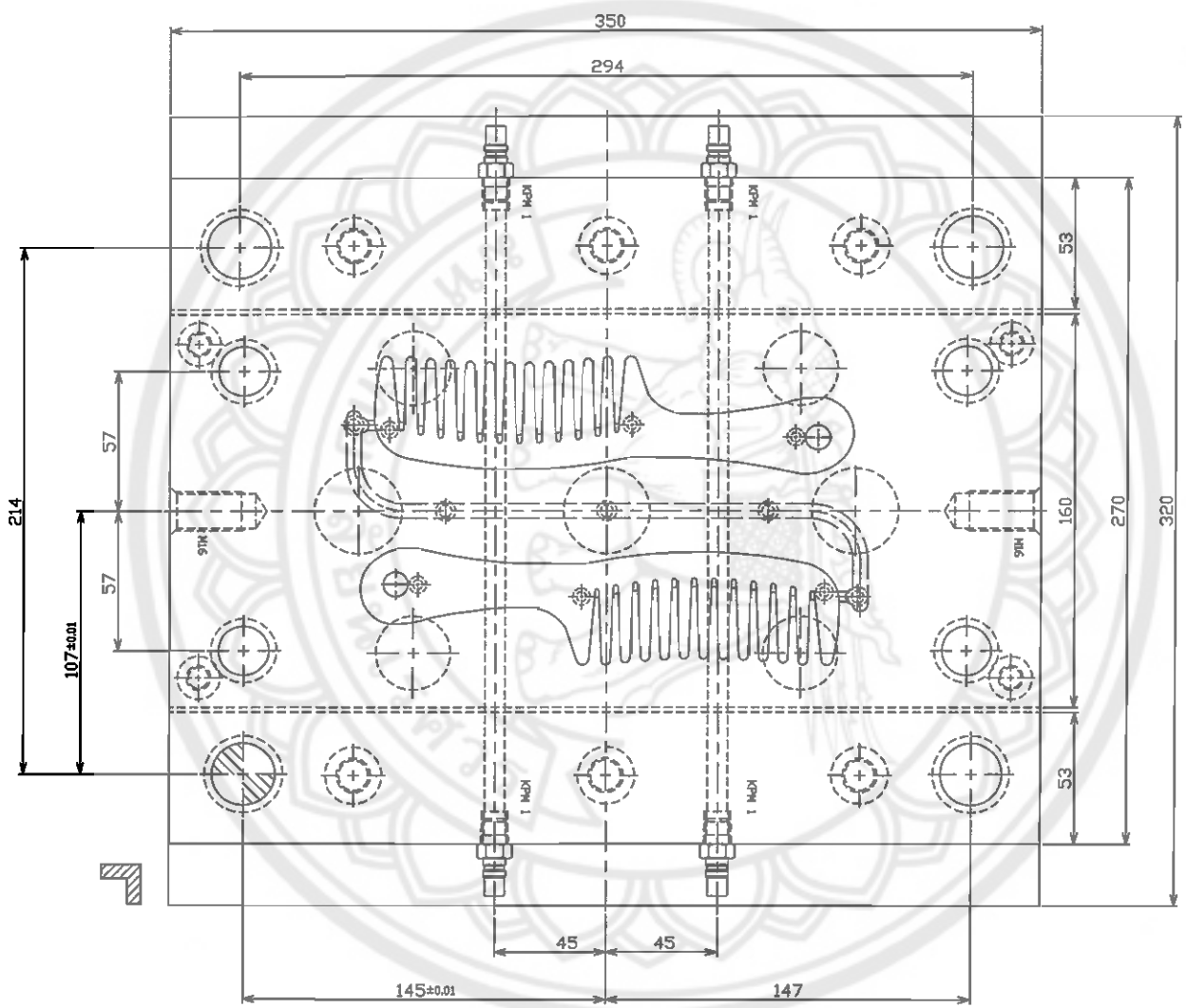
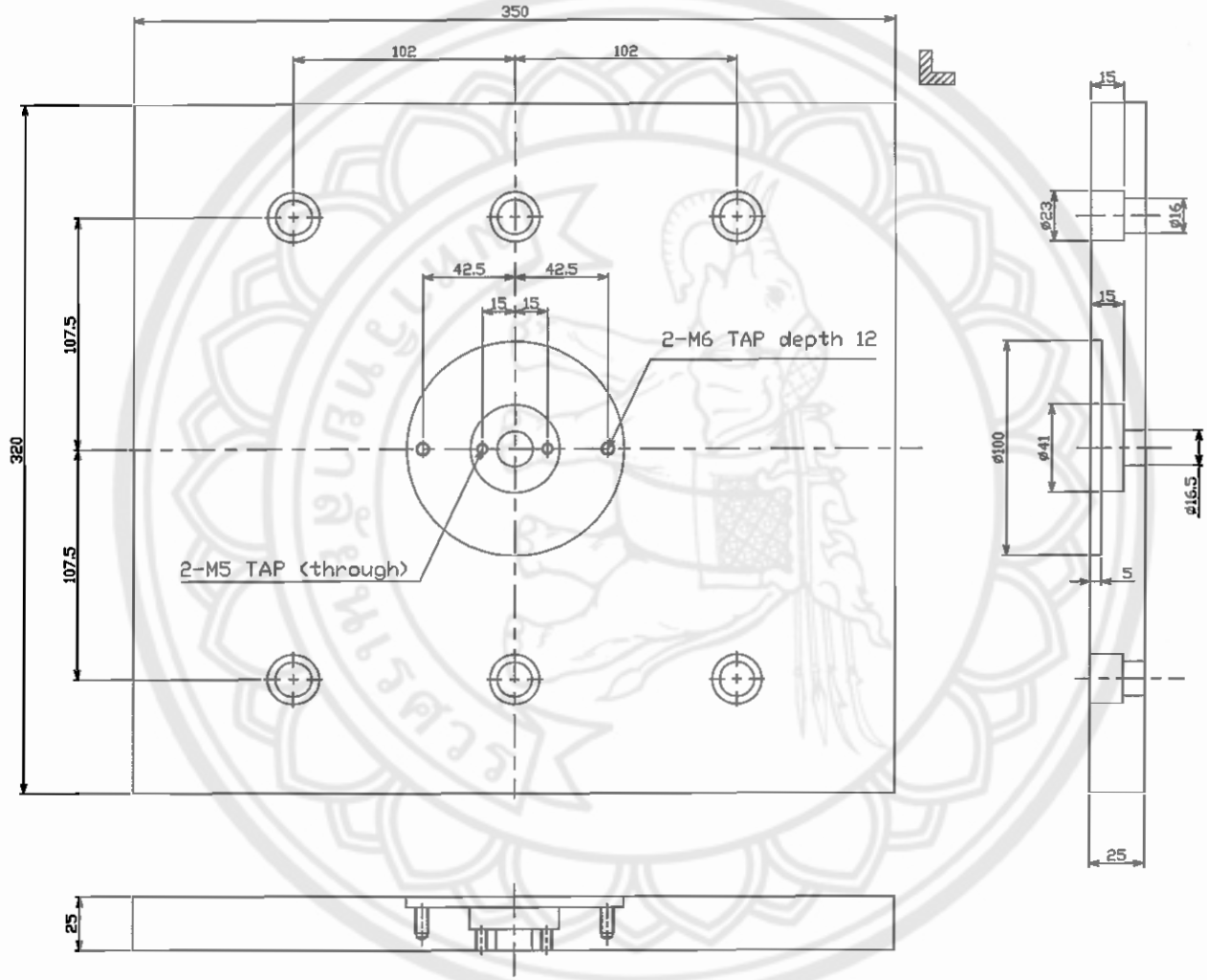


MDC SC2735-405060 S-MN

FACULTY OF ENGINEERING NARESUAN UNIVERSITY	Design and Manufacturing Process Planing of Plastics Mold for Comb	MECHANICAL ENGINEERING	
		UNIT: M.M	TITLE: COMB
		SCALE: NOT TO SCALE	PART NAME: ASSEMBLY 04
		CA (MS=1.005)	
		MAK.BD: 1	STD.DRAWING: JIS
		MATERIAL	Q'TY
		DATE: 21/02/2004	DRAW: AMAN
			REMARK
			DWG.NO: 06

PROCESS	MC				



B01

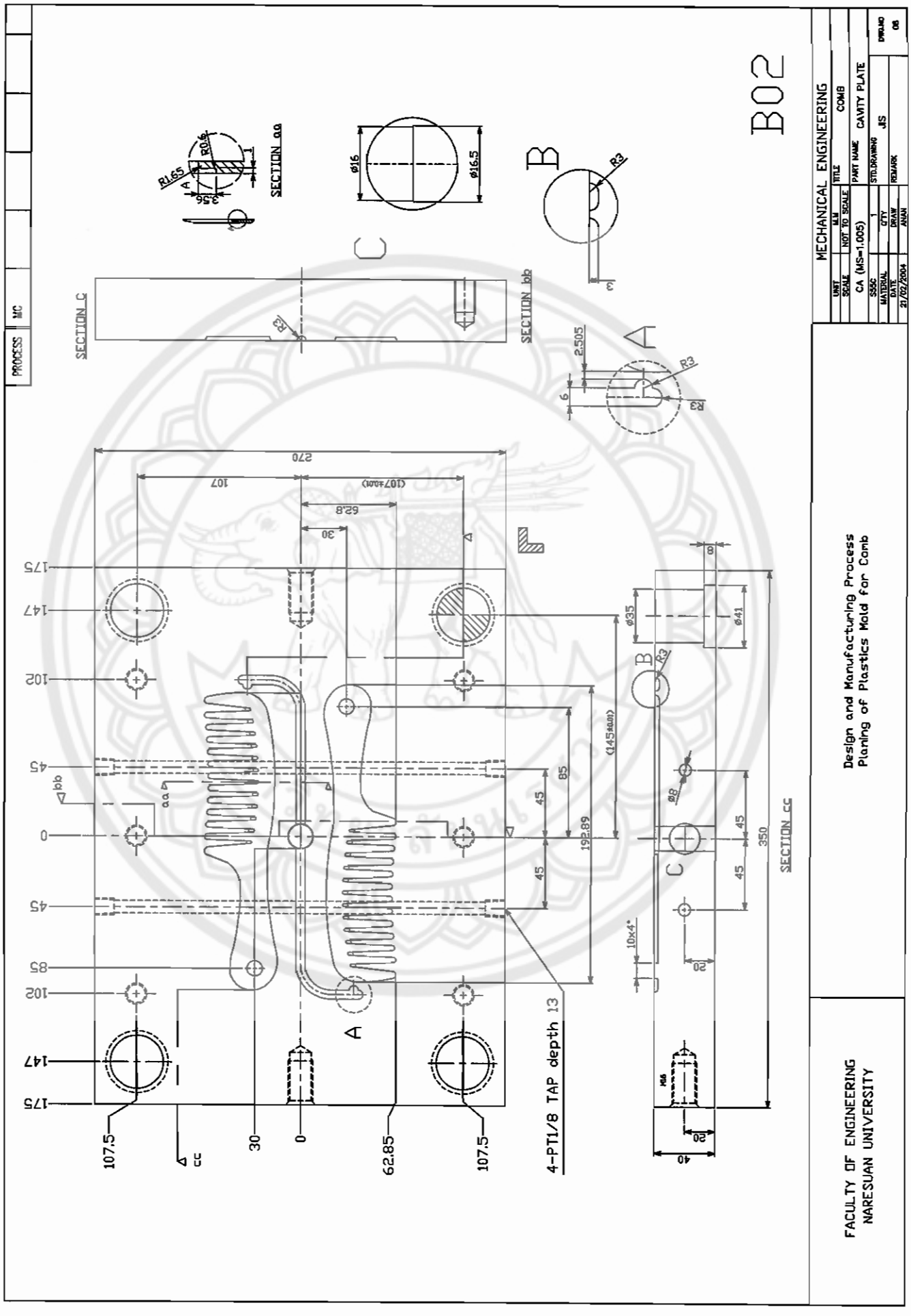
FACULTY OF ENGINEERING
NARESUAN UNIVERSITY

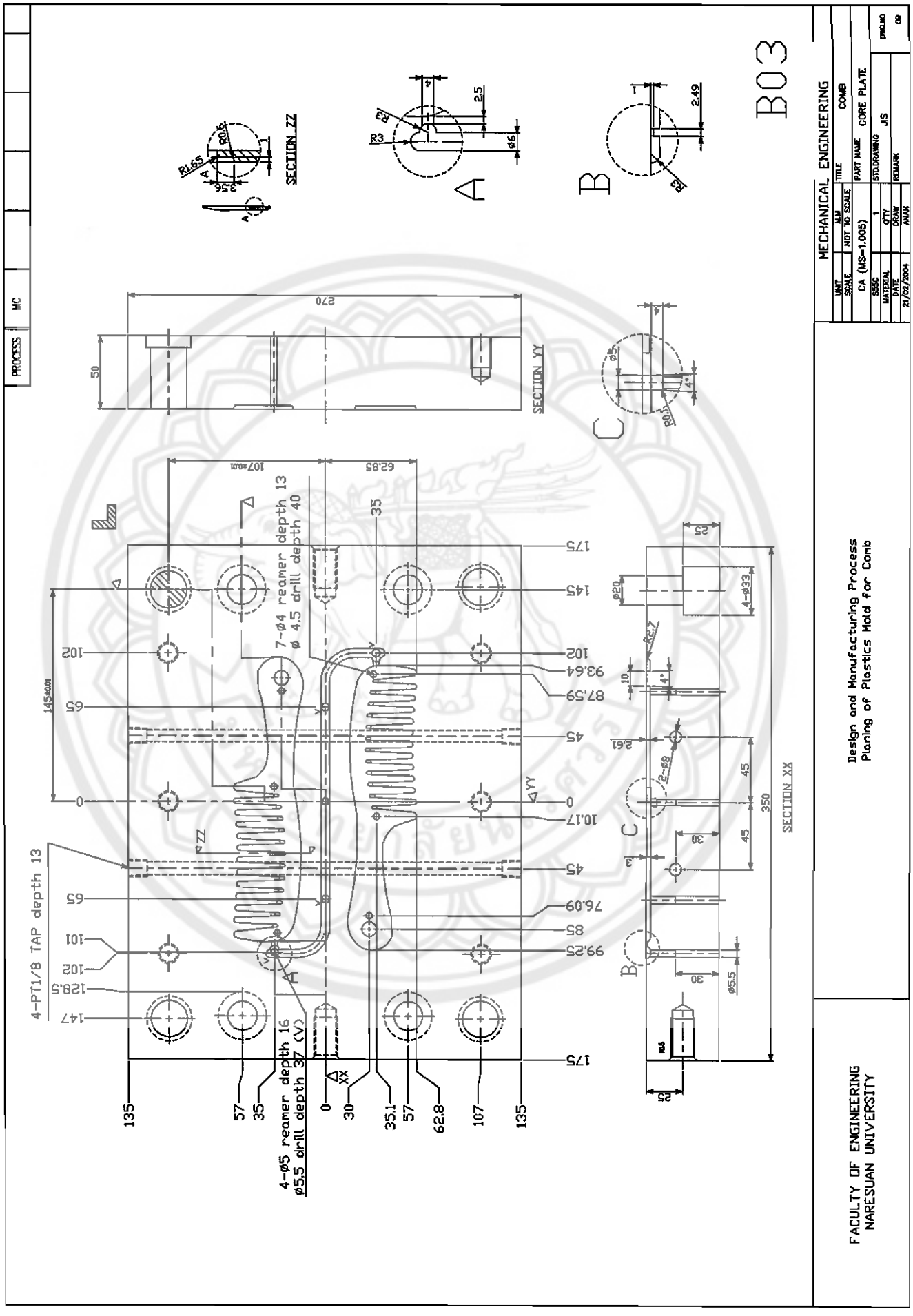
Design and Manufacturing Process
Planing of Plastics Mold for Comb

MECHANICAL ENGINEERING

UNIT	M.M	TITLE	COMB
SCALE	NOT TO SCALE		
CA (MS=1.005)		PART NAME	TOP CLAMPING PLATE
S55C	1	STD.DRAWING	JIS
MATERIAL	Q'TY		
DATE	DRAW	REMARK	
21/02/2004	ANAN		

DWG.NO 07


B02
MECHANICAL ENGINEERING
COMB
CAVITY PLATE
CA (MS=1.005)
S50C
JIS
Design and Manufacturing Process
Planing of Plastics Mold for Comb
FACULTY OF ENGINEERING
NARESUAN UNIVERSITY
4-PT1/8 TAP depth 13
SECTION aa
SECTION bb
SECTION cc
SECTION C


B03
SECTION ZZ
SECTION YY
SECTION XX
7-ø4 reamer depth 13
ø 4.5 drill depth 40
4-PT1/8 TAP depth 13
4-ø5 reamer depth 16
ø5.5 drill depth 37 (V)
4-ø33
2-ø8
MECHANICAL ENGINEERING
COMB
CORE PLATE
CA (MS=1.005)
S55C
JIS
Design and Manufacturing Process
Planing of Plastics Mold for Comb
FACULTY OF ENGINEERING
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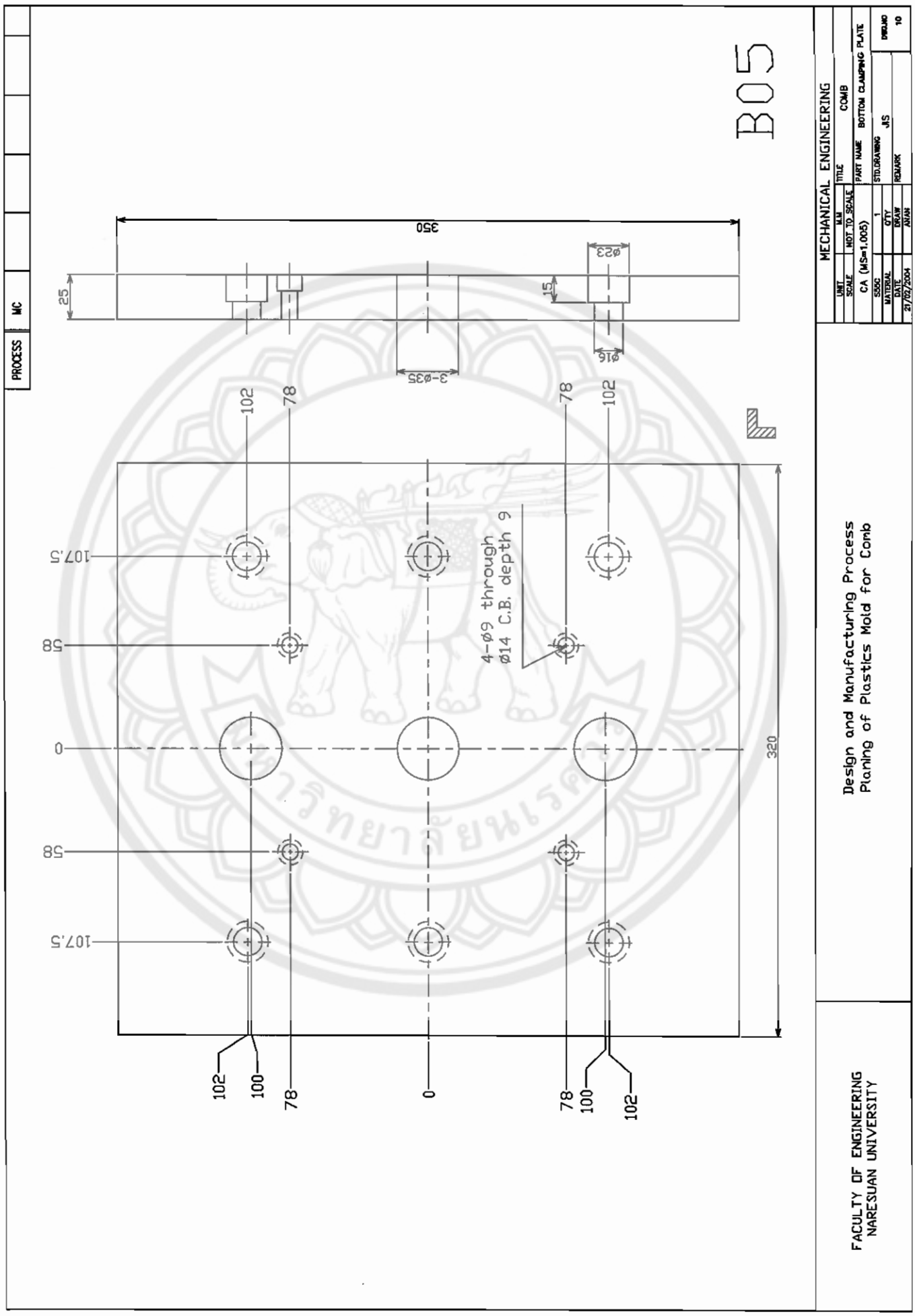
B05
PROCESS
MC
350
25
15
ø23
ø16
3-ø35
102
78
78
102
107.5
58
0
58
107.5
4-ø9 through
ø14 C.B. depth 9
320
102
100
78
0
78
100
102
MECHANICAL ENGINEERING
UNIT
M.M
SCALE
NOT TO SCALE
TITLE
COMB
CA (MS=1.005)
PART NAME
BOTTOM CLAMPING PLATE
S50C
1
STD.DRAWING
JIS
DRGNO
MATERIAL
QTY
10
DATE
21/02/2004
DRAW
ANAN
REMARK
Design and Manufacturing Process
Planing of Plastics Mold for Comb
FACULTY OF ENGINEERING
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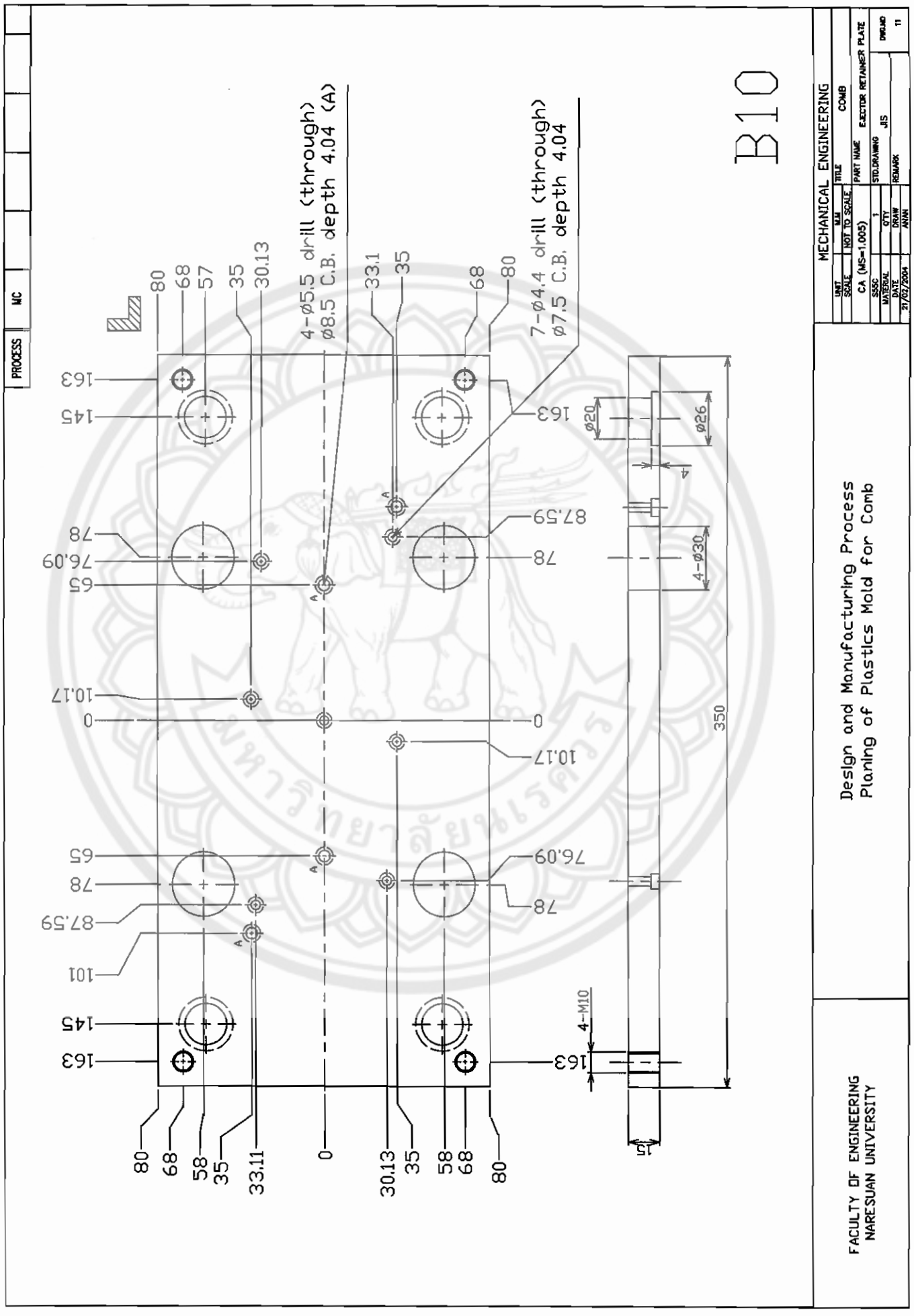
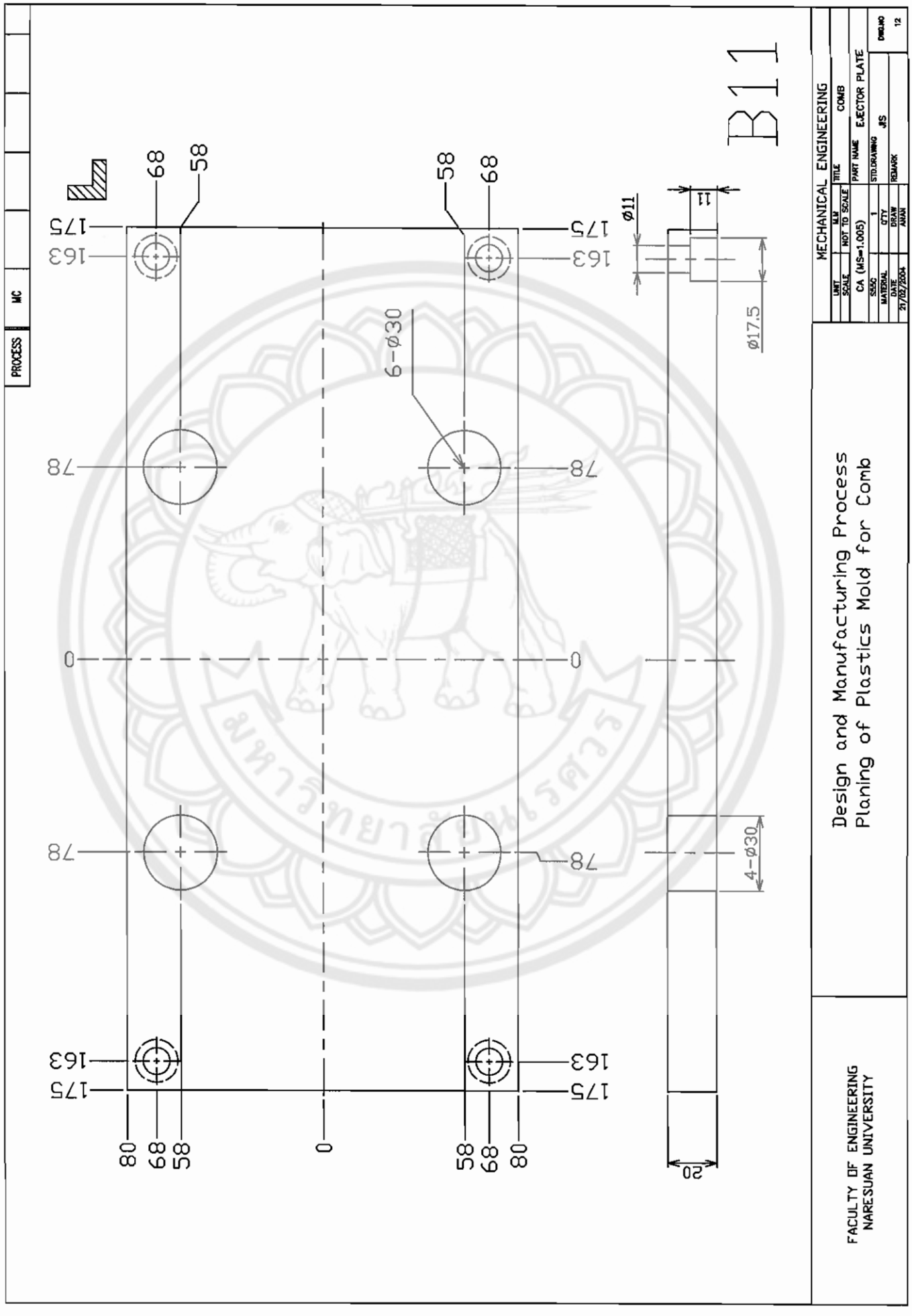
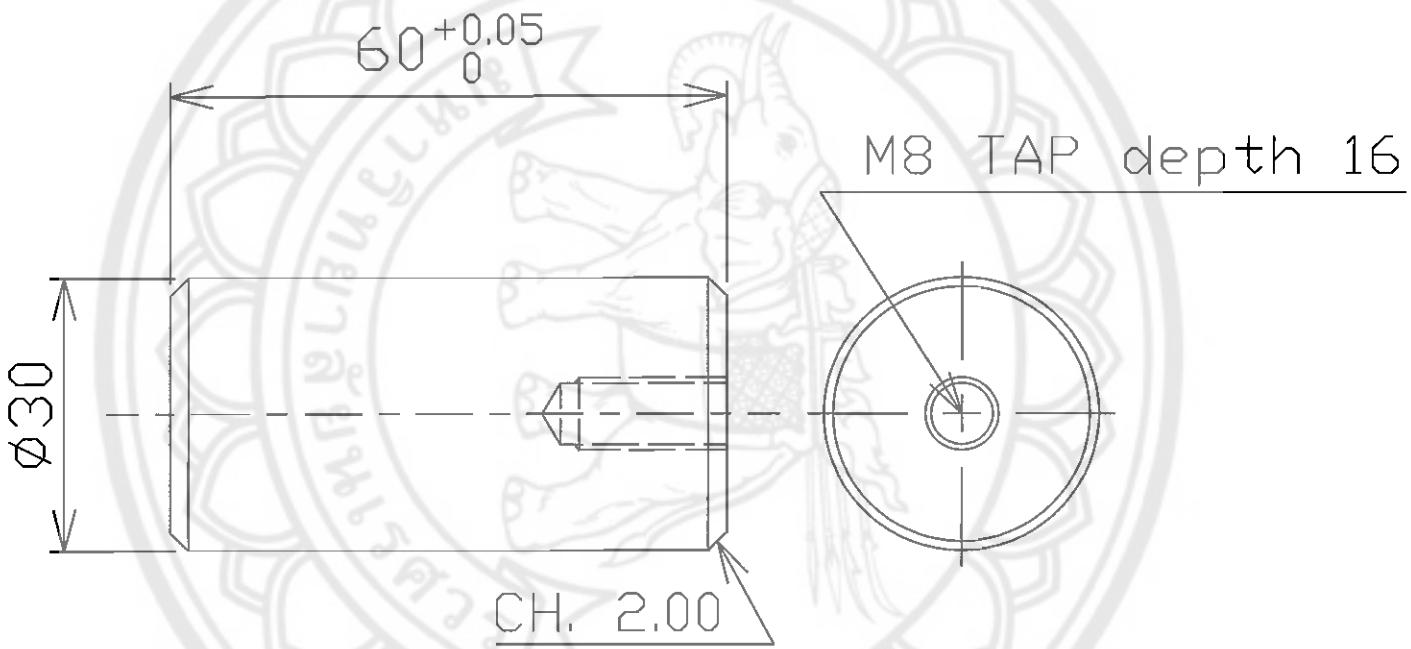

PROCESS
MC
B10
4-ø5.5 drill (through)
ø8.5 C.B. depth 4.04 (A)
7-ø4.4 drill (through)
ø7.5 C.B. depth 4.04
4-M10
4-ø30
ø20
ø26
350
MECHANICAL ENGINEERING
UNIT
SCALE
NOT TO SCALE
CA (MS=1.005)
SSSC
MATERIAL
DATE
21/02/2004
TITLE
COMB
PART NAME
EJECTOR RETAINER PLATE
STD.DRAWING
JIS
QTY
1
DRAW
ANAN
REMARK
DWG.NO
11
Design and Manufacturing Process
Planing of Plastics Mold for Comb
FACULTY OF ENGINEERING
NARESUAN UNIVERSITY


B11
PROCESS
MC
6-ø30
4-ø30
ø11
ø17.5
11
20
0
78
163
175
58
68
80
MECHANICAL ENGINEERING
UNIT
SCALE
NOT TO SCALE
TITLE
COMB
CA (MS=1.005)
PART NAME
EJECTOR PLATE
SS50
1
STD.DRAWING
JIS
MATERIAL
QTY
REMARK
DATE
21/02/2004
DRAW
AMAN
DWG.NO
12
FACULTY OF ENGINEERING
NARESUAN UNIVERSITY
Design and Manufacturing Process
Planing of Plastics Mold for Comb

PROCESS	Lathe	SG				



FACULTY OF ENGINEERING
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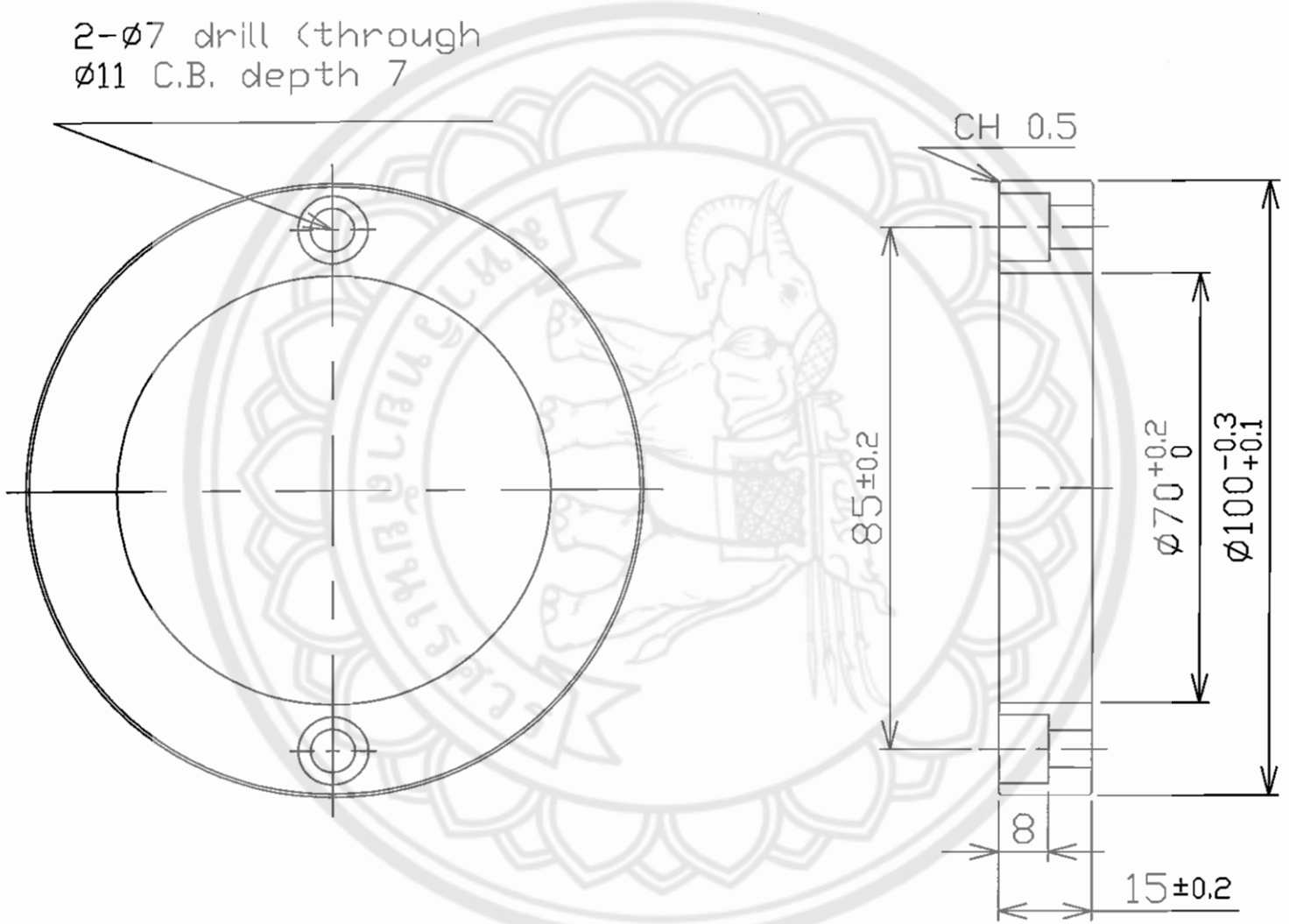
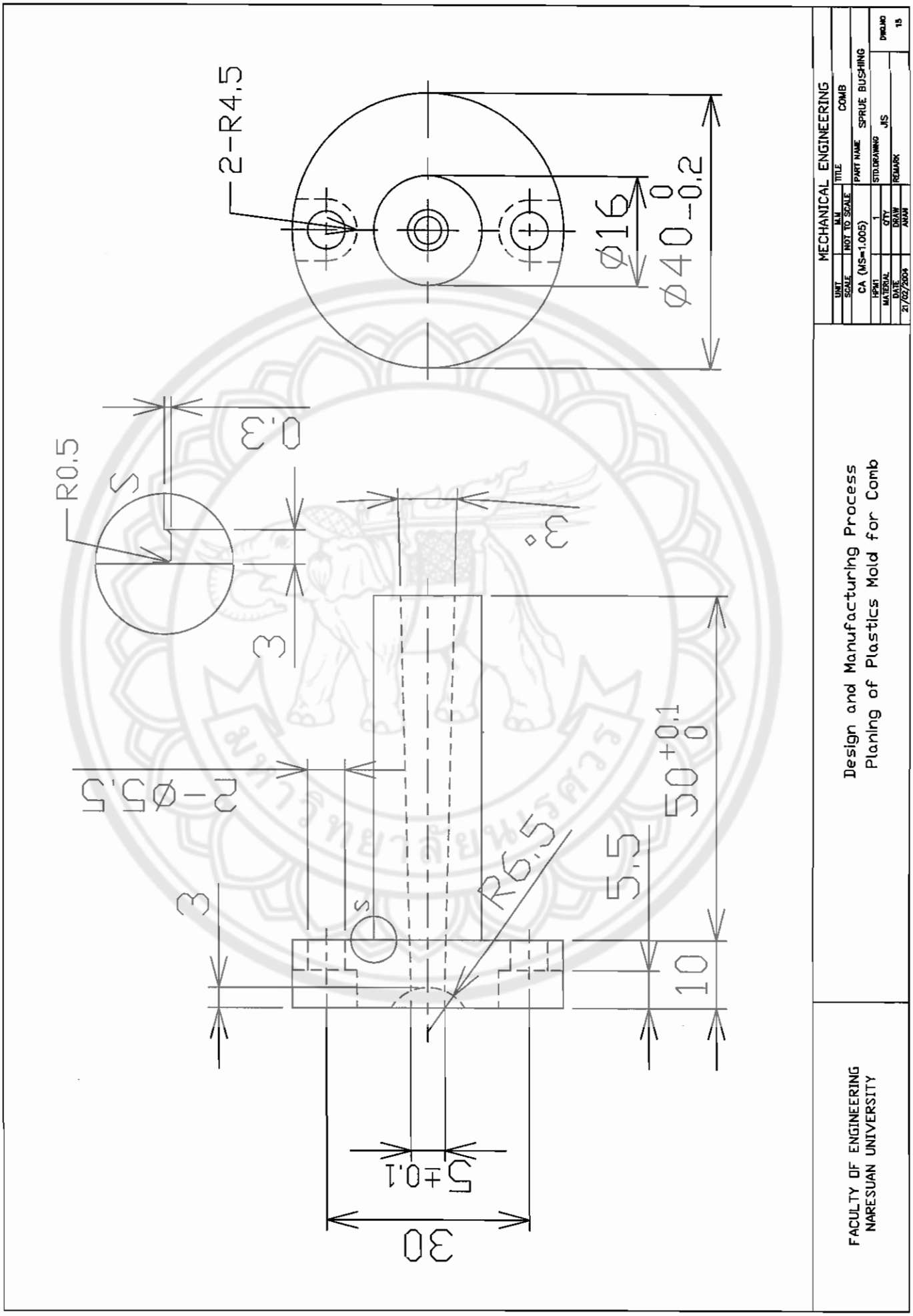
Design and Manufacturing Process
Planing of Plastics Mold for Comb

MECHANICAL ENGINEERING

UNIT	M.M	TITLE	COMB
SCALE	NOT TO SCALE		
CA (MS=1.005)		PART NAME	SUPPOR PILLARS
S45C	4	STD.DRAWING	JIS
MATERIAL	Q'TY		DWG.NO 13
DATE	DRAW	REMARK	
21/02/2004	ANAN		



FACULTY OF ENGINEERING NARESUAN UNIVERSITY	Design and Manufacturing Process Planing of Plastics Mold for Comb	MECHANICAL ENGINEERING	
		UNIT: M.M. / SCALE: NOT TO SCALE	TITLE: COMB
		CA (MS=1.005)	PART NAME: LOCATING RING
		S45C / 1	STD.DRAWING: JIS
		MATERIAL / QTY	REMARK
		DATE: 21/02/2004 / DRAW: ANAN	DWG.NO: 14



MECHANICAL ENGINEERING			
UNIT	M.M	TITLE	COMB
SCALE	NOT TO SCALE		
CA (MS=1.005)		PART NAME	SPRUE BUSHING
HPM1	1	STD.DRAWING	DWG.NO
MATERIAL	QTY	JIS	15
DATE	DRAW	REMARK	
21/02/2004	AMAN		

Design and Manufacturing Process
Planing of Plastics Mold for Comb

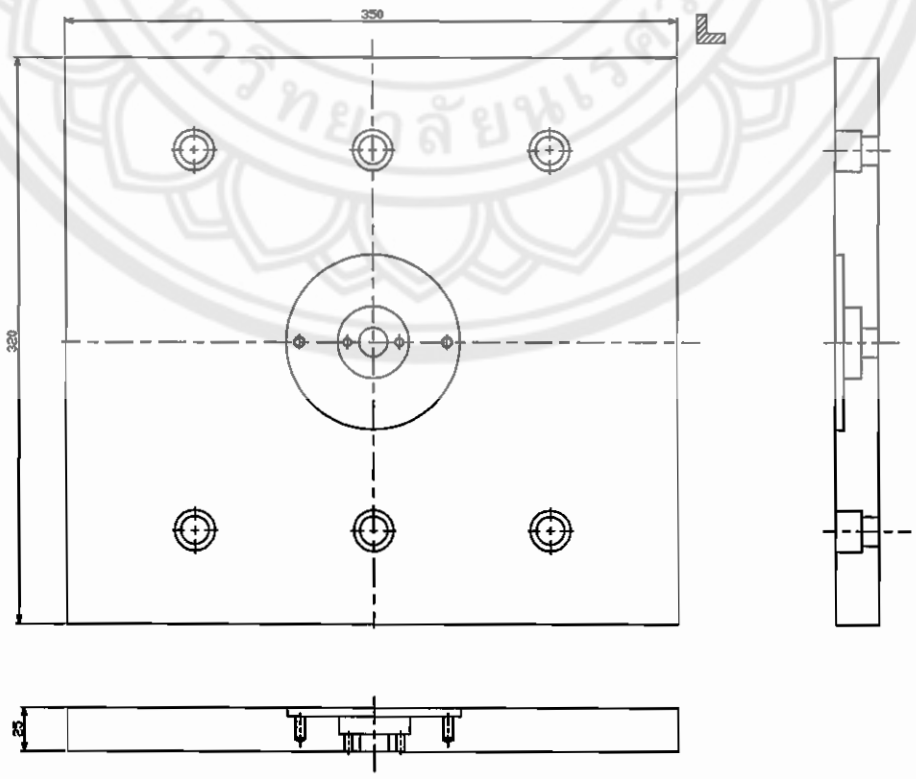
FACULTY OF ENGINEERING
NARESUAN UNIVERSITY

Mold Name:	C□MB
Part Name:	TOP CLAMPING PLATE

OPERATION LIST

Program Name	Tools Name	Method	Cooling	Tools Leght	Cut depth	Z_setting	Machine Time(Min)	Remark
0041	ø3 CDR		Fluid	5	−3	20	0: 00: 49	
0042	ø16.5	Drill	Fluid	40	−35	20	0: 00: 48	
0043	ø5	Drill	Fluid	20	−17	20	0: 03: 17	
0044	ø4.2	Drill	Fluid	35	−30	20	0: 05: 42	
0045	ø16 EM	Rough	Fluid	40	−5	20	0: 29: 38	
						Totol	0: 40: 14	

Drawing



B01

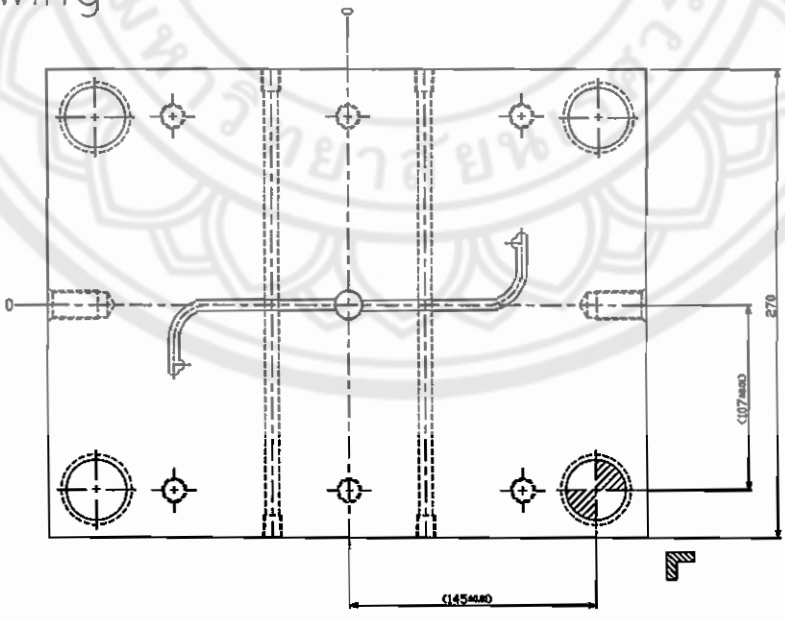
Mold Name:	COMB
Part Name:	CAVITY PLATE

OPERATION LIST

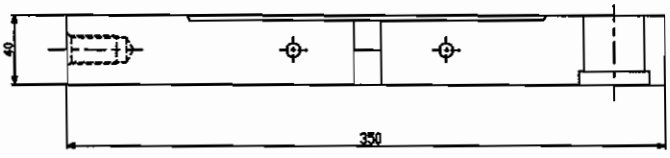
Program Name	Tools Name	Method	Cooling	Tools Leght	Cut depth	Z_setting	Machine Time(Min)	Remark
0033	ø3 CDR		Fluid	5	−3	20	0: 00: 39	
0034	ø15.8	Drill	Fluid	33	−28	20	0: 00: 39	
0035	ø16	REM	Fluid	40	−28	20	0: 00: 32	
0036	3RB	Finish	Fluid	10	−3	20	0: 22: 20	
						Totol	0: 23: 40	

Drawing

TOP



FRONT



B02

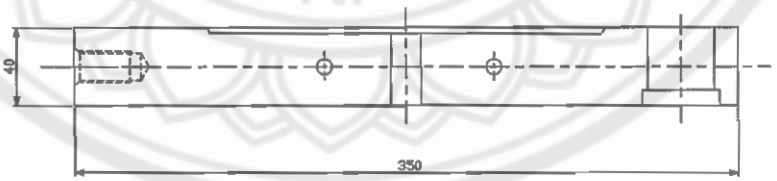
Mold Name:	COMB
Part Name:	CAVITY PLATE

OPERATION LIST

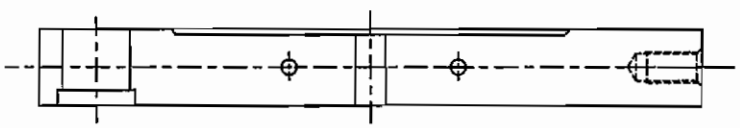
Program Name	Tools Name	Method	Cooling	Tools Leght	Cut depth	Z_setting	Machine Time(Min)	Remark
Front								
0081	ø3 CDR		Fluid	5	−3	20	0:00:07	
0082	ø8	Drill	Fluid	160	−150	20	0:13:03	
Back								
0081	ø3 CDR		Fluid	90	−3	20	0:00:07	
0082	ø8	Drill	Fluid	160	−150	20	0:13:03	
						Totol	0:26:20	

Drawing

FRONT



BACK



B02

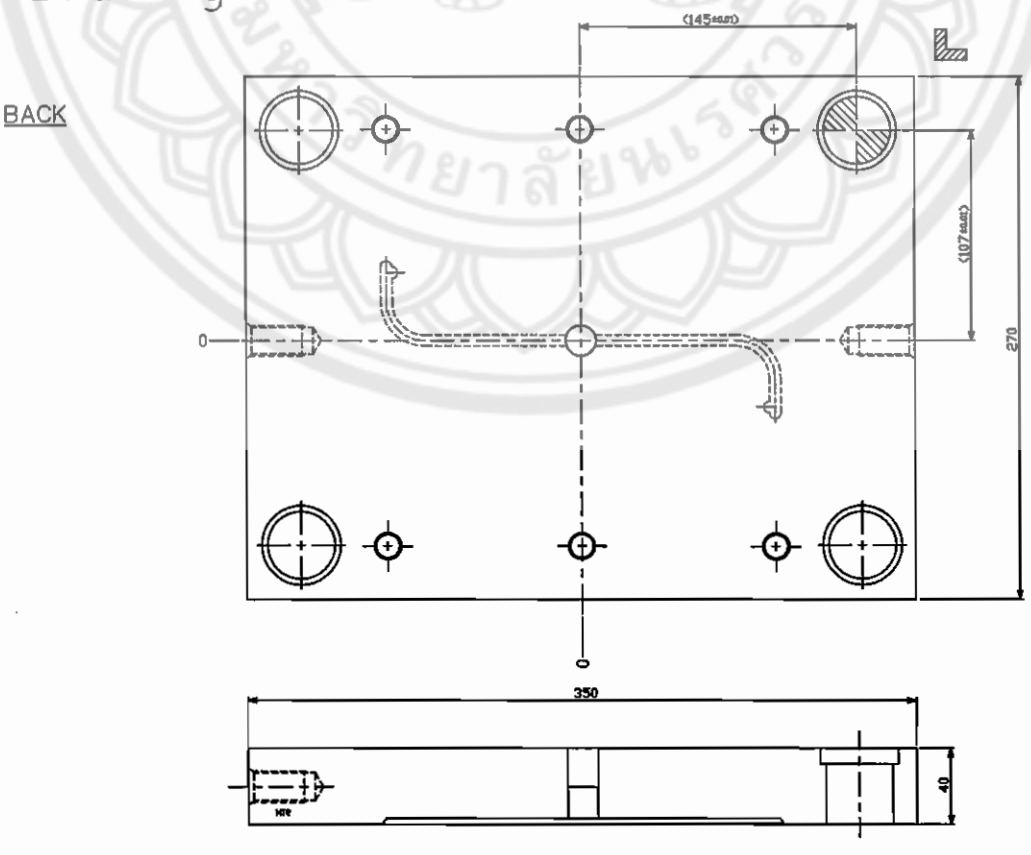
Mold Name:	COMB
Part Name:	CAVITY PLATE

OPERATION LIST

Program Name	Tools Name	Method	Cooling	Tools Leght	Cut depth	Z_setting	Machine Time(Min)	Remark
0031	ø3 CDR		Fluid	5	−3	20	0: 00: 09	
0032	ø16.5	Drill	Fluid	33	−28	20	0: 00: 39	
						Totol	0: 00: 48	

Drawing

BACK



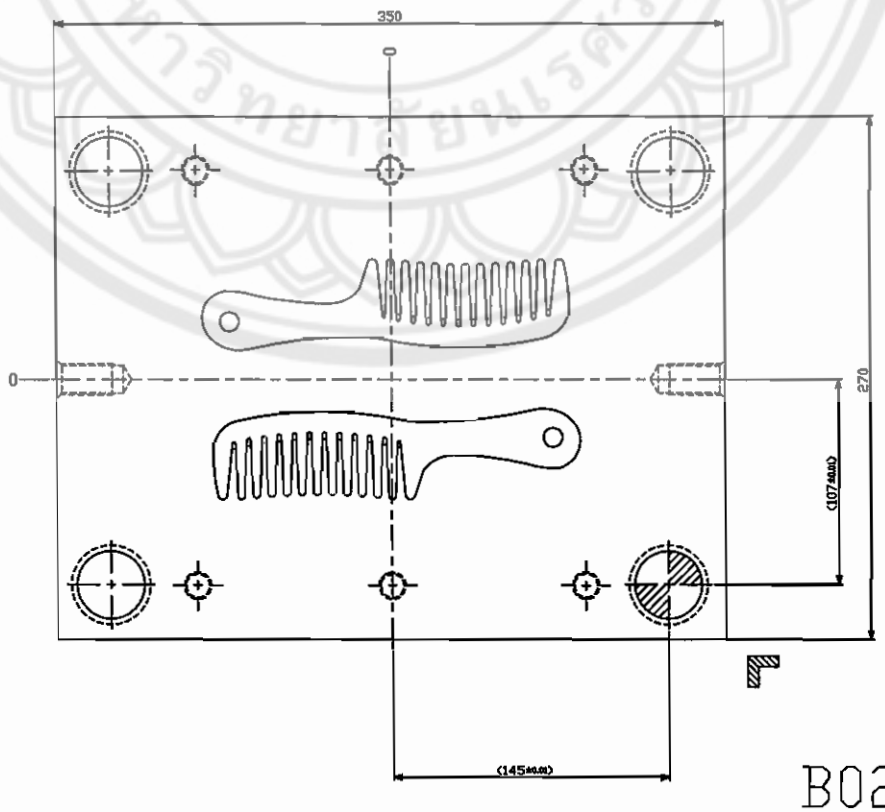
B02

Mold Name:	C□MB
Part Name:	CAVITY PLATE

OPERATION LIST

Program Name	Tools Name	Method	Cooling	Tools Leght	Cut depth	Z_setting	Machine Time(Min)	Remark
5555	3 RB	Rough	Fluid	10	2.4	20		
5555	1 RB	Finish	Fluid	7	2.4	20		
11								
						Totol		

Drawing



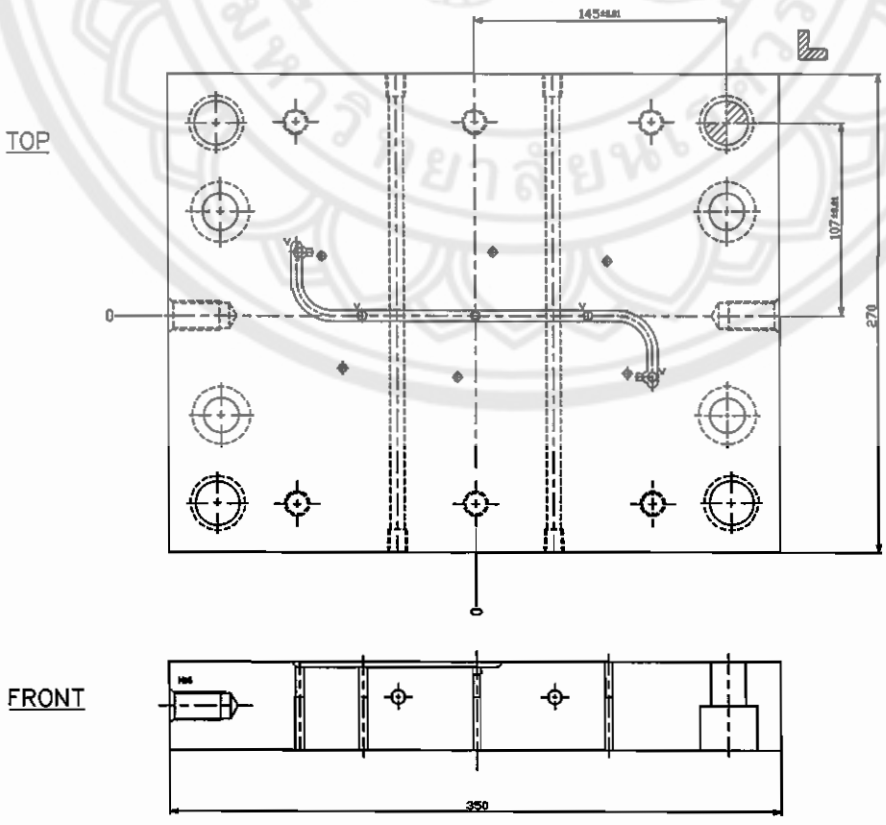
B02

Mold Name:	COMB
Part Name:	CORE PLATE

OPERATION LIST

Program Name	Tools Name	Method	Cooling	Tools Leght	Cut depth	Z_setting	Machine Times	Remark
0024	ø3 CDR		Fluid	5	−3	20	0:00:42	
0025	ø3.8	Drill	Fluid	27	−22	20	0:22:45	
0026	ø5	Reamer	Fluid	27	−22	20	0:02:13	
0027	ø4	Reamer	Fluid	27	−22	20	0:03:52	
0028	ø4 EM	Rough	Fluid	16	−1	20	0:04:05	Gate
0029	3RB	Finish	Fluid	10	−3	20	0:22:50	Runner
						Totol	0:34:45	

Drawing



B03

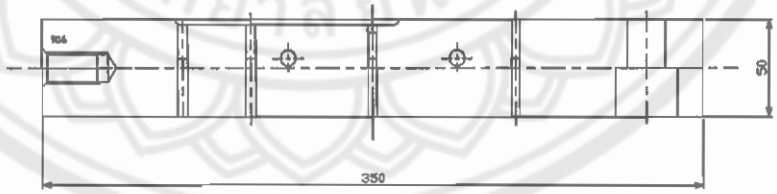
Mold Name:	COMB
Part Name:	CORE PLATE

OPERATION LIST

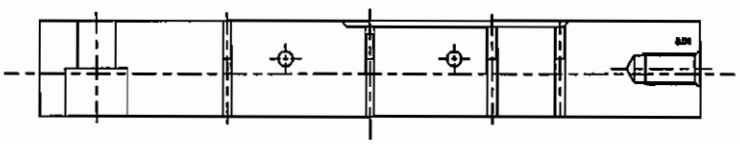
Program Name	Tools Name	Method	Cooling	Tools Leght	Cut depth	Z_setting	Machine Time(Min)	Remork
Front								
0071	ø3 CDR		Fluid	5	−3	20	0: 00: 07	
0072	ø8	Drill	Fluid	160	−150	20	0: 13: 03	
Back								
0071	ø3 CDR		Fluid	5	−3	20	0: 00: 07	
0072	ø8	Drill	Fluid	160	−150	20	0: 13: 03	
						Totol	0: 26: 20	

Drawing

FRONT



BACK



B03

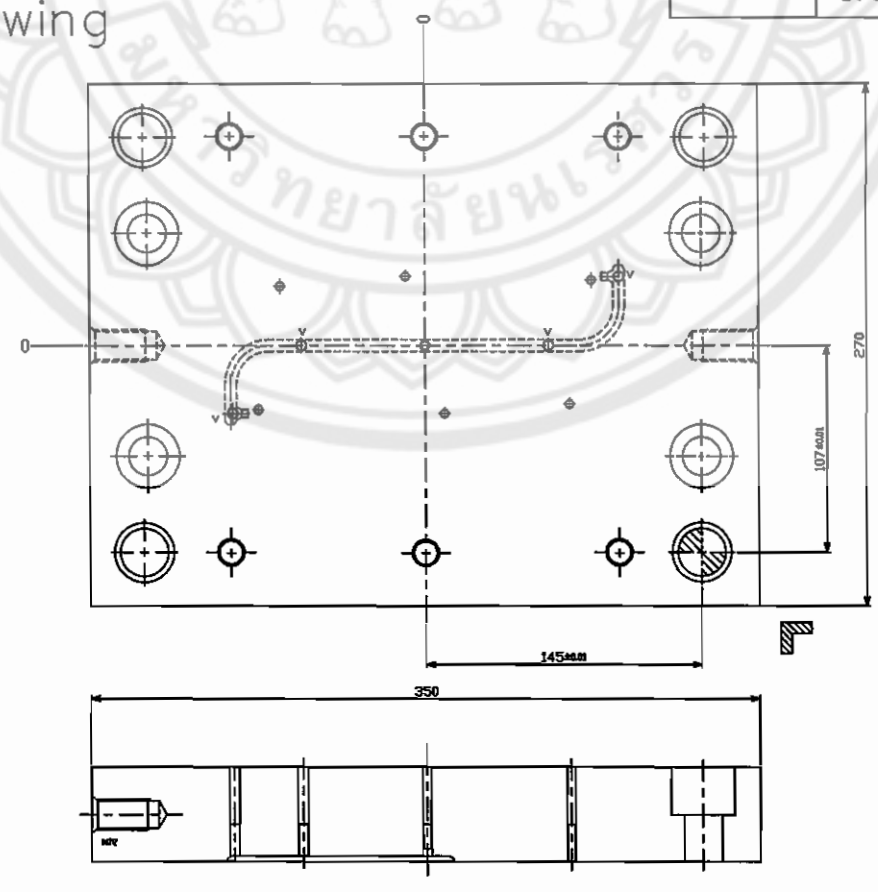
Mold Name:	COMB
Part Name:	CORE PLATE

OPERATION LIST

Program Name	Tools Name	Method	Cooling	Tools Leght	Cut depth	Z_setting	Machine Time(Min)	Remark
0021	ø3 CDR		Fluid	5	−3	20	0: 00: 42	
0022	ø5.5	Drill	Fluid	38	−33	20	0: 11: 43	
0023	ø4.4	Drill	Fluid	38	−33	20	0: 20: 29	
0091	ø16 EM	Rough	Fluid	40	−25	20	0: 18: 36	
						Totol	0: 51: 30	

Drawing

BACK



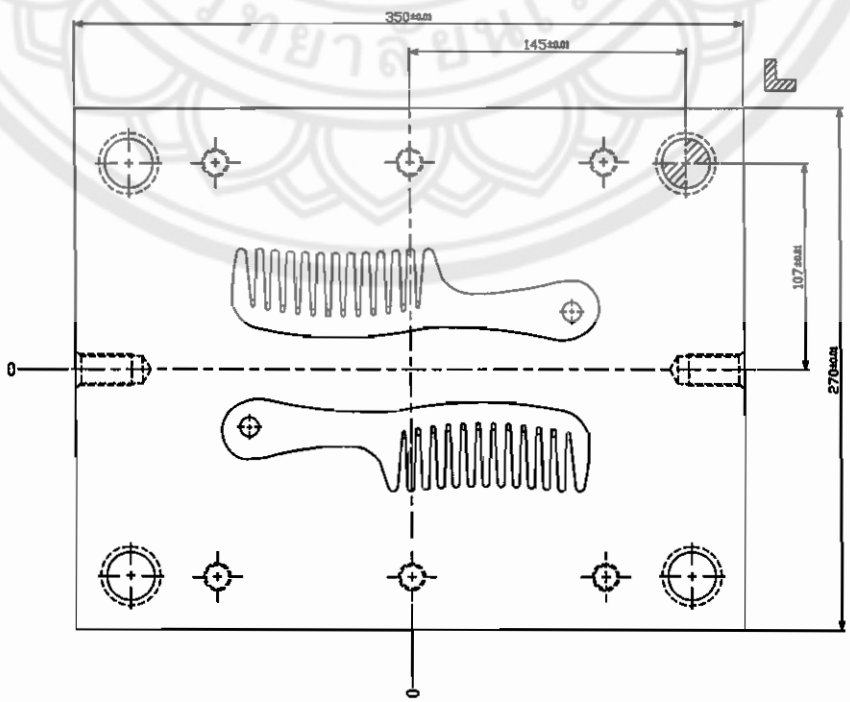
B03

Mold Name:	COMB
Part Name:	CORE PLATE

OPERATION LIST

Program Name	Tools Name	Method	Cooling	Tools Leght	Cut depth	Z_setting	Machine Time(Min)	Remark
5555	3 RB	Rough	Fluid	10	2.4	20		MC MIROR
5555	1 RB	Finish	Fluid	7	2.4	20		
						Totol		

Drawing



B03

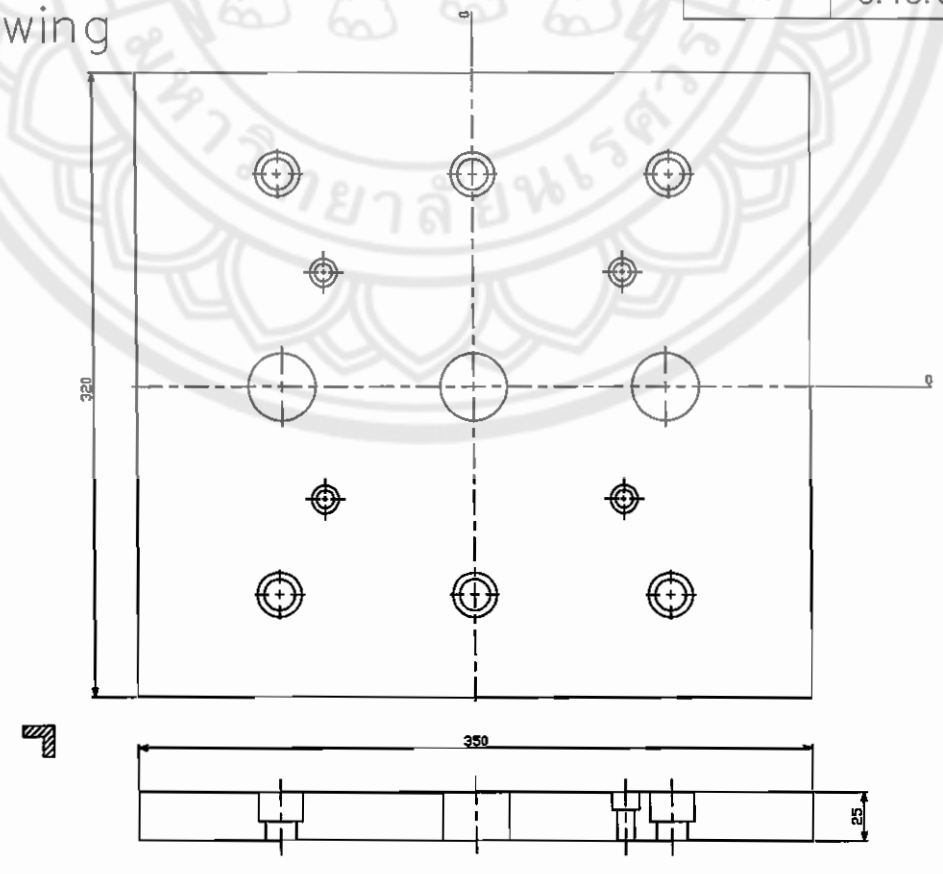
Mold Name: C□MB

Part Name: BUTTOM CLAMPING PLATE

OPERATION LIST

Program Name	Tools Name	Method	Cooling	Tools Leght	Cut depth	Z_setting	Machine Time(Min)	Remark
0061	ø3 CDR		Fluid	5	−3	20	0:00:43	
0062	ø16.5	Drill	Fluid	35	−30	20	0:12:01	
0063	ø8 EM	Rough	Fluid	20	−9	20	0:01:12	
						Totol	0:13:56	

Drawing



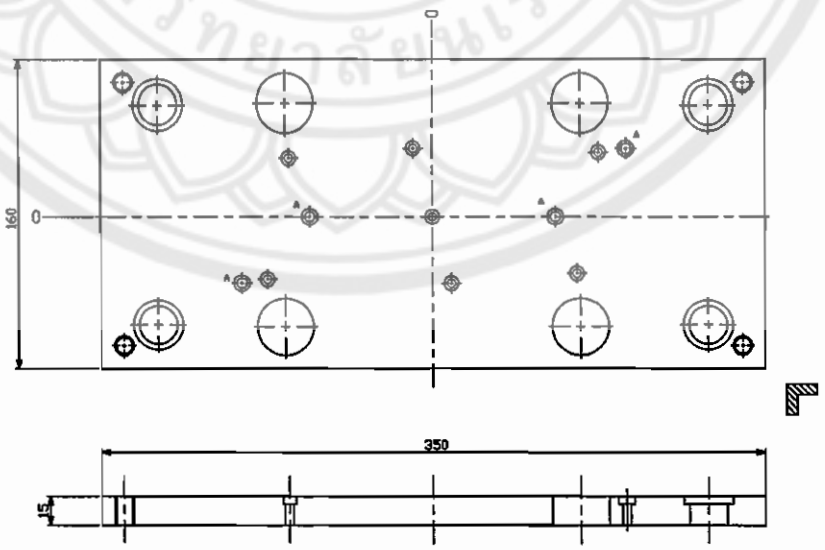
B05

Mold Name:	C□MB
Part Name:	EJECTOR RETAINER PLATE

OPERATION LIST

Program Name	Tools Name	Method	Cooling	Tools Leght	Cut depth	Z_setting	Machine Time(Min)	Remark
0011	ø3 CDR		Fluid	5	−3	20	0: 02: 36	
0012	ø4.4	Drill	Fluid	23	−18	20	0: 12: 10	
0013	ø5.5	Drill	Fluid	23	−18	20	0: 06: 58	
0014	ø16	Drill	Fluid	30	−25	20	0: 02: 29	
0015	ø8	Drill	Fluid	20	−4.04	20	0: 03: 36	
0016	ø9	Drill	Fluid	20	−4.04	20	0: 00: 10	
0017	ø16 EM	Rough	Fluid	24	−18	20	0: 03: 33	
0018	ø16 EM	Finish	Fluid	23	−18	20	0: 05: 36	(D60,61,621)
0019	ø16 EM	Check Size	Fluid	23	−18	20	0: 02: 23	(D01)
						Totol	0: 39: 31	

Drawing



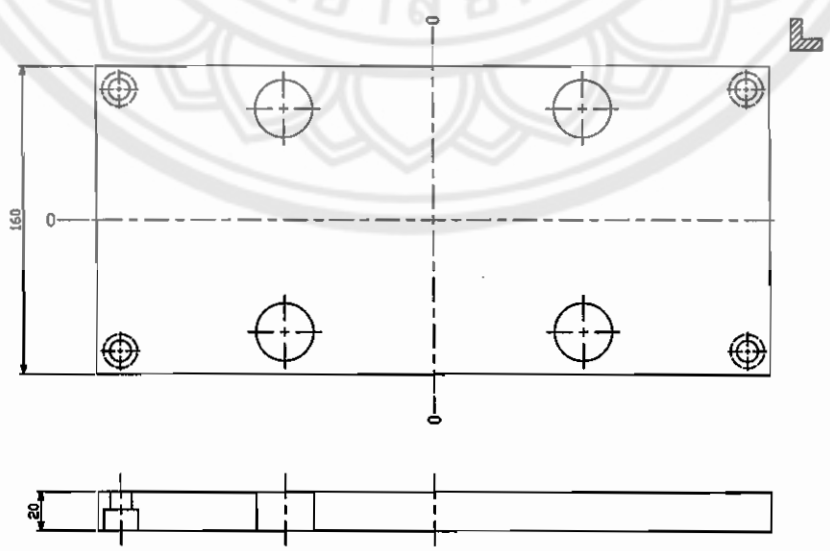
B10

Mold Name:	C□MB
Part Name:	EJECTOR PLATE

OPERATION LIST

Program Name	Tools Name	Method	Cooling	Tools Leght	Cut depth	Z_setting	Machine Time(Min)	Remark
0001	ø3 CDR		Fluid	5	−3	20	0: 00: 43	
0002	ø10−20	Drill	Fluid	35	−30	20	0: 02: 54	
0003	ø16 EM	Rough	Fluid	27	−22	20	0: 17: 32	
0004	ø16 EM	Finish	Fluid	27	−22	20	0: 05: 27	(D60,61,62)
0005	ø16 EM	Check Size	Fluid	27	−22	20	0: 01: 43	(D01)
						Totol	0: 28: 08	

Drawing



B11