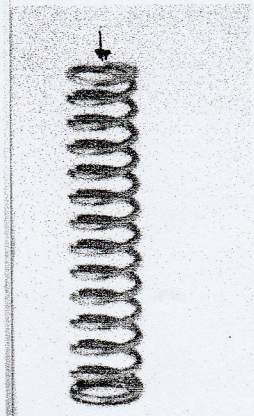
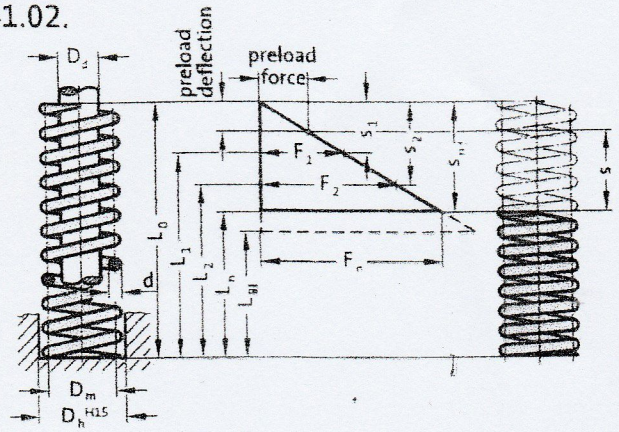
ınd wire compression spring



241.02.



erial:

steel wire class C DIN 17.223 sheet 1, drawn and patented.
ghly stressed compression springs and for loads both static and ting.
facturing tolerances to DIN 2095 class 2, load-stabilized.
working temperature 100 °C.

cution:

ned and ground end coils, surface homogenized byball-shot, oiled.

e:

ing sizes listed also available in "making-up-"lengths of 500 mm. ordering these, please add "500" at the end of the order number 241.02.11.040.500.
iameter of guide sleeve
nean coil diameter
iameter of guide pin

d = diameter of spring wire
L_0 = free length of spring
$L_1...L_n$ = lengths of loaded spring as related to spring forces $F_1...F_n$
R = spring rate [N/mm]
L_{Bl} = length of compacted spring (i.-e. wire-to-wire)
$F_1...F_n$ = forces [N] as related to lengths of spring $L_1...L_n$
$s_1...s_n$ = deflection as related to spring forces $F_1...F_n$
i_f = number of active coilss = working stroke of spring – i. e. working deflection

.02. Round wire compression spring

No	D_h	D_d	D_m	d	L_c	R	s_1	Spring force [N] initial*	l_1	s_2	F_2 [N]**	l_2	s_n	F_n [N]***	L_n	i_f
2.11.040	11	6.5	8.5	1.5	40	8.08	11.3	91	28.7	13.7	110	26.3	16.1	130	23.9	10.5
2.13.055	13	8.5	10.5	1.5	55	3.8	20.8	79	34.2	25.2	95	29.8	29.7	112	25.3	12
2.15.040	15	9.5	12	2	40	11.93	12.3	146	27.7	15	178	25	17.6	210	22.4	8
2.15.050	15	9.5	12	2	50	10	17.5	175	32.5	21.2	212	28.8	25	250	25	9.5
2.16.040	16	10.5	13	2	40	11	14	154	26	17	187	23	20	220	20	7
2.18.085	18	12	14.75	2.25	85	5.92	30.8	182	54.2	37.4	221	47.6	44	260	41	14
2.19.045	19	11	14.5	3	45	35	9.8	343	35.2	11.9	416	33.1	14	490	31	8
2.19.050	19	11	14.5	3	50	30	11.2	336	38.8	13.6	408	36.4	16	480	34	8.5
2.19.083	19.5	9	14	4	83	75	12.6	945	70.4	15.3	1147	67.7	18	1350	65	16
2.20.035	20.5	10	15	4	35	170	5.6	952	29.4	6.8	1156	28.2	8	1360	27	4.5
2.20.090	20.5	9	14.5	4.5	90	97.8	12.3	1202	77.7	15	1467	75	17.6	1714	72.4	4
2.21.035	21	13.5	17	2.5	35	13.32	10.5	139	24.5	12.7	169	22.3	15	200	20	6
2.21.040	21	12	16.25	3	40	32.1	9.8	314	30.2	11.9	381	28.1	14	450	26	5.5
2.22.095	22	14.5	18	2.5	95	4.1	34.2	140	60.8	41.5	170	53.5	48.8	200	46.2	17
2.22.040	22.5	12	17	4	40	105.5	7.7	812	32.3	9.3	981	30.7	11	1160	29	5
2.23.045	23	14.5	18.5	3	45	25.7	15	385	30	18.2	467	26.8	21.4	550	23.6	5
2.23.050	23	12.5	17.5	4	50	74.3	11	817	39	13.3	988	36.7	15.6	1160	34.4	6.5
2.26.024	26.5	16	21	4	24	133.2	5	666	19	6.1	812	17.9	7.2	960	16.8	2
2.30.070	30	13	20.8	7	70	341	7.7	2625	62.3	9.3	3171	60.7	11	3750	59	8
2.32.070	32	21	26	4	70	24.2	23.8	575	46.2	28.9	700	41.1	34	822	36	6
2.32.150	32	16	23.5	6.5	150	103.6	19.6	2030	180.4	23.8	2465	126	28	2900	122	14
2.34.125	34	19	26	6	125	67.2	22.4	1505	102.6	27.2	1827	97.8	32	2150	93	11.5
2.44.130	44	25	34	8	130	108.2	25.2	2726	104.8	30.6	3310	99.4	36	3895	94	10
2.44.200	44	25	34	8	200	62.7	43.4	2721	156.6	52.7	3304	147.3	62	3887	137.7	17
2.48.067	48	25	36	10	67	640	6.3	4032	60.7	7.6	4864	59.4	9	5760	58	3.5
2.49.050	49	29	38.5	8.5	50	337	7.7	2594	42.3	9.3	3134	40.7	11	3707	39	2.5
2.55.200	55	30	42	11	200	157	30.1	4725	169.9	36.6	5746	163.4	43	6750	157	13
2.58.050	58	39	48	8	50	151.2	9.8	1481	40.2	11.9	1799	38.1	14	2117	36	2.5
2.63.180	63	38	50	11	180	121	30.1	3642	149.9	36.6	4428	143.4	43	5203	137	10

* spring life; ** = medium spring life; *** = max. spring loading

LAMPIRAN G

PERHITUNGAN WAKTU PERMESINAN BOR

Calculating machining time for drilling operations

The machining (drilling) time is the period of time in which the machine performs the actual drilling operation

rpm—known

L = length of drill travel in mm

$L = l + 0.3\,d$

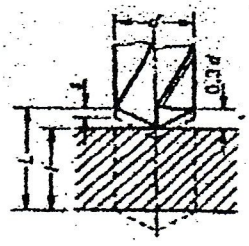
d = diameter of the drill in mm

n = revolutions per minute

s_r = feed in mm/revolution

s = feed per minute

t_m = machining time



rpm—unknown

$L = l + 0.3\,d$

d = diameter of the drill in mm

s_r = feed in mm/revolution

v = cutting speed in m/min

$v = \frac{\pi \times d \times n}{1000}$

$n = \frac{v \times 1000}{\pi \times d}$ min^{-1}

t_m = machining time

$t_m = \frac{L}{s_r \times n}$ min

Machining time = $\frac{\text{length of tool travel}}{\text{feed per min}}$

$t_m = \frac{L \times \pi \times d}{s_r \times v \times 1000}$ min

Example: $l = 35$ mm $\quad d = 30$ mm

$s_r = 0.2$ mm/rev, $n = 300$ rpm

$L = l + 0.3d = 35 + 0.3 \times 30$

$= 35 + 9 = 44$ mm

$t_m = \frac{L}{s_r \times n} = \frac{44}{0.2 \times 300} = 0.73$ min

Example: $l = 35$ mm $\quad d = 30$ mm

$s_r = 0.2$ mm/rev $\quad v = 28$ m/min

$L = l + 0.3\,d$ $\quad = 35 + 9 = 44$ mm

$t_m = \frac{L \times \pi \times d}{s_r \times v \times 1000} = \frac{44 \times \pi \times 30}{0.2 \times 28 \times 1000}$

$= 0.73$ min

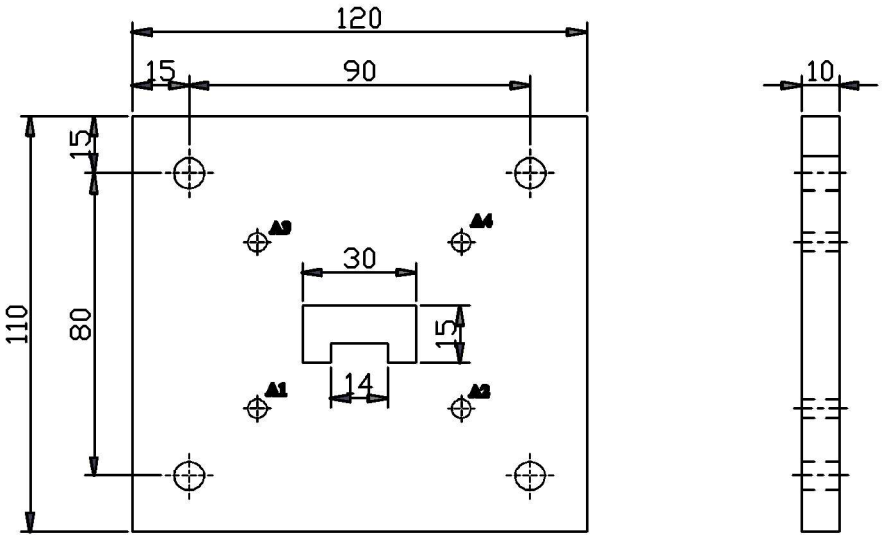
Machining time in minutes per 10 mm length of tool travel

rpm n	Feed s in mm/rev: 0.1	0.12	0.16	0.2	0.25	0.32	0.4	0.5	0.65
	Machining time t_m in min/10 mm								
11.2	8.93	7.44	5.85	4.46	3.57	2.79	2.23	1.78	1.38
14	7.15	5.95	4.46	3.57	2.85	2.23	1.78	1.43	1.09
18	5.56	4.36	3.47	2.77	2.22	1.73	1.38	1.11	0.85
22.4	4.46	3.71	2.79	2.23	1.78	1.39	1.11	0.89	0.68
28	3.57	2.97	2.23	1.78	1.42	1.11	0.88	0.71	0.55
35.5	2.82	2.34	1.76	1.40	1.12	0.88	0.70	0.56	0.43
45	2.22	1.85	1.39	1.11	0.89	0.69	0.55	0.44	0.34
56	1.79	1.31	1.12	0.89	0.71	0.55	0.44	0.36	0.27
71	1.41	1.17	0.88	0.70	0.53	0.44	0.35	0.28	0.21
90	1.11	0.92	0.69	0.55	0.44	0.34	0.28	0.22	0.17
112	0.89	0.74	0.58	0.44	0.36	0.28	0.22	0.18	0.14
140	0.71	0.59	0.44	0.36	0.28	0.22	0.18	0.14	0.109
180	0.55	0.43	0.35	0.28	0.22	0.17	0.14	0.111	0.085
224	0.45	0.37	0.28	0.22	0.18	0.14	0.111	0.089	0.068
280	0.36	0.29	0.22	0.18	0.14	0.111	0.088	0.071	0.055
355	0.28	0.23	0.17	0.14	0.112	0.086	0.070	0.056	0.043
450	0.22	0.18	0.14	0.111	0.088	0.069	0.055	0.044	0.033
560	0.18	0.13	0.112	0.089	0.071	0.055	0.044	0.036	0.027
710	0.14	0.117	0.089	0.070	0.053	0.044	0.035	0.028	0.021
900	0.111	0.092	0.069	0.055	0.044	0.034	0.028	0.022	0.017
1120	0.089	0.074	0.058	0.044	0.036	0.028	0.022	0.018	0.014
1400	0.071	0.059	0.044	0.036	0.028	0.023	0.018	0.014	0.011
1800	0.055	0.043	0.035	0.028	0.022	0.017	0.014	0.011	0.008
2240	0.045	0.037	0.028	0.022	0.018	0.014	0.011	0.009	0.007
2800	0.036	0.029	0.022	0.018	0.014	0.011	0.009	0.007	0.006

NO.4 TOL ± 0.2

MILLING

N8



HOLE TABLE			
HOLE	XDIM	YDIM	DESCRIPTION
A1	33,00	33,00	Ø5,00 THRU
A2	87,00	33,00	Ø5,00 THRU
A3	33,00	77,00	Ø5,00 THRU
A4	87,00	77,00	Ø5,00 THRU

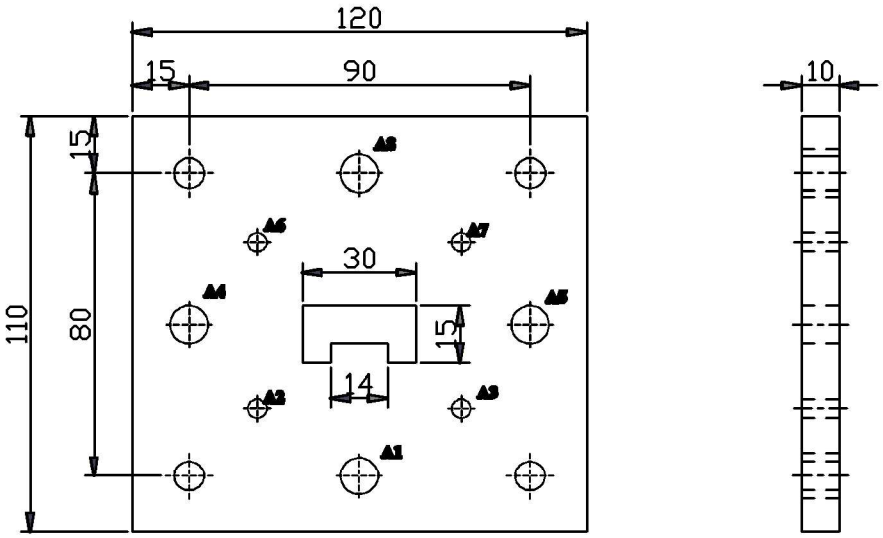
		1	PELAT STIPPER POTONG	4	ST.37	120 X 110 X 10	DIBUAT
JUMLAH			NAMA BAGIAN	N.BAG	MATERIAL	UKURAN	KETERANGAN
III	II	I	Perubahan:				

PART PRESS TOOL	Skala 1 : 2	Digambar	TEAM
		Diperiksa	
Politeknik Negeri Sriwijaya	DRAWME.4/6MD		

NO.2 TOL ± 0.2

MILING

N8



HOLE TABLE			
HOLE	XDIM	YDIM	DESCRIPTION
A1	60,00	15,00	Ø10,00 THRU
A2	33,00	33,00	Ø5,00 THRU
A3	87,00	33,00	Ø5,00 THRU
A4	15,00	55,00	Ø10,00 THRU
A5	105,00	55,00	Ø10,00 THRU
A6	33,00	77,00	Ø5,00 THRU
A7	87,00	77,00	Ø5,00 THRU
A8	60,00	95,00	Ø10,00 THRU

		1	PUNCH HOLDER POTONG	2	ST.37	120 X 110 X 10	DIBUAT
JUMLAH			NAMA BAGIAN	N.BAG	MATERIAL	UKURAN	KETERANGAN
III	II	I	Perubahan:				

PART PRESS TOOL

Skala 1 : 2

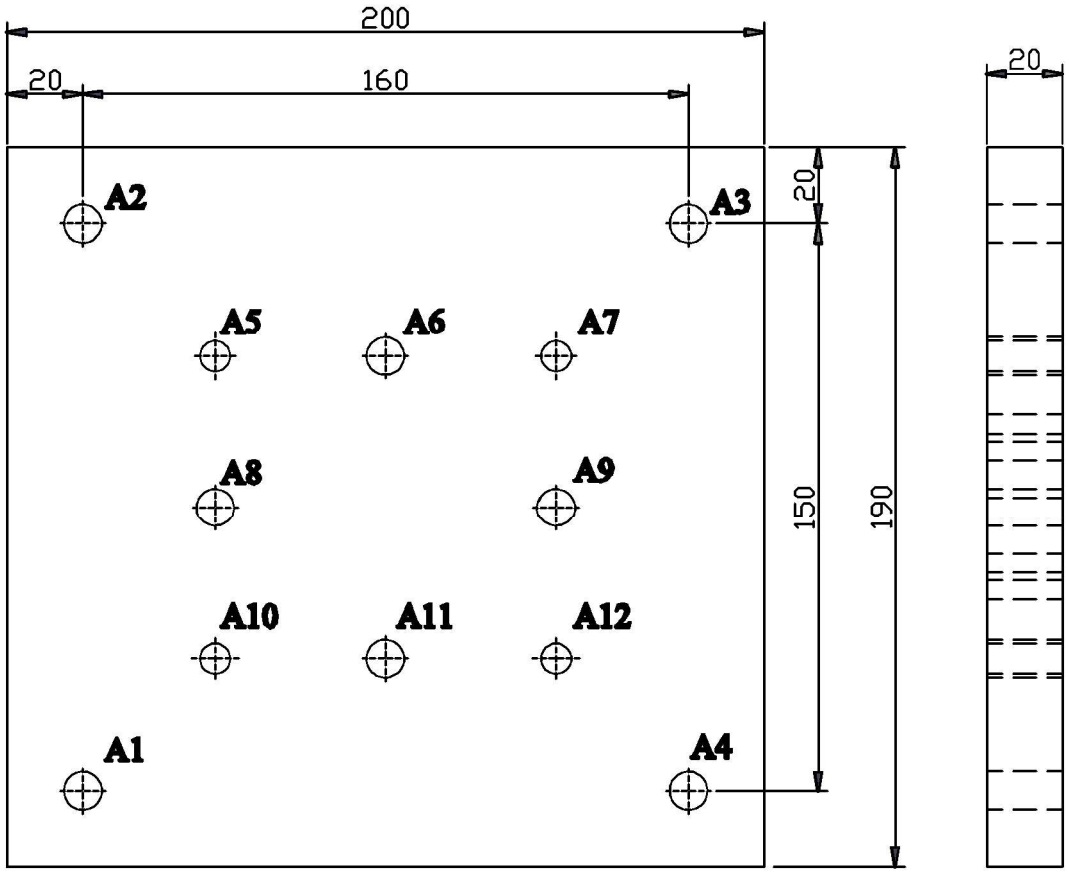
Digambar		TEAM
Diperiksa		

Politeknik Negeri Sriwijaya

DRAWME.2/6MD

NO.1 TOL ± 0.2

N8 MILLING



HOLE TABLE			
HOLE	XDIM	YDIM	DESCRIPTION
A10	55,00	55,00	Ø8,00 THRU
A11	100,00	55,00	Ø10,00 THRU
A12	145,00	55,00	Ø8,00 THRU
A8	55,00	95,00	Ø10,00 THRU
A9	145,00	95,00	Ø10,00 THRU
A5	55,00	135,00	Ø8,00 THRU
A6	100,00	135,00	Ø10,00 THRU
A7	145,00	135,00	Ø8,00 THRU

		1	PELAT ATAS	1	ST.37	201 X 191 X 20	DIBUAT
JUMLAH			NAMA BAGIAN	N.BAG	MATERIAL	UKURAN	KETERANGAN
III	II	I	Perubahan:				

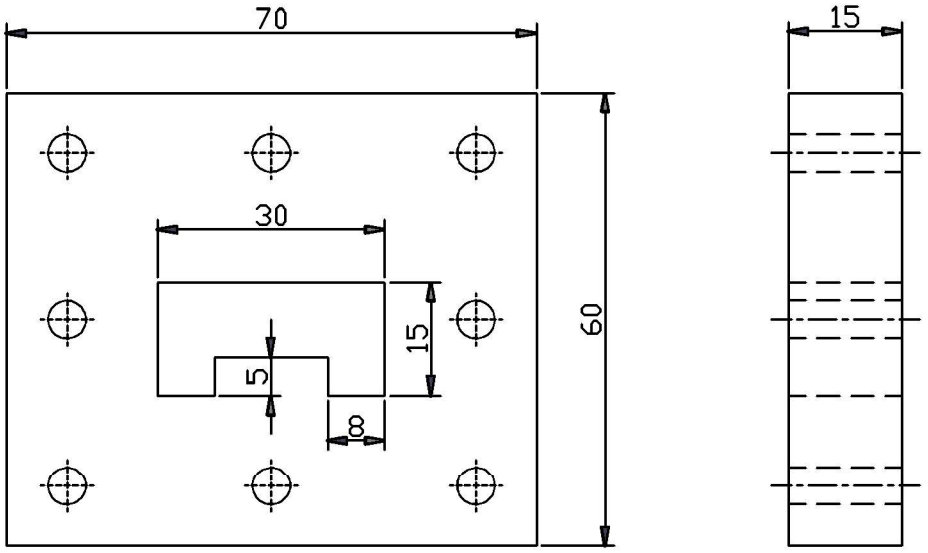
PART PRESS TOOL

Skala 1 : 2	Digambar		TEAM
	Diperiksa		

Politeknik Negeri Sriwijaya

DRAWME.01/6MD

NO.5 TOL ± 0.2 N8 MILLING



HOLE TABLE			
HOLE	XDIM	YDIM	DESCRIPTION
A1	8,00	8,00	Ø6,00 THRU
A2	35,00	8,00	Ø6,00 THRU
A3	62,00	8,00	Ø6,00 THRU
A4	8,00	30,00	Ø6,00 THRU
A5	62,00	30,00	Ø6,00 THRU
A6	8,00	52,00	Ø6,00 THRU
A7	35,00	30,00	Ø6,00 THRU
A8	62,00	52,00	Ø6,00 THRU

		1	DIES POTONG	5	Amutit	70 X 60 X 15	DIBUAT
JUMLAH			NAMA BAGIAN	N.BAG	MATERIAL	UKURAN	KETERANGAN
III	II	I	Perubahan:				

PART PRESS TOOL

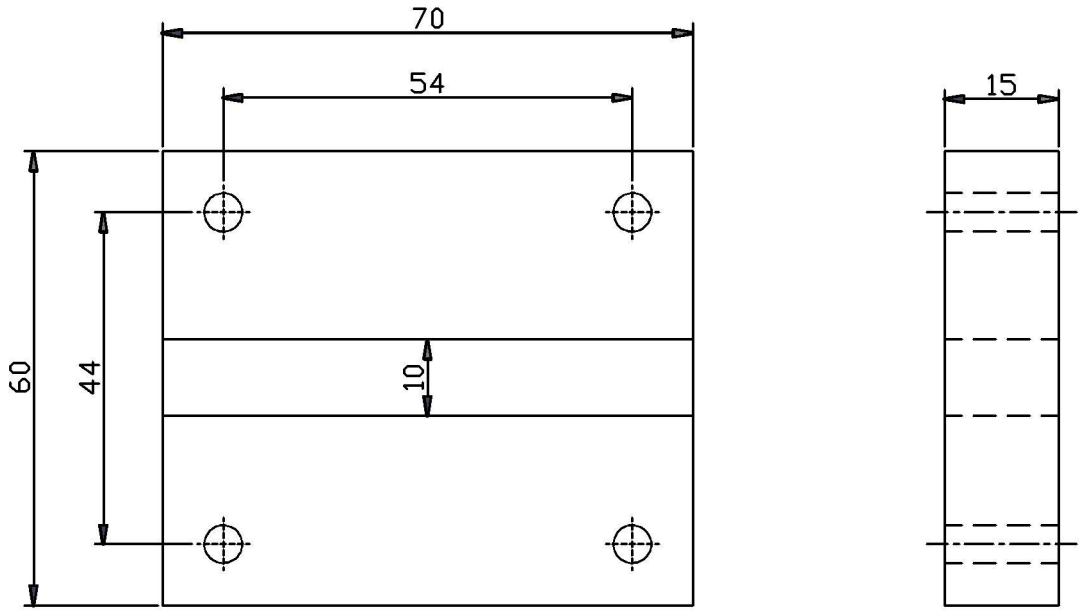
Skala 1:1	Digambar	TEAM
	Diperiksa	

Politeknik Negeri Sriwijaya

DRAWME.5/6MD

N8 MILLING

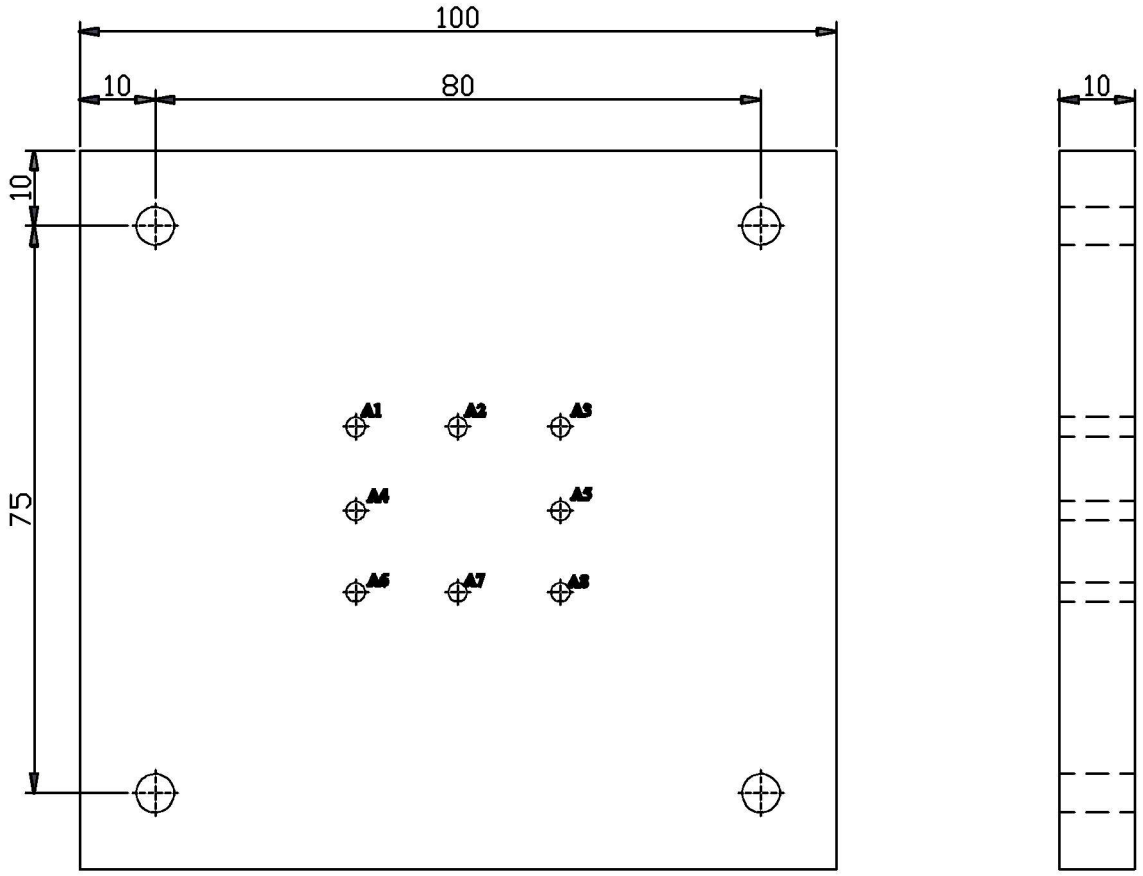
NO.14 TOL ± 0.2



		1	DIES BANDING	14	Amutit	70 X 60 X 15	DIBUAT
JUMLAH			NAMA BAGIAN	N.BAG	MATERIAL	UKURAN	KETERANGAN
III	II	I	Perubahan:				
			PART PRESS TOOL		Skala 1:1	Digambar	TEAM
						Diperiksa	
			Politeknik Negeri Sriwijaya			DRAWME.14/6MD	

NO.6 TOL ± 0.2

N8 MILING



HOLE TABLE			
HOLE	XDIM	YDIM	DESCRIPTION
A6	73,00	73,00	Ø5,00 THRU
A7	100,00	73,00	Ø5,00 THRU
A8	127,00	73,00	Ø5,00 THRU
A4	73,00	95,00	Ø5,00 THRU
A5	127,00	95,00	Ø5,00 THRU
A1	73,00	117,00	Ø5,00 THRU
A2	100,00	117,00	Ø5,00 THRU
A3	127,00	117,00	Ø5,00 THRU

		1	PELAT BAWAH	6	ST.37	201 X 191 X 20	DIBUAT
JUMLAH			NAMA BAGIAN	N.BAG	MATERIAL	UKURAN	KETERANGAN
III	II	I	Perubahan:				

PART PRESS TOOL

Skala 1 : 2

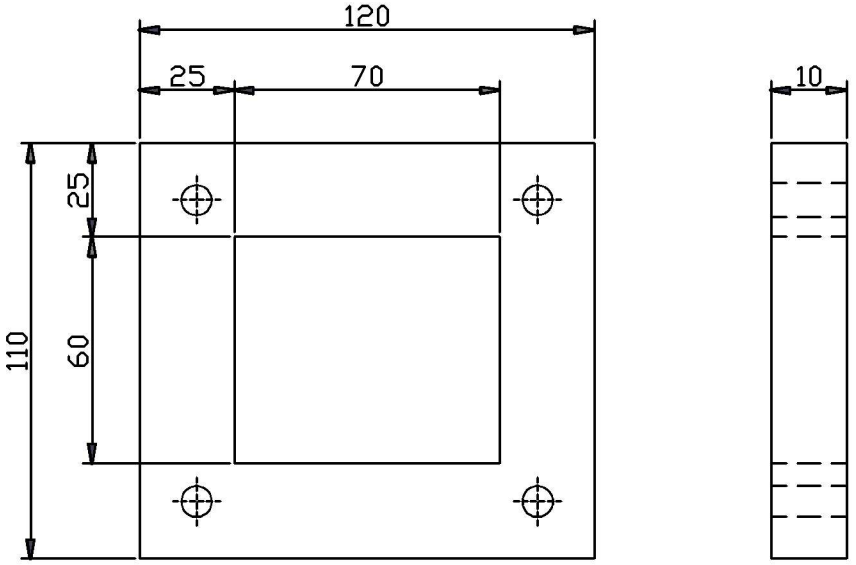
Digambar | TEAM

Diperiksa

Politeknik Negeri Sriwijaya

DRAWME.6/6MD

NO.13 TOL ± 0.2 N8 MILLING



HOLE TABLE			
HOLE	XDIM	YDIM	DESCRIPTION
A1	15,00	15,00	Ø8,00 THRU
A2	105,00	33,00	Ø8,00 THRU
A3	95,00	15,00	Ø8,00 THRU
A4	105,00	95,00	Ø8,00 THRU

		1	PELAT STIPPER BANDING	13	ST.37	120 X 110 X 10	DIBUAT
JUMLAH			NAMA BAGIAN	N.BAG	MATERIAL	UKURAN	KETERANGAN
III	II	I	Perubahan:				

PART PRESS TOOL

Skala 1 : 2

Digambar | TEAM

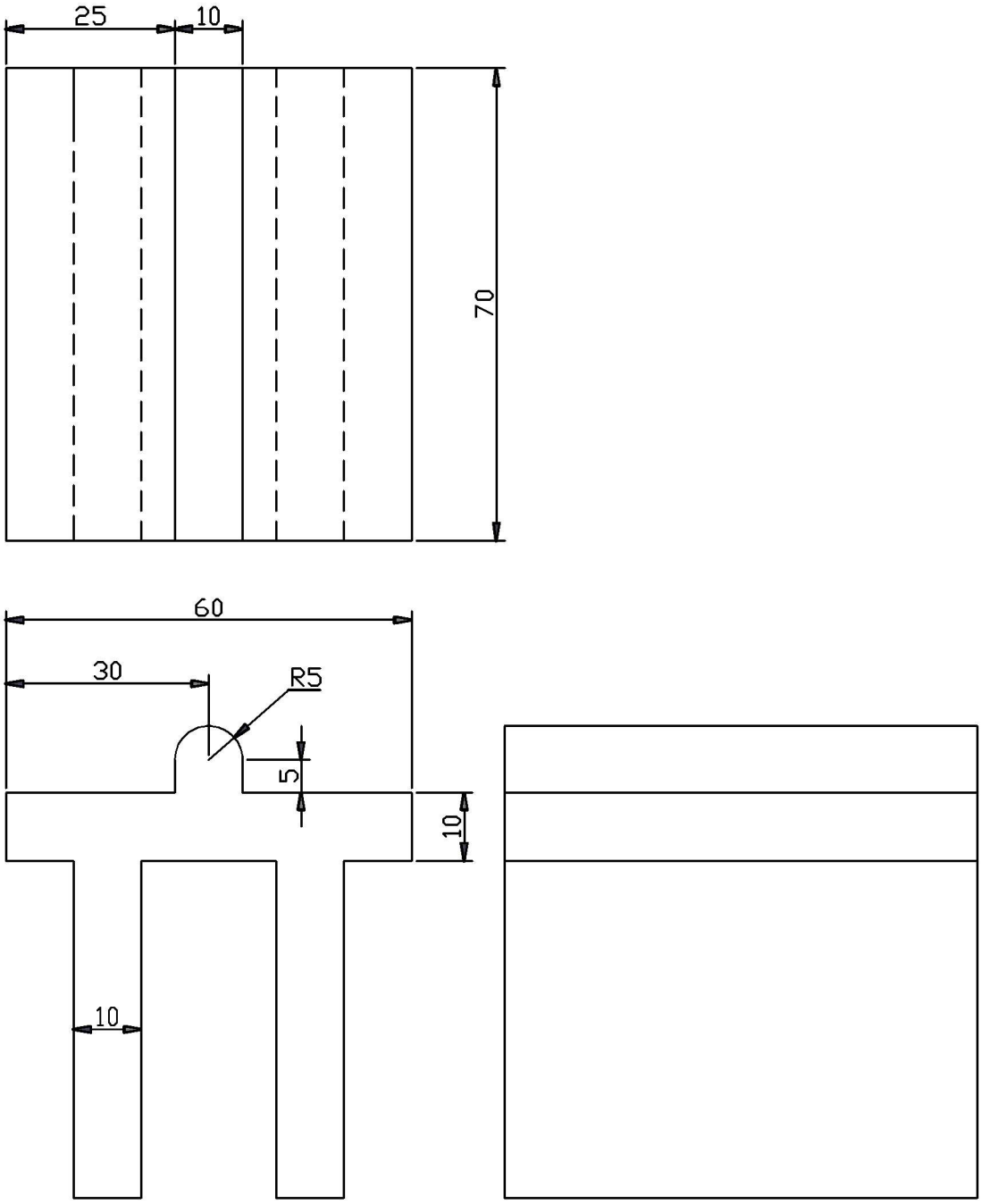
Diperiksa

Politeknik Negeri Sriwijaya

DRAWME.13/6MD

MILING

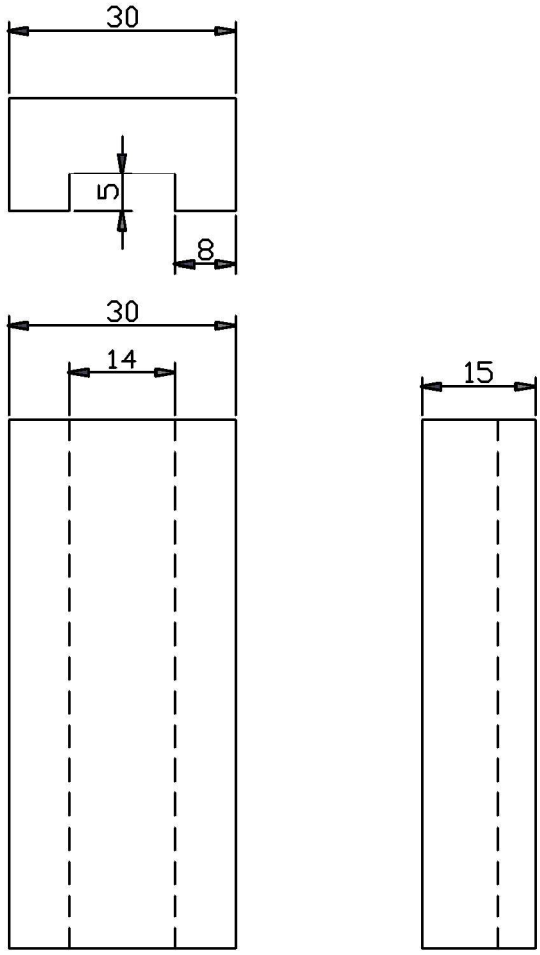
NO.12 TOL ± 0.2



		1	PUNCH BANDING	12	AMUTIT		DIBUAT
JUMLAH			NAMA BAGIAN	N.BAG	MATERIAL	UKURAN	KETERANGAN
III	II	I	Perubahan:				
			PART PRESS TOOL		Skala 1 : 1	Digambar	TEAM
						Diperiksa	
			Politeknik Negeri Sriwijaya			DRAWME.12/6MD	

N8 MILLING

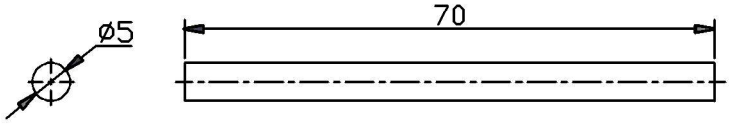
NO.15 TOL ± 0.2



BUBUT

N7

NO.3 TOL ± 0.2



		1	PUNCH POTONG 1	12	AMUTIT	Ø5 X 70	DIBUAT
		4	PUNCH POTONG	3	AMUTIT	70 X 30 X 15	DIBUAT
JUMLAH			NAMA BAGIAN	N.BAG	MATERIAL	UKURAN	KETERANGAN

III	II	I	Perubahan:

PART PRESS TOOL

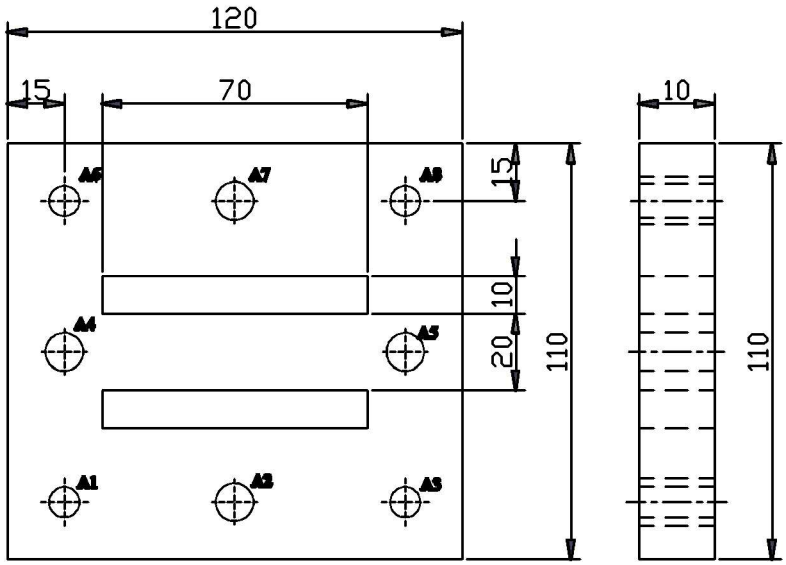
Skala 1 : 1

Digambar		TEAM
Diperiksa		

Politeknik Negeri Sriwijaya

DRAWME.3/6MD

NO.11 TOL ± 0.2 N8 MILLING



HOLE TABLE			
HOLE	XDIM	YDIM	DESCRIPTION
A1	15,00	15,00	Ø8,00 THRU
A2	60,00	15,00	Ø10,00 THRU
A3	105,00	15,00	Ø8,00 THRU
A4	15,00	55,00	Ø10,00 THRU
A5	105,00	55,00	Ø10,00 THRU
A6	15,00	95,00	Ø8,00 THRU
A7	60,00	95,00	Ø10,00 THRU
A8	105,00	95,00	Ø8,00 THRU

		1	PUNCH HOLDER BANDING	11	ST.37	120 X 110 X 10	DIBUAT
JUMLAH			NAMA BAGIAN	N.BAG	MATERIAL	UKURAN	KETERANGAN
III	II	I	Perubahan:				

PART PRESS TOOL	Skala 1 : 2	Digambar	TEAM
		Diperiksa	
Politeknik Negeri Sriwijaya	DRAWME.11/6MD		