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1.1. TAHAP PROSEDUR APQP PT.MAJ

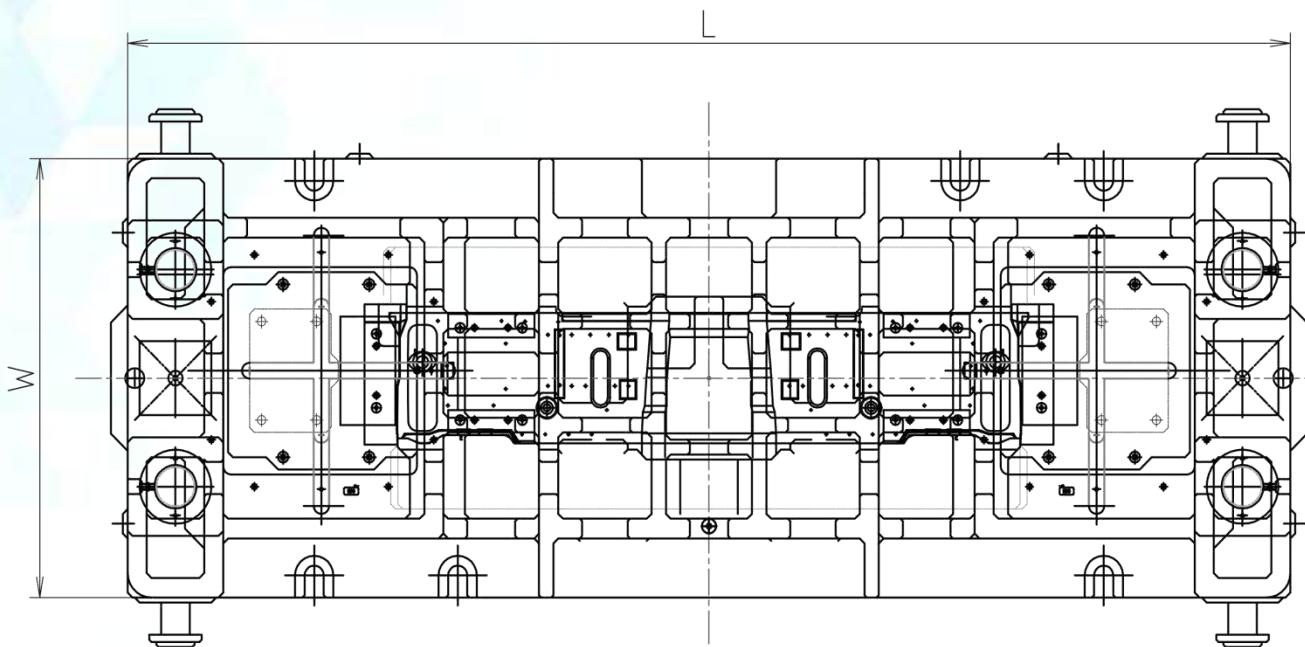
No.	Flow Chart	Deskripsi	PIC	Doc Terkait
1	<pre> graph TD A[Mulai] --> B[Project Baru] </pre>			
2	<pre> graph TD B --> C[Pembentukan Team] </pre>	Memberikan informasi project	MKT Support	- Part Drawing / Sample Part - NPPE
3	<pre> graph TD C --> D[Flow Process] </pre>	- Detail ruang lingkup project - Membahas Project - Membahas Schedule	PE, QE, DMFG, ENG DESIGN, MKT Support	- APQP Project Scope - Minute of Meeting - Project Team Structure
4	<pre> graph TD D --> E[Proses FMEA] </pre>	Penentuan Flow Proses	PE, QE, DMFG, ENG DESIGN	
5	<pre> graph TD E --> F[PE & QE] F --- G["- QCPC Pre-launch - Instruksi Kerja - Master Schedule - List kebutuhan Process"] </pre>	Analisa kemungkinan timbul masalah	PE, QE, DMFG, ENG DESIGN	P-FMEA (Pre-launch)
6	<pre> graph TD F --> H[Dies making] </pre>	Membuat persiapan dokumen QCPC Pre-Launch Melakukan kajian lebih detail terhadap standard dan permintaan customer	PE, QE, MKT Support, PUD	- QCPC Pre-launch - Purchase Request (PR) - Schedule and Progress Report of New Project
7	<pre> graph TD H --> I[Checking Fixture / JIG] </pre>	Pembuatan Dies	ENG Design, DMFG, Supplier	Schedule and Progress Report of New Project
8	<pre> graph TD I --> J[Trial Dies, JIG, Acc C/F] </pre>	Membuat Checking Fixture / JIG	ENG Design, DMFG, Supplier	Schedule and Progress Report of New Project
9	<pre> graph TD J --> K{Hasil Trial ?} K -- NG --> L[Perbaikan] K -- OK --> M[OK] </pre>	Trial Dies, JIG, dan accuracy C/F (Part) di Supplier	ENG Design, DMFG, Supplier	- Trial Requisition - Trial Dies Report
10	<pre> graph TD L --> M M --> N[Transfer Dies, C/F, JIG] </pre>	Jika hasil trial masih NG maka Dies akan diperbaiki	Supplier	
11	<pre> graph TD N --> O[Trial MAJ] </pre>	Dies, C/F, JIG di transfer	ENG Design, DMFG, Supplier	Schedule and Progress Report of New Project
12	<pre> graph TD O --> P{Hasil Trial ?} P -- NG --> Q[Perbaikan] P -- OK --> R[OK] </pre>	Trial Dies, C/F, JIG (Part) di MAJ	ENG Design, DMFG, QC Supplier	- Trial Requisition - Trial Dies Report
13	<pre> graph TD Q --> R R --> S[Pre Production] </pre>	Jika hasil trial masih NG maka akan dilakukan perbaikan	ENG Design, DMFG, Supplier	Minute of Meeting (trial)
14	<pre> graph TD S --> T[Training Operator] </pre>	Evaluasi sebelum mass pro	PE, ENG Design, DMFG, QE, QI, Produksi, Customer	Minute of Meeting
15	<pre> graph TD T --> U[Analisa MSA (bila ada)] </pre>	Melatih Operator untuk melakukan process	PE, QE, Produksi	Materi Training
16	<pre> graph TD U --> V((A)) U --> W((B)) </pre>	Bila ada sistem pengukuran baru lakukan MSA, bila tidak ada langsung studi SPCjangka pendek untuk PPAP	PE, ENG Design, DMFG, QE, QI, Produksi	SPC New Project

No.	Flow Chart	Deskripsi	PIC	Doc Terkait
7.17	<pre> graph TD A((A)) --> PQSO[Product Quality Sign Off] PQSO --> Decision{Masih ada} Decision -- Ya --> PPAP[Pengajuan Full Dokumen PPAP] Decision -- Tidak --> PQSO PPAP --> Perbaikan[Perbaikan] </pre>	Melakukan Review, Validasi, dan Verifikasi semua dokumen APQP dan PPAP yang sesuai dengan requirement customer. Gunakan standar format customer jika ada	PE, QE, DMFG, ENG DESIGN, Produksi	- Part Submission Warrant - internal sign off check list - internal sign off customer
7.18	<pre> graph TD PPAP[Pengajuan Full Dokumen PPAP] --> Perbaikan[Perbaikan] </pre>	Mengajukan semua requirement PPAP customer dan APQP dokumen	PE, QE, DMFG, ENG DESIGN,	PPAP Document & part
7.19	<pre> graph TD Perbaikan[Perbaikan] --> Selesai[Selesai] </pre>	Jika masih terdapat pending Melakukan perbaikan dan melengkapinya	PE, QE, DMFG, ENG DESIGN, Produksi	Rump-up activities
7.20	<pre> graph TD QCPC[QCPC untuk Produksi] --> PPAP[Full Approval (PPAP)] </pre>	Membuat QCPC untuk Mass-Produksi QCPC Pre-Launch tidak boleh dibuang dan disimpan sebagai bagian dari PPAP	OMCC	QCPC Mass Pro
7.21	<pre> graph TD PPAP[Full Approval (PPAP)] --> MassPro[Mass Pro] </pre>	Sign Customer di Part melengkapi dan membuat document PPAP untuk Diserahkan ke Customer di approval	PE, QE, DMFG, ENG DESIGN	Master Sample (Part tag) Dokumen PPAP
7.22	<pre> graph TD MassPro[Mass Pro] --> Selesai[Selesai] Selesai -- B --> MassPro </pre>	Pemantauan Proses selama 3 bulan pertama produksi	QE, QI, Produksi, PE	Performance Report

1.2. DOKUMEN PENDUKUNG PROJECT

1. APQP Project Scope
2. Schedule and Progress Report Of New Project
3. FMEA (Process- Failure Mode and Effects Analysis)
4. QCPC (Quality Control Process Chart)
5. Trial Dies Report
6. Trial Dies Checksheet
7. Point of Stamping Work
8. Packing Spect
9. Part Inspection Standard
10. Production Part Approval Process (PPAP) List Submitted
11. Evaluasi Hasil Produk Baru
12. Quality planning sign off
13. MSA
14. SPC
15. Production Control Plan
16. Minute Meeting Trial Project
17. Part Submission Warrant
18. Struktur Tim Project
19. Daily Check sheet Accuracy In Process
20. Instruksi Kerja FMEA
21. Instruksi Kerja MSA
22. Instruksi Kerja SPC
23. Instruksi Kerja pembuatan QCPC

1.3. PENENTUAN KELAS DIES



Gambar 1. ilustrasi ukuran die

Table 8.Penentuan Kelas Dies

CLASS	DIMENSION							STAMPING LINE	
	MIN			TO	MAX				
	L	X	W	-	L	X	W		
A	2000	X	2000	-	>	X	>	LINE A	
B	1750	X	1100	-	2000	X	1500	LINE B/D	
C	1500	X	750	-	1746	X	1099	LINE B/D	
D	1000	X	600	-	1499	X	749	LINE C	
E	750	X	500	-	999	X	599	SMALL PRESS	
F	<	X	<	-	750	X	500	SMALL PRESS	

RUMUS PENENTUAN KG ESTIMATION

$$KG = \frac{L \times W \times T \times (\text{Massa Jenis})}{1.000.000} \times \text{Koefisien Dies}$$

1.4. LEAD TIME LOADING CAPACITY TOOLING

DESIGN		CLASS					
LEAD TIME		A	B	C	D	E	F
DRAW	HOUR	108.0	108.0	99.0	99.0	72.0	72.0
	WEEK	2.7	2.7	2.5	2.5	1.8	1.8
TRIM	HOUR	162.0	162.0	144.0	144.0	76.5	76.5
	WEEK	4.1	4.1	3.6	3.6	1.9	1.9
FLANGE	HOUR	144.0	144.0	121.5	121.5	72.0	72.0
	WEEK	3.6	3.6	3.0	3.0	1.8	1.8
CAM	HOUR	198.0	198.0	175.5	175.5	117.0	117.0
	WEEK	5.0	5.0	4.4	4.4	2.9	2.9
BLANK	HOUR	160.0	140.0	134.3	105.3	75.3	64.6
	WEEK	4.0	3.5	3.4	2.6	1.9	1.6
FORM	HOUR	160.0	150.0	142.5	107.0	105.0	72.9
	WEEK	4.0	3.8	3.6	2.7	2.6	1.8

CAD CAM

LEAD TIME		CLASS					
		A	B	C	D	E	F
DRAW	HOUR	72.0	72.0	58.5	58.5	45.0	45.0
	WEEK	1.8	1.8	1.5	1.5	1.1	1.1
TRIM	HOUR	36.0	36.0	31.5	31.5	22.5	22.5
	WEEK	0.9	0.9	0.8	0.8	0.6	0.6
FLANGE	HOUR	36.0	36.0	31.5	31.5	22.5	22.5
	WEEK	0.9	0.9	0.8	0.8	0.6	0.6
CAM	HOUR	54.0	54.0	45.0	45.0	36.0	36.0
	WEEK	1.4	1.4	1.1	1.1	0.9	0.9
BLANK	HOUR	73.3	65.0	50.7	43.2	30.0	30.2
	WEEK	1.8	1.6	1.3	1.1	0.8	0.8
FORM	HOUR	72.0	59.5	56.3	50.2	43.0	35.9
	WEEK	1.8	1.1	1.4	1.3	1.5	0.9

POLY

LEAD TIME		CLASS			
		A	B	C	D
DRAW	HOUR	72.0	63.0	58.5	49.5
	WEEK	1.8	1.6	1.5	1.2
TRIM	HOUR	85.5	81.0	72.0	58.5
	WEEK	2.1	2.0	1.8	1.5
FLANGE	HOUR	85.5	81.0	72.0	58.5
	WEEK	2.1	2.0	1.8	1.5
CAM	HOUR	94.5	85.5	81.0	63.0
	WEEK	2.4	2.1	2.0	1.6
BLANK	HOUR	90.0	87.3	83.6	68.4
	WEEK	2.3	2.2	2.1	1.7
FORM	HOUR	87.0	85.0	78.8	71.1
	WEEK	2.2	2.1	2.0	1.8

MACHINING

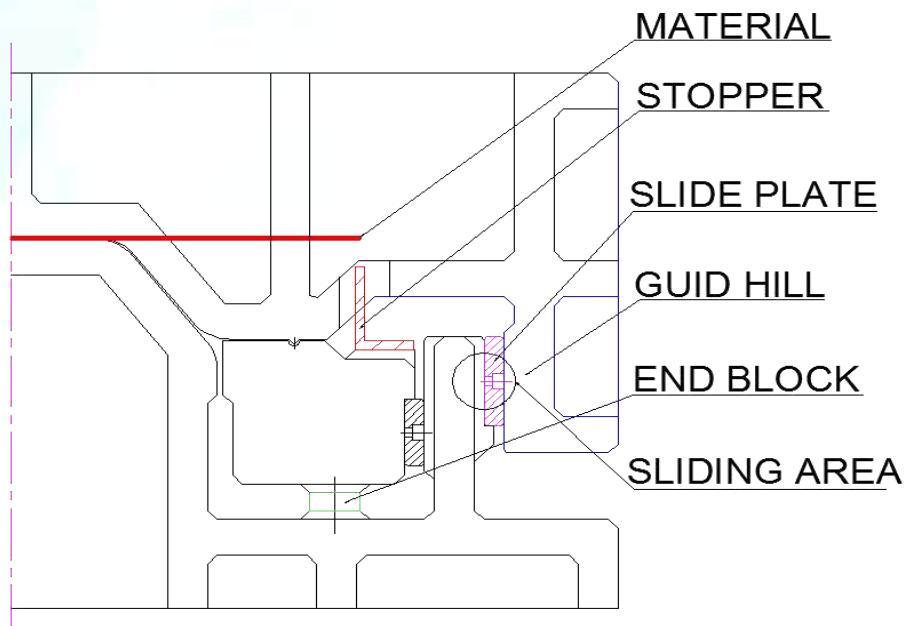
LEAD TIME		CLASS					
		A	B	C	D	E	F
DRAW	HOUR	297.0	265.5	234.0	198.0	135.0	99.0
	WEEK	7.4	6.6	5.9	5.0	3.4	2.5
TRIM	HOUR	418.5	369.0	324.0	279.0	184.5	139.5
	WEEK	10.5	9.2	8.1	7.0	4.6	3.5
FLANGE	HOUR	387.0	346.5	301.5	261.0	171.0	130.5
	WEEK	9.7	8.7	7.5	6.5	4.3	3.3
CAM	HOUR	418.5	369.0	324.0	279.0	184.5	139.5
	WEEK	10.5	9.2	8.1	7.0	4.6	3.5
BLANK	HOUR	381.5	350.0	325.7	232.7	164.2	116.1
	WEEK	9.5	8.8	8.1	5.8	4.1	2.9
FORM	HOUR	367.5	267.8	220.6	190.0	149.0	110.0
	WEEK	9.2	6.7	5.5	4.8	3.7	2.8

mc :24 H
RADIAL : 16H
GRDG : 8H
MAKINO : 8 H

FINISHING AND TRY OUT

LEAD TIME		CLASS					
		A	B	C	D	E	F
DRAW	HOUR	189.0	171.0	157.5	130.5	99.0	85.5
	WEEK	4.7	4.3	3.9	3.3	2.5	2.1
TRIM	HOUR	261.0	243.0	220.5	180.0	144.0	121.5
	WEEK	6.5	6.1	5.5	4.5	3.6	3.0
FLANGE	HOUR	243.0	225.0	270.0	171.0	130.5	112.5
	WEEK	6.1	5.6	6.8	4.3	3.3	2.8
CAM	HOUR	261.0	243.0	220.5	180.0	144.0	121.5
	WEEK	6.5	6.1	5.5	4.5	3.6	3.0
BLANK	HOUR	313.3	253.1	212.5	137.6	111.5	100.1
	WEEK	7.8	6.3	5.3	3.4	2.8	2.5
FORM	HOUR	210.0	186.0	155.0	120.0	112.0	90.0
	WEEK	5.3	4.7	3.9	3.0	2.8	2.3

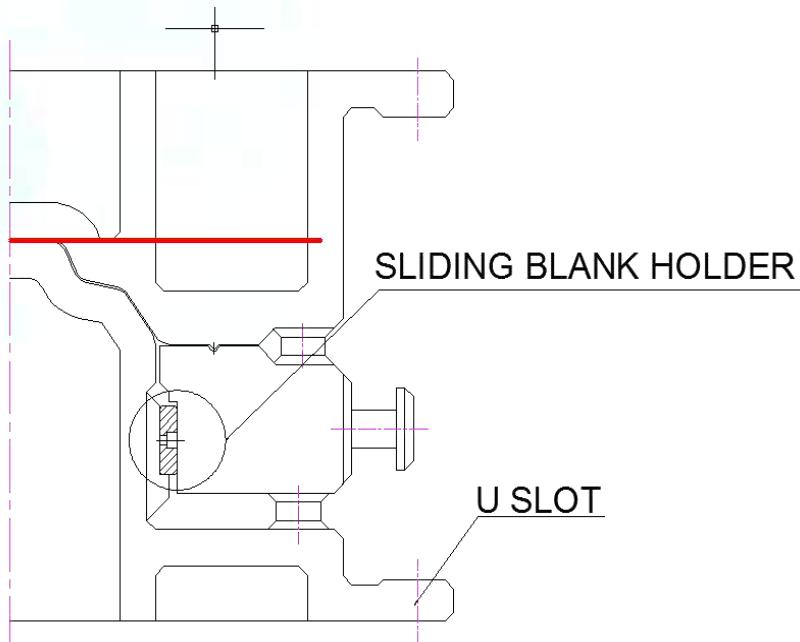
1.5. PENENTUAN UKURAN DIES BERDASARKAN BENTANGAN



Gambar 3. Keterangan Dies Draw bagian Depan

Table 3. Penentuan Dies Draw Bagian Depan

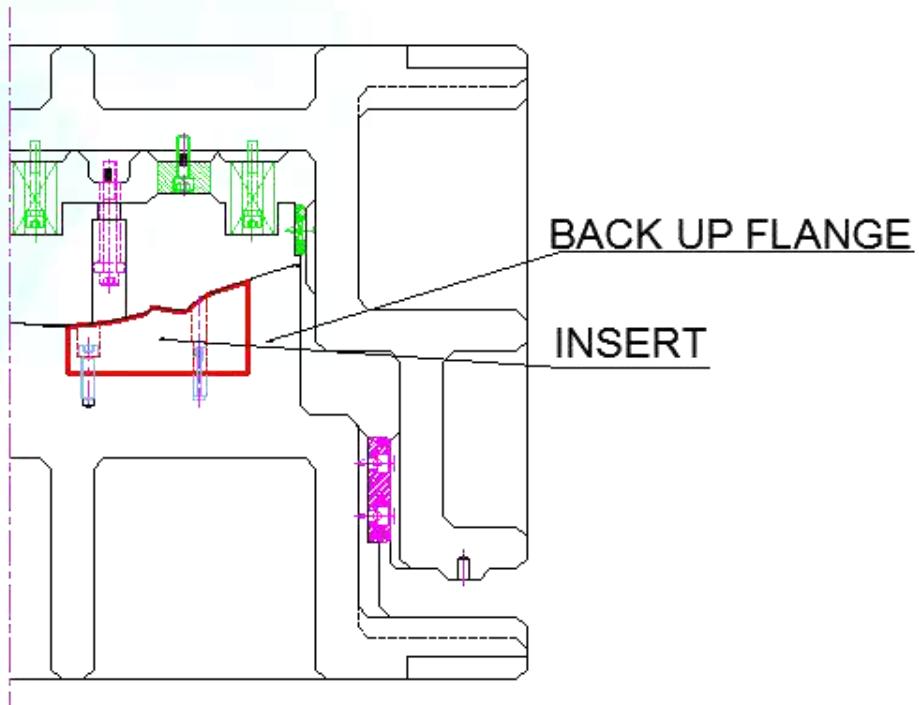
Blank Size	Stopper (2 x 20)	End Block (2 x 80)	Guide Hill	Sliding Area		Sliding Blank Holder		Σ Length
				Contact Area (2 x 10)	Slide Plate (2 x 20)	Slide Plate (2 x 10)	Rib (2 x 40)	
0 - 750	40	160	300	20	40	20	80	1410
750 - 900	40	160	300	20	40	20	80	1560
900 - 1050	40	160	300	20	40	20	80	1710
1050 - 1200	40	160	320	20	40	20	80	1880
1200 - 1350	40	160	320	20	40	20	80	2030
1350 - 1500	40	160	340	20	40	20	80	2200
1500 - 1650	40	160	340	20	40	0	0	2250
1650 - 1800	40	160	360	20	40	0	0	2420
1800 - 1950	40	160	360	20	40	0	0	2570
1950 - 2100	40	160	380	20	40	0	0	2740
2100 - 2250	40	160	380	20	40	0	0	2890
2250 - 2400	40	160	400	20	40	0	0	3060
2400 - 2550	40	160	400	20	40	0	0	3210
2550 - 2700	40	160	400	20	40	0	0	3360



Gambar 4.Keterangan Dies Draw bagian Samping

Table 4.Penentuan Dies Draw Bagian Samping

Side View (FB)					
Blank Size	Stopper (2 x 20)	End Block (2 x 80)	U-Slot (2 x 120)	Urethane Set Height (2 x 30)	Σ Length
0 - 300	40	160	240	60	800
300 - 450	40	160	240	60	950
450 - 600	40	160	240	60	1100
600 - 750	40	160	240	60	1250
750 - 900	40	160	240	60	1400
900 - 1050	40	160	240	60	1550
1050 - 1200	40	160	240	60	1700
1200 - 1350	40	160	240	60	1850
1350 - 1500	40	160	240	60	2000
1500 - 1650	40	160	240	60	2150
1650 - 1800	40	160	240	60	2300
1800 - 1950	40	160	240	60	2450
1950 - 2100	40	160	240	60	2600



Gambar 5. Keterangan Dies Flange bagian Depan

Table 5. Penentuan Dies Flange Bagian Depan

Front View (RL)					
OP 20 - Size	Insert Flange (2 x 60)	Back Up Flange (2 x 40)	Gap Upp / Low (2 x 30)	Contact Area (2 x 10)	Σ Length
750 - 900	120	80	60	20	1180
900 - 1050	120	80	60	20	1330
1050 - 1200	120	80	60	20	1480
1200 - 1350	120	80	60	20	1630
1350 - 1500	120	80	60	20	1780
1500 - 1650	120	80	60	20	1930
1650 - 1850	120	80	60	20	2130
1850 - 1950	120	80	60	20	2230
1950 - 2100	120	80	60	20	2380
2100 - 2250	120	80	60	20	2530
2250 - 2400	120	80	60	20	2680
2400 - 2550	120	80	60	20	2830

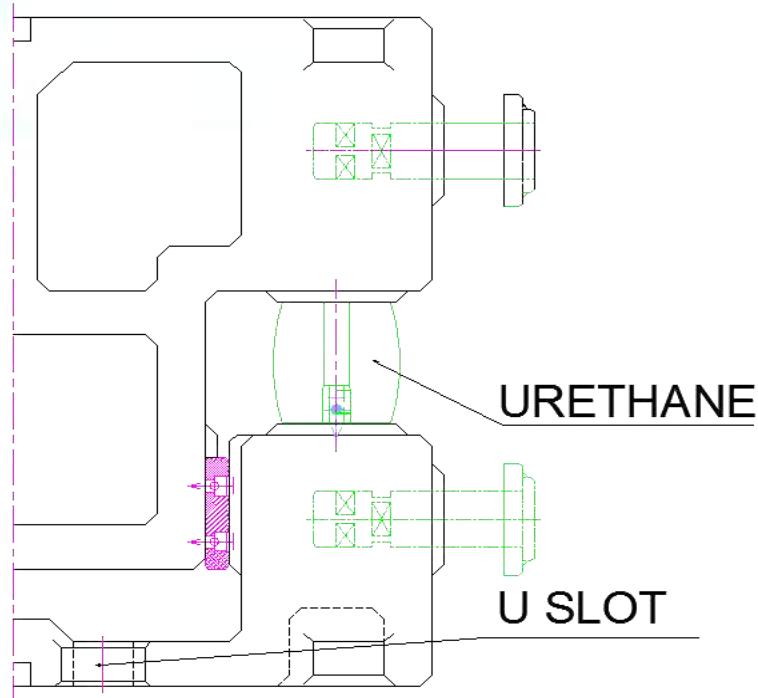
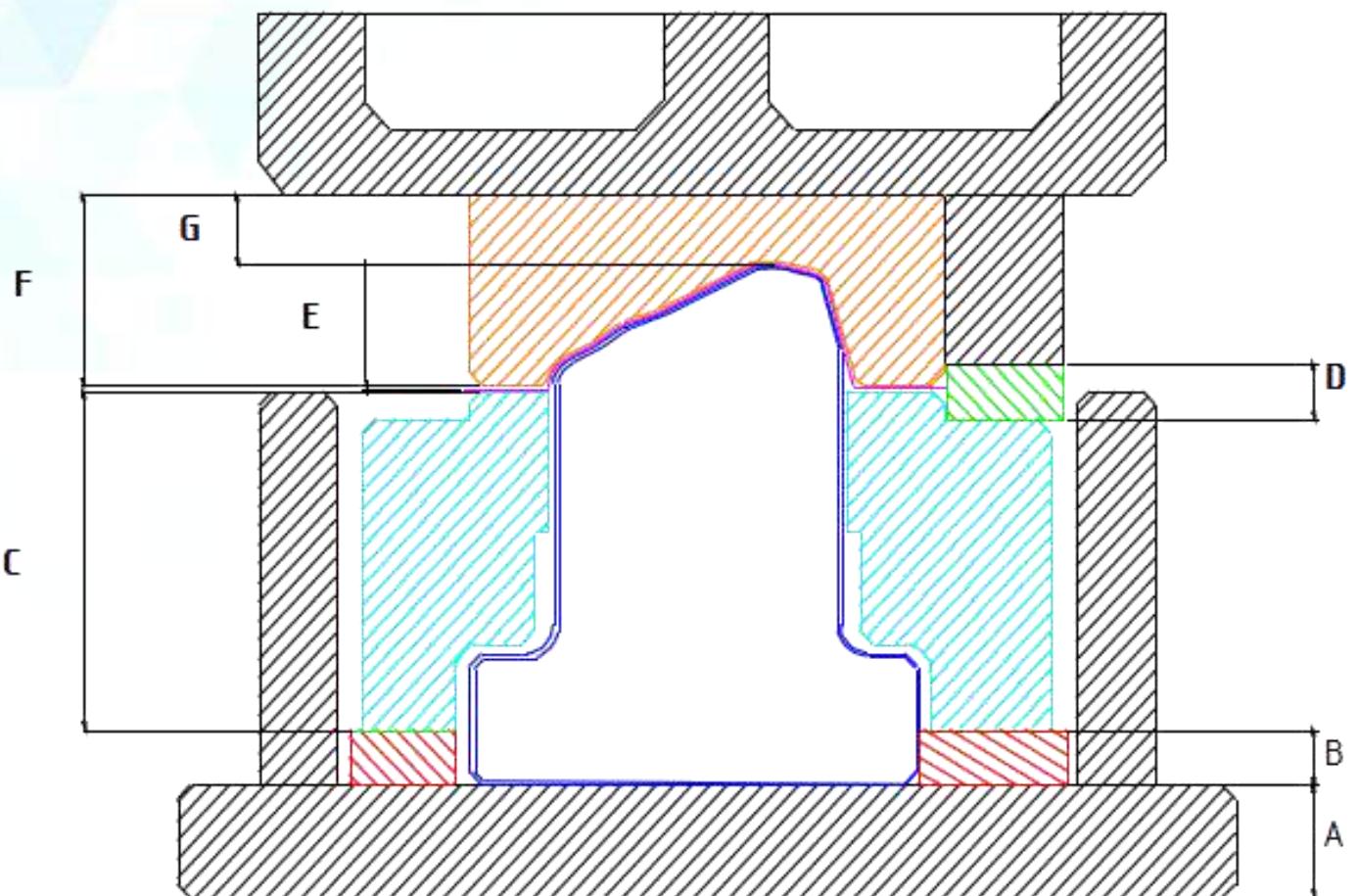


Table 6. Penentuan Dies Flange Bagian Samp

Side View (FB)				
OP 20 - Size	Insert Flange (2 x 60)	Back Up Flange (2 x 40)	U-Slot (2 x 120)	Σ Length
300 - 450	120	80	240	890
450 - 600	120	80	240	1040
600 - 750	120	80	240	1190
750 - 900	120	80	240	1340
900 - 1050	120	80	240	1490
1050 - 1200	120	80	240	1640
1200 - 1350	120	80	240	1790
1350 - 1500	120	80	240	1940
1500 - 1650	120	80	240	2090
1650 - 1800	120	80	240	2240
1800 - 1950	120	80	240	2390

1.6. STANDAR DIE HIGH



Gambar 6. Contoh Die

Tabel 3. Penjelasan Gambar 15

No	Stroke	Base	End	Bank	End	Surace	Insert	Rib	Total	Rounded
		Lower	Block	Holder	Block	Depth (s)				
		A	B	C	D	E	F	G		
1	$0 > s \geq 50$	100	40	150	40	50	50	80	510	550
2	$50 > s \geq 100$	100	40	150	40	100	50	80	560	600
3	$100 > s \geq 150$	120	50	150	50	150	50	80	650	700
4	$150 > s \geq 200$	120	50	200	50	200	50	80	750	800
5	$200 > s \geq 250$	140	50	200	50	250	50	100	840	900
6	$250 > s \geq 300$	140	50	250	50	300	50	100	940	1000
7	$300 > s \geq 350$	140	50	250	50	350	50	100	990	1050

1.7. STANDAR DESIGN DIES

ENGINEERING STAMPING TOOLS DIV. – PT. MEKAR ARMADA JAYA

DIE DESIGN STANDARDS

APPLICATION

ALL DIE

AVERAGE STANDARD FOR PANEL SIZE VS DIE SIZE

1/10

I. BIG DIE (Upper & Lower tool made by casting steel)

- SINGLE PROCESS

a. Draw

Die Length (L) = p+850

Die Width (W) = l+650

Die Height (DH):

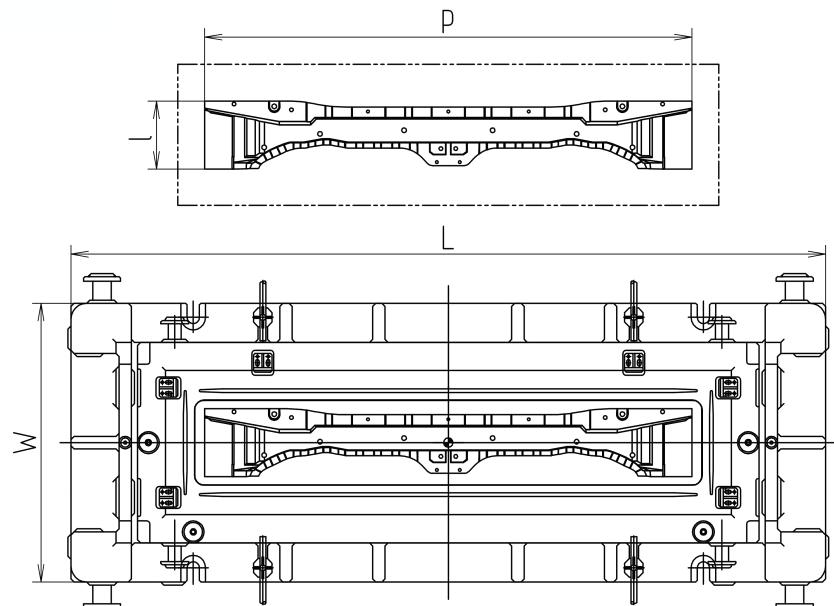
$t < 40$ (DH)= 400

$t 50 \sim 70$ (DH)= 500

$t 80 \sim 100$ (DH)= 600

$t 110 \sim 150$ (DH)= 700

$t 160 \sim 200$ (DH)= 800



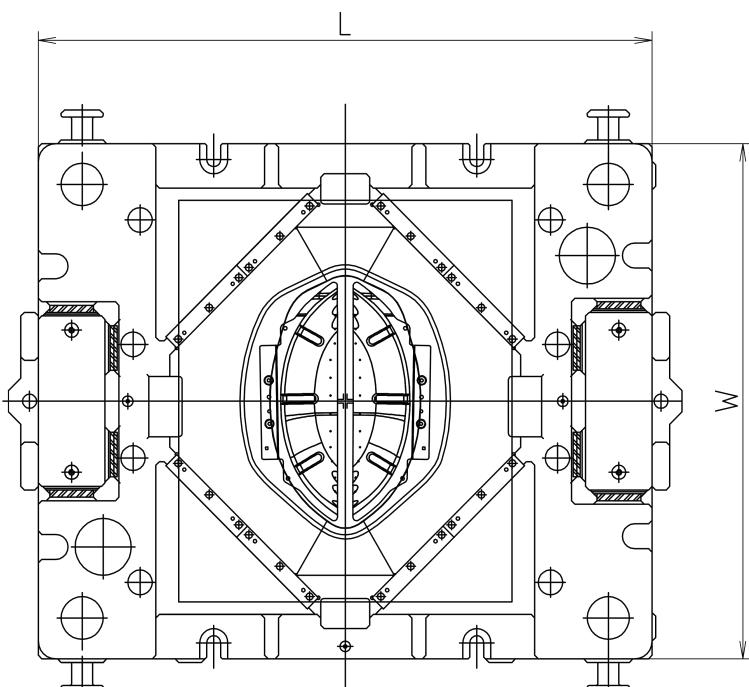
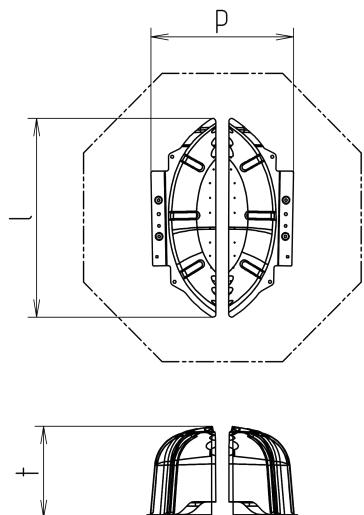
b. Deep Draw

Die Length (L) = p+1250

Die Width (W) = l+800

Die Height (DH):

$t > 200$ (DH)=1000



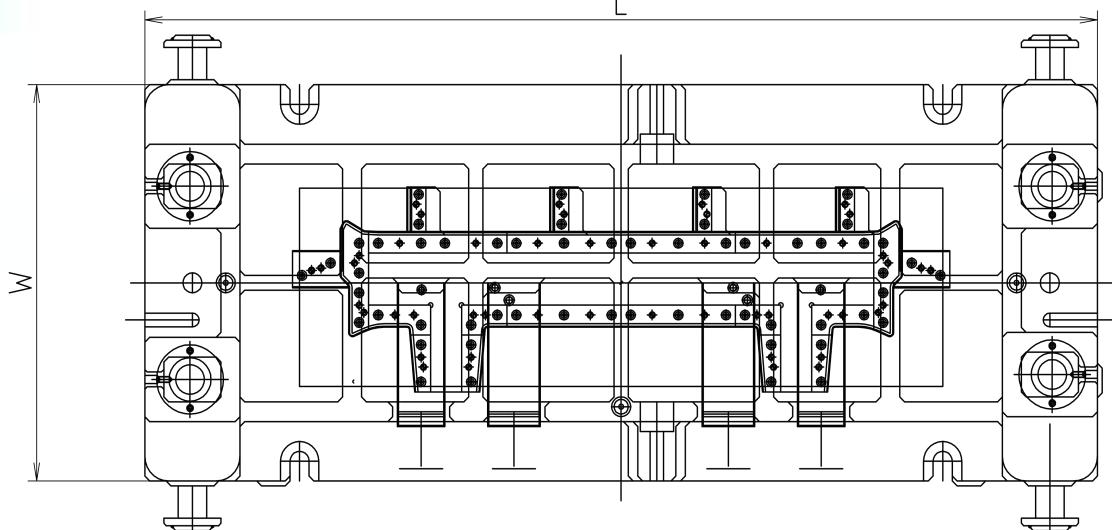
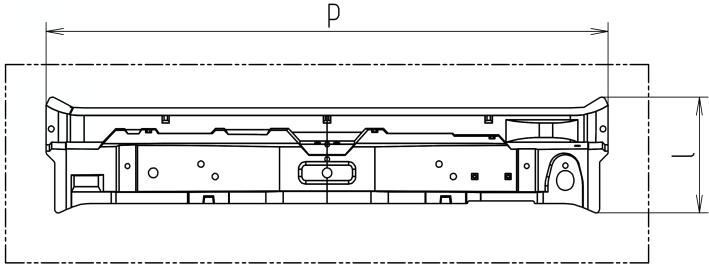
SYM	DATE	REVISION			REFERENCE	APPRV	CHECKED	DRAWN	ISSUED DATE
						AGUNG T	KHABIB M	BUDI	17-04-07

ENGINEERING STAMPING TOOLS DIV. – PT. MEKAR ARMADA JAYA

DIE DESIGN STANDARDS	APPLICATION	ALL DIE
AVERAGE STANDARD FOR PANEL SIZE VS DIE SIZE	2/10	

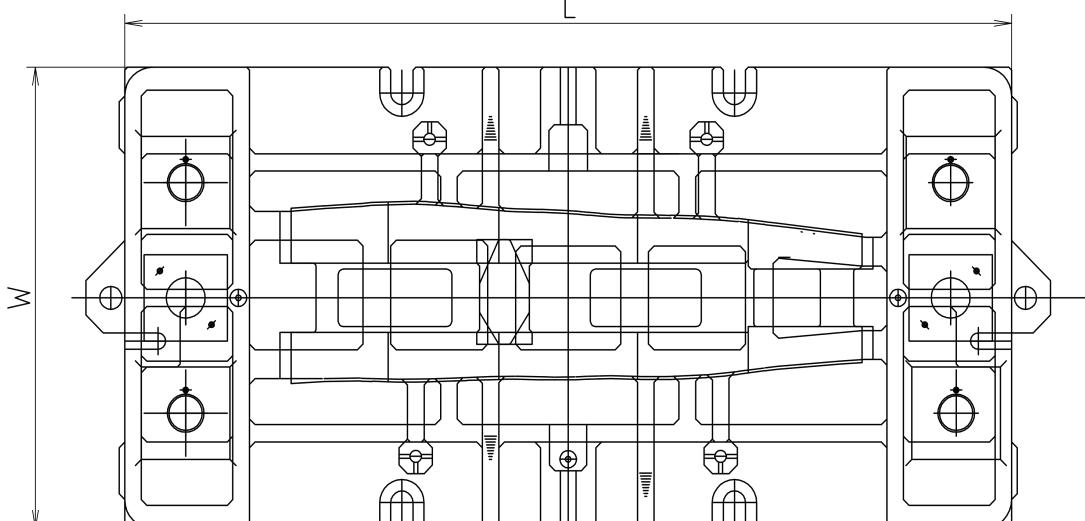
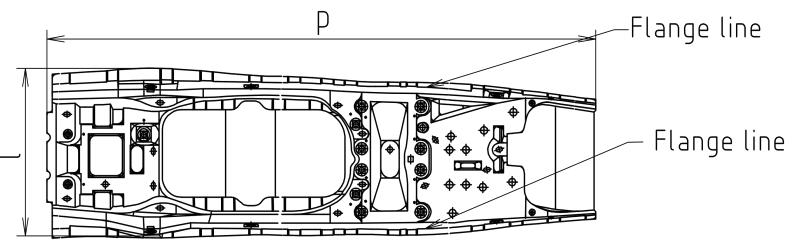
c. Trim

Die Length (L) = p+800
Die Width (W) = l+600



d. Flange

Die Length (L) = p+600
Die Width (W) = l+500



SYM	DATE	REVISION			REFERENCE	APPRV	CHECKED	DRAWN	ISSUED DATE
						AGUNG T	KHABIB M	BUDI	17-04-07

ENGINEERING STAMPING TOOLS DIV. - PT. MEKAR ARMADA JAYA

DIE DESIGN STANDARDS

APPLICATION

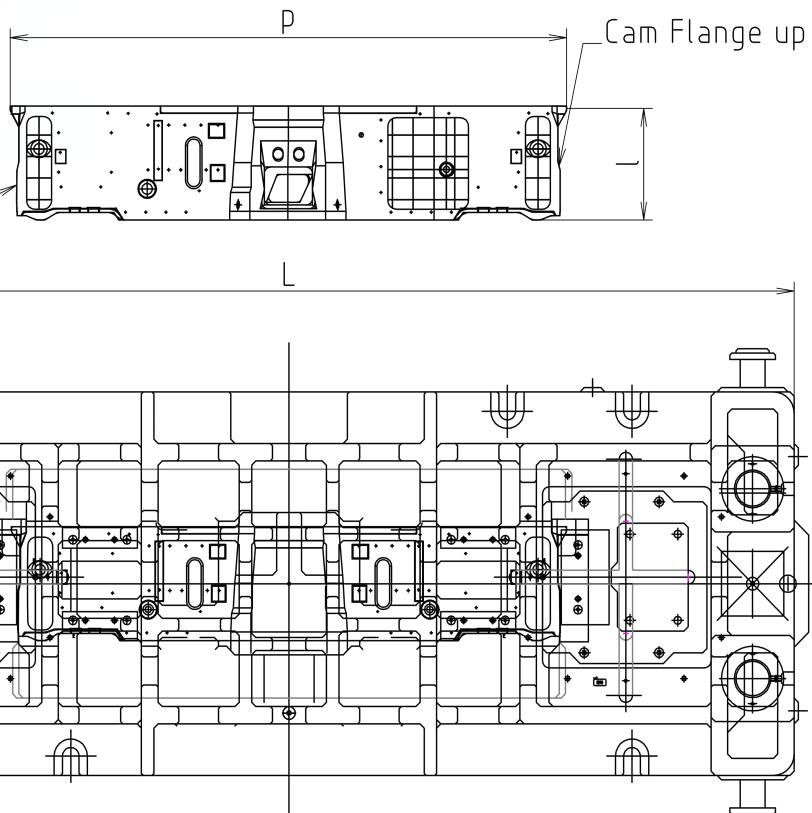
ALL DIE

AVERAGE STANDARD FOR PANEL SIZE VS DIE SIZE

3/10

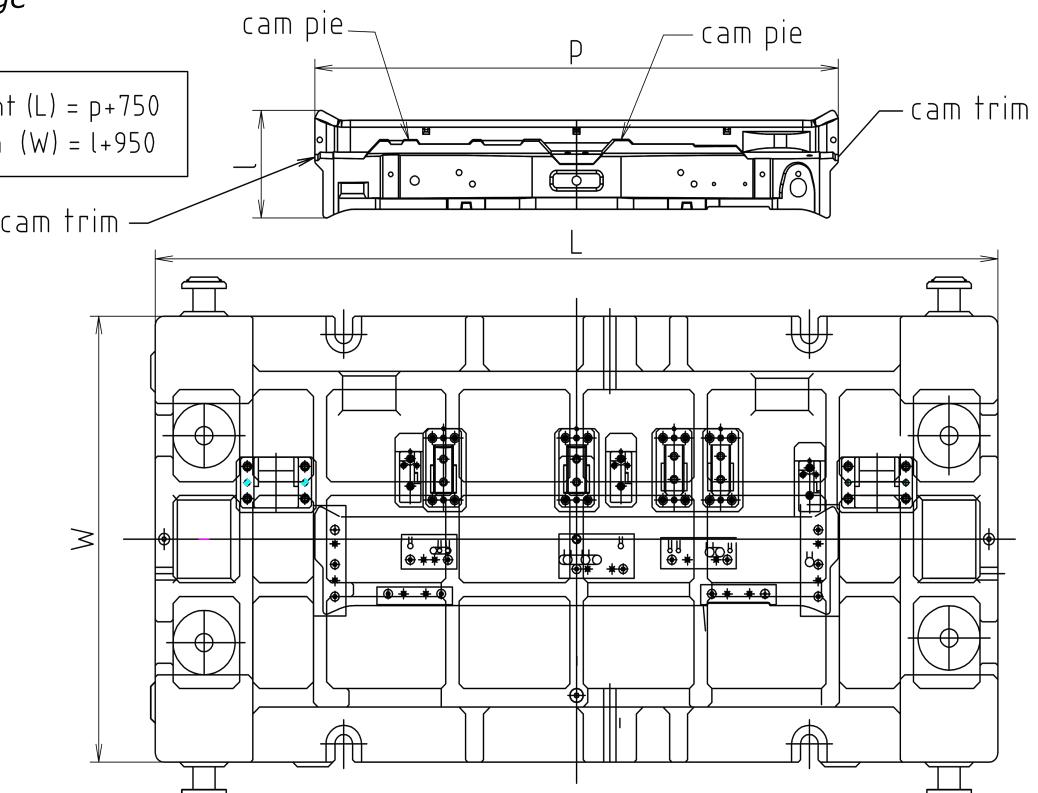
e. Cam Flange

Die Length (L) = p+1100
Die Width (W) = l+600



f. Cam Flange

Die Length (L) = p+750
Die Width (W) = l+950



SYM	DATE	REVISION		REFERENCE	APPRV	CHECKED	DRAWN	ISSUED DATE
					AGUNG T	KHABIB M	BUDI	17-04-07

ENGINEERING STAMPING TOOLS DIV. - PT. MEKAR ARMADA JAYA

DIE DESIGN STANDARDS

APPLICATION

ALL DIE

AVERAGE STANDARD FOR PANEL SIZE VS DIE SIZE

4/10

II. MEDIUM DIE

- SINGLE PROCESS

a. Draw

$$\text{Die Length (L)} = p+800$$

$$\text{Die Width (W)} = l+600$$

Die Height (DH):

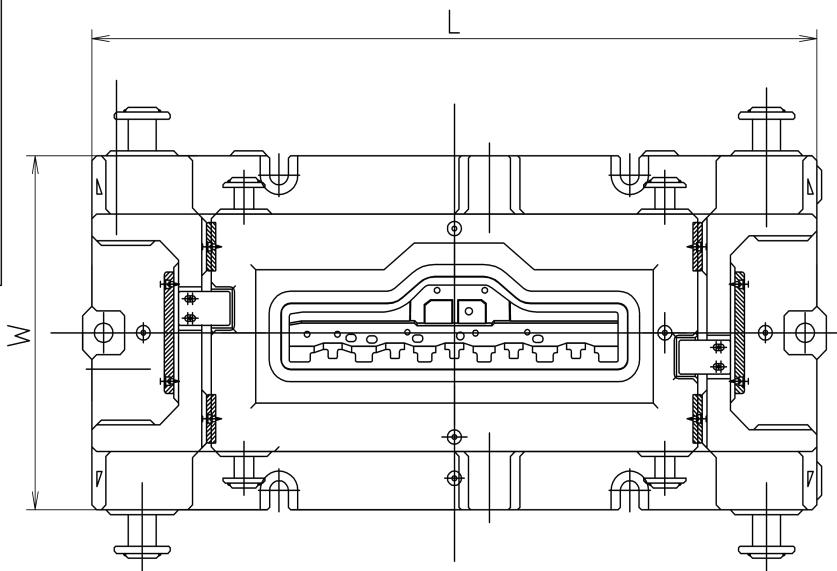
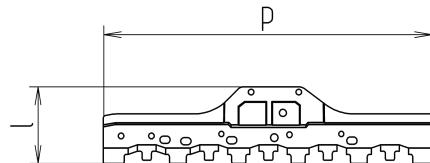
$$t < 40 \quad (DH) = 400$$

$$t 50 \sim 70 \quad (DH) = 500$$

$$t 80 \sim 100 \quad (DH) = 600$$

$$t 110 \sim 150 \quad (DH) = 700$$

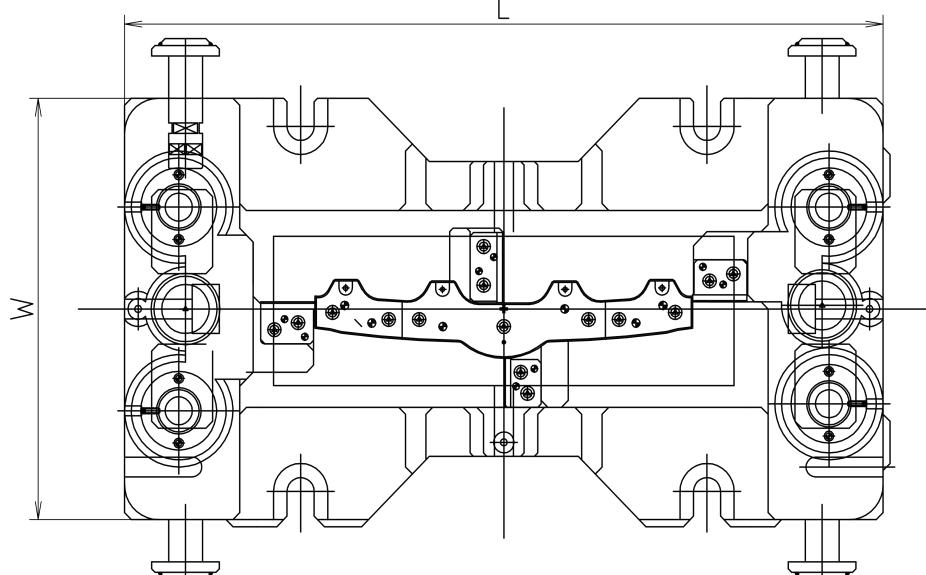
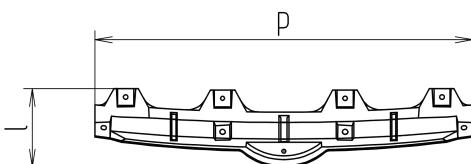
$$t 160 \sim 200 \quad (DH) = 800$$



b. Trim

$$\text{Die Length (L)} = p+600$$

$$\text{Die Width (W)} = l+500$$



SYM	DATE	REVISION			REFERENCE	APPRV	CHECKED	DRAWN	ISSUED DATE

AGUNG T KHABIB M BUDI 17-04-07

ENGINEERING STAMPING TOOLS DIV. – PT. MEKAR ARMADA JAYA

DIE DESIGN STANDARDS

APPLICATION

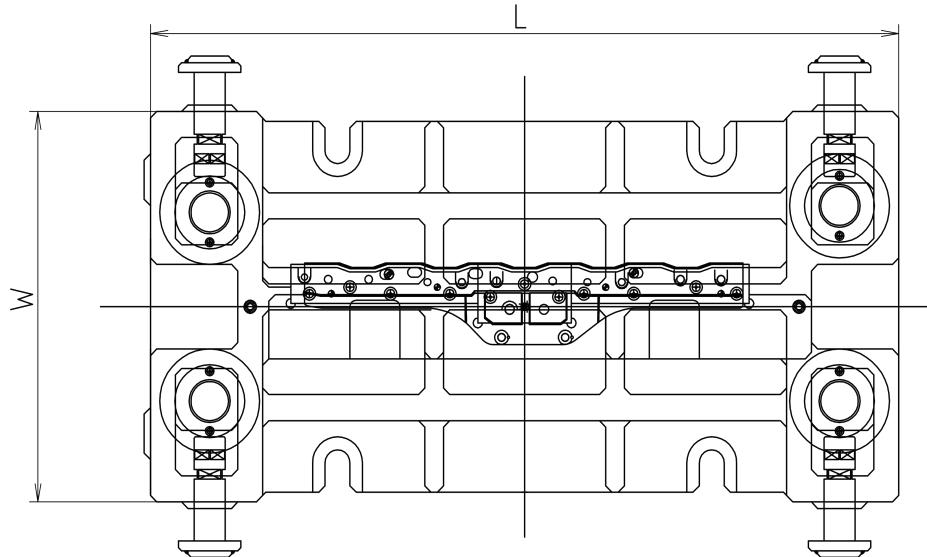
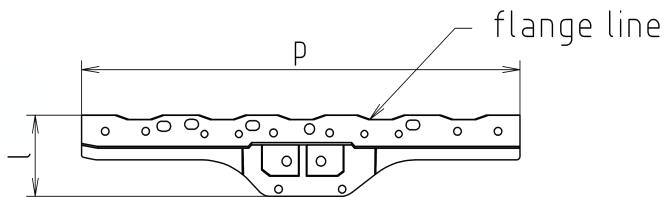
ALL DIE

AVERAGE STANDARD FOR PANEL SIZE VS DIE SIZE

5/10

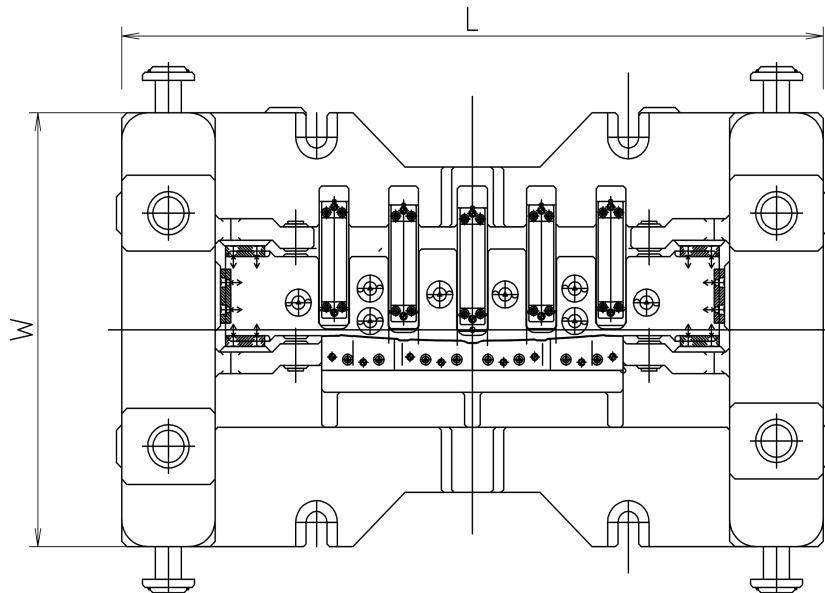
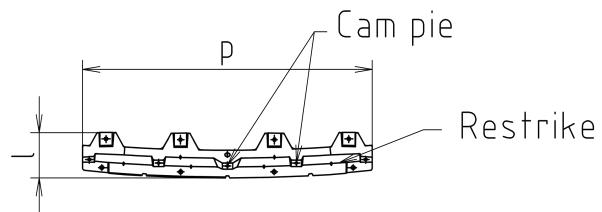
c. Flange

Die Length (L) = $p+500$
Die Width (W) = $l+450$



d. Cam pie

Die Length (L) = $p+800$
Die Width (W) = $l+700$



SYM	DATE	REVISION			REFERENCE	APPRV	CHECKED	DRAWN	ISSUED DATE
						AGUNG T	KHABIB M	BUDI	17-04-07

ENGINEERING STAMPING TOOLS DIV. - PT. MEKAR ARMADA JAYA

DIE DESIGN STANDARDS

APPLICATION

ALL DIE

AVERAGE STANDARD FOR PANEL SIZE VS DIE SIZE

6/10

- GANG PROCESS

a. Draw

$$\text{Die Length (L)} = p + 800$$

$$\text{Die Width (W)} = l + 600$$

Die Height (DH):

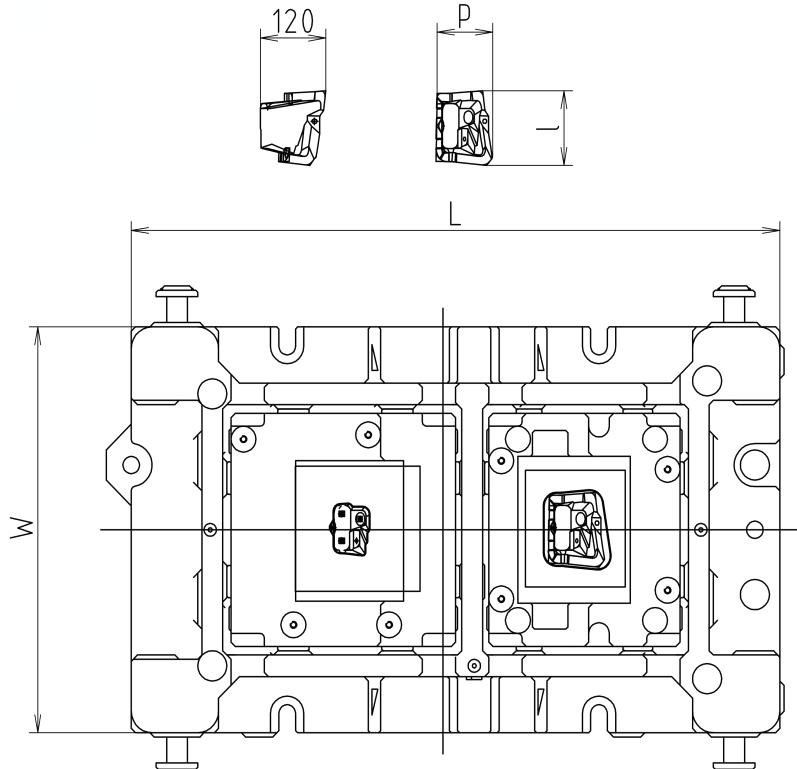
$$t < 40 \quad (\text{DH}) = 400$$

$$t 50 \sim 70 \quad (\text{DH}) = 500$$

$$t 80 \sim 100 \quad (\text{DH}) = 600$$

$$t 110 \sim 150 \quad (\text{DH}) = 700$$

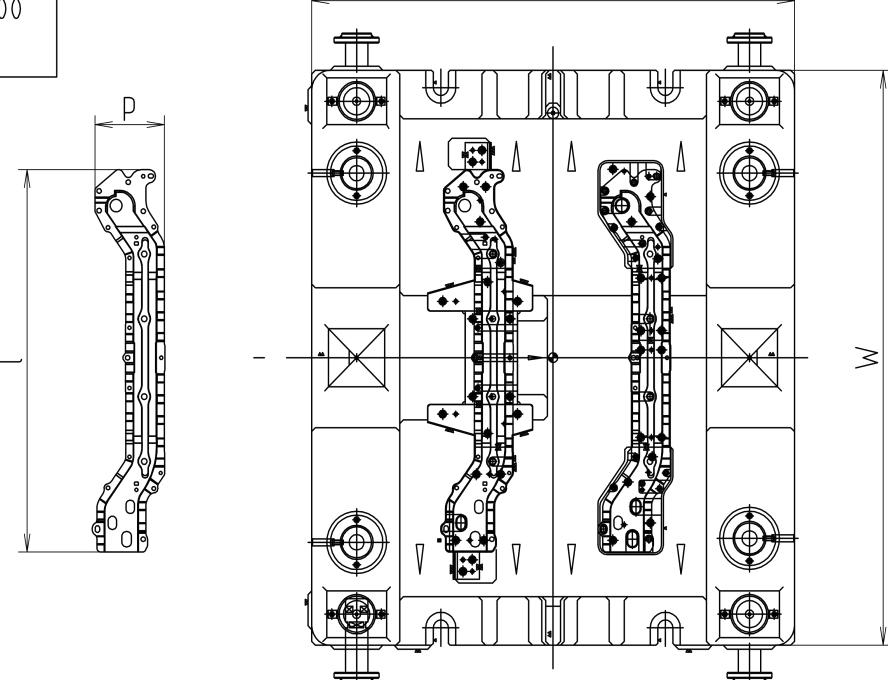
$$t 160 \sim 200 \quad (\text{DH}) = 800$$



b. Trim

$$\text{Die Length (L)} = p + 1200$$

$$\text{Die Width (W)} = l + 500$$



SYM	DATE	REVISION			REFERENCE	APPRV	CHECKED	DRAWN	ISSUED DATE
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ENGINEERING STAMPING TOOLS DIV. - PT. MEKAR ARMADA JAYA

DIE DESIGN STANDARDS

APPLICATION

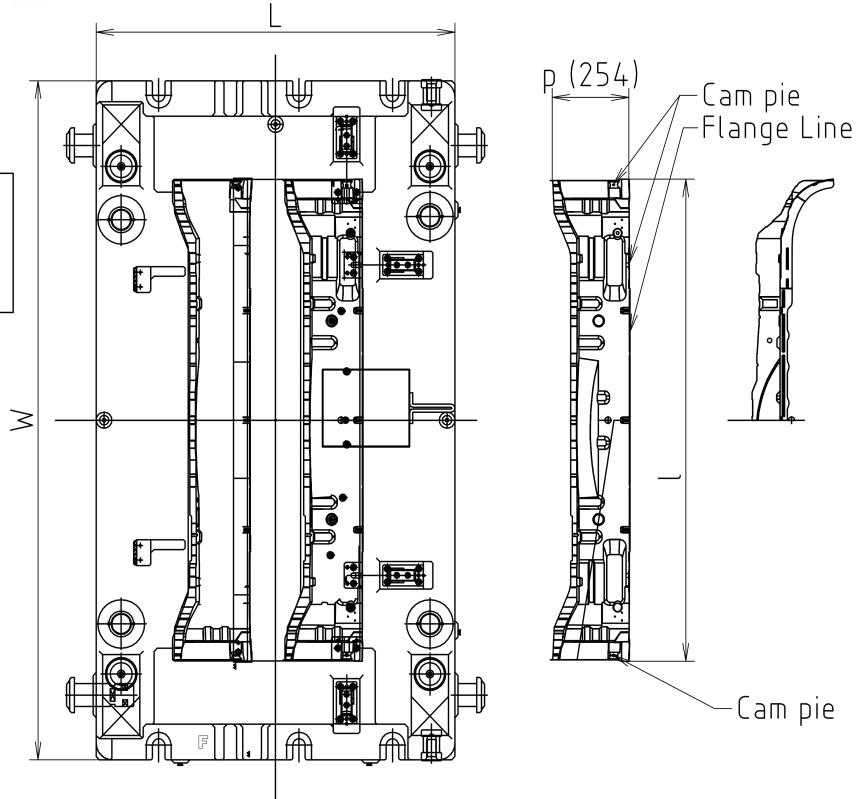
ALL DIE

AVERAGE STANDARD FOR PANEL SIZE VS DIE SIZE

7/10

c. Flange-Cam Pie

Die Length (L) = p+1000
Die Width (W) = l+650

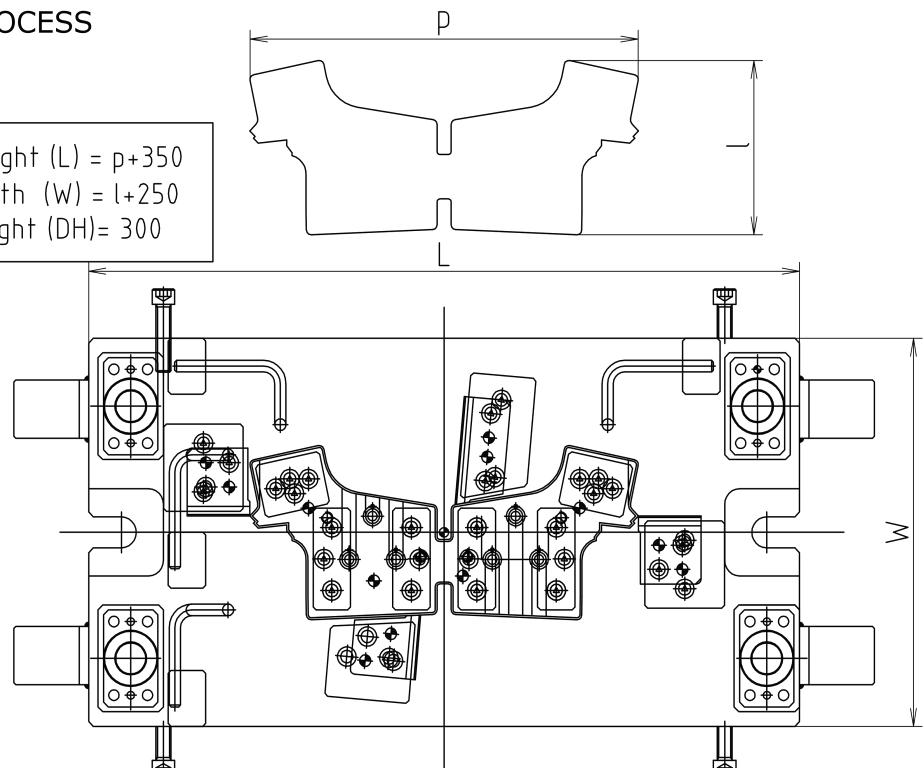


III. SMALL DIE (Upper & Lower tool made by Steel plate)

- SINGLE PROCESS

a. Blank

Die Length (L) = p+350
Die Width (W) = l+250
Die Height (DH)= 300



SYM	DATE	REVISION		REFERENCE	APPRV	CHECKED	DRAWN	ISSUED DATE
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ENGINEERING STAMPING TOOLS DIV. – PT. MEKAR ARMADA JAYA

DIE DESIGN STANDARDS

APPLICATION

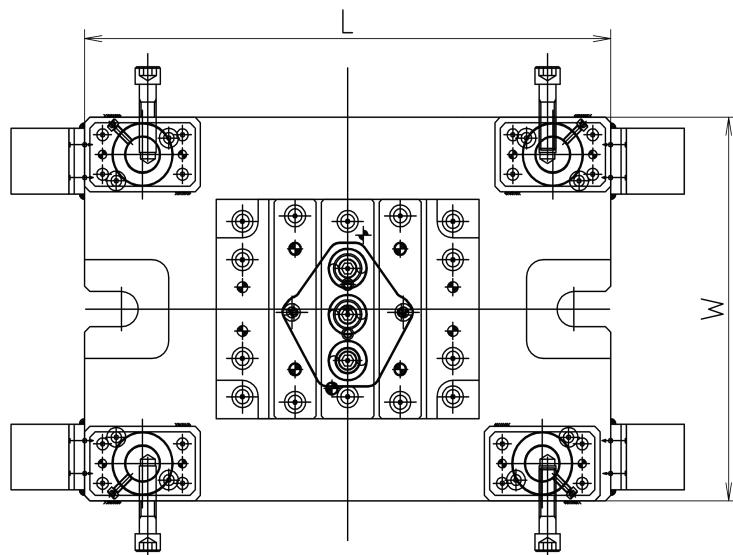
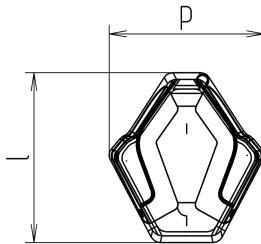
ALL DIE

AVERAGE STANDARD FOR PANEL SIZE VS DIE SIZE

8/10

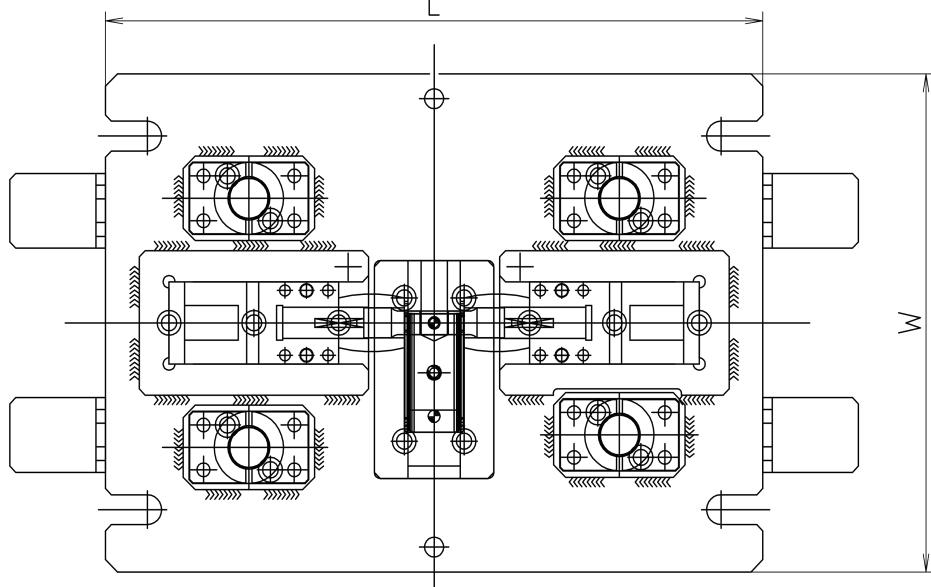
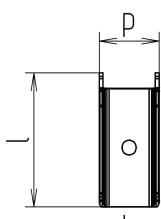
b. Forming

Die Length (L) = $p+350$
 Die Width (W) = $l+200$
 Die Height (DH)= 350



c. Cam Pie (Compact Cam)

Die Length (L) = $p+500$
 Die Width (W) = $l+300$
 Die Height (DH)= 350-500



SYM	DATE	REVISION			REFERENCE	APPRV	CHECKED	DRAWN	ISSUED DATE
						AGUNG T	KHABIB M	BUDI	17-04-07

ENGINEERING STAMPING TOOLS DIV. - PT. MEKAR ARMADA JAYA

DIE DESIGN STANDARDS

APPLICATION

ALL DIE

AVERAGE STANDARD FOR PANEL SIZE VS DIE SIZE

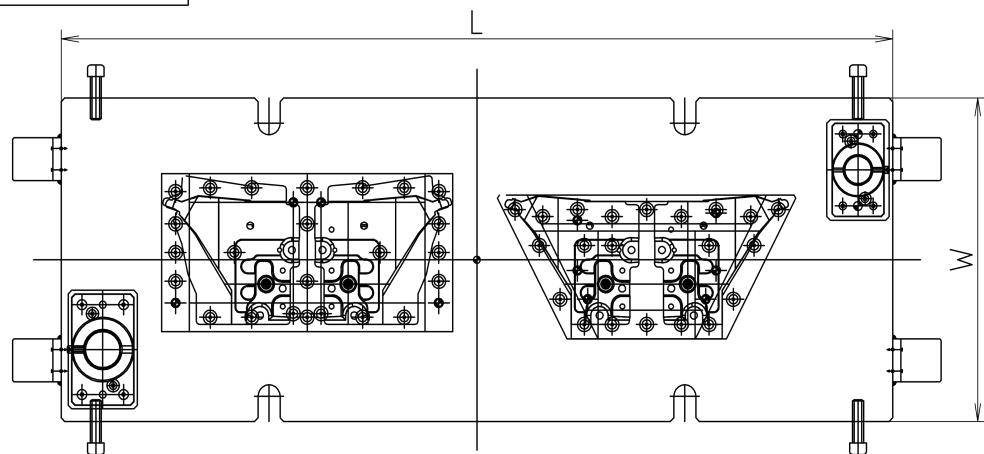
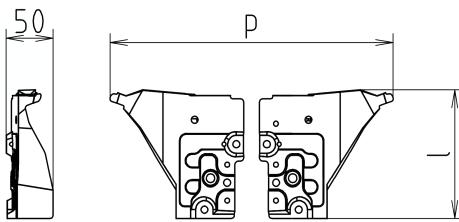
9/10

- PLURAL PROCESS

a. Gang Die

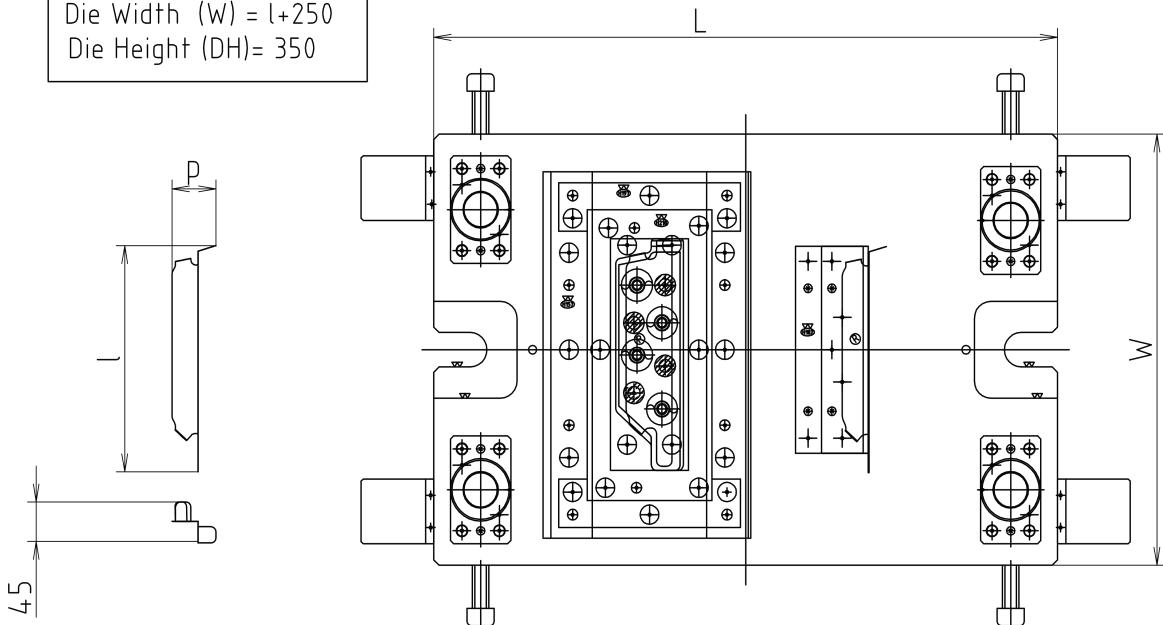
a.1. Form-Flange

Die Length (L) = $p+800$
 Die Width (W) = $l+250$
 Die Height (DH)= 550



b.2. Bend 1, Bend 2

Die Length (L) = $p+500$
 Die Width (W) = $l+250$
 Die Height (DH)= 350



SYM	DATE	REVISION			REFERENCE	APPRV	CHECKED	DRAWN	ISSUED DATE
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ENGINEERING STAMPING TOOLS DIV. - PT. MEKAR ARMADA JAYA

DIE DESIGN STANDARDS

APPLICATION

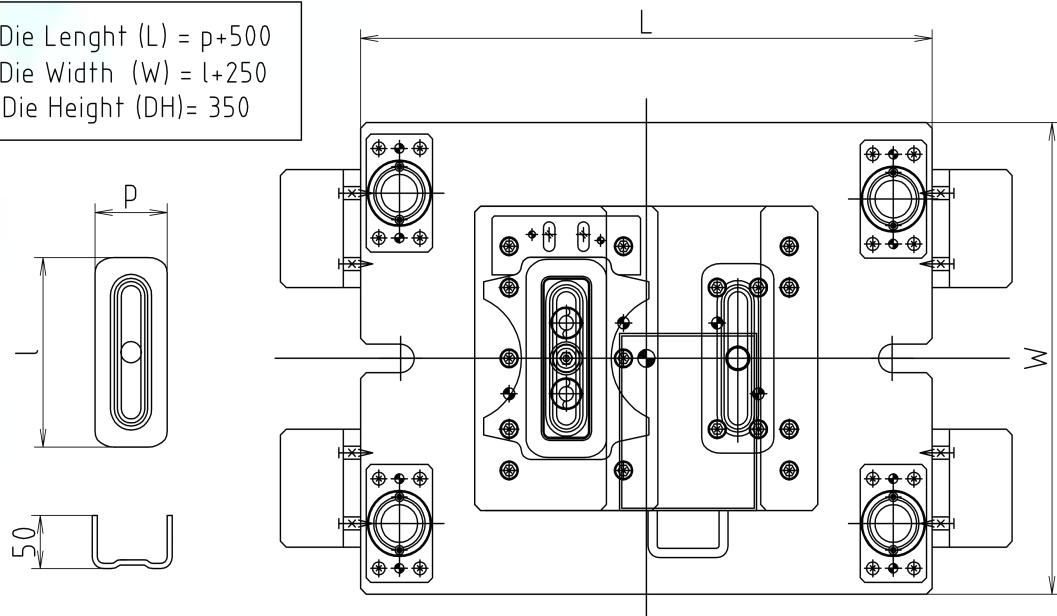
ALL DIE

AVERAGE STANDARD FOR PANEL SIZE VS DIE SIZE

10/10

c.3. Forming, Pie

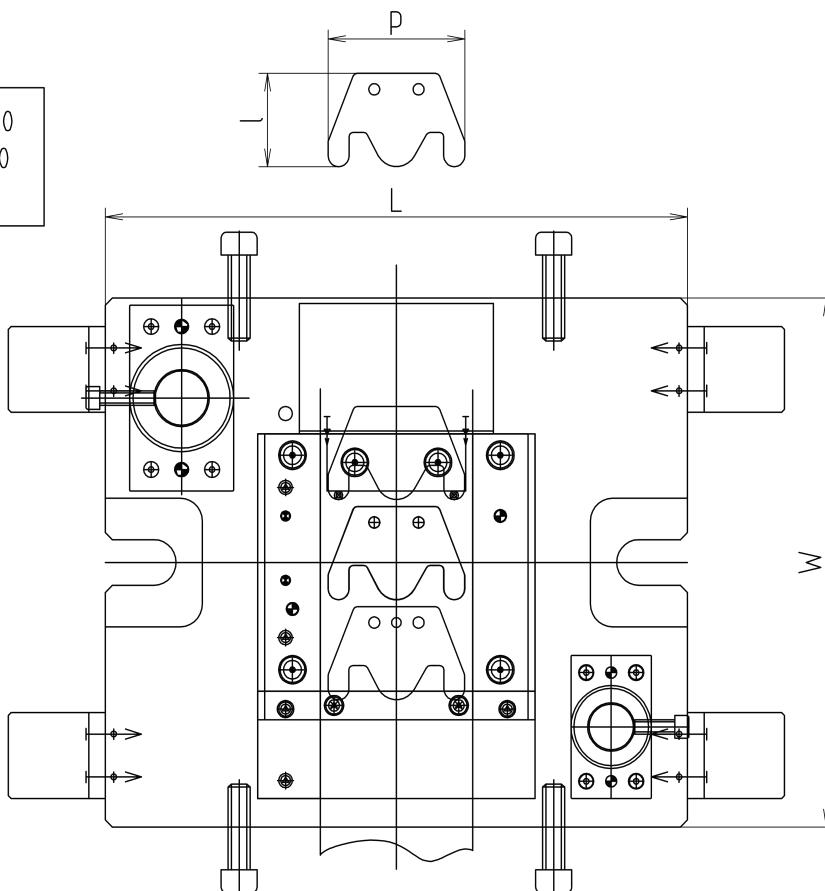
Die Length (L) = p+500
 Die Width (W) = l+250
 Die Height (DH)= 350



b. Progressive Die

Blank-Pie

Die Length (L) = p+350
 Die Width (W) = l+300
 Die Height (DH)= 350



SYM	DATE	REVISION			REFERENCE	APPRV	CHECKED	DRAWN	ISSUED DATE
						AGUNG T	KHABIB M	BUDI	17-04-07

ENGINEERING STAMPING TOOLS DIV. - PT. MEKAR ARMADA JAYA

DIE DESIGN STANDARDS

APPLICATION

ALL DIE

AVERAGE STANDARD FOR PANEL SIZE VS DIE SIZE

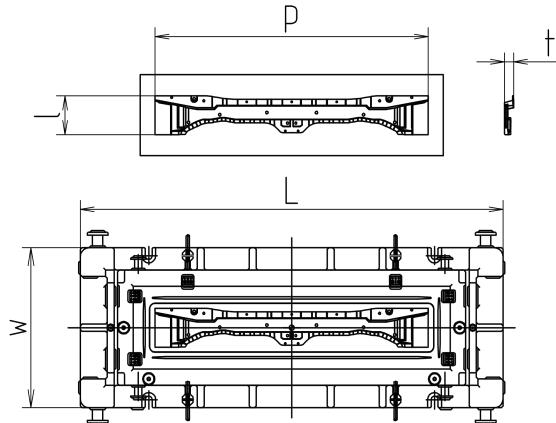
1/6

I. BIG DIE (Upper & Lower tool made by casting steel)

- SINGLE PROCESS

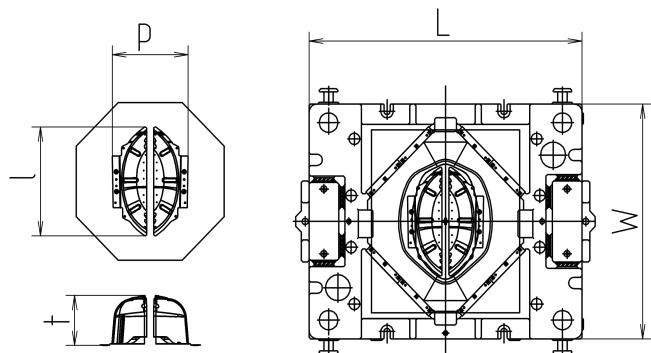
a. Draw

Die Length (L) = p+850
 Die Width (W) = l+650
 Die Height (DH):
 $t < 40 \quad (DH)= 400$
 $t 50 - 70 \quad (DH)= 500$
 $t 80 - 100 \quad (DH)= 600$
 $t 110 - 150 \quad (DH)= 700$
 $t 160 - 200 \quad (DH)= 800$



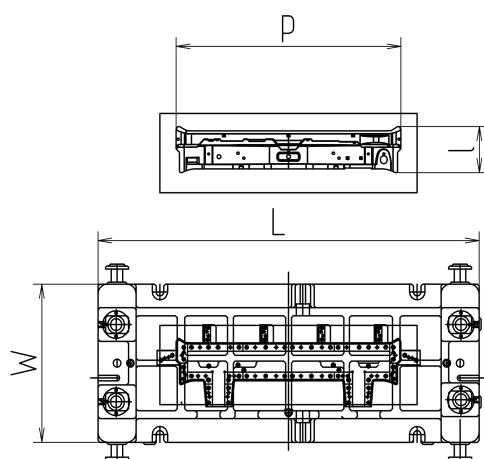
b. Deep Draw

Die Length (L) = p+1250
 Die Width (W) = l+800
 Die Height (DH):
 $t > 200 \quad (DH)= 1000$



c. Trim

Die Length (L) = p+800
 Die Width (W) = l+600



SYM	DATE	REVISION				REFERENCE	APPRV	CHECKED	DRAWN	ISSUED DATE
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ENGINEERING STAMPING TOOLS DIV. - PT. MEKAR ARMADA JAYA

DIE DESIGN STANDARDS

APPLICATION

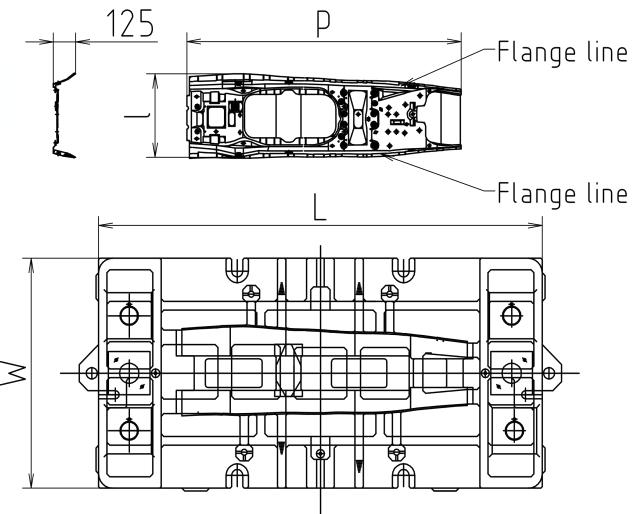
ALL DIE

AVERAGE STANDARD FOR PANEL SIZE VS DIE SIZE

2/6

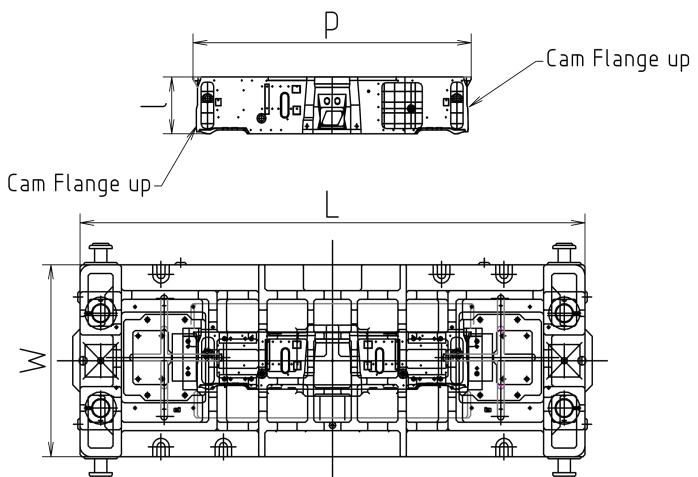
d. Flange

Die Length (L) = p+600
Die Width (W) = l+500



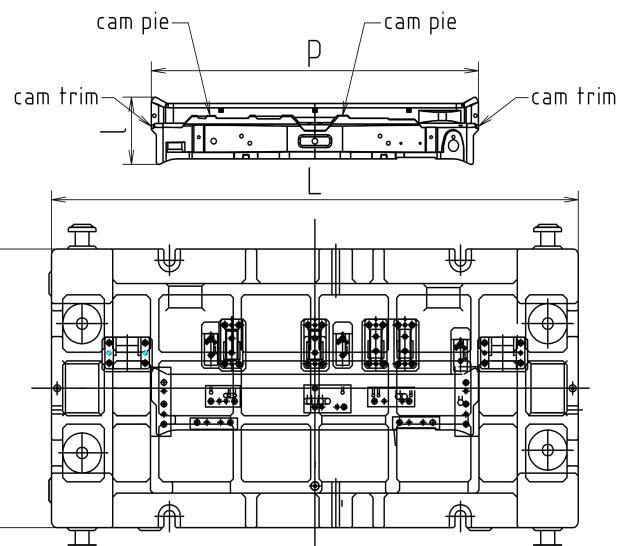
d. Cam Flange

Die Length (L) = p+1100
Die Width (W) = l+600



e. Cam Flange

Die Length (L) = p+750
Die Width (W) = l+950



SYM	DATE	REVISION			REFERENCE	APPRV	CHECKED	DRAWN	ISSUED DATE
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ENGINEERING STAMPING TOOLS DIV. - PT. MEKAR ARMADA JAYA

DIE DESIGN STANDARDS	APPLICATION	ALL DIE
AVERAGE STANDARD FOR PANEL SIZE VS DIE SIZE		3/6

II. MEDIUM DIE

- SINGLE PROCESS

a. Draw

Die Length (L) = p+800

Die Width (W) = l+600

Die Height (DH):

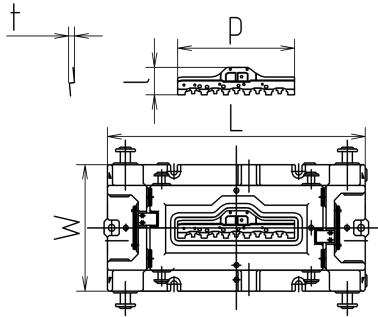
$t < 40$ (DH)= 400

$t 50 - 80$ (DH)= 500

$t 90 - 100$ (DH)= 600

$t 110 - 150$ (DH)= 700

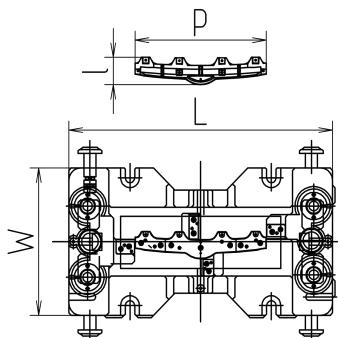
$t 160 - 200$ (DH)= 800



b. Trim

Die Length (L) = p+600

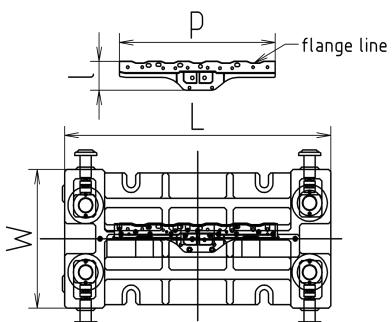
Die Width (W) = l+500



c. Flange

Die Length (L) = p+500

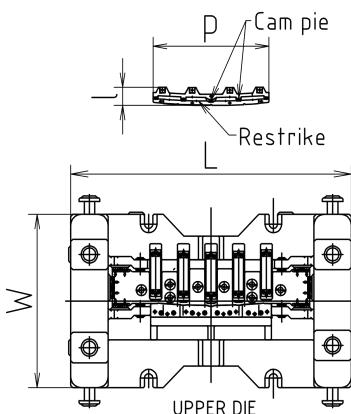
Die Width (W) = l+450



d. Cam pie

Die Length (L) = p+800

Die Width (W) = l+700



SYM	DATE	REVISION			REFERENCE	APPRV	CHECKED	DRAWN	ISSUED DATE
						AGUNG T	KHABIB M	BUDI	23-01-2008

ENGINEERING STAMPING TOOLS DIV. - PT. MEKAR ARMADA JAYA

DIE DESIGN STANDARDS

APPLICATION

ALL DIE

AVERAGE STANDARD FOR PANEL SIZE VS DIE SIZE

4/6

- GANG PROCESS

a. Draw

Die Length (L) = p+800

Die Width (W) = l+600

Die Height (DH):

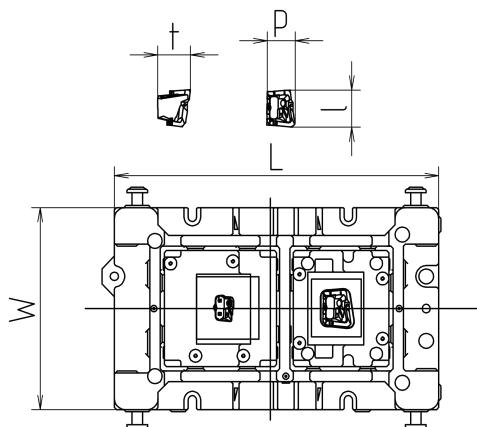
t < 40 (DH)= 400

t 50~70 (DH)= 500

t 80~100 (DH)= 600

t 110~150 (DH)= 700

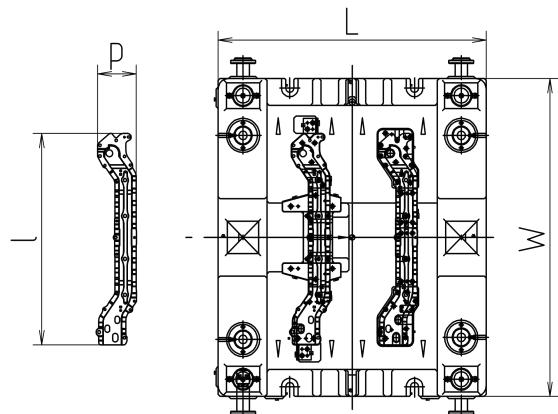
t 160~200 (DH)= 800



b. Trim

Die Length (L) = p+1200

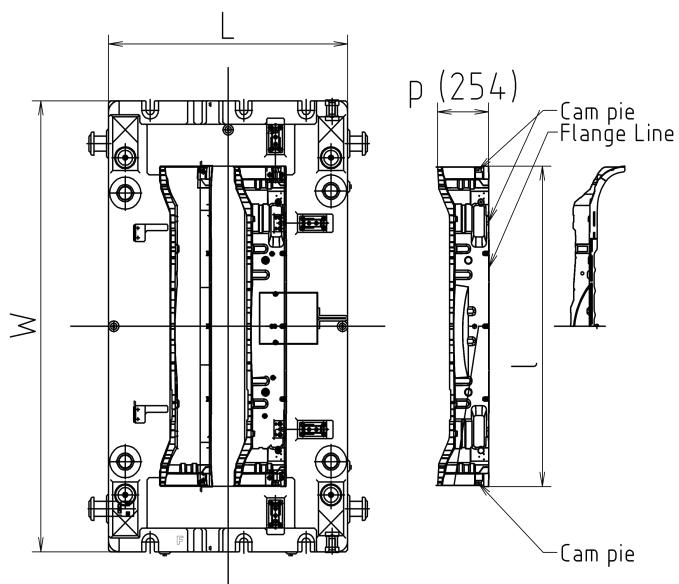
Die Width (W) = l+500



c. Flange-Cam Pie

Die Length (L) = p+1000

Die Width (W) = l+650



SYM	DATE	REVISION			REFERENCE	APPRV	CHECKED	DRAWN	ISSUED DATE
						AGUNG T	KHABIB M	BUDI	23-01-2008

ENGINEERING STAMPING TOOLS DIV. – PT. MEKAR ARMADA JAYA

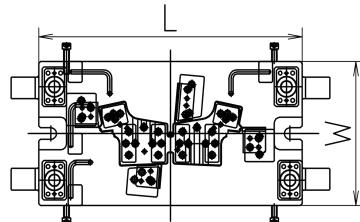
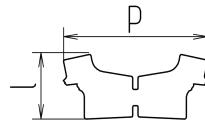
DIE DESIGN STANDARDS	APPLICATION	ALL DIE
AVERAGE STANDARD FOR PANEL SIZE VS DIE SIZE		5/6

III. SMALL DIE (Upper & Lower tool made by Steel plate)

- SINGLE PROCESS

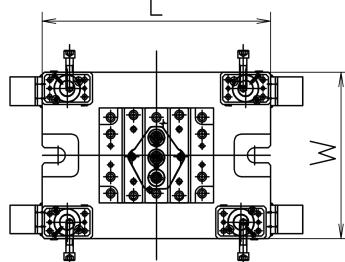
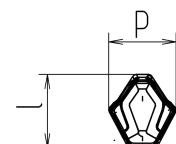
a. Blank

Die Length (L) = p+350
 Die Width (W) = l+250
 Die Height (DH)= 300



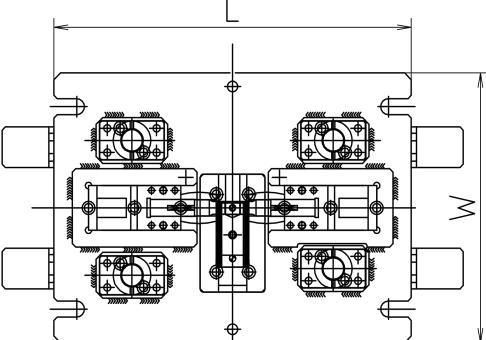
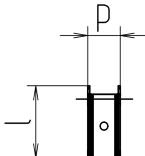
b. Forming

Die Length (L) = p+350
 Die Width (W) = l+200
 Die Height (DH)= 350



c. Cam Pie (Compact Cam)

Die Length (L) = p+500
 Die Width (W) = l+300
 Die Height (DH)= 350-500



SYM	DATE	REVISION			REFERENCE	APPRV	CHECKED	DRAWN	ISSUED DATE
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ENGINEERING STAMPING TOOLS DIV. - PT. MEKAR ARMADA JAYA

DIE DESIGN STANDARDS

APPLICATION

ALL DIE

AVERAGE STANDARD FOR PANEL SIZE VS DIE SIZE

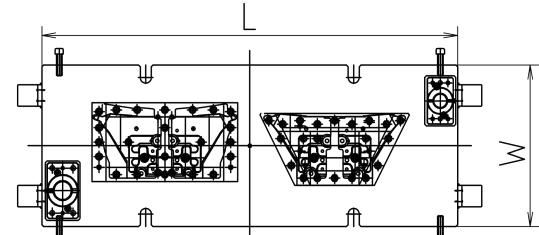
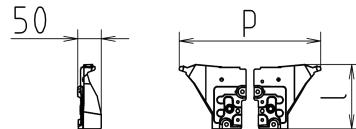
6/6

- PLURAL PROCESS

a. Gang Die

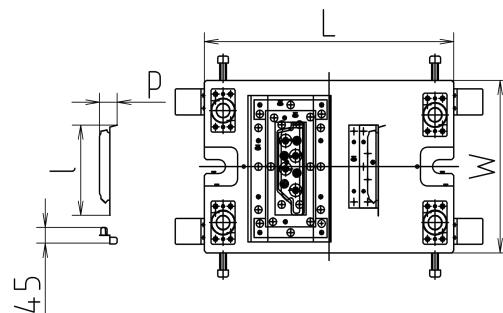
a.1. Form-Flange

Die Length (L) = $p+800$
 Die Width (W) = $l+250$
 Die Height (DH)= 550



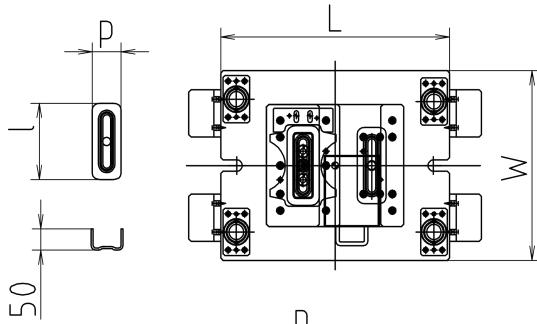
b.2. Bend 1, Bend 2

Die Length (L) = $p+500$
 Die Width (W) = $l+250$
 Die Height (DH)= 350



c.3. Forming, Pie

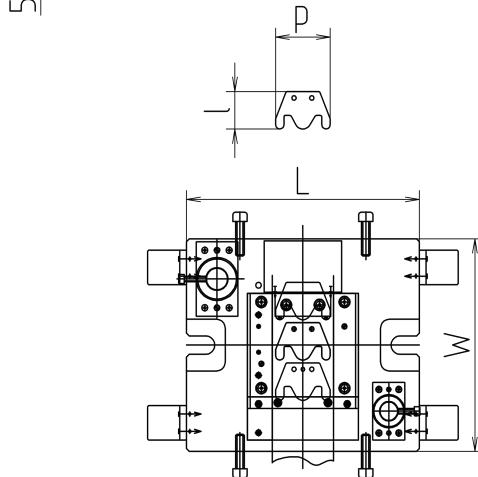
Die Length (L) = $p+500$
 Die Width (W) = $l+250$
 Die Height (DH)= 350



b. Progressive Die

Blank-Pie

Die Length (L) = $p+350$
 Die Width (W) = $l+300$
 Die Height (DH)= 350



SYM	DATE	REVISION			REFERENCE	APPRV	CHECKED	DRAWN	ISSUED DATE
						AGUNG T	KHABIB M	BUDI	23-01-2008

DIE DESIGN STANDARDS

APPLICATION

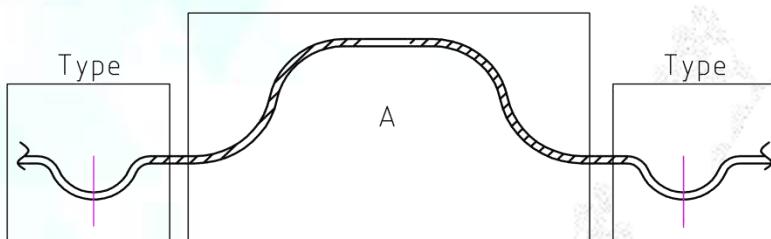
DIE DRAW

STANDARD BEAD FOR DIE DRAW

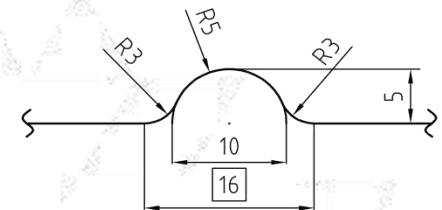
1/1

I. STANDARD BEAD (PROCESS DRAW ONLY)

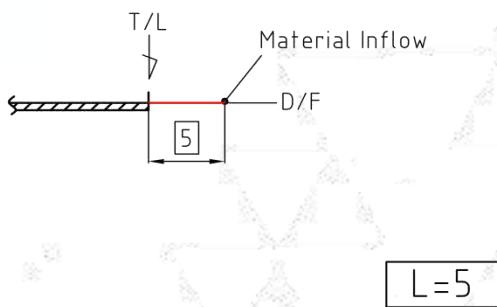
Illustrasi



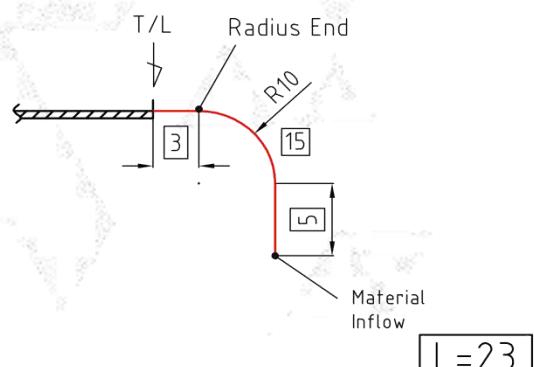
Way of thinking for Bead



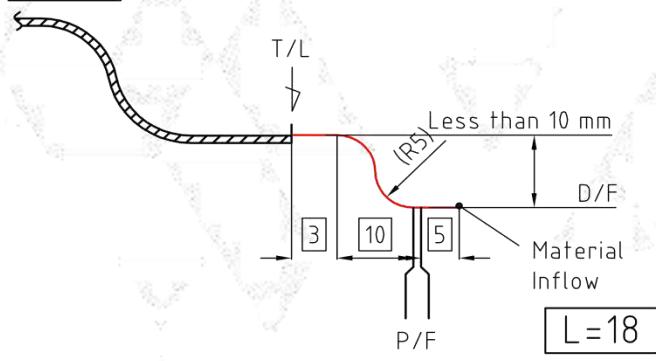
Type A



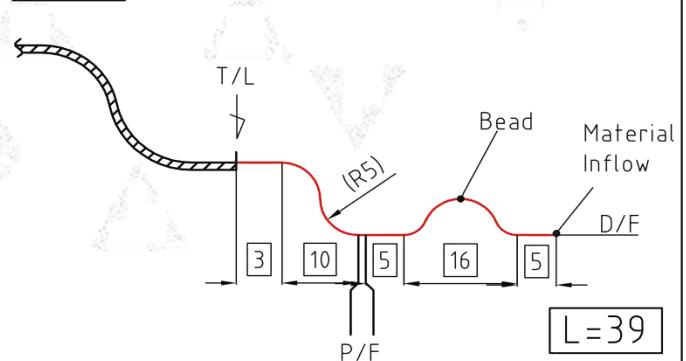
Type B



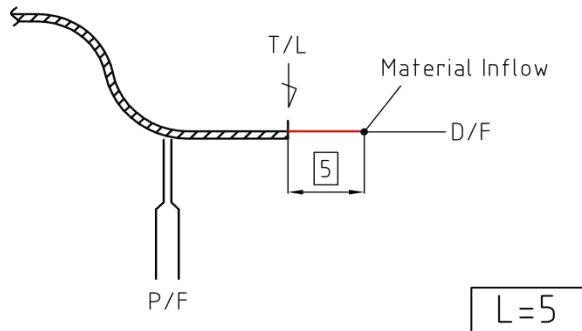
Type C



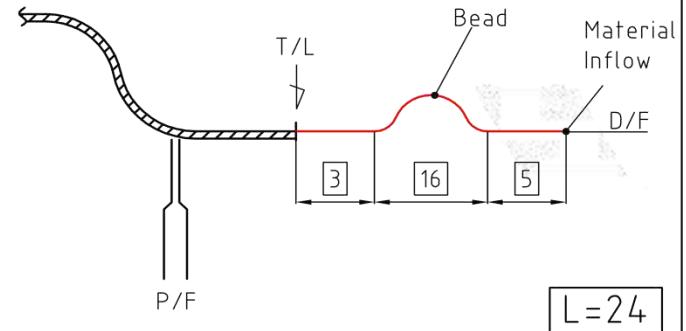
Type D



Type E



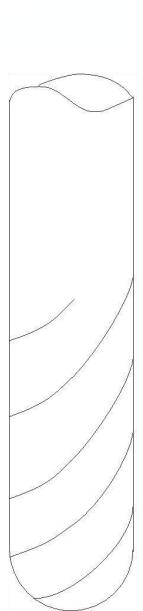
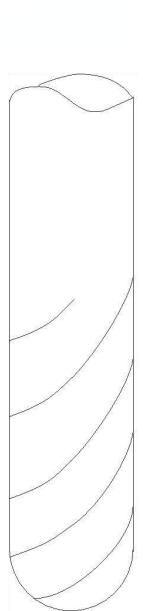
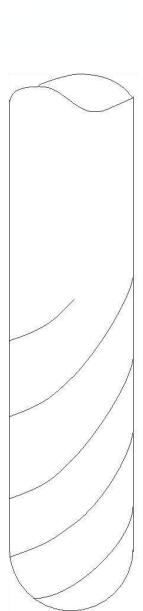
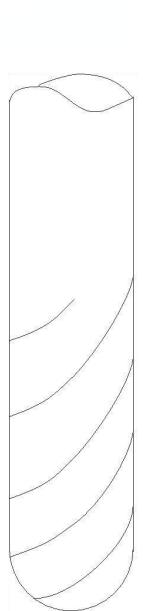
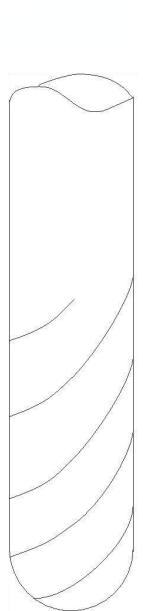
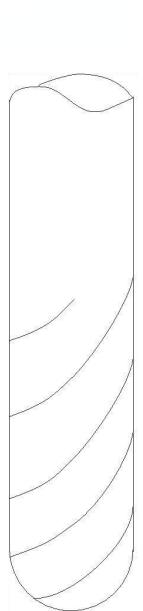
Type F



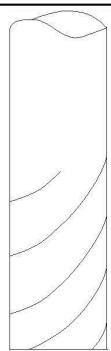
SYM	DATE	REVISION			REFERENCE	APPRV	CHECKED	DRAWN	ISSUED DATE
						W. NUGROHO	RULLY	NOVAN	15-12-2017

1.8. CAD/CAM STANDAR

Tabel 4. MACHINING CONTOUR

NO	PROGRAM	TOOL Ballnose	Spindle Speed	Feed Rate	Stock	Tolerance	
1.	Custome Test		Ø 50	700	300	2	0.1
			Ø 40	850			
			Ø 32	1000			
2.	Contouring		Ø 50	700	300	2	0.1
			Ø 40	850			
			Ø 32	1000			
3.	Roughing		Ø 50	700	300	1	0.1
			Ø 40	850			
			Ø 32	1000			
4.	Pencil		Ø 50	700	300	0.5	0.05
			Ø 40	850			
			Ø 32	1000			
5.	Semi finish		Ø 30	1100	400	0.3	0
6.	Test finish		Ø 30				
7.	Finishing		Ø 30				
8.	Pencil		Ø 20	1600	200	0.1	0.03
			Ø 16				
			Ø 12				
			Ø 10	900	200	0	0
			Ø 8				
			Ø 6				

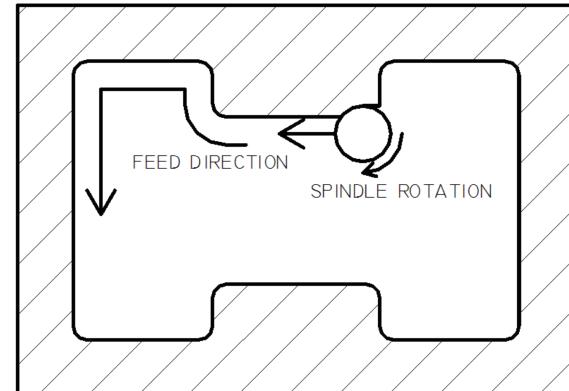
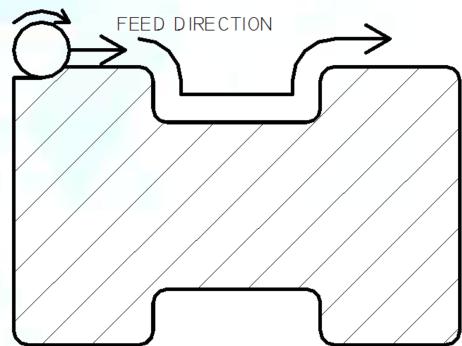
Tabel 5. MACHINING PROFILE

NO	PROGRAM	TOOL Spiral	Spindle Speed	Feed Rate	Stock		
					Die Trim	All except trim	
1.	Roughing		Ø 80	400	300	0.2	
			Ø 63				
			Ø 25				
2.	Finishing		Ø 20	800	400	0	
			Ø 16				
			Ø 12				
3.	Pencil		Ø 10	900	200	0	
			Ø 8				
			Ø 6				

Tabel 6. ARAH MACHINING/ FEED DIRECTION HARUS BENAR

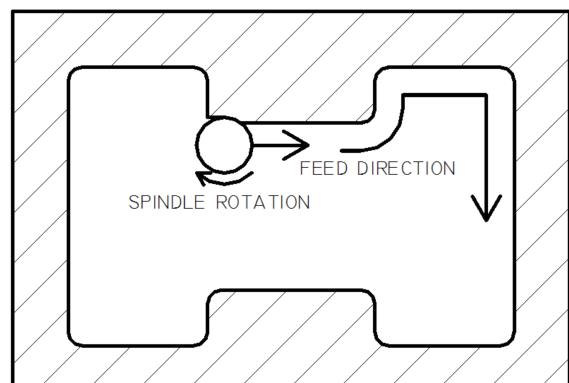
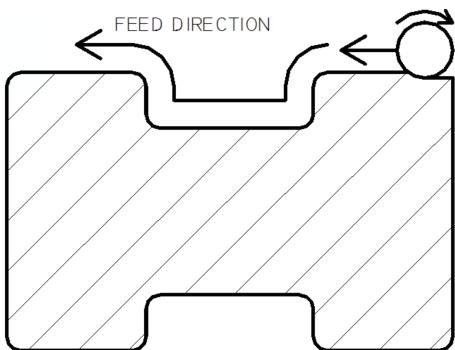
* ROUGHING → CLIMB

SPINDLE ROTATION

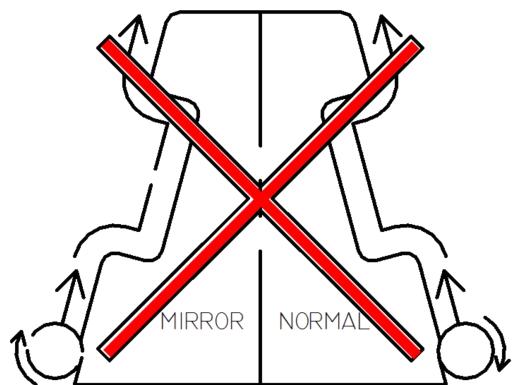


* FINISHING/ PENCIL → CONVENTIONAL

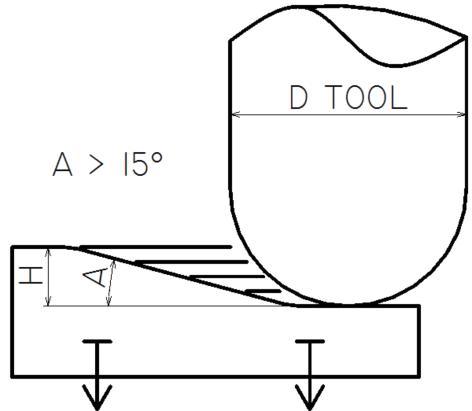
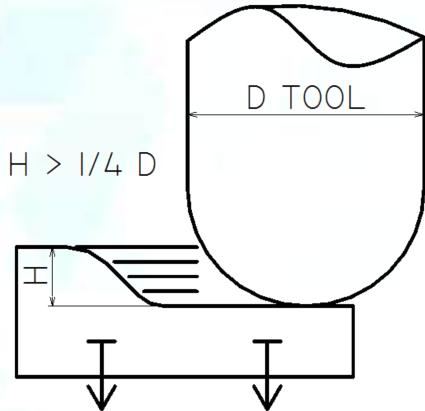
SPINDLE ROTATION



TIDAK DILAKUKAN
MIRROR PROGRAM PROFILE
UNTUK DATA SIMETRIS

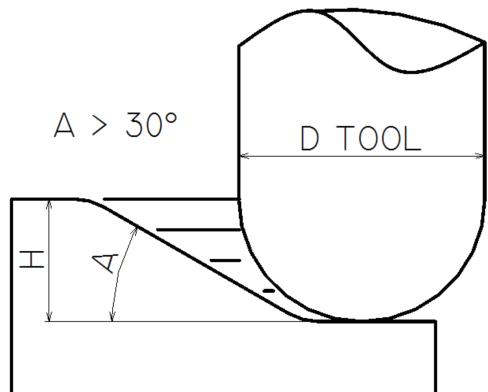
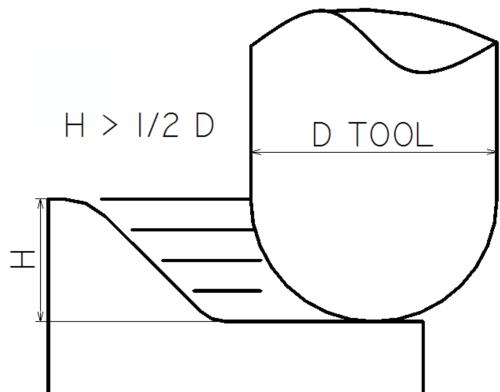


* MATERIAL STEEL HARUS DILAKUKAN CONTOURING LEBIH DAHULU



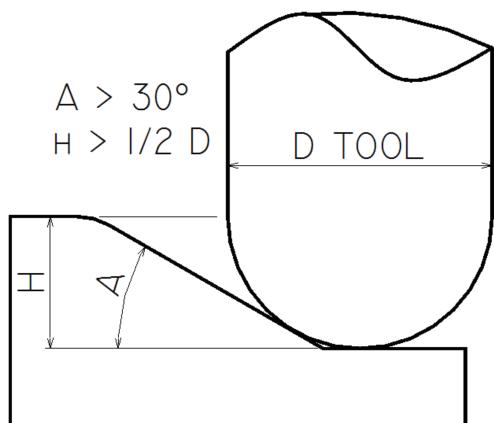
LEVEL PEMAKANAN: MAX 5 mm/ LEVEL

* MATERIAL CASTING TANPA MACHINING PATTERN,
HARUS DILAKUKAN CONTOURING LEBIH DAHULU

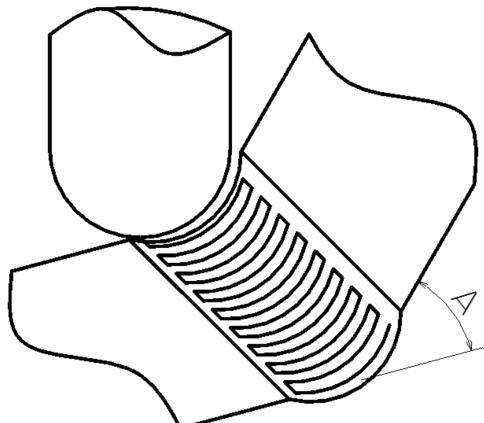


LEVEL PEMAKANAN: MAX 8 mm/ LEVEL

BIDANG KEMIRINGAN 30 °
HARUS DILAKUKAN PENCIL



APABILA PENCIL TIDAK MEMUNGKINKAN,
HARUS DISIAPKAN FINISHING SETEMPAT



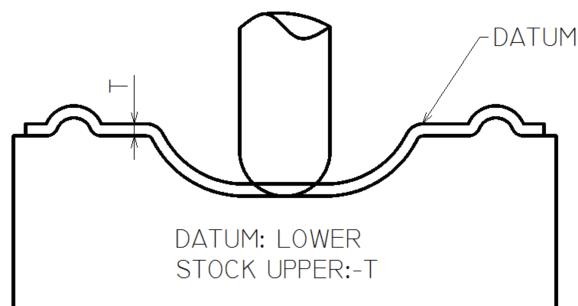
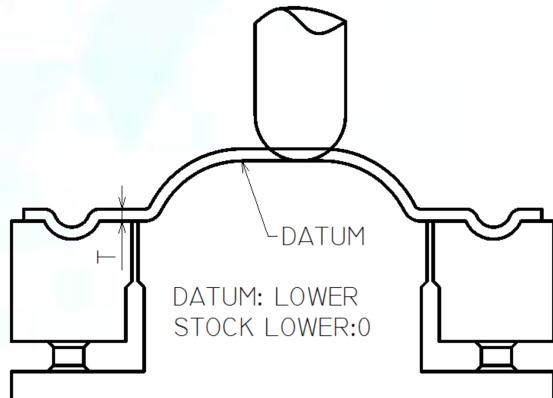
Tabel 7. DATUM SURFACE HARUS JELAS

* DATUM LOWER:

TARGET FINISH LOWER: STOCK 0
TARGET FINISH UPPER: STOCK -T

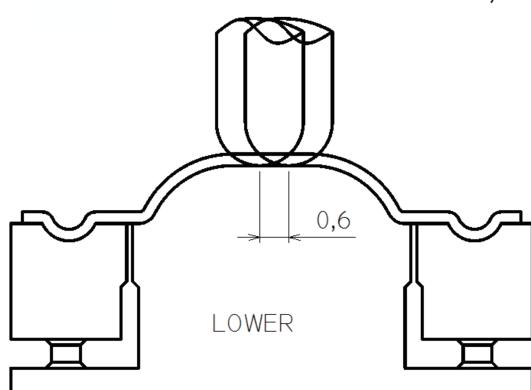
* DATUM UPPER:

TARGET FINISH LOWER: STOCK -T
TARGET FINISH UPPER: STOCK 0

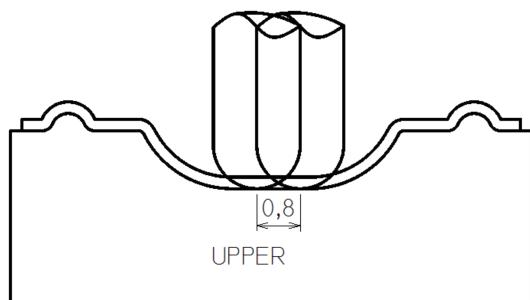


TARGET FINISHING

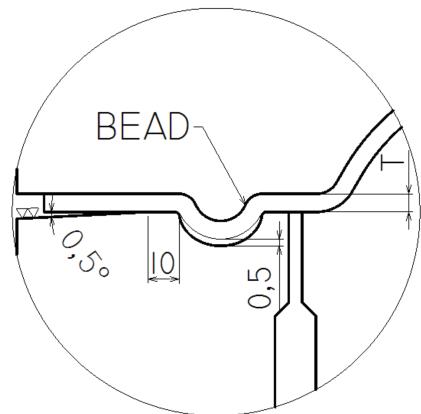
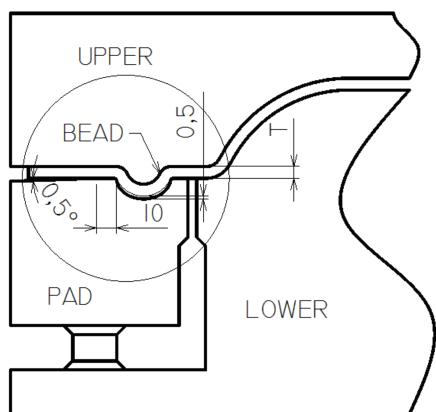
* LOWER: PITCH/ DISTANCE 0,6



* UPPER: PITCH/ DISTANCE 0,8



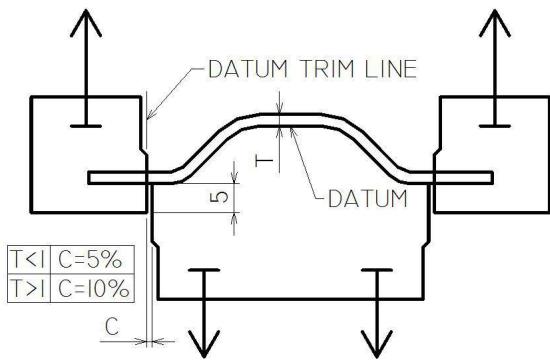
AREA PAD DI LUAR BEAD DIBUAT NIGASI



Tabel 8. TARGET STOCK FINISH

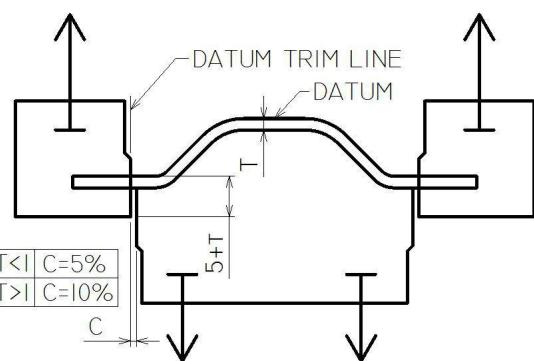
DATUM SURFACE: LOWER DIE

- * Contour lower finish: Stock 0
- * Contour upper finish: Stock 5



DATUM SURFACE: UPPER DIE

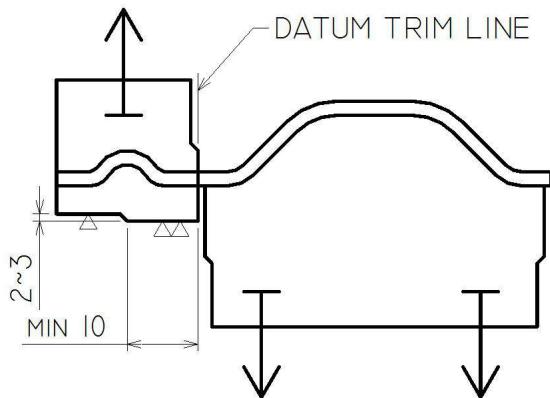
- * Contour lower finish: Stock -T
- * Contour upper finish: Stock 5+T



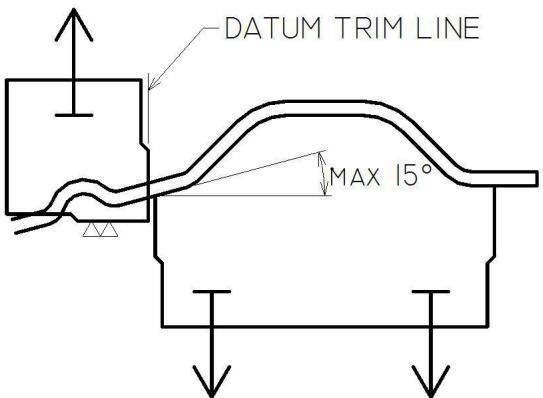
PROFILE LOWER FINISH: -7% T

PROFILE UPPER FINISH: 0

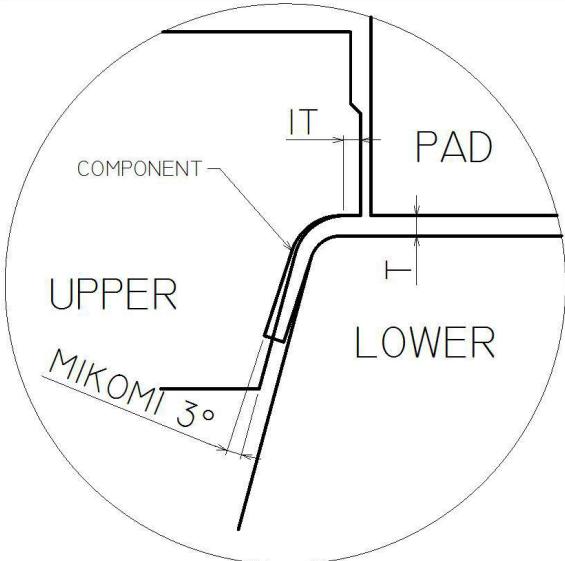
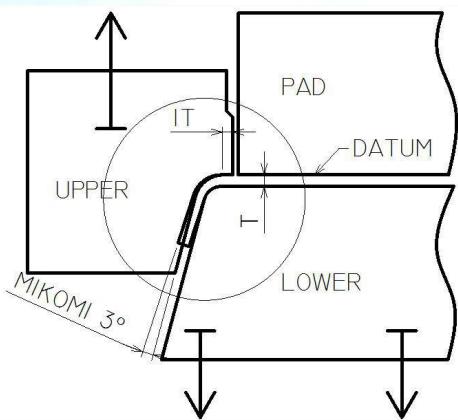
AREA UPPER DIE DI LUAR TRIM LINE
HARUS DIBEBASKAN
(KECUALI AREA SCRAP CUTTER)



SISI POTONG UPPER DIE HARUS
DIBUAT DATAR
(KECUALI AREA SCRAP CUTTER)



Tabel 9. TARGET FLANGE
AREA FLANGE DIBUAT MIKOMI



AREA FLANGE TEGAK (90°),
CLEARANCE AREA FLANGE DIPERKECIL

