

**LAMPIRAN 1**  
**TABEL DATA MATERIAL, *CUTTING SPEED*, DAN KECEPATAN**  
***SPINDLE* MESIN BUBUT**

## LAMPIRAN 1

**TABEL DATA MATERIAL, *CUTTING SPEED*, DAN KECEPATAN  
*SPINDLE* MESIN BUBUT**

MATERIAL	STRAIGHT TURNING SPEED		THREADING SPEED	
	FEET PER MINUTE	METERS PER MINUTE	FEET PER MINUTE	METERS PER MINUTE
LOW-CARBON STEEL	80-100	24.4-30.5	35-40	10.7-12.2
MEDIUM-CARBON STEEL	60-80	18.3-24.4	25-30	7.6-9.1
HIGH-CARBON STEEL	35-40	10.7-12.2	15-20	4.6-6.1
STAINLESS STEEL	40-50	12.2-15.2	15-20	4.6-6.1
ALUMINUM AND ITS ALLOYS	200-300	61.0-91.4	50-60	15.2-18.3
ORDINARY BRASS AND BRONZE	100-200	30.5-61.0	40-50	12.2-15.2
HIGH-TENSILE BRONZE	40-60	12.2-18.3	20-25	6.1-7.6
CAST IRON	50-80	15.2-24.4	20-25	6.1-7.6
COPPER	60-80	18.3-24.4	20-25	6.1-7.6

NOTE: Speeds for carbide-tipped bits can be 2 to 3 times the speed recommended for high-speed steel

Bahan	Pahat Bubut HSS		Pahat Bubut Karbida	
	m/men	Ft/min	M/men	Ft/min
Baja lunak ( <i>Mild Steel</i> )	18 – 21	60 – 70	30 – 250	100 – 800
Besi Tuang ( <i>Cast Iron</i> )	14 – 17	45 – 55	45 - 150	150 – 500
Perunggu	21 – 24	70 – 80	90 – 200	300 – 700
Tembaga	45 – 90	150 – 300	150 – 450	500 – 1500
Kuningan	30 – 120	100 – 400	120 – 300	400 – 1000
Aluminium	90 - 150	300 - 500	90 - 180	b. – 600

Gambar 1A Tabel data material dan *cutting speed* mesin bubut (Widarto, 2008)

LONGITUDINAL FEED					TRANSVERSE FEED				
D	M				D	M			
	D	E	F	G		D	E	F	G
1	0.044	0.088	0.176	0.352	1	0.020	0.039	0.079	0.158
2	0.050	0.099	0.198	0.396	2	0.022	0.044	0.089	0.178
3	0.052	0.105	0.210	0.420	3	0.023	0.047	0.094	0.188
4	0.055	0.110	0.220	0.440	4	0.024	0.049	0.098	0.196
5	0.060	0.121	0.242	0.484	5	0.027	0.054	0.109	0.218
6	0.063	0.127	0.254	0.508	6	0.028	0.057	0.114	0.228
7	0.066	0.132	0.264	0.528	7	0.029	0.059	0.118	0.236
8	0.072	0.144	0.287	0.574	8	0.032	0.064	0.128	0.256
9	0.075	0.149	0.298	0.596	9	0.033	0.067	0.134	0.268
10	0.077	0.154	0.308	0.616	10	0.034	0.069	0.138	0.276
11	0.083	0.166	0.331	0.662	11	0.037	0.074	0.148	0.296

Gambar 2A Tabel pemakanan mesin bubut



Gambar 3A Kecepatan *spindle* mesin bubut

**LAMPIRAN 2**  
**TABEL DATA MATERIAL, *CUTTING SPEED*, DAN KECEPATAN**  
***SPINDLE* MESIN GURDI**

## LAMPIRAN 2

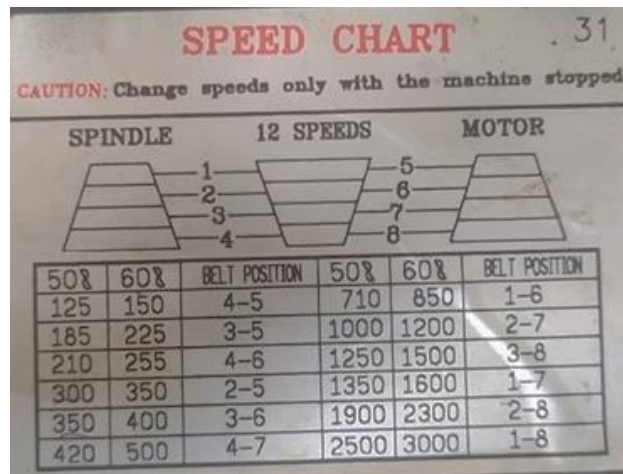
### TABEL DATA MATERIAL, CUTTING SPEED, DAN KECEPATAN SPINDLE MESIN GURDI

MATERIAL	CUTTING SPEEDS 1.		POINT ANGLE	LIP CLEARANCE	COOLANTS
	(METERS/MINUTE) MPM	(FEET/MINUTE) FPM			
Aluminum And Alloys	61.00 - 91.50	200 - 300	90 - 130 deg	12 - 15 deg	Kerosene/Kerosene & Lard Oil/ Soluble Oil
Armor Plate	12.20 - 18.25	40 - 50	135 - 140 deg	6 - 9 deg	Light Machine Oil
Brass	61.00 - 91.50	200 - 300	118 - 118 deg	12 - 15 deg	Dry/ Soluble Oil/Kerosene/Lard Oil
Bronze	61.00 - 91.50	200 - 300	110 - 118 deg	12 - 15 deg	Dry/ Soluble Oil/Mineral Oil/Lard Oil
Bronze, High Tensile	21.35 - 45.75	70 - 150	100 - 110 deg	12 - 15 deg	Dry/ Soluble Oil/Mineral Oil/Lard Oil
Cast Iron, Soft	30.50 - 45.75	100 - 150	90 - 100 deg	12 - 15 deg	Air Jet Dry/ Soluble Oil
Cast Iron, Medium	21.35 - 30.50	70 - 100	100 - 110 deg	12 - 15 deg	Air Jet Dry/ Soluble Oil
Cast Iron, Hard	21.35 - 30.50	70 - 100	100 - 118 deg	8 - 12 deg	Air Jet Dry/ Soluble Oil
Cast Iron, Chilled	9.15 - 12.20	30 - 40	118 - 135 deg	5 - 9 deg	Air Jet Dry/ Soluble Oil
Copper	61.00 - 91.50	200 - 300	100 - 118 deg	12 - 15 deg	Air Jet Dry/ Soluble Oil
Copper Graphite Alloy (Carbon Drills)	18.30 - 21.35	60 - 70	**_**	**_**	Soluble Oil/Dry/Mineral Oil/Kerosene
Glass (Carbon Drills)	6.10 - 9.15	20 - 30	**_**	**_**	Soluble Oil/Dry/Mineral Oil/Kerosene
Iron, Malleable	15.25 - 27.45	50 - 90	90 - 100 deg	12 - 15 deg	Light Machine Oil
Magnesium And Alloys	76.25 - 122.0	250 - 400	70 - 118 deg	12 - 15 deg	Soluble Oil
Monel Nickel	4.15 - 15.28	30 - 50	118 - 125 deg	10 - 12 deg	Compressed Air/Mineral Oil
Nickel Alloys	12.20 - 18.30	40 - 60	135 - 140 deg	5 - 7 deg	Lard Oil/Soluble Oil
Plastic, Hot Set	30.50 - 91.50	100 - 300	60 - 90 deg	10 - 12 deg	Lard Oil/Soluble Oil
Plastic, Cold Set	30.50 - 91.50	100 - 300	118 - 135 deg	12 - 20 deg	Soap Solution
Steel, Low Carbon, 0.2-0.3ct	24.40 - 33.55	80 - 110	110 - 118 deg	7 - 9 deg	Soap Solution
Steel, Medium Carbon 0.4-0.5c	21.35 - 24.40	70 - 80	118 - 125 deg	7 - 9 deg	Soluble Oil/Mineral Oil/Sulfur Oil/Lard Oil
Steel (High Carbon 1.2c)	15.25 - 18.30	50 - 60	118 - 145 deg	7 - 9 deg	Soluble Oil/Mineral Oil/Sulfur Oil/Lard Oil
Steel, Forged	15.25 - 18.30	50 - 60	118 - 145 deg	7 - 12 deg	Soluble Oil/Mineral Oil/Sulfur Oil/Lard Oil
Steel, Alloy	15.25 - 21.35	50 - 70	118 - 125 deg	10 - 12 deg	Mineral Lard Oil
Steel, Alloy 300 To 400 Brinell	6.10 - 9.15	20 - 30	130 - 140 deg	7 - 10 deg	Soluble Oil
Steel, Stainless, Free Machining	9.15 - 24.40	30 - 80	110 - 118 deg	8 - 12 deg	Soluble Oil
Steel, Stainless, Hard	4.57 - 15.25	15 - 50	118 - 135 deg	6 - 8 deg	Soluble Oil
Steel, Manganese	3.66 - 4.57	12 - 15	140 - 150 deg	7 - 10 deg	Soluble Oil
Stone (Carbide Drills)	7.63 - 9.15	25 - 30	**_**	**_**	Water Solution
Wood	91.50 - 122.2	300 - 400	60 - 70 deg	10 - 15 deg	Dry

MATERIAL	CUTTING SPEED (sfpm) 2			
	PLAIN MILLING CUTTERS		END MILLING CUTTERS	
	Roughing	Finishing	Roughing	Finishing
Aluminum .....	400 to 1,000	400 to 1,000	400 to 1,000	400 to 1,000
Brass, composition .....	125 to 200	90 to 200	90 to 150	90 to 150
Brass, yellow .....	150 to 200	100 to 250	100 to 200	100 to 200
Bronze, phosphor and manganese .....	30 to 80	25 to 100	30 to 80	30 to 80
Cast iron (hard) .....	25 to 40	10 to 30	25 to 40	20 to 45
Cast iron (soft and medium) .....	40 to 75	25 to 80	35 to 65	30 to 80
Monel metal .....	50 to 75	50 to 75	40 to 60	40 to 60
Steel, hard .....	25 to 50	25 to 70	25 to 50	25 to 70
Steel, soft .....	60 to 120	45 to 110	50 to 85	45 to 100

- a) Untuk pisau karbida harga kecepatan potong angka pada tabel dikalikan 2.
- b) Apabila satuan kecepatan potong (*cutting speed* diubah menjadi m/menit angka pada tabel dibagi 3,28).

Gambar 1B Tabel data material (Widarto, 2008)



Gambar 2B Tabel kecepatan *spindle* mesin gundi

TYPE OF CUTTER	ALUMINUM		BRONZE		CAST IRON		FREE MACHINING STEEL		ALLOY STEEL	
	HSS	CAR BIDE	HSS	CAR BIDE	HSS	CAR BIDE	HSS	CAR BIDE	HSS	CAR BIDE
FACE MILLS	.007	.007	.005	.004	.004	.006	.003	.004	.002	.003
	to	to	to	to	to	to	to	to	to	to
	.022	.020	.014	.012	.016	.020	.012	.016	.008	.014
HELICAL MILLS	.006	.006	.003	.004	.004	.002	.002	.003	.002	.003
	to	to	to	to	to	to	to	to	to	to
	.018	.016	.011	.010	.018	.018	.010	.013	.007	.012
SIDE CUTTING MILLS	.004	.004	.003	.003	.002	.003	.002	.003	.001	.002
	to	to	to	to	to	to	to	to	to	to
	.013	.012	.008	.007	.009	.012	.007	.009	.005	.008
END MILLS	.003	.003	.003	.002	.002	.003	.001	.002	.001	.002
	to	to	to	to	to	to	to	to	to	to
	.011	.010	.007	.006	.008	.010	.006	.008	.004	.007
FORM RELIEVED CUTTERS	.002	.002	.001	.001	.002	.002	.001	.002	.001	.001
	to	to	to	to	to	to	to	to	to	to
	.007	.006	.004	.004	.005	.006	.004	.005	.003	.004
CIRCULAR SAWS	.002	.002	.001	.001	.001	.002	.001	.001	.005	.001
	to	to	to	to	to	to	to	to	to	to
	.005	.005	.003	.003	.004	.006	.003	.004	.002	.004

Gambar 3B Tebal beram per gigi untuk beberapa tipe pisau frais dan benda kerja yang dikerjakan (satuan dalam inchi) (Widarto, 2008)

- Untuk baja

$$f = 0,084\sqrt[3]{d}; mm / put \dots \dots \dots (8.2)$$

- Untuk besi tuang

$$f = 0,1\sqrt[3]{d}; mm / put \dots \dots \dots (8.3)$$

Gambar 4B Rumus empiris gerak makan gundi (Widarto, 2008)

**LAMPIRAN 3**  
**DATA PENGUJIAN LABORATORIUM**

**LAMPIRAN 4**  
**DOKUMENTASI PROSES PRODUKSI**



**LAMPIRAN 4**  
**DOKUMENTASI PROSES PRODUKSI**





**LAMPIRAN 5**  
**TABEL *BILL OF MATERIAL***

LAMPIRAN 5

TABEL *BILL OF MATERIAL*

<b>BOM MESIN PENIRIS MINYAK (SPINNER) BAWANG GORENG DENGAN PENAMBAHAN TIMER</b>					
<b>No</b>	<b>Komponen</b>	<b>Jumlah</b>	<b>Satuan</b>	<b>Harga Satuan</b>	<b>Harga Total</b>
1.	Plat <i>Stainless steel</i> 201 berlubang 240 x 120 cm	1	cm	Rp 850.000	Rp 850.000
2.	Besi siku 40 x 40 x 4 mm panjang 6 meter	2	m	Rp 115.000	Rp 230.000
3.	Poros S45C Ø 25,4	1	mm	Rp 70.000	Rp 70.000
4.	Pipa <i>Stainless steel</i> Ø20	1	mm	Rp 15.000	Rp 15.000
5.	Plat besi untuk <i>body</i> dan <i>base</i> roda	2	pcs	Rp 300.000	Rp 300.000
6.	Elektroda <i>stainless</i> NSN-308	4	pcs	Rp 5.000	Rp 20.000
	Elektroda RB-26	45	pcs	Rp 1.000	Rp 45.000
7.	Kapasitor 8 uf	1	pcs	Rp 13.000	Rp 13.000
8.	Box X7	1	pcs	Rp 16.000	Rp 16.000
9.	<i>Dimmer</i> AC 2000 watt	1	pcs	Rp 19.000	Rp 19.000
10.	<i>Timer</i> mesin cuci	1	pcs	Rp 16.000	Rp 16.000
11.	<i>Sealant</i>	1	pcs	Rp 30.000	Rp 30.000
12.	Roda 2 inchi	4	pcs	Rp 12.500	Rp 50.000
13.	Mur, baut, dan <i>ring</i>	36	pcs	Rp 500	Rp 18.000
14.	<i>Pulley</i>	2	pcs	Rp 50.000	Rp 100.000
15.	Sabuk v 45 A	1	pcs	Rp 35.000	Rp 35.000
16.	Pasak 5 mm	2	pcs	Rp 5.000	Rp 10.000
17.	Penampung minyak	1	pcs	Rp 20.000	Rp 20.000
18.	Dinamo AC 110 watt	1	pcs	Rp 230.000	Rp 230.000
19.	Lem besi	1	pcs	Rp 17.000	Rp 17.000
20.	Cat dan dempul	2	pcs	Rp 50.000	Rp 100.000
21.	Selang Ø 5 mm	3	m	Rp 2.000	Rp 9.000
22.	Kelistrikan	2	pcs	-	Rp 50.000
23.	Bantalan UCP 204	2	pcs	Rp 30.000	Rp 60.000
25.	Lain-lain	-	-	-	Rp 400.000
<b>Total Biaya</b>					<b>Rp 2.723.000</b>

**LAMPIRAN 6**  
**BIODATA PENULIS**

**LAMPIRAN 6**  
**BIODATA PENULIS**



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**Riwayat Pendidikan:**

1. SDN Kedungpucang : Tahun 2009-2015
2. SMP Negeri 19 Purworejo : Tahun 2015-2018
3. SMK PN 2 Purworejo : Tahun 2018-2021