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TABEL SIFAT-SIFAT FISIK AIR

Tabel 2.12 - Sifat-sifat fisik air (Air di bawah 1 atm, dan air jenuh di atas 100°C).

Temperatur (°C)	Kerapatan (kg/l)	Viskositas kinematik (m ² /s)	Tekanan uap jenuh (kg/cm ²)
0	0,9998	1,792 × 10 ⁻⁶	0,00623
5	1,0000	1,520	0,00889
10	0,9998	1,307	0,01251
20	0,9983	1,004	0,02383
30	0,9957	0,801	0,04325
40	0,9923	0,658	0,07520
50	0,9880	0,554	0,12578
60	0,9832	0,475	0,20313
70	0,9777	0,413	0,3178
80	0,9716	0,365	0,4829
90	0,9652	0,326	0,7149
100	0,9581	0,295	1,0332
120	0,9431	0,244	2,0246
140	0,9261	0,211	3,685
160	0,9073	0,186	6,303
180	0,8869	0,168	10,224
200	0,8647	0,155	15,855
220	0,8403	0,150	23,656
240	0,814	0,136	34,138
260	0,784	0,131	47,869
280	0,751	0,128	65,468
300	0,712	0,127	87,621

Catatan: 1 atm = 101,3 kPa 1 kgf/cm² = 98,1 kPa

TABEL PEMILIHAN DAYA MOTOR LISTRIK

Table 10/15. Average values of rated motor current in A for different power ratings.

Power rating		Direct-current motors		Three-phase induction motors					
kW	hp (metric)	220 V	440 V	Cage			Slipring		
				220 V	380 V	500 V	220 V	380 V	500 V
1	1.4	6.4	3.2	5.2	3	2.4	5.9	3.5	2.6
1.5	2	9.5	4.8	7.5	4.3	3.3	8.5	5	4.6
2	2.7	13	6.5	9.2	5.4	4.1	11	6	3.7
3	4	18	9	14	7.9	6	15	8.2	4.6
4	5.5	24	12	18	10.5	7.6	19	11	6.2
5	7	29	14.5	21	12.5	9	22	13	8.3
6	8	34	17	26	14.2	11	26	15	10
7	9.5	40	20	29	16.5	12.5	29	17	11.5
8	11	45	22.5	32	19	14	32	19	13
9	12	50	25	36	21	16	36	21	14
10	13.5	56	28	40	23	17.9	40	23	16
12	16.5	66	33	46	27	21	47	27	18
15	20	85	42.5	56	33	26	56	33	21
20	27	110	55	75	43	33	73	43	26
30	40	160	80	110	64	48	110	66	33
40	55	210	105	145	84	64	140	83	47
50	68	260	130	180	107	79	172	100	62
60	82	310	155	210	125	95	200	120	76
70	95	360	180	250	145	110	230	140	90
80	110	400	200	280	160	120	280	155	105
90	123	450	225	305	180	140	305	175	120
100	136	500	250	345	200	150	330	195	145

Table 10/16a. Conversion from hp (metric) to kW

hp →	0	1	2	3	4	5	6	7	8	9
0	—	0.74	1.47	2.21	2.94	3.68	4.41	5.15	5.89	6.62
10	7.36	8.09	8.83	9.56	10.3	11.0	11.8	12.5	13.2	14.0
20	14.7	15.5	16.2	17.0	17.7	18.4	19.1	19.9	20.6	21.3
30	22.1	22.8	23.5	24.3	25.0	25.8	26.5	27.2	28.0	28.7
40	29.4	30.2	30.9	31.6	32.4	33.1	33.9	34.6	35.3	36.1
50	36.8	37.5	38.3	39.0	39.7	40.5	41.2	42.0	42.8	43.4
60	44.2	44.9	45.6	46.4	47.1	47.8	48.6	49.3	50.0	50.8
70	51.5	52.2	53.0	53.7	54.5	55.2	55.9	56.7	57.5	58.1
80	58.9	59.6	60.3	61.1	61.8	62.5	63.3	64.0	64.8	65.5
90	66.2	67.0	67.7	68.4	69.2	69.9	70.6	71.4	72.1	72.8
100	73.6	74.3	75.1	75.8	76.5	77.3	78.0	78.7	79.5	80.2

Table 10/16b. Conversion from kW to hp (metric)

kW →	0	1	2	3	4	5	6	7	8	9
0	—	1.36	2.72	4.08	5.44	6.80	8.16	9.52	10.9	12.2
10	13.6	15.0	16.3	17.7	19.0	20.4	21.8	23.1	24.5	25.8
20	27.2	28.6	29.9	31.3	32.6	34.0	35.4	36.7	38.1	39.4
30	40.8	42.2	43.5	44.9	46.2	47.6	49.0	50.3	51.7	53.0
40	54.4	55.7	57.0	58.5	59.8	61.2	62.5	63.9	65.3	66.6
50	68.0	69.3	70.7	72.1	73.4	74.8	76.1	77.5	78.9	80.2
60	81.6	82.9	84.3	85.7	87.0	88.4	89.7	91.1	92.5	93.8
70	95.2	96.5	97.9	99.3	101	102	103	105	106	107
80	109	110	111	113	114	116	117	118	120	121
90	122	124	125	126	128	129	131	132	133	135
100	136	137	139	140	141	143	144	145	147	148

TABEL BAHAN BAJA

Lampiran ini berisi bahan-bahan dari JIS (Standar Industri Jepang) yang dikutip dalam buku ini

1 JIS G 4051. Baja karbon untuk konstruksi mesin.

(a) Unsur kimia

Lambang	Unsur kimia (%)				
	C	Si	Mn	P	S
S 30 C	0,27-0,33	0,15-0,35	0,60-0,90	0,030	0,035
S 35 C	0,32-0,38				
S 40 C	0,37-0,43				
S 45 C	0,42-0,48				
S 50 C	0,47-0,53				
S 55 C	0,52-0,58				
S 15 CK	0,13-0,18	0,15-0,35	0,30-0,60	0,025	0,025

(b) Ukuran standar baja batang yang dirol panas (Ukuran dalam kurung sedapat mungkin dihindari pemakaiannya)

9	(10)	11	(12)	13	(14)	(15)	16	(17)	(18)	19	(20)	22	(24)	25	(26)
28	30	32	34	36	38	40	42	44	46	48	50	55	60	65	70
75	80	90	95	100	(105)	110	(115)	120	130	140	150	160	(170)	180	(190)
200															

(c) Sifat-sifat mekanis standar

Lambang	Temperatur transformasi		Perlakuan panas			Sifat mekanis			
	A_c (°C)	A_r (°C)	Penormalan (N)	Celup dingin (H)	Temper (H)	Perlakuan panas	Batas mulur (kg/mm ²)	Kekuatan tarik (kg/mm ²)	Kekerasan (H_B)
S30C	720-815	780-720	850-900 Pendinginan udara	850-900 Pendinginan air	550-650 Pendinginan cepat	N	29	48	137-197
						H	34	55	152-212
S35C	720-800	770-710	840-890 Pendinginan udara	850-900 Pendinginan air	550-650 Pendinginan cepat	N	31	52	149-207
						H	40	58	167-235
S40C	720-790	760-700	830-880 Pendinginan udara	830-880 Pendinginan air	550-650 Pendinginan cepat	N	33	55	156-217
						H	45	62	179-255

MATERIAL UNTUK BAGIAN UTAMA POMPA

Tabel 2.26 Bahan-bahan untuk pompa yang umum dipakai.

Nomor kelompok	Frekuensi	Rumah (casing)	Impeler	Pemakaian
A-1 A-2 A-3 A-4	○	FC FC FC FC	FC FCD SC BC	Air tawar, air minum Air tawar, air minum Air tawar, air minum Air tawar, air minum
A-5	○	FC	PBC	Air laut Air tawar, air limbah
A-6	○	FC	ABC	Air laut Air tawar, air limbah
A-7	○	FC	SCS2	Air laut Air tawar, air minum
A-8 A-9	○	FC FC berlapis karet	SCS12 or SCS13 SCS12 or SCS13	Air limbah Air limbah, air laut Air distilasi, air laut
B-1 B-2	○	SC SC	SC ABC	Air tawar, air laut Air tawar, air minum
B-3	○	SC	SCS2	Air laut Air tawar, air minum
B-4 B-5	○	SC SC	SCS12 or SCS13 SCS14 or SCS15	Air limbah Air limbah, air laut Air laut
C-1 C-2 C-3	○	BC BC ABC	BC PBC ABC	Air distilasi, air laut Air laut Air laut
D-1 D-2 D-3 D-4 D-5 D-6	○	SCS2 SCS2 SCS2 SCS12 or SCS13 SCS12 or SCS13 SCS12 or SCS13	SCS2 SCS12 or SCS13 SCS14 or SCS15 SCS12 or SCS13 SCS14 or SCS15 Worthite	Air limbah, air laut Air limbah, air laut Air laut Air laut Air laut Air laut
E-1 E-2 E-3	⊕ ○	SS SS SUS27	SC SCS2 SCS13	Air tawar Air tawar, air minum Air tawar, air minum Air laut

1. Frekuensi dengan tanda "○" berarti bahan sering dipakai.
2. FC (besi cor) menyatakan FC15, FC20, FC25, dan FC25 Ma.
3. BC (perunggu cor) menyatakan BC2 dan BC3.
4. SC berarti baja karbon cor.
5. ABC berarti perunggu aluminium cor.
6. SS berarti plat baja.
7. Nomor kelompok besar berarti bahan dengan mutu lebih tinggi.

JIS G 5501 BESI COR KELABU

9 JIS G 5501. Besi cor kelabu.

Lambang	Tebal utama coran (mm)	Kekuatan tarik (kg/mm ²)	Kekerasan (kg/mm ²)
FC 20	4-8	24	255 atau kurang
	8-15	22	235 "
	15-30	20	223 "
	30-50	17	217 "
FC 25	4-8	28	269 "
	8-15	26	248 "
	15-30	25	241 "
	30-50	22	229 "
FC 30	8-15	31	269 "
	15-30	30	262 "
	30-50	27	248 "
FC 35	15-30	35	277 "
	30-50	32	269 "

10 JIS G 5502. Besi cor grafit bulat.

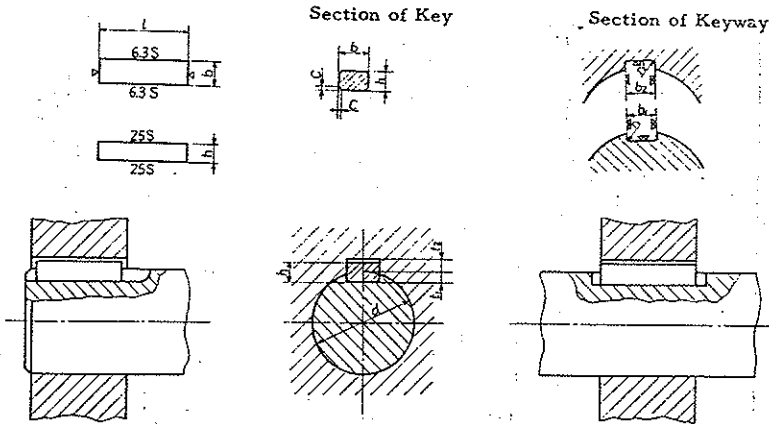
Lambang	Batas mulur (kg/mm ²)	Kekuatan tarik (kg/mm ²)
FCD 40	26	40
FCD 45	30	45
FCD 50	35	50
FCD 60	40	60
FCD 70	45	70

11 JIS G 5101. Baja karbon cor.

Lambang	Batas mulur (kg/mm ²)	Kekuatan tarik (kg/mm ²)	Keterangan
SC 37	18	37	Untuk bagian motor
SC 42	21	42	Untuk konstruksi umum
SC 46	23	46	"
SC 49	25	49	"

TABEL UKURAN PASAK

Attached Table 1. Shape and Dimension of Parallel Key and Keyway

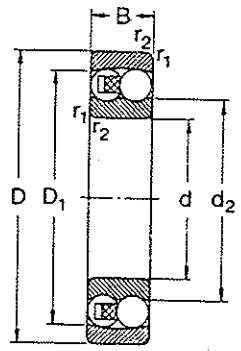


Unit: mm

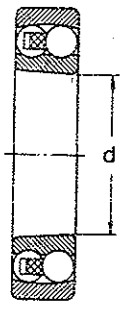
Nominal size of key $b \times h$	Dimension of key				l (*)	Dimension of keyway							Applicable shaft dia. d (†)	Interference note	
	b		h			Basic dimension of dimension of b_1 and b_2	Normal grade			r_1 and r_2	Basic dimension of t_1	Basic dimension of t_2			Tolerance of t_1 and t_2
	Basic dimension	Tolerance (h 9)	Basic dimension	Tolerance			Tolerance (P 9)	Tolerance (N 9)	Tolerance (G 9)						
2x2	2	0	2	0	6~20	2	-0.006	-0.004	± 0.0125	0.08	1.2	1.0	6~8		
3x3	3	-0.025	3	-0.025	6~36	3	-0.031	-0.029	± 0.0125	0.16	1.8	1.4	8~10		
4x4	4		4		8~45	4				0.16	2.5	1.8	10~12	+0.1 0	
5x5	5	-0.030	5	-0.030	10~56	5	-0.012	0	± 0.0150	0.16	3.0	2.3	12~17		
6x6	6		6		14~70	6	-0.042	-0.030		0.16	3.5	2.8	17~22		
(7x7)	7		7	-0.036	16~80	7				0.25	4.0	3.0	20~25		
8x7	8	-0.036	7		18~90	8	-0.015	0	± 0.0180	0.25	4.0	3.3	22~30		
10x8	10		8		22~110	10				0.25	5.0	3.3	30~38		
12x8	12		8		28~140	12				0.25	5.0	3.3	38~44		
14x9	14		9	-0.090	36~160	14				0.25	5.5	3.8	44~50		
(15x10)	15	-0.043	10		40~180	15	-0.018	0	± 0.0215	0.40	5.0	5.0	50~55		
16x10	16		10		45~180	16	-0.061	-0.043		0.40	6.0	4.3	50~58	+0.2 0	
18x11	18		11		50~200	18				0.40	7.0	4.4	58~65		
20x12	20		12		56~220	20				0.40	7.5	4.9	65~75		
22x14	22		14		63~250	22				0.40	9.0	5.4	75~85		
(24x16)	24	-0.052	16	-0.110	70~280	24	-0.022	0	± 0.0260	0.40	8.0	8.0	80~90		
25x14	25		14		70~280	25	-0.074	-0.052		0.40	9.0	5.4	85~95		
28x16	28		16		80~320	28				0.40	10.0	6.4	95~110		
32x18	32	-0.062	18		90~360	32	-0.026	0	± 0.0310	0.40	11.0	7.4	110~130		



TABEL BANTALAN SELF ALIGNING BALL BEARINGS



Cylindrical bore



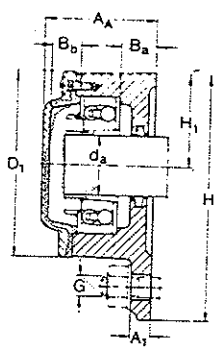
Tapered bore
 taper 1:12 on diameter

Principal dimensions			Basic load ratings		Fatigue load limit P_u	Speed ratings		Mass	Designations	
d	D	B ¹⁾	C	C_0		Lubrication grease	oil		cylindrical bore	tapered bore
mm			N		N	r/min		kg	-	
30	62	16	15 600	4 650	240	10 000	13 000	0,22	1206 E	1206 EK
	62	20	23 800	6 700	345	9 500	12 000	0,26	2206 E	2206 EK
	72	19	22 500	6 800	355	9 000	11 000	0,39	1306 E	1306 EK
	72	27	31 200	8 800	450	8 500	10 000	0,50	2306	2306 K
	90	28	59 200	17 000	865	6 700	8 000	1,00	1406	-
35	72	17	19 000	6 000	305	9 000	11 000	0,32	1207 E	1207 EK
	72	23	30 700	8 800	455	8 500	10 000	0,40	2207 E	2207 EK
	80	21	26 500	8 500	430	7 500	9 000	0,51	1307 E	1307 EK
	80	31	39 700	11 200	585	7 000	8 500	0,68	2307 E	2307 EK
	100	30	62 400	18 000	930	6 300	7 500	1,30	1407	-
40	80	18	19 900	6 950	355	8 500	10 000	0,42	1208 E	1208 EK
	80	23	31 900	10 000	510	7 500	9 000	0,51	2208 E	2208 EK
	90	23	33 800	11 200	570	6 700	8 000	0,72	1308 E	1308 EK
	90	33	54 000	16 000	815	6 300	7 500	0,93	2308 E	2308 EK
	110	33	76 100	23 600	1 200	5 300	6 300	1,70	1408	-
45	85	19	22 900	7 800	400	7 500	9 000	0,47	1209 E	1209 EK
	85	23	32 500	10 600	540	7 000	8 500	0,55	2209 E	2209 EK
	100	25	39 000	13 400	695	6 300	7 500	0,96	1309 E	1309 EK
	100	36	63 700	19 300	1 000	5 600	6 700	1,25	2309 E	2309 EK
	120	35	88 400	27 500	1 400	5 000	6 000	2,15	1409	-
50	90	20	26 500	9 150	475	7 000	8 500	0,53	1210 E	1210 EK
	90	23	33 800	11 200	570	6 300	7 500	0,60	2210 E	2210 EK
	110	27	43 600	14 000	720	5 600	6 700	1,20	1310 E	1310 EK
	110	40	63 700	20 000	1 040	5 300	6 300	1,65	2310	2310 K
	130	37	101 000	32 000	1 630	4 800	5 600	2,65	1410	-
55	100	21	27 600	10 600	540	6 300	7 500	0,71	1211 E	1211 EK
	100	25	39 000	13 400	695	6 000	7 000	0,81	2211 E	2211 EK
	120	29	50 700	18 000	915	5 000	6 000	1,60	1311 E	1311 EK
	120	43	76 100	24 000	1 250	4 800	5 600	2,10	2311	2311 K
	140	40	111 000	36 500	1 860	4 300	5 000	3,25	1411	-

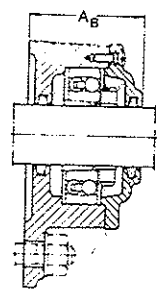
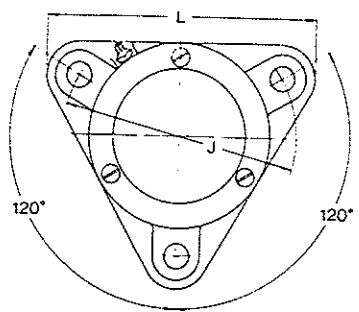


TABEL RUMAH BANTALAN

Flanged bearing housings
 for bearings with adapter sleeve
 d_a 20-60 mm



Housing for shaft end A design



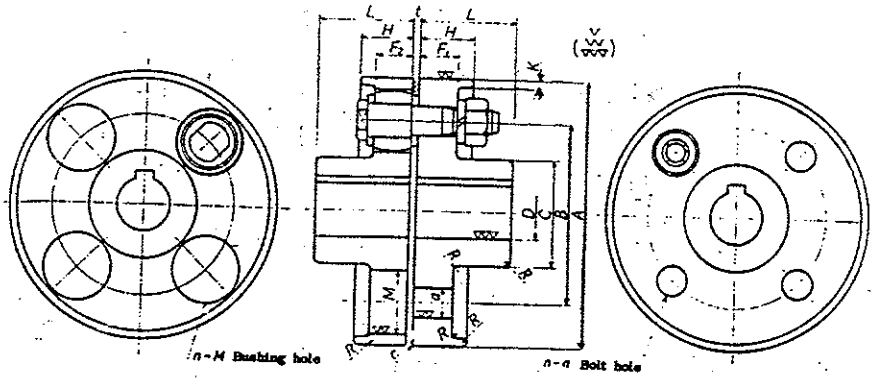
Housing for through shaft B design

Shaft diameter d_a	Housing Dimensions										Mass	Designations		
	A_A	A_B	A_1	B_a	B_b	D_1	H	H_1	J	L		G	A	B
mm	mm										kg	-		
20	51,5	56,5	10	15	12,5	75	100	38	96	110	10	1,10	722505 DA	722505 DB
25	57	59,5	12	16	15	86	117	44	116	130	10	1,50	722506 DA	722506 DB
30	59,5	63,5	12	16	14,5	97	130	48,5	130	145	12	1,80	722507 DA	722507 DB
35	64	65,5	12	17	18	108	143	54	140	160	12	2,30	722508 DA	722508 DB
40	64,5	69,5	12	19	16,5	113	160	60	160	180	12	3,00	722509 DA	722509 DB
45	68,5	73	15	22	17,5	118	160	60	160	180	12	3,00	722510 DA	722510 DB
50	75,5	81,5	15	24	19,5	128	172	65	170	192	12	4,10	722511 DA	722511 DB
55	77	82	15	23	19	142	189	72	180	210	12	4,80	722512 DA	722512 DB
60	80	86	15	22	20	152	203	78	190	225	12	5,90	722513 DA	722513 DB



TABEL PEMILIHAN KOPLING

Attached Table 1.: Flexible Flanged Shaft Coupling



Remark: The bolt holes shall be arranged approximately symmetrically with respect to the key way.

Unit: mm

Nominal diameter of coupling A	D		L	C	B	F ₁	F ₂	H	K	n ⁽¹⁾	a	M	t ⁽²⁾	Reference		
	Layout shaft-hole diameter	Bushing shaft-hole diameter												K	c	Draw-out length of bolt
90	18	—	28	35.5	60	14	14	20	4	4	8	19	3	2	1	50
100	22	—	35.5	40	67	16	16	22.4	4	4	10	23	3	2	1	56
112	25	16	40	45	75	16	16	22.4	4	4	10	23	3	2	1	56
125	28	18	45	50	85	18	18	25	4	4	14	32	3	2	1	64
140	35	20	50	63	100	18	18	25	4	4	14	32	3	2	1	64
160	45	25	56	80	115	18	18	25	6	8	14	32	3	2	1	64
180	50	28	63	90	132	18	18	25	6	8	14	32	3	3	1	64
200	56	32	71	100	145	22.4	22.4	31.5	6	8	20	41	4	3	1	85
224	63	35	80	112	170	22.4	22.4	31.5	6	8	20	41	4	3	1	85
250	71	40	90	125	180	28	28	40	8	8	25	51	4	4	1	100
280	80	50	100	140	200	28	40	45	8	8	28	57	4	4	1	116
315	90	63	112	160	236	28	40	45	8	10	28	57	4	4	1	116
355	100	71	125	180	260	35.5	56	63	10	8	35.5	72	5	5	1	150
400	110	80	125	200	300	35.5	56	63	10	10	35.5	72	5	5	1	150
450	125	90	140	224	355	35.5	56	63	10	12	35.5	72	5	5	1	150
560	140	100	160	250	450	35.5	56	63	12	14	35.5	72	5	6	1	150
630	160	110	180	280	530	35.5	56	63	12	18	35.5	72	5	6	1	150

Notes (1) The letter n indicates the number of bush holes or bolt holes.
 (2) The letter t indicates the clearance produced at the time of assembling the coupling bodies, and is equivalent to the thickness of coupling bolt washer.

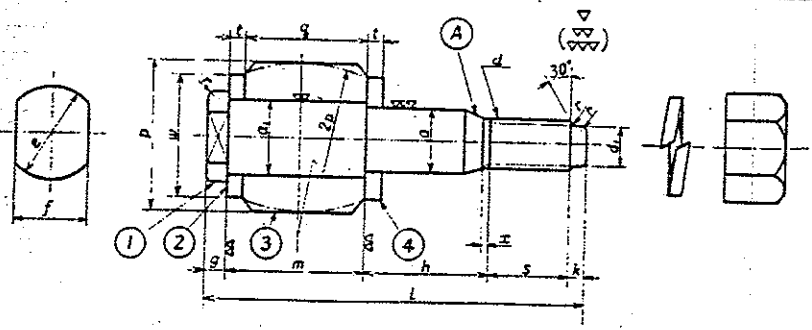
Remarks 1. The draw-out length of bolt indicates the dimension from the shank end.
 2. The screw hole to facilitate the drawing out of a coupling from a shaft is allowed to make optionally.



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TABEL PEMILIHAN BAUT KOPLING

Attached Table 2. Coupling Bolt for Flexible Flanged Shaft Coupling



Unit: mm

Designation a x l	Number of Threads	① Bolt											r (Approx.)
		a ₁	a	d ₁	c	f	g	m	h	s	k	l	
M 8 x 50	8	9	8	5.5	12	10	4	17	15	12	2	50	0.4
M 10 x 56	10	12	10	7	16	13	4	19	17	14	2	56	0.5
M 12 x 64	12	16	14	9	19	17	5	21	19	16	3	64	0.6
M 20 x 85	20	22.4	20	15	28	24	5	26.4	24.6	25	4	85	1
M 24 x 100	24	28	25	18	34	30	6	32	30	27	5	100	1
M 24 x 116	24	31.5	28	18	38	32	6	44	30	31	5	116	1
M 30 x 150	30	40	35.5	23	48	41	8	61	38.5	36.5	6	150	1.2

Designation a x l	② Washer			③ Bushing			④ Washer		
	a ₁	w	t	a ₁	p	q	a	w	t
M 8 x 50	9	14	3	9	18	14	8	14	3
M 10 x 56	12	18	3	12	22	16	10	18	3
M 12 x 64	16	25	3	16	31	18	14	25	3
M 20 x 85	22.4	32	4	22.4	40	22.4	20	32	4
M 24 x 100	28	40	4	28	50	28	25	40	4
M 24 x 116	31.5	45	4	31.5	56	40	28	45	4
M 30 x 150	40	56	5	40	71	56	35.5	56	5

1. The hexagon nuts shall be such that of Class 1 ordinary nuts specified in JIS B 1181, of which strength class shall be 4 and thread accuracy 6 H (or Class 2).
2. The spring washers shall be No. 2 S specified in JIS B 1251.
3. The dimensions of width across flats are in accordance with JIS B 1002. The dimensional tolerance shall be of Class 2.
4. The shape and dimensions of the screw end shall be same as the half dog point specified in JIS B 1003.
5. The accuracy of the screw thread shall conform to 6 g (or Class 2) of JIS B 0209.
6. The portion (A) may be either tapered or toriced.
7. The length x may be constituted either by an incomplete-threads or by an under-cut for thread cutting. However, a length of approximately two threads shall be taken for x in the case of the incomplete-threads.
8. Bushing may be formed either to cylindrical shape or to spherical shape. When the bushing is of cylindrical shape, both ends of external periphery shall be chamfered.
9. The bushing may provide metallic lining.

TABEL BAHAN JIS G 3101

18 JIS G 3101. Baja rol untuk konstruksi umum.

Lambang	Unsur kimia (%)				Kekuatan tarik (kg/mm ²)	Batas * mulur (kg/mm ²)
	C	Mn	P	S		
SS34	-	-	0,050 atau kurang	0,050 atau kurang	34-44	18
SS41					41-52	22
SS50					50-62	26
SS55	0,30 atau kurang	1,60 atau kurang	0,040 atau kurang	0,040 atau kurang	55	40

* Batas mulur ini merupakan harga terendah, dan besarnya tergantung pada tebal, diameter, dll.

19 JIS G 3108. Baja karbon rol untuk batang baja finis dingin.

(a)

Lambang	Unsur kimia (%)				Kekuatan tarik (kg/mm ²)	** Batas mulur (kg/mm ²)	Setelah ditarik dingin ***			
	C	Mn	P	S			Lambang	**** Kekuatan tarik (kg/mm ²)	Kekerasan ****	
									H _B (H _K C)	H _A
SGD A	-	-	0,045 atau kurang	0,045 atau kurang	30-40	-	SS30B-D	35-65	50-94	90-204
SGD B	-	-	0,045 atau kurang	0,045 atau kurang	41-52	22	SS41B-D	46-77	69-100 (22)	121-240

* Di antara SGD A, SGD B, SGD 1, SGD 2, SGD 3, dan SGD 4, hanya diberikan dua tipe yang pertama saja.

** Di sini diberikan harga terendah, di mana harga tersebut tergantung pada diameter, panjang sisi, tebal, dll.

*** JIS G 3123

**** Di sini diberikan harga terendah, di mana batas tertinggi dan batas terendah kekuatan tarik dan kekerasan tergantung pada diameter.

(b) Ukuran standar batang bulat

5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	28	30	32	35	36	38	40	42	45	48
50	55	60	65	70	75	80									

TABEL UKURAN ULIR LEMBUT METRIS

Tabel 7.1 (b) Ukuran standar ulir kasar metris (JIS B 0205).

Ulir			Jarak bagi p	Tinggi kaitan H_1	Ulir dalam		
					Diameter luar D	Diameter efektif D_2	Diameter dalam D_1
1	2	3			Ulir luar		
					Diameter luar d	Diameter efektif d_2	Diameter inti d_1
M 6		M 7	1	0,541	6,000	5,350	4,917
M 8			1	0,541	7,000	6,350	5,917
			1,25	0,677	8,000	7,188	6,647
M 10		M 9	1,25	0,677	9,000	8,188	7,647
			1,5	0,812	10,000	9,026	8,376
		M 11	1,5	0,812	11,000	10,026	9,376
M 12	M 14		1,75	0,947	12,000	10,863	10,106
M 16			2	1,083	14,000	12,701	11,835
			2	1,083	16,000	14,701	13,835
M 20	M 18		2,5	1,353	18,000	16,376	15,294
	M 22		2,5	1,353	20,000	18,376	17,294
			2,5	1,353	22,000	20,376	19,294
M 24	M 27		3	1,624	24,000	22,051	20,752
M 30			3	1,624	27,000	25,051	23,752
			3,5	1,894	30,000	27,727	26,211
M 36	M 33		3,5	1,894	33,000	30,727	29,211
	M 39		4	2,165	36,000	34,402	31,670
			4	2,165	39,000	36,402	34,670
M 42	M 45		4,5	2,436	42,000	39,077	37,129
M 48			4,5	2,436	45,000	42,077	40,129
			5	2,706	48,000	44,752	42,587
M 56	M 52		5	2,706	52,000	48,752	46,587
	M 60		5,5	2,977	56,000	52,428	50,046
			5,5	2,977	60,000	56,428	54,046
M 64	M 68		6	3,248	64,000	60,103	57,505
			6	3,248	68,000	64,103	61,505

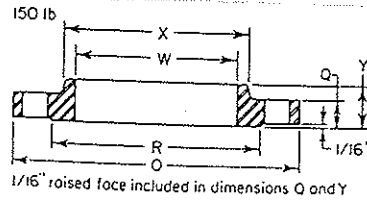
Catatan: (1) Kolom 1 merupakan pilihan utama. Kolom 2 atau kolom 3 hanya dipilih jika terpaksa.



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TABEL STANDAR FLENS PIPA



Nominal pipe size	Outside diameter of flange O	Thickness of flange Q (min)	Diameter of raised-face R	Diameter of bore W	Length through hub Y	Diameter of hub at base X	Number of bolt holes	Diameter of bolts ^a	Diameter of bolt circle	Length of bolts			Weight (approx), lb
										Stud ^b		Machine	
										1/8-in. raised-face	Ring joint		
150 lb													
1/2	3 1/2	3/16	1 3/8	0.88	5/8	1 3/4	4	1/4	2 3/4	2 1/4	...	1 1/4	2
3/4	3 3/4	1/4	1 11/16	1.09	5/8	1 1/2	4	1/4	2 3/4	2 1/4	...	2	2
1	4 1/4	3/16	2	1.36	1 1/4	1 13/16	4	1/4	3 1/4	2 1/4	3	2	2
1 1/4	4 3/4	5/16	2 1/4	1.70	1 3/4	2 1/4	4	1/4	3 1/2	2 1/4	3	2 1/4	3
1 1/2	5	11/16	2 3/4	1.95	1 7/8	2 3/4	4	1/4	3 3/4	2 3/4	3 1/4	2 1/4	3
2	6	3/4	3 3/8	2.44	1	3 1/4	4	5/8	4 3/4	3	3 3/4	2 3/4	5
2 1/2	7	7/8	4 1/8	2.94	1 1/4	3 3/4	4	5/8	5 1/4	3 1/4	3 3/4	3	7
3	7 1/2	1 1/16	5	3.57	1 3/4	4 1/4	4	5/8	6	3 1/4	4	3	8
3 1/2	8 1/4	1 1/8	5 1/2	4.07	1 7/8	4 13/16	8	5/8	7	3 1/4	4	3	11
4	9	1 1/4	6 3/16	4.57	1 7/8	5 1/4	8	5/8	7 1/2	3 1/4	4	3	13
5	10	1 1/2	7 1/16	5.66	1 7/8	6 1/4	8	3/4	8 1/2	3 3/4	4 1/4	3 3/4	15
6	11	1	8 1/4	6.72	1 3/4	7 1/4	8	3/4	9 1/4	3 3/4	4 1/4	3 1/4	19
8	13 1/2	1 1/4	10 3/8	8.72	1 3/4	9 1/4	8	3/4	11 3/4	4	4 1/2	3 1/4	30
10	16	1 3/8	12 3/4	10.88	1 13/16	12	12	7/8	14 1/4	4 1/4	5	3 3/4	43
12	19	1 1/2	15	12.88	2 1/4	14 3/4	12	7/8	17	4 1/4	5	4	64
14	21	1 3/4	16 1/4	14.14	2 1/2	15 3/4	12	1	18 3/4	5	5 1/2	4 1/4	85
16	23 1/4	1 7/8	18 1/4	16.16	2 3/4	18	16	1	21 1/4	5 1/4	5 3/4	4 1/4	93
18	25	1 5/8	21	18.18	2 11/16	19 3/8	16	1 1/4	22 3/4	5 3/4	6 1/4	4 3/4	120
20	27 1/4	1 13/16	23	20.20	2 7/8	22	20	1 1/2	25	6	6 3/4	5 1/4	155
22 ^c	29 1/4	1 3/4	25 1/4	22.22	3 1/4	24	20	1 1/2	27 1/4	6 1/2	7	5 1/4	159
24	32	1 7/8	27 1/4	24.25	3 1/2	26 1/4	20	1 1/4	29 1/4	6 3/4	7 1/4	5 3/4	210

TABEL
UKURAN ULIR KASAR METRIS JIS B 0205

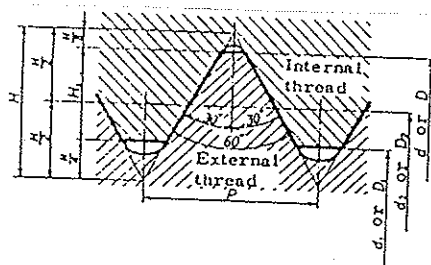


Fig. Basic Profile for Metric Fine Screw Threads

Unit : mm

Designation of screw thread	Pitch P	Depth of thread engagement, H_1	Internal thread		
			Major diameter D	Pitch diameter D_2	Minor diameter D_1
			External thread		
			Major diameter d	Pitch diameter d_2	Minor diameter d_1
M 27 × 2	2	1.083	27.000		
M 27 × 1.5	1.5	0.812	27.000	25.701	24.835
M 27 × 1	1	0.541	27.000	26.026	25.376
M 28 × 2	2	1.083	28.000		
M 28 × 1.5	1.5	0.812	28.000	26.701	25.835
M 28 × 1	1	0.541	28.000	27.026	26.376
M 30 × 3	3	1.624	30.000		
M 30 × 2	2	1.083	30.000	28.051	26.752
M 30 × 1.5	1.5	0.812	30.000	28.701	27.835
M 30 × 1	1	0.541	30.000	29.026	28.376
M 32 × 2	2	1.083	32.000		
M 32 × 1.5	1.5	0.812	32.000	30.701	29.835
M 33 × 3	3	1.624	33.000		
M 33 × 2	2	1.083	33.000	31.051	29.752
M 33 × 1.5	1.5	0.812	33.000	31.701	30.835
M 35 × 1.5	1.5	0.812	35.000	34.026	31.376
M 36 × 3	3	1.624	36.000		
M 36 × 2	2	1.083	36.000	34.051	32.752
M 36 × 1.5	1.5	0.812	36.000	34.701	33.835
M 38 × 1.5	1.5	0.812	38.000	35.026	34.376
M 39 × 3	3	1.624	39.000		
M 39 × 2	2	1.083	39.000	37.051	35.752
M 39 × 1.5	1.5	0.812	39.000	37.701	36.835
M 40 × 3	3	1.624	40.000		
M 40 × 2	2	1.083	40.000	38.051	36.752
M 40 × 1.5	1.5	0.812	40.000	38.701	37.835
M 42 × 4	4	2.165	42.000		
M 42 × 3	3	1.624	42.000	39.402	37.670
M 42 × 2	2	1.083	42.000	40.051	38.752
M 42 × 1.5	1.5	0.812	42.000	40.701	39.835
M 45 × 4	4	2.165	45.000		
M 45 × 3	3	1.624	45.000	42.402	40.670
M 45 × 2	2	1.083	45.000	43.051	41.752
M 45 × 1.5	1.5	0.812	45.000	43.701	42.835
M 48 × 4	4	2.165	48.000		
M 48 × 3	3	1.624	48.000	45.402	43.670
M 48 × 2	2	1.083	48.000	46.051	44.752
M 48 × 1.5	1.5	0.812	48.000	46.701	45.835
M 50 × 3	3	1.624	50.000		
M 50 × 2	2	1.083	50.000	48.051	46.752
M 50 × 1.5	1.5	0.812	50.000	48.701	47.835
M 52 × 4	4	2.165	52.000		
M 52 × 3	3	1.624	52.000	49.402	47.670
M 52 × 2	2	1.083	52.000	50.051	48.752
M 52 × 1.5	1.5	0.812	52.000	50.701	49.835
M 55 × 4	4	2.165	55.000		
M 55 × 3	3	1.624	55.000	52.402	50.670
M 55 × 2	2	1.083	55.000	53.051	51.752
M 55 × 1.5	1.5	0.812	55.000	53.701	52.835
M 56 × 4	4	2.165	56.000		
M 56 × 3	3	1.624	56.000	53.402	51.670
M 56 × 2	2	1.083	56.000	54.051	52.752
M 56 × 1.5	1.5	0.812	56.000	54.701	53.835
M 58 × 4	4	2.165	58.000		
M 58 × 3	3	1.624	58.000	55.402	53.670
M 58 × 2	2	1.083	58.000	56.051	54.752
M 58 × 1.5	1.5	0.812	58.000	56.701	55.835

Tabel Perhitungan defleksi poros

1	2	3	4	5	6	7	8	9	10	11	12	13	14
No	F (Kg)	V (Kg)	dX (mm)	M (Kggmm)	I	EI	M/EI	M/EI rata-rata	teta	teta rerata	Y	C	defleksi
1	-0.311	0	0	0	201288.96	4227068139	-9.2111E-10	0	0	-2.878E-09	-3.598E-08	0.0437604	0.04376
2	30.143	-0.311	12.5	-3.893575	201288.96	4227068139	-9.2111E-10	-4.606E-10	-5.76E-09	1.759E-05	0.00175913	-0.0437604	
3	-2.492	29.83	100	2979.246	201288.96	4227068139	7.0480E-07	3.519E-07	3.519E-05	8.66E-05	0.008665977	-0.0310699	
4	0	27.34	100	5713.196	306796.16	6442719309	1.3516E-06	1.028E-06	0.000138	0.0001748	0.0124133	-0.0266839	
5	-8.73	27.34	71	7654.301	306796.16	6442719309	1.1881E-06	1.037E-06	0.0002117	0.0002506	0.01528574	-0.0426664	
6	-13	18.61	61	8789.481	306796.16	6442719309	1.3643E-06	1.276E-06	0.0002895	0.0003581	0.03491329	-0.0295383	
7	-7.06	5.61	97.5	9336.408	306796.16	6442719309	1.4491E-06	1.407E-06	0.0004267	0.0004753	0.03208365	-0.0547005	
8	-13	-1.451	67.5	9238.476	306796.16	6442719309	1.4339E-06	1.442E-06	0.000524	0.0006048	0.07560313	-0.0161914	
9	-13	-14.45	125	7432.121	306796.16	6442719309	1.1536E-06	1.294E-06	0.0006857	0.0007056	0.026106	-0.0492305	
10	0	-27.45	37	6416.44	306796.16	6442719309	1.1536E-06	1.075E-06	0.0007255	0.000768	0.08639882	-0.0492305	
11	-2.803	-27.45	112.5	3328.22	201288.96	4227068139	5.1659E-07	7.563E-07	0.0008105	0.0008322	0.09361932	-0.0109401	
12	31.625	-30.25	112.5	-75.3796	201288.96	4227068139	7.8736E-07	3.848E-07	0.0008538	0.0008536	0.02134106	-0.0109401	
13	-0.623	1.371	25	-41.11615	201288.96	4227068139	-1.7833E-08	-1.378E-08	0.0008535	0.0008534	0.02133441	-0.0109401	
14	0	0.748	25	-22.42699	201288.96	4227068139	-9.7269E-09	-7.516E-09	0.0008533	0.0008532	0.02559727	-0.0131281	
15	-0.748	0.748	30	0	201288.96	4227068139	-5.3056E-09	-2.653E-09	0.0008532	0.0008532	0.02559727	-0.0131281	0.063E

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