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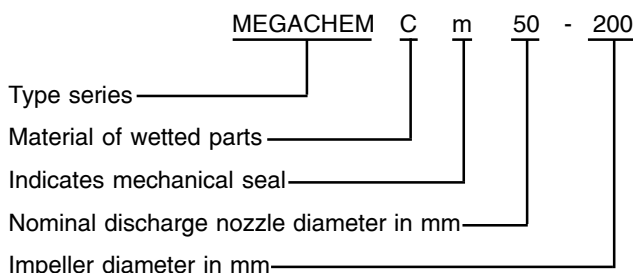
## 1 Design

Horizontal, radially split, single stage, single entry, volute casing in back-pull out design, radial impeller. The connection dimensions are in accordance with ISO 2858.

## 2 Application

The MEGACHEM pumps are suitable for pumping organic & inorganic fluids in chemical, food & other industries. The application areas are chemical, refinery, paper and pulp, food & sugar industries.

## 3 Designation



Material of wetted parts  
C = Stainless steel (CF8M)

## 4 Operating Parameters

### 4.1 Capacity and total head

MEGACHEM pumps are available in following range.

Pump del. size	DN	25 to 150 mm
Capacity	Q up to	540 m <sup>3</sup> /hr.
Head	H up to	100 m
End pressure	p up to	16 bar
Operating temp.	t up to	200° C

Q minimum : Refer performance curve  
Q maximum : 1.1 Q opt. ( For 2 pole drive )  
Q maximum : 1.2 Q opt. ( for 4 pole drive )

### 4.2 Differential head

The differential head depends upon speed and impeller diameter (see family curves and individual characteristic curves). Limitations of end pressure to be taken care of.

### 4.3 NPSH

The NPSH values given in the individual characteristic curves are the minimum values which corresponds to cavitation limits. They are valid for water without gases. **At least 0.5 m. must be added as a safety margin.** Available NPSH ( NPSHa) must be always more than NPSH required ( NPSHr) by atleast 0.5 m.

## 5 Selection

### 5.1 Present Programme available

Size	Impeller nominal diameter in mm						Bearing bracket
	125	160	200	250	315	400	
25		A <sup>1)</sup>	A				A30
32	A	A	A	A			A40
40	C	A	A	A	A		
50	C	A	A	A	A		A50
65	A	A	A	A	C		
80		A	A	A	C	C	
100		C	A	A	C	C	A60
125			C	A	C	A	
150			C	C	C	C	

<sup>1)</sup> Actual pump size 25 -150

A = Available C = not developed

Table no. 1

### 5.2 Individual performance curves

All individual performance curves are generated for the nominal speed; hence the same should be converted to effective speed of the drive using affinity laws.

#### 5.2.1 Power

The differential head and power curves are valid for water (density = 1.0 kg / dm<sup>3</sup>). In case density is not equal to 1.0 kg / dm<sup>3</sup> then the power must be multiplied by density.

#### 5.2.2 Efficiency

The efficiency is indicated in the standard individual performance curves.

**Efficiency correction factor of 0.97 is to be applied for all models.**

#### 5.2.3 Impeller diameter selection

The characteristic curves indicate minimum and maximum impeller diameter. The diameter obtained from the curve for the operating point is to be increased by 2 mm for impellers of stainless steel. However reduce head by 3 % if duty point is on full diameter.

### 5.3 Pressure temperature limits

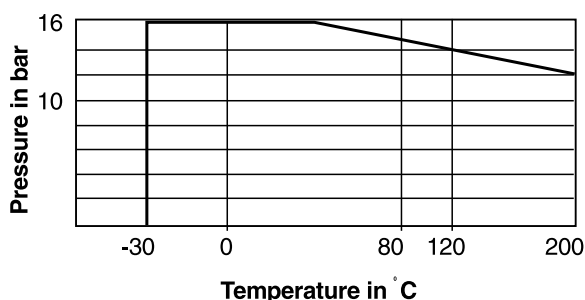


Fig.no.1: Max. discharge pressure as a function of the temp.

### 5.4 Suction pressure

Maximum allowable suction pressure is 10 bar. For suction pressure greater than 4 bar mechanical seal is recommended.

### 5.5 Flanges

Flanges conform to ASME B 16.5 class 150 only. Outside diameter & thickness are as per KSB standard & are on higher side of ASME standard.

### 5.6 Speed

The maximum permissible peripheral velocity for the impeller (see fig.no.2) as well as the maximum permissible P/n value (see table no.2) should also be taken into account, while selecting the pump.

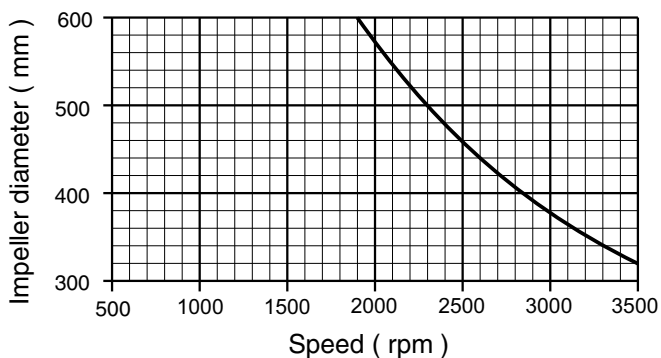


Fig.no.2 : Maximum permissible speed Stainless steel or Cast Steel impeller with peripheral velocity 60 m/s

### 5.7 Torque speed characteristics

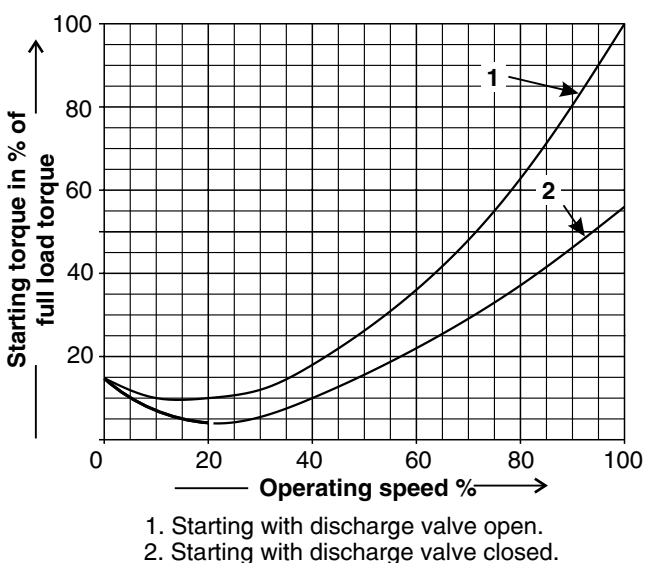


Fig. 3 : Torque-Speed curve (closed impeller)

### 5.8 Maximum permissible P/n value

Bearing bracket	P/n ( kW / rpm )
A 30	0.0129
A 40	0.0336
A 50	0.0735
A 60	0.116

Table no. 2

### 5.9 Power reserve for drive

Motor power in kW	Power reserve
Up to 1.5	Min. 20 %
1.5 to 12	Approx 15 %
Above 12	Approx 10 %

Table no.3 : Minimum prime mover power rating should be 1 kW.

## 6 Design features

### 6.1 Shaft sealing

Shaft sealing can be done either by gland packing or mechanical seal depending upon the service conditions. Changeover from gland packing execution to single mechanical seal or vice-versa is possible by using corresponding set of interchangeability parts known as conversion kit. (Refer cl. 6.2)

#### 6.1.1 Stuffing box compartment

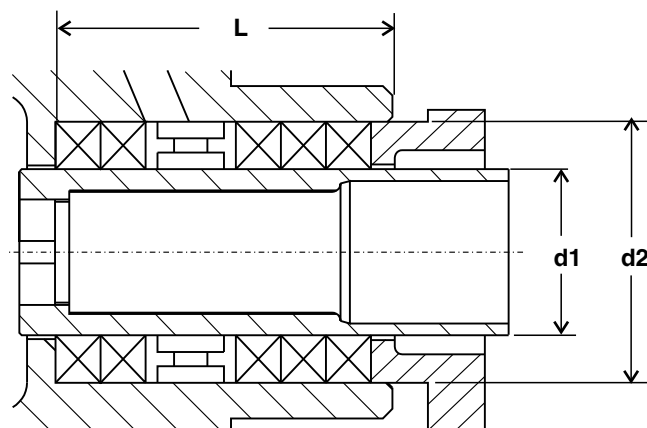


Fig. no. 4 : Stuffing box dimensions

Bearing bracket	Dimensions in mm			Packing size	
	d1	d2	L	mm	Qty
A 30	35	55	71	10x10	5+1 Lantern ring
A 40	45	65	71	10x10	
A 50	60	85	90.5	12.5x12.5	
A 60	70	95	90.5	12.5x12.5	

Table no. 4

### 6.1.2 Mechanical seal

Mechanical seal with suitable face combination can be fitted. For seal types & make refer table no. 9.

Bearing bracket	S e a l	Seal type, size material			Pr. Limit in bar	Plan
		Burgmnn	EPIL (Sealol)	Durametalic		
A 30	Single unbalanced	M7N - 35	P 11 / 12 - D 22	RO / ROTT 1.375	10	11+61/62 01+61/62
A 40		M7N - 45	P 11 / 12 - D 28	RO / ROTT 1.875		
A 50		M7N - 55	P 11 / 12 - D 36	RO / ROTT 2.250	12	
A 60		M7N - 65	P 11 / 12 - D 42	RO / ROTT 2.625		

Table no. 5

Face material combination is recommended as Carbon v/s Silicon Carbide.

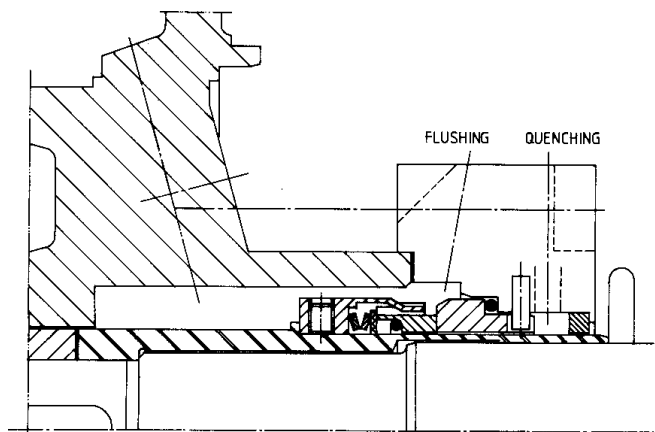


Fig. no. 5 : Mechanical seal arrangement

### 6.2 Conversion kit

#### A. Parts required for changeover from gland packing to mechanical seal execution

1. Shaft protection sleeve
2. Mechanical seal
3. Seal cover with gasket
4. 4 nos. of studs & nuts
5. Set of gaskets

#### B. Parts required for changeover from mechanical seal to gland packing execution

1. Shaft protection sleeve
2. Gland
3. Gland Packings
4. 2 nos. of studs, nuts & washers
5. Lantern ring
6. Set of gaskets

## 7 Materials

### Standard material of construction

Part no.	Part name	Material executions		
		1	2	0
102	Volute casing	CF8M	CF8M	CF8M
163	Discharge cover	CF8M	CF8M	CF8M
165	Cooling cover	C.I.	C.I.	C.I.
210	Shaft 1)	45 C 8	Type 410	AISI 329
230	Impeller	CF8M	CF8M	CF8M
330	Bearing bracket	C.I.	C.I.	C.I.
360	Bearing Cover	C.I.	C.I.	C.I.
461	Gland packing	Style 1650		
524	S.P.Sleeve	Type 316	Type 316	Type 316
901	Hex.Hd. Bolt	Gr.B8M	Gr.B8M	Gr.B8M

Table no. 6

For Temperature of pumped media less than -10 °C use AISI 410 for Shaft

## 8 Moment of inertia & pump weight

Pump size	Moment of inertia ( kg m2 )	Weight ( kg )	Pump size	Moment of inertia ( kg m2 )	Weight ( kg )
25 -150	0.015	35	50-315	0.51	114
25-200	0.083	52	65-125	0.028	52
32-125	0.015	38	65-160	0.055	74
32-160	0.0252	36	65-200	0.104	65
32-200	0.0822	46	65-250	0.237	94
32-250	0.193	72	80-160	0.068	94
40-160	0.0385	40	80-200	0.166	98
40-200	0.0679	52	80-250	0.308	112
40-250	0.2	77	100-200	0.191	115
40-315	0.466	110	100-250	0.336	140
50-160	0.0422	45	125-250	0.435	166
50-200	0.0798	50	125-400	1.7926	205
50-250	0.204	76			

Table no. 7

## 9 Cooling

For pumping liquid temperature > 105 °C, stuffing box cooling is required for gland packed execution.

Pressure of cooling water 7 bar max.

Temperature of cooling water inlet 20 to 30° C

Temperature of cooling water outlet 50° C max.

Test pressure of cooling chamber 11 kg/cm<sup>2</sup>

Clean, clear and non-abrasive water is recommended for cooling (pH7).

### 9.1 Quantity of cooling water in lpm

Bearing bracket	Pumped media - Temp (°C)	
	upto 140	upto 200
A 30	1.2	1.6
A 40	2.3	2.6
A 50	3	3.4
A 60	3.8	4.5

Table no. 8

## 10 Accessories

Following accessories are supplied with the pump :  
(if ordered on KSB)

- a. Coupling
- b. Coupling guard
- c. Base plate with foundation bolts
- d. Prime mover

### 10.1 Auxiliary connections

The auxiliary connections provided for pumps are (cooling, sealing liquid etc. as the case may be) indicated below.

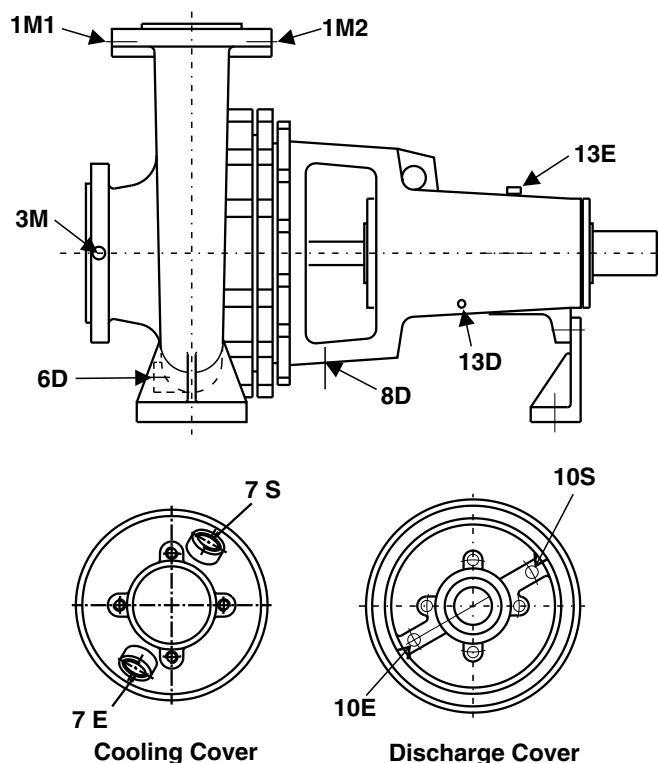


Fig. no. 6 : Auxiliary connections

Conn. code	Description	Bearing bracket		
		A-30	A-40	A-50 & A-60
1M1	Discharge Pressure gauge	3/8"1)	3/8"	1/2"
1M2	Discharge Pressure gauge	3/8" 1)	3/8"	1/2"
3M	Suction Pressure gauge	3/8" 1)	3/8"	1/2"
6D	Casing drain	3/8"	3/8"	1/2"
7E	Cooling inlet	1/2"	1/2"	1/2"
7S	Cooling outlet	1/2"	1/2"	1/2"
8D	Drain (leakage)	3/8"	3/8"	3/4"
10E	External sealing in	1/2"	1/2"	1/2"
10S	External sealing out	1/2"	1/2"	1/2"
13E	Vent plug	φ 20 mm		

All connections are NPT type

1) for DN 25; the connection size is 1/4" NPT

Table no. 9

### 10.2 Couplings

The coupling between the pump & prime mover can be either flexible or spacer type. Preferably spacer type couplings are recommended, for ease of maintenance & to take advantage of back-pull out feature of pump.

### 10.3 Prime mover

The prime mover to be used is electric motor as a standard. Steam turbine, or an I.C. engine can be used upon request.

## 11 Painting

The painting is done with enamel paint as per internal standard of KSB.

## 12 Testing

Performance testing of pump is carried out as per IS : 5120. The values of tolerance factors for pump performance are as per ISO 9906/ Table 10 Gr.2.

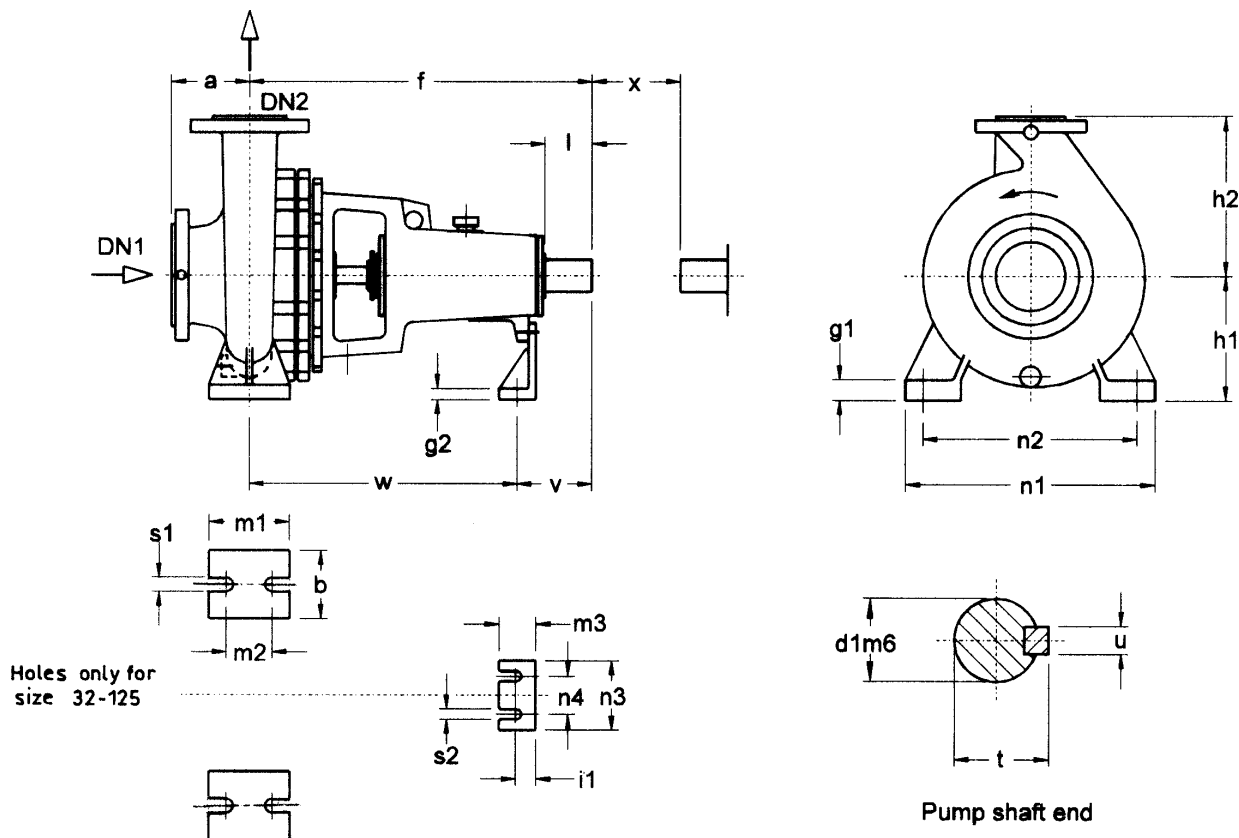
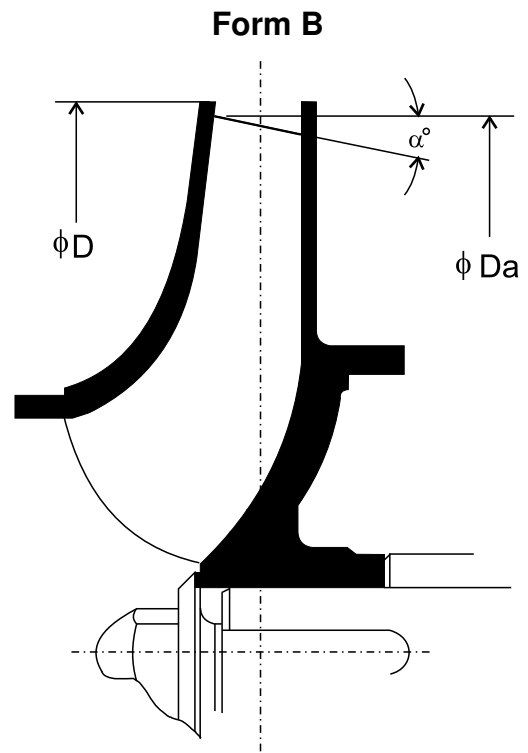
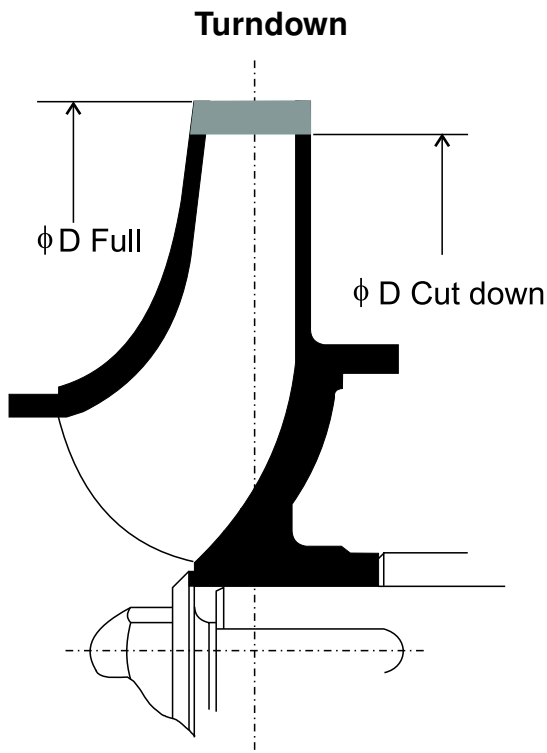
**13 Pump Dimensions**


Table. No. 10  
All dimensions are in mm

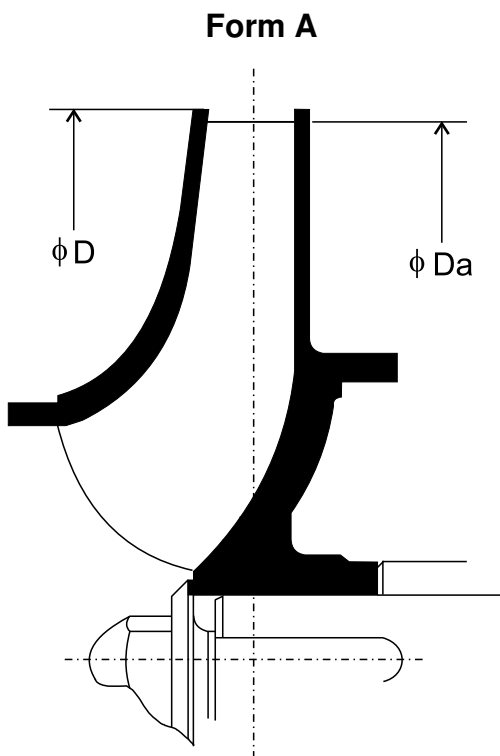
Pump	Pump dimensions						Foot dimensions														Shaft end dimensions					
	DN1	DN2	a	f	h1	h2	b	g1	g2	i1	m1	m2	m3	n1	n2	n3	n4	s1	s2	v	w	d1	l	t	u	x
25- 150	32	25	73	398	112	160	50	18	8	42	100	70	65	190	140	155	110	14	14	100	298	24	50	26.9	8	100
25- 200	40	25	90	385	160	175	50	18	8	43	100	70	65	240	190	155	110	14	14	100	285	24	50	26.9	8	100
32- 125	50	32	80	385	112	140	50	15	8	42	100	70	65	190	140	155	110	14	14	100	285	24	50	26.9	8	100
32- 160	50	32	80	385	132	160	50	15	8	42	100	70	65	240	190	155	110	14	14	100	285	24	50	26.9	8	100
32- 200	50	32	80	385	160	180	50	15	8	43	100	70	65	240	190	155	110	14	14	100	285	24	50	26.9	8	100
32- 250	50	32	100	500	180	225	65	18	8	39	125	95	65	320	250	155	110	14	14	130	370	32	80	35.3	10	100
40- 160	65	40	80	385	132	160	50	15	8	42	100	70	65	240	190	155	110	14	14	100	285	24	50	26.9	8	100
40- 200	65	40	100	385	160	180	50	15	8	43	100	70	65	265	212	155	110	14	14	100	285	24	50	26.9	8	100
40- 250	65	40	100	500	180	225	65	18	8	39	125	95	65	320	250	155	110	14	14	130	370	32	80	35.3	10	100
40- 315	65	40	125	500	200	250	65	18	12	39	125	95	65	345	280	155	110	14	14	130	370	32	80	35.3	10	100
50- 160	80	50	100	385	160	180	50	15	8	43	100	70	65	265	212	155	110	14	14	100	285	24	50	26.9	8	100
50- 200	80	50	100	385	160	200	50	15	8	43	100	70	65	265	212	155	110	14	14	100	285	24	50	26.9	8	100
50- 250	80	50	125	500	180	225	65	18	8	39	125	95	65	320	250	155	110	14	14	130	370	32	80	35.3	10	100
50- 315	80	50	125	500	225	280	65	18	12	42	125	95	65	345	280	155	110	14	14	130	370	32	80	35.3	10	100
65- 125	100	65	100	385	160	180	65	18	8	43	125	95	65	280	212	155	110	14	14	100	285	24	50	26.9	8	100
65- 160	100	65	100	500	160	200	65	18	8	39	125	95	65	280	212	155	110	14	14	130	370	32	80	35.3	10	100
65- 200	100	65	100	500	180	225	65	18	8	43	125	95	65	320	250	155	110	14	14	130	370	32	80	35.3	10	140
65- 250	100	65	125	500	200	250	80	19	12	40	160	120	65	360	280	155	110	18	14	130	370	32	80	35.3	10	140
80- 160	125	80	125	500	180	225	65	18	8	39	125	95	65	320	250	155	110	14	14	130	370	32	80	35.3	10	140
80- 200	125	80	125	500	180	250	65	18	8	39	125	95	65	345	280	155	110	14	14	130	370	32	80	35.3	10	140
80- 250	125	80	125	500	225	280	80	19	12	42	160	120	65	400	315	155	110	18	14	130	370	32	80	35.3	10	140
100-200	125	100	125	500	200	280	80	18	12	40	160	120	65	360	280	155	110	18	14	130	370	32	80	35.3	10	140
100-250	125	100	140	530	225	280	80	20	12	39	160	120	65	400	315	155	110	18	14	160	370	42	110	45.1	12	140
125-250	150	125	140	530	250	355	80	18	12	39	160	120	65	400	315	155	110	18	14	160	370	42	110	45.1	12	140
125-400	150	125	140	530	315	400	100	20	12	39	200	150	65	500	400	155	110	22	14	160	370	42	110	45.1	12	140

14 Trimming of impeller



Wherever form A & form B is not recommended the above sketch is to be followed.

Wherever form A & form B is not recommended the above sketch is to be followed.



Example for **Form B** :

1. MEGA 65-160 (1450 rpm)

**Form B**  $\phi Da = 149 \text{ mm}$   
 $\alpha = 13^\circ$   
 $\phi D = 151 \text{ mm}$

2. MEGA 125-200

**Form B**  $\phi Da = 213 \text{ mm}$   
 $\alpha = 26^\circ$   
 Here  $\phi D = 218 \text{ mm}$

Vanes to be cut to diameter  $Da$  and shrouds to be cut to diameter  $D$

Pump type	Speed	Form	D	Da	$\alpha$	Dmax.	Dmin.
32 - 125	1450	A	114	108		139	114
32 - 125	1450	A	115	113		139	114
32 - 125	1450	Turn down	119			139	114
32 - 125	1450	Turn down	124			139	114
32 - 125	1450	Turn down	129			139	114
32 - 125	1450	Turn down	134			139	114
32 - 125	1450	Full Dia.	139			139	114
32 - 125	2900	A	114	108		139	114
32 - 125	2900	Turn down	114			139	114
32 - 125	2900	Turn down	119			139	114
32 - 125	2900	Turn down	123			139	114
32 - 125	2900	Turn down	129			139	114
32 - 125	2900	Turn down	134			139	114
32 - 125	2900	Full Dia.	139			139	114
32 - 160	1450	Turn down	148			176	148
32 - 160	1450	Turn down	154			176	148
32 - 160	1450	Turn down	162			176	148
32 - 160	1450	Turn down	169			176	148
32 - 160	1450	Full dia.	176			176	148
32 - 160	2900	Turn down	136			176	136
32 - 160	2900	Turn down	144			176	136
32 - 160	2900	Turn down	154			176	136
32 - 160	2900	Turn down	161			176	136
32 - 160	2900	Turn down	168			176	136
32 - 200	1450	Turn down	178			209	178
32 - 200	1450	Turn down	186			209	178
32 - 200	1450	Turn down	192			209	178
32 - 200	1450	Turn down	202			209	178
32 - 200	1450	Full dia.	209			209	178
32 - 200	2900	Turn down	178			209	178
32 - 200	2900	Turn down	186			209	178
32 - 200	2900	Turn down	192			209	178
32 - 200	2900	Turn down	202			209	178
32 - 200	2900	Full dia.	209			209	178
32 - 250	1450	Turn down	213			260	213
32 - 250	1450	Turn down	220			260	213
32 - 250	1450	Turn down	230			260	213
32 - 250	1450	Turn down	238			260	213
32 - 250	1450	Turn down	249			260	213
32 - 250	1450	Full dia.	260			260	213
32 - 250	2900	Turn down	212			260	212
32 - 250	2900	Turn down	220			260	212
32 - 250	2900	Turn down	230			260	212
32 - 250	2900	Turn down	238			260	212
32 - 250	2900	Turn down	249			260	212
32 - 250	2900	Full dia.	260			260	212
40 - 125	1450	A	115	108		139	115
40 - 125	1450	A	115	113		139	115
40 - 125	1450	Turn down	119			139	115



Pump type	Speed	Form	D	Da	$\alpha$	Dmax.	Dmin.	
40 - 125	1450	Turn down	122	110		139	115	
40 - 125	1450	Turn down	128			139	115	
40 - 125	1450	Turn down	133			139	115	
40 - 125	1450	Full dia.	139			139	115	
40 - 125	2900	A	115			139	115	
40 - 125	2900	Turn down	115			139	115	
40 - 125	2900	Turn down	120			139	115	
40 - 125	2900	Turn down	124			139	115	
40 - 125	2900	Turn down	128			139	115	
40 - 125	2900	Turn down	134			139	115	
40 - 125	2900	Full dia.	139			139	115	
40 - 160	1450	B trim 7.8mm	137			45	176	137
40 - 160	1450	B trim 7.8mm	142				176	137
40 - 160	1450	B trim 7.8mm	149	176	137			
40 - 160	1450	B trim 7.8mm	154	176	137			
40 - 160	1450	B trim 7.8mm	162	176	137			
40 - 160	1450	B trim 7.8mm	166	176	137			
40 - 160	1450	B trim 7.8mm	176	176	137			
40 - 160	2900	B trim 7.8mm	137	176	137			
40 - 160	2900	B trim 7.8mm	142	176	137			
40 - 160	2900	B trim 7.8mm	149	176	137			
40 - 160	2900	B trim 7.8mm	154	176	137			
40 - 160	2900	B trim 7.8mm	162	176	137			
40 - 160	2900	B trim 7.8mm	166	176	137			
40 - 160	2900	B trim 7.8mm	176	176	137			
40 - 200	1450	Turn down	173		209		173	
40 - 200	1450	Turn down	182		209		173	
40 - 200	1450	Turn down	192		209		173	
40 - 200	1450	Turn down	202		209		173	
40 - 200	1450	Full dia.	209		209		173	
40 - 200	2900	Turn down	175		209		175	
40 - 200	2900	Turn down	184		209	175		
40 - 200	2900	Turn down	192		209	175		
40 - 200	2900	Turn down	199		209	175		
40 - 200	2900	Full dia.	209		209	175		
40 - 250	1450	Turn down	208			260	208	
40 - 250	1450	Turn down	218			260	208	
40 - 250	1450	Turn down	227			260	208	
40 - 250	1450	Turn down	238	260		208		
40 - 250	1450	Turn down	250	260		208		
40 - 250	1450	Full dia.	260	260		208		
40 - 250	2900	Turn down	214	260		214		
40 - 250	2900	Turn down	225	260		214		
40 - 250	2900	Turn down	236	260		214		
40 - 250	2900	Turn down	248	260		214		
40 - 250	2900	Full dia.	260	260		214		
40 - 315	1450	Turn down	278			333	278	
40 - 315	1450	Turn down	293			333	278	
40 - 315	1450	Turn down	307		333	278		

Pump type	Speed	Form	D	Da	$\alpha$	Dmax.	Dmin.
40 - 315	1450	Turn down	320			333	278
40 - 315	1450	Full dia.	333			333	278
50 - 125	1450	Turn down	114			142	114
50 - 125	1450	Turn down	120			142	114
50 - 125	1450	Turn down	125			142	114
50 - 125	1450	Turn down	131			142	114
50 - 125	1450	Turn down	137			142	114
50 - 125	1450	Full dia.	142			142	114
50 - 125	2900	Turn down	114			142	114
50 - 125	2900	Turn down	120			142	114
50 - 125	2900	Turn down	125			142	114
50 - 125	2900	Turn down	131			142	114
50 - 125	2900	Turn down	137			142	114
50 - 125	2900	Full dia.	142			142	114
50 - 160	1450	Turn down	135			174	135
50 - 160	1450	Turn down	141			174	135
50 - 160	1450	Turn down	148			174	135
50 - 160	1450	Turn down	153			174	135
50 - 160	1450	Turn down	160			174	135
50 - 160	1450	Turn down	167			174	135
50 - 160	1450	Full Dia.	174			174	135
50 - 160	2900	Turn down	135			174	135
50 - 160	2900	Turn down	141			174	135
50 - 160	2900	Turn down	148			174	135
50 - 160	2900	Turn down	154			174	135
50 - 160	2900	Turn down	161			174	135
50 - 160	2900	Turn down	167			174	135
50 - 160	2900	Full Dia.	174			174	135
50 - 200	1450	Turn down	178			219	178
50 - 200	1450	Turn down	188			219	178
50 - 200	1450	Turn down	199			219	178
50 - 200	1450	Turn down	209			219	178
50 - 200	1450	Turn down	219			219	178
50 - 200	1450	Full dia.				219	178
50 - 200	2900	Turn down	180			219	180
50 - 200	2900	Turn down	187			219	180
50 - 200	2900	Turn down	193			219	180
50 - 200	2900	Turn down	202			219	180
50 - 200	2900	Turn down	210			219	180
50 - 200	2900	Full dia.	219			219	180
50 - 250	1450	Turn down	220			260	220
50 - 250	1450	Turn down	230			260	220
50 - 250	1450	Turn down	239			260	220
50 - 250	1450	Turn down	249			260	220
50 - 250	1450	Full dia.	260			260	220
50 - 250	2900	Turn down	220			260	220
50 - 250	2900	Turn down	230			260	220
50 - 250	2900	Turn down	239			260	220
50 - 250	2900	Turn down	249			260	220

Pump type	Speed	Form	D	Da	$\alpha$	Dmax.	Dmin.
50 - 250	2900	Full dia.	260			260	220
50 - 315	1450	Turn down	270			320	270
50 - 315	1450	Turn down	283			320	270
50 - 315	1450	Turn down	296			320	270
50 - 315	1450	Turn down	307			320	270
50 - 315	1450	Full dia.	320			320	270
65 - 125	1450	Turn down	112			141	112
65 - 125	1450	Turn down	115			141	112
65 - 125	1450	Turn down	120			141	112
65 - 125	1450	Turn down	125			141	112
65 - 125	1450	Turn down	131			141	112
65 - 125	1450	Turn down	138			141	112
65 - 125	1450	Full dia.	141			141	112
65 - 125	2900	Turn down	114			141	114
65 - 125	2900	Turn down	119			141	114
65 - 125	2900	Turn down	122			141	114
65 - 125	2900	Turn down	128			141	114
65 - 125	2900	Turn down	131			141	114
65 - 125	2900	Turn down	137			141	114
65 - 125	2900	Full dia.	141			141	114
65 - 160	1450	B	151	143	16	172	143
65 - 160	1450	B	151	149	13	172	143
65 - 160	1450	Turn down	151			172	143
65 - 160	1450	Turn down	158			172	143
65 - 160	1450	Turn down	166			172	143
65 - 160	1450	Full dia.	172			172	143
65 - 160	2900	B	151	144	16	172	144
65 - 160	2900	B	151	147	7	172	144
65 - 160	2900	Turn down	151			172	144
65 - 160	2900	Turn down	159			172	144
65 - 160	2900	Turn down	166			172	144
65 - 160	2900	Full dia.	172			172	144
65 - 200	1450	Turn down	180			219	180
65 - 200	1450	Turn down	188			219	180
65 - 200	1450	Turn down	196			219	180
65 - 200	1450	Turn down	204			219	180
65 - 200	1450	Turn down	212			219	180
65 - 200	1450	Full dia.	219			219	180
65 - 200	2900	Turn down	180			219	180
65 - 200	2900	Turn down	187			219	180
65 - 200	2900	Turn down	195			219	180
65 - 200	2900	Turn down	204			219	180
65 - 200	2900	Turn down	211			219	180
65 - 200	2900	Full dia.	219			219	180
65 - 250	1450	Turn down	220			260	220
65 - 250	1450	Turn down	230			260	220
65 - 250	1450	Turn down	240			260	220

Pump type	Speed	Form	D	Da	$\alpha$	Dmax.	Dmin.
65 - 250	1450	Turn down	250			260	220
65 - 250	1450	Full dia.	260			260	220
65 - 250	2900	Turn down	220			260	220
65 - 250	2900	Turn down	229			260	220
65 - 250	2900	Turn down	240			260	220
65 - 250	2900	Turn down	250			260	220
65 - 250	2900	Full dia.	260			260	220
65 - 315	1450	Turn down	270			320	270
65 - 315	1450	Turn down	283			320	270
65 - 315	1450	Turn down	298			320	270
65 - 315	1450	Turn down	310			320	270
65 - 315	1450	Full Dia.	320			320	270
80 - 160	1450	B	172	154	26	172	154
80 - 160	1450	B	172	158	24	172	154
80 - 160	1450	B	172	162	19	172	154
80 - 160	1450	B	172	166	15	172	154
80 - 160	1450	B	172	170	9	172	154
80 - 160	1450	Full dia.	172			172	154
80 - 160	2900	B	172	154	26	172	154
80 - 160	2900	B	172	158	24	172	154
80 - 160	2900	B	172	162	20	172	154
80 - 160	2900	B	172	166	15	172	154
80 - 160	2900	B	172	170	9	172	154
80 - 160	2900	Full dia.	172			172	154
80 - 200	1450	Turn down	180			219	180
80 - 200	1450	Turn down	190			219	180
80 - 200	1450	Turn down	198			219	180
80 - 200	1450	Turn down	208			219	180
80 - 200	1450	Full Dia.	219			219	180
80 - 200	2900	Turn down	180			219	180
80 - 200	2900	Turn down	190			219	180
80 - 200	2900	Turn down	199			219	180
80 - 200	2900	Turn down	208			219	180
80 - 200	2900	Full Dia.	219			219	180
80 - 250	1450	Turn down	220			266	220
80 - 250	1450	Turn down	234			266	220
80 - 250	1450	Turn down	247			266	220
80 - 250	1450	Turn down	255			266	220
80 - 250	1450	Full Dia.	266			266	220
80 - 250	2900	Turn down	220			266	220
80 - 250	2900	Turn down	234			266	220
80 - 250	2900	Turn down	247			266	220
80 - 250	2900	Turn down	255			266	220
80 - 250	2900	Full Dia.	266			266	220
80 - 315	1450	Turn down	281			333	281
80 - 315	1450	Turn down	293			333	281
80 - 315	1450	Turn down	305			333	281

Pump type	Speed	Form	D	Da	$\alpha$	Dmax.	Dmin.
80 - 315	1450	Turn down	318			333	281
80 - 315	1450	Full dia.	333			333	281
80 - 400	1450	Turn down	330			404	330
100 - 160	1450	B	185	178	19	185	178
100 - 160	1450	B	185	178	11	185	178
100 - 160	1450	B	185	185	13	185	178
100 - 160	1450	Full dia.	185			185	178
100 - 160	2900	B	185	178	19	185	178
100 - 160	2900	B	185	184	16	185	178
100 - 160	2900	B	185	185	13	185	178
100 - 160	2900	Full dia.	185			185	178
100 - 200	1450	Turn down	179			219	179
100 - 200	1450	Turn down	189			219	179
100 - 200	1450	Turn down	197			219	179
100 - 200	1450	Turn down	207			219	179
100 - 200	1450	Full dia.	219			219	179
100 - 200	2900	Turn down	179			219	179
100 - 200	2900	Turn down	189			219	179
100 - 200	2900	Turn down	197			219	179
100 - 200	2900	Turn down	207			219	179
100 - 200	2900	Full dia.	219			219	179
100 - 250	1450	Turn down	216			265	216
100 - 250	1450	Turn down	225			265	216
100 - 250	1450	Turn down	236			265	216
100 - 250	1450	Turn down	247			265	216
100 - 250	1450	Turn down	257			265	216
100 - 250	1450	Full dia.	265			265	216
100 - 250	2900	Turn down	216			265	216
100 - 250	2900	Turn down	226			265	216
100 - 250	2900	Turn down	238			265	216
100 - 250	2900	Turn down	250			265	216
100 - 250	2900	Full dia.	265			265	216
100 - 315	1450	Turn down	280			332	280
100 - 315	1450	Turn down	293			332	280
100 - 315	1450	Turn down	307			332	280
100 - 315	1450	Turn down	320			332	280
100 - 315	1450	Full dia.	333			332	280
100 - 400	1450	Turn down	329			404	329
100 - 400	1450	Turn down	343			404	329
100 - 400	1450	Turn down	358			404	329
100 - 400	1450	Turn down	374			404	329
100 - 400	1450	Turn down	389			404	329
100 - 400	1450	Full Dia.	404			404	329
125 - 200	1450	B	218	208	31	218	208
125 - 200	1450	B	218	213	26	218	208
125 - 200	1450	B	218	218	23	218	208

Pump type	Speed	Form	D	Da	$\alpha$	Dmax.	Dmin.
125 - 200	1450	B	218	218	13	218	208
125 - 200	1450	Full dia.	218			218	208
125 - 200	2900	B	218	208	31	218	208
125 - 200	2900	B	218	213	26	218	208
125 - 200	2900	B	218	218	23	218	208
125 - 200	2900	B	218	218	13	218	208
125 - 200	2900	Full dia.	218			218	208
125 - 250	1450	Turn down	218			265	218
125 - 250	1450	Turn down	227			265	218
125 - 250	1450	Turn down	237			265	218
125 - 250	1450	Turn down	246			265	218
125 - 250	1450	Turn down	258			265	218
125 - 250	1450	Full Dia.	265			265	218
125 - 315	1450	Turn down	280			332	280
125 - 315	1450	Turn down	296			332	280
125 - 315	1450	Turn down	306			332	280
125 - 315	1450	Turn down	320			332	280
125 - 315	1450	Full Dia.	332			332	280
125 - 400	1450	Turn down	330			417	330
125 - 400	1450	Turn down	346			417	330
125 - 400	1450	Turn down	362			417	330
125 - 400	1450	Turn down	380			417	330
125 - 400	1450	Turn down	399			417	330
125 - 400	1450	Full Dia.	417			417	330
150 - 200	1450	B	218	218	31	218	218
150 - 200	1450	B	218	218	23	218	218
150 - 200	1450	B	218	218	14	218	218
150 - 200	1450	B	218	218	5	218	218
150 - 200	1450	Full Dia.	218			218	218
150 - 250	1450	Turn down	220			265	220
150 - 250	1450	Turn down	230			265	220
150 - 250	1450	Turn down	239			265	220
150 - 250	1450	Turn down	250			265	220
150 - 250	1450	Turn down	258			265	220
150 - 250	1450	Full dia.	265			265	220
150 - 315	1450	Turn down	264			328	264
150 - 315	1450	Turn down	277			328	264
150 - 315	1450	Turn down	290			328	264
150 - 315	1450	Turn down	303			328	264
150 - 315	1450	Turn down	317			328	264
150 - 315	1450	Full dia.	328			328	264
150 - 400	1450	Turn down	329			413	329