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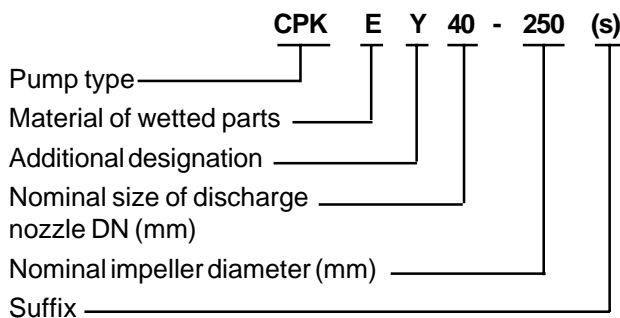
1. Design

CPK pumps are horizontal, radially split single stage, single entry, back pullout type, volute casing process pumps with radial flow impeller, to EN 22858 / ISO 2858 / ISO 5199. Complemented by pumps of DN 200 and above.

2. Application

CPK pumps are used for pumping hot water and organic and inorganic fluids in chemical, food and other branches of industries. The application areas are Chemical, Refinery, Paper & Pulp Industries, Food Industries, Sugar Industries etc.

3. Pump Designation



Material of wetted parts can be :
(for details, refer pt. no. 7)

- i) Cast Iron : GC
- ii) Cast steel : E / EG / EC
- iii) Stainless steel : C / GC / EC - with S.S. Impeller
EG - with C.I. impeller

Additional designations can be :

- Y - Pump with intensively cooled stuffing box (refer Annexure I)
- m - Pump with mechanical seal

Suffix can be :

- s - Pump with heavy bearing bracket
- c - Pump with cooled bearing bracket (Only for EY pump)

4. Operating Parameters

4.1 Capacity and total head

CPK pumps are available in the following range.

Supply frequency	50 Hz
Pump size	DN 32 to 250 mm
Capacity	Q Up to 1200 m ³ /hr.
Total Head	H Up to 150 m

4.3 NPSH

The NPSH values given in the individual performance curves are the minimum values which corresponds to the cavitation limits. They are valid for water without gases. As a safety margin, committed NPSHr values must therefore be higher than that on the curve by atleast 0.5m.

In general (NPSHa-NPSHr) should be > 0.5m, and for hot water should be >1m.

5. Selection of Pump

Selection of pump is based on -

Capacity	: Q m ³ /hr.
Total head	: H mtrs of water column
NPSHa	: mtrs of water column
Pumping Liq.Temp.	: °C
Density	: ρ kg/dm ³

and several other factors like pH of liquid, solid content, viscosity etc.

An initial selection of the pump size can be done from the Family Curves (Fig.1). The exact selection is to be finalised as per individual performance curve of the respective pump.

5.1 Family Curves

Refer page no. 2 Fig. 1.

5.3 Individual Performance Curves

The total head and power curves are valid for the pumped medium of density ρ = 1.0 kg / dm³. In case ρ is not equal to 1.0 kg / dm³, then the power must be multiplied by ρ. The measured values in performance curves are guaranteed in accordance with **ISO 2548/C**. All the individual performance curves are plotted for the nominal speed, hence the same should be converted to effective speed of the drive using affinity laws.

5.4 Capacity

Q minimum	= 0.1 (Q optimum) - provided no limitation is given in table no. 14
Q maximum	= 1.1 (Q optimum) - for 2 pole drive
Q maximum	= 1.2 (Q optimum) - for 4 pole drive

5.5 Capacity of pumps fitted with mechanical seal

If the pumps are fitted with a single mechanical seal with product circulation (circulation line from discharge nozzle via the seal back into the pump casing), then, up to 20 m³/hr.; 1m³/hr. should be added to actual pump capacity.

Example :

If desired capacity is 15 m³/hr. & single mechanical seal is used all the values should be read off the curve at Q = 15+1 = 16 m³/hr.

5.7 Impeller diameter selection

The characteristic curves indicate the minimum and maximum impeller diameters. The impeller diameter obtained from the curve for the operating point is to be increased by 2 mm for impellers of Cast Steel and Stainless Steel.

5.8 Pressure-temperature limits

5.8.1 For CPK-GC

A. Without special regulations

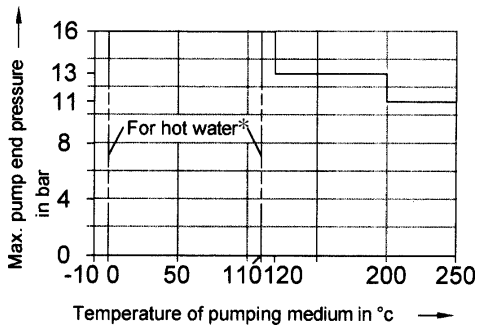


Fig.2 : Applicable for all mediums including hot water & organic heat transfer media.

*Applicable for hot water, but not for heating plants i.e. for applications governed by regulations for pressure vessels (IBR & ASME Boiler code). For applications outside the specified limits, refer to H.O.

B. With special regulations : For special applications e.g. as per regulations of pressure vessel as well as for excessive corrosion and erosion conditions; CPK GC pumps are not allowed.

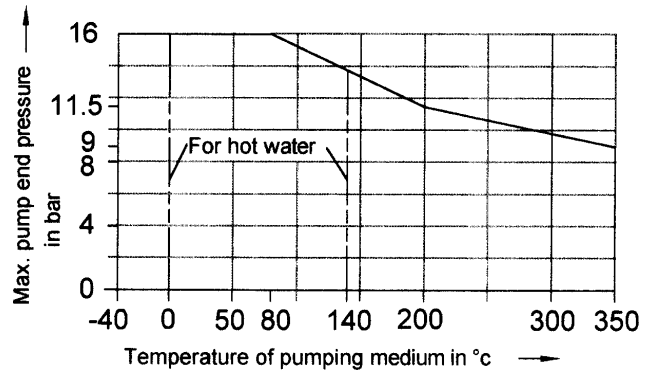


Fig.6 : Applicable for all liquids including organic heat transfer media including hot water for sizes mentioned in table no. 4.

32-125	40-250	65-250	200-250
32-160	40-315	80-160	200-500
32-200	50-160	80-200	
32-250	50-200	100-200	
40-160	50-250	100-250	
40-200	65-200	125-250	

Table no. 4

5.8.2.1 Pressure Temperature limits for CPK-C

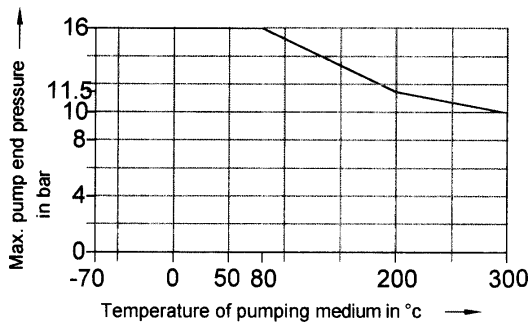


Fig.4

5.8.2.2 Pressure Temperature limits for CPK E

For pump sizes

50-315, 65-315, 80-250, 80-315, 80-400, 100-315, 100-400, 125-315, 150-250, 150-315, 150-400, 200-315, 200-400, 250-315, 250-400, 250-500

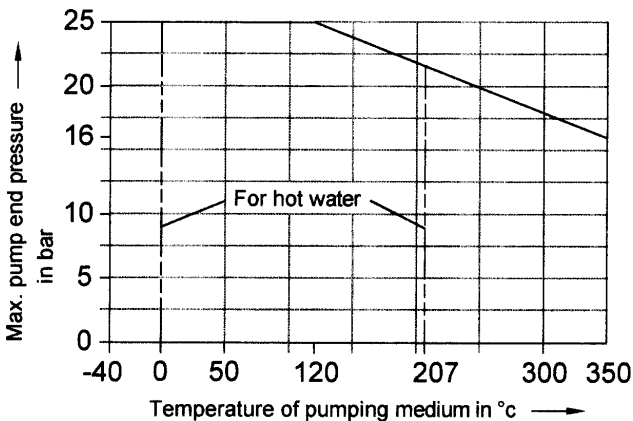


Fig.5 : Applicable for all liquids including organic heat transfer media including hot water.

Note :

Applicable for hot water only but not for water heating plants i.e. not for applications governed by regulations for pressure vessels (IBR or ASME Boiler code). For applications outside the specified limits; refer to Z.O./B.O.

5.9 Suction pressure

Maximum permissible suction pressure (Ps max.) is difference between permissible discharge pressure and shutoff head.

$$\text{Thus } P_{s \text{ max.}} = P_d - H_o \times \rho / 10$$

Where Pd = pump discharge pressure in bar

Ho = Head at Q = 0 in m i.e. shut off head

ρ = density of liquid in kg/dm³

5.10 Hydrostatic test pressure

Minimum = 6 kg/cm²

Normal = 1.5 X Working pressure

Maximum = 1.5 X maximum permissible discharge pressure at room temperature. Refer table no. 5.

5.11 Flanges

- 1) CPK GC pumps are available with flanges according to ASME B 16.1 Class 125 FF only.
- 2) CPK C pumps are available with flanges according to ASME B 16.5 class 150 RF only.
- 3) CPK E pumps applicable for fig. 5 are available with flanges according to ASME B 16.5 class 300 RF only. All other CPK E pumps are available with flanges according to ANSI B 16.5 class 150 RF.

5.12 Speed

The family curves (fig. 1) are to be referred for maximum permissible speed of individual models. However, this speed is permissible only for the sizes shown in table no. 14. In any case the maximum permissible peripheral velocity for the impeller (see fig. no. 8) as well as the max. permissible P/n value (see table no. 8) should also be taken into account.

Max. permissible peripheral velocity for the impeller

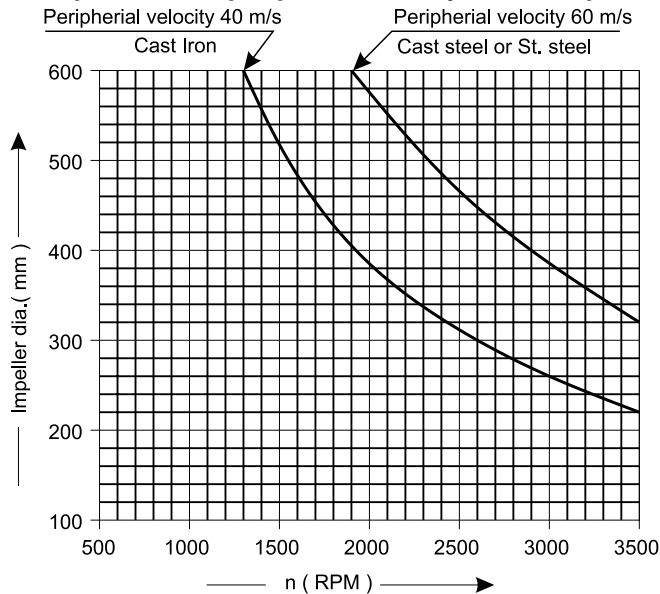


Fig. no. 8

5.14 Torque speed characteristics

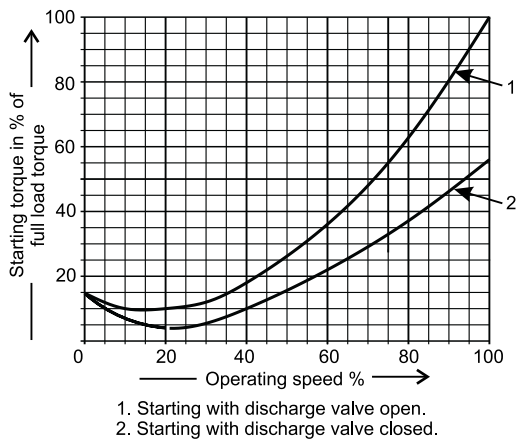


Fig. no. 9

5.15 Maximum permissible P/n value

Bearing Bracket	P/n = kW / RPM	Maximum permissible drive power in kW		
		n = 960	n = 1450	n = 2900
P 25/62	0.009	8.6	13	26.1
P 35/80	0.021	20.1	30.4	60.9
P 45/120	0.05	48	72.5	145
P 45/120 as				
P 55/140	0.11	105.6	159.5	-
P 65/160	0.22	211.2	319	-

Table no. 8

5.16 Power Reserves for Drives

Motor Power	Power reserve
Up to 7.5 kW	About 20%
7.5 - 37 kW	About 15%
Above 37 kW	About 10%

Table no. 9

Note : Motor power should never be less than 1kW.

6. Design Features

Direction of Rotation of the pump is clockwise (as seen from the drive end).

6.1 Casing

It is a radially split volute casing with end suction and top discharge. Single or double volute depends on size. Generally the casing is offered with bottom feet mounting. Centre feet mounting is given for operating temperatures above 200°C. (Applicable only for CPK C & E pumps.) For CPK GC, only bottom feet mounting is offered. For sizes of connections provided on the casing refer Annexure III.

6.1.1 Branch orientation

Suction branch is axial and discharge branch is radially upwards.

6.3 Wearing Rings

CPK C & E pumps have no wear ring on impeller and casing as a standard execution. Single wearing ring is provided for CPK GC pumps.

6.4 Bearings

Bearings used for a pump depending upon type of bearing bracket used. Standard execution is with normal bearing bracket having two deep groove ball bearings. Heavy bearing bracket is provided with one heavy duty cylindrical roller bearing at pump side and two angular contact ball bearings at motor side (in "O" arrangement). Refer table no. 12 & 13 for the bearings used. Selection of bearing bracket depends upon the radial & thrust load of individual pumps. The subsequent table no. 14 illustrates recommended bearing brackets for CPK pumps.

For normal bearing bracket

Bearing bracket	Pump & motor side	Oil fill (ltr.)
P 25/62	6305 C3	0.2
P 35/80	6307 C3	0.5
P 45/120	6409 C3	0.5
P 55/140	6411 C3	1.5

Table no. 12

For Heavy Bearing Bracket

Bearing bracket	Pump side	Motor side	Oil fill (ltr.)
P 25/62 s	NU 305 C	2 X 7206 BG	0.2
P 35/80 s	NU 307 C3	2 X 7307 BG	0.5
P 45/120 s	NU 311 C3	2 X 7311 B TVP UA 80	0.5
P 55/140 s	NU 313 C3	2 X 7313 B TVP UA 80	1.5
P 65/160 s	NU 413	2 X 7315 B TVP UA 80	1.8

Table 13

Note : BG is BECBP for SKF make & B.TVP.UA for FAG make B.TVP.UA 80 is BEC86P for SKF make.

6.4.1 Selection of Bearing Brackets

In table no. 14, wherever "N" bearing bracket is mentioned, the data is valid for normal bearing bracket for following specifications. For conditions other than mentioned below; heavy bearing bracket "S" should be used.

Density = 1.05 kg/dm³

Suction pressure ≤ 4 bar

Max. speed 2900 rpm ++				Max. speed 1450 rpm			
Pump Sizes	Q / Q opt.			Pump Sizes	Q / Q opt.		
	< 0.5	1#	1.1\$		< 0.5	1#	1.2 @
32-125	N			80-400	N		
32-160				100-400			
32-200				125-250			
32-250	S			125-315			
40-160	N			125-400	S	N	N
40-200	S	N		150-250	N		
40-250				150-315			
40-315				150-400			
50-160				200-250	N		
50-200				200-315			
50-250				200-400			
65-200				200-500		S	
65-250				250-315		S	
65-315				250-400		N	
80-160				250-500		S	
80-200	N						
80-250							
80-315							
100-200				S			
100-250	N	N					
100-315	S						

Table no. 14

++ These pumps are executed with normal brg. bracket for 1450 rpm

0.5 < Q/Qopt. < 1

\$ 1 < Q/Qopt. < 1.1

@ 1 < Q/Qopt. < 1.2

- 50-315 pump at 1450 rpm with P 45-120as bearing bracket

- For 60Hz supply frequency heavy (s) bearing bracket should be used irrespective of Q/Qopt. ratio.

6.5 Shaft sealing

Shaft sealing can be done by either gland packing or mechanical seals depending upon the service conditions. Change over from gland packing execution to single mechanical seal or vice-versa is possible by using corresponding set of interchangeable parts also known as "Conversion kit". Refer 6.5.3 for further details.

6.5.1 Stuffing box packing

Generally gland packings are used up to a maximum suction pressure of 4 bar. Grade of gland packings used for CPK pumps are :

Style 1094 (TIWA)* CPK G, E, C

Grafoil CPK EY

* Teflon Impregnated White Asbestos)

Gland packing execution is available with lantern ring. For CPK EY pump no lantern ring is provided.

6.5.2 Mechanical Seal

Mechanical seal is used as a sealing device in the following condition.

1. For pumping expensive, toxic, inflammable and corrosive liquids.
2. Generally for a chemical, refinery, fertilizers, pharmaceuticals and nuclear applications.
3. For hot water / DM water services
4. For special process requirements.

Commercially available mechanical seals of single, double & tandem type in cartridge construction are fitted. Single acting mechanical seals may be fitted with a quenching medium, sealing against atmospheric influence is effected by means of a throttling bush or a secondary mechanical seal.

Note : For standard mechanical seal arrangements refer fig. no. 10a & Annexure II. The charts indicate standard seal types, seal sizes, seal face materials and API flushing plans. All offers should be made as per these charts only. For any deviations from these charts refer Z.O./B.O. before making offers.

6.5.3 Conversion kit

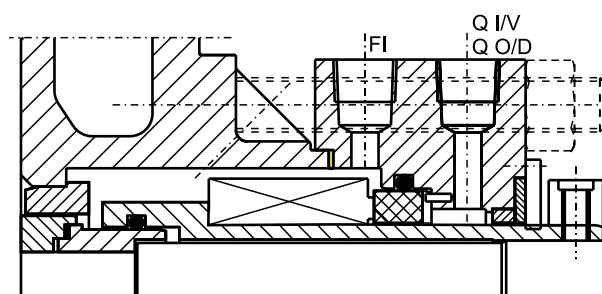
A. Parts required for changeover from gland packing to single mechanical seal :

1. Shaft protection sleeve.
2. mechanical seal
3. Seal cover with throttle bush & flushing line.
4. Casing cover (if applicable)
5. 4 no. of studs & nuts or 4 nos. od allen head screw
6. Set of gaskets & O-rings.

B. parts required for changeover from single mechanical seal to gland packing :

1. Shaft protection sleeve.
2. Gland packing
3. Lantern ring
4. Stuffing box pressure ring
5. Stuffing box gland
6. Casing cover (if applicable)
7. 2 nos. of studs, nuts and washers
8. Set of gaskets and O-rings

Refer Annexure II for further details on casing cover interchangeability.



Shaft seal : single-acting mechanical seal, unbalanced, cartridge.

Fig. 10 : Seal arrangements

7 Materials

Following tables indicate different material combinations available in CPK G, CPK E, and CPK C models.

Refer Annexure IV for reference standards and grades of materials.

7.1 Material Combinations for CPK GC, C

Part name	Material executions		
	GC	C	
	2	4	
Volute casing	C.I.	CF8M	
Casing cover			
Stuffing box pr. Ring			
Lantern ring			
Neck ring (packing)			Type 316
Stuffing box gland			CF8M
Shaft protection sleeve (packing)	Type 316		
Impeller	CF8M		
Impeller nut	CF8M/Type 316		
Brg. Bkt. Lantern	C.I.		
Studs & nuts	Class 6.8 / 6	B7/2H	
Shaft	45C8		
Key			
Splash ring	Al.		

Table no. 16

Note :

- When $V_u > 40$ m/s; use CF8M for impeller
- For mechanical seal
 Material of Sleeve : Type 316
 Material of Seal cover : Type 316
 Material of throttle bush : Carbon
- For size 200-250 bearing bracket lantern is given in WCB.

7.2 Material Combinations for CPK E

Part name	Material executions			
	EGY	E	EC	EY
	0	1	2	3
Volute casing	WCB			
Casing cover				
Stuffing box pr. Ring	C.I.	C.I.		C.I.
Lantern ring	-			-
Neck ring (packing)	-			-
Stuffing box gland	C.I.			C.I.
Shaft protection sleeve (packing)	C45/CH	Type 410		
Impeller	C.I.	WCB	CF8M	WCB
Impeller nut	CF8M/Type 316			
Bearing Bracket Lantern	C.I.			WCB
Studs & nuts	B7/2H	Cl. 6.8 & 6	B7/2H	
Shaft	C 45			Type 410
Key				
Splash ring	Al.			

Table no. 17.

Note :

- For mechanical seal
 Material of Sleeve : Type 316
 Material of Seal cover : Type 316
 Material of throttle bush : Carbon
- Material of wearing ring and impeller ring is applicable only when details of construction indicates double wearing ring execution.

- Combination no. "0" is always offered without wearing rings.
- Shaft can given in C45 for operating temp. in the range of -10 to +250 °C.
 - Bearing bracket lantern is given in WCB if operating temp. is more than 200 °C or when pumping hot water above 180 °C and where special regulations are applicable. Bearing bracket lantern is given in CF8M for operating temperature < -30 °C.
 - When $V_u > 40$ m/sec. or operating temp. 250 °C to 300 °C use CF8M for Impeller.
 - CH. is Chrome plated.
 - Fastners of grade B7/2H should be offered if operating temperature > 250 °C.

8 Technical data

8.1 Dynamic moment of inertia, volumetric content and weight of pump

Pump size	Dynamic moment of inertia - J in kg-m^2	Volumetric content of pump in liters	Weight of pump in kg.	
			CPK G	CPK E,C
32-125	0.005	0.6	33	39
32-160	0.009	0.7	33	39
32-200	0.019	1	39	48
32-250	0.047	1.7	75	84
40-160	0.009	1	35	41
40-200	0.019	1.2	40	48
40-250	0.047	1.9	75	84
40-315	0.105	2.7	85	106
50-160	0.01	1.6	38	44
50-200	0.023	1.9	44	49
50-250	0.051	2.5	75	85
50-315	0.105	3	100	114
65-200	0.023	2.7	66	81
65-250	0.05	3.2	80	90
65-315	0.107	4.6	117	121
80-160	0.015	4	71	80
80-200	0.025	4.1	71	85
80-250	0.056	4.7	97	100
80-315	0.125	5.7	122	130
80-400	0.3	7.6	151	162
100-200	0.03	6.3	88	100
100-250	0.07	6.9	117	120
100-315	0.14	7.9	131	140
100-400	0.32	9.5	162	175
125-250	0.089	10.3	132	138
125-315	0.173	11.1	149	160
125-400	0.4	12.6	177	193
150-250	0.1	18	170	180
150-315	0.23	19	240	250
150-400	0.47	20	275	290
200-250	0.15	29	230	240
200-315	0.28	30	270	280
200-400	0.7	31	314	335
200-500	1.5	33	496	511
250-315	0.32	70	447	475
250-400	0.9	70	485	515
250-500	1.6	70	570	610

Table no.19

11.2 Couplings

The couplings between the pump and prime mover can be either flexible or all metal type or gear type. Preferably spacer type couplings are recommended for ease of maintenance and to take maximum advantage of back pull out feature of CPK pumps i.e. maintenance without disturbing the mounting of pump casing in the pipe line and mounting of prime mover. Spacer length should be suitably selected. For minimum spacer length refer dimension "y" in table 33 & 34. While selecting a coupling following care is to be taken :

1. Maximum rated speed of the coupling should be more than the actual running speed.
2. Maximum rated power to be transmitted by the coupling should be more than the drive rating.
3. Permissible P/n value of the coupling should be more than the actual ratio of power to be transmitted to the running speed.
4. Permissible maximum bore of the coupling should be more than the diameter of shaft of the pump or prime mover (in prescribed tolerance).

11.6 Vacuum balance line

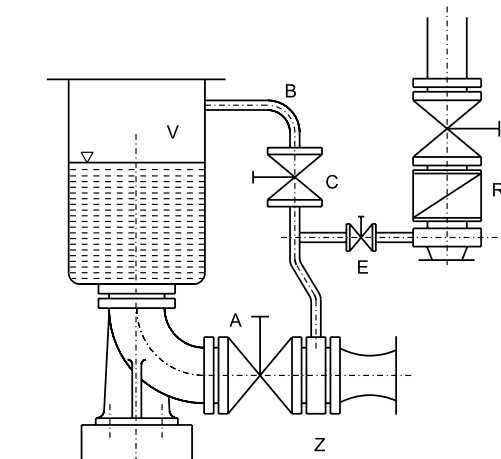


Fig. 18

- A. Main isolating valve
- B. Vacuum balance line
- C. Isolating valve
- E. Vacuum tight isolating valve
- R. Check valve
- V. Vessel under vacuum
- Z. Intermediate flange

If the pump has to pump a liquid out of vessel under vacuum, it is advisable to install a vacuum balance line. This line should have a nominal size of 25 mm atleast. It should be arranged to lead back into the vacuum vessel at a point above the permissible liquid level. An additional line starting at the pump discharge nozzles facilitates venting of the pump before start up. The vacuum tight isolating valve E in the connecting line should be closed after the venting procedure and should remain closed while the pump is running. The main isolating valve C in the vacuum balance line must remain open at all times when the pump is running and should be closed when the pump is shut down. See fig. 18.

12. Painting

Painting of the pump is done with enamel paints as per internal standard ok KSB.

13. Testing

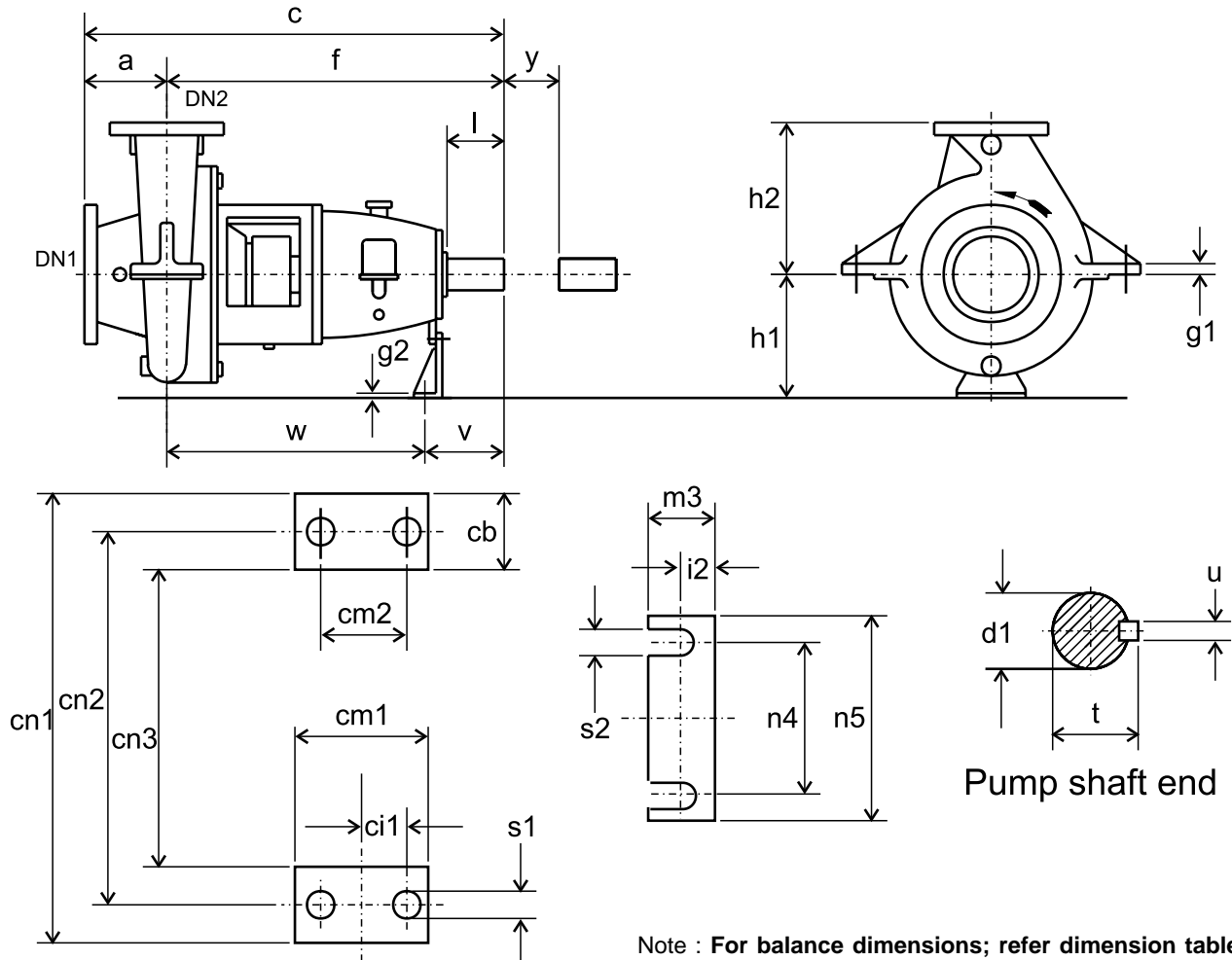
Performance testing of the pump is carried out as per IS:5120 or DIN 1944/III. Testing as per any other standard is possible.

15.1 *List of components*

Part no.	Description	Part no.	Description
102	Volute casing	503.01	Impeller ring
161	Casing cover	507.01	Splash ring
183	Support foot	524.01	Shaft protection sleeve
210	Shaft	550.23	Spacer disc
230	Impeller	561.02	Cylindrical pin
320.02	Angular contact ball bearing	638	Constant level oiler
321.01/02	Deep groove ball bearing	901.04	Hex. Bolt - Support foot
322.01	Cylindrical roller bearing	901.31	Hex. Bolt - Dismantling
330	Bearing bracket	902.01	Stud - Bearing bracket lantern
344	Bearing bracket lantern	902.04	Stud - Bearing bracket
360.01	Bearing cover	903.01	Hex. Head plug - Casing drain
360.02	Bearing end cover	903.18	Hex. head plug - Casing cover
400.01	Flat gasket - Bearing cover	903.46	Hex. Head plug - Bearing bracket drain
400.02	Flat gasket - Bearing end cover	913	Vent plug- Bearing bracket
411.18	Gasket	914.02	Allen grub screw - Impeller ring
411.01	Gasket	920.01	Hex. Nut - Bearing bracket lantern
411.10/11	Flat gasket - Casing cover	920.04	Hex. Nut - Bearing bracket
411.31/32	Flat gasket - Impeller nut / impeller	920.21	Withdrawal nut
411.46	Flat gasket - Drain plug Brg. Bkt.	922	Impeller nut
412.01	O ring - Bearing bracket lantern	930.01	Spring washer - Support foot
421.01	Oil seal - Bearing cover	931.01	Lock washer
421.02	Oil seal - Bearing end cover	932.01/02	Circlip
456.01	Neck ring	940.01/02	Key
502.01	Wearing ring		

16 Pump dimensions

16.1 Centre feet pump dimensions

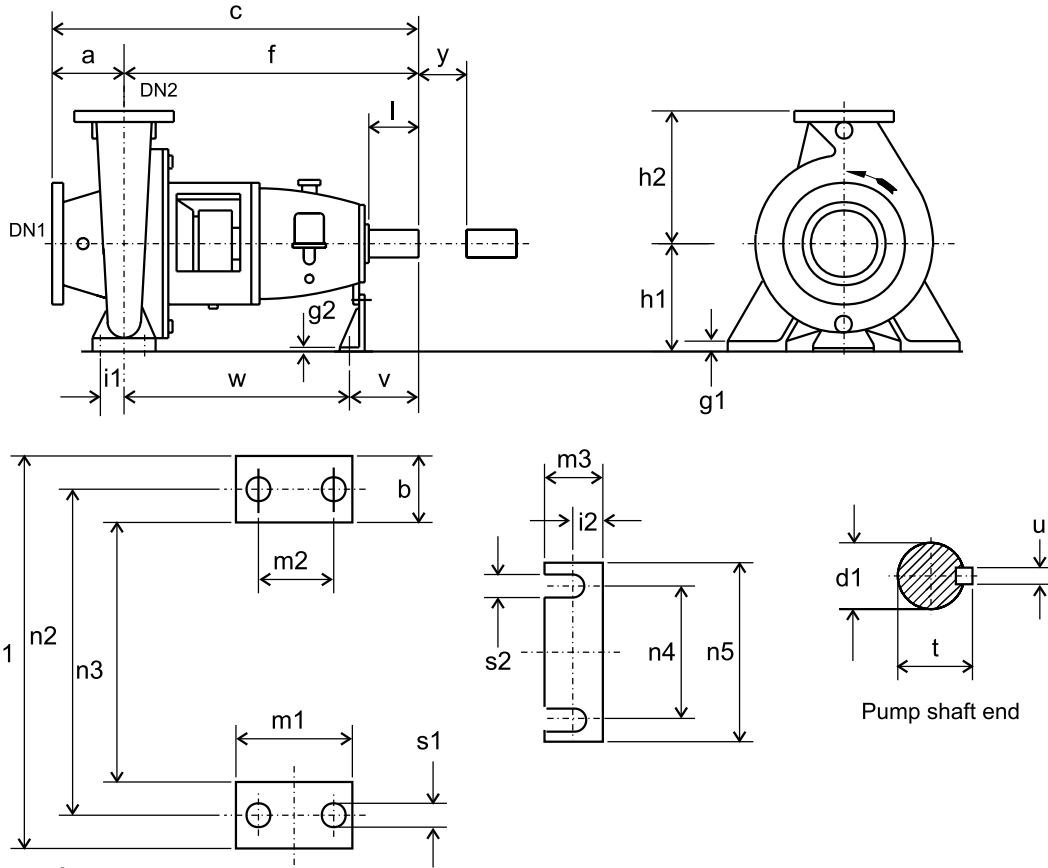


All dimensions are in mm

Note : For balance dimensions; refer dimension table of bottom feet pumps.

Pump Size	Bearing Bracket	Pump Dimensions								Mounting Bolts					
		DN1	DN2	cb	g1	cm1	cn1	cn3	ci1	cm2	cn2	s1			
32	160 P 25/62	50	32	40	14	100	320	240	30	70	285	14			
	200 P 25/62			45	16		360	270			315				
	250 P 35/80			50	16		115	440			340		400		
40	160 P 25/62	65	40	40	14	100	340	260	30	70	310	14			
	200 P 25/62			45	16		375	285			340				
	250 P 35/80			50	16		115	440			340		400		
	315 P 35/80			20	20		130	500			400		38	90	460
50	160 P 25/62	80	50	42.5	14	100	375	290	30	70	340	14			
	200 P 25/62			45	16		410	320			370				
	250 P 35/80			50	16		115	460			360		40	80	420
	315 P 45/120 as			20	20		130	525			425		37.5	90	485
65	200 P 35/80	100	65	45	16	110	425	335	38	80	375	14			
	250 P 35/80			18	130	500	400	460							
	315 P 45/120			20	20	130	590	490			90		550	18	
80	200 P 35/80	125	80	50	16	120	480	380	38	90	430	14			
	250 P 35/80			18	130	525	440	485							
	315 P 45/120			20	20	130	590	490			37.5		550	18	
100	200 P 35/80	125	100	16	120	510	410	38	90	90	460	18			
	250 P 45/120			18	130	550	450	38			510				
	315 P 45/120			20	20	130	640	540			37.5		600		
125	250 P 45/120	150	125	18	130	590	490	38	90	90	550	18			
	315 P 45/120			20	150	690	590				110		650	20	
200	400 P 55/140	250	200	65	22	160	920	790	55	110	855	23			

16.2 Bottom feet pump dimensions



All dimensions are in mm

Pump Size	Bearing Bracket	Pump Dimensions															Shaft end dimensions				Mounting Bolts									
		DN1	DN2	a	b	c	f	g1	g2	h1	h2	m1	m3	n1	n3	n5	d1 k6	l	t	u	y	l1	l2	m2	n2	n4	s1	s2	v	w
32	125	P 25/62	50	32	80	50	465	385	12	112	140	100	45	190	90	160	24	50	27	8	100	35	25	70	140	110	14	100	285	
	160				132	160	100	240	140	24	50	27	8	35	25		70	190	100	285										
	200				160	180	100	240	140	24	50	27	8	35	25		70	190	110	14	100	285								
	250				180	225	125	47	320	190	32	80	35	10	48		27	96	250	130	370									
40	160	P 25/62	65	40	80	50	465	385	14	132	160	100	45	240	140	160	24	50	27	8	100	35	25	70	190	110	14	100	285	
	200				160	180	100	240	140	24	50	27	8	35	25		70	212	110	14	100	285								
	250				180	225	125	47	320	190	32	80	35	10	48		27	96	250	130	370									
	315				200	250	150	50	345	215	32	80	35	10	48		27	96	280	130	370									
50	160	P 25/62	80	50	100	50	485	385	14	160	180	100	45	265	165	160	24	50	27	8	100	35	25	70	212	110	14	100	285	
	200				160	180	100	240	140	24	50	27	8	35	25		70	212	110	14	100	285								
	250				180	225	125	47	320	190	32	80	35	10	48		27	96	250	130	370									
	315				200	250	150	50	345	215	32	80	35	10	48		27	96	280	130	370									
65	200	P 35/80	100	65	100	65	600	500	16	180	225	125	47	320	190	160	32	80	35	10	140	48	27	96	250	110	14	130	370	
	250				180	225	125	47	320	190	32	80	35	10	48		27	96	250	130	370									
	315				200	250	150	50	345	215	32	80	35	10	48		27	96	250	130	370									
	315				200	250	150	50	345	215	32	80	35	10	48		27	96	250	130	370									
80	160	P 35/80	125	80	125	80	625	500	15	180	225	125	47	320	190	160	32	80	35	10	140	47.5	25	95	250	110	14	130	370	
	200				180	225	125	47	320	190	32	80	35	10	47.5		25	95	250	130	370									
	250				200	250	150	50	345	215	32	80	35	10	47.5		25	95	250	130	370									
	315				225	280	160	52	400	240	42	110	45	12	60		30	120	315	110	14	160								
100	200	P 35/80	125	100	125	80	625	500	16	200	280	160	47	360	200	160	32	80	35	10	140	60	27	120	280	110	18	14	130	370
	250				180	225	125	47	320	190	32	80	35	10	60		27	120	280	130	370									
	315				200	250	150	50	345	215	32	80	35	10	60		27	120	280	130	370									
	400				225	280	160	52	400	240	42	110	45	12	60		27	120	280	130	370									
125	250	P 45/120	150	125	140	100	670	530	18	250	315	160	52	400	240	160	42	110	45	12	140	60	30	120	315	110	18	14	160	370
	315				180	225	125	47	320	190	42	110	45	12	60		30	120	315	110	14	160								
	400				200	250	150	50	345	215	42	110	45	12	60		30	120	315	110	14	160								
	400				225	280	160	52	400	240	42	110	45	12	60		30	120	315	110	14	160								
150	250	P 45/120	200	150	160	100	690	530	20	280	375	200	52	500	300	160	42	110	45	12	180	75	30	150	400	110	14	160	370	
	315				180	225	125	47	320	190	42	110	45	12	75		30	150	400	110	14	160								
	400				200	250	150	50	345	215	42	110	45	12	75		30	150	400	110	14	160								
	400				225	280	160	52	400	240	42	110	45	12	75		30	150	400	110	14	160								
200	250	P 55/140	200	200	180	100	850	670	22	355	450	200	60	550	350	200	48	110	51.5	14	180	75	39	150	450	140	23	18	170	500
	315				180	225	125	47	320	190	48	110	51.5	14	75		39	150	450	140	23	18	170	500						
	400				200	250	150	50	345	215	48	110	51.5	14	75		39	150	450	140	23	18	170	500						
	500				225	280	160	52	400	240	48	110	51.5	14	75		39	150	450	140	23	18	170	500						
250	315	P 65/160 (s)	300	250	130	920	720	26	425	600	260	60	800	540	200	60	140	64	18	180	95	39	190	670	140	28	18	205	515	
	400				180	225	125	47	320	190	60	140	64	18		95	39	190	670	140	28	18	205	515						
	500				200	250	150	50	345	215	60	140	64	18		95	39	190	670	140	28	18	205	515						
	500				225	280	160	52	400	240	60	140	64	18		95	39	190	670	140	28	18	205	515						

17 Auxiliary connections on pump

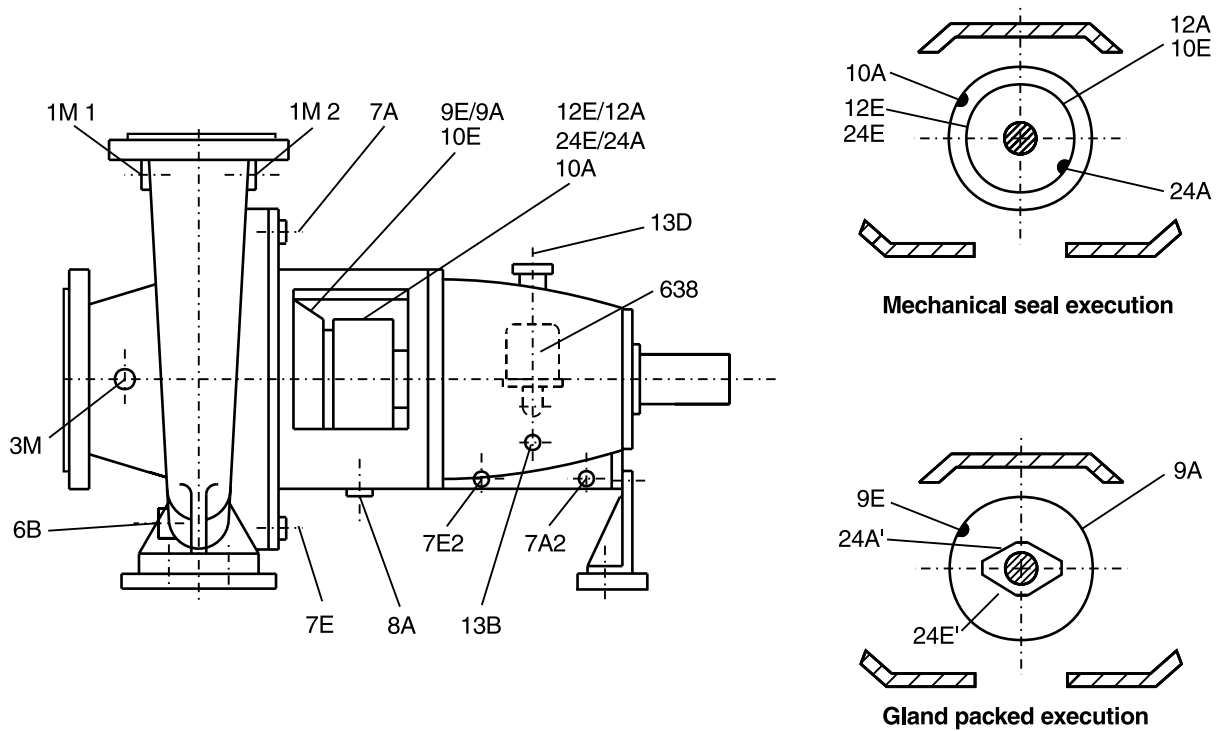


Fig. no. 23

Connection no.	Service/Description	Bearing bracket				
		P 25 / 62	P 35 / 80	P 45 / 120	P 55 / 140	P 65 / 160s
1M1 / 3M	Pressure guage cum connection for flushing	3/8" NPT 1/4" G		1/2" NPT 1/2" G		
1M2	Circulation line for flushing (not in use)	1/4" NPT 1/4" G				
6B	Casing drain*	3/8" NPT 1/4" G	1/2" NPT 3/8" G	1/2" NPT 1/2" G		
7E / 7A	Stuffing box inlet & outlet through bearing bracket lantern	1/2" NPT 3/8" G			3/4" NPT 1/2" G	
7E2/7A2	Brg. Bkt. cooling inlet and outlet	1/2" NPT			3/4" NPT	
8A	Bearing bracket lantern drain	3/4" NPT 1/2" G				
9E / 9A	Sealing liquid inlet & outlet to stuffing box (for gland packed pumps)	1/4" NPT 1/4" G				
10E / 10A	Flushing liquid inlet & outlet	1/4" NPT				
12E / 12A	Circulation liquid inlet & outlet					
13B	Bearing bracket oil drain	1/4" G				
13D	Vent connection on bearing bracket	5/8" G				
24E / 24A	Plan 61/62 inlet & outletconnection on seal cover	1/4" NPT			1/4" NPT	
24E' / 24A'	Cooling inlet & outlet to stuffing box gland	1/4" NPT 1/4" G				
638	Constant level oiler connection	1/4" G				
-	Cooling to pedestal (only for CF pumps)	1/2" NPT				

* For casing drain threaded and seal welded, termination of drain piping by DN 15 ANSI flanges for P 25/62 P 35/80. DIN 20 ANSI flanges for P 45/120, P55/140, P65/160.

Annexure I CPK Y Pumps

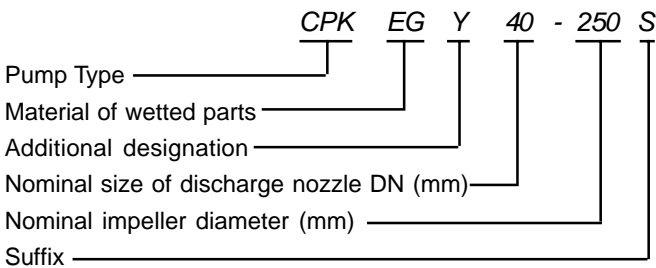
1 Design

CPK Y pumps are horizontal, radially split, back pull out type, single suction, single stage, process pumps with radial flow impeller, centre feet mounting and special jacketd casing cover. Except for the casing cover and bearing bracket lantern, all other components are same as standard CPK pump.

2 Application

CPK Y pumps are used for pumping hot water and organic heat transfer media.

3 Pump Designation



Material of wetted parts like casing and Casing Cover is Cast Steel and Impeller is Cast Iron or Cast Steel.

Additional designations can be

Y - Gland packed pump with intensively cooled stuffing box ('Y' type casing cover).

Ym - Pump with mechanical seal and intensively cooled stuffing box ('Y' type casing cover)

Suffix can be

- s - Pump with heavy bearing bracket
- c - Pump with cooled bearing bracket

4 Operating Parameters

CPK Y pumps are available in the following range

- Q - up to 900 m³/hr.
- H - up to 150 mtrs.
- DN - From 32 mm to 200 mm

The operation of the pump at any point on the standard curve (within the permissible range) is possible as long as NPSHa > NPSHr and the maximum permissible pumping.

6 Family curves

Refer fig. no.1 for family curves for different nominal speeds. Initial selection is to be done from these curves. If the required operating speed is different from the nominal speed; the operating parameters should be converted to the nominal speed and then the selection is to be done.

Annexure II : Mechanical Seals
1 Mechanical seals : Standard types & sizes

Seal arrangement	M/s EPIL				
	Seal type	MFR's code	API code	Seal faces	Secondary sealing
Single	E02	EGGB	USTGX	TC-Ni / SiC	Teflon
	P11	NFAB	USTFN	C / SiC	Viton
	P12	NGAB	USTGN	C / SiC	Teflon
	P13 Cld. seat	NFAX	BSTFN	C / SiC	Viton
	Y15	NADC	BSTRN	C / SiC	Graphite
		EADC	BSTRX	TC-Ni / SiC	Graphite

Seal arrangement	M/s Burgmann				
	Seal type	MFR's code	API code	Seal faces	Secondary sealing
Single	M7N	U1Q1M1GG	USTGX	SiC / TC-Ni	Teflon
	M74N	Q1AVMG	USTFN	SiC / C	Viton
		Q1AM1MG	USTGN	SiC / C	Teflon
	H75-G15 Cld. Seat	Q1AVMG	BSTFN	SiC / C	Viton

M/s EPIL.

Seal arrangement	Area of application	Type of seal		Seal sizes in D --.					API Plan
				P25/62	P35/80 P45/120as	P45/120	P55/140	P65/160	
Single	Normal temp.	E02 / P11 / P12	U	20	26	34	40	48	02/11/21/23/32+61/62
	High temp.	Y15	B	18	22	30	38	44	02/32 + 61/62

U : Unbalanced seal B : Balanced seal

M/s Burgmann.

Seal arrangement	Area of application	Type of seal		Seal sizes in mm.					API Plan
				P25/62	P35/80 P45/120as	P45/120	P55/140	P65/160	
Single	Normal temp.	M7N / M74N	U	30	40	50	60	70	02/11/21/23/32+61/62

U : Unbalanced seal B : Balanced seal

Note : For any other seal arrangement refer to Zonal/Branch Office.

All mechanical seals in cartridge arrangement.

Non cartridge seals for

1. Y 15 mechanical seals of M/s EPIL

Stuffing box interchangeability : Gland packing to single mechanical seal and vice-versa

Seal type	Pump sizes as indicated by bearing bracket					
	P25/62	P35/80 P45/120as	P45/120	P55/140	P65/160s	
M/s EPIL						
E02 / P11 / P12	U	Common (C1)	Common (C2)	Common (C3)	Common (C4)	Common (C5)
E04 / P13 / P14	B	Separate (S1)	Separate (S2)	Separate (S3)	Separate (S4)	Separate (S5)
Y15	B	Common (C1)	Common (C2)	Common (C3)	Common (C4)	Common (C5)
M/s Durametall						
AROTT / RO / ROTT	U	Common (C1)	Common (C2)	Common (C3)	Common (C4)	Common (C5)
APT / PTO / PT	B	Separate (S1)	Separate (S2)	Separate (S3)	Separate (S4)	Separate (S5)
PBS	B	Common (C1)	Common (C2)	Common (C3)	Common (C4)	Common (C5)
M/s Burgmann						
M7N / M74N	U	Common (C1)	Common (C2)	Common (C3)	Common (C4)	Common (C5)
H7N / H75N	B	Separate (S1)	Separate (S2)	Separate (S3)	Separate (S4)	Separate (S5)

U : Unbalanced seal. B : Balanced seal.

