

Study of PP Centrifugal Pump

Deepak Deshmukh¹, Niraj Deshmukh², Dattatraya Jambhale³

¹Utility Engineer, Dept. of Engineering, Rathi Dye Chem Pvt Ltd, Roha,

²India Project Engineer, Dept. of Engineering, Rathi Dye Chem Pvt Ltd

³Roha, India Director, Rathi Dye Chem Pvt Ltd, Roha, India

Abstract - To study of PP centrifugal. This paper includes maintenance, running and continuous running observations of PP centrifugal pumps including all the circumstances and parameters. It also includes parameters of selection of PP centrifugal pumps. This paper also has chart to explain preventive maintenance and breakdown maintenance schedule. It also contain preventive checklist and problems and remedies.

Key Words: MOC-material of construction, PP-poly propylene, C.P-centrifugal pump, Amb-ambient temperature, NSH-net suction head, NRV- non return valve.

1. INTRODUCTION

PP Centrifugal pumps is and important equipment in every chemical and pharmacy industry. It is generally used to transfer any kind of fluid from one place to another place by converting electrical energy to mechanical energy. PP centrifugal pump is generally low costly hence it is consider by user at first as per costing point of view. PP centrifugal pumps are selected as per our requirement and that requirement contains lots of others parameter includes head, discharge, motor power, and rpm so this pump has to be selected as per our requirement. This paper also includes maintenance schedule and remedies to be carried out. This paper includes data is actually available at industry and on the regular basis

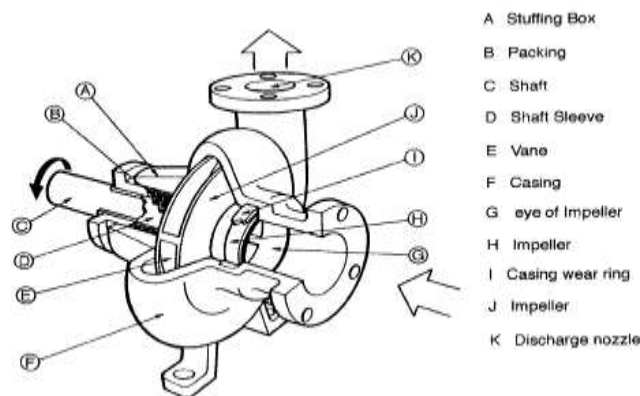


Fig -1: Centrifugal pump layout

2. PARTS OF THE CENTRIFUGAL PUMPS

1.1 Casing



Fig -2: PP centrifugal pump casing

1.2 Impeller



Fig -3: PP centrifugal pump impeller

1.3 Stuffing box



Fig -4: PP centrifugal pump stuffing box

1.4 Shaft



Fig -5: PP centrifugal pump EN8 shaft

2. SELECTION METHOD OF CENTRIFUGAL PUMP

Table -1: Methods of sections of PP pumps

Selection Criteria of PP Pumps			
Sr.no	Parameter	Details	Suitable
1	Ph	Acidic	Suitable
		Neutral	Suitable
		Basic	Suitable
2	Working temp.	Cold	Limited suitable
		Hot	Limited suitable
		Amb.	Suitable
3	Discharge	M3/hr.	Depends on application
4	Head	10m of head = 1 kg/cm ² pressure	Select pump according to it
5	Slurry liquid	Thick material	Limited suitable
6	Continuous running	24 hours	Select pump of low rpm with low HP motor power
7	Seal	Gland pack	Liquid which is less costly and have low head
		Mechanical seal	High head and costly liquid

3. CARE TO BE TAKEN WHILE RUNNING THE PP CENTRIFUGAL PUMPS

- 1) Don't run PP centrifugal pump dry. It may lead major breakdown of PP centrifugal pump.
- 2) Provide pressure gauge filled with glycerin to suction and discharge end. Glycerin provides damping to pressure gauge needle.
- 3) Check alignment of PP centrifugal pump by dial gauge before starts.
- 4) Provide water cooling line at cooling end of PP centrifugal pump.
- 5) Provide coupling guard and motor guard to reduce major accident
- 6) Don't reduce suction and discharge pipe given by supplier. It may increases chances of breakdown of PP centrifugal pump.
- 7) Always check current of motor. It also helps you to sort out many problems before breakdown.
- 8) Provide 20W40 grade pump oil in bearing housing if it is oil pump or provide greasing to the bearings by grease gun through nozzle of greasing.
- 9) Provide love joy coupling to PP centrifugal pump as it provide damping at both axial and radial direction of rotation.

- 10) Always check direction of rotation of primary mover before coupling to pump.
- 11) Always use foot valve to NSH pumps. To reduce chances of dry running of pumps and it also saves the liquid to transfer.
- 12) Provide automatic level controller to NSH pumps.
- 13) Provide NRV at discharge end when discharge head is more than 20 meters.
- 14) Provide second foundation for PP centrifugal pump so it is easy to interchangeable pump from one to another.

3. REGULAR PROBLEM AND REMIDIES

Table -2: Regular problem and remedies

Sr.no	Problem	Solution
1	Suction problem	1, 3, 4, 5, 10
2	Discharge problem	1, 2, 3, 4, 5,10
3	Noise	6, 7, 8, 9,10
4	Pump heating	6, 7, 8, 9,10

Solution-

- 1) Gland leakage
- 2) Impeller and stuffing box melt
- 3) Impeller worn out
- 4) Impeller touches to casing
- 5) Foot valve problem or gasket leakage
- 6) Bearing problem
- 7) Coupling and alignment problem
- 8) Cooling problem
- 9) Low oil level
- 10) Electric motor burn

4. MAINTENANCE SCHEDULE

Table -3: Maintenance schedule

Sr.no	Maintenance	Time
1	Oil level	After every 100 hours of running
2	Alignment	Every month
3	Noise	Every month
4	Preventive maintenance	Every 6 months

5. PP CENTRIFUGAL PUMP PREVENTIVE CHECKLIST

PREVENTIVE MAINTENANCE CHECKLIST FOR PUMP		
EQUIPMENT NO. -		
NAME OF FITTER -		
NAME OF ELECTRICIAN -		
	DATE -	/ /
PARTICULARS	STANDARD	REMARKS
1 FOUNDATION FRAME & BOLT	NO DAMAGE & TIGHT	
2 TERMINAL PLATE COVER & CONNECTIONS	1 NO CARBON DEPOSITION SHOULD BE CLEAN 2 NO LOOSE CONNECTION 3 CABLE GLAND SHOULD PROPER	
3 BODY WASHING	NO LOOSE CONNECTION	
4 BEARING CONDITION	WELL LUBRICATED	
5 FAN CONDITION	SHOULD NOT BROKEN	
6 BODY	SHOULD BE CLEAN	
7 CHECKY PUSH BUTTON	SHOULD NOT BROKEN	
Note:-		
1 CHECK FOUNDATION & FRAME CONDITION	SHOULD NOT DAMAGED	
2 CHECK MECHANICAL LOOSENESS	SHOULD BE TIGHT ENOUGH	
3 CHECK OIL LEVEL	LEVEL UP TO MARK	
4 CHECK SAFETY GUARD CONDITION	NO DAMAGE	
5 CHECK BEARING CONDITION	WELL LUBRICATED	
6 CHECK ALIGNMENT & CONDITION OF COUPLER/FULLY EFFICIENT	PROPERLY ALIGNING/NO DAMAGE	
7 CHECK GLAND/MCHANICAL SEAL CONDITION	NO LEAKAGE/DAMAGE	
8 CHECK NOZZLES GASKETS, VALVE & PIPING	NO DAMAGE	
9 CHECK CORROSION & PAINTING	NO CORROSION	
10 CHECK BELT/DRIVE/FOUR CONDITION	SHOULD NOT SLUTTER OPEN	
11 CHECK NOISE	NO ABNORMAL NOISE	
12 CHECK VIBRATION	NO ABNORMAL VIBRATION	
13 CHECK IMPELLER CONDITION	NO DAMAGE	

Fig -6: Preventive maintenance checklist of pump

6. CONCLUSION

There is a requirement of proper selection of PP centrifugal pumps with proper specification and this specification should be understood by supplier and user also in any industry. Hence this paper clears all the doubt regarding selection of PP centrifugal pumps, problems, remedies and maintenance schedule with the preventive maintenance checklist.

ACKNOWLEDGEMENT

I would like to thank our honorable director Dr. jambhale sir for his constant support and help also thank to my colleague Mr. korde and Mr. desh mukh. Special thanks to our HOD Mr. bhagat sir.

REFERENCES

[1] www.nuclear-power.net/nuclear-engineering/fluid- dynamics/centrifugal-pumps/parts-of-centrifugal- pumps/

BIOGRAPHIES



BE Mechanical
Utility engineer
At Rathi Dye Chem Pvt. Ltd.



BE Mechanical
Project engineer
At Rathi Dye Chem Pvt. Ltd



Doctorate in plastic polymer
Director
At Rathi Dye Chem Pvt. Ltd