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SPECIFICATION FOR SEWAGE AND DRAINAGE PUMPS

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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SPECIFICATION FOR SEWAGE AND DRAINAGE PUMPS

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Indian Standard

SPECIFICATION FOR SEWAGE AND DRAINAGE PUMPS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 25 March 1970, after the draft finalized by the Pumps Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 Sewage and drainage pumps are used where sewage and other drainage from buildings is below sewer level and is to be taken into a sump and pumped or ejected from there into the sewer. These pumps are also used in cases where drainage cannot be taken care of by gravity flow.

0.3 The technical requirements for centrifugal and rotodynamic pumps covering wide range including definitions, units, classes and types of pumps, effect of viscosity, specific gravity and other effects on the performance of pumps, material of construction, salient design features, testing procedures, tolerances and guarantees are already included in IS:5120-1968*.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS:2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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1. SCOPE

1.1 This standard specifies the technical requirements for rotodynamic pumps (such as centrifugal, axial, flow, etc) for handling sewage and other drainage.

2. UNITS, TERMINOLOGY AND CLASSIFICATION

2.1 Units, terminology and classification relating to pumps for handling sewage and other drainage shall be as specified in IS:5120-1968*.

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*Technical requirements for rotodynamic special purpose pumps. (**Since revised**).
†Rules for rounding off numerical values (*revised*).

3. CHARACTERISTICS OF SEWAGE

3.1 Some typical characteristics of sewage are given below:

a)	Total solids	1 000 to 2 200 ppm
b)	Suspended solids	150 to 500 ppm
c)	Four hours oxygen consumption	50 to 120 ppm
d)	BOD (5 days 20°C)	150 to 450 ppm
e)	Alkalinity	350 to 700 ppm
f)	Chloride	120 to 300 ppm
g)	Free nitrogen	15 to 45 ppm
h)	Albuminoid nitrogen	4 to 40 ppm
j)	*p*H value	6·8 to 7·9

4. NOMENCLATURE

4.1 Nomenclature of the parts commonly used in sewage and drainage pumps shall be as given in IS : 5120-1968*.

5. MATERIAL OF CONSTRUCTION

5.1 The typical materials of construction for sewage and drainage pumps are given below:

Sl No.	*Material of Construction*	*Relevant Specification*
1)	All cast iron fitted	Grade 20 of IS : 210-1962†
2)	All stainless steel	Schedule V of IS : 1570-1961‡

NOTE — The materials of construction indicated above are merely for guidance and are not necessary to be considered as exhaustive.

6. DIRECTION OF ROTATION

6.1 For rotodynamic pumps, the direction of rotation is designated as clockwise or anti-clockwise as observed when looking at the pump shaft from the driving end.

6.2 The direction of rotation shall be clearly marked either by incorporating an arrow in the casting or by a separate metal plate arrow securely fitted to the pump.

*Technical requirements for rotodynamic special purpose pumps. (**Since revised**).
†Specification for grey iron castings (*revised*). (Since revised).
‡Schedules for wrought steels for general engineering purposes.

7. ACCESSORIES

7.1 The following shall constitute common accessories:

a) Vacuum pump if there is no positive suction,
*b) Flanged sluice valve on suction side if there is positive suction,
* c) Flanged sluice valve on delivery side,
*d) Flanged reflux valve,
e) Pressure relief valve,
f) Coupling,
g) Pressure and vacuum gauge with siphon and cock,
h) Base plate,
j) Foundation bolts and nuts, and
k) Ball type air relief valve.

7.2 An automatic level operated control switch may be provided as an optional accessory.

8. SUCTION LIMITATIONS

8.1 Suction limitations affecting the performance of the sewage and drainage pumps are the same as specified in IS:5120-1968†.

NOTE — It is always desirable for sewage pumps to operate with positive head on suction or with flooded suction. If the pumps operate with a suction lift, there is a possibility of the gases contained in the sawage being given off resulting in vapour lock and ultimate failure of the pumps.

9. FACTORS AFFECTING PUMP PERFORMANCE

9.1 Factors affecting the pump performance are the same as those specified in IS:5120-1968†.

10. ESSENTIAL DESIGN FEATURES

10.1 The pumps shall have suitable features properly designed to ensure satisfactory performance. In particular design features, such as the following shall be incorporated:

a) The size of solids should at least be up to 80 percent of the outlet width of the impeller;

b) Casing and impeller should be so designed as to allow free passage of the specified maximum size of solids;

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*Optional.
†Technical requirements for rotodynamic special purpose pumps. (**Since revised**).

c) Hand holes should be provided in the casing, one to allow early access to the impeller eye, and one as close as possible to the casing throat; and

d) On account of the abrasive nature of sewage, provision should be made on the stuffing boxes to ensure clear water supply or grease lubrication to the glands shall be provided from external sources according to the discretions of the manufacturer.

11. INFORMATION TO BE SUPPLIED BY THE PURCHASER AND THE SUPPLIER

11.1 The information to be supplied by the purchaser and the supplier shall be as specified in IS:5120-1968*.

12. PUMP TESTS

12.1 Pump tests shall be the same as those specified in IS:5120-1968*.

13. DETERMINATION OF PUMP PERFORMANCE

13.1 The determination of the performance of the sewage and drainage pumps shall be in accordance with the method specified in **14** of IS:5120-1968*.

14. GUARANTEES

14.1 Guarantee of Workmanship and Material—The pumps shall be guaranteed by the manufacturer against defects in material and workmanship, under normal use and service, for a period of at least one year.

14.2 Guarantee of Performance—The supplier shall indicate the working range of the pump and the efficiency of the pump shall be guaranteed to cover the performance of the pump under conditions varying therefrom or for a sustained performance for any period of time. If the purchaser so desires, the manufacturer shall guarantee the non-overload of the prime mover for variations in the head in the working range. In the case of pumps where acceptance cannot be conducted on the liquid for which the pump is designed, the manufacturer shall indicate the liquid performance of the pump based on the results of the tests conducted by him on the pump with water and interpolated as given in IS:5120-1968*. However, in these cases, the manufacturer shall guarantee for the performance of the pumps with water for the specified range.

*Technical requirements for rotodynamic special purpose pumps. (**Since revised**).

14.3 Unless specified otherwise, pump performance figures shall be deemed to be applicable for 4·5 m suction lift at mean sea level and at a water temperature of 30°C.

14.4 Suction lift is to be reduced for higher altitudes at the rate of 1·5 m for every 1 000 m above mean sea level.

15. TOLERANCES

15.1 In all commercial acceptance tests of pumps, a certain tolerance shall be allowed to the manufacturer on his guarantee to cover inaccuracies of the equations for discharge, errors of observation and unavoidable minor inaccuracies of the instruments employed.

15.2 A tolerance of ± 2·5 percent shall be permissible on the discharge. However, for small discharges up to 900 litres per minute, a tolerance of + 2·5 percent or + 24 litres per minute whichever is higher, is allowed while the negative tolerance of 2·5 percent is maintained.

15.3 The percentage pump efficiency shall be not less than the specified value by more than 2·5. This tolerance may be raised to 5 in case the prime mover does not get overloaded.

16. GENERAL REQUIREMENTS

16.1 The general requirements covering the pumps for process water shall be as given in IS:5120-1968*.

*Technical requirements for rotodynamic special purpose pumps. (Since revised).

(*Continued from page* 2)

Sewage and Drainage Pumps Panel, EDC 35 : 5/P-4

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Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 1 JULY 1994
TO
IS 5600 : 1970 SPECIFICATION FOR SEWAGE AND DRAINAGE PUMPS

[*Page* 6, *clause* **10.1**(c)] — Substitute the following for the existing matter:

'Hand hole should be provided in the casing to access the casing throat to check clogging.'

(HMD 20)

Reprography Unit, BIS, New Delhi, India