IS 6595 (Part 2) : 1993
(Reaffirmed 1997)

भारतीय मानक

साफ और ठंडे पानी के लिये क्षैतिज अपकेन्द्री पंप

भाग 2 सामान्य प्रयोजन (कृषि और ग्रामीण पूर्ति को छोड़कर) — विशिष्टि

(दूसरा पुनरीक्षण)

Indian Standard

HORIZONTAL CENTRIFUGAL PUMPS FOR CLEAR, COLD WATER

PART 2 GENERAL PURPOSE (OTHER THAN AGRICULTURAL AND RURAL WATER SUPPLY) — SPECIFICATION

(Second Revision)

UDC 621·671

BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

July 1993

Price Group 2

Pumps Sectional Committee, HMD 20

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Pumps Sectional Committee had been approved by the Heavy Mechanical Engineering Division Council.

IS 6595 was first published in 1972 and revised in 1980. While finalizing the second revision of IS 6595 the committee responsible to formulate this standard decided to publish this standard in following two parts:

IS 6595 (Part 1) : 1993 Horizontal centrifugal pumps for clear, cold water: Part 1 Agricultural, and rural water supply purposes — Specification

IS 6595 (Part 2) : 1993 Horizontal centrifugal pumps for clear, cold water: Part 2 General purpose (other than agricultural and rural water supply) — Specification

Earlier requirements of horizontal centrifugal pumps for clear, cold fresh water for general purposes other than agricultural use were covered in IS 1520 which has been withdrawn.

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 or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

HORIZONTAL CENTRIFUGAL PUMPS FOR CLEAR, COLD WATER

PART 2 GENERAL PURPOSE (OTHER THAN AGRICULTURAL AND RURAL WATER SUPPLY) — SPECIFICATION

(Second Revision)

1 SCOPE

This standard specifies the technical requirements for horizontal centrifugal pumps for handling clear, cold water for general purpose other than agricultural and rural water supply.

2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

3 UNITS, TERMINOLOGY AND CLASSIFICATION

Units, terminology and classification relating to pumps for clear, cold water shall be as specified in IS 5120 : 1977.

4 CHARACTERISTICS OF CLEAR, COLD WATER

Characteristics of clear, cold water are specified below:

a) Turbidity	50 ppm, *Max*
b) Chlorides	500 ppm, *Max*
c) Total solids	3 000 ppm, *Max*
d) *p*H value	6·5 to 8·5
e) Temperature	33°C, *Max*
f) Specific gravity	1·004, *Max*

NOTE — If any characteristic of the water differ from those specified in **4**, the pump details shall be agreed between the manufacturer/supplier and the user and shall be specified in order.

5 NOMENCLATURE

Nomenclature of the parts commonly used in horizontal centrifugal pumps shall be as given in IS 5120 : 1977.

6 MATERIAL OF CONSTRUCTION

6.1 It is recognized that a number of material of constructions are available to meet the needs for pumps handling clear, cold water. A few typical materials are indicated below merely for guidance of the manufacturer and user:

Sl No.	*Component*	*Material of Construction*
1.	Casing	Casting grade FG 200 of IS 210 : 1978
2.	Impeller	Casting grade FG 200 of IS 210 : 1978, or Bronze grade LTB 2 of IS 318 : 1981
3.	Casing ring and impeller ring (if provided)	Casting grade FG 200 of IS 210 : 1978, or Bronze grade LTB 2 of IS 318 : 1981
4.	Shaft	Grade 40C8 of IS 1570 (Part 2, Section 1) : 1979
5.	Shaft sleeve (if provided)	Bronze grade LTB 2 of IS 318 : 1981 or Chrome steel 07Cr13 of IS 1570 (Part 5) : 1985

NOTE — If the *p*H value of water pumped is between 6·5 and 7·5 and also the chlorides content is less than 100 ppm, the pump may be made of bronze fitted construction of bronze grade LTB 2 of IS 318 : 1981. However, if the range of *p*H value is between 6·5 and 8·5 and the chlorides content exceeds 100 ppm, only zinc free bronze fitted construction or stainless steel construction shall be permitted.

6.2 Gasket, Seals and Packings

Gaskets, seals and packings used for clear, cold water pumps may conform to those specified in IS 5120 : 1977.

7 DIRECTION OF ROTATION

7.1 The direction of rotation of pumps is designated clockwise or anticlockwise as observed when looking at the shaft from the driving end.

7.2 The direction of rotation shall be marked either by incorporating an arrow on the casting itself or by a separate metal plate arrow securely fitted to the pumps, which is clearly visible.

8 DESIGN LIMITATIONS

8.1 In case of more than one duty point, the performance range is to be indicated and the primemover should be of sufficient power to take the entire load in this range. Head restriction shall be indicated on name plate to avoid overloading of the primemover.

8.2 Suction Limitations

i) Suction limitations affecting performance of pumps for clear, cold water are the same as those specified in **9** of IS 5120 : 1977.

ii) Effect of total suction lift on performance of pumps for clear, cold water are the same as those specified in **10.5** of IS 5120 : 1977.

8.3 Efficiency at specified duty point shall be mutually agreed between manufacturer/supplier and purchaser and shall be guaranteed.

9 GENERAL REQUIREMENTS

9.1 Pump casing shall be of robust construction and shall be capable to withstand 1·5 times the maximum discharge pressure.

9.2 In case of speed 2000 rpm or below, impeller shall be statically balanced. In case of speed ranging in between 2 001 and 3 600 rpm the impeller shall be dynamically balanced to grade G 0·3 of IS 11723 : 1985.

NOTE — Balancing here means the balancing of the unbalanced rotating mass in the impeller and not balancing of axial hydraulic thrust in the impeller.

9.3 Shaft

The shaft shall be of adequate size to transmit the required power.

9.4 For the pumps working in parallel, the operating point of the pump shall lie on the stable portion of the head and discharge rate characteristic curve.

9.5 Arrangement for cooling of bearings where required shall be provided. Wherever external cooling fluid is needed, the same shall be specified by the manufacturer.

9.6 Balancing water leakage connection shall be provided in case of multistage pumps with balancing discs.

9.7 Thrust bearing of adequate size shall be provided wherever required.

10 PUMP TEST, TOLERANCES AND VERIFICATION OF GUARANTEE ON PUMP PERFORMANCE

10.1 Pump tests, tolerances and verification of guarantee on pump performance shall be in accordance with IS 9137 : 1978, unless otherwise specified. If purchaser specifies for IS 10981 : 1983, acceptance test, tolerances and verification of guarantee shall be done accordingly. However, the test on NPSHR shall be conducted in following situation:

a) for proto type, and

b) whenever requested by the purchaser.

10.2 Sampling

The method of sampling and criteria for conformity for acceptance of a lot offered for inspection shall be in accordance with IS 10572 : 1983.

10.3 Correction and Allowances

Power delivered to the pump shaft when directly connected shall be the power output, of driving element, when not directly connected correction shall be made for the losses between the driving element and the pump. In case of flat belt and 'V' belt drives, the allowances for belt losses may be taken as 6 and 3 percent respectively.

10.4 Hydrostatic Test

Hydrostatic test on the casing shall be made at 1·5 times the maximum discharge pressure and this pressure shall be maintained for ten minutes.

10.5 Guarantee of Workmanship and Material

The pump shall be guaranteed by the manufacturer against defects in the material and workmanship, under normal use and service, for a period of at least 15 months from the date of despatch or 12 months from the date of commissioning whichever is less.

11 PARAMETERS TO BE SUPPLIED BY PURCHASER

When enquiring or ordering pumps, the user shall furnish the following information to the supplier:

a) Discharge rate in l/s;

b) Total head in m;

c) Range of head in m;

d) Corresponding discharge rate range; and

e) If total head and range is not known, then the details of following shall be provided:

i) Total static head in m;
ii) Suction pipe dia in mm;
iii) Delivery pipe dia in mm;
iv) Suction pipe length in m;
v) Delivery pipe length in m;
vi) Pipe material;
vii) Foot valve/Sluice valve/Non return valve;
viii) Number of bends in suction branch;
ix) Number of bends in delivery branch;
x) Primemover rating. If there is any limitation of primemover rating; and
xi) If possible, sketch of installation to be furnished.

12 PARAMETERS TO BE DECLARED BY MANUFACTURER

The following parameters shall be declared by manufacturer:

a) Pipe size (Suction and delivery);
b) Speed;
c) Duty point head and discharge rate;
d) Pump efficiency at duty point;
e) NPSHR at duty point;
f) Head range for overloading requirements; and
g) Recommended primemover rating.

13 MARKING

13.1 The pump shall be marked with the following:

a) Type, size and serial number;
b) Speed, total head, discharge rate and corresponding pump efficiency at specified duty point;
c) Head range for overloading requirements;
d) Recommended primemover rating in kW; and
e) Manufacturer's name or recognized trademark.

13.1.1 The manufacturer's brand name shall be embossed or indented on the pump during casting.

14 STANDARD MARKING

Details are available with the Bureau of Indian Standards.

ANNEX A

(*Clause* 2)

LIST OF THE REFERRED INDIAN STANDARDS

IS No.	*Title*
210 : 1978	Specification for grey iron castings (*third revision*)
318 : 1981	Specification for leaded tin bronze ingots and castings (*second revision*)
1570 (Part 2/Sec 1) : 1979	Schedule for wrought steels: Part 2 Carbon steels (unalloyed steels), Section 1 Wrought products (other than wires) with specified chemical composition and related properties (*first revision*)
1570 (Part 5) : 1985	Schedule for wrought steels: Part 5 Stainless and heat resisting steels (*second revision*)
5120 : 1977	Technical requirements for rotodynamic special purpose pumps (*first revision*)
9137 : 1978	Code for acceptance test for centrifugal, mixed flow and axial pumps — Class C
10572 : 1983	Methods of sampling for pumps
10981 : 1983	Code for acceptance tests for centrifugal, mixed flow and axial pumps — Class B
11723 : 1985	Balancing of rotating rigid bodies

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indin Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards Monthly Additions'. Comments on this Indian Standard may be sent to BIS giving the following reference:

Doc : No. HMD 20 (0155)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Printed at Printwell Printers, Aligarh, India