

भारतीय मानक

नदी घाटी परियोजनाओं में कार्य मापन की पद्धतियाँ
(बाँध और सम्बद्ध संरचनाएँ)

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(पहला पुनरीक्षण)

Indian Standard

METHOD OF MEASUREMENT OF WORKS
IN RIVER VALLEY PROJECTS (DAMS AND
APPURTENANT STRUCTURES)

PART 3 GROUTING

(*First Revision*)

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FOREWORD

This Indian Standard (Part 3) was adopted by the Bureau of Indian Standards, after the draft finalized by the Measurement of Works of River Valley Projects Sectional Committee had been approved by the River Valley Division Council.

In measurement of works of river projects a large diversity of methods exist at present according to local practices. The lack of uniformity creates complications regarding measurements and payments. This standard is being formulated in various parts, covering each type of work separately. This part is intended to provide a uniform basis for measuring the work done in respect of grouting for river valley projects.

This standard (Part 3) was first published in 1980. With the experience gained by its usage and by the revision and updation of related standards, it was necessary to revise the standard so as to bring it in line with the current field practice.

Certain portions of the standard which dealt with grouting procedure have been deleted as the same are adequately covered in the revision of the standard relating to pressure grouting (IS 6066 : 1994).

This part has also been brought in line with the other parts of the standard which deal with measurement of various items of work of river valley projects. Due care has been taken to ensure conformity with the Indian Standard relating to analysis of unit rate of grouting (IS 13418 : 1992).

In reporting the result of measurements made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

Indian Standard

METHOD OF MEASUREMENT OF WORKS IN RIVER VALLEY PROJECTS (DAMS AND APPURTENANT STRUCTURES)

PART 3 GROUTING

(*First Revision*)

1 SCOPE

1.1 This standard (Part 3) covers the method of measurement of grouting in river valley project works (dams and appurtenant structures).

2 REFERENCES

2.1 The Indian Standards listed below are necessary adjuncts to this standard:

<i>IS No.</i>	<i>Title</i>
6066 : 1994	Recommendations for pressure grouting of rock foundations in river valley projects (<i>third revision</i>)
9401 (Part 2) : 1982	Method of measurement of work in river valley projects (dams and appurtenant structures) : Part 2 Dewatering
13418 : 1992	Proforma for analysis of unit rate of grouting

3 GENERAL

3.1 Clubbing of Items

Items may be clubbed together provided that the break-up of the clubbed items is on the basis of the detailed description of the items stated in this standard.

3.2 Booking of Dimensions

In booking dimensions, the order shall be consistent and generally in the sequence of length, width and height or depth or thickness.

3.3 Description of Items

3.3.1 The description of each item shall, unless otherwise stated, be held to include where necessary, conveyance and delivery, handling, unloading, storing, fabrication, hoisting, all formwork and scaffolding, all labour for finishing to required shape and size, setting, fitting and fixing in position,

straight cutting and return of waste packings, dismantling of the equipment and taking it back, etc.

3.3.2 Reaming of drilled holes shall not be measured separately.

3.4 Units of Measurement

All work shall be measured net in decimal system as fixed in its place subject to the following limitations, unless otherwise stated:

- a) Linear dimensions shall be measured to the nearest 0.01 m;
- b) Areas shall be worked out to the nearest 0.01 m²; and
- c) Cubic contents shall be worked out to the nearest 0.01 m³.

3.5 Work to be Measured Separately

Work executed in the following conditions shall be measured separately:

- a) Work in or under water
- b) Work in liquid mud/marshy land
- c) Work under tides

3.5.1 Wherever springs or special situations are encountered and dewatering is resorted to, it shall be measured in accordance with Part 2 of this standard.

4 BILL OF QUANTITIES

4.1 The bill of quantities shall fully describe the materials and workmanship and accurately represents the work to be executed.

4.2 The available information, as to the strata conditions through which grouting is to be done, shall be stated or reference showing records of bores be given.

4.3 If pressure testing is to be done, the provision for such test shall be specified and measured separately.

4.4 Diameters and length of holes shall be stated in item descriptions for drilling for grouting along with the method of drilling.

4.5 Components of grout mixtures and their proportions by volume shall be stated in item descriptions for grout materials and injections.

4.6 Thickness of plate steel liners through which grout holes may have to be drilled shall be stated.

4.7 Pipes, specials and fittings shall be measured separately.

5 MEASUREMENT OF GROUT PIPES, SPECIALS AND FITTINGS

5.1 Pipes and Specials

The grout pipes, fittings and specials provided for drilling and grouting shall be designated according to the class of pipes and specials in accordance with the relevant Indian Standard specifications. The measurements shall be done on the basis of weight. The weights shall be calculated on the basis of relevant Indian Standards, where applicable. No measurement shall be made for pipes, fittings and specials which are removable and are above the surface from where the grouting starts.

6 MEASUREMENT OF DRILLING OF HOLE FOR GROUTING

6.1 Precise location of the hole with respect to co-ordinate, group and number of the hole, shall be fixed and recorded.

6.2 The drilling of the hole shall be measured separately in running metres of the hole drilled. It shall be classified as follows:

- a) Drilling through material other than rock or artificial hard material.
- b) Drilling through rock or artificial hard material.
- c) Method of drilling, such as percussion, rotary, diamond, etc, shall be stated.

6.2.1 In addition, these holes shall be classified depending on their angle as follows:

- a) 0° to 45° vertically downwards,
- b) 0° to 45° vertically upwards, and
- c) Up to but not including 45° to the horizontal.

6.3 The length of holes drilled and grouted shall be grouped in stages of approximately 5 m as up to 5

m, exceeding 5 m and up to 10 m, exceeding 10 m and up to 15 m, etc. Length drilled through previously grouted holes shall be measured separately. The above stages shall be grouped and measured from the top of the hole or from the top of the casing pipe whichever is higher.

6.4 Grout holes drilled through plate steel liners shall however, be measured in numbers separately, mentioning the thickness of liners.

7 WATER PRESSURE TESTING BEFORE AND AFTER GROUTING

7.1 Measurement of water pressure testing by open end washing or pressure washing wherever necessary shall be made separately for each hole as follows:

- a) Open end washing of the holes shall be measured in linear metres of the hole drilled irrespective of the stage of the hole;
- b) Pressure washing or jetting of holes shall be measured in terms of hours of pumping done;
- c) Percolation test shall be measured in terms of hours for the duration of pumping; and
- d) The water loss shall be measured in lugeons.

8 GROUTING

8.1 The measurement for all types of grouting (*see* IS 6066 : 1994) shall be made on the basis of the weight of cement in the grout actually forced into the holes. Sand, clay and liquid admixtures shall be measured by volume. Bentonite, pulverized fuel ash, silicate and/or other admixtures, if used shall be measured separately in the loose dry state before mixing and shall be measured by weight.

8.2 The measurement shall not include the weight of water.

9 INSTRUMENTATION REQUIRED FOR GROUTING

9.1 The instruments needed for the grouting operation shall be described clearly giving detailed specification of the instruments like upheaval gauges, deflection gauges, stress-strain meters, etc, indicating their location and shall be measured in numbers.

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