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Indian Standard
SPECIFICATION FOR
COARSE AGGREGATE FOR WATER
BOUND MACADAM
(*First Revision*)

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

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SPECIFICATION FOR COARSE AGGREGATE FOR WATER BOUND MACADAM (*First Revision*)

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0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 27 February 1981, after the draft finalized by the Stones Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Water bound macadam (WBM) is a common item for highway construction. The coarse aggregates, accounting for nearly three-fourths of the volume and mass of WBM, may be said to be the main constituent. Many a time, an engineer-in-charge is faced with the problem of selecting the coarse aggregate for WBM from several alternative materials available. If the minimum physical requirements of such aggregates could be indicated, selection of the appropriate material would be easy. With this aspect in view, this standard has been prepared to lay down the requirements of coarse aggregates for WBM construction.

0.2.1 This standard was first published in 1972. It is being revised to incorporate improvements found necessary in the light of the usage of the standard and the suggestions made by various bodies implementing it. In this revision, a number of changes have been incorporated, the most important being the adoption of the WBM aggregates for construction of sub-base course also. The requirement of abrasion value, impact value and flakiness index of such aggregates for use as sub-base has been added and the size and grading of the WBM aggregates modified, depending on the sieve designation of IS : 460 (Part I)-1978*. A requirement for water absorption has also been included.

0.3 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†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Specification for test sieves: Part I Wire cloth test sieves (*second revision*).

†Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard specifies the quality, physical properties and grading of coarse aggregates suitable for use in WBM construction.

2. MATERIALS

2.1 The coarse aggregates used for WBM construction shall be any one of the following:

- a) Crushed or broken rock,
- b) Crushed or broken slag, and
- c) Broken brick aggregate.

2.1.1 Natural aggregates (like *KANKAR*, laterite, etc) other than mentioned in 2.1 may also be used.

3. QUALITY

3.1 The coarse aggregates from natural sources shall be hard and durable. They shall be free from excessive flat, elongated, soft or disintegrated particles, dirt and other similar sources of weakness.

3.2 The coarse aggregates of slag shall be made from air-cooled blast furnace slag and shall not contain glassy material exceeding 20 percent and shall not weigh less than 1 120 kg/m³. They shall be dense, of angular shape and shall be free from dirt and other similar sources of weakness.

3.3 The broken brick aggregate shall be made out of well burnt bricks (see IS : 1077-1976*). It shall be free from underburnt particles, dust and other foreign matter.

4. SIZE AND GRADING

4.1 The size and grading of the coarse aggregates shall be as specified in Table 1.

5. PHYSICAL REQUIREMENTS

5.1 **Abrasion (Los Angeles) Value** — The abrasion value of the coarse aggregates when tested in accordance with the method laid down in IS : 2386 (Part IV)-1963† shall not be more than 40 percent for wearing surface, 50 percent for base course and 60 percent for sub-base course.

*Specification for common burnt clay building bricks (*third revision*).

†Methods of test for aggregates for concrete: Part IV Mechanical properties.

TABLE 1 SIZE AND GRADING OF COARSE AGGREGATES

(Clause 4.1)

GRADING No.	SIEVE DESIGNATION [see IS : 460 (PART I)-1978*]	PERCENTAGE PASSING THE SIEVE BY MASS
(1)	(2)	(3)
	mm	
1	106	100
	75	55 to 80
	63	25 to 60
	37.5	0 to 15
	19	0 to 5
2	75	100
	63	90 to 100
	53	50 to 80
	37.5	0 to 15
	19	0 to 5
3	63	100
	53	95 to 100
	37.5	30 to 65
	19	0 to 10
	11.2	0 to 5

NOTE — For coarse aggregates susceptible to degradation during rolling, the above grading may not hold good.

*Specification for test sieves: Part I Wire cloth test sieves (second revision).

5.2 Flakiness Index — The flakiness index of the coarse aggregates when tested in accordance with the method given in IS : 2386 (Part I)-1963* shall not be more than 15 percent. The flakiness index may be judiciously adjusted when the material is to be used in sub-base or when significant degradation is expected under rolling.

NOTE — The requirement of flakiness index shall be enforced only in the case of crushed broken stone and crushed slag.

5.3 Impact Value — The impact value of the aggregates when determined in accordance with the method given in IS : 2386 (Part IV) 1963† and IS : 5640-1970‡ shall not be more than 30 for wearing surface, 40 for base course and 50 for sub-base course.

NOTE — Aggregates like brick, KANKAR and laterite shall be tested for impact value under wet condition in accordance with the methods given in IS : 5640-1970‡.

*Methods of test for aggregates for concrete: Part I Particle size and shape.

†Methods of test for aggregates for concrete: Part IV Mechanical properties.

‡Methods of test for determining aggregates impact value of soft coarse aggregates.

5.4 Water Absorption — The water absorption of the aggregates when tested in accordance with the method given in IS : 2386 (Part III)-1963* shall not be more than 1.5 percent for wearing surface, base and sub-base course in the areas where the aggregates are subjected to freezing and thawing and shall not be more than 2 percent in other areas.

5.5 Soundness — The soundness of the aggregates when tested in accordance with the method given in IS : 2386 (Part V)-1963† shall satisfy the following requirements:

- a) Loss with sodium sulphate (5 cycles) : 20 percent *Max*
- b) Loss with magnesium sulphate (5 cycles) : 30 percent *Max*

NOTE - The aggregate shall be tested for soundness only when it has to undergo alternate freezing and thawing

6. SAMPLING AND CRITERIA FOR CONFORMITY

6.1 The procedure of sampling and the criteria for conformity shall be as given in IS : 2430-1969‡.

7. SUPPLIER'S CERTIFICATE AND COST OF TESTS

7.1 The supplier shall satisfy himself that the material supplied conforms to the requirements of this standard and, if requested, shall furnish a certificate to this effect to the purchaser or his representative.

7.2 If the purchaser or his representative requires independent tests to be made, the sample for such tests shall be taken before or immediately after delivery at the option of the purchaser or his representative, and the tests shall be carried out in accordance with this standard and on the written instructions of the purchaser or his representative.

7.3 The supplier shall supply, free of charge, the material required for tests.

7.4 The cost of the tests carried out under 7.2 shall be borne as follows:

- a) By the supplier, if the results show that the material does not comply with this standard; and
- b) By the purchaser, if the results show that the material complies with this standard.

*Methods of test for aggregates for concrete : Part III Specific gravity, density, voids, absorption and bulking.

†Methods of test for aggregates for concrete : Part V Soundness.

‡Methods for sampling of aggregates for concrete.

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