IS 875-1 (1987): Code of Practice For Design Loads (Other Than Earthquake)For Buildings And Structures, Part 1: Dead Loads - Unit Weights of Building Material And Stored Materials (Incorporating IS 1911 : 1967) [CED 37: Structural Safety]

BLANK PAGE


IS : 875 (Part I) - 1987
(*Incorporating* IS : 1911 - 1967)
(Reaffirmed 2003)

*Indian Standard*

# CODE OF PRACTICE FOR DESIGN LOADS (OTHER THAN EARTHQUAKE) FOR BUILDINGS AND STRUCTURES

## PART 1 DEAD LOADS — UNIT WEIGHTS OF BUILDING MATERIALS AND STORED MATERIALS

*(Second Revision)*

Eighth Reprint SEPTEMBER 2003

UDC 624:042 : 006:76



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

Gr 12

*February* 1989

# CONTENTS

# AMENDMENT NO. 1 DECEMBER 1997
# TO
# IS 875 ( PART 1 ) : 1987 CODE OF PRACTICE FOR DESIGN LOADS (OTHER THAN EARTHQUAKE) FOR BUILDINGS AND STRUCTURES

## PART 1 DEAD LOADS — UNIT WEIGHTS OF BUILDING MATERIALS AND STORED MATERIALS

*( Second Revision )*

( *Page* 10, *Table* 1, *col* 1, *Item* 39 ) — Substitute '*Metal sheeting, Protected Galvanized Steel Sheets and Plain' for 'Metal Sheeting, Protected Galvanized Steel Sheets, Plain and Corrugated'.*

( CED 37 )

Printed at Simco Printing Press, Delhi

*Indian Standard*

# CODE OF PRACTICE FOR DESIGN LOADS (OTHER THAN EARTHQUAKE) FOR BUILDINGS AND STRUCTURES

## PART 1 DEAD LOADS — UNIT WEIGHTS OF BUILDING MATERIALS AND STORED MATERIALS

*( Second Revision )*

## 0. FOREWORD

**0.1** This Indian Standard ( Part 1 ) ( Second Revision ) was adopted by the Bureau of Indian Standards on 30 October 1987, after the draft finalized by the Structural Safety Sectional Committee had been approved by the Civil Engineering Division Council.

**0.2** A building has to perform many functions satisfactorily. Amongst these functions are the utility of the building for the intended use and occupancy, structural safety, fire safety; and compliance with hygienic, sanitation, ventilation and daylight standards. The design of the building is dependent upon the minimum requirements prescribed for each of the above functions. The minimum requirements pertaining to the structural safety of buildings are being covered in this code by way of laying down minimum design loads which have to be assumed for dead loads, imposed loads, snow loads and other external loads, the structure would be required to bear. Strict conformity to loading standards recommended in this code, it is hoped, will not only ensure the structural safety of the buildings which are being designed and constructed in the country and thereby reduce the hazards to life and property caused by unsafe structures, but also eliminate the wastage caused by assuming unnecessarily heavy loadings.

**0.3** This Indian standard code of practice was first published in 1957 for the guidance of civil engineers, designers and architects associated with planning and design of buildings. It included the provisions for the basic design loads ( dead loads, live loads, wind loads and seismic loads ) to be assumed in the design of buildings. In its first revision in 1964, the wind pressure provisions were modified on the basis of studies of wind phenomenon and its effect on structures, undertaken by the special committee in consultation with the Indian Meteorological Department. In addition to this, new clauses on wind loads for butterfly type structures were included; wind pressure coefficients for sheeted roofs both curved and sloping, were modified; seismic load provisions were deleted ( separate code having been prepared ) and metric system of weights and measurements was adopted.

**0.3.1** With the increased adoption of the code, a number of comments were received on provisions on live load values adopted for different occupancies. Simultaneously, live load surveys have been carried out in America and Canada to arrive at realistic live loads based on actual determination of loading ( movable and immovable ) in different occupancies. Keeping this in view and other developments in the field of wind engineering, the Sectional Committee responsible for the preparation of the standard has decided to prepare the second revision in the following five parts:

Part 1 Dead loads
Part 2 Imposed loads
Part 3 Wind loads
Part 4 Snow loads
Part 5 Special loads and loads combinations

Earthquake load is covered in a separate standard, namely IS : 1893-1984* which should be considered along with the above loads.

**0.4** This standard deals with dead loads to be assumed in the design of buildings and same is given in the form of unit weight of materials. The unit weight of other materials that are likely to be stored in a building are also included for the purpose of load calculations due to stored materials.

**0.4.1** This standard incorporates IS : 1911† published in 1967. The unit weight of materials incorporated in this standard are based on information available through published Indian standards and various other publications.

**0.4.2** The values given in this standard have been rounded off in accordance with IS : 2-1960‡.

*Criteria for earthquake resistant design of structures ( *third revision* ).

†Schedule of unit weights of building materials ( *first revision* ).

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

## 1. SCOPE

1.1 This code ( Part 1 ) covers unit weight/mass of materials, and parts or components in a building that apply to the determination of dead loads in the design of buildings.

1.1.1 The unit weight/mass of materials that are likely to be stored in a building are also specified for the purpose of load calculations along with angles of internal friction as appropriate

NOTE 1 — Table 1 gives the unit weight mass of individual building materials in alphabetical order, Table 2 covers the unit weight mass of parts or components of a building and Appendix A gives unit weight mass of stored materials

## 2. BUILDING MATERIALS

2.1 The unit weight/mass of materials used in building construction are specified in Table 1

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS

| MATERIAL | NOMINAL SIZE OR THICKNESS | WEIGHT/MASS | | |
|---|---|---|---|---|
| | mm | kN | kg | per |
| (1) | (2) | (3) | (4) | (5) |
| 1 *Acoustical Material* | | | | |
| Eelgrass | 10 | $5.70 \times 10^{-3}$ to $7.65 \times 10^{-3}$ | 0.58 to 0.78 | $m^2$ |
| Glass fibre | 10 | $3.80 \times 10^{-3}$ | 0.39 | " |
| Hair | 10 | $19.10 \times 10^{-3}$ | 1.95 | " |
| Mineral wool | 10 | $13.45 \times 10^{-3}$ | 1.37 | " |
| Slag wool | — | 2.65 | 270 | $m^3$ |
| Cork | — | 2.35 | 240 | " |
| 2 *Aggregate, Coarse* | | | | |
| Broken stone ballast · | | | | |
| Dry, well-shaken | — | 15.70 to 18.35 | 1 600 to 1 870 | " |
| Perfectly wet | — | 18.85 to 21.95 | 1 920 to 2 240 | " |
| Shingles, 3 to 38 mm | — | 14.35 | 1 460 | " |
| Broken bricks: | | | | |
| Fine | — | 14.20 | 1 450 | " |
| Coarse | — | 9.90 | 1 010 | " |
| Foam slag ( foundry pumice ) | — | 6.85 | 700 | " |
| Cinder* | — | 7.85 | 800 | " |
| 3 *Aggregate, Fine* | | | | |
| Sand· | | | | |
| Dry, clean | — | 15.10 to 15·70 | 1 540 to 1 600 | " |
| River | — | 18.05 | 1 840 | " |
| Wet | — | 17.25 to 19.60 | 1 760 to 2 000 | " |
| Brick dust ( *SURKHI* ) | — | 9.90 | 1 010 | " |
| 4. *Aggregate, Organic* | | | | |
| Saw dust, loose | — | 1.55 | 160 | " |
| Peat: | | | | |
| Dry | — | 5.50 to 6·30 | 560 to 640 | " |
| Sandy, compact | — | 7.85 | 800 | " |
| Wet, compact | — | 13·35 | 1 360 | " |
| 5. *Asbestos* | | | | |
| Felt | 10 | 0.145 | 15 | $m^2$ |
| Fibres: | | | | |
| Pressed | — | 9·40 | 960 | $m^3$ |
| Sprayed | 10 | 0.02 | 2 | $m^2$ |
| Natural | — | 29·80 | 3 040 | $m^3$ |
| Raw | — | 5·90 to 8·85 | 600 to 900 | " |
| 6. *Asbestos Cement Building Pipes* ( *see* under 41 'Pipes' in this table ) | | | | |

*Also used for filling purposes.

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS | WEIGHT/MASS | | |
|---|---|---|---|---|
| | mm | kN | kg | per |
| (1) | (2) | (3) | (4) | (5) |
| 7 *Asbestos Cement Gutters* [ *see* IS : 1626 ( Part 2 )-1980* ] | | | | |
| Boundry wall gutters | | | | |
| 400 × 150 × 250 mm | 12 5 | 0 16 | 16 0 | m |
| 450 × 150 × 300 mm | 12 5 | 0 16 | 16 0 | ,, |
| 300 × 150 × 225 mm | 12 5 | 0 13 | 13 0 | ,, |
| 275 × 125 × 175 mm | 10 0 | 0 085 | 8 5 | ,, |
| Valley gutters | | | | |
| 900 × 200 × 225 mm | 12 5 | 0 245 | 24 8 | ,, |
| 600 × 150 × 225 mm | 12 5 | 0 160 | 16 1 | ,, |
| 450 × 125 × 150 mm | 12 5 | 0 145 | 14 6 | ,, |
| 400 × 125 × 250 mm | 12 5 | 0 130 | 13 2 | ,, |
| Half round gutters | | | | |
| 150 mm | 9 5 | 0 043 | 4 4 | ,, |
| 250 mm | 9 5 | 0 079 | 8 1 | ,, |
| 300 mm | 9 5 | 0 087 | 8 9 | ,, |
| 8 *Asbestos Cement Pressure Pipes* ( *see* under 41 'Pipes' in this table ) | | | | |
| 9 *Asbestos Cement Sheeting* ( *see* IS : 459-1970† ) | | | | |
| Corrugated ( pitch — 146 mm ) | 6 | 0 118 to 0 130 | 12 0 to 13 3 | m² |
| Semi-corrugated ( pitch — 340 mm) | 6 | 0 118 to 0 127 | 12 0 to 13 0 | ,, |
| Plain | 5 | 0 09 | 9 16 | ,, |
| 10 *Bitumen* | — | 0 102 | 10 40 | m² |
| 11 *Blocks* | | | | |
| Lime-based solid blocks ( *see* IS 3115-1978‡ ) | — | 8 65 to 12 55 | 880 to 1 280 | ,, |
| Hollow ( open and closed cavity concrete blocks ) [ *see* IS 2185 ( Part 1 )-1979§ ] | | | | |
| Grade A ( load bearing ) | — | 1 41 | 144 | ,, |
| Grade B ( load bearing ) | — | 1 41 to 0 94 | 144 to 96 | ,, |
| Grade C ( non-load bearing ) | — | 1 41 to 0 94 | 144 to 96 | ,, |
| Solid concrete blocks | — | 17 65 | 1 800 | ,, |
| 12 *Boards* | | | | |
| Cork boards | | | | |
| Compressed | 10 | 0 04 | 4 | m² |
| Ordinary | 10 | 0 02 | 2 | ,, |
| Fibre building boards ( *see* IS : 1658-1977‖ ) | | | | |
| Medium hardboard | 6 | 0 028 to 0 047 | 2 88 to 4 80 | ,, |
| | 8 | 0 038 to 0 063 | 3 84 to 6 40 | ,, |
| | 10 | 0 047 to 0 078 | 4 80 to 8 00 | ,, |
| | 12 | 0 056 to 0 095 | 5 76 to 9 60 | ,, |

*Specification for asbestos cement building pipes and pipe fittings, gutters and gutter fittings and roofing fittings: Part 2 Gutters and gutter fittings ( *first revision* )

†Specification for unreinforced corrugated and semi-corrugated asbestos cement sheets ( *second revision* ).

‡Specification for lime based block ( *first revision* )

§Specification for concrete masonry units: Part 1 Hollow and solid concrete blocks ( *second revision* ).

‖Specification for fibre hardboards ( *second revision* )

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS mm | WEIGHT/MASS kN | kg | per |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| Standard hardboard | 3 | 0·024 to 0·035 | 2·40 to 3·60 | m² |
| | 4 | 0·031 to 0·047 | 3·20 to 4·80 | ,, |
| | 5 | 0·039 to 0·059 | 4·00 to 6·00 | ,, |
| Tempered hardboard | 6 | 0·047 to 0·071 | 4·80 to 7·20 | ,, |
| | 9 | 0·071 to 0·106 | 7·20 to 10·80 | ,, |
| Fire insulation board ( *see* IS : 3348-1965* ) | 9 | 0·035 | 3·6 | ,, |
| | 12 | 0·047 | 4·8 | ,, |
| Fibre insulation board, ordinary or flame-retardant type, bitumen-bounded fibre insulation board | 18 | 0·071 | 7·2 | ,, |
| | 25 | 0·098 | 10·0 | ,, |
| Gypsum plaster boards ( *see* IS : 2095-1982† ) | 9·5 | 0·069 to 0·098 | 7·0 to 10·0 | ,, |
| | 12·5 | 0·093 to 0·147 | 9·5 to 15·0 | ,, |
| | 15 | 0·110 to 0·154 | 11·25 to 15·75 | ,, |
| Insulating board ( fibre ) | 12 | 0·034 | 3·5 | ,, |
| Laminated board ( fibre ) | 6 | 0·034 | 3·5 | ,, |
| Wood particle boards ( *see* IS : 3087-1985‡ ) Designation: | | | | |
| FPSI | — | 4·90 to 8·85 | 500 to 900 | m² |
| FPTH | — | 4·90 to 8·85 | 500 to 900 | ,, |
| XPSO | — | 4·90 to 8·85 | 500 to 900 | ,, |
| XPTU | — | 4·90 to 8·85 | 500 to 900 | ,, |
| Wood particle boards for insulation purposes ( *see* IS : 3129-1985§ ) | — | 3·90 | 400 | ,, |
| High density wood particle boards ( *see* IS : 3478-1966‖ ) | | | | |
| Type 1, Grade A | — | 0·117 | 12 | m² |
| Type 1, Grade B | — | 0·088 | 9 | ,, |
| Type 2, Grade A | — | 0·117 | 12 | ,, |
| Type 2, Grade B | — | 0·088 | 9 | ,, |

NOTE 1 — Density of medium hardboard varies from 350 to 800 kg/m³.

NOTE 2 — Density of normal hardboard varies from 800 to 1 200 kg/m³.

NOTE 3 — Density of tempered hardboard varies according to treatment. The actual value may be had from the manufacturers.

NOTE 4 — All the three types of hardboards are manufactured to width of 1·2 m.

| | | | | |
|---|---|---|---|---|
| 13. *Bricks* | | | | |
| Common burnt clay bricks ( *see* IS : 1077-1987¶ ) | — | 15·70 to 18·85 | 1 600 to 1 920 | m³ |
| Engineering bricks | — | 21·20 | 2 160 | ,, |
| Heavy duty bricks ( *see* IS : 2180-1985** ) | — | 24·50 | 2 500 | ,, |
| Pressed bricks | — | 17·25 to 18·05 | 1 760 to 1 840 | ,, |
| Refractory bricks | — | 17·25 to 19·60 | 1 760 to 2 000 | ,, |
| Sand cement bricks | — | 18·05 | 1 840 | ,, |
| Sand lime bricks | — | 20·40 | 2 080 | ,, |
| 14. *Brick Chips and Broken Bricks* ( *see* under 2 'Broken bricks' in this table ) | | | | |
| 15. *Brick Dust* ( *SURKHI* ) | — | 9·10 | 1 010 | ,, |

*Specification for fibre insulation boards.
†Specification for gypsum plaster boards ( *first revision* ).
‡Specification for wood particle boards ( medium density ) for general purposes ( *first revision* ).
§Specification for low density particle boards ( *first revision* ).
‖Specification for high density wood particle boards.
¶Specification for common burnt clay building bricks ( *fourth revision* ).
**Specification for heavy-duty burnt clay building bricks ( *second revision* ).

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| Material | Nominal Size or Thickness mm | Weight/Mass kN | kg | per |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| 16. *Cast Iron, Manhole Covers* ( *see* IS : 1726* ) | | | | |
| Double triangular ( HD ) | 500 | 1·16 | 118 | Cover |
| | 560 | 1·37 | 140 | ,, |
| Circular ( HD ) | 500 | 1·16 | 118 | ,, |
| | 560 | 1·37 | 140 | ,, |
| Circular ( MD ) | 500 | 0·57 | 58 | ,, |
| | 560 | 0·63 | 64 | ,, |
| Rectangular ( MD ) | — | 0·78 | 80 | ,, |
| Rectangular ( LD ) : | | | | |
| Single seal ( Pattern 1 ) | — | 0·23 | 23 | ,, |
| ( Pattern 2 ) | — | 0·15 | 15 | ,, |
| Double seal | — | 0·28 | 29 | ,, |
| Square ( LD ) : | | | | |
| Single seal | 455 | 0·13 | 13 | ,, |
| | 610 | 0·25 | 26 | ,, |
| Double seal | 455 | 0·23 | 23 | ,, |
| | 610 | 0·36 | 37 | ,, |
| 17. *Cast Iron, Manhole Frames* ( *see* IS : 1726* ) | | | | |
| Double triangular ( HD ) | 500 | 1·09 | 111 | Frame |
| | 560 | 1·13 | 115 | ,, |
| Circular ( HD ) | 500 | 0·83 | 85 | ,, |
| | 560 | 1·06 | 108 | ,, |
| Circular ( MD ) | 500 | 0·57 | 58 | ,, |
| | 560 | 0·63 | 64 | ,, |
| Rectangular ( MD ) | — | 0·63 | 64 | ,, |
| Rectangular ( LD ) : | | | | |
| Single seal ( Pattern 1 ) | — | 0·15 | 15 | ,, |
| ( Pattern 2 ) | — | 0·10 | 10 | ,, |
| Double seal | — | 0·23 | 23 | ,, |
| Square ( LD ) : | | | | |
| Single seal | 455 | 0·07 | 7 | ,, |
| | 610 | 0·13 | 13 | ,, |
| Double seal | 455 | 0·15 | 15 | ,, |
| | 610 | 0·18 | 18 | ,, |
| 18. *Cast Iron Pipes* ( *see* under 41 'Pipes' in this table ) | | | | |
| 19. *Cement* ( *see* IS : 269-1976† ) | | | | |
| Ordinary and aluminous | — | 14·10 | 1 440 | m |
| Rapid-hardening | — | 12·55 | 1 280 | ,, |
| 20. *Cement Concrete, Plain* | | | | |
| Aerated | — | 7·45 | 760 | ,, |
| No-fines, with heavy aggregate | — | 15·70 to 18·80 | 1 600 to 1 920 | ,, |
| No-fines, with light aggregate | — | 8·65 to 12 55 | 880 to 1 280 | ,, |
| With burnt clay aggregate | — | 17·25 to 21·20 | 1 760 to 2 160 | ,, |
| With expanded clay aggregate | — | 9 40 to 16·50 | 960 to 1 680 | ,, |
| With clinker aggregate | — | 12·55 to 17·25 | 1 280 to 1 760 | ,, |
| With pumice aggregate | — | 5·50 to 11·00 | 560 to 1 120 | ,, |
| With sand and gravel or crushed natural stone aggregate | — | 22·00 to 23·50 | 2 240 to 2 400 | ,, |
| With saw dust | — | 6·30 to 16·50 | 640 to 1 680 | ,, |
| With foamed slag aggregate | — | 9·40 to 18·05 | 960 to 1 840 | ,, |

*Specification for cast iron manhole covers and frames.

†Specification for ordinary and low heat Portland cement ( *third revision* ).

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS | WEIGHT/MASS | | |
|---|---|---|---|---|
| | mm | kN | kg | per |
| (1) | (2) | (3) | (4) | (5) |
| 21. *Cement Concrete, Prestressed* ( conforming to IS : 1343-1980* ) | — | 23·50 | 2 400 | $m^3$ |
| 22. *Cement Concrete, Reinforced* | | | | |
| With sand and gravel or crushed natural stone aggregate: | | | | |
| With 1 percent steel | — | 22·75 to 24·20 | 2 310 to 2 470 | ,, |
| With 2 percent steel | — | 23·25 to 24·80 | 2 370 to 2 530 | ,, |
| With 5 percent steel | — | 24·80 to 26·50 | 2 530 to 2 700 | ,, |
| 23. *Cement Concrete Pipes* ( *see* under 41 'Pipes' in this table ) | | | | |
| 24. *Cement Mortar* | — | 20·40 | 2 080 | ,, |
| 25. *Cement Plaster* | — | 20·40 | 2 080 | ,, |
| 26. *Cork* | — | 2·35 | 240 | ,, |
| 27. *Expanded Metal* ( conforming to IS : 412-1975† ) | | | | |
| Reference No. | Size of Mesh, Nominal | | | |
| | SWM mm | LWM mm | | |
| 1 | 100 | 250 | 0·030 | 3.08 | $m^2$ |
| 2 | 100 | 250 | 0·024 | 2·47 | ,, |
| 3 | 100 | 250 | 0·016 | 1·60 | ,, |
| 4 | 75 | 200 | 0·042 | 4·28 | ,, |
| 5 | 75 | 200 | 0·032 | 3·29 | ,, |
| 6 | 75 | 200 | 0·021 | 2·14 | ,, |
| 7 | 40 | 115 | 0·080 | 8·02 | ,, |
| 8 | 40 | 115 | 0·060 | 6·17 | ,, |
| 9 | 40 | 75 | 0·060 | 6·17 | ,, |
| 10 | 40 | 75 | 0·028 | 2·85 | ,, |
| 11 | 40 | 115 | 0·039 | 4·01 | ,, |
| 12 | 40 | 75 | 0·039 | 4·01 | ,, |
| 13 | 40 | 115 | 0·020 | 2·04 | ,, |
| 14 | 40 | 75 | 0·020 | 2·04 | ,, |
| 15 | 25 | 75 | 0·054 | 5·53 | ,, |
| 16 | 25 | 75 | 0·038 | 3·93 | ,, |
| 17 | 25 | 75 | 0·028 | 2·81 | ,, |
| 18 | 25 | 75 | 0·021 | 2·19 | ,, |
| 19 | 20 | 60 | 0·070 | 7·15 | ,, |
| 20 | 20 | 50 | 0·070 | 7·15 | ,, |
| 21 | 20 | 60 | 0·050 | 5·09 | ,, |
| 22 | 20 | 50 | 0·050 | 5·09 | ,, |
| 23 | 20 | 60 | 0·036 | 3·63 | ,, |
| 24 | 20 | 50 | 0·036 | 3·63 | ,, |
| 25 | 20 | 60 | 0·021 | 2·18 | ,, |
| 26 | 20 | 50 | 0·021 | 2·18 | ,, |
| 27 | 12·5 | 50 | 0·050 | 5·04 | ,, |
| 28 | 12·5 | 40 | 0·050 | 5·04 | ,, |
| 29 | 12·5 | 50 | 0·040 | 4·00 | ,, |
| 30 | 12·5 | 50 | 0·030 | 3·13 | ,, |
| 31 | 12·5 | 40 | 0·030 | 3·13 | ,, |
| 32 | 12·5 | 50 | 0·025 | 2·50 | ,, |
| 33 | 12·5 | 40 | 0·025 | 2·50 | ,, |
| 34 | 10 | 40 | 0·050 | 5·98 | ,, |
| 35 | 10 | 40 | 0·035 | 3·59 | ,, |
| 36 | 10 | 40 | 0·028 | 2·87 | ,, |

*Code of practice for prestressed concrete ( *first revision* ).

†Specification for expanded metal steel sheets for general purposes ( *second revision* ).

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| Reference No. | Material | Nominal Size or Thickness mm | Weight/Mass kN | kg | per |
|---|---|---|---|---|---|
| (1) | | (2) | (3) | (4) | (5) |
| | | Size of Mesh, Nominal | | | |
| | | SWM mm / LWM mm | | | |
| 37 | | 9 5 / 28 5 | 0 050 | 5 19 | m² |
| 38 | | 9 5 / 28 5 | 0 028 | 2 81 | ,, |
| 39 | | 9 5 / 28 5 | 0 020 | 2 09 | ,, |
| 40 | | 6 / 25 | 0 074 | 7 55 | ,, |
| 41 | | 6 / 25 | 0 048 | 4 88 | ,, |
| 42 | | 6 / 25 | 0 038 | 3 ·0 | ,, |
| 43 | | 5 / 20 | 0 050 | 5 01 | ,, |
| 44 | | 3 / 15 | 0 041 | 4 28 | ,, |
| 28 | *Felt, Bituminous for Waterproofing and Damp-proofing* ( *see* IS 1322-1982* ) | | | | |
| | Fibre base | | | | |
| | Type 1 ( Underlay ) | — | $8\ 34 \times 10^{-6}$ | 0 85 | ,, |
| | Type 2 ( Self-finished felt ) | | | | |
| | Grade 1 | — | $21\ 48 \times 10^{-6}$ | 2 19 | ,, |
| | Grade 2 | — | $30\ 21 \times 10^{-6}$ | 3 08 | ,, |
| | Hessian base | | | | |
| | Type 3 ( Self-finished felt ) | | | | |
| | Grade 1 | — | $21\ 87 \times 10^{-6}$ | 2 23 | ,, |
| | Grade 2 | — | $35\ 70 \times 10^{-6}$ | 3 64 | ,, |
| 29 | *Foam Slag, Foundry Pumice* | — | 6 85 | 700 | m³ |
| 30 | *Glass* ( *see* IS 2835-1977† ) | | | | |
| | Sheet | 2 0 | 0 049 | 5 0 | ,, |
| | | 2 5 | 0 062 | 6 3 | ,, |
| | | 3 0 | 0 074 | 7 5 | ,, |
| | | 4 0 | 0 098 | 10 0 | ,, |
| | | 5 0 | 0 123 | 12 5 | ,, |
| | | 5 5 | 0 134 | 13 7 | ,, |
| | | 6 5 | 0 167 | 17 0 | ,, |
| 31 | *Gutters, Asbestos Cement* ( *see* under 7 'Asbestos cement gutter' in this table ) | | | | |
| 32 | *Gypsum* | | | | |
| | Gypsum mortar | — | 11 75 | 1 200 | m³ |
| | Gypsum powder | — | 13 89 to 17 25 | 1 410 to 1 760 | ,, |
| 33 | *Iron* | | | | |
| | Pig | — | 70 60 | 7 200 | ,, |
| | Gray, cast | — | 68 95 to 69 90 | 7 030 to 7 130 | ,, |
| | White, cast | — | 74 30 to 75 70 | 7 580 to 7 720 | ,, |
| | Wrought | — | 75 50 | 7 700 | ,, |
| 34 | *Lime* | | | | |
| | Lime concrete with burnt clay aggregate | — | 18 80 | 1 920 | ,, |

NOTE 1 — The weight of untreated based shall be taken as in the dry condition

NOTE 2 — The weights given above are indicative of the total weight of ingredients used in the manufacture of felt and not of the ingredients determined from a physical analysis of the finished material

*Specification for bitumen felts for waterproofing and damp-proofing ( *third revision* ).

†Specification for flat transparent sheet glass ( *second revision* )

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS mm | WEIGHT/MASS kN | kg | per |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| Lime mortar | — | 15·70 to 18·05 | 1 600 to 1 840 | $m^3$ |
| Lime plaster | — | 17·25 | 1 760 | ,, |
| Lime stone in lumps, uncalcined | — | 12·55 to 14·10 | 1 280 to 1 440 | ,, |
| Lime, unslaked, freshly burnt in pieces | — | 8·60 to 10·20 | 880 to 1 040 | ,, |
| Lime slaked, fresh | — | 5·70 to 6·30 | 580 to 640 | ,, |
| Lime slaked, after 10 days | — | 7·85 | 800 | ,, |
| Lime, unslaked ( *KANKAR* ) | — | 11·55 | 1 180 | ,, |
| Lime, slaked ( *KANKAR* ) | — | 10 00 | 1 020 | ,, |
| 35. *Linoleum* ( *see* IS : 653-1980* ) | | | | |
| Sheets and tiles | 4·4 | 0·056 9 | 5·8 | $m^3$ |
| | 3·2 | 0·040 2 | 4·1 | ,, |
| | 2·0 | 0·026 5 | 1·7 | ,, |
| | 1·6 | 0 021 5 | 2·2 | ,, |
| 36. *Masonry, Brick* | | | | |
| Common burnt clay bricks | — | 18·85 | 1 920 | $m^3$ |
| Engineering bricks | — | 23·55 | 2 400 | ,, |
| Glazed bricks | — | 20·40 | 2 080 | ,, |
| Pressed bricks | — | 22·00 | 2 240 | ,, |
| 37. *Masonry, Stone* | | | | |
| Cast | — | 22·55 | 2 300 | ,, |
| Dry rubble | — | 20·40 | 2 080 | ,, |
| Granite ashlar | — | 25·10 | 2 640 | ,, |
| Granite rubble | — | 23·55 | 2 400 | ,, |
| Lime stone ashlar | — | 25·10 | 2 560 | ,, |
| Marble dressed | — | 26·50 | 2 700 | ,, |
| Sand stone | — | 22·00 | 2 240 | ,, |
| 38. *Mastic Asphalt* | 10 | 0·215 | 22 | $m^3$ |
| 39. *Metal Sheeting, Protected Galvanized Steel Sheets, Plain and Corrugated* ( *see* IS : 277-1985† ) | | | | |
| Class 1 | 1·60 | 0·131 | 13·31 | ,, |
| | 1·25 | 0·104 | 10·56 | ,, |
| | 1·00 | 0·084 | 8·60 | ,, |
| | 0·80 | 0·069 | 7·03 | ,, |
| | 0·63 | 0·056 | 5·70 | ,, |
| Class 2 | 1·60 | 0·129 | 13·16 | ,, |
| | 1·25 | 0·102 | 10·41 | ,, |
| | 1·00 | 0·083 | 8·45 | ,, |
| | 0·80 | 0·067 | 6·88 | ,, |
| | 0·63 | 0·054 | 5·55 | ,, |
| Class 3 | 1·60 | 0·128 | 13·01 | ,, |
| | 1·25 | 0·101 | 10·26 | ,, |
| | 1·00 | 0·081 | 8·30 | ,, |
| | 0·80 | 0·066 | 6·73 | ,, |
| | 0·63 | 0·053 | 5·40 | ,, |
| Class 4 | 1·60 | 0·127 | 12·94 | ,, |
| | 1·25 | 0·100 | 10·19 | ,, |
| | 1·00 | 0·081 | 8·22 | ,, |
| | 0·80 | 0·065 | 6·66 | ,, |
| | 0·63 | 0·052 | 5·32 | ,, |
| 40. *Mortar* | | | | |
| Cement | — | 20·40 | 2 080 | $m^3$ |
| Gypsum | — | 11·80 | 1 200 | ,, |
| Lime | — | 15·70 to 18·05 | 1 600 to 1 840 | ,, |

*Specification for linoleum sheets and tiles ( *second revision* ).
†Specification for galvanized steel sheets ( plain and corrugated ) ( *fourth revision* ).

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS mm | WEIGHT/MASS kN | kg | per |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| 41. *Pipes* | | | | |
| Asbestos cement pipes [ *see* IS : 1626 ( Part ) 1-1980* ] | 50 | 0·032 to 0·034 | 3·3 to 3·5 | m |
| | 60 | 0·032 to 0·043 | 3·3 to 4·4 | ,, |
| | 80 | 0·051 to 0·054 | 5·2 to 5·5 | ,, |
| | 90 | 0·052 to 0·060 | 5·3 to 6·1 | ,, |
| | 100 | 0·058 to 0·065 | 5·9 to 6·6 | ,, |
| | 125 | 0·072 to 0·086 | 7·3 to 8·8 | ,, |
| | 150 | 0·086 to 0·108 | 8·8 to 11·0 | ,, |
| Asbestos cement pressure pipes ( *see* IS : 1592-1980† ) | 50 | 0·056 | 5·7 | ,, |
| | 80 | 0·067 | 6·8 | ,, |
| | 100 | 0·090 | 9·2 | ,, |
| | 125 | 0·139 | 14·2 | ,, |
| | 150 | 0·175 | 17·8 | ,, |
| | 200 | 0·264 | 26·9 | ,, |
| | 250 | 0·380 | 38 8 | ,, |
| | 300 | 0·539 | 55 | ,, |
| Cast iron pipes: | | | | |
| Rainwater pipes ( *see* IS : 1230-1979‡ ) | | | | |
| Standard overall length 1·8 m with socket | 550 | 0·073 | 7·5 | pipe |
| | 75 | 0·108 | 11·0 | ,, |
| | 100 | 0·137 | 14·0 | ,, |
| | 125 | 0·196 | 20·0 | ,, |
| | 150 | 0·255 | 26·0 | ,, |
| Standard overall length 1·5 m with socket | 50 | 0·064 | 6·5 | ,, |
| | 75 | 0·093 | 9·5 | ,, |
| | 100 | 0·123 | 12·5 | ,, |
| | 125 | 0·172 | 17·5 | ,, |
| | 150 | 0·230 | 23·5 | ,, |
| Pressure pipes for water, gas and sewage: | | | | |
| a) Centrifugally cast ( *see* IS : 1536-1976§ ) | | | | |
| i) Socket and spigot pipes: | | | | |
| Barrel: | | | | |
| Class LA | 80 | 1·144 | 14·7 | m |
| | 100 | 0·182 | 18·6 | ,, |
| | 125 | 0·237 | 24·2 | ,, |
| | 150 | 0·295 | 30·1 | ,, |
| | 200 | 0·432 | 44·0 | ,, |
| | 250 | 0·582 | 59·3 | ,, |
| | 300 | 0·750 | 76·5 | ,, |
| | 350 | 0·944 | 96·3 | ,, |
| | 400 | 1·146 | 116·9 | ,, |
| | 450 | 1·383 | 141·0 | ,, |
| | 500 | 1·620 | 165·2 | ,, |
| | 600 | 2·156 | 219·8 | ,, |
| | 700 | 2·778 | 283·2 | ,, |
| | 750 | 3·111 | 317·2 | ,, |
| Class A | 80 | 0·157 | 16·0 | ,, |
| | 100 | 0·201 | 20·5 | ,, |
| | 125 | 0 259 | 26·4 | ,, |
| | 150 | 0·326 | 33·2 | ,, |
| | 200 | 0·472 | 48·1 | ,, |
| | 250 | 0·637 | 65·0 | ,, |
| | 300 | 0·824 | 84·0 | ,, |
| | 350 | 1·030 | 105·0 | ,, |
| | 400 | 1·262 | 128·7 | ,, |
| | 450 | 1·530 | 156·0 | ,, |
| | 500 | 1·775 | 181·0 | ,, |

*Specification for asbestos cement buildings pipes and pipe fittings, gutters and gutter fittings and roofing fittings: Part 1 Pipes and pipe fittings ( *first revision* ).

†Specification for asbestos cement pressure pipes ( *second revision* ).

‡Specification for cast iron rainwater pipes and fittings ( *second revision* ).

§Specification for centrifugally cast ( spun ) iron pressure pipes for water, gas and sewage ( *second revision* ).

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS mm | WEIGHT/MASS kN | kg | per |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| Class A | 600 | 2 367 | 241·4 | m |
| | 700 | 3 056 | 311·6 | ,, |
| | 750 | 3·422 | 348 9 | ,, |
| Class B | 80 | 0·172 | 17 3 | ,, |
| | 100 | 0 216 | 22 0 | ,, |
| | 125 | 0 281 | 28 7 | ,, |
| | 150 | 0 352 | 35 9 | ,, |
| | 200 | 0 511 | 52 1 | ,, |
| | 250 | 0 692 | 70 6 | ,, |
| | 300 | 0 896 | 91·4 | ,, |
| | 350 | 1 122 | 114·5 | ,, |
| | 400 | 1 368 | 139 5 | ,, |
| | 450 | 1 657 | 169 0 | ,, |
| | 500 | 1·929 | 156·7 | ,, |
| | 600 | 2 578 | 262 9 | ,, |
| | 700 | 3·317 | 338 2 | ,, |
| | 750 | 3 733 | 380 6 | ,, |
| Sockets for Class LA, Class A and Class B barrels | 80 | 0 054 | 5·5 | Socket |
| | 100 | 0 069 | 7 1 | ,, |
| | 125 | 0 090 | 9·2 | ,, |
| | 150 | 0 113 | 11 5 | ,, |
| | 200 | 0 165 | 16 8 | ,, |
| | 250 | 0 225 | 22·9 | ,, |
| | 300 | 0 292 | 29·8 | ,, |
| | 350 | 0 368 | 37 5 | ,, |
| | 400 | 0 454 | 46·3 | ,, |
| | 450 | 0 549 | 56 0 | ,, |
| | 500 | 0·647 | 66·0 | ,, |
| | 600 | 0 876 | 89·3 | ,, |
| | 700 | 1 145 | 116 8 | ,, |
| | 750 | 1·292 | 131 7 | ,, |
| ii) Flanged pipe with screwed flanges: | | | | |
| Barrel: | | | | |
| Class A | 80 to 300 | Same as for centrifugally cast socket and spigot pipes, Class A | | |
| Class B | 80 to 300 | Same as for centrifugally cast socket and spigot pipes, Class B | | |
| Flanges for Class A and Class B barrels | 80 | 0 042 | 4·3 | Flange |
| | 100 | 0 049 | 5 0 | ,, |
| | 125 | 0 065 | 6 6 | ,, |
| | 150 | 0 080 | 8 2 | ,, |
| | 200 | 0·112 | 11 4 | ,, |
| | 250 | 0 144 | 14 7 | ,, |
| | 300 | 0 182 | 18 6 | ,, |
| b) Vertically cast socket and spigot pipes ( *see* IS : 1537-1976* ) | | | | |
| Barrel: | | | | |
| Class A | 80 to 750 | Same as for centrifugally cast socket and spigot pipes, Class A | | |
| | 800 | 3 82 | 389 | m |
| | 900 | 4 65 | 474 | ,, |
| | 1 000 | 5 59 | 570 | ,, |
| | 1 100 | 6 59 | 672 | ,, |
| | 1 200 | 7·67 | 783 | ,, |
| | 1 500 | 11 98 | 1 222 | ,, |
| Class B | 80 to 750 | Same as for centrifugally cast socket and spigot pipes, Class B | | |
| | 800 | 4·15 | 423 | m |
| | 900 | 5·07 | 516 | ,, |
| | 1 000 | 6 07 | 619 | ,, |
| | 1 100 | 7·23 | 739 | ,, |
| | 1 200 | 8·35 | 851 | ,, |
| | 1 500 | 13·07 | 1 333 | ,, |

*Specification for vertically cast iron pressure pipes for water, gas and sewage ( *first revision* ).

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS mm | WEIGHT/MASS kN | kg | per |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| Socket for Class A and Class B barrels | 80 to 750 | Same as for centrifugally cast socket and spigot pipes, Class A and Class B | | |
| | 800 | 1 45 | 147 | Socket |
| | 900 | 1 79 | 182 | ,, |
| | 1 000 | 2 18 | 222 | ,, |
| | 1 100 | 2 60 | 265 | ,, |
| | 1 200 | 3 07 | 313 | ,, |
| | 1 500 | 4 91 | 501 | ,, |
| c) Sand cast ( flanged pipes ) | | | | |
| Barrel· | | | | |
| Class A | 80 to 750 | Same as for centrifugally cast socket and spigot pipes, Class A | | |
| | 800 to 1 500 | Same as for vertically cast socket and spigot pipes, Class A | | |
| Class B | 80 to 750 | Same as for centrifugally cast socket and spigot pipes, Class B | | |
| | 800 to 1 500 | Same as for vertically cast socket and spigot pipes, Class B | | |
| Flanges for Class A and Class B Barrels | 80 | 0 036 | 3 7 | Flange |
| | 100 | 0 041 | 4 2 | ,, |
| | 125 | 0 052 | 5 3 | ,, |
| | 150 | 0 066 | 6 7 | ,, |
| | 200 | 0 091 | 9 3 | ,, |
| | 250 | 0 117 | 12 0 | ,, |
| | 300 | 0 145 | 14 8 | ,, |
| | 350 | 0 186 | 19 4 | ,, |
| | 400 | 0 229 | 23 4 | ,, |
| | 450 | 0 250 | 26 5 | ,, |
| | 500 | 0 315 | 32 1 | ,, |
| | 600 | 0 431 | 44 0 | ,, |
| | 700 | 0 587 | 59 9 | ,, |
| | 750 | 0 685 | 69 8 | ,, |
| | 800 | 0 792 | 80 8 | ,, |
| | 900 | 0 928 | 94 6 | ,, |
| | 1 000 | 1 18 | 120 0 | ,, |
| | 1 100 | 1 38 | 139 0 | ,, |
| | 1 200 | 1 70 | 173 0 | ,, |
| | 1 500 | 2 71 | 276 2 | ,, |
| Concrete pipes ( *see* IS 458-1971* ) | | | | |
| Class NP1 ( unreinforced non-pressure pipes ) | 80 | 0 19 | 19 | m |
| | 100 | 0 22 | 22 | ,, |
| | 150 | 0 30 | 31 | ,, |
| | 250 | 0 40 | 41 | ,, |
| | 300 | 0 69 | 70 | ,, |
| | 350 | 0 84 | 86 | ,, |
| | 400 | 0 95 | 97 | ,, |
| | 450 | 1 17 | 119 | ,, |
| Class NP2 ( reinforced concrete, light duty, non-pressure pipes ) | 80 | 0 196 | 20 | ,, |
| | 100 | 0 235 | 24 | ,, |
| | 150 | 0 324 | 33 | ,, |
| | 250 | 0 510 | 52 | ,, |
| | 300 | 0 736 | 75 | ,, |
| | 350 | 0 902 | 92 | ,, |
| | 400 | 1 02 | 104 | ,, |
| | 450 | 1 26 | 128 | ,, |
| | 500 | 1 38 | 141 | ,, |
| | 600 | 1 89 | 193 | ,, |
| | 700 | 2 19 | 223 | ,, |
| | 800 | 2 81 | 287 | ,, |
| | 900 | 3 51 | 358 | ,, |

*Specification for concrete pipes ( with and without reinforcement ) ( *second revision* )

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS mm | WEIGHT/MASS kN | kg | per |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| Class NP2 ( reinforced concrete, light duty, non-pressure pipes ) | 1 000 | 4·30 | 438 | m |
| | 1 100 | 5·15 | 525 | ,, |
| | 1 200 | 6·09 | 620 | ,, |
| | 1 400 | 8·18 | 834 | ,, |
| | 1 600 | 9·93 | 1 013 | ,, |
| | 1 800 | 12·58 | 1 283 | ,, |
| Class NP3 ( reinforced concrete, heavy duty, non-pressure pipes ) | 350 | 2·35 | 240 | ,, |
| | 400 | 2·63 | 269 | ,, |
| | 450 | 2·91 | 297 | ,, |
| | 500 | 3·19 | 325 | ,, |
| | 600 | 4·02 | 410 | ,, |
| | 700 | 4·61 | 470 | ,, |
| | 800 | 5·92 | 604 | ,, |
| | 900 | 7·39 | 754 | ,, |
| | 1 000 | 8·13 | 829 | ,, |
| | 1 100 | 10·34 | 1 054 | ,, |
| | 1 200 | 11·18 | 1 140 | ,, |
| Class P1 ( reinforced concrete pressure pipes safe for 20 MPa pressure tests ) | 80 | 0·196 | 20 | ,, |
| | 100 | 0·235 | 24 | ,, |
| | 150 | 0·324 | 33 | ,, |
| | 250 | 0·510 | 52 | ,, |
| | 300 | 0·736 | 75 | ,, |
| | 350 | 0·902 | 92 | ,, |
| | 400 | 1·02 | 104 | ,, |
| | 450 | 1·26 | 128 | ,, |
| | 500 | 1·38 | 141 | ,, |
| | 600 | 1·89 | 193 | ,, |
| | 700 | 2·19 | 223 | ,, |
| | 800 | 2·81 | 287 | ,, |
| | 900 | 3·51 | 358 | ,, |
| | 1 000 | 4·30 | 437 | ,, |
| | 1 100 | 5·15 | 525 | ,, |
| | 1 200 | 6·09 | 620 | ,, |
| Class P2 ( reinforced concrete pressure pipes safe for 40 MPa pressure tests ) | 80 | 0·196 | 20 | ,, |
| | 100 | 0·235 | 24 | ,, |
| | 150 | 0·324 | 33 | ,, |
| | 250 | 0·608 | 63 | ,, |
| | 300 | 1·01 | 103 | ,, |
| | 350 | 1·31 | 134 | ,, |
| | 400 | 1·67 | 170 | ,, |
| | 450 | 1·84 | 188 | ,, |
| | 500 | 1·56 | 261 | ,, |
| | 600 | 3·20 | 326 | ,, |
| Class P3 ( reinforced concrete pressure pipes safe for 60 MPa pressure tests ) | 80 | 0·196 | 20 | ,, |
| | 100 | 0·235 | 24 | ,, |
| | 150 | 0·324 | 33 | ,, |
| | 250 | 0·736 | 75 | ,, |
| | 300 | 1·15 | 117 | ,, |
| | 350 | 1·65 | 168 | ,, |
| | 400 | 2·04 | 204 | ,, |
| Lead pipes [ *see* IS : 404 ( Part 1 )-1977* ] ( service and distribution pipes to be laid underground ) : | | | | |
| For working pressure 40 MPa | 10 | 0·018 | 1·87 | ,, |
| | 15 | 0·031 | 3·13 | ,, |
| | 20 | 0·042 | 4·24 | ,, |
| | 25 | 0·060 | 6·11 | ,, |
| | 32 | 0·074 | 7·50 | ,, |
| | 40 | 0·091 | 9·28 | ,, |
| | 50 | 0·142 | 14 45 | ,, |

*Specification for lead pipes: Part 1 For other than chemical purposes ( *second revision* ).

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS mm | WEIGHT/MASS kN | kg | per |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| For working pressure 70 MPa | 10 | 0·022 | 2·26 | m |
| | 15 | 0·038 | 3·83 | ,, |
| | 20 | 0.050 | 5·11 | ,, |
| | 25 | 0·069 | 7·03 | ,, |
| | 32 | 0·126 | 12·80 | ,, |
| | 40 | 0·175 | 17·82 | ,, |
| For working pressure 100 MPa | 10 | 0·029 | 2·96 | ,, |
| | 15 | 0 048 | 4·88 | ,, |
| | 20 | 0·067 | 6·86 | ,, |
| | ( *see* Note below ) 25 | 0·105 | 10·75 | ,, |
| | ( *see* Note below ) | | | |
| Service pipes to be fixed or laid above ground: | | | | |
| For working pressure 40 MPa | 10 | 0·014 | 1·45 | ,, |
| | 15 | 0·021 | 2·15 | ,, |
| | 20 | 0·027 | 2·74 | ,, |
| | 25 | 0·036 | 3·67 | ,, |
| | 32 | 0·059 | 6·00 | ,, |
| | 40 | 0·091 | 9·28 | ,, |
| | 50 | 0·142 | 14·45 | ,, |
| For working pressure 70 MPa | 10 | 0·018 | 1·81 | ,, |
| | 15 | 0·024 | 2·47 | ,, |
| | 20 | 0·030 | 3·11 | ,, |
| | 25 | 0·069 | 7·03 | ,, |
| | 32 | 0·126 | 12·80 | ,, |
| | 40 | 0·175 | 17·82 | ,, |
| For working pressure 100 MPa | 10 | 0·029 | 2·96 | ,, |
| | 15 | 0·048 | 4·88 | ,, |
| | 20 | 0 067 | 6·86 | ,, |
| | ( *see* Note below ) 25 | 0·105 | 10·75 | ,, |
| | ( *see* Note below ) | | | |
| Cold water distribution pipes to be fixed or laid above ground: | | | | |
| For working pressure 25 MPa | 10 | 0·014 | 1·45 | ,, |
| | 15 | 0·021 | 2·15 | ,, |
| | 20 | 0·027 | 2·74 | ,, |
| | 25 | 0·036 | 3·67 | ,, |
| | 32 | 0·048 | 4·85 | ,, |
| | 40 | 0 067 | 6·79 | ,, |
| | 50 | 0·084 | 8·53 | ,, |
| For working pressure 40 MPa | 10 | 0·014 | 1·45 | ,, |
| | 15 | 0 021 | 2·15 | ,, |
| | 20 | 0·027 | 2·74 | ,, |
| | 25 | 0 036 | 3·67 | ,, |
| | 32 | 0·059 | 6·00 | ,, |
| | 40 | 0·091 | 9·29 | ,, |
| | 50 | 0·142 | 14·45 | ,, |
| Hot water distribution pipes to be fixed or laid above ground: | | | | |
| For working pressure 20 MPa | 10 | 0·015 | 1·50 | ,, |
| | 15 | 0 023 | 2·34 | ,, |
| | 20 | 0·031 | 3·13 | ,, |
| | 25 | 0·041 | 4·13 | ,, |
| | 32 | 0·062 | 6·30 | ,, |
| | 40 | 0·082 | 8·38 | ,, |
| | 50 | 0·142 | 14·45 | ,, |

NOTE — The maximum working pressure for these sizes is 90 MPa.

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS mm | WEIGHT/MASS kN | kg | per |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| For working pressure 35 MPa | 10 | 0·015 | 1.50 | m |
| | 15 | 0·027 | 2·34 | ,, |
| | 20 | 0·045 | 4·56 | ,, |
| | 25 | 0·085 | 8·69 | ,, |
| | 32 | 0·132 | 13·51 | ,, |
| Soil, waste, and soil and waste ventilation pipes | 50 | 0·050 | 5·07 | ,, |
| | 75 | 0·073 | 7·48 | ,, |
| | 100 | 0·097 | 9·88 | ,, |
| | 150 | 0·160 | 16·36 | ,, |
| Flushing and warning pipes | 20 | 0·020 | 2·09 | ,, |
| | 25 | 0·025 | 2·56 | ,, |
| | 32 | 0·032 | 3·28 | ,, |
| | 40 | 0·039 | 3·95 | ,, |
| | 50 | 0·049 | 5·07 | ,, |
| Gas pipes: | | | | |
| Heavy weight gas pipes | 10 | 0·008 | 0·81 | ,, |
| | 15 | 0·017 | 1·70 | ,, |
| | 20 | 0·025 | 2·60 | ,, |
| | 25 | 0·034 | 3·44 | ,, |
| | 32 | 0·045 | 4·57 | ,, |
| | 40 | 0·061 | 6·27 | ,, |
| | 50 | 0·071 | 7·20 | ,, |
| Light weight gas pipes | 10 | 0·008 | 0·81 | ,, |
| | 15 | 0·012 | 1·21 | ,, |
| | 20 | 0·020 | 2·09 | ,, |
| | 25 | 0·029 | 2·99 | ,, |
| | 32 | 0·037 | 3·74 | ,, |
| | 40 | 0·047 | 4·76 | ,, |
| | 50 | 0·058 | 5·87 | ,, |
| Stoneware, salt-glazed pipes ( *see* IS : 651-1980* ) | 100 | 0·137 | 14 | ,, |
| | 150 | 0·216 | 22 | ,, |
| | 200 | 0·324 | 33 | ,, |
| | 230 | 0·412 | 42 | ,, |
| | ( *see* Note below) | | | |
| | 250 | 0·510 | 52 | ,, |
| | 300 | 0·775 | 79 | ,, |
| | 350 | 0·980 | 100 | ,, |
| | 400 | 1·26 | 128 | ,, |
| | 450 | 1·44 | 147 | ,, |
| | 500 | 1·77 | 180 | ,, |
| | 600 | 2·35 | 240 | ,, |
| 42. *Plaster* ( *see also* 6 'Finishing' in Table 2 ) | | | | |
| Cement | — | 20·40 | 2 080 | $m^3$ |
| Lime | — | 17·25 | 1 760 | ,, |
| Acoustic | 10 | 0·078 | 8 | $m^2$ |
| Anhydrite | 10 | 0·206 | 21 | ,, |
| Barium sulphate | 10 | 0·284 | 29 | ,, |
| Fibrous | 10 | 0·088 | 9 | ,, |
| Gypsum | 10 | 0·186 | 19 | ,, |
| 43. *Sheeting* | | | | |
| Asbestos ( *see* under 9 'Asbestos cement sheeting' in this table ) | | | | |
| Galvanized iron ( *see* under 39 'Metal sheeting, protected' in this table ) | | | | |
| Glass ( *see* under 30 'Glass' in this table ) | | | | |
| Plywood | 1 | 0·007 | 0·7 | ,, |

NOTE — This is non-preferred size and its manufacture is permitted for a limited period.

*Specification for salt-glazed stoneware pipes and fittings ( *fourth revision* ).

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| Material | Nominal Size or Thickness | Weight/Mass | | |
|---|---|---|---|---|
| | mm | kN | kg | per |
| (1) | (2) | (3) | (4) | (5) |
| 44. *Slagwool* | — | 2·65 | 270 | $m^3$ |
| 45. *Soils and Gravels* | | | | |
| Aluvial ground, undisturbed | — | 15·69 | 1 600 | ,, |
| Broken stone ballast: | | | | |
| Dry, well-shaken | — | 15·70 to 18·35 | 1 600 to 1 870 | ,, |
| Perfectly wet | — | 18·85 to 21·95 | 1 920 to 2 240 | ,, |
| Chalk | — | 15·70 to 18·85 | 1 600 to 1 920 | ,, |
| Clay: | | | | |
| China, compact | — | 21·95 | 2 240 | ,, |
| Clay fills: | | | | |
| Dry, lumps | — | 10·20 | 1 040 | ,, |
| Dry, compact | — | 14·10 | 1 440 | ,, |
| Damp, compact | — | 17 25 | 1 760 | ,, |
| Wet, compact | — | 20·40 | 2 080 | ,, |
| Undisturbed | — | 18·85 | 1 920 | ,, |
| Undisturbed, gravelly | — | 20 40 | 2 080 | ,, |
| Earth: | | | | |
| Dry | — | 13·85 to 18 05 | 1 410 to 1 840 | ,, |
| Moist | — | 15 70 to 19·60 | 1 600 to 2 000 | ,, |
| Gravel: | | | | |
| Loose | — | 15 70 | 1 600 | ,, |
| Rammed | — | 18·85 to 21·20 | 1 920 to 2 160 | ,, |
| Kaolin, compact | — | 25 50 | 2 600 | ,, |
| Loam: | | | | |
| Dry, loose | — | 11·75 | 1 200 | ,, |
| Dry, compact | — | 15 70 | 1 600 | ,, |
| Wet, compact | — | 18 85 | 1 920 | ,, |
| Loess, dry | — | 14 10 | 1 440 | ,, |
| Marl, compact | — | 17 25 to 18 85 | 1 760 to 1 920 | ,, |
| Mud, river, wet | — | 17·25 to 18·85 | 1 760 to 1 920 | ,, |
| Peat: | | | | |
| Dry | — | 5·50 to 6 30 | 560 to 640 | ,, |
| Sandy, compact | — | 7·85 | 800 | ,, |
| Wet, compact | — | 13·35 | 1 360 | ,, |
| Rip-rap | — | 12·55 to 14 10 | 1 280 to 1 440 | ,, |
| Sand: | | | | |
| Dry, clean | — | 15 10 to 15·70 | 1 540 to 1 600 | ,, |
| River | — | 18 05 | 1 840 | ,, |
| Wet | — | 17·25 to 19 60 | 1 760 to 2 000 | ,, |
| Shingles: | | | | |
| Aggregate 3 to 38 mm | — | 13 75 | 1 400 | ,, |
| Fine sand: | | | | |
| Dry | — | 15·70 | 1 600 | ,, |
| Saturated | — | 20 40 | 2 080 | ,, |
| Silt, wet | — | 17·25 to 18·85 | 1 760 to 1 920 | ,, |
| 46. *Steel Sections* Hot rolled [ *see* IS : 808 ( Part 1 )-1978* ] | | | | |
| Beams — Designation | | | | |
| MB 100 | — | 0·113 | 11·5 | m |
| MB 125 | — | 0·131 | 13·4 | ,, |
| MB 150 | — | 0·147 | 15·0 | ,, |
| MB 175 | — | 0·191 | 19·5 | ,, |
| MB 200 | — | 0 249 | 25·4 | ,, |
| MB 225 | — | 0·306 | 31·2 | ,, |

*Dimensions for hot-rolled steel sections: Part 1 MB series ( beams ) ( *second revision* ).

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS mm | WEIGHT/MASS kN | kg | per |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| **Beams — Designation** | | | | |
| MB 250 | — | 0·365 | 37·3 | m |
| MB 300 | — | 0·452 | 46·1 | ,, |
| MB 350 | — | 0·514 | 52·4 | ,, |
| MB 400 | — | 0·604 | 61·6 | ,, |
| MB 450 | — | 0·710 | 72·4 | ,, |
| MB 500 | — | 0·852 | 86·9 | ,, |
| MB 550 | — | 1·00 | 104 | ,, |
| MB 600 | — | 1·21 | 123 | ,, |
| **Columns — Designation [ *see* IS : 808 ( Part 2 )-1978* ]** | | | | |
| SC 100 | — | 0·196 | 20·0 | ,, |
| SC 120 | — | 0·257 | 26·2 | ,, |
| SC 140 | — | 0·327 | 33·3 | ,, |
| SC 160 | — | 0·411 | 41·9 | ,, |
| SC 180 | — | 0·495 | 50·5 | ,, |
| SC 200 | — | 0·591 | 60·3 | ,, |
| SC 220 | — | 0·690 | 70·4 | ,, |
| SC 250 | — | 0·839 | 85·6 | ,, |
| **Channels — Designation [ *see* IS : 808 ( Part 3 )-1979† ]** | | | | |
| **Medium weight channel sections with sloping flanges** | | | | |
| MC 75 | — | 0·070 | 7·14 | ,, |
| MC 100 | — | 0·098 | 10·0 | ,, |
| MC 125 | — | 0·165 | 16·8 | ,, |
| MC 150 | — | 0·192 | 19·6 | ,, |
| MC 175 | — | 0·219 | 22·3 | ,, |
| MC 200 | — | 0·256 | 26·1 | ,, |
| MC 225 | — | 0·300 | 30·6 | ,, |
| MC 250 | — | 0·356 | 36·3 | ,, |
| MC 300 | — | 0·419 | 42·7 | ,, |
| MC 350 | — | 0·491 | 50·1 | ,, |
| MC 400 | — | | | |
| **Medium weight channel sections with parallel flanges ( *see* Note below )** | | | | |
| MCP 75 | — | 0·070 | 7·14 | ,, |
| MCP 100 | — | 0·094 | 9·56 | ,, |
| MCP 125 | — | 0·128 | 13·1 | ,, |
| MCP 150 | — | 0·165 | 16·8 | ,, |
| MCP 175 | — | 0·192 | 19·6 | ,, |
| MCP 200 | — | 0·219 | 22·3 | ,, |
| MCP 225 | — | 0·256 | 26·1 | ,, |
| MCP 250 | — | 0·300 | 30·6 | ,, |
| MCP 300 | — | 0·356 | 36·3 | ,, |
| MCP 350 | — | 0·419 | 42·7 | ,, |
| MCP 400 | — | 0·491 | 50·1 | ,, |
| **Equal leg angles — Size [ *see* IS : 800 ( Part 5 )-1976‡ ]** | | | | |
| ISA 2020 | 3·0 | 0·009 | 0·9 | m |
| | 4·0 | 0·011 | 1·1 | ,, |
| ISA 2525 | 3·0 | 0·011 | 1·1 | ,, |
| | 4·0 | 0·014 | 1·4 | ,, |
| | 5·0 | 0·018 | 1·8 | ,, |
| ISA 3030 | 3·0 | 0·014 | 1·4 | ,, |
| | 4·0 | 0·018 | 1·8 | ,, |
| | 5·0 | 0·022 | 2·2 | ,, |

NOTE — These sections are steel in the developmental stage and may be available subject to agreement with the manufacturer.

*Dimensions for hot-rolled steel sections: Part 2 Columns — SC series ( *second revision* ).
†Dimensions for hot-rolled steel sections: Part 3 Channels, MC and MPC series ( *second revision* ).
‡Dimensions of hot-rolled steel sections: Part 5 Equal leg angles ( *second revision* ).

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS | WEIGHT/MASS | | |
|---|---|---|---|---|
| | mm | kN | kg | per |
| (1) | (2) | (3) | (4) | (5) |
| ISA 3535 | 3·0 | 0·016 | 1·6 | m |
| | 4·0 | 0 021 | 2·1 | ,, |
| | 5·0 | 0 026 | 2·6 | ,, |
| | 6·0 | 0·029 | 3·0 | ,, |
| ISA 4050 | 3·0 | 0·018 | 1·8 | ,, |
| | 4·0 | 0·024 | 2·4 | ,, |
| | 5·0 | 0·029 | 3·0 | ,, |
| | 6·0 | 0·034 | 3·5 | ,, |
| ISA 4545 | 3·0 | 0·021 | 2·1 | ,, |
| | 4·0 | 0·027 | 2·7 | ,, |
| | 5·0 | 0·033 | 3·4 | ,, |
| | 6·0 | 0·039 | 4·0 | ,, |
| ISA 5050 | 3·0 | 0·023 | 2·3 | ,, |
| | 4·0 | 0 029 | 3·0 | ,, |
| | 5·0 | 0·037 | 3 8 | ,, |
| | 6·0 | 0·044 | 4·5 | ,, |
| ISA 5555 | 5·0 | 0·040 | 4·1 | ,, |
| | 6·0 | 0·048 | 4·9 | ,, |
| | 8·0 | 0·063 | 6·4 | ,, |
| | 10·0 | 0·077 | 7·9 | ,, |
| ISA 6060 | 5·0 | 0·044 | 4·5 | ,, |
| | 6·0 | 0 053 | 5·4 | ,, |
| | 8·0 | 0·069 | 7·0 | ,, |
| | 10·0 | 0·084 | 8·6 | ,, |
| ISA 6565 | 5·0 | 0 048 | 4·9 | ,, |
| | 6·0 | 0·057 | 5·8 | ,, |
| | 8·0 | 0·076 | 7·7 | ,, |
| | 10·0 | 0·092 | 9·4 | ,, |
| ISA 7070 | 5·0 | 0·052 | 5·3 | ,, |
| | 6·0 | 0·062 | 6·3 | ,, |
| | 8·0 | 0 081 | 8·3 | ,, |
| | 10·0 | 0·100 | 10·2 | ,, |
| ISA 7575 | 5·0 | 0·056 | 5·7 | ,, |
| | 6·0 | 0·067 | 6·8 | ,, |
| | 8·0 | 0·087 | 8·9 | ,, |
| | 10·0 | 0·108 | 11 0 | ,, |
| ISA 8080 | 6·0 | 0·072 | 7·3 | ,, |
| | 8·0 | 0·094 | 9·6 | ,, |
| | 10·0 | 0·116 | 11·8 | ,, |
| | 12·0 | 0·137 | 14·0 | ,, |
| ISA 9050 | 6·0 | 0·080 | 8·2 | ,, |
| | 8·0 | 0·106 | 10·8 | ,, |
| | 10·0 | 0·131 | 13·4 | ,, |
| | 12·0 | 0·155 | 15·8 | ,, |
| ISA 100100 | 6·0 | 0·090 | 9·2 | ,, |
| | 8 0 | 0·119 | 12·1 | ,, |
| | 10·0 | 0·146 | 14·9 | ,, |
| | 12·0 | 0·174 | 17 7 | ,, |
| ISA 110110 | 8·0 | 0·131 | 13·4 | ,, |
| | 10·0 | 0·163 | 16·6 | ,, |
| | 12·0 | 0·193 | 19·7 | ,, |
| | 16·0 | 0·252 | 25·7 | ,, |
| ISA 130130 | 8·0 | 0·156 | 15·9 | ,, |
| | 10·0 | 0·193 | 19·7 | ,, |
| | 12·0 | 0·230 | 23·5 | ,, |
| | 16·0 | 0·301 | 30·7 | ,, |
| ISA 150150 | 10·0 | 0·225 | 22·9 | ,, |
| | 12·0 | 0·268 | 27·3 | ,, |
| | 16·0 | 0·351 | 35·8 | ,, |
| | 20·0 | 0·432 | 44·1 | ,, |
| ISA 200200 | 12·0 | 0·362 | 36·9 | ,, |
| | 16·0 | 0·476 | 48·5 | ,, |
| | 20·0 | 0·588 | 60·0 | ,, |
| | 25·0 | 0·725 | 73·9 | ,, |

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| Material | Nominal Size or Thickness | Weight/Mass | | |
|---|---|---|---|---|
| | mm | kN | kg | per |
| (1) | (2) | (3) | (4) | (5) |
| Unequal leg angles — Size [ *see* IS : 808 ( Part 6 )-1976* ] | | | | |
| ISA 3020 | 3·0 | 0·011 | 1·1 | m |
| | 4·0 | 0·014 | 1·4 | " |
| | 5·0 | 0·018 | 1·8 | " |
| ISA 4025 | 3·0 | 0·015 | 1·5 | " |
| | 4·0 | 0·019 | 1·9 | " |
| | 5·0 | 0·024 | 2·4 | " |
| | 6·0 | 0·027 | 2·8 | " |
| ISA 4530 | 3·0 | 0·017 | 1·7 | " |
| | 4·0 | 0·022 | 2·2 | " |
| | 5·0 | 0·027 | 2·8 | " |
| | 6·0 | 0·032 | 3·3 | " |
| ISA 5030 | 3·0 | 0·018 | 1·8 | " |
| | 4·0 | 0·024 | 1·8 | " |
| | 5·0 | 0·029 | 3·0 | " |
| | 6·0 | 0·034 | 3·5 | " |
| ISA 6040 | 5·0 | 0·016 | 3·7 | " |
| | 6·0 | 0·043 | 4·4 | " |
| | 8·0 | 0·057 | 5·8 | " |
| ISA 6545 | 5·0 | 0·040 | 4·1 | " |
| | 6·0 | 0·048 | 4·9 | " |
| | 8·0 | 0·063 | 6·4 | " |
| ISA 7045 | 5·0 | 0·042 | 4·3 | " |
| | 6·0 | 0·051 | 5·2 | " |
| | 8·0 | 0·066 | 6·7 | " |
| | 10·0 | 0·081 | 8·3 | " |
| ISA 7550 | 5·0 | 0·046 | 4·7 | " |
| | 6·0 | 0·055 | 5·6 | " |
| | 8·0 | 0·073 | 7·4 | " |
| | 10·0 | 0·088 | 9·0 | " |
| ISA 8050 | 5·0 | 0·048 | 4·9 | " |
| | 6·0 | 0·058 | 5·9 | " |
| | 8·0 | 0·076 | 7·7 | " |
| | 10·0 | 0·092 | 9·4 | " |
| ISA 9060 | 6·0 | 0·067 | 6·8 | " |
| | 8·0 | 0·087 | 8·9 | " |
| | 10·0 | 0·108 | 11·0 | " |
| | 12·0 | 0·128 | 13·0 | " |
| ISA 10065 | 6·0 | 0·074 | 7·5 | " |
| | 8·0 | 0·087 | 9·9 | " |
| | 10·0 | 0·120 | 12·2 | " |
| ISA 10075 | 6·0 | 0·078 | 8·0 | " |
| | 8·0 | 0·103 | 10·5 | " |
| | 10·0 | 0·127 | 13·0 | " |
| | 12·0 | 0·151 | 15·4 | " |
| ISA 12571 | 6.0 | 0·090 | 9·2 | " |
| | 8·0 | 0·119 | 12·1 | " |
| | 10·0 | 0·146 | 14·9 | " |
| ISA 12595 | 6·0 | 0·099 | 10·1 | " |
| | 8·0 | 0·131 | 13·4 | " |
| | 10·0 | 0·162 | 16·5 | " |
| | 12·0 | 0·193 | 19·7 | " |
| ISA 15075 | 8·0 | 0·134 | 13·7 | " |
| | 10·0 | 0·167 | 17·2 | " |
| | 12·0 | 0·198 | 20·2 | " |
| ISA 150115 | 8·0 | 0·160 | 16·3 | " |
| | 10·0 | 0·197 | 20·1 | " |
| | 12·0 | 0·235 | 24·0 | " |
| | 16·0 | 0·308 | 31·4 | " |
| ISA 200100 | 10·0 | 0·225 | 22·9 | " |
| | 12·0 | 0·268 | 27·3 | " |
| | 16·0 | 0·351 | 35·8 | " |

*Dimensions of hot-rolled steel sections: Part 6 Unequal leg angles ( *second revision* ).

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS mm | WEIGHT/MASS kN | kg | per |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| ISA 200150 | 10·0 | 0·264 | 26·9 | m |
| | 12·0 | 0·315 | 32·1 | ,, |
| | 16·0 | 0·414 | 42·2 | ,, |
| | 20·0 | 0·510 | 52 0 | ,, |
| Cold formed light gauge structural steel sections ( *see* IS : 811-1965* ) : | | | | |
| Light gauge sections — angles | | | | |
| Size: | | | | |
| 100 × 100 | 3 15 | 0·047 | 4·81 | ,, |
| | 4 0 | 0 060 | 6 07 | ,, |
| 80 × 80 | 2·5 | 0·030 | 3 05 | ,, |
| | 3·15 | 0·037 | 3·82 | ,, |
| | 4·0 | 0·047 | 4·82 | ,, |
| 60 × 60 | 2·0 | 0·018 | 1·82 | ,, |
| | 2·5 | 0·022 | 2·26 | ,, |
| | 3·15 | 0·028 | 2·83 | ,, |
| | 4·0 | 0·035 | 3·56 | ,, |
| 50 × 50 | 1·6 | 0·012 | 1·21 | ,, |
| | 2·0 | 0·015 | 1·51 | ,, |
| | 2 5 | 0·018 | 1·87 | ,, |
| | 3 15 | 0·023 | 2·34 | ,, |
| | 4 0 | 0·029 | 2·93 | ,, |
| 40 × 40 | 1·2 | 0·007 | 0·75 | ,, |
| | 1·6 | 0·009 | 0·96 | ,, |
| | 2·0 | 0·012 | 1·19 | ,, |
| | 2·5 | 0·014 | 1 48 | ,, |
| | 3·15 | 0·018 | 1·84 | ,, |
| 30 × 30 | 1·2 | 0·005 | 0·56 | ,, |
| | 1·6 | 0·007 | 0·71 | ,, |
| | 2·0 | 0 009 | 0·88 | ,, |
| | 2·5 | 0·010 | 1·08 | ,, |
| 20 × 20 | 1·2 | 0 004 | 0·36 | ,, |
| | 1·6 | 0·005 | 0·46 | ,, |
| | 2·0 | 0·006 | 0 56 | ,, |
| Channels without lips | | | | |
| Size: | | | | |
| 100 × 100 | 3·15 | 0·070 | 7·15 | ,, |
| | 4·0 | 0·088 | 9·01 | ,, |
| 80 × 80 | 2·5 | 0·044 | 4·52 | ,, |
| | 3·15 | 0·056 | 5·66 | ,, |
| | 4 0 | 0·070 | 7·12 | ,, |
| 60 × 60 | 2·0 | 0·026 | 2·69 | ,, |
| | 2·5 | 0·033 | 3·35 | ,, |
| | 3·15 | 0·041 | 4·18 | ,, |
| | 4·0 | 0·051 | 5·24 | ,, |
| 50 × 50 | 1·6 | 0·018 | 1·79 | ,, |
| | 2·0 | 0·022 | 2·23 | ,, |
| | 2·5 | 0 027 | 2·76 | ,, |
| | 3·15 | 0 034 | 3·44 | ,, |
| | 4·0 | 0·042 | 4·30 | ,, |
| 40 × 40 | 1·25 | 0·011 | 1·12 | ,, |
| | 1·6 | 0·014 | 1·42 | ,, |
| | 2·0 | 0·017 | 1·75 | ,, |
| | 2·5 | 0·021 | 2·17 | ,, |
| | 3·15 | 0·026 | 2·70 | ,, |
| 30 × 30 | 1·21 | 0·008 | 0·82 | ,, |
| | 1·6 | 0·010 | 1 04 | ,, |
| | 2·0 | 0 013 | 1·28 | ,, |
| | 2·5 | 0·015 | 1·58 | ,, |

*Specification for cold formed light gauge structural steel sections ( *revised* ).

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS mm | WEIGHT/MASS kN | kg | per |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| Channels without lips | | | | |
| Size: | | | | |
| 20 × 20 | 1·25 | 0·005 | 0·53 | m |
| | 1·6 | 0·007 | 0·66 | ,, |
| | 2·0 | 0·008 | 0·81 | ,, |
| 200 × 50 | 2·00 | 0·045 | 4·58 | ,, |
| | 2·50 | 0·056 | 5·70 | ,, |
| | 3·15 | 0·070 | 7·14 | ,, |
| | 4·00 | 0·088 | 9·01 | ,, |
| 180 × 50 | 2·00 | 0·042 | 4·27 | ,, |
| | 2·50 | 0·052 | 5·31 | ,, |
| | 3·15 | 0·065 | 6·65 | ,, |
| | 4·00 | 0·082 | 8·38 | ,, |
| 160 × 50 | 2·00 | 0·039 | 3·95 | ,, |
| | 2·50 | 0·048 | 4·92 | ,, |
| | 3·15 | 0·060 | 6·16 | ,, |
| 140 × 40 | 1·60 | 0·026 | 2·67 | ,, |
| | 2·00 | 0·033 | 3·33 | ,, |
| | 2·50 | 0·041 | 4·13 | ,, |
| | 3·15 | 0·051 | 5·17 | ,, |
| 120 × 40 | 1·60 | 0·024 | 2·42 | ,, |
| | 2·00 | 0·030 | 3·01 | ,, |
| | 2·50 | 0·037 | 3·74 | ,, |
| 100 × 40 | 1·25 | 0·017 | 1·70 | ,, |
| | 1·60 | 0·021 | 2·17 | ,, |
| | 2·00 | 0·026 | 2·70 | ,, |
| | 2·50 | 0·033 | 3·35 | ,, |
| 80 × 30 | 1·25 | 0·013 | 1·31 | ,, |
| | 1·60 | 0·016 | 1·67 | ,, |
| | 2·00 | 0·020 | 2·07 | ,, |
| | 2·50 | 0·025 | 2·56 | ,, |
| 60 × 30 | 1·25 | 0·011 | 1·12 | ,, |
| | 1·60 | 0·014 | 1·42 | ,, |
| | 2·00 | 0·017 | 1·75 | ,, |
| 50 × 30 | 1·25 | 0·010 | 1·02 | ,, |
| | 1·60 | 0·013 | 1·29 | ,, |
| | 2·00 | 0·016 | 1·60 | ,, |
| Channels with lips | | | | |
| Size: | | | | |
| 100 × 100 | 2·00 | 0·051 | 5·24 | ,, |
| | 2·50 | 0·063 | 6·50 | ,, |
| | 3·15 | 0·082 | 8·36 | ,, |
| | 4·00 | 0·103 | 10·48 | ,, |
| 80 × 80 | 1·60 | 0·033 | 3·33 | ,, |
| | 2·00 | 0·041 | 4·14 | ,, |
| | 2·50 | 0·052 | 5·32 | ,, |
| | 3·15 | 0·065 | 6·62 | ,, |
| 60 × 60 | 1·25 | 0·019 | 1·94 | ,, |
| | 1·60 | 0·024 | 2·45 | ,, |
| | 2·00 | 0·031 | 3·20 | ,, |
| | 2·50 | 0·039 | 3·95 | ,, |
| 50 × 50 | 1·25 | 0·016 | 1·64 | ,, |
| | 1·60 | 0·020 | 2·08 | ,, |
| | 2·00 | 0·025 | 2·57 | ,, |
| 40 × 40 | 1·25 | 0·013 | 1·35 | ,, |
| | 1·60 | 0·017 | 1·70 | ,, |
| | 2·00 | 0·020 | 2·09 | ,, |
| 30 × 30 | 1·25 | 0·009 | 0·95 | ,, |
| | 1·60 | 0·012 | 1·20 | ,, |

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS mm | WEIGHT/MASS kN | kg | per |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| Channels with lips | | | | |
| Size | | | | |
| 200 × 80 | 1 60 | 0 047 | 4 84 | m |
| | 2 00 | 0 059 | 6 02 | ,, |
| | 2 50 | 0 075 | 7 67 | ,, |
| | 3 15 | 0 094 | 9 59 | ,, |
| | 4 00 | 0 118 | 12 05 | ,, |
| 180 × 80 | 1 60 | 0 045 | 4 59 | ,, |
| | 2 00 | 0 056 | 5 71 | ,, |
| | 2 50 | 0 071 | 7 28 | ,, |
| | 3 15 | 0 089 | 9 10 | ,, |
| | 4 00 | 0 112 | 11 42 | ,, |
| 160 × 80 | 1 60 | 0 043 | 4 34 | ,, |
| | 2 00 | 0 053 | 5 39 | ,, |
| | 2 50 | 0 068 | 6 89 | ,, |
| | 3 15 | 0 084 | 8 60 | ,, |
| | 4 00 | 0 106 | 10 79 | ,, |
| 140 × 70 | 1 60 | 0 038 | 3 84 | ,, |
| | 2 00 | 0 047 | 4 76 | ,, |
| | 2 50 | 0 058 | 5 91 | ,, |
| | 3 15 | 0 075 | 7 61 | ,, |
| | 4 00 | 0 094 | 9 54 | ,, |
| 120 × 60 | 1 25 | 0 025 | 2 52 | ,, |
| | 1 60 | 0 031 | 3 21 | ,, |
| | 2 00 | 0 041 | 4 14 | ,, |
| | 2 50 | 0 050 | 5 12 | ,, |
| | 3 15 | 0 063 | 6 38 | ,, |
| 100 × 50 | 1 25 | 0 021 | 2 13 | ,, |
| | 1 60 | 0 027 | 2 71 | ,, |
| | 2 00 | 0 033 | 3 35 | ,, |
| | 2 50 | 0 043 | 4 34 | ,, |
| 80 × 40 | 1 25 | 0 017 | 1 74 | ,, |
| | 1 60 | 0 022 | 2 20 | ,, |
| | 2 00 | 0 027 | 2 72 | ,, |
| 60 × 30 | 1 25 | 0 012 | 1 25 | ,, |
| | 1 60 | 0 015 | 1 57 | ,, |
| 50 × 30 | 1 25 | 0 011 | 1 15 | ,, |
| | 1 60 | 0 014 | 1 45 | ,, |
| Hat sections | | | | |
| Size | | | | |
| 100 × 100 | 2 50 | 0 068 | 6 89 | ,, |
| | 3 15 | 0 089 | 9 05 | ,, |
| | 4 00 | 0 115 | 11 73 | ,, |
| 80 × 80 | 2 00 | 0 043 | 4 39 | ,, |
| | 2 50 | 0 056 | 5 71 | ,, |
| | 3 15 | 0 072 | 7 36 | ,, |
| 60 × 60 | 1 60 | 0 026 | 2 63 | ,, |
| | 2 00 | 0 034 | 3 45 | ,, |
| | 2 50 | 0 043 | 4 34 | ,, |
| 50 × 50 | 1 60 | 0 022 | 2 25 | ,, |
| | 2 00 | 0 028 | 2 88 | ,, |
| 40 × 40 | 1 25 | 0 013 | 1 36 | ,, |
| | 1 60 | 0 018 | 1 83 | ,, |
| 100 × 50 | 1 60 | 0 034 | 3 51 | ,, |
| | 2 00 | 0 044 | 4 45 | ,, |
| | 2 50 | 0 054 | 5 51 | ,, |
| 80 × 40 | 1 25 | 0 021 | 2 15 | ,, |
| | 1 60 | 0 028 | 2 83 | ,, |
| | 2 00 | 0 034 | 3 51 | ,, |
| 60 × 30 | 1 25 | 0 016 | 1 64 | ,, |
| | 1 60 | 0 020 | 2 08 | ,, |
| 50 × 25 | 1 25 | 0 013 | 1 35 | ,, |
| 100 × 150 | 3 15 | 0 101 | 10 28 | ,, |
| | 4 00 | 0 134 | 13 68 | ,, |

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS | WEIGHT/MASS | | |
|---|---|---|---|---|
| | mm | kN | kg | per |
| (1) | (2) | (3) | (4) | (5) |
| **Hat sections** | | | | |
| **Size:** | | | | |
| 80 × 120 | 3·15 | 0·089 | 9·08 | m |
| | 4·00 | 0·113 | 11·48 | ,, |
| 60 × 90 | 2·50 | 0·050 | 5·12 | ,, |
| | 3·15 | 0·067 | 6·82 | ,, |
| | 4·00 | 0·084 | 8·59 | ,, |
| 50 × 75 | 2·00 | 0·033 | 3·37 | ,, |
| | 2·50 | 0·043 | 4·44 | ,, |
| | 3·15 | 0·055 | 5·64 | ,, |
| 40 × 60 | 1·60 | 0·021 | 2·14 | ,, |
| | 2·00 | 0·028 | 2·82 | ,, |
| | 2·50 | 0·035 | 3·55 | ,, |
| **Rectangular box sections** | | | | |
| **Size:** | | | | |
| 200 × 100 | 1·60 | 0·072 | 7·35 | ,, |
| | 2·00 | 0·0 0 | 9·16 | ,, |
| 180 × 90 | 1·60 | 0·065 | 6·60 | ,, |
| | 2·00 | 0·081 | 8·22 | ,, |
| 160 × 80 | 1·60 | 0·057 | 5·85 | ,, |
| | 2·00 | 0·071 | 7·28 | ,, |
| 140 × 70 | 1·60 | 0·050 | 5·09 | ,, |
| | 2·00 | 0·062 | 6·34 | ,, |
| 120 × 60 | 1·60 | 0·043 | 4·34 | ,, |
| | 2·00 | 0·053 | 5·39 | ,, |
| 100 × 50 | 1·25 | 0·028 | 2·82 | ,, |
| | 1·60 | 0·035 | 3·58 | ,, |
| 80 × 40 | 1·25 | 0·022 | 2·23 | ,, |
| | 1·60 | 0·028 | 2·83 | ,, |
| 60 × 30 | 1·25 | 0·016 | 1·64 | ,, |
| | 1·60 | 0·020 | 2·08 | ,, |
| 50 × 30 | 1·25 | 0·014 | 1·44 | ,, |
| | 1·60 | 0·018 | 1·83 | ,, |
| **Square box section** | | | | |
| **Size:** | | | | |
| 200 × 200 | 1·60 | 0·097 | 9·86 | ,, |
| | 2·00 | 0·121 | 12·30 | ,, |
| 180 × 180 | 1·60 | 0·087 | 8·86 | ,, |
| | 2·00 | 0·108 | 11·04 | ,, |
| 160 × 160 | 1·60 | 0·764 | 77·85 | ,, |
| | 2·00 | 0 096 | 9·79 | ,, |
| 140 × 140 | 1·60 | 0·067 | 6·85 | ,, |
| | 2·00 | 0·084 | 8·53 | ,, |
| 120 × 120 | 1·60 | 0·057 | 5·85 | ,, |
| | 2·00 | 0·071 | 7·28 | ,, |
| 100 × 100 | 1·25 | 0·037 | 3·80 | ,, |
| | 1·60 | 0·047 | 4 84 | ,, |
| 80 × 80 | 1·25 | 0·030 | 3 01 | ,, |
| | 1·60 | 0·038 | 3·84 | ,, |
| 60 × 60 | 1·25 | 0·022 | 2·23 | ,, |
| | 1·60 | 0·028 | 2·83 | ,, |
| 50 × 50 | 1·25 | 0·018 | 1·84 | ,, |
| | 1·60 | 0·023 | 2·33 | ,, |
| **Rolled steel tee bars ( *see* IS : 1173-1978* )** | | | | |
| **Designation** | | | | |
| ISNT 20 | — | 0·009 | 0·9 | ,, |
| ISNT 30 | — | 0·014 | 1·4 | ,, |
| ISNT 40 | — | 0·034 | 3·5 | ,, |
| ISNT 50 | — | 0·044 | 4·5 | ,, |
| ISNT 60 | — | 0·053 | 5·4 | ,, |
| ISNT 80 | — | 0·094 | 9·6 | ,, |
| ISNT 100 | — | 0·147 | 15·0 | ,, |
| ISNT 150 | — | 0·223 | 22·8 | ,, |

*Specification for hot-rolled and slit steel tee bars ( *second revision* ).

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| | Material | Nominal Size or Thickness mm | Weight/Mass kN | kg | per |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| | Designation | | | | |
| | ISHT 75 | — | 0·150 | 15·3 | m |
| | ISHT 100 | — | 0·196 | 20·0 | ,, |
| | ISHT 125 | — | 0·269 | 27·4 | ,, |
| | ISHT 150 | — | 0·288 | 29·4 | ,, |
| | ISST 100 | — | 0·079 | 8·1 | ,, |
| | ISST 150 | — | 0·154 | 15·7 | ,, |
| | ISST 200 | — | 0·279 | 28·4 | ,, |
| | ISST 250 | — | 0·368 | 37·5 | ,, |
| | ISLT 50 | — | 0·040 | 4·0 | ,, |
| | ISLT 75 | — | 0·070 | 7·1 | ,, |
| | ISLT 100 | — | 0·125 | 12·7 | ,, |
| | ISJT 75 | — | 0·034 | 3·5 | ,, |
| | ISJT 87·5 | — | 0·039 | 4·0 | ,, |
| | ISJT 100 | — | 0 049 | 5 0 | ,, |
| | ISJT 112·5 | — | 0·063 | 6·4 | ,, |
| | Steel sheet piling sections ( *see* IS : 2314-1963* ) | | | | |
| | Designation | | | | |
| | ISPS 1 021 Z | — | 0.483 | 49 25 | ,, |
| | ISPS 1 625 U | — | 0·641 | 65·37 | ,, |
| | ISPS 2 222 U | — | 0·811 | 82·70 | ,, |
| | ISPS 100 F | — | 0·541 | 55·20 | ,, |
| 47. | *Stone* | | | | |
| | Agate | — | 25·50 | 2 600 | m³ |
| | Aggregate | — | 15·70 to 18·85 | 1 600 to 1 920 | |
| | Basalt | — | 27·95 to 29·05 | 2 850 to 2 960 | ,, |
| | Cast | — | 21·95 | 2 240 | ,, |
| | Chalk | — | 21·50 | 2 190 | ,, |
| | Dolomite | — | 28·25 | 2 880 | ,, |
| | Emery | — | 39·25 | 4 000 | ,, |
| | Flint | — | 25·40 | 2 590 | ,, |
| | Gneiss | — | 23·55 to 26·40 | 2 400 to 2 690 | ,, |
| | Granite | — | 25·90 to 27·45 | 2 640 to 2 800 | ,, |
| | Gravel: | | | | |
| | Loose | — | 15·70 | 1 600 | ,, |
| | Moderately rammed, dry | — | 18·85 | 1 920 | ,, |
| | Green stone | — | 28·25 | 2 880 | ,, |
| | Gypsum | — | 21·55 to 23·55 | 2 240 to 2 400 | ,, |
| | Laterite | — | 20·40 to 23·55 | 2 080 to 2 400 | ,, |
| | Lime stone | — | 23·55 to 25·90 | 2 400 to 2 640 | ,, |
| | Marble | — | 26·70 | 2 720 | ,, |
| | Pumice | — | 7·85 to 11·00 | 800 to 1 120 | ,, |
| | Quartz rock | — | 25·90 | 2 640 | ,, |
| | Sand stone | — | 21·95 to 23·54 | 2 240 to 2 400 | ,, |
| | Slate | — | 27·45 | 2 800 | ,, |
| | Soap stone | — | 26·45 | 2 700 | ,, |
| 48. | *Tar, Coal* | | | | |
| | Crude ( *see* IS : 212-1983† ) | — | 9·90 | 1 010 | ,, |
| | Naphtha, light ( *see* IS : 213-1968‡ ) | — | 9·90 | 1 010 | ,, |
| | Naphtha, heavy | — | 9·90 | 1 010 | ,, |
| | Road tar ( *see* IS : 215-1961§ ) | — | 9·90 | 1 010 | ,, |
| | Pitch ( *see* IS : 216-1961‖ ) | — | 9·50 | 1 010 | ,, |
| 49. | *Thermal Insulation* | | | | |
| | Unbonded glass wool | — | 12·75 to 23·55 | 1 300 to 2 400 | ,, |
| | Unbonded rock and slag wool | — | 11·30 to 19·60 | 1 150 to 2 000 | ,, |
| | Expanded polystyrene | — | 1·45 to 2·95 | 150 to 300 | ,, |
| | Cellular concrete | | | | |
| | Grade A | — | Up to 29·40 | Up to 3 000 | ,, |
| | Grade B | — | 29·50 to 39·20 | 3 010 to 4 000 | ,, |
| | Grade C | — | 39·30 to 49·00 | 4 010 to 5 000 | ,, |
| | Preformed calcium silicate insulation ( for temperature up to 650°C ) | — | 19·60 to 34·30 | 2 000 to 3 500 | ,, |

*Specification for steel sheet piling sections.
†Specification for crude coal tar for general use ( *second revision* ).
‡Specification for coal-based naphtha ( *first revision* ).
§Specification for road tar ( *revised* ).
‖Specification for coal tar pitch ( *revised* ).

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| | Material | Nominal Size or Thickness mm | Weight/Mass kN | kg | per |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| 50. | *Terra Cotta* | — | 18·35 to 23·25 | 1 870 to 2 370 | $m^3$ |
| 51. | *Terrazzo* | | | | |
| | Paving | 10 | 0·24 | 24 | $m^2$ |
| | Cast partitions | 40 | 0·93 | 95 | ,, |
| 52 | *Tiles* | | | | |
| | Mangalore pattern ( *see* IS : 654-1972* ) | — | 0·02 to 0·03 | 2 to 3 | Tile |
| | Polystyrene wall tiles | 99 × 99 | 0·013 | 1·35 | $m^2$ |
| | ( *see* IS : 3463-1966† ) | 148·5 × 148·5 | 0·013 | 1·35 | ,, |
| 53. | *Timber* | | | | |
| | Typical Indian timbers ( *see* IS : 399-1963‡ ) | | | | |
| | Aglaia | — | 8·34 | 850 | $m^3$ |
| | Aini | — | 5·83 | 595 | ,, |
| | Alder | — | 3·63 | 370 | ,, |
| | Amari | — | 6·13 | 625 | ,, |
| | Amla | — | 7·85 | 800 | ,, |
| | Amra | — | 4·41 | 450 | ,, |
| | Anjan | — | 8·33 | 850 | ,, |
| | Arjun | — | 7·99 | 815 | ,, |
| | Ash | — | 7·06 | 720 | ,, |
| | Axlewood | — | 8·82 | 900 | ,, |
| | Babul | — | 7·70 | 785 | ,, |
| | Baen | — | 7·70 | 785 | ,, |
| | Bahera | — | 7·99 | 815 | ,, |
| | Bakota | — | 4·21 | 430 | ,, |
| | Balasu | — | 7·55 | 770 | ,, |
| | Ballagi | — | 11·13 | 1 135 | ,, |
| | Banati | — | 4·41 | 450 | ,, |
| | Benteak | — | 6·62 | 675 | ,, |
| | Ber | — | 6·91 | 705 | ,, |
| | Bhendi | — | 7·55 | 770 | ,, |
| | Bijasal | — | 7·85 | 800 | ,, |
| | Birch | — | 6·13 | 625 | ,, |
| | Black chuglam | — | 7·85 | 800 | ,, |
| | Black locust | — | 8·34 | 850 | ,, |
| | Blue gum | — | 8·34 | 850 | ,, |
| | Blue pine | — | 5·05 | 515 | ,, |
| | Bola | — | 6·42 | 655 | ,, |
| | Bonsum | — | 5·20 | 530 | ,, |
| | Bullet wood | — | 8·78 | 895 | ,, |
| | Casuarina | — | 8·34 | 850 | ,, |
| | Cettis | — | 6·42 | 655 | ,, |
| | Champ | — | 4·85 | 495 | ,, |
| | Chaplash | — | 5·05 | 515 | ,, |
| | Chatian | — | 4·07 | 415 | ,, |
| | Chikrassy | — | 6·62 | 675 | ,, |
| | Chilauni | — | 6·42 | 655 | ,, |
| | Chilla | — | 7·85 | 800 | ,, |
| | Chir | — | 5·64 | 575 | ,, |
| | Chuglam: | | | | |
| | Black | — | 7·85 | 800 | ,, |
| | White ( silver grey-wood ) | — | 6·91 | 705 | ,, |
| | Cinnamon | — | 6·42 | 655 | ,, |
| | Cypress | — | 5·05 | 515 | ,, |
| | Debdaru | — | 6·28 | 640 | ,, |
| | Deodar | — | 5·35 | 545 | ,, |
| | Devdam | — | 7·06 | 720 | ,, |
| | Dhaman: | | | | |
| | *Grewia tiliofolia* | — | 7·70 | 785 | ,, |
| | *Grewia vestita* | — | 7·40 | 755 | ,, |
| | Dhup | — | 6·42 | 655 | ,, |
| | Dilenia | — | 6·13 | 625 | ,, |

*Specification for clay roofing tiles, Mangalore pattern ( *second revision* ).

†Specification for polystyrene wall tiles.

‡Classification of commercial timbers and their zonal distribution ( *revised* ).

( *Continued* )

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS | WEIGHT/MASS | | |
|---|---|---|---|---|
| | mm | kN | kg | per |
| (1) | (2) | (3) | (4) | (5) |
| Dudhi | — | 5·49 | 560 | $m^3$ |
| Ebony | — | 8·19 | 835 | ,, |
| Elm | — | 5·20 | 530 | ,, |
| Eucalyptus | — | 8·33 | 850 | ,, |
| Figs | — | 4·56 | 465 | ,, |
| Fir | — | 4·14 | 450 | ,, |
| Frash | — | 6·62 | 675 | ,, |
| Gamari | — | 5·05 | 515 | ,, |
| Gardenia | — | 7·40 | 755 | ,, |
| Garuga | — | 5·98 | 610 | ,, |
| Geon | — | 4·07 | 415 | ,, |
| Gluta | — | 7·06 | 720 | ,, |
| Gokul | — | 4·07 | 415 | ,, |
| *Grewia sp.* | — | 7·55 | 770 | ,, |
| Gurjan | — | 7·70 | 785 | ,, |
| Gutel | — | 4·41 | 450 | ,, |
| Haldu | — | 6·62 | 675 | ,, |
| Hathipaila | — | 5·84 | 595 | ,, |
| Hiwar | — | 7·70 | 785 | ,, |
| Hollock | — | 5·98 | 610 | ,, |
| Hollong | — | 7·21 | 735 | ,, |
| Hoom | — | 7·71 | 735 | ,, |
| Horse chestnut | — | 5·05 | 515 | ,, |
| Imli | — | 8·97 | 915 | ,, |
| Indian Chestnut | — | 6·28 | 640 | ,, |
| Indian Hemlock | — | 3·92 | 400 | ,, |
| Indian Oak | — | 8·48 | 865 | ,, |
| Indian Olive | — | 10·35 | 1 065 | ,, |
| Irul | — | 8·33 | 850 | ,, |
| Jack | — | 5·83 | 595 | ,, |
| Jaman | — | 7·70 | 785 | ,, |
| Jarul | — | 6·13 | 625 | ,, |
| Jathikai | — | 5·05 | 515 | ,, |
| Jhingan | — | 5·63 | 575 | ,, |
| Jutili | — | 7·85 | 800 | ,, |
| Kadam | — | 4·85 | 495 | ,, |
| Kail | — | 5·05 | 515 | ,, |
| Kaim | — | 6·42 | 655 | ,, |
| Kambli | — | 4·07 | 415 | ,, |
| Kanchan | — | 6·62 | 675 | ,, |
| Kanjuj | — | 5·84 | 595 | ,, |
| Karada | — | 8·34 | 850 | ,, |
| Karal | — | 7·99 | 815 | ,, |
| Karani | — | 6·28 | 640 | ,, |
| Karar | — | 5·34 | 545 | ,, |
| Kardahi | — | 9·27 | 945 | ,, |
| Karimgotta | — | 3·92 | 400 | ,, |
| Kasi | — | 5·83 | 595 | ,, |
| Kasum | — | 10·84 | 1 105 | ,, |
| Kathal | — | 5·85 | 595 | ,, |
| Keora | — | 6·13 | 625 | ,, |
| Khair | — | 9·90 | 1 010 | ,, |
| Khasipine | — | 5·05 | 515 | ,, |
| Kindal | — | 7·55 | 770 | ,, |
| Kokko | — | 6·28 | 640 | ,, |
| Kongoo | — | 9·76 | 995 | ,, |
| Kuchla | — | 8·63 | 880 | ,, |
| Kumbi | — | 7·70 | 785 | ,, |
| Kurchi | — | 5·20 | 530 | ,, |
| Kurung | — | 9·76 | 995 | ,, |
| Kusum | — | 11·28 | 1 150 | ,, |
| Kuthan | — | 4·71 | 480 | ,, |
| Lakooch | — | 6·28 | 640 | ,, |
| Lambapatti | — | 5·34 | 545 | ,, |
| Lampati | — | 5·05 | 515 | ,, |
| Laurel | — | 8·33 | 850 | ,, |
| Lendi | — | 7·40 | 755 | ,, |
| Machilus: | | | | |
| Gamblei | — | 5·05 | 515 | ,, |
| Macrantha | — | 5·20 | 530 | ,, |
| Maharukh | — | 4·07 | 415 | ,, |

*( Continued )*

TABLE 1 UNIT WEIGHT OF BUILDING MATERIALS — *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS mm | WEIGHT/MASS kN | kg | per |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| Mahogany | — | 6·62 | 675 | $m^3$ |
| Mahua | — | 8·97 | 915 | ,, |
| Maina | — | 5·64 | 575 | ,, |
| Makai | — | 3·14 | 320 | ,, |
| Malabar neem | — | 4·41 | 450 | ,, |
| Mango | — | 6·77 | 690 | ,, |
| Maniawga | — | 7·40 | 755 | ,, |
| Maple | — | 5·64 | 575 | ,, |
| Mesua | — | 9·76 | 995 | ,, |
| Milla | — | 9·12 | 930 | ,, |
| Mokha | — | 7·99 | 815 | ,, |
| Mulberry | — | 6·62 | 675 | ,, |
| Mullilam | — | 7·21 | 735 | ,, |
| Mundani | — | 6·77 | 690 | ,, |
| Murtenga | — | 7·70 | 785 | ,, |
| Myrabolan | — | 9·27 | 945 | ,, |
| Narikel | — | 5·49 | 560 | ,, |
| Nedunar | — | 5·05 | 515 | ,, |
| Oak | — | 8·48 | 865 | ,, |
| Padauk | — | 7·06 | 720 | ,, |
| Padri | — | 7·06 | 720 | ,, |
| Palang | — | 5·98 | 610 | ,, |
| Pali | — | 6·28 | 640 | ,, |
| Papita | — | 3·28 | 335 | ,, |
| Parrotia | — | 8·48 | 865 | ,, |
| Persian lilac | — | 5·84 | 595 | ,, |
| Piney | — | 6·13 | 625 | ,, |
| Ping | — | 8·97 | 915 | ,, |
| Pinus insignis | — | 6·13 | 625 | ,, |
| Pipli | — | 5·83 | 595 | ,, |
| Pitraj | — | 6·77 | 690 | ,, |
| Poon | — | 6·42 | 655 | ,, |
| Poplar | — | 4·41 | 450 | ,, |
| Pula | — | 3·78 | 385 | ,, |
| Pyinma | — | 5·98 | 610 | ,, |
| Rajbrikh | — | 8·48 | 865 | ,, |
| Red sanders | — | 10·84 | 1 105 | ,, |
| Rohini | — | 11·33 | 1 155 | ,, |
| Rosewood ( black wood ) | — | 8·19 | 835 | ,, |
| Rudrak | — | 4·71 | 480 | ,, |
| Sal | — | 8·48 | 865 | ,, |
| Salai | — | 5·64 | 575 | ,, |
| Sandal wood | — | 8·97 | 915 | ,, |
| Sandan | — | 8·34 | 850 | ,, |
| Satin wood | — | 9·41 | 960 | ,, |
| Saykaranji | — | 7·40 | 755 | ,, |
| Seleng | — | 4·85 | 495 | ,, |
| Semul | — | 3·78 | 385 | ,, |
| Silver oak | — | 6·28 | 640 | ,, |
| Siris | — | 3·92 | 400 | ,, |
| Kala-siris | — | 7·21 | 735 | ,, |
| Safed-siris | — | 6·28 | 640 | ,, |
| Sisso | — | 7·70 | 785 | ,, |
| Spruce | — | 4·71 | 480 | ,, |
| Suji | — | 2·65 | 270 | ,, |
| Sundri | — | 9·41 | 960 | ,, |
| Talauma | — | 5·64 | 575 | ,, |
| Tanaku | — | 2·99 | 305 | ,, |
| Teak | — | 6·28 | 640 | ,, |
| Toon | — | 5·05 | 515 | ,, |
| Udal | — | 2·50 | 255 | ,, |
| Upas | — | 3·14 | 320 | ,, |
| Uriam | — | 7·40 | 755 | ,, |
| Vakai | — | 9·41 | 960 | ,, |
| Vellapine | — | 5·83 | 595 | ,, |
| Walnut | — | 5·64 | 575 | ,, |
| White bombwe | — | 5·98 | 610 | ,, |
| White cedar | — | 7·06 | 720 | ,, |
| White chuglam ( silver grey-wood ) | — | 6·91 | 705 | ,, |
| White dhup | — | 4·22 | 430 | ,, |
| Yon | — | 8·33 | 850 | ,, |
| NOTE—The unit of timbers correspond to average unit weight of typical Indian timbers at 12 percent moisture content. | | | | |
| 54. *Water* | | | | |
| Fresh | — | 9·81 | 1 000 | $m^3$ |
| Salt | — | 10·05 | 1 025 | ,, |
| 55. *Wood-Wool Building Slabs* | 10 | 0·059 | 6 | ,, |

## 3. BUILDING PARTS AND COMPONENTS

3.1 The unit weights of building parts or components are specified in Table 2.

TABLE 2 UNIT WEIGHTS OF BUILDING PARTS OR COMPONENTS

| MATERIAL | NOMINAL SIZE OR THICKNESS mm | WEIGHT/MASS kN | kg | per |
|---|---|---|---|---|
| 1. *Ceilings* | | | | |
| Plaster on tile or concrete | 1·3 cm | 0·25 | 25 | $m^2$ |
| Plaster on wood lath | 2·5 cm | 0·39 | 40 | ,, |
| Suspended metal lath and cement plaster | 2·5 cm | 0·74 | 75 | ,, |
| Suspended metal lath and gypsum plaster | 2·5 cm | 0·49 | 50 | ,, |
| 2. *Cement Concrete, Plain* ( *see* 20 'Cement concentrate, plain' in Table 1 ) | | | | |
| 3. *Cement Concrete, Reinforced* ( *see* 21 'Cement concrete, reinforced' in Table 1 ) | | | | |
| 4. *Damp-Proofing* ( *see* 28 'Felt bituminous for waterproofing and damp-proofing' in Table 1 ) | | | | |
| 5. *Earth Filling* ( *see* 45 'Soils and gravels' in Table 1 ) | | | | |
| 6. *Finishing* ( *see also* 'Floor finishes' given under 7 'Flooring' and 8 'Roofing' in Table 1 ) | | | | |
| Aluminium foil | — | ← Negligible → | | |
| Plaster: | | | | |
| Acoustic | 10 | 0·08 | 8 | $m^2$ |
| Anhydrite | 10 | 0·21 | 21 | ,, |
| Barium sulphate | 10 | 0·28 | 29 | ,, |
| Fibrous | 10 | 0·09 | 9 | ,, |
| Gypsum or lime | 10 | 0·19 | 19 | ,, |
| Hydraulic lime or cement | 10 | 0·23 | 23 | ,, |
| Plaster ceiling on wire netting | 10 | 0·26 | 27 | ,, |
| NOTE — When wood or metal lathing is used, add | — | 0·06 | 6 | ,, |
| 7. *Flooring* | | | | |
| Asphalt flooring | 10 | 0·22 | 22 | ,, |
| NOTE — For macadam finish, add | 10 | 0·26 | 27 | ,, |
| Compressed cork | 10 | 0·04 | 4 | ,, |
| Floors, structural: | | | | |
| Hollow clay blocks including reinforcement and mortar jointing between blocks, but excluding any concrete topping | 100 | 1·47 | 150 | ,, |
| | 125 | 1·67 | 170 | ,, |
| | 150 | 1·86 | 190 | ,, |
| | 175 | 2·16 | 220 | ,, |
| | 200 | 2·55 | 260 | ,, |
| NOTE — Add extra for concrete topping | | | | |
| Hollow clay blocks including reinforcement and concrete ribs between blocks, but excluding any concrete topping | 100 | 1·18 | 120 | ,, |
| | 115 | 1·27 | 130 | ,, |
| | 125 | 1·37 | 140 | ,, |
| | 140 | 1·47 | 150 | ,, |
| | 150 | 1·57 | 160 | ,, |
| | 175 | 1·76 | 180 | ,, |
| | 200 | 1·96 | 200 | ,, |
| NOTE — Add extra for concrete topping. | | | | |

( *Continued* )

TABLE 2 UNIT WEIGHTS OF BUILDING PARTS OR COMPONENTS *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS mm | WEIGHT/MASS kN | kg | per |
|---|---|---|---|---|
| Hollow concrete units including any concrete topping necessary for constructional purposes | 100 | 1·67 | 170 | m² |
| | 125 | 1·96 | 200 | ,, |
| | 150 | 2·16 | 220 | ,, |
| | 175 | 2·35 | 240 | ,, |
| | 200 | 2·65 | 270 | ,, |
| | 230 | 3·14 | 320 | ,, |
| Floors, wood: | | | | |
| Hard wood | 22 | 0·16 | 16 | ,, |
| | 28 | 0·20 | 20·5 | ,, |
| Soft wood | 22 | 0·11 | 11 | ,, |
| | 28 | 0·13 | 13·5 | ,, |
| Weight of mastic used in laying wood block flooring | — | 0·015 | 1·5 | ,, |
| NOTE — All thicknesses are 'finished thicknesses'. | | | | |
| Floor finishes: | | | | |
| Clay floor tiles ( *see* IS : 1478-1969* ) | 12·5 to 25·4 | 0·10 to 0·2 | 10 to 20 | ,, |
| NOTE — This weight is 'as laid' but excludes screeding. | | | | |
| Magnesium oxychloride: | | | | |
| Normal type ( saw dust filler ) | 10 | 0·142 | 14·5 | ,, |
| Heavy duty type ( mineral filler ) | 10 | 0·216 | 22 | ,, |
| Parquet flooring | — | 0·08 to 0·12 | 8 to 12 | ,, |
| Rubber ( *see* IS : 809-1970† ) | 3·2 | 0·048 to 0·062 | 4·9 to 6·3 | ,, |
| | 4·8 | 0·070 to 0·09 | 7·1 to 9·5 | ,, |
| | 6·4 | 0·093 to 0·130 | 9·5 to 13·2 | ,, |
| Terra cotta, filled 'as laid' | — | 5·54 to 7·06 | 570 to 720 | m² |
| Terrazzo paving 'as laid' | 10 | 0·23 | 24 | m² |
| 8. *Roofing* | | | | |
| Asbestos cement sheeting ( *see* 'Asbestos cement sheeting' in Table 1 ). | | | | |
| Allahabad tiles ( single ) including battens ( *see* Note below ) | — | 0·83 | 85 | ,, |
| Allahabad tiles ( double ) including battens ( *see* Note below ) | — | 1·67 | 170 | ,, |
| Country tiles (single ) with battens ( *see* Note below ) | — | 0·69 | 70 | ,, |
| Country tiles (double ) with battens ( *see* Note below ) | — | 1·18 | 120 | ,, |
| Mangalore tiles with battens ( *see* Note below ) | — | 0·64 | 65 | ,, |
| Mangalore tiles bedded in mortar over flat tiles ( *see* Note below ) | — | 1·08 | 110 | ,, |
| Mangalore tiles with flat tiles ( *see* Note below ) | — | 0·78 | 80 | ,, |
| Copper sheet roofing including laps and rolls | 0·56 | 0·08 | 8 | ,, |
| | 0·72 | 0·10 | 10 | ,, |
| Flat Roofs: | | | | |
| Clay tiles hollow ( *see* 7 'Flooring' in this table ) | | | | |
| Concrete hollow precast ( *see* 7 'Flooring' in this table ) | | | | |
| Galvanized iron sheeting ( *see* 39 'Metal sheeting, protected' in Table 1 ) | | | | |
| Glazed Roofing: | | | | |
| Glazing with aluminium alloy bars for spans up to 3 m | 6·4 | 0·19 | 19·5 | ,, |
| Glazing with lead-covered steel bars at 0·6 m centres | 6·4 | 0·25 to 0·28 | 26 to 29 | ,, |
| Slates on battens | — | 0·34 to 0·49 | 35 to 50 | ,, |
| Thatch with battens | — | 0·34 to 0·49 | 35 to 50 | ,, |

NOTE — Weights acting vertically on horizontal projection to be multiplied by cosine of roof angle to obtain weights normal to the roof surface.

*Specification for clay flooring tiles ( *first revision* ).
†Specification for rubber flooring materials for general purposes ( *first revision* ).

( *Continued* )

TABLE 2 UNIT WEIGHTS OF BUILDING PARTS OR COMPONENTS *Contd*

| MATERIAL | NOMINAL SIZE OR THICKNESS mm | WEIGHT/MASS kN | kg | per |
|---|---|---|---|---|
| Roof finishes | | | | |
| Bitumen mecadam | 10 | 0 22 | 22 | $m^2$ |
| Felt roofing ( *see* 28 'Felt, bituminous for water-proofing and damp-proofing' in Table 1 ) | 10 | 0 008 | 0 8 | ,, |
| Glass silk quilted | 0 5 | 0 05 | 5 | ,, |
| Lead sheet | 0 8 | 0 07 | 7 | ,, |
| Mortar screeding | 10 | 0 21 | 21 | ,, |
| 9 *Walling* ( IS 6072-1971* ) | | | | |
| Autoclaved reinforced cellular concrete wall slabs | | | | |
| Class A | — | 8 35 to 9 80 | 850 to 1 000 | $m^3$ |
| Class B | — | 7 35 to 8 35 | 750 to 850 | ,, |
| Class C | — | 6 35 to 7 35 | 650 to 750 | ,, |
| Class D | — | 5 40 to 6 35 | 550 to 650 | ,, |
| Class E | — | 4 40 to 5 40 | 450 to 550 | ,, |
| Brick masonry ( *see* 36 'Masonry, brick' in Table 1 ) | | | | |
| Concrete blocks ( *see* 11 'Block' in Table 1 ) | | | | |
| Stone masonry ( *see* 37 'Masonry, stone' in Table 1 ) | | | | |
| Partitions | | | | |
| Brick wall | 100 | 1 91 | 195 | $m^2$ |
| Cinder concrete | 75 | 1 13 | 115 | ,, |
| Galvanized iron sheet | — | 0 15 | 15 | ,, |
| Hollow glass block ( bricks ) | 100 | 0 88 | 90 | ,, |
| Hollow blocks per 200 mm of thickness | | | | |
| Ballast or stone concrete | 20 | 0 201 | 20 5 | ,, |
| Clay | 20 | 0 201 | 20 5 | ,, |
| Clinker concrete | 20 | 0 220 | 22 5 | ,, |
| Coke breeze concrete | 20 | 9 176 | 18 | ,, |
| Diatomaceous earth | 20 | 0 093 | 9 5 | ,, |
| Gypsum | 20 | 0 137 | 14 | ,, |
| Pumice concrete | 20 | 0 177 | 18 | ,, |
| Slag concrete, air-cooled | 20 | 0 196 | 20 | ,, |
| Slag concrete foamed | 20 | 0 186 | 19 | ,, |
| Lath and plaster | - | 0 392 | 40 | ,, |
| Solid blocks per 20 mm of thickness | | | | |
| Ballast or stone | 20 | 0 451 | 46 | ,, |
| Clinker concrete | 20 | 0 300 | 30 5 | ,, |
| Coke breeze concrete | 20 | 0 221 | 22 5 | ,, |
| Pumice concrete | 20 | 0 221 | 22 5 | ,, |
| Slag concrete, foamed | 20 | 0 250 | 25 5 | ,, |
| Terrazzo cast partitions | 40 | 0 932 | 95 | ,, |
| Timber studding plastered | — | 9 981 | 100 | ,, |

NOTE — For unit weight of fixtures and fittings required to buildings including builder's hardware, reference may be made to appropriate Indian standards

*Specification for autoclaved reinforced cellular concrete wall slabs.

## 4. STORE AND MISCELLANEOUS MATERIALS

**4.1** Units weights of store and miscellaneous materials intended for dead load calculations and other general purposes are given in Appendix A.

# APPENDIX A

[ *Clauses* 1.1.1 ( *Note*) *and* 4.1 ]

## UNIT WEIGHTS OF STORE AND MISCELLANEOUS MATERIALS

| MATERIAL | WEIGHT/MASS | | ANGLE OF FRICTION, DEGREES |
|---|---|---|---|
| | kN/m³ | kg/m³ | |
| 1. *Agricultural and Food Products* | | | |
| Butter | 8.45 | 860 | — |
| Coffee in bags | 5·50 | 560 | — |
| Drinks in bottles, in boxes | 7·35 | 750 | — |
| Eggs, packed | 2·95 | 300 | — |
| Eats, oil | 5·80 | 590 | — |
| Fish meal | 4·90 | 500 | 45 |
| Flour in sacks up to 1 m height | 2·20 to 5·90 | 225 to 600 | — |
| Forage ( bales ) | 1·25 | 125 | — |
| Fruits | 3·45 | 350 | — |
| Grains: | | | |
| Barley | 6·75 | 690 | 27 |
| Corn, shelled | 7·55 | 770 | 27 |
| Flax seed | 7·35 | 750 | 30 |
| Oats | 5·30 | 540 | 30 |
| Rice | 6 55 | 670 | 33 |
| Soyabeans | 7·35 | 750 | 30 |
| Wheat | 8·15 | 830 | 28 |
| Wheat flour | 6·85 | 700 | 30 |
| Grain sheaves up to 4 m stack height | 0·98 | 100 | 30 |
| Grain sheaves over 4 m stack height | 1·45 | 150 | 30 |
| Grass and clover | 3·45 | 350 | — |
| Hay: | | | |
| Compressed | 1·65 | 170 | — |
| Loose up to about 3 m stack height | 0·69 | 70 | — |
| Honey | 14·10 | 1 440 | — |
| Hops: | | | |
| In sacks | 1·65 | 170 | — |
| In cylindrical hop bins | 4 60 | 470 | — |
| Sewn up or compressed in cylindrical shape in hop cloth | 2·85 | 290 | — |
| Malt: | | | |
| Crushed | 3·90 | 400 | 20 |
| Germinated | 1·85 | 190 | — |
| Meat and meat products | 7·05 | 720 | — |
| Milk | 10·05 | 1 025 | — |
| Molasses | 4·40 | 450 | — |
| Onion in bags | 5·40 | 550 | 0 |
| Oil cakes, crushed | 5·80 | 590 | 0 |
| Potatoes | 7·05 | 720 | 30 |
| Preserves ( tins in cases ) | 4·90 to 7·85 | 500 to 800 | — |
| Salt: | | | |
| Bags | 7·05 | 720 | — |
| Bulk | 9·40 | 960 | 30 |
| Seeds: | | | |
| Heaps | 4·90 to 7·85 | 500 to 800 | 25 |
| Sacks | 3·90 to 6·85 | 400 to 700 | — |
| Straw and chaff: | | | |
| Loose up to about 3 m stack height | 0·45 | 45 | — |
| Compressed | 1·65 | 170 | — |
| Sugar: | | | |
| Crystal | 7·35 | 750 | 30 |
| Cube sugar in boxes | 7·85 | 800 | — |
| Sugar beet, pressed out | 7·85 | 800 | — |
| Tobacco bundles | 3·45 | 350 | — |
| Vinegar | 10·40 | 1 080 | — |

| MATERIAL | WEIGHT/MASS | | ANGLE OF FRICTION, DEGREES |
|---|---|---|---|
| | kN/m³ | kg/m³ | |
| 2. *Chemicals and Allied Materials* | | | |
| Acid, hydrochloric | 11·75 | 1 200 | — |
| Acid, nitric 91% | 14·80 | 1 510 | — |
| Acid, sulphuric 87% | 17·55 | 1 790 | — |
| Alcohol | 7·65 | 780 | — |
| Alum, pearl, in barrel | 5·20 | 530 | — |
| Ammonia, liquid | 8·85 | 900 | — |
| Ammonium chloride, crystalline | 8·15 | 830 | 30-40 |
| Ammonium nitrate | 7·05 to 9·80 | 720 to 1 000 | 25 |
| Ammonium sulphate | 7·05 to 9·00 | 720 to 920 | 32-45 |
| Beeswax | 9·40 | 960 | — |
| Benzole | 8·90 | 910 | — |
| Benzene hexachloride | 8·75 | 890 | 45 |
| Bicarbonate of soda | 6·40 | 650 | 30 |
| Bone | 18·65 | 1 900 | — |
| Borax | 17·15 | 1 750 | — |
| Calcite | 26·50 | 2 700 | — |
| Camphor | 9·70 | 990 | — |
| Carbon disulphide | 12·75 | 1 300 | — |
| Casein | 13·25 | 1 350 | — |
| Caustic soda | 13·85 | 1 410 | — |
| Creosole | 10·50 | 1 070 | — |
| Dicalcium phosphate | 6·65 | 6·80 | 45 |
| Disodium phosphate | 3·90 to 4·80 | 400 to 490 | 30-45 |
| Iodine | 48·55 | 4 950 | — |
| Oils in bottles or barrels | 5·70 to 8·90 | 580 to 910 | — |
| Oil, linseed: | | | |
| In barrels | 5·70 | 580 | — |
| In drums | 7·05 | 720 | — |
| Oil, turpentine | 8·50 | 865 | — |
| Paints | 9·40 | 960 | — |
| Paraffin wax | 7·85 to 9·40 | 800 to 960 | — |
| Petroleum | 9·90 | 1 010 | — |
| Phosphorus | 17 85 | 1 820 | — |
| Plastics: | | | |
| Cellulose acetate | 12·25 to 13·35 | 1 250 to 1 360 | — |
| Cellulose nitrate | 13·25 to 15·70 | 1 350 to 1 600 | — |
| Methyl methacrylate | 11·60 | 1 185 | — |
| Phenol formaldehyde | 12·55 | 1 280 | — |
| Polystryrene | 10·40 | 1 060 | — |
| Polyvinyl chloride ( Perspex ) | 11·75 to 13·25 | 1 200 to 1 350 | — |
| Resin bonded sheet | 12·85 to 13·55 | 1 310 to 1 380 | — |
| Urea formaldehyde | 13·25 to 13·55 | 1 350 to 1 380 | — |
| Potash | 14·40 | 1 470 | — |
| Potassium | 8·65 | 880 | — |
| Potassium nitrate | 9·90 | 1 010 | — |
| Red lead, dry | 20·70 | 2 110 | — |
| Red lead, paste | 87·30 | 8 900 | — |
| Rosin in barrels | 6·75 | 690 | — |
| Rubber: | | | |
| Raw | 8·90 to 9·40 | 910 to 960 | — |
| Vulcanized | 8·90 to 9·10 | 910 to 930 | — |
| Saltpetre | 9·91 | 1 010 | — |
| Sodium silicate in barrels | 8·35 | 850 | — |
| Sulphur | 20·10 | 2 050 | — |
| Talc | 27·45 | 2 800 | — |
| Varnishes | 9·40 | 960 | — |
| Vitriol, blue, in barrels | 7·05 | 720 | — |
| 3. *Fuels* | | | |
| Brown coal | 6·85 | 700 | — |
| Brown coal briquettes heaped | 7·85 | 800 | 35 |

| Material | Weight/Mass | | Angle of Friction, Degrees |
|---|---|---|---|
| | kN/m³ | kg/m³ | |
| Brown coal briquettes, stacked | 12·75 | 1 300 | — |
| Charcoal | 2·95 | 300 | — |
| Coal: | | | |
| Untreated, mine-moist | 9·80 | 1 000 | 35 |
| In washeries | 11·75 | 1 200 | 0 |
| Dust | 6 85 | 700 | 25 |
| All other sorts | 8·35 | 850 | 35 |
| Coke: | | | |
| Furnace or gas | 4·90 | 500 | 35 |
| Brown coal, low-temperature | 9·80 | 1 000 | 35 |
| Hard, raw coal | 8 35 | 850 | 35 |
| Hard, raw coal, mine-damp | 9 80 | 1 000 | 35 |
| Diesel oil | 9 40 | 960 | 0 |
| Firewood, chopped | 3 90 | 400 | 45 |
| Petrol | 6 75 | 690 | 0 |
| Wood in chips | 1 95 | 200 | 45 |
| Wood shavings, loose | 1 45 | 150 | 35 |
| Wood shavings, shaken down | 2 45 | 250 | 35 |
| 4. *Manures* | | | |
| Animal manures: | | | |
| Loosely heaped | 11 75 | 1 200 | 45 |
| Stacked dung, up to about 2 5 m stack height | 17 65 | 1 800 | 45 |
| Artificial manures | 11 75 | 1 200 | 24-30 |
| 5. *Metals and Alloys* | | | |
| Aluminium | | | |
| Cast | 25 30 to 26·60 | 2 580 to 2 710 | — |
| Wrought | 25 90 to 27 45 | 2 640 to 2 800 | — |
| Sheet per mm of thickness per m² | 0 028 | 2 8 | — |
| Antimony, pure: | | | |
| Amorphous | 60·90 | 6 210 | — |
| Solid | 65·70 | 6 700 | — |
| Bismuth: | | | |
| Liquid | 98 07 | 10 000 | — |
| Solid | 95 02 to 97 09 | 9 690 to 9900 | — |
| Cadmium: | | | |
| Cast | 83 75 to 84·05 | 8 540 to 8 570 | — |
| Wrought | 85 03 | 8 670 | — |
| Calcium | 15 60 | 1 590 | — |
| Chromium | 63·95 to 66·00 | 6 520 to 6 730 | — |
| Cobalt: | | | |
| Cast | 83 25 to 85 10 | 8 490 to 8 680 | — |
| Wrought | 88 45 | 9 020 | — |
| Copper: | | | |
| Cast | 86 20 to 87 65 | 8 790 to 8 940 | — |
| Wrought | 86·70 to 87·65 | 8 840 to 8 940 | — |
| Sheet per mm of thickness | 0 09 | 8·7 | — |
| Gold: | | | |
| Cast | 188·75 to 189·55 | 19 250 to 19 330 | — |
| Wrought | 189 55 | 19 330 | — |
| Iron: | | | |
| Pig | 70 60 | 7 200 | — |
| Grey, cast | 68 95 to 69 90 | 7 030 to 7 130 | — |
| White, cast | 74 35 to 75·70 | 7 580 to 7 720 | — |
| Wrought | 75 50 | 7 700 | — |

| Material | Weight/Mass | | Angle of Friction, Degrees |
|---|---|---|---|
| | kN/m³ | kg/m³ | |
| Lead: | | | |
| Cast | 111 20 | 11 340 | — |
| Liquid | 105 00 | 10 710 | — |
| Wrought | 111 40 | 11 360 | — |
| Sheet per mm of thickness | 0 11 | 11 | — |
| Magnesium | 16 45 to 17 15 | 1 680 to 1 750 | — |
| Manganese | 72 55 | 7 400 | — |
| Mercury | 133 35 | 13 60 | — |
| Nickel | 81 20 to 87·20 | 8 280 to 8 890 | — |
| Platinum | 210·25 | 21 440 | — |
| Silver: | | | |
| Cast | 102 0 to 102·85 | 10 400 to 10 490 | — |
| Liquid | 93 15 | 9 500 | — |
| Wrought | 103 35 to 103 55 | 10 540 to 10 560 | — |
| Sodium: | | | |
| Liquid | 9 10 | 930 | — |
| Solid | 9 30 | 950 | — |
| Tungsten | 188 30 | 19 200 | — |
| Uranium | 180 45 | 18 400 | — |
| Zinc | | | |
| Cast | 68 95 to 70 20 | 7 030 to 7 160 | — |
| Wrought | 70 50 | 7 190 | — |
| Sheet per mm of thickness | 0 07 | 7 | — |
| Alloys: | | | |
| Aluminium and copper | | | |
| Aluminium 10%, copper 90% | 75 40 | 7 690 | — |
| Aluminium 5%, copper 95% | 82 00 | 8 360 | — |
| Aluminium 3%, copper 97% | 85 10 | 8 680 | — |
| Aluminium 91%, zinc 9% | 27 45 | 2 800 | — |
| Babbit metal (tin 90%, lead 5%, copper 5% ) | 71 70 | 7 310 | — |
| Wood's metal ( bismuth 50%, lead 25%, cadmium 12 5%, tin 12 5% ) | 95 00 | 9 690 | — |
| Brasses: | | | |
| Muntz metal ( copper 60%, zinc 40% ) | 80 60 | 8 220 | — |
| Red ( copper 90%, zinc 10% ) | 84 25 | 8 590 | — |
| White ( copper 50%, zinc 50% ) | 80 30 | 8 190 | — |
| Yellow ( copper 70%, zinc 30% ): | | | |
| Cast | 82 75 | 8 440 | — |
| Drawn | 85 10 | 8 680 | — |
| Rolled | 83 85 | 8 550 | — |
| Bronzes: | | | |
| Bell metal ( copper 80%, tin 20% ) | 85 60 | 8 730 | — |
| Gun metal ( copper 90%, tin 10% ) | 86 10 | 8 780 | — |
| Cadmium and tin | 75 40 | 7 690 | — |
| German Silver: | | | |
| Copper 52%, zinc 26%, nickel 22% | 82 75 | 8 440 | — |
| Copper 59%, zinc 30%, nickel 11% | 81 70 | 8 330 | — |
| Copper 63%, zinc 30%, nickel 7% | 81 40 | 8 300 | — |
| Gold and Copper: | | | |
| Gold 98%, copper 2% | 184·75 | 18 840 | — |
| Gold 90%, copper 10% | 168 20 | 17 150 | — |

| Material | Weight Mass | | Angle of Friction, Degrees |
|---|---|---|---|
| | kN m³ | kg m³ | |
| Lead and Tin: | | | |
| Lead 87 5%, tin 12 5% | 103 85 | 10 590 | - |
| Lead 30 5%, tin 69 5% | 81 10 | 8 270 | — |
| Monel metal cast ( nickel 70%, copper 30% ) | 87 00 | 8 870 | |
| Steel: | | | |
| Cast | 77 00 | 7 850 | — |
| Wrought mild | 76 80 | 7 830 | |
| Black plate per mm of thickness | 0 08 | 8 | -- |
| Steel sections ( *see* 46 'Steel sections' in Table 1 ) | | | |
| 6. *Miscellaneous Materials* | | | |
| Aggregate, coarse | 10 80 to 15·70 | 1 100 to 1 600 | 30 |
| Ashes, coal, dry, 12 mm and under | 5 50 to 6·30 | 560 to 645 | 40 |
| Ashes, coal, dry, 75 mm and under | 5 50 to 6·30 | 560 to 645 | 38 |
| Ashes, coal, wet, 12 mm and under | 7 05 to 7·85 | 720 to 800 | 52 |
| Ashes, coal, wet, 75 mm and under | 7 05 to 7 85 | 720 to 800 | 50 |
| Asphalt, crushed, 12 mm and under | 7·05 | 720 | 30-45 |
| Ammonium nitrate, prills | 3 55 to 8·35 | 360 to 850 | 27 |
| Bone | 18 65 | 1 900 | — |
| Books and files, stacked | 8 35 | 851 | -- |
| Calcium ammonium nitrate | 9 80 | 1 000 | 28 |
| Copper sulphate, ground | 11 75 | 1 200 | 30 |
| Chalk | 21·95 | 2 240 | — |
| Chinaware, earthenware, stacked ( including cavities ) | 10 80 | 1 100 | — |
| Clinker, furnace, clean | 7·85 | 800 | 30 |
| Diammonium phosphate | 7 85 to 8·50 | 800 to 865 | 29 |
| Double salt ( ammonium sulphate nitrate ) | 7 05 to 9·30 | 720 to 950 | 34 |
| Filling cabinets and cupboards with contents, in records offices, libraries, archives | 5 90 | 600 | — |
| Flue dust, boiler house, dry | 5·50 to 7·05 | 560 to 720 | >30 |
| Fly ash, pulverised | 5 50 to 7·05 | 560 to 720 | — |
| Glass: | | | |
| Glass, solid | 23·50 to 26·70 | 2 400 to 2 720 | — |
| Wool | 0·16 to 1·18 | 16 to 120 | — |
| In sheets | 25 50 | 2 600 | — |
| Glue | 12·55 | 1 280 | — |
| Gypsum, calcined, 12 mm and under | 8 60 to 9·40 | 889 to 960 | 40 |
| Gypsum, calcined, powdered | 9·40 to 12·55 | 960 to 1 280 | 45 |
| Gypsum, raw, 25 mm and under | 14·10 to 15·70 | 1 440 to 1 600 | 30-45 |
| Hides | | | |
| Dry, Salted } Only green | 8·65 | 880 | — |
| Ice | 8 90 | 910 | — |
| Leather put in rows | 7·85 | 800 | — |
| Lime, ground, 3 mm and under | 9·40 | 960 | >45 |
| Lime, hydrated, 3 mm and under | 6·30 | 640 | 30-45 |
| Lime, hydrated, pulverized | 5 00 to 6·30 | 510 to 640 | 30-45 |
| Lime pebble | 8·25 to 8·75 | 840 to 890 | >45 |
| Limestone, agricultural, 3 mm and under | 10·60 | 1 080 | 30-45 |
| Limestone, crushed | 13·30 to 14·10 | 1 355 to 1 440 | 30-45 |
| Limestone dust | 8·65 to 14·90 | 880 to 1 520 | 38-45 |
| Magnesite, caustic, in powder form | 7·85 | 800 | — |
| Magnesite, sinter and magnesite, granular | 19·60 | 2000 | — |
| Phosphate, rock, pulverized | 9·40 | 960 | 40-52 |
| Phosphate rock | 11·75 to 13·35 | 1 200 to 1 360 | 30-45 |
| Phosphate sand | 14 10 to 15·70 | 1 440 to 1 600 | 30-45 |
| Potassium carbonate | 7·95 | 810 | 30-45 |
| Potassium chloride, pellets | 18·85 to 20·40 | 1 920 to 2 080 | 30-45 |
| Potassium nitrate | 4·85 | 495 | >30 |
| Potassium sulphate | 6·55 to 7·45 | 670 to 760 | 45 |
| Pyrites, pellets | 18·85 to 20·40 | 1 920 to 2 080 | 30-45 |

| Material | Weight/Mass | | Angle of Friction, Degrees |
|---|---|---|---|
| | kN/m³ | kg/m³ | |
| Pumice | 5·80 to 9·90 | 590 to 1 010 | — |
| Rubbish: | | | |
| Building | 13·80 | 1 410 | — |
| General | 6·30 | 645 | — |
| Salt, common, dry, coarse | 6·30 to 10 00 | 640 to 1 020 | 30-45 |
| Salt, common, dry, fine | 11 00 to 12·55 | 1 120 to 1 280 | 30-45 |
| Salt cake, dry, coarse | 13·35 | 1 360 | 30 |
| Salt cake, dry, pulverized | 11·20 to 13·35 | 1 140 to 1 360 | 35 |
| Sand, bank, damp | 17·25 to 20·40 | 1 760 to 2 080 | 45 |
| Sand, bank, dry | 14·10 to 17·25 | 1 440 to 1 760 | 30 |
| Sand, silica, dry | 14·10 to 15·70 | 1 440 to 1 600 | 30-35 |
| Saw dust, loose | 1·57 | 160 | 30 |
| Silica gel | 4·40 | 450 | 30-45 |
| Soda ash, heavy | 8·65 to 10·20 | 880 to 1 040 | 35 |
| Soda ash, light | 4·70 to 6·00 | 480 to 610 | 37 |
| Sodium nitrate, granular | 11·00 to 12·55 | 1 120 to 1 280 | 24 |
| Sulphur, crushed, 12 mm and under | 7·85 to 8·25 | 800 to 840 | 35-45 |
| Sulphur, 76 mm and under | 8·65 to 13·35 | 880 to 1 360 | 32 |
| Sulphur, powdered | 7·85 to 9·40 | 800 to 960 | 30-45 |
| Single superphosphate ( S.S.P. ), granulated | 7·65 to 8·25 | 780 to 840 | 37 |
| Slag, furnace, crushed | 14·90 | 1 520 | 35 |
| Steel goods: | | | |
| Cylinders, usually stored for carbonic acid, etc | 13·80 | 1 410 | — |
| Sheets, railway rails, etc, usually stored | 44·00 | 4 490 | — |
| Trisodium phosphate | 9·40 | 960 | 30-45 |
| Triple superphosphate | 7·85 to 8·65 | 800 to 880 | 30-45 |
| Turf | 2·85 to 5·70 | 2 910 to 5 810 | — |
| Urea, prills | 6·40 | 650 | 23-26 |
| 7. *Ores* | | | |
| Antimony | 29·80 | 3 040 | — |
| Ferrous sulphide | 26·50 | 2 700 | — |
| Ferrous sulphide ore waste after roasting | 13·85 | 1 400 | — |
| Iron ore, compact storing | 29·80 | 3 040 | — |
| Magnesium ore | 19·60 | 2 000 | — |
| 8. *Textiles, Paper and Allied Materials* | | | |
| Cellulose in bundles | 7·35 | 750 | — |
| Cotton, compressed | 12·75 | 1 300 | — |
| Flax, piled and compressed in bales | 2·95 | 300 | — |
| Furs | 8·90 | 910 | — |
| Jute in bundles | 6·85 | 700 | |
| Paper: | | | |
| In bundles and rolls | 6·85 | 700 | — |
| Newspapers in bundles | 3·90 | 400 | — |
| Put in rows | 10·80 | 1 100 | — |
| Thread in bundles | 4·90 | 500 | — |
| Wood, compressed | 12·75 | 1 300 | — |

**Bureau of Indian Standards**

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 1986 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

**Copyright**



**Review of Indian Standards**

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 Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

**Amendments Issued Since Publication**

| Amend No. | Date of Issue | Text Affected |
|---|---|---|
| | | |
| | | |
| | | |

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402

Telegrams: Manaksanstha
(Common to all offices)

Regional Offices:

| | | Telephone |
|---|---|---|
| Central | : Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002 | 2323 7617, 2323 3841 |
| Eastern | : 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi, KOLKATA 700054 | 2337 8499, 2337 8561, 2337 8626, 2337 9120 |
| Northern | : SCO 335-336, Sector 34-A, CHANDIGARH 160022 | 60 3843, 60 9285 |
| Southern | : C.I.T. Campus, IV Cross Road, CHENNAI 600113 | 2254 1216, 2254 1442, 2254 2519, 2254 2315 |
| Western | : Manakalaya, E9 MIDC, Marol, Andheri (East), MUMBAI 400093 | 2832 9295, 2832 7858, 2832 7891, 2832 7892 |

Branches : AHMEDABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. NAGPUR. NALAGARH. PATNA. PUNE. RAJKOT. THIRUVANANTHAPURAM. VISAKHAPATNAM.

Printed at Simco Printing Press, Delhi