

*Indian Standard*

RECOMMENDATIONS FOR  
CO-ORDINATION OF DIMENSIONS IN  
BUILDINGS — ARRANGEMENT OF BUILDING  
COMPONENTS AND ASSEMBLIES

**PART IV FUNCTIONAL GROUP 4 — SERVICES  
AND DRAINAGE**

( First Reprint DECEMBER 1982 )

UDC 721.013 : 389.63 : 696



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**INDIAN STANDARDS INSTITUTION**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

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**IS : 7564 (Part IV) - 1975**

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# *Indian Standard*

## RECOMMENDATIONS FOR CO-ORDINATION OF DIMENSIONS IN BUILDINGS — ARRANGEMENT OF BUILDING COMPONENTS AND ASSEMBLIES

### PART IV FUNCTIONAL GROUP 4 — SERVICES AND DRAINAGE

#### 0. FOREWORD

**0.1** This Indian Standard (Part IV) was adopted by the Indian Standards Institution on 5 December 1975, after the draft finalized by the Modular Co-ordination Sectional Committee had been approved by the Civil Engineering Division Council.

**0.2** Since the basic decision to adopt a 10-cm module has been taken, the work connected with application of this module for different building components, such as bricks, walling materials and roofing materials, has been done by different committees and dimensions have been recommended by these committees for such components.

**0.2.1** However, it has been felt that some thought had to be given to the need for dimensionally co-ordinating a particular product, specially with respect to the three dimensions — length, width, height/thickness. It was felt that in some cases such co-ordination of dimensions may or may not be necessary, while in other cases it is absolutely imperative. To identify such parameters for individual components, it was felt that building as a whole should be examined from the point of view of various components that go into it and then decide on the need for dimensional co-ordination on an individual basis.

**0.2.2** After such a decision has been arrived at, it will then be possible for the relevant committees to adopt this principle in finally arriving at the nominal and work sizes for the individual components. With this end in view the building has been divided broadly into the following five functional groups:

- a) Functional group 1 — Structure
- b) Functional group 2 — External envelope
- c) Functional group 3 — Internal subdivision
- d) Functional group 4 — Services and drainage
- e) Functional group 5 — Fixtures, furniture and equipment

**0.3** It was indeed very useful for the Modular Co-ordination Sectional Committee to have the views of various architects, engineers and users in arriving at a basic decision regarding the need for dimensionally co-ordinating some of these products so that the relevant committees could exercise their mind on such items only. Based on these decisions, it may be possible to review the existing Indian Standards on different subjects where dimensions have been already given and arrive at new dimensions where necessary.

**0.3.1** It may be noted that the words 'co-ordination of dimensions' instead of 'modular co-ordination' have been used in the title of the standard with a view to encouraging the concept of establishing the correlation of two or more products when juxtaposed together to perform a function. If such a function is not necessary or there is no function to be done, then it appears there may not be a need for co-ordinating dimension in the products placed together.

**0.4** In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country. This has been met by deriving assistance from the following:

BSPD 6432: Part 1 - 1969 Recommendations for the co-ordination of dimensions in building—arrangement of building components and assemblies within functional groups; Part 1 Functional groups 1, 2, 3 and 4. British Standards Institution.

BSPD 6432: Part 2 - 1969 Recommendations for the co-ordination of dimensions in building—arrangement of building components and assemblies within functional groups; Part 2 Functional group 5. British Standards Institution.

**0.5** This standard is one of a series of Indian Standards on modular co-ordination. Other standards published so far in the series are given on page 14.

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## **1. SCOPE**

**1.1** This standard (Part IV) lays down recommendations for co-ordinating dimensions of building components and assemblies for functional group 4—services and drainage, which comprises the following:

Heating, water, fire fighting, ventilation and air distribution, electrical, drainage, refuse collection and disposal, transporter and miscellaneous equipment and services.

## 2. TERMINOLOGY

**2.0** For the purpose of this standard, the following definitions shall apply.

**2.1 Element of Construction** — A functional part of a building constructed from building materials and/or building components.

**2.2 Services** — The group of installation each of which supplies one or more services to a building.

**2.3 Assembly** — An aggregate of building components used together.

**2.4 Building Component** — A building product formed as a distinct unit having specified sizes in three dimensions.

**2.5 Building Section** — Building material formed to a definite cross section but of unspecified length. Sections are usually manufactured by a continuous process, such as rolling, drawing, extruding or machining. Examples are angles, bars, tubes, battens, sheet, plate, wire and cable.

**2.6 Co-ordinating Plane** — A plane by reference to which a building component or assembly is co-ordinated with another.

**2.7 Co-ordinating Space** — A space bounded by co-ordinating planes allocated to a component, including allowances for tolerances and joint clearances.

**2.8 Co-ordinating Dimensions** — A dimension of co-ordinating space, which defines the relative positions of two or more components in an assembly, according to the characteristics of the components which are relevant to assembly.

**2.9 Basic Size** — The size by reference to which the limits of size are fixed.

## 3. GRADING OF COMPONENTS AND ASSEMBLIES

**3.1** Depending upon the relative importance, the components or assemblies shall be given a grading A, B, or C as follows:

Grading A — Components or assemblies for which dimensional co-ordination is essential.

Grading B — Components or assemblies which in some situations need to be dimensionally co-ordinated.

Grading C — Components or assemblies which do not require to be dimensionally co-ordinated.

## 4. CO-ORDINATING DIMENSIONS OF BUILDING COMPONENTS AND ASSEMBLIES

**4.1** The recommended co-ordinating dimensions of building components and assemblies for functional group 4—services and drainage shall be as given in Table 1.

**TABLE 1 RECOMMENDED CO-ORDINATING DIMENSIONS OF BUILDING COMPONENTS AND ASSEMBLIES FOR FUNCTIONAL GROUP 4 — SERVICES AND DRAINAGE**

(Clause 4.1)

SERVICE	ASSEMBLY OR SYSTEM	COMPONENT	GRADING	CO-ORDINATING DIMENSIONS					CROSS REFERENCE TO OTHER FUNCTIONAL GROUPS
				Length	Width	Height	Depth	Thickness	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Heating	High and low pressure hot water and steam	*Boilers: back	A	✓	✓	✓	—	—	5
		*Boilers: domestic independent	A	✓	✓	✓	—		
		*Boilers: industrial independent	B	—	—	✓	—		
		*Boilers: inset	A	✓	✓	✓	—	2, 3	
		*Boilers: flue pipes and fittings	B	†C/S	†C/S	✓	—		
		*Boilers: flue linings	B	C/S	C/S	—	—	2	
		*Boilers: balanced flue terminals	A	—	✓	✓	✓		
		*Automatic stokers: bunker fed	B	✓	—	—	—	5	
		*Automatic stokers: hopper fed	B	✓	✓	✓	—		
		*Automatic stokers: burners	B	✓	✓	—	—		
		Valves	B	C/S	C/S	—	—		
		*Pumps	B	✓	✓	—	—		
		Temperature controls	C	—	—	—	—		
		Space heating appliances: radiators	A	—	—	✓	✓		
		Space heating appliances: skirting heaters	A	✓	—	✓	—		
		Space heating appliances: unit heaters, suspended	C	—	—	—	—		
		Space heating appliances: embedded panels	A	✓	—	✓	✓		
		Room air-conditioning units: free standing	A	✓	✓	✓	—	3	
		Heat exchange calorifiers	B	C/S	C/S	✓	—		
		Pipework and fittings	B	C/S	C/S	✓	—		
Insulation	B	C/S	C/S	✓	—				
Tanks: oil storage	B	✓	✓	✓	—				

	Electric under-floor	Conduit: withdrawable	B	✓	—	—	—	✓	3
	Room heaters — solid fuel, gas, electric, oil	Heaters: freestanding	C	—	✓	✓	—	—	5
		Chimney throats	B	✓	✓	✓	—	—	2, 3, 5
		Hearths	B	✓	—	—	✓	✓	3, 5
		Flue pipe and fittings	B	C/S	C/S	✓	—	—	2, 3
Water	Cold water-pressure	Pipework and fittings	B	C/S	C/S	✓	—	—	3, 5
		Pipework insulations	B	C/S	C/S	✓	—	—	
		Storage cisterns	A	✓	✓	✓	—	—	
		Flushing cisterns	A	✓	—	✓	✓	—	
		*Pumps	C	✓	✓	✓	—	—	
		Meters	C	—	—	—	—	—	
		Stop valves, pressure reducing valves, check valves	B	C/S	C/S	—	—	—	
		Terminal fittings: draw-off taps	B	C/S	C/S	—	—	—	
	Ball valves	B	C/S	C/S	—	—	—		
	Cold water treatment	Filters	C	—	—	—	—	—	5
		Water softeners	B	✓	✓	✓	—	—	
	Hot water supply — all systems	*Boilers: back	A	✓	—	✓	✓	—	2, 3
		*Boilers: domestic independent	A	✓	—	✓	✓	—	
		*Boilers: industrial independent	B	—	—	✓	✓	—	
*Boilers: inset		A	✓	—	✓	✓	—		
*Boilers: flue pipe and fittings		B	C/S	C/S	✓	—	—		
*Boilers: flue linings		B	C/S	C/S	—	—	—		
*Boilers: balanced flue terminals		A	—	✓	✓	✓	—		
*Automatic stokers: bunker fed		B	✓	—	—	—	—		
*Automatic stokers: hopper fed		B	✓	✓	✓	—	—		
*Automatic stokers: burners		B	✓	✓	—	—	—		
Valves		B	C/S	C/S	—	—	—		

\*Co-ordination is essential at the time of planning itself.

†C/S indicates relation to cross section.

(Continued)

**TABLE 1 RECOMMENDED CO-ORDINATING DIMENSIONS OF BUILDING COMPONENTS AND ASSEMBLIES FOR FUNCTIONAL GROUP 4—SERVICES AND DRAINAGE — Contd**

SERVICE	ASSEMBLY OR SYSTEM	COMPONENT	GRADING	CO-ORDINATING DIMENSIONS					CROSS REFERENCE TO OTHER FUNCTIONAL GROUPS	
				Length	Width	Height	Depth	Thickness		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
Water—Contd	Hot water supply — all systems — Contd	*Pumps	B	✓	✓	✓	—	—	3	
		Temperature controls	C	—	—	—	—			
		Pipework and fittings	B	†C/S	†C/S	✓	—	—		
		Insulation	B	C/S	C/S	—	—	—		
		Oil storage tanks	B	✓	✓	✓	—	—		
		Stop valves, pressure reducing valves, check valves	C	C/S	C/S	—	—	—		
		Immersion heaters: electric	C	✓	—	—	—	—		
		Hot water storage cylinders: domestic	A	✓	✓	✓	—	—		5
		Hot water storage cylinders: industrial	B	✓	✓	✓	—	—		5
		Combination hot water storage units	A	✓	✓	✓	—	—		3, 5
Calorifiers	B	—	—	✓	—	—	5			
Water storage heaters: electric, domestic	A	—	—	✓	—	—				
Fire-fighting (see also 'Fire detection')	Fire mains — wet	Hydrants: ground	C	—	—	—	—	—	5	
		Hydrants: wall	B	✓	✓	✓	—	—		
		Hose reels	A	✓	✓	✓	—	—		
		Hydrant boxes: inset	A	✓	✓	—	✓	—		3, 5
		Pipework and fittings	B	C/S	C/S	—	—	—		3
		Drencher systems: controls	B	✓	✓	✓	—	—		

	Drencher systems: pipework and fittings *Compressors	B C	C/S —	C/S —	— —	— —	— —	3
Sprinklers	Controls Pipework and fittings *Compressors	C B C	√ C/S —	√ C/S —	√ — —	— — —	— — —	3 3
Dry risers	Inlet boxes: recessed Pipework and fittings Landing valves	A B B	— C/S √	√ C/S √	√ √ √	√ — —	— — —	2
Foam-dry	Inlet boxes: recessed Pipework and fittings Terminal fittings	A B B	— C/S √	√ C/S √	√ √ —	√ — —	— — —	2
Fixed foam	Tanks Pipework and fittings Terminal fittings	B B B	√ C/S √	√ C/S √	√ — —	— — —	— — —	
CO <sub>2</sub>	Storage racks Pipework and fittings Terminal fittings	B B B	√ C/S √	√ C/S √	√ — —	— — —	— — —	3, 5
Hand appliances	Extinguishers Blankets	C C	— —	— —	— —	— —	— —	3, 5 3, 5

\*Co-ordination is essential at the time of planning itself.  
†C/S indicates relation to cross section.

(Continued)

**TABLE 1 RECOMMENDED CO-ORDINATING DIMENSIONS OF BUILDING COMPONENTS AND ASSEMBLIES FOR FUNCTIONAL GROUP 4 — SERVICES AND DRAINAGE — Contd**

SERVICE	ASSEMBLY OR SYSTEM	COMPONENT	GRADING	CO-ORDINATING DIMENSIONS					CROSS REFERENCE TO OTHER FUNCTIONAL GROUPS
				Length	Width	Height	Depth	Thickness	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ventilation and air distribution	Air-conditioning and ventilation	*Heater and cooling batteries	B	✓	✓	—	—	—	1, 3
		*Fans	B	✓	—	✓	—		
		*Filters	B	✓	✓	—	—		
		*Air washers	B	✓	✓	—	—		
		Ductwork, fittings and fire dampers	A	—	—	—	—		
		Terminal fittings	B	✓	—	✓	—		
		Grilles	A	✓	—	✓	—		
	Ventilators: roof	A	✓	✓	✓	—	2		
	Cooling plant	*Refrigeration machinery *Air-cooled condensers and water towers	A	✓	✓	✓	—	—	
			A	✓	✓	✓	—	—	
Electrical	Mains voltage	Recessed conduits	A	†C/S	†C/S	—	—	—	3
		Conduits and surface trunking	B	C/S	C/S	—	—	—	
		Cables	B	—	—	—	—	—	
		*Distribution boards	A	✓	—	✓	—	—	
		*Control and switchgear	A	✓	✓	✓	—	—	
		*Flameproof equipment	B	✓	✓	✓	—	—	
		*Transformers and rectifiers	B	✓	✓	✓	—	—	
		*Meters	A	✓	✓	✓	—	—	

	*Generators and motors Fixing accessories *Vertical distribution equipment	B C A	√ — √	√ — √	√ — √	— — —	— — —	
Wiring pathways	Ducts	A	√	√	√	—	—	3
	Trunking	A	√	√	√	—	—	3
	Skirting	A	√	√	√	—	—	3, 5
Lighting	Lamps: single cap	C	—	—	—	—	—	5
	Lamps: double cap	B	√	√	—	—	—	5
	Fittings: independent	C	√	√	—	—	—	3, 5
	Fittings: inset	B	√	√	—	—	—	3, 5
Switches, socket outlets, etc	Wiring (drawing of wires)	C	—	—	—	—	—	
	Accessory boxes	B	—	√	√	√	—	3, 5
	Cover plates	C	—	—	—	—	—	3, 5
Communication — GPO and internal telephone	Cable entry boards and boxes	B	—	√	√	√	—	5
	Switch and distribution boards and boxes	B	√	—	√	—	—	
	Terminal fittings	B	—	—	√	—	—	
	Conduits	B	C/S	C/S	C/S	—	—	5
	Cables	B	√	C/S	C/S	—	—	5
	Receivers	C	—	—	—	—	—	5
	Fixing accessories	C	—	—	—	—	—	
	*Distribution risers	B	√	√	√	√	—	
Internal address	Receivers and amplifiers (EQPT)	C	—	—	—	—	—	5
	Terminal fittings	B	√	—	√	—	—	3, 5
	Television and radio equipment	B	√	√	√	—	—	5
Clock	Cables in conduits	B	C/S	C/S	—	—	—	
	*Master and slave clocks	B	√	√	√	—	—	5
	Fixing accessories	C	—	—	—	—	—	

\*Co-ordination is essential at the time of planning itself.

†C/S indicates relation to cross section.

(Continued)

**TABLE 1 RECOMMENDED CO-ORDINATING DIMENSIONS OF BUILDING COMPONENTS AND ASSEMBLIES FOR FUNCTIONAL GROUP 4 — SERVICES AND DRAINAGE — Contd**

SERVICE	ASSEMBLY OR SYSTEM	COMPONENT	GRADING	CO-ORDINATING DIMENSIONS					CROSS REFERENCE TO OTHER FUNCTIONAL GROUPS
				Length	Width	Height	Depth	Thickness	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Electrical — Contd	Fire detection	Smoke and heat detectors	B	—	✓	✓	✓	—	3, 5
		Fire alarms — terminals	B	—	✓	✓	✓	—	3, 5
		*Operating equipment	C	—	—	—	—	—	—
Drainage	Drains — under-ground and suspended	Pipe and fittings	B	†C/S	†C/S	—	—	—	1, 3 1, 3
		Inspection chambers and gullies	B	✓	✓	✓	—	—	
		Cesspools and collecting sumps	B	✓	✓	✓	—	—	
		Sump and sewage lift pumps	B	✓	✓	✓	—	—	
			B	✓	✓	✓	—	—	
	Soil, waste and vent pipe	Pipes and fittings	B	C/S	C/S	—	—	—	5 3, 5
		Traps and wastes	B	✓	✓	✓	—	—	
		Grease interceptors	B	✓	✓	✓	—	—	
		Waste disposal units	C	—	—	—	—	—	
	Rainwater pipes and gutters	Pipes and fittings	B	C/S	C/S	—	—	—	2 2 2
		Chutes	B	✓	C/S	—	—	—	
		Roof outlets — all types	A	—	✓	✓	—	✓	
		Gutters and fittings	B	✓	✓	—	—	✓	
	Petrol, chemical and trade effluent	Interceptors	B	✓	✓	✓	—	—	3
		Separators	B	✓	✓	✓	—	—	3
Neutralizers		B	✓	✓	✓	—	—	3	
Pipework and fittings		B	C/S	C/S	—	—	—	—	
Valves		B	C/S	C/S	—	—	—	—	
Pumps		B	✓	✓	✓	—	—	—	
Refuse collection and disposal	Portable equipment fixed installations	Bins, skips, food waste bins	B	C/S	C/S	✓	—	—	5
		Gravity chutes	A	✓	C/S	—	—	—	3
		Incinerators	C	—	—	—	—	—	—
		Vacuum pipes	B	✓	C/S	—	—	—	5

Transporter	Water carriage system	Pipes and fittings Terminal fittings Plant	B A B	C/S C/S √	C/S C/S √	— — √	— — —	— — —	5 3, 5
	Vacuum cleaning	Pipes and fittings Terminal fittings Suction plant	B A B	C/S √ √	C/S √ √	— √ √	— — —	— — —	5 3, 5
	Lifts	*Mechanical parts Electrical parts Wells Car	B B A A	√ — √ √	√ √ √ √	√ √ √ √	— √ √ —	— — — —	3 1, 3 1, 3
	Hoists	Electrical Mechanical Wells or ducts	B B A	— — √	√ √ √	√ √ √	√ — √	— — —	3 3 1, 3
	Escalators	Mechanical parts Electrical parts Wells	B B A	√ √ √	√ √ √	√ √ √	— — —	— — —	3 3 1, 3
	Linen chutes	Pipes Terminals	A A	C/S C/S	C/S C/S	√ —	— —	— —	3 3
	Pneumatic tubes	Pipes and fittings Terminal fittings Fans	B A B	C/S C/S —	C/S C/S —	— — —	— — —	— — —	3, 5 3, 5
	Miscellaneous equipment and services	*Service intake units (for water, gas, electricity and district heating)	A	√	√	—	√	—	2

\*Co-ordination is essential at the time of planning itself.

†C/S indicates relation to cross section.

**INDIAN STANDARDS  
ON  
MODULAR CO-ORDINATION**

IS:

- 1233-1969 Recommendations for modular co-ordination of dimensions in the building industry (*first revision*)
- 2718-1964 Recommendations for preferred dimensions for storey heights
- 4993-1973 Glossary of terms relating to modular co-ordination
- 6408-1971 Recommendations for modular co-ordination — application of tolerances in building industry
- 6772-1972 Recommendations for dimensional co-ordination for industrialized buildings — preferred increments
- 6820-1972 Recommendations for modular co-ordination — rules for modular planning
- 7184-1973 Recommendations for modular co-ordination reference lines of horizontal controlling co-ordinating dimensions
- 7564 (Part I)-1974 Recommendations for co-ordination of dimensions in buildings — arrangement of building components and assemblies: Part I Functional group 1 — Structure
- 7564 (Part II)-1974 Recommendations for co-ordination of dimensions in buildings — arrangement of building components and assemblies: Part II Functional group 2 — External envelope
- 7564 (Part III)-1974 Recommendations for co-ordination of dimensions in buildings — arrangement of building components and assemblies: Part III Functional group 3 — Internal subdivision
- 7564 (Part V)-1974 Recommendations for co-ordination of dimensions in buildings — arrangement of building components and assemblies: Part V Functional group 5 — Fixtures, furniture and equipment

# INTERNATIONAL SYSTEM OF UNITS ( SI UNITS )

## Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

## Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

## Derived Units

Quantity	Unit	Symbol	Definition
Force	newton	N	1 N = 1 kg.m/s <sup>2</sup>
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m <sup>2</sup>
Frequency	hertz	Hz	1 Hz = 1 c/s (s <sup>-1</sup> )
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	Pascal	Pa	1 Pa = 1 N/m <sup>2</sup>

## INDIAN STANDARDS INSTITUTION

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones : 26 60 21, 27 01 31

Telegrams : Manaksanstha

### Regional Offices :

Western : Novelty Chambers, Grant Road  
 Eastern : 5 Chowringhee Approach  
 Southern : G.I.T. Campus,  
 Northern : B 69, Phase VII

	Telephone
BOMBAY 400007	37 97 29
CALCUTTA 700072	37 50 90
MADRAS 600115	41 24 42
B. A. S. NAGAR (MOHALI) 160051	—
AHMADABAD 380001	2 03 91
BANGALORE 560002	22 48 05
BHOPAL 462009	6 27 16
BHUBANESHWAR 751014	5 36 27
HYDERABAD 500001	22 10 83
JAIPUR 302005	6 98 33
KANPUR 208005	4 72 92
PATNA 800015	6 28 08
TRIVANDRUM 695001	92 27

### Branch Offices :

'Pushpak', Nurmohamed Shaikh Marg, Khandur,  
 'F' Block, Unity Bldg, Narasimharaja Square  
 Gangotri Complex, Bhadbhada Road, T.T. Nagar  
 22B Kalpana Area  
 5-8-56G L. N. Gupta Marg  
 R 14 Yudhister Marg, C Scheme  
 117/418 B Sarvodaya Nagar  
 Patliputra Industrial Estate  
 Hantex Bldg (2nd Floor), Rly Station Road