

NATIONAL BUILDING CODE OF INDIA 2016 — VOLUME 1

PART 4 — FIRE & LIFE SAFETY | 01 | CODE MAP

Concise professional reference — key clauses, tables and numeric metrics

PART 4 ARCHITECTURE → FIRE PREVENTION + LIFE SAFETY + FIRE PROTECTION

OCCUPANCY CLASSIFICATION — THE FIRST DESIGN DECISION

Group	Occupancy	Typical sub-classification / examples
A	Residential	Lodging/rooming • dwellings • dormitories • apartments • hotels • starred hotels
B	Educational	Schools • training / other educational institutions
C	Institutional	Hospitals/sanatoria • custodial • penal/mental institutions
D	Assembly	Theatres/cinemas • halls • restaurants • malls/assembly • mass rapid transit
E	Business	Offices • banks • professional establishments • labs/clinics • IT/data centres • telecom/broadcast
F	Mercantile	Shops/markets • departmental stores • underground shopping
G	Industrial	G-1 low • G-2 moderate • G-3 high hazard
H	Storage	Storage buildings / warehouses
J	Hazardous	Hazardous buildings / processes / materials

FIRE PREVENTION

Fire zones • occupancy classification • construction type • fire-resistance • fire walls/partitions • protected openings • interior finish • electrical/gas/HVAC controls • smoke/fire dampers • detection/alarm.

LIFE SAFETY

Occupant load • exit count/capacity • travel distance • exit access • stairs/ramps • horizontal exits • protected enclosures • smoke control • emergency lighting/signage • refuge areas.

FIRE PROTECTION

Extinguishers • hose reels • hydrants/down-comers/wet risers • sprinklers • special suppression • fire water storage • pumps • fire alarm • fire command/fire-fighting access • inspection/testing/maintenance.

KEY DESIGN INPUTS: Occupancy • Height • Floor/Basement Area • Occupant Load • Fire Load/Hazard • Construction Type • Sprinkler Status • Fire-Service Access

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The most frequently used numerical tables for egress calculations

TABLE 3 — OCCUPANT LOAD FACTORS

Group / use	m ² /person	Calculation note
A Residential	12.50	Gross floor area
B Educational	4.00	Gross floor area
C Institutional — indoor patients	15.00	Gross floor area
C Institutional — outdoor patients	10.00	Gross floor area
D Assembly — concentrated, no fixed seating	0.65	Gross floor area
D Assembly — less concentrated, no fixed seating	1.40	Gross floor area
D Dining / restaurants with seating & tables	1.80	Gross floor area
D Fixed seating	Seats × 1.2	Use actual fixed-seat count
E Business	10.00	Gross floor area
F Mercantile — street floor / sales basement	3.00	Gross floor area
F Mercantile — upper sales floor	6.00	Gross floor area
F Storage / warehouse / receiving	20.00	Gross floor area
G Industrial	10.00	Gross floor area
H Storage	30.00	Gross floor area
J Hazardous	10.00	Gross floor area

TABLE 4 — EGRESS CAPACITY FACTORS

Occupancy	Stairways: mm/person	Level components & ramps: mm/person
A Residential	10	6.5
B Educational	10	6.5
C Institutional	15	13
D Assembly	10	6.5
E Business	10	6.5
F Mercantile	10	6.5
G Industrial	10	6.5
H Storage	18	10
J Hazardous	18	10

Example: a 1,000 mm clear level component ÷ 6.5 mm/person = 153 persons; the overall egress capacity is limited by the most restrictive component in the egress path.

TABLE 5 — MAXIMUM TRAVEL DISTANCE

Occupancy	Type 1 & 2 (m)	Type 3 & 4 (m)
A Residential	30	22.5
B Educational	30	22.5
C Institutional	30	22.5
D Assembly	30	30
E Business	30	30
F Mercantile	30	30
G-1 / G-2 Industrial	45	—*
G-3 Industrial	22.5	—*
H Storage	30	22.5
J Hazardous	22.5	—*

Table 5 notes: Fully sprinklered buildings may increase the tabulated travel distance by 50%. A ramp is not counted as an exit for basements below the first basement in car parking. Type 3/4 construction is not permitted for the marked G-3/J cases.

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Passive protection and dimensional controls

TABLE 1 — SELECTED FIRE-RESISTANCE RATINGS (minutes)

Element	Type 1	Type 2	Type 3	Type 4
Exterior wall — bearing, separation <3.7 m	240	120	120	60
Exterior wall — non-bearing, separation <3.7 m	120	90	60	60
Fire separation assemblies / fire check doors	120	120	120	120
Enclosure of exits	120	120	120	120
Service shafts / lift hoistway / refuse chutes	120	120	120	120
Vertical separation between tenant spaces	60	60	60	60
Dwelling-unit separation — load bearing	120	120	60	60
Floor construction	120	90	60	60
Roof — ≤5 m to lowest member	120	90	60	60
Roof — >5 m and <6.7 m	60	60	60	60

EXIT DOORWAYS

Minimum clear width generally 1,000 mm; assembly exit doorways: minimum 2,000 mm. Minimum door height 2,000 mm. Exit doors must be openable from the served side without a key.

DEAD-END CORRIDOR

Maximum dead-end length: 6 m for Educational, Institutional and Assembly; 15 m for other occupancies.

FIRE DOOR

Basement openings leading from upper occupancy into basement generally require fire doors of 120 min rating, except exit-discharge doors from basements.

STAIR / RAMP QUICK METRICS

Metric	NBC 2016 quick reference
Minimum common stair width — A-1/A-3/A-4	1.25 m
Residential hotel A-5/A-6	1.50 m
Assembly	2.00 m (1.50 m may be accepted for assembly <150 persons, subject to conditions)
Educational	1.50 m
Institutional / hospitals	2.00 m
All other occupancies	1.50 m
Typical minimum headroom under/within stair	2.20 m
Maximum riser (general public buildings)	150 mm
Minimum tread (general public buildings)	300 mm
Risers per flight	12 maximum
Ramp slope	Normally not steeper than 1:10; never greater than 1:8 where permitted

Fire-fighting shaft: protected lobby + protected staircase + fireman's lift; the shaft and associated fire-resisting construction are intended to provide a protected route for fire-fighting operations and assist evacuation.

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Table 7 logic + water supply and pumping metrics

TABLE 7 — HOW TO READ THE FIRE-FIGHTING INSTALLATION MATRIX

Table 7 is a large occupancy/height-based matrix. It should be read by **occupancy + building height + special condition**, then cross-checked against the exact row, notes and clauses. The matrix commonly selects combinations of extinguishers, first-aid hose reels, wet risers/down-comers, yard hydrants, sprinklers, manual/electronic fire alarm and automatic detection, together with water storage and pump capacities.

Typical trigger / example	Key Table 7 values or installation emphasis
Business building <10 m	Extinguishers + first-aid hose reel + detection/alarm provisions as applicable; water storage/pump provisions depend on the exact row and notes.
Business >15 m to 24 m	Wet riser / yard hydrant / sprinkler / detection-alarm combination becomes significant; a representative row uses 100,000 L underground storage and 10,000 L terrace tank with pump capacity per Table 7 notes.
Business >24 m to 30 m	Representative row: 150,000 L underground storage and 20,000 L terrace tank; pump capacity per Table 7.
Business >30 m	Representative row: 200,000 L underground storage and 20,000 L terrace tank; pump capacity per Table 7.
Institutional / hospital >15 m to 24 m	Representative Table 7 row uses 150,000 L underground storage and 10,000 L terrace tank, with wet-riser/yard-hydrant/sprinkler/detection requirements subject to exact occupancy row.
Institutional / hospital >24 m	Representative row uses 200,000 L underground storage and 20,000 L terrace tank; exact requirements depend on C-1/C-2/C-3 subdivision and notes.

Important: These are selected high-use rows/metrics, not a reproduction of the complete Table 7 matrix. The complete matrix must be checked for final design because installation requirements vary by occupancy subdivision, height, area, sprinkler status and notes.

TABLE 8 — SIZE OF FIRE-FIGHTING MAINS

Main size	Occupancy / condition	NBC 2016 height reference
100 mm, single-outlet landing valves	Dormitories; apartments; hotels	Hotels up to 45 m
100 mm	Educational	No height qualifier in Table 8 row
100 mm	Institutional	Up to 30 m
100 mm	Assembly	No height qualifier in Table 8 row
100 mm	Business	Up to 45 m
100 mm	Mercantile	No height qualifier in Table 8 row
100 mm	Industrial	Up to 15 m
150 mm, single-outlet landing valves	Hotels / starred hotels	Hotels above 45 m; starred hotels —
150 mm	Institutional / Business	Institutional above 30 m; Business above 45 m
150 mm	Industrial / Storage / Hazardous	Industrial above 15 m; Storage up to 15 m; Hazardous up to 15 m

CORE ACTIVE SYSTEMS

WATER-BASED Hydrant / wet riser / down-comer • sprinklers • high/medium velocity water spray • water mist • foam	NON-WATER Clean agents / gas-based suppression • special suppression for protected equipment or hazards	COMMAND & DETECTION Fire alarm • automatic detection • emergency communication • fire command centre / fire-fighting interface
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Annexes E–M and occupancy-specific design triggers

Topic	Critical metric / principle
Refuge area	For buildings >24 m: first refuge at/about immediately above 24 m and thereafter at about 15 m intervals. Size: 0.3 m ² /person for occupants served, plus 0.9 m ² wheelchair space per 200 occupants (or part), subject to minimum 15 m ² .
Refuge area facilities	Open to air at least one side; protected railing; signage; ventilation; first-aid box; extinguishers; PA/talk-back; emergency lighting; drinking water; accessible approach; connection to firefighting shaft.
Fireman's lift	Where applicable, minimum capacity 8 passengers; automated emergency operation and communication provisions are required.
Fire-fighting shaft	Protected lobby + staircase + fireman's lift; intended to support fire-fighting operations and protected evacuation strategy.
Basements	Protected separation from upper occupancies; fire doors and smoke/ventilation controls according to use; car-park basements have specific ramp/egress rules.
Atrium	Smoke management, compartmentation, detection/alarm, suppression and evacuation strategy coordinated with the open volume.
Commercial kitchen	Cooking hazard protection: hood/duct fire protection, automatic suppression, fuel/electrical isolation and ventilation/smoke considerations.
Car parking	Fire detection/protection, ventilation or smoke control, access/egress and water-based systems according to configuration and Table 7.
Metro stations / trainways	Dedicated fire/life-safety provisions addressing evacuation, smoke, emergency response, systems and interfaces.
Industrial venting	Explosion/fire hazard assessment and controlled venting provisions where applicable; coordinate with process hazard analysis.

ANNEX MAP

Annex	Subject
A	Calorific values of common materials
B	Broad industrial occupancy hazard classification
C	Fire-resistance data for building components
D	Fire drill & evacuation procedures for high-rise buildings
E	Additional requirements for high-rise buildings
F	Atrium
G	Commercial kitchens
H	Car parking facilities
J	Fire & life safety — metro stations
K	Fire & life safety — metro trainways
M	Fire protection considerations for venting in industrial buildings

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PART 4 — FIRE & LIFE SAFETY | 06 | ENGINEERING DESIGN WORKFLOW

Use this page as a design-review / Fire NOC checklist

STEP	CHECK / OUTPUT
01 — CLASSIFY	Occupancy group + subdivision; mixed/minor occupancy; hazard classification.
02 — DEFINE GEOMETRY	Height; floor areas; basements; number of storeys; occupant load; travel paths.
03 — CONSTRUCTION	Type 1–4; required FRR; fire walls; compartmentation; shafts; fire doors; penetration sealing.
04 — EGRESS	Occupant load → exit count → capacity factors → stair/door/corridor widths → travel distance → dead ends → discharge.
05 — FIRE SERVICE	Fire-tender access; approach; fire-fighting shaft; fireman's lift; Fire Command Centre where applicable.
06 — ACTIVE PROTECTION	Extinguishers; hose reels; hydrants/wet risers/down-comers; sprinklers; special suppression; detection/alarm.
07 — WATER & PUMPS	Table 7 row; static storage; pump duty; pressure at remote point; mains/riser sizing; zoning; high-rise staging.
08 — HVAC / SMOKE	Smoke control; pressurization; dampers; fire/smoke compartmentation; AHU shutdown/control; emergency power.
09 — SPECIAL RISKS	Basement; atrium; kitchen; parking; hazardous processes; electrical rooms; gas; industrial explosion/venting.
10 — COMMISSION	Hydraulic tests; pump tests; alarm/detection testing; interface tests; emergency power; signage; drills; records.
11 — MAINTENANCE	Inspection, testing, maintenance, impairment control, fire orders, training and periodic drills.

FINAL DESIGN REVIEW CHECKLIST

FINAL QA GATE	YES / NO
Occupancy & hazard classification confirmed	■
NBC Table 3 occupant load calculated	■
NBC Table 4 egress capacity checked	■
NBC Table 5 travel distance checked	■
Table 1 fire-resistance strategy verified	■
Table 7 exact installation row + notes verified	■
Table 8 main/riser sizing checked	■
Water storage & pump hydraulics independently calculated	■
Fire alarm / detection / emergency power interfaces checked	■
Refuge / fire-fighting shaft / fireman's lift requirements checked	■
Authority-specific requirements / amendments checked	■

IMPORTANT: NBC 2016 Part 4 IS THE CONTROLLING REFERENCE — THIS INFOGRAPHIC IS A DESIGN AID, NOT A SUBSTITUTE FOR THE CODE

Source basis: NBC 2016, Volume 1, Part 4 — Fire and Life Safety. Numeric tables in this aid are selectively reproduced/summarized for engineering reference. Always verify the exact clause, table notes, referenced IS standards, amendments and the requirements of the competent local fire authority before approval or construction.