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E-BOOK 02 INTERMEDIATE EDITION

Fire Protection Design Handbook

A Step-by-Step Method Following NBC 2016 Part 4

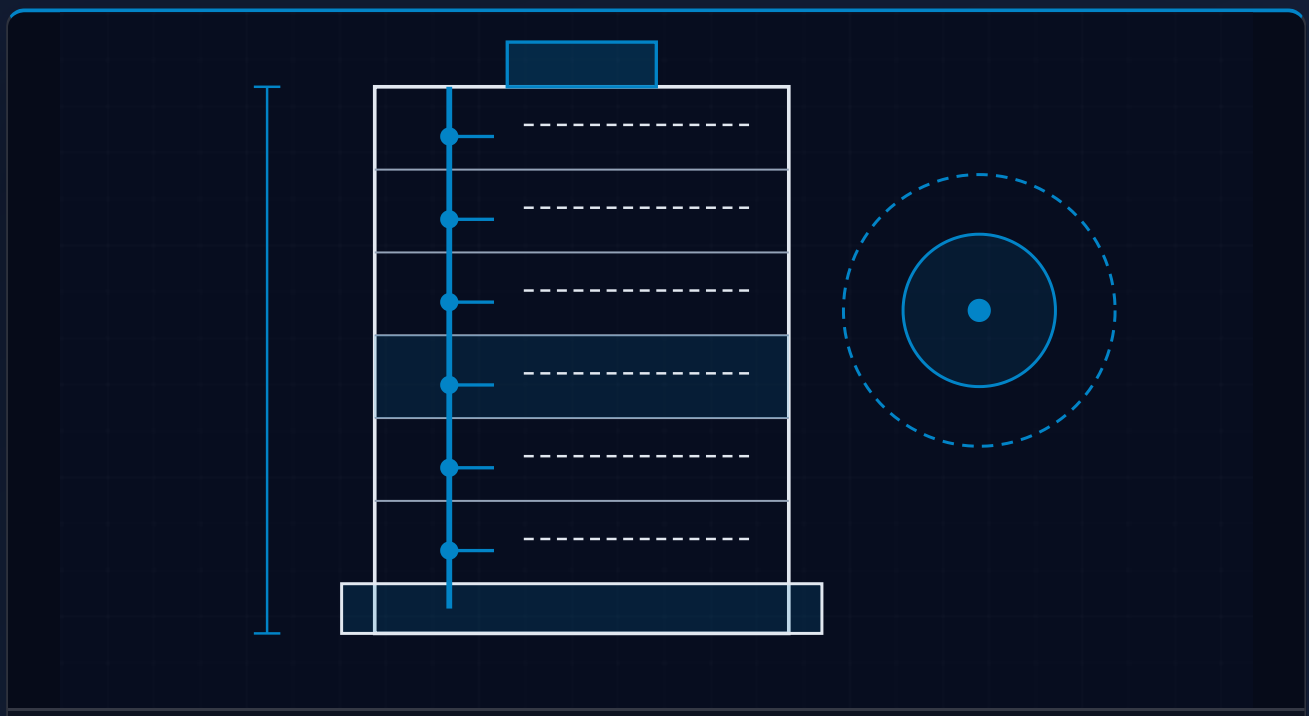


FIG 02.1 — NBC 2016 PART 4 HIGH-RISE ZONING & WET RISER ELEVATION

SYLLABUS
10 Structured Chapters

CALCULATIONS
Worked SI Examples & Tables

SITE READY
Forms & Hinglish Glossary

Shree Ganesh Enterprises (SGE) — AMC MEP 24x7
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Fire Protection Design Handbook

A Step-by-Step Method Following NBC 2016 Part 4

A repeatable, step-by-step fire protection engineering design method aligned with the National Building Code of India 2016 Part 4. Covers architectural data gathering, occupancy classification, water tank sizing, Total Dynamic Head pump duty calculations, Hazen-Williams pipe friction arithmetic, inter-discipline coordination, and submission deliverables.

Intended Audience: MEP design engineers, civil and structural engineers, architects, BIM coordinators, and project engineers reviewing statutory fire schemes.

Engineering Notice & Standards Policy

This publication is an educational and field-reference guide prepared by **Shree Ganesh Enterprises (SGE)**. It is **not** a substitute for a stamped project design, statutory approval, or the governing text of the National Building Code of India (NBC), Bureau of Indian Standards (BIS) codes, Indian Electricity Rules / CEA Regulations, or your State/Municipal Fire Service Bye-Laws. Standards are cited at document level; always verify the **current applicable edition**, manufacturer datasheets, and local amendments before design, procurement, testing, or certification.

Worked numerical examples across this book are illustrative engineering demonstrations. All design inputs, pipe friction factors, battery deratings, and protective clearances must be re-checked for project conditions by a competent licensed professional. High-voltage electrical testing, pump-room servicing, and gaseous fire suppression operations can be fatal if undertaken without qualified personnel, written Permits-to-Work, and Lockout-Tagout (LOTO) controls.

Roman-script Hindi/Hinglish site terms are included cleanly to assist execution teams; formal English engineering terminology governs contractual and code interpretations.

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What You Will Learn

- Extract all mandatory architectural and occupancy inputs before placing the first fire symbol on a drawing
- Build an active-and-passive requirements matrix calibrated to building height and occupancy group
- Calculate dedicated underground and terrace fire water storage reserves with clean tank partitioning
- Compute pump Total Dynamic Head (TDH) and main/jockey duty points using step-by-step SI arithmetic
- Perform manual Hazen-Williams friction loss calculations to verify pipe diameters and residual landing-valve pressures
- Assemble a clean Design Basis Report (DBR), riser schematic, and statutory approval submission package

Chapter 1: Gathering Architectural Inputs and Building Classification

Design Begins with Inputs, Not CAD Blocks

A reliable fire protection scheme cannot be copied from a previous building. A hospital ward, an IT park with three basements, a warehouse racking bay, and a residential tower of identical height have sharply different fire loads, occupant vulnerabilities, and smoke travel paths. Before drawing a single red line in CAD, gather verified architectural data in writing.

NOTE

All design thresholds and system requirements in India depend on the National Building Code of India 2016 Part 4, State Fire Service notifications, and local Municipal Development Authority bye-laws. Confirm the current applicable edition and local amendments before freezing design parameters.

Architectural Data Capture Matrix

Input Parameter	What to Ask the Architect	Why It Controls Fire Design
Occupancy group & mixed uses	Retail, office, hospital, hotel, factory, storage	Sets sprinkler density, exit width, refuge rules, tank size
Building height	Top finished terrace / parapet level from ground road	Triggers wet riser vs down-comer, fire lift, pressurisation
Floor plate & total built-up area	Gross area per floor and aggregate BUA	Determines detector/sprinkler count and hydrant zoning
Basement levels & areas	B1, B2, B3 area and ventilation mode	Triggers basement sprinklers, smoke exhaust ACH, access ramps
Road width & open setbacks	Minimum abutting road and side setbacks around block	Required for fire tender movement and yard hydrant layout
Staircase count & travel distances	Clear flight widths and furthest dead-end distance	Verifies passive egress compliance prior to active sizing

NBC Occupancy Group Reference

The National Building Code of India 2016 Part 4 categorises buildings across Groups A through J (Residential, Educational, Institutional, Assembly, Business, Mercantile, Industrial, Storage, Hazardous). Where a single complex houses retail shops on the lower two levels and residential apartments above, apply the stricter rule for shared shafts and escape routes unless full horizontal fire compartmentation is engineered.

HINGLISH

Occupancy group = bhavan ke upyog ki shreni. Built-up area = kul nirmit kshetrafal. Travel distance = aag lagne par surakshit seedhi tak pahunchne ki adhiktam doori.

Chapter 1 Checklist

- ☐ Obtain signed architectural floor plans, sections, and site plan with road widths.
- ☐ Record exact height from finished road level to terrace floor level (and roof parapet).
- ☐ Highlight basements, mezzanines, transformer vaults, DG yards, and LPG banks.
- ☐ Verify mixed-occupancy boundaries and vertical shaft separations.

Chapter 2: Life Safety and Passive Design Parameters

Active Systems Cannot Rescue Blocked Exits

Water pumps and sprinklers control fire growth, but **passive fire protection** buys the minutes required for human evacuation. If staircases are too narrow, travel distances exceed permitted limits, or fire shafts lack compartment seals, even a compliant pump house cannot prevent smoke casualties.

Key Passive Checks During Design Review

1. **Travel Distance & Dead-End Corridors:** Measure walking paths around furniture layouts—not straight air lines—from the remotest room point to the nearest protected exit door.
2. **Exit Capacity & Door Swing:** Ensure exit doors open outward in the direction of escape (except small individual room doors where permitted) and never encroach onto staircase landings.
3. **Refuge Areas:** High-rise structures exceeding typical height thresholds require designated external/open refuge zones at specified floor intervals—kept clear of HVAC chillers or electrical panels.
4. **Fire Compartmentation & Fire Doors:** Electrical shafts, HVAC ducts crossing floor slabs, and lift lobbies require tested fire barriers and rated self-closing fire doors.

> **FIELD TIP**
> Always verify fire shaft wall thickness and fire-rating with the structural architect early. Drywall or unsealed masonry gaps around riser pipes destroy staircase pressurisation during an actual fire.

> **HINGLISH**
> Passive protection = bina paani ya bijli ke aag aur dhuen ko rokne wali deewarein aur darwaze. Staircase pressurisation = seedhiyon mein taaza hawa ka dabav banana taaki dhuan andar na ghuse.

Chapter 2 Checklist

- ☐ Verify number of independent staircases per floor plate.
- ☐ Confirm staircase doors carry automatic door closers and panic hardware where needed.
- ☐ Locate dedicated fire-rated MEP shafts (separate from normal LV/IT risers where required).

Chapter 3: Determining the Active System Requirements Matrix

Translating Building Height & Occupancy into System Scope

Once height and occupancy group are verified, map which active sub-systems are mandatory. The table below presents an **illustrative design framework** reflecting common practice under NBC 2016 Part 4 principles; verify every cell against the actual tables of the code and your State Fire Service schedule.

Building Category (Illustrative)	Portable Extinguishers	First-Aid Hose Reel	Wet Riser / Down-comer	Yard Hydrants	Automatic Sprinklers	Fire Detection & Alarm	Basement / Stair Smoke Control
Low-rise Residential (< 15 m, typical)	Required	Common in larger blocks	Usually not triggered	Usually not triggered	Basement if > threshold	Manual/basic typically	If enclosed basement
Mid-rise Business / Commercial (15–30 m)	Required	Required	Wet Riser	Required	Typical throughout	Addressable FAS + PA	Basements & enclosed stairs
High-rise Commercial / Hospital (> 30 m)	Required	Required	Multiple Wet Risers	Ring Main Required	Full coverage + Refuge	Networked FAS + Voice	Full staircase/lift lobby + exhaust
Industrial / High-Hazard Warehouse	Specialised	Required	Ring main + Hydrants	Perimeter Ring	High-density / ESFR	Beam / ASD + MCP	Heat/smoke vents

WARNING

Never remove sprinklers or detection from a Design Basis Report merely to cut contractor tender pricing. Reduced scope often triggers rejection at Final NOC inspection after civil work is complete.

HINGLISH

Requirement matrix = bhavan ki oonchai aur shreni ke hisaab se kaun-kaun se system lagne hain, uski poori taaleeka.

Chapter 3 Checklist

- ☐ Cross-verify each building block individually (podium vs tower vs ancillary utility block).
- ☐ Mark basements, kitchen exhaust hoods, server rooms, and HT transformer yards for special systems.

Chapter 4: Water Storage Estimation (Underground and Terrace Tanks)

Dedicated Fire Reserve Rules

Fire fighting requires guaranteed water on day one of an incident without relying on erratic municipal supply. Tanks are split into:

- **Underground (UG) Static Fire Water Tank:** Feeds the main electric and diesel fire pump headers via flooded suction.
- **Terrace Overhead Fire Tank:** Keeps wet risers/sprinklers primed and feeds terrace booster pumps (typically 900 lpm) for immediate initial attack.

Domestic and Fire Combined Tanks: Only One Safe Way

Where civil space forces a shared underground reservoir, fire water must occupy the **bottom zone** up to the dedicated fire volume height. Domestic pump suction foot-valves must stop above the fire reserve level so domestic consumption can never drain a single litre of firefighting capacity.

FORMULA

Tank Volume (m3) = Length (m) x Breadth (m) x Effective Liquid Depth (m) Check liquid depth strictly **below** the overflow pipe invert and **above** the pump vortex-plate dead zone (minimum 300–450 mm sump).

WORKED EXAMPLE

Underground & Terrace Fire Tank Sizing (Illustrative). Assume a mid-rise commercial complex requires a dedicated UG reserve of 150,000 L (hydrant + sprinkler combined per applicable schedule) plus a 20,000 L terrace reserve.

UG Tank Required Volume = 150,000 L = 150 m3 Split into 2 interconnected cells (with isolation valve) for cleaning without losing protection: 75 m3 each. Chosen effective liquid depth = 3.5 m (total clear structural tank height = 4.2 m allowing 0.4 m freeboard + 0.3 m dead sump). Required footprint per cell = 75 / 3.5 = 21.43 m2. Select clear inside dimensions: 6.0 m x 3.6 m = 21.6 m2 -> 21.6 x 3.5 = 75.6 m3 per cell (151.2 m3 total UG capacity). Terrace tank = 20 m3 (e.g. 4.0 m x 2.5 m x 2.0 m effective depth).

HINGLISH

Static water storage = ruka hua aarakshit paani. Dead sump = tank ke neeche ka woh khali hissa jahan se pump paani nahi utha sakta. Freeboard = overflow pipe se chhat ke slab ke beech ki khali jagah.

Chapter 4 Checklist

- ☐ Verify effective liquid depth (subtracting freeboard and dead sump margin).
- ☐ Confirm tank suction pit / vortex breaker location directly aligns with pump suction header.
- ☐ Ensure make-up water auto-fill ball valve / float switch maintains full static reserve.

Chapter 5: Pump Duty Selection (Flow, Head and Jockey Logic)

Defining Pump Room Configuration

Standard fire protection systems normally use three coordinated pump duties pulling from the UG static header:

1. **Main Electric Fire Pump:** Handles full design hydrant/sprinkler flow against system pressure loss.
2. **Standby Diesel Engine Pump:** Identical flow and head duty to the main electric pump; starts automatically on power failure or deeper pressure drop.
3. **Jockey Pump (Pressure Maintenance):** Small flow (typically 3% to 5% of main pump flow, e.g., 180 lpm when main is 2,280 lpm) at slightly higher shut-off head to top up weeping flange leaks without triggering main pumps.

Note: Where sprinklers and hydrants share a combined pump header or operate independently per code, select distinct sprinkler + hydrant electric/diesel sets accordingly.

WORKED EXAMPLE

Total Dynamic Head (TDH) Build-Up (Illustrative). Design a 2,280 lpm wet riser electric fire pump for a 42 m high commercial building (pump floor at -4.0 m basement relative to ground -> total rise to terrace manifold = 46.0 m).

- Static lift to highest landing valve (on 42 m roof level from -4 m pump axis) = 46.0 m
- Required residual nozzle/landing valve pressure (3.5 bar typical) = 3.5 x 10.197 = 35.7 m
- Riser + cross-main + branch friction losses (verified via Hazen-Williams) = 6.5 m
- Pump-room suction + NRV + strainer + header losses = 3.8 m Total Dynamic Head (TDH) = 46.0 + 35.7 + 6.5 + 3.8 = 92.0 m (~9.0 bar). Check hydraulic power: Q = 2,280 / 60 / 1,000 = 0.038 m3/s P_hyd = (1,000 x 9.81 x 0.038 x 92.0) / 1,000 = 34.29 kW. At 70% pump efficiency: Shaft Power = 34.29 / 0.70 = 48.99 kW -> With 15% motor margin (56.3 kW) specify standard **55 kW or 75 kW** motor per OEM pump curve at 92 m duty.

FIELD TIP

Always check ground-floor landing valve static pressure on tall towers! If the pump delivers 90 m (9 bar) at pump house, ground-floor hydrants see nearly 8.5–9.0 bar and may require orifice plates or Pressure Reducing Valves (PRVs) so firefighters can safely hold the branch hose.

HINGLISH

Duty point = woh sahi flow aur pressure jis par pump ko kaam karne ke liye chuna gaya hai. Residual pressure = paani bahar nikalte samay valve par bacha hua dabav.

Chapter 6: Pipe Sizing, Velocity Checks and Hazen-Williams Hydraulics

Checking Pipe Velocity Before Friction

Before sizing solely on standard bore tables, check water velocity inside every pipe run. Excessive velocity creates water-hammer shock waves when valves slam shut and accelerates erosion-corrosion.

- **Pump Suction Headers:** Keep velocity <= 1.5 to 1.8 m/s (prevents cavitation).
- **Pump Delivery Mains & Risers:** Aim for <= 2.5 to 3.5 m/s (verify upper limits per design standard).

Hazen-Williams Friction Formula (SI Metric Units)

FORMULA

`Delta_P (bar per metre) = 6.05 x 10^5 x Q^1.85 / (C^1.85 x d^4.87) Where: Q = flow rate in litres per minute (lpm) d = inside pipe diameter in millimetres (mm) C = Hazen-Williams roughness coefficient (typically C = 120 for wet black MS steel pipes, C = 100 for dry systems, verify code)`

WORKED EXAMPLE

Hydraulic Loss in a 100 mm Wet Riser (Illustrative). A 100 NB Heavy Class MS riser (OD = 114.3 mm, wall = 5.4 mm -> internal diameter d = 103.5 mm) carries Q = 900 lpm up 45 m of vertical riser. Add 20% for bends, tees, and isolation valves -> Equivalent Length L_eq = 45 x 1.20 = 54 m. Take C = 120.

Step 1: Compute powers: 900^1.85 = 291,967 120^1.85 = 7,022.4 103.5^4.87 = 6,498,000,000 (approx 6.50 x 10^9)

Step 2: Pressure drop per metre: Delta_P/m = (605,000 x 291,967) / (7,022.4 x 6.50 x 10^9) = 1.7664 x 10^11 / 4.564 x 10^13 = 0.00387 bar/m (or ~0.039 m head/m).

Step 3: Total friction loss along 54 m equivalent length: Loss = 0.00387 x 54 = 0.209 bar (~2.13 m head).

Check flow velocity: Area = 0.7854 x (0.1035)^2 = 0.00841 m2; Q = 900/60,000 = 0.015 m3/s v = 0.015 / 0.00841 = 1.78 m/s -> Safe velocity and negligible friction loss!

FIELD TIP

Compare manual Hazen-Williams values instantly using the free hydraulic engine at `sge.org.in/tools/fire-hydraulics` and check pipe weight / inside diameter values at `sge.org.in/tools/pipe-schedules`.

HINGLISH

Friction loss = pipe ke andar paani behne par ragad se kam hone wala dabav. Equivalent length = seedhi pipe ki lambai ke saath elbow aur tee ki extra lambai jodna.

Chapter 7: Wet Riser, Yard Hydrant and Sprinkler Interface

Layout

Hydrant Ring-Main Strategy

Surround mid-rise, commercial, hospital, and industrial structures with a looped underground or pedestal **External Yard Hydrant Ring Main** (typically 150 NB Heavy MS pipe coated & wrapped against soil corrosion per IS 10221). Why a ring instead of a dead-end radial line? If maintenance closes one isolation valve on the north leg, water still feeds the remaining yard hydrants from the south leg.

Wet Riser & Down-comer Placement Checklist

- ☐ Place internal wet risers inside protected staircase lobbies or dedicated ventilated fire shafts.
- ☐ Mount single/double landing valves at ergonomic height (~1.0 m above finished floor level).
- ☐ Provide two lengths of canvas/RRL fire hose (typically 15 m each) and branch pipe inside glass-fronted weatherproof cabinets beside each landing valve.
- ☐ Fit manual air-release valve at top of every wet riser shaft to prevent trapped air cushion.
- ☐ Provide drain valve and pressure gauge with isolation cock at riser base and top header.

HINGLISH

Ring main = imarat ke chaaron taraf ghoomne wali goli pipe line taaki ek taraf band hone par doosri taraf se paani mil sake. Wrapping coating = zameen ke andar ki pipe ko zang se bachane wali kaali patti aur primer.

Chapter 8: Inter-Discipline Coordination (Architect, Structural, Electrical & HVAC)

Where MEP Projects Fail Before Construction

Most fire-safety rework comes from uncoordinated service clashes, not faulty pipe sizing. Use this discipline coordination table during GFC (Good for Construction) sign-off:

Coordinating Trade	What Fire Designer Must Issue	What Other Trade Must Deliver
Structural Engineer	Water tank full dead load, pump plinth weight, suspended 200 NB filled pipe load per hanger	Slab thickness, hanger anchor inserts, waterproofed sunken pump pit
Architect	Shaft clear sizes, fire command centre (FCC) room footprint, hydrant cabinet recesses	Rated shaft enclosures, non-slip pump house slope to sump, fire door schedules
Electrical Engineer	Motor kW ratings (main/sprinkler/jockey), FAS/PA UPS load, damper actuator power	Separate essential feeder before main incomer, auto-changeover DG supply, earth pits
HVAC Engineer	Basement/corridor smoke exhaust flow targets, staircase pressurisation, zone damper interlock signals	Rated smoke extraction fans (250 C / 2 hr typical), motorized fire/smoke dampers

WARNING

Confirm fire pump electrical supply is tapped upstream of the building's general main isolator so shutting off general building power during a fire does NOT cut power to the fire pumps!

HINGLISH

Inter-discipline coordination = civil, electrical, HVAC aur fire teams ka milkar kaam check karna taaki site par pipe ya cable aapas mein na takrayein.

Chapter 9: Design Review Deliverables, DBR & Submission Package

Assembling a Submission-Ready Approval Folder

A complete statutory design package submitted to the Fire Service / consultant review desk includes:

1. **Design Basis Report (DBR):** Code basis, occupancy table, hazard assumptions, water demand breakdown, pump head/flow schedule, and interface matrix.
2. **Site & Yard Hydrant Plan:** Tender access path, turning radius, UG/terrace tank location, pump house plan, yard ring main, and fire-brigade inlet connection.
3. **Floor-by-Floor Fire Fighting Layouts:** Wet risers, hose reels, sprinkler branches (with zone area shading), portable extinguishers, and exit signage.
4. **Detection & Alarm Layouts:** Smoke/heat detectors, MCPs, sounders, repeater/main FACP location, and battery/loop schematics.
5. **Pump House Detailed Layout & Hydraulic Calculations:** Suction/delivery header schematic, foundation blocks, and stamped Hazen-Williams flow sheets.

Design Review Self-Audit Checklist

- ☐ Every riser line clearly states pipe size (e.g., 100 NB IS 1239 Heavy) and system pressure rating.
- ☐ Yard main shows isolation valves, NRVs, air valves, and underground pipe protection specification.
- ☐ All worked hydraulic paths end at the hydraulically remotest landing valve / sprinkler group.
- ☐ Legend matches every symbol drawn on floor plans.

Chapter 10: Cheat Sheet, Design Worksheet, FAQ & Bilingual Glossary

One-Page Design Cheat Sheet

- **Water-to-Head Conversion:** `1 bar = 10.197 m water head = 1.0197 kg/cm2`
- **Circular Steel Pipe Weight:** `Weight (kg/m) = (OD – t) x t x 0.0246615`

- **Hazen-Williams (SI lpm):** `dP (bar/m) = 6.05e5 x Q_lpm^1.85 / (C^1.85 x d_mm^4.87)`
- **Pump Hydraulic kW:** `P_hyd = (1,000 x 9.81 x Q_m3s x H_m) / 1,000`
- **Suction Velocity Limit:** `<= 1.5 to 1.8 m/s` (prefer 200–250 NB flooded suction headers)

Design Basis Worksheet Template

Project Field	Entry Value	Verification Basis
Building Name & Location	_____	Client Architectural Set
Height (m) & Basements	____ m / ____ Basements	Section Drawing No. _____
NBC Occupancy Group	_____	NBC 2016 Part 4
UG Fire Reserve (m3)	____ m3 (2 compartments)	Tank Calculation Sheet
Terrace Fire Reserve (m3)	____ m3	Code Table Check
Hydrant Pump Duty (lpm @ m)	____ lpm @ ____ m	Hazen-Williams Calcs
Sprinkler Pump Duty (lpm @ m)	____ lpm @ ____ m	Remote-Area Worksheet

Frequently Asked Questions (Site & Design)

1. **Can we share one common pump for both hydrants and sprinklers?** Only if specifically permitted by the design code/authority for smaller low-hazard facilities and sized for the combined simultaneous flow; most medium/high-rise designs require dedicated independent main/sprinkler pumps.
2. **Why is C = 120 used for wet steel pipes and C = 100 for dry?** Wet pipes remain flooded, avoiding internal scaling cycles caused by air/water contact; dry systems use C = 100 to allow for heavier internal corrosion roughness.
3. **Should basement ramps have sprinklers?** Check enclosed canopy/ramp widths and code criteria; enclosed parking driveways almost universally require sprinkler protection.
4. **How high should the pump house ceiling be?** High enough to lift pump casings or diesel engines cleanly with a maintenance gantry/chain hoist (commonly 3.5 to 4.5 m clear).
5. **Can terrace water tanks be plastic/Sintex?** No; static fire water tanks must use non-combustible materials (RCC, masonry, or approved bolted/welded steel) so fire heat cannot melt the reservoir.
6. **Why do wet risers use Heavy Class (Red band) MS pipe?** Because pump churn and surge pressures on risers routinely exceed 8–12 bar; thinner Light Class pipes risk splitting at threaded/welded joints.
7. **Where does the Fire Brigade Inlet Breeching fit?** Accessible from the main road front at ground/wall height (never behind a locked gate) feeding directly into the riser main and UG tank fill line.
8. **Is pressure testing mandatory before concealing pipes?** Yes; all buried yard mains and shaft risers must pass hydrostatic pressure tests and written witness sign-off before backfilling or closing shafts.
9. **What is the minimum number of staircases in a large office floor?** Typically two independent remote staircases so a fire near one stair does not trap occupants on that floor.
10. **Who verifies the final Fire Design before NOC?** The architect/licensed fire consultant stamps the scheme, and the local Fire Service reviews and inspects the completed site against approved plans.

Hindi–English Bilingual Glossary

English Term	Hinglish / Site Hindi	Operational Meaning
Design Basis Report (DBR)	Design aadhar report	Document explaining engineering rules and numbers
Occupancy Group	Bhavan ke upyog ki shreni	Residential, hospital, school, mercantile classification
Total Dynamic Head (TDH)	Kul pump dabav oonchai	Sum of height, friction loss, and nozzle pressure
Residual Pressure	Bacha hua antim dabav	Pressure still left at remotest valve while flowing
Static Head	Ruki hui oonchai ka dabav	Pressure caused purely by building height
Friction Loss	Ragad se pressure ghatna	Pressure drop along rough pipe walls and bends
Equivalent Length	Kul barabar lambai	Straight pipe length plus equivalent valve/elbow length
Hazen-Williams Equation	Paani ragad niyam	Formula used to find pipe friction drop
Vortex Plate	Bhanwar rokne wali plate	Steel plate preventing air whirlpool at tank suction
Dead Sump	Tanki ka nichla khali hissa	Bottom few inches pump cannot safely suck
Freeboard	Tanki ke upar khali jagah	Clearance between top water level and slab
Flooded Suction	Hamesha bhara suction	Water enters pump naturally under gravity
Eccentric Reducer	Ek-tarfa chhota reducer	Pipe fitting keeping top level flat to block air pockets
Wet Riser	Hamesha paani bhari vertical pipe	Pressurised vertical main fed from pump house
Down-comer	Chhat se neeche aati pipe	Vertical line fed by gravity terrace tank
Yard Ring Main	Ghumavdar bahari line	Looped underground hydrant pipe around site
Landing Valve	Manzil par hydrant valve	Valve inside floor lobby for connecting hose
Fire Brigade Inlet	Fire tender jodne ka point	Ground wall inlet for municipal fire trucks
Breeching Valve	Do-munha jodne wala valve	2-way or 4-way inlet with internal check flaps
Compartment	Aag rodhi hissa	Closed zone sealed by fire walls and rated doors
Travel Distance	Surakshit rasta doori	Maximum walk path to reach fire exit
Refuge Area	Aapatkaleen sharan sthal	Safe open-air waiting terrace on high-rise floor
Fire Stopping	Surakh band karna	Sealant/mortar plugging gaps around cables and pipes
Pressurisation	Hawa ka dabav	Fan-driven air keeping stairs free of smoke
Good for Construction (GFC)	Nirman ke liye final naksha	Approved blueprint issued to site execution team
Hydrostatic Test	Paani dabav parikshan	Testing pipe strength above working pressure

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A repeatable, step-by-step fire protection engineering design method aligned with the National Building Code of India 2016 Part 4. Covers architectural data gathering, occupancy classification, water tank sizing, Total Dynamic Head pump duty calculations, Hazen-Williams pipe friction arithmetic, inter-discipline coordination, and submission deliverables.

COMPLETE 12-VOLUME SGE ENGINEERING LIBRARY

01 Fire Fighting System A to Z
02 **Fire Protection Design Handbook**
03 The Fire Pump House Manual
04 Pressure Switch & Pump Controller Field Manual
05 Sprinkler System Design Workbook
06 Fire Alarm Design & Cable Calculation Guide
07 Special Hazard Suppression Guide
08 Fire NOC & Building Approval Playbook
09 Fire Extinguishers, Home & Office Safety
10 Cable Sizing, LT Panel & Short-Circuit (kA) Guide
11 HT Cable Hi-Pot Testing & Fault Location
12 The Site Engineer's Calculation Handbook

Need This Executed or Audited on Your Site?

Shree Ganesh Enterprises (SGE) designs, supplies, installs, tests, commissions, and maintains Fire Fighting, Addressable Fire Alarm, HT/LT Electrical, Plumbing, HVAC, and IBMS systems — backed 24×7 by AMC MEP 24x7.

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