

Hydraulic calculation methods — pipe schedule vs hydraulic

method

When pipe-schedule design is allowed, when full hydraulic calculation is required, and how the two compare in cost and water demand.

Pipe schedule method

Pre-calculated tables in NFPA 13 §27 fix pipe sizes vs number of sprinklers downstream. Allowed for Light Hazard and Ordinary Hazard with K5.6 (K80) heads at minimum supply pressure of 50 psi (3.4 bar). Quick to design — no software needed — but generally oversized.

Hydraulic calculation method

Solves Hazen-Williams for every pipe segment against the design density $\times$ area. Produces the smallest pipe network meeting the demand. Required for all ESFR, all extra-hazard, all storage, and any system without sufficient supply.

Software & approach

Industry tools: HydraCAD, AutoSPRINK, SprinkCAD, FireCAD — all solve the Hardy Cross loop method or matrix equivalent. Output deliverables: hydraulic placard at riser, pipe schedule, demand-supply graph on $N^{1.85}$ paper.

Choosing between them

On a small LH/OH retrofit with strong public supply, pipe-schedule is faster and the modest pipe-cost penalty is acceptable. On any greenfield project or any HHP/HHS work, calculate hydraulically — the savings on pipe and supply outweigh the engineering hours.

Source: NFPA 13 (2022) Chapters 27 & 28; EN 12845:2015 §11