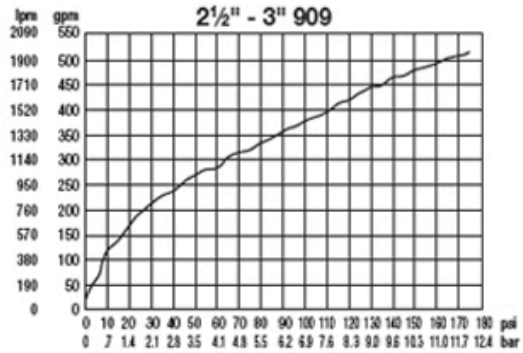
## *David E. DeBord CPD, LEED®AP BD+C, ARCSA® AP – RPZ DANGERS*

***Much of this article is a reprint from another source, but it is very important!***

Installing reduced pressure zone (RPZ) backflow preventers indoors carries with it a risk of property damage due to flooding. For many of the projects, it seems many of the floor drains and floor sinks are an inadequate remedy. The risk is related to flow rate differences of RPZs compared to the drain capacity of floor drain and floor sinks. The RPZ is designed to dump water when a backpressure or back-siphon condition occurs. If something keeps the #2 check valve from closing completely during a backpressure or zero-pressure event, the relief valve dumps. The relief valve discharge graphs below were created by the Watts Company. The drain flow rates are sourced from this link: http://www.engineeringtoolbox.com/sewer-pipes-capacity-d_478.html.

We derive the flood rate below by subtracting the drain capacity from the relief valve discharge rate at 65 PSI. As the graphs below indicate, higher-pressure rates will increase the flood rate shown.

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Flow @ 65 PSI = 312 gpm
Drain         =  93 gpm
Flood rate      219 gpm
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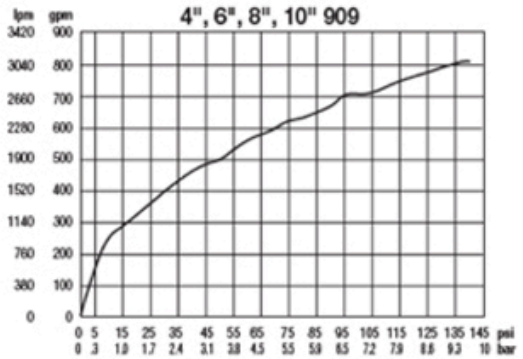


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Flow @ 65 PSI = 575 gpm
Drain         =  93 gpm
Flood rate      482 gpm
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There have been numerous cases of building damage, especially following new construction, from RPZs installed indoors. The Denver Mayor's office estimated that 5–10% of backflow preventers fail their initial test. This puts additional pressure on design engineers to be sure that system-failure risks are assessed accurately.

Many water jurisdictions (Charlotte, Las Vegas, Chicago, Nashville) are amending design specifications and preferences for new commercial building projects to locate meters and backflow preventers at the Right of Way on the in-bound water sources: fire, domestic, and irrigation.

Some items to keep in mind when designing systems with RPZs include:

- RPZ flooding of indoor mechanical rooms
  Stated above, the floor drain capacity of RPZs of 3" diameter and higher are likely to be cost-prohibitive due to necessary pipe diameter and fall rates.

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***RPZ DANGERS CONTINUED…***

- Ongoing cost and liability of BFPs in underground vaults
  Risk of injury in confined space
  OSHA requires 2 men at any service call and at every annual BFP test
  Flooded vaults must first be pumped out prior to testing
  The installed cost of the vault and an above ground enclosure are comparable

- Difficulty of annual testing due to lack of access to premises
  Tenants in subdivided spaces often are unaware of the BFP location and complicate access for testing
  Vacant lease premises are often locked and inaccessible
  Having all BFPs in one location accessible with one key, eases backflow testing time and reduces cost

- The change of use of commercial properties over time
  Leased properties change uses over time and a low hazard water user (Double Check BFP) often changes to a high-hazard water user (RPZ BFP)

- Fire Department intervention
  When the Fire Department is called to a location during a fire, the fire service backflow can quickly be located close to the public Right of Way. Many times, the backflow enclosure includes a Fire Department Connection (FDC) downstream of the backflow piped to the exterior wall. This speeds up response capability, and reduces risk to firefighters and rescue personnel.

Thanks for reading,

**David E. DeBord CPD, LEED®AP BD+C, ARCSA®AP, GPD** is the Plumbing and Fire Protection Group Leader at dbHMS in Chicago. He is the ASPE Vice President Legislative (Society Level), and serves on several committees. He is also an Adjunct Assistant Professor at IIT (Illinois Institute of Technology), Instructor at UCLA (Online), Past President of ASPE (American Society of Plumbing Engineers)- Chicago Chapter, a Regional Representative for ARCSA (American Rainwater Catchment Society of America), and a member of USGBC (United States Green Building Council), ILFI (International Living Future Institute), IAPMO (international Association of Plumbing and Mechanical Officials), WPC (World Plumbing Council), WTO (World Toilet Organization), ASHRAE (American Society of Heating, Refrigeration, and Air -Conditioning Engineers), ASES (American Solar Energy Society),GSHPC (Ground Source Heat Pump Consortium), and SFPE (Society of Fire Protection Engineers). In his spare time he is an author of magazine articles and data book chapters, and some other stuff. He has been in the consulting engineering business for over 40 years.

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***MAY MEETING ATTENDANCE***

The following individuals attended the May 2013 meeting of the ASPE Chicago Chapter. In accordance with ASPE Society policy, these individuals are entitled to **0.75 RU's** toward the required 24 RU's needed every two years to maintain CPD registration. Meeting attendance is also recognized by the Illinois Department of Professional Regulation to count as 1 PDH towards the required 30 PDH's needed every two years to renew Professional Engineering licenses.

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|---|---|---|---|
| Alonzo Anderson | David DeBord | Joe Ficek | Nataila Dankanich |
| April Ricketts | David Erickson | John Greenwood | Natalie Aherns |
| Bill Bauer | David Lehman | John Nieman | Nevo Martelli |
| Bob Dahlmann | Dick Simms | John Stanzi | Otton Finiewicz |
| Bob Downey | Don Johnson | Jon Triphahn | Patrich O'Boyle |
| Brandon Taylor | E.D. Kedzie | Keith Seier | Peter Wu |
| Brian Hank | Ed Lichner | Ken Cutler | Phill Kroll |
| Bruce Shegarfi | Francisco DeHoyos | Kevin Zaleski | Rich Turkicuicz |
| Charlie Zowinski | Gabriel Gomez | Lou Faeler | Rick Butler |
| Chris Sharbaro | George Patermo | Luciana Kayo | Sean Allard |
| Chris Wisinski | George Sobyra | Mark Gomenzi | Shawn McAuliffe |
| Damon Camereon | Holly Hirsch | Mark Nasha | Steve Adams |
| Dan Gordon | James Dipping | Matt Keller | Steve Montgomery |
| Dan Heilman | Jason Romano | Matt Pardue | Tom Dolan |
| Dan Patt | Jeff Cochran | Mel Withrow | Tom Higgins |
| Darren McCuaig | Jim Lagina | Michael Ponx | Tom Ronan |
| Darren Rich | Jim Majerowicz | Micheal Cwanek | Tony Garcian Jr |
| Dave Ewing | Joe Dinkel | Mike Imoka | Travis McKnight |