



Fire Protection For Tanks: Risk Management and Protection

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Pond & Company



Fire Protection of Tanks

- Design Risks
- Operational Risks



Design Risks/Hazards

Hazard/Consequence Analysis – What are our risks involved?

- Heat Flux Calculations
- Vapor Cloud Fires
- Pool Fires
- BLEVEs (Boiling Liquid Evaporating Vapor Explosions)
- Vapor Cloud Explosions
- Jet Fires



Heat Flux Calculations vs. Site Operability

- Firefighter Maximum Pain Threshold of 4 Kw/m^2
- Distances to Automatic or Manual Equipment
- Location of Command Centers
- Construction of Fire Walls for Protection

Risk Mitigation



- Site Relocation
- Suppression/ Extinguishing Systems
- Blast/Fire Walls
- Early Detection Systems

Manual and Automatic Extinguishing Systems

- Actuation Mechanism for Automatic Systems
- Flow And Pressure Limitations of Equipment
 - Pressure Gauges
- Fixed, Semi-Fixed, Portable
- Interoperability of Equipment
- ARFF Crash Trucks – Pump Package



FLOW RANGE

The flow rate of the foam chamber is determined by the orifice size and the inlet pressure. The flow ranges listed in the following table are based on 40 psi (2.76 bar) using the smallest orifice for the minimum flow and 100 psi (6.9 bar) using the largest orifice for the maximum flow.

<u>Model</u>	<u>Flow Range</u>	<u>K-Factor Range</u>
AFC-90	49 to 151 gpm (185 to 572 Lpm)	7.8 to 15.1
AFC-170	94 to 279 gpm (356 to 1056 Lpm)	14.9 to 27.9
AFC-330	183 to 610 gpm (693 to 2309 Lpm)	28.9 to 61.0
AFC-550	350 to 980 gpm (1325 to 3709 Lpm)	55.3 to 98.0

To determine flow rates for specific applications and proper orifice sizing, consult Technical Services, Marinette, WI 54143-2542.

Operational Risks

- Coordination with Fire Department
- Municipal or Volunteer?
- Planning and Response Plan?
- Designated Personnel?
- Training (Run through Scenarios)

Operations, Techniques & Equipment

- Does Local FD have enough Equipment?
- Aid Agreement with Area FDs?
- Same Equipment / Connections?
- Heights of Tanks?
- Portable Monitors – DASPIT?
- Correct amount of LDH



Fire Scenarios



- Ground Fires
- Vent Fires
- Rim Seal Fires
- Obstructed Fires
- Unobstructed Fires

Water Supplies



- Enough Pressure to maintain 20 psi at required flows.
- Duration?
- Is Drafting and/or Shuttling an option?

Site Access

- Road Widths
- Turning Radii
- Access in bad weather conditions?
 - Fog
 - Flooding

Maintenance

- Local Ordinances
- NFPA 25 and 11
- Pressure Testing of Equipment