



Advanced Engineering Investigations

CHARLES B. SULLIVAN, ASCR₂, CKH₂
Senior Consultant
charlie@AEIengineers.com



Mr. Sullivan is an expert in the layout/design, installation, inspection, testing, maintenance, repair and operation of fire suppression systems and their components, and often addresses industry standard of care issues. Mr. Sullivan is also knowledgeable about fire alarm systems, plumbing systems, backflow prevention devices, and fire extinguishers. He worked in the fire protection industry for 22 years and has spent the last 12 years working in the forensic side of the industry evaluating various issues with fire suppression systems, fire alarm systems, plumbing systems, backflow prevention devices, and fire extinguishers. His responsibilities have ranged from installing fire sprinkler systems to managing groups of field service and installation suppression and alarm technicians. His 30 years of troubleshooting gives him unique expertise in failure analysis of fire suppression, fire alarm, and plumbing systems, as well as the related equipment. Mr. Sullivan has expertise in code analysis, standard of care, construction defect, and cost estimating as they relate to installation and repair of systems. He has provided expert deposition and trial testimony both nationally and internationally.

EDUCATION

Southeastern Regional Vocational-Technical/High School–Mechanical Engineering/Drafting, 1974 to 1978
UA Local 550 1200 Hours of Classroom Training and 5500 Hours of Field Training in Fire Sprinkler Installation and Service, 1987 to 1990
Ansul, Pyro-Chem, and Amerex Suppression System Design, Installation and Service
Numerous Cross Connection and Backflow Certifications
Certifications through Spears Corporation, Lubrizol-BlazeMaster Fire Sprinkler Systems, REHAU Fire Sprinkler Systems, Viking Corporation, ITT Pump, Potter Electric, STI, Faraday, Honeywell, Fire-Lite, Notifier, and Silent Knight fire alarm systems
Has Completed NFPA and IAAI Courses, Tested and Passed

LICENSURE

State of Colorado Department of Public Safety Division of Fire Prevention and Control
(Registered Fire Sprinkler Fitter, Registration Number: 21-SF-12473)
State of Colorado Department of Public Health and Environment, Certified Backflow Tester (#ABPA 6-22)
City & County of Denver Fire Protection A Supervisors Certificate (#1054786)
CSA Sprinkler Competent On-Site Person Commercial & Residential, ASCR₂ #CSA21493
CSA Commercial Kitchen Hood Installation and Service, CKH₂ #CSA21493
City of Colorado Springs Licenses–Kitchen Suppression FSC-B, Fire Sprinkler FSC-A & Fire Extinguishers FSC-C
City of Aurora Supervisors Certificate (#2013 658840 00 SI D-7 Fire Sprinkler)
American Backflow Prevention Association (ABPA), Tester 06-00022, Proctor, P6-22

EXPERIENCE

Mr. Sullivan has worked extensively with all types of fire suppression systems, including but not limited to, wet, dry, pre-action, foam, deluge, kitchen hood, paint booth, vehicle and clean agent. He also has extensive experience with and working knowledge of equipment including fire and jockey pumps, roll-down fire doors, backflow preventers, fire dampers and fire extinguishers. In addition, he has experience with fire alarm systems, fire caulking, and plumbing related issues. He is an active member of the NFPA, Technical Committee for NFPA's 17 and 17A. He is an active member of the CBPA (Immediate Past President and Education Committee). He is an active member of

ABPA and continues to proctor. He is an active member of the AWWA, M-15 Cross Connection Control Committee. Mr. Sullivan has 31 years of experience performing failure analysis of fire suppression systems and related equipment.

WORK HISTORY

Senior Consultant, *AEI Corporation*, 2009 to Present
Supervisor, Installation/Service of Suppression and Alarm Systems, *Global Fire and Safety*, 2005 to 2009
Service Manager, Suppression and Alarm, *Complete Fire Protection*, 2004 to 2005
Inspection & Service Manager, Suppression and Alarm, *Rocky Mountain Fire and Safety*, 1992 to 2004
Foreman, Fire Sprinkler Installation, *Evergreen Fire Protection*, 1990 to 1992
Apprentice Fire Sprinkler Fitter, *UA Local 550*, 1987 to 1990
Apprentice Plumber, *Conefry Plumbing*, 1984 to 1987

PROFESSIONAL AFFILIATIONS

National Fire Protection Association (NFPA) Technical Committee for NFPA 17 and 17A, Standards for Wet and Dry Chemical Extinguishing Systems, Principal Member (2020)
National Fire Protection Association (NFPA), Member, Building Fire Safety Systems Section
American Water Works Association (AWWA), M14 Committee for Backflow Prevention and Cross-Connection Control: Recommended Practices, Principal Member (2017)
American Water Works Association (AWWA), Member, Distribution and Plant Operations Division,
Colorado Fire Protection Association (CFPA), Member
National Fire Sprinkler Association (NFSA), Member
Society of Fire Protection Engineers (SFPE), Rocky Mountain Chapter, Member
American Backflow Prevention Association (ABPA), Member, Tester, and Proctor
Colorado Backflow Prevention Association (CBPA), Immediate Past President and Education Committee
Cross Connection Control Foundation of the Niagara Frontier, Member
International Association of Arson Investigators (IAAI), Member
International Code Council (ICC), Member

PUBLICATIONS

C. B. Sullivan, *Post-Fire Investigation of Restaurant Cooking Line Fires*, Firewatch!, Volume 56, Number 4, December 2019
C. B. Sullivan, *The Anti-Freeze Fire Sprinkler Conundrum*, AEI Newsletter, November 2014
C. B. Sullivan & J.L. Schumacher, *Frozen Sprinkler Systems*, AEI Newsletter, September 2014
C.B. Sullivan & J.L. Schumacher, *Commercial Cooking Operation-Related Fires*, International Symposium on Fire Investigations Science and Technology, National Association of Fire Investigators, Hyattsville, MD, September 2014
C.B. Sullivan & J.L. Schumacher, *There May Be More To A Commercial Restaurant Kitchen Fire Than Just the Cause!* Fire & Arson Investigator Journal, Volume 65, July 2014
C. B. Sullivan, *Commercial Kitchen Hood Fire Suppression Systems*, ADV Newsletter, January 2012
C.B. Sullivan, *Automatic Fire Sprinklers*, ADV Newsletter, September 2010
C.B. Sullivan and J.L. Schumacher, *Residential Fire Sprinkler Systems At Our Doorstep*, ADV Newsletter, March 2010
C.B. Sullivan, *Fire Sprinkler Inspection: Water Supply*, Colorado Claims Magazine Fourth Quarter Volume 6 Number 1
C.B. Sullivan, *How Can Sprinkler Systems Cause Water Losses?*, ADV Newsletter, September 2009.
C.B. Sullivan & J.L. Schumacher, *Dry-Pipe Fire Sprinkler Systems: Preventive Maintenance*, ADV Newsletter, March 2009

PRESENTATIONS

Post-Fire Commercial Cooking Line Fire Investigation

Co-presented with P. Carroll, Cozen O'Connor, National Association of Subrogation Professionals, Virtual Annual Conference – November 2021

Fire Sprinkler System Inspection and Service – Those Troublesome Insurance Claims

Colorado Fire Protection Association, Sheridan, CO – October 2021

Commercial Kitchen Cooking Operations-Post Fire Investigation

AEI Corporation, Webinar – October 2020

National Association of Fire Equipment Distributors (NAFED), New Orleans, LA – May 2019

National Association of Fire Equipment Distributors (NAFED), Atlantic City, NJ – April 2019

National Association of Fire Equipment Distributors (NAFED), Las Vegas, NV – March 2019

Post Fire Investigation of Commercial Kitchen Fires

Multi Agency Fire Investigation Team (MAFIT), Broomfield, CO – November 2018

Fire Sprinkler Awareness for Backflow Assembly Testers

Amerimid, Aurora, CO – September 2018

Amerimid, Aurora, CO – October 2015

Wet Chemical ITM

SimplexGrinnell, Aurora, CO – July 2018

Fire Sprinkle and Fire Alarm Overview

Colorado Springs Fire Department, Colorado Springs, CO – April 2018

Backflow Technician Awareness Fire Sprinkler Systems

Cross Connection Control Foundation (CCCFNF), Batavia, NY – October 2017

National Backflow Technician Awareness Fire Sprinkler Systems

American Backflow Prevention Association (ABPA), San Antonio, TX – April 2017

Fire Sprinklers: Manufacturer's Defect vs Maintenance/Service

Society of Fire Protection Engineers, Greenwood Village, CO – March 2017

The Antifreeze Fire Sprinkler System Conundrum

National Association of Safety Professionals (NASP), Colorado Springs, CO – October 2016

Investigation and Legal Aspects of Commercial Kitchen Fires

AEI Corporation, Littleton, CO – June 2016

Commercial Kitchen Hoods

Chartered Property Casualty Underwriter, Centennial, CO – October 2015

Commercial Cooking Line Fires

Colorado Springs Fire Department, Colorado Springs, CO – September 2015

Restaurant Hoods

Fire Marshal's Association of Colorado, Littleton, CO – March 2015

Fire Sprinkler Systems–Know your System and the Legal Aspects of a Loss

AEI Corporation, Littleton, CO – November 2014

Water Freezing and Sprinkler Systems–How it Happens and What Should You Do After It Does

National Association of Subrogation Professionals (NASP), Orlando, FL – November 2014

Commercial Cooking Operation-Related Fires

National Association of Fire Investigators, Hyattsville, MD - September 2014

Commercial Kitchen Hood & Exhaust

Honolulu Fire Department, Honolulu, HI – June 2014

Kitchen Hood Suppression Systems

South Metro Fire, Littleton, CO – September 2013

AEI Corporation, Littleton, CO – July 2012

AEI Corporation, Littleton, CO – February 2012

Colorado Defense Lawyers Association (CDLA), Denver, CO – April 2010

Field and Service Report Documentation

Rocky Mountain Fire Specialists, Denver, CO – December 2013

Sentry Fire Protection, Denver, CO – September 2012

Nuts & Bolts of Fire Sprinkler System

AEI Corporation, Littleton, CO – July 2012

AEI Corporation, Littleton, CO – February 2012

AEI Corporation, Denver, CO – November 2009

Antifreeze System

KMGH-TV, Denver7 News, Littleton Fire Training Center – January 2011

Fire Sprinklers

National Association of Safety Professionals (NASP), Webinar – May 2010

CERTIFICATIONS/TRAINING

Chlorinated Polyvinyl Chloride (CPVC) – Fire Sprinkler

- *Installation of BlazeMaster Fire Protection Systems*, Lubrizol BlazeMaster Fire Protection Systems – November 2020
- *Proper Methods of Installing & Inspecting FlameGuard CPVC Fire Sprinkler Products, Certified Inspector*, Spears Manufacturing Company - November 2020
- *FlameGuard CPVC Fire Sprinkler Products Installer Training, FlameGuard CPVC Fire Sprinkler Products*, Spears Manufacturing Company – November 2017

Fire Sprinkler

- *Consequences of Omitting Sprinklers from Concealed Spaces*, Tyco, February 2022.
- *Storage Fire Protection*, Tyco, February 2022.
- *Fire Sprinkler Systems in Cold Storage Applications*, Reliable and General Air Products – April 2021
- *Internal Corrosion of Sprinkler Pipe: Causes, Consequences, and Countermeasures*, United Fire Systems – October 2020
- *Introduction to Fire Protection*, Tyco, May 2020
- *NFPA 25, 2011 Edition: Inspection, Testing, Maintenance Series Parts 1-4*, Tyco – May 2020
- *Water-Mist Fire Protection Overview*, Tyco – May 2020
- *How to Size the Incoming Water Main for Commercial Fire Protection Systems*, Tyco – May 2020
- *Variables that Impact Water Delivery Time in Dry Pipe Systems*, Tyco – June 2019
- *Thermal Expansion Calculations*, Tyco – June 2019
- *Fire Sprinkler Product Training*, Potter Electric Signal Company – February 2008
- *Foam Fire Protection Systems*, Ansul Corporation– May 2002

Fire Marshal's Association of Colorado

- *Energy Storage Systems Best Practices* – January 2021

IAAI CFI Trainer.net

- *Critical Evaluation and Testing of Commonly Reported Accidental Causes* – September 2020
- *An Analysis of the Station Nightclub Fire* September 2020
- *Electrical Safety* – September 2020
- *Residential Electrical Systems* – September 2020
- *Evidence Examination: What Happens at the Lab?* – July 2018
- *Digital Photography and the Investigator* – February 2016
- *Introduction to Evidence* – February 2016
- *Arc Mapping Basics* – February 2016
- *Documenting the Event* – February 2016
- *Fire Protection Systems* – December 2014
- *Basic Electricity* – December 2014
- *Process of Elimination* – December 2014
- *40-Hour Fundamentals of Fire Investigation CO* – February 2014

- *Expert Report Writing – August 2011*

Society of Fire Protection Engineers

- *Fire Modeling: How Forensic Examples Apply and Inform Building Design Process – October 8, 2020*
- *2019 Denver Code Updates – September 10, 2020*
- *Paris Notre Dame Cathedral Fire – May 2020*
- *Improving Fire Alarm Intelligibility Through Technology – April 2020*
- *Smoke Control Systems & Challenges with New Codes - February 2020*
- *New Antifreeze Fire Sprinkler Technology and other Expert of the Day Style TechNote Topics – November 2019*
- *Surviving Survivability – A User’s Guide to Survivable Fire Alarm Circuits – March 2019*
- *Tall Wood Buildings – March 2018*
- *Regulating Laboratories – A Challenge for Designers and Enforcers – February 2018*
- *Navigating the Relationship of NFPA 30 and NFPA 13 – Sprinklers for Flammable and Combustible Liquids – November 2017*

Backflow Prevention

- *Backflow Products Engineering Lecture, Zurn-Wilkins – September 2019*
- *Test Proctor, American Backflow Prevention Assoc. – October 2018*
- *Backflow Prevention Assembly Tester, American Backflow Prevention Assoc. – March 2018*
- *Annual Training Event, American Backflow Prevention Assoc. – April 2017*
- *Backflow Assembly Repair, Colorado Backflow Prevention Assoc. – April 2013*
- *Backflow Prevention Assembly Testing and Repair on Fire Sprinkler Systems, Colorado backflow Prevention Assoc. – November 2006*
- *Cross Connection Control Workshop, Backflow Consulting and Repair – June 2003*
- *Colorado Department of Public Health and Environment and The Water Distribution and Wastewater collection Systems Council, Backflow Prevention Assembly Tester - March 1999*
- *Cross Connection Control and Backflow Prevention Training, S&M Water Consultants – March 1999*
- *Cross Connection Control, Backflow Assembly Tester, Red Rocks Community College, State of Colorado Environmental Training Center – May 1995*

National Fire Sprinkler Association

- *Tech Tuesday: NFPA 13, 2019 Edition, Reorganization – July 2018*
- *Update on the 2013 Edition of NFPA 13, The Academy of Fire Sprinkler Technology – February 2015*

Fire Alarm

- *Understanding the Relationship of codes for Fire Alarms, Sprinklers, and Elevators, Automatic Fire Alarm Assoc. – December 2017*
- *Changes to the 2016 Edition of the NFPA 72 National Fire Alarm and Signaling Code, System Sensor – July 2016*
- *Introduction to Basic Fire Alarm Technology, Honeywell – July 2015*
- *Introduction to Mass Notification Systems, Honeywell – July 2015*
- *Addressable Fire Alarm Control Panels, Honeywell – July 2015*
- *Voice Evacuation Systems, Honeywell – July 2015*
- *MRP Series Releasing Panels, Honeywell – July 2015*
- *ECC-50/100 Emergency Command Center, Honeywell – July 2015*
- *AFP-200, AFP-100, FireWarden-100, and Fire Warden-100-2, FireVoice-25/50, FireVoice-25/50ZS Fire Alarm Control Panels, Also Qualified to Work on Cross-Branded FireLite MS-9200, MS-9200UD, MS-9600, MS-9600LS, MS-9050UD, ACC-25/50, ACC-25/50ZS, Notifier by Honeywell – August 2006*
- *Installation and Programming of IntelliKnight 5820XL, 5808, and 5700 Series Addressable Fire Products, Silent Knight by Honeywell – May 2006*

- *NICET Fire Alarm Training*, National Training Center, Inc. – February 2003
- *MPC-1500 & MPC-1000, Programming, Installation, & Service*, Faraday – August 2000

National Fire Protection Association

- *2016 NFPA 13: Introduction to Occupancy and Hazard Classifications* – November 2017
- *2016 NFPA 13: Fire Sprinkler System Types and Applications* – November 2017
- *2016 NFPA 13: Fire Sprinkler Installation Requirements* November 2017
- *NFPA 25: Standard for Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems* – October 2017
- *Certified Fire Protection Specialist Primer* – October 2011

Colorado Fire Protection Association

- *Commercial Fire Sprinkler Design with BlazeMaster CPVC* – May 2017
- *Sprinkler Spacing* – May 2017
- *NFPA 25: Colorado Fire Sprinkler System Tagging Requirements* – May 2017
- *Special Hazard Classification and Correct Suppression* – May 2017
- *Inspection Requirements for Fire Sprinkler Systems* – May 2017
- *Reducing Pipe Sizes with Fire Sprinkler* – May 2017
- *2013 NFPA 13: Update, The Academy of Fire Sprinkler Technology* – February 2015
- *Colorado Sprinkler Rules and Insurance Industry Perspective* – February 2015
- *The Lost Art of Manual Hydraulic Calculations* – April 2014
- *Solving the Liability Minefield for Inspection and Service of Fire Protection Systems* – April 2014
- *High Pressure Clean Agent Suppression System Design* – April 2014
- *Seismic Bracing for Fire Sprinkler Systems* – April 2014
- *Pre-Action Fire Sprinkler Systems* – April 2014

Commercial Cooking Operations

- *Prevention and Investigation of Commercial Kitchen Fires*, Phil Ackland and Assoc. – March 2016
- *Design, Installation, Maintenance, Inspection, and Service of Kitchen Knight II Restaurant Systems*, PyroChem – January 2007
- *Design, Installation, Maintenance, Inspection, and Service of Monarch Industrial fire Suppression Systems*, PyroChem – May 2004

CPVC – Thermoplastic

- *Thermoplastic Piping Systems Assembly and Installation*, Spears Manufacturing Company – November 2015

PEX

- *Plumbing Systems and FirePEX Residential Fire Sprinkler Systems*, REHAU – November 2013

International Association of Arson Investigators Colorado Chapter (IAAI)

- *IAAI Colorado Chapter District 3 Training Seminar* – August 2013
- *2009 Annual Training Conference* – October 2009

Clean Agent

- *Clean Agent Pre-Engineered Fire Suppression System*, Amerex Corporation – December 2008

Firestopping

- *Current Firestopping Theory and Proper Installation Techniques of Firestop Training for Electrical and Telcom Penetrations*, Specified Technologies, Inc. – February 2008

Litigation Bootcamp

- *Kitch Attorneys & Counselors* – December 2021