Contents

Errors & Ommisions to ArunFSS@live.com

Points to note:
The PBX, Data Area and Electrical Fire Suppression System (Div-21)

Clean Agent fire suppression.
Various options

Argon	Carbon Dioxide (CO2)	FE-13	FM-200 / Sinorix 227
Halon (banned since 1994)	Inergen	Water Mist (NFPA 750)	Novec 1230 / Sinorix 1230

Electrical Fire suppression (Clean Agent) equipment:

Using FM-200 or similar requires:

1. A dedicated 110-125 VAC 20 Ampere dedicated ground line.
2. An interconnect with the building alarm system.(Code)
    i. Alarm Technicians should run an LV alarm line to the FM 200
    ii. So that if it trips, you can see it at the alarm panel
    iii. And so that if it trips, the building alarm system is tripped.

    The above are required by Code.
3. A dedicated AC line, inside the PBX room 20 amp, dedicated, isolated ground, to supply an Amerex or equivalent FM-200 control panel, inside the PBX room.
4. This Company, FSSI does have Electricians (Div-26) & Alarm technicians. (Div-28)

Maintenance:

5. Seal for effective Fire Suppression. (Code).
    a. Door to PBX/Data rooms must remain closed at all times. (Use an auto-closer)
        i. No chocks or wedges.
    b. Gas-tight integrity of PBX rooms must be maintained at all times.
        i. If it is not, & AHJ or Insurance notices an excessive the loss of seal, re-seal & fan-test are expensive.
6. Regular inspection & Tagging by Fire Suppression Technicians.

Room seal-integrity

Although it is important to assure the hazard is sealed sufficiently to hold concentration for a pre-determined amount of time if it is sealed too tightly the pressure developed during system discharge could over-pressurize the room and damage walls or windows.
The air/agent mixture is slightly heavier than air and any openings in or near the floor will result in the mixture escaping the space. Small openings found in the ceiling, such as air returns, leakage around light fixtures, etc. are typically not significant in regards to maintaining, or holding, concentration.
Openings under and leakage around doors, leakage around outlets, leakage around windows, etc. should be sealed to reduce loss of agent after discharge. To determine the amount of leakage in the hazard a room integrity test using door fan technology can be conducted. This test, outlined in the Annex of NFPA 2001, will estimate the equivalent leakage area (ELA) and, if conducted properly, provide an indication of hold time.
It should be noted that the accuracy of the test results will be improved if the location and size of the leaks are known.
If the location and size are not known the typical integrity test program assumes a worst case scenario with the total ELA divided 50% in the ceiling and 50% in the floor.
Smoke generators/pencils can be used to locate sources of leakage which can then be sealed.

The Cooking Hood Exhaust System Inter-connect.

- State Code requires an interconnection between all the cooking appliances and the exhaust system. (The exhaust and make-up air fan System is also known as the Kitchen Exhaust System)

- A Kitchen Hood must (by Code) have somewhere in it, thermal sensors. (Your Supplier of the kitchen hood, e.g. CaptiveAire, may have offered them as an option to you with the hood and they also may have offered to supply the control boxes for these to interconnect to the exhaust-makeup air system if it is in their contract with you.)
  None of this is part of a kitchen hood suppression system; It is part of the 'Kitchen Exhaust System'. (Mechanical Code)

- If your kitchen hood supplier did not do so, we (FSSI) can supply ONLY the thermal sensors for your kitchen hood. NOT the control boxes that do the interconnection from the thermal sensors to the electrical system that controls the fan system. And therefore your electricians will have to supply any installation and interconnect/controls to the fan controls from the thermal sensors.
  Put this in the Scope of Division-26.Electrical (Scope)

  These are part of the Mechanical Code and have NO PART or anything to do with, the kitchen hood chemical suppression (Ansul, Amerex or PyroChem) system.
  The thermal sensors are 'mentioned' in the International Fire Code but not as a component or function of the kitchen hood chemical suppression (Ansul or PyroChem) system.

Suppressing a Kitchen Cooking Area Fire (Div-21)

Look at it as being divided into FOUR main areas. They are:

1. Thermal Sensors (Code)
2. The Hood Chemical Suppression System (Code)
3. The Cooking-Gas (Fuel) & Electrical Shut-offs (Code)
4. Regular **daily** cleaning of the hood filters AND
   Regular six monthly filter-and-exhaust-duct steam cleaning (Code)
   Fire Suppression Services Inc. offers this as a fee-based service.

1. The Thermal Sensors detect the following:

a. If someone turns on ANY cooking appliance under the hood and forgets to turn on the exhaust fans, the thermal sensors must turn on the exhaust fans automatically.
   (Caveat: the thermal sensors must override the manual on-off switches. Manual on-off switches must never override the thermal sensors.) (Code)
   i. That wiring is put in place & made operational by Division-26 or 28 (Scope)

2. The Hood Chemical Suppression System (Ansul, Amerex ProChem)

Consists of:

a. A Cabinet Enclosure
b. An Automan Regulated Release Assembly
c. A Junction Box
d. Wet Chemical Storage Tank/s

e. Nozzles & Blow-off caps
f. Detectors
g. Cartridges (CO_2 or N)
h. Chemical Agent
i. Fusible Links
j. Pulley elbows & Pipe to the pull station & cabinet.
k. Remote Manual Pull-Station with conduit(sched-40 plated black-iron) and stainless wire
l. Mechanical or Electrical gas-valves, pressures switches, electrical switches, for automatic equipment and gas-line shutoff.

3. The Chemical Suppression Cabinet

Consisting of:

i. An extinguisher-like tank that holds blanketing wet-chemical
    1. (potassium carbonate & potassium acetate)
ii. Control valve/s for the tank (Ansul called it the Ansul Automan regulated release assembly) and connected to piping to run under a kitchen hood
iii. The Cartridge (an expellant gas pressurized cylinder or Squib)
iv. Pull-station mechanical wire (stainless)
v. A Mechanical trip device
vi. The chemical suppression cabinet also contains micro switches (three of 'em)
Each micro switch has three terminals:
    1. A Common pole,
    2. An Open pole &
    3. A Closed pole.
vii. <u>One</u> of the micro-switches has terminals upon which is connected (by the Div-28 alarm folks) Low Voltage wiring back to the building alarm panel. It is the <u>ONLY</u> micro-switch inside this cabinet that has <u>screw</u> <u>terminals</u>.
viii. The ONLY wiring connections made <u>inside</u> the Automan is the Alarm wire.
ix. The ONLY personnel permitted inside the Automan cabinet are fire suppression technicians and alarm technicians.
x. The two other micro switches have pigtail connectors, the other ends of which will be found in a junction box <u>outside</u> and near to, the Automan.
    1. Inside this external junction box, an electrician connects his under-25 Ampere HV wires. An Electrician must NOT use the Automan as a junction box. (it invalidates the Warranty)
    2. Electrician must stay out of the cabinet that houses the Automan. (They usually fry the circuitry-invalidates the Warranty)
    3. The ONLY wiring connections made inside the Automan is the Low Voltage Alarm wire (Div-28 Alarm technician) and the junction-box pigtails. (Div-21 Suppression technician)
    4. The electrical wires from the external junction box are to be used for HV for all other electrical shutoffs. e.g.:
        a. To turn off Dedicated Make-Up air fans (if you have them)
        b. To turn off <u>ALL</u> electricity under the hood, (including but not limited to the appliances. toasters, clocks etc…)

4. The Natural-Gas Valve:

a. Fire Suppression Services Incorporated most often bids and supplies the Natural Gas valve that controls the supply of all natural gas fuel to the Cooking Equipment under the Kitchen Hood.

b. Fire Suppression Technicians DO NOT install gas valves in the gas line.
c. We give it to the Plumbers when they are ready for it.
d. Division-22 Plumbers install the gas valve.
e. Fire Suppression Technician/s will then run conduit from the pneumatic actuator in this valve, through conduit and pulleys, back to the Chemical Suppression/Ansul cabinet.

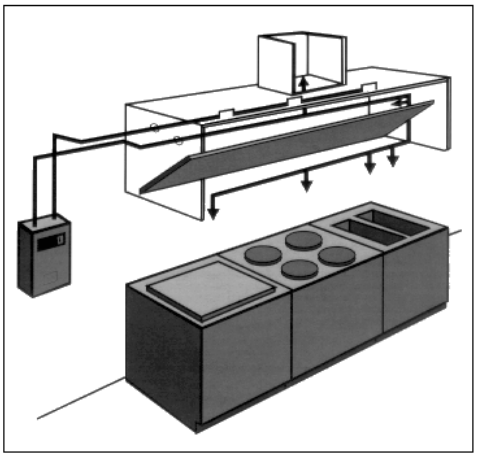

Fig 1 External Junction Box not shown.

Fig 2 Cabinet, chemical tank, gas shutoff & liquid chemical bucket

The Wet Suppression System / Sprinklers. (Div-21)

The Riser room, the stairwell Riser Mains Control assemblies, and anywhere there are Tamper devices, Flow Detector switches/valves will require LV wiring back to the alarm panel by the Client's alarm technicians.
On each & every floor, in each & every stairwell the riser mains pass upward, and will have an FDC (Fire Dept. Connection) and a Control Assembly with flow and tamper devices. They must be wired back to discreet sections on the building alarm panel. (For Zone Control).

IF you have an anti-freeze loop (to protect outside overhang areas or unheated attic areas) they will also require LV wiring back to the building alarm panel by the Client's alarm technicians.
However Utah Codes now require phasing out of the use of antifreeze loops by 2022. A dry system with compressor is now expected.
Put the alarm work in the Scope of Division-28 Electronic Safety & Security, & electric supply in Div-26.

The Riser room & the standpipe levels in the stairways need to be kept at a temperature that prevents freezing of the water in the lines (above 42F Code). (Heaters); and the areas must have adequate lighting. (Code)
Put this in the Scope of Division-26 Electrical & Division-23 HVAC (Scope)
Post Indicator & Valve (PIV): Underground and alarm technicians need to know if you are installing these. They have to be monitored.

Maintenance:

During the construction phase, FSSi adds paint-caps to sprinkler heads to prevent paint overspray.
Painting the sprinkler heads puts them out of code, and will incur parts & labour charge-back if we have to replace painted heads.
Warn your maintenance-painting department folk. ALWAYS cover sprinklers and escutcheons before painting
It is a safety violation to clean paint off paint-sprayed heads, they must be replaced. (Because the heads won't operate correctly in a fire if painted or cleaned after painting, it changes their thermal coefficient).
Tell your painters:
"Coffee Filters are your friend! They're cheap, easy to use and keep the Fire Marshall or the Fire Suppression Service Inspectors off your back" (red-tag)
Know How-To
Remove and replace an escutcheon. Many twist off, not pull off.
All parts of the wet sprinkler system have annual inspection criteria that must be carried out in order to maintain safety to human life, and to maintain your insurance & occupancy levels.

Fire Extinguishers & Cabinets (Div-10)

Extinguishers

Layout Designers need a FULL set of CAD files.

There may be two types: K-Class & ABC dry powder.

Refer to the Product Data sheets for each type at the end of this manual.

Maintenance

CODE REQUIRES THE RE-CHARGE, REPAIR & RE-TAG OF A FIRE EXTINGUISHER AFTER ANY DAMAGE, DISCHARGE OR USE.

The State requires annual inspection & re-tagging of all extinguishers by a licensed technician. **Fire Suppression Services Inc.** offers this fee-based service.

ABC:

1. Annual inspection, Maintenance and re-tag (Code) refer NFPA-10
2. Every six years, a Six-Year Maintenance is required which includes a complete disassembly and recharge.
3. Every 12th year the six-year items must be done plus an hydrostatic-test of the extinguisher shell.

K-Class:

1. Annual inspection, maintenance and re-tag (Code) refer NFPA-10
2. Every 5 yrs complete breakdown hydrostatic testing & replacement of chemical (Code) & NFPA-10.

Cabinets (Fire Extinguisher)

Although the Cabinets are key-locked, they are designed so that if one needs access to an extinguisher inside the cabinet, a sharp pull on the cabinet handle will snap the 'tongue' and the door will open.

Maintenance

Replace the lock 'tongue' if broken.

Ensure extinguisher is inside the cabinet & is within its pressure range on the gauge, and its tag is current.

Ensure the external 'Fire Extinguisher' sign is visible.

A discharged extinguisher should be laid on the floor below the cabinet, to await the service technician who will recharge & re-tag it, place it back in the cabinet with a new lock tab. Do not put a discharged extinguisher back in the cabinet. (Code) (Safety)

Alarms, FACP's, Annunciators [Div-28]

Designers need a FULL set of CAD files.

Only an alarm technician is allowed inside the Fire Alarm Control Panel. Electricians are to drop their wires to the panel locations.

Fire Wire is generally used for devices.

Breakers must be clearly labeled at panels so that fire Department Crews can find them.

At least one CAT5 wire should be dropped from demark to the FACP panel with two POTS lines with dialtone.

Explanatory

There are three requirements for a fire:

1. Fuel 2. Temperature 3. Oxygen

** Remove any one of the three, and the fire will go out **

Almost all Fire Suppressing Systems attempt to remove at least two of the three.
For example:

- Water Sprinkling attempts to lower the temperature and smother the fuel source.
- Chemical Suppression attempts to remove Oxygen and, by rapid expansion, lower the temperature (endothermic reaction).
- Cooking Hood Suppression Systems attempt to knock down the flame, to smother the fuel source, separating the fuel source from the supply of oxygen, shutting off the gas-fuel supply and shutting of fans, (removing the oxygen supply).
- Hand-held (portable) extinguishers attempt to smother the fire (remove oxygen, separate the fuel source), or lower the temperature by causing an endothermic reaction to drop the temperature or smother the fire with an inert gas (remove oxygen)
- The Fireman with his water hoses and chemical foam
- All fans are turned off (removes the supply of oxygen)
- All electrical systems are turned off (removing the ignition source)
- All Natural Gas Supply Valves are closed (Removing the Fuel Source)
- AND: all installations are required to alert the occupants: Loud Noises, Flashing Lights etc. (exception: portables, they just make noise!)
- AND: all materials used in the manufacture of a building are fire-proofed (remove fuel source)

Fire Codes, Life Safety Codes, Building Codes and Local Codes all govern/specify when, where and how these events occur.

References

CSI Master format numbers 2012 http://www.csinet.org/
NFPA 10: Standard for Portable Fire Extinguishers.
NFPA 13 & 13R: Installation of Sprinkler Systems.
NFPA 14: Standard for the Installation of Standpipes and Hose Systems, 2010 edition.
NFPA 17 & 17A Standard for Dry/Wet Chemical Extinguishing Systems
NFPA 20: Standard for the Installation of Stationary Pumps for Fire Protection, 2010 (if applicable)
NFPA 24 Standard for the Installation of Private Fire Service Mains and Their Appurtenances
NFPA 25 Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems
NFPA 30: Flammable and Combustible Liquids Code 2003 Edition. (if applicable)
NFPA 72: National Fire Alarm Code
NFPA 96: Standard for Ventilation Control and Fire Protection of Commercial Cooking Ops/Grease-laden vapors.
NFPA 101: Life Safety Code
NFPA 170: Standard for Fire Safety and Emergency Symbols
NFPA 409: Standard on Aircraft Hangers 2011Edition (Where applicable)
NFPA 750: Standard on Water Mist Fire Protection Systems
NFPA 2001 Standard on Clean Agent Fire Extinguishing
Incorporated into this document are other NFPA Codes as referenced and where applicable.
NFPA Home: http://www.nfpa.org/aboutthecodes/list_of_codes_and_standards.asp
NFPA Data: http://www.nfpa.org/codes-and-standards/document-information-pages
EN 12845: Fixed firefighting systems, Automatic sprinkler systems, Design, installation and maintenance.
International Fire & Building Code/s and Life Safety Code **if** installed according to Code..

http://publicecodes.cyberregs.com/icod/ifc/2012/index.htm

Utility Supply Code
Ansul - R-102 UL300 MANUAL Rev 10 - (143 Pages)
UL Standard 1254 & UL Standard 300
https://archive.org/details/publicsafetycode
Fire Suppression Services Inc. Bid, Contract documents, & Terms & Conditions

Credits

Bill Gubler, Tek Purser, Heath Dangerfield. Tim Strickland.