Port of Portland

Fire Alarm System (FAS) Standard Design Guidelines

OVERVIEW

The Division 28 specification sections include appropriate information for products and installation of fire detection and alarm system but do not include the related work of other tasks. Verify the following items are included in other specification sections or the drawings.

PORT CONTACT

Any questions regarding fire alarm design should be directed to Paulo Vasconcelos via email at Paulo.Vasconcelos@portofportland.com or phone at 503-415-6384.

PROJECT DELIVERY SERVICES (CONSTRUCTION PROJECTS)

1. Fire alarm design for project delivery requires close coordination with the Port's Fire Alarm System (FAS) programmer and Port Facilities Engineering.

2. Plan for and deliver a design solution that meets Port standards, which are sometimes more stringent than currently adopted fire alarm code due to operational risks and inherent complexities of airport facilities.

3. The FAS shall have an adequate number of circuits, properly distributed and of sufficient wire size, to provide a flexible infrastructure and to permit changes and expansion in the future.

    a. Initiating devices and notification appliances shall be wired to circuits inside respective signaling zones served by the same Fire Alarm Control Panel (FACP).

    b. Whenever possible, sprinkler zones and signaling zones shall match. Crossing boundaries between zones is not allowed.

4. Signaling line circuits (SLCs) shall be initially designed with 80% loading where technically feasible. Either separate circuits (preferred method) or isolation modules should be used to limit the number of devices that might be out of service due to a fault at any one location.

5. For concealed locations where a remote indication is required, use a standard base that provides wiring terminals for connection to a remote indicator. Preference should be given to detector bases with a built-in line fault isolator for use on Class A SLCs.

6. Duct detectors shall be installed in conjunction with remote test stations and remote indicators (LEDs).

7. Avoid t-taps in SLCs whenever possible. If required, and approved by the Port, SLCs shall be initially designed to contain a maximum of 50% t-taps (75 t-taps) where permitted by code, to allow for future circuit expansion. Maximum expansion shall contain 80% t-taps (100 t-taps) permitted by the manufacturer.

8. Initiating devices, notification appliances, and accessories shall be installed in accordance with manufacturer's design manual and labeled according to the Port's specifications.

9. Notification appliance circuits (NACs) should be initially designed with a load limit of 70% due to their likelihood to require changes during the life of the system.

10. No individual NAC should serve more than one fire or smoke zone – even if the system is set up for general alarm. This should allow for future "zoning" or selective communications options to be implemented by changing or reconfiguring the control equipment (which is easier and less expensive than rewiring a building). Deviations shall be approved by the Port Facilities Engineering.

11. Conventional and non-addressable devices no longer meet the Port's standard design guidelines. Projects in areas that use these cards/devices (initiating devices and monitoring/control modules) shall update those to intelligent addressable loop cards/devices and modules. Examples of these include but are not limited to Edwards Initiating Device Circuit (3-IDC 8/4) cards and Addressable Analog Device Circuit (3-AADC) cards installed on legacy locations.

12. The approved method to connect visual signal appliance (strobe) only circuits are:

    a. Strobes shall be connected to fire alarm notification appliance circuit (FANAC) panel output circuits (preferred). Whenever possible, each output circuit should serve only one area or tenant and labeled as such.

    b. Strobes can be connected to a loop controller using addressable modules. In this case, the module logical address shall be used to label circuit and devices.

    c. If necessary, strobe-only circuits can be connected to audio amplifier cards using their dedicated NAC outputs.

13. No individual module shall activate more than one FANAC/FAPS.

14. Amplifier cards shall be used for installation of fire alarm speakers whenever possible since those circuits are only limited by the available wire size and amplifier size, providing greater potential for future growth.

    a. Speaker-only circuits shall be designed to operate separately from day-to-day communications and paging needs as permitted by NFPA 72.

b. Use high definition speakers; dual coil speakers no longer meet the Port's standard design guidelines.

c. Audible and visual signal (A/V) appliance circuits can be installed on audio amplifier cards using both audio and NAC outputs. Use audio circuit address PP-CC-0000 for audible signal appliances (speakers) labeling and visual circuit address PP-CC-0001 for visual signal appliances (strobes) labeling.

15. Use the manufacturer's instructions to prepare FACPs to resist seismic forces as specified in the IBC/OSSC for ground motion accelerations (seismic events) corresponding to the project location.

16. Electrical equipment (ELEC) or mechanical equipment (MECH) room types should be used to house fire alarm equipment. Avoid installing fire alarm panels inside MECH RISER RM or where abnormal conditions have the potential to affect electrical equipment.

    a. FACPs shall not be installed in common public areas such as hallways, where non-technical staff have access to them. An annunciator shall be used to provide access to first responders in case of an event.

    b. Fire alarm equipment such as FACPs, Fire Alarm Terminal Cabinets (FATCs), or FANAC/FAPSs shall not be installed in tenant spaces. If a previously Port-owned space later becomes a tenant space, fire alarm equipment shall be relocated to a Port non-leased space.

17. Device descriptors shall be submitted for review/approval by the Port after the project design phase once the number and type of devices are finalized, and construction is ready to start.

    a. Descriptors (message label) should follow the guidelines described in this document and be included in the drawing set using the FAS IO Schedule template available online at www.portofportland.com/Business/MasterSpecs under the Standard Drawings tab. Coordinate with the Port's FAS programmer if necessary.

18. The following information should be included in all drawing sets: Port-provided symbol legend, identification legend, point descriptors list, input/output table (SOO), BOM, line voltage calculation, and devices/equipment data sheets.

    a. Use the Fire Alarm Device Schedule to record device serial numbers (barcodes) and transfer this information to the record (as-built) drawings after the acceptance test or system commissioning.

19. Provide preliminary fire alarm design as follows:

    a. Perform a code evaluation to bring spaces up to current code specs, especially if a building was constructed over 5 years ago.

b. If existing devices are reused, provide report that:

i) Explains the rationale behind this solution.

ii) Describes how the existing devices and different technologies will integrate into new systems to achieve design intent that follows Port standards.

iii) Demonstrates efficiencies to the system.

iv) Presents a cost analysis if necessary, comparing such solution to a complete system replacement with newer technology.

c. In addition to floor plans (required by code), the consultant must show fire life/safety devices layout on the reflected ceiling plan sheet (RCP), especially on locations that use ceiling tiles.

d. Wall-mounted devices (including wall strobes, speakers, or detectors) must be shown on "Section Views" when applicable. To avoid this requirement, do not use wall-mounted devices in small projects.

20. When resources are available, the consultant shall deliver Revit files including information provided by the project contractor. It is expected that both parties coordinate work and collaborate to provide a complete 3D model.

21. Obtain redlines from the Port of all electrical conduit relocation or other changes made to the design by the project contractor during construction.

22. The consultant is responsible for auditing/approving changes made to its design during construction by the electrical contractor and including those alterations in the record (as-built) drawing set at project close-out.

23. Room Numbers:

a. Room numbers are paramount information for the fire life safety system. Consultants should keep room numbers as an integer number (no decimals) and consistent throughout the building. Maximum of 6 characters, including letters. Room numbers with decimals such as XXX.Z do not meet design guidelines due to the limitations of the current programming software.

b. Any room number changes should be in response to a tenant improvement or a Port construction project. As such, they would either go through the tenant improvement process or the Port construction process, which requires as-builts as part of closeout and requires all room numbers to be assigned by the Port’s lease plat administrator.

c. Lease plat exhibits are updated based on as-builts by the Port’s lease plat administrator at the request of the properties team member responsible for that tenant. Once updated, the lease agreement is either amended or exhibits are sent out under a cover letter for replacement depending on

actual lease language. New lease plats include any updated room numbering and revised square footage.

d. If a tenant improvement project requires new room numbers, those are assigned by Port's lease plat administrator and provided to the tenant to be completed by their contractor as part of the tenant improvement project using door signage specs.

e. If new room numbers are required based on improvements/changes made by a Port construction project, the Port construction project is required to request new room numbers from the Port's lease plat administrator and install them as part of the project using door signage specs.

f. If there are incorrect door numbers in tenant leased space, the properties team member assigned to that tenant should be contacted. Research can be conducted as to why the door numbers are incorrect, and a path can be determined from there. If it is determined that changes were made by a Port construction project, the project should be responsible for correction to the door number signage as well as ensuring that the Port base plan has been updated. The properties team member would then update lease plats per the process described above.

Fiber Optic Infrastructure:

1. FACPs at the PDX campus shall be connected to the existing FAS fiber network. Fiber optic infrastructure shall be installed in accordance with Port Master Specification Section 271000 (online at https://www.portofportland.com/Business/MasterSpecs).

   a. Provide wall-mounted closet connector housings (CCH)/fiber optic distribution units (FODU) adjacent to the FACP. Provide LC connectors for single-mode and ST connectors for multi-mode cables. Fiber optic patch cords between the CCH/ FODU and the FACP shall be protected/installed inside the conduit.

   b. Fiber Optic Cables:

      i) For locations inside the PDX Airport, provide dedicated fiber cables, 12 strands minimum, from the point of connection in the existing FAS fiber network to the new FACPs. Fiber optic cable type shall be reviewed and approved by Port IT Communications Services, and Facilities and Design Engineering.

      ii) For locations outside the PDX Airport, fiber optic cables shall be single-mode. The fiber infrastructure to the point of connection in the existing FAS fiber network may be shared with other Port systems to the extent possible. Minimum of eight strands of the shared fiber cable (four strands for data, two strands for voice and two spares) shall be reserved for the FAS. Coordinate fiber cable sizing with Port IT Communications Services, and Facilities and Design Engineering.

2. Termination location of fiber optic cables in Port IT rooms shall be reviewed and approved by Port IT Communications Services, and Facilities and Design Engineering.

3. Deviations to these guidelines shall be reviewed and approved by Port IT Communications Services, and Facilities and Design Engineering.

Capital Projects Only:

1. The consultant shall coordinate with the Port to provide the most current AutoCAD backgrounds to the Port's FAS programmer and the project contractor, especially if changes were made to a space or if it is a new space.

Tenant Improvements (TI) Projects Only:

1. The Port's FAS programmer and the tenant's contractor (if applicable) shall be part of the design team and provide comments starting at 60% review.
2. Tenant shall use the Port's FAS programmer for all programming services.
3. The consultant shall provide the most current AutoCAD backgrounds to the Port's FAS programmer and contractor, especially if changes were made to a space or if it is a new space.
4. All tenant spaces inside PDX buildings shall be part of the Port's FAS and shall have equipment communicating directly with the system. Exceptions may occur but must be approved on a case-by-case basis by the Port's Fire Department, Comm Center, and Facilities Engineering.
5. Tenant spaces outside PDX buildings (such as outlying buildings) that are not physically connected to the fiber optic network shall be monitored by a third-party company. Tenant shall use the Port's selected monitoring provider for all monitoring services.