QUELL methodology FAQ's

Welcome to the peak in cold storage fire protection.

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Frequently Asked Questions

Tyco® Application of the QUELL Design Methodology **June 2020**

Is the QUELL Designed Pre-action and Dry System the only option for dry pipe protection of cartoned Group A plastic commodity for storage heights above 25 feet (7,6m) that does not require the use of in-rack sprinkler systems?

The QUELL technology is the ONLY method available for providing dry pipe sprinkler protection to cartoned Group A unexpanded plastic commodities stored above 25 feet (7,6m) that does not require the use of in-rack sprinklers. The commodity classification, storage heights, and ceiling heights that can be protected using QUELL are constantly expanding. Contact your Johnson Controls representative for the latest application guidelines.

How do I purchase a QUELL system?

To ensure the high standards of Johnson Controls are maintained throughout the design and installation process, QUELL systems are only available through trained and authorized fire sprinkler professionals. For a list of fire protection contractors authorized to design and install fire protection systems utilizing QUELL technology, please contact the nearest Johnson Controls representative. Please see www.tyco-fire.com to find your local representative.

What is the approval status of QUELL design methodology?

All components utilized in a QUELL designed system are both UL Listed and FM Global Approved.

I understand that only licensed and trained QUELL contractors can offer QUELL designed systems. What is included in the QUELL training program?

The first part of the QUELL training program is designed to educate licensed system designers and installers about the key performance aspects of the QUELL system and the parameters that are critical to the successful deployment of a QUELL system. This portion of the training program focuses on existing protection methods and the test programs used to develop these methods. Specifically, the testing used to develop the storage density curves in NFPA 13 are discussed to provide a basis of comparison for the validation of currently accepted prescriptive methods compared to the level of testing undertaken during development of the performance-based QUELL designed system. In addition, questions regarding the need for application of the “equivalency clause” in NFPA 13 to the acceptance of QUELL designed system are answered.

The second part of the QUELL training program focuses on the specific components and design requirements specified in Johnson Controls technical data sheets TFP370 & TFP373. Examples of typical system designs are demonstrated using a specific version of the SprinkFDT Fluid Delivery Calculation Program with enhanced features available only to licensed QUELL contractors.

Most of the QUELL testing was conducted on double row rack arrangements. Can QUELL technology be used to protect multiple row racks or piled storage?

It has been recognized through extensive testing conducted at both UL and FM Global that double row rack storage presents a greater fire challenge than other standard forms of storage such as multiple row "pushback" racks, or piled storage. As such, much of the QUELL testing was performed with the double row rack storage arrangement; however, to verify the assumption that double row rack represented the most severe challenge, one test was conducted with multiple row racks. The results of this test indicate that multiple row rack storage produces a less severe fire than double row rack storage when all other variables are equal.

However, according to FM Global, for K33.6 designs, multi-row rack arrangements have specific limitations. Racking must be considered "open frame" per FM 8-9, therefore no more than 16 feet (4,9m) deep with minimum 6 inches (152,4mm) flue space at end of the 16 feet (4,9m) or 3 inches (76mm) open space around each pallet.

Why were QUELL technology fire tests not conducted under more realistic conditions, such as at very low temperatures? What effect does temperature play on fire growth?

All of the QUELL technology fire testing was conducted in one of the largest and most technologically advanced full-scale fire testing facilities in the world, UL Large-Scale fire test facility located in Northbrook, IL. One aspect of this facility is that smoke is extracted and cleaned in a regenerative thermal oxidizer at a rate of 36,000 – 55,000 ft^3/min (1,000 – 1,500 m^3/min) to permit very large scale testing to be conducted in an environmentally responsible manner. Further, the facility is not insulated to allow dissipation of the heat generated during fire testing, as well as to limit the presence of potentially combustible materials in the structural design of the building. As a result of these two factors, it is not possible to reach and maintain sub-freezing temperature as part of the test protocol. There is no facility available in the world today capable of generating sub-freezing temperature and withstanding the conditions generated during a 20 MW or larger fire. Despite the inability to directly evaluate the impact of temperature on warehouse fire growth, it has long been recognized that the temperature of a material has a significant impact upon its rate of fire propagation, with cold temperatures leading to slower fire growth. Preliminary estimates developed by Johnson Controls indicate that a material at -30°F (-34°C) will burn at a rate APPROXIMATELY one class lower than that same material burned at a typical "ambient" temperature. For example, a Class III commodity at -30°F (-34°C) will have a fire growth rate similar to a Class II commodity at ambient temperature; however, as standard test commodity cannot exactly mimic the fire behavior of all "real" materials in that Class, the reduction in fire growth rate attributable to decreased temperatures is appropriately viewed as one of the many safety factors built into the QUELL technology designed according to QUELL protection methods.

Has the performance of QUELL technology installed to protect freezers constructed of Polyurethane sandwich panels been evaluated?

During the extensive full-scale fire testing conducted as part of the QUELL development program, Polyurethane sandwich panels were not specifically evaluated. The full-scale tests were conducted largely at UL full-scale fire test facility, which has a test pad of more than 10,000 ft^2 (929 m^2). This test facility is specifically constructed to withstand repeated exposure to the intense fire environment of large warehouse fires. The use of specific construction features is not part of the routine sprinkler qualification program, nor was it considered during the testing used to develop the protection criteria specified in NFPA 13 today, therefore it was not directly included in the QUELL technology test program. Given the large variation in type, material, assembly method, and fire performance of the commercially available sandwich panel systems, specific tests of any single panel would not necessarily apply to other styles of panel. Additionally, the QUELL technical literature includes all of the full-scale fire test data, including measured ceiling and steel beam temperatures for the duration of the each test (unlike the protection criteria specified in NFPA 13 or other prescriptive requirements). This information can be used by structural and fire protection engineers to specifically evaluate the need to address polyurethane sandwich panel construction as part of the overall fire risk analysis of the facility.

Are all QUELL designed systems required to be double interlock preaction systems or can a less complex single interlock or dry pipe system be utilized?

QUELL designed systems installed in areas that are continuously subjected to temperatures below approximately 40ºF (4ºC) should always utilize double interlock configurations to minimize the chance of an inadvertent valve trip and system fill. When a system installed in an area continuously operated at temperatures below freezing fills with water, it is extremely difficult to drain the system before water-filled piping freezes. When this occurs, there are typically only two options available for returning the fixed fire suppression system to service.

The first option requires removing all frozen or perishable commodity from the freezer, heating the space until all ice has thawed, and then draining, drying the system and replacing any operated sprinklers or other damaged components. After the sprinkler system has been returned to service, the freezer can be brought back down to operating temperature and the commodity returned. The second option does not require the freezer be taken out of service, but instead the entire sprinkler system is disassembled, moved to a heated area for thawing, and then reassembled. In a cold storage environment, this is a very time consuming and costly process due to the limited time a laborer can remain in the freezer prior to mandatory “warm up” intervals. In the event of an actual fire of any significant magnitude, it is likely that the freezer will be taken out of service to repair fire damage and mitigate any smoke damage. These activities typically require shutdown of the freezer, providing an opportunity to thaw out and reset the sprinkler system.

The purpose of a double interlock system is to minimize the chance that the sprinkler system will fill with water due to a non-fire event. In areas that are only occasionally subjected to freezing conditions such as an unheated warehouse in moderate climates, a single interlock system or dry system may be utilized. Single interlock or dry pipe systems are appropriate only in areas that are typically above 40ºF (4.4ºC) but that might on rare occasions be subject to freezing; however, even in these cases there are significant benefits to the double interlock system that should be considered before a final selection is made.

The intended application of the QUELL methodology utilizing the dry configuration is for areas which do not have forced ventilation. By waiting for the first sprinkler(s) to operate to begin fan shutdown, it is possible to operate sprinklers which may not be located over the fire origin, due to the air movement. When LHD is installed in areas with forced ventilation, the location of the activation of the LHD in regards to the ignition location is irrelevant, as it is utilized to begin fan shutdown and possibly pump start up; however the array of operated sprinklers has a significant effect on the efficacy of the system. By beginning fan shutdown upon air loss, it is possible that sprinklers away from the fire origin may operate. If this is the case, the number of activated sprinklers may deviate from the actual fire tests.

If the space does have mechanical fans, the fans must be shut down before sprinkler activation. Detection may be utilized to shut down the ventilation system.

What are the steps to include detection in a dry QUELL application?

The steps for adjusting program 8 to include detection are as follows:

1. Set Potter 4410RC to program #8 (QUELL Dry System per TFP370 & TFP373)

2. Set 4410RC to program #0 (Custom Program)

3. While in program #0, scroll to the Zone Outputs Function

4. Press the SET button to set the output to the zone displayed and move to the next zone

5. While on Zone #1, remove output #3 (releasing) by pressing the SELECT button

6. Verify that output #1 is mapped to Zone #1

7. Test all zones to verify operation

8. This custom program leaves all program #8 functions intact but removes the releasing output #3 from Zone #1

9. Output #1 should be wired to the optional relay module for HVAC control

Can dry nitrogen be used as an alternative to dried air to charge a QUELL designed system?

Nitrogen can be used as an alternative to air for pressurizing and monitoring the integrity of the QUELL system piping provided that a dry nitrogen supply is used. Every effort should be made to minimize moisture transfer into the piping system as trapped moisture can accumulate and form ice plugs. There are various dry nitrogen options available from Johnson Controls – the TYCO Model NG-1 Nitrogen Generators can be installed as a continuous supply of dry nitrogen or the TYCO AMD-3 could be used with Nitrogen Cylinders.

What type of fire detection is recommended for use with QUELL designed systems?

In theory, any type of fire detection that is guaranteed to operate prior to the first sprinkler is suitable for use as the detection component in a QUELL double interlock pre-action system. In practice, the two preferred fire detection methods are linear heat detecting wire or aspirating smoke detection.

Linear heat detection wire offers the simplest and most robust option and has been specifically tested during QUELL technology full-scale fire tests. As LHD cable is the only method of detection that has been fully evaluated during the QUELL development process, Johnson Controls highly recommends the use of LHD cable installed in accordance with TFP370 and TFP373 and the manufacturer's design and installation manual. LHD cable is available from Johnson Controls as part of the complete QUELL package, further simplifying the ordering process. One advantage of using the Johnson Controls recommended linear heat detecting wire is that this detection device is currently UL Listed and FM Global Approved for use with the Potter 4410 RC releasing panel deployed as part of the Model QRS Electronic Accelerator. As such, a single releasing panel can provide all of the system monitoring, fire detection and electronic accelerator functions for its associated zone, and can be easily integrated with the overall building fire alarm system.

Aspirating smoke detection represents a second option to linear heat detection, with the advantage of typically providing a comparably earlier warning than the linear wire; however, this improved sensitivity requires more complex equipment and can result in a greater frequency of nuisance alarms. A properly installed and maintained aspirating smoke detection system can be used in lieu of linear heat detection when a more responsive fire detection option is desired. Johnson Controls has not specifically tested the performance of aspirating smoke detection and therefore cannot validate its effectiveness in these environments.

How should fire pumps be connected to QUELL designed systems?

As QUELL systems typically protect high challenge scenarios with correspondingly high water discharge rates, fire pumps are frequently required to meet the hydraulic demand of the fire suppression system. To ensure that the pump startup time does not contribute to a delay in water delivery, it should be automatically started upon activation of the fire detection system.

Full-scale fire tests demonstrate that the time difference between activation of a linear heat detector and activation of the first sprinkler head is between 5 and 10 seconds, which provides adequate time for a fire pump controller to allow the pump to be brought up to full speed.

Activation of the fire pump can be accomplished by fitting the releasing panel with an auxiliary relay interconnected to the remote start terminals on the fire pump controller. The fire pump should be installed in accordance with NFPA 20 or equivalent national installation code.

It is recommended to directly connect the auxiliary relay associated with the Potter 4410 panel directly to the fire pump controller. It is not recommended to start the fire pump from the base building fire alarm system. Some addressable systems have polling rates which can take approximately 5 seconds between polling cycles. It should be kept in mind that the linear heat detection only operated 8-9 seconds before the sprinkler during full-scale testing. This added delay should be taken into account when integrating with the base building, in addition to the time delay associated with the pump to reach full speed. Even though it is not recommended, if the base building fire alarm panel is used to start the fire pump, the ramping time and the delay associated with the base building fire alarm together must be less than 9 seconds.

How should the QUELL design methodology be applied under mechanical penthouses?

Many large freezers are built using refrigerators and heat exchangers located on the roof of the building in so-called "penthouse" arrangements. These arrangements typically use ducted air discharge outlets to distribute chilled air evenly throughout the freezer, with return air being supplied simply through the use of grated flooring between the "ceiling" of the freezer and the "floor" of the penthouse.

This arrangement presents a significant challenge to any "ceiling only" fire suppression system, as the grated flooring will not allow accumulation of sufficient heat to activate the sprinklers. Further, the design of penthouses varies considerably from facility to facility. Variables such as the volume and height of the penthouse, the arrangement of storage racks under and near the penthouse, and the location of duct work and other obstructions around the penthouse all impact the layout of TYCO Ultra K17 286°F (141°C) glass bulb sprinklers or TYCO Ultra K34 286°F (141°C) glass bulb sprinklers in this area.

While no universal recommendation is possible due to the wide range of penthouse configurations, several recommendations can be provided which will improve the thermal sensitivity of sprinklers located below mechanical penthouses.

For grated rooftop mechanical penthouse scenarios, FM Global recommends the installation of a suspended ceiling below, and extending somewhat beyond, the area of each penthouse opening. Sprinklers are then installed below the suspended ceiling, which keeps heat from escaping into the penthouses during a fire thus ensuring that sprinkler operation is not delayed.

When installation of a suspended ceiling is not possible, the "open" or grated area of the floor should be kept to the minimum size needed to provide makeup air to the mechanical equipment located in the space. This can be accomplished by fastening metal sheets over the grated flooring to retain as much heat below the penthouse as possible.

When sprinkler heads other than the Ultra K17 or Ultra K34 sprinklers are installed at the ceiling of the penthouse, they should be 286°F (141°C) rated to ensure that excessive penthouse sprinklers do not operate prior to the Ultra K17 or Ultra K34 sprinklers located below.

How can the freezer operation be restored after a fire has been controlled by a QUELL designed system?

Restoring the operation of a freezer protected by a QUELL system after a fire is largely the same as restoring a freezer protected with traditional Dry, Single or Double Interlock systems. The major difference with QUELL is that there are no in-rack sprinklers to thaw, drain and/or inspect.

Since there is only low-pressure air or nitrogen in the pipes normally, why do I need to use tri-seal gaskets? I've used standard gaskets in freezers before and they worked fine.

When standard gaskets are employed, a small annular "groove" is left between the ends of the two pipes to be coupled. This annular gap can fill with water any time the system is flooded, such as during hydrostatic or water delivery time testing. It is virtually impossible to remove this water, which will then freeze when the freezer is placed into operation. The expansion of the water as it freezes can damage the gasket, and in severe cases even damage the coupling or even lead to premature joint failure. Tri-seal gaskets provide additional gasket material to fill and seal the gap between the pipe ends to ensure that water cannot accumulate and freeze in this area. The use of tri-seal gaskets helps to ensure a trouble-free system with a long service lifetime. Utilizing silicone grease during the installation of the tri-seal gasket is recommended and also helps to ensure the longevity of the system.

The Model QRS Electronic Accelerator required by the QUELL system documentation is only available with a Potter PFC 4410RC releasing panel, is it CE marked?

Yes, the Potter PFC-4410RC panel is CE marked.

When running hydraulic calculations which C factor do I use for black steel pipe and galvanized piping?

The C factor should be taken from whichever edition of NFPA 13 is applicable for your jurisdiction, for dry systems utilizing CMSA sprinklers. For example; in the 2007 edition of NFPA 13 the C factor utilizing galvanized piping in a dry system with CMSA sprinklers would be 120, as opposed to utilizing black steel pipe with a C factor of 100. In the 2010 edition of NFPA 13 the C factor for galvanized piping for dry systems with the use of CMSA sprinklers was reduced to 100.

Is galvanized piping required when utilizing the QUELL Methodology?

In previous versions of TFP370 (Ultra K17), galvanized piping was not required but there were a few stipulations when utilizing black steel piping in areas subject to freezing temperatures. In the transition from NFPA 13 2013 edition to the 2016 edition there is a change in section 8.4.7.2 of NFPA 2013 edition. This section no longer requires the use of internally galvanized piping for dry systems when utilizing CMSA sprinklers. Johnson Controls feels that the changes in NFPA 13 2016 edition, in regards to piping for dry systems utilizing CMSA sprinklers, are justified based on new testing/research and agree that the industry is moving is the right direction. TFP370 and TFP373 removed the added stipulations for the use of black steel piping subject to freezing temperatures and freely allow the use of black steel piping in all QUELL installations. If designing a system in accordance with FM Global data sheet 2-0, FM states that black steel pipe can be used in dry-pipe sprinkler systems equipped with closed-type sprinklers if the piping system is filled with an inert gas.

I want to verify the results of the SprinkFDT-Q Fluid Delivery Calculation Program water delivery calculations with a field test, how accurate can I expect the calculations to compare to the field test?

During the listing process, UL required that the SprinkFDT-Q Fluid Delivery Calculation Program calculations be within 10% of the measured water operating time. As such, the SprinkFDT-Q program calculations should, in most cases, be within 10% of the measured value. Additional information shows that the use of diaphragm style valves may increase the time required for water delivery and can result in up to 20% error, between calculated values and field test results. See the relevant system data sheets for full details and limitations. Like all simulations, the accuracy of the output of the SprinkFDT-Q program is closely tied to the accuracy of the inputs used. The accuracy of input factors such as the water supply curve and the physical piping arrangement should be carefully considered during the design process. In most cases, when care is taken to ensure that model inputs are accurate, the difference between the simulated and measured water delivery values is less than two seconds.

How large can each individual system be and still meet the required operating time found in the technical data sheets?

It is important not to exceed the maximum operating times found in the technical data sheet. As operating time depends upon a large number of variables, including water supply and piping configuration, it is not possible to provide an absolute rule of thumb regarding maximum system volume; however, it is not uncommon to have systems with volumes exceeding 2,000 gallons (7,571 liters) with an operating time of 22 to 23 seconds.

What is the coldest temperature to which the TYCO Ultra K17 and Ultra K34 286°F (141°C) glass bulb sprinklers can be exposed?

The Ultra K17 286°F (141°C) Glass Bulb sprinklers and the Ultra K34 286°F (141°C) Glass Bulb sprinklers may be subjected to temperatures as low as -60°F (-51°C). Keep in mind however, that other system components may have higher temperature limitations, and should be considered. For example, a tri-seal grooved coupling gasket is rated to -30°F (-34°C).

Your QUELL methodology requires that four (4) sprinklers be simulated open when performing the fluid delivery calculations for maximum water delivery time. Which four (4) sprinklers are the most appropriate to simulate open?

Johnson Controls recommends that the four (4) sprinklers utilized, consist of the two (2) most remote sprinklers each of the two (2) most remote branch-lines within the hydraulic remote area. The sequence of operation of the four (4) sprinklers should be based on the linear length of pipe from the sprinkler to the source. For the maximum delivery time calculations, the first sprinkler operation is based on the longest linear length from the source. Additionally, it should be noted that for the minimum delivery time calculation, the first sprinkler operation is based on the shortest linear length from the source.

Is it possible for a grouping of four (4) sprinklers (which are not part of the hydraulically remote area), to result in a longer operating time when evaluated using the SprinkFDT-Q Fluid Delivery Calculation Program, than the four (4) sprinklers chosen in accordance with Item 19 above? If so, why wouldn't I calculate these four (4) sprinklers to determine maximum operating time?

Yes, under certain system piping configurations, a group of four sprinklers; consisting of one (1) sprinkler on four (4) adjacent branch lines; other than the 4 sprinklers described in Question 19, can result in a longer operating time. However, if this group of sprinklers is not within the hydraulically remote area, it will also be true that upon operation, additional water pressure will likely be available to some or all of these sprinklers that is not available to sprinklers within the hydraulically remote area. NFPA 13 states, when flow is from four sprinklers, the test shall simulate two sprinklers on each of two branch lines.

Is a "safety factor" or "cushion" required to be maintained when performing operating time calculations from the maximum operating times required within the QUELL data sheet?

For K34 QUELL systems, a 4 second (20%) safety factor should be used. For K17 QUELL designed systems, there are 3 options outlined below. See relevant data sheets for full details in both cases. There are three (3) options available when performing the operating time calculations based on how you will be validating the calculation in the field. The option chosen will determine the required operating time safety factor.

Option 1: Four (4) Sprinkler Test Manifold – When a 4-sprinkler test manifold is piped from the remote 2 branch lines in accordance with NFPA 13, the following procedure shall be utilized. Perform the 4-sprinkler calculations on the overhead system with no specific "cushion" or "safety factor" required (All piping to test header must be included/modeled in all calculations). After confirming that the calculated overhead sprinklers do not exceed the maximum allowed operating time, run an additional fluid delivery calculation for the 4-sprinkler test manifold by closing the previous four (4) overhead sprinklers and opening the four (4) test manifold sprinklers simultaneously. The resulting time to these four sprinklers is not subject to any maximum time of the overhead sprinklers (i.e. may be greater than 30 seconds). The resultant water delivery time (calculation to first water as opposed to operating time calculation) to these four sprinklers as shown in the calculated results must be verified during the field test.

Option 2: One (1) Sprinkler Inspectors Test – When a single sprinkler inspectors test is installed, the following procedure shall be utilized. Perform the 4-sprinkler calculations on the overhead system with a 5% "safety factor" required (All piping to test header must be included/modeled in all calculations). After confirming that the calculated overhead sprinklers do not exceed the maximum allowed operating time with a 5% safety factor, run an additional calculation for the 1-sprinkler test manifold by closing the previous four (4) overhead sprinklers and opening the single sprinkler inspectors test connection. The resulting time to this single sprinkler inspectors test connection is not subject to the maximum operating time of the overhead sprinklers (i.e. may be greater than 30 seconds). The resultant water delivery time to this single sprinkler inspectors test "sprinkler" as shown in the calculated results must be verified during the field test.

Option 3: If you will not be conducting a Field Verification Test we recommend a 10% safety factor from the stipulated "Operating Times" in Tables A, B, or C be maintained in the calculated results.

Can I install tie-in drains where multiple branch-lines are "tied" together by a common drain line?

Tie-in drains where multiple branch lines are drained by a common drain line should be avoided. While this common line may only be nominal 1 inch in size, it now allows for the branch-lines to "communicate" with each other. This "communicating" would allow for air to also be transferred from line to line, in essence creating a grid-like scenario, as opposed to "dead-end" branch-lines which do not allow for this air transfer. NFPA currently does not allow for gridded dry type systems to be installed due to the increased operating times which can be expected. The SprinkFDT-Q Fluid Delivery Calculation Program does not have the capability to calculate fluid delivery through gridded piping systems.

Do the operating calculations have to be calculated back to the actual source, or can I establish pressure and flow characteristics at any other point in the system and calculate my water delivery based on that information?

The operating time calculations must be calculated back to the source of water supply. This would include any possible underground private loop, etc. which may be present on the site. This allows for the SprinkFDT-Q Fluid Delivery Calculation Program to account for any possible "inertia" conditions which may be present in large underground feeds. The SprinkFDT-Q program automatically considers and calculates for this condition if present, and there is no need for the user to input special information.

There was at one time, a FM Global Engineering Bulletin which appeared to provide similar criteria as your QUELL methodology. Is that bulletin still available and/or applicable if I want to design to FM Global requirements?

The bulletin you reference is FM Global EB-01-06. With recent revisions to FM Global Property Loss Prevention Data Sheet 8-9, (**http://www.fmglobal. com/FMGlobalRegistration**) it is our understanding that the referenced Engineering Bulletin is no longer applicable. Always first consult with FM Global beforehand, for any FM Global specific requirements.

What water supply duration should I utilize when designing in accordance with the QUELL methodology?

When designing in accordance with TFP370 (Ultra K17) a hose stream allowance of 500 gpm is required. For Classes I, II, and III commodities, a water supply duration of 90 minutes is required and for Class IV (which must be protected as group A Plastics) and cartoned unexpanded Group "A" plastics, a water supply duration of 120 minutes is required. When designing in accordance with TFP373 (Ultra K34) and FM datasheet 8-9, a hose stream allowance of 500 gpm and a water supply duration of 90 minutes is required for all commodity types (Classes I, II and III) and building heights.

Can the linear heat detection (LHD) be run perpendicular to the sprinkler branch lines?

Yes. If choosing to run LHD perpendicular to branch lines, the LHD must be run above the sprinkler operating element and must pass each sprinkler no more than 1 foot laterally.

When running the Linear Heat Detection (LHD) on the branch lines, does it matter how low the branch lines are in relation to the sprinklers (i.e. Sprig-ups to sprinklers)?

LHD may be run directly on branch lines which are no larger than 2-1/2 inch nominal pipe size and the sprinklers are attached directly to the pipe (i.e. no sprig-ups allowed in this scenario). It is our intent within the Performance-Based Design approach, to assure as reasonably as possible that the linear heat detection will operate before the first sprinkler operates. For this reason, the requirement for running detection at each branch line instead of larger spacing that detection wires may be listed at was prudent. This would assure that the linear heat detection is typically run at approximately 10 – 12 feet (3 – 3,7m) on center. During full-scale fire testing,

LHD was attached to 2-1/2 inch nominal piping with double loop ties with the LHD installed on the pipe at approximately the 5 o'clock or 7 o'clock position.

Where should I run the Linear Heat Detection (LHD) if I am running parallel to branch lines but the branch lines are larger than 2-1/2 inch or there are "sprig-ups" to the sprinklers?

In scenarios where the branch lines are run low and sprinklers are sprigged up, running the linear detection on the branch lines would not be prudent due to the effect on the thermal response caused by the greater LHD to Ceiling distance. To insure that the linear detection operates before the first sprinklers in this scenario, the LHD may still be run parallel to the branch lines at each branch line, but must be located above the sprinkler and within 12 inches laterally of the branch line.

See the QUELL data sheet for further details.

How do I test the linear heat detection?

Questions regarding the testing and installation of the LHD should be answered by referring to the appropriate manufacturer's installation manual, NFPA 72, and the QUELL data sheet. For any questions not addressed in the above references, contact the Johnson Controls Technical Services Dept.

About Johnson Controls

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