

## Implementing performance-based design in multifaceted storage arrangements



“We asked our FPE partner, Code Consultants, Inc., for a new and innovative option that met our needs – EAS-1 was their solution.”

Jason Lee, Engineering Manager, IKEA

### EAS-1 Electronically Activated Sprinkler System

#### Finding the right solution

In 2017 Code Consultants, Inc. (CCI) reached out to Johnson Controls about a new fire sprinkler technology in development. The recently announced EAS-1 Electronically Activated Sprinkler System offered earlier fire detection and less water and smoke damage compared to a traditional storage space fire protection plan. The system accomplished this through a ceiling-only protection scheme that did not require vertical barriers or in-rack sprinklers – two options that limit warehouse flexibility. Through continued partnership, a potential project involving the newly developed EAS-1 was identified at an IKEA store in Coquitlam, British Columbia in Canada. The IKEA team challenged CCI to find the ideal fire protection solution for their unique needs. The EAS-1 proved to be the right solution.

## IKEA Project Goals

- Ensure fire safety
- Maximize storage flexibility
- Realize project cost savings
- Minimize retail store downtime
- Utilizes existing pipe system and existing fire pump

## IKEA Project by the numbers

- Sprinkler head quantity: 1,360
- Store size: 130,000ft<sup>2</sup> (12,077m<sup>2</sup>)
- 90% of install work completed with no store downtime



## Unique Challenge

The nature of an IKEA store presents unique scenarios that require non-traditional fire protection solutions. The store layout closely mimics a structure similar to a warehouse or storage facility. However, the use of the space is primarily retail focused, serving as a showroom that allows customers to try products before making a selection. This blended use of space allows IKEA customers to shop freely through the majority of available inventory. This inventory includes a high percentage of exposed expanded group A plastics, which requires a higher than usual fire protection system compared to standard retail stores. As with most retail stores, flexibility and store up-time is critical to provide the customer the best shopping experience possible, while maintaining a smooth business operation plan in the background. With all of these factors in mind, the IKEA team started their search for the optimal way to upgrade their fire protection scheme to ensure the safest environment for customers and employees.

Standard fire protection schemes for the specifications of a space like IKEA stores can include vertical barriers, in-rack sprinklers, or ceiling-only sprinklers - all of which would require existing pipe replacement as well as a significant labor cost impact of inventory movement to accommodate system installation. None of these options met the needs of high operational flexibility and minimal space downtime. CCI introduced the EAS-1 concept into the list of possible fire protection options to address the key goals of the IKEA store.

	Replace System: In-rack	Replace System: Ceiling only	Retrofit System: EAS-1
Sprinkler	EC-25 Pendent	ESFR-25	EAS-1 (K17)
Upgrade requirements	<ul style="list-style-type: none"> <li>• Install piping into racks</li> <li>• Replace system piping inclusive of additional risers and mains</li> <li>• Install horizontal barriers</li> </ul>	<ul style="list-style-type: none"> <li>• Complete system replacement required</li> <li>• Fire pump upgrade from 1,500 GPM to a 2,500 GPM pump</li> <li>• Install vertical barriers</li> </ul>	<ul style="list-style-type: none"> <li>• Replace sprinkler heads on existing piping infrastructure</li> <li>• Install sensors and wiring</li> <li>• Install EAS-1 suppression releasing panel</li> </ul>
Warehouse Operations Flexibility	<ul style="list-style-type: none"> <li>• Sprinklers in racks - fixed piping within rack structures limit flexibility of moving racks and are prone to damage</li> </ul>	<ul style="list-style-type: none"> <li>• Ceiling-only sprinklers allow for flexibility with racking</li> <li>• Vertical barriers limit flexibility</li> </ul>	<ul style="list-style-type: none"> <li>• Ceiling-only protection scheme allows full racking flexibility</li> <li>• Smaller K-factor (less pressure and less water being discharged)</li> </ul>

“The Johnson Controls team supports us with direct access to technical staff who help us build solutions for our customers.”

Larry Frank, Senior Project Manager, CCI

## Unique Solution

The EAS-1 was selected as the optimal fire protection system after reviewing the options CCI presented to the IKEA team. The EAS-1 relies on a performance-based design method of developing the ideal system scheme using an intelligent operation of an array of sprinklers around a point of origin. This is accomplished through the system components – sprinkler with metron activator, heat sensor, and a suppression releasing panel wired to all heat sensors. The system detects the fire location faster than traditional protection systems through the sensors that gather data on the rate of rise in the surrounding air temperature. This temperature spike allows the system to select the most accurate sprinklers to activate. Based on the grid pattern design, between 6 and 9 sprinklers activate simultaneously to address the fire location. This design targets the fire with a surround and drown approach which activates only the required sprinklers earlier in the development of the fire.

## Unique Partnership

A unique solution requires a unique partnership. Project success relied on the collaboration among all three groups – IKEA, CCI and Johnson Controls. CCI reached out to the Johnson Controls team early in the project evaluation process to ensure all system requirements met IKEA’s needs. Open communication was essential and allowed our technical staff to review details of prior fire tests and Listing information directly with the CCI team. These technical details were a great asset to the planning process and confirmed the viability of the system in the beginning phase of the project.

Based on the project location, Johnson Controls took steps to add ULC listing to all system components that were previously UL Listed only. Completing this step early in the project avoided delays in the overall timeline. As the project progressed, the local fire officials assessed the fire protection plans and the distinctive ways it met all needs. Johnson Controls was able to help facilitate this conversation in support of IKEA’s end goals. “Johnson Controls collaborated with our local fire marshal to ensure system approval, which was a great support to our team,” said Jason Lee, Engineering Manager, IKEA.





## EAS-1 Electronically Activated Sprinkler System

### Advanced Storage Protection for Higher Hazards

Finally, a sprinkler system for the ever-changing world of warehousing and logistics. With 2-day, overnight, and same-day delivery now commonplace, e-commerce has dramatically changed the way warehouses operate. This new paradigm makes fire protection paramount to keep business moving. The increased plastic content in packaging that is utilized to transport and store products creates new, higher risk challenges. Companies must adapt to meet customer expectations – and EAS-1 is ready to meet that demand.

#### Features & Benefits

- 25% earlier fire detection reduces facility and commodity smoke damage
- Up to 60% smaller fires and reduces water damage
- Use 50% of required water compared to traditional systems
- Maximizes use of existing infrastructure
- Optimizes storage flexibility
- All system components are UL, ULC Listed

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