

TYCO Model WS & FireLite Plus WS Product Alert

 **Authorities Having Jurisdiction (AHJs)** should read this alert before considering approval for TYCO Model WS or FireLite Plus WS using [ESR-2397](#) as an alternate to 1-2 hour wall assemblies.

◆ **Alternative Assembly Subject to AHJ Approval**

TYCO Model WS and FireLite Plus WS both require prior approval by the AHJ for use as an alternative to a two-hour fire-resistance-rated non-loadbearing interior fire barrier assembly prescribed in IBC Section 707, fire partition assembly prescribed in IBC Section 708 or exterior wall assembly prescribed in IBC Section 705. Per Section 5.9 Conditions of use in ESR-2397:

*“The fixed glazed assembly is not permitted to be used in lieu of fire walls. Where the assemblies are used as an alternative to fire barriers for exit-passageways, horizontal exits, or exit enclosures, the fire area (Section 202 of the IBC) in which the assembly is located shall be fully sprinklered in accordance with Section 903.3.1 of the IBC. The water supply duration for the sprinklers, where used, shall be not less than the fire resistance rating that would have been required for a fire barrier. **In addition, the registered design professional shall provide the code official with documentation in accordance with Section 104.10 of the IBC for a code modification or Section 104.11 of the IBC for an alternative method of construction that addresses any anticipated impact on the functionality of the means of egress.**”*

◆ **Alternative Methods and Materials Clauses**

Since ESR-2397 mentions IBC sections 104.10 and 104.11 so that AHJs can consider the TYCO Model WS and FireLite Plus WS as alternatives to already tested, listed and code approved 1-2 hour fire resistive glazing assemblies, it is important to review the intent of these clauses:

IBC Section 104.10 states that:

*“**Wherever there are practical difficulties involved in carrying out the provisions of this code, the building official shall have the authority to grant modifications for individual cases**, upon application of the owner or owner’s representative, provided the building official shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and that **such modification does not lessen health, accessibility, life and fire safety, or structural requirements**. The details of action granting modifications shall be recorded and entered in the files of the department of building safety.”*

IBC Section 104.11 states that:

*“... An alternative material, design or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, **at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety.**”*

◆ **Alternative Methods and Materials Clauses** *continued*

 **Question for AHJs:**
Given that USA-made, tested, listed and code approved 1-2 hour fire resistive are have been readily available for over three decades now, what 'practical difficulties' exist today that would warrant this alternative system?

It certainly isn't design flexibility. In fact, there are several design requirements and limitations outlined in ESR-2397, such as:

- ◆ Maximum exposed glazing height of 13 feet. No horizontal mullions allowed.
- ◆ 36" minimum pony wall with heat-strengthened or tempered glazing.
- ◆ Water supply duration for the sprinklers must equal the rating of the wall.
- ◆ Cannot be used in exterior wall applications where the fire separation distance is less than 10 feet for states following the 2009, 2012 and 2015 IBC (5 feet for states following the 2006 IBC).

None of these requirements or limitations apply to 1-2 hour fire resistive glazing assemblies.

It certainly isn't cost either. Aside from the material and installation costs of the TYCO WS sprinkler system and the fixed glazed assembly, there are a number of associated costs that the building owner has to pay for, such as:

- ◆ Additional research, calculations and other administrative costs that the architect submits to the AHJ for approval.
- ◆ Additional water supply and pressure that this special wet-pipe sprinkler system requires.
- ◆ Laminated ceramic used in the FireLite Plus WS system can cost up to \$120/sq. ft.
- ◆ Perpetual maintenance cost of the special wet-pipe sprinkler system for the entire life of the building.

Other than material and installation, there are no other associated and perpetual maintenance costs for using 1-2 fire resistive glazing assemblies.

◆ **Fact is, Sprinklers Can and Do Fail**

According to NFPA's Report U.S. Experience with Sprinklers in June 2013, "Sprinklers operated in 91% of all reported structures large enough to activate sprinklers... When sprinklers operated, they were effective 96% of the time, resulting in a combined performance of operating effectively in 87% of all reported fires where sprinklers were present in the fire area and the fire was large enough to activate them."

In the same NFPA report, majority of sprinkler failures (where sprinklers did not activate at all) occurred because the system was shut off, and that majority of sprinkler ineffectiveness (where sprinklers activated but were not effective) was because water did not reach the fire or not enough water was released. This could be caused by a number of factors, including manual tampering, lack of maintenance, low water pressure or damage to the system, which is a real possibility during natural disasters such as earthquakes.

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◆ **Fact is, Sprinklers Can and Do Fail** *continued*

So in the case of the alternative system provided by TYCO Model WS and FireLite Plus WS, its potential effectiveness is entirely dependent on 100% sprinkler reliability and effectiveness, which doesn't exist. The NFPA report demonstrates, the potential for failure is always present – whether caused by human error, equipment failure, natural disasters, or something else.

On the other hand, fire resistive glazing assemblies that do not require prior AHJ approval provide built-in life and property protection 24 hours a day, 7 days a week without the mechanical triggers that sprinklers need, which makes it 100% reliable, effective and virtually maintenance-free.



Question for AHJs:

Given this difference, how can an alternative 'wall' system that is entirely dependent on 100% sprinkler reliability – which does not exist per the NFPA's report – be relied upon to provide the same level of protection fire resistive glazing assemblies already provide?

It would be hard to see how the TYCO Model WS or FireLite Plus WS system can satisfy the alternative methods and materials clauses in the IBC.

◆ **Why the Special Treatment, and What About Radiant Heat?**

Perhaps the most troubling concern of all is how the ASTM E-119 or UL 263 test method and test assembly were substantially modified for TYCO Model WS or FireLite Plus WS to take into account sprinkler discharge. This system relies on 100% sprinkler reliability (which does not exist) to wet the surface of the glass to limit the rate of heat transfer to and through the glass. When the sprinklers fail to operate, the non-rated glass will be useless in preventing fire, smoke and dangerous radiant heat.



Question for AHJs:

So why give special treatment to a system that may not always work? Especially with a function as important as providing safe egress to building occupants or safe harbor for occupants awaiting rescue?

Another concern that should be raised is how this system limits radiant heat, which are invisible electromagnetic waves that travel at the speed of light with little resistance. When these waves strike an object, they are absorbed and their energy is converted to heat. If the object is a combustible material, a fire will start when the material's ignition temperature is reached. Radiant heat is extremely dangerous to building occupants since it can quickly reach a level that causes unbearable pain, followed rapidly by second degree burns, preventing safe egress.

Wetting the surface of heat-strengthened glass or tempered glass may prevent thermal shock and compartmentalize smoke and flames, but it won't prevent the passage of radiant heat.

Ceramics may be able to resist cracking or shattering at high temperatures because it is an excellent conductor of heat. This is why it is widely used as cooktops, and why the IBC limits its use to fire protective applications only because it does not limit radiant heat whatsoever.

◆ Why the Special Treatment, and What About Radiant Heat? *continued*

Fire fighters with first hand-experience with radiant heat can attest that water curtains do not stop radiant heat transmittal. As one firefighting training manual puts it:

“Because water itself is transparent and radiant heat will pass through it, throwing a stream between the fire and the exposure will not protect the exposure. The radiant heat will move through the stream and heat the surface of the exposure at its ignition point.” (Engine Company Fireground Operations, 2nd edition)

Robert Davidson, former fire marshal, echoes this point, and continues to say in an article in Construction Specifier, “the fire service eventually realized that a water curtain does not stop fire spread. Heat is transmitted to other objects by conduction, convection, direct flame impingement and radiation. The water curtains may be able to effect convection to some degree depending on the size of the fire, but they do not stop radiated heat because the water is not opaque.”

Fact is, the only materials proven to limit the passage of radiant heat are fire resistive building materials that have successfully passed ASTM E-119 testing without any modifications to the test method or test assembly.

Allowing an alternative ‘wall’ that relies on sprinklers wetting the surface of heat-strengthened, tempered or ceramic glass to take the place of readily available, true ASTM E-119 tested, listed and labeled fire resistive glazing assembly means the risking the lives of building occupants that the code community serves to protect.

For more information, contact your local SAFTI *FIRST* architectural representative today or call us toll-free at 888.653.3333.