



## LFP Antifreeze, Nitrogen Generator, and New Products

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- Polling
- Post-webinar assessment
- Ask questions
- Chat window



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## Portfolio of Flagship Brands

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RECORD ●

# Listed Antifreeze for Sprinkler Systems

April 2020

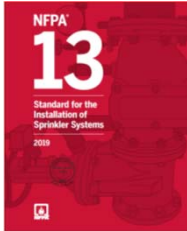
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**NFPA 13, 2019 Edition**

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## Protection of Piping Against Freezing (13:19, 16.4.1)



If systems cannot be maintained at or above 40°F (4°C):

- Listed Antifreeze
- Insulation
- Listed, Supervised Heat-trace
- Dry Pipe or Preaction System
- PE Verified Heat-loss Calculations

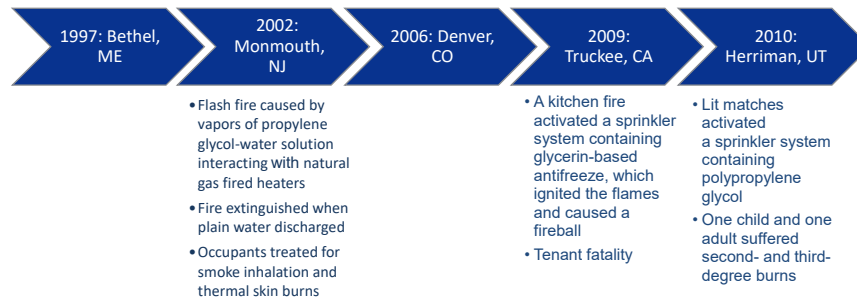
### Options for Protecting Piping Against Freezing

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## Addressing a Life Safety Concern



### Serious Incidents Involving Antifreeze



Source: The Fire Protection Research Foundation, Antifreeze Solutions in Home Sprinkler Systems, 2010

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## Antifreeze Combustibility



### Details

Testing and Heat Release Rates
Residential pendent, concealed and sidewall sprinklers
K-factors between 3.1 and 7.4 tested
Solutions of glycerin and propylene glycol were tested
Glycerin — from 50% – 70% concentration by volume
Propylene Glycol — from 40% – 60% concentration by volume

### Findings

Large-scale ignition was found to occur in various situations
50% glycerin & 40% propylene glycol w/ HRR of 3.0 MW
55% glycerin & 45% propylene glycol w/ HRR of 1.4 MW
>55% glycerin & >45% propylene glycol w/ HRR of <0.5 MW

### Results

Antifreeze Mixture	Freezing Point	Density at 68°F	Energy Released
Water	32 °F	0.998 kg/l	357 MJ
Glycerin	-22 °F	1.146 kg/l	596 MJ
Propylene Glycol	-22 °F	1.062 kg/l	629 MJ



Fig. 3 – Water test at 4.8 min.

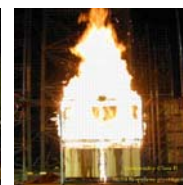


Fig. 3 – 50% Water/Glycol test at 4.8 min.

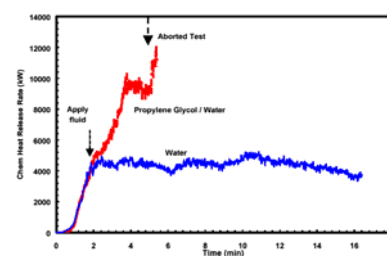


Fig. 2 – HRR v Time for water and 50% water/glycol



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## Current Antifreeze Rules – NFPA 13, 13R & 13D, 25

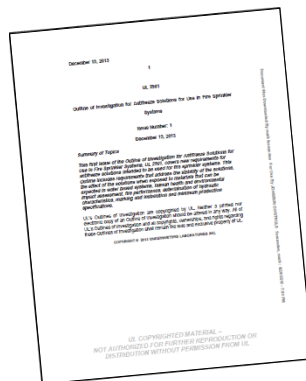


	Propylene Glycol	Glycerin
NFPA 13 (13:19, 8.6.2)	Shall Be Listed for Use in Sprinkler Systems	Shall Be Listed for Use in Sprinkler Systems
NFPA 25 installed prior 9/30/2012 (25:20, 5.3.4.4.1)	Premixed Non-listed 30% by Volume Until 9/30/2022	Premixed Non-listed 38% by Volume Until 9/30/2022
	Premixed Non-listed Between 30% and 40% with a Deterministic Risk Assessment	Premixed Non-listed Between 38% and 50% with a Deterministic Risk Assessment
NFPA 25 installed after 9/30/2012 (25:20, 5.3.4.4)	Listed Antifreeze	Listed Antifreeze
NFPA 13R (13R:19, 5.4.2)	Follow NFPA 13	Follow NFPA 13
NFPA 13D (13D:19, 9.2.2)	Listed or 38% When Deemed Acceptable by AHJ	Listed or 48% When Deemed Acceptable by AHJ

**New listed solutions NOT required to be Glycerin- or Glycol-based, as long as they pass UL 2901**



## UL 2901 Test Protocol for Antifreeze



**Test protocol recently finalized by UL, in development since 2011**

### Performance

- General
- Characterization Tests
- High Ambient Temperature Stability
- Temperature Cycling Stability
- Electrical Conductivity
- Corrosion Rate
- Pit Depth Corrosion
- Exposure to Elastomeric Materials
- Stress Corrosion
- Impact of Galvanic Action
- Compatibility with Polymeric Materials
- Toxicity
- Exposure to Fire
- Fire Fighting Effectiveness
- Viscosity at Temperature Limitations
- Resistance to Leakage



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## Tyco LFP® Antifreeze


Listed for use in residential, commercial and storage applications\*

**Benefits**

- Cost-effective
- Easy installation & maintenance
- Helps meet NFPA 13, 13R, 13D & 25
- UL Listed

**Features**

- 5-gal. pail
- 30-gal. drum
- Non-toxic<sup>2</sup>
- Compatible with most system materials
- Minimum use temperature -10°F (-23.3°C)



2. For the purposes of this product, non-toxic means acute exposure to ingredients in the LFP™ antifreeze does not pose a risk of adverse effects in humans or the environment following short-term exposure in scenarios related to fire sprinkler system installation, maintenance, and discharge.

\*Not listed for extra hazard occupancies, flammable liquid protection or systems using ESFR Sprinklers

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## Minimum Use Temperature— the Correct Message for Installers

**Unlisted Solution Confusion**

Existing “unlisted” antifreeze reference multiple temperature values with no guidance on which to follow or what various temperatures mean.

**FireFighter® GL48**  
*Pre-mixed Antifreeze for Wet Fire Sprinkler Systems*

% of FireFighter GL48	Freeze Point	Flow Point	Burst Point	Specific Gravity @ 77° F / 25° C
100	-15°F	-25°F	-50°F	1.137



**Listed Solution Clarity**

UL Standards call for *Minimum Use Temperature*: the value that allows the sprinkler system to operate as intended.

**LFP™ Antifreeze**  
**Agency Listed Solution for Fire Sprinkler Systems**

Allowable Temperature Range:

Minimum Use Temperature:  
-10°F (-23.3°C)

Max Use Temperature:  
150°F (65°C)

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## Technical Details



Tyco LFP® Antifreeze Pre-mixed antifreeze solution	
Appearance	Liquid, colorless
Minimum Use Temperature	-10°F (-23.3°C)
Refractive Index	1.3960 – 1.3995
pH	7 – 8
Specific Gravity	1.122 – 1.129
Electrical Conductivity	1000 – 1400 microsiemens/cm
Compatible Piping	CPVC, PEX, steel, brass, stainless steel, black steel, copper, cast iron, fusion bonded epoxy coated materials
Compatible Materials	EPDM natural rubber, SBR, BUNA-N elastomeric materials

See Tech Data Sheet TFP1680 for full details

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## Installation and Maintenance Overview



### Installation Instructions

#### New Systems

Ensure system is air-tight

Perform pressure test to 200 psi to ensure no leakages

Test LFP® Antifreeze using a refractometer and/or hydrometer to demonstrate compliance to property ranges

Fill system with LFP® Antifreeze

Perform pressure test to 200 psi to ensure no leakages

#### Existing Systems

Flush branch lines and mains to avoid contamination

Perform pressure test to 200 psi to ensure no leakages

Test LFP® Antifreeze using a refractometer and/or hydrometer to demonstrate compliance to property ranges

Fill system with LFP® Antifreeze

Perform pressure test to 200 psi to ensure no leakages

Test the system again to verify solution is not diluted

### Maintenance Instructions\*

#### Fluid Test

Use a hydrometer or refractometer to test fluid annually, prior to cold weather

- Annual calibration of test equipment is required
- See TFP1680 for suggested tools

The acceptable property ranges of LFP® Antifreeze are:

Concentration of LFP Antifreeze %	Specific Gravity at Approximately 77°F (25°C)	Refractive Index at 77°F (25°C)
100	1.122 – 1.129	1.396 – 1.3995

\*Automatic sprinkler antifreeze systems to be inspected, tested and maintained by a qualified inspection, testing and maintenance service.

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## Tyco LFP® Antifreeze

Testing Requirements and Usage Limitations



### Testing Requirements

Same installation/maintenance requirements as existing antifreezes per NFPA 13 and 25

It is recommended that automatic sprinkler antifreeze systems be inspected, tested and maintained by a qualified inspection, testing and maintenance service annually, prior to cold weather

Tools to use for testing antifreeze solution:

Digital refractometer

Hydrometer and thermometer in appropriate graduated cylinder

### Volume Limitations

NFPA 13D	<ul style="list-style-type: none"> <li>No volume limitations</li> <li>Antifreeze may only be used in above-ground piping</li> </ul>
NFPA 13R	<ul style="list-style-type: none"> <li>No volume limitations</li> <li>Dwelling-only buildings are limited to above-ground use of antifreeze</li> </ul>
NFPA 13R Mixed-Use Occupancies	<ul style="list-style-type: none"> <li>No volume limitations for system size in buildings containing only dwellings</li> <li>System size limitation of 40 gal. for sprinkler systems in non-dwelling buildings</li> <li>System size limitation of 40 gal. in mixed-use occupancies fed by a single sprinkler system</li> <li>If future building renovations result in occupancy classification changes, a fire sprinkler system evaluation must be performed to determine if any changes are required for the use of antifreeze</li> <li>Only above-ground piping may be filled with antifreeze</li> </ul>
NFPA 13	<ul style="list-style-type: none"> <li>Buildings with occupancy classifications of Light Hazard and Ordinary Hazard Group 1 and 2 are limited to a sprinkler system volume of 40 gal.</li> <li>Storage applications using non-ESFR sprinklers are limited to a sprinkler system volume of 40 gal.</li> <li>LFP® antifreeze is not listed for use in protecting Extra Hazard occupancies, flammable liquids or use with ESFR sprinklers.</li> </ul>

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## Common Misconceptions



### Antifreeze is....

#### Toxic

##### Tyco LFP® Antifreeze is:

- Safe
- Non-toxic\*
- Easily disposed of at local waste water treatment centers

\*For the purposes of this product, non-toxic means that acute exposure to ingredients in the LFP™ Antifreeze does not pose a risk of adverse effects in humans or the environment following short-term exposure.

#### Expensive

##### Tyco LFP® Antifreeze is:

- A very cost-effective way to protect a piping system from cold environments
- Alternatives, such as dry pipe systems and heat tracing, can:
  - Be expensive
  - Require monitoring
  - Require maintenance
  - Create design challenges in some situations

#### Hard to Work With & Maintain

##### Tyco LFP® Antifreeze is:

- Easy to install and compatible with most common fire protection piping system materials using a small pump

Following NFPA 25, the system can be quickly checked annually and does not need to be replaced unless the material is diluted or out of spec.

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## Resources



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## Resources



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### Poll Question 1

What is the minimum use temperature of Tyco LFP?

- a. 32 degrees F
- b. 40 degrees F
- c. -10 degrees F
- d. -60 degrees F



## Nitrogen Generation

Tyco NG Series Nitrogen Generators



## Learning Objectives

- Discuss the issue of corrosion in water based fire protection systems
- Outline the Tyco NG-Series Product
- Identify the use of nitrogen generation for dry pipe system inerting.
- Describe the use of nitrogen in wet pipe systems and air venting.
- Recognize Corrosion Monitoring solutions and the technical information used with the Tyco Model NG series nitrogen generators



Proprietary Nitrogen Generation- Tyco NG Series

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## Corrosion in Fire Sprinkler Systems

## The Corrosion Triangle

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▪ Corrosion requires three components:

- Water
- Metal
- Oxygen

▪ Fire sprinkler systems typically have all three:

WATER	Water in the pipes and/or the moisture in compressed air
METAL	The galvanized or black steel pipe
OXYGEN	Compressed air (Dry/Preaction); Trapped air (Wet)



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## The Impact of Corrosion

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- Corrosion damage in a fire protection system can cause pinhole leaks or partial/full system blockages.

**Pinhole Leaks**

- Damage property (structures, inventory, etc...)
- Interrupt business during repairs/replacement
- Increase expected system-maintenance costs

**Partial/Full System Blockages**

- Reduce water flow capacity
- Clog sprinklers, preventing them from spraying properly
- Increase the risk of an uncontrolled fire loss



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## Why are Fire Sprinkler Systems Prone to Corrosion?

The fire sprinkler industry has several practices which accelerate the impact of corrosion.

<b>Widespread use of thin-wall branches</b>  <p>Thinner metal has the potential to develop pinhole leaks more quickly, accelerating repair/replace timeline</p>	<b>Galvanized pipe for dry/preaction</b>  <p>Galvanized coating can flake off which allows for highly-localized corrosion causing pinhole leaks</p>	<b>Grid design – branch lines elevated</b>  <p>Trapped air at the high points will cause corrosion at the air-water interface</p>	<b>Trapped water in all dry pipe systems</b>  <p>Impossible to remove all water from a dry system – corrosion reaction only requires a small amount</p>	<b>Code-mandated system testing</b>  <p>Testing introduces fresh oxygen to the system which restarts the corrosion process</p>
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## Air Venting and Nitrogen Inerting

Removing the oxygen is the most effective way to reduce corrosion in fire sprinkler systems. Our Corrosion Solutions program will cover the following options:

Air Venting	Nitrogen Inerting
<p>By venting the trapped air in wet systems, you <b>reduce the corrosion</b>. It's a linear reaction – vent 50% of the trapped air, reduce corrosion by 50%.</p> 	<p>Nitrogen is an inert gas and will not react with metal and water to cause corrosion. If you replace the oxygen with nitrogen, you will <b>stop the corrosion</b> process.</p> <div style="display: flex; justify-content: space-around;"> <div> <p><i>Dry Pipe Nitrogen Inerting (DPNI)</i></p>  </div> <div> <p><i>Wet Pipe Nitrogen Inerting (WPNI)</i></p>  </div> </div>

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## NFPA References

- NFPA 13 (2019 Edition) : Standard for the Installation of Sprinkler Systems
  - Chapter 4: General Requirements
  - Chapter 5: Water Supplies
  - Chapter 8: System Types and Requirements
  - Chapter 28: System Acceptance
- NFPA 25 (2020 Edition) : Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems
  - Chapter 13: Common Components and Valves



Proprietary Nitrogen Generation-Type NC Series

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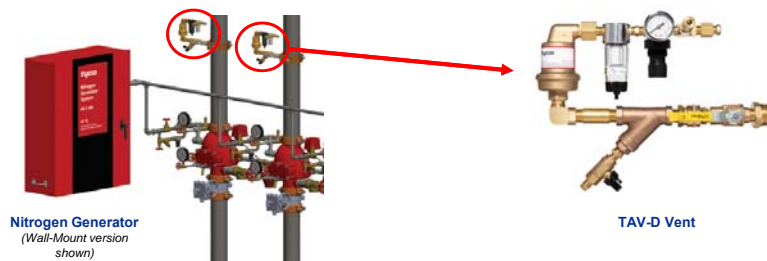
## Dry Pipe Nitrogen Inerting



## TYCO Dry Pipe Nitrogen Inerting (DPNI)

There are three essential components to the TYCO Dry Pipe Nitrogen Inerting process.

- **Continuous source of nitrogen** capable of 98%+ purity – nitrogen generator
- **Oxygen removal vent** to facilitate removal of oxygen from the dry piping system
- A **fill/purge method** to facilitate removal of oxygen from dry system



**Nitrogen Generator**  
(Wall-Mount version shown)

**TAV-D Vent**



## NG-1 Nitrogen Generators – Features & Benefits

- Wall-mount, skid-mount, or stand-alone configurations
- Can serve one or more systems from a single location
- FM Approved / CE Marked
- No nitrogen storage tanks or refrigerated air dryers
- Standard alarm signals
  - Air bypass mode
  - Excessive runtime / leak monitoring
- Standard monitoring points
  - Nitrogen generator loss of power
  - Air bypass mode
  - Nitrogen generation mode
  - Excessive runtime / leak monitoring

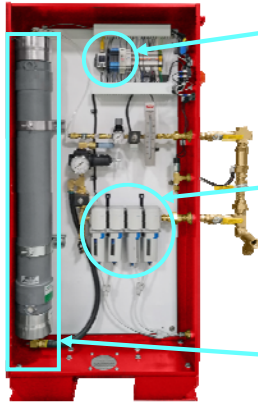




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## NG-1 Nitrogen Generators

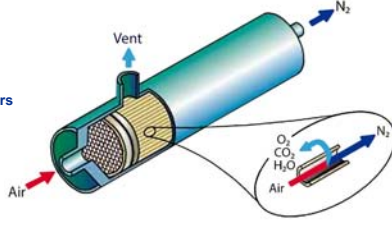
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**Control Panel**

**Filters**

**Nitrogen Membrane**




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## NG-1 Nitrogen Generators – Available Options

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	NG-1 100	NG-1 250	NG-1 500	NG-1 1000	NG-1 1150	NG-1 1500	NG-1 2000	NG-1 3000
<b>Total System Capacity Gal (L)</b>	675 (2555)	950 (3596)	2000 (7571)	3200 (12113)	6500 (24605)	11000 (41640)	18500 (70030)	22500 (85172)
<b>Single System Capacity @ 40 psi (2.75 bar)* Gal (L)</b>	215 (814)	265 (1003)	560 (2120)	950 (3596)	1150 (4353)	1440 (5451)	2025 (7666)	2900 (10978)
<b>Single System Capacity @ 20 psi (1.4 bar)* Gal (L)</b>	540 (2044)	590 (2233)	1120 (4240)	1800 (6814)	2300 (8706)	2880 (10902)	4050 (15331)	5800 (21955)
<b>Air Compressor</b>	Integral Oil-Less				Oil Lubricated			
<b>Configuration</b>	Wall Mount			Skid Mount	Stand Alone			



**UL 508A Listed  
Industrial  
Control Cabinet**

\*Single system capacity based on 30 min. fill requirement of largest single sprinkler system; a secondary air compressor with normally closed isolation valve can be used to meet fill requirement for larger individual systems

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## Air Vents – Dry Systems

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- TYCO Dry Pipe Nitrogen Inerting requires **one** oxygen-removal vent **for each system** being supported by a Nitrogen Generator. TYCO Dry vent features include:
  - Designed to be **mounted at the riser**
  - Listed float valve to prevent water discharge
  - In-line filter to protect restricted orifice
  - Pressure regulating device provides fail-safe to **prevent acc** sprinkler system
- To complete the 14-day DPNI process, there are two vent optic
  - TAV-D** Oxygen Removal Vent – Manual Shut-off
  - TSV-D** Oxygen Removal Vent – Electronic Shut-off

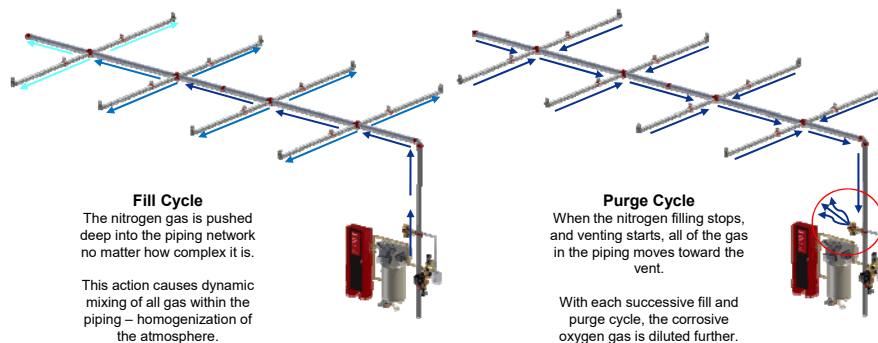


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## “Fill-and-Purge” Breathing Method

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Over a 14-day period, the oxygen gas is removed which inertes the atmosphere in the pipe.

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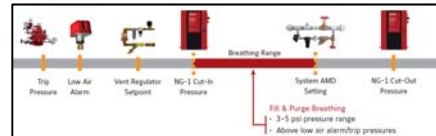
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## Dry Pipe Nitrogen Inerting

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### “Fill-and-Purge” Breathing Method

- Achieves 98% Nitrogen purity throughout entire fire sprinkler system
- Allows you to install vent directly on riser – **faster, easier installation**
  - No need to install vents at far points of system
- Eliminates need for nitrogen tank – **reduces equipment footprint**



### TYCO NG-1 Nitrogen Generators

- Use nitrogen membrane technology which eliminates need for refrigerated air dryers
- Can support multiple systems at the same time
- Are available as pre-engineered units to **minimize installation time**

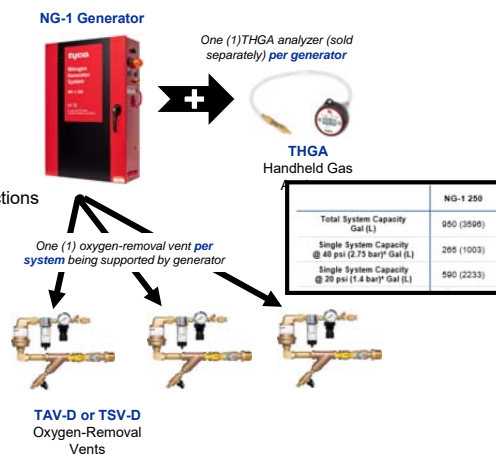
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## Ordering Process – Nitrogen Generators (DPNI)

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- To ensure the nitrogen generator is appropriately sized and you have all required components, customer will need to provide the following details:
  - Total cumulative size of all dry/preaction sprinkler systems
  - Size of the largest single dry/preaction sprinkler system
  - Total number of dry/preaction sprinkler systems
  - Supervisory pressure of all dry/preaction sprinkler systems
  - Voltage requirements for electrical connections
  - Do they require manual or automatic air vents for each system?



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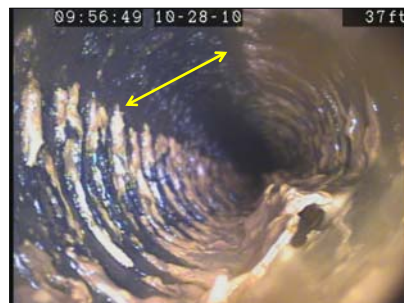
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## Wet System Air Venting



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### Corrosion in Wet Systems – Look for the Trapped Air



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### Corrosion in Wet Systems – Trapped Air (Gridded Center Pitched)

The diagram illustrates two scenarios of trapped air in a wet system. The top view shows a grid of pipes with a central area circled and labeled "Trapped Air". The side view shows a pitched pipe with a central air pocket circled and labeled "Trapped Air". Red circles at the air/water interface are labeled "Hot Spot at the air/water interface".

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### Corrosion in Wet Systems – Trapped Air (Pitched, Back to Front)

The diagram illustrates two scenarios of trapped air in a wet system. The side view shows a pitched pipe with a back air pocket circled and labeled "Trapped Air". The top view shows a grid of pipes with a back air pocket circled and labeled "Trapped Air".

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## Air Vents – Wet Systems

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- Since trapped air is the primary source for oxygen being in a wet system, you can reduce corrosion by venting the trapped air.
  - Install a vent in a level position at an accessible high point on the sprinkler system where trapped gas can be vented
  - For higher-levels of corrosion protection, follow the Wet Pipe Nitrogen Inerting process.
- There are two vent options – depending if you are going to use Nitrogen to protect against corrosion:
  - **TAV-W** Oxygen Removal Vent – Wet Systems
  - **TAV-WN** Oxygen Removal Vent – Wet Pipe Nitrogen Inerting



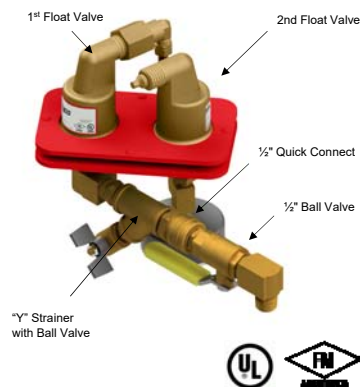
Remove 50% of the trapped air from a wet system  
and you will reduce corrosion activity by 50%!

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## TAV-W Automatic Wet Vent

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- Redundant automatic reset design
- No requirement to plumb to drain
- Easily convertible to TAV-WN for wet pipe nitrogen inerting

*Codes/standards are changing to address corrosion in wet pipe systems.*

**NFPA 13, 2016/2019 Editions**

Single air vent **shall** be provided on each wet pipe system

**FM Global Data Sheet 2-1**

**2.2.1.8** Remove trapped air from wet-pipe sprinkler systems

- Install minimum 1/2" FM Approved automatic air-release valve OR
- Install FM Approved manual valve at system high points

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## Wet Pipe Nitrogen Inerting

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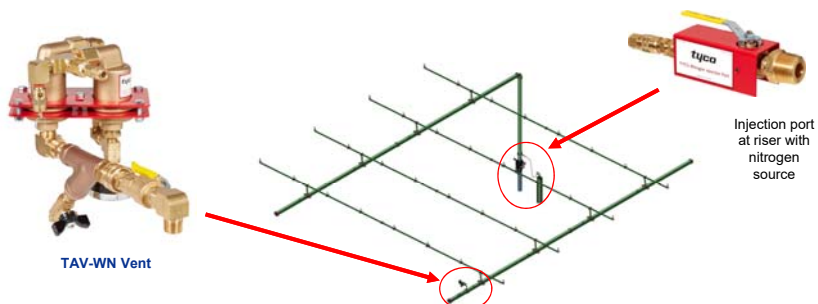


### TYCO Wet Pipe Nitrogen Inerting (WPNI)



There are three essential components to the TYCO Wet Pipe Nitrogen Inerting process.

- **Nitrogen source** capable of 98%+ purity – nitrogen cylinders or nitrogen generator
- **Oxygen removal vent** to facilitate removal of oxygen from the wet piping system
- **Proven protocol** to displace oxygen gas with nitrogen



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## TYCO Wet Pipe Nitrogen Inerting (WPNI)

- TYCO Wet Pipe Nitrogen Inerting provides a higher level of corrosion protection than simply venting air from a wet system.
  - Manual pressure cycling with nitrogen gas removes corrosive oxygen
  - Any gas which remains in the system is not corrosive
  - WPNI pressure cycling process is accomplished over 2-3 hours so system can quickly be returned to service

### Key Products



**TAV-WN**  
Oxygen Removal Vent –  
Wet Pipe Nitrogen Inerting



**TNIP**  
Nitrogen Injection Port  
(included with TAV-WN,  
or sold separately)



**TNIK**  
Nitrogen Inerting Startup Kit  
(Nitrogen cylinder regulator; 25-ft hose)



**THGA**  
Handheld Gas Analyzer

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## Wet Pipe System Comparison



Untreated System



WPNI Treated System

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## Poll Question 2



*Choose the best response to fill in the blank.*

NG-1 nitrogen generators prevent corrosion in \_\_\_\_\_.

- a. deluge systems
- b. wet pipe systems
- c. dry type systems
- d. wet and dry type systems

Corrosion  
Monitoring

## TYCO In-Line Corrosion Detector

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- Installs in-line with piping system
- Roll grooved ends for easy installation
- Available in diameters: 1-1/4" to 8"
  - Schedule 10 or 40
  - Black Steel or Galvanized

### Advantages

- Real-time early warning system
- No obstruction issues to interfere with system flow
- 360° exposure of pipe surface to corrosion

Thin-walled section  
creates a pressure  
chamber



Remote Test Station  
included

51 Johnson Controls — Proprietary Nitrogen Generation—Tyco NG Series

Johnson  
Controls

## In-Line Corrosion Detector – Dry System Installation

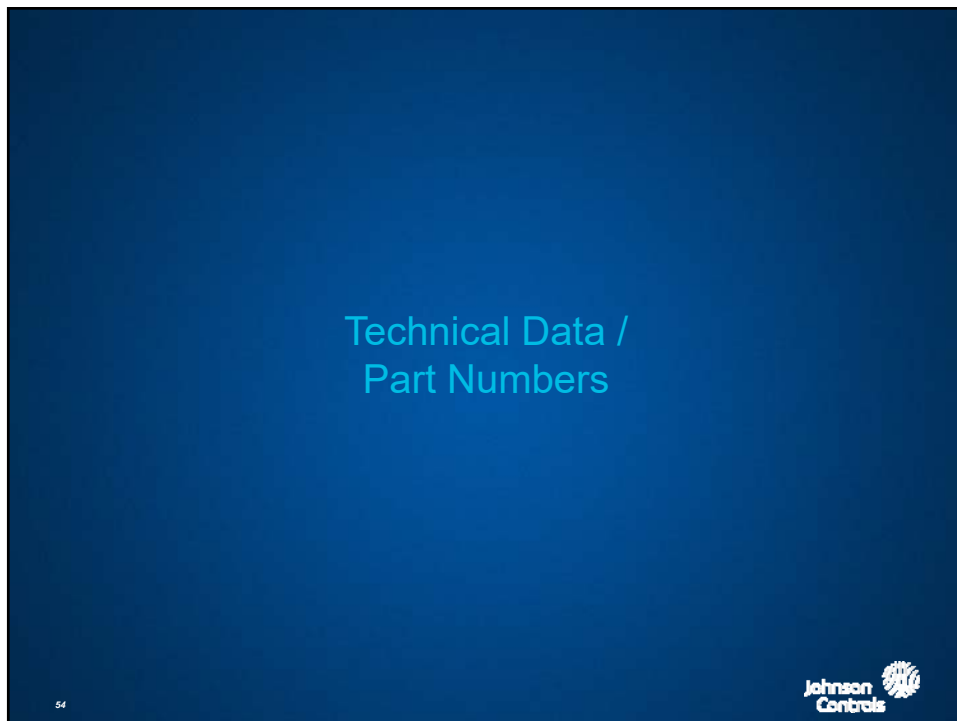
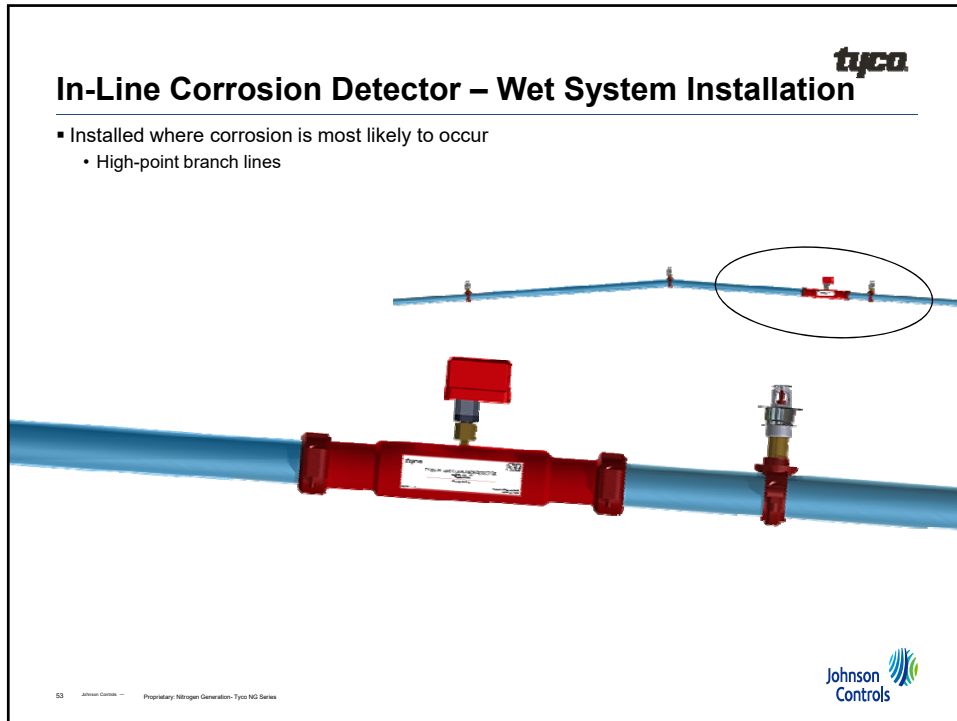
**tyco**

- Installed where corrosion is most likely to occur
  - Low-point mains



52 Johnson Controls — Proprietary Nitrogen Generation—Tyco NG Series

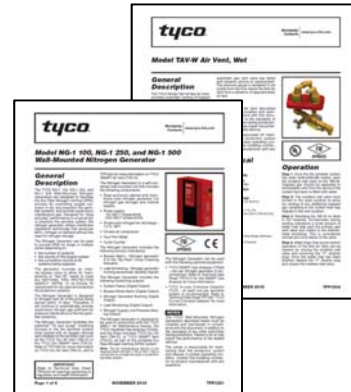
Johnson  
Controls



## Technical Data Sheets

- Data sheets available on [www.tyco-fire.com](http://www.tyco-fire.com)

Data Sheet	Models	Subject
TFP1251	NG-1 100, 250, 500	Nitrogen Generators - Wall Mount
TFP1252	NG-1 1000	Nitrogen Generators - Skid Mount
TFP1253	NG-1 1150, 1500, 2000, 3000	Nitrogen Generators - Stand-Alone
TFP1261	TILO	In-Line Corrosion Detector
TFP1262	TAV-D	Oxygen Removal Vent, Dry Systems - Manual
TFP1263	TSV-D	Oxygen Removal Vent, Dry Systems - Smart
TFP1264	TAV-W	Automatic Air Vent, Wet Systems
TFP1265	TAV-WN	Automatic Air Vent, Wet Systems – Nitrogen Inerting
	TNIP	
	TRIS	
TFP1266	TNIK	Nitrogen Inerting Kit
TFP1267	THGA	Handheld Gas Analyzer / Gas Sampling Port
	TGSP	
	TGSK	
TFP1268	TNIM	Nitrogen Inerting Manifold
TFP1269	TNIC	Nitrogen Interface Controller
TFP1270	TSGA	Smart Gas Analyzer
TFP1272	TNST-2000	Nitrogen Storage Tank - 200 gal.



## NG-1 Installation Manuals



## Americas Price Book – Part #s / List Pricing



Nitrogen Generators					
Model	Size	Total System Capacity (gal.)	Flow Rate (SLPM)	Pressure (PSI)	List Price
NG-1 150	Wall Mount	475	175	120 VAC / 60 Hz	TNG0150 \$12,100.00
NG-1 250	Wall Mount	850	285	120 VAC / 60 Hz	TNG0250 \$13,450.00
NG-1 500	Wall Mount	2,000	800	120 VAC / 60 Hz	TNG0500 \$19,175.00
NG-1 1000	Stand Alone	2,000	800	120 VAC / 60 Hz	TNG1000 \$25,125.00
NG-1 1150	Stand Alone	6,500	1,150	120 VAC / 60 Hz	TNG1150 \$28,525.00
NG-1 1500	Stand Alone	11,000	1,400	120 VAC / 60 Hz	TNG1500 \$40,600.00
NG-1 2000	Stand Alone	18,500	2,200	120 VAC / 60 Hz	TNG2000 \$50,825.00
NG-1 3000	Stand Alone	22,500	2,800	120 VAC / 60 Hz	TNG3000 \$72,350.00

Replacement Filters			
Model	Type	Part No.	List Price
NG-1 150	Simplex	TNGCFP15001	PGA
NG-1 250	Simplex	TNGCFP25001	PGA
NG-1 500	Simplex	TNGCFP50001	PGA
NG-1 1000	Simplex	TNGCFP10001	PGA
NG-1 1150	Simplex	TNGCFP11501	PGA
NG-1 1500	Simplex	TNGCFP15001	PGA
NG-1 2000	Simplex	TNGCFP20001	PGA
NG-1 3000	Simplex	TNGCFP30001	PGA
NG-1 1500	Duplex	TNGCFP15002	PGA
NG-1 2000	Duplex	TNGCFP20002	PGA
NG-1 3000	Duplex	TNGCFP30002	PGA

Compressor Start-Up Kits (For Replacement Compressors Only)			
Model	Type	Part No.	List Price
NG-1 150	Simplex	TC5K11501	PGA
NG-1 250	Simplex	TC5K12501	PGA
NG-1 500	Simplex	TC5K15001	PGA
NG-1 1000	Simplex	TC5K10001	PGA
NG-1 1150	Simplex	TC5K11501	PGA
NG-1 1500	Simplex	TC5K15001	PGA
NG-1 2000	Simplex	TC5K20001	PGA
NG-1 3000	Simplex	TC5K30001	PGA
NG-1 1500	Duplex	TC5K15002	PGA
NG-1 2000	Duplex	TC5K20002	PGA
NG-1 3000	Duplex	TC5K30002	PGA

\*Contact your TYCO representative for different voltage options for generators and compressors.  
 Technical Data Sheet: TFP1251 (Wall Mount), TFP1252 (Stand Mount), TFP1253 (Stand Alone)

Oxygen Removal Vents - Dry/Precation Systems					
Model	Size	Flow Rate (SLPM)	Pressure (PSI)	Part No.	List Price
TRV-D	Manual	120 VAC / 60 Hz	120 VAC / 60 Hz	TRV001	\$1,250.00
TRV-D	Automatic	120 VAC / 60 Hz	120 VAC / 60 Hz	TRV001	\$2,400.00

Replacement Filter		
Model	Type	Part No.
TRV-D	Simplex	TRV001

\*Contact your TYCO representative for different voltage options for TRV-D.  
 Technical Data Sheet: TFP1262 (TRV-D), TFP1263 (TRV-D)

Monitoring - Nitrogen/Oxygen Concentration			
Model	System Data Sheet	Description	List Price
THGA	THP1257	Handheld Gas Analyzer	THGA01 \$600.00
THGA	THP1270	Electronic Gas Analyzer	THGA01 \$5,500.00



## Americas Price Book – Part #s / List Pricing



Model TLD - Monitoring - TYCO In-Line Corrosion Detector					
Flow Direction	Size	Material	Part No.	List Price	
1-1/4"	Black Steel	10	TLD011000	\$2,775.00	
		40	TLD014000	\$2,775.00	
	Galvanized	10	TLD011000	\$2,775.00	
		40	TLD014000	\$2,775.00	
1-1/2"	Black Steel	10	TLD011500	\$2,775.00	
		40	TLD014500	\$2,775.00	
	Galvanized	10	TLD011500	\$2,775.00	
		40	TLD014500	\$2,775.00	
2"	Black Steel	10	TLD021000	\$2,775.00	
		40	TLD024000	\$2,775.00	
	Galvanized	10	TLD021000	\$2,775.00	
		40	TLD024000	\$2,775.00	
2-1/2"	Black Steel	10	TLD021500	\$2,775.00	
		40	TLD024500	\$2,775.00	
	Galvanized	10	TLD021500	\$2,775.00	
		40	TLD024500	\$2,775.00	
3"	Black Steel	10	TLD031000	\$2,775.00	
		40	TLD034000	\$2,775.00	
	Galvanized	10	TLD031000	\$2,775.00	
		40	TLD034000	\$2,775.00	
4"	Black Steel	10	TLD041000	\$2,775.00	
		40	TLD044000	\$2,775.00	
	Galvanized	10	TLD041000	\$2,775.00	
		40	TLD044000	\$2,775.00	
6"	Black Steel	10	TLD061000	\$4,300.00	
		40	TLD064000	\$4,300.00	
	Galvanized	10	TLD061000	\$4,300.00	
		40	TLD064000	\$4,300.00	
8"	Black Steel	10	TLD081000	\$6,425.00	
		40	TLD084000	\$6,425.00	
	Galvanized	10	TLD081000	\$6,425.00	
		40	TLD084000	\$6,425.00	

Technical Data Sheet: TFP1261

Wet Pipe Air Venting / Wet Pipe Nitrogen Inerting (WPN)					
Model	Size	Flow Rate (SLPM)	Pressure (PSI)	Part No.	List Price
TRV-W	1/2"	10	120 VAC / 60 Hz	TRVW01	\$1,400.00
TRV-W	1/2"	40	120 VAC / 60 Hz	TRVW01	\$1,775.00
TRV-W	1/2"	10	120 VAC / 60 Hz	TRVW01	\$225.00
TRV-W	1/2"	40	120 VAC / 60 Hz	TRVW01	\$1,250.00
TRV-W	1/2"	10	120 VAC / 60 Hz	TRVW01	\$1,000.00
TRV-W	1/2"	40	120 VAC / 60 Hz	TRVW01	\$3,250.00
TRV-W	1/2"	10	120 VAC / 60 Hz	TRVW01	\$1,500.00

Dry Pipe Nitrogen Inerting			
Model	System Data Sheet	Description	List Price
TRV-D	THP1267	Gas Sampling Port	TRV001 \$375.00
TRV-D	THP1267	Gas Sampling Kit	TRV001 \$1,100.00
TRV-D	THP1268	Nitrogen Interface Controller	TRV001 \$7,000.00





## TYCO® Series EC-8C Exposed Corridor Sprinkler

March 2020



Johnson Controls — Exposed Corridor Sprinkler

## Extended Coverage Sprinklers Characteristics



- Provide larger areas of coverage compared to standard coverage sprinklers
- Maximum coverage area is 400 ft<sup>2</sup> as restricted by NFPA 13
- Typically used in
  - Hotels
  - Restaurants
  - Office Buildings



82 Johnson Controls — Exposed Corridor Sprinkler



## TY4282 Sprinkler Details

**tyco**

The diagram features a central hexagon with the text "Max Coverage 28 ft x 10 ft (8,5m x 3,1m)". Surrounding this central hexagon are eight other hexagons, each containing a feature of the sprinkler. The features are: "Extended Coverage" (top-left), "Designed for use in corridors and hallways" (top), "Light Hazard Occupancies" (top-right), "Pendent and Recessed Pendent options" (right), "UL Listed" (bottom-right), "Quick Response" (bottom), and "Extended Coverage" (bottom-left). There are also two small images of the sprinkler head: one showing the top view and one showing the side view.

83 Johnson Controls — Recessed Ceiling Sprinkler

Johnson Controls

## EC-8C Technical Details

**tyco**

The diagram shows a detailed view of the EC-8C sprinkler head. Five callout boxes provide technical specifications: "K-Factor: 8.0 gpm/psi<sup>1/2</sup> (115,2 lpm/bar<sup>1/2</sup>)" (top-left), "Max Operating Pressure: 250 psi (17,2 bar)" (top-right), "Recess: 1/2 inch (Style 30 Escutcheon) 3/4 inch (Style 40 Escutcheon)" (middle-right), "Sensitivity: Quick Response Operating Temperatures: 155°F (68°C) 200°F (93°C)" (bottom-right), and "Pipe Thread Connection: 3/4 inch NPT" (bottom-left).

84 Johnson Controls — Recessed Ceiling Sprinkler

Johnson Controls

**tyco**

## Current Alternatives for Corridor Coverage

**Current Alternatives**

Standard Coverage Pendent Sprinkler	Standard Coverage HSW Sprinklers	Extended Coverage Light Hazard Pendent Sprinklers	Extended Coverage Light Hazard Horizontal Sidewall (HSW) Sprinklers	Corridor Sprinkler
10x10	10x12	16x16 20x20	16x16 20x20	28x10

**Fewer sprinklers and lower system pressure demands are required as compared to traditional extended coverage sprinklers**

85 Johnson Controls Registered Corridor Sprinkler

**tyco**

## Current Alternatives for Corridor Coverage

**Corridor Sprinklers, 28x10 ft spacing**

**Extended Coverage Pendent Sprinklers, 20x20 ft spacing**

Extra water

86 Johnson Controls Registered Corridor Sprinkler



## Sprinkler Coverage



- Requires fewer sprinklers at lower pressures compared to current alternatives
- Minimum allowable spacing is 12 feet in the long spray direction



Description	Coverage Area	Flow Rate	Pressure
TY4282 (K=8.0) Pendent	28 ft x 8 ft (8,5 m x 2,4 m)	23 gpm (87,1 lpm)	8.3 psi (0,6 bar)
	28 ft x 10 ft (8,5 m x 3,1 m)	28 gpm (106 lpm)	12.3 psi (0,9 bar)

Note: For coverage area dimensions less than or between those listed, use the minimum flow required for the next highest coverage area.

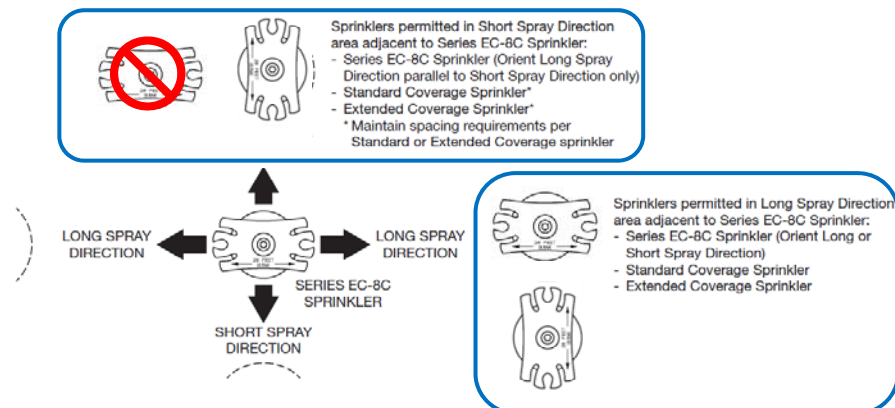
See Tech Data Sheet TFP 226 for full details



## Sprinkler Coverage and Orientation



- The Series EC-8C Pendent Sprinklers are not to be installed with the short spray direction oriented towards another Series EC-8C Pendent Sprinkler's short spray direction





## Finishes, Coatings, & Installation Tools

- **Sprinkler:** Natural Brass, Signal White Polyester Coated, Pure White Polyester Coated, Jet Black Polyester Coated, or Chrome Plated
- **Recessed Escutcheon:** Natural Brass, Signal White, Pure White, Jet Black, Chrome Plated
- **Sprinkler Wrenches:**

W-Type 6



W-Type 7 Recessed



## Poll Question 3

*What is the benefit of utilizing the EC corridor sprinkler?*

- a. It is aesthetically pleasing.
- b. It is the perfect shape to hang decorations off of.
- c. It allows for a more efficient design, with less sprinklers.



## Model CWS Window Sprinkler

**Special Application**  
**Concealed Pendent Vertical Sidewall**  
**5.6 K-Factor**

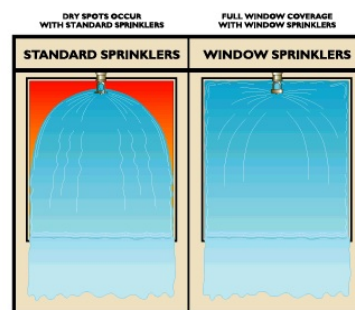


Model CWS Window Sprinkler  
 Johnson Controls Inc.

## Why Utilize an Automatic Window Sprinkler?



- Even coating of water over the pane for proper protection
- Allow for a 2-hour equivalent rated glazing unit utilizing automatic sprinklers
- More cost effective



## Glass Types to be used with Window Sprinklers



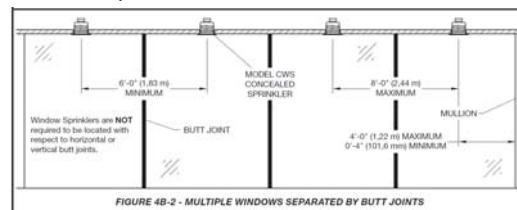
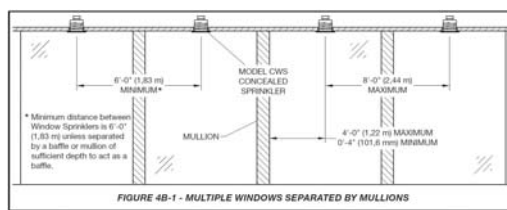
Window sprinklers are used to protect a variety of glazing assemblies including:

- single-glazed (single pane)
- double-glazed (double pane)
- insulated
- non-operable heat-strengthened
- tempered
- stronger glass window assemblies where each individual pane is a minimum 1/4" (6 mm) thick.

Window sprinklers allow for the use of clear glass as opposed to tinted fire-rated glass or wire mesh glass. Also, fire-rated glass is generally heavier and more costly than regular glass.

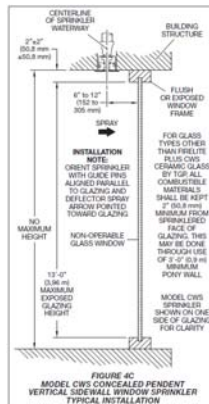


## Glass Types to be used with Window Sprinklers



## Glass Types to be used with Window Sprinklers

**tyco**



95 Johnson Controls — Model CWS Window Sprinkler

Johnson  
Controls

## Window Types That Can Be Protected Using Window Sprinklers

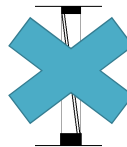
**tyco**

Tyco Window Sprinklers can only be used on **fixed vertical glass windows**.

So, **NO**....

- Sloped glass windows - regardless of how little the slope is.
- Doors – regardless of the size or location cannot be protected.
- Operable windows. If the window opens at all, then it cannot be protected.
- Glass windows with a horizontal or intermediate mullion.\*

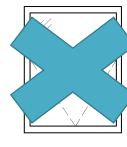
\*Refer to next slide for exceptions.



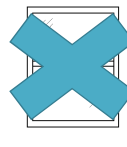
Sloped glass window



Glass Doors



Operable Windows



Windows with horizontal or intermediate mullions



96 Johnson Controls — Model CWS Window Sprinkler

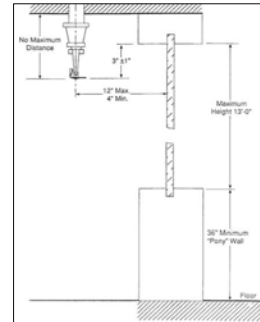
Johnson  
Controls

## Window Types That Can Be Protected Using Window Sprinklers

**tyco**

### Minimum Clearance from Face of Glass to Combustible Materials

For glass types other than FIRELITE PLUS CWS ceramic glass by TGP, all combustible materials shall be kept 2 in. (50,8 mm) from the front face of the glass. This can be accomplished by a minimum 36 in. (914,4 mm) pony wall or other method acceptable to the authority having jurisdiction.

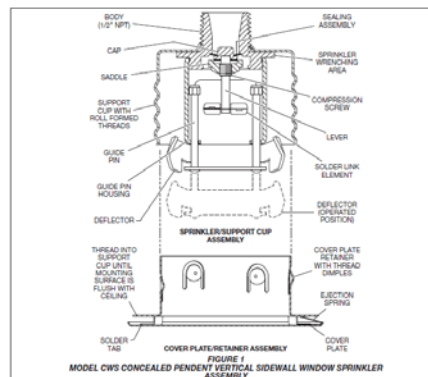


97 Johnson Controls Model CWS Window Sprinkler

Johnson  
Controls

## Model Concealed Window Sprinkler

**tyco**

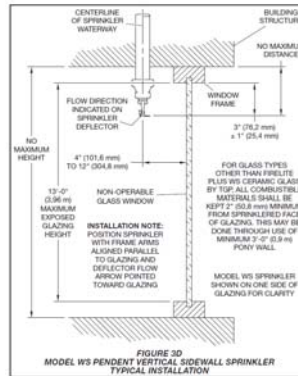


98 Johnson Controls Model CWS Window Sprinkler

Johnson  
Controls

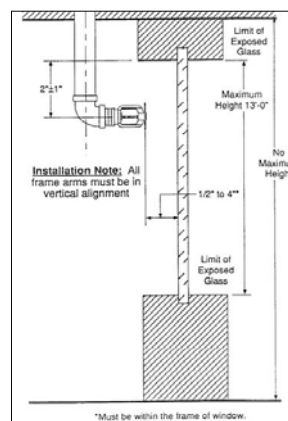
## Vertical Sidewall Window Sprinkler

**tyco**



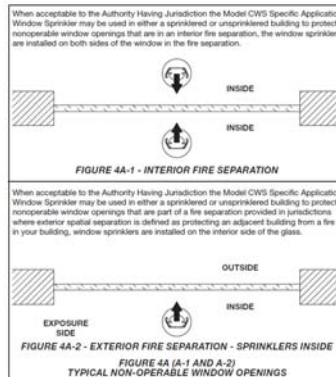
## Horizontal Sidewall Window Sprinkler

**tyco**



## Lot Line Protection

**tyco**



## Poll Question 4

**tyco**

*What is the window sprinkler utilized for?*

- a. To provide a 2-hour equivalent fire resistance rating to window assemblies.
- b. To protect combustibles pushed against the window.
- c. It allows for a more efficient design, with less sprinklers.
- d. They are a supplement to window washers.



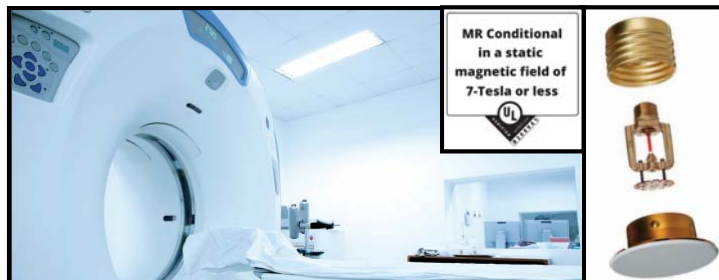
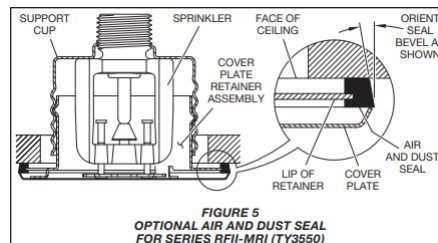
## New Concealed Sprinklers

103



### RFII-MRI

- 5.6K Concealed Pendent Sprinkler
- 155°F Sprinkler/139 °F Plate  
200°F Sprinkler/ 165°F Plate
- Quick Response
- Standard and Extended Coverage Offerings
- **TFP182** Standard Coverage
- **TFP262** Extended Coverage F



104

## LFII Intermediate Temperature Residential

**tyco**

- 4.9K
- 212°F Sprinkler/ 165°F Plate
- Reduced Gap
- 10 standard colors with Custom Options

**INTERMEDIATE TEMPERATURE RATING**



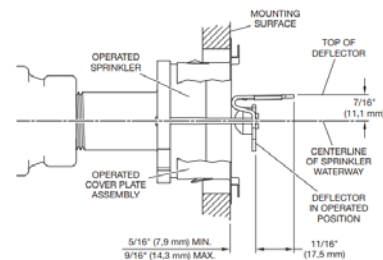
Johnson  
Controls

105 Johnson Controls — Proprietary & Patented. Assembled Under

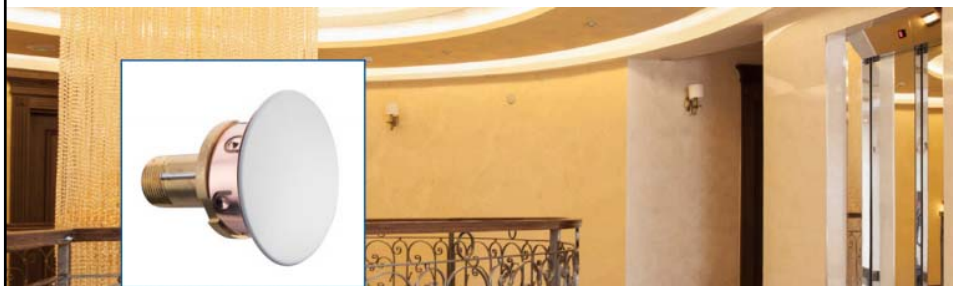
## RFIII Extended Coverage Horizontal Sidewall Sprinkler

**tyco**

- 8.0K
- Quick Response
- 160°F Sprinkler/ 139°F Plate
- Reduced Gap/ 1/4" Adjustment
- Up to 24-foot Extended Coverage Throw



**FIGURE 2**  
MODEL RFIII ECLH CONCEALED HSW SPRINKLER  
OPERATED CONDITION



## Other New Products



107

### Model BFV-300 Indicating Butterfly Valve

**tyco**

- Pre-assembled in normally open or closed states
- Two factory-plugged NPT threaded tapping bosses in the valve body are located on the up- and downstream sides of the disc for connection to valve trim
- 2in. –3 in. . . . . 3/8 NPT
- 4in. –12 in. . . . . 1/2 NPT
- Tapping Bosses Great for Deluge/ Pre-action Priming and Fire Pump Sensing Line



MODEL BFV-300  
OPEN SUPERVISORY SWITCHES



MODEL BFV-300C  
CLOSED SUPERVISORY SWITCHES

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**tyco**

### Model CV-300B Grooved Swing Check Valve


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- Light-weight
- Cost-effective
- 4"
- Maximum Working Pressure: 300 psi





For fire protection pressure rating, listing and approval information, contact your TYCO representative.




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**tyco**

### Other Automatic Sprinklers

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- TN-17
- ESFR-22
- TY-B and TY-FRB Poly-Stainless





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**Fittings**

- Rapid Seal Adapter
- G-Fire One Bolt Coupling



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Questions?  
**Thank You!!!!**

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1-800-381-9312

[Josh.mcdonald@jci.com](mailto:Josh.mcdonald@jci.com)  
**Technical Trainer**

112 Johnson Controls, Inc. — Exposed Corridor Sprinkler

