A perspective view of a modern tunnel interior. The ceiling is dark with multiple rows of bright, rectangular light fixtures. The walls are composed of large, light-colored panels. The floor is a dark, polished surface with white lane markings. Light trails from vehicles are visible on the road, and the overall atmosphere is one of a well-lit, secure underground passage.

The Total Fire Protection Solution for Tunnels

tyco

Expert Fire Protection for Tunnels

Tyco provides a complete fire protection solution to help safeguard the infrastructure of tunnels. Whether it is rail, road or other underground constructions, Tyco has the expertise for the most challenging and crucial tunnel structures in the world.

With over a billion vehicles on the road, infrastructure has become critical to the performance of businesses and individuals alike. Such reliance has resulted in the demand for superior transportation networks and an increase in the number of tunnels being constructed around the world.

Protecting tunnels against fire hazards poses many unique challenges. Tunnels see every type of vehicle and possible fuel load; congestion and the potential for large fires create the need for a fire protection system that increases safety by minimizing the risk of fire propagation. The innovative, integrated fire suppression solutions from Tyco Fire Protection Products help to control and suppress fire even in the most challenging of environments, helping to manage fire risk and keep people, assets and the environment safe.

Tyco delivers a turnkey solution for tunnel fire protection by combining products from its innovative, market-leading range of solutions.



Tunnel Nozzles

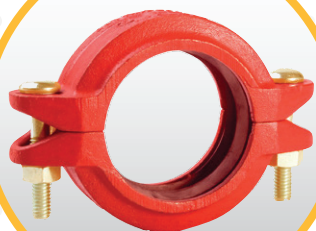
The TYCO Models TN-25 and TN-17 Horizontal Spray Nozzles are intended for integration into a water spray, deluge fire protection system. They are UL listed nozzles that have also been independently tested and proven to suppress or control full scale tunnel fires.

Extinguisher

Portable extinguishing solutions from Tyco consistently exceed the highest quality standards for continuous performance and reliability. A leader in first response fire protection, we offer solutions for all types of fire risk situation and application.

Hose Reel

As part of the complete solution offering, Tyco provides hose reels suitable for this application.



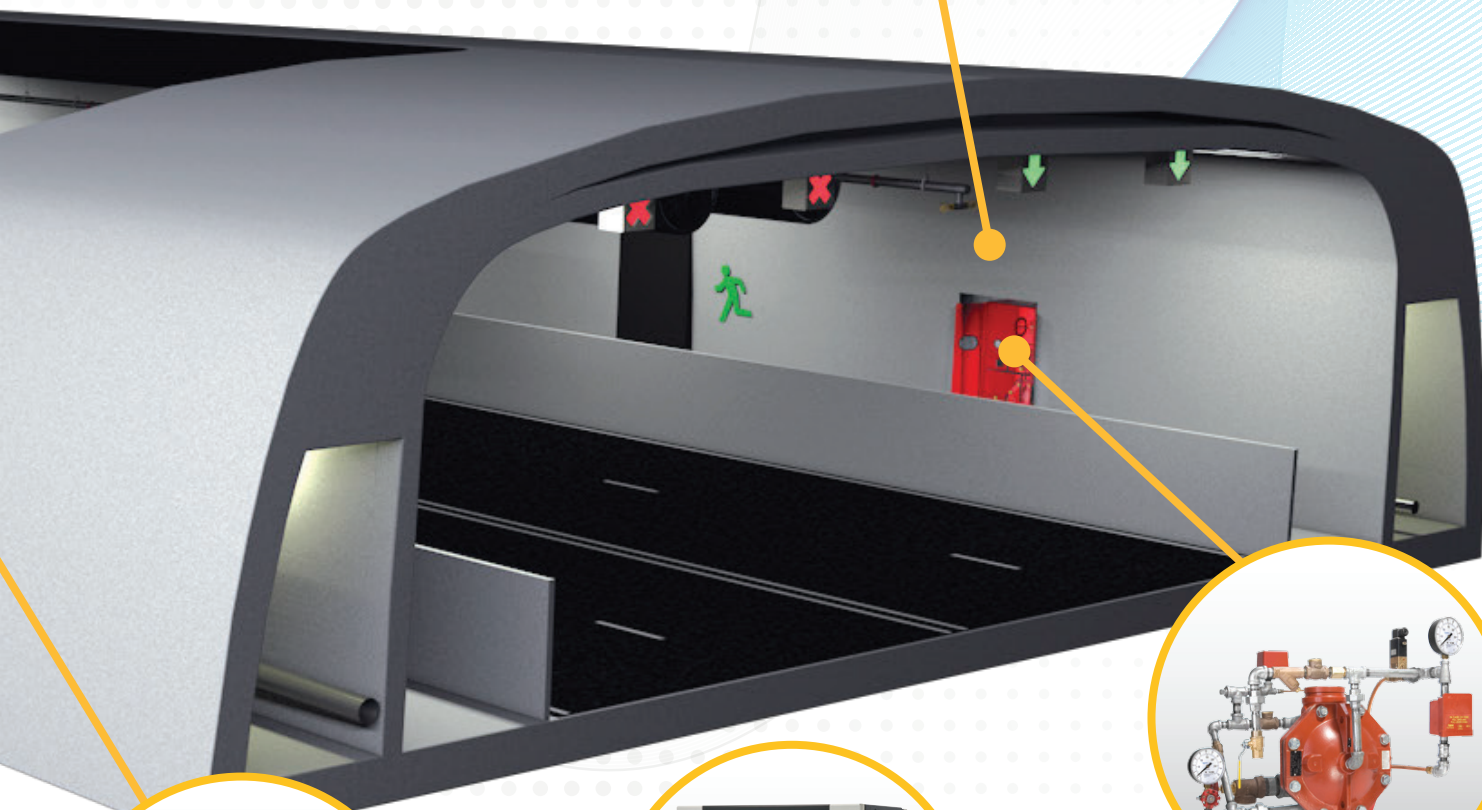
Grinnell G-Fire Piping & couplings

Grinnell G-Fire delivers quality grooved piping solutions for a full range of fire applications. The products offer piping and cost-effective tools for joining pipe compared with traditional welding methods.



Special Design Cabinets

The Tyco Model DV-5 Red-E Cabinet is a pre-assembled fire protection valve package enclosed within a free-standing cabinet designed to occupy minimal floor space and an aesthetically pleasing enclosure. The entire package is pre-wired and the water inlet and outlets to the valve riser are grooved for minimal installation time.



DV-5

TYCO Remote-Resetting, Pressure-Reducing Model DV-5 Deluge Valves are quick-opening, hydraulically operated, differential-type valves designed for fire protection system service. System outlet pressure is determined by the Pilot Valve. When the valve is activated, in response to Electric Detection, the Waterway Diaphragm controls downstream pressure.



PROFILE Flexible Control Panels

PROFILE Flexible from ZETTLER is a powerful fire detection and alarm system that uses MZX Technology at its heart.



Detectors

The Zettler SensorLaserPlus™ Designed for fast and continuous fire detection even in difficult and varying ambient conditions.

Purpose Designed Tunnel Sprinklers

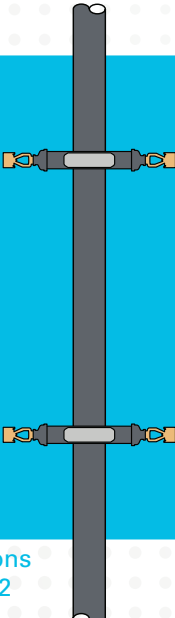
The Tyco TN sprinkler systems were specifically engineered to address fire protection challenges in tunnels. The improved coverage area per water spray nozzle is intended to minimise the total number of nozzles required.

The nozzles' greater stream diameter and lower nozzle pressure results in larger water droplets, so water can be effectively delivered to penetrate plume and reach fuel faster, resulting in efficient wetting and cooling of fuel and tunnel surfaces.

Both the TN-17 and TN-25 sprinklers generally require only a single pipe to help protect up to 50 ft (15 m) of tunnel width, with the nozzles installed with a back-to-back configuration; minimal fittings and couplings are required for fewer installed nozzles – so it can reduce installation time and materials.

Easy integrated maintenance and performance testing means that piping can be flushed at regular intervals by discharging deluge zones.

Valve cabinets can be customized for unique tunnel installations. Standard pressure reducing and remote re-setting deluge valves are available.

TN-17			TN-25	
Operating Pressure	Approximate Coverage Area		Operating Pressure	Approximate Coverage Area
10 psi (0,7 bar)	16ft-4in x 24ft-7in (5,0m) x (7,5m)		07 psi (0,5 bar)	14ft-0in x 16ft-0in (4,3m) x (4,9m)
<i>up to-</i> 30 psi (2,1 bar)	16ft-4in x 32ft-8in (5,0m) x (10,0m)		<i>up to-</i> 30 psi (2,1 bar)	16ft-4in x 24ft-7in (5,0m) x (7,5m)

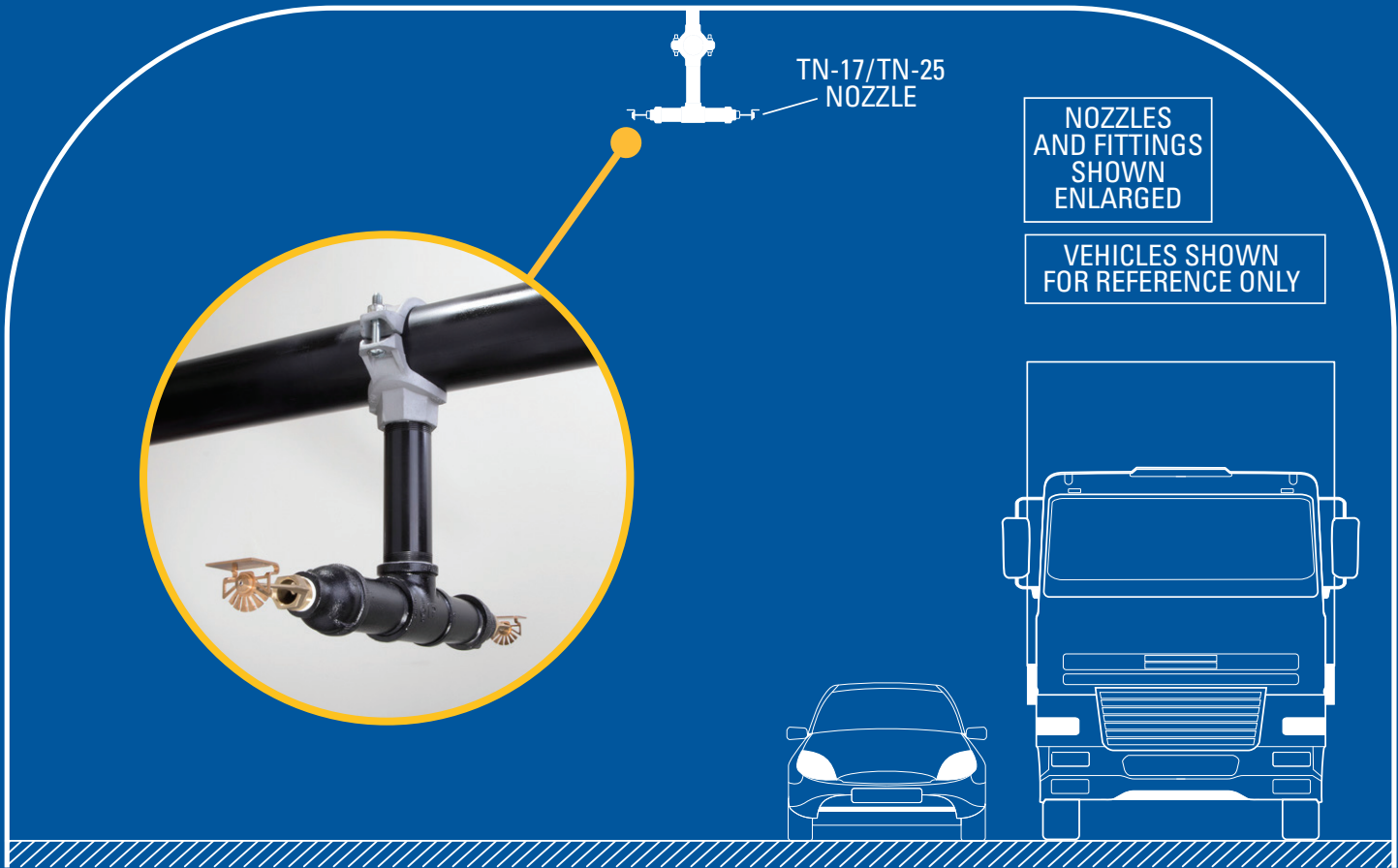
For complete coverage area and pressure specifications always refer to Technical Data Sheets TFP850 & TFP852

Low cost and ease of operation

- Low installation cost – because of one simple branch line solution
- Low operation cost – simple design, less maintenance
- Pressure reducing function maintains pre-set outlet pressure
- Remote-resetting feature provides the ability to reset the valve from one or more locations
- Compact, space-saving cabinet design to reduce the valve room footprint and construction costs
- Electric activation is compatible with various automatic and manual release options

TN-17 / TN-25 Tunnel Protection

	TN-17	TN-25
K-Factor	16.8 gpm/psi ^{1/2} (241.9 lpm/bar ^{1/2})	25.2 gpm/psi ^{1/2} (360 lpm/bar ^{1/2})
Pipe Thread Connections	3/4" NPT or ISO 7-R 3/4	1" NPT or ISO 7-R 1
Maximum Coverage Area	16ft-4in x 32ft-8in (5,0m x 10m)	16ft-4in x 32ft-8in (5,0m x 7.5m)
Working Pressure Range	10 - 30 psi (0.7 - 2.1 bar)	7 - 30 psi (0.5 - 2.1 bar)
Laboratory Certification	UL, C-UL	
Nozzle Design	Specialized open nozzle for use in tunnel deluge fire protection systems	
Technical Datasheet Reference	TFP 852	TFP 850



Actual Tunnel Test Parameters:

Obstructed Class A large scale fire testing
Ventilation – 7 mph (3m/s) forced, throughout
Actuation delayed 4 min after ceiling reached 141°C

Actual Tunnel Test Results:

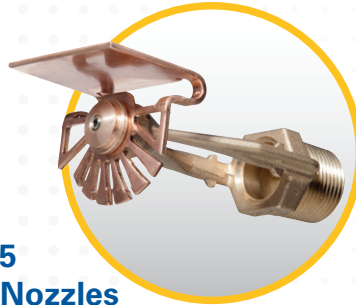
TN17 and TN25 proven to control or suppress
Gas temperatures well below design threshold
Peak HRR remained below design threshold

DV-5 Red-E Cabinet



- Aesthetically pleasing design
- Custom manufactured
- Externally visible controls and panel display
- Removable side panels for ease of maintenance

TN-17 /TN-25 Open Nozzles



- Application-specific design
- Lower material and installation costs
- Designed to meet requirements for minimized water use while maximizing coverage area

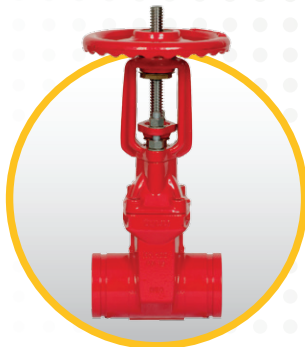


DV-5 Deluge Valve



- Compact and versatile pre-trimmed configuration
- Low installation and operational costs
- Activation and quick reset from one or multiple remote locations
- Wide ranging configurations and applications
- Wide variety of sizes

Grooved Gate Valve



- Significant material weight savings allow for easier on-site handling and reduced shipping costs
- Durable, long-lasting and easy to operate gate valve
- Various end connection configurations available



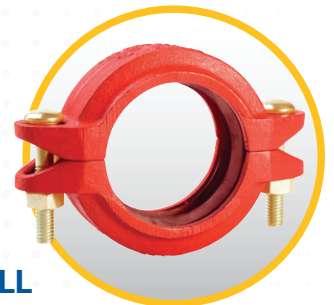
Grooved Butterfly Valve



- Visual indication of valve open/closed position
- Cut groove inlet and outlet connections
- Suitable for use with grooved pipe couplings that are listed or approved for fire protection service
- Rated for use at a maximum pressure of 300 psi (20,7 bar) or 175 psi (12,0 bar) for the 10 in. model



GRINNELL G-FIRE Grooved Rigid Coupling



- Proven method of joining pipe that provides a rigid joint by firmly gripping along the full circumference of the pipe groove
- Economical alternative to welding, threading or using flanges
- Rated at pressures up to 350 psi (24,1 bar) depending on pipe size and wall thickness





GRINNELL G-Fire Piping Solutions

The optimum piping product can be specified according to local specifications and standards.

Joining pipe using GRINNELL G-Fire couplings can provide quick installation, easy ongoing system maintenance and significant cost savings compared with traditional pipe joining methods such as welded and flanged pipe joining.

Listings and Approvals:
UL, C-UL, LPCB, VdS, FM



Various system components

Tyco can deliver all the components needed for a tunnel fixed fire protection system. In addition to the parts above, Tyco can also supply:

- High and medium velocity nozzles
- Other nozzles or sprinklers
- Butterfly valves, gate valves, flanges, couplings and outlets

Selected sprinklers, nozzles and valves are now available in a variety of special materials such as stainless steel and titanium.

For more information please see datasheets: TFP850, TFP852 and TFP1331, or visit www.tyco-fire.com

Resilient Fire Detection for Effective Fire Suppression

As a pioneer in the fire detection and protection industry, with more than 100 years of experience, Tyco Fire Protection Products is the solution provider for any application.

From detection to suppression, technologically advanced Tunnel Fire Protection Solutions from Tyco have been tested and approved by industry standards for efficient, effective protection every time.

Detection

The ZETTLER SensorLaserPlus™. The ZETTLER brand provides world class fire detection systems built on MZX Technology platforms.

The Zettler SensorLaserPlus™ is designed for use in areas that are hard or impossible to access after

installation, e.g. false floors, since maintenance and troubleshooting can be carried out from the control unit.

The fibre optic sensor cable is designed to be maintenance-free and, thanks to its particularly robust characteristics, offers a high level of security against false alarms. The sensor cable is designed to be insensitive to dust, dirt, moisture, high temperatures (up to approx. 90°C), pressure and the action of vibration and wind as well as corrosive atmospheres. The purely passive, optical analysis process, is intended to make the ZETTLER SensorLaserPlus™ immune to electromagnetic interference caused by generators, energy routes, cables or motors.





Global Strength. Local Expertise. At Your Service.

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