

CASE STUDY:

TNL280 Deluge Nozzle 'New M4' Tunnel Sydney, Australia



Project Description

About the 'New M4' Tunnels

The 'New M4' East (M4E) tunnel project is located in the inner west of Sydney, Australia. The M4E tunnel is a twin tube design of 3 lanes in both directions. Each tube is 5.5 km (3.4 miles) in length. Therefore, the project has approximately 11 km (6.8 miles) of tunnels in total. The tunnels are divided into 517 fire deluge zones along the entire length, including the covered entry & exit ramps. Each fire deluge zone is approximately 30 meters (98 ft) long. The tunnel is equipped with fibre optic detection that signals a central monitoring station. Each deluge zone is monitored by operators and manually activated.

When the specifications for the project were being developed, the design brief called for "an extended coverage nozzle that could effectively deliver 10 mm/min (0.25 gpm) density". No such product existed. In response to this requirement, the Reliable® model TNL280 nozzle was developed.



M4 East Tunnel Entrance
Photo provided courtesy of Transurban

Reliable® TNL280 Pendent Nozzle	
K-factor	K400 lpm/bar ^{1/2} (28.0 gpm/psi ^{1/2})
Pipe Threads	25 mm (1"), ISO 7-1R1 (BSPT) or NPT
Maximum Coverage Area	5.5 m x 5.5 m/30.25 m ² (18 ft x 18 ft/324 ft ²)
Working Pressure Range	0.5 to 1.2 bar (7 to 175 psi)
Certification	cULus (2351)
Nozzle Design	Overhead pendent design for use in vehicle road tunnel

About the Reliable® TNL280 Nozzle

The Reliable® TNL280 pendent nozzle has been specifically designed to provide an extended coverage nozzle suitable for use in vehicle tunnels. Key to the design of the nozzle is a very large K-factor. The large nozzle coverage area typically results in lower installed costs by reducing the amount of material (pipe and hangers) and facilitates faster installation. By comparison, traditional tunnel nozzles – usually spaced at around 9 m² (97 ft²) – are much more material and labor intensive.

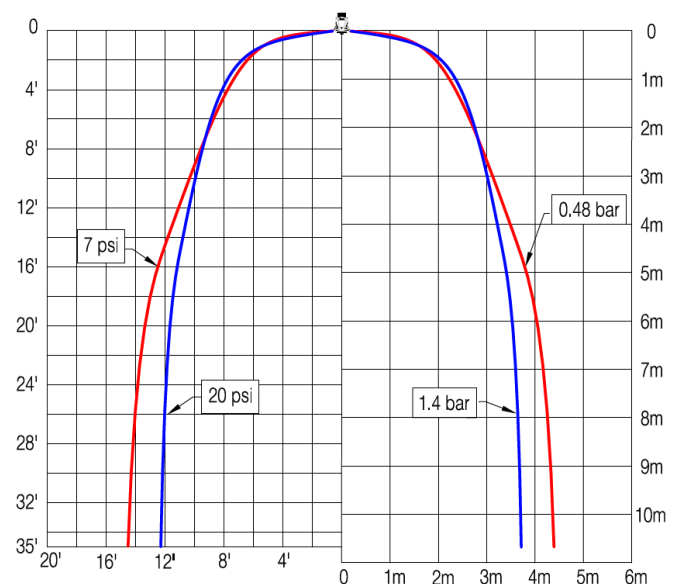


Other benefits of the very large K-factor are:

- TNL280 delivers large water droplets which are extremely effective at penetrating the fire plume of high challenge vehicle fires.
- TNL280 operates at very low pressure; typically between 0.5 to 1.4 bar (7 to 20 psi).

The TNL280 nozzle is a pendent nozzle that is used in the overhead position. Therefore, it is less likely to suffer from a 'shielded fire' which can occur with different height vehicles. An overhead pendent layout, by design, directs water down toward the road and on top of the vehicles.

Road tunnel environments can be extremely aggressive. To enhance the service life of the TNL280 nozzle, it is offered with an Electroless Nickel PTFE (ENT) finish, now with an anti-reflective black paint topcoat. See Reliable® Technical Bulletin 099 for complete information on the TNL280 nozzle.



Model TNL280 Spray Pattern Graph





Testing of deluge system in 'New M4' Tunnels

About Deluge Systems

Deluge systems consist of water supply, a valve, a system of piping and nozzles that are open to atmosphere, and a means of detection and actuation. When the deluge valve is activated, water flows through all nozzles controlled by the valve. Unlike automatic sprinkler systems, where water flows only through individual sprinklers that have activated close to the heat source, deluge systems are designed to “surround and drown” an entire zone to prevent the spread of fire in hazardous environments.

Project Quick Facts

Client

Transurban and Transport for NSW

Consulting Engineer

Norman Disney Young (NDY)

Site Engineer

Jessica Keogh

Number of Deluge Systems

517

Tunnel Height

5.3 m (17.4 ft)

Unique Project Requirements

Design brief required an Extended Coverage Nozzle that could cover at least 5.1 m x 5.1 m (17 ft x 17 ft) delivering 10 mm/min (0.25 gpm) density. No product on the market could deliver this – thus the Reliable® TNL280 was developed.



Tunnel Interior

Learn More

For more information on Reliable® products, systems, and innovation, visit our website at www.reliablesprinkler.com. Stay connected via social media for the latest updates and product releases.