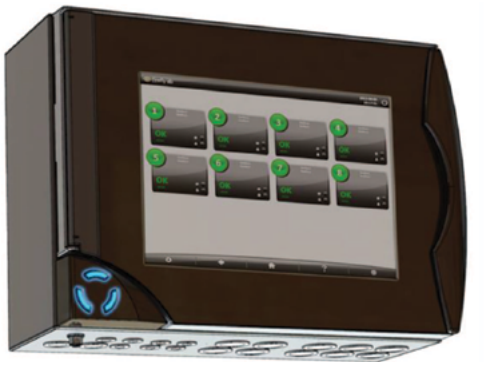
The TUNPROTEC® Detection System consists of

- VFK Deflametec-TPT flame detectors
- VFK Deheattec-TPT heat detectors
- VFK LZP-TPT Control Panel
- VFK MCP-TPT Interface Panel

And has been designed to reliably assess fire risks in tunnels and to facilitate the necessary control of alarm and fire protection systems of within the entire TUNPROTEC® system. The TUNPROTEC® Detection System operates in conjunction with the Model C-NHV Zone Valve Station and the subsequent TUNPROTEC® fire protection system.

The TUNPROTEC® Detection System consists of triple-knock fire detection, surveying the electromagnetic radiation from flames and the development of heat within the location, and the necessary control units to alarm necessary personnel and activate the Model C-NHV Zone Valve Station, and subsequent fire protection system within the tunnel.



Application

The TUNPROTEC® Detection System has been designed for application in infrastructure tunnels in conjunction with the TUNPROTEC® fire-protection systems such as the Model C-NHV Valve Stations, VFK Watermist Systems and the VFK Pump Units.

System Design

The TUNPROTEC® Detection System shall be sectioned in accordance with the specified fire-zones of the fire-protection system. Each fire-zone shall include a sufficient and appropriate number of heat- and flame detectors, a VFK LZP-TPT Control Panel and a Model C-NHV Zone Valve Station. The appropriate number of detectors will vary from location to location and fire-zone to firezone, however no less than two VFK Deflametec-TPT and one VFK Deheattec-TPT may be used in a single fire-zone.

Additionally, all fire-zone systems shall be connected to the VFK MCP-TPT Interface Panel, which collects and logs all signals between system components and facilitates the correct response between

Technical Specifications	
Included Components:	VFK Deflametec-TPT VFK Deheattec-TPT VFK LZP-TPT VFK MCP-TPT
Other Relevant Components:	Model C-NHV Zone Valves Model S-NHV Cabinets VFK Watermist Systems VFK Pump Systems

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system components and safety personnel.
The specific TUNPROTEC® System components are described below.

VFK Deflametec-TPT

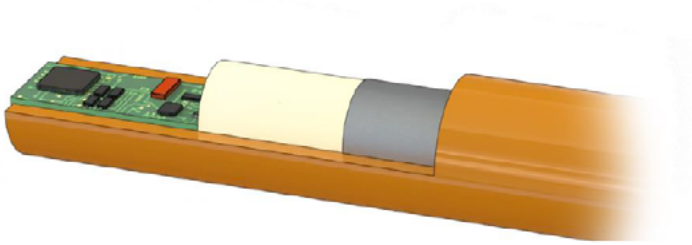
The VFK Deflametec-TPT is a robust and reliable means of detecting fires. Surveying for the specific light emitted from the oxidation of carbon, the Deflametec-TPT is highly reliable and not prone to false alarms.

When utilized in the TUNPROTEC® Detection SYstem, the Deflametec-TPT shall be coupled in groups of, at the least, two flame detectors and connected to the VFK LZP-TPT Control Panel, ensuring reliable surverillance.
For more on the VFK Deflametec-TPT, please review the TUNPROTEC® Detection System Design, Installation, Operation and Maintenance (DIOM) Manual.

VFK Deheattec-TPT

The VFK Deheattec-TPT is a reliable linear heat detector surveuing both nominal temperature and the rate-of-rise (ROR) of the ambient temperature within the location.

When utilized in the TUNPROTEC® Detection System, the Deheattec-TPT shall run the lenght og the specific fire-zone and shall in conjunction with the Deflametec-TPT flame detectors ensure a reliable



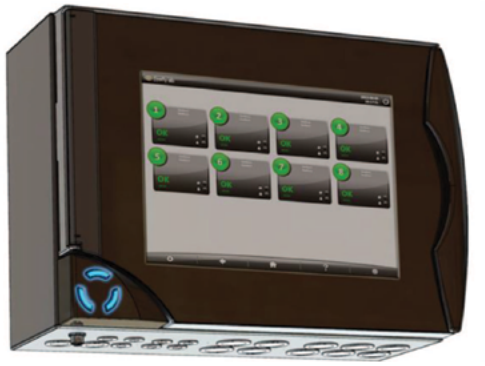
alarm-signal free from false alarms.
For more on the VFK Deheattec-TPT, please review the TUNPROTEC® Detection SYstem Design, Installation, Operation and Maintenance (DIOM) Manual.

VFK LZP-TPT

The VFK LZP-TPT Control Panel has been designed to facilitate signals from the flame detectors, linear heat detectors and the Model C-NHV Zone Valve Station. The LZP-TPT Control Panel assesses fires-risks and activates the zone valve unit once a fire has been identified and informs the VFK MCP-TPT Interface Panel of the fire.

Additionally, the LZP-TPT facilitates system resets, tests and system maintenance through commands from the VFK MCP-TPT Interface Panel.
For more on the VFK LZP-TPT Control Panel, please review the TUNPROTEC® Detection SYstem Design, Installation, Operation and Maintenance (DIOM) Manual.

VFK MCP-TPT



The VFK MCP-TPT Interface Panel has been designed to be the link between the several fire-zones within the TUNPROTEC®system, relevant personnel and peripheral alarm systems. The MCP-TPT allows for quick diagnostics of the system in its entirety and the subsequent fire-zones, and allows for complete system resets, fire-zone specific resets, zone specific function-testing and entering maintenance mode.
For more on the VFK MCP-TPT, please review the TUNPROTEC® Detection System Design, Installation, Operation and Maintenance (DIOM) Manual.

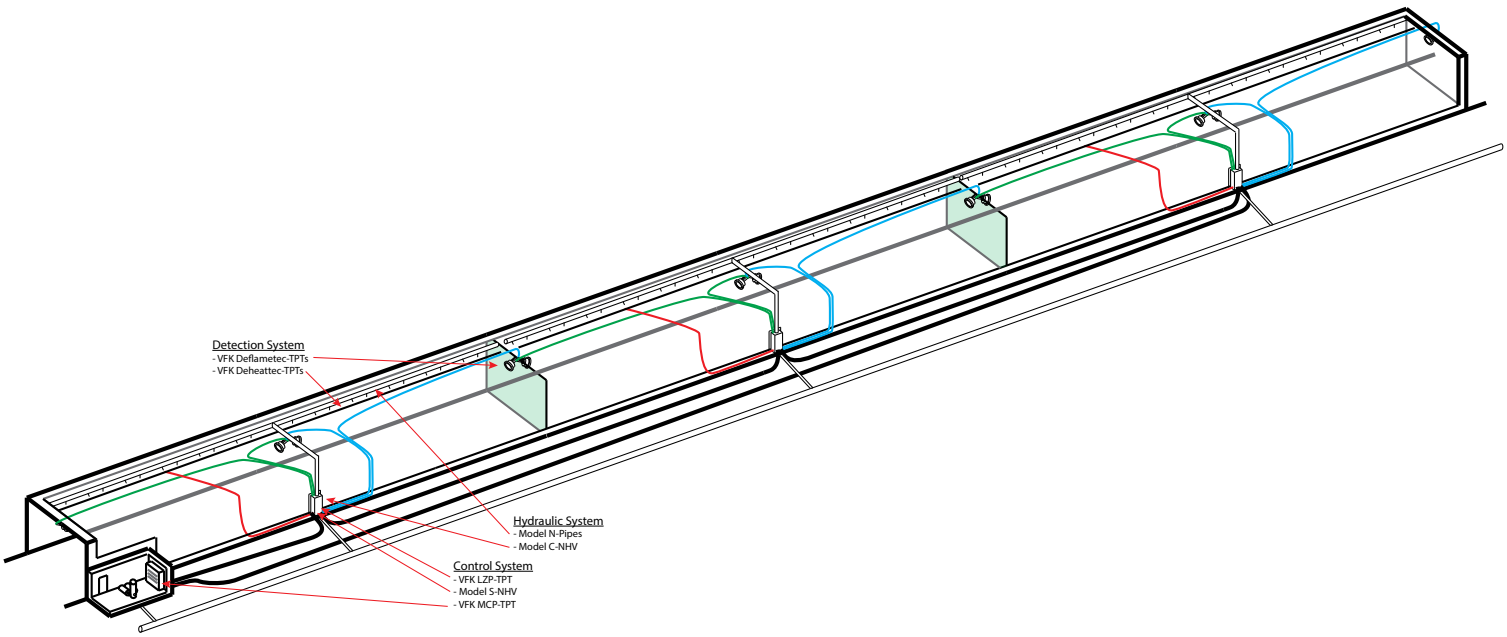
Approvals

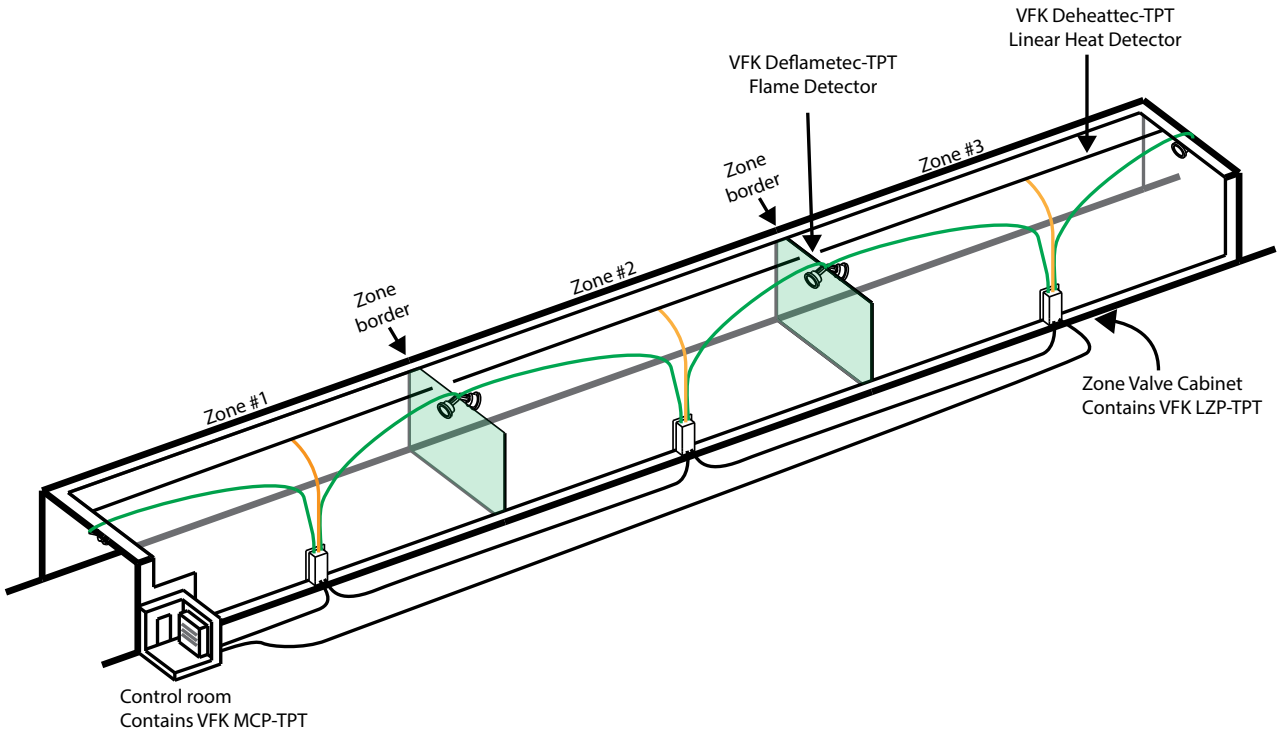
All TUNPROTEC® Detection System components have been tested to relevant standards for tunnel protection. Additionally, the subsequent components have been tested in accordance with the several standards relevant for the specific component, such as the VFK Deflametec-TPT having been tested in accordance with EN5410:2002 for flame detectors, CE-marked and tested in accordance with ATEX for Ex-zones.

Installation

Equal for all system components is that they shall all be installed using approved and appropriate hangers and supplied with the required power supply. All system components shall be installed in areas in which harm to the components are not to be expected.

The VFK Deflametec-TPT and the VFK Deheattec-TPT shall be installed in sucg a way that all areas with a chance of developing fire-risks are covered. The means of detection shall be installed in locations free from physical harm and obstructions,





which have not been accounted for in the design of the detection system. The VFK Deflametec-TPT and VFK Deheattec-TPT shall be coupled in such a way that maximizes the system's ability to detect fires without causing false alarms - As such fire-zones may contain several VFK Deflametec-TPTs in separate groups, as described by the two diagrams on this page and on the previous page.

The control panels, the VFK LZP-TPT and VFK MCP-TPT, shall be in stalled in areas in which no physical harm is expected and in which there is no risk of fires developing. The VFK LZP-TPT and VFK-MCP-TPT, shall be installed in the vicinity of the relevant Model C-NHV Zone Valve Station and, whereever possible, within the Model S-NHV Cabinet.

The VFK MCP-TPT shall be installed separately from the protected location. If possible the VFK MCP-TPT should be installed in areas in which it is possible for continual monitoring by trained personnel. The VFK MCP-TPT shall be connected to the VFK LZP-TPTs and peripheral systems capable of informing and alarming personnel and relevant persons within the location during fires.
The connection between the VFK MCP-TPT and subsequent VFK LZP-TPTs shall be designed in sich a way, that no one breacg on the connection will cause the system to become unresponsive or incapable of transferring information and commands between system units.

Contact

For further information regarding the TUNPROTEC® Detection System, the TUNPROTEC® system or similar products, please contact the TUNPROTEC® salesteam at Sales@TUNPROTEC.com