

HOSE REEL SYSTEM: DESIGN AND REQUIREMENTS

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INTRODUCTION

A hose reel system is one of the most fundamental first-aid firefighting installations provided in buildings. It is designed to enable trained occupants to control or extinguish small fires during their early stages before they escalate into larger emergencies. By providing an immediate and continuous supply of water, the system serves as a critical first line of defence, helping to minimise fire spread, reduce property damage, and improve the safety of building occupants while awaiting the arrival of the Fire and Rescue Department. A hose reel is not intended to replace other fire protection measures such as fire extinguishers, automatic sprinkler systems, or rising mains. Instead, it forms part of a building's overall fire protection strategy and provides occupants with an opportunity to respond to a fire while it is still at an early stage.

A typical hose reel installation consists of a dedicated fire water storage tank, duty and standby hose reel pumps, hose reels, pipework, valves, and associated control equipment. To ensure the system performs effectively during an emergency, every component must be properly designed, installed, tested, and maintained in accordance with the applicable Malaysian standards and regulatory requirements.

HOSE REELS

The effectiveness of a hose reel depends greatly on where it is located. A hose reel that is technically installed but difficult to find or access during an emergency may not provide the intended level of protection. In general, hose reels should be positioned in prominent and easily accessible locations, preferably along escape routes, near exit doors or staircases. Each hose reel should provide coverage within a 30 metres. To facilitate safe evacuation, hose reels should be positioned within 5 metres of an exit while ensuring that they do not obstruct the means of escape. For large open spaces such as car parks or warehouses, hose reels are generally spaced not more than 48 metres apart to maintain continuous coverage throughout the protected area ^[1].

Coverage should not be considered simply as a circle drawn around the hose reel on a floor plan. Walls, partitions, doors and other obstructions may affect the actual route available for the hose. The layout should therefore be assessed to ensure that the hose and nozzle can practically reach the intended protected areas. In addition, proper installation is equally important to ensure reliable operation during an emergency. Hose reel pipework is generally constructed using 50 millimetres nominal diameter pipes, while the supply pipe to each individual hose reel should not be less than 25 millimetres in diameter. The pipework should be clearly identified by painting it red or by applying red identification bands to facilitate quick recognition by emergency responders. Each hose reel shall be capable of delivering a minimum discharge of 30 litres of water per minute to all parts of the protected area, ensuring sufficient water flow to control small fires effectively during the initial stages before the arrival of firefighters.

HOSE REEL PUMPS AND TANK

A reliable water supply is essential because a hose reel is only effective if sufficient flow and pressure are available when it is needed. The hose reel pump system normally consists of a duty pump and a standby pump. The duty pump provides the normal operating supply, while the standby arrangement provides redundancy should the duty pump become unavailable. The hose reel pump system draws water from the fire water storage tank to the hose reels for fire suppression. The pump capacity is typically designed to deliver a minimum flow rate of 120 L/min at a running pressure of not less than 2 bar, with any four hose reels operating simultaneously.

The standby hose reel pump set shall be supplied with power from an emergency generator, where available. Otherwise, the standby hose reel pump set shall be driven by a diesel engine. The fuel

supply shall be sufficient for a minimum of one hour of operation. Wiring cables supplying power to the hose reel system shall be installed in galvanised steel conduits or, alternatively, shall be of fire-resistant cable type. Batteries for diesel engines shall be of the maintenance-free type.

Where the number of hose reels in a building does not exceed four (4), standby pumps may be electrically operated and are not required to be connected to an emergency power supply. Because the pump is essential to maintaining water flow during an emergency, its location and environment are important considerations. The pump set should be protected from weather exposure and positioned away from areas that may be affected by flooding. Where the pump room is located within the building or on the roof, adequate natural or mechanical ventilation and appropriate signage should also be provided. The hose reel pump shall comply with MS 2616 or other recognised international standards such as NFPA, FM, or UL.

The hose reel tank provides the dedicated water reserve required for firefighting. Unlike a normal domestic water supply, the fire water reserve must remain available when an emergency occurs. The fire water storage tank shall be sized based on a minimum capacity of 5,400 litres for four (4) hose reels, with a maximum capacity of 7,200 litres, sufficient for one hour of hose reel pump operation. The hose reel tank shall be automatically refilled from the mains water supply through a minimum 50-millimetre-diameter inlet pipe.

The tank may be constructed of pressed steel, fibreglass reinforced polyester (FRP), or concrete. Pressed steel tanks shall be hot-dip galvanised and internally coated with bituminous paint for corrosion protection. The tank shall be compartmentalised, and a water level indicator shall be provided to show the available water volume.

The external surface of the tank shall be painted red, or alternatively, where a red tank external surface is not desirable, a red band of at least 200 millimetres wide shall be applied to indicate that it is a fire water tank. Although the hose reel tank is usually separated from the domestic water storage tank, the two may be combined. In such cases, the total tank capacity shall meet both domestic and hose reel demands, and domestic water draw-off points shall be positioned above the hose reel outlet to ensure that the minimum fire water storage is always maintained.

PUMP CONTROLS AND SYSTEM OPERATION

The pump control system is responsible for automatically starting the pumps when a drop in system pressure is detected. This allows the hose reel system to respond without requiring an operator to manually start the pump. The pump starter panel shall be complete with indicator lights, and ventilation openings shall be fitted with insect screens to prevent pest entry.

The hose reel pump shall start automatically upon activation of the pressure switch. Typically, two pressure switches are provided with the following recommended settings outlined in the table below:

Table 1: Cut-In and Cut-Out Pressures of the Duty Pump and Standby Pump

Pump	Cut-In Pressure	Cut-Out Pressure
Duty Pump	80%	100%
Standby Pump	60%	100%

Pressure switches are usually installed on the test and drain lines at the pump discharge. The pressure settings shall be clearly indicated on tags attached to each pressure switch. For diesel pump sets, the system shall be capable of automatic starting but shall only be stopped manually.

HOSE REEL SYSTEMS FED FROM OTHER SOURCES

Not every hose reel installation requires a completely independent water source. Depending on the building's fire protection arrangement, the hose reel system may be supplied from a pressurised hydrant system, wet riser system, or a combined system.

However, such an arrangement must be carefully designed so that operation of the hose reel does not compromise the independent operation or required water reserve of the other fire protection systems. Hose reels should not be connected to automatic sprinkler systems ^[1].

TESTING AND MAINTENANCE

A hose reel system should not simply be installed and left unattended without regular testing and maintenance, which can compromise operability during emergencies. Regular inspection, testing and maintenance are necessary to ensure that the equipment remains ready for use during an emergency. The condition of the hose reel, hose, nozzle, valves, cabinet, pipework and associated equipment should be checked, while the pumps should be tested to verify proper operation. The pipework should also be inspected for leakage and subjected to the appropriate pressure and flow tests ^[1].

CONCLUSION

A properly designed and maintained hose reel system plays a vital role as a building's first-response firefighting installation. By providing adequate hose coverage, reliable water supply, and strategically located hose reels along escape routes, the system enables trained occupants to respond quickly to small fires before they develop into major incidents. However, the effectiveness of a hose reel system depends not only on proper design and installation, but also on regular inspection, testing, and maintenance to ensure that every component remains fully operational when needed.

A hose reel system is effective only when its location, coverage, water supply, pumps and associated components work together as intended. Compliance with the applicable Malaysian standards, including MS 1489 and MS 1447, together with the relevant provisions of the Uniform Building By-Laws (UBBL), helps ensure that hose reel systems continue to provide reliable protection throughout the life of a building. When integrated with other fire protection systems and supported by proper occupant training, a well-designed hose reel system contributes significantly to safeguarding lives, protecting property, and enhancing the overall fire safety of a building. More importantly, occupants should understand that a hose reel is intended for controlling an early-stage fire only when it is safe to intervene, and it should form part of a broader building fire safety strategy rather than being relied upon as the sole means of fire protection.

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Reference:

[1] Mohammad, N.H. (2025). *Guide to Fire Protection in Malaysia (Third Edition)*. Pertubuhan Akitek Malaysia (PAM).