

SUPPLEMENTARY PAPER ON TECHNICAL GUIDANCE NOTE 1 (TGN 1) ADDRESSING OVERCOMING NEGATIVE SUCTION CONDITIONS

Option 3: Detailed specifications for horizontal fire pump in positive suction arrangement adjacent to fire water supply reservoir

1. Background

Negative suction condition for fire protection system has been discussed during the Technical Sub Committee (TSC) meeting where TSC has agreed an alternative solution alongside with 03 regulatory requirements to address the negative suction condition of fire pump. The RSC has developed an independent implementation guidance based on the outcome of the discussion, which may aid industry in completing their remediation plan in a timely manner.

3 regulatory requirements are as below-

1. Where the top of the reservoir is accessible, and it has the required structural strength, a listed vertical turbine fire pump may be installed.
2. Where there is an existing below ground reservoir, excavate a pit beside the reservoir such that a horizontal fire pump can be installed beside the reservoir at its lowest level.
3. The installation of an appropriately located water reservoir to facilitate a listed horizontal fire pump to be installed in a positive suction arrangement adjacent to the reservoir.

And alternative solution-

4. Install a header tank or break tank in a positive suction arrangement sized to supply the sprinkler system demand plus the inside hose stream allowance for a period not less than 20 minutes. The remaining required water supply may be in an accepted negative suction arrangement.

This supplementary paper to address and provide the technical specifications and implementation guidance on-

“The installation of an appropriately located water reservoir to facilitate a listed horizontal fire pump to be installed in a positive suction arrangement adjacent to the reservoir.”

2. Standard Requirement/s:

Fire pumps shall be installed in positive suction arrangements.



3. Implementation Guidance:

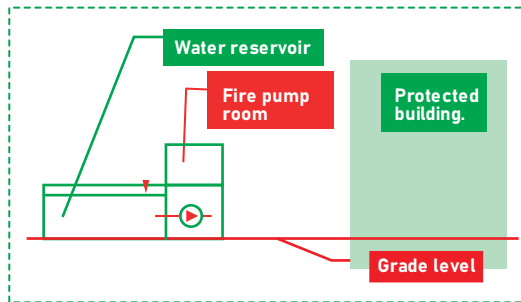


Fig 1: outdoor- above ground water reservoir

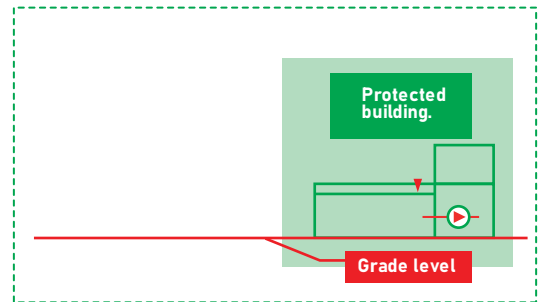


Fig 2: indoor- above ground water reservoir

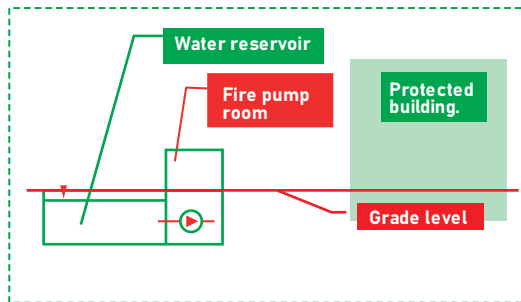


Fig 3: outdoor- below ground water reservoir

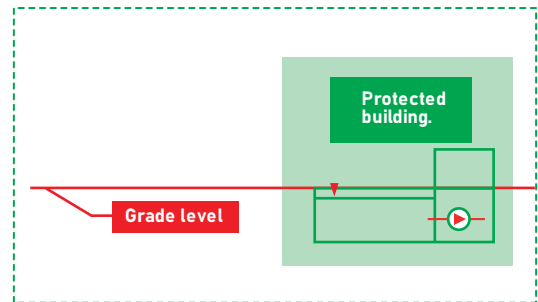


Fig 4: indoor- below ground water reservoir

A. Proper site condition assessment is necessary under this specification note to consider the factors related to indoor/ outdoor location of to be constructed below/ above ground water reservoir, adjacent to the fire pump and fire pump room.

- 1) In case of outdoor- above ground water reservoir (Fig 1) - special consideration shall be provided to the structural design and construction of above ground water reservoir with adjacent fire pump room, proper hydraulic calculation to review the margin of head losses, consider seasonal flood situation, the access to fire pump room and proper measure of equipment protection of fire pump room.
- 2) In case of indoor- above ground water reservoir (Fig 2)- special consideration shall be provided on
 - The structural design and construction of above ground water reservoir with adjacent fire pump room.
 - Need to check whether this new construction has any impact on existing building to where it would be built and the location of fire pump room.
 - Floor clear height needs to consider for determining the depth of the water reservoir and the height of fire pump room.
 - Proper hydraulic calculation needs to perform to review the margin of head losses.
 - The access to fire pump room and proper measure of equipment protection of fire pump room.





- 3) In case of outdoor- below ground water reservoir (Fig 3)- special considerations shall be provided to the structural design and construction of below ground water reservoir with adjacent fire pump room, location of proposed fire pump room with water reservoir and the distance from the building the system would provide the support to, consider seasonal flood situation, proper hydraulic calculation needs to perform to review the margin of head losses, the access to fire pump room and proper measure of equipment protection of fire pump room.
- 4) In case of indoor- below ground water reservoir (Fig 4)- special consideration shall be provided on
 - The structural design and construction of below ground water reservoir with adjacent fire pump room.
 - Need to check whether this new construction has any impact on existing building to where it would be built and the location of fire pump room.
 - Floor clear height needs to consider for determining the height of fire pump room.
 - Proper hydraulic calculation needs to perform to review the margin of head losses.
 - The access to fire pump room and proper measure of equipment protection of fire pump room.
- B. Determine the capacity of proposed water reservoir for above illustrated 4 cases A1, A2, A3 & A4. The requirement is to ensure minimum 60 minutes (effective) fire protection water supply duration located such that the pump is always with required positive pressure.
- C. Water reservoir depth is an important factor to be considered for performing hydraulic calculation and corresponding to maximum positive suction pressure of fire pump.
- D. Determine the standard size (length, width, and height) of fire pump room to fit all necessary equipment and adequate to accommodate-
 - 1) Clearances for installation and maintenance
 - 2) Clearance for electrical equipment
 - 3) Orientation of pump to suction piping
- E. Equipment protection of fire pump room including proper ventilation must be ensured according to NFPA 20 Section 4.12.
- F. Standard installation of stationary fire pump must comply to the requirement of NFPA 20.
- G. Check the proposed water reservoir design and installation to comply with the requirements of NFPA 22.
- H. Design drawing and related hydraulic calculations must be accepted and reviewed by the RSC prior to the execution of this option.
- I. The installation contractor is responsible for installation, testing & commissioning of fire protection system in accordance with NFPA 25.

4. Recommendation:

Section 3 within this supplementary paper provides detailed design considerations on installation of fire pump and fire pump room adjacent to a properly located new water reservoir, which will assist the user with adequate guidance and knowledge on fulfilling the remediation requirement accordingly.

5. References:

NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection.

NFPA 22, Water Tanks for Private Fire Protection.

NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.

Technical Guidance Notes for Fire and Building Safety Remediation in Bangladesh

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