



TECHNICAL BULLETIN CEA 4001-TB-002-Third Party Inspection

CEA 4001 - Sprinkler systems - Planning and installation

Third Party Inspection September 2022

This technical bulletin is intended to be used in combination with CEA 4001.

It supplements the CEA 4001 rule - clauses 1.4.2, 1.4.3.2 and 17 - by providing specific requirements for third party inspections. This basic rules and good practices may also apply to sprinkler systems or other water based firefighting systems that have been designed according to other standards than CEA 4001. This document highlights the importance of third party inspection that, in combination with approved components, suitable design and approved installers, ensures the reliability and effectiveness of the system.

Unless specified differently in this technical bulletin, all the provisions of CEA 4001 shall be fulfilled.

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1. Scope

In the life time of a fire fighting system, there are several tests and inspections by various parties.

This document highlights the importance of third party inspection that, in combination with approved components, suitable design and approved installers, ensures the reliability and effectiveness of the system.

2. Third party inspection in the life cycle of a system

The commissioning and acceptance testing (§17 of CEA 4001) is the phase where the approved installer company ensures through testing and visual verification, that the system has been designed and installed in compliance with the standard.

Following this stage, an initial third party inspection, also named approval inspection or system verification (see 1.4.2) shall be performed by an independent inspection body.

The periodic maintenance program is aimed to ensure that the system remains functional (see §18 of CEA 4001).

In addition, the periodic third party inspection (§1.4.3) is aimed to ensure that the system remains in accordance with the standard concerning effectiveness and reliability.

This is important because changes may have occurred after the initial inspection, e.g. in the building structure, process, content and/or storage configuration.

Another aim is to check that system components are fully operational and that the system is properly and regularly maintained..

In reference to EN 16 763, the various stages of work in a life of an automatic fire fighting system are in the scheme below. This technical bulletin focuses on initial inspection and periodical inspection.

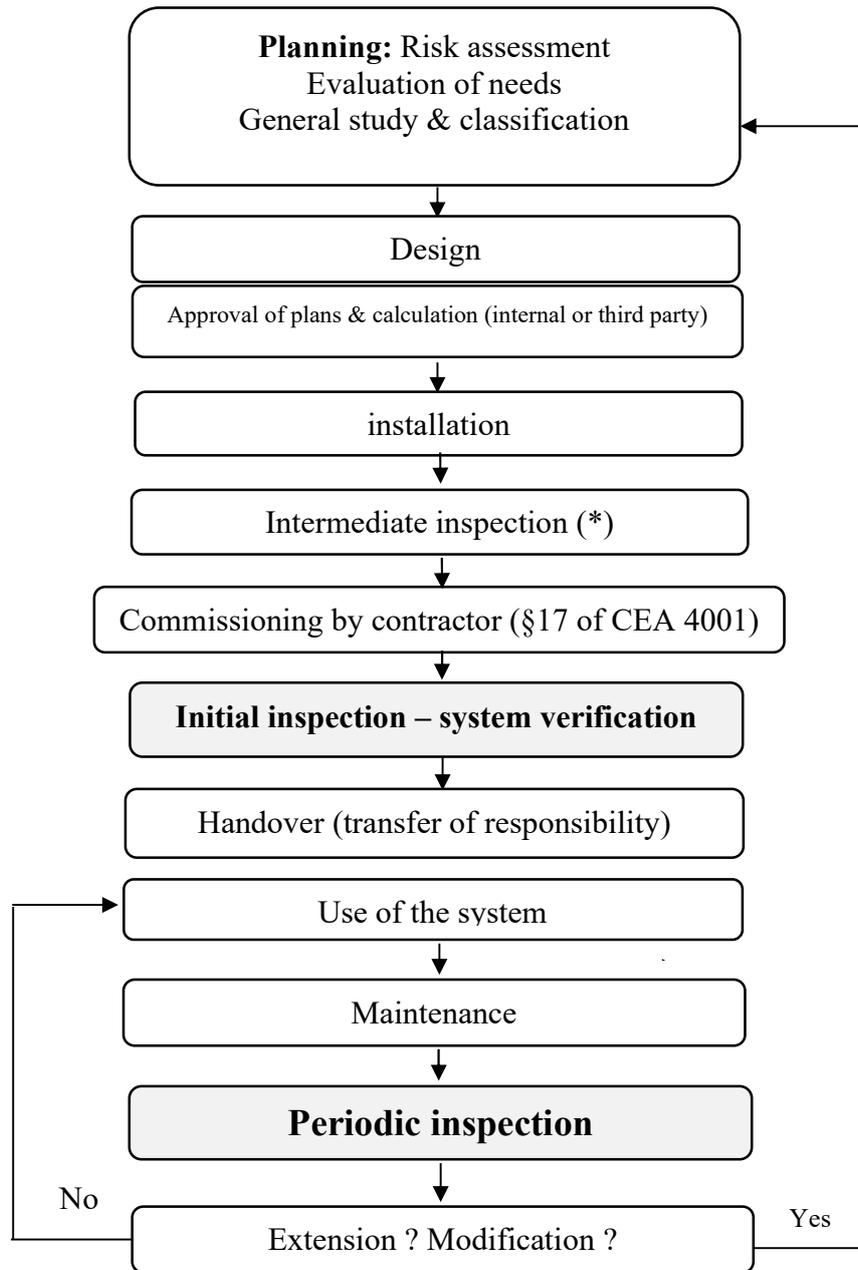


Figure F 2 — Typical life cycle of automatic firefighting system

(*) Intermediate inspection: may be required for the inspection of the parts of the installation which may be unreachable during the initial inspection.

3. Qualification of third party

Initial or periodic inspection shall be performed by a third party (independent body), which shall not be the system owner, building user, nor parties that have been involved in the system installation.

The inspection shall be performed by a designated person, suitably trained, qualified by knowledge and practical experience and with the necessary instruction to enable the test and examinations to be carried out.

The performance testing of individual equipment may be done by the representative of the owner, user or by the representative of the installer according to situations (initial inspection or periodical inspection), but should be witnessed by the third party inspector.

Qualification related to sprinkler system shall be documented and proof of knowledge, both theoretical and practice, shall be recorded.

In some countries, qualification for third party inspection might be confirmed by specific examination.

Where the sprinkler or deluge system is triggered by an automatic fire detection system (e.g. pre-action installations), it is required that the third party in charge of the inspection has the qualification for fire detection system, so that the inspection can include the verification of the interaction between both systems. This qualification can be held by one single person or by the inspection team.

4. Initial inspection

This initial third party inspection, also named approval inspection or system verification is aimed to ensure that the design and installation of the entire system is in compliance with the requirement of the sprinkler system standard.

Where applicable (e.g. deluge or pre-action installations), the initial inspection shall also include the conformity inspection of the automatic fire detection system and its adequate interaction with the sprinkler system.

It covers documentation of the installed system, including water supply, alarm systems, but also the adequacy between protection and building activity (e.g. classification of goods, permitted height of storage or clearance ...). To achieve this objective, the third party inspection shall cover the entire premises and includes the following:

4.1 Documentation

- Design criteria and possible deviations
- "As Built" drawings and hydraulic calculations
- Approved and/or listed components
- Compatibility assessment between foam additive, protected materials and hazard
- Documents of the commissioning test (flushing, hydrostatic test, alignment of pump set...)
- Maintenance program and owner or user's manual
- Proof that systems linked to sprinkler installation are compliant with relevant standard or rule, e.g. fire detection system for deluge or pre-action installations.

4.2 Water supply

- Arrangement and availability of water tank and/or public water supply or any other source supplying sprinkler system
- Verify that pump room arrangement and components are compliant with relevant clauses of standard
- Test of the characteristics of flow/pressure, volume and functionalities of water supplies
- Check that the most unfavourable and most favourable hydraulic demands are covered with adequate duration.

4.3 Functional tests

- Verify the functionality of all devices and monitoring systems, including the correct reception of signals at remote stations and/or devices
- Test of all fire alarms, including the correct reception of signals at remote stations and/or devices
- Test functionalities of all alarm valves
- Trip test of all alarm valves (including the water delivery time test for dry or pre-action system unless this test has been done and documented during commissioning phase)
- Trip test of all deluge alarm valves: whenever possible, it is highly recommended to perform a full scale test. Where it is not possible to flood the entire protected area, it is acceptable to perform a trip test, having the downstream stop valve closed.
- Where manual and/or automatic triggered system is present, test the interaction functionalities: e.g. make sure that the activation of fire detection does activates the intended deluge or pre-action alarm valve.
- Verify the automatic activation of ancillary system or interlocks, if applicable, e.g. automatic equipment shut down.
- Where foam additive is present, perform a functional test of the foam injection device and measure of foam concentrate.

4.4 Installation and protected risk

- Separations between protected and unprotected areas.
- Architectural elements that are incompatible with protection, e.g. obstructions
- Presence of ancillary techniques (e.g. smoke vents) that may influence the protection and effectiveness.
- Actual occupancy compliant with sprinkler system design in the area concerned.
- Storage compliant with the sprinkler system design in the area concerned, e.g. actual storage height, clearance, flue spaces, aisle around storage...
- Total protection of buildings, premises or facilities.
- Sprinkler heads, e.g. surface area covered by sprinkler, distances
- Missing or damaged pipe support.
- Condition of trace heating, risk of frost, compressed air/nitrogen,

- Antifreeze solution (quality, concentration...),
- Foam concentrate / premix (quality, concentration...)
- Components and material used
- Spare parts availability on site.

4.5 Owner or user's programme

- Suitable training programme of operators
- Suitable routine inspection and testing for sprinkler systems
- Suitable quality assurance programme, which includes the automatic fire fighting system

4.6 Inspection report

A report shall be established with the results, water supply curves and findings of tests and inspection. It shall include the exhaustive list of deviations.

A severity level should be associated to each deviation and a conclusion regarding the compliance with the standard of the system should be provided.

4.7 Completion of inspection

At the end of the inspection, ensure that the system is left in fully operating condition.

In case the system cannot be reset in fully operating condition (leakage, damaged component...) the impairment notification shall be initiated and immediate corrective action shall be carried out.

The inspector shall inform the owner or user's representative about critical findings and state of the installation at the end of the inspection.

5. Periodic inspections

The periodic third party inspections (§1.4.3) are aimed to ensure that the system remains in accordance with the standard concerning effectiveness and reliability.

It covers installed system itself; water supply, alarm systems, but also the adequacy between protection and hazard to be protected (e.g. classification of goods, permitted height of storage, clearance, ...).

5.1 Documentation

- Availability of initial inspection report
- modification of system since initial or previous inspection
- verify that routine testing by the owner or user have been performed regularly since previous inspection, including checking the "logbook"
- verify that the maintenance has been performed since previous inspection according to the specifications (CEA 4001, EN12845, NFPA13, ...):
 - from the component supplier
 - from the installer

- Verify that the necessary long-term inspections and maintenance programs have been successfully completed in due time. It includes e.g. verification of sprinkler heads, pipe inspection, replacement of the rubber gaskets, cleaning of water tank, ...)

5.2 Water supply

- Verify that the water tank and/or public water supply or any other source supplying sprinkler system are in operational condition
- Inspect that pump room equipment is in operational condition
- Test the functionalities of water supplies
- Test of the characteristics of flow/pressure and verify that the measured values are fulfilling the requirements

5.3 Functional tests

- Verify the functionality of the monitoring system, including the correct reception of signals at remote stations and/or devices
- Test of all fire alarms, including the correct reception of signals at remote stations and/or devices
- Trip test of all alarm valves. For dry, pre-action, deluge installation, it is recommended to avoid flooding the entire pipework.
- Verify that manual and/or automatic triggering systems are in operating condition, e.g. make sure that activation of fire detection activates the intended pre-action alarm valve.
- Verify the automatic activation of ancillary system or interlocks, if applicable, e.g. automatic equipment shut down.

5.4 Installation and protected risk

- Separations between protected and unprotected areas
- Architectural elements that are incompatible with protection, e.g. obstruction
- Presence of ancillary techniques (e.g. smoke vents) that may influence the protection and effectiveness.
- Actual occupancy compliant with sprinkler design in the area concerned.
- Storage compliant with the sprinkler design in the area concerned, e.g. actual storage height, clearance, flue spaces, aisle around storage...
- Total protection of buildings, premises or facilities.
- Sprinkler heads, e.g. surface area covered by sprinkler, distances
- Missing or damaged pipe support.
- Condition of trace heating, risk of frost, compressed air/nitrogen,
- Antifreeze solution (quality, concentration...),
- Foam concentrate / premix (quality, concentration...)
- Spare parts availability on site.

5.5 Owner or user's programme

Check that the initial owner or user's programmes are performed and adjusted as necessary including:

- Up to date training/capability of operators
- Routine inspection and testing for sprinkler systems
- Suitable corrective actions in case of modifications of the building or the hazard

5.6 Inspection report

A report shall be established with the results of water supply curves and findings of verifications.

It shall include the exhaustive list of deviations.

A severity level should be associated to each deviation and a conclusion regarding the compliance with the standard of the system should be provided.

Attention shall be paid to the corrective actions of deviations recorded in previous reports.

5.7 Completion of inspection

At the end of the inspection, ensure that the system is left in fully operating condition.

In case the system cannot be reset in fully operating condition (leakage, damaged component...) the impairment notification shall be initiated and immediate corrective action shall be carried out.

The inspector shall inform the owner or user's representative about critical findings and state of the installation at the end of the inspection.