1. Scope

This Technical Specification specifies the evaluation and recognition requirements for Loss of Pressure (LOP) tube detection systems. These systems are used as fire detection devices in mobile or transportable equipment fire protection systems in accordance with AS 5062, to be certified by CSIRO's ActivFire® Scheme ("the Scheme").

This Technical Specification was developed to provide criteria that will allow the LOP tube detection system to demonstrate suitable compliance for the purpose of satisfying Clause 9.1 (a)(ii) of AS 5062:2022.

This document supersedes SSL Test Specification FTS-139.

2. Referenced Documents

Details of the documents referenced by this Technical Specification are detailed in Table 1.

Table 1 List of documents referenced by this Technical Specification

AS 5062:2022	Fire Prevention and protection for mobile and transportable equipment
SSL Test Specification FTS-139, Ver:1.0, 2002	Bursting Temperature Testing of Plastic Fire-Detection Tubing
ANSI/UL 521 Ed 8, 2024	Standard for Heat Detectors for Fire Protective Signalling Systems
AS ISO / IEC 17025:2018	General requirements for the competence of testing and calibration laboratories

3. Pre-evaluation requirements

In addition to the application requirements of CSIRO's ActivFire Scheme document AF-D001, the Applicant seeking product evaluation and certification by CSIRO shall provide the following information and documentation:

1. Manual or datasheet including the following:
    a. The maximum temperature rating of the LOP tube.
    b. The operating temperature rating.
    c. If the LOP tube will be operating at a low temperature
    d. The operating pressure.

4. Evaluation

4.1. Evaluation activities

Evaluation of conformity of the LOP tube detection systems, for the purposes of CSIRO's ActivFire® Scheme, requires the following activities detailed in Table 2.

Table 2 Activities required by this Technical Specification to evaluate the conformity of the LOP tube detection systems for the purposes of CSIRO's ActivFire® Scheme.

Activity	Description
1	Evaluation protocol selection.
2	Testing and assessment of the LOP tube detection systems in accordance with Section 4.3, if required.
3	Review of the design and installation manual(s).
4	Identification of product limitations.

4.2. Activity 1

For this activity, ActivFire shall develop an evaluation protocol based on Table 3 below that is appropriate for the LOP tube detection system

Table 3 Evaluation protocols suitable for demonstrating conformance to this specification.

Criteria	Notes
ANSI/UL 521	• Test datasheets and test records by UL shall be provided by the applicant in addition to the Certificate of Compliance by UL. • CSIRO will conduct a verification test to Clause 43 of ANSI/UL 521 Ed. 8.
CSIRO TS-022	The product shall be tested by CSIRO's Fire Systems Laboratory to the following: • Clause 38 of ANSI/UL 521 Ed. 8. • Clause 43 of ANSI/UL 521 Ed. 8. • Clause 46 of ANSI/UL 521 Ed. 8 (if applicable).
SSL Test Specification FTS-139, Ver:1.0, 2002	• Test report to by SSL to this test specification. • CSIRO will conduct a verification test to Clause 43 of ANSI/UL 521 Ed. 8. Note: This criterion will not be offered to new products and will be removed from future versions of this TS.

4.3. Activity 2

To meet the requirements of Activity 2 of this Technical Specification, CSIRO's Fire Systems Laboratory shall either conduct verification testing to Clause 43 of ANSI/UL 521 Ed. 8 and review the test reports and datasheets or conducted testing to the requirements of this Technical Specification.

Table 4 below provides some clarification on the testing of the LOP tubes to Clause 38, 43 and 46 of ANSI/UL 521 Ed. 8.

Table 4 Clarification for testing LOP tubes to Clause 38, 43 and 46 of ANSI/UL 521 Ed. 8

Clause	Deviation/clarification	Number of samples of LOP tube to be tested	Criteria
38	• Five samples of LOP tube shall be exposure to high temperature. • All samples may be tested simultaneously. • During the 30-day exposure, the samples are to be monitored for (unwanted) operation. • Following the 30-day exposure, each sample shall be tested according to Clause 43.	5	• No operation shall occur during the 30-day high temperature exposure. • Following the high-temperature exposure, each sample of LOP tube shall meet the requirements of the Operating Temperature Test (Clause 43).
43	• Testing is to occur in a heated (air) oven. • At least 1 m of LOP tube shall be exposed to the heated environment (e.g. oven). • All samples may be tested simultaneously. • Monitoring shall be by pressure transducer or pressure switch. Separate transduces or switches shall be used for each sample if multiple samples are tested simultaneously. • LOP tubes are to be charged to the required pressure as they will be used during installation as part of a fire suppression system. • The LOP tube is to be tested unwound, or with a minimum bend radius of 300 mm.	5	• Operation shall be within the temperature ranges for the nominated rating in accordance with Table 43.1 of UL 521. • Operation of the LOP tube will be deemed to be when the pressure has returned to atmospheric pressure.
46	• Testing may occur in the same chamber as that used for Clause 38 and 43. • All samples may be tested simultaneously. • Following the low-temperature exposure, the Operating Temperature Test (Clause 43) may commence when the pressure within the LOP tube has returned to atmospheric pressure. • Only LOP tubes claiming low temperature operations shall be tested.	3	• Monitoring is not required during low temperature exposure. • Following the low-temperature exposure, each sample of LOP tube shall meet the requirements of the Operating Temperature Test (Clause 43).

4.4. Activity 3

The manual and/or datasheet of the LOP tube detection system intended for use shall be provided to CSIRO for review. The manual and/or datasheet shall contain a title, document no (if applicable), version no., date of issue, details of the business entity and the business entity address. The manual and/or datasheet shall be written in English, include all relevant components and any system or component limitations.

The system limitation shall be included in the report by CSIRO's Fire System Laboratory.

4.5. Activity 4

CSIRO's Fire Systems Laboratory shall identify any product limitation from their evaluation activities including the following:

1. The operating temperature of the LOP tube detection system.
2. The operating pressure of the LOP tube detection system.
3. The maximum temperature the LOP tube detection systems can be exposed to.

4.6. Suitability of external evidence

Evidence of conformity, in the form of endorsed test reports written in English, are required to be submitted in full.

Test reports shall, where possible, be provided by a National Association of Testing Authorities (NATA) ISO 17025 accredited laboratory and in accordance with the relevant test standard, or as agreed with CSIRO.

Where test reports were originally produced in a language other than English, suitable translations may be supplied in addition. Submitted external test reports must provide sufficient detail to describe the product being evaluated in full and in detail and establish that an evaluation schedule was designed and applied to each component submitted to the external agency.

External evidence can only be accepted where verification between the product submitted for evaluation and the specimens in the endorsed test report is considered a critical requirement. Where external reports do not provide sufficient product identification, additional evaluation to specified requirements may be required.

4.7. Reporting

The evaluation of a conformity report shall include the following information:

a. A statement of conformity with reference to CSIRO Technical Specification TS-022 and unambiguous designation that the system has been evaluated in accordance with this technical specification.
b. A description of the system.
c. Limitation of the product.
d. List of documentation used for the evaluation of conformity including the document ID, version number, and issue date.

5. Ongoing Verification of Conformity

5.1. Ongoing verification of conformity activities

To maintain ongoing certification with CSIRO's ActivFire® Scheme, the LOP tube detection system shall be subject to a post-certification surveillance activity described in Table 5.

Table 5 Activities required to demonstrate ongoing conformity of the LOP tube detection system.

Activity	Description	Notes
1	Factory Production Control (FPC) audit of the Primary Manufacturing Unit (PMU) every three (3) years from the issue date of the Certificate of Conformity.	• Details of the audit activities are described in CSIRO ActivFire® Scheme document AF-D008. • If the Registrant has multiple Certified fire suppression systems with the Scheme that are manufactured at the same PMU, the Scheme shall work with the Registrant to conduct the PMU audit within the same period for the Certified fire suppression system.

Document Review

Version: 1

Issued date: 20-Aug-25

Authorised by: Kai Loh

Document version no:	Issued date:	Change description:
1	20-Aug-25	• Initial issue