

*Building Life Safety Equipment and Systems
Testing, Inspection, Service, and Maintenance*

2019

Professional Practice Manual



*The Fire Protection Technicians Network
Suite 343, Building 151,
10090 – 152 Street,
Surrey, British Columbia V3R 8X8
Telephone: +1(888) 340-3473
Facsimile: +1(604) 552-7909*

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In memory of
G. Richard (Rich) Morris
David Sylvester
Gary Darling
Randy Barnes
whose passion and dedication continue to inspire

Table of Contents

Acknowledgements.....	5
1. General Comments & Introduction.....	6
1.1 Contact Information & Mailing Address	7
1.2 Mission and Objective.....	7
1.3 Member Code of Ethics and Conduct.....	7
2. Definitions Terminology Used in this Manual	9
3. Technician Certification in Canada (to December 31, 2018)	11
4. Building Life Safety Equipment & Systems Certification Program	12
5. Requirements for Certification	14
5.0 General.....	14
5.1 Currently Certified Fire Alarm Technicians & Registered Fire Protection Technicians (RFPT)	15
5.2 Currently Certified DHI Technicians (FDAI)	15
5.3 Building Life Safety Consultant Certificate	15
5.4 Transfer of Educational Credits	16
5.5 Restrictions on Practice	16
6. Disclosure.....	20
7. Seal and Membership Identification Card	20
8. AHJ Review & Transparency	21
9. Online Building Information System (Anticipated Launch Date – July 2019).....	21
10. Owners/Property Managers Review & Transparency	21
11. Testing Standards in Effect - Referenced in NFCC 2015 & NBCC 2015	22
12. Professional Practice Procedure	23
12.1 Inspection Tags.....	23
12.1.1 General Requirements.....	23
12.1.2 Completing the Inspection Tag.....	24
12.1.3 Comments on Report.....	25
12.1.4 Additional Work Required	25
12.1.5 RED TAG Procedures (Identification & Use)	26
12.2 “No Access”	27

12.3 Initial Communication & Site Review.....	27
12.4 Scheduling of Inspections and Site Contact	27
12.5 Documentation & Reports	28
12.6 Tools	28
12.7 Personal and Workplace Safety.....	29
12.8 Walk-through & General Site Inspection	30
12.9 Inspection & Test Procedures	31
12.9.1 Fire Alarm & EVC Systems	31
12.9.1.1 Fire Alarm & EVC Systems – Annual Testing Procedures	32
12.9.1.2 Fire Alarm & EVC Systems – Verification Procedures.....	33
12.9.2 Unit Emergency Lighting	35
12.9.2.1 Emergency Light Battery Packs.....	35
12.9.2.2 Dual Function (Self Contained) Exit Signs.....	36
12.9.3 Portable Fire Extinguishers.....	37
12.9.4 Water-based Extinguishing Systems	38
12.9.4.1 General.....	38
12.9.4.2 Back-flow Preventers (Cross-Connection Controls).....	38
12.9.4.3 Dry Pipe Systems.....	39
12.9.4.5 Standpipe Systems	39
12.9.4.6 Valve Enclosures and Rooms.....	39
12.9.5 Extinguishment Systems Employing Electro-Mechanical Releasing Means and Gaseous or Liquid Agents.....	39
12.9.6 Generators.....	40
12.9.7 Fire Pump & Control Systems	40
12.9.8 Smoke Control Systems	40
12.9.9 Kitchen Suppression Systems.....	41
12.9.10 Carbon Monoxide & Parkade Exhaust Systems.....	41
12.9.11 Fire Alarm System Communicators	41
12.9.12 Passive Building Fire Protection Systems.....	42
12.9.12.1 Fire & Emergency Plans	42
12.9.12.2 Fire Doors and Exit Systems	42
12.9.12.3 Fire Stopping	43
12.9.12.4 Self-Illuminated Exits & Egress Pathway Marking Systems	43
12.9.12.5 Mechanically Actuated Dampers or Door Assemblies	43
12.10 Integrated Testing of Building Life Safety Equipment and Systems (CAN/ULC-S1001-11)	44

12.10.1 Initial Integrated Systems Testing – Commissioning Tests.....	44
12.10.2 Periodic Integrated Systems Testing	44
12.10.3 Retro-Integrated Systems Testing	44
12.10.4 Integrated Systems Testing for Modifications.....	45
13.1 Duty to Report Non-compliance	46
13.1.1 Reporting Non-compliance of Other Technicians or Agencies	46
13.10.2 Reporting Non-compliance of Another Technologist/Associate Member	46
14. Technologist / Specialist Online Account & Practice Log (Anticipated Launch – July 2017)	47
14.1 Technologist’s Personal Page & Activities	47
14.2 Errors	47
14.3 Uploading Test Reports	47
15. Liability	48
16. Practice Review	49
16.0 General	49
16.1 Professional Practice Evaluation.....	49
16.2 Professional Practice Reviews.....	49
16.2.1 Places of Employment	50
16.2.2 Building Site Specific.....	50
17. Technologist Competency – Personal Professional Development Plan.....	50
18. Continuing Education, Required Education Credits	51
19. Conflicts from Employment	51
19.0 General	51
19.1 Conflict Resolution	52
20. Complaints	52
20.1 Dispute Resolution - Preamble	52
20.2 Filing a Complaint Report.....	52
20.3 Member Interview	53
20.4 Witnesses / Review	53
20.5 Complaint Hearing	53
20.6 Determining Factors	53
20.7 Outcomes	54
20.8 Appeal	54
21. Termination and Severability	55
21.1 Member Initiated	55

21.2 Failure to Renew.....	55
21.3 Suspension.....	55
21.4 Termination for Cause.....	55
22. Reinstatement.....	56
22.1 Lapsed (Expired) Membership (14 – 120 days from membership due date)	56
22.2 Lapsed (Expired) Membership (121 – 720 days from membership due date)	56
22.3 Lapsed (Expired) Membership (greater than 720 days from membership due date).....	56
22.4 Suspended (or Cancelled) Membership for Cause	57
23. Conditions	57
23.1 Confidentiality	57
23.2 Test Reports and Documents.....	57
24. Schedule of Fees	58
24.1 General Fees	58
24.2 Course Fees:.....	59
24.2.1 Full Course Fees.....	59
24.1.2 Refresher and Online Course Fees	59
25. Additional Notes / Index to Photographs & Illustrations.....	60



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*ASTTBC – Applied Science Technologists and Technicians of British Columbia
Their Fire Protection Program’s Practice Guideline (2008) and Code of Ethics are the inspiration for this manual as well as the Fire Technicians Network Technologist Certification Programme.*

*CFAA – Canadian Fire Alarm Association
Their educational initiatives have set the standard for the training of fire alarm technicians in Canada.*

*DHI – Door and Hardware Institute
Setting the standard for regular fire door inspection and functional testing.*

*FPOABC – The Fire Prevention Officers Association of British Columbia
CFPOA – The Canadian Fire Prevention Officers Association
EIABC – Electrical Inspectors Association of British Columbia
ECABC – Electrical Contractors Association of British Columbia
BOMA – Building Owners & Managers Association
Partners in life safety, training and knowledge*

*NFPA – National Fire Protection Association
SCC – Standards Council of Canada
CSA – Canadian Standards Association
ULC – Underwriters Laboratories (of Canada)
Producing Standards that serve an international community of professionals, manufacturers, and agencies dedicated to our safety and security*

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United Technologies Corporation
their affiliates and subsidiaries, all of whom foster participation, inspiration, leadership, and innovation in the workplace, our industry, and in our communities*

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Promoting and encouraging initiatives to make us all safe and secure.*

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friends, mentors, & consummate professionals.*

*Dedicated to Philip and Jovel Galorosa
Everyone’s children and grandchildren*

*“Every child comes with the message that
God is not yet discouraged of humanity.”
-- Rabindorath Tagor*

1. General Comments & Introduction

This manual is your guide to the inspection, testing, service, and maintenance procedures required of a technologist or specialist certified by the Fire Protection Technicians Network. It is also laying down a code of conduct for individuals engaged in any level of management within the fire protection equipment service industry or that provide professional consultative services to building owners in the preparation and execution of periodic maintenance or service agreements.

This manual covers your interaction with other life safety professionals and co-workers, as well as building owners, their representatives, and the local jurisdictional authority(ies). It provides guidelines that will help empower you to take your practice to the next level. Professional practice demands an ongoing commitment to education and personal growth. The three watchwords of the Network: knowledge, integrity, and vigilance, also form the three sides of the triangle in our Logo and are the foundation upon which we would wish to encourage you to build your career. More-over, it is a living document, and as such will be undergoing frequent, extensive review, and amendment.

Building Life Safety is more than an amalgam of technologies designed to protect people and property, it's also a partnership between three distinct groups: building owners and managers, local authorities, and the fire protection equipment & service industry.



"We are not a professional union, but together, we are a union of professionals!"

1.1 Contact Information & Mailing Address

The Fire Protection Technicians Network
Suite 343, Building 151,
10090 152 Street,
Surrey, British Columbia V3R 8X8

Telephone: +1 (888) 340-3473 (North America Toll Free)
+1 (604) 468-8324 (24 hrs.)
+1 (778) 863-7147 (Mobile & SMS)
Facsimile: +1 (604) 552-7909

email: tech@firetechs.net
members@firetechs.net

URL: www.firetechs.net

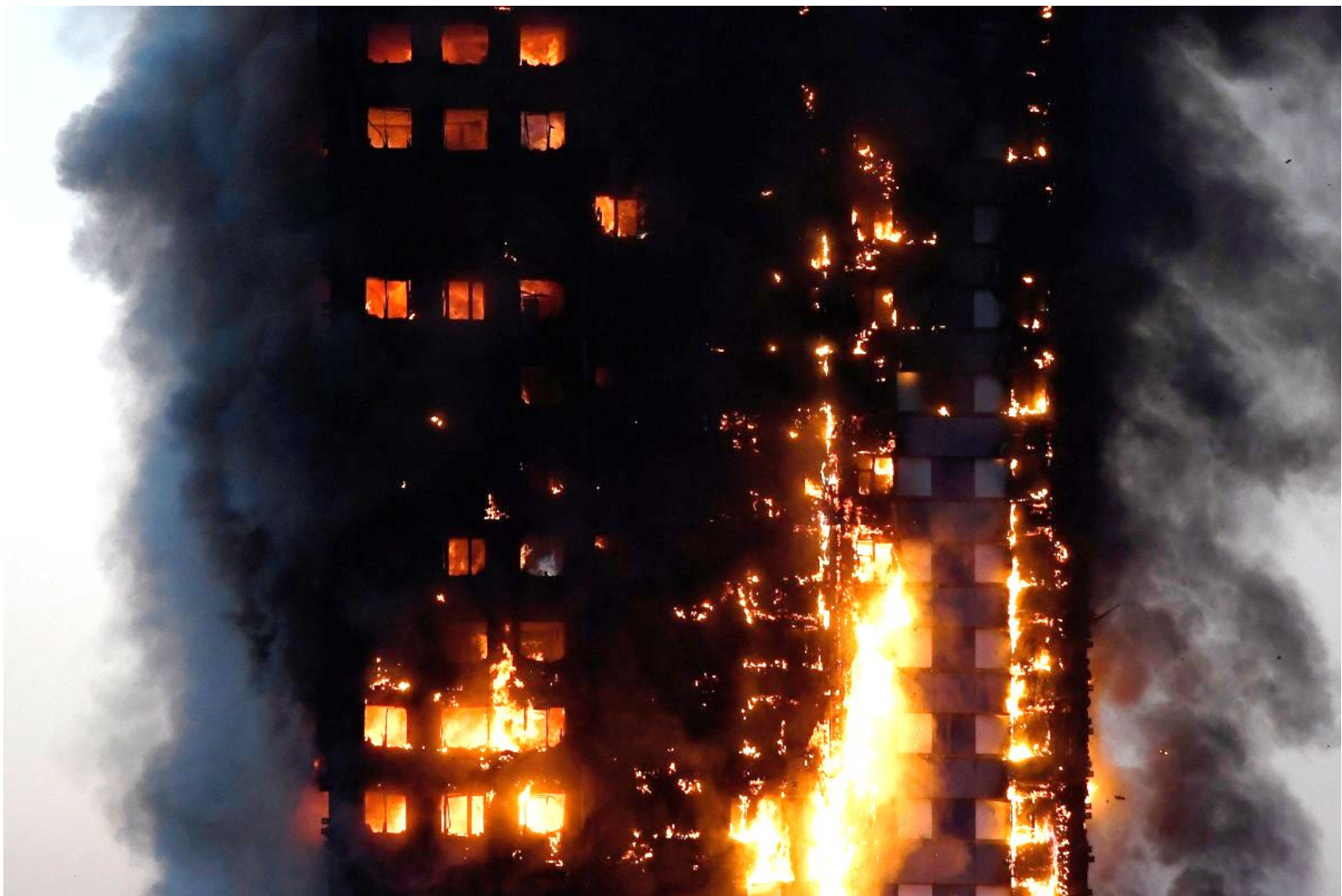
1.2 Mission and Objective

The protection of the public is our association's primary mission and our highest purpose.

1.3 Member Code of Ethics and Conduct

1. *Members shall diligently apply themselves to the acquisition of knowledge, to its further dissemination and rigorous application through practical endeavour.*
2. *Members shall apply the published referenced Codes and Standards in their area of expertise and jurisdiction which is considered to be the minimum expected performance, inspection and testing criteria.*
3. *Members shall ensure that any required inspection or test report submitted to the building owner(s) and/or their authorized representative(s) is based on the approved format as reviewed and provided by the Network.*
4. *Members shall comport themselves in an honest, straight forward and professional manner, both as representatives of the Fire Technicians Network and as the representatives of the larger community of fire equipment service industry professionals they represent.*
5. *Members shall only perform work for which they have received formal training and can demonstrate competence through actual experience. Note: Minimum certification criteria has been established by the Network which the member is responsible to achieve within the time frames that have been established in the Practice Guideline and/or in their personal professional development plan.*
6. *Members certified by the Network shall be subject to Periodic Practice Reviews (PPR).*
7. *Members under review shall cooperate with the assigned reviewer in providing documentation, reports, equipment and materials as required to ensure compliance with the applicable Codes and Standards, and the Practice Guideline.*

8. *Members shall support the goals, objectives, and mission of the Fire Technicians Network at all times in any interaction with members of the Public, other industry (or non-industry) professionals, other Network members, the media, Building Officials, Fire Prevention Officers, and other jurisdictional authorities.*
9. *Members shall document and report the unprofessional practice of anyone engaged in the installation, service, testing, maintenance and inspection of building life safety equipment to the building owner (or their representative) and to the local jurisdictional authority forthwith.*
10. *Members shall report unprofessional or substandard practice(s) of other Network Certified Members. Note: Failure to do so may result in the suspension of the Member's professional privileges while they themselves undergo a formal Practice Review in conjunction with the offending Member(s).*



2. Definitions / Terminology Used in this Manual

2.0.1 Advertising when used in this manual refers to the actions of an agency or company engaged in providing fire protection equipment service, testing, or inspection to promote the services they offer via print, audio, visual, or Internet based medias. Advertising services may also include mobile (truck and vehicle) or fixed outdoor signage.

2.0.2 Active Building Life Safety Equipment and Systems describes equipment and systems that play an active role in identifying and warning building occupants of an emergency condition. Active systems may also be engaged to suppress a fire (e.g. sprinkler or extinguishment system) and exhaust harmful products of combustion (e.g. smoke control & venting systems). **Table 1** identifies further examples of Active Building Life Safety Equipment and Systems.

2.0.3 Authority Having Jurisdiction (AHJ) is an individual or organization that adopts and enforces the codes, rules, and by-laws which govern the various concerns of a community (commonly referred to as the "final authority" for any matters relating to LIFE SAFETY and BUILDING CONSTRUCTION within that specific community).

2.0.4 Back-flow assembly (or back-flow preventer) is a check valve which prevents stagnant water serving fire protection system piping from flowing back into and contaminating the domestic supply of a building, complex, or community.

2.0.5 A Consultant provides professional consultation prepares quotations and contractual agreements for submission to a building owner for the testing, service, and inspection of related building life safety equipment and services.

2.0.6 A Dual Function (or Self-Contained) Exit Sign is an exit sign which incorporates a charger board and battery.

2.0.7 Elevator Dedicated Detection and Recall Controller (or DDRC) (where permitted to be used by the jurisdictional authority) is comprised of a fire alarm control panel and related field devices which are programmed to perform elevator recall and alternate floor homing functions.

2.0.8 Fire (or Smoke) Curtain Assembly is a fire rated assembly or smoke barrier which can be either electrically or mechanically deployed by the building's fire alarm system, specific detectors within the protected area, or by means of fusible linkages, and is designed to restrict smoke or fire from spreading to adjacent areas or compartments.

2.0.9 The Forward Flow Test is performed annually as required by NFPA 25 (Testing Standard for Water Based Extinguishing Systems) which verifies the rated flow of water in accordance with the design of the water-based fire protection system piping served by a back-flow preventer. This test is always followed by the performance test required by the local water authority to ensure the backflow preventer is fully functional.

2.0.10 Inspection Tag is a form in a prescribed format that is affixed to and identifies the specific fire protection equipment as having been inspected by a qualified technologist/specialist in accordance with applicable Codes and Standards.

2.0.11 A Manager (in the context of this manual) is an individual engaged in the day-to-day operation of a fire equipment service agency and may have direct oversight of technologists and specialists certified by the Network.

2.0.12 National Building Code of Canada (NBC or NBCC) is the National Building Code of Canada (adopted by Province or Territory) in effect.

2.0.13 National Fire Code of Canada (NFC or NFCC) is the National Fire Code of Canada (adopted by Province or Territory) in effect.

2.0.14 Owner refers to the building owner or the owner's designated representative responsible for carrying out the inspection, testing, and maintenance requirements in accordance with Section 6 of the National Fire Code.

2.0.15 Passive Building Life Safety Equipment and Systems describes equipment or systems that are designed to inform building occupants of the locations of Exits, Areas of Refuge (includes illuminated and self-illuminating pathways to egress, exit signage, etc.) and the procedures to follow in the event of an emergency. They also incorporate construction techniques and equipment designed to minimize the spread of smoke and/or fire (e.g. fire doors, fire stopping materials & methods, fire walls, etc.). **Table 1** identifies further examples of Passive Building Life Safety Equipment and Systems.

2.0.16 Seal refers to the technologist’s seal (or stamp) which is affixed to all pertinent testing and inspection documents and equipment tags. It identifies the technologist by name, practice endorsements and certification number.

2.0.17 Self-illuminating Exit or Egress Path Marker Signs are photo-luminescent signs and markers designed to provide a visual indication for the route (or path) to egress from an area and do not depend on an external or internal electrical source or a connection to the building’s electrical equipment or systems.

2.0.18 Supervisor (in the context of this manual) is an individual engaged in the day-to-day oversight of technologists and specialists certified by the Network.



3. Technician Certification in Canada (to December 31, 2018)

Canadian Certification Agency References:

ASTTBC – Applied Science Technologists & Technicians of British Columbia

CFAA – Canadian Fire Alarm Association

DHI – Door and Hardware Institute

ULC – Underwriters Laboratories of Canada

Table 1

CANADIAN CERTIFICATION CROSS-REFERENCE TABLE						
Passive Building Safety Systems Testing				Active Building Safety Systems Testing		
EQUIPMENT DESCRIPTION	AGENCY			EQUIPMENT DESCRIPTION	AGENCY	
	DHI	ASTTBC ¹	CFAA		ASTTBC ¹	CFAA
Fire Door Assemblies	FDAI	NED*	NED	Fire Alarm Systems	AL	CT
Mechanical Smoke Dampers	NED	NED*	NED	Emergency Voice Communication Systems	AL	CT
Self-illuminating Egress Path Markers	NED	NED	NED	Fire Alarm Communicator Systems	NED, ACA	NED, ACA
Self-illuminating Exit Signs	NED	NED	NED	Smoke Control Systems	SM	NED
Fire Stopping	NED	NED	NED	Egress Path Marker Systems	NED	NED
Fire Safety (Emergency) Planning	NED	NED	NED	Fire Curtain Assemblies	NED	NED
				Portable Fire Extinguishers	EX	NED
				Fire Hose Assemblies	WA	NED
				Water-based Suppression Systems	WA	NED
				Standpipe Systems	WA	NED
				Sprinkler Back-Flow Assemblies	NED, MA	NED, MA
				Fire Pumps	FP	NED
				Unit Emergency Lighting	EL	NED
				Generator Systems	GS	NED
				Special Suppression Systems (Includes Extinguishment Releasing Systems)	SP, MT	NED, MT
				Fire Alarm Verification	NED	NED
				Building Life Safety Systems Commissioning	NED	NED
				Kitchen Hood Cleaning	CO	NED
				Carbon Monoxide Systems	NED	NED

CT – Certified Fire Alarm Technician (CFAA)

ACA – Alternate Certifying Authority (ULC)

MA – Municipal Authority may require additional certification

MT – Manufacturer's Training & Certification

¹ASTTBC - Registered Fire Protection Technician Endorsements

FDAI – Fire and Egress Door Assembly Inspector

NED – No Equivalent Designation

* Observation and inspection of some passive safety equipment is mentioned in the ASTTBC Standard of Practice (SoP).

Additional Table Notes:

1. ASTTBC is only recognized in a limited number of communities in British Columbia (through the adoption of a local Bylaw) and no other Canadian provinces or territories.
2. ASTTBC's Fire Alarm Verification (VI) Endorsement is in permanent abeyance. No further endorsements will be issued. The endorsement's acceptance in most jurisdictions in the province has been called into question by the decision of Mr. Justice Funt of the Supreme Court of British Columbia in his landmark ruling.
3. Extinguisher testing is required to be performed by technicians certified in compliance with NFPA 10. All accreditation must be acceptable to the local jurisdictional authority (AHJ) and may require additional certification of the fire protection equipment servicing agency which employs the individually certified technician.
4. A NED in the form field may imply that the proper testing of the related equipment is not being accomplished in accordance with the National Fire and Building Codes (or local By-laws). Alternative agencies may be involved in providing the required inspection/testing in accordance with the acceptance criteria established by the local jurisdictional authority (AHJ).
5. A technician with an endorsement which appears in a table field for the related equipment may not be performing the required testing or submitting the required documentation. It is the building OWNER's responsibility to ensure life safety equipment is being maintained in a fully operational condition and that acceptable maintenance, service, and testing records are kept available ON SITE for inspection by the Authority Having Jurisdiction (AHJ).

4. Building Life Safety Equipment & Systems Certification Program

1. The Fire Protection Technicians Network has two technical certification tiers that involve proficiencies in both the inspection and testing of passive as well as active building life safety equipment and systems. They are:

Tier One - Certified Building Life Safety Systems Technologist (LSST), and

Tier Two - Certified Building Life Safety Specialist (CLSS)

2. Within the first tier, there are two certification levels with “LSST” representing a Journeyman level Building Life Safety Technologist. A provisional level in a discipline is indicated within parentheses on the member’s identification card & seal.
3. LSST members will have the following equipment/system category designations that involve education, training, and field review components. They are:

B Fire Safety Planning, Fire Door Assemblies, Mechanical Smoke Dampers, Self-illuminated Egress Path Markers, and Self-illuminated Exit Signs

C Carbon Monoxide and Exhaust Systems

E Portable Fire Extinguishers

F Fire Alarm, Extinguishment Releasing, Smoke Control, Emergency Voice Communication, Fire Alarm Communicator, Smoke Alarms, Egress Path Marker Systems, Door Holder and Fire Curtain Assemblies

G Generator Systems

H Commercial Kitchen Hood & Exhaust Cleaning

K Kitchen Fire Suppression Systems

L Unit Emergency Lighting

P Fire Pump Testing

V Verification of Fire Alarm Systems, Extinguishment Releasing, Smoke Control, Emergency Voice Communication, Fire Alarm Communicator, Smoke Alarms, Egress Path Marker Systems, Door Holder and Fire Curtain Assemblies

W Water-based Extinguishment Systems, Standpipe Systems, Hoses, and Back-flow Preventer Assemblies

4. LSST member’s practice is limited to only those disciplines in which certification has been granted. Technologist members shall not engage in inspection, service, or repair of equipment/systems for which they have not received formal Endorsements.
5. A third certification tier governs members involved in any level of management of a fire equipment service company with or without direct oversight of certified technologists, or who may be engaged in consultation with Building Owners for the preparation, execution of service agreements and contracts for the maintenance, testing and inspection of building life safety equipment and systems. This is the Certified Building Life Safety Consultant (BLSC).

The certification designations are outlined in **Table 2** on the next page.

Table 2

FIRE PROTECTION TECHNICIANS NETWORK CERTIFICATION DESIGNATIONS			
	Equipment Description	Life Safety System Technologist Certification Levels	
Passive Building Life Safety Systems Testing	Fire Safety (Emergency) Planning Fire Door Assemblies Mechanical Smoke Dampers Self-illuminating Egress Path Markers Self-illuminating Exit Signs Fire Stopping	LSST – B	Certified Building Life Safety Specialist (CLSS)
	Fire Alarm Systems Emergency Voice Communication Systems Fire Alarm Communicator Systems Elevator Dedicated Detection & Recall Control Systems Extinguishment & Releasing Systems Smoke Control Systems * Smoke / CO Alarms Egress Path Marker Systems Fire Curtain Assemblies	LSST – F or V	
Active Building Life Safety Systems Testing	Carbon Monoxide Detection Systems	LSST – C	
	Portable Fire Extinguishers *	LSST – E	
	Fire Hose Assemblies Stand-Pipe Assemblies * Sprinkler Back-Flow Assemblies * Water-based Extinguishing Systems	LSST – W	
	Unit Emergency Lighting	LSST – L	
	Kitchen Suppression Systems *	LSST – K	
	Kitchen Hood & Exhaust Cleaning	LSST – H	
	Verification & Integrated Testing		
	Fire Pumps	LSST – P	
	Generator Systems	LSST – G	
Account Sales, Consultants, Supervisors & Managers		Certified Building Life Safety Consultant (BLSC)	

* Additional certification (or documentation) by a third-party agency or manufacturer may be required to satisfy certain Certification & testing criteria. This is outlined in *Section 5 –Requirements for Certification*.

5. Requirements for Certification

5.0 General

1. Currently Registered (or Certified) technicians practicing in Canada can transfer their certification to the Network. You will be granted a pro-rated credit for any unused portion of the current membership dues paid to another agency (from the date of acceptance). You can opt to cancel your current membership with that agency, or simply not renew it.
2. In all instances you must register for any required refresher or upgrade courses within six (6) calendar months following your acceptance.
3. You will be granted a limited practice licence while you complete the course requirements. The limitations of practice are strictly enforced.
4. Table 3 illustrates the designations that transfer directly from another agency's qualification criteria:

Table 3

Technician Qualifications & Educational Course Credit		
ASTTBC Designation/BCIT Program	CFAA	FTN LSST(A) Designation
EX	NED	E*
EL	NED	L
GS	NED	G*
FP	NED	P*
WA	NED	W
SP	NED	K* only
CO	NED	H
SM	NED	(is part of F or V)
SP (other Suppression)	NED	(is part of F or V)
AL	CT	F*
VI †	NED	V
NED	NED	C

NED – No Equivalent Designation

**Additional Certification and/or training may be required (as stipulated elsewhere in this Guide)*

† The Verification Endorsement is no longer being issued



5.1 Currently Certified Fire Alarm Technicians & Registered Fire Protection Technicians (RFPT)

1. An ASTTBC Registered Fire Protection Technician (RFPT) with an “AL” stamp, a CFAA Certified Fire Alarm Technician, or a NICET IV Certified Fire Alarm Technologist who wishes to obtain LSST-F (Inspection) Certification would be required to complete the following within one (1) year** from the date of acceptance to our Programme:
 - i. LSST-FR Online Review Course which reviews CAN/ULC-S524-14 & CAN/ULC-S536-13, and includes elevator DDRC systems, releasing systems, egress path marker systems, fire curtain assemblies, fire alarm communicator testing, special applications (Radio Frequency and Line Modulation systems), integrated testing (CAN/ULC-S1001-11), smoke control, and single and multiple station smoke/CO alarm testing, and
 - ii. Twenty (20) fire alarm communicator systems tested.
2. An ASTTBC Registered Fire Protection Technician (RFPT) with a “VI” endorsement (or with an “AL” endorsement that is currently listed on the City of Vancouver’s Bulletin), or a CFAA Certified Fire Alarm Technician in the employ of a manufacturer (or acting as a representative with factory training) who wishes to obtain LSST-V (Verification) Certification would be required to complete the following within one (1) year** from the date of acceptance to our Programme:
 - i. Either the LSST-V (Full Classroom Based Course) or the LSST-VR (Review Course) based on the results of your Professional Practice Evaluation. Both courses cover (CAN/CSA C22.1-18 (Sections 10 & 32), CAN/ULC-S524-14 (Including Amendment 1), CAN/ULC-S537-13, and includes elevator DDRC systems, releasing systems, egress path marker systems, fire curtain assemblies, special applications (Radio Frequency and Line Modulation Systems), integrated testing (CAN/ULC-S1001-11), smoke control, and single and multiple station smoke/CO alarm testing; and
 - ii. Fire Alarm Communicator Installation, Testing, and Commissioning (CAN/ULC-S561-13) Course & twenty (20) systems tested.

****** - Subject to Course Availability or other reasonable circumstance, an extension may be granted.

5.2 Currently Certified DHI Technicians (FDAI)

1. A technician with FDAI certification wishing to obtain a LSST-B designation would require:
 - i. Passive Building Life Safety Systems Course 2 & the number of practical inspections indicated in Table 4 (fire door inspection criteria is exempted).

5.3 Building Life Safety Consultant Certificate

There are two distinct groups of individuals that could require this designation (at a minimum):

1. The management personnel of an agency engaged in providing service, inspection, testing, maintenance, installation, and repair of building life safety equipment will automatically qualify for the BLSC designation if they currently hold any of the ASTTBC designations “AL”, “WA”, “EX”, “EL”, “SM”, “GS”, “FP”, “CO” or “SP”.
2. Sales and service sales staff responsible for the preparation of equipment quotations, periodic maintenance agreements, or that schedules the work of or liaises with field service technologists are required to maintain BLSC Certification. Those individuals that can demonstrate two (2) years of full time engagement in providing these services qualify for the BLSC designation.

5.4 Transfer of Educational Credits

1. Individuals newly graduated from any of the recognized CFAA or ASTTBC approved courses automatically qualify for registration as Apprentices within certain disciplines which are outlined in Table 4.
2. Completion of the related field experience component (verified through the documentation provided in the technologist's personal database) and a formal practice review (which includes a challenge examination) are required to achieve full certification.

5.5 Restrictions on Practice

1. As noted in **Table 2**, some designations require an additional certification component and specialized testing equipment in order to properly satisfy the applicable testing standards. This may also include manufacturer training or certification by a third-party agency. The technologist member is responsible for ensuring the integrity of any testing or inspection they perform by complying with these additional requirements. They must also provide the Network with copies of all training and recertification documentation they receive in the course of their employment. Restrictions on their practice will often automatically be imposed as provided in the following instances:
 - i. A technologist with "E" certification can perform monthly & annual inspection of portable fire extinguishers, but cannot perform recharging, six-year maintenance or hydrostatic testing unless (s)he is currently registered, and their employer is also designated a "Cylinder Requalifier" by Transport Canada (or other provincially recognized authority). "Recharging" is included in the restrictions to discourage "on site" or "truck mounted" services being offered where the manufacturer's recommended storage conditions for the extinguishing agent cannot be properly ascertained or guaranteed. Exceptions would have to be very carefully considered and alternative measures must include special acceptance by the Jurisdictional Authority which may involve a program of frequent site inspections.
 - ii. A technologist with "W" certification cannot perform back-flow **forward flow** or performance testing unless an appropriate test header has been installed (or a method approved by the local jurisdictional authority has been properly formulated), and the technologist has met the requirements of the agency designated by the local municipal authority. Their employer must also provide and maintain the required calibrated testing equipment.
 - iii. A technologist with "K" certification cannot perform the required semi-annual testing of kitchen suppression systems unless they also hold a valid current authorization from the equipment's manufacturer (or their designated agent).
 - iv. A technologist with "F" or "V" or "CLSS" certification is restricted to performing the required annual (or semi-annual) testing of the electrical components of an extinguishment releasing, kitchen suppression or smoke control system (this includes ancillary devices controlled by either the extinguishment releasing or smoke control system) unless the proper calibrated testing equipment is available through the employer and the required manufacturer's training (evidenced by a separate certificate or qualification card) is on file.
 - v. A technologist with "W" certification cannot document the proper testing of a standpipe system unless their employer maintains the calibrated test equipment but can tag off on performing the annual system test requirements (where all associated floor level valves must be exercised through their full range of motion and water is discharged from each connection in accordance with the requirements of NFPA 25).
 - vi. A technologist with "G" certification can satisfactorily perform the monthly testing of an emergency generator utilizing the "test" feature of the transfer switch but would require their employer to maintain the calibrated testing equipment to properly document a full load and performance test. The technologist is responsible to provide the additional certification and proof of training in order to satisfactorily maintain and service this equipment and ancillary systems.
 - vii. A technologist with "P" certification can satisfactorily perform the monthly testing of a building's fire pump and controller but would require their employer to maintain the calibrated testing equipment to properly document flow and pressure testing required by NFPA 25. The technologist is responsible to provide the additional certification and proof of training in order to satisfactorily maintain and service this equipment and ancillary systems.



Table 4

TECHNOLOGIST CERTIFICATION REQUIREMENTS		
ALST Discipline (from Table 2)	Education Component	Field Experience
B	FTN Passive Building Life Safety Systems Course	150 fire door assemblies, 50 self-illuminated exit systems, 100 fire-stopping inspections, 30 mechanical shutters tested, Production of 5 AHJ approved Fire Safety Plan Manuals or Construction Safety Plan Manuals (includes onsite training of Fire Safety Director and Deputy Fire Safety Director)
C	FTN Carbon Monoxide Systems Course	40 Systems Tested
E	BCIT (or equivalent), FTN Extinguisher Course, Transport Canada (or equivalent Canadian Certification Agency)	150 Extinguishers (in situ), 75 installations
F	LSST-F Course OR CFAA Courses 1-5, BCIT Fire Alarm Testing Course (or equivalent) Plus the FTN LSST-F Upgrade Course OR: <ul style="list-style-type: none"> LSST-COM Course - Communicator Installation, Testing & Commissioning (CAN/ULC-S561) BCIT Smoke Control Systems† (or equivalent) Extinguishing Systems Testing* 	40 Fire Alarm Systems Annual Testing [must include the testing of ten (10) high-rise buildings with smoke control or smoke venting measures] 20 Ancillary Systems Periodic Testing 20 Communicators Tested
G	BCIT or equivalent, FTN Generator Course	40 Systems Inspected and Tested
K	BCIT or equivalent, or FTN Kitchen Suppression Course And current manufacturer's training Certificate	20 Systems Inspected and Tested
L	BCIT or equivalent, FTN Emergency Lighting Course	150 Dual Function Exits, 150 ELU Packs†
P	BCIT or equivalent, Journeyman Sprinkler Fitter, FTN Fire Pump Testing Course	40 Units Tested (Flow and performance parameters measured and recorded/submitted in the approved testing format)
V	(Prerequisite is LSST-F Designation) must successfully complete FTN Course for: <ul style="list-style-type: none"> LSST-V - Verification Current ASTTBC "AL", or CFAA "CT" (not in the employ of a manufacturer) must enroll in (or have completed) FTN Equivalent Courses in: <ul style="list-style-type: none"> LSST-V Verification Communicator Installation, Testing & Commissioning (CAN/ULC-S561), Smoke Control Systems† Extinguishing Systems Testing* 	100 Fire Alarm Systems Annual Tests documented, 30 Fire Alarm Systems Verifications, 30 Ancillary Systems which must include testing of twenty (20) high-rise buildings (or equivalent occupancies) that employ fire alarm system controlled smoke control or smoke venting measures and EVC Systems 20 Communicator Systems Tested (Waived for previous "F" Designation) 10 Extinguishment Systems
W	BCIT or equivalent, FTN Water Based Extinguishing Systems Course Or Journeyman Sprinkler Fitter with FTN Refresher Course in NFPA 25	20 Dry and 20 Wet Pipe Valve Interior and related systems inspections, 30 Wet Sprinkler Systems Tests, 10 Forward Flow Tests, 150 Fire Hose Inspections, 40 Standpipe Tests
H	FTN Kitchen Hood Cleaning & Inspection Course (or equivalent)	Three months documented work experience with a Recognized Kitchen Hood Cleaning Company
Commissioning/Verification (CLSS Designation)	Must have LSST - V, B, E, L, P, G, & K and must have FTN Course for Commissioning of Building Integrated Systems	Be able to document 10 Commissioning Tests involving integrated testing of fire alarm, EVCS, smoke control, elevator recall, and extinguishing systems

6. Disclosure

1. All new applicants and current members are required to disclose any prior or currently ongoing complaints, disciplinary actions, or censure conditions levied by any other recognized North American certification body.
2. Subject to a formal review, transfer of any existing certification and continuance of any designation or certification by the Network is contingent on a conclusion that does not involve cancellation, termination, or suspension of the member's practice by any other such agency.

NOTE: Assistance may be available for the prospective or current member to resolve the complaint in certain circumstances.

7. Seal and Membership Identification Card

1. The technologist's official seal and identification card bears the member's registration number and name.
2. The seal and identification card also identify the **LSST** certified technologist's qualified field(s) of practice. Fields of practice in which the member holds provisional status (has not yet achieved full certification or is under probation) are indicated within parentheses. An example would be "(B)" - Provisional in Passive Building Systems, "(F)" - Provisional in Fire Alarm Testing, "(E W)" - Provisional in Extinguishers and Water Based Suppression Systems, etc.
3. The seal must be used on all official correspondence related to the member's professional activities and practice and must be applied to all inspection tags.
4. A facsimile of a technologist's or specialist's seal cannot be used to pre-imprint documentation or in corporate marketing materials (including business or company identification cards).
5. The seal and members identification card remain the property of the Fire Protection Technicians Network and is licenced for use under the terms of membership and this Practice Manual. The seal and card must be returned on request, when the member's certification is upgraded, cancelled or within sixty (60) days of membership expiry. Failure to comply with an official request for the return of our seal or identification card will result in further disciplinary action including but not limited to available legal remedies which could incur significant additional costs to the (ex)member.

NOTE: The seal and member's individual identification card is the Copyright © 2016 of the Fire Protection Technicians Network and can only be used under the limited license terms provided (which may be amended from time to time).



Sample Technician Seal



Sample Technician Identification Card

This individual's identification card witnesses his full certification in Passive Building Systems, Extinguishers, Fire Alarm Systems, Unit Emergency Lighting, and Water-Based Extinguishing Systems. The yellow bar at the top of his photograph (at the red arrow) indicates he is "under supervision" for the additional endorsements listed in parentheses (Carbon Monoxide Systems, Kitchen Suppression, and Verification of Fire Alarm Systems). In British Columbia, your BCWWA Backflow Testers Certification number would appear beneath your endorsements as "* BCWWA 00000 *". The expiry date is pro-rated to the month following the date you are required to renew your Cross-Connection Control affiliated membership (a copy of which is also maintained on file).

8. AHJ Review & Transparency

Jurisdictional Authorities will be able to review complaints and hearing outcomes against practicing technologists, specialists or consultants certified under the program and who happen to be practicing in their jurisdiction for a period of two (2) years from the date the outcome was officially rendered.

9. Online Building Information System (Anticipated Launch Date – July 2019)

Jurisdictional Authorities have direct access to the online building information system maintained by the Network. Logging on to the system will populate their home screen with a list of buildings by city or area/district with inspection dates, flagged with (or without) deficiencies, and the testing technologist's information (including certification and current status) and comments. AHJ's registered on our system will also be able to download a copy of the building's test or verification reports in PDF format which are uploaded to the system as they are received from the practicing member.

10. Owners/Property Managers Review & Transparency

Building owners and/or their designates must be provided with copies of all inspection and test reports filed by a technologist member. A signed and sealed original of the report must be left on site for formal review by the authority having jurisdiction as required by the National Fire Code (NFC) as adopted by each Province. It is recommended that the original Verification Appendix "C" Report be appended to the buildings' Fire Safety Plan Manual as a permanent addition. This Manual also makes an excellent repository for the annual inspection and test reports of which only the current and previous years' need be kept in accordance with NFC.



11. Testing Standards in Effect - Referenced in NFCC 2015 & NBCC 2015

The following Testing and Inspection Standards represent the minimal acceptable for testing of building life safety equipment in Canada. It is mandatory that any member technologist or specialist qualified in these designations possess a copy of the Standard in effect for their jurisdiction. Failure to produce the required Standard at the request of the jurisdictional authority or a designated Network compliance officer will result in disciplinary action being commenced against the member.

Fire Alarm/Smoke Alarms/EVCS/DDRC/Extinguishing Releasing Panels:

CAN/ULC-S536-13 – Standard for Inspection and Testing of Fire Alarm Systems

CAN/ULC-S537-13 – Standard for Verification of Fire Alarm Systems

CAN/ULC-S524-14 (Including Amendment 1) – Standard for Installation of Fire Alarm Systems

CAN/ULC-S552-14 - Standard for Inspection, Testing and Maintenance of Smoke Alarms

Fire Alarm Communicators Systems:

CAN/ULC-S561-13 – Standard for Installation and Services for Fire Signal Receiving Centres and Systems

Smoke Control and Emergency Systems in Tall Buildings:

NFC (2015) Division B – Part 7

Commentary “C” of the User’s Guide – NBC 1995 Fire Protection, Occupant Safety and Accessibility (Part 3)

Carbon Monoxide Systems:

NFPA 720

Emergency Lighting and Power Systems:

NFC 2015 Division B – Part 6 Section 6.5 – Emergency Power Systems and Unit Equipment for Emergency Lighting

CAN/CSA-C282 (2015) – Emergency Electrical Power Supply for Buildings

CSA Z32-09 – Electrical Safety and Essential Electrical Systems in Health Care Facilities

Water Based Fire Suppression Systems:

NFPA 25 (2014)

Fire Hoses & Standpipe Systems:

NFPA 25 (2014)

Portable Fire Extinguishers:

NFPA 10 (2013)

Fire Pumps:

NFPA 25 (2014)

Extinguishment Systems:

NFPA 11 (2010) (Low, Medium, and High-Expansion Foam Systems)

NFPA 12 (2011) (Carbon Dioxide Extinguishing Systems)

NFPA 12A (2009) (Halon 1301 Fire Extinguishing Systems)

NFPA 12B (1990) (Halon 1211 Fire Extinguishing Systems)

NFPA 17 (2013) (Dry Chemical Extinguishing Systems)

NFPA 17A (2013) (Wet Chemical Extinguishing Systems)

Kitchen Suppression Systems:

NFPA 17A (2013) (Wet Chemical Extinguishing Systems)

The formal procedures outlined in this section meet the minimum standard of professional practice expected of a Network Certified member. Annual or semi-annual tests/inspections on building life safety equipment must be conducted to the satisfaction of the Authority Having Jurisdiction and the Network's Executive. Deviations are not permitted and may result in a formal review of the member's practice.

12.1.1 General Requirements

In the approved example of an inspection tag provided below, there is ample room to imprint the name and contact information for the fire equipment service company employing the member. The line for the technologist's name can be omitted, but the separate signature line shall be left intact. There shall be room at the right side of the tag over the signature line to affix the certifying technologist's seal.

Fire Alarm CAN/ULC-S536	Extinguisher NFPA 10	Emergency Light BCFC B-6.5.1.7	Sprinkler NFPA 25	Fire Hose NFPA 25											
FIRE PROTECTION EQUIPMENT TEST RECORD															
DO NOT REMOVE! EXPIRES ONE YEAR FROM DATE INDICATED HERE-ON.															
2015															
Tested/ Inspected															
Additional Work Req'd															
Comments on Report															
<div style="display: flex; justify-content: space-between;"> model no.: _____ serial no.: _____ signature: _____ </div>															
<div style="display: flex; justify-content: space-between;"> _____ _____ _____ </div>															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	2015
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	

RECORD	FIRE PROTECTION SYSTEM	TESTED	DATE	
			TESTED	BY
	VERIFICATION OF FREELAND SYSTEM			
	FIRE ALARM SYSTEM			
	SMOKE CONTROL SYSTEM			
	EMERGENCY LIGHTING SYSTEM			
	EMERGENCY EVACUATION SIGNS			
	SPRINKLER SYSTEM			
	STANDPIPE SYSTEM			
	FIRE PUMP			
	PORTABLE FIRE EXTINGUISHERS			
	SPECIAL FIRE SUPPRESSION SYSTEM			
TECHNICIAN NAME				
SEP. 1 TEST SERVICES INC. ON 80708E Y N D DO NOT SIGNOFF THIS TAG UNTIL NEW TAG IS APPLIED				

J F M A M J J A S O N D
 2015, 2016, 2017, 2018

Professional Practice Manual (2019)

In this sample photograph of an actual tag, the area we highlighted in **red** (in the example on the preceding page) was cut off (at **RED** arrow) and the Year entry in the space under “Next Service Due on or Before” was altered (at **BLUE** arrow) from “11” to “12” by the building owner (effectively “skipping” an entire years’ inspection by a qualified technician).



12.1.2 Completing the Inspection Tag

1. Inspection tags shall be completed in a legible manner with the equipment identified by make, model, and serial number (if applicable).
2. Additional work or comments (if required) shall be recorded on the reverse side of the tag.
3. A hole punch shall be used to properly indicate the equipment being tested and the day and month of the test. The tag indicates that the equipment has been tested/inspected, and whether comments/remarks have been made in the test report or if there is additional work required to bring the equipment into compliance with the referenced Standard.
4. The tag does not guarantee or warranty that the equipment will function properly. It is a visible witness to the fact that the equipment was tested/inspected on the date indicated in accordance with applicable Standards.
5. The tag shall be inserted into a clear plastic sleeve which shall be affixed to the tested equipment so that it is protected and can be easily reviewed.
6. Deficiencies of individually tested and tagged equipment that, in the opinion of the certifying technologist, may pose an imminent danger or risk to the building’s occupants shall be indicated by a large RED **X** on the face and back of the inspection tag. Additional **RED TAG** procedures must also be followed (which are further outlined in Section 12.1.5).

















12.1.3 Comments on Report

1. This area may indicate comments affecting the inspection or recommendations on the report.
2. The master inspection form sheet must identify the page numbers of any comments in the individual report sections.
3. Comments, remarks, and recommendations must be brought to the attention of the owner/building operator who must also be made aware that a copy of the report will be submitted to the jurisdictional authority for review.

12.1.4 Additional Work Required

1. Where fire protection equipment (or portions there-of) has not been tested in accordance with the requirements of the applicable Standard, the technologist member shall make the appropriate notation in the test report and the "Additional Work Required" section of the tag must be punched out.
2. Where some aspect of the testing could not be completed and additional work or service has been indicated which needs to be performed in order to successfully satisfy the applicable Standard and ensure full functionality of the life safety equipment the technologist must specify the additional work on the reverse side of the tag.
3. The Authority Having Jurisdiction must be informed of any deficient testing so that the consultation process with the building owner can begin and/or an effective resolution determined so that future testing is not impeded. Examples include (but are not limited to):
 - i. Tenants refusing access to the technologist to perform testing of in-suite devices like heat detectors, speakers, buzzers, or smoke alarms ("Additional Work Required");
 - ii. Backflow testing not performed (reasons should be given such as test headers being unavailable to perform the Forward Flow Test on a sprinkler or standpipe system) ("Additional Work Required");
 - iii. Elevator out of service (testing cannot be performed on devices in the shaft), or elevator not made available for testing ("Additional Work Required");
 - iv. Locked doors to rooms where access has not been provided ("Additional Work Required");
 - v. Test equipment is unavailable for the specific type of device (e.g. sensitivity testing of older smoke detectors) ("See Log and Report").
4. Where inspection or testing has uncovered an issue affecting the operation or functionality of the equipment or system, then the technologist member shall make the appropriate notation in the test report, the reverse side of the tag, and the "Additional Work Required" section of the tag must be punched out. The additional procedures identified in Section 12.1.5 **RED TAG Procedures (Identification and Use)** must be followed.

12.1.5 RED TAG Procedures (Identification & Use)

1. The use of a red  on the face of an inspection tag indicates to the local authority that the fire protection equipment is either non-functional or is impaired to the point where it may not function correctly in an emergency. Normally speaking these types of impairments are dealt with when they are discovered but circumstances may arise where repairs are refused or legitimately delayed (parts or components may have to be sourced).
2. The following **RED TAG** Procedure must be followed when either of the above conditions are present and immediate repairs cannot be initiated:
 - i. The reason for the  must be indicated on the reverse side of the tag.
 - ii. The building's owner, onsite maintenance, and/or management personnel must be notified immediately, and steps must be taken to ensure the safety of the occupants in accordance with the procedures established in the building's Fire Safety Plan Manual. This may require that a Fire Watch patrol procedure be instituted.
 - iii. It is imperative that the technologist member verify that the proper procedures are in place before (s)he leaves the building.
 - iv. The fire department must be notified.
 - v. Arrangements must be made to repair the deficiencies and restore full service to the affected equipment in the shortest possible time.
3. The following partial list provides examples of fire protection equipment deficiencies that require a **RED TAG** Procedure:
 -  Inoperative fire alarm system initiating zone, or non-functional fire alarm field device (i.e. smoke detector, flow switch, etc.)
 -  Inoperative fire alarm system notification zone or appliance(s)
 -  Cut, abraded or missing fire hose
 -  Inoperative hose valve or nozzle, broken or severely corroded components
 -  Hydrostatic test overdue on fire extinguishers, fire hoses, suppression system hose assemblies, agent bottles
 -  Discharged extinguisher (or where the gauge falls outside of the normal operating **green** range)
 -  Inoperative emergency light or battery pack
 -  Any equipment or system that is past its required testing date
 -  Inoperative generator, or any ancillary component (heater, battery, starter, intake shutters)
 -  Inoperative compressor or jockey pump on a sprinkler system, inoperative heater in a sprinkler valve room/enclosure
 -  Inoperative heat trace controller
 -  Inoperative fire pump, or ancillary component (indicator panel, leaking bearings, discoloured housing)
 -  Failure of a sprinkler valve to trip
 -  A delay in excess of ten (10) seconds between initiation of a fire alarm device and the programmed response of a fire alarm system (Note: This should not be confused with the normal function of the adjustable mechanical delay of a water flow device.)

12.2 “No Access”

1. The use of the term “No Access” to explain an untested device or area of the building shall only be used within the very narrow parameters stipulated in the relevant testing Standard.
2. The term “No Access” on any test report is automatically flagged and must be satisfactorily explained in any testing documentation that is submitted.

12.3 Initial Communication & Site Review

1. Communication with the building owner or onsite management personnel should be established well in advance of the proposed testing date.
2. Copies of previous test reports must be obtained and reviewed, along with a copy of the fire alarm system’s Verification report. This will assist the technologist member in planning for, and executing, a complete test of the building’s emergency and life safety systems.
*NOTE: Previous test reports found not to be in compliance with the referenced Standards require additional attention by the technologist member. These are outlined in Section 13.1 entitled **Duty to Report Non-compliance**.*
3. The documentation check-list must clearly indicate which (if any) of the referenced documents are NOT available for review. This will assist the local jurisdictional authority in determining any required additional course of action to bring the building into compliance with local Codes and Bylaws.

*NOTE: The documentation required satisfying Clauses 12.3.2 and 12.3.3 is outlined in the Section 12.9 entitled **Inspection and Test Procedures**.*

12.4 Scheduling of Inspections and Site Contact

1. Fire alarm and related systems must have their testing and inspection times properly coordinated. In buildings which employ elevators, escalators, and other people moving conveyors, access to service rooms, shaft, and equipment spaces which contain fire detection devices must be arranged in advance. The technologist’s initial communication with a building’s onsite contact must include a request to review the previous test/inspection reports. Elevators and other people moving systems are inspected on a monthly basis. Coordinating with the service agency to schedule your testing on the same day will ensure you have access to these restricted areas. There really is NO EXCUSE for a “No Access” entry on the building test report form. The site contact should have a list of tenants and will have arranged access to suites, service rooms and storage lockers.
2. The alternate means of notification (should an emergency situation arise during the course of testing) must be posted or circulated to the occupants forty-eight (48) hours before the testing is commenced.

12.5 Documentation & Reports

1. *Technologists certified by the Network shall use the forms provided in the FORMS section of the website at www.firetechs.net. Use of other forms is permitted as long as they comply with the minimum acceptable formats required by the applicable Standards and have adequate space available for the application of your official seal.*
2. *The Jurisdictional Authority may require additional testing criteria be documented. The technologist shall inform the Network Executive of any such additions so that appropriate measures are taken to update the forms.*

NOTE: Deviations or use of forms not prescribed by Canadian Standards and/or the Jurisdictional Authority will result in disciplinary action being commenced against the member.

12.6 Tools

Members are required to provide some basic tools and equipment:

1. Technologists

basic tools (screw drivers, wire strippers, hole punch, utility knife), flash light, test magnet, voltage sensing pen, fire panel & elevator recall keys, manuals & testing Standards

2. Consultants

appointment calendar, address or contact book, notepad, calculator & testing Standards

3. Additional and Specialty Tools & Equipment

The technologist's employer should provide a multi-meter, sound level meter (with current calibration certificate), pressure gauges, lap-top computer, software, program keys, and other specialty tools and equipment that may be required and which the technologists under their supervision are trained and qualified to use safely (i.e. back-flow test kit, biological test kits, man-lift operation, etc.), fall arrest gear in accordance with local Safety Regulations, ladders

12.7 Personal and Workplace Safety

1. *It is incumbent upon the member to provide some basic safety gear:*
 - i. *Safety footwear (CSA Approved or equivalent steel-toed shoes),*
 - ii. *Hardhat,*
 - iii. *Safety Glasses,*
 - iv. *High visibility vest and,*
 - v. *Proper clothing suitable for the work being performed.*
2. *The member must identify and not participate in unsafe work conditions or practices.*
3. *The member must notify their immediate supervisor if conditions identified in Clause 12.7.2 exist on a worksite as soon as is practical.*
4. *Where specialized equipment may be required in order to satisfy local safety concerns or to fulfill the member's contractual obligations, it shall be made available to the member by the employer on request.*
5. *The employer must provide training on the safe operation of the equipment provided in Clause 12.7.4 as required.*
6. *The member's employer must provide for regular hearing tests and,*
7. *The member's employer must provide approved hearing protection.*

12.8 Walk-through & General Site Inspection

The member must detail any observations which might affect a successful outcome for the building's anticipated test/inspection. This includes (but is not limited to) the following examples:

- ❖ Construction activities that relate to a tenant improvement or repairs (includes coring or relocation of walls that might affect sprinkler or fire detection coverage, painting of fire detection devices or sprinkler heads)
- ❖ Storage of dangerous goods in open parkades or service rooms
- ❖ Review (or publication) date of the building's Fire Safety Plan Manual (if older than five years, make a recommendation that it be updated in accordance with the version of the Fire Code in effect)
- ❖ Ensuring contact information as presented in the Fire Safety Plan is current and accurate
- ❖ Are the building's posted emergency evacuation plans accurate? Have renovations altered the floor plans? Are they correctly oriented? Are they readily understandable?
- ❖ Accumulation of construction related debris, cardboard, wood, papers, newsprint, or other combustible materials in hallways, electrical or mechanical service rooms, stair shaft landings, etc.
- ❖ Damaged (or missing) hose and sprinkler valve handles, missing caps, etc.
- ❖ Damaged or improperly relocated fire detection devices, emergency light or exit fixtures
- ❖ Missing extinguishers, vandalized or damaged cabinets and break-glass
- ❖ Personal goods or inventory stacked excessively close to sprinkler heads or blocking air vents or outlets
- ❖ Inappropriate jury-rigged wiring in high public traffic areas
- ❖ Damaged or broken light fixtures in common corridors and exit stair shafts
- ❖ Evidence of water leaks on ceilings, walls, or floors
- ❖ Evidence of resident/tenant hoarding
- ❖ Inoperative or disabled fire protection equipment (e.g. sprinklers or smoke detectors wrapped in plastic or taped)
- ❖ Improperly painted fire rated door assemblies and fixtures, non-functional latches, closures, hold-open devices, request-to-exit buttons and push-bars

12.9 Inspection & Test Procedures

It must be noted that the following procedures draw extensively from the applicable testing Standards including published and unpublished amendments. Where additional recommended testing provides significant enhancement to occupant life safety, it is incumbent on the member technologist to perform this work. Such testing is normally indicated by the use of a phrase similar to "Additional testing not mandated by the Standard" (or words to this effect) which is noted in our forms. They represent the minimum expected level of professional practice of a Network Certified Member. Any testing that the technologist cannot complete must be noted in the remarks section of the applicable test report and on the inspection tag affixed to the fire protection equipment in accordance with Section 12.1.3.

12.9.1 Fire Alarm & EVC Systems

- 1. The technologist must ensure he has all of the required equipment on hand to properly conduct the testing. This includes: Canned smoke, ladders, multi-meter, two-way radios, test magnet (if an approved testing method), heat gun, clip-board & paperwork, high security screw driver (to remove some tamper and water flow covers), elevator reset key, appropriate testing meters (sound pressure, differential air pressure, smoke detector sensitivity meter, etc.)*
- 2. The technologist must ensure he has the access codes for the appropriate service levels for any required control panel programming menus and testing functions (auxiliary bypass, smoke detector sensitivity reports, etc.)*
- 3. The technologist must ensure that proper notices have been posted to alert the building occupants to the test and that an alternate method of occupant notification has been specified should an actual emergency occur during the test.*
- 4. The technologist must contact the monitoring facility to ensure they're aware of the testing of the life safety systems within the building.*
- 5. The technologist must inform the local fire department's non-emergency number or their dispatch centre to advise them of the testing activities at the building.*
- 6. The technologist must determine how many power supplies and annunciators they will be dealing with, where the circuit breakers are located, and, if a generator is in the building, whether-or-not it provides power to the fire alarm system. Technologists must ensure the circuit interrupter means for each power supply is also properly identified and recorded in the report.*
- 7. The technologist must make appropriate arrangements with the individual that will be positioned at the annunciator (or common control) to engage the required protocols if a fire or other life-threatening emergency should occur during the course of the building's test that would require immediate notification of the occupants. This individual will also be responsible for bypassing the building's ancillary functions (elevator recall, and air handling/smoke control systems) for the duration of the testing.*
- 8. Power supply and stand-by battery testing must be conducted in accordance with the provisions of the applicable Standard. Battery load and stand-by calculations must be performed for each power supply and battery and the results noted in your test report.*
- 9. Manual stations must be tested as one would expect a member of the public to actually use them in an emergency (e.g. the Edwards 270SPO requires that you to open the station, remove the glass rod, close the cover and then operate it normally. Activating the toggle switch with the unit open is NOT the proper test method).*

10. Duct detectors require the Technologist to physically remove the sample tubes so as to ensure that they are unobstructed and oriented correctly. They also require the Technologist to ensure the airflow through the detector is in accordance with the manufacturer's stipulated guidelines. This requires additional testing equipment your employer must provide. Any non-conformance must be noted in your report.

12.9.1.1 Fire Alarm & EVC Systems – Annual Testing Procedures

1. The testing Standard is CAN/ULC-S536-13 (Standard for Inspection and Testing of Fire Alarm Systems).
2. Specialized meters required to ensure compliance with the provisions of the referenced Standard must be available as required (i.e. Manometer, smoke detector sensitivity testers, etc.)
3. The technologist must review the following documentation prior to testing any building's fire alarm/EVC Systems:
 - i. The system's installation & operation manual,
 - ii. Installation and testing instructions for all the detectors types and field devices installed on the system,
 - iii. The locations of all fire alarm field devices (reference to previous test reports or the Verification Appendix "C" should identify these),
 - iv. A list of ancillary devices controlled by the fire alarm system to determine the best way and time to test their operation (e.g. first thing in the morning or after business hours) so as not to inconvenience the occupants,
 - v. A list of elevator shaft devices and appropriate arrangements for access,
 - vi. A list of high devices (or where testing requires interruption of manufacturing type processes), and arrangements to access (man lift, tall ladder, etc.)
 - vii. A copy of the previous annual test report
 - viii. A copy of the Verification Appendix "C" report
4. The building's management must provide access (or arrange for it) to ALL areas of the building. The technologist must determine where testing should commence (i.e. if a high-rise residential building, in-suite testing may have been arranged according to a pre-determined schedule, etc.).

NOTE: An operational test of these functions can usually be scheduled for the early morning or late afternoon when frequency of occupant movement is reduced or to minimize disruption of normal building activities.

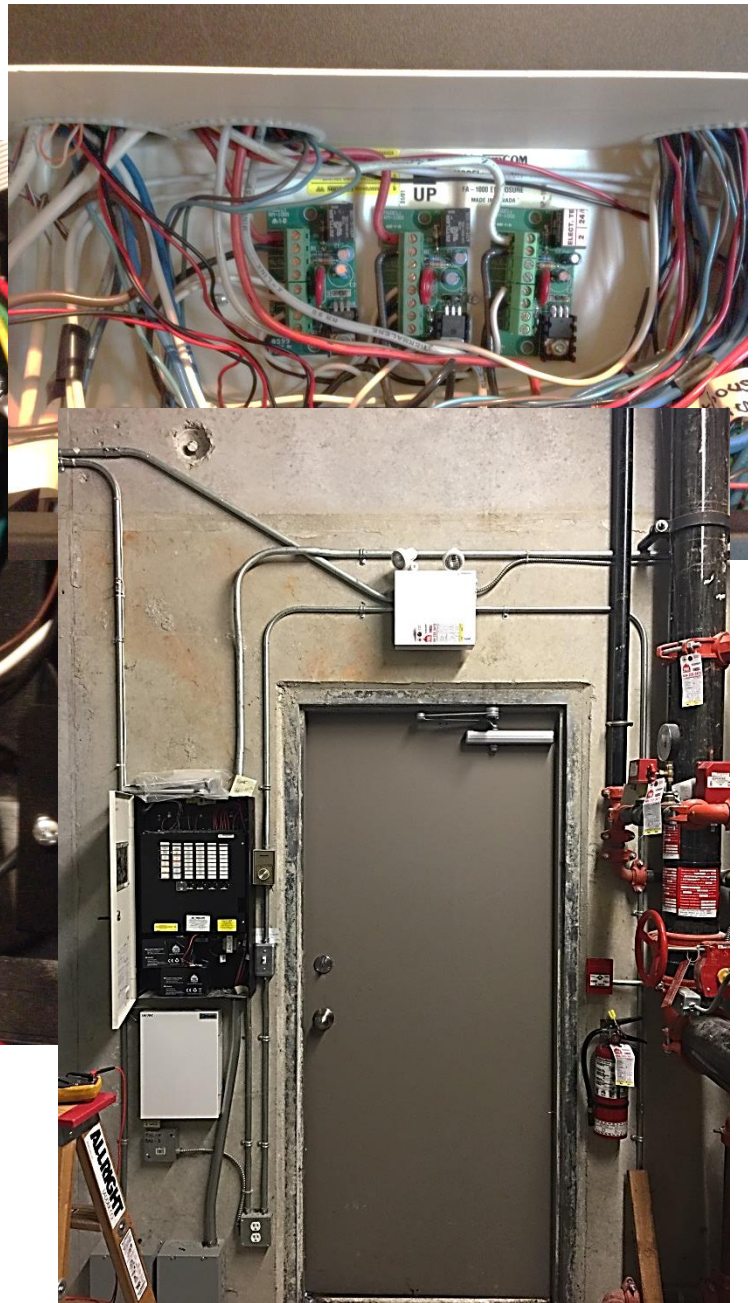
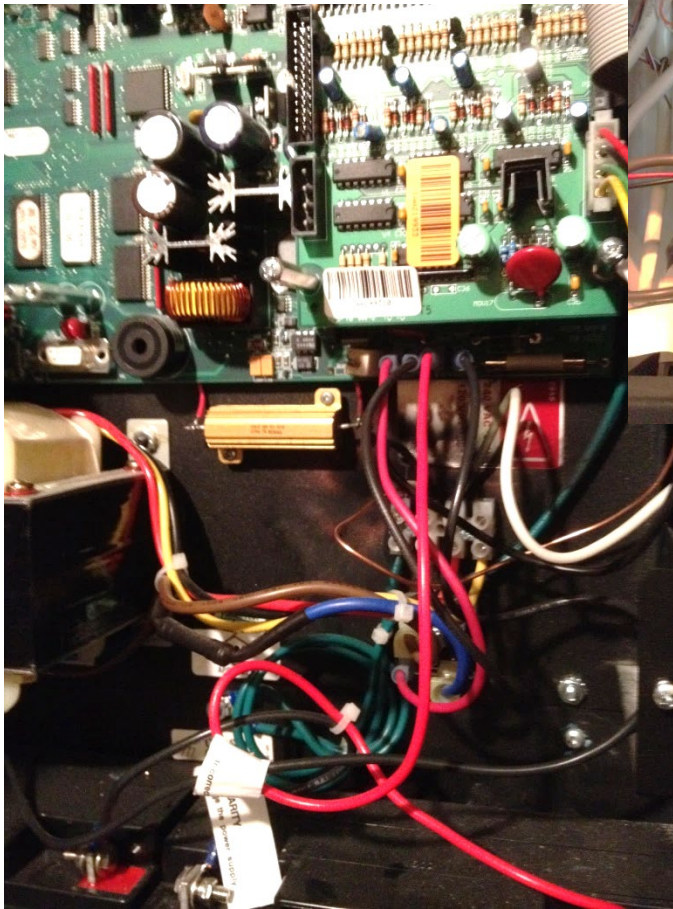
5. The Testing Standards stipulate that programmed outputs (including audible signals) shall be tested by activating one field device in each fire alarm zone. Other devices within that zone can be tested with the outputs bypassed.
6. End-of-line resistor plates are required to be physically removed and an "open", "ground fault", and "short" test performed. It is recommended that you record the voltage across the resistors as a comparative analysis over several years could highlight potential problem areas in the circuit wiring or other field device terminations. This will also ensure that devices powered from the zone are receiving their rated operating voltage in accordance with the manufacturer's published instructions.
7. Electrically supervised valves must be exercised through their entire range to ensure proper operation if the technologist performing the fire alarm test is not able to witness (or participate in) the actual test of the extinguishment system.
CAUTION: Supervised valves on wet standpipe systems must be exercised through their full range of motion with the main riser supply valve turned off and the riser drained prior to this test.
8. Electrical supervised sprinkler devices that employ covers with tamper switches must be properly tested to ensure the correct signal is received by the fire alarm system (common trouble for cover removal, followed by the alarm or supervisory signal).

9. *Make observations in the “Comments” and “Recommendations” area on the report if you see anything unusual (see Section 12.8 Walk-through and General Site Inspection).*

12.9.1.2 Fire Alarm & EVC Systems – Verification Procedures

1. *The testing Standard is CAN/ULC-S537-13 (Standard for Verification of Fire Alarm Systems).*
2. *Specialized meters required to ensure compliance with the provisions of the referenced Standard must be available as required (i.e. Audibility meter, intelligibility meter, manometer, smoke detector sensitivity testers, etc.)*
3. *The building’s owner (or representative) must provide access (or arrange for it) to ALL areas of the building in which fire alarm devices are installed. The technologist should determine where testing must commence based on his knowledge of the building layout and accessibility of field components.*
4. *The technologist must review the following documentation prior to commencing the Verification:*
 - i. *The system’s installation & operation manual*
 - ii. *If the system employs field addressable devices, a printout of all programmed devices, functions, and correlations must be provided,*
 - iii. *Installation and testing instructions for all the detector types and field devices installed on the system,*
 - iv. *The locations of all fire alarm field devices (reference to as-built drawings, control unit software programming, etc.),*
 - v. *A list of ancillary devices controlled by the fire alarm system,*
 - vi. *A list of elevator shaft devices (appropriate arrangements must be made for access),*
 - vii. *A list of high devices (where specialized equipment is necessary to access them, ensure appropriate arrangements have been made),*
 - viii. *A copy of the designer’s drawings and specifications for comparison against the installers “as built” drawings,*
 - ix. *Copies of all electrical inspection notes (as they apply to the fire alarm system) provided by the local authority,*
 - x. *If applicable, copies of previous Verification or Annual Test reports.*
5. *End-of-line resistor plates are required to be physically removed and an “open”, “ground fault”, and “short” test performed. As these are the last device on a conventional circuit, the voltage across the resistor must be compared against the maximum recommended voltage drop stipulated in the manufacturers printed installation instructions. The results must be recorded on the remarks line in the individual device test record. Any non-conformity must be noted as a deficiency in your report.*
6. *The last device in every circuit (or the one most remote from the control panel electrically) must be identified with an indelible label (i.e. “FAD-EMR” Fire Alarm Device – Electrically Most Remote).*
7. *The Technologist must ensure that field devices that require specific identification as outlined in the referenced Standard comply.*
8. *Electrically supervised valves must be exercised through their entire range to ensure proper operation if the technologist performing the fire alarm test is not able to witness (or participate in) the actual test of the extinguishment system.*
CAUTION: Supervised valves on wet standpipe systems must be exercised through their full range of motion with the main riser supply valve turned off and the riser drained prior to this test.
9. *Electrical supervised sprinkler devices that employ covers with tamper switches must be properly tested to ensure the correct signal is received by the fire alarm system (common trouble for cover removal, followed by the alarm or supervisory signal).*

10. The Standard requires a visual inspection of all system termination points. All field devices must be so inspected without exception.
11. A “clear” Verification Appendix “C” requires that all field devices conform to the manufacturers’ installation requirements as well as the recommended operational and environmental specifications.
12. Make observations in the “Comments” and “Recommendations” area on the report if you see anything unusual (see Section 12.8 Walk-through and General Site Inspection).
13. Deficiencies identified during a Verification inspection performed in accordance with **Section 7 – Modifications** of CAN/ULC-S537 must be properly documented. It is incumbent on the technician to ensure that any identified deficiencies that may impact the proper operation of the fire alarm system are brought to the attention of the Authority Having Jurisdiction and the building owner.



12.9.2 Unit Emergency Lighting

Emergency Lighting includes the typical battery pack (with or without heads); the remote heads and illuminated EXIT signs powered by the unit, and Dual Function EXIT signs.

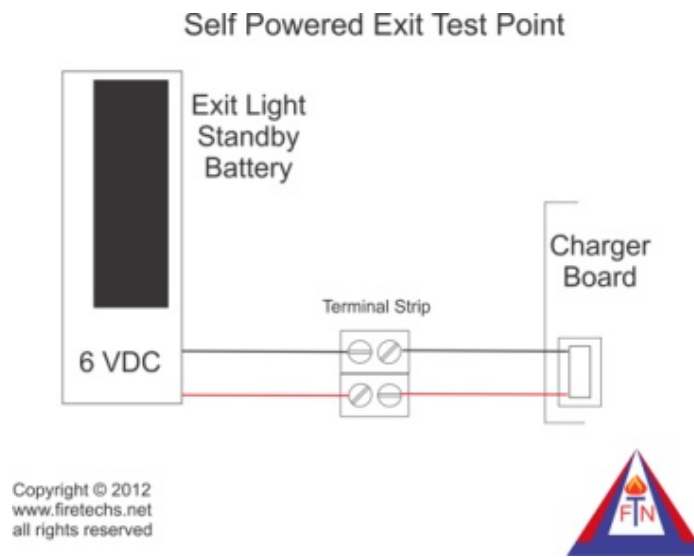
12.9.2.1 Emergency Light Battery Packs

1. Before the "power off" test is performed, open the unit and observe the condition of the battery (is it swollen, cracked, leaking, or "normal" in appearance?).
2. Take a reading of the float voltage across the battery if the unit appears to be "normal", otherwise, replace the battery with one that is appropriately sized for the pack's capacity and has a current date-code.
3. Push the "test" button and ensure the lights turn "on". If they don't, the batteries may require replacing.
4. Observe the condition of the charger board and ensure that the fuses are of the correct rating for the pack.
5. Check that power to the unit is normal 120VAC line power. * The technologist member must determine if the battery pack is powered from the same source as the normal floor area lighting for the area. Do this by selectively turning "off" the circuit breakers for the lighting. If the breakers are not properly labelled, or are not part of the proper lighting circuit, note this on your report as a deficiency.
**NOTE: If it's 347VAC, make a notation on your report and DO NOT interrupt power to the unit by disconnecting it! You MUST, instead, find the circuit disconnect means (circuit breaker) that controls the power to this pack and use it to interrupt power to the unit. Regardless of the incoming voltage on the unit, it is important to communicate any testing involving interruption of local area lighting to onsite personnel and building occupants as testing of these packs may interrupt key lighting circuits in the area for the duration of the test.*
6. If the unit is powered by normal 120VAC power and turning of the local area lighting circuit poses a significant inconvenience (or hazard) to the occupants, and the unit is not equipped with a standard cord and plug assembly you can remove for testing, carefully remove the wire nut on the black (incoming) power wire and separate the connection. Secure the incoming power wire with the wire nut, ensuring no bare wire appears outside of the plastic insulation. You'll observe the emergency lights (and any remote heads wired to the unit) turn "on".
7. Place your DC Amp clamp-on meter across the negative lead between the charger board and the attached heads and observe the current reading on your report. Multiply this number by 6 or 12 (depending on whether the battery pack is a six- or twelve-volt unit). This will give you the wattage draw on the pack. It should not exceed its rated capacity as noted on the label affixed to the unit.
8. Record the "start time" on your test report. Start your timer and set it for thirty (30) or for sixty (60) minutes (as may be required by your jurisdiction). You will return to this unit after the timer has expired.
9. Ensure that ALL connected remote lamp canopies and attached exit signs are activated and that the areas they serve are properly illuminated.
10. Proceed to the next unit in the building and repeat steps 1 - 5.
11. On return to the starting unit, observe the condition of the light heads. Are they still producing enough light for you to safely navigate this section of the corridor or stairwell?
12. Restore power to the unit and measure the voltage across the battery. Record the "stop time" on your report.
13. If everything's normal, complete a testing tag and affix it to the unit. Proceed to the next unit in line.

12.9.2.2 Dual Function (Self Contained) Exit Signs

Note: ALL Dual Function EXIT signs must be individually tested and tagged!

1. Carefully remove the cover to expose the charger board and battery. If not previously tested, you will likely see a direct connection between the charger board and battery. The battery is supplied with permanent leads “red”, and “black” that terminate in a small Molex™ plug. If the battery appears to be in good (normal) condition, you will have to insert a small terminal block between the battery and the plug. This will provide you with your voltage test point. Here’s what it should look like when you’re finished:



*NOTE: Unplug the battery from the charger board before making any alteration to the wiring.
Exercise extreme caution when fitting the terminal strip. **Do not short the wires!***

2. Proceed with testing the unit (once you’ve made the modifications) as outlined in the **Emergency Light Battery Packs** testing section. Obtaining current readings are not required in this instance as the batteries are sized to power just the unit’s internal lighting for the time required by NBCC. You should still record the charging voltage!
3. Ensure all of the lights (LED’s) are functional and note any that aren’t on the test report.
4. Complete a tag and affix it to the unit.

12.9.3 Portable Fire Extinguishers

As noted in Section 5 – Requirements for Certification, a Life Safety Technologist (LST) with an “E” (Extinguisher) designation can only perform the monthly or annual inspection of portable fire extinguishers unless they have also been Transport Canada (or equivalent) certified to perform Cylinder Requalification (and the company they’re employed by has also received and maintains current formal accreditation).

1. The testing criteria for extinguishers are outlined in NFPA 10 and must be followed.
2. The technologist must verify the certification of any agency that may have performed either six (6) year maintenance or hydrostatic testing of the extinguisher (as evidenced by the permanently affixed label on the extinguisher’s shell). An example of a typical label is provided below:



The Transport Canada website provides public access to their database of Cylinder Requalifiers at:
<http://www.wapps.tc.gc.ca/saf-sec-sur/3/fdr-rici/cylinder/requalifier.aspx>

3. Fire extinguishers with labels from companies that are not properly certified must be **RED Tagged**. This procedure is outlined in the **Section 12.1.5**.
4. The jurisdictional authority **MUST** be notified, and a properly qualified replacement extinguisher provided as soon as is practical.
5. Extinguishers that are not tested “in situ” (e.g. an extinguisher that has been transported to a fire equipment service provider’s place of business), must be appropriately identified on the inspection tag by incorporating wording to the effect that the unit was tested while **NOT** installed at the customer’s premises.
6. Complete a tag and affix it to the unit in the prescribed manner.

12.9.4 Water-based Extinguishing Systems

Water-based extinguishing systems may include a number of different system types ranging from dry, wet, dual-action, standpipe, water curtains, full flooding and foam systems.

12.9.4.1 General

1. Testing requirements for water-based extinguishing systems are covered in NFPA 25 (2011) and are detailed in our testing forms. Our report forms can document up to ten (10) water-based extinguishing systems. Each system is represented (and identified) by a riser valve in the main sprinkler or mechanical room. The second and third pages of the report form must be duplicated in order to document testing and inspection of components that are part of each separate riser.
2. Risers may employ connections or branches on each floor of a building and may incorporate a local valve and flow switch on the floor somewhere (usually located in a stairwell in many high-rise buildings). It is only necessary to tag the main riser valve serving the floors in this instance.
3. While the fire alarm test report documents testing of the individual valves and flow switches (for proper annunciation), it is incumbent on the technologist to ensure all valves are properly exercised as required by the NFPA 25 if (s)he does not have access to the sprinkler test report.
CAUTION: Supervised valves on wet standpipe systems must be exercised through their full range of motion with the main riser valve turned off and the riser drained prior to this test.
4. Removable covers on water-flow or supervisory devices which employ electrically supervised cover tamper switches must be removed before physical testing of the device to ensure the correctly differentiated signals are received by the fire alarm system.

NOTE: Valves and devices that are difficult to reach, whose operation is compromised by incorrectly wired tamper switches, or that are not electrically supervised should be noted in the report's "Comments" section.

12.9.4.2 Back-flow Preventers (Cross-Connection Controls)

1. A test header must be installed to facilitate performing the Forward Flow Test (FFT) required by NFPA 25. **Absence of the test header must be noted in the report.**
2. The performance test report should include a reference to the FFT if the back-flow is installed on fire protection system piping. You must transfer this information to the sprinkler test report form and ensure that a copy of the back-flow test report is appended as well.
3. If the FFT cannot be performed for any reason, it must be noted in the report's "Comments" section and the tag placed on the unit must indicate "Additional Work Required" in accordance with Section 12.1.4.
4. Many jurisdictions maintain provincial (or have adopted other) cross-connection control programmes which may include additional certification requirements. This certification (in most jurisdictions) does not provide proactive oversight of the technician's practice. Where such additional certification is provided/required, this will be included on the individual member's identification card which means it is subject to the Professional Practice Review process (Refer to Section 16.2).

12.9.4.3 Dry Pipe Systems

1. Interiors and mechanisms of dry pipe valves will be inspected at the intervals recommended by the manufacturer (or NFPA 25).
2. The date of the interior test will be prominently displayed on the reverse of the inspection tag along with the next scheduled date.
3. Correct operation of low pressure and alarm flow switches must be confirmed.
4. The full trip test must be conducted from the most remote inspector's test valve in accordance with the procedures established in the Testing Standard.
5. Removal of internal contamination or corrosion build-up is mandatory. Excessive build-up noted within the manifold will warrant obtaining a sample for examination by a certified testing laboratory for bacterial contamination.

12.9.4.5 Standpipe Systems

1. All associated floor level valves must be exercised through their full range of motion and water clear of visible contaminants must be observed to discharge from each connection.
2. Flow testing of standpipe systems can only be accomplished if the employer provides and maintains the required testing equipment.
3. Flow testing **MUST** be performed at the interval noted in accordance with the requirements of the Testing Standard.
4. The date of the flow test and the next flow test date must be indicated on the reverse side of the inspection tag and affixed to the system's riser valve.

12.9.4.6 Valve Enclosures and Rooms

1. The ambient temperature conditions inside the mechanical or sprinkler room, on the day of the testing of the water-based extinguishment system, must be documented.
2. Operation of the room's heater must be confirmed.
3. The setting and operation of the room's low temperature supervisory device must be confirmed.

NOTE: Absence of a low temperature device must be noted on the report.

12.9.5 Extinguishment Systems Employing Electro-Mechanical Releasing Means and Gaseous or Liquid Agents

1. Testing of all initiating and output field devices, control units, and annunciators must be accomplished in accordance with CAN/ULC-S536 at six (6) month intervals.
2. Further inspection (as required by the referenced NFPA Standard) shall be conducted at the intervals specified. Such inspection will require specialized training by the manufacturer (or authorized agent), testing equipment, and capabilities. Evidence of special certification and/or manufacturer training must be maintained on file with the Network and updated as required.

12.9.6 Generators

The following tests of a building's generator shall be conducted when the fire alarm control panel's primary power source is derived from the building's emergency power panel:

- 1. Operation of the test function of the transfer switch, in accordance with the monthly testing regimen required by NFC will test the interconnection to (and proper annunciation at) the building's fire alarm system.*
- 2. Full load testing of generators must be conducted on an annual basis by technologist/mechanics in the employ of the manufacturer (or their authorized representative).*
- 3. The equipment required to perform this test must be provided by the technologist's employer and maintained in proper working order.*
- 4. Low fuel indicator shall be tested to ensure receipt of trouble condition at the fire alarm control panel. Absence of a low fuel trouble shall be noted in the "remarks" section of the fire alarm system annual report.*
- 5. Evidence of special certification and/or manufacturer training must be maintained on file with the Network and updated as required.*

12.9.7 Fire Pump & Control Systems

- 1. Testing of fire pumps and associated piping should only be performed by technologists that have received formal training, and whose employers provide the required test equipment (hose monster, flow meters and gauges, etc.). This testing must be performed at the interval noted and in accordance with the requirements of the Testing Standard.*
- 2. Evidence of special certification and/or manufacturer training must be maintained on file with the Network and updated as required.*
- 3. Technologists are otherwise restricted to performing the equivalent of the monthly "run" test to document correct system operation, and annunciation at the fire alarm system's common control (or annunciators).*
- 4. Technologists must exercise caution when engaging the fire pump controller and carefully observe pump temperatures and pressures.*
- 5. All testing must be accomplished while normal building power is available.*

12.9.8 Smoke Control Systems

- 1. Testing of smoke control systems will often involve integrated testing of a building's mechanical air handling facilities. It is incumbent on the building owners to ensure the provisions of the Fire Code with respect to such testing are met on a quarterly basis (with appropriate notations made in the applicable log books). The technologist must review the log books and provide suitable comments in the test report.*
- 2. Annual testing of a building's smoke control measures should ensure proper interconnection, and applicable control functions as provided by the building's fire alarm system.*
- 3. A performance test can only be provided if the member technologist's employer provides the proper, calibrated testing equipment.*

NOTE: Use of punk sticks in lieu of measured differential pressures to verify proper air flow(s) may be allowed by the local jurisdictional authority.

12.9.9 Kitchen Suppression Systems

1. *Testing of kitchen suppression systems must be accomplished in accordance with the requirements of NFPA 17A.*
2. *The technologist must hold current manufacturer qualification in order to perform service, maintenance or testing of kitchen suppression systems.*
3. *Evidence of special certification and/or manufacturer training must be maintained on file with the Network and updated as required.*
4. *The technologist must utilize only approved replacement components (e.g. fusible links, nozzle covers, releasing cartridges, etc.).*
5. *Replacement of individual components must be accomplished at the intervals recommended by the manufacturer's printed instructions.*
6. *The technologist must confirm correct operation of the fire alarm system during a trip test simulation (this includes proper signal function and zone annunciation).*
7. *The technologist must confirm and record the date of the last duct cleaning. Inspection of ductwork normally accessible during a semi-annual inspection must note any abnormal grease buildup on the filters or hood drains.*

12.9.10 Carbon Monoxide & Parkade Exhaust Systems

1. *Operation of exhaust fans must be visually confirmed.*
2. *Detector heads must be clean and free of visible contaminants or corrosion.*
3. *Manual operation of the control unit's functions must be confirmed (e.g. high-level audible & visual warning, switches for "auto" or "manual" actuation, etc.)*
4. *Manufacturer's approved test gas must be used to test detector function and control panel operation.*

12.9.11 Fire Alarm System Communicators

1. *The technologist must complete the CAN/ULC-S561-13 Appendix "C" test report and secure a copy next to the fire alarm control unit for inspection by the Authority Having Jurisdiction.*
2. *Use of non-listed (or unapproved) equipment must be noted on the report.*
3. *Any changes to telephony technology (e.g. conversion to VOIP on any of the communication channels being utilized by the system) must be flagged as a deficiency.*
4. *Off-site and on-site contact information must be confirmed. The key holder list must be amended as required.*
5. *Cover or door tamper switch operation (and the required signal transmission) must be confirmed.*
6. *Where passive communication channels are utilized, one channel shall be faulted, and receipt of signals confirmed at the monitoring station. An approved means to initiate this fault must be provided (eight position jack installed).*
7. *Where active communicator technology is utilized, loss of signal shall be confirmed at the monitoring station.*
8. *The alarm bypass function (if installed) at the fire alarm control panel shall be tested, and receipt of the trouble signal confirmed at the monitoring station.*

12.9.12 Passive Building Fire Protection Systems

1. *Technologists engaged in the inspection of passive building systems must be vigilant of any changes in occupancy that may affect the building's layout, or otherwise impact fire safety.*
2. *Testing and inspection of Passive Building Fire Protection Systems must be performed in accordance with the provisions of the building's Fire Safety Plan Manual.*
3. *Appropriate documentation witnessing the testing performed under this Section must be provided to the building owner and left on site for review by the jurisdictional authority.*

12.9.12.1 Fire & Emergency Plans

1. *Emergency planning documentation must be reviewed on an annual basis and any changes or alterations to the physical layout, building systems, or equipment must be updated.*
2. *Contact numbers for the Fire Safety Director and Deputy Fire Safety Director must be confirmed. Verify that the training information sheet has been completed and identifies the currently appointed individuals.*
3. *Emergency contact numbers and information for building occupants requiring assistance must be reviewed and updated as necessary.*
4. *Contact information for building maintenance services providers must be reviewed and updated.*
5. *Evacuation floor plaques must be examined to confirm they accurately represent the current layout and occupancies, are not damaged, defaced, or missing.*
6. *The monthly test and inspection forms should be examined to ensure the proper inspections are being conducted.*

12.9.12.2 Fire Doors and Exit Systems

1. *Fire door assemblies must be visually inspected for proper labelling and their operation confirmed:*
 - i. *Painting of identification plates must be recorded as a deficiency.*
 - ii. *Missing hardware, maladjusted or mismatched latches & strike plates must be recorded as a deficiency.*
 - iii. *Improperly operating door closures must be recorded as a deficiency.*
 - iv. *All fire door assemblies that are required to remain closed must be properly identified with the correct signage.*
2. *Check to ensure that:*
 - i. *Floor landings are properly identified on the stairwell side of the door,*
 - ii. *Handrails must be securely fastened to the wall,*
 - iii. *Noses of stair treads must be painted in a contrasting colour,*
 - iv. *Stairwell illumination must be adequate,*
 - v. *Emergency lighting in stairwells must provide the minimum required candela/lumens required by the NBCC.*
3. *Record any deviations in the comments section of the report along with any observations and recommendations.*

12.9.12.3 Fire Stopping

1. All penetrations between floor areas, either horizontally or vertically, must be adequately fire-stopped.
2. Where possible fire stopping shall be inspected for integrity on both sides of a wall or floor:
 - i. For modifications that may be caused by newly added cables or pipes,
 - ii. For physical damage resulting from incursion of water or other liquid media, rodents, deliberate or accidental damage.

12.9.12.4 Self-Illuminated Exits & Egress Pathway Marking Systems

1. Adequate lighting in the vicinity of any self-illuminated signage used for life safety shall be confirmed in accordance with the manufacturer's installation instructions.
2. Signs that are blocked, faded, or otherwise compromised shall be identified on the report.

12.9.12.5 Mechanically Actuated Dampers or Door Assemblies

1. Fusible linkages shall be replaced every three (3) years or in accordance with the hardware manufacturer's recommended replacement intervals.
2. Fusible linkages must be replaced with identical units of the correct rating and operation.
3. Orientation and operation of mechanical dampers must be in accordance with the manufacturers published installation instructions.
4. Manual releases must be operated to ensure proper operation.



12.10 Integrated Testing of Building Life Safety Equipment and Systems (CAN/ULC-S1001-11)

The procedures for testing the individual building systems noted above may include an interconnection to one or more of the described systems. It is incumbent on the member technologist to ensure that interconnectivity functions are properly tested and documented. Reference is made to the applicable testing Standards, including published and unpublished amendments.

There are several scenarios a Network Certified Technologist may be involved with. These include:

- 1. The initial Integrated Test of a newly installed life safety system as required by Section 6 of CAN/ULC-S1001 (Standard for Integrated Systems Testing of Fire Protection and Life Safety Systems),*
- 2. The periodic testing required by the National Fire Code (2015) Division B Section 6.8 (in conformance with Section 8 - Periodic Integrated Systems Testing in CAN/ULC-S1001),*
- 3. Integrated Systems Testing in conformance with Section 9 – Retro-Integrated Systems Testing of CAN/ULC-S1001-11, and*
- 4. Integrated Systems Testing in conformance with Section 10 – Integrated Systems Testing for Modifications of CAN/ULC-S1001-11.*

12.10.1 Initial Integrated Systems Testing – Commissioning Tests

Member Technologists must have successfully achieved registration as a Certified Building Life Safety Systems Specialist (CLSS) in order to perform the required Commissioning Test in NBC 2015 Clause 3.2.4.6 – Commissioning of Life Safety and Fire Protection Systems. The commissioning of integrated systems must be performed in accordance with the requirements of CAN/ULC-S1001-11 Section 5 – Integrated Systems Testing Process, and Section 6 – Integrated Systems Testing Requirements.

12.10.2 Periodic Integrated Systems Testing

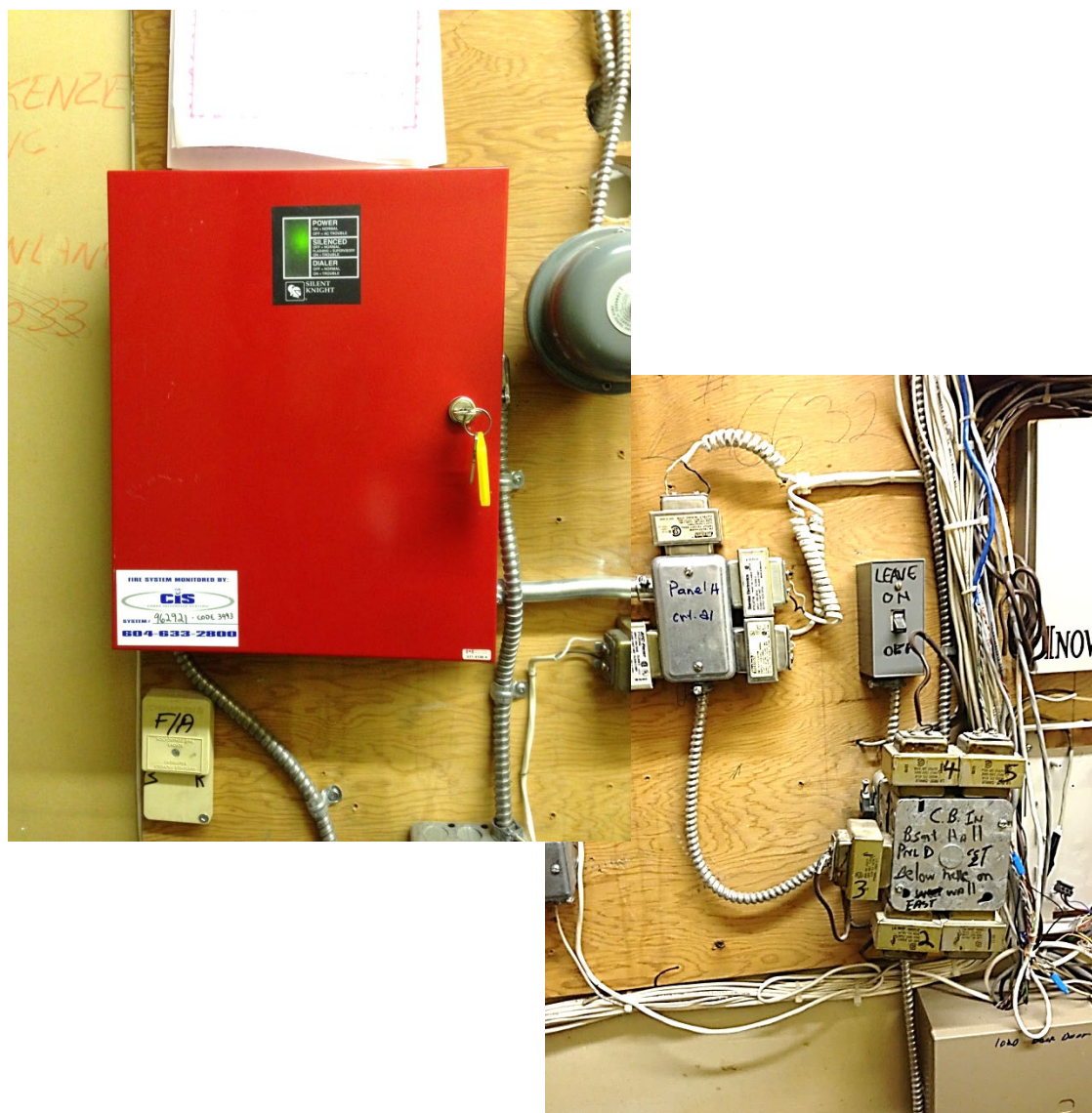
- 1. Member Technologists must have successfully achieved LSST-F or LSST-V certification in order to perform the periodic (annual) integrated testing of building life safety systems.*
- 2. The technologist member must request and review a copy of the original Commissioning Report and identify any discrepancies to the building owner (non-functional or disconnected equipment, or where system interconnectivity should be considered).*
- 3. Documentation describing the procedures and the test results shall be provided in a format approved by the local jurisdictional authority.*
- 4. Documentation must be provided to the building owner with clear instructions to retain a copy on site.*
- 5. Periodic testing must be accomplished in accordance with the requirements of the jurisdictional authority. Where such procedures have not been proscribed, subsequent integrated tests shall be performed every five (5) years in accordance with CAN/ULC-S1001-11 Sentence 8.2.3, and the jurisdictional authority notified.*

12.10.3 Retro-Integrated Systems Testing

Member technologists must have successfully achieved registration as a Building Life Safety Systems Technologist (LSST) in either the F or V disciplines in order to produce the integrated testing plan in conformance with CAN/ULC-S1001-11 Section 9 – Retro-Integrated Systems Testing. The plan must be reviewed and accepted by the jurisdictional authority. A certified LSST-F or LSST-V may participate in the execution of the testing plan in accordance with the requirements of Section 12.10.2 Periodic Integrated Systems Testing.

12.10.4 Integrated Systems Testing for Modifications

1. Member technologists engaged in performing the Verification of a modified fire alarm or life safety system in accordance with CAN/ULC-S537-13 (Standard for Verification of Fire Alarm Systems) Section 7 – Modifications, must ensure that they have identified and tested any integrated functions that may be affected or required by the modifications. The Verification Appendix C.1 page must be annotated accordingly and a separate Annex item to the required documentation must be included. Only a LSST-V certified member may produce and seal this documentation.
2. The LSST-V certified member must annotate the building's Integrated Systems Testing Report and the Periodic Integrated Testing Report with the prescribed form.



13.1 Duty to Report Non-compliance

All technicians engaged in providing service to building life safety equipment and systems are expected to adhere to the minimum required testing and inspection criteria provided in the referenced Standards and this Practice Guide. Deviations cannot be tolerated and must be reported to the jurisdictional authority. Technologist members are held to a higher standard when it comes to the testing, inspection, and service of this equipment. This section outlines the **duty to report** required of all technologist members.

13.1.1 Reporting Non-compliance of Other Technicians or Agencies

1. The three (3) other agencies certifying technicians in Canada are:
Canadian Fire Alarm Association (CFAA) www.cfaa.ca
Applied Science Technologists & Technicians www.asttbc.org
Door and Hardware Institute www.dhi.org
2. Where substandard or non-compliance by an individual performing testing, inspection, maintenance or service of building life safety equipment has been identified, the member shall contact the Network Executive by telephone at +1(888) 340-3473 (preferably from the site) for instructions about documenting the substandard work. In all instances where filing a formal complaint becomes necessary, the technologist member will also be required to submit a copy of the complaint to the local jurisdictional authority.
3. Where the complaint involves technicians working within the same organization (same employer) as that of the technologist member, the following procedure must be followed:
 - i. Contact your immediate supervisor and advise them of the breach;
 - ii. Proceed with the required testing/inspection/service of the building (unless otherwise instructed). This will likely identify additional problem areas which you will document on your building test report;
 - iii. Follow all procedures outlined in Section 12.1 **Inspection Tags**;
 - iv. Submit a copy of your report to your supervisor and proceed with initiating the complaint process. You will be required to append copies of your report (with remarks and comments) to any documentation you submit;
 - v. Refer to Section 19 **Conflicts from Employment** for additional procedural guidelines.











13.10.2 Reporting Non-compliance of Another Technologist/Associate Member

1. Contact the Network Executive by telephone at +1(888) 340-3473 (preferably from the site) for instructions about documenting the substandard work. This may require you to take photographs of tags, specific equipment or portions thereof;
2. Where the complaint involves technologist members working within the same organization (same employer), the procedures outlined in 13.1.1.3 shall be followed;
3. The technologist members' (that is the subject of the complaint) immediate supervisor will be contacted by the Network Executive within twenty-four (24) hours, or by noon of the next business day, whichever comes first.

14. Technologist / Specialist Online Account & Practice Log (Anticipated Launch – July 2017)

14.1 Technologist's Personal Page & Activities

Network Certified Technologists will maintain a daily online log of their activities. Members will have chosen a unique login ID and password. Their respective home page will provide a number of options. This includes:

-  The ability to update personal information (including current employer)
-  Adding (uploading) training certificates
-  Completing their daily log
-  Uploading building test reports (in PDF) format
-  Sending and receiving secure personal messages from other members of the network
-  Access to a members exclusive forum in which to ask questions and receive answers from peers and industry experts
-  Access to an online library of fire alarm panel manuals (downloadable in PDF format)
-  Review complaints received regarding their own practice as well as track them through the process from initial receipt to final disposition
-  Receive information regarding online courses, view training videos, and track their continuing education credits
-  Review their membership status

It is incumbent upon the member to maintain accurate and up-to-date contact, certification and employment reference information.

14.2 Errors

Errors in entry of information must be reported immediately. Technologists may contact us through the twenty-four (24) hour Toll Free number at: +1 (888) 340-3473 (FIRE), or via email at tech@firetechs.net. Members cannot edit or make changes.

14.3 Uploading Test Reports

Building inspection reports must be uploaded within forty-eight (48) hours of completion of testing. If the member anticipates a delay in providing a copy of the report, they must notify the Network.

15. Liability





Liability for substandard work falls into two distinct categories:

Omission through either negligence or deliberate action

And

Error through either lack of knowledge or genuine oversight.

Examples of both types (of error and omission) include:

-  *Removing a fire extinguisher for off-site service without leaving a temporary replacement*
-  *Not performing the mandated testing required of a Standard for a specific device (i.e. end-of-line resistors, isolators)*
-  *Leaving an unsupervised sprinkler valve in the closed (or partially closed) position*
-  *Failing to reconnect ancillary circuits following the testing of a fire alarm system*

Your employer may be required to provide evidence that they have third party liability insurance to satisfy a contractual undertaking for the testing, inspection, and service of fire protection equipment in a building. In most cases coverage is extended to any employees engaged in providing the services contracted for on the employer's behalf, but where a wrongful death or serious injury results from your actions (or inaction), the courts will ultimately decide if this was due to an "error" or an "omission" (the results of a separate investigation into any formal complaint filed against you may also factor into a trial judge's decision).

If it can be proven that the damage or injury resulted from a deliberate action or inaction involving negligence on your part, you may also become liable to criminal prosecution. It is extremely important that you follow the guidelines and procedures outlined in this manual (and the applicable testing standards), and thoroughly document any communication with the building owner, the technologists/technicians assisting you, and your employer.

16. Practice Review

16.0 General

There are two categories of Professional Practice Oversight. The first involves an evaluation phase in which every prospective member of the Network must participate in. The second involves an ongoing review process. Both may involve a field review component. Field reviews fall into two distinct categories: Places of Employment, and Site Specific. In either instance, advance notice will likely not be provided. Site specific visits will be arranged in conjunction with the local jurisdictional authority and with the building owner's cooperation.

16.1 Professional Practice Evaluation

In order to properly assess an applicant's suitability for the endorsement he/she is applying, an evaluation of the prospective member's professional practice must be conducted. This may include:

- 1. An examination of previously filed test reports.*
- 2. A hands-on demonstration of the prospect's technical abilities.*
- 3. A test (oral and/or written) of the individual's knowledge of the equipment being tested.*
- 4. A test (oral and/or written) of the applicant's knowledge of the Codes and Standards applicable to the endorsement being applied for.*
- 5. An examination of the applicant's work environment.*
- 6. Interviews with co-workers, agencies and known stakeholders.*
- 7. An examination of the prospect's current Certification(s).*

16.2 Professional Practice Reviews

Professional Practice Reviews may include (but are not limited to) the following:

- 1. An examination of the member's use of the approved testing forms (formatted for the Jurisdiction as applicable) is required, along with the results of the building test time calculator found at <http://www.firetechs.net/library/forms/PMACalculator.htm>.*
- 2. A review of the technologist member's written or online log compared to the test report(s) submitted for the time period in question. Failure to complete a daily log is subject to disciplinary measures.*
- 3. Discrepancies in testing flagged by the online system maintained by the Network will be rigorously reviewed and may involve direct contact with the member and their supervisor/manager.*
- 4. Contact will be pre-arranged at a time that is mutually convenient. Failure to respond to a request for an interview within a reasonable time may result in further action being taken against the member(s) (including but not limited to suspension of their privileges).*

16.2.1 Places of Employment

1. If the member or the member manager's service agency is publicly advertising that it is performing:
 - i. periodic testing of backflow preventers,
 - ii. performance testing of generator systems,
 - iii. building standpipe testing,
 - iv. performance testing of fire pump systems,
 - v. confirmation of or performance testing of smoke control systems,
 - vi. recharging, hydrostatic or six-year maintenance inspections of portable fire extinguishers,
 - vii. periodic testing of kitchen fire suppression systems,
 - viii. periodic testing of extinguishment releasing systems, then

The required testing equipment and/or the specific manufacturer's authorization documentation must be made available for examination (including applicable calibration certification documentation).

2. Failure to produce the equipment or any required certification during the field review may result in disciplinary action being taken against the member manager responsible.

*NOTE: Recharging of fire extinguishers or other types of extinguishing agent bottles from a **mobile platform** is not normally permitted and may be subject to a second onsite review at the responsible member manager's expense at which time the proper decommissioning of this equipment must be verified. Please ensure appropriate documentation is provided in those jurisdictions where the local authority has examined and granted their approval for the services provided.*

16.2.2 Building Site Specific

A field review can include actual building sites whose test reports have been submitted by the technologist member. The selection process is performed on a random basis or may be triggered as a result of discrepancies found in the submitted test reports. Identified deficiencies must be corrected and may require a second site specific review conducted at the responsible member manager's expense.

17. Technologist Competency – Personal Professional Development Plan

*If engaged in the mandated testing of building life safety systems and equipment, the technologist who has demonstrated the ability to satisfy the certification criteria of a particular discipline but whose present employer may not possess the proper test equipment may continue to practice within that discipline subject to certain restrictions. These are outlined in **Sections 5 & 12.9**. Additionally, a review of the technologist's practice will be conducted at least every two (2) years and such review may require them to complete additional educational components as may be identified during the course of the evaluation or review process.*

Technologists are responsible for establishing and maintaining a Personal Professional Development Plan in conjunction with their individual initial assessment or subsequent follow-up review.

18. Continuing Education, Required Education Credits

Technologists certified by the Network are required to submit evidence of ten (10) education credits per annum as part of their annual renewal. Credits can include (but are not limited to):

- manufacturer sponsored training
- online seminars
- regularly scheduled learning events (seminars, breakfast meetings, lunch and learns) relevant to their practice
- participating in Code or Standards development (relevant to their practice)
- lecturing or teaching of courses relevant to their practice

The credits issued are based on the number of hours the technologist is able to document that he has attended a course, seminar, or event, as well as a review of the course's relevance to the technologist's practice and personal development.

19. Conflicts from Employment

Note: It is not the intent of this manual to, in any way, conflict with the member's employment obligations, however, it is important for the technologist member and the employer to understand that there are obligatory requirements in performing acceptable inspection and testing of life safety equipment to the stipulated Standards (and this Practice Guide) that cannot be interfered with or altered. Neither the Standards nor the practice provisions in this guide allow deviations and it is expected that management & supervisory personnel align themselves accordingly and provide the necessary supports and oversight to ensure the overall compliance of the members they are tasked with supervising.

19.0 General

1. Confidentiality in the investigation of any complaints must be maintained.
2. Managers with direct (or indirect) oversight of a technologist's practice must be certified by the Network in any of the three tiers: LSST, CLSS, or BLSC.
3. Employers often provide corporate specific procedural manuals which may outline additional codes of conduct and expected comportment. Examples may include:
 - i. **Dress code** – Your employer may require you to wear company badged apparel (uniforms) with name tags
 - ii. **Security provisions** – Some employers employ internal means to control access to portions of their corporate premises. This may require the use of a key fob or security pass, picture identification, and business cards
 - iii. **Service Vehicles** – An employee member may be provided with a service vehicle in order to properly carry out their duties. The responsibilities for routine maintenance, personal use, or restrictions on its use may be outlined
 - iv. **Specialized testing tools & equipment** – Most employers will provide special testing equipment that include sound level meters (and their calibration units), multi-meters, back-flow test gauges, hose monster, testing hoses, clamp-meters, laptop computer, software keys, etc.

19.1 Conflict Resolution

1. *Provincial Labour Standards, Union Contracts, and their established mediation processes govern employer and employee relations and provide the means to resolve many conflicts arising from employment. This Practice Guide provides additional guidelines with respect to the professional conduct expected of a Network Certified member.*
2. *Where a breach of employment has occurred, the Network Executive must be notified by the supervising member and the details of any censure conditions or termination provided.*
3. *Where the breach of employment results in termination of the technologist member and may also involve a substantial violation of this Practice Manual, a formal investigation by the Network Executive into the member's practice will be initiated. Both the former and the present supervising members may be contacted to provide additional information.*
4. *Where a violation of this Practice Manual has occurred, the provisions outlined in Section 20.3 **Complaints – Member Interview** will be followed.*

20. Complaints

20.1 Dispute Resolution - Preamble

Where a dispute regarding the services provided to the complainant by the servicing agency can be resolved through an interpretation of a Code or Standard then the Network Executive will initiate the process by which such an interpretation can be obtained, provided such interpretation has not already been rendered previously. In this case, copies of the interpretation will be made available to all parties.

20.2 Filing a Complaint Report

1. *Complaints can be initiated by a third party (another Network Member, a Building Owner, or Licensed Professional), a Jurisdictional Authority, or by the Network's Executive.*
2. *The member (and his immediate supervisor) must be notified within twenty-four (24) hours of the receipt of a formal complaint.*
3. *All complaints must be submitted in writing and delivered to the Network Executive via either email, facsimile, or the postal service.*
4. *Complaints must include the following information:*
 - i. *The member's name and certification number*
 - ii. *The date and location (building address) of the alleged offence*
 - iii. *Details of the alleged offence must include: copies of the report [with the area(s) of concern highlighted] with the member's name and seal clearly identifiable, a photograph of the inspection tag with the member's name and seal clearly identifiable, and such other documentation, photographic evidence, and/or Code/Standard references as may support a formal investigation into the member's practice*
 - iv. *The name and contact information of the individual filing the complaint*
 - v. *The name and contact information of the local Jurisdictional Authority*

20.3 Member Interview

1. Upon receipt of a formal complaint, a conference with a Network Compliance Officer, the member and their immediate supervisor will be arranged.
2. The initial interview of the member will involve a review of the circumstances surrounding the complaint and may identify the complaining party to the member. The member is barred from any direct contact with the complaining party until an outcome has been formalized.
3. If the complaint has merit, and the member recognizes that they are in violation, the matter may be stayed from further proceedings through the member's acceptance of censure conditions (subject to a review by the Network Executive).
4. If the complaint contains similar (or identical) elements from a member interview conducted previously (within two calendar years) and which resulted in acceptance of censure conditions, a full hearing will be scheduled.
5. If the complaint has merit, and it is clear the member is unwilling to accept censure conditions, then a full hearing will be scheduled.

20.4 Witnesses / Review

1. Witnesses will be identified, and their contact information verified. Verbal information gathered in this process will be transcribed into a formal report which will be presented and signed for verification purposes. Additional documentation and any amplification of the formal written complaint will be requested at this time as well.
2. Where possible, a site visit by a member of the Network Executive or a representative of the Local Jurisdictional Authority will be arranged, and the details of the complaint confirmed.
3. Witnesses identified in the original complaint and any subsequent investigative process will be properly deposed.
4. Contact between the member under investigation (including their agents, employers, managers or legal representatives) and any witness(es) identified during this process is strictly forbidden and will result in severe penalties to the member.

20.5 Complaint Hearing

1. A fair and impartial hearing of the complaint will be arranged via online tele-conference or personal appearance.
2. All witnesses, the complainant, and the technologist member will be required to appear at this time. The evidence will be reviewed and the specifics of the complaint presented.
3. Owing to the complexity of some issues, the matter may be adjourned for further deliberation at a later date. During this time, additional information that may not have been presented on the date of the formal hearing will also be considered and questions arising from this process may require another appearance by witnesses, the complainant, the AHJ and the technologist member and/or his supervisor.
4. The review panel will consider all the evidence and testimonies provided in rendering a final verdict.

20.6 Determining Factors

1. The technologist member's certification, training, and experience will be carefully considered. Circumstances surrounding the testing/service rendered, prior issues with the building, the age of the equipment, and previous testing experiences may factor into the deliberations.
2. Where found in violation of a Code, Standard, or this practice manual, the technologist member will bear the cost of the resultant proceedings to the maximum stipulated in the Schedule of Fees.

3. *The technologist's supervisor/manager will be liable for not more than double the investigation fee levied against the technologist member.*
4. *All fees are payable within fifteen (15) days of the publication of the formal hearing outcome.*

20.7 Outcomes

1. *The Complainant and/or his immediate supervisor/manager will be informed of the hearing outcome and the censure conditions (if any) imposed upon the member.*
2. *The local jurisdictional authority will be informed of the outcome and will be able to access this information for a period of two (2) years from the date of the formal hearing.*
3. *Formal outcomes cannot be disseminated or otherwise distributed to any other party with the exception of another qualified certification agency, jurisdictional or legal authority.*
4. *A building owner may apply to obtain a copy of the outcome subject to a formal review by the Network Executive and an undertaking not to disclose this information to any other party.*

20.8 Appeal

1. *The member has the right to an appeal of a hearing's outcome and/or any imposed censure conditions.*
2. *Such appeal must be filed within thirty (30) days of the filing of the formal outcome.*
3. *All appeals filed outside of the period specified in Sentence 20.8.2 will be reviewed by the Network's Executive*
4. *The Network's Executive will establish a Review Committee comprised of the member's peers who will be the final arbiter. The decision rendered by the Committee is final.*

21. Termination and Severability

21.1 Member Initiated

1. *A member may elect to terminate their relationship with the Network at any time.*
2. *The member must return their seal within seven (7) calendar days from the date of termination.*
3. *Termination will be considered final upon receipt of the member's seal.*

21.2 Failure to Renew

1. *A member's certification is considered suspended if the annual dues are not received by the individual membership anniversary date. Renewal notifications are provided sixty (60) days prior to this date and mailed to the member's last known address.*
2. *Members under suspension are barred from using their seal.*

21.3 Suspension

1. *A member whose practice has been suspended must surrender their seal within seven (7) calendar days of receiving formal suspension.*
2. *Notice will be provided by double registered (or certified) mail to the member's last known address. The Notice of suspension is considered received seven (7) calendar days from the mailing date.*
3. *Failure to return our seal will result in legal action being commenced against the (ex)member.*

21.4 Termination for Cause

1. *A member whose practice has been terminated for cause must surrender their seal within twenty-four (24) hours of receiving notice.*
2. *Notice will be provided by double registered (or certified) mail to the member's last known address. The Notice of suspension is considered received seven (7) calendar days from the mailing date.*
3. *Failure to return our seal will result in legal action being commenced against the ex-member.*

22. Reinstatement

22.1 Lapsed (Expired) Membership (14 – 120 days from membership due date)

1. *Candidate must submit the re-instatement fee in effect with completed Membership Re-instatement Request Form (MRRF). The fee is non-refundable and covers administrative costs only.*
2. *Member will submit the membership fee pro-rated from the date of re-instatement to the member's original expiry month and day.*
3. *Candidate must remit the Seal Replacement Fee (if their Seal's return has been officially requested).*

22.2 Lapsed (Expired) Membership (121 – 720 days from membership due date)

1. *Candidate must submit the re-instatement fee in effect with completed MRRF. The fee is non-refundable and covers administrative costs only.*
2. *Candidate must provide a current curriculum vitae including work history from the time of their membership expiration.*
3. *Candidate must provide a list of courses taken from the time of their membership expiration.*
4. *The Network Executive will determine if any upgrade (or refresher) courses are going to be required based on the information provided in Clauses 22.2.2 and 22.2.3 and on a telephone interview.*
5. *Membership may be renewed (with or without) additional provisions.*
6. *Member will submit the membership fee pro-rated from the date of re-instatement to the member's original expiry month and day.*
7. *Member must submit the Seal Replacement Fee and complete any additional course material within six (6) calendar months from acceptance.*

22.3 Lapsed (Expired) Membership (greater than 720 days from membership due date)

1. *Candidate must submit the re-instatement fee in effect with completed MRRF. The fee is non-refundable and covers administrative costs only.*
2. *Candidate must provide a current curriculum vitae including work history from the time of their membership expiration.*
3. *Candidate must provide a list of courses taken from the time of their membership expiration.*
4. *Candidate must complete the upgrade (or refresher) courses identified during the review process. A LSST Seal with Provisional Endorsements will be granted in the Candidate's previous fields of practice until these courses have been satisfactorily completed.*
5. *A practice review will be conducted at the discretion of the Network Executive.*
6. *A variance may be granted for any of the forgoing conditions at the discretion of the Network Executive.*
7. *Candidate must submit the Seal Replacement Fee upon completion of the forgoing conditions.*

22.4 Suspended (or Cancelled) Membership for Cause

1. *Candidate must submit the re-instatement fee in effect with completed MRRF. The fee is non-refundable and covers administrative costs only.*
2. *Candidate must provide a current curriculum vitae including work history from the time of their membership expiration.*
3. *Candidate must provide at least two (2) current technical (or trade) references that can attest to their character and current work experience.*
4. *Candidate's complaint history will be reviewed along with any limitation to their reapplication.*
5. *On satisfactory completion of the review process, the candidate must complete the upgrade (or refresher) courses identified during the review. A LSST Seal with Provisional Endorsements will be granted in the Candidate's previous fields of practice until these courses have been satisfactorily completed.*
6. *A practice review will be conducted at the discretion of the Network Executive.*
7. *Candidate must submit the Seal Replacement Fee upon completion of the forgoing conditions.*

23. Conditions

23.1 Confidentiality

1. *Members' personal information (home address, telephone number) will not be disseminated except through legally authorized means. Such dissemination will be with full disclosure to the member.*
2. *Members' daily online activity logs can only be accessed by the individual member for the purpose of entering information and reviewing activity. The individual member's employer cannot access this information, nor will it be provided unless it is done with the member's full consent.*
3. *Members will not share their personal identifier or log-in information with any other party or individual.*
4. *Except as provided in this manual, a members' certification number, certification designations & competencies, practice reviews, activities, and censure conditions will not be disclosed to any party or individual.*
5. *Members will not collect, store or disseminate personal client information except as required as part of their normal daily activities and shall only disseminate information to those parties involved by virtue of the relationship established between the client and the member's employer.*
6. *Members are expected to adhere to any provisions their employer requires of them with respect to client data and the collection there-of. This includes the prompt return of any company owned material or equipment should the member terminate their employment at any time and for any reason.*
7. *Members are expected to refrain from accessing previous work histories or report forms for purposes other than their own personal review. This information cannot be disseminated to a third party or employer.*

23.2 Test Reports and Documents

1. *All test reports and documents that relate to the service, inspection, repair, or disposition of the fire protection equipment in a building (or project) remains the property of the building's owner (or designated agent) and can only be disclosed to the local jurisdictional authority when specifically requested or as provided in this manual.*

24. Schedule of Fees

24.1 General Fees

<i>Student or Associate Member</i>	<i>\$65.00 per annum</i>
<i>Initial membership application, seal & processing fee:</i>	<i>\$345.00 (Credit for pro-rated dues paid to another certification agency will be applied – initial application only)</i>
<i>Annual membership renewal:</i>	<i>\$95.00</i>
<i>Complaint Investigation & Processing Fee:</i>	<i>\$500.00 (levied only if the member is found responsible)</i>
<i>Supervisor/Manager Complaint Investigation Fee:</i>	<i>\$1500.00 (levied only if the offending member is found responsible)</i>
<i>Seal Replacement Fee:</i>	<i>\$100.00</i>
<i>Seal Upgrade Fee:</i>	<i>Included on completion of successful practical evaluation.</i>
<i>Challenge Examination Fee:</i>	<i>\$250.00</i>
<i>Site Review Fee:</i>	<i>First Review - \$1000.00 plus travel expenses Second (Follow-up) Review - \$2000.00 plus travel expenses (Fees are waived if alternative certification agencies are involved and acceptable documentation is provided)</i>
<i>Member Reinstatement Fee:</i>	<i>\$150.00 (Seal Replacement Fee is additional)</i>

24.2 Course Fees:

24.2.1 Full Course Fees

Fees include all manuals and course materials as outlined in the applicable Course Curriculum and are subject to change (please refer to the website for up-to-date course fees and information):

LST-B	\$850.00
LST-F	\$1250.00
LST-V	\$1250.00
LST-C	\$750.00
LST-E	\$545.00
LST-K	\$545.00
LST-W	\$850.00
LST-P	\$550.00
LST-G	\$650.00
LST-F(SMO)	\$820.00
LST-F(COM)	\$750.00

24.1.2 Refresher and Online Course Fees

Fees include all course materials as outlined in the applicable Course Curriculum:

LST-B	\$275.00
LST-F	\$380.00
LST-V	\$390.00
LST-C	\$335.00
LST-E	\$225.00
LST-K	\$225.00
LST-W	\$420.00
LST-P	Not Applicable
LST-G	Not Applicable
LST-F(SMO)	\$325.00
LST-F(COM)	\$300.00

25. Additional Notes / Index to Photographs & Illustrations

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Index to Photographs/Illustrations:

Page 4 - Incorrectly sized service collar on a 5 lb. ABC extinguisher / Incorrectly wired alarm and supervisory contacts on an Edwards EST-3 fire alarm control panel

Page 8 - Fire at the Grenfell Towers Apartment Project, London, England – June 14th, 2017

Page 10 - Multiple DCL (SLC) isolator failures on an Edwards EST-3 fire alarm control panel / Premises fire alarm monitoring panel with compromised primary power circuit

Page 14 - Mircom FA-1000 fire alarm common control chassis installation inside a Mirtone 790 series enclosure

Page 17 - Mircom FA-2000 fire alarm initiating modules inside an Edwards Custom 6500 fire alarm system enclosure / Incorrectly installed premises fire alarm monitoring panel

Page 18 - Mircom FA-1000 common control chassis mounted inside an Edwards Custom 6500 fire alarm system enclosure / Edwards Custom 6500 Relay Module wired to a Mircom RM-1008 alarm trigger

Page 21 - Smoke detector installation directly exposed to a high output floor ventilation outlet

Page 33 - Missing exit sign on exterior exit facility from a building's electrical room / Incorrectly wired Mircom FX-2000 primary power supply / These relays, mounted in a Mircom FA-1000 fire alarm control enclosure, are triggered by a momentary push button mounted in an Edwards 6700 EVCS system

Page 42 - Missing fire stopping in transformer room

Page 44 - Incorrectly installed premises fire alarm monitoring panel (multiple exposure)

*The Fire Protection Technicians Network
Suite 343, Building 151,
10090 – 152 Street,
Surrey, British Columbia V3R 8X8
Telephone: +1(888) 340-3473
Facsimile: +1(604) 552-7909*

