SOME OF THE MOST COMMON TESTING MISTAKES MADE BY TECHNICIANS PERFORMING VERIFICATIONS TO CAN/ULC 537-04

The reason I know some of them is because I have made them myself.
Why?

Because nobody’s perfect including

■ The People who write the standard
■ The Engineers who design the systems
■ The Manufacturers who build them
The Who Creates Standards

• People involved in Fire Protection such as:
  – Manufacturers Rep’s
  – Engineers and Consultants
  – Government Agencies
  – AHJ’s
  – People in this room like you and me.

Remember nobody’s perfect!
Sometimes it’s hard to answer the Questions

APPENDIX C (INFORMATIVE)-FIRE ALARM SYSTEM VERIFICATION REPORTS
Reference: Subsection 3.1-Note, Clause 3.2.1,3.2.2

YES ✓=Tested Correctly  No □=Did not test correctly   N/A □=Not applicable

<table>
<thead>
<tr>
<th></th>
<th>System provides single stage operation</th>
<th>Yes ✓</th>
<th>No □</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>System provides two stage operation</td>
<td>Yes ✓</td>
<td>No □</td>
</tr>
</tbody>
</table>

If you answer “No” to either of the questions you are indicating that system did test correctly.
Sometimes it’s hard to answer the Questions

My solution is add the N/A box. Remember the appendix is a sample form. You can modify it!

<table>
<thead>
<tr>
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<td>B</td>
<td>System provides two stage operation</td>
<td>Yes □</td>
<td>No □</td>
<td>N/A □</td>
</tr>
</tbody>
</table>

Note: Many people reviewing reports are looking for any “No” box that is checked
Sometimes the tests require special manufacturers information!

4.2.3 Voice Communication Tests

K Upon failure of one amplifier, the system automatically transfers to backup amplifier(s)

- It may be possible on some systems to exchange an amplifier with a defective one.
- Sometimes it is possible to perform this test by removing a fuse or disconnecting power.
Sometimes the tests require special manufacturers information!

4.2.3 Voice Communication Tests

K Upon failure of one amplifier, system automatically transfers to backup amplifier(s)

• At least one system manufacturer has a test switch for this test

• However for some systems this is just not possible due to design without major work!
Sometimes the tests require special manufacture information!

• When in doubt contact the manufacture.
• If they do not have a procedure to perform this test then document this on the report.
Sometimes you need to know why you're doing the test!

- Battery Charging
- 4.4.4 Each battery shall be inspected and tested to confirm operability, including the following functions, as applicable...
- F Charging current;

Why do we this test?

To make sure the battery charger is working!!
Battery Charging

• The problem is in most cases the battery charging current is directly related to the battery condition.

• If you simply measure the current when the battery is fully charged the current reading may be only a few milliamps.

• In many cases this does not prove anything!
Battery Charging

- However if you measure the battery charging current after you perform the 24hr load test (or accelerated test), then you will get a better indication that the charger is operating correctly.

- Remember you only get out what you put in! A discharged 20 amp hr battery may require over one amp in order for it to recharge and meet ULC standards.
So what’s the correct Measurement

• 4.4.4 Each battery shall be inspected and tested to confirm operability, including the following functions, as applicable…

• D Voltage and current with main power supply power ‘off’ and the fire alarm system in full load condition;
So what’s the correct Measurement

- Why do we test this?
- We need this measurement to calculate the required battery capacity requirements in 4.4.4 Q. or to calculate the size of the loading resistor if a silent or accelerated load test is to be performed. (4.4.4 P)
So what’s the correct Measurement

• This was fairly simple years ago when the alarm signal was a constant.
• When the alarm signal was constant the alarm current was also constant. This allowed us to give an accurate calculation.
So what’s the correct Measurement

• Today the problem is the alarm signals will be pulsing at a temporal rate, which mean the current will be pulsing at a temporal rate as well.

![Graph showing signal current, peak current level, and average current level](image-url)
So what’s the correct Measurement

- So what’s the correct reading?
- The peak current?
- The average current?
- If it’s the average current how you do measure it? Most meters will not give an accurate reading.
  - Give a good guess?
    - Not exactly professional!
  - Calculate it from a formula?
    - Every system would be slightly different.
  - Use an oscilloscope
    - Possible but not very practical
So what’s the correct Measurement

• So what’s the answer?
• If you use the peak current you know it will meet the requirements. Yes it will oversize the batteries but that is not all bad.
• We know the battery capacity will reduced as they age, so being on the high side will help compensate.
So what’s the correct Measurement

- Problem
- What if the batteries installed in the system which you are verifying do not meet the calculated requirements using the peak current value.
- I think the only way to know 100 percent for sure if they are acceptable is to perform the 24 hour test as described in the standard and document the results.
• 3.1.1 Each fire alarm system shall be inspected and tested to confirm operability and that the installation is in accordance with the design and CAN/ULC-S524, Standard for the installation of Fire Alarm Systems.
• Note: It does not say building code! It says the design.
• Technicians verifying systems that do not have all the documentation sometimes will make assumptions based on code requirements and common practice not realizing additional design requirement.
Going a little to far

• Examples:
• Smoke control operation
• Two stage operation
• Zoning requirements
• Circuit design Class A or B
Sometimes it takes a little more Work!

5.2.1 Each manual pull station shall be inspected and tested to confirm operability, as applicable;

• The purpose of the test is to make sure the pull station operates properly. In many cases the station has a glass or plastic rod which will break, so the easily way to test is to open the station to operate the switch. This however proves the switch works but not the station.

• I have personally seen many stations over the years in which the mechanical activation of the switch has been faulty from bent switch levers, broken mechanical assembles, even nails installed instead of glass rods.
The Biggest Mistake

- Not having the standard for both Verification and Installation close by for reference.
- Guessing is not acceptable! When in doubt look it up!
- Personal Note: Even after attending some of the ULC working group meetings which created these standards and being in the field for over 30 years, I regularly have to look up items.
You cannot do good work if your tools are not calibrated

- Amp meters
- Sound level meter
- Smoke sensitivity meters
- Air velocity meters
Final Thoughts for Verifiers

• Documentation may seem to be a lot of extra work, however the more comments you can provide, the more credibility the report will have.

• Always remember that it is your signature that is going on the document, so when in doubt always clarify in the notes any test or inspect items which are not a definite yes or no answer.
Hope This Presentation will Assists You to Perform Better Verifications