Battery Testing AS 1851-2012

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Introduction

Warren Makings – Technical Manager and RTO Assessor
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Warren Makings is a highly experienced professional with over 30 years in the fire protection industry. Currently serving as the Technical Manager at FPA Australia, Warren's expertise extends to being an FPA Australia RTO assessor, Business Owner, Registered Electrical Contractor (REC), and Electrician.

Warren's journey began with an electrical apprenticeship in a company specializing in fire system installation and maintenance. In his time at FPA Australia, he has various roles in Technical and State committees. As an RTO assessor, he is entrusted with the task of assessing ‘Functional testing on fire detection, warning, and intercommunication systems’, ensuring compliance and safety in this area. With a wealth of experience, Warren Makings continues to make significant contributions to fire safety and industry standards.

Overview

- AS 1851-2012 Requirements
- When to replace
- Battery Inspection
- Survey Installed Batteries
- Battery Capacity Test
- Battery Test
- Logbook compliance
- Conclusion & Questions

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AS 1851-2012 Requirements

AS 1851-2012 Routine service of fire protection systems and equipment

1. Frequency of Testing
2. Testing Procedures
3. Requirements for documentation and reporting
4. Safety Considerations
5. Compliance with Manufacturer Recommendations
6. Integration with Overall Maintenance Program

It's essential to refer directly to the latest version of AS 1851 for specific guidelines and requirements related to battery testing. Additionally, local regulations and codes may also impact battery testing practices, so it's important to consider those as well.

When to replace

Only the following are required to be replaced after two years
Table 3.4.3 Yearly Service Schedule Fire Pumps

TABLE 3.4.3 *(continued)*

Item No.	Item	Action required and pass/fail requirement	Records		
			Result	Pass/Fail	Comments
3.5	Engine start batteries	REPLACE all engine-starting batteries after a maximum of 2 years service, irrespective of condition. Record date of replacement on the new battery and the date the batteries were replaced in the service record.	.....Date .....Date		
3.6	Control batteries	When the battery has not been replaced in the previous two years, verify the battery condition by carrying out a battery discharge test in accordance with Appendix F.	Date last replace .....or; Load current .....A Final voltage V		

Table 13.4.1.12 Fire and smoke control features of mechanical services – fire curtains and smoke curtains

11.7	Battery function	REPLACE batteries that are more than two years old.	Date last replaced		

All other batteries require testing to determine if they should be replaced.

Battery Inspection

- Inspect battery enclosure for evidence of corrosion – Monthly
- Check the batteries for any condition likely to adversely affect it's function
- Where a battery has not been replaced in the previous two years, VERIFY the battery condition by carrying out a battery discharge test in accordance with Appendix F
- Appendix F is a normative appendix which means you must do this.
- There are two tests in appendix F
  - F1 Determining Required Battery Capacity
  - F2 Battery Test

Survey Installed Batteries

- Nominal battery capacity

2.15	Nominal battery capacity	MEASURE system quiescent and alarm currents. Calculate the required battery capacity and CHECK the installed battery's nominal capacity is no less than the required capacity. See Appendix F for calculating the required battery capacity.	Quiescent current I_Q ....A Alarm current I_A.....A Battery capacity.....Ah		

- This is important. You need to determine if the batteries installed are infact the correct size.
- You cannot rely on the manufacturers suppling the correct size batteries.
- There is a battery capacity test in appendix F that will determine this.

Battery Capacity Test

F1 Determining Required Battery Capacity

- The battery capacity shall be determined as follows
  - *Iq* - Determine the quiescent load current
  - *Ia* - Determine the alarm current
  - *Fc* - Determine the capacity de-rating factor
  - *Tq* – 72hrs for non-monitored or 24 for monitored
  - *Ta* – Alarm load standby power source time (minimum 30 minutes)
  - *L* – Compensation factor for battery deterioration 1.25 new 1.1 older

The 20 h discharge battery capacity shall be determined using the following formula.

$C20 = L[(Iq \times Tq) + Fc\ (Ia \times Ta)]$

Example of how it would be calculated for 24 hours.

C20 = 1.1((.5 x 24) + 2(.8 X .5))
1.1((12) + 2(.4))
1.1(12 + 2 X .4)
1.1(12 + .8)
1.1 X 12.8
C20 = 14.08AH

Battery Test

- Ensure Batteries are fully charged
- Set the battery tester to a discharge current, 80% of full capacity. e.g 100Ah battery is tested at 80A. Subtract the system quiescent current if the test is to be carried out without disconnecting the batteries.
- Record total load current used.
- If the batteries aren't disconnected turn off mains power.
- Apply the test load for 25 minutes or until battery terminal voltage falls to the minimum test voltage of 21V
- If the batteries don't fall below 21V in 25minutes record the battery test as a PASS
- Restore system to allow batteries to re-charge.
- Note: Batteries should be allowed to be charged for a minimum of 1 week before any discharge test is carried out.
- If one battery of a set fails it is recommended to replace all batteries at the same time.

Logbook Compliance

- Section 1.16 of AS 1851-2012 sets out the requirements for Routine Service Records.
- You can use hard copy logbooks or Electronic recording. However, for all methods of recording a hardcopy shall be left onsite. (clause 1.16.2)
- Service records shall be retained for a minimum of seven years
- Your battery test will form part of the yearly condition report that shall be provided for the systems annual report.
- An example of a condition report is given in Appendix E of AS1851-2012.

Conclusion

While this procedure may seem long and onerous to some. We must remember that when we are testing our system to AS1851-2012 these are the requirements we must follow to be fully compliant. Taking shortcuts no matter how small can affect the performance of a fire system.

I hope you found this presentation informative and I'm happy to take any questions in the time remaining.

Questions

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