Australian Government
Civil Aviation Safety Authority

AIRWORTHINESS BULLETIN

AWB 24-012 Issue 1 – 14 July 2017

Battery Capacity Tests

1. Effectivity

Any aircraft fitted with lead acid main batteries

2. Purpose

Provide further information for conducting capacity tests to determine serviceability of lead acid batteries. This information is not covered in CASA maintenance schedule CAAP 42B-1.

3. Criticality of failure

Failures of batteries can result in costly AOG situations and catastrophic inflight emergencies.

FAA AC 23.1309-1E states failure of electrical power is a catastrophic failure condition if primary flight instruments require electrical power.

Batteries that have been discharged to the point where their cranking power has been diminished must NOT be jumped with another power source. The discharged battery may not be airworthy because it does not have the necessary capacity required to operate the aircraft avionics and electrical system in the event of generator failure

4. Background

Capacity is the total quantity of electricity of a cell or a battery, expressed in ampere-hours.

The capacity test is perceived as the most important test. Capacity test provides an indication of the condition of the battery and provides an initial starting point for the first charge.

The capacity of a battery is the ability to deliver current for a minimum amount of time while remaining above a minimum voltage. Test must show that the battery is capable of sustaining 80 to 85% depending on the manufacturer of the amp-hour rating of the battery.

Proper maintenance is essential if the battery is to achieve maximum life and performance.

5. Recommendations

The following procedures are recommended for use in the absence of detailed information from the aircraft type certificate holder, supplemental type certificate holder or other part 21 approved data. Part 21 approved data and the aircraft manufacturer's maintenance schedule takes precedence over this AWB.

Note: Airframe or accessory equipment manufacturers may specify a different capacity test requirement, which should take precedence.

a. Remove the battery from the aircraft and charge it according to manufacturers recommended charging instructions. Allow the battery to stand on open circuit for one hour. If the battery is cold warm it up to at least 20°C before testing.

b. Connect the fully charged battery to a capacity tester that incorporates a load resistance, amp meter, volt meter and a timer.

c. Discharge the battery at the one hour capacity rate to 1.67 volts per cell (10 volts for a 12 volt battery and 20 volts for a 24 volt battery). Record the discharge time.

d. The battery is considered airworthy if it meets 80% to 85% of the one hour capacity rating.

e. If the battery fails to meet the minimum run-time, recharge using constant current method until the specific gravity reading stabilises over three consecutive readings. Allow the battery to stand on open circuit for one hour.

f. Repeat the discharge test as indicated. If the failure persists or the battery overheats to greater than 55°C, replace the battery.

g. If the battery is found to be airworthy, it must be recharged prior to re-installing it in the aircraft.

Re-install the battery into the aircraft after capacity checks and charging. Ensure correct installation and security. Check the battery ventilation system is connected and serviceable.

Note: Charging of the battery while still fitted in the aircraft is prohibited and dangerous. Recommended Intervals for Capacity checks:

- Gill recommends performing subsequent capacity tests of batteries in service every 400±50 hrs or 5±1 calendar months whichever comes first.
- Concorde recommends performing subsequent capacity tests of batteries in service operating less than 1000 hours per year, every 12±1 months if capacity is above 90% or every 6±1 months if the capacity is between 85% and 90%.

- The capacity check intervals specified above are general recommendations suitable for most applications. The intervals can get adjusted for a specific aircraft or fleet once the average battery life is established

If there is a different battery manufacturer always consult their specific continued airworthiness instructions for service requirements.

6. References

RTCA/DO-293 - Minimum operational performance standards for nickel-cadmium and lead acid batteries

Gill batteries - http://www.gillbatteries.com/maintenance.aspx

Concorde batteries - http://www.concordebattery.com/main_air_tech.php

CASA AWB 24-008 - Main Battery Failures

FAA AC 43.13-1B, Chapter 11, Section 2, Battery Ventilating Systems

7. Reporting

CASA encourages reporting any service difficulties with lead acid main batteries via the Defect Reporting system.

8. Enquiries

Enquiries with regard to the content of this Airworthiness Bulletin should be made via the direct link email address:
AirworthinessBulletin@casa.gov.au
or in writing, to:
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