Statement of Equivalency in the testing of Aircraft Batteries

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Introduction:

Making a Statement of Equivalency means to demonstrate that the equipment satisfies the charging and discharging requirements as stated in the CMM[1]'s or OMM[2] of the batteries as specified by the respective battery manufacturers.

The equipment manufactured by JFM Engineering is designed to meet the basic test requirements while providing additional testing performance.

The basic tests are based on providing constant current charge for Nickel-Cadmium Batteries, constant voltage charge for Lead-Acid Batteries, constant current discharge for both and constant resistance discharge for certain types of batteries.

Constant Current:

Constant Current is the most important characteristic of battery testing because this is how testing is specified by manufacturers of Nickel-Cadmium batteries, both in charge and discharge.

Constant Current means that the current will maintain the set value independent of battery voltage, power line voltage, temperature, and other associated conditions.

Equipment manufactured by JFM Engineering meets this requirement because it is characterized by very accurate and very stable current. Current stability is either +/- 0.1A, +/- 10mA or, +/- 2mA, depending on the power capability of the Charger-Analyzer.

Verification of performance requires an external measurement of the current, with an ammeter or shunt having accuracy better than 1%.

Constant Voltage:

Lead-Acid batteries require that charge be performed under constant voltage conditions, with an initial current under a specified maximum value.

Constant Voltage means that the voltage of the battery will be maintained at the specified value by continuously adjusting (reducing) the charge current.

Equipment manufactured by JFM Engineering meets this requirement because in the Constant Voltage Mode, the charge current starts at the specified maximum value and remains constant until the battery reaches the specified voltage at which time the current is continuously adjusted to maintain the required battery voltage.

The transition point is approximately 0.5V to 0.25V under the selected voltage. This provides a very efficient bulk charge operation.

Verification of performance requires an external measurement of the current and an external measurement of the battery voltage.

[1] CMM: Component Maintenance Manual
[2] OMM: Operation and Maintenance Manual

Special Test Modes:

Some batteries, usually small packs, require a resistive load for capacity testing, as opposed to the constant current loading that is specified for most batteries. This requires that an external, high power resistor be connected to the battery terminals.

Some of the models manufactured by JFM Engineering perform this test with an electronic emulation of the load resistor. The operator needs only to enter the required value of load resistance and a microprocessor continuously calculates the value of the current. This, results in a more accurate test without the difficulties associated with having to provide a suitable load resistor.

Verification of Performance requires to program a value of test resistance, to connect to a power supply, and at different voltages observe the resulting current which must adhere to the basic calculation $I = V/R$

Voltage Settings:

Most tests involve a measurement of the battery voltage that is used to determine pass/fail conditions as in Capacity Testing and Charge Overvoltage, or operational conditions such as Constant Voltage Charging and Charge Termination at a peak voltage.

Equipment manufactured by JFM Engineering meets this requirement because it uses precision circuits and high accuracy voltage references to control the tests performed.

Verification of Performance requires that an external variable supply be used to simulate battery voltages and to measure such voltages with a precision voltmeter to determine the accuracy of the voltage performance.

REVISION	DATE	NOTES
V1	23 October 2014	Preliminary writing
V2	29 October 2014	First Release