



Concorde Battery Corporation
2009 San Bernardino Road
West Covina, California, USA 27106

RG-129

24 VOLT 3.8 Ah, VALVE REGULATED, LEAD-ACID, AIRCRAFT BATTERY

DECLARATION OF DESIGN PERFORMANCE

TO THE REQUIREMENTS OF

RTCA DO-293 and IEC60952

Applications: Emergency Aircraft Battery

NOTE: Applications may not be a complete list of all applications for this battery type.

The item or Technical Data contained herein has been reviewed and approved for general release on the basis that it contains no Export-controlled information.

Characteristic	RTCA DO-293 IEC 60952	Requirement/Performance	Test Report / Reference
Description	<p>The RG-129 is a 24 volt, 3.8 ampere hour, valve regulated lead-acid aircraft storage battery.</p> <p>The battery consists of two parallel strings of twelve 2 volt cells connected in series. The individual cells are enclosed by an epoxy fuse coated aluminum container and cover. The battery hold down is accomplished by 4 bolts that pass through the housing and anchor into the aircraft structure. The electrolyte is a sulfuric acid and water solution and is absorbed within the battery plates and separators. There is no free electrolyte. See Material Safety Data Sheet for hazardous material identification and precautions.</p> <p>The RG-129 is equipped with heater blankets for improved cold performance. Heater blankets are interwoven between the cells and operate when the battery temperature is below 15°C. The heater blankets are connected through the primary electrical connector and operate on 28 VDC. Heaters are controlled by redundant military specification snap action thermal switches which open on rising temperature, removing the heater blankets from the power source. Heater blanket insulation is Kapton.</p>		
Format	IEC 60952-2	Concorde Drawing No. RG-129	
Connector	IEC 60952-2	The battery has a circular connector conforming to MS3122E14-5S	
Mass		5.1 Kg (11.2 lbs) Max.	
Charging method	IEC 60952-1, 4.3	Constant potential at 28.25 V	
Any auxiliary requirement:		The battery is equipped with internal electric resistance heaters and their controls. If heaters are used, DC power must be supplied to pin C of the connector. The battery is equipped with one input/output that is not current limited and one output that is current limited to 7.5A by a circuit breaker internal to the battery assembly. See schematic on drawing RG-129.	
Ventilation	DO-293, 1.9 IEC 60952-2	N/A	
Flammability	IEC 60952-2	Outer container is fire resistant	
Unspillability		Non spill	
Electrical Performance			
Rated Capacity	DO-293, 2.2.2 IEC 60952-1, 5.1.1	3.8 Ah	
Capacity at -18°C	DO-293, 2.2.3 IEC 60952-1, 5.1.2	2.5 Ah	
Capacity at -30°C	DO-293, 2.2.4 IEC 60952-1, 5.1.3	2.0 Ah	
Capacity at +50°C	DO-293, 2.2.5 IEC 60952-1, 5.1.4	4.3 Ah	
Power Rating +23°C	DO-293, 2.2.6.1 IEC 60952-1, 5.2.1.1	N/A, for engine starting batteries only	
Power Rating -18°C	DO-293, 2.2.6.2 IEC 60952-1, 5.2.1.2	N/A, for engine starting batteries only	
Power Rating -30°C	DO-293, 2.2.6.3 IEC 60952-1, 5.2.1.3	N/A, for engine starting batteries only	
Rapid Discharge Capacity at 23°C	DO-293, 2.3.1 IEC 60952-1, 5.3.1	N/A, output limited by circuit breaker.	

Characteristic	RTCA DO-293 IEC 60952	Requirement/Performance	Test Report / Reference
Rapid Discharge Capacity at -30°C	DO-293, 2.3.2 IEC 60952-1, 5.3.2	N/A, output limited by circuit breaker.	
Charge Retention	DO-293, 2.4 IEC 60952-1, 5.4	23°C - Rating value for design = 95%	
		50°C - Rating value for design = 75%	
Storage	DO-293, 2.5 IEC 60952-1, 5.5	DO-293 - Completed 1 year storage life test. Battery delivers 100% of rated capacity after 1 year storage.	
Charge Stability	DO-293, 2.6 IEC 60952-1, 5.6, Class I	OK. Max battery temperature on charge = 50.3°C. Charge current fell during the entire charge period. Capacity at end of test was greater than the C ₁ rate	
Short-circuit Current	DO-293, 2.7 IEC 60952-1, 5.7	Circuit breaker tripped as designed.	
Charge Acceptance	DO-293, 2.8 IEC 60952-1, 5.8	+23°C = 103%	
		-18°C = 126%	
		-40°C = 275%	
Insulation Resistance	DO-293, 2.9.1 IEC 60952-1, 5.9.1	The sample successfully met the test requirements.	
Dielectric Strength	DO-293, 2.9.2 IEC 60952-1, 5.9.2	The sample successfully met the test requirements.	
Duty Cycle Performance	DO-293, 2.10 IEC 60952-1, 5.10	N/A	
Water Consumption	DO-293, 2.11 IEC 60952-1, 5.11	N/A	
Overcharge Endurance	DO-293, no requirement IEC 60952-1, 5.12	Not tested.	
Cyclic Endurance	DO-293, 2.12 IEC 60952-1, 5.13	100 cycles completed.	
Deep Discharge	DO-293, 2.13 IEC 60952-1, 5.14	The sample successfully met the evaluation criteria.	
Induced Destructive Overcharge	DO-293, 2.14 IEC 60952-1, 5.15	The sample successfully met the evaluation criteria.	
Electrical Emissions	DO-293, 2.15 IEC 60952-1, 5.16	N/A, battery contains no active electronics.	
Environmental Performance			
Vibration	DO-293, 3.1 IEC 60952-1, 6.1	Tested and qualified to DO-160D, Category S, Curve C. Tested and qualified to the Initial Resonance Search IAW DO-293.	
Acceleration	DO-293, no requirement IEC 60952-1, 6.2	Not tested	
Operational Shock	DO-293, 3.3.1 IEC 60952-1, 6.3, Class I	Tested and qualified to DO-160D, Category B.	
Crash Safety Shock	DO-293, 3.3.2 IEC 60952-1, 6.3	Tested and qualified to DO-160D, Category B, impulse.	

Characteristic	RTCA DO-293 IEC 60952	Requirement/Performance	Test Report / Reference
		Tested and qualified to the sustained shock test in Table 7-1 of DO-160E, Aircraft type 5 at a sustained acceleration level of 20g's in each axis including inverted.	
Explosion Containment	DO-293, 3.4 IEC 60952-1, 6.4	Tested and successfully met the test requirements IAW DO-293.	
Altitude	DO-293, 3.5 IEC 60952-1, 6.6	Tested to 20,621m (67,654 ft) IAW DO-293. The test article successfully met all test requirements.	
Rapid Decompression	DO-293, 3.5.2 IEC 60952 no requirement	Tested from 2,300m (8,000 ft) to 20,621m (67,654 ft) IAW DO-293. The test article successfully met all test requirements.	
Temperature Shock	DO-293, 3.6 IEC 60952-1, 6.7	RG-129 was tested IAW DO-293. The sample successfully met all test requirements.	
Fungus Resistance	DO-293, 3.7 IEC 60952-1, 6.8	DO-160E Category F. All samples successfully met the test requirements.	
Humidity	DO-293, 3.8 IEC 60952-1, 6.9	Tested and qualified to DO-160D, Category C.	
Fluid Contamination	DO-293, 3.9 IEC 60952-1, 6.10	<p>Test was performed on representative material samples.</p> <p>Fluids tested:</p> <p>Fuels. All samples successfully met the test requirement.</p> <ul style="list-style-type: none"> Aviation Jet A fuel Aviation piston engine fuel (100LL AVGAS) <p>Hydraulic fluids</p> <ul style="list-style-type: none"> Mineral based (MIL-H-5606) Non-mineral based synthetic (MIL-PRF-83282 and MIL-PRF-87257) <p>Lubricating oils</p> <ul style="list-style-type: none"> Mineral based (MIL-L-6081) Ester based synthetic (MIL-L-23699) Internal combustion engine SAE 15W40 <p>Solvents and cleaning fluids</p> <ul style="list-style-type: none"> Isopropyl alcohol (TT-I-735) Denatured alcohol <p>De-icing fluid</p> <ul style="list-style-type: none"> Ethylene Glycol Propylene Glycol AMS 1424 (SAE AEA Type I) AMS 1428 (SAE AEA Type II) <p>Insecticides - none</p> <p>Sullage - none</p> <p>Disinfectants (heavy duty phenolics) - none</p> <p>Coolant dielectric fluid - none</p> <p>Fire extinguishants - none</p>	
Salt Spray	DO-293, 3.10 IEC 60952-1, 6.11	Tested and qualified to DO-160E, Category S, IAW DO-293.	
Physical Integrity at High Temperature	DO-293, 3.11 IEC 60952-1, 6.12	The sample successfully met the test requirements.	

Characteristic	RTCA DO-293 IEC 60952	Requirement/Performance	Test Report / Reference
Flammability	DO-293, 3.12 IEC 60952-1, 6.13	Not tested. See Page 2	
Electrolyte Resistance	DO-293, 3.13 IEC 60952-1, 6.14	All components met the specification requirements.	
Thermal Sensors	DO-293, 3.13 IEC 60952-1, 6.15	All samples successfully met the test requirements.	
Component Qualification tests	DO-293, 3.14 IEC 60952-1, 6.16	All components successfully met the test requirements.	
Battery Airtightness	DO-293, no requirement IEC 60952-1, 6.17	N/A	
Cell Baffle	DO-293, no requirement IEC 60952-1, 6.18	N/A, applies only to nickel-cadmium batteries only.	
Strength of Receptacle	DO-293, 3.15 IEC 60952-1, 6.19	N/A, connector strength dictated by military specification for connector.	
Handle Strength	DO-293, 3.16 IEC 60952-1, 6.20	N/A, no handles	

N/A = Not Applicable

Authentication:

Manufacturer. Concorde Battery Corporation.

Signed:
Name of signatory: John B. Timmons, PE
Title or Function: Vice President Engineering