Concorde Battery Corporation

2009 San Bernardino Road
West Covina, California, USA 91790

RG-427

24 VOLT 34 Ah, VALVE REGULATED, LEAD-ACID, AIRCRAFT BATTERY

DECLARATION OF DESIGN PERFORMANCE

TO THE REQUIREMENTS OF

RTCA DO-293 and IEC 60952-1

Applications: Engine Starting and Emergency Power
NOTE: Applications may not be a complete list of all applications for this battery type.

Characteristic	RTCA DO-293 IEC 60952-1	Requirement/Performance	Test Report / Reference
Description	The RG-427 is a 24 volt valve regulated lead-acid aircraft battery designed for engine starting and emergency power. The battery consists of 4 identical monoblocks in a series/parallel arrangement providing 24 volts. All monoblocks are constructed of a one piece plastic container and cover which are secured together with an epoxy cement. The monoblocks are housed within an epoxy fuse-coated aluminum container and cover. The cover is attached to the container with high retention rivets. The battery hold down is incorporated into the outer housing. Vent tubes are incorporated into the outer container walls. The RG-427 is fitted with an MS3509 conforming receptacle. 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. The RG-427 battery conforms to Concorde envelope drawing RG-427 and assembly drawing CB-00438. The RG-427 contains the identical monoblocks used in the construction of the RG-222 as well as an aluminum container and cover substantially similar to the RG-407. Therefore, the RG-427 is considered qualified to many environmental and electrical tests based on these similarities with an equivalent level of safety.		
Format	IEC 60952-2	Concorde Drawing No. RG-427	
Connector	IEC 60952-2	The battery is available with a Type Q terminal conforming to MS-3509.	
Mass		RG-427 – 35.8 kg Max (79 lbs).	
Charging method	IEC 60952-1, 4.3	Constant potential at 28.25 V	
Any auxiliary requirement:		None	
Ventilation	DO-293, 1.9 IEC 60952-2	Battery is equipped with vent tubes	
Flammability	IEC 60952-2	RG-427 outer container is fire resistant.	
Spillability		Non spill	
Electrical Performance			
Rated Capacity (C1)	DO-293, 2.2.2 IEC 60952-1, 5.1.1	34 Ah	
Capacity at –18°C	DO-293, 2.2.3 IEC 60952-1, 5.1.2	17.0 Ah when discharged at the C1 rate.	
Capacity at –30°C	DO-293, 2.2.4 IEC 60952-1, 5.1.3	12.0 Ah when discharged at the C1 rate.	
Capacity at +50°C	DO-293, 2.2.5 IEC 60952-1, 5.1.4	34.0 Ah when discharged at the C1 rate.	
Power Rating +23°C	DO-293, 2.2.6.1 IEC 60952-1, 5.2.1.1	Ipp = 1800 A, Ipr = 1200 A	
Power Rating -18°C	DO-293, 2.2.6.2 IEC 60952-1, 5.2.1.2	Ipp = 1325 A, Ipr = 650 A	

Characteristic	RTCA DO-293 IEC 60952-1	Requirement/Performance	Test Report / Reference
Power Rating -30°C	DO-293, 2.2.6.3 IEC 60952-1, 5.2.1.3	Ipp = 1025 A, Ipr = 500 A	
Rapid Discharge Capacity at 23°C	DO-293, 2.3.1 IEC 60952-1, 5.3.1	18.0 Ah when discharged at 10 times the C1 rate to 10 volts.	
Rapid Discharge Capacity at -30°C	DO-293, 2.3.2 IEC 60952-1, 5.3.2	5.0 Ah when discharged at 10 times the C1 rate to 10 volts.	
Charge Retention	DO-293, 2.4 IEC 60952-1, 5.4	+23/C - Rating value for design = 90 %	
		+50/C - Rating value for design = 50 %	
Storage	DO-293, 2.5 IEC 60952-1, 5.5	DO-293 - 1 year storage life test successfully completed.	
Charge Stability	DO-293, 2.6 IEC 60952-1, 5.6, Class I	OK. Max battery temperature on charge = 50°C. Charge current fell during the entire charge period. Capacity at end of test > C1 After storage for 12 months: OK. Max battery temperature on charge = 50.4°C. Charge current fell during the entire charge period. Capacity at end of test > C1	
Short-circuit Current	DO-293, 2.7 IEC 60952-1, 5.7	Peak current = 3628 A Last recorded current = 765 A at 5.3 sec	
Charge Acceptance	DO-293, 2.8 IEC 60952-1, 5.8	+23/C = 97%	
		-18/C (battery with heaters only) N/A	
		-40/C (battery with heaters only) N/A	
Insulation Resistance	DO-293, 2.9.1 IEC 60952-1, 5.9.1	All samples successfully met the test requirements.	
Dielectric Strength	DO-293, 2.9.2 IEC 60952-1, 5.9.2	All samples successfully met the test requirements.	
Duty Cycle Performance	DO-293, 2.10 IEC 60952-1, 5.10	100 cycles successfully completed.	
Water Consumption Test	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 successfully completed.	

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Deep Discharge	DO-293, 2.13 IEC 60952-1, 5.14	After sitting in a discharged condition for 4 weeks: Battery recovered 99 % of its initial capacity. After storage for 12 months: After sitting in a discharged condition for 4 weeks: Battery recovered 100 % of its initial capacity.	
Induced Destructive Overcharge	DO-293, 2.14 IEC 60952-1, 5.15	All test requirements were successfully met.	
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	Qualified to DO-293 and DO-160E, random vibration test per Curve C, section 8, 1 hour per axis.	
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	Qualified to DO-293 and DO-160E, Category B	
Crash Safety Shock	DO-293, 3.3.2 IEC 60952-1, 6.4	Qualified to DO-293 and DO-160E, Category B, impulse and sustained. Sustained per DO-160E Table 7-1, Aircraft type 5, Test type R, 20g's in each orientation.	
Explosion Containment	DO-293, 3.4 IEC 60952-1, 6.5	Qualified to DO-293 and DO-160E. All test requirements were met.	
Altitude	DO-293, 3.5 IEC 60952-1, 6.6	Tested to 20621m (67654 ft) IAW DO-293.	
Rapid Decompression	DO-293, 3.5.2 IEC 60952 no reqmt	Tested from 2300m (8000 ft) to 20621m (67654 ft) IAW DO-293.	
Temperature Shock	DO-293, 3.6 IEC 60952-1, 6.7	Tested from +85°C to -55°C IAW DO-293. Sample successfully met the test requirements.	
Fungus Resistance	DO-293, 3.7 IEC 60952-1, 6.8	Component test. All components have been qualified to DO-293 and DO-160E Category F.	
Humidity	DO-293, 3.8 IEC 60952-1, 6.9	Qualified to DO-293 and DO-160E, Category B.	

Characteristic	RTCA DO-293 IEC 60952-1	Requirement/Performance	Test Report / Reference
Fluid Contamination	DO-293, 3.9 IEC 60952-1, 6.10	Component test. Test was performed on representative material samples. All samples successfully met the test requirements. Fluids tested: Fuels. Aviation Jet A fuel Aviation piston engine fuel (100LL AVGAS) Hydraulic fluids Mineral based (MIL-H-5606) Non-mineral based synthetic (MIL-PRF-83282 and MIL-PRF-87257) Lubricating oils Mineral based (MIL-L-6081) Ester based synthetic (MIL-L-23699) Internal combustion engine SAE 15W40 Solvents and cleaning fluids Isopropyl alcohol (TT-I-735) Denatured alcohol De-icing fluid Ethylene Glycol Propylene Glycol AMS 1424 (SAE AEA Type I) AMS 1428 (SAE AEA Type VI) Insecticides - none Sullage - none Disinfectants (heavy duty phenolics) - none Coolant dielectric fluid - none Fire extinguishants - none	
Salt Spray	DO-293, 3.10 IEC 60952-1, 6.11	Qualified to DO-293 and DO-160E, Category S.	
Physical Integrity at High Temperature	DO-293, 3.11 IEC 60952-1, 6.12	Qualified to DO-293. Sample successfully met the test requirements.	
Flammability	DO-293, no requirement IEC 60952-1, 6.13	Not tested. See Section 1	
Electrolyte Resistance	DO-293, 3.12 IEC 60952-1, 6.14	Component test. All components successfully met the test requirements.	
Thermal Sensors	DO-293, 3.13 IEC 60952-1, 6.15	N/A	
Component Qualification tests	DO-293, 3.14 IEC 60952-1, 6.16	Component test. All components successfully met the test requirements.	
Battery Airtightness	DO-293, no requirement IEC 60952-1, 6.17	N/A	

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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	OK	
Handle Strength	DO-293, 3.16 IEC 60952-1, 6.20	OK	

N/A = Not Applicable

Authentication:

Manufacturer. Concorde Battery Corporation

John B. Timmons, PE

Digitally signed by John B. Timmons, PE
DN: cn=John B. Timmons, PE, o=Concorde Battery Corporation, ou=Vice President Engineering, email=jtimmons@concordebattery.com, c=US
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Signed: ……
Name of signatory: John B. Timmons, PE
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