Concorde Battery Corporation

2009 San Bernardino Road
West Covina, California, USA 27106

RG-350 and RG-355

24 VOLT 17 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.

The data/information contained herein has been reviewed and approved for general release on the basis that this document contains no export-controlled information

Characteristic	RTCA DO-293 IEC 60952-1	Requirement/Performance	Test Report / Reference
Description	The RG-350 and RG-355 are 24 volt valve regulated lead acid batteries designed for engine starting and emergency power. The batteries consist of two MB12-17AA monoblocs connected in series. Each monobloc is made of a polypropylene container and cover. The monoblocs are connected in series. The RG-350 and RG-355 each house the complete monobloc assembly in an aluminum container and cover. The cover is attached to the container with high retention rivets. The batteries are integrated with a polypropylene handle assembly fitted around the cover. The RG-350 and RG-355 are fixed with foot style hold downs integrated at both ends of the battery. Both batteries are fitted with male threaded post terminals and have two perforated vent areas machined into each side of the container for ventilation. 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-350 and RG-355 are electrically identical to the RG-222, electrical testing conducted on the RG-222 is considered representative of the RG-350 and RG-355 batteries. Many environmental test results from the RG-222 are also considered representative of the RG-350 and RG-355 batteries due to similarities in material and construction. For a complete analysis of the test battery to the RG-222 and a summary of test results which may be considered representative see Concorde Report CB021709-1.		
Format	IEC 60952-2	Concorde Drawing No. RG-350 Concorde Drawing No. RG-355	
Connector	IEC 60952-2	The RG-350 and RG-355 are fabricated with male threaded post terminals.	
Mass		RG-350 - 18.6 kg Max (41 lbs). RG-355 - 18.8 kg Max (41.5 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	The RG-350 and RG-355 have two perforated vent areas machined into each side of the container for ventilation.	
Flammability	IEC 60952-2	The outer container and cover are fire resistant	
Spillability		Non spill	
Electrical Performance			
Rated Capacity (C1)	DO-293, 2.2.2 IEC 60952-1, 5.1.1	17 Ah	
Capacity at –18°C	DO-293, 2.2.3 IEC 60952-1, 5.1.2	11.0 Ah when discharged at the C1 rate.	
Capacity at –30°C	DO-293, 2.2.4 IEC 60952-1, 5.1.3	8.0 Ah when discharged at the C1 rate.	
Capacity at +50°C	DO-293, 2.2.5 IEC 60952-1, 5.1.4	18.0 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 = 900 A, Ipr = 625 A	

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Power Rating -18°C	DO-293, 2.2.6.2 IEC 60952-1, 5.2.1.2	Ipp = 600 A, Ipr = 425 A	
Power Rating -30°C	DO-293, 2.2.6.3 IEC 60952-1, 5.2.1.3	Ipp = 450 A, Ipr = 300 A	
Rapid Discharge Capacity at 23°C	DO-293, 2.3.1 IEC 60952-1, 5.3.1	10.0 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	3.5 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 in process	
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 charge period. Capacity at end of test > C1	
Short-circuit Current	DO-293, 2.7 IEC 60952-1, 5.7	Peak current = 1832 A Last recorded current = 850 A at 3.8s	
Charge Acceptance	DO-293, 2.8 IEC 60952-1, 5.8	+23 C = 103% -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	The RG-350 and RG-355 successfully met the test requirement.	
Dielectric Strength	DO-293, 2.9.2 IEC 60952-1, 5.9.2	The RG-350 and RG-355 successfully met the test requirement.	
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.	
Deep Discharge	DO-293, 2.13 IEC 60952-1, 5.14	The RG-350 and RG-355 successfully met the test requirement.	
Induced Destructive Overcharge	DO-293, 2.14 IEC 60952-1, 5.15	The RG-350 and RG-355 successfully met the test requirement.	
Electrical Emissions	DO-293, 2.15 IEC 60952-1, 5.16	N/A Batteries contains no active electronics.	

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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. The RG-350 and RG-355 successfully met the test requirement.	
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. The RG-350 and RG-355 successfully met the test requirement.	
Fungus Resistance	DO-293, 3.7 IEC 60952-1, 6.8	Qualified to DO-293 and DO-160E Category F. All samples successfully met the test requirement.	
Humidity	DO-293, 3.8 IEC 60952-1, 6.9	Qualified to DO-293 and DO-160E, Category B	

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Fluid Contamination	DO-293, 3.9 IEC 60952-1, 6.10	Test was performed on representative material samples. All samples successfully met the test requirement. 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	The RG-350 and RG-355 successfully met the test requirement.	
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	All samples met the specification 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	All components successfully met the test requirement.	
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
Reason: I am approving this document
Date: 2010.04.13 14:27:32 -07'00'

Signed: ……
Name of signatory: John B. Timmons, PE
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