Concorde Battery Corporation

2009 San Bernardino Road
West Covina, California, USA 91790

RG24-15, RG24-15M & RG24-16

24 VOLT 13.6 Ah, VALVE REGULATED, LEAD-ACID, AIRCRAFT BATTERY

DECLARATION OF DESIGN PERFORMANCE

TO THE REQUIREMENTS OF

RTCA DO-293A and IEC60952-1

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 RG24-15, RG24-15M and RG24-16 are 24 volt 13.6 Ah valve regulated lead-acid batteries designed for engine starting and emergency power. Each battery consist of twelve 2 volt cells connected in series, and terminates in a female forged brass threaded terminal. The cells are enclosed by a one piece plastic monoblock container and a plastic one piece top which are secured together with an epoxy cement. The monoblock and top are made of high-impact polypropylene. A cover(s) is attached to the plastic top to restrict access. The battery(s) are equipped with a pressure relief vent valve on each cell. The difference between each model are in the one piece plastic covers. *RG24-15M:* The RG24-15M is a manifolded battery that incorporates a vent tube in the manifold and a hold down integrated into the over cover. The hold down is molded as part of the over cover. There is no handle provided. The RG24-15M essentially duplicates the configuration and hold down of the Cessna C614002 including the vented manifold for direct substitution for the flooded electrolyte battery *RG24-15:* The RG24-15 hold down attachment points and a rope handle assembly are incorporated into the cover/over cover. The hold down bar is a separate metal piece that may be used in two locations. *RG24-16:* The RG24-16 hold down attachment points and a rope handle assembly are incorporated into the basic cover. The hold down bar is a separate metal piece that may be used in one location. The vent valves are protected by two raised wells with over covers. The RG24-16 essentially duplicates the configuration and hold down of the Cessna C614001. 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.		
Format	IEC 60952-2	Concorde Drawing No. RG24-15 RG24-15M RG24-16	
Connector	IEC 60952-2	The battery is available with female threaded terminals.	
Mass		RG24-15 – 29.5 lbs (13.4 kg) Max. RG24-15M – 29.5 lbs (13.4 kg) Max. RG24-16 – 29.5 lbs (13.4 kg) Max.	
Charging method	IEC 60952-1, 4.3	Constant potential at 28.25 VDC ± 0.25 VDC	
Any auxiliary requirement:		None	
Ventilation	DO-293, 1.9 IEC 60952-2	The RG24-15 and RG24-16 are not vented. The RG24-15M has a vent tube.	
Flammability	IEC 60952-2	Flammable	
Spillability		Non spill	

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Electrical Performance			
Rated Capacity (C1)	DO-293, 2.2.2 IEC 60952-1, 5.1.1	13.6 Ah	
Capacity at –18°C	DO-293, 2.2.3 IEC 60952-1, 5.1.2	10.0 Ah when discharged at the C_1 rate	
Capacity at –30°C	DO-293, 2.2.4 IEC 60952-1, 5.1.3	7.5 Ah when discharged at the C_1 rate.	
Capacity at +50°C	DO-293, 2.2.5 IEC 60952-1, 5.1.4	13.6 Ah when discharged at the C_1 rate.	
Power Rating +23°C	DO-293, 2.2.6.1 IEC 60952-1, 5.2.1.1	Ipp = 1025 A, Ipr = 625 A	
Power Rating -18°C	DO-293, 2.2.6.2 IEC 60952-1, 5.2.1.2	Ipp = 600 A, Ipr = 400 A	
Power Rating -30°C	DO-293, 2.2.6.3 IEC 60952-1, 5.2.1.3	Ipp = 450 A, Ipr = 275 A	
Rapid Discharge Capacity at 23°C	DO-293, 2.3.1 IEC 60952-1, 5.3.1	8.5 Ah when discharged at 10 times the C_1 rate to 10 volts.	
Rapid Discharge Capacity at -30°C	DO-293, 2.3.2 IEC 60952-1, 5.3.2	3.0 Ah when discharged at 10 times the C_1 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 = 75%	
Storage	DO-293, 2.5 IEC 60952-1, 5.5	DO-293A Storage test in process.	
Charge Stability	DO-293, 2.6 IEC 60952-1, 5.6, Class I	Ok. Max battery temperature on charge = 55.5/C. Charge current fell during the charge period. Capacity at tend of test > 13Ah.	
Short-circuit Current	DO-293, 2.7 IEC 60952-1, 5.7	Peak current = 2500A Last recorded current = 319A at 6.88s	
Charge Acceptance	DO-293, 2.8 IEC 60952-1, 5.8	+23/C = 106% -18/C (battery with heaters only) N/A -30/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.	

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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 sample successfully met the test requirements.	
Induced Destructive Overcharge	DO-293, 2.14 IEC 60952-1, 5.15	The sample successfully met the test requirements.	
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	The RG24-15M has been tested to the requirements of 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	The RG24-15M has been tested to the requirements of DO-160E, Category B.	
Crash Safety Shock	DO-293, 3.3.2 IEC 60952-1, 6.4	The RG24-15M has been tested to the requirements of DO-160E, Category B, impulse and sustained. Sustained shocks 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	RG24-15M is Qualified to DO-293 and DO-160E. RG24-15 and RG24-16 - N/A	
Altitude	DO-293, 3.5 IEC 60952-1, 6.6	Tested and qualified to 20621m (67654 ft) in accordance with DO-293.	
Rapid Decompression	DO-293, 3.5.2 IEC 60952 no reqmt	Tested and qualified to 20621m (67654 ft) in accordance with DO-293.	
Temperature Shock	DO-293, 3.6 IEC 60952-1, 6.7	Tested from +85°C to -55°C in accordance with DO-293. The RG24-16 successfully met the test requirement. .	
Fungus Resistance	DO-293, 3.7 IEC 60952-1, 6.8	DO-160E Category F. Test was performed on representative material samples. 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	

Characteristic	RTCA DO-293 IEC 60952-1	Requirement/Performance	Test Report / Reference
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	CB020107-1 27363-0716526
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 sample successfully met the test requirements.	
Flammability	DO-293, no requirement IEC 60952-1, 6.13	Not tested.	
Electrolyte Resistance	DO-293, 3.12 IEC 60952-1, 6.14	Component test. All samples successfully met the test requirements.	CB020107-1
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 samples successfully met the test requirements.	CB020107-1

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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	
Handle Strength	DO-293, 3.16 IEC 60952-1, 6.20	RG24-15 and RG24-16 were tested. Samples met requirements. RG24-15M - N/A	

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=Senior Vice President, email=jtimmons@concordebattery.com, c=US
Reason: I am approving this document
Date: 2017.04.19 09:46:45 -04'00'

Signed: ……

Name of signatory: John B. Timmons, PE

Title or Function: Senior Vice President Engineering