



## **Concorde Battery Corporation**

2009 San Bernardino Road  
West Covina, California, USA 27106

### **RG-49 Series**

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
<b>Description</b>	<p>The RG-49 is a 24 volt valve regulated lead acid battery designed for engine starting and emergency power.</p> <p>The battery consists of two MB12-17AA monoblocs connected in series. Each monobloc is made of a polypropylene container and cover. The monoblocs are connected in series.</p> <p>The RG-49 houses a complete monobloc assembly in an aluminum container and cover. The battery cover is attached to the container with high retention rivets. The battery is integrated with a polypropylene handle assembly fitted around the cover. The RG-49 is manufactured with two metal foot brackets affixed to the battery container at the bottom of each side. These brackets are welded to the container. The RG-49 has vent tubes integrated into the container. The RG-49 is fabricated with a terminal receptacle conforming to MS3509.</p> <p>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-49 is electrically identical to the RG-222, electrical testing conducted on the RG-222 is considered representative of the RG-49 battery. Many environmental test results from the RG-222 are also considered representative of the RG-49 battery 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.</p>		
Format	IEC 60952-2	Concorde Drawing No. RG-49	
Connector	IEC 60952-2	The RG-49 is fitted with a Type Q terminal conforming to MS-3509.	
Mass	RG-49 - 19.1 kg Max (42 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-49 is equipped with vent tubes.	
Flammability	IEC 60952-2	The outer container and cover are fire resistant	
Spillability	Non spill		
<b>Electrical Performance</b>			
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	I <sub>pp</sub> = 900 A, I <sub>pr</sub> = 625 A	
Power Rating -18°C	DO-293, 2.2.6.2 IEC 60952-1, 5.2.1.2	I <sub>pp</sub> = 600 A, I <sub>pr</sub> = 425 A	

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Power Rating -30°C	DO-293, 2.2.6.3 IEC 60952-1, 5.2.1.3	I <sub>pp</sub> = 450 A, I <sub>pr</sub> = 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-49 successfully met the test requirement.	
Dielectric Strength	DO-293, 2.9.2 IEC 60952-1, 5.9.2	The RG-49 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-49 successfully met the test requirement.	
Induced Destructive Overcharge	DO-293, 2.14 IEC 60952-1, 5.15	The RG-49 successfully met the test requirement.	
Electrical Emissions	DO-293, 2.15 IEC 60952-1, 5.16	N/A Battery contains no active electronics.	

Characteristic	RTCA DO-293 IEC 60952-1	Requirement/Performance	Test Report / Reference
<b>Environmental Performance</b>			
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-49 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-49 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	

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	
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-49 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	

