Concorde Battery Corporation

2009 San Bernardino Road
West Covina, California, USA 27106

RG-400E/13

24 VOLT 13 Ah, VALVE REGULATED, LEAD-ACID, AIRCRAFT BATTERY

DECLARATION OF DESIGN PERFORMANCE

TO THE REQUIREMENTS OF

RTCA DO-293 and IEC 60952-1

Applications: Fixed and Rotary Wing Aircraft, Fuselage Mounted
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-400E/13 is a 24 volt, 13 ampere hour, valve regulated lead-acid aircraft storage battery. The RG-400E/13 battery consists of twelve 2 volt cells connected in series. The cells are enclosed by a one piece plastic monoblock container and a plastic one piece top which is secured to the monoblock with an epoxy cement. The monoblock and top are made of high-impact polypropylene. The monoblock is contained within a molded plastic outer container with a molded plastic cover which incorporates the hold down. 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. RG-400E/13	
Connector	IEC 60952-2	The battery is available with a Type Q terminal conforming to MS-3509.	
Mass		RG-400E/13 – 16.6 kg Max.	
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-400E/13 outer container is flammable	
Spillability		Non spill	
Electrical Performance			
Rated Capacity (C1)	DO-293, 2.2.2 IEC 60952-1, 5.1.1	13 Ah	
Capacity at –18°C	DO-293, 2.2.3 IEC 60952-1, 5.1.2	6.5 Ah when discharged at the C1 rate.	
Capacity at –30°C	DO-293, 2.2.4 IEC 60952-1, 5.1.3	4.0 Ah when discharged at the C1 rate.	
Capacity at +50°C	DO-293, 2.2.5 IEC 60952-1, 5.1.4	14.5 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 = 950 A, Ipr = 250 A	
Power Rating -18°C	DO-293, 2.2.6.2 IEC 60952-1, 5.2.1.2	Ipp = 615 A, Ipr = 125 A	
Power Rating -30°C	DO-293, 2.2.6.3 IEC 60952-1, 5.2.1.3	Ipp = 400 A, Ipr = 100 A	
Rapid Discharge Capacity at 23°C	DO-293, 2.3.1 IEC 60952-1, 5.3.1	6.3 Ah when discharged at 10 times the C1 rate to 10 volts.	

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Rapid Discharge Capacity at -30°C	DO-293, 2.3.2 IEC 60952-1, 5.3.2	2.0 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 = 80%	
		+50 C - Rating value for design = 75%	
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 = 51°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 = 1940A Last recorded current = 515A at 8.6s	
Charge Acceptance	DO-293, 2.8 IEC 60952-1, 5.8	+23 C = 100%	
		-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 requirement.	
Dielectric Strength	DO-293, 2.9.2 IEC 60952-1, 5.9.2	All samples successfully met the test requirement.	
Duty Cycle Performance	DO-293, 2.10 IEC 60952-1, 5.10	All samples successfully met the test requirement.	
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	
Deep Discharge	DO-293, 2.13 IEC 60952-1, 5.14	All samples successfully met the test requirement.	
Induced Destructive Overcharge	DO-293, 2.14 IEC 60952-1, 5.15	All samples successfully met the test requirement.	
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	Random vibration test per Curve C, section 8, DO-160E, 1 hour per axis.	R4088
Acceleration	DO-293, no requirement IEC 60952-1, 6.2	Not tested	

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Operational Shock	DO-293, 3.3.1 IEC 60952-1, 6.3, Class I	Category B, DO-160E – OK	R4146
Crash Safety Shock	DO-293, 3.3.2 IEC 60952-1, 6.4	Category B, DO-160E, Category B, impulse and sustained – OK. Sustained per DO-160E Table 7-1, Aircraft type 5, Test type R, 20g's in each orientation.	R4146
Explosion Containment	DO-293, 3.4 IEC 60952-1, 6.5	All samples 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	RG-400E/13 tested from +85°C to -55°C IAW DO-293. Sample successfully met the test requirement.	
Fungus Resistance	DO-293, 3.7 IEC 60952-1, 6.8	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	CB020107-1 27363-0716526
Salt Spray	DO-293, 3.10 IEC 60952-1, 6.11	Qualified to DO-293 and DO-160E, Category S.	13489
Physical Integrity at High Temperature	DO-293, 3.11 IEC 60952-1, 6.12	All samples 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 successfully met the test requirement.	
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 samples 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	All samples successfully met the test requirement.	
Handle Strength	DO-293, 3.16 IEC 60952-1, 6.20	N/A	

N/A = Not Applicable

Authentication:

Manufacturer. **Concorde Battery Corporation**

John B. Timmons, PE

Digitally signed by John B. Timmons, PE
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