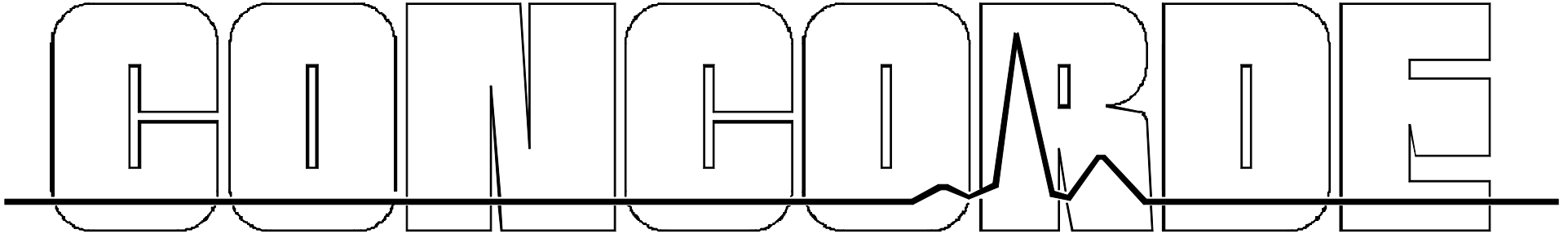


... the heart of your system. ®



Concorde Battery Corporation

**2009 San Bernardino Road
West Covina, California, USA 27106**

RG-390E Series

24 VOLT 28.0 Ah, VALVE REGULATED, LEAD-ACID, AIRCRAFT BATTERY

DECLARATION OF DESIGN PERFORMANCE

TO THE REQUIREMENTS OF

RTCA DO-293 and IEC60952

Applications: Engine Starting and Emergency Power

NOTE: Applications may not be a complete list of all applications for this battery type.

The item or Technical Data contained herein has been reviewed and approved for general release on the basis that it contains no Export-controlled information.

Characteristic	Part / Clause	Requirement/Performance	Test Report / Reference
Description		<p>The RG-390E series of batteries are designed for engine starting and emergency power. Within this series of batteries there are four types. All of the battery types are electrically identical. The battery monoblock portion of each assembly is essentially mechanically identical. The RG-390ES version has vent tubes that have been machined (shortened and threaded) to accept a pipe thread connection. Two of the versions, the 'L' and the 'LS', are encased in an outer housing of either fusecoated aluminum (L) or stainless steel (LS). The outer housings provide the assembly with increased protection from fire with the aluminum housing being flame resistant and the stainless steel housing being fire proof. The metal cased batteries also provide an aperture for the mounting of a temperature sensor if required by the aircraft configuration.</p> <p>Each monoblock used in all types consists of 12 series connected cells. The cells are enclosed by a one piece plastic container and a plastic one piece cover which is secured to the container with an epoxy cement. The container and cover are made of high-impact polypropylene. Each monoblock is equipped with an integrally molded quick disconnect connector dimensionally conforming to MS3509.</p> <p>The outer housing of the basic battery and the 'ES' version is the injection molded polypropylene plastic monoblock. The battery assembly is fitted with a fuse coated aluminum cover. The battery hold down is incorporated into the outer cover.</p> <p>The outer housing of the 'L' series battery is a fuse coated aluminum container and cover. The battery hold down is incorporated into the outer housing.</p> <p>The outer housing of the 'LS' series battery is a stainless steel container and cover. The battery hold down is incorporated into the outer housing.</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>	
Format	IEC 60952-2	Concorde Drawing Nos. RG-390E, RG-390ES and RG-390E/L(S)	
Connector	IEC 60952-2	The battery is equipped with an IEC Type Q (MS3509) connector	
Mass		RG-390E - 28.1 Kg (62.0 lbs) Max RG-390ES - 28.1 Kg (62.0 lbs) Max RG-390E/L - 28.1 Kg (62.0 lbs) Max RG-390E/LS - 29.0 Kg (64.0 lbs) Max	
Charging method	IEC 60952-1, 4.3	Constant potential at 28.25 VDC \pm 0.25 VDC	
Any auxiliary requirement:	N/A	The RG-390E/L and /LS series batteries are equipped with a mounting plate for the attachment of a temperature sensor.	
Ventilation	DO-293, 2.2.2 IEC 60952-2	All battery types are equipped with vent tubes.	
Flammability	IEC 60952-2	RG-390E and ES series outer container is flammable. RG-390E/L series outer container is fire resistant. RG-390E/LS series outer container is fire proof.	
Unspillability		Non spill	
Electrical Performance			
Rated Capacity (C ₁)	DO-293, 2.2.2 IEC 60952-1, 5.1.1	28 Ah	

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Capacity at -18°C	DO-293, 2.2.3 IEC 60952-1, 5.1.2	18 Ah	
Capacity at -30°C	DO-293, 2.2.4 IEC 60952-1, 5.1.3	13 Ah	
Capacity at +50°C	DO-293, 2.2.5 IEC 60952-1, 5.1.4	30 Ah	
Power Rating +23°C	DO-293, 2.2.6.1 IEC 60952-1, 5.2.1.1	I _{pp} = 1350 A I _{pr} = 950 A	
Power Rating -18°C	DO-293, 2.2.6.2 IEC 60952-1, 5.2.1.2	I _{pp} = 1025 A I _{pr} = 800 A	
Power Rating -30°C	DO-293, 2.2.6.3 IEC 60952-1, 5.2.1.3	I _{pp} = 800 A I _{pr} = 600 A	
Rapid Discharge Capacity at 23°C	DO-293, 2.3.1 IEC 60952-1, 5.3.1	12.5 Ah	
Rapid Discharge Capacity at -30°C	DO-293, 2.3.2 IEC 60952-1, 5.3.2	6 Ah	
Charge Retention	DO-293, 2.4 IEC 60952-1, 5.4	23°C - Rating value for design = 90 %	
		50°C - Rating value for design = 80 %	
Storage	DO-293, 2.5 IEC 60952-1, 5.5	Testing in progress	
Charge Stability	DO-293, 2.6 IEC 60952-1, 5.6, Class I	Max battery temperature on charge = 50°C. Charge current fell during the entire charge period. Capacity at end of test was greater than the C ₁ rate.	
Short-circuit Current	DO-293, 2.7 IEC 60952-1, 5.7	Battery met all test requirements: Peak current: 3344 A Avg. Last Current: 1471 A at 6.2 sec	
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	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 cycle requirement successfully completed.	
Water Consumption	DO-293, 2.11 IEC 60952-1, 5.11	N/A, applies to flooded electrolyte batteries only.	
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 cycle requirement successfully completed.	

Characteristic	Part / Clause	Requirement/Performance	Test Report / Reference
Deep Discharge	DO-293, 2.13 IEC 60952-1, 5.14	All test requirements were met.	
Induced Destructive Overcharge	DO-293, 2.14 IEC 60952-1, 5.15	All test requirements were 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	Subjected to the random vibration test per Curve C, section 8 of DO-160E, 1 hr per axis. All batteries met the vibration test requirements.	
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	Subjected to Category B, of DO-160. All batteries met the Operational Shock test requirements.	
Crash Safety Shock	DO-293, 3.3.2 IEC 60952-1, 6.3	Subjected to Category B, DO-160. All batteries met the crash safety test requirements.	
Explosion Containment	DO-293, 3.4 IEC 60952-1, 6.4	All batteries met the test requirements.	
Altitude	DO-293, 3.5 IEC 60952-1, 6.6	Tested to 20,621m (67,654 ft).	
Rapid Decompression	DO-293, 3.5.2 IEC 60952 no requirement	Tested from 2,300m (8,000 ft) to 20,621m (67,654 ft).	
Temperature Shock	DO-293, 3.6 IEC 60952-1, 6.7	All batteries met the test requirements.	
Fungus Resistance	DO-293, 3.7 IEC 60952-1, 6.8	DO-160E Category F. All samples successfully met the test requirements.	
Humidity	DO-293, 3.8 IEC 60952-1, 6.9	Tested to DO-160, Category B. All batteries met the test requirements.	

Characteristic	Part / Clause	Requirement/Performance	Test Report / Reference
Fluid Contamination	DO-293, 3.9 IEC 60952-1, 6.10	<p>Test was performed on representative material samples. All samples successfully met the test requirements.</p> <p>Fluids tested:</p> <p>Fuels.</p> <ul style="list-style-type: none"> Aviation Jet A fuel Aviation piston engine fuel (100LL AVGAS) <p>Hydraulic fluids</p> <ul style="list-style-type: none"> Mineral based (MIL-H-5606) Non-mineral based synthetic (MIL-PRF-83282 and MIL-PRF-87257) <p>Lubricating oils</p> <ul style="list-style-type: none"> Mineral based (MIL-L-6081) Ester based synthetic (MIL-L-23699) Internal combustion engine SAE 15W40 <p>Solvents and cleaning fluids</p> <ul style="list-style-type: none"> Isopropyl alcohol (TT-I-735) Denatured alcohol <p>De-icing fluid</p> <ul style="list-style-type: none"> Ethylene Glycol Propylene Glycol AMS 1424 (SAE AEA Type I) AMS 1428 (SAE AEA Type II) <p>Insecticides - none Sullage - none Disinfectants (heavy duty phenolics) - none Coolant dielectric fluid - none Fire extinguishants - none</p>	
Salt Spray	DO-293, 3.10 IEC 60952-1, 6.11	Tested to DO-160 category S. All batteries successfully met the test requirements.	
Physical Integrity at High Temperature	DO-293, 3.11 IEC 60952-1, 6.12	All batteries met the test requirements.	
Flammability	DO-293, 3.12 IEC 60952-1, 6.14	Not tested. See section 1.	
Electrolyte Resistance	DO-293, 3.13 IEC 60952-1, 6.15	All components 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 met the specification requirements.	
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.	

