



## **Concorde Battery Corporation**

2009 San Bernardino Road  
West Covina, California, USA 91790

### **RG-390E/25 Series**

**24 VOLT 25.0 Ah, VALVE REGULATED, LEAD-ACID, AIRCRAFT BATTERY**

### **DECLARATION OF DESIGN PERFORMANCE**

**TO THE REQUIREMENTS OF  
RTCA DO-293, DO-293A and IEC 60952**

**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/25 series of batteries are designed for engine starting and emergency power. Within this series of batteries there are five types. All of the battery types are electrically identical. The battery monoblock portion of each assembly is essentially mechanically identical. The RG-390E/25S and RG-390E/25LP versions have 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 fuse coated 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.</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 'S' 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' and 'LP' 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 No's. RG-390E/25, RG-390E/25S, RG-390E/25L(S) and RG-390E/25LP	
Connector	IEC 60952-2	The battery is equipped with an IEC Type Q (MS3509) connector	
Mass		RG-390E/25 - 24.0 Kg (53.0 lbs) Max RG-390E/25S - 24.0 Kg (53.0 lbs) Max RG-390E/25L - 24.9 Kg (55.0 lbs) Max RG-390E/25LS - 25.9 Kg (57.0 lbs) Max RG-390E/25LP - 25.2 Kg (55.5 lbs) Max	
Charging method	IEC 60952-1, 4.3	Constant potential at 28.25 VDC " 0.25 VDC	
Any auxiliary requirement:	N/A	The RG-390E/25L, LP and /LS series batteries are equipped with a mounting plate for the attachment of a temperature sensor.	
Ventilation	DO-293A, 2.2.2 IEC 60952-2	All battery types are equipped with vent tubes.	
Flammability	IEC 60952-2	RG-390E/25 and RG-390E/25S series outer container is flammable. RG-390E/25L and RG-390E/25LP series outer container is fire resistant. RG-390E/25LS series outer container is fire proof.	
Unspillability		Non-spill	

Characteristic	Part / Clause	Requirement/Performance	Test Report/ Reference
<b>Electrical Performance</b>			
Rated Capacity (C <sub>1</sub> )	DO-293A, 2.2.2 IEC 60952-1, 5.1.1	25 Ah	
Capacity at -18EC	DO-293A, 2.2.3 IEC 60952-1, 5.1.2	14 Ah	
Capacity at -30EC	DO-293A, 2.2.4 IEC 60952-1, 5.1.3	9 Ah	
Capacity at +50EC	DO-293A, 2.2.5 IEC 60952-1, 5.1.4	30 Ah	
Power Rating +23EC	DO-293A, 2.2.6.1 IEC 60952-1, 5.2.1.1	I <sub>pp</sub> = 1000 A I <sub>pr</sub> = 650 A	
Power Rating -18EC	DO-293A, 2.2.6.2 IEC 60952-1, 5.2.1.2	I <sub>pp</sub> = 750 A I <sub>pr</sub> = 600 A	
Power Rating -30EC	DO-293A, 2.2.6.3 IEC 60952-1, 5.2.1.3	I <sub>pp</sub> = 550 A I <sub>pr</sub> = 450 A	
Rapid Discharge Capacity at 23EC	DO-293A, 2.3.1 IEC 60952-1, 5.3.1	13 Ah	
Rapid Discharge Capacity at -30EC	DO-293A, 2.3.2 IEC 60952-1, 5.3.2	4 Ah	
Charge Retention	DO-293A, 2.4 IEC 60952-1, 5.4	23EC - Rating value for design = 90 %	
		50EC - Rating value for design = 70 %	
Storage	DO-293A, 2.5 IEC 60952-1, 5.5	Testing in progress.	
Charge Stability	DO-293A, 2.6 IEC 60952-1, 5.6, Class I	Max battery temperature on charge = 52°C. Charge current fell during the entire charge period. Capacity at end of test was greater than the C <sub>1</sub> rate.	
Short-circuit Current	DO-293A, 2.7 IEC 60952-1, 5.7	Peak Current: 1430.5 A Last Recorded Current: 631.5 A at 11.1 sec	
Charge Acceptance	DO-293A, 2.8 IEC 60952-1, 5.8	+23°C = 101 %	
		-18°C (battery with heaters only) N/A	
		-40°C (battery with heaters only) N/A	
Insulation Resistance	DO-293A, 2.9.1 IEC 60952-1, 5.9.1	All samples successfully met the test requirement	
Dielectric Strength	DO-293A, 2.9.2 IEC 60952-1, 5.9.2	All samples successfully met the test requirement	
Duty Cycle Performance	DO-293A, 2.10 IEC 60952-1, 5.10	100 cycles successfully completed	
Water Consumption	DO-293A, 2.11 IEC 60952-1, 5.11	N/A, applies to flooded electrolyte batteries only.	

Characteristic	Part / Clause	Requirement/Performance	Test Report/Reference
Overcharge Endurance	DO-293A, no requirement IEC 60952-1, 5.12	Not tested	
Cyclic Endurance	DO-293A, 2.12 IEC 60952-1, 5.13	100 cycles successfully completed	
Deep Discharge	DO-293A, 2.13 IEC 60952-1, 5.14	The RG-390E/25 Series successfully met the test requirements.	
Induced Destructive Overcharge	DO-293A, 2.14 IEC 60952-1, 5.15	The RG-390E/25 Series successfully met the test requirements.	
Electrical Emissions	DO-293A, 2.15 IEC 60952-1, 5.16	N/A, battery contains no active electronics.	
<b>Environmental Performance</b>			
Vibration	DO-293A, 3.1 IEC 60952-1, 6.1	The RG-390E/25 Series met the qualification requirements per RTCA/DO-293A.	
Acceleration	DO-293A, no requirement IEC 60952-1, 6.2	Not tested	
Operational Shock	DO-293A, 3.3.1 IEC 60952-1, 6.3, Class I	The RG-390E/25 Series met the qualification requirements per RTCA/DO-293A.	
Crash Safety Shock	DO-293A, 3.3.2 IEC 60952-1, 6.3	The RG-390E/25 Series met the qualification requirements per RTCA/DO-293A.	
Explosion Containment	DO-293A, 3.4 IEC 60952-1, 6.4	The RG-390E/25 Series met the qualification requirements per RTCA/DO-293A.	
Altitude	DO-293A, 3.5 IEC 60952-1, 6.6	The RG-390E/25 Series met the qualification requirements per RTCA/DO-293A.	
Rapid Decompression	DO-293A, 3.5.2 IEC 60952 no requirement	The RG-390E/25 Series met the qualification requirements per RTCA/DO-293A.	
Temperature Shock	DO-293A, 3.6 IEC 60952-1, 6.7	The RG-390E/25 Series met the qualification requirements per RTCA/DO-293A.	
Fungus Resistance	DO-293A, 3.7 IEC 60952-1, 6.8	All samples successfully met the test requirement.	
Humidity	DO-293A, 3.8 IEC 60952-1, 6.9	The RG-390E/25 Series met the qualification requirements per RTCA/DO-293A.	
Fluid Contamination	DO-293A, 3.9 IEC 60952-1, 6.10	Test was performed on representative material samples. All samples successfully met the test requirement. <b>Fluids tested:</b> 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)	

Characteristic	Part / Clause	Requirement/Performance	Test Report/Reference
		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 II) Insecticides - none Sullage - none Disinfectants (heavy duty phenolics) - none Coolant dielectric fluid - none Fire extinguishants - none	
Salt Spray	DO-293A, 3.10 IEC 60952-1, 6.11	The RG-390E/25 Series met the qualification requirements per RTCA/DO-293A.	
Physical Integrity at High Temperature	DO-293A, 3.11 IEC 60952-1, 6.12	The RG-390E/25 Series met the qualification requirements per RTCA/DO-293A.	
Flammability	DO-293A, 3.12 IEC 60952-1, 6.14	Not tested. See section 1.	
Electrolyte Resistance	DO-293A, 3.13 IEC 60952-1, 6.15	Component test. All components successfully met the test requirements.	
Thermal Sensors	DO-293A, 3.13 IEC 60952-1, 6.15	N/A	
Component Qualification tests	DO-293A, 3.14 IEC 60952-1, 6.16	Component test. All components successfully met the test requirements.	
Battery Airtightness	DO-293A, no requirement IEC 60952-1, 6.17	N/A	
Cell Baffle	DO-293A, no requirement IEC 60952-1, 6.18	N/A, applies only to nickel-cadmium batteries only.	
Strength of Receptacle	DO-293A, 3.15 IEC 60952-1, 6.19	Ok.	
Handle Strength	DO-293A, 3.16 IEC 60952-1, 6.20	Ok.	

N/A = Not Applicable

**Authentication:**

Manufacturer: Concorde Battery Corporation.

Signed: .....  
Name of Signatory: John B. Timmons, PE  
Title or Function: Senior Vice President Engineering