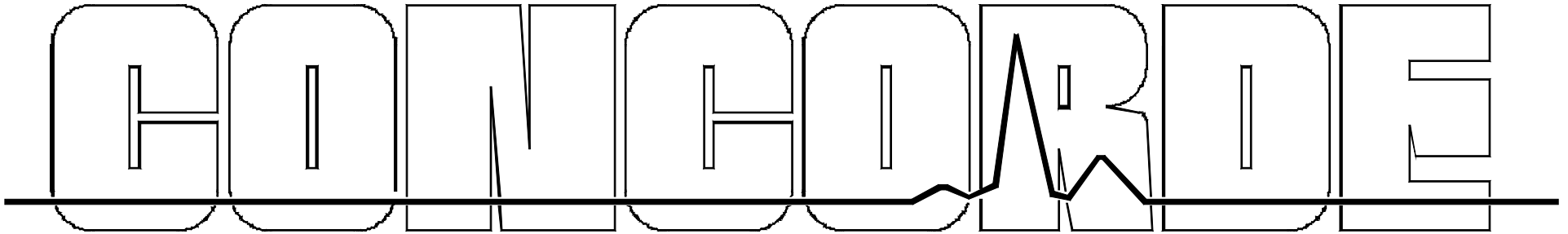


... the heart of your system. ®



Concorde Battery Corporation

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

RG-380E/40 Series

24 VOLT 38.0 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-380E/40B Series is a 24 volt, 38 Ah, valve regulated lead-acid aircraft storage battery. This series of batteries consists of a basic battery and a variety of outer packaging assemblies.</p> <p>The basic RG-380E/40 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 cover of the battery is an epoxy fuse coated aluminum and 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.</p> <p>The RG-380E/40L and RG-380E/40K incorporate the RG-380E/40B battery into an outer housing that is an epoxy fuse coated aluminum fire resistant container and cover. The battery hold down is incorporated into the outer housing.</p> <p>The RG-380E/40LS and the RG-380E/40KS incorporate the RG-380E/40B battery into an outer housing that is a stainless steel fire proof container and cover. The battery hold down is incorporated into the outer housing.</p> <p>The RG-380E/40 series batteries are mechanically identical to the RG-380E/44 series batteries except for the size of the battery plates in each group. All other components of both series of batteries are identical. Several environmental tests performed on the RG-380E/44 series are considered applicable to the RG-380E/40 series. Similarly, the D8565/15-1 battery is similar to the RG-380E/40B except for the same difference in battery plate size and military markings. The basic RG-380E/40B is sufficiently similar to the D8565/15-1 battery that several military specification qualification tests performed on the D8565/15-1 battery are considered applicable to the RG-380E/44. The D8565/15-1 is a Qualified Product Listed to Mil-B-8565.</p>	
Format	IEC 60952-2	Concorde Drawing No. RG-380E/40B, RG-380E/40L and RG-380E/40K	
Connector	IEC 60952-2	The battery is equipped with an IEC Type Q (MS3509) connector	
Mass		RG-380E/40B - 36.7 Kg (81.0 lbs) Max RG-380E/40L - 38.1 Kg (84.0 lbs) Max RG-380E/40K - 38.1 Kg (84.0 lbs) Max RG-380E/40LS - 39.0 Kg (86.0 lbs) Max RG-380E/40KS - 39.0 Kg (86.0 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-380E/40L and /40LS series batteries are equipped with a mounting plate for the attachment of a temperature sensor.	
Ventilation	DO-293, 2.2.2 IEC 60952-2	RG-380E/40B battery is equipped with vent tubes. RG-380E/40K and /40KS batteries are equipped with vent louvers. RG-380E/40L and /40LS batteries are equipped with vent tubes.	
Flammability	IEC 60952-2	RG-380E/40B series outer container is flammable. RG-380E/40K and /40L series outer container is fire resistant. RG-380E/40KS and /40LS 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	38 Ah	

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Capacity at -18°C	DO-293, 2.2.3 IEC 60952-1, 5.1.2	29 Ah	
Capacity at -30°C	DO-293, 2.2.4 IEC 60952-1, 5.1.3	22 Ah	
Capacity at +50°C	DO-293, 2.2.5 IEC 60952-1, 5.1.4	40 Ah	
Power Rating +23°C	DO-293, 2.2.6.1 IEC 60952-1, 5.2.1.1	I _{pp} = 1350 A I _{pr} = 1050 A	
Power Rating -18°C	DO-293, 2.2.6.2 IEC 60952-1, 5.2.1.2	I _{pp} = 900 A I _{pr} = 750 A	
Power Rating -30°C	DO-293, 2.2.6.3 IEC 60952-1, 5.2.1.3	I _{pp} = 650 A I _{pr} = 550 A	
Rapid Discharge Capacity at 23°C	DO-293, 2.3.1 IEC 60952-1, 5.3.1	24 Ah	
Rapid Discharge Capacity at -30°C	DO-293, 2.3.2 IEC 60952-1, 5.3.2	11 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 = 60%	
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 = 50.5°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: 2662 A Last Current: 1859 A at 8 sec	
Charge Acceptance	DO-293, 2.8 IEC 60952-1, 5.8	+23°C = 99 %	
		-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	

Characteristic	Part / Clause	Requirement/Performance	Test Report / Reference
Cyclic Endurance	DO-293, 2.12 IEC 60952-1, 5.13	100 cycles requirement successfully completed.	
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. The sustained shocks were performed at an acceleration of 4g's in the up direction, 20g's in the down direction and 18g's in the forward, aft and sides for 3 sec in each direction. All batteries met the crash safety test requirements.	
Explosion Containment	DO-293, 3.4 IEC 60952-1, 6.4	All batteries met the 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 requirements.	
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	DO-160E Category B and Mil-B-8565J. 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 requirement.</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	Mil-B-8565J and 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 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.	

Characteristic	Part / Clause	Requirement/Performance	Test Report / Reference
Strength of Receptacle	DO-293, 3.15 IEC 60952-1, 6.19	Ok.	
Handle Strength	DO-293, 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: Vice President Engineering