...the heart of your system®

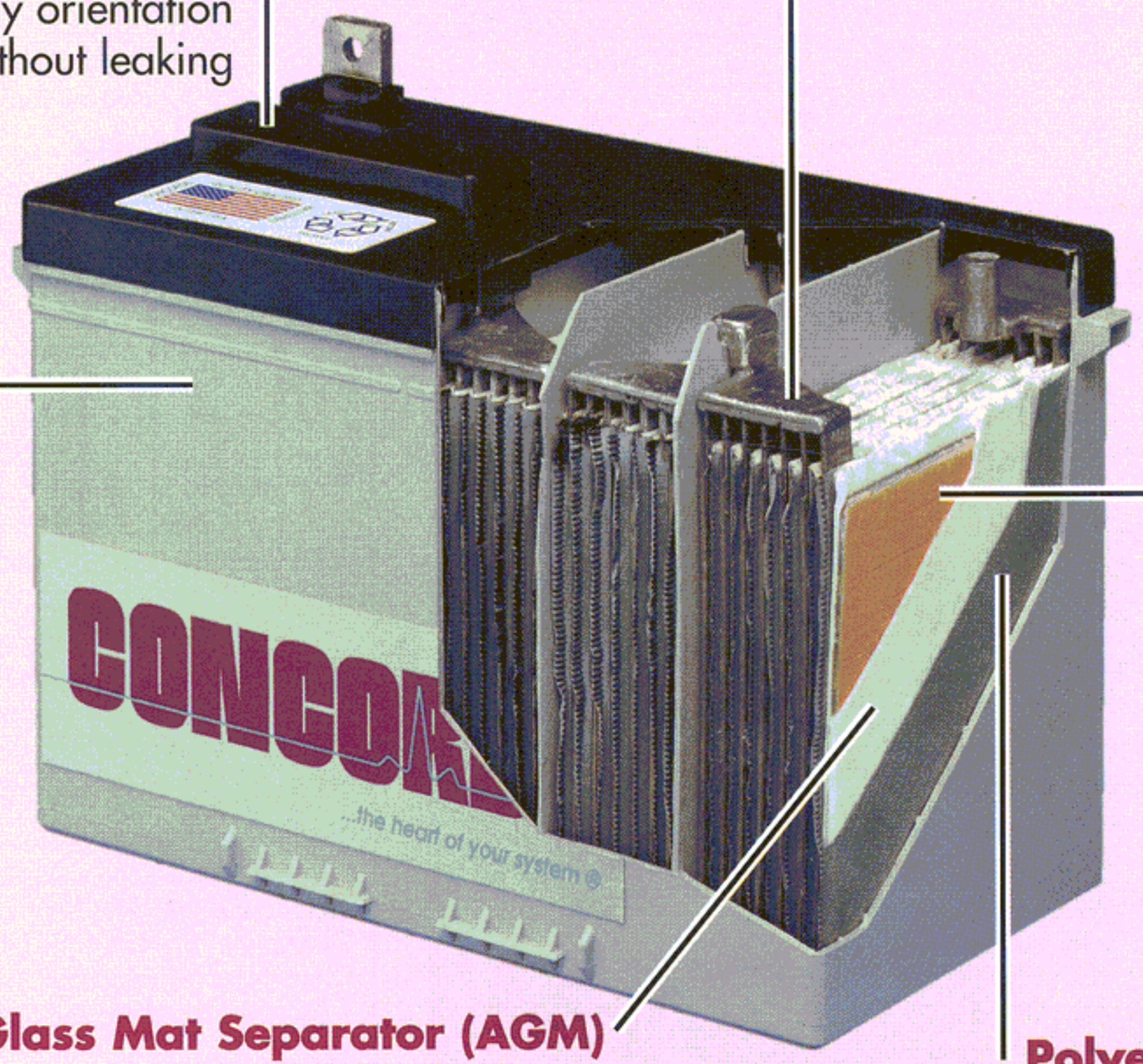
CONCORDE

Pressure Relief Safety Valves

Recombinant gas batteries are sealed and allow operation in any orientation without leaking

Heavy Duty Intercell Welds

- Low resistance cell interconnects
- Eliminates possibility of open welds



Durable Polypropylene Container and Cover

Thick Positive Plates

Designed for exceptional life

Absorbed Glass Mat Separator (AGM)

Provides ideal wicking characteristics for electrolyte retention

Polyethylene Envelope

Rugged construction provides puncture resistance, eliminating short circuits

Valve Regulated Lead Acid Batteries

TECH BRIEF

CONCORDE'S PROPRIETARY VALVE REGULATED LEAD ACID (VRLA) BATTERIES EMPLOY ABSORBED GLASS MAT (AGM) TECHNOLOGY

Since their introduction in 1986, the Concorde Battery Corporation has developed several VRLA-AGM designs for various application requirements. Concorde has a dedicated Research & Development Department that is continuously improving and refining their sealed VRLA product line. Formed in 1977, their factory was dedicated to manufacturing dry charged (vented/flooded electrolyte) batteries and gelled electrolyte batteries. Because of the development and industry acceptance of the new technology Concorde's production today is over 90% VRLA-AGM.

VENTED VS. VRLA BATTERIES – THE DIFFERENCE

Some of the main differences between the old vented lead acid batteries and the Valve Regulated Lead Acid batteries are:

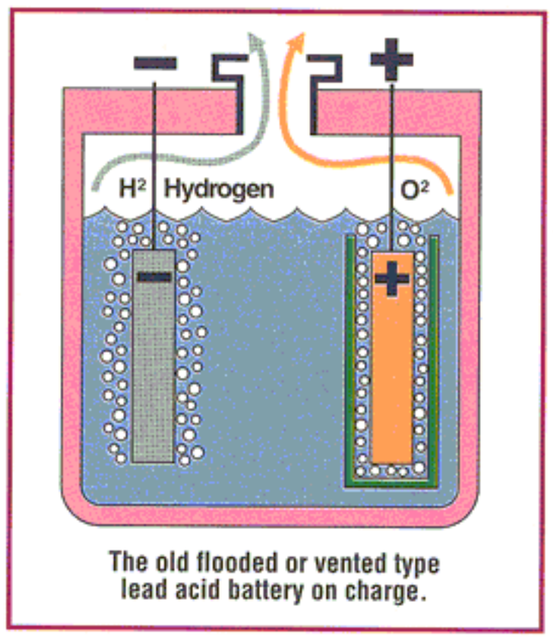
- The electrolyte is absorbed in a glass mat (AGM) separator in the VRLA and it is spillable in the flooded/vented type.
- The cells have pressure relief safety valves with flame arrestors in the VRLA batteries that are designed to keep positive pressure in each cell. The older flooded/vented type battery cells are open to the atmosphere through the vent cap holes. Should the vented battery be tilted or inverted the result can be electrolyte (sulfuric acid & water mixture) spilled all over your equipment, a highly corrosive and potentially dangerous condition.
- The cell groups in the old vented types are loosely packed and thus have high plate separation. In contrast, the VRLA has every square inch of positive and negative plate material tightly packed and compressed with the AGM and supported by each cell wall. Because of this type of construction the VRLA batteries have much lower internal resistance and obviously greater energy density. Additionally, this support provides a much higher degree of shock and vibration resistance than the old flooded types.
- The flooded electrolyte electric storage batteries consume water in service because the battery generates hydrogen from the negative plate and oxygen from the positive plate when on charge, a process known as electrolysis. During the electrolysis process the flooded battery can generate ignitable and explosive amounts of hydrogen gas into the air. Also, the hydrogen and oxygen gases that escape through the vent holes must be replaced periodically by adding water that is consumed.

HOW THEY WORK

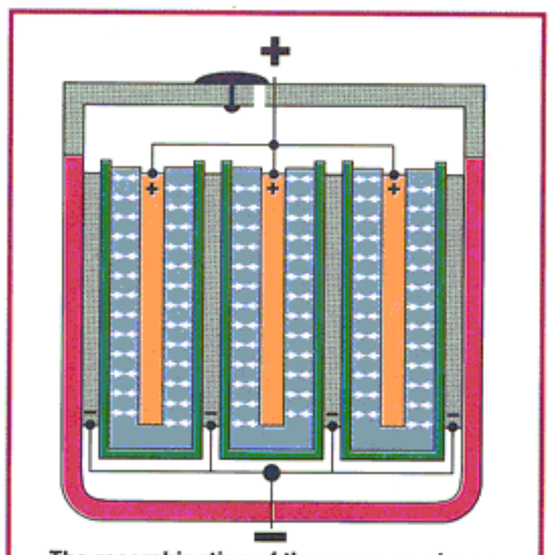
The Concorde VRLA design is a recombinant gas, absorbed electrolyte battery. The cells are sealed using pressure relief safety valves with flame arrestors that provide a positive pressure within the battery. The plates are sandwiched with a microfibrous silica glass mat consisting of a blend of glass fibers of varying length and diameter that have superior wicking characteristics and promote retention of the electrolyte. Electrolyte is absorbed and held by the capillary action between the fluid and the glass mat fibers. The mat is over 90% saturated with electrolyte. By design it is not totally saturated with electrolyte, a portion is filled with gas. This void space provides the channels by which oxygen travels in its path from the positive to the negative plate during charging. The void spaces allow the freshly generated gases, which are in their atomic state and very reactive, to recombine rapidly and safely. The recombination passivates the negative slightly, reducing electrolysis and ultimately eliminating the need to add water, which makes the battery truly maintenance free.

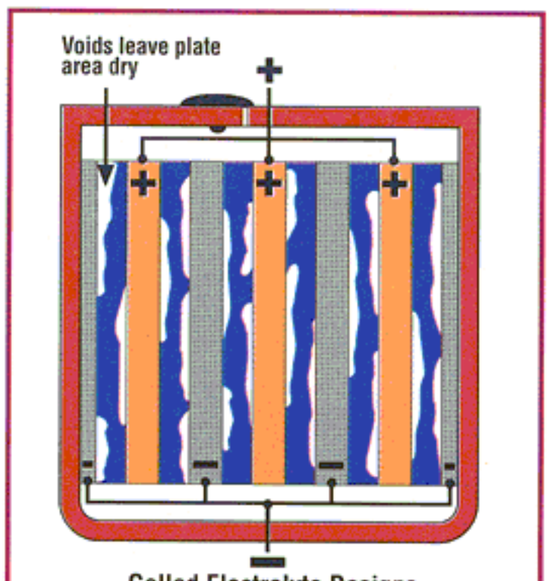
NOT A GELLED ELECTROLYTE

Until early 1988 Concorde's production included gelled electrolyte batteries. With the great success Concorde achieved with its VRLA-AGM development in aircraft batteries Concorde turned their attention to other applications including deep cycle and float designs. The new design offered significant improvements compared to the gel battery. The VRLA-AGM production batteries offered superior energy density and longer life over the gel batteries. Hence, since early 1988 all of Concordes' sealed battery production has utilized the VRLA-AGM technology.



The old flooded or vented type lead acid battery on charge.


The recombination of the gases on charge with the absorbed glass mat (AGM) design.



Gelled Electrolyte Designs

A major limitation of all gelled electrolyte batteries is the immobility of the electrolyte. These batteries are manufactured using a silica gell/acid mixture. The gelled electrolyte is highly viscous and recombination of the gases generated on charge occurs at a much slower rate than with the VRLA-AGM batteries. This effectively increases the time it takes to recharge a gel battery and limits the charging current. Further, the gel batteries lose capacity over their life. During the charge cycle minute voids develop within the gell matrix to allow passage of gases. However, because of the viscosity of the gelled electrolyte, these voids (channels) do not always refill. Over time these voids keep increasing in size and number. As these voids continue to increase, more and more plate surface area is left dry and unable to provide a path for ionic flow, progressively reducing the capacity of the gel battery.

CHARGE RETENTION

Concorde batteries retain charge five to ten times better than flooded/vented type batteries. Depending on the series selected self discharge is one to three percent per month.

SAFE

By design, Concorde VRLA-AGM batteries produce no more than 1% hydrogen gas during severe overcharge at elevated temperatures. In recent testing by the U.S. Navy the batteries were tested to MIL-B-8565J for hydrogen gas emission. For flammability in air a hydrogen concentration of 4.1% or greater is required. The Mil Spec. requires a concentration of 3.5% or less to pass the test. The Concorde VRLA-AGM products produced no more than 1% during test.

Further, Concorde's commercial VRLA Batteries have been tested by Underwriters Laboratories for compliance to UL 924 and UL 1989. The Concorde Batteries are a UL recognized system component.

RELIABLE

All Concorde Batteries are manufactured under stringent quality control procedures. Military aircraft manufacturers and the Defense Department have very high reliability requirements. Concorde is a MIL-I-45208 qualified manufacturing facility and also is certified to Aeronautics and Space, 14 CFR Part 21, Section 303, Federal Aviation Regulations.

D.O.T. - SHIPPING

Concorde VRLA-AGM Batteries have been tested by an independent laboratory to meet D.O.T. shipping requirements for hazardous materials, 49 CFR Section 173.159. The testing requirements of 173.159d permit the batteries to be shipped as a nonspillable wet electric storage battery and exempted from the hazardous materials category. Therefore no UN labels are required. Most Concorde VRLA batteries are not restricted for shipment by air or any other means of transportation.

RECYCLABLE

The Concorde VRLA-AGM Batteries may be recycled at any smelter that processes lead acid automobile batteries. Due to the Cadmium content used in their manufacturing process, some other VRLA manufacturers' batteries are limited as to where they can be recycled.

...the heart of your system®
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CONCORDE BATTERY CORPORATION
2009 San Bernardino Road • West Covina, California 91790 USA
Phone: (626) 813-1234 • (626) 813-1235
http://www.concordebattery.com