



Aircraft batteries
VARTA
safety plus power



The technology with more safety and power on board



manufacturing VARTA safety plus power

The world is becoming smaller. Aircrafts bridge thousands of kilometers in a matter of hours. Air routes connect entire continents. A failure of the airborne energy supply system can result in a catastrophe, vital instruments must be kept in constant operational readiness. This duty is performed by VARTA batteries manufactured by Hawker.

Construction

The cell is the basic component of the nickel cadmium battery, as with other accumulators, and consists of positive and negative electrodes, here in a sinter plate design, with separators, electrolyte, cell container and a vent.

A sintered metal structure, consisting of nickel powder with a porosity of about 80%, serves as a carrier for the active mass in the negative and positive electrodes. This structure is stiffened by means of a perforated nickel plated insert. The active material is introduced into the highly porous composite carrier in a liquid state with the positive electrodes being immersed in a nickel salt solution and the negative electrodes in a cadmium salt solution.

Extremely thin special separators segregate the positive and negative electrodes. One layer of the separators

is made up of a "gas barrier" which is very resistant to temperature and prevents thermal damage to the cell even at high ambient temperatures or excessive charging voltages - known in the industry as "Thermal run-away". The positive and negative electrodes are combined, with alternate layers of separators, into a plate bloc which has the appropriate terminals.

The cell container and cell cover are made of heat resistant plastic (Polyamide). Once the plate pack has been inserted, the container and cover are welded together by a special process to form a sealed unit.

Each cell is fitted with a special vent. This ensures that the gases produced during charging can escape when a certain pressure is reached, but also prevents the leakage of electrolyte if the battery is turned upside down.

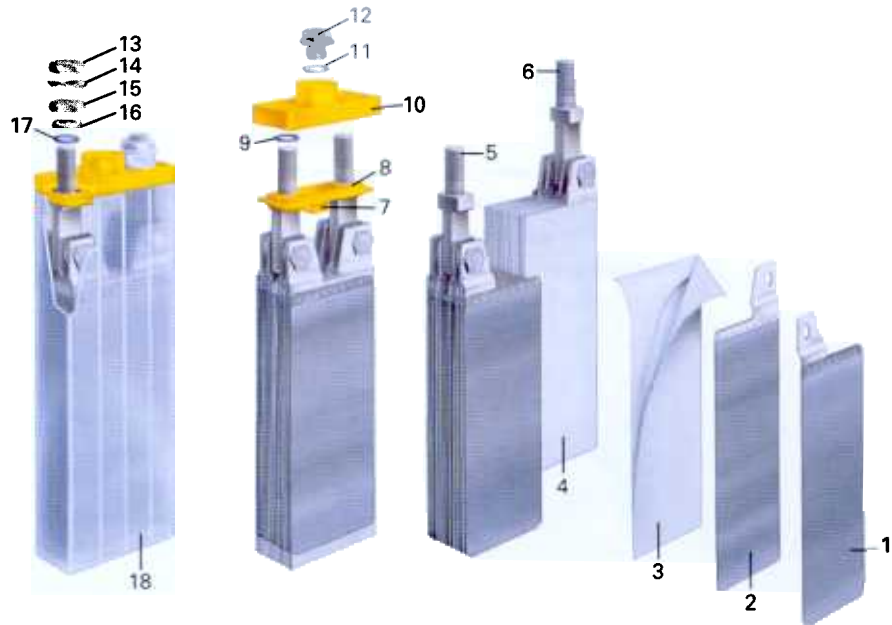


The right aircraft batteries for each application

The battery

The battery is normally made up of 20 cells, which are housed in a battery case. The battery container and cover and all hardware are made of stainless steel sheet.

The interior of the battery container is lined with heat resistant plastic plates. The cover is lined with a soft rubber seal which acts as a retainer for the cells. High conductivity nickel plated copper connectors are used for inter-cell connections. The battery is vented by means of tubes attached to its side. A plug mounted on the front of the battery container allows the battery be connected to the aircraft electrical system. All batteries can also be fitted with temperature sensors for thermal monitoring.



Design

- | | |
|-------------------------------|---------------------------|
| 1 Negative electrode | 10 Cell cover |
| 2 Positive electrode | 11 Sealing ring |
| 3 Separator | 12 Vent |
| 4 Plate block | 13 Nut |
| 5 Negative pole bolt | 14 Spring washer |
| 6 Positive pole bolt | 15 Nut |
| 7 Electrolyte level indicator | 16 Limiting cap |
| 8 Baffle | 17 Pole bolt sealing ring |
| 9 Pole bolt sealing ring | 18 Cell container |

Advantages

- Excellent power for APU starting in the temperature range -30°C to $+70^{\circ}\text{C}$: capable of high current discharge cause of the low inside resistance
- Excellent capacity for emergency: high capacity also at deep temperatures, quick rechargeable with constant voltage to 100% capacity
- Optimum charge acceptance during flight: a high charging current at the beginning by a constant voltage supply is the result of Hawker's special technology of thin electrodes with a very low internal resistance
- No "Thermal run-away": the use of a special separator material which is stable also against high temperatures give a high grad of safety, special overcharging tests (28,5 V/50 $^{\circ}\text{C}$ /50 h) show no defects to the separator material as well as to the complete cells
- Long lifetime at specified conditions: optimum storage conditions, temperature: $+10^{\circ}\text{C}$ to $+35^{\circ}\text{C}$, humidity: 45% to 75%
- Very low selfdischarge: cause of the special design of the cells with a high electrolyte level
- Long periods between maintenance: a less consumption of water and enough electrolyte for a long operating time, no decreasing of the useable capacity



Application

Hawker manufactures modern aircraft batteries based on great experience. VARTA batteries ensures efficient starting and reliability on board for the smallest private aircraft to the largest commercial aircraft, civil as military. All materials used are subject to stringent laboratory tests. Special quality controls

according to ISO 9001 ensure the constant quality of the product. VARTA safety plus power – made by Hawker – is the result of many years of research work. Where a perfect supply of power to all monitoring devices must be ensured. Where the function of all control instruments is vital. Where perfect starting behaviour, even under extreme conditions must be ensured.

Where it is vital to maintain radio communication. Then what is required in the newly developed VARTA NiCd aircraft battery to ensure that constant operational readiness is available at all times to give high power and extensive capacity. This battery complies with the highest requirements of airworthiness authorities as LBA, CAA and ARMAK.




Battery Designation	Type No. 334 ...	Standards Specification	Connector	Num. of cells	Rated voltage (V)	Cap. 1 h rate (Ah)	Dimensions			max. Weight (kg)	Max instantaneous peak power (+27°C/80°F) safety plus power	Cell type	Type No. 374 ...	Rated voltage (V)	Dimensions over top			max. Weight (kg)											
							Length (mm)	Width (mm)	Height (mm)						Length (mm)	Width (mm)	Height (mm)												
F 20/7 H1C-E2	9007 9000	IEC 952-1 IEC 952-2 MIL-B-26 220 C MIL-StD 810 C Phl. 56 101 A BS 3G 205 MS 24 496-2 MS 24 497-2 MS 24 498-2 DIN 29 831 DIN 29 832 DIN 29 834 DIN 29 998 VG 95 238 T2/ 8/10/15/24/29/ TS 20 320/15-25 AS 80 33 A DIN EN 60952-1 DIN EN 60952-2	special	20	24	7	325	145	130	12.5	8 kW	FP7H1C	3073 240	1.2	60	27	109.5	0.40											
F 20/15 H1C	9014 910						198	195	196	16.5							11.5 kW	FP15H1C	3152 240			0.65							
F 20/15 H1C-3	9015 940						368	124	200	16.5							11.8 kW	FP17H1C	3163 200	171.5	0.67								
F 20/17 H1C	9017 910						198	195	196	16.9																			
F 20/17 H1CT	9017 960									17.1																			
F 20/17 H1C-1	9017 920									16.9																			
F 20/17 H1CT2-1	9017 900									17.2																			
F 20/17 H1C-2	9017 930									17.0																			
F 20/17 H1CT-2	9017 950									17.1																			
F 20/17 H1C-3	9017 940						DPXB-8-33 s-0301			17.3																			
F 20/22 H1C-1	9022 900						special			23.5																			
F 20/22 H1C-2	9021 910									22																			
F 20/22 H1CT-A	9022 940									254							197	180	21.0										
F 20/25 H1C	9025 900									254							197	223.5	25.5										
F 20/25 H1C-B	9025 9000									25.6																			
F 20/25 H1CT	9025 910									25.7																			
F 20/25 H1CT 2	9025 920									25																			
20 FP 25 H1C-R	9025 940									363							174	226	24.5										
20 FP 25 H1CT-R	9025 950									254							248	204	27.5										
F 20/27 H1C	9027 920									27.6																			
F 20/27 H1CT 70	9027 910				20																								
F 20/27 H1C-T2	9027 940																												
F 20/27 H1C-E1	9027 900																												
F 20/27 H1CM	9027 960				363	168.5	218	28.0																					
F 20/27 H1CM1	9027 9600				479			28.5																					
F 20/27 H1CM2	9027 9601				466	186	237.5	28.6																					
F 20/27 H1CM3	9027 8000				480	190	220	29.5																					
20 FP 38 H1C-R	9038 900				495	174	226	35.0																					
20 FP 38 H1CT-R	9038 901				38																								
F 20/40 H1C	9040 910				254	248	262	36.4																					
F 20/40 H1CT	9040 9206							36.5																					
F 20/40 H1CT-3	9040 9209							36.6																					
F 20/40 H1CT2 (C)	9040 9203				40																								
F 20/40 H1CT2 (P)	9040 9201																												
F 20/40 H1C-E1 WT	9040 9000																												
F 20/40 H1C-E1	9040 900																												
F 20/44 H1C	9045 910				362	168.4	268	37.6																					
F 20/44 H1CT	9045 920				44																								
						254	248	262	37.5																				

voltage and electrolyte dens

electrolyte





Wherever in Europe you do business, Hawker can support you with motive power energy. The Hawker branded battery range, matched chargers and systems provide trouble free performance under the most demanding service conditions.

Our strategically located manufacturing plants are efficient and responsive with a culture of continuous improvement and added value for our business partners.

Hawker has an enviable position in technology leadership and with significant investment in research and development we intend to stay at the leading edge in product innovation. Hawker evolution batteries and Hawker HF chargers, Lifeplus and Powertech have set new standards in maintenance free solutions. Our team of development engineers is driven by the desire to build the best energy solutions and works closely with our customers and suppliers to identify development opportunities. Our bias for rapid innovation means we get new products to market fast.

Hawker's integrated sales and service network across Europe is dedicated to providing our customers with the best solutions and after-sales support for their business. Whether you require 1 battery or a complete fleet of batteries, chargers, a battery handling system and a state of the art fleet management system, you can count on us. As part of EnerSys Inc. the world's largest industrial battery manufacturer, we are dedicated to being the best.



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