



**Industrial Batteries (UK) Limited**

*Main distributor of Alcad Ni-Cd Batteries in the UK and suppliers of Battery Support Services*

**Industrial Batteries (UK) Limited**  
**Greenlands Business Centre**  
**Studley Road**

**Redditch, Worcestershire, B98 7HD**

**Tel: 01527 520052 Fax: 01527 520053**

**E-mail: sales@ibluk.co.uk**

**Web: www.ibluk.co.uk**

## Glossary of Battery Terms

**Accumulator** - A rechargeable battery or cell (see also Secondary battery).

**Ampere or Amp** - An Ampere or an Amp is a unit of measurement of an electrical current. One amp is the amount of current produced by an electromotive force of one volt acting through the resistance of one ohm. The abbreviation for Amp is A but its mathematical symbol is "I".

**Amp Hour or Ampere-Hour** - One amp hour (Ah) is equal to a current of one ampere flowing for one hour.

**Anode** - The negative electrode of a cell. The anode gives up electrons to the load circuit and dissolves into the electrolyte.

**Actual Capacity or Available Capacity** - The total battery capacity, usually expressed in Ah or mAh, available to perform work. The actual capacity of a particular battery is determined by a number of factors, including the cut-off voltage, discharge rate, temperature and method of charge and the life history of the battery.

**Battery** - An electrochemical device used to store energy. The term is usually applied to a group of two or more electric cells connected together electrically. In common usage, the term "battery" is also applied to a single cell, such as an AA battery.

**Battery Capacity** - The electric output of a cell or battery on a service test delivered before the cell reaches a specified final electrical condition, and may be expressed in Ah, Wh, or similar units. The capacity in Wh is equal to the capacity in Ah multiplied by the battery voltage.

**Battery Charger** - A device capable of supplying electrical energy to a battery.

**Battery-Charge Rate** - The current expressed in amperes (A) or milliamps (mA) at which a battery is charged.

**Cut-off Voltage, final** - The prescribed lower-limit voltage at which battery discharge is considered complete. The cut-off or final voltage is usually chosen so that the maximum useful capacity of the battery is realised.

**C** - Used to signify a charge or discharge rate equal to the capacity of a battery divided by 1 hour. Thus C for a 1600 mAh battery would be 1.6 A, C/5 for the same battery would be 320 mA and C/10 would be 160 mA. Because C is dependent on the capacity of a battery the C rate for batteries of different capacities must also be different.

**Capacity** - The capacity of a battery is a measure of the amount of energy that it can deliver in a single discharge. Battery capacity is normally listed as Ah (or mAh) or as Wh.

**Cathode** - The positive electrode of a voltaic cell. The electrode that, in effect, oxidises the anode or absorbs the electrons.

**Cell** - An electrochemical device, composed of positive and negative plates and electrolyte, which is capable of storing electrical energy. It is the basic "building block" of a battery.

**Charge Rate** - The amount of current applied to battery during the charging process. This rate is commonly expressed as a fraction of the capacity of the battery. For example, the C/2 or C/5.

**Charging** - The process of supplying electrical energy for conversion to stored chemical energy.

**Constant-Current Charge** - A charging process in which the current applied to the battery is maintained at a constant value.

**Constant-Voltage Charge** - A charging process in which the voltage applied to a battery is held at a constant value.

**Cycle** - One sequence of charge and discharge.

**Deep Cycle** - A cycle in which the discharge is continued until the battery reaches its cut-off voltage.

**Shallow Cycling** - Charge and discharge cycles which do not allow the battery to approach its cut-off voltage. Shallow cycling of 'sealed' Ni-Cd cells lead to "memory effect". This effect does not apply to 'open' industrial Ni-Cd cells.

**Cycle Life** - For rechargeable batteries, the total number of charge/discharge cycles the cell can sustain before its capacity is significantly reduced. End of life is usually considered to be reached when the cell or battery delivers only 80 percent of rated Ah capacity. The cycle of a battery is greatly influenced by the type depth of the cycle (deep or shallow) and the method of recharging. Improper charge cycle cut-off can greatly reduce the cycle life of a battery.

**Discharge** - The conversion of the chemical energy of the battery into electric energy.

**Depth of Discharge** - The amount of energy that has been removed from a battery (or battery pack). Usually expressed as a percentage of the total capacity of the battery. For example, 50 percent depth of discharge means that half of the energy in the battery has been used. 80 percent DOD means that eighty percent of the energy has been discharged, so the battery now holds only 20 percent of its full charge.

**Discharge, deep** - Withdrawal of all electrical energy to the end-point voltage before the cell or battery is recharged.

**Electrochemical Couple** - The system of active materials within a cell that provides electrical energy storage through an electrochemical reaction.

**Electrode** - An electrical conductor through which an electric current enters or leaves a conducting medium, whether it be an electrolytic solution, solid, molten mass, gas, or vacuum. For electrolytic solutions, many solids, and molten masses, an electrode is an electrical conductor at the surface of which a change occurs from conduction by electrons to conduction by ions. For gases and vacuum, the electrodes merely serve to conduct electricity to and from the medium.

**Electrolyte** - A chemical compound which, when fused or dissolved in certain solvents, usually water, will conduct an electric current. All electrolytes in the fused state or in solution give rise to ions which conduct the electric current.

**End-of-Discharge Voltage** - The voltage of the battery at termination of a discharge.

**Energy** - Output Capability - expressed as capacity times voltage, or Wh.

**Energy Density** - Ratio of cell energy to weight or volume (Wh per kg, or Wh per L).

**Final Voltage** (see Cut-off voltage)

**Float Charging** - Method of recharging in which a secondary cell is continuously connected to a constant-voltage supply that maintains the cell in fully charged condition.

**Gassing** - The evolution of gas from one or both of the electrodes in a cell. Gassing commonly results from self-discharge or from the electrolysis of water in the electrolyte during charging.

**Internal Resistance** - The resistance to the flow of an electric current within the cell or battery.

**Memory Effect** - A phenomenon in which a cell, operated in successive cycles to less than full, depth of discharge, temporarily loses the remainder of its capacity at normal voltage levels (usually applies only to sealed cylindrical Ni-Cd cells). Memory effect is reversible.

**Negative Terminal** - The terminal of a battery from which electrons flow in the external circuit when the cell discharges. See Positive Terminal.

**Ohm's Law** - The formula that describes the amount of current flowing through a circuit. Ohm's Law - In a given electrical circuit, the amount of current in A (I) is equal to the pressure in volts (V) divided by the resistance, in ohms (R).  $V=I/R$

**Open Circuit** - Condition of a battery which is neither on charge nor on discharge (i.e., disconnected from a circuit).

**Open-Circuit Voltage** - The difference in potential between the terminals of a cell when the circuit is open (i.e., a no-load condition).

**Parallel Connection** - The arrangement of cells in a battery made by connecting all positive terminals together and all negative terminals together. The voltage of the group remains the same as the voltage of the individual cell. The capacity is increased in proportion to the number of cells.

**Polarity** - Refers to the charges residing at the terminals of a battery.

**Positive Terminal** - The terminal of a battery toward which electrons flow through the external circuit when the cell discharges. See Negative Terminal.

**Rated Capacity** - The number of Ah a cell can deliver under specific conditions (rate of discharge, end voltage, temperature); usually the manufacturer's rating.

**Rechargeable** - Capable of being recharged; refers to secondary cells or batteries.

## IBLUK Support

Industrial Batteries (UK) Limited has been serving the industrial battery market in the United Kingdom since 1997 and specialises in nickel-cadmium industrial battery supply and support.

We will size the optimum battery for your application from our extensive ranges, provide battery layouts, supply battery stands where required and help you to choose the most cost effective solution.

We also provide battery training, maintenance equipment, accessories and support services. Please do not hesitate to contact us.

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Battery Definitions 09/08

**Recombination** - State in which the gases normally formed within the battery cell during its operation, are recombined to form water.

**Secondary Battery** - A battery made up of secondary cells. See Storage Battery; Storage Cell.

**Self Discharge** - Discharge that takes place while the battery is in an open-circuit condition.

**Separator** - The permeable membrane that allows the passage of ions, but prevents electrical contact between the anode and the cathode.

**Series Connection** - The arrangement of cells in a battery configured by connecting the positive terminal of each successive cell to the negative terminal of the next adjacent cell so that their voltages are cumulative. See Parallel Connection.

**Short-Circuit Current** - That current delivered when a cell is short-circuited (i.e., the positive and negative terminals are directly connected with a low-resistance conductor).

**Starting-Lighting-Ignition (SLI) Battery** - A battery designed to start internal combustion engines and to power the electrical systems in automobiles when the engine is not running. SLI batteries can be used in emergency lighting situations.

**Stationary Battery** - A secondary battery designed for use in a fixed location.

**Storage Battery** - An assembly of identical cells in which the electrochemical action is reversible so that the battery may be recharged by passing a current through the cells in the opposite direction to that of discharge.

**Storage Cell** - An electrolytic cell for the generation of electric energy in which the cell after being discharged may be restored to a charged condition by an electric current flowing in a direction opposite the flow of current when the cell discharges. See Storage Battery.

**Terminals** - The parts of a battery to which the external electric circuit is connected.

**Thermal Runaway** - A condition whereby a cell on charge or discharge will destroy itself through internal heat generation caused by high overcharge or high rate of discharge or other abusive conditions. A particular problem with VRLA batteries.

**Trickle Charging** - A method of recharging in which a secondary cell is either continuously or intermittently connected to a constant-current supply that maintains the cell in fully charged condition.

**Vent** - A normally sealed mechanism that allows for the controlled escape of gases from within a cell.

**Volt** - The unit of electromotive force, or difference of potential, which will cause a current of one A to flow through a resistance of one ohm.

**Voltage, cut-off** - Voltage at the end of useful discharge. (See Voltage, end-point.)

**Voltage, end-point** - Cell voltage below which the connected equipment will not operate or below which operation is not recommended.

**Voltage, nominal** - Voltage of a fully charged cell when delivering rated current.

**Wet Cell** - A cell, the electrolyte of which is in liquid form and free to flow and move.