Expert opinion on POWERBATT agents

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POWERBATT action:

1. removal of blocking (sulphate) layers from lead accumulator electrodes, converting it back to a recyclable form thus enabling further charging and use of the accumulators
2. The conductive particles dispersed in the acid solution and in the sludge layer, which cause self-discharging and short circuits, are converted into non-conductive state, thus eliminating the self-discharging and short circuits.
3. Initiates the active material of the lead accumulator electrodes to increase the intensity of the electro-chemical processes.
4. Modifies and reinforces the structure of the lead accumulator electrodes, enhancing its surface and maintaining it in good condition by reduction of sludge generation. The enhanced surface enables stronger starting currents at low temperatures.

POWERBATT composition:

- Main component of the agent is the substance capable of releasing active oxygen, which cannot be considered a pollutant under any circumstances.
- Further components include so called expanders, which are added also to lead electrodes during their manufacturing (however, the positive effect is lost over extended duration of use). These substances are not new to the accumulator, they just supplement the quantities that were already there but lost effect over time.
- Upon incorporation of the expanders in the electrode mass and after reaction of the oxygen released from POWERBATT, what remains is water.

Explanation:

- In the charged state, the positive electrode, i.e. anode, contains an active substance (paste) composed of brown to purple-brown plumbic oxide – this material may scale during the service life of the accumulator and create conductive sediment in the sludge compartment.
- Negative cathode, composed of the spongy silver-gray lead seldom scales (only as a result of certain impurities in electrolyte). However, improper use causes reduction of the pores in the spongy cathode (cathode hardening) in the active mass of the negative (gray) electrode.
- POWERBATT – through released active oxygen and new expanders modifies and reinforces the structures of the lead accumulator electrodes, thus enhancing their surface and long term maintenance of the enhanced surface while maintaining good contact of individual particles (reduced accumulation of sludge). The enhanced surface enables greater starting currents at low temperatures.

- Accumulators cannot last forever – not even in theory – only until the moment when the entire positive (brown) electrode transforms into sludge.

IT IS IMPORTANT TO EMPHASIZE:
Over the service life of the accumulator, the individual grains of the active mass, i.e. in case of positive electrode with conversion to lead sulphate (discharging) and plumbic oxide (charging), change their volume by as much as 60 %, which leads to destruction of its structure and the grains fall out into sludge – this process can be slowed but not stopped.
However the electro-chemical processes in the accumulator can be modified. And this is the method of action by POWERBATT.

- Irreversible sulphatizing is a harmful change of the structure of the active substance. But it is the same active substance which continuously changes from plumbic oxide to lead sulphate and vice versa – however, the irreversible sulphatation causes crystallization of the lead sulphate in large grains which cannot be converted by charging because these grains are not conductive, whereas fine lead sulphate is converted during charging because its pores contain conductive electrolyte! Refining of the structure of the active substance is one of the tasks of POWERBATT agent.

SUMMARY

The POWERBATT agent does not – under any circumstances – introduce into accumulators any new chemicals which were not present before and which could have adverse environmental impact.

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ABSTRACT FROM EXPERT OPPINION
No.: 005/2002

evaluation of the regeneration agent
for lead accumulators
POWERBATT

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Expert's task: evaluation of the regeneration agent for lead accumulators POWERBATT (utility model ČR No. 11655).

Purpose of the evaluation: Ascertain the utility features and effects of POWERBATT.

Documentation used to develop the report:

- test protocol P/300817/02 by testing facility INFORGEN CONTROL, dated: 30.8.2002,
- visual inspection of the test samples,
- documentation supplied by client,
- data provided by the client,
- expert's archive,
- Expert's standard approved by the Ministry of Justice under No. 4221/94-50 as a binding methodical statute for experts listed in the registry of district courts of SR.

I. FINDING

1. Identification of the substance:

   Name: POWERBATT – regeneration agent for lead accumulators
   Description: clear solution.

II. ASSESSMENT

Having summarized the results of measurements and observations, it can be stated that adding POWERBATT into the electrolyte solution of an operable lead accumulator enables its further use subject to compliance with the accurate procedures.

The following observations were made on lead accumulators:

1. the sulphated electrodes (plates) which were incapable of recharging before application of POWERBATT (or which could be charged only with difficulties), upon application of POWERBATT enabled further recharging and further charging cycles .
2. conductive sludge particles of PbO2, dispersed in the electrolyte (and facilitating short circuit), were rendered non-conductive by conversion to PbSO4 by application of POWERBATT and dropped to the sludge compartment.
3. Upon application of POWERBATT, no PbO2 could be demonstrated in the sludge, thus the sludge was rendered non-conductive.
4. the application of POWERBATT has eliminated the short-circuits caused by bridges of active substance.
5. the application of POWERBATT has resulted in the increase of the nominal capacity and extension of the start discharging at -18 °C, thus extending the service life of the accumulators.

expert's seal

expert's signature

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Expert's clause

The expert's opinion was developed by the expert appointed by the district court in Banská Bystrica under No. 4349/90 dated 18:12.1990 and 4470/94 for the basic fields of:

100 000 – electrical engineering – high current
110 000 – electrical engineering – low current

and sub-fields:

100 201 – electrotechnical machines and systems
110 300 – electrical machines and instruments
110 701 – valuation of the electrical and electronic devices

Expert's registration No.: 60014

Expert's registration number was assigned by decision 4079/97 dated 7.7.1997.

The expert's act has been registered under No. 005/2002 of the Expert's journal No.1.

Banská Štiavnica, 30.8.2002

expert's signature

Ing Pavel BALŽANKA

znalec z odboru