

# BOTCOLABORATORIES

1184 Chapel Street, New Haven, Connecticut

## LABORATORY TEST REPORT

Gentlemen:

We are submitting herewith the results of our laboratory investigations, re the efficacy of VITTA-Q Battery Life Extender, which were conducted in our laboratories under rigid controlled conditions.

This laboratory investigated the effects of VITTA-Q Battery Life Extender on two groups of batteries. The first, a group of sixty (60) new dry charged batteries obtained from members of the Association of American Battery Manufacturers. Only those batteries which were manufactured within 60 days from the date of the initiation of the test studies were used. All were adequately tested and examined for defects and to determine their true condition.

The second group of batteries studied were twenty (20) older sulphated batteries that were adequately examined and found to be *mechanically sound*.

These studies were conducted to determine the efficacy, if any, of VITTA-Q in increasing the degree of charging and discharging efficiency, the reduction of internal operating temperatures, and the inhibition of the conversion of the porous, soft, spongy mass of lead within the grid framework of the negative plates to a larger, more brittle, less porous, i.e., sulphated surface.

In addition, observations were made to determine whether the addition of VITTA-Q Battery Life Extender would harm lead acid batteries.

These studies have taken place over a six month period, and we are submitting the attached report to you with recommendations that another investigation be implemented to investigate other matters not covered in this initial laboratory study.

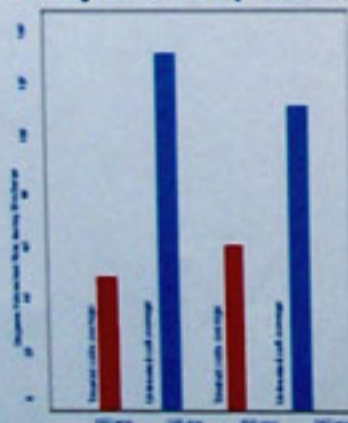
Should you deem it desirable, we will be pleased to furnish you with whatever additional details you may require in regard to the test procedures, specifications and techniques utilized by this laboratory during the investigations.

Respectfully submitted,

**BOTCOLABORATORIES**

### GRAPH # 1

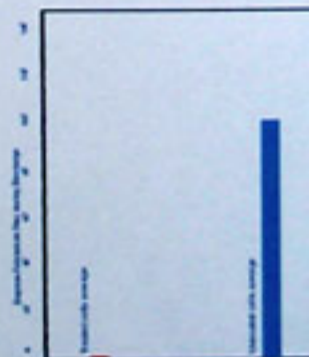
The averages illustrated in the graph relate to the new cell study as well as those of other mechanically sound sulphated cells.



for 72+ 6 hours. At the end of this period all cells were fully charged having an average of 2.50 + 5% per cell and specific gravity 1265-1270 per cell. Temperatures were taken while still on charge at the end of the period.

### GRAPH # 2

The averages illustrated in the graph relate to the new cell study as well as those of other mechanically sound sulphated cells.



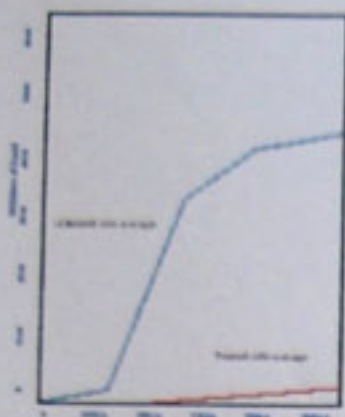
Charged at 10 amperes for 72+ 6 hours. At the end of this period all cells were fully charged having an average of 2.50 + 5% per cell and specific gravity 1265-1270 per cell. Temperatures were taken while still on charge at the end of the period.

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## GRAPH # 3

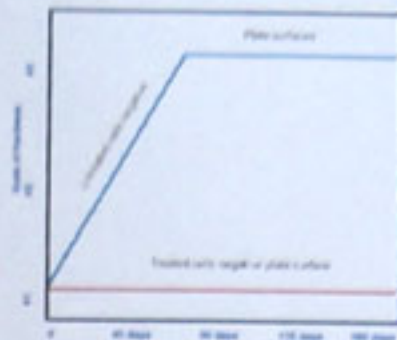
The averages illustrated in the graph relate to the new cell study as well as those of other mechanically sound sulphated cells.



Comparative graph illustrating liquid loss averages in untreated Batteries "cycled" for 120 hours as compared to liquid loss in treated cells.

## GRAPH # 4

Degree of Sulphation based on Scale of Hardness: Fingernail Probe and Plow.



The averages illustrated in the above chart graph relate to new cells studied.

- #1 Surface, musty paste area on negative plate. Fingernail can easily plow up material.
- #2 Medium hardness. I.e. fingernail could scrape up surface with effort and surface felt less hard and brittle than # 1.
- #3 Relatively hard negative plate, so that fingernail could not plow up any material, and surface felt hard and brittle onscraping with fingernail.

## GENERAL DISCUSSION AND OBSERVATIONS LABORATORY STUDIES

The test studies conducted by this laboratory were designed to afford a controlled laboratory evaluation as to the efficacy, if any, of VITTA-Q Battery Life Extender. Based upon the data collected and interpreted by this laboratory, we can conclude, e.g., that due to cooler internal operating temperatures and the fact that more time is required for treated cells to reach terminal voltage under heavy ampere discharge loads, the use of VITTA-Q can produce additional ampere hours of capacity. (see Graph #1). Cooler internal temperatures were also found during the charging cycle. (See graph #2). We can also conclude from these studies that VITTA-Q is not harmful to lead acid storage batteries, and that the use of VITTA-Q resulted in less liquid being lost during charging and discharging cycles. Untreated cells averaged 90% more liquid lost than treated cells. Total liquid lost equiv. To 100%, i.e., untreated cells averaged a loss of 35 ml. Of liquid, treated cells averaged a loss of 2.5 ml. or 32.5ml. less than untreated cells (See Graph #3).



Before Vitta-Q



After Vitta-Q



Before.... After.....Vitta-Q