

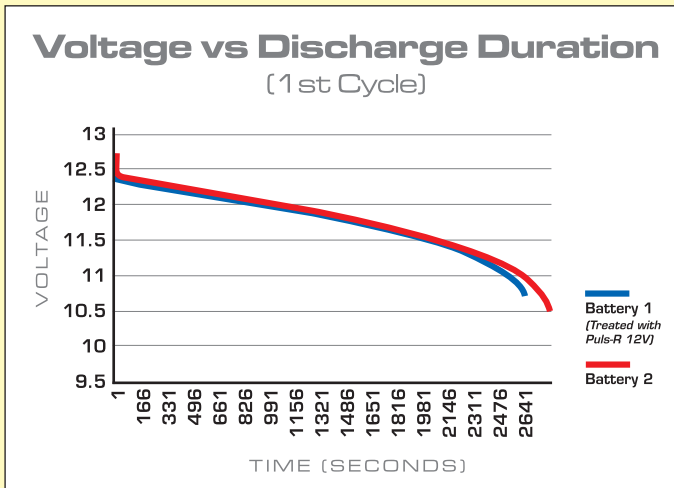


# PULS-R 12V

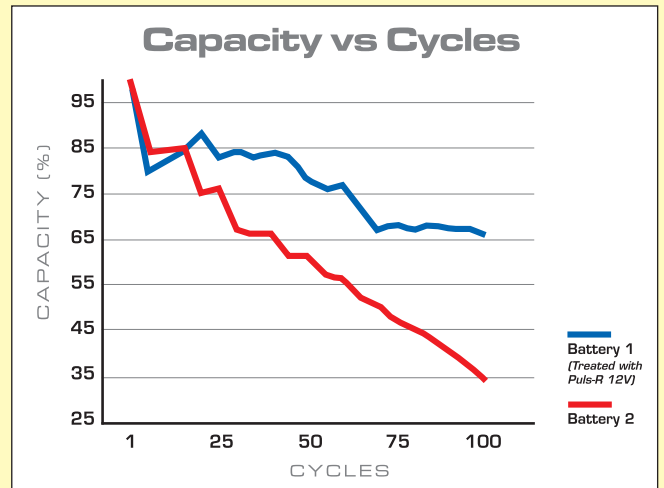
## Independent Verification Test of a Puls-R 12V

### SUMMARY OF RESULTS

The object of the test programme on a Puls-R 12V was to review the performance of the device.

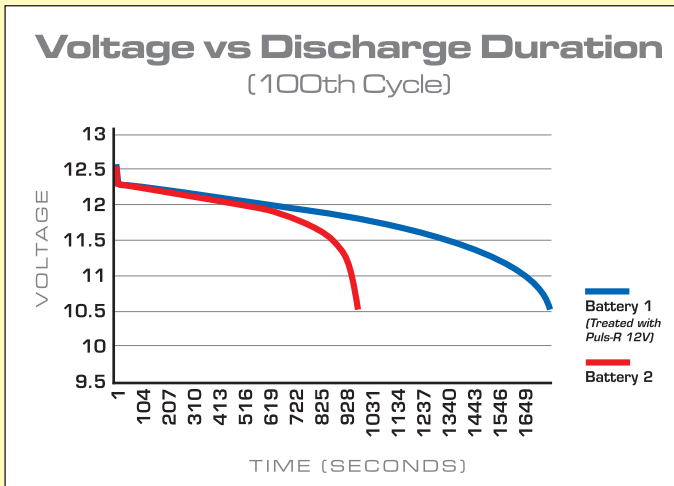


Graph reproduced from MIRA Report: 1030339#01



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At the 1st cycle the untreated battery took approximately 2794 seconds (46 minutes) to discharge where the treated battery took approximately 2637 seconds (43 minutes).



Graph reproduced from MIRA Report: 1030339#01

At the 100th cycle the untreated battery took approximately 966 seconds (16 minutes) to discharge where the treated battery took approximately 1742 seconds (29 minutes). The final discharge duration of the treated battery is equal to 66% of the initial capacity and the duration of the untreated battery is equal to 34% of the initial capacity.

This is an example of the data used to calculate the change in capacity over 100 cycles. Data collected from battery 1 (treated) and battery 2 (untreated) was used to profile a graph of capacity against cycles. Samples were taken at 5 cycle intervals. The capacity was calculated at each of these points and plotted on the graph.

After the 100 cycles the untreated battery had dropped in capacity by approximately 66% to a final capacity of 34% where as the treated battery had only dropped by approximately 34% to a final capacity of 66%.

### Testimonials...

"I installed the Puls-R onto a five and half year old AGM battery that was refusing to take charge. Using the same charging source, the Puls-R 12V has been true to it's word and slowly but surely appears to have restored the battery back to a usable condition" Tom Gardiner, Sales Engineer, JPC Limited

"We have done our own testing in workshop conditions, with great success. I had an old battery that I had tested at an automotive workshop, who advised that it was ready for the tip. We put the Puls-R 12V on it, and it is now working perfectly, and driving one of our forklifts!!"

Jim Fraser, Managing Director, AMI Marine International Pte Ltd.



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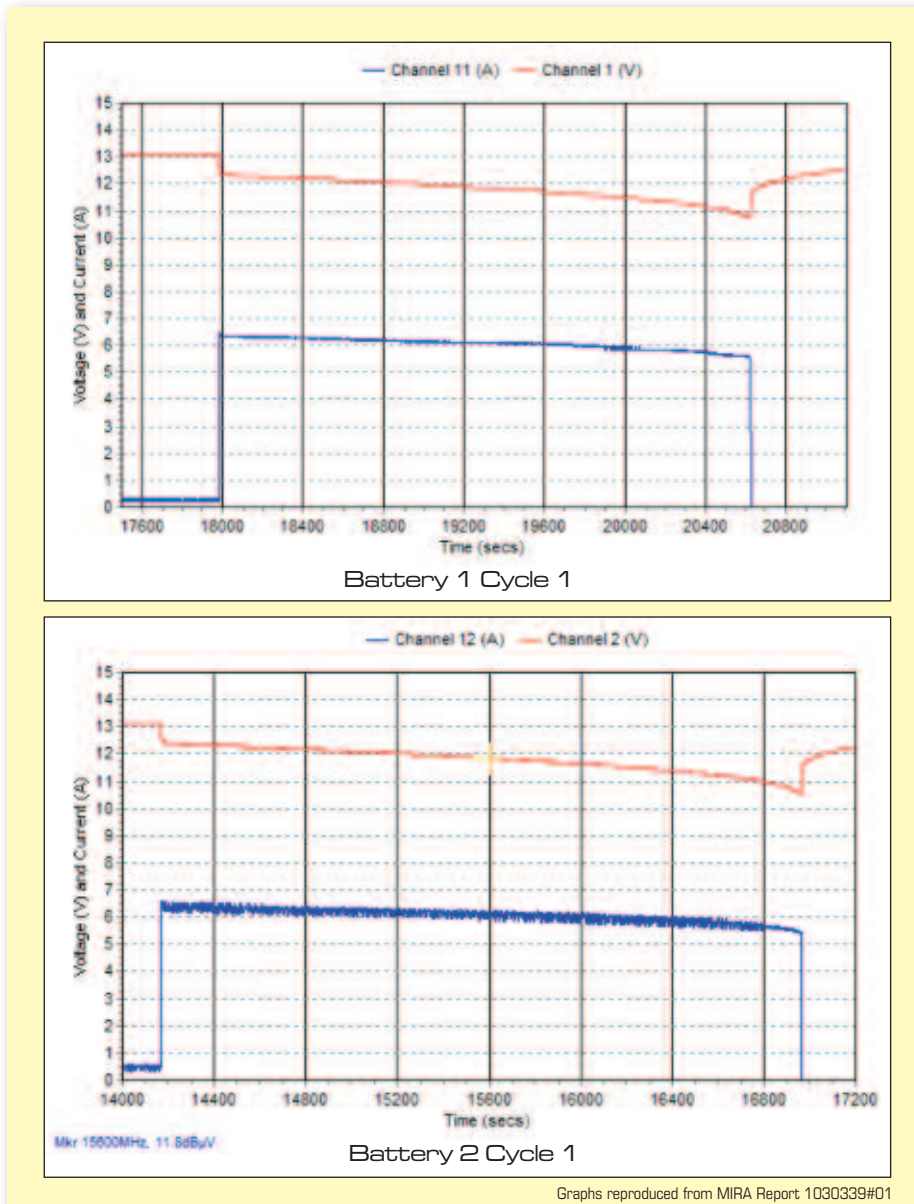
To test the effect of the Puls-R 12V a sample of 10 batteries of the same type and specification were connected to a custom built test rig. The test rig was designed to automatically run the batteries through 100 complete cycles. A cycle consists of the batteries being charged to a level of 14.6V at a maximum rate of 1.5A. Once the battery was fully charged a rest period of 20 minutes was allowed before discharging the battery to 10.5V via a 2 ohm load resistor. Five of the batteries were connected to the test rig with a Puls-R 12V connected across the terminals (treated) and five were connected directly to the test rig (untreated). Measurements of voltage and current were taken from

each battery during the 100 cycles via a data logger to allow capacity calculations to be made and a comparison between treated and untreated batteries to be carried out.

Capacity was calculated by measuring the time in seconds taken to discharge the battery down to 10.5V. The time taken to discharge the battery on the first cycle was considered 100% and all other capacity measurements were made against this.

### Discharge Durations

This is an example of the data used to calculate start capacity. Data was collected from the 1st cycle of battery 1 (treated) and battery 2 (untreated) was plotted on a graph of voltage against time. These were used to evaluate the start capacity of the batteries.



Graphs reproduced from MIRA Report 1030339#01

Information taken from 'Independent Verification Test of a Puls-R 12V' Report No. 1030339#01 conducted by MIRA.