

## Megapulse test report



Megapulse, test report

Høvik 15.01.09

### 1. Background:

The testes were performed at Unitech Energy AS office in the period from December 4<sup>th</sup> 2008 to February 27<sup>th</sup> 2009.

The purpose of the test is to check the development of the performance of batteries in bad condition with the Megapulse.

### 2. Batteries

Two 24V battery banks consisting of two 12V batteries each are tested with the Megapulse MK4, ver. 2 to investigate the effect on the battery banks.

The batteries are Lead Acid batteries, type: Volvo Heavy Duty Extra II with a rated capacity of 225Ah at 20A discharge rate.

All batteries are initially in a bad condition and are classified as defects. The batteries have been installed in Heavy Volvo trucks.

The tests are initiated by Calix AB, Sweden and Jens Kleven Trading, Norway.

### 3. Testing

Prior to mounting the Megapulse, the batteries were fully charged with a 24V charger, type Calix BC 2412, providing 12A charging current.

After completion of the charging process, the battery banks were discharged with a constant current of 10A to check the initial capacity.

The battery banks were then fully charged and the 24V Megapulse was connected to the battery banks.

After 38days the battery banks were fully charged.

Acid gravity and battery voltage were monitored and the capacity was tested after the battery banks were recharged.

After recharging the batteries, the batteries were again connected to the Megapulse until end of February month.

The batteries were then tested for capacity and acid gravity.

4. Test results:

Acid gravity:

Battery no: 1

Date	Cell no.1	Cell no.2	Cell no.3	Cell no.4	Cell no.5	Cell no. 6
04.12.08	1,18	1,19	1,18	1,16	1,18	1,19
10.12.08	1,18	1,19	1,19	1,17	1,19	1,19
17.12.08	1,18	1,19	1,18	1,17	1,18	1,19
07.01.09	1,18	1,18	1,18	1,16	1,18	1,18
After recharge:						
12.01.09	1,27	1,28	1,27	1,25	1,27	1,28
26.01.09	1,27	1,28	1,28	1,26	1,28	1,28
02.02.09	1,27	1,28	1,27	1,25	1,27	1,28
After recharge:						
24.02.09	1,29	1,30	1,29	1,27	1,29	1,30

Battery no: 2

Date	Cell no.1	Cell no.2	Cell no.3	Cell no.4	Cell no.5	Cell no. 6
04.12.08	1,18	1,18	1,19	1,17	1,18	1,18
10.12.08	1,19	1,18	1,19	1,18	1,19	1,19
17.12.08	1,18	1,18	1,19	1,17	1,19	1,18
07.01.09	1,17	1,17	1,18	1,17	1,18	1,18
After recharge:						
12.01.09	1,27	1,27	1,28	1,26	1,28	1,27
26.01.09	1,28	1,27	1,29	1,27	1,28	1,28
02.02.09	1,27	1,27	1,28	1,26	1,28	1,28
After recharge:						
24.02.09	1,29	1,29	1,30	1,28	1,30	1,30

Battery no: 3

Date	Cell no.1	Cell no.2	Cell no.3	Cell no.4	Cell no.5	Cell no. 6
04.12.08	1,30	1,29	1,25	1,30	1,29	1,26
10.12.08	1,30	1,30	1,27	1,31	1,30	1,27
17.12.08	1,28	1,29	1,26	1,30	1,28	1,25
07.01.09	1,27	1,28	1,24	1,29	1,26	1,23
After recharge:						
12.01.09	1,30	1,30	1,27	1,31	1,29	1,26
26.01.09	1,29	1,29	1,27	1,30	1,29	1,26
02.02.09	1,29	1,29	1,26	1,30	1,28	1,26
After recharge:						
24.02.09	1,27	1,30	1,28	1,27	1,26	1,28

Battery no: 4

Date	Cell no.1	Cell no.2	Cell no.3	Cell no.4	Cell no.5	Cell no. 6
04.12.08	1,30	1,23	1,25	1,30	1,30	1,28
10.12.08	1,31	1,26	1,27	1,30	1,31	1,29
17.12.09	1,29	1,26	1,25	1,29	1,30	1,26
07.01.09	1,28	1,24	1,24	1,27	1,28	1,24
After recharge:						
12.01.09	1,30	1,26	1,26	1,30	1,30	1,28
26.01.09	1,29	1,27	1,29	1,29	1,30	1,27
02.02.09	1,29	1,26	1,25	1,29	1,30	1,26
After recharge:						
24.02.09	1,28	1,28	1,30	1,27	1,29	1,29

Battery voltages:

Date	Battery no: 1	Battery no: 2	Battery no: 3	Battery no: 4
04.12.08	12,2V	12,3V	12,8V	12,8V
10.12.08	12,2V	12,3V	12,8V	12,8V
17.12.08	12,2V	12,2V	12,8V	12,7V
07.12.09	12,2V	12,2V	12,7V	12,7V
After recharge:				
12.01.09	12,8V	12,8V	12,8V	12,8V
23.01.09	12,74V	12,78V	12,87V	12,84V
02.02.09	12,75V	12,79v	12,84V	12,82V

Capacity development:

Date:	Battery bank no. 1:	Battery bank no. 2:
04.12.08	65Ah	80Ah
12.01.09	120Ah	125Ah
27.02.09	120Ah	140Ah

From the test results it can be seen that the batteries performance have been improved.

Finally the batteries short circuit, CCA capabilities were measured.

The test instrument used for this test is: Heavy Duty Battery Analyzer 7200 from Volvo.

Battery No.:	CCA:
Battery no. 1	293A
Battery no. 2	372A
Battery no. 3	385A
Battery no. 4	538A

