

## Material Handling

### True North Forklift Sales

Monitoring Specific Gravity of a forklift used at grocery shop in Auburn, WA

<b>Test date:</b>	June 2005	
<b>Place:</b>	Grocery Shop in Auburn, WA	
<b>Lift Truck:</b>	Electric Clark Lift	
<b>Battery Spec.:</b>	Maker	GNB Technologies
	Model	M2601812517B
	S/N	GCZ0835
	Capacity	1000 Ah
	Voltage	36V
	Yr. Made	2001

\* At the grocery shop, lift is used 3~4 hours a week and usually cycled once a week.

\* Specific Gravity measured is not temperature adjusted because temperature was not recorded for the reading on 06-08. Temperature on 7-20 was average at 40 . Below record is not adjusted Temp on 9-28 was 44 . Therefore, to match to 7-20, 4 degree C  $\{(0.0007 \times 4 = 0.0028) \sim 0.003\}$  was adjusted.

#### Specific Gravity of each cell From positive to negative

Cell / Date	06-08	07-20	09-28
1	1.235	1.270	1.273
2	1.230	1.270	1.268
3	1.230	1.275	1.273
4	1.265	1.285	1.283
5	1.225	1.275	1.273
6	1.260	1.280	1.283
7	1.250	1.280	1.278
8	1.260	1.280	1.278
9	1.245	1.275	1.278
10	1.250	1.275	1.278
11	1.220	1.265	1.273
12	1.200	1.265	1.268
13	1.200	1.250	1.251
14	1.220	1.260	1.263
15	1.220	1.265	1.278
16	1.200	1.240	1.238
17	1.225	1.270	1.263
18	1.225	1.275	1.268
<b>Average S.G.</b>	<b>1.231</b>	<b>1.270</b>	<b>1.270</b>

#### VOLTAGE on 9-28-2005.

Cell / Date	Voltahe	Load V
1	2.1	1.9
2	2.1	2.0
3	2.1	1.9
4	2.1	1.9
5	2.1	1.9
6	2.1	1.9
7	2.1	1.9
8	2.1	1.9
9	2.1	1.9
10	2.1	1.9
11	2.1	1.9
12	2.1	1.9
13	2.0	1.9
14	2.1	1.9
15	2.1	1.9
16	2.0	1.8
17	2.1	1.9
18	2.1	1.9
<b>Total Voltage</b>	<b>37.6</b>	<b>34.2</b>

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#### Comments

6-6-05	Battery was charged on an automatic charger twice, however it did not seem to be charged fully. Therefore, it was on a timer charge for two days, 11 hours each day.
6-8-05	After equalization charge SG readings were taken, then Nanopulser was installed. Until delivery to grocery shop, battery was left unattended with Nanopulser installed.
6-30-05	Forklift with the battery and a charger were delivered to grocery shop in Auburn, WA. After delivery, battery was charged.
7-19-05	Equalized for SG reading a day before measurement.
7-20-05	SG was measured, 10:00 AM in the morning,. Cell number 9, 10, 12, 13, 14, 15 were dry and after measurement filled with water.
In between	Charger's fuse was out and it took a long time to fix. Charger was replaced with a different charger. -- see photo.
9-27-05	12 hour equalization charge was performed.
9-28-05	S.G. reading and Voltage w/ and w/o load were measured. Specific Gravity improved in first 6 weeks, then maintained. Even initial SG improvement can be seen on cell #16, as seen on photo, white sulfation buildup on top of the case showing physical damage. To confirm the damage, voltage of each cells were recorded.

#### Testimonial

I Mark D. White of True North Forklift Sales, Seattle Wa. Used this customer as a test Subject. I am impressed by the results of the test. I have since purchased several more units for other forklifts I have sold and have recommended this product to other customers. This battery was not in the best condition and two cells could be replaced but the battery shops would not have replaced the two cells with the other cells in the condition they were in.

**True North Forklift Sales, Seattle, WA**  
**Mr. Mark D. White**

#### Cost Analysis

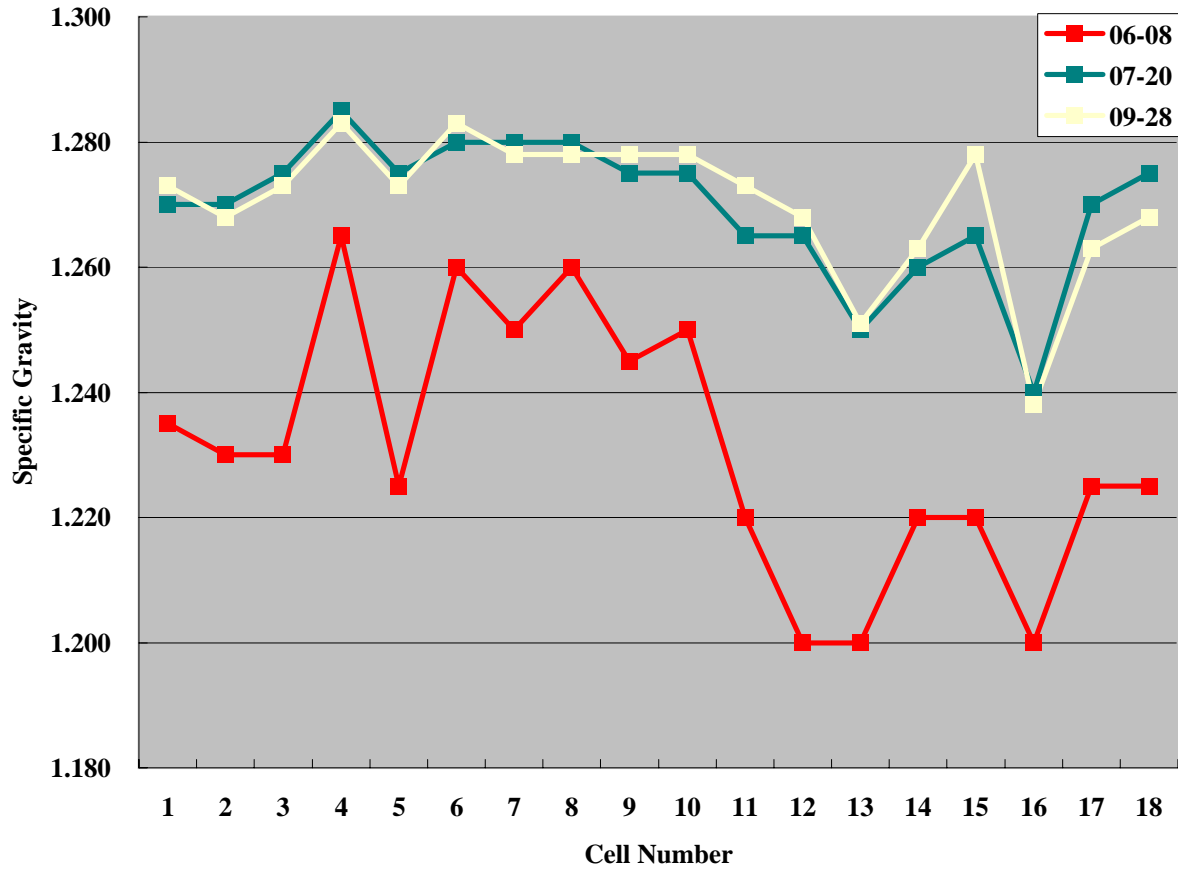
Estimated replacement Battery cost (36V 1000Ah)	\$3,000.00
PG36H Nanopulser for 36V battery at retail	\$160.00
How long it lasted (2005 - 2001 = 4 years)	48 months
Cost of battery per month (\$ 3000 / 48 months)	\$62.50 per month
To self pay Nanopulser (\$160 / \$62.50)	2.56 months

\*\*\* Nanopulser was installed on 6-08. Therefore, on 8-25, Nanopulser self paid.

\*\*\* Any length after 8-25-2005 is cumulative savings of \$62.50 per month.

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Change in Specific Gravity - TNFS @ Grocery Shop.



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White deposit is growing on cel 16 & 17. (Showing physical damage.)

