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LIQUIP INTERNATIONAL PTY LTD - ENGINEERING DEPARTMENT - 13 HUME RD SMITHFIELD SYDNEY NSW AUSTRALIA 2164
PH: +61 2 9725 9000 FAX: +61 2 9609 4739 EMAIL: engineering@liquip-nsw.com.au

TECH TALK 0076
ETHANOL / PETROL BLENDS
TESTED IN DIPTRONIC
17/7/2007

Summary

Diptronic for petroleum is calibrated, for safety reasons, with a non-flammable petroleum product such as diesel. This calibration is then accurately applicable to all pure petroleum products as these have similar dielectrics of 1.7 up to about 3.0.

Ethanol (Ethyl Alcohol) however has a dielectric of 24.0, so as ethanol is blended into petrol, it starts to change the overall dielectric, hence it changes the calibration and ultimately it drifts outside the allowable accuracy requirement.

Tests show that calibration on pure diesel (or similar) is acceptable for all petroleum and blends of ethanol up to and including E10.

It is not accurate for higher concentrations of ethanol.

Legal limit in Australia is currently E10 or less so this is not currently an issue in Australia.

Export sales should consider how to calibrate Diptronic in countries carrying higher proportions of ethanol, bearing in mind the Autocal rig is not explosion-proof and so it cannot be calibrated using a petrol blend. One possibility is that the graph of K-factor versus Ethanol proportion equates to a straight line and it is possible overseas authorities will accept a calibration carried out on diesel then have a correction factor programmed to suit the particular ethanol concentration in use in that locality.

Diesel fuels are more commonly blended with vegetable derivatives (termed bio-diesels). These have the same dielectric as petroleum's and therefore should not be affected no matter how high the proportion.



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Test Detail

Test DIP 100 stick 1 metre long

Sensor DIP-120 set to Dielectric 1.4-1.7
Software 1.00.16 Dated 2-04-07

Compartment setting
Step 1117.0 +0000.0L
Step 0000.0 +1000.0L

No thermal drift correction data entered.

Set up to read 1mm = 1 litre.
Use 2000ml plastic measuring tube.
Caltex unleaded, Figtree service station and Methylated spirits.

Procedure

Use medium size measuring tube at 1000, 1500 and 2000ml marks.

Table 1A

	1000	1500	2000
WATER	255	348	440
ULP	229	322	418
E10	230	324.5	419.5
E15	232.5	326	420.5
E20	235	329	424
E25	236	330.5	424
E30	237.5	331	424.5

Result

The attached graphs show each blend concentration measured at 3 different heights on the stick providing an excellent set of check readings.

Graphs must be interpreted with the knowledge that Diptronic reads +/- 1 litre. Nevertheless there is a good trend on all graphs which equate to a straight line and give some promise to the eventual development of an automatic correction factor for ethanol/petrol blends in the future. While NMI may be difficult to convince quickly, others overseas may well accept such a programme without query.

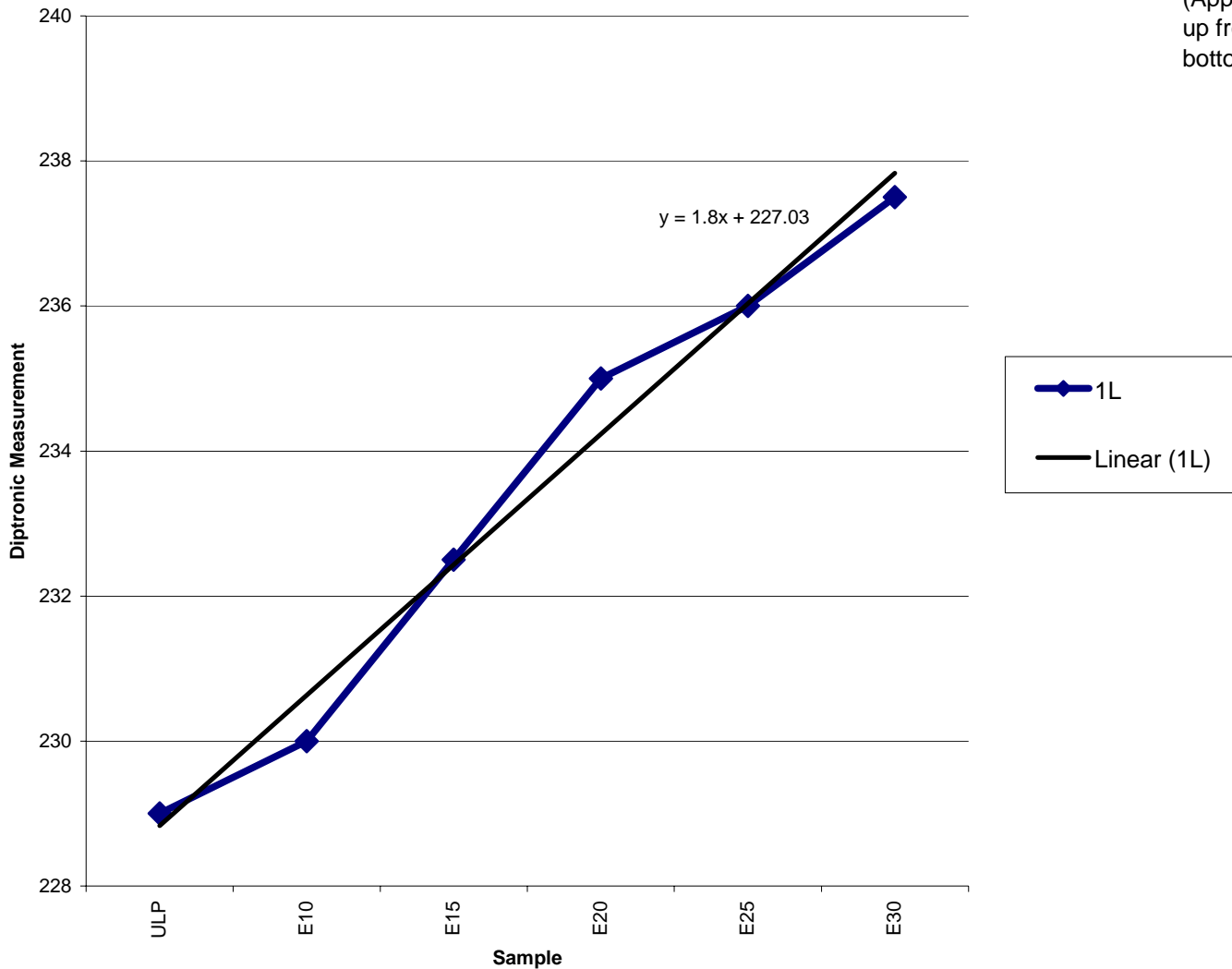


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Diptronic Test Ethanol/Petrol

Graph 1
At 1 litre level
(Approx. 200mm
up from stick
bottom)



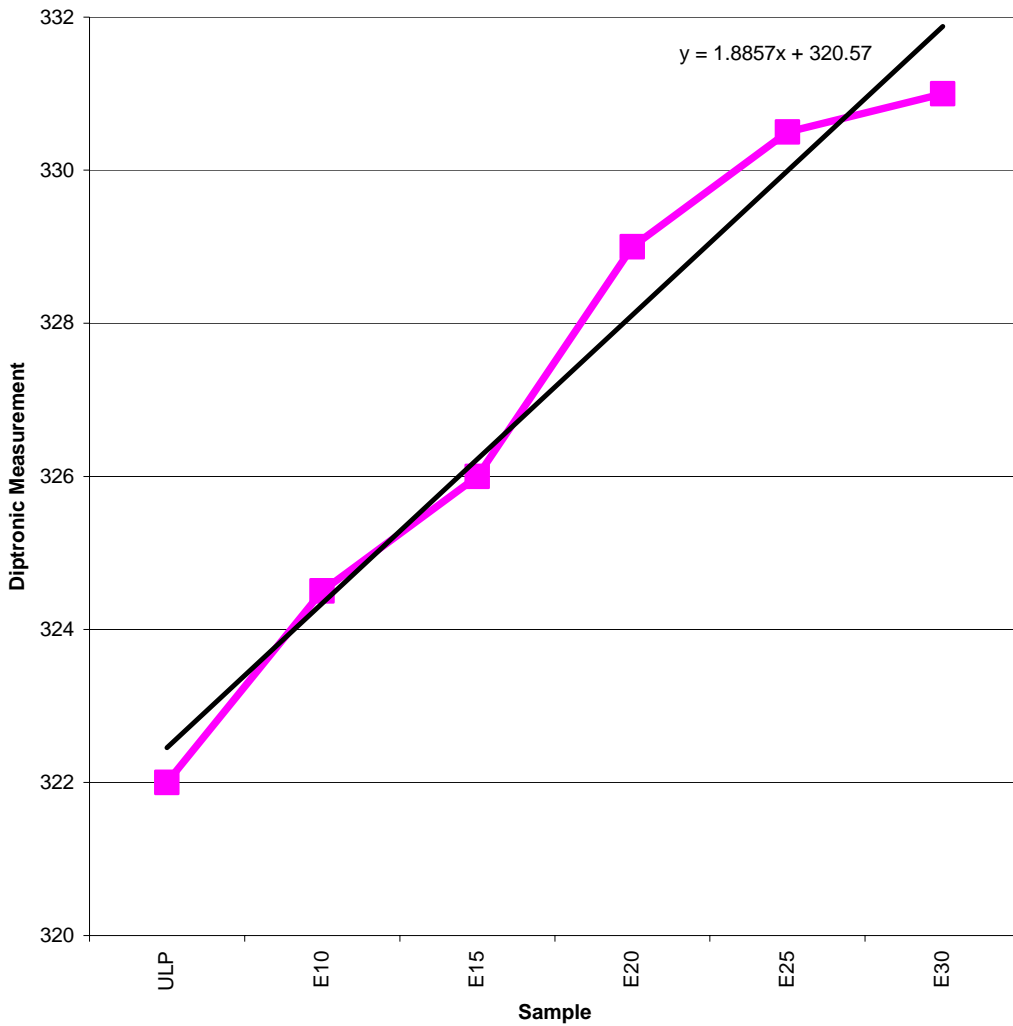
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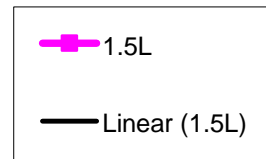
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Diptronic Test Ethanol/Petrol



Graph 2
At 1.5 litre level
(Approx. 300mm
up from stick
bottom)



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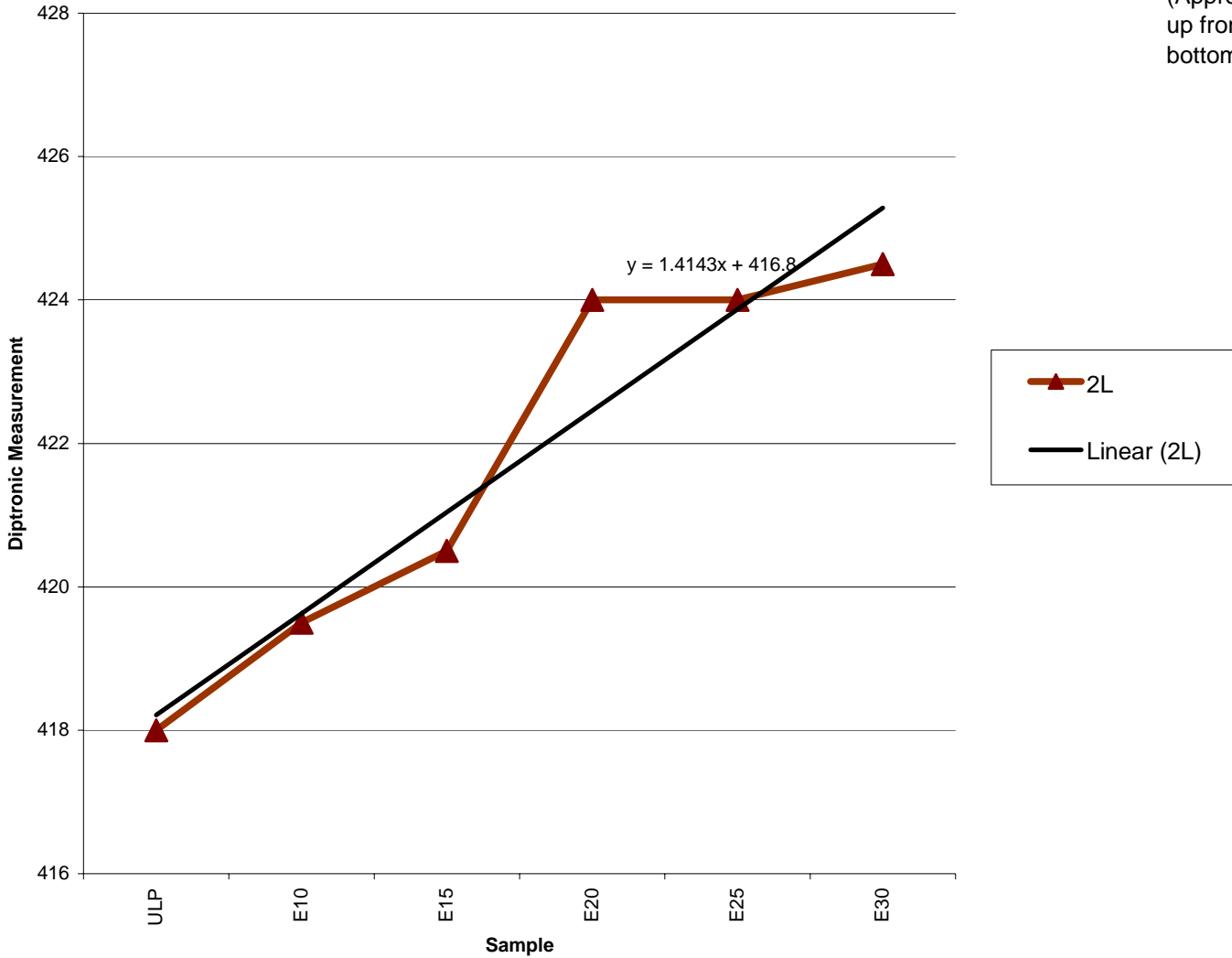


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Diptronic Test Ethanol/Petrol

Graph 3
At 2.0 litre level
(Approx. 400mm
up from stick
bottom)



14-6-07

David Gregory
11/7/2007