



ENVIRONMENTAL TECHNOLOGY VERIFICATION (ETV)

VERIFICATION STATEMENT

TECHNOLOGY TYPE: Fuel Saving Device

APPLICATION: **Spark-Ignition Engines**

TECHNOLOGY NAME: *HydrOplus*
(ETV 12-009)

COMPANY: **H₂O Technologies Philippines Inc.**

DATE: **May 2013**

Disclaimer

This ETV Statement is the result of an impartial, consensus-based approach to evaluating innovative environmental technology in accordance with the ETV Technical Protocol. The data presented are believed accurate and the analyses credible. The statements made and conclusions drawn regarding the product evaluated do not, however, amount to an endorsement or approval of the product in general or for any particular application nor a warranty to the performance of the technology that it will always operate as verified.

This ETV Statement is based from an evaluation activity supported by the DOST-ITDI ETV Group, the Panel of Experts and H₂O Technologies Philippines Incorporated.

Mention of commercial product name does not imply endorsement.



This ETV Statement is a summary of the ETV Report of the *HydrOplus* (ETV 12-009).

ETV TEST DESCRIPTION

The ETV Panel of Experts and the *H₂O Technologies Philippines Inc.*, agreed to validate the claim on the *HydrOplus*; that the device will provide the following performance benefits:

- Reduces fuel consumption
- Reduces exhaust emissions

This ETV is limited to the use of *HydrOplus* in spark-ignition engine or commonly known as gasoline engine. The effect of the technology on the engine stability and any other technology-engine interactions/reactions are beyond the scope of this ETV.

TECHNOLOGY DESCRIPTION

The description given below is based on the product data sheet provided by *H₂O Technologies Philippines Inc.*, and does not represent verified information:

The HydrOplus is a self-contained hydrogen generator device that produces hydrogen as needed. The system produces a superior, clean stream of hydrogen and oxygen fuel from water that does not only deliver a saving benefit for the vehicle; it also produces a more efficient combustion with increase performance and cleaner emission. It eliminates the need for high pressure tanks to store the production of the hydrogen. The process undergoes through an electrolytic fuel reformer that splits Hydrogen (H₂) and Oxygen (O₂) gas from plain water (H₂O) through electrolysis. This self-contained hydrogen enhancement device allows a better and more complete combustion to take place, thus make the vehicle gain more mileage with the same amount of fuel used.

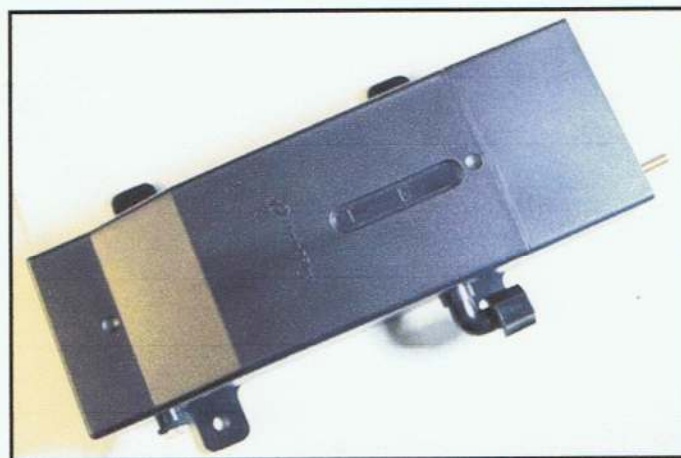


Figure 1. The physical appearance of the *HydrOplus*.

VERIFICATION OF PERFORMANCE

Claim on fuel efficiency/economy

Based on the results of the on-road fuel economy test runs conducted with and without the HydrOplus, the average fuel efficiency of the two motorcycles and the corresponding differences (in percentages) from baseline run is shown in Table 1.

Table 1. Summary of the Fuel Economy Test Runs.

Parameter	Without HydrOplus	With HydrOplus	% Increase in fuel economy
<i>Yamaha RXT 135</i>			
Average Distance covered, km	5.262	6.350	20.68
Fuel consumption, L	0.25	0.25	
Fuel efficiency, km/L	21.048	25.400	
<i>Baja CT 100</i>			
Average Distance covered, km	17.012	19.025	11.83
Fuel consumption, L	0.25	0.25	
Fuel efficiency, km/L	68.048	76.100	

Note that the presented results are averages of four (4) trial test runs.

Legend: km = kilometer, L = liter & km/L = kilometers per liter

Claims on the reduction in emissions

Based on the results of the exhaust emission tests conducted with and without the HydrOplus, there were reductions in Carbon Monoxide (CO) and an increase in Hydrocarbons (HC) emissions as shown in Table 2.

Table 2. Summary of the Exhaust Emissions Test Results.

Parameter	Without HydrOplus	With HydrOplus	% Change
<i>Yamaha RXT 135</i>			
CO(% by volume)	2.950	2.880	-2.37
HC(ppm as hexane)	(out of range)	(out of range)	not calculated
<i>Baja CT 100</i>			
CO(% by volume)	0.454	0.140	-69.16
HC(ppm as hexane)	923.75	1428.00	54.59

Note: Negative (-) % change indicates a reduction; Positive % change indicates an increase.

Based on the average data obtained from test runs, the claims of *H₂O Technologies Philippines Inc.*, on the merits of *HydrOplus*, have been verified as follows:

On fuel efficiency/economy:

The Yamaha RXT 135 (2-stroke engine) had increased its fuel efficiency from 21.048km/L to 25.400km/L or about 20.68% while the Baja CT 100 (4-stroke engine) had also increased its fuel efficiency from 68.048km/L to 76.100km/L or about 11.83% when equipped with HydrOplus.

On the reduction in emissions:

The Yamaha RXT 135 (2-stroke engine) showed a decrease in CO emissions from 2.950% to 2.880 % or about -2.37%. However, the amount of HC exceeded the 9999ppm emission analyzer's maximum limit while the Baja CT 100 (4-stroke engine) showed a decrease in CO from 0.454% to 0.140% or about -69.16% and increased HC emissions from 923.75ppm to 1,428ppm or about 54.59%when equipped with HydrOplus.