



# H2 Fuel Save Australia Hydrogen on Demand

## Frequently asked Questions.

### **What is a Fuel Save Australia H2 Hydrogen on Demand (H2HOD) unit and what does it do?**

H2HOD unit is a carbon emissions reduction device for all types and sizes of diesel, petroleum, and gas engines. It produces pure hydrogen and oxygen that will reduce carbon emissions from your engine and help you save money on fuel. These gases are introduced into the diesel engine air intake, in front of the turbo to create a homogeneous mixture with the injected fuel that is consumed during the combustion process. H2HOD technology does not change, alter, or modify the engine's computer or control system in any way.

### **What applications is the H2HOD technology compatible with?**

The H2HOD technology was created for use in diesel engines for every type of vehicle and stationary engine applications. H2HOD is suitable for trucks, power generation equipment, marine vessels, construction equipment, mining and forestry equipment and rail locomotives.

### **Does the current H2HOD technology suit multi-stage injected engines?**

In short no.

In multi-stage injected engines most of the hydrogen that is introduced into the system is burnt in the first stage of injection, resulting in little to no hydrogen entering the combustion chamber that improves the burn of the carbon-based fuel that improve engine efficiency and fuel savings.

### **Will use of this system void any manufacturer warranties?**

No warranties are voided through the proper installation and use of the H2HOD technology. For over 16 years, and with an estimated 300,000,000 kms of in application performance the H2HOD unit has recorded zero engine damage.

### **Are engine modifications required when installing the H2HOD?**

There are no engine modifications required when installing a H2HOD unit.

### **How many KM's must be driven or engine hours running are needed to recover the cost of the unit?**

The ROI will vary depending on application, engine size, application running time, purchase price of fuel, achieved fuel saving percentage and the load profile of the application. Even different drivers of the same trucks in fleet operations can see a variation with their ROI just by the way the different drivers drive.



### **Will the H2HOD improve fuel economy and by how much?**

The H2HOD will improve a vehicle or stationary engines fuel economy. Results will vary depending on application and engine type, but generally the fuel savings will be between 5 and 12% with some older mechanical engines achieving 15-18%.

### **How can you see how much fuel savings you are getting?**

Depending on application, clients are seeing real life savings by comparing fuel usage data pre installation of the H2HOD unit and after installation of the H2HOD unit. Fuel consumption data can be collected on fixed plant equipment like power generation equipment via genset controllers, and through weekly/monthly/annual fuel cost reductions drivers are recording for their freight routes.

### **Will the H2HOD unit help reduce emissions?**

Yes.

### **Will H2HOD help reduce the "Green House Effect"?**

Installation of a H2HOD unit will ensure your THC, CO, CO<sub>2</sub> and NO<sub>x</sub> will be considerably reduced as a result of the more complete combustion in the engine.

### **Does the fuel improvement vary by speed and/or load profile of an engine?**

Yes. Fuel improvement varies by speed and by load profile factor of the engine.

### **How often is service/maintenance required?**

There is very little regular maintenance required. Regular maintenance includes refilling the units with demineralised water. Depending on the size of the unit and intended application, refills vary from 2000km or approx. 20 hours of operation up to 100 days of operation between refills.

### **Does the durability of the units allow for removal from one engine and placement into another when a tired fleet is upgraded to newer model vehicles?**

Yes. A H2HOD unit can be retrofitted from one application to another. However, the unit will possibly need to be recalibrated to suit the newer engine and the newer engine needs to be suitable for fitment of a H2HOD unit.

### **Can these units be rebuilt or refurbished, or do they need to be replaced?**

All H2HOD units come standard with a one-year warranty. We recommend an electrolyte recharge is completed annually.

### **How long does the anode/cathode last?**

The H2HOD anode/cathode are manufactured from extremely high-grade stainless steel and should never need replacement. Our anode/cathode continue to operate unaffected after 5 million kms or the equivalent of approx. 50,000 engine hours

### **What happens in the event of a product failure?**

In the unlikely event your H2HOD unit stops working and needs to be replaced due to a warrantable failure within the warranty period, one of our approved service agents will replace a component or entire H2HOD unit depending on the failure type.

### **Will the H2HOD function on other fossil fuel (e.g. petrol) internal combustion engines?**

Yes, the H2HOD technology has been designed for use on diesel, petroleum, and gas engines.



### **How much electrical energy does the H2HOD consume?**

The maximum consumption of electrical power varies by H2HOD model. For example, on a 24v stationary engine using 60L p/h the current draw is approx. 5.5 Amps. This adds minimal parasitic draw to the application.

### **Since the H2HOD uses the intended applications battery, does it make the application less efficient?**

No. The unit is only running when the application is turned on and its engine is running. So long as the engine is running, the equipment's alternator will constantly produce enough electricity to charge the battery and provide the minimal energy required to power the H2HOD unit.

### **Can anyone install the H2HOD unit?**

Only trained electrical and/or mechanical technicians should be used to professionally install H2HOD products.

### **Will the H2HOD repair an old and neglected engine?**

The H2HOD unit will enhance the performance of a good running and well-maintained engine. It will not undo damage done to a poorly maintained engine. We have many clients using the H2HOD system on older mechanical engines that have and are experiencing both fuel savings and improved performance.

### **How is this possible for an engine to become cleaner (over time) and increase engine oil life?**

The improved engine combustion results in less carbon build up inside the engine. The outcome of this is a cleaner running engine with cleaner oil, longer engine life and lower overall engine maintenance, thus resulting in lower overall operating costs.

### **Will my engine overheat?**

The engine temp will not be increased with the introduction of hydrogen remembering that all we are doing is burning all the carbon-based fuel within the chamber reducing any inefficiency with the burn process.

A precise amount of hydrogen is introduced into the system that does not disrupt the air fuel ratio within the combustion chamber which then creates the perfect burn environment without causing heat spikes.

By maintaining this correct air to fuel ratio all the carbon-based fuel burnt and is converted to drive energy with the corresponding reductions in the CO<sub>2</sub> Es

Therefore, the increase in efficiency of the thermodynamic cycle results in lower engine exhaust temperatures, not higher.

### **Is hydrogen safe to use?**

Hydrogen is the lightest gas and thus dissipates/disperses into the air very quickly. Only when it is stored can it become unsafe. The H2HOD technology is a hydrogen-on-demand system and does not store hydrogen. The hydrogen that is produced in the H2HOD unit is safe within the design parameters of the system.

### **Certain companies are utilizing hydrogen today in their fuel cells. Is the H2HOD technology similar?**

Fuel cells are intended to utilize hydrogen as an alternative main fuel. In their case the vehicle will have fuel cells that produce electricity from hydrogen. The power generated will then be used to power electrical motors. The H2HOD technology acts as a reverse fuel cell that uses an applications power to produce hydrogen and oxygen gas.



### **What manufacturers would allow the H2HOD installed on their engines?**

We currently have installations on Cummins, Volvo, Detroit Diesel, John Deere, Komatsu, Mack, Navistar, Caterpillar, Daff, Nissan, Toyota, Isuzu, Holden, and Fords.

Engine manufacturers are always cautious when dealing with third party retrofits, however as the H2HOD product improves engine efficiency, there is no negative impact to engine warranty.

### **How is the water turned into hydrogen and oxygen?**

It is done through the simple process of electrolysis in a sealed non-pressurized reactor that uses an electrolyte with demineralised water and battery power to convert the H<sub>2</sub>O into H<sub>2</sub> and O<sub>2</sub>.

### **How are the H<sub>2</sub> and O<sub>2</sub> gases delivered to the engine?**

The gases from the H2HOD unit are introduced into the engine's air intake after the air filter, and before the turbo, by a gas feed line.

### **How does it integrate with original equipment manufacturer fuel systems?**

H2HOD unit communicates with an engines controller but it is not part of or connected directly to the manufactures fuel system.

### **Does H2HOD make the engine ignition combust at a hotter temperature?**

No, in fact the addition of H<sub>2</sub> and O<sub>2</sub> gases make the engine burn at a lower average temperature, running cooler overall.

### **Does H2HOD increase stress on an engine or engine pressure?**

No.

### **Is there any injection of water into the engine?**

No, H2HOD technology only delivers dry H<sub>2</sub> and O<sub>2</sub> gases to the engine air intake. No water is injected.

### **Isn't Potassium hydroxide corrosive?**

H2HOD technology uses a Potassium Hydroxide derivative in a closed reactor which is not introduced into the engine or air stream.

The amount of derivative used is less than 3% of the systems total fluid capacity and can last for a period of approx. 24 months. However, annual checking of the reactor level is recommended.

As Potassium Hydroxide is a corrosive and caustic compound, always wear suitable PPE when checking levels in the closed reactor and refer to the safety data sheet for the proper protocols for storing, handling, using, and disposing of potassium hydroxide.

### **Is H2HOD technology market ready?**

Yes, it is currently available now for use on a wide variety of vehicle and fixed engine applications, from trucks, power generation equipment, marine vessels, construction equipment, mining and forestry equipment and rail locomotives.

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