



Eneco Holdings

## Gas Business

Effective utilization of limited resources,  
development of next generation new fuel



In recent years, the resources of the earth have been depleted due to an increase in consumption. Therefore, we developed an alternative fuel, "Eneco PLASMA FUSION fuel", which mixes water and oil instead of using conventional fossil fuel (heavy oil, light oil, kerosene, BDF). For natural gas, which at present is rapidly being consumed, we succeeded in developing "Eneco Gas" as an alternative gas. This makes it possible to contribute greatly to the protection of the global environment while maximizing the utilization of limited earth resources.



Water is added into a glass bottle containing the catalyst, generating Eneco gas which is then ignited.



Experiment that the generated Eneco Gas is fed into a generator that is used to power other devices.

## Eneco Holdings success in developing water and catalyst reaction technology Birth of next generation eco gas "Eneco Gas"

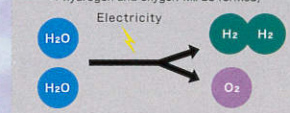
This technology effectively generates both "hydrogen oxygen gas" and "pure hydrogen gas" at low energy and low temperature reaction by employing our uniquely developed catalyst that consists of tap water and waste. Since this fuel is generated from water, it takes us one step closer to securing lasting energy sources without consuming resources. The cost can also be reduced by about 50% compared with conventional gas, realizing significant reduction on the environmental load (CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>x</sub>, PM). It is a new energy gas comparable to natural gas, LPG and shale gas.

### Eneco Gas generation, principle of development

Eneco Gas is generated by application of water electrolysis. For general water electrolysis, hydrogen and oxygen are isolated and taken out separately, however, Eneco developed technology extracts both as a gas mixture. This generated gas is commonly called oxyhydrogen gas, Brown gas or HHO gas. Although considered better to mix the separated oxygen and hydrogen at time of combustion, hydrogen tends to leak out if contained in a metal bottle. Oxyhydrogen gas, however, will not leak. It is not a simple bond but a special bond state at the molecular level.

#### [Standard water electrolysis]

■ Principle of water electrolysis  $2H^+ + O_2$   
(When electricity is passed through water  
⇒ hydrogen and oxygen will be formed)



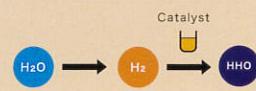
Ensure safety

Secure heat quantity

Correspond to temperature change

#### [Eneco's new technology]

■ Water and catalyst reaction technology



Gas generated by mixing oxygen and hydrogen at 1:2 can be handled safely without explosion because the H<sub>2</sub>O molecule decomposes into H<sub>2</sub> and O.

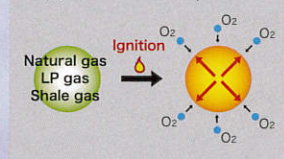
### Mechanism of Eneco Gas combustion

Eneco Gas generated by mixing oxygen and hydrogen at 1:2 can be handled safely without explosion because the H<sub>2</sub>O molecule decomposes into H<sub>2</sub> and O. When Eneco Gas is ignited, passing your hand over the flame will not burn or feel hot. However, when the flame touches an iron plate, the plate will quickly melt and be cut through. Why is this? It is because the flame is an implosion not an explosion. As a result, when the gas is ignited, it burns and the surrounded area is vacated through a shift from a volume of gas to a volume of liquid, a liquid water phase. Therefore, even if your hand is brought close to the flame, you do not feel heat, neither does it burn. Eneco Gas has a characteristic that does not waste such highly concentrated energy.

#### [Commonly used gas]

##### Explosion

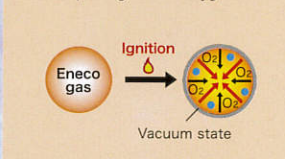
· Normal gas burns while taking in oxygen from the atmosphere



#### [Eneco Gas]

##### Implosion

· Eneco Gas contracts because it burns while capturing its own oxygen

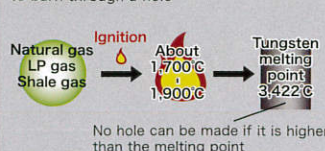


### Eneco Gas characteristic that temperature changes freely according to substance

If you put a coin made of nickel into the flame of a regular acetylene gas burner, it turns red but does not melt. If you put the same coin into the flame of an oxyhydrogen burner, it makes a hole in about five to six seconds. In comparison, tungsten, with a melting point of 3,422°C, will turn red and start to melt in about 15 seconds with the oxyhydrogen burner. This means that the flame of the oxyhydrogen gas radiates at least 3,422°C. When the tungsten begins to evaporate the flame reaches temperatures over 5,000°C to 6,000°C. However, the temperature of the oxyhydrogen gas flame is very low reaching only 280°C. That is to say, the flame has a very curious characteristic of changing its temperature freely depending on the substance of the object.

#### [Commonly used gas]

Since the combustion temperature of ordinary gas is fixed, if the melting point of the substance is higher than that, it is impossible to burn through a hole



#### [Eneco Gas]

Eneco Gas carries the power which can melt things with low temperature not possible by standard gas.



\*Tungsten is one of the rare metals with the highest melting point among all metals.

## Eneco PLASMA R Hydrogen Gas

Gas is generated from water such as tap water.

Equipment in the photo has the ability to generate "2.4 tons per day" and continuous operation is possible.

Eneco PLASMA R Hydrogen Gas  
Demo video



### Product Specifications

- Size: W3,500mmxD1,700mmxH2,000mm
- Weight: about 1t

\*There may be specification changes depending on the place to implement.

### Features

- Pure hydrogen gas and oxyhydrogen gas (HHO gas) are both generated by water and uniquely developed catalyst.
- The calorific value is comparable to LPG, natural gas and shale gas.
- It is highly safe because it is a mixed gas of hydrogen and oxygen.
- Significant reduction of greenhouse gases (CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>x</sub>, PM).
- Significant reduction in cost.
- It can be used in present day equipment without modification.
- Infrastructure is almost unnecessary.

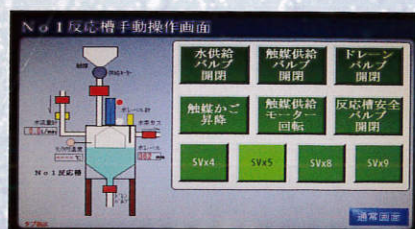
### Applications

- Industrial (burner)
- Boilers (steam · hot water)
- Generators (small to large)
- Ships

\* Depending on the intended use of the generated new gas, it may be necessary to confirm separately.



Operation panel image



## Eneco Holdings, Inc

### Contact

#### ● Product and tour

**TEL : (+81)555-72-8687**

( Reception hours: 10:00-16:00  
\*Reception closes on Saturday, Sunday  
and public holidays. Reception hour may  
change. )

#### ● Inquiry contact information

**TEL : (+81)3-3548-1036**

( Reception hours: 10:00-16:00  
\*Reception closes on Saturday, Sunday  
and public holidays. Reception hour may  
change. )

#### ● Email contact information

[plasmafusion@eneco-hd.co.jp](mailto:plasmafusion@eneco-hd.co.jp)

#### ● Official web site

<http://en.eneco-hd.co.jp>



#### ● YouTube Eneco Holdings official channel

