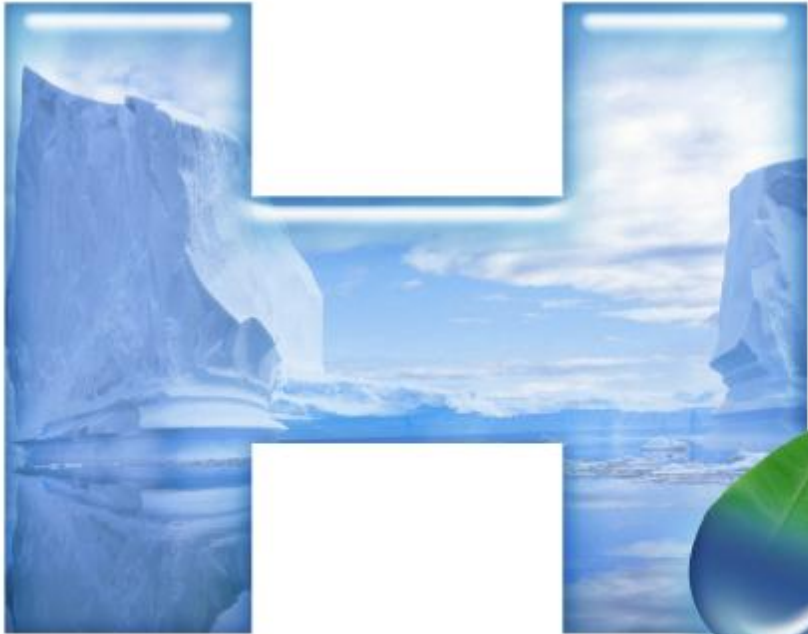
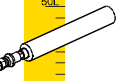


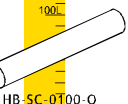
Perfect solution for Fuel Cells



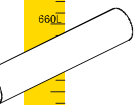
HB-SC-0010-Q



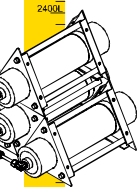
HB-SC-0050-Q



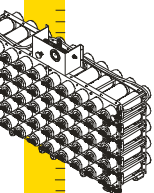
HB-SC-0100-Q



HB-SC-0260-N



HB-PR2400



HB-SS-33000

- Safety
- Huge Flow Rate
- Rechargeable
- Highest Purity



- Capacity - 16500 liters
- Mobile design
- Flow rate - 12~75 L/min
- Lifespan - over 3000 cycles
- Charging purity - 99.99% H₂
- Releasing purity - 99.9999% H₂
- Operating temperature - 0~60°C
- 380^t × 550^w × 550^h mm Weight < 180 kg



about H Bank

Over 30 year in the R&D of metal hydrides, H Bank is an expert in offering the total hydrogen solutions to our clients.

H Bank Technology Inc. is the leading hydrogen storage and purification system manufacturing and consultant company registered in Taiwan. Our core-tech team has been accumulating more than 30 years of experience in studying metal hydrides and its applications. With the background of such indomitable devotion and peerless achievements in metal hydride technology, we have successfully commercialized our technology to meet the demands of different markets, such as Analytical Instruments, Fuel Cells and energy saving mixed fuel Burners, et al.

Fuel cell market: our products are considered as an excellent hydrogen storage solution in the renewable energy projects. With the widespread recognition, H Bank's hydrogen storage systems are de facto a symbol of the best hydrogen storage solutions for 1-20KW FC devices. Our products have been successfully tested in dozens of laboratories in Europe, North America and Asia with different experimental fuel cells as well as with standard FC products from Plug Power, Ballard, Voller, FC R&D, et al. Due to his experienced R&D team, H Bank is able in very short period of time design the right compositions for the storage alloys and offer to his customers high quality tailor made storage products, which can fully meet their demands.

Analytical instruments market: in the past few years we have successfully replaced the traditional high-pressure hydrogen cylinders and hydrogen generators, used in the VOC/THC stations of Taiwan's Environment Protection Bureau, with our hydrogen storage systems. At present our products are widely used also in few dozens of different profile laboratories in Taiwan as well as in over 10 countries. They were tested and currently are used with number of GC, GC-MS, GC-FID models, produced by almost all worldwide known manufacturers: Agilent, Thermo, Signal Instruments, HP, Toshiba, SRI, Baseline MOCON Inc., et al. Moreover, Photovac Inc.(USA) and J.U.M. Engineering (Germany) have already designed new models of portable gas analyser with mounted inside our 50 liter hydrogen storage.

Energy saving market: hydrogen is the only ecological clean and one of the most caloric fuels. Replacing 8-10 %wt of traditional fuel with hydrogen can save from 40 up to 60% of fossil fuels. For example, adding 8% of hydrogen into the burning mixture of small unmanned airplanes engine can save up to 50% of methanol fuel. HBank is actively collaborating in this R&D field with few companies in design of mixed burners for various applications. We hope within less one year 2-3 new models with hydrogen mixed fuel burners can be already offered to customers.

Why H Bank ?

Safety	<ul style="list-style-type: none"> a. Hydrogen is chemically bounded in the form of solid metal hydride. b. Rugged construction. c. H Bank's storages will release hydrogen slowly avoiding any risk of explosion.
Storage	<ul style="list-style-type: none"> a. Stores large volumes of hydrogen in a small space while maintaining pressures acceptable for PEM FC. b. Volumetric density is closed to that of liquid hydrogen but functions at ambient temperatures.
Purification	<ul style="list-style-type: none"> a. Rechargeable, provides more than 99.9999% purity hydrogen while for refilling requires only 99.99% purity hydrogen source. b. No manifold construction is needed, connect directly to your instrument avoiding any gas impurities. c. Highly portable for FC application.

Our patented material

Using special vacuum technology from rare-earth and transition metals can be melted alloys, which are able to absorb hydrogen from the gas phase. These alloys, at room temperature and under certain hydrogen pressure, are absorbing extremely large quantities of hydrogen by forming solid metal hydrides. The chemical reaction of hydride formation is accompanied with release of heat into environment. The hydrogen absorption process can be reversed if the hydrogen pressure is lowered below some certain value.

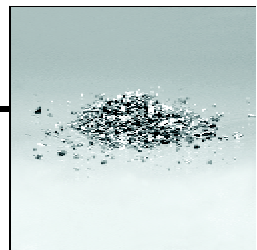
The hydrogen storage alloys, based on rare-earth metals, Ti, Zr, Fe, et. al, are extensively studied. However, only rare-earth based so called AB_5 -type and transition metal based AB_2 -type alloys has reached the stage of mass production and commercialization. At the same time, as a reversible gas storage material, only AB_5 -type alloys can operate at moderate temperatures (from -20°C up to $+60^{\circ}\text{C}$), while the AB_2 -type ones require additional heating.

Developed by H Bank in 2000, our patented alloy compositions are able to absorb hydrogen as high as 1.65wt.%, whereas the maximum values for commercial AB_5 -type alloy is below 1.5wt.% so far. Our alloy outperforms any existing AB_5 -type alloy.

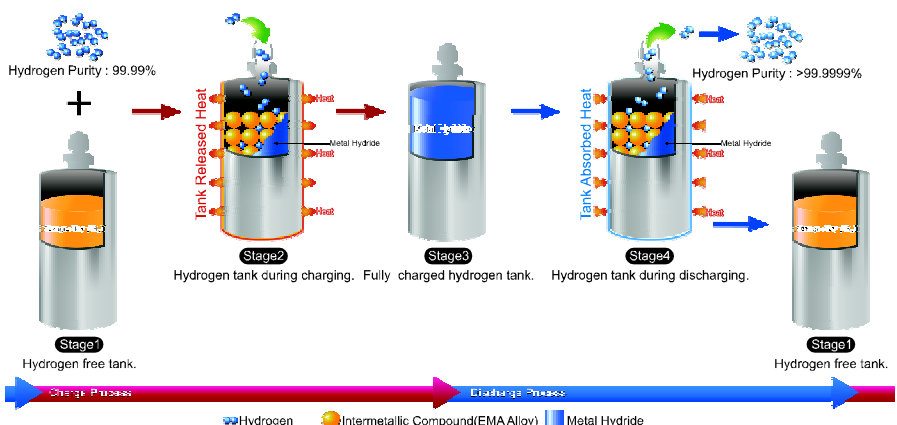
In 2004, we devoted in putting the solid state hydrogen storage idea into the market. We have developed a big variety of hydrogen storage tanks and containers with amount of stored hydrogen from 10 up to 100,000 liters. All our rights on these products are protected with corresponding patents. We will devote every effort to replace dangerous high-pressure hydrogen cylinders with safe metal-hydride based storages.

Core Technology

Patents: 158203, 196342, I 267605, I 271487 (Taiwan);
 ZL 00 1 29765.1(China);
 USA and Germany(pending).



Scheme



P

roduct

10Liter

HB-SC-0010-Q

Applications:

- Designed specific for mini size fuel cells or fuel cell in toys .

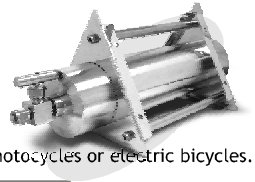


660Liter

HB-SC-0660-N

Applications:

- For stational fuel cells
- For fuel cell in electric motorcycles or electric bicycles.

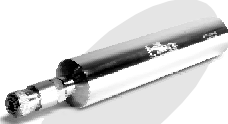


50Liter

HB-SC-0050-Q

Applications:

- For portable fuel cells
- For fuel cell in first aid equipments.

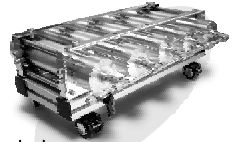


3300Liter

HB-SS-3300

Applications:

- For fuel cells in PC UPS.
- For fuel cells in hybrid cars or hydrogen cars.



100Liter

HB-SC-0100-Q

Applications:

- For middle size fuel cells
- For fuel cell in medical instruments.

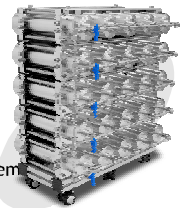


16500Liter

HB-SS-16500

Applications:

- For back-up power supply system
- For fuel cells in yachts.



F

lat storages for portable devices



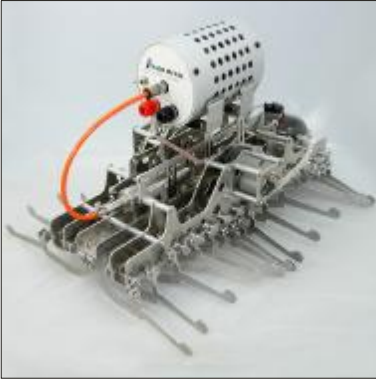
H Bank's storage manufacturing technology allows designing products in not traditional for this field rectangular shape, which seems to be an important factor for portable applications. The 5-100 liter hydrogen capacity products were specially designed for powering mini size Fuel Cells in notebooks and/or other portable electronic devices. Based on special designed low pressure hydrogen storage alloys, these products are highly safe hydrogen storages, which in the nearest future have to power fuel cells in various electronic products in the consumer market. According to test results, these products with their lifespan can easily replace 20 traditional batteries.





Applications of H Bank storage

Low power FC (<100w)



▲ FC R&D FC



▲ VOLLER FC

Middle power FC (100w-2kw)



▲ BALLARD FC



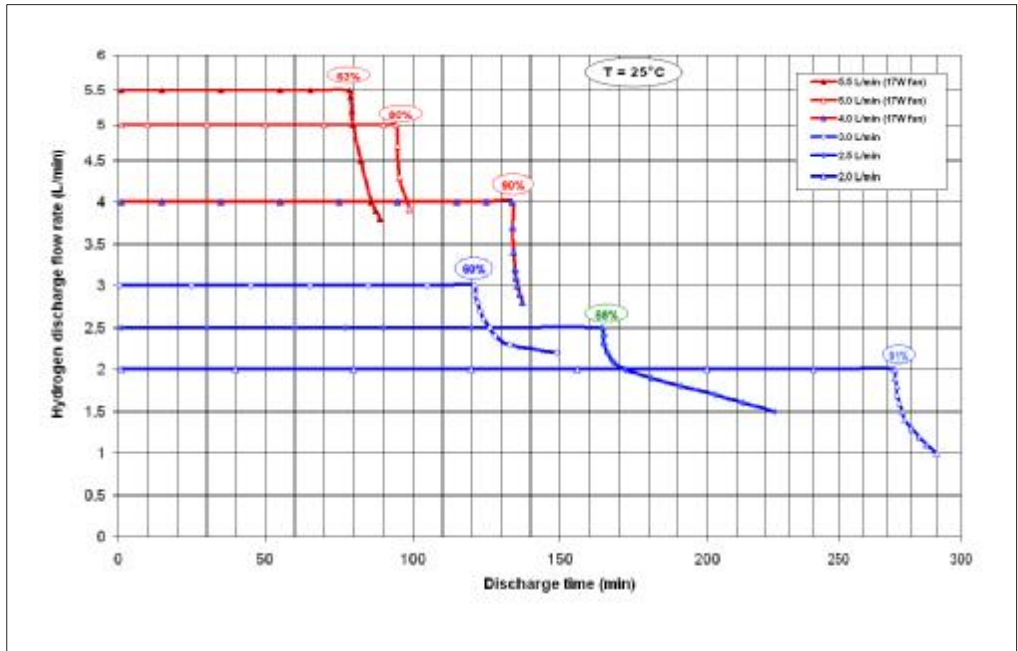
▲ BALLARD FC

High power FC (>2kw)

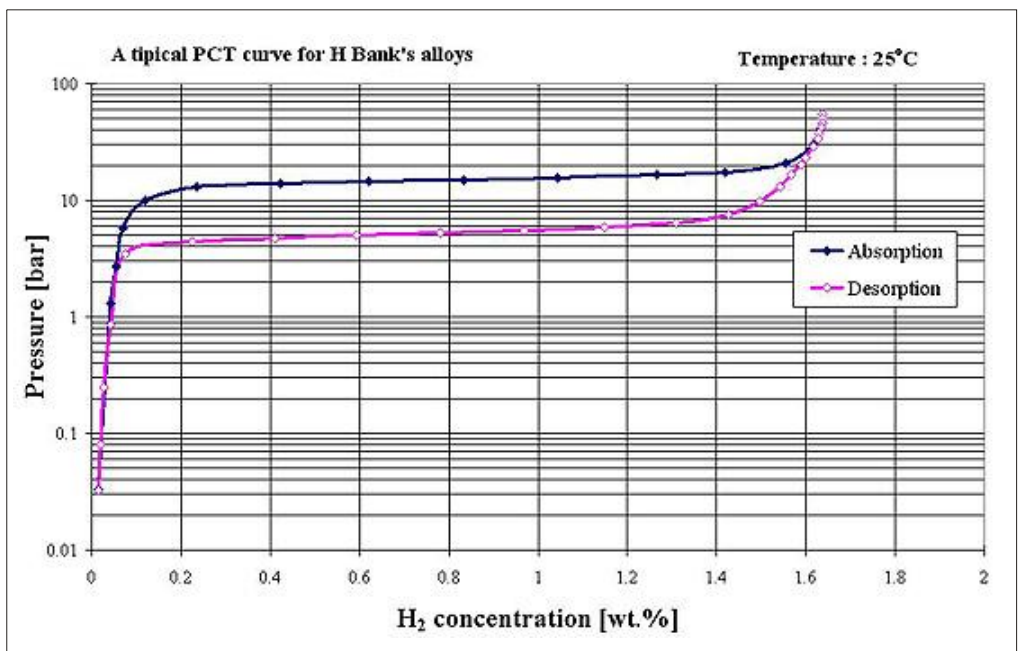


▲ PLUGPOWER FC

Discharge Map for 660Liter Capacity Hydrogen Storage Tank



AB₅ Alloy Hydrogen Alloy's PCT Curve





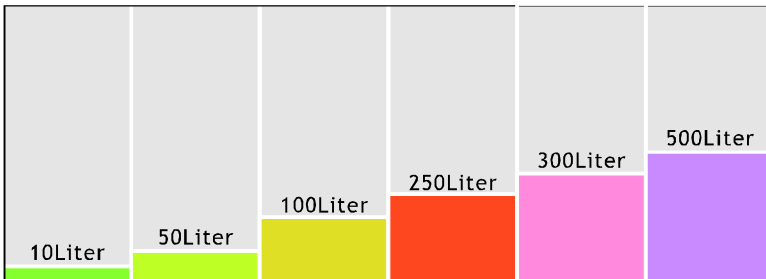
customer specified products



At present a number of well known companies are almost ready to produce Fuel Cell products with power from few watts up to several kilowatts. However, to create a real consumer market for Fuel Cells it still need to finalize the fuel storage solutions for these products as well as to create the refueling infrastructure for these storages.

We have successfully tested our storages with almost all commercial fuel cell products, so we have full confidence that our products have great potential for helping in commercialization of PEM Fuel Cells and putting them into the market.

H Bank Technology Inc. is ready and open for collaboration with any PEM Fuel Cell R&D and/or manufacturing companies in this field.



Available standard storage products from H Bank. (Capacity in liters)



Cell Phone



Notebook



Flashlight



Portable FC



Back up power



Boat



Car



Power plant



Features & Benefits

- Our storages are based on H Bank's patented AB₅ alloy with hydrogen absorption reversible capacity of 1.65 wt%. The unique composition and special production technology of alloy allowed the storages to operate over 3000 cycles.
- The bodies of our canisters are made from high-grade low carbon SS316L stainless steel, which ensure the system's necessary strength as well as prevents it from corrosion related negative effects.
- H Bank offers from 10 up to 660 liter standard hydrogen storage units. These units can meet the different demands of gas flow rate for all kinds of hydrogen propelling systems and hydrogen generators. Our highly extensible modular feature provides the best support for the fuel cell designers.
- H Bank hydrogen storage systems are designed to charge and discharge hydrogen at low pressures and are extremely efficient, steady and safe. Our designs make our hydrogen storage units friendlier to end users.
- H Bank offer complete technical support, after services and one year warranty for all products.
- In the past few years, H Bank products passed hundreds of tests with hydrogen generators and related devices. Besides the products, the core-tech team of H Bank has offered the superb consultant service for hydrogen solutions to our clients in the development of fuel cell and hydrogen-powered products.
- In offering the hydrogen required for generating power, the hydrogen storage system of H Bank also has cooling function which can be crucial in reducing the heat generated by the fuel cell stack and therefore increase the efficiency of the whole system.
- H Bank can provide tailor-made hydrogen storage systems which can meet our customer's specific demands on hydrogen pressure and flow rate as well as the storage volume, dimensions and shape.
- H Bank can provide professional assistance to developers of fuel cell and hydrogen-powered products in reducing the cost of storages with different capacities. Also, we accept OEM orders for specific specs and we would like to offer our assistance for product positioning so that we can support our client in the global competitiveness of their products.

Q & A

Q:How long is the lifespan of the metal hydride tank?

A:The only variable in determining the lifespan of our metal hydride tanks is the purity of the charging hydrogen if the charging instructions are strongly followed. The lifespan of our tanks is over 3,000 cycles if the purity of the charging hydrogen is kept at least 99.99%.

Q:How large is the flow rate while discharging hydrogen?

A:We can design the storage system to meet the demands of our clients in flow rate. During discharging, temperature is the only factor that can affect the steady flow rate of our systems. Heat absorption during discharging hydrogen will result in decreasing the temperature to such an extent that the ice may emerge on the appearance the tank and thus reduce the flow rate. H Bank is capable to design the storage system which can release the hydrogen at almost constant given rate while keeping the ice from happening.

Q:How to operate the charging and discharging procedures?

A:H Bank will provide the operation manual accompanying our product. With simple tools in hand, the end users can easily charge our tank by themselves.

To speed up the charging procedure, all the user need is to increase the tank's cooling speed by putting it into the cold water.



H Bank Technology Inc.
TEL:+886-2-2653-3300 FAX:+886-2-2785-7640
E-mail:service@hbank.com.tw
<http://www.hbank.com.tw>