



# **Metal Hydride Tank**

## **MH\_1500**

*Datasheet*



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## 1 To the attention of the user

This user's manual is adapted to the Metal Hydrid Tank which it has been delivered with. This is part of it and must not be removed or separated from it.

The following symbols are used in this manual to indicate safety issues and information:



Safety risks for personal and components  
Ignoring these instructions may cause  
severe injuries or hardware damages



Helpful note or advice  
risks of burn



Do not smoke



Do not use naked flame

## 2 Safety

### 2.1 Introduction

To insure a safety experience for personal and components, this material shall be used only for purpose and according to the instructions described in this manual, into the provided practical exercises or approved by PRAGMA INDUSTRIES.

In case of misuse or abuse, PRAGMA INDUSTRIES shall not be liable for resultant injuries and damages.

Anyone involved in the setup or use of this system must:

- Read, understand and follow instructions described in this manual.
- Being informed of the risks during manipulation and use of hydrogen.

All instructions given in this manual describe in details procedures to be followed during use of the MH10 and MH20, and additional safety features which must be considered as an integral part of instructions.

### 2.2 Sources of hazard

#### 2.2.1 Hydrogen tank use

Hydrogen tank (MH tank) provided with the Fuel Cell pack are using a mix of metallic powder able to create hydrides (a compound resulting from the absorption of hydrogen by a metallic crystal). Thus, hydrogen isn't stored as a gas under pressure, but as a powder. Even if this technology removes all the risks bound to under pressure storage, following instructions have to be respected:

- MH tank must be manipulated with caution to insure safety and life span. Be sure of having read instructions about MH tank refilling before starting to use them.
- Do never let the MH tank alone during refill.
- Do never use damaged tank.
- Do not burn, drill, or open the metallic tank. In case of powder leakage, risks of burn. In case of contact with skin or eyes, rinse with water.
- Metallic powders are very sensitive to moisture and oxygen. Exposure to these elements may lead to a quick degradation of storage capacity. Consequently, MH tanks are equipped with a valve which closes when male fitting is removed. Do never store MH tank with male fitting inserted.
- MH tank must not be exposed to temperature higher than 45°C (113°F).
- MH tank must be stored in a dry place, far from heat and moisture sources.

### 3 Technical specifications

Using metal hydrides technology, Metal hydrides tanks doesn't contain any hydrogen under pressure, but chemically stored into powder. Even if it is safer than under pressure tank, this technology requires respecting some rules, as described on page 4, to insure a good life span and safety use.

Metal hydrides used into this tank is AB<sub>5</sub> type, where A is a 'rare-earth' element and B a transitional metal. These compounds are able to absorb hydrogen according to the following reversible chemical reaction:



When used and stored in good conditions, filled with good quality hydrogen (>99,99%), this tank has a life span of more than 2 000 cycles of discharge.

For more information, please refer to the dedicated chapter into the supplied course.



***Do not open! Do not drill!***

***Tanks contains AB<sub>5</sub> type metal hydrides which can burn when in contact with air and ignition source***

***MH tank must be used only with 99,99% pure, dry hydrogen (Industrial gas, or electrolyzer + dryer)***



***Metal hydride powder is sensible to moisture. MH tank must not be stored with male fittings***

***Risks of destruction!***

## 4 Technical specifications

<b>Hydrogen Capacity</b>	1500 N liters Hydrogen
<b>Diameter</b>	145 mm
<b>Length</b>	350 mm
<b>Weight</b>	14 kg (9 kg Metal Hydride)
<b>Vessel Material</b>	Al alloy type EN-AA-6063
<b>Heat Exchanger (internal)</b>	Cu
<b>Safety valve</b>	open at 17 Bars
<b>Charging Pressure</b>	10 Bar (g)
<b>Charging temperature</b>	25°C
<b>Charging time</b>	1 hour (with heat exchanger)
<b>Discharging Pressure</b>	10 to 2 Bar (g)
<b>Discharging temperature</b>	20-40°C

**Hydride Material:** Nickel based alloy - metal hydride type LaNi<sub>5</sub>

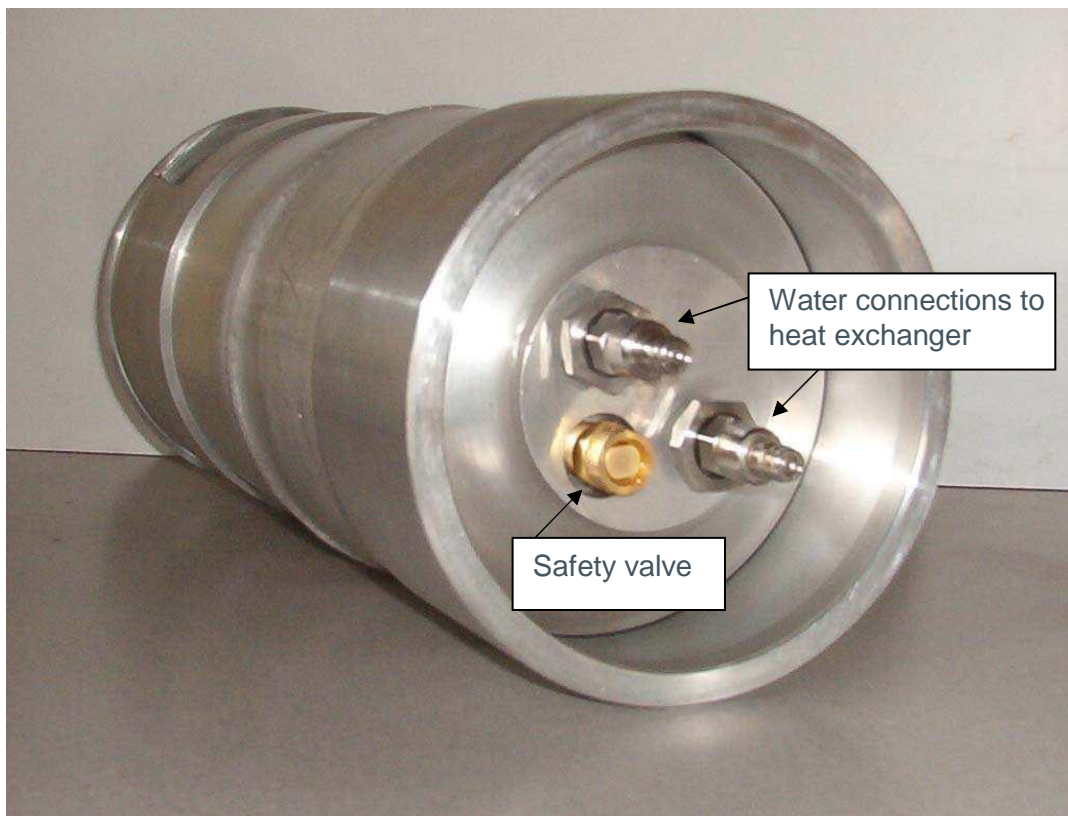
**Chemical formula:** (LaCe)Ni<sub>5</sub>

Enthalpy of hydride formation -30.8(kj/mol)

**Size:** Powder with particles less that 0.1 mm.

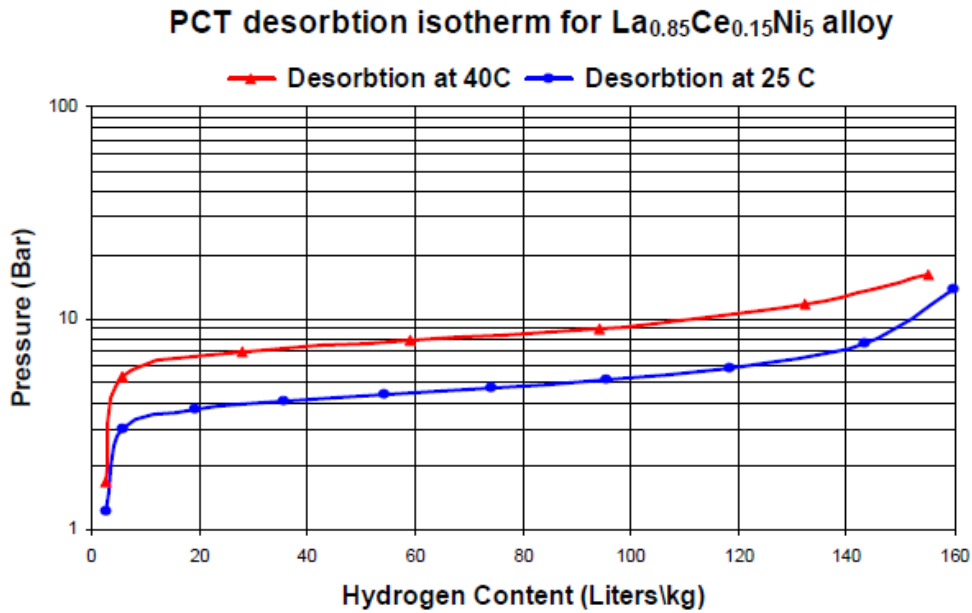


## 5 Connections

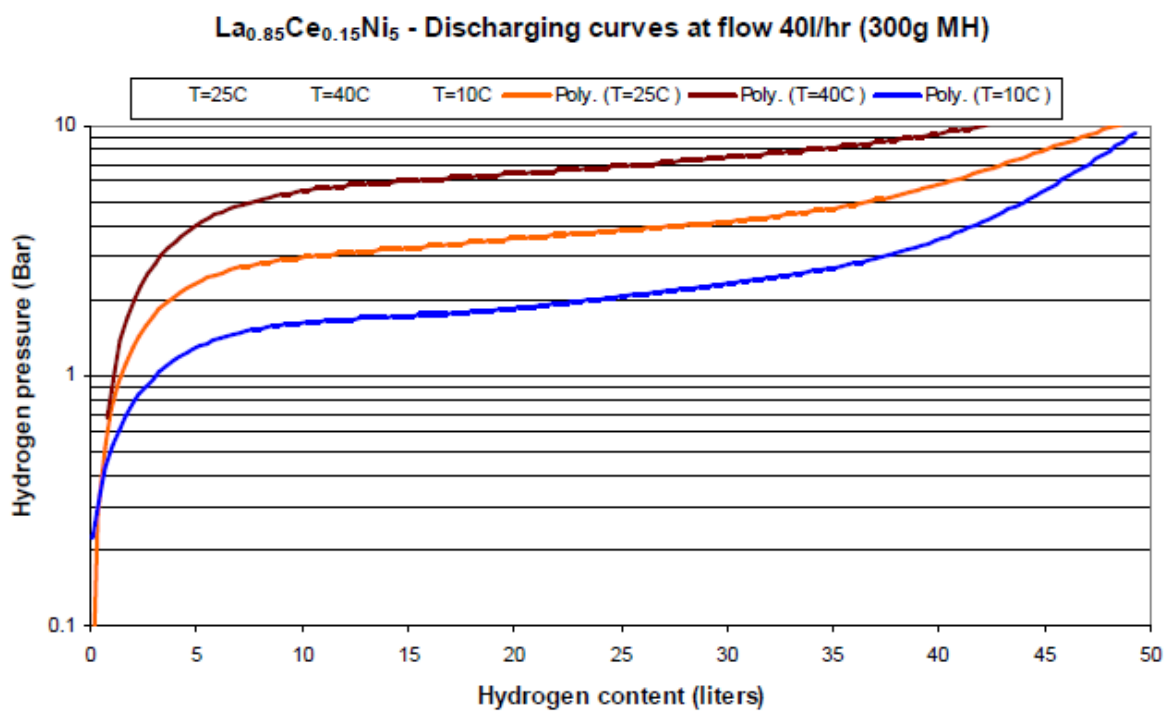


## 6 Thermodynamic properties of metal hydride

### 6.1 Equilibrium points



### 6.2 Pressure drop when you discharge for one hour. discharging time





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