GSA Gas Dryers

Hydrogen(H2)
Hydrogen Deoxidation equipment
Global Standard Air & Gas

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Why H_2 Dryer?

What H_2 Dryer Can Do

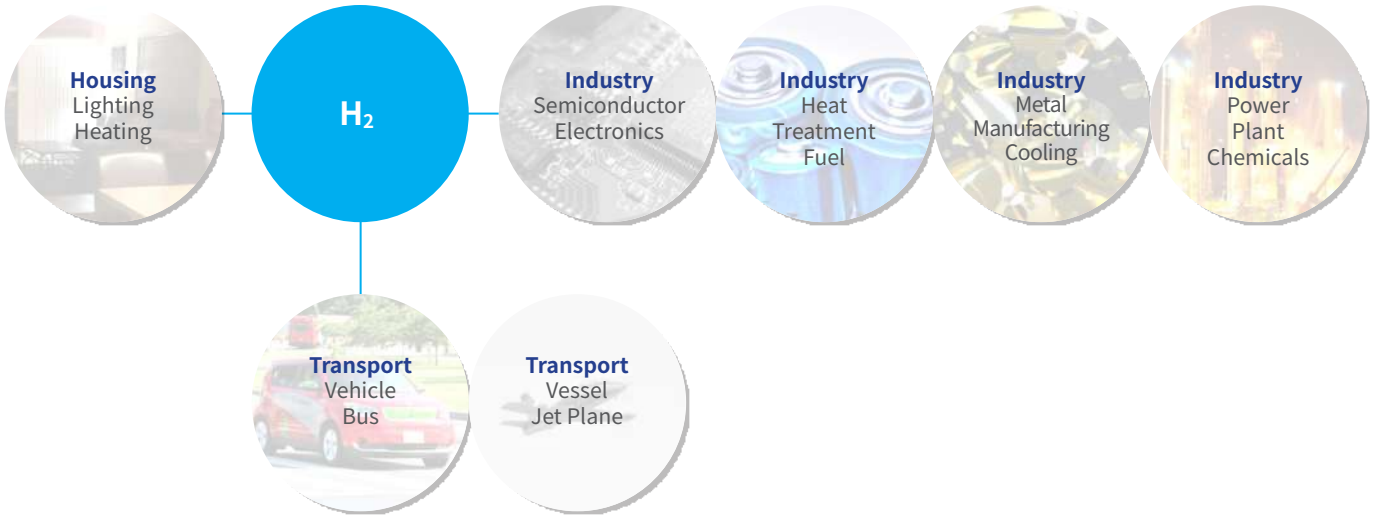
Due to greenhouse gas issues such as carbon dioxide resulting from the excessive consumption of fossil fuels and climate changes, there has been a rising interest and demand for eco-friendly energy resources. As a result, hydrogen has drawn an attention as a new energy source substituting fossil fuels. As an ultimate environment-friendly energy source, hydrogen is a clean unlimited resource which does not generate any byproducts other than water. Lately, this natural gas has become more diverse in terms of applications including hydrogen fuel cell vehicles.

As hydrogen draws a more attention as an alternative energy source, people's interest in how to produce hydrogen has also increased. The most common hydrogen production method is to use by-product hydrogen through the separation of hydrogen-mixed gases generated during the petrochemical process. In addition, there is a way to reform of natural gases produced through decomposition into high-temperature/high-pressure vapor. The reforming of natural gases is the most common method which enables hydrogen production at low prices. Lastly, there is an electrolysis method which enables the acquisition of hydrogen through water electrolysis.

Since hydrogen purity has a significant influence on performances such as fuel cells, refining technology is crucial in acquiring high-purity hydrogen.
A hydrogen dryer is a system designed to purify hydrogen by eliminating oxygen in the hydrogen, using the palladium (Pd) catalyst and adsorbent.




Applications of Hydrogen Gas



Shift to Hydrogen Society

There have been a lot of R&Ds on alternative energy around the globe, and hydrogen has taken center stage. A lot of countries including the U.S., Europe and Japan as well as the Republic of Korea have made continued efforts to take over hydrogen economy in advance and for a shift to a hydrogen society.

In such transition to a H_2 society, the production and quality of hydrogen are critical. There should be a plan to increase hydrogen production at lower prices and enhance the quality of hydrogen gas.

GSA is preparing for a hydrogen society through continued R&Ds on diverse products including H_2 dryer to improve the quality of hydrogen.


Features and Operating Mechanism

Operating Mechanism

A H_2 dryer is apparatus designed to adsorb and remove water through hydrogen-oxygen reaction, using a desiccant in the absorber. The hydrogen is heated up to about 100°C for easy reaction in the pre-heater and the heated hydrogen gas flows into the catalyst tower filled with palladium. In a catalyst tower, water is generated through hydrogen-oxygen reaction. This water is cooled and flown into an absorption tower for easy adsorption with hydrogen in the pre-cooler. The water produced while being cooled in the pre-cooler is drained out.

The two absorption towers remove water by taking turns. While one absorption tower is executing drying process, the other one engages in regeneration process to remove the absorbed water.

The regeneration process designed to eliminate absorbed water in the desiccant is divided into heating and cooling processes. During the heating process, a desiccant is regenerated while removing and cooling the adsorbed moisture by heating the desiccant, using hydrogen heated by the regeneration heater and regeneration cooler. Once the heating regeneration process is complete, the cooling process targeted to reduce the temperature of the dried desiccant is initiated. Then, the regeneration heater stops.

If the desiccant regeneration is done, two absorption towers are switched. In the tower where adsorption is performed, then, the regeneration process is executed. In the tower where such regeneration process is completed, absorption is executed.

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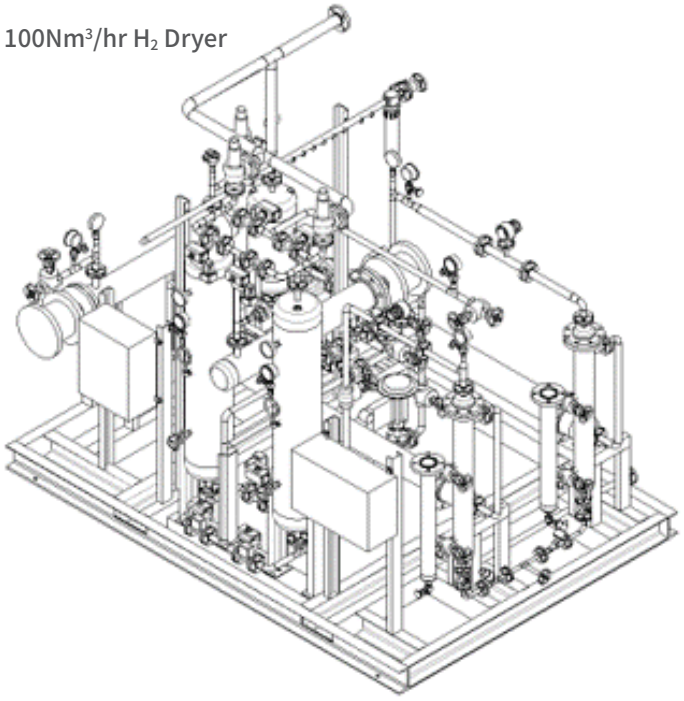
H_2 Dryer Applications and Installation

- Purifies hydrogen produced in the hydrogen PSA
- Purifies hydrogen produced through the electrolysis system
- Purifies hydrogen by installing the system in the hydrogen supply line
- Required to provide cooling water and hot steam
- Able to design an explosion-proof heater instead of hot steam

Features

- A specially designed explosion-proof heater used;
  able to construct the system without steam which is used in the pre-heater and regeneration heater
- A 5-step level switch used; water drained out smoothly and a leak of hydrogen caused by failure prevented
- Great operating performances with reliable valves and measuring meters
- High-quality desiccant and catalyst used
- Precise system control through diverse measuring instruments such as control valve and flow meter
- Diverse design code : KS, ASME, GOST, DOSH, etc.
- A high-efficiency heat exchanger applied to both pre-cooler and regeneration cooler
- Able to design in diverse specifications according to user needs

100Nm³/hr H_2 Dryer



Components

System Components