

# Type-4 CNG CYLINDER

## Installation instructions



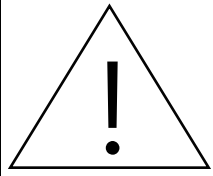
 Hanwha Solutions/Advanced Materials

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## ■ WARNING TAG



Read carefully this **installation instruction manual** and use the product properly. Signs are used to prevent damage toward the user and other people. Be sure to use it after confirming usage and product specifications.

### ● Following signs indicate general attention and warning for uncertain risk



**DANGER**

This sign indicates the risk of death or serious wound is foreseeable if the user ignores and wrongly handles.



**WARNING**

This sign indicates the risk of serious wound is foreseeable if the user ignores and wrongly handles.





**CAUTION**


This sign indicates the risk of being injured or physically damaged is foreseeable.

- ◆ Before using this product, please read carefully this **instruction manual** for use.
- ◆ Also, always keep this Manual in a conspicuous place

● **Following signs indicate attention, prohibition and enforcement for specified risk**

 <p><b>Danger</b></p>	<p><b>Danger</b></p> <ul style="list-style-type: none"><li>● DO NOT disassemble, repair or remodel this container at your need. Explosion and leakage may occur.</li><li>● If this product requires repairing, contact the head office. Head office: 32, Hwajeongsandan 3-ro, Gangseo-gu, Busan, Korea Tel: +82-2-729-2899 Fax: +82-2-729-2363 E-mail: hpark1024@hanwha.com</li><li>● DO NOT disassemble the valve from the container while it is operation.</li><li>● Be sure that valve seat is tightened before providing working pressure. If the valve seat is tight it by hand wheel without fall.</li></ul>
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 <p><b>WARNING</b></p>	<p><b>Warning</b></p> <ul style="list-style-type: none"><li>● All work on cylinders and gas equipment should be performed by trained staff.</li><li>● DO NOT use this product beyond the scope of the specification. Using the product outside the specifications may fail, and stop functioning. It may also significantly reduce the service life of the product.</li><li>● Be careful not to damage the container during handing.</li><li>● DO NOT use unapproved pressure relief device or valve. It may cause an explosion or serious damage to operator.</li><li>● DO NOT use the valve beyond the scope of working temperature and working pressure. If the valve is used under high temperature and high pressure, it may cause failure or explosion.</li><li>● Inside pressure of the container must be drained and be sure to be no pressure(zero) before removal valve from container. It may cause an explosion or serious damage to operator.</li><li>● In radius of 10 meters around the cylinder, smoking and fire is prohibited.</li></ul>
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 <p><b>CAUTION</b></p>	<p><b>Caution</b></p> <ul style="list-style-type: none"><li>● The service life is provisionally limited to 20 years.</li><li>● The containers shall be subjected to visual inspection of the outside surface at least every 3 years.</li></ul>
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## 1. CONTAINER TYPE

- CNG-4 container

Resin impregnated continuous filament with a non-metallic liner (all composite).

## 2. APPLICATION

- The container is specially designed for the on-board storage of high pressure compressed natural gas as a fuel for automotive vehicles to which the containers are to be fixed.

## 3. SERVICE CONDITIONS

- Service life:

The service life is provisionally limited to 20 years.

- Temperature range:

Settled temperature of gas in containers may vary from a low of -40°C to a high of 57°C

The temperature of the container materials may vary from -40°C to 82°C

Use of fusible plug TPRD is designed to prevent the burst of the container in the event of vehicle fire. Therefore, the fusible plugs in the valves should not be replaced with solid plugs or other valves.

## 4. INSTALLATION OF CYLINDER

### **Danger !**

Improper handling and storage of cylinder may result in personal injury, death, and property damage

Do not puncture or drop the cylinder will lead to death or serious injury and property damage.

Never expose the cylinders to temperatures exceeding 82°C

### **Warning !**

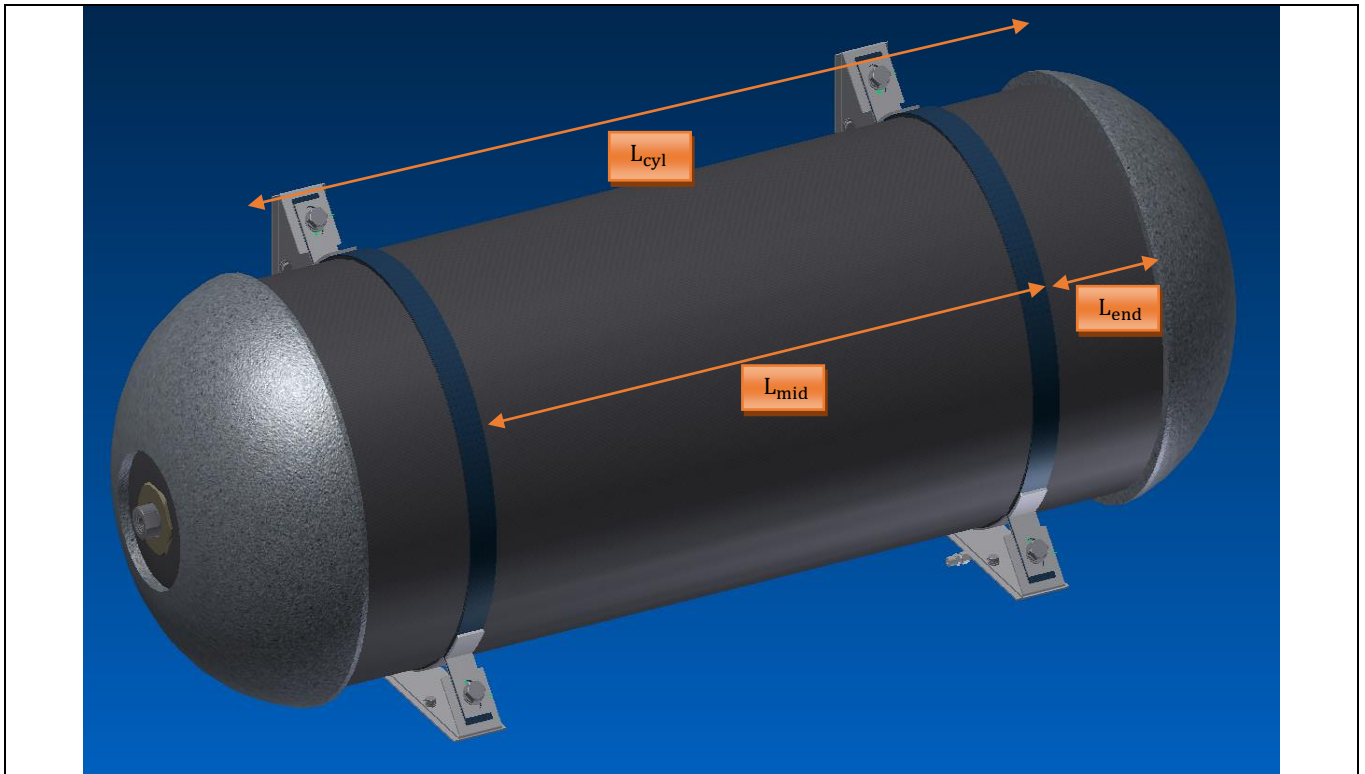
The container shall be mounted in a manner that adequately restrains the container but does not induce damage. Check looseness in the mounting system and fuel & vent lines by grasping them firmly and trying to separate them. In addition, look for trace of abrasion between components, which may be indicated by shiny or burnished spots on either the components or the vehicle.

The container assembly shall be mounted at least 100mm from the exhaust system of the vehicle. It must be assured that the top surface of the cylinder does not exceed 65°C

If the cylinder is planned to be installed in the undercarriage of the vehicle, the cylinder shall be sufficiently protected against loose articles (e.g. heavy tools) or aggressive media (e.g. solvents).

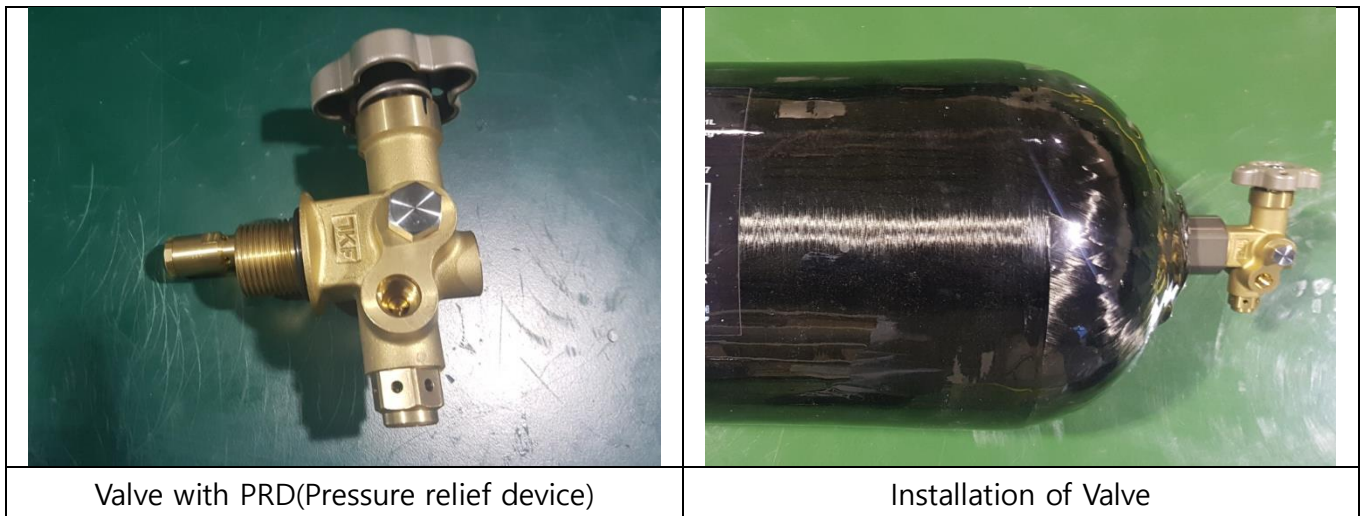
Verify that lines connected to the container are installed in a manner that prevents damage to the plumbing when the container expands under pressurization.

## 4.1 Bracket mounting



1. The distance between the strap-mounting ( $L_{mid}$ ) shall be longer than 1/2 times the cylinder length ( $L_{cyl}$ ), ( $L_{mid} = \frac{1}{2} \times L_{cyl}$ )
2. In general, the strap-mountings should be installed at the point at least 50mm away from the outer ends of the cylinder.
3. When using strap-mountings, rubber layers shall always be between the strap and the cylinder.
4. The rubber layer absorbs the axial and circumferential expansion of the cylinder without damaging the surface of the cylinder.
5. A new rubber strip must be installed between the cylinder and each metal mounting strap to protect the composite part of the cylinder
6. While installing the rubber strip on the metal mounting strap, make sure that the metal strap has a uniform curvature around the whole strap.

## 4.2 Installation of Valves



Valve with PRD(Pressure relief device)

Installation of Valve

During assembly of valves, please follow, the instruction as below.

1. Only certified valves and relief devices are to be used.
2. Ensure that the thread of the valve and adapter is compatible to the cylinder threads.  
Hanwha Solutions cylinders have a connecting thread of 1.125-12UNF.
3. Check all threads for damage and dirt. Remove dirt with a clean cloth. Damaged parts must be replaced.
4. Check valve for damages.

During the complete preparation, cylinders need careful handling. Any impact, drop damage or other visible damage (e.g. scratches or notches  $t > 0.5\text{mm}$  or surface damage) must be recorded and reported to Hanwha Solutions as soon as possible.

5. Tighten the valve with the proper specialty tool with a torque of 135Nm. Applying a torque of 135Nm +/- 5Nm to the adapter for cylinder is required.

VALVE TORQUE VALUE TABLE		
Thread	Min. N-m	Max. N-m
1.125-12UNF	130	140

6. Mark from valve to the cylinder with a drop of sealing mark or paint.
7. Record the change of the valve in the documents.
8. Test the system of cylinder , adapter, and valve for leaks.