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COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS AND ON THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS

Sub-Committee of Experts on the Transport of Dangerous Goods

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PROPOSALS OF AMENDMENTS TO THE RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS

Proposals of supplement to the packing containers of Calcium Carbide and its safety measures

Transmitted by the expert from China

Background

Calcium Carbide (UN No.1402) belongs to substances (4.3) which emit flammable gas when it meets with water. The combustion and explosion is easy to take place when its packing or handling is not appropriate for transport process. For safety transportation, the packing requirements of Calcium Carbide and its relevant safety measures have been prescribed concretely in 14th revised edition of United Nations “Model Regulations on the Transport of Dangerous Goods” (for short, “Model Regulations”).

The relevant provisions concerning dangerous features and packing requirements of Calcium Carbide in Model Regulations as follows:

| UN No. | Name and description | Class or division | Subsidiary risk | UN packing group | Special provisions | Limit quantities | Packagings and IBCs | | Portable tanks and Bulk containers | |
|--------|----------------------|-------------------|-----------------|------------------|--------------------|------------------|---------------------|----------------------------|------------------------------------|--------------------|
| | | | | | | | Packing instruction | Special packing provisions | Instructions | Special provisions |
| 1402 | CALCIUM CARBIDE | 4.3 | | I | | NONE | P403 IBC04 | B1 | T9 | TP7 TP33 |
| | | 4.3 | | II | | 500g | P410 IBC07 | B2 | T3 | TP33 |

According to TP7 of section 4.2.5.3 of Model Regulations: After Calcium Carbide is encased in portable tank or bulk container, “Air shall be eliminated from the vapour space by nitrogen or other means.” It may be called "protecting method of filling nitrogen".

The aim of this kind of method is to eliminate the oxygen contained inside the container. But in practice, it results in complicated packing operation and significant costs for packing of Calcium Carbide. It is well known that the three elements of combustion and explosion for packed Calcium Carbide after its packing are acetylene, oxygen and source of ignition which exist simultaneously, and each element's quantity reach or is above the lower scope of the critical value. As long as eliminate any element of three elements or control its quantity out of scope of critical value, the combustion and explosion would not be taken place. In fact, it is difficult to control the source of ignition, because any quake and shock in transport process of Calcium Carbide may create sparks. But controlling the oxygen would make the operation and costs of packing of Calcium Carbide complicated and increased simultaneously. Therefore, Chinese suppliers tried to find a useful method which can prevent the combustion and explosion through controlling the acetylene contents in packing container of Calcium Carbide from the 1990's of last century. After many tests, the useful method has been found. The method is to check the acetylene contents in packing container of Calcium Carbide and make sure the acetylene contents is less than 1% (by volume) before sealing up the container without filling nitrogen. With more than 10 years' practice of the method's application in Chinese local railway transport and export shipping to Japan, there is no accident of combustion and explosion.

The explosive scope of acetylene in air is 2.5~100% (by volume). Videlicet, when acetylene contents in air are less than 2.5%, the combustion and explosion would not be to take place. Put the controlling target below 1% just to be 40% of the lower limit of explosive scope of acetylene, therefore the safety can be guaranteed. Because the controlling target of this method prescribed is concrete and clear, it is easy to accurately measure by acetylene test gauge, simple and fast in operation, not only lowering the costs of packing of Calcium Carbide but also insuring the transport safety.

Proposals:

1. Adding one sentence behind the original contents of TP7 in section 4.2.5.3 of Model Regulations:
For UN1402, the acetylene contents in container should be controlled to be less than <1% (by volume).
2. Adding Behind the original contents of B1 of IBC04 and IBC07 in section 4.1.4.2 of Model Regulations: For UN1402, the acetylene contents in container should be controlled to be less than <1% (by volume).
