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PEOPLE'S REPUBLIC OF CHINA**

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Guidance for electric vehicle firefighting and emergency rescue

电动汽车灾害事故应急救援指南

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Foreword

This Standard was drafted as per the rules specified in GB/T 1.1-2009. This Standard was proposed by the Ministry of Industry and Information Technology of PRC. This Standard shall be under the jurisdiction of National Technical Committee for Standardization of Automobile (SAC/TC 114). Drafting organizations of this Standard: Shanghai Fire Research Institute of Ministry of Public Security; China Automotive Technology & Research Center

Co., Ltd.; Beijing Electric Vehicle Co., Ltd.; BYD Automobile Industry Co., Ltd.; Technical Center for SAIC Motor Corporation Limit; Contemporary Ampere Technology Ltd.; Fire Department of Ministry of Public Security; China FAW Group Co., Ltd.; Pan Asia Technical Automotive Center Co., Ltd.; and Zhengzhou Yutong Bus Co., Ltd. Chief drafting staffs of this Standard: Cai Liying, He Ning, Li Peng, Fu Hedong, Lu Chun, Liu Guibin, Xue Lin, Zhang Yongfeng, Huang Hao, Tan Yi, Zhang Lei, Liu Chaohui, Fu Jiewen, Song Fang, Wu Pei, and Huang Dongyi. Guidance for Electric Vehicles Fire Fighting and Emergency Rescue

1 Scope

China's national guidance on firefighting and emergency rescue involving electric vehicles. It specifies the terms and definitions, the basic principles, the identification of the vehicle, and the response. It is the operational counterpart to the standard requiring manufacturers to publish a rescue sheet, and it addresses what a crew should actually do. An electric vehicle fire behaves unlike a conventional one in ways that matter tactically. A lithium battery in thermal runaway generates its own oxygen, so smothering does not work; the fire can reignite hours or days after it appears extinguished, so the vehicle must be isolated and watched; and the quantity of water needed to cool a battery pack is far greater than for a petrol fire, because the object is to remove heat from cells rather than to extinguish flames. Identification comes first in the guidance for the obvious reason: many electric vehicles are not obviously electric.

This Standard gives guidance on the fire fighting and emergency rescue in the event of a fire, collision, or water bubble for an electric vehicle. This Standard is applicable to the full-time rescue personnel for emergency rescue against the pure electric vehicles and hybrid electric vehicles. This Standard is inapplicable to the emergency rescue of the fuel cell electric vehicles.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB/T 5907 (all parts) Fire Protection Vocabulary

GB/T 19596 Terminology of Electric Vehicles GA/T 1276 Guidelines for Extricating Trapped Persons in Road Traffic Accidents

3 Terms and Definitions

For the purpose of this document, the terms and definitions given in GB/T 5907 and GB/T

19596 and the following apply.

3.1 Offensive attack When a person is trapped or the high-voltage battery does not catch fire, an offensive fire extinguishing tactic is adopted under the condition of good personal protection.

3.2 Defensive attack When the high-voltage battery is ignited and no one is trapped, a defensive fire extinguishing tactic is adopted under the insufficient fire-extinguishing conditions.

4 Basic Principles

4.1 Evaluation When an electric vehicle occurs a disaster accident, it is necessary to firstly evaluate the scene; and judge the damage of the accidental vehicle's power battery and high-voltage electrical system and the risk factors and consequences of explosion and combustion caused by the power battery through external observation and instrument monitoring. Prepare for the accident rescue.

4.2 Alert

4.2.1 For the accident scene, first of all, it is necessary to consider the situation of the scene; determine the alert range; and set up alert signs.

4.2.2 A working area is usually set within 10m around the accidental vehicle; irrelevant vehicles, people, and vessels are prohibited from entering as far as possible. An operating area is set within 5m; and only rescue personnel directly responsible for treating or rescuing the trapped are allowed to enter.

4.2.3 It is necessary to continuously monitor flammable and toxic gases; monitor the temperature of the power battery part of the accidental vehicle; and adjust the alert range in a timely manner.

4.3 Leakage disposal

4.3.1 When any liquid other than the electrolyte leaks from the vehicle, it shall be disposed of in accordance with the fuel vehicle disposal method.

4.3.2 When the electrolyte leaks, there is a large amount of toxic gas overflowing. It is necessary to wear a full set of respiratory protective equipment and control the external fire source to avoid the electrolyte being ignited.

4.3.3 If possible, it is advisable to use an adsorbent material to collect the electrolyte as much as possible to prevent it from polluting the environment.

4.4 Rescue personnel capabilities and equipment

4.4.1 Technical capabilities Rescuers need to be familiar with electric vehicles and their

structures; and receive relevant training to quickly cut off power and avoid the threat of high voltage electricity at the scene of the accident.

4.4.2 Personal protective equipment In the event of an electric vehicle accident, especially when the battery is damaged or burned, in addition to the danger of electric shock, a large amount of toxic and harmful gases shall be released. To ensure the safety of rescuers, personal protective equipment shall be worn as follows:

- a) When dealing with fire accident, rescuers shall wear full sets of personal protective equipment and respiratory protective equipment as much as possible;
- b) When dealing with collisions and wading accidents, rescuers shall wear a full set of electrical insulation equipment as much as possible; and wear the necessary water rescue protective equipment for water rescue.

5.1 Vehicle external sign identification

5.1.1 Vehicle number plate identification If the vehicle number plate is not damaged, the national electric vehicle number plate rules can be used to identify whether the accidental vehicle is electric vehicle, such as a green number plate.

5.1.2 Electric vehicle identification The vehicle can be determined whether it is an electric vehicle by observing the body, especially if there is an electric vehicle sign on the trunk lid at the rear, such as "EV", "Hybrid", "electric vehicle", and "hybrid power".

5.2 Vehicle internal sign identification

5.2.1 The position of high-voltage components and power-off switches can be known in advance based on vehicle information.

5.2.2 When operating the vehicle, firstly observe the conditions of the high-voltage/low-voltage cables or components; especially the orange high-voltage cables or components. At the same time, other related signs need to be checked.

6 Vehicle Fixing

6.1 Fixing wheels It should be according to the state and location of the accidental vehicle, reasonably adopt short-feet, long-feet and other stable technologies; use supporting rods and other equipment to effectively stabilize the vehicle body; create safe operating conditions; and effectively prevent the vehicle from moving.

6.2 Vehicle braking device According to the braking devices of different vehicles, make sure that the vehicle is parked as much as possible.

7 Turn-off the Power