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**Earth-moving machinery - Battery electric wheel loaders for
plateau tunnels**

土方机械 高原隧道用纯电动轮胎式装载机

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Table of Contents

1	Scope
2	Normative references
3	Terms and definitions
4	Parameters
5	Requirements
5.1	General requirements
5.2	Performance requirements
5.3	Safety requirements
6	Test methods
7	Inspection rules
8	Signs, packaging, transport and storage
A	Annex A (informative) Main parameters of battery electric wheel loaders
B	Annex B (informative) Battery electric wheel loader test record
	Bibliography

Foreword

SAC/TC 334 is in charge of this English translation. In case of any doubt about the contents of English translation, the Chinese original shall be considered authoritative.

This standard is drafted in accordance with the rules given in the GB/T 1.1-2020 Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents.

Attention is drawn to the possibility that some of the elements of this standard may be the subject of patent rights. The issuing body of this document shall not be held responsible for identifying any or all such patent right.

This standard was proposed by China Machinery Industry Federation.

This standard was prepared by SAC/TC 334 National Technical Committee on Earth-moving Machinery of Standardization Administration of China.

1 Scope

China's national standard for the battery electric wheel loader built to work inside a tunnel on the high plateau, and it exists because two hard problems meet in the same machine. The first is the tunnel: a diesel loader working a heading burns oxygen and fills a confined

space with exhaust, and the ventilation plant that keeps the face breathable is one of the largest costs of driving a tunnel at all. Take the engine out and that cost falls away, along with the noise and the heat. The second is the altitude: above two thousand metres the thin air derates a diesel engine badly, but it also thins the insulation clearances of electrical equipment, changes how air cooling works, and puts the battery through a wide daily temperature swing - which is why the standard leans on the plateau apparatus standard and on the insulation coordination standard rather than treating the machine as an ordinary electric loader. This document specifies the parameters, requirements, inspection rules, signs, packaging, transport and storage of battery electric wheel loaders for plateau tunnels and describes the corresponding test methods. It applies to the manufacture and testing of wheel loaders for plateau tunnels whose operating energy is supplied entirely by an on-board rechargeable energy storage system and whose maximum motor-driven operating voltage falls in class B. This record is drawn from the official English translation issued by the standardization body, not from a translation of our own.

This document specifies the parameters, requirements, inspection rules, signs, packaging, transport and storage of battery electric wheel loaders for plateau tunnels, and describes the corresponding test methods.

This document is applicable to the manufacturing and detection of wheel loaders for plateau tunnels, with the operation energy fully powered by the on-board rechargeable energy storage system and maximum motor-driven operation voltage classified as class B voltage.

2 Normative references

The following documents contain provisions which, through normative reference in this text, constitute essential provisions of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

The documents cited run from GB/T 4208 through the earth-moving machinery series, the electric vehicle and power battery standards and the plateau and low-voltage insulation standards, to JB/T 5947, JB/T 12462 and JB/T 12463; the complete list with the full titles is given under the normative references of this record.

3 Terms and definitions

For the purpose of this document, the terms and definitions given in GB/T 25602, GB/T 25604, GB/T 44254 and the following apply.

3.1 battery electric wheel loader for plateau tunnels: wheel loaders applicable to working in plateau tunnels, with the operation energy fully powered by the on-board rechargeable energy storage system and driven by electric motors.

4 Parameters

The main parameters of battery electric wheel loaders for plateau tunnels (hereinafter referred to as battery electric wheel loaders) are given in Annex A.

5.1 General requirements

5.1.1 Battery electric wheel loaders shall be able to work normally in plateau tunnels under the following conditions: a non-explosive environment; an altitude within the band stated in this clause; an ambient temperature within the range stated in this clause; and a relative humidity not exceeding the value stated there.

5.1.2 The cabs of battery electric wheel loaders shall be equipped with warnings and information indicating the machine conditions, including indicator signal of the machine availability, system fault warning, battery state of charge (SOC), battery voltage, battery temperature, motor speed, and motor temperature.

5.1.3 Battery electric wheel loaders shall be equipped with charging function, and should have battery swapping function.

5.1.4 The motor controller shall conform to the applicable provisions given in GB/T 18488.

5.1.5 The hydraulic system's oil, solid, and particle contamination grade code of battery electric wheel loaders shall not be higher than the code specified in GB/T 14039-2002 and named in this clause.

5.1.6 The transmission system's oil, solid, and particle contamination grade code of battery electric wheel loaders shall not be higher than the code specified in GB/T 14039-2002 and named in this clause.

5.1.7 Heat balance temperatures of all systems of battery electric wheel loaders shall conform to the provisions specified by the manufacturer.

5.1.8 A newly-produced machine shall not have any leakage before leaving the factory.

5.1.9 The power battery performance shall conform to the provisions of GB/T 44257.2.

5.1.10 The operator's manuals of battery electric wheel loaders shall conform to the provisions of GB/T 25622.1.

5.2 Performance requirements

5.2.1 Battery electric wheel loaders shall be able to operate continuously for no less than the time stated in this clause after a full charge or battery-swapping.

5.2.2 The gradeability of battery electric wheel loaders under rated load shall not be less than the value stated in this clause.

5.2.3 The other performance requirements of battery electric wheel loaders shall conform to the provisions given in GB/T 35199-2017, 5.2.5.

5.3 Safety requirements

5.3.1 Access systems: the access systems of battery electric wheel loaders should conform to the provisions given in GB/T 17300.

A Annex A (informative) Main parameters of battery electric wheel loaders

Annex A carries Table A.1, Main parameters of battery electric wheel loaders, which lists the parameters by which a machine of this type is described commercially.

B Annex B (informative) Battery electric wheel loader test record

Annex B carries the two record forms used when the machine is tested: Table B.1, Operation performance test record, and Table B.2, Comprehensive heat balance test record.