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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 20721-2022

Replacing GB/T 20721-2006

Automated guided vehicles - General specifications

自动导引车 通用技术条件

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1 Scope

China's national general specification for automated guided vehicles. It specifies the product classification, the technical requirements, the test methods, the inspection rules, and the marking, packaging, transport and storage, and it applies to the design, manufacture and inspection of automated guided vehicles. An AGV is a machine that moves loads through a space where people also work, without a driver, and that single fact governs the whole document. Everything else about the vehicle - the guidance method, whether magnetic tape, inductive wire, laser triangulation, natural feature navigation or vision; the drive and steering arrangement; the load handling, whether fork, roller, latent or tow; the battery and its charging regime - is a design choice within a range the standard has to accommodate rather than narrow. What cannot be a choice is the safety behaviour. So the specification fixes the obstacle detection and the protective stop, the stopping distance as a function of speed and load, the emergency stop and its release, the warning devices, the behaviour on loss of guidance or of communication, the speed limits in different zones, and the requirements for operation among pedestrians. Around that sit the performance characteristics a buyer specifies against: the rated load and the travel speed, the positioning and repeat positioning accuracy at a station - which determines whether automatic transfer works at all - the gradeability, the battery endurance and charging time, and the noise. And the environmental and electromagnetic requirements matter because an AGV operates in a warehouse or a workshop full of radio traffic and metal structure. Issued on 15 April 2022 and in force since 1 November 2022, it replaces GB/T 20721-2006.

This Standard specifies product classification, technical requirements, test methods, inspection rules and marking, packaging, transportation, storage for automatic guided

vehicles. This Standard is applicable to the design, manufacture and inspection of automated guided vehicles in the fields of warehousing, production lines, transportation, and manufacturing.

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Notes and Explanations

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2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 191, Packaging and storage marks

GB/T 2423.55, Environmental testing for electric and electronic products - Part 2: Test method - Test Eh: Hammer tests

GB/T 4208, Degrees of protection provided by enclosure (IP code)

GB/T 5226.1-2019, Electrical safety of machinery - Electrical equipment of machines - Part 1: General requirements

GB/T 10827.1-2014, Industrial trucks - Safety requirements and verification - Part 1: Self-propelled industrial trucks, other than driverless trucks, variable-reach trucks and burden-carrier trucks

GB/T 15706, Safety of machinery - General principles for design - Risk assessment and risk reduction

GB/T 16855.1, Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design

GB/T 17626.2, Electromagnetic compatibility - Testing and measurement techniques - Electrostatic discharge immunity test

GB/T 17626.3, Electromagnetic compatibility - Testing and measurement techniques -

Radiated, radio-frequency, electromagnetic field immunity test of connectors of good and reliable.

d) There is no loosening of all fastening parts. Mark the key fastening parts. The moving parts are well lubricated and running. The vibration reduction is reliable. The hydraulic connection is reliable.

e) The structural safety protection device is connected reliably, functioning normally.

f) It has sufficient strength. Static load can withstand

1.25 times rated load.

6.1.3 Protection capability requirements

6.1.3.1 Enclosure protection level It shall meet the requirements of

GB/T 4208. The protection level of the indoor electric control part shall not be lower than IP3X. The protection level of the outdoor electric control part shall not be lower than IP54.

6.1.3.2 Housing damage resistance The non-metallic shell shall meet the requirements of IK03 in GB/T 20138.

6.1.3.3 Components The protection level of electrical components shall meet the requirements of GB/T 4208.

6.2 Interface requirements

6.2.1 Power interface The output interface of the battery pack shall be connected by plugging. Soldering or wire bonding is not permitted. The interface protection level shall not be lower than IP2X.

6.2.2 External communication interface Communication interfaces such as wireless serial port, optical, Ethernet, cellular mobile shall be used.

6.2.3 Other interfaces There shall be several debugging interfaces, wireless or wired manual operating device interfaces.

6.3.1 Mechanical body

6.3.1.1 The automatic guided vehicle body shall ensure that the distortion and deformation during normal operation are small enough. Avoid malfunctions.

6.3.1.2 Body coverings shall be shaped to avoid possible hazards. The cover shall have a strong structure to prevent functional failure due to collision with other items.

6.3.2 Control system

6.3.2.1 Control device The control device shall have anti-vibration function. Avoid the