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

GB/T 18160-2025

Replacing GB/T 18160-2008

Specifications of space-gyro type of rides

陀螺类游乐设施通用技术条件

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1 Scope

This document specifies the technical requirements, inspection and testing requirements, packaging, transportation and storage of space-gyro type of rides.

This document applies to the design, manufacture, installation, use, modification, repair, inspection and testing of space-gyro type of rides.

2 Normative references

GB/T 191
 GB/T 755
 GB/T 1184
 GB/T 1804
 GB/T 5226.1
 GB/T 8923
 GB/T 9286
 GB/T 13384
 GB/T 13912
 GB/T 19804
 GB/T 20050-2020
 GB/T 20306

GB/T 34370

3 Terms and definitions

For the purpose of this document, the following terms and definitions, as well as those given in GB/T 20306, apply.

3.1 space-gyro type of rides

An amusement ride in which the passenger cabin rotates around an axis with a variable dip angle and has a similar movement form.

Note. Space-gyro type of rides are divided into gyro series and other types of gyro.

Typical facilities of the gyro series include the Brave Man Turntable and the Double Flying Wheel. Typical facilities of other types of gyro include the Speed Windmill, the Disco Turntable and the Movie Viewing Robot Arm. A schematic diagram of common space-gyro type of rides is shown in Figure 1.

[Source. GB/T 20306-2017, 2.3.1.2]

4.1 Basic requirements

4.1.1 The technical parameters of space-gyro type of rides shall at least include the dip angle, swing diameter, motion speed, running height, number of cabins, number of passengers per cabin, and number of passengers.

4.1.2 The design documents for space-gyro type of rides shall at least include design specifications, design calculations, operating and maintenance instructions and design drawings, risk assessment report, design verification test plan, nameplate, list of main load-bearing components and important welds, etc.

4.2 Mechanical and structural

4.2.1 Critical shafts (pins) of space-gyro type of rides that are difficult to inspect and test shall be designed for unlimited life.

4.2.2 Critical shafts (pins) of space-gyro type of rides (such as big-jib pins, cylinder pins, cabin suspension shafts, pressure bar shafts, etc.) and critical welds of major load-bearing components (such as big jib welds, cylinder base welds, etc.) shall be subjected to non-destructive testing. The non-destructive testing methods and requirements shall be implemented in accordance with GB/T 34370 (all parts).

4.2.3 The dimensional tolerances and form and position tolerances of parts and

components shall comply with the requirements of the design documents. The machined parts without individual dimensional tolerances as well as form and position tolerances shall

comply with the relevant requirements of GB/T 1804 and GB/T 1184.

The welded structure without individual dimensional tolerance as well as form and position tolerance indications shall comply with the relevant requirements of GB/T 19804.

4.2.4 When the support arm and the turntable are connected by flange, the percentage of contact spots on the installation contact surface shall be no less than 70% and the maximum gap at the edge of the installation contact surface shall not be greater than 1 mm.

4.2.5 Critical steel structures with inner surfaces without anti-corrosion measures shall

be designed as closed cavity structures.

4.2.6 The rotary joints of hydraulic and pneumatic transmissions shall rotate flexibly

and seal reliably.

4.2.7 If the main load-bearing parts are blocked by decorations, the decorations shall be easy to remove.

4.3 Electrical and control systems

4.3.1 The design and installation of the electrical system shall comply with the relevant provisions of GB/T 5226.1.

4.3.2 The safety-related electrical control systems of space-gyro type of rides shall

comply with the fail-safe principle.

4.3.3 When designing safety-related electrical control systems, safety-oriented

measures shall at least be taken into account in the event of faults such as signal acquisition errors, control line disconnection, power supply line disconnection, short circuit, leakage, etc.

4.3.4 The safety functions of the control system should comply with the requirements

of GB/T 16855.1; control systems using electrical and electronic programmable devices should comply with GB/T 20438 (all parts).

4.3.5 Space-gyro type of rides shall be equipped with video surveillance equipment,

covering critical operating areas, recording operators, service personnel, passengers and equipment operation status, to ensure that operators are aware of the equipment operation status in a timely manner; the power supply line of the video surveillance equipment shall be independent of the equipment power supply line and set up separately, and the video storage period shall be no less than 10 days.

4.3.6 When the altitude of the equipment is higher than 1 000 m, the motor capacity shall be checked according to the provisions of GB/T 755; when the altitude exceeds 2 000 m, the power distribution and protection devices shall be checked.

4.3.7 Electrical cabinets, operating tables, power units (such as motors, brakes),

actuators (such as solenoid valves, electric actuators, etc.), electronic components (such as limit switches, electromagnetic switches, photoelectric switches, various sensors, etc.), exposed collectors, etc. used outdoors or in places that require moisture and rain protection shall have rain protection measures; alternatively, rain and moisture-proof equipment and devices shall be used.

4.3.8 Operation buttons, control handles and operating software interfaces shall have

clear Chinese labels.

4.3.9 Manual control mode shall not be used during normal operation of the disco turntable.

4.4 Safety protection devices and protective measures

4.4.1 Where there is a risk of the cabin being thrown out due to failure of a single component at the connection between the cabin and the main structure, safety measures shall be in place.

4.4.2 When two or more sets of viewing robotic arms are operating on the same track, at least two control measures shall be provided to prevent collisions.

4.4.3 The machine room of the air compressor and hydraulic station shall have good ventilation conditions to meet the normal operation requirements of the hydraulic and pneumatic systems.

4.4.4 During operation, if there is a risk of falling objects from high altitudes within the vertical projection range of the equipment, personnel isolation measures or measures to prevent falling objects from high altitudes shall be set up.

4.4.5 The dip angle of the disco turntable should not exceed 22°.

4.4.6 Disco turntables in design acceleration zone 2 and above shall be equipped with passenger restraint devices.