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

GB/T 18029-2000

**Wheelchairs - Resistance to ignition of upholstered parts -
Requirements and test methods
(English Translation)**

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Table of Contents

Foreword...	3
ISO Foreword...	4
1 Scope...	6
2 Normative References...	6
3 Definitions...	6
4 Judgment Criteria for Combustion...	7
5 Principle...	7
6 Operation Safety...	8
7 Apparatus...	8
8 Pretreatment and Test Environment...	12
9 Material Combination...	12
10 Test Procedures...	15
11 Requirements...	17
12 Test Report...	17
13 Results Statement...	18

1 Scope

This Standard specifies the test methods to assess the resistance to ignition of upholstered parts in wheelchairs by cigarettes and matches.

This test only measures the resistance to ignition to the materials under test by cigarettes and matches, but it cannot measure the ignitability of the complete wheelchairs. This Test only instructs rather than guarantees the ignitability of the complete wheelchairs.

NOTE: The requirements are minimal. It is advisable that manufacturers, as possible, use the materials with superior resistance to ignition.

2 Normative References

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

GB/T 14729-2000 Wheelchairs - Terms (eqv ISO 6440.1985)

ISO 8191-1.1987 Furniture - Assessment of Ignitability of Upholstered Furniture

- Part 1.Ignition Source. Lighted Cigarettes

ISO 8191-2.1988 Furniture - Assessment of Ignitability of Upholstered Furniture

- Part 2.Ignition Source. Match Flame Equivalent

ISO 7176-15 Wheelchairs - Part 15.Requirements for Information Disclosure,
Documentation and Labelling

3.1 Progressive [translator. smoldering]

Exothermic oxidation, not accompanied by flaming, that is self-propagating, i.e.

independent of the ignition source. It may or may not be accompanied by incandescence.

3.2 Flaming

Undergoing combustion in the gaseous phase with the emission of light.

4.1 Progressive smoldering

This Standard defines any of the following phenomena as progressive smoldering.

- a) The smoldering of the test block is gradually upgraded, so that the continued test shall endanger the safety, and the fire-fighting measures are required;
- b) The test block is smoldered to substantially exhaust during the test;
- c) The test block is smoldered to the upper or lower open edge, either side, or vertically burned out;
- d) At the end of the test, the test block is burnt (not only discolored) more than 100mm in any direction except upwards from the burning point.

NOTE: In fact, it shall be found that there are obvious differences between different materials;

some materials shall burn under the influence of the combustion source, but it shall not spread (non-progressive smoldering); while the smoldering of other materials shall continue to escalate and spread (progressive smoldering).

4.2 Flaming combustion

This Standard defines any of the following phenomena as flaming combustion.

- a) The burning of the test block is gradually upgraded, so that the continued test shall endanger the safety, and the fire-fighting measures are required;
- b) The test block is burned to substantially exhaust during the test;

c) During the test, the flame front reaches the lower open edge, either side, or vertically burned out.

5 Principle

The smoldering cigarette or the burning match is applied to the test block of upholstered parts materials. The test block installation is made in a combination of typical wheelchair seat cushion, back cushion (or seat cushion or armrest); the fire source uses the cigarettes and matches (or equivalent fire source) commonly used by the smokers. This test method only tests the ignitability of the overall test block (including skin, lining, fillers, etc.) on the test frame. The test results are not applicable to the single material in the overall test block.

6.1 General

This Test method may endanger health and safety, so appropriate precautions shall be taken.

6.2 Isolation

For safety, the test shall be conducted in a non-combustible fume cupboard. If such a cupboard is not available, a test enclosure shall be constructed so that the operator is protected from the fumes.

6.3 Extinguisher

Certain combinations of materials may produce a violent flame during the test; active and/or fixed sprinkler head that can spray water directly into the combustion zone shall be installed. Other equipment such as fire extinguishers, fireproof cloth and buckets shall be prepared.

Sometimes smoldering may be difficult to completely extinguish, it is necessary to completely immerse the test block into water.

7.1 Test framework

Figures 1 and 2 show a suitable test framework. It consists of two rectangular boxes that are hinged together; and can be fixed at a vertical angle.

The framework is made of 25mmx3mm steel strip with a steel mesh platform fixed firmly in the middle; such mesh (mesh size is 15~150mm²) is 6mm±1mm lower than the top edge of the framework.

The inner width and height of the back framework are 450mm±2mmx300mm±2mm;

the inner width and depth of the seat framework are 450mm±2mmx150mm±2mm. The surrounding edges of the steel mesh platform has a protection and reinforcement function

against the steel mesh.

The cigarette shall be cylindrical with no attachments at both ends, and meet the following requirements.

--- Length. $70\text{mm}\pm 4\text{mm}$;

--- Diameter. $8\text{mm}\pm 0.5\text{mm}$;

--- Mass. $1\text{g}\pm 0.19\text{g}$.

The smoldering rate is $12.0\text{min}/50\text{mm}\pm 3.0\text{min}/50\text{mm}$; its test method is as follows.

Mark on the cigarette about 5mm and 55mm from the burning end of the cigarette; the cigarette is pretreated as per 8.1; ignite the cigarette as per the requirements of 10.2;

then insert and fix the unburned end of the cigarette on the horizontal needle with inserting depth no greater than 13mm, environment air flowrate $0.02\sim 0.2\text{m/s}$. Record the smoldering time from the 5mm mark to the 55mm mark.

7.4.2 Equivalent fire source of gas flame fire source - match fire source

NOTE: The equivalent fire source shall be designed with the heat output approximately equal to that of burning match.

The burning tube is a stainless-steel tube (with outer diameter $8\text{mm}\pm 0.1\text{mm}$, inner diameter $6.5\text{mm}\pm 0.1\text{mm}$, length $200\text{mm}\pm 5\text{mm}$); it is connected by a hose and a propane or butane bottle. The pipeline is equipped with a flow meter, a fine-tuning valve, an on-off valve (optional) and a pressure regulating valve; the outlet pressure is adjusted to 2.8kPa.

NOTE: If there is no stainless-steel tube of the above size; a similar size of tube can also be used instead; but the latter tube shall be processed as the above size at a length of 50mm from the nozzle.

The flow meter shall be calibrated; the flow rate of propane or butane gas is

$45\text{mL}/\text{min}\pm 2\text{mL}/\text{min}$ at 25°C . The hose connecting the flow meter with burning but has a length of 2.5~3m and inner diameter of $7\text{mm}\pm 1\text{mm}$.

7.4.2.1 Gas flow control

The gas must be supplied to the combustion tube at the specified flow rate.

When the cylinder storage temperature is lower than the specified test temperature (it is necessary), or when the cylinder is at a certain distance from the test framework, gas supply and measurement are difficult.

In this case, the pipeline within the test environment ($10\sim 30^{\circ}\text{C}$) shall be long enough to ensure that the gas reaches the required temperature before flowing to the measuring instrument. One of the effective methods is to ensure that the gas flows through a metal