

ICS 13.340.99

CCS C 73



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

GB/T 24538-2009

**Personal fall protection equipment - Energy absorbers
(English Translation)**

Issued on: October 30, 2009

Implemented on: September 1, 2010

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine of the People's Republic of China**

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1 Scope

This Standard specifies the classification, technical requirements, test methods, inspection rules, and marks of energy absorbers.

This Standard applies to energy absorbers used in work at heights, climbing, and suspension operations by personnel whose combined body weight and load do not exceed 100 kg.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For dated references, the subsequent amendments (excluding corrigendum) or revisions do not apply to this Standard, however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 6096, Test method for personal fall protection systems

GB/T 10125, Corrosion tests in artificial atmospheres -- Salt spray tests (GB/T 10125-1997, eqv ISO 9227.1990)

GB/T 12903, Personal protective equipment terminology

GB 24543, Personal fall protection equipment -- Lanyards

3 Terms and definitions

The terms and definitions established in GB/T 12903 and the following terms and definitions apply to this Standard.

3.1

energy absorber

A component connected in series between the harness and the anchor point that absorbs a portion of the impact energy and reduces the impact force in the event of a fall.

3.2

permanent extension

The difference in length between the endpoints of the energy absorber before and after deployment.

3.3

length after deployment

The straight-line distance between the endpoints when the energy absorber is fully extended.

3.4

pin centre length

The straight-line distance between the force application points at both ends of the energy absorber under pretension is shown in Figure 1.

Figure 1 -- Schematic diagram of the pin centre length of the energy absorber

3.5

free-fall distance

The vertical distance from the moment the fall begins until the system starts to apply braking.

3.6

arrest force

The maximum impact force exerted on the person during the fall.

4 Classification

Energy absorbers are classified into Type I and Type II based on free-fall distance and arrest force, as shown in Table 1.

Table 1 -- Classification of energy absorbers

5.1 General requirements

5.1.1

Energy absorbers shall be fitted with protective sleeves.

5.1.2 When working near areas involving welding, cutting, or heat sources, the energy

absorber must be protected against heat.

5.1.3 A protective cushion (sleeve) or support bracket shall be provided within the eye at the end of the energy absorber.

5.1.4 All components shall be smooth, free from material and manufacturing defects, and free from sharp corners or edges.

5.2.1.1 Initial deformation

When tested in accordance with 6.2, the deformation of the energy absorber shall not exceed 40 mm.

5.2.1.2 Static load

When tested in accordance with 6.3, the energy absorber shall show no signs of fracture.

5.2.2 Dynamic mechanical properties

When tested in accordance with 6.4, the energy absorber shall meet the following requirements.

- a) Type I. the arrest force shall not exceed 4 kN, and the permanent extension shall not exceed 1.2 m;
- b) Type II. the arrest force shall not exceed 6 kN, and the permanent extension shall not exceed 1.75 m.

5.2.3 Corrosion resistance

When tested in accordance with 6.5, all metal parts shall be free from rust or other visible signs of corrosion discernible to the naked eye. White spots are permissible.

5.3.1.1 The technical performance characteristics for special environments specified in

the product identification apply only to the corresponding special locations.

5.3.1.2 Energy absorbers with technical performance characteristics for special

environments shall also meet the general requirements and basic technical performance specifications prescribed in this Standard.

5.3.1.3 Energy absorbers with technical performance characteristics for special

environments are not required to possess all such characteristics or any specific combination thereof.

5.3.2 High temperature

When tested in accordance with 6.6.1, the dynamic mechanical properties of the energy absorber shall meet the requirements specified in Table 2.

5.3.3 Dampness

When tested in accordance with 6.6.2, the dynamic mechanical properties of the energy absorber shall meet the requirements of Table 2.

5.3.4 Low temperature

When tested in accordance with 6.6.3, the dynamic mechanical properties of the energy absorber shall meet the requirements specified in Table 2.

5.3.5 Damp and cold

When tested in accordance with 6.6.4, the dynamic mechanical properties of the energy absorber shall meet the requirements of Table 2.

Table 2 -- Technical performance requirements for energy absorbers in special environments

6.1.1 Test lanyard

6.1.1.1

Type I energy absorber test lanyard. A wire-lanyard type safety line with a length of (2400 ± 25) mm under a pretension of 44 N; it is made of 302 stainless steel, 7x19 aviation-grade wire lanyard with a diameter of 9.5 mm, and complies with the safety line standard GB 24543.

6.1.1.2

Type II energy absorber test lanyard. A chain-type safety line with a length of (2000 ± 25) mm between the load-bearing points at both ends when suspended; the chain diameter is not less than 6 mm, and it complies with the safety lanyard standard