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**ISO Standard 41024**

**Performance and Safety Requirements for Pogosticks**

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# Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](https://www.iso.org/directives-and-policies.html)).

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This document was prepared by NextBounceLabs ISO/TC *410*, Subcommittee SC 24, .

This second edition cancels and replaces the first edition (ISO 41024:2023), which has been technically revised.

The main changes are as follows:

— Scope and Introduction

— Performance Requirements

— Ergonomics

— Labeling

A list of all parts in the ISO 41024 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](https://www.iso.org/members.html).

# Introduction

Pogo sticks are widely recognized as both recreational tools and equipment for professional sports, bridging the gap between playful innovation and athletic performance. As the popularity of pogo sticks expands across diverse user groups, including children, casual enthusiasts, and professional athletes, there is a growing need for comprehensive standards to ensure their safety, functionality, and sustainability. The ISO 41024 standard addresses this need by providing detailed guidelines for the design, testing, and labeling of pogo sticks, accommodating the varied requirements of recreational and competitive users alike.

This document reflects the collaborative efforts of industry professionals and regulatory bodies to establish universal performance and safety criteria for pogo sticks. By incorporating advanced engineering principles, sustainable materials, and user feedback, ISO 41024 aims to promote innovation while upholding public safety and confidence in pogo stick use. The standard also recognizes and categorizes the unique demands of different user levels and applications, ensuring inclusivity and relevance across all demographics.

In addition to establishing scope, key definitions, normative references, and technical requirements, this document outlines considerations for ergonomics, labeling, and performance testing. With the ultimate goal of fostering growth in both recreational participation and professional engagement, ISO 41024 serves as a critical resource for manufacturers, users, and regulatory authorities worldwide.

**ISO Standard 41024**

**Performance and Safety Requirements for Pogosticks**

# Scope

1.1 This International Standard specifies requirements for the design, testing, and labeling of pogo sticks intended for use by a wide audience, including children, novice users, professionals, and extreme athletes. For the purposes of this standard, users can be grouped into two categories: competitive and recreational use. General non-comprehensive guidelines for what is encompassed by each category can be seen below in Figure 1.

| Category | Sub-Group | Primary Use |
| --- | --- | --- |
| Recreational Use | Children | Play and light bouncing |
| Novice Users | Casual recreational use |
| General Hobbyists | Regular recreational use |
| Competitive Use | Extreme athletes | Advanced tricks and stunts |
| Competition Participants | Structured sports and contests |
| Advanced Stunt Performers | Professional-grade use and innovation |

**Figure 1.** User categories and guidelines for what they encompass

The requirements outlined in this document act as guidelines to ensure that pogo sticks meet the safety, durability, and functionality needs of both categories, making it applicable to a wide range of user experience and skill level.

1.2 Requirements of this International Standard are not applicable to certain scenarios and user categories. This document is relevant to pogo sticks designed for both recreational and competitive use, but excludes the following categories:

— *Early Childhood Use*. Regulations regarding the use of pogo sticks by children under

the age of 5 are not addressed in this standard. Products targeting this age group must

involve heightened safety considerations to account for the significant added risk.

— *Able-Bodied Limitations*. Pogo sticks designed for rehabilitative or adaptive use by

individuals with physical disabilities are excluded from the scope of this document.

These devices involve unique features that are subject to alternate regulations.

— *Custom/Modified Pogo Sticks*. Guidelines for pogo sticks that have been customized

or significantly modified from their original design are not specified by this document

as alterations can affect the original integrity and safety characteristics intended by

the manufacturer. This also excludes motorized assistance or any power mechanisms.

1.3 The purpose of this International Standard is to ensure the quality and performance of pogo sticks to improve their safety for all audiences. The standard achieves this by offering a comprehensive framework of requirements for their design, testing, and labeling. Addressing key characteristics such as durability, ergonomics, and component functionality works to reduce the risk of injury. Furthermore, this standard promotes innovation in pogo stick design by encouraging the integration of sustainable materials and advanced engineering solutions. This document specifies appropriate use cases, performance requirements, suitable materials, ergonomic design, methods for testing, labeling instructions, and quality control.

1.4 Through compliance with this standard, manufacturers can deliver products that effectively balance safety, performance, and environmental responsibility. Ensuring a more positive user experience in this way may foster public confidence in pogo sticks as a safe recreational activity. In addition, this will support the competitive community, as interest and involvement in extreme sports may be encouraged. Overall, this standard is valuable for both new and professional pogo stick users, inspiring growth in both recreational participation and competitive engagement.

1.5 No recommendation is made or implied within this document as to the merits of products from any particular manufacturer. Choice of component selection for the pogo stick design should be made based on the intended use application. Additionally, the specifications set forth in this standard do not purport to address safety and security concerns associated with reckless behavior. Instead, each individual pogo stick user bears the responsibility to operate the device within their own athletic capabilities, and to exercise caution appropriately.

# Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 13715:2017, *Technical product documentation - Edges of undefined shape - Indication and dimensioning*

ISO 3269:2019,  *Fasteners Acceptance inspection*

# Terms and definitions

For the purposes of this document, the following terms and definitions apply.

**3.1**

**pogostick**

a device that is used to bounce on and off the ground, whose motion is assisted and powered by a spring and elastic motion; can be used as a toy, for exercise, professional use..

**3.2**

**elastic mechanism system**

a physical system whose motion is related to the physical phenomena of elasticity and the storage and release of energy.

**3.3**

**spring**

a part inside the pogo stick as an internal component that can compress and decompress as a user presses down on the pogostick and is released back up as a part of the bouncing motion; energy is stored when the spring is compressed and energy is released when the spring is decompressed.

**3.4**

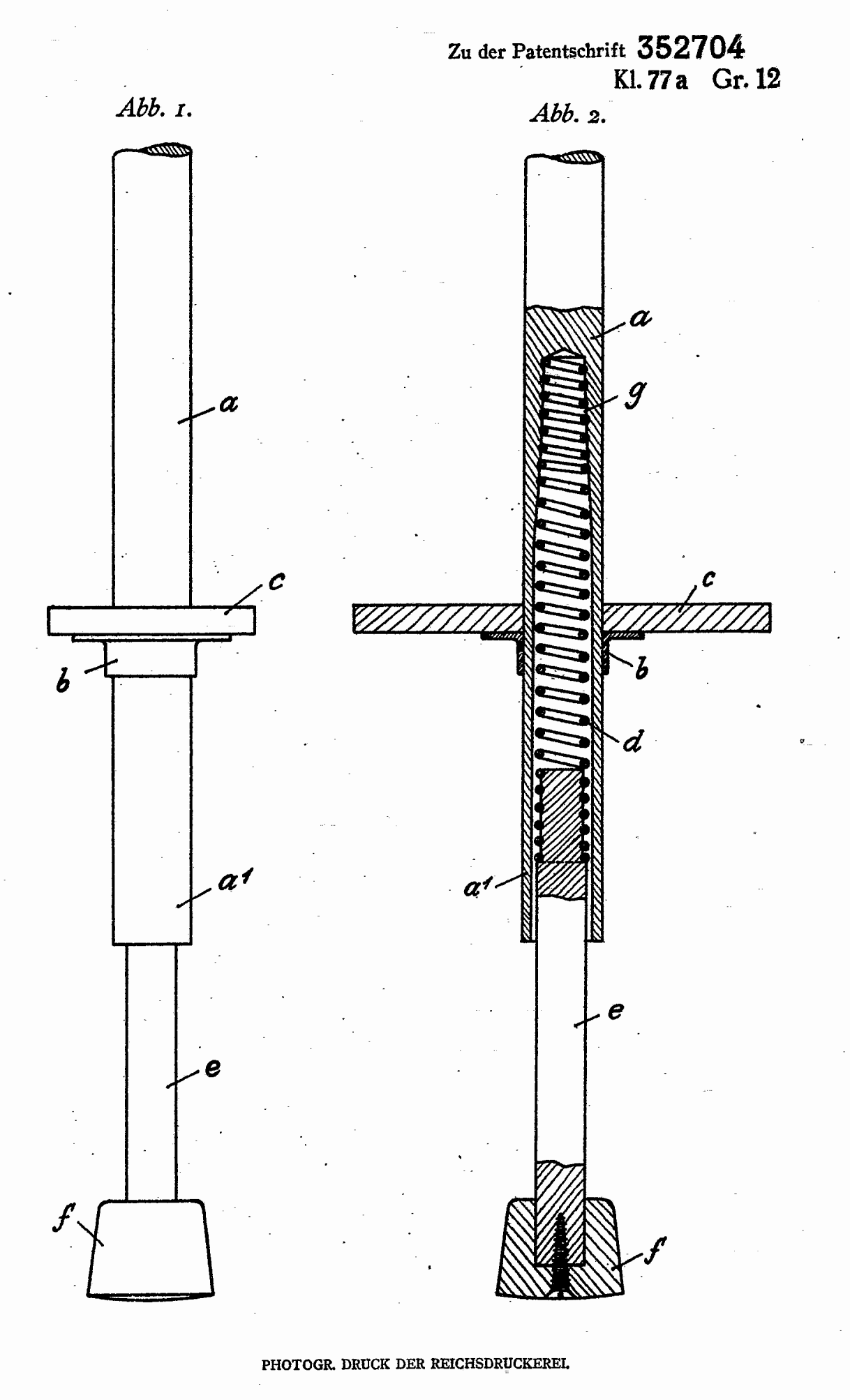
**piston**

a part inside the pogo stick as an internal component that assists the spring in producing the bouncing motion when users press down on the pogostick and are released back up as the spring compresses and decompresses.

# Performance Requirements

## General Requirements

Any pogostick subject to regulations in this standard shall meet the requirements of this part in the condition to which it is offered for sale to consumers; any pogo stick offered for sale to consumers in disassembled or partially assembled condition shall meet these requirements after assembly according to the manufacturer's instructions [1]. For the purpose of compliance with this part, where the metric and English units are not equal due to the conversion process the less stringent requirement will prevail [1].



**Figure 2.** Drawing for the modern day invention of the pogostick by Ernst Gottschall and Max Bohlig in 1920 [2]. Highlights outer and inner views of the pogostick, including the spring, pistons, footplates, and foot grip.

## Mechanical Requirements

### Assembly

Pogosticks shall be manufactured such that mechanical skills required of the consumer for assembly shall not exceed those possessed by an adult of normal intelligence and ability.

### Sharp Edges

There shall be no unfinished sheared metal edges or other sharp parts on assembled pogosticks that are, or may be, exposed to hands or legs; sheared metal edges that are not rolled shall be finished so as to remove any feathering of edges, [1] or any burrs or spurs caused during the shearing process.

### Specifications

The pogo stick shall have a height of 22-39 in. for children at the beginner experience level, 27-47 in. for children at the intermediate and advanced level, and 33-57 in. for teenage and adult users. If adjustable, the user should be able to adjust the height without tools, using a robust, yet lightweight locking system. The height adjustment mechanism must be secure and easy to operate, locking into place at predefined intervals. Handlebar ends shall be symmetrically located with respect to the longitudinal axis of the pogostick shall meet the following heights of 16-33 in. for children at the beginner experience level, 17-37 in. for children at the intermediate and advanced level, and 15-39 in. for teenage and adult users.

The weight of the pogo stick, without additional accessories, shall fall between 4-7 lbs. for children at the beginner experience level, 5-11 lbs for children at the intermediate and advanced level, and 5-18 lbs for teenage and adult users. This weight range strikes a balance between strength, durability, and ease of handling for the user. Material selection to meet weight requirements must maintain structural integrity under high-load conditions.

## Elastic Mechanism System Requirements

### Spring

The spring shall be tested to support the weight of a 90-180 lb rider on the footplates. There shall be no visible fractures, or misalignment of the elastic mechanism system. The spring constant values extracted within batches, and between batches must have a variability of 2500-4500 N/m to ensure precision of spring constant before and after the loading and rocking tests. Spring constant variability comes as a result of user characteristics, such as age and weight. Elastic mechanism system assemblies shall be securely attached to the frame by means of fasteners with locking devices such as a lock washer, locknut, or equivalent and shall not loosen during the rocking test [1].

The pogostick shall be able to securely support an operating force of 801 N (180 lbf). Such operating force influences the bounce, safety, and stability of the pogostick, as it is related to how much force is applied to the spring of the pogostick. Operating force shall be able to support a variety of users (age, weight, experience level).

### Piston

The pistons shall be a part of the spring mechanism and shock absorption system. The pistons shall be tested and examined, separate from the spring and shock absorption. When the user presses down, the piston is forced down the internal frame of the pogostick and subsequently aids in compressing the spring. When a user releases up, the spring decompresses, allowing the piston to return to its original position, formulating the bouncing motion of the pogostick.

### Shock Absorption

The shock absorption system of the pogostick shall be tested and examined separately from the spring and pistons of the pogostick. The shock absorption system shall be supported by the spring itself, which is the main component of the entire system that absorbs force. As well, the shock absorption shall be supported by the pistons in order to dampen the bouncing motion that is created when users press down and release up.

## Requirements for Handlebar, Footplate, and Foot Grip

### Handlebars

The handlebar stem shall be tested for strength in accordance with the handlebar stem test [1], and shall withstand a force of 2000 N (450 lbf) for professional pogosticks and 1000 N (225 lbf) for beginner pogosticks. Handlebars shall allow comfortable and safe control of the pogostick. Handlebar ends shall be symmetrically located with respect to the longitudinal axis of the pogostick and no more than 914 mm (36 in) above the footplates. The ends of the handlebars shall be capped or otherwise covered. Handgrips, end plugs, control shifters, or other end-mounted devices shall be secure against a removal force of no less than 66.8 N (15 lbf) in accordance with the protective cap and end-mounted devices test.

### Footplate

Pedals shall have right-hand/left-hand symmetry. The tread surface shall be present on both top and bottom surfaces of the foot pedal except that if the pedal has a definite preferred position, the tread surface need only be on the surface presented to the rider's foot [1].

### Foot Grip

The end of the foot shall be capped with an acceptable elastic material. The foot grip shall be secured against an acceptable pogostick terrain with a friction constant of 0.9.

# Ergonomics

Ergonomics is a critical consideration in the design and development of pogo sticks to ensure that the device is safe, comfortable, and efficient for users of varying ages and skill levels. Proper ergonomics design minimizes the risk of discomfort and injury while maximizing user performance and satisfaction. Incorporating ergonomic principles into parts of a pogo stick design can address key factors like user comfort, injury prevention, and adaptability to different body sizes and strengths. When ergonomics is prioritized, pogo sticks are designed to reduce fatigue during extended use, enhance safety by improving balance and control, and provide adjustable features to suit a diverse range of users. These considerations not only enhance user experience but also ensure that the pogo stick complies with safety and usability standards for a wide range of individuals. This section of the standard focuses on the parts that have ergonomic considerations: handlebars, footplates, spring and grips.

## Handlebars

### Size

The handlebars of the pogostick are of major importance to ensure comfort, control and safety for the user. For optimum ergonomics, the design should consider a wide range of hand sizes and grip styles. Handlebar diameter should lie in the range of 28-35 mm for good grip with reduced hand fatigue. Non-slip materials with cushioning could be integrated for comfort and reduction in the impact of vibration during use. The handlebar width should allow for natural arm positioning, typically between 350-500 mm, ensuring stability and preventing overextension. Adjustable height options are recommended to accommodate varying user heights, promoting proper posture and reducing strain on shoulders and wrists.

## Footplates

### Size

The footplates of the pogo stick shall provide sufficient surface area to accommodate the feet of the intended user. This would aim to minimize fatigue and ensure comfort during use. The width and length of the footrest should be sufficient to support the balls of the feet during use, minimizing the risk of foot slippage or misplacement. Additionally, the footrest design should allow for even distribution of the user’s weight, contributing to stability and balance during operation. Ranges of widths and depths are as follows:

Children Use Cases [3]:

Beginner (6-7 years):

Width: 7-9 cm, Depth: 5-6 cm

Intermediate and Advanced Levels (8-12 years):

Width: 8-11 cm, Depth: 6-7 cm

Teenage/Adult Use Cases [4]:

Beginner (13+ years):

Width: 11-12 cm, Depth: 8-9 cm

Intermediate and Advanced Levels (8-12 years):

Width: 12-14 cm, Depth: 9-10 cm

### Durability

Footplates shall be designed from materials capable of withstanding repeated impacts and normal wear during use. They must maintain structural integrity over time, even under the stress of high-impact landings. Ergonomics considerations include shock-absorbing properties to reduce strain on the feet and legs during high-impact landings. footplates should be tested for load-bearing capacity and impact resistance to ensure that they do not break, crack, or degree during typical use. The materials used for footplates must also be resistant to abrasion, wear, and environmental factors.

### Rounded Edges

To prevent injury and enhance user safety, the edges of foot plates shall be rounded or smoothed to eliminate shape corners. This design feature minimizes the risk of abrasions to the user's feet and legs, especially during high-impact landings. The rounded edges shall not hinder the functionality of the footplates but should provide additional safety and comfort for users.

### Adjustability

The footrest should be designed with ergonomic adjustability in height and/or angle. This will allow for customization based on the user's leg length. Adjustable footrest should be easily repositionable without the need for special tools. This flexibility will allow users to set footplates at the most comfortable and stable position. The range of adjustability should ensure that the footplates can accommodate a wide range of users, from children to adults. This adjustability mechanism should be secure, preventing any unintended movement during use that could compromise user safety.

## Spring

### Changing Tension of Spring

The tension of the spring in a pogostick is a critical ergonomic feature that affects user control and comfort. To accommodate a wide range of users, from children to athletes, the spring should allow for gradual adjustments in tension. This could be achieved through a threaded adjuster enabling the user to fine-tune the spring to match their weight and jumping ability. Gradual changes in spring tension are essential to prevent sudden shifts in bounce height, which could destabilize the user and lead to fatigue or injury during extended use. The adjustment mechanism should be designed to be accessible without special tools and should clearly indicate the tension level for consistent settings across sessions.

### Force of Spring

The force of the spring must be optimized for ergonomic performance, ensuring that it delivers sufficient rebound for use without an excessive strain on the user’s body. Children must use a spring with a lower force reducing strain on the user's body. For athletes, the spring should generate a higher force to achieve higher jumps while maintaining balance and stability The spring must distribute evenly across its compression to reduce the risk of sudden jolts and uneven landings, which can cause injury.

### Size of Spring

The dimensions of the pogo stick’s spring are integral to its ergonomic functionality. A shorter spring with less compression may be ergonomically appropriate for younger and lighter users, ensuring they can achieve a comfortable bounce. A longer spring with higher compression is suitable for athletes and prolonged users. A well-sized spring ensures that users of all sizes can achieve a stable bounce trajectory, minimizing strain on their legs and maintaining control during operation. Additionally, the spring housing should be ergonomically integrated into the pogo stick design to prevent interference with the user's movements and to ensure consistent, safe performance. Below is a range of lengths and diameters of sizes of springs.

Length:

* Children's pogo sticks: 6–10 inches (15–25 cm).
* Adult recreational pogo sticks: 10–15 inches (25–38 cm).
* High-performance or extreme pogo sticks: 18–24 inches (46–61 cm).

Diameter:

* Children's pogo sticks: 0.75–1 inch (1.9–2.5 cm).
* Adult or high-performance pogo sticks: 1.5–2.5 inches (3.8–6.3 cm).

## Grips

### Non-slip Handlebars

Non-slip materials with cushioning could be integrated for comfort and reduction in the impact of vibration during use. Handlebar grips on a pogostick should prioritize comfort, safety and durability. Non-slip materials like rubber or silicone ensure a steady grip, even in wet conditions. Contoured shapes and textured patterns enhance control while reducing hand fatigue. Cushioned grips help absorb vibrations, improving comfort during extended use. Durable, wear resistant materials are essential to withstand frequent use and environmental exposure ensuring reliability and long-term exposure performance [5]

### Non-slip Footplates

Footplates shall be designed with a non-slip surface to ensure that the user’s feet remain securely positioned during use. The non-slip feature may be achieved through textured materials, rubberized coatings, or specialized anti-slip pads. The surface should provide sufficient friction to prevent slippage. The non-slip material should cover the entire footrest surface and be durable enough to maintain its grip over time. The design of the grip should ensure that users can maintain a stable and comfortable stance.

# Labeling

## User Level of Experience

The pogostick shall have clearly written on the label the intended user level of experience.. This should be clearly labeled to highlight what is safe and appropriate for users regarding how they use the device. The pogostick should have the experience level clearly printed in bold on the top of the label. This is to ensure that the user is able to clearly see the level intended for each device.

## Storage Conditions

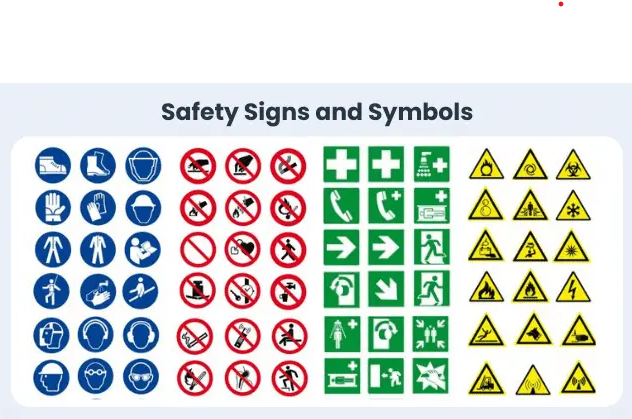
The device shall have clearly written on the label the proper storage conditions. These being the pogostick should not be compressed when it storage, in an upright position, The pogostick should also be kept away from sources of heat, as heat can damage and warp the materials, The pogostick should be stored in a room temperature environment away from direct sunlight, as this helps to keep the pogostick away from moisture and humidity which can cause damage to the pogostick, Lastly, that proper care of the pogostick allows the pogostick to have a greater lifespan and that regular maintenance and care ensures good working conditions. These should be written out at the bottom of the label where it can be clearly seen.

## Components and Materials

The components and material shall be clearly printed on the label and packaging of the pogostick. Each component should also be properly labeled. The frame should have a clear serial number and production date etched on the lower tube. The sprint or elastic mechanism should be labeled with the clearly energy capacity, spring constant, and tension levels. The footpegs should have labels that state the load capacity, cleaning, and replacement instructions.

## Warnings and Safety

The label shall include instructions on how to use the pogostick. These instructions can be written on the label or can include a graphical representation of the proper way to use the pogostick. This should show or describe the right or wrong way to bounce on the pogostick. The label shall also include the proper environment to use the pogostick and the type of environment the pogostick was made for. This is to ensure that the user knows the kind of environment the pogostick is designed for. The label or packaging shall include any warnings or hazards regarding the use of the pogostick , specifically it shall say that improper use of the pogostick could result in serious or permanent injury, or even death. The label should include the following safety symbols, or symbols like the symbols shown in Figure 4.



**Figure 3.** Safety Signs and Symbols [6]

## Age, Weight, and Customer Support Information

The label shall clearly state the minimum age for safe use of the pogostick, as determined in Scope and Purpose. These age requirements consider developmental factors for safety and ergonomic fit. The label shall also clearly specify the maximum supported weight of the pogostick. This ensures compatibility with materials and structural integrity. The label shall also contain customer support information. This includes a phone number, email, and/or website where the user is able to contact the manufacturer should any issues arise. The label shall also include any warranty, troubleshooting, and replacement part guidance, whether that be instructions on how to achieve that, or contact information in order to receive this assistance.

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