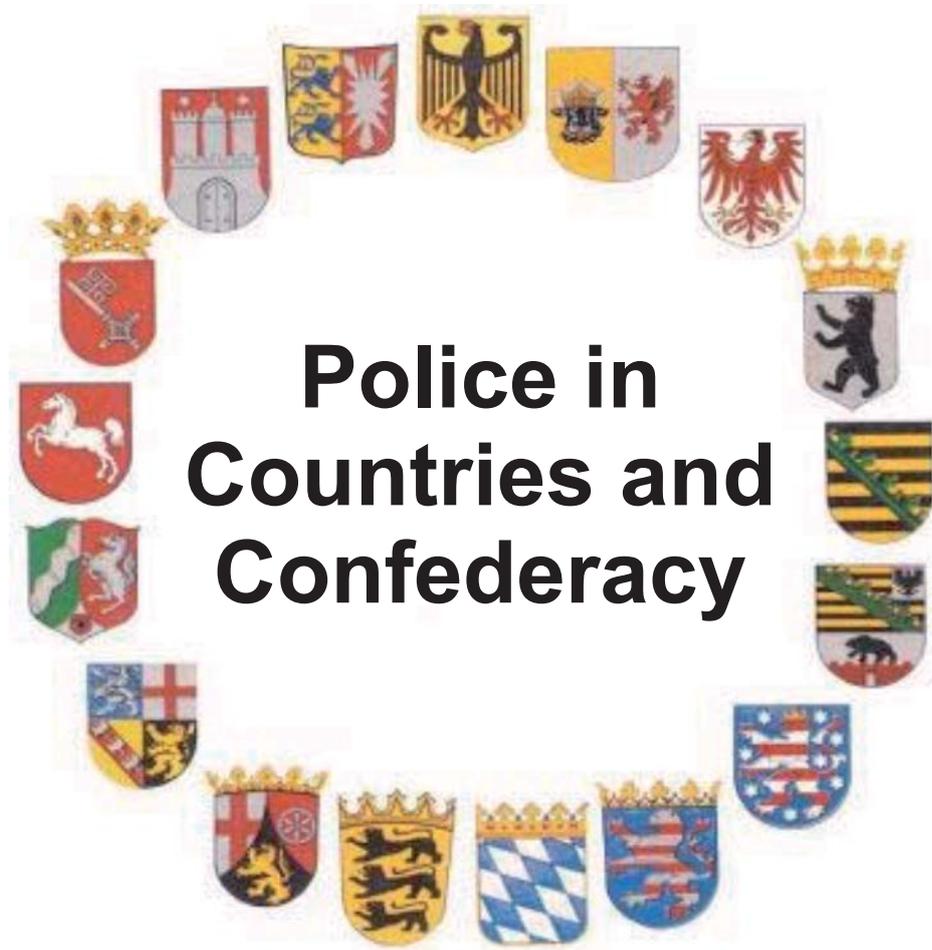


Technical Directive

Short and long batons

Situation: April 2006



Police in Countries and Confederacy

Editing:

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1 General requirements

1.1 Notes

The following Technical Directive (TS) describes Police requirements on the design and tests of batons.

Documents required, when purchasing batons, are usually the Technical conditions on supplies or lists of performances created by the relevant ordering party and which become parts of the supplies. They may include also other technical requirements extending the framework of this Technical Directive, e.g. quality requirements or conditions on final tests.

1.2 The use

Batons serve, among other situations, as the immediate enforcing means. They are used in the following versions:

- **short and**
- **long.**

Short batons are determined for permanent carrying on a body and should be used especially during general Police provisions.

Long batons are also determined for the transport in vehicles, carrying on a body or a protection shield. They should serve during general Police provisions or special purpose provisions (violent demonstration), for example, for moving people out of streets or places.

1.3 Scope of the TS use

For participation in tenders, suppliers must document to the testing place, accredited by the Police-Technical Institute, with certificates or expert opinions saying that the batons fulfil requirements in this Directive.

1.4 Qualification

A company wishing to offer the German Police batons must have the quality management system, according to ISO 9001 (or some other comparable quality management system), implemented in the manufacture and assembly.

1.5 Relating documents

- **DIN 1451-2**, Fonts; Non Serif linear- Antiqua; Traffic font
- **DIN EN ISO 9001**, Quality management systems - Requirements
- **DIN 50021 -SS**, Test with sprayed different solutions of sodium chloride
- **DIN EN 10204**, Type 2.1, Metal products – Test certificate kinds

- **DIN EN ISO 4892-2**, Plastics – Artificial radiation exposure, or weather tests of instruments - Part 2:
Filtrated radiation exposure to xenon arc
- **DIN 53 438**, Tests of flammable materials; Performance when exposed to flames, Parts 1 - 3
- **DIN 53508**, Indian rubber and elastomer test - Artificial aging

1.6 Baton presentation

1.6.1 PFA/PTI contact place

The Police-Technical Institute (PTI) of the Police Academy (PFA) is responsible for the test coordination (PFA). Contact:

Polizei-Führungsakademie
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Postrach 480 353

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1.6.2 Requirements documentation

The baton manufacturer or seller participating in tenders by authorities of homelands or of the Federal Republic must document the observation of requirements described in this Technical Directive with test certificates. The execution of the tests is organised by the manufacturer or distributor on his own expense.

The address of the testing institute is presented in Annex 1.

In addition to the testing institute presented in Annex 1, there are other comparable institutes in EU countries respected, when the institutes have at their disposal the necessary professional and factual knowledge required for the execution of the required tests. This professional and factual knowledge of the relevant institute must be proved by the manufacturer. PTI maintains its right to verify the professional prerequisites of the institution executing the tests.

When the requirements described in this Technical Directive have been fulfilled, the testing institute issues a certificate.

After a baton has been successfully certified, the complete testing documentation, including photographs, must be transferred to PTI.

When the baton was changed (its design, manufacture, processing, or materials), the ordering party or the manufacturer, in cooperation with PTI, can ask the testing institute for the extension of the certificate validity. The scope of possible additional tests must be agreed and determine between the manufacturer and the testing institute. The manufacturer bears the costs of additional certification.

1.6.3 Certification

The certificate in accordance with this Technical Directive can be issued by a recognised testing institute (e.g. the institute in Annex 1).

When batons do not fulfil all requirements established in the Technical Directive, the candidate gets only a report on the testing.

1.6.4 Certificate

When the batons fulfil requirements in this Technical Directive (*the tests are done in accordance with the provisions 2.1, 2.2, 2.4, and 3.1 to 3.7*), the relevant testing institute issues a certificate. The certificate, protocols and other documents are issued by the institute in the German language. The certificate must clearly show that it relates only to the tested model.

In addition to test reports, the certificate must include at least the following data:

- Name and address of the candidate
- Name and address of the testing institute
- Certificate number
- Testing report number
- Model specification (or *the specification of the type*)
- Date of testing
- Testing process (the specification of TS with the date of issue)
- Test requirements

1.6.5 Report on the test

The report on the test must provide for information about the general progression and results of the test. It must include at least the following general information:

- Name and address of the candidate
- Name and address of the testing institute
- Testing date and report number
- Date of acceptance of the tested sample (several batons of the same model)
- Date of testing
- Model specification
- Baton photograph
- Information about the design, materials, material thickness, etc. (manufacturer's data)
- Testing process (the specification of TS with the date of issue)
- Test requirements
- Notice about special observations and findings during the test

1.6.6 Certification validity

The certificate is valid only when the consequently manufactured batons are identical to the tested sample.

The certificate expires when the manufacturer changes the product (the change in design, materials, material thickness, processing, etc.), when compared with the tested sample.

1.7 Technical documentation

For the purpose of certification, the supplier or the seller of this product must provide the testing institute with the relevant technical documentation, i.e. the description of the device, drawings, the bill of materials, and possibly also the Operating Manual.

In addition, the purchaser must get also cleaning and handling instructions and instruction for the maintenance and inspections in German, if possible, also in an electronic form in the usual data format.

2 Design requirements¹

2.1 Design

Batons are needed in the following versions:

- **short expandable and**
- **long, and of special designs (the multifunctional baton - tonfa (?))**

The baton flexibility must not be too high. Fracturing of batons, but also their back springing must be prevented.

The risk of injuries by sharp edges or fragments, during the real use or during training, must be permanently excluded.

There must be the way of comfortable carrying on a belt offered for the carriage of the **short expandable** or **long baton**. This should allow both for the carrying of an open baton and for the hidden carrying in different positions (angles). The immediate availability for the use must be ensured.

Short expandable batons and the special designs of tonfas must also allow for carrying in sitting positions inside vehicles.

2.1.1 Short expandable baton

Short expandable batons must fulfil the following requirements:

- Folded length 180-220 mm
- Expanded length about 500 mm
- Handle diameter 22 - 30 mm (adjustment for big hands should be possible, for example, with a solid sleeve)
- Weight 450 - 500 g
- Straight design with a round crosscutting without any strengthening at the end; the round ending, or with rounded edges or with the relevant rubber or plastic cap; the side handle is not required
- **The pulling out** of the baton must be possible by swinging and by hand without the use of an excessive strength, **the letting in** of the baton must be possible by hand without the use of excessive strength (the technology of locking)
- The handle shell must firmly enclose the baton and it must allow for easy handling both by cold and by sweated hands or hands in gloves. The handle must absorb well the energy of strikes
- The colouring must be permanent (similar to RAL 9005).

A hand loop fixture is optional.

2.1.2 Long baton

Long batons must fulfil the following requirements:

- Length 570 - 750 mm

¹ Disregarding special short batons (the rubber ones).

- Diameter 20 - 28 mm (adjustment for big hands should be possible, for example, with a solid sleeve)
- Weight 280 - 600 g
- The cylindrical shape of the round or oval crosscutting and round ending (without strengthening at the end) or with rounded edges or with the relevant rubber or plastic cap and the side handle, or two handles
- The handle must allow for easy handling both by cold and by sweated hands or hands in gloves. The handle must absorb well the energy of strikes
- The colouring must be permanent (similar to RAL 9005).

2.2 Materials

The batons must be manufactured of in shape permanent and fracture resistant materials. The long baton must not be manufactured of metal.

All used materials must be:

- Resistant to high and low temperatures (-20°C to +70°C)
- Difficult to put in flame, self-extinguishing
- Resistant to chemicals, e.g. cleaning agents and lubricants and solvents
- Resistant to aging, corrosion, temperature, and UV radiation.

The observation of the material requirements must be documented with quality certificates, according to DIN EN 10204, Type 2.1. When different materials and glues are used, their mutual compatibility must be ensured.

2.3 Long-term properties

The batons, with the exception of parts subjected to wear, must be covered, when used in accordance with their proper use, with at least 10 year warranty period.

When newly developed materials are used, with which there are no long-term experiences at disposal, the warranty period can be shorter, but not shorter than at least 5 years.

2.4 Product marking

Batons must be permanently marked as follows:

- Manufacturer, the date of manufacture – the month and the year
- Model specification
- Possible marking of the owner: The abbreviation of the home state or country (with the narrow font, according to DIN 1451, the height of 4 mm)

3 Technical requirements

The batons described in the provisions 2.1.1 to 2.1.3 must fulfil the following requirements.

3.1 Impact strength

The resistance of batons is tested by the free falling test element (of the weight 5096 g + 50 g) at the impact angle of $90^\circ + 3^\circ$ at the baton surface.

There must be the incident testing machine described in Annex 2 used for the test.

The test is executed with the tool (the steel element), according to Annex 3, with the hardness 55 + 5 HRC.

Before the test, one baton should be cooled down, according to the provision 3.1.1, for the test in a cooling facility in laying position. Its temperature should go down to $-20^\circ\text{C} + 2^\circ\text{C}$ for at least 12 hours (max. 24 hours) and another baton should be heated up in its laying position in an oven to $+70^\circ\text{C} + 2^\circ\text{C}$ for at least 12 hours (max. 24 hours). In the case of the test according to 3.1.2 (the short expandable baton only), two other batons should be stored under the same conditions. The storing of the short expandable baton is done in its closed position, but the baton is extended during the test.

After the storing, the baton must be withdrawn from the facility and firmly fixed on the rolls of the bearing surface.

The incident test, according to 3.1.1 or 3.1.2, is done during 60 + 15 seconds after the baton was withdrawn from the cooling down facility/oven.

3.1.1 *The test under maximal strain*

The impact energy must be 100 + 1 Joules (the fall height 2 m).

The tempered batons are tested.

During the test of the long baton, the falling element must impact different baton places three times (the distance of the impacts from the centre to the centre, the point respectively: 80 mm + 10 mm with the exception of the handle).

During the test of the short expandable baton, the falling element must impact the centres of segments and transition places. The handle is excluded from the test.

During the test, the material must not, in any case:

- Show a permanent shape deformation larger than 5 mm – measured at the lower side and related to the range of 120 mm
- Fracture, tear off, or break.

3.1.2 *The test under strain in accordance with the determined use (short and expandable batons only)*

The front extending part of the baton is always tested, after its storage under cold and hot conditions, for the impact strength of 20 + 1 Joules (the fall height: 400 mm).

The middle part of the baton is always tested, after its storage under cold and hot conditions, for the impact strength of 10 + 1 Joules (the fall height: 200 mm).

The batons must remain functional after the tests (allowing for letting in and extensions).

3.2 Flexibility test

During the test, the baton is fixed at the handle in its horizontal position (the fixing length is 200 mm) and at the distance of 40 mm from the point it is loaded by 150 N under the angle of 90°. The speed of loading must be 10 mm/min.

During the test, **the short expandable baton** must not flex by more than **20 mm** and **the long baton** by more than **100 mm**. After the withdrawal of the weight, the baton must return back to the original shape and remain functional.

3.3 Burning characteristics

The test must be done in accordance with DIN 53 438, Parts 1 - 3.

When the surface of the handle and functional parts of the baton are exposed to a flame, the requirements of the Class F1 must be satisfied, while during the exposure of edges at the end of the tube, the requirements of the Class K1 must be satisfied.

3.4 Characteristics under the influence of chemicals

The resistance against aggressive liquids must be verified. The following test chemicals must be used during the test:

- Caustic soda 40%
- Hydrochloric acid 36%
- Sulphuric acid 30%
- Acetone 100%
- Terebinthine replacement (the testing gasoline 145/200, No. ČSA 64742-82-1)
- Petrol Super (unleaded), according to DIN EN 228, any brand (a sample)

One baton must be used for each substance test. During each test, the baton must get submerged in the given substance for 10 + 1 minutes (the short expandable baton in its extended position). Then, the baton must be stored for 4 hours in its vertical position, with the handle up, to allow the remaining liquid to run down. Consequently, there is the impact test done on these differently treated batons, according to 3.1.1 TS, always once with the fall height of 2 m at the temperature +20°C + 2°C.

The material must not break up, tear off, or splinter during the test. Resulting marks/deformations are tolerated.

3.5 Performance under the influence of high/low temperatures

The baton must be tested by storing in a hot oven, according to DIN 53508, at 70°C for 7 days with the air circulation present.

The long baton must be consequently tested by the test described in the provision 3.1.1 with the fall height of 2 m at the temperature $+20^{\circ}\text{C} + 2^{\circ}\text{C}$.

The material must not break up, tear off, or splinter during the test. Resulting marks/deformations are tolerated.

In addition, a visual inspection of surface changes must be done. The creation of fissures or blisters is not allowed.

The short expandable baton must be visually inspected for surface changes and from the functionality point of view. The functionality is verified by 25 times extending and folding the baton.

3.6 Weather resistance

The baton must be tested for its resistance against the filtrated radiation of xenon arc and against rain, according to DIN EN ISO 4892-2. The baton is made subject to the following conditions:

- Test duration: 96 hours (the changes light/darkness)
- Test cycle: 25 min. intervals without rain, 5 min. rain
- Temperature: $+30^{\circ}\text{C}$ to $+40^{\circ}\text{C}$
- Relative humidity of the air in the testing room: about 50%

The long baton must be consequently tested, according to the provision 3.1.1, with the fall height of 2 m at the temperature $+20^{\circ}\text{C} + 2^{\circ}\text{C}$.

The material must not break up, tear off, or splinter during the test. Resulting marks/deformations are tolerated.

In addition, a visual inspection of surface changes must be done. The creation of fissures or blisters is not allowed.

The short expandable baton must be function tested and no changes can take place during extending of folding.

3.7 Performance under the influence of corrosion

The baton must be tested by spraying of salt solution, according to DIN 50021-SS, with the following parameters:

- Content of NaCl: 50 + 5 g/l
- Temperature: $+35^{\circ}\text{C}$
- pH value: 6.5 – 7.2
- Duration: 22 hours + 2 hours of drying

The baton is consequently washed with water and dried up with a cloth. No corrosion can occur.

The maintenance of functionality is verified by 25 times extending and folding the baton.

3.8 Minimal adjustment strength of the short expandable baton

In order to ensure the minimal adjustment strength, the short expandable baton is let to fall down, with its point in the down direction and the handle in the tube up, on a wooden surface. The fall height (the distance of the point from the place of impact) must be 2 m. The baton must not fold during the test.

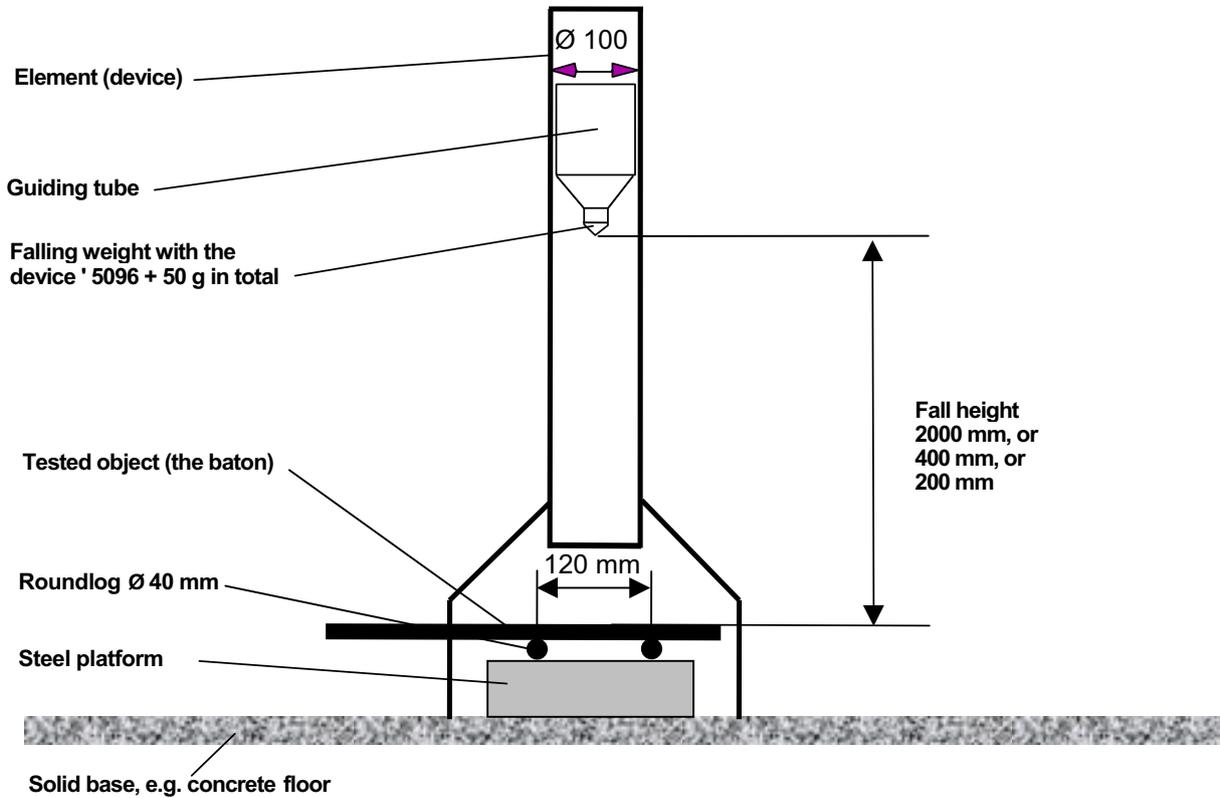
Annex 1 – Testing institute address

Materialprüfanstalt für Werkstoffe und Produktionstechnik
Schönebecker Allee 2

30823 Garbsen

Tel.: +49 (0) 511 762-4362-
E-mail: witte@mpa-hannover.de
Internet: www.mpa-hannover.de

Annex 2 – Impact strength testing facility



Note:

When possible, the breaking of the falling object by the pressurised or sucked air should be prevented (with a groove in the tube, the falling weight is not of the cylindrical sealing shape, or the tube is open at its upper end).

Annex 3 – Testing element

Steel element – the hardness 55 + 5 HRC, W

