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Title: BS EN IEC 62792 Measurement method for the output of electroshock weapons

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Introduction

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For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



85/934/CD

COMMITTEE DRAFT (CD)

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85/928/RR

IEC TC 85 : MEASURING EQUIPMENT FOR ELECTRICAL AND ELECTROMAGNETIC QUANTITIES

SECRETARIAT:

China

SECRETARY:

Ms Guiju HAN

OF INTEREST TO THE FOLLOWING COMMITTEES:

HORIZONTAL FUNCTION(S):

ASPECTS CONCERNED:

Safety

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TITLE:

Measurement method for the output of electroshock weapons

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MEASUREMENT METHOD FOR THE OUTPUT
OF ELECTROSHOCK WEAPONS****FOREWORD**

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All terms defined in Clause 3 are italicized in this standard.

The text of this standard is based on the following documents:

FDIS	Report on voting
85/490/FDIS	85/507/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

50 This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

51 The committee has decided that the contents of this publication will remain unchanged until
52 the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data
53 related to the specific publication. At this date, the publication will be

- 54 • reconfirmed,
- 55 • withdrawn,
- 56 • replaced by a revised edition, or
- 57 • amended.

58

59

INTRODUCTION

60 Manufacturers, medical researchers, policy makers, users, and other interested parties
61 involved with different aspects of electroshock weapons (ESWs) use a variety of different
62 measurement methods, different terminologies, and different parameters to measure and
63 describe the performance of an ESW. These differences generate confusion and
64 misunderstanding within this stakeholder community, and this impacts the ability to perform
65 accurate, reliable, and reproducible measurement comparisons. By developing a generally-
66 accepted terminology, set of performance parameters, and test methods, this standard will
67 facilitate accurate and precise communication for the parameters that describe the electrical
68 outputs, current and high voltage, of ESWs. This improved communication will aid this
69 stakeholder community in collectively developing uniform methods for describing the ESW
70 output and its effect on human physiology consistently and accurately, thereby enabling the
71 development of safe use performance standards/regulations by the appropriate
72 standardization body.

73

MEASUREMENT METHOD FOR THE OUTPUT OF ELECTROSHOCK WEAPONS

1 Scope

This document specifies a method for measuring the electrical outputs, current and voltage, from electroshock weapons (ESWs) that deliver an electrical stimulus to humans. This Document is applicable to any and all ESWs. This Document describes ESW measurement systems to help guide the user of this standard in developing their own ESW measurement system. It includes methods for measuring and/or computing a variety of parameters that may be used to characterize the electrical output of the ESW. The user of this standard should select those parameters that are appropriate for their applications and stakeholders.

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.

IEC 60469:2013, *Transitions, pulses and related waveforms – Terms, definitions and algorithms*

IEEE Std. 1057-2017, *IEEE Standard for digitizing waveform recorders*

BIPM, *The International System of Units (SI)*, 9th Edition, 2019

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply. The parameters included here and suggested for use in describing the performance of an ESW are those typically used to describe the waveforms of pulse-like signals that are produced by pulse generators, such as an ESW, or the step-response or impulse-response of waveform recorders that are used to measure these pulse signals.

3.1

aggregate current

flow of charge per second delivered by the ESW pulse train

3.2

impulse amplitude

difference between the specified *level* corresponding to the *maximum peak* (*minimum peak*) of the positive (negative) *impulse-like waveform* and the *level* of the *state* preceding the first *transition* of that *impulse-like waveform*

[SOURCE: IEC 60469:2013, 3.2.3.1]

3.3

correction

operation combining the results of the conversion operation with the transfer function information to yield a *waveform* that is a more accurate representation of the *signal*

Note 1 to entry: Correction may be effected by a manual process by an operator, a computational process, or a compensating device or apparatus. Correction must be performed to an accuracy that is consistent with the overall accuracy desired in the waveform measurement process.

[SOURCE: IEC 60469:2013, 3.2.4, modified – Note 2 to entry has been deleted.]

3.4

effective number of bits

ENOB

for an input sinewave of specified frequency and amplitude, the number of bits of an ideal waveform recorder for which the root-mean-square (r.m.s.) quantization error is equal to the r.m.s. noise and distortion of the waveform recorder under test

[SOURCE: IEEE Std. 1057-2017, 3.1.29]

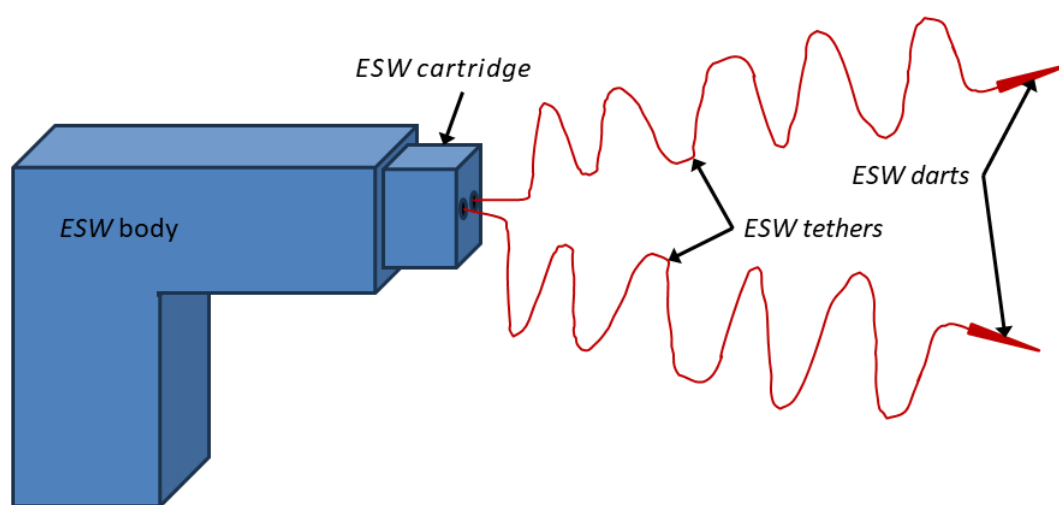


Figure 1 –Long-range wired ESW showing components.

3.5

electroshock weapon

ESW

weapon that generates a *high-voltage* transient electrical *signal* that is transmitted to a person

Note 1 to entry: The ESW comprises, at a minimum, a signal generator located in the body of the ESW and a pair of electrical contacts to make electrical connection between the generator and a person.

3.5.1

long-range wired ESW

ESW that uses propelled, tethered, skin-penetrating or adhering (for example, to clothing) barbed darts as the electrical contacts (see Figure 1)

Note 1 to entry: Adhering darts attach sufficiently close to the surface of the person to complete a circuit capable of delivering an electrical charge to that person. These barbed darts are tethered to the ESW cartridge that is mechanically attached to the body of the ESW and travel away from the cartridge when deployed. The ESW cartridge is often used to convert a contact ESW to a long-range wired ESW.

3.5.2

long-range non-wired ESW

ESW that is compact in size and that is fired or launched from a separate and independent firearm, device, or apparatus and to which there is no physical connection between the ESW and the firearm, device, or apparatus after it is fired or launched

3.5.3**contact ESW**

ESW that uses fixed metal electrodes located on the body or cartridge of the *ESW* as the electrical contacts

3.5.4**ESW cartridge**

component of the *long-range wired ESW* that contains the tethered skin-penetrating or adhering barbed darts (*ESW darts*) and mechanically attaches and electrically connects to the body of the *ESW* to complete the circuit and facilitate the delivery of electrical charge

Note 1 to entry: The *ESW cartridge* is often used to convert a *contact ESW* to a *long-range wired ESW*.

3.5.5**ESW dart (probe)**

component of the *long-range wired ESW* that is connected to the *ESW tether* and makes electrical contact to the target by penetrating the skin of the target or adhering to the clothing of the target

3.5.6**ESW tether**

conductive wire providing electrical contact between the *ESW dart* and the *ESW cartridge* of the *long-range wired ESW* as the *ESW dart* travels from the *ESW* to the target

3.6**high voltage**

voltage having a value above a conventionally adopted limit

Note 1 to entry: For *ESW*, this conventionally adopted limit shall be specified by the user of this standard.

[SOURCE: IEC 60050-151:AMD2021, 151-15-05, modified – Note 1 to entry has been added.]

3.7**impulse response**

time response of a linear time-invariant system to an impulse excitation $K_{\delta}\delta(t)$

3.8**instant**

particular time value within a *waveform* epoch that, unless otherwise specified, is referenced to the *initial instant* of that *waveform epoch*

[SOURCE: IEC 60469:2013, 3.2.13]

3.8.1**final instant**

last *sample instant* in the *waveform*

[SOURCE: IEC 60469:2013, 3.2.13.1]

3.8.2**initial instant**

first *sample instant* in the *waveform*

[SOURCE: IEC 60469:2013, 3.2.13.3]

3.9**interval**

set of all values of time between a first *instant* and a second *instant*, where the second *instant* is later in time than the first

Note 1 to entry: These first and second instants are called the endpoints of the interval. The endpoints, unless otherwise specified, are assumed to be part of the interval.

[SOURCE: IEC 60469:2013, 3.2.15]

3.10**level**

constant value having the same units as y

[SOURCE: IEC 60469:2013, 3.2.17]

3.10.1**average level**

pertaining to the value of the mean of the *waveform level*

If the *waveform* takes on n discrete values, y_j , all equally spaced in time, that *average level* is,

$$\bar{y} = \left(\frac{1}{n} \right) \sum_{j=1}^n y_j \quad (1)$$

[SOURCE: IEC 60469:2013, 3.2.17.1, modified – The formula for the *average level* of a continuous function of time has been deleted and the notes have been deleted.]

3.10.2**average absolute level**

pertaining to the mean value of the absolute *waveform* value. If the *waveform* takes on n discrete values, y_j , all equally spaced in time, the *average absolute level* is,

$$\overline{|y|} = \left(\frac{1}{n} \right) \sum_{j=1}^n |y_j|$$

(2)

[SOURCE: IEC 60469:2013, 3.2.17.2, modified – The formula for the *average level* of a continuous function of time has been deleted and the notes have been deleted.]

3.11**measurand**

quantity intended to be measured

[SOURCE: ISO/IEC Guide 99:2007, 2.3, modified – The notes have been deleted.]

3.12**measured quantity value**

measured value of a quantity

measured value

quantity value representing a measurement result

[SOURCE: ISO/IEC Guide 99:2007, 2.10, modified – The notes have been deleted.]

3.13**measurement trueness**

trueness of measurement

trueness

closeness of agreement between the average of an infinite number of replicate measured quantity values and a reference quantity value

[SOURCE: ISO/IEC Guide 99:2007, 2.14, modified – The notes have been deleted.]

3.14**measurement uncertainty**

uncertainty of measurement

uncertainty

non-negative parameter characterizing the dispersion of the quantity values being attributed to a *measurand*, based on the information used

[SOURCE: ISO/IEC Guide 99:2007, 2.26, modified – The notes have been deleted.]

3.15**metrological traceability**property of a measurement result whereby the result can be related to a reference through a documented unbroken chain of calibrations, each contributing to the *measurement uncertainty*

[SOURCE: ISO/IEC Guide 99:2007, 2.41, modified – The notes have been deleted.]

3.16**offset**algebraic difference between two specified *levels*

Note 1 to entry: Unless otherwise specified, the two levels are state 1 and the base state.

[SOURCE: IEC 60469:2013, 3.2.18]

3.17**parameter**any value (number multiplied by a unit of measure) that can be calculated from a *waveform*

[SOURCE: IEC 60469:2013, 3.2.20]

3.18**maximum peak (minimum)**pertaining to the greatest (least) value of the *waveform*

[SOURCE: IEC 60469:2013, 3.2.21 and 3.2.22]

3.19**peak-to-peak**pertaining to the value of the difference between the extrema of the specified *waveform*

[SOURCE: IEC 60469:2013, 3.2.23]

3.20**pulse duration**difference between the first and second *transition* occurrence *instants*

[SOURCE: IEC 60469:2013, 3.2.27, modified – Note 1 to entry and figure references have been deleted.]

3.21**pulse rate**

number of pulses per second within an ESW output pulse train

3.22**pulse separation**

duration between the 50 % reference *level instant*, unless otherwise specified, of the second *transition* of one pulse in a *pulse train* and that of the first *transition* of the immediately following pulse in the same *pulse train*

[SOURCE: IEC 60469:2013, 3.2.28]

3.23**pulse train**

repetitive sequence of *pulse waveforms*

Note 1 to entry: Unless otherwise specified, all of the pulse waveforms in the sequence are assumed to be identical.

[SOURCE: IEC 60469:2013, 3.2.29, modified – The figure has been deleted.]

3.24**reconstruction**

waveform deconvolution

process of removing the effect of the measurement instrument on the *acquired waveform*

Note 1 to entry: This process mathematically removes the estimated impulse response of the test instrument from the *acquired waveform*.

3.25**reference measurement procedure**

measurement procedure accepted as providing measurement results fit for their intended use in assessing measurement trueness of measured quantity values obtained from other measurement procedures for quantities of the same kind, in calibration, or in characterizing reference materials

[SOURCE: ISO/IEC Guide 99:2007, 2.7]

3.26**reference measurement system**

reference system

ESW measurement system that is used to support a *reference measurement procedure*

3.27**sample**

element of a *sampled waveform*

3.28**signal**

physical phenomenon, one or more of whose characteristics may vary to represent information

Note 1 to entry: This phenomenon is a function of time.

[SOURCE: IEC 60050-701:1988, 701-01-02, modified – the note to entry has been replaced.]