

# UGANDA STANDARD

First Edition  
2019-mm-dd

Military Combat Helmets — Specification



PUBLIC REVIEW DOCUMENT



Reference number  
US 2080: 2019

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The **table of contents** is an optional preliminary element, but is necessary if it makes the document easier to consult. The table of contents shall be entitled “Contents” and shall list clauses and, if appropriate, subclauses with titles, annexes together with their status in parentheses, the bibliography, indexes, figures and tables. The order shall be as follows: clauses and subclauses with titles; annexes (including clauses and subclauses with titles if appropriate); the bibliography; indexes; figures; tables. All the elements listed shall be cited with their full titles. Terms in the “Terms and definitions” clause shall not be listed in the table of contents.

The table of contents shall be inserted for a document of 15 or more pages.

## Foreword

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Draft Uganda Standards adopted by the Technical Committee are widely circulated to stakeholders and the general public for comments. The committee reviews the comments before recommending the draft standards for approval and declaration as Uganda Standards by the National Standards Council.

The committee responsible for this document is Technical Committee UNBS/TC8, *Transport and Communication*.

US 2080 consists of the following parts, under the general title *Introductory element — Main element*:

- —Part n: Part title
- —Part [n+1]: Part title
- —Part [n+2]: Part title

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**Military combat Helmets — Specifications****1 Scope**

This standard covers performance requirements, materials, design and construction, workmanship, mass and methods of test for **military combat helmets** intended to protect the wearer **from the damaging effects of bullets of small arms ammunition, fragments, and cold weapons**.

**Terms and classification of military combat helmets established by this standard are obligatory for use in all types of documentation and literature included in the scope of work on standardization or using the results of these works.**

**2 Normative references**

The following referenced documents 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.

*US ab-c:199x, General title of series of parts — Part c: Title of part*

*US xyz (all parts), General title of the series of parts*

### 3 Terms and definitions

#### 3.1

##### term

**armored helmet** - Means of individual armor, made in the form of the head a dress designed to be periodically worn to protect a person's head from exposure cold arms and (or) small arms bullets, and (or) shrapnel attacks under specified conditions operation.

#### 3.2

**body of the armored helmet** - Forming part of the protective structure of the armored helmet protecting the human head from the means of destruction.

#### 3.3

**Suspension mounting system** – system of the armored helmet set of elements united by a common design solution to enable wearing an armored helmet on his head, adjusting it when used in accordance with the rules, normative documents for a specific sample or group of homogeneous products.

#### 3.4

**armor visor** - the structural element of the armored helmet designed to protect the front of the user's head (optional for special requirements).

#### 3.5

**protective apron** - constructive element of armor, intended- to protect the neck/ neck and sides of the head. (optional for special requirements).

#### 3.6

**area of the armor** - the size of the outer surface of the armored helmet. Express in square decimetres.

#### 3.7

**armored helmet cover** - cover made of woven materials with high wear-resistant qualities, waterproof, water-repellent. The colour of the material must be resistant to fading. Fastening of the cover is carried out using an elastic gum or strings. Additionally, on the case can be placed identification marks on the accessories.

#### 3.8

**protection area** - size of the outer surface of the structure armor. providing the protection class specified in the regulatory document.

#### 3.9

**class of the protective structure of the armored helmet** - Protective resistance index the structure of the armored helmet to the effects of the regulated means of damage at a safe back face impact of the damaging element in the absence of penetration of the protective structure.

#### 3.10

**mounts for fastening attachments of armor** – part of the armored helmet, for mounting additional equipment (night vision, LED-torch, IR-torch, radio). (optional for special requirements)

#### 3.11

**impact resistance of armor** - the shock resistance of the armored helmet. Ability to design armor resist shock effects.

#### 3.12

**bulletproof resistance** - The property of a bulletproof helmet to provide protection from bullets of small arms.

#### 3.13



measure of anti-fragment resistance of the protective structure of the armor - Fragment speed ( $V^A$ ). under which is provided penetration of the protective structure of the armored helmet with a probability of 0.5.

### 3.14

**non-penetration (penetration) of the protective structure of the armored helmet** - absence (presence) of penetration through the means of destruction beyond the inner surface of the protective structure of the armored helmet and / or penetration of the blade of a cold weapon beyond the inner surface beyond shield structure on the permissible (unacceptable) value established in regulatory documents on a specific product or group of homogeneous products.

### 3.15

**impact of the damaging element in the absence of penetration of the protective structure** - dynamic impact of the striking element, in case of non-penetration of the protective structure, determined by the indicator normalized by the regulatory document for a specific product or group of homogeneous products.

**Note** - Indicator - a parameter through which the criteria for evaluating the product, the value which is obtained as a result of measurement, calculation and forecast.

### 3.16

**Angle of Incidence** - The angle between the line of flight of a bullet and the perpendicular to the plane tangent to the point of impact. See figure 1.

### 3.17

**impact speed of the striking element** - velocity of a element with a protective structure of an armored helmet at the point of interaction (touch).

### 3.18

**offset (not offset) defeat of the protective structure of the armored helmet** -

A hit that impacts the helmet at an angle of incidence no greater than  $5^\circ$ , and is at least 5 cm from a prior hit or the edge of the helmet. A bullet that impacts too close to the edge or a prior hit and/or is of too high a velocity, but does not penetrate, shall be considered a fair hit for the determination of penetration.

### 3.19

**Ballistic material** - special fabrics, materials (various types depending on materials made from: Aramid, High Molecular Polyethylene, ) and products made from them with high resistance to high-speed impact. Characterised by high mechanical strength, elasticity, determined by the allowable deflection after a shot at them.

### 3.20

**Armor** - is a protective layer of material with sufficiently high strength, viscosity and other mechanical parameters that are at a high level of performance, which in one case or another performs the function of a barrier from a different strength and intensity of impact on an object surrounded by this layer.

### 3.21

**Ballistics** - science that deals with the motion, behaviour, appearance, or modification of missiles or other ammunition acted upon by propellants, wind, gravity, temperature, or any other modifying substance, condition, or force

### 3.22

**Full Metal Jacketed Bullet (FMJ)** - A bullet made of lead completely covered, except for the base, with copper alloy (approximately 90 copper-10 zinc).

### 3.23

Jacketed Soft Point (JSP) - A bullet made of lead completely covered, except for the point, with copper alloy (approximately 90 copper-10 zinc).

3.24

**Lead Bullet** - A bullet made of lead alloyed with hardening agents.

3.25

**Round** - A single unit of ammunition before it has been fired.

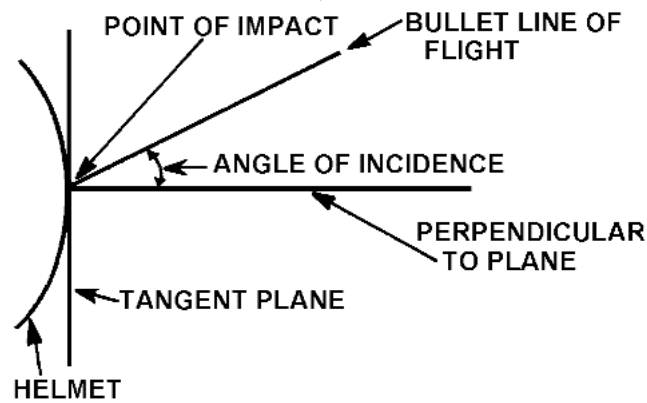


Figure 1. Angle of incidence.

#### 4 Classification

4.1 Military combat helmets covered by this standard are classified by level of performance.

- on protective properties;
- on the design of protective structures.

4.1.1 protective properties of military combat -helmets are divided into :

- bulletproof;
- anti-fragment;
- combined.

4.1.2 design of the protective structures of the military combat helmets are divided into:

- soft:
- on semi-rigid. based on soft protective structures with solid armor plates;
- hard, based on solid armor materials.

4.2 military combat helmets are of three protection classes.

The military combat helmets threat posed by a bullet depends, among other things on its composition, shape, caliber, mass, and impact velocity. Because of the wide variety of cartridges available in a given caliber and because of the existence of hand loads, helmets that will defeat a standard test round may not defeat other loadings in the same caliber. For example, a helmet that prevents penetration by a 7,62x25 "TT" test round may or may not defeat a 7,62x25 round with different core or higher velocity. Similarly, for identical striking velocities, non-deforming or armour piercing rounds pose a significantly greater penetration threat than an equivalent lead core round of the same caliber. The test ammunition specified in this standard represent common threats to the law enforcement community in the region.

#### 4.2.1 Class 1 (Impact Resistant, fragmentation protection)

This helmet protects against the impacts, cold weapons, fragments V50 - 250 m/s.

#### 4.2.2 Class 2 (9x19 mm)

This helmet protects against the standard test rounds as defined in paragraph 5.4 It also provides protection against lesser threats such as 12 gauge shotgun, 9x19 mm, as well as the threats mentioned in paragraph 4.2.1.

#### 4.2.3 Class 3 (7.62x25 mm)

This helmet protects against the standard test rounds as defined in paragraph 5.4 It also provides protection against 7.62x25, as well as the threats mentioned in paragraph 4.2.1 and 4.2.2.

### 5 Requirements

#### 5.1 Acceptance Criteria

A military combat helmets material satisfies the requirements of this standard if the sample item (see sec. 7.1) meets the requirements of sections 5 through 5.4.

#### 5.2 Workmanship

military combat helmets resistant protective materials shall be free from dents, blisters, cracks, crazing, chipped or sharp corners, and other evidence of inferior workmanship.

#### 5.3 Labelling

The Sample item and each full size panel of military combat helmets shall be permanently and legibly labelled and shall include the following information.

- a) Name, designation, or logo of the manufacturer
- b) Type of material, according to section 6.1 of this standard
- c) Month and year of manufacture
- d) Lot number
- e) Strike face, if any
- f) Certification of compliance with this edition of this standard Items c and d may be incorporated into a single number, e.g., a serial number.

#### 5.4 Ballistic Resistance

The ballistic resistance of each test specimen of ballistic resistant protective material shall be determined in accordance with section 7.4. The test weapon and ammunition used during this test shall be those specified in table 1 in accordance with the type (threat level rating) specified by the manufacturer. Any penetration of the witness plate or over-limit back-face deformation shall constitute failure. The ballistic resistance test variables and test requirements are presented in table 1.

Table 1- Test ammunitions for military combat helmets

Protection class	Type of the ammunition/threat	Weapon	Specification of the striking element			Testing distance (meters)
			Type of the core	Weight gr.	Velocity m/s	
Class 1 of protection						
1	Cold weapon	Knife 6X5	—	Impact power(49±1) J.		—
1	18.5-mm hunting cartridge	12 gauge shotgun	Lead	34.0±1.0	390—410	5±0,1
1	Fragmet simulator	Ballistic gun or equivalent	Steel ball	1.05		—
Main classes of protection for military combat Helmet						
2	9x19 mm Pistol cartridge FMJ	9-mm Pistol Glock	Lead	8	335±15	5±0.1
3	7.62x25 mm Pistol cartridge FMJ	7.62 «TT»	Lead	5,52	460±15	5±0,1

Abbreviations:

FMJ - Full Metal Jacket

TT – Tulskiy Tokarev

## 6. Specification

### 6.1 Materials

#### 6.1.1 shell body

It must be made using one of the following materials or its combination: aramid, ultra-High molecular weight polyethylene, ceramic steel, aluminium, polycarbonate (impact protection).

#### 6.1.2 Shell weight

- It shall have weight of 2.0Kgs (maximum) with complete suspension system and chin strap
- The helmet shall consist of shell body with complete suspension system and chin strap
- The fixation system shall be made of quick release buckle
- One size helmet with adjustable strap to fit different head sizes, must cover the forehead, ear level at the back of the head

- e) Visor/face Shield (Optional)
  - i) Material of visor – polycarbonate (laminated)
  - ii) Weight of visor – (2 Kgs) (maximum)
  - iii) Thickness – 15 – 30mm
  - iv) Protection Area – 4.5 Sq.dm (maximum)
  - v) Fitting – must be shell fitted with fixation screws of visor fastening system
  - vi) Comfort – construction designed in a way preventing any marked motion limitation of the user's head downward his chest
- f) Features
  - a) Visor is scratch resistant.

## 7 Test methods

### 7.1 Sampling

The test specimen shall be a current production sample of the military combat Helmet.

#### 7.1.1 Sampling for Test

Three helmets shall be selected at random from each batch to constitute a test sample as shown in table 2.

Table 2 – sampling criteria

No. of helmets	Sample QTY	Acceptance level
1 - 100	3	2
101 - 1000	6	4
1001 – 10,000	10	8
Above 10,000	15	12

### 7.3 Test Equipment

It should be noted that hand-loaded ammunition may be required to achieve some of the bullet velocities required in the following sections

#### 7.3.1 Class 1

##### 7.3.1.1 Fragmentation test

Fragments Velocity 50 - 250 m/s

##### 7.3.1.2 Impact test

protective material shall be at an angle of incidence no greater than 5°, and is at least 5 cm (2 in) from a prior hit or the edge of the test specimen and at an acceptable velocity as defined in 7.3.1.1.

#### 7.3.2 Class 2 Test Weapons and Ammunition

##### 7.3.2.1 lower velocity 9mm

The test weapon may be a Glock handgun or test barrel. The use of a handgun with a 10 to 12 cm (4 to 4.75 in) barrel is suggested. Test bullets shall be 9X19 FMJ, with nominal masses of 8 g and measured velocities of  $340 \pm 15$  m per second.

#### 7.3.3 Class 3 Test Weapons and Ammunition

#### **7.3.3.1 caliber 7,62x25mm**

The test weapon may be a "TT" handgun or test barrel. The use of a handgun with a 15 to 16.5 cm barrel is suggested. Test bullets shall be 7,62x25mm, with nominal masses of 5.5 g and measured velocities of  $460 \pm 15$  m per second.

#### **7.3.4 Special Type Test Weapon and Ammunition**

The test weapon, cartridge type, bullet construction, bullet caliber, bullet mass, and bullet striking velocity must all be specified by the user.

#### **7.3.5 Chronograph**

The chronograph shall have a precision of  $1 \mu\text{s}$  and an accuracy of  $2 \mu\text{s}$ . Its triggering devices shall be of either the photoelectric or conductive screen type.

#### **7.3.6 Support Fixture**

The test specimen shall be supported by a fixture that permits its position and attitude to be readily adjusted so that it is perpendicular to the line of flight of the bullet at the point of impact.

### **6.2 Test Sequence**

The helmets shall be examined to determine compliance with the requirements of table 1, and shall then be tested for compliance with the requirements of this standard.

### **6.3 Ballistic penetration**

helmets shall be tested for resistance to ballistic penetration in accordance with table 2. Penetration by any fair hit shall constitute failure. The detailed ballistic performance requirements are summarized in table 1.

## **7 BALLISTIC TESTING METHODOLOGY**

### **7.1 Test Processes**

During a test, the helmet being tested is affixed to a head form and a specified rifle is used to fire various projectiles into the helmet. The chronograph is used as a recording the velocity as illustrated in figure 1.

### **7.2 safety**

The tested should be done in a enclosed environment.

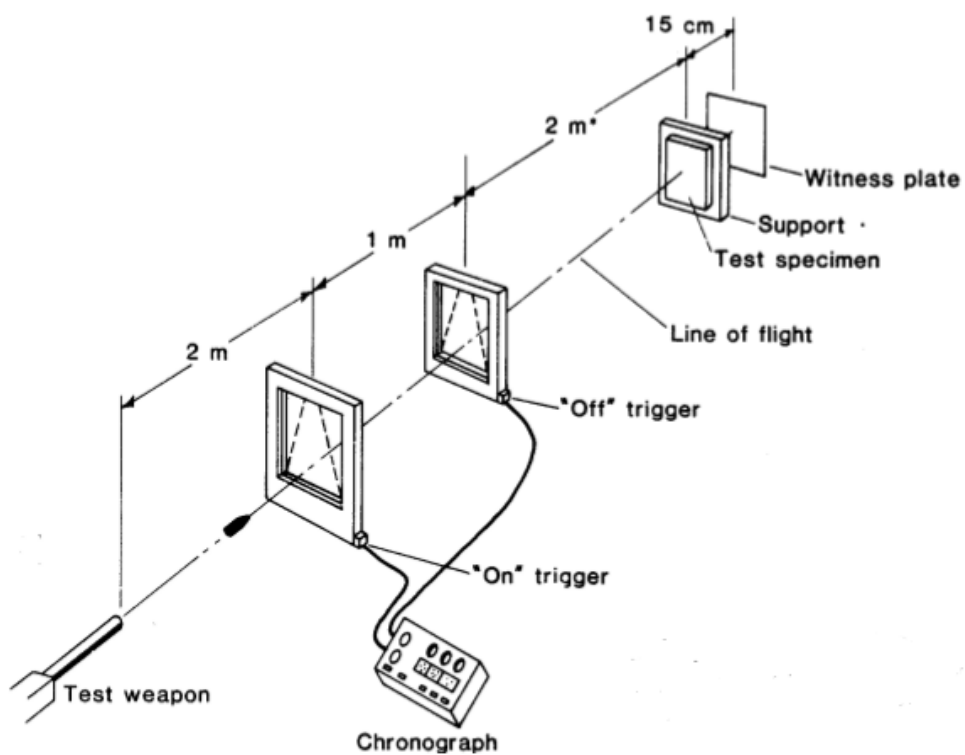


Figure 1 demonstrates setup for testing

## Bibliography

[1] NIJ Standard 0108.01— Ballistic Resistant Protective Materials

[2] GOST R 50744-95 - Armored clothing. Classification and general technical requirements

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