

	<b>ΤΕΧΝΙΚΗ ΠΡΟΔΙΑΓΡΑΦΗ</b> <b>SAFETY HELMETS FOR GENERAL USE</b>	<b>CODES:</b> 831001410 831001460 831001471 831003479
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### 1. Object

This specification determines the technical data, test of delivery, marking and the way of packing of safety helmets. These helmets are used for the protection of the workers heads against injuries during their work. These injuries could due to workers falls, to object falls or splashes, to crash to objects, machines or suspended loads as well as contact with live electrical elements.

### 2. Descriptors

Helmet, Worker, Safety, Head, Personal Protective Equipment.

### 3. Operating Conditions

Safety helmets shall be used to all the working places, open-aired or closed. In this context is demanded to have strength to unfavorable conditions, as the high temperature, solar radiation, cold, humidity and dust. Also they will have the required dielectric strength and will be light and easy to use without reducing the mechanical strength.

Those helmets are not intended for protection against molten metal splashes and for lateral deformation.

### 4. Standards – Specifications

1. EN 397/1998 Industrial Safety Helmets
2. ISO 3873/1977 Industrial Safety Helmets
3. ANSI Z/89.1/1986 Protective headwear for industrial workers.
4. DIN 4840/1989 Protective helmets
5. EN 960/1994 Head forms for use in the testing of protective helmets
6. Ministry Decision 4373/1205/1993 (EEC Directive 89/686)

### 5. Description

The safety helmets will be consisted by two distinguished parts.

- The external shell
- The harness for adaptation and maintaining the helmet on the worker's head.

Also a chinstrap will be applied either to the internal harness or to the shell, The whole manufacturing of the helmet (shell, harness, fitting systems) must be designed in such a way to disqualify the user's injury in case of accident. Particularly:

- They shall not exist any rough projection in the internal shell.
- No one part shall have any sharp projective edge.
- No one part of harness will be easily modified.

#### 5.1 External shell

The external shell will be hemispherical shaped, made of homogeneous synthetic material, with the most possible equally distributed mechanical resistance, without ventilation holes.

The shell will have front peak and a folding extension of it to the sides and back. It will cover the front part of head and its below part will reach at least the line of the above part of the straps (figure 1).

To obtain of the uniform strength it won't exist any reinforcements to special points. This doesn't exclude a gradual increase of the shell's weight or rib, but exclude categorically any other local reinforcement.

The external surface of the shell will be smooth and its edges rounded.

In the internal part of the shell will be six sockets, which the harness will be adapted to the head. The way of head harness fitting will be such one that won't allow its unintentional removal from the shell. In case of intentional removal will be easy the replacing.

The shell mustn't prevent the user to wear corrective spectacles or safety goggles.

## 5.2 Harness

### 5.2.1 General description

The harness is the full system that provides:

- Helmet's retention on the head.
- Absorption of the kinetic energy in case of an impact from object.

It will be consisted of:

- The headband, which is the part that surrounds the head from the front up to the ears.
- The nape strap, which is the adjustable part that surrounds the back of head. For the better fitting of the helmet the nape strap will form acute accent angle with the edge of the shell.

The nape strap for its adjustment will have in its rear part, a ratchet to permit the perimeter's adjustment in the desired length even the helmet is worn.

- The cradle, which are the cross straps that fit the helmet in the top of head.
- The sweatband, which covers the headband in the surface of the contact with front and will be possible to be subtracted for cleaning.

### 5.2.2 Technical characteristics

The headband and nape straps will be made from synthetic material low density. Any material that may cause skin irritations is excluded. All the parts that contact with the skin will have smooth surface.

The cradle will be made from textile tapes and will have the capability of adjustment in order that the appropriate contact with the top of the user's head shall be done and to avoid any stress, irritation or sweating.

The width of any cross strap won't bigger than 15 mm.

The sweatband will have a length so that it would cover all the length of the headband and will be made by leather with the following characteristics:

- Minimum thickness 0,8 mm.
- pH 4 at least.
- Washable material content 6% maximum.
- Proportion dichloromethane extractable materials 4 to 12 %.

## 5.3 Chinstrap

The chinstrap will be applied either to the internal harness or to the shell, with a non metallic joint and will be consisted of leather strap 10 mm at least with length regulator.

## 6. Tests

### 6.1 Design tests

No required.

### 6.2 Type tests

#### 6.2.1 Visual inspection

The helmets must fulfill the requirements referred to § 5 concerning the shape and the materials and they must be also easy to use and functional.

#### 6.2.2 Dimensional and weight's check

For the helmet's dimension checking it will put at headforms as per EN/960/1994.

The dimensions that are reported at the next paragraphs 6.2.2.1 up to 6.2.2.5 mustn't have any difference before and after application a vertical force of 50 N. (EN 397, § 6.5).

##### 6.2.2.1 Wearing height

The vertical distance from the lower edge of the headband up to the top of head form must be at least: 80 mm for type D, 85 mm for type G and 90 mm for type K. The types D, G, K are reported on EN/960/1994.

##### 6.2.2.2 External vertical distance

The vertical distance between the above edges of the headform up to the highest point of the shell must be less than 80 mm.

### 6.2.2.3 Internal vertical distance

The difference of the height distance of the highest point of the shell when is normally wearing and when is in contact to the headform (without the cradles) must be less than 50 mm.

### 6.2.2.4 Internal vertical clearance

The difference in level of the above edge of the shell when is normally wearing and when is put to headform (without the cradles) must be at least 25 mm so that to be assured sufficient ventilation on head.

### 6.2.2.5 Horizontal distance

The horizontal distance between the headform and the internal of the shell measured in the lower edge of it on the front and to middle of the skull must be at least 5 mm.

### 6.2.2.6 Weight

The weight of the whole helmet must be less than 450 g.

### 6.2.3 Sock absorption test (EN 397, § 6.6)

The helmet will be put in to a head form in a steady and massive base. An striker with hemispherical surface impact (with range  $50 \pm 1$  mm, and  $5 \pm 0, 1$  Kg) will fall in free way from  $1000 \pm 5$  mm height on the shell's edge (correspond to 49 J energy). The power that is transferred to the head form must be less than 5 KN.

### 6.2.4 Resistance to penetration test (EN 397 § 6.7)

The helmet will be put in a head form to a steady and massive base. A conical striker will fall in free way from  $1000 \pm$  mm height in a point of the shell that would be in 50 mm distance from the shell's edge. The object must have the characteristics:

- Weight  $3 \pm 0,05$  Kg.
- Angle  $60^\circ \pm 0,5^\circ$ .
- Radium  $0,5 \pm 0,1$  mm.
- Cone height at least 40 mm.
- Hardness 50 – 45 on Rockwell HRC.

The test must be successful if the object doesn't come in contact with the head form.

### 6.2.5 Resistance to flame (EN 397, § 6.8)

The helmet will be conditioned at  $50^\circ$  C and then will be put upside down. A burner of propane (95% clearness, with  $3430 \pm 50$ Pa air pressure) will be put under  $45^\circ$  angle to the helmet and will be provided flame so that the edge of the flame adjoined to helmet's points in the external of the shell in a 50 to 100 mm distance from the edge for 10 sec. The test must be successful if 5 sec after the flames removal the shell's material is not burnt.

### 6.2.6 Chinstrap Anchorage test (EN 379, § 6.9)

The helmet will be put to the head form and an under force is applied with rate of increasing  $20 \pm 2$  N/min until the chinstrap disconnected from the point of its annexation. The test must be successful if the chinstrap detached from the point of its anchorage with the force between 150 and 250 N.

The detach must be done only with the destroy of the anchorage point of the helmet's chinstrap with no other damage.

### 6.2.7 Ageing test (EN 397 § 5.26 and annex B)

After the helmet exposed to artificial ageing with Xenon lamp for  $400 \pm 4$  hours then will be tested to shock absorption according to § 6.2.3 and 6.2.4 respectively to resistance to penetration tests.

### 6.2.8 Dielectric strength tests (ANSI Z 89.1/ 1986, § 8.2)

The whole helmet will be part reversible into a water tank with an aqueous solution NaCl into an environment temperature. The test tension will be run to 20.000 V and will be stay for 3 min.

The test will be successful if the leakage current is less than 9mA. Then the tension will be run to 30.000 V with rate of increasing 1000V/sec and will be eliminated rapidly. The test will be successful if the helmet doesn't break.

## 6.3 Sampling tests

### 6.3.1 Number of samples

Before the delivery of each portion they will test the groups that are shown in the list.

Size of portion	Groups under testing	Permissible variances
0-500	1	0
500-1000	2	0
1000-1500	3	0

Every group that is under testing will be consisted of nine helmets, which are tested as follows:

- 1 for the sock absorption test after putting into the water.
- 1 for the sock absorption test at  $50^\circ$ C and after the testing in flame resistance.
- 1 for the sock absorption test at  $-20^\circ$ C.
- 1 for the sock absorption test after artificial ageing.

- 1 for the test penetration resistance test after putting into the water.
- 1 for the penetration resistance test at 50° and after for the chinstrap anchorage test.
- 1 for the test penetration resistance test after artificial ageing.
- 1 for the penetration resistance test at -20°C.
- 1 for dielectric strength

### 6.3.2 Sample preparation

The samples will be conditioned for 3 days at least at  $20^{\circ} \pm 2^{\circ} \text{C}$  temperature and related humidity  $65 \pm 5\%$  and then:

For the tests at -20°C they will be air conditioned at  $-20\text{C} \pm 2^{\circ}$  about 4 – 24 hours.

For the test with putting into the water they will be put entire into baths  $20^{\circ} \pm 2^{\circ} \text{C}$  temperature about 4 – 24 hours.

For the tests in high temperatures they will be air- conditioned at  $50^{\circ} \pm 2^{\circ} \text{C}$  about 4 – 24 hours.

For the acceptance of a lot all the tests must be executed successfully.

### 6.4 Routine tests

No required.

## 7. Labels - Marking

### 7.1 Marking on the helmet

Every helmet shall be indelibly marked by:

- The CE mark according legislation
- EN 397
- The sign of IPTO
- The name or identification mark of the manufacturer
- The product identification on the shell and also in the internal order
- The size of the skull's perimeter, which covered with it.
- The year and quarter of manufacture. The date on which the order will be assigned shall be, at most, four months previous of the manufacture date.
- The label -20°C that is the very low temperature in which mechanical tests have been occurred.
- The label 440 Vac that is tested the dielectric resistance.

### 7.2 The sticker

Every helmet will have a sticker with the following in Greek:

- For adequate protection this helmet fit or be adjusted to the use's head.
- The helmet is made to absorb the energy of a blow partial destruction or damage to the shell and the harness, and even though such damage may not be readily apparent, any helmet subjected to severe impact should be replaced.
- The attention of users is also drawn to the danger of modifying or removing any of the original component parts of the helmet, other than as recommended by the helmet manufacturer.

Helmets should not be adapted for the purpose of fitting attachments in any way not recommended by the helmet manufacturer.

- Helmets shall not be applied by paint, solvents adhesives or self-adhesives.

## 8. Packing

Each helmet shall be packaged in a plastic bag with a way that could be carried. Every 10 – 15 helmets will be packaged in cartoons in which will be inscribed all the necessary information (factory, number of pieces etc).

Each helmet shall be attended with a booklet, written in Greek, in which will be inscribed:

- Name and the address of the manufacture
- Instructions or recommendations that concern to regulation, adaptation, use, cleaning, disaffection, preservation and storing.
- The cleaning disaffection and maintenance materials couldn't have any unfavorable effect on helmet's properties and wouldn't be materials which is known that cause harmful effect to the user.
- Details for exchangeable helmet's elements.
- Information about the helmet's ageing and its parts.
- Information about the way of packing in the transportation.
- Information for the extra helmet's properties (dielectric strength, strength in very low temperatures).
- The accredited laboratory that testified it.

## 9. Additional details submitted within the offer.

Every bidder will accompany his technical offer with two samples and with:

1. Informative data (technical booklets) in which will reported the technical details the helmet's properties test result etc.
2. Certificate from a Notified Body.
3. Guarantee for the minimum helmet's lifetime under regular use conditions.

Under IPTO judgment some tests may won't to carry out so long as there are results from testing on notified body. IPTO should buy the spare parts it needs from the lowest bidder from a price list that must be submitted to the financial offer.

	<b>ΤΕΧΝΙΚΗ ΠΡΟΔΙΑΓΡΑΦΗ HELMETS WITHOUT PEAK</b>	<b>CODES: 831009871</b>
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This helmet shall be used by construction working groups in outdoor works, where the hazard of electric accident is restricted.

The helmets shall meet the basic requirements of EN 397 and the following:

- They shall have a shell without brim and lateral extension.
- The shell shall have ventilation holes.
- The harness shall have a cradle from six textile tapes.
- In forehead there shall be a leather sweatband.
- The chin strap shall be made of textile and shall be connected to the helmet or harness in three points at least.
- They shall execute the tests in low temperature and shall have the appropriate marking (−20°C).

The technical offer shall be accompanied by:

- A sample
- Detailed prospectus
- Certification from a notified body

In delivery:

- They shall have an indelible marking of the IPTO mark.
- They shall have a label with information in Greek language (EN 397 § 7.2).
- They shall be individually packed in a plastic transparent bag.

	<b>ΤΕΧΝΙΚΗ ΠΡΟΔΙΑΓΡΑΦΗ</b> <b>HELMET INCORPORATING FACE SHIELD</b>	<b>CODE:</b> <b>831009238</b>
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The equipment shall be consisted of:

- A protective helmet.
  - A face shield for protection against short circuit electric arc incorporated to the inner part of helmet, that shall be possible to be moved down to cover the user's face.
  - An adjustment device by which the user shall be able to move up or down the face shield.
- The equipment shall have CE mark and shall fulfill the requirements of EN 379 (helmet) and EN 166, 167, 168 (face shield) with the following characteristics:

#### **Helmet**

- It shall fulfill the basic requirements of EN 397.
- It shall provide protection against molten metals (symbol MM)
- It shall have a dielectric strength as per ANSI 2891 § 8.2.3 (helmets class B).
- It shall fulfill the requirements for mechanical strength under low temperature (symbol - 20oC)
- The cradle shall be made from synthetic fibres and the headband and nape strap from low density synthetic material.
- The adjustment of nape strap shall be executed by a ratchet, while the helmet is worn, that shall be to its backside.
- There shall be a chin strap with length adjuster.
- There shall be a sweat band made from leather or cotton textile.
- A device from face shield adjustment shall be incorporated.

#### **Face shield**

The face shield shall fulfill the requirements of EN 166, especially:

- The scale number shall be 2 – 1.2 or 3 – 1.2.
- The optical class shall be 2 (max).
- The mechanical strength shall be of medium energy impact (Symbol B).
- They shall provide protection against short circuit electric arc (symbol 8).
- They shall be anti-mist (symbol N) and anti-scratch (symbol K).
- They shall provide protection against liquid chemicals, molten metals and hot solids (symbols 3& 9).

When the face shield is in use (coming down) shall be locked in this state to avoid to lift up in case of a striking

The items shall be delivered one by one packed in plastic bags and a leaflet with instructions of use and maintenance and explanation of the mark symbols and code, **in Greek language**, shall accompany them.

Every offer shall be accompanied by:

- • A sample.
- • The certification of a Notified body.
- • Prospectus.

	<b>ΤΕΧΝΙΚΗ ΠΡΟΔΙΑΓΡΑΦΗ</b> <b>WINTER PROTECTIVE HEAD COVERS</b>	<b>CODE:</b> <b>831000909</b>
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### 1. Object - general information.

1. The winter protective head covers, are destined for the protection of working personnel at open air and low temperatures.
2. The winter protective covers are put on, under a protective helmet.
3. The cover, when is brought in full unfolding, will cover all the hairy part of the head, the neck, the ears and the forehead whoever wears it. The cover refolded will leave uncovered the neck and the ears.

### 2. Materials - Manufacture details.

1. The cover will, especially, be consisted by the following parts:

1. The sides parts made of cloth dimity/flannel of a diagonal weaving, sanforized, mercerised, internally flannel made, weight of cloth approx 210gr/m<sup>2</sup>.
2. The above part internally will have an additional lining flannel, cotton made, hydrophil, approx, weight 170gr/m<sup>2</sup>.
3. The tops of each side of the parts will be connected by part of cloth Elanca, at all, of Nylon threads and will be:
  1. cloth weight approx 270gr/m<sup>2</sup> (+3%)
  2. elasticity: the least elongation 70%, restoration of elongation 100%(-5%).
4. The middle stitch, in the interior will be covered with cotton tape (stripe) Extra Forth 15mm large of a dense weaving.
5. The side stitches of the cloth at the top (made of dimity) will be made by cutting-swing machine with no defects.
6. The cover will be covered, perimetrically, with a tressa tape, 25mm large, made of linen or cotton, of 175 threads in all the width of tape.
7. At the back of the neck there shall be a piece of rectangular cotton material weighed 220-280 gr/m<sup>2</sup> and its dimension shall be 20X30 cm.

More details about the material are given in the Annex I which is attached in this specification.

2. At the top of the cover there will be a part which is needed to fix the cover to the helmet.

#### 3. Cover colours (in general):

1. In the outside part: grey-blue light
2. In the interior part: grey of other light colours (except white).

4. The covers will be washable without shrinkage or other defect.

### 3. Stamping

In the outside part of each cover there will be the mark of P.P.C clearly printed, in an artistic presentation and indelible.

### 4. Delivery Packing

The covers delivery will be executed as follows:

Each cover must be packed in an individual plastic transparent, dustproof bag. Fifty by fifty covers will be packed in a cardboard box on which will appear the full description indicating the type of the material contained, the number of pieces, the order number, the manufacturer and the production year.

### 5. Samples

The competition participants shall accompany their offer with an exact and complete sample of what is offered. The sample will be conform to the up to date average anthropometric dimensions.

## ANNEX I

### **WINTER PROTECTIVE HEAD COVERS**

Requirements for the manufacture material - Other information

#### **1. DIMITY/FLANNELS**

Cotton quality: This cloth must be made of cotton of a good quality, well ginned and refined, without impurities, long-fibrous and of the same species. It is absolutely prohibited to mix cotton spoiled by insects, damaged due to bad warehousing and conservation, as well as cotton coming from industrial remains.

Weaving: The cloth weaving will be normal, regular, cohesive with equal density and will have all the outer features of good and diligent manufacture, without essential defects, like spacings, stripes, knots, irregularities etc.

Weaving type: Diagonal (dimity lining with flannel at one side). The twist of threads will be regular and uniform. During the work of starching of the warp, must not be used methods and materials which aim at hiding cloth defects, or increasing its weight. The starch, which will be used, shall be of recent production (fresh), not spoiled, completely free of salts of zinc. The most allowed percentage of magnesium salts is 0,51%, corresponded to magnesium oxide.

Colouring: The cloth colour will be light grey uniform without stains, stripes or marbling.

Colouring stability: Colouring will present the under stated least resistances:

- in the water 4-5
- when washed 4-5
- in rubbing using 4-5
- in the weak chlorine 4-5
- in the light 6

Weight humidity: It will be 210+5% gr/m<sup>2</sup>, in hygrometry of 8,5%.

Strength against stretch: In warp at least 50 kg.

In woof at least 40 kg.

Numbers of threads: In warp 30 less

In woof 18 less

Percentage of shrinkage: In warp 5-6%

In warp 2-3%

#### **2. HYDROPHIL FLANNEL**

Raw material: The cotton should be long fibrous, of the best quality, well refined and ginned, uniform, thin and free of impurities. It is absolutely prohibited to mix cotton spoiled by insects, damaged due to bad conservation or warehousing, and coming from industrial remains or the use of synthetic resins. The cotton will be hydrophile.

Weaving: This will be simple (toile), regular, of equal density and externally will present features of good weaving with no defects (knots, irregularities, spacings etc). The twist of threads will be regular and will not aim at increasing of the requested dynamometric strength by exaggerated twisting. Finally the both sides of cloth will be with nap.

Colour: Will be beige, resistible to wash and to perspiration.

Weight: Per square meter: 160-170 gr. The weight of the cloth is meant in the agreed condition for cotton, hydrometric state (8,5%).

Number of threads: In warp per cm: 20 + 1

In woof per cm: 18 + 1

Dynamometrical strength: In warp 35 kg the least. In a tape of 5 cm and length 15 cm between the clips of the dynamometer.

Loss in washing: Must not exceed the 4% of the original weight.

#### **3. CLOTH MADE BY ELASTIC WEAVING (ELANKA)**

This cloth should be completely made of Nylon threads.

Weaving: Elastic, uniform without defects (knots, irregularities, spacings).

Weight: 270 + 3% gram per m<sup>2</sup>.

Elasticity: Elongation 70% (the least).

Restoration of elongation 100%.

Colouring: Light-grey, steady.

#### **4. TAPE EXTRA FORTH**

Width: 15 mm

Weaving: Cotton made, equal density, without defects and spacings.

Number of threads: In warp 22 double together twisted

In woof 12 double together twisted

#### **5. TRESSA**

Width: 25 mm

Number of threads: In all the width of tressa will be counted 175 threads, made of linen or cotton yarn, mercerized No 40/2.

Knitting: In a type of "Regular Straw" without defects.

Colouring: Grey – Steady.

	<b>ΤΕΧΝΙΚΗ ΠΡΟΔΙΑΓΡΑΦΗ</b> <b>WINTER FULL FACE CAPS</b>	<b>CODE:</b> 831000122
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The winter cap shall have the following characteristics:

- It shall cover the head, the nape and the neck and it shall have the ability of anadiplosis to cover the head partially.
- It shall have a visor with a resistant synthetic material inside and with wooly texture Rib 1x1 outside. It also shall have the ability to take 2 positions:
  - a. up for large visibility
  - b. down for limited visibility and maximum protection
- It shall be made of 100% acrylic fiber.
- It shall have a color resistance to the washing of level 4-5 according to ISO 105-C06 and to the sunlight of level 4 according to ISO 105-B02.
- It shall have, according to EN ISO 12945-1/2000, a resistance to pilling of level 3 at 7.000 rubs and of level 2-3 at 10.400 rubs.
- Its weight shall be 100-120 g.
- Its rupture resistance shall be at least 4,5 kg/cm<sup>2</sup> according to ISO 13938-1 throughout.
- The texture shall be regular, equal in density, without knots and constructive defects (e.g. holes).
- The cap shall have a special texture at its ends and the connection with the hood shall be hand made.
- Each item shall be packed in a transparent plastic bag and they shall be packed per 80 - 100 in resistant paper boxes, on which the name of the supplier, the content and the number of the contact shall be written.
- The color of the cap shall be determined in accord with the underbidder, before the mass production.

The minimum dimensions of the caps and their figures are written on the attached sketch.

The bidders shall submit, apart from their offer, two samples and prospectus of the product.

