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## DRAFT EAST AFRICAN STANDARD

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Hair dye — Specification — Part 2: Aryl di-amine-based liquid oxidation

EAST AFRICAN COMMUNITY

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## Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

The committee responsible for this document is Technical Committee EASC/TC 071, *Cosmetics and cosmetic products*.

Attention is drawn to the possibility that some of the elements of this document may be subject of patent rights. EAC shall not be held responsible for identifying any or all such patent rights.

This first edition cancels and replaces the first edition (EAS 844: 2017), which has been technically revised.

EAS 461 consists of the following parts, under the general title *Hair dye — Specification*:

- *Part 1: Aryl diamine based formulated powder*
- *Part 2: Aryl di-amine-based liquid oxidation*

# Hair dye — Specification — Part 2: Aryl di-amine-based liquid oxidation

## 1 Scope

This Draft East African Standard specifies requirements, sampling and test methods for permanent liquid oxidation hair dyes which are aryl di-amine based.

NOTE The product may also be referred to as ready for use hair dye.

This standard does not apply to powder hair dyes, plant-based hair dyes, hair dye shampoo and metallic-based hair dyes (temporary).

## 2 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.

EAS 346, *Labelling of cosmetics — General requirements*

EAS 377 (All parts), *Cosmetics and cosmetic products*

EAS 846, *Glossary of terms relating to cosmetic industry*

EAS 847-16, *Cosmetics — Analytical methods — Part 16: Determination of lead, mercury and arsenic content*

ISO 24153, *Random sampling and randomization procedures*

## 3 Terms and definitions

For the purposes of this standard, the terms and definitions given in EAS 846 shall apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <http://www.iso.org/obp>

## 4 Ingredients

4.1.1 All ingredients used shall comply with EAS 377.

4.1.2 The active ingredient shall be an aryl amine dispersed in a suitable surface active agent in an alkaline medium. It may also contain other suitable modifiers.

## 5 Requirements

### 5.1 General requirements

5.1.1 A liquid oxidation hair dyeing preparation shall generally consist of two parts supplied in separate containers, the dye and the developer, as follows:

- a) the dyes contain arylamines (phenylenediamine or toluenediamine and their derivatives and salts) as active ingredients. The hair dye may also contain different chemicals like aminophenols. It may contain suitable modifiers such as resorcinol and other dyes of different chemical families, necessary to obtain different hair shades; and
- b) the developer or oxidant such as hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) or another hydrogen peroxide releaser

5.1.2 The dye and developer shall be mixed together before applying them on the head.

5.1.3 The dye shall not cause sensitization on the scalp.

5.1.4 The dye shall have no undesirable effect on the hair.

### 5.2 Specific requirements

5.2.1 Hair dye shall comply with the specific requirements given in Table 1 when tested in accordance with the test methods specified therein.

**Table 1 — Specific requirements for aryl di-amine-based liquid-hair dye**

S/N	Characteristic	Requirements	Test method
i.	pH at 25 °C ± 2 °C	6.0 - 11.0	Annex A
ii.	Total active matter (dye content), % m/m	1.0 - 4.0	Annex B

5.2.2 The package shall include a developer, which will be a dilute solution of hydrogen peroxide, free from foreign matter and suitably stabilized. The developer shall comply with the requirements given in Table 2 when tested in accordance with the test methods specified therein.

**Table 2 — Requirements for oxidizing agent (developer)**

Characteristic	Requirement	Test method
pH at 25 °C ± 2 °C	1.8 – 4.0	Annex A
H <sub>2</sub> O <sub>2</sub> assay, % m/m	5 - 12	Annex C

## 6 Hair dye ready for use

6.1 The Para phenylene diamine (PPD) content in ready for use hair dye shall be as given in Table 3.

**Table 3 — Requirements for para phenylene diamine (PPD) content in hair dye, ready-for-use**

S/N	Substance	Characteristic	Requirement	Test method
i.	p-Phenylenediamine and its salts	Aryl amine in the solution after recommended dilution with developer, calculated as free base, %, max.	2	See 6.2
ii.	Other N-substituted derivatives of p-Phenylenediamine and their salts; N-substituted derivatives of o-Phenylenediamine.		3	
iii.	1,4-Benzene-diamine and 2-methyl-2,5-Diaminotoluene sulphate		2	
iv.	Methylphenylenediamines, their, N-substituted derivatives and their salts		5	

NOTE: The dye ready for use is prepared by mixing the dye content and the developer in the proportion recommended by the manufacturer in the leaflet describing instructions for use.

6.2 The procedure for calculation of PPD content in solution after recommended dilution with developer is as follows:

$$\text{Aryl di-amine content in ready for use preparation} = \frac{X}{Y + 1}$$

Where

X is the aryl amine content in dye

Y is the number of parts of diluent mixed with 1 part of dye.

## 7 Heavy metal contaminants

7.1 Ready-for-use hair dye shall comply with the limits for heavy metal contaminants given in Table 4 when tested in accordance with the test methods specified therein.

**Table 4 — Limits for heavy metal contaminants for hair dye, ready-for-use**

S/No.	Characteristic	Maximum limit <sup>a</sup> mg/kg	Test method
i.	Lead	10	EAS 847-16
ii.	Arsenic	2	
iii.	Mercury	2	

<sup>a</sup> The total amount of heavy metals as lead, mercury and arsenic, in combination, in the finished product shall not exceed 10 mg/kg.

7.2 The sample for heavy metal analysis shall be prepared by mixing liquid dye with the developer as recommended by the manufacturer in the leaflet.



## 8 Packaging

The product shall be packaged in suitable well-sealed containers that shall protect the contents and shall not cause any contamination or react with the product.

## 9 Labelling

In addition, to the labelling requirements given in EAS 346, each package shall be legibly and indelibly marked with the following information:

- a) product name as “Liquid oxidation hair dye”;
- b) colour of the dye;
- c) mixing ratio; and
- d) caution/warning:
  - i. The following warnings shall be printed on the label, if the package is for general use:
    - “For general use only”;
    - Can cause an allergic reaction”;
    - “Contains phenylenediamines”;
    - “Do not use to dye eyelashes or eyebrows”;
    - “Hair colourants can cause severe allergic reactions”.
    - Read and follow instructions”.
    - “This product is not intended for use on persons under the age of 16”.
    - “Temporary “black henna” tattoos may increase your risk of allergy”; and
    - “Do not colour your hair if: you have a rash on your face or sensitive, irritated and damaged scalp, you have ever experienced any reaction after colouring your hair, or you have experienced a reaction to a temporary “black henna” tattoo in the past”.
  - ii. The following warnings shall be printed on the label, if the package is for professional use:
    - “For professional use only”;
    - “Contains phenylenediamines”;
    - “Hair colorants can cause severe allergic reactions”;
    - “Read and follow instructions”:
    - “This product is not intended for use on children”;
    - “Temporary “black henna” tattoos may increase your risk of allergy”; and

- “Do not colour your hair if: you have a rash on your face or sensitive, irritated and damaged scalp, you have ever experienced any reaction after colouring your hair, or you have experienced a reaction to a temporary “black henna”.

## **10 Sampling**

Sampling shall be done in accordance with ISO 24153.

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## **Annex A** (normative)

### **Determination of pH**

#### **A.1 Apparatus**

Any pH meter, preferably equipped with a glass electrode

#### **A.2 Reagents**

**A.2.1** pH 7.0 buffer solution

**A.2.2** pH 4.0 and pH 9.0 buffer solutions

**A.2.3** Deionised water

#### **A.3 Procedure**

##### **A.3.1 Verification of pH meter**

**A.3.1.1** Dip the pH meter into about 50 mL of pH 7.0 buffer solution. Ensure that the reading is 7.0.

**A.3.1.2** Rinse the meter with deionised water, and dip it into about 50 mL of pH 4.0 buffer solution. Ensure that the reading is 4.0. Repeat using pH 9.0 buffer solution.

##### **A.3.2 For the dye**

Take about 10 mL - 20 mL (or any appropriate amount) of the dye and determine its pH at  $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$  using the meter.

##### **A.3.3 For the developer**

Similarly, take 10 mL - 20 mL of the oxidizing agent (developer) and determine its pH at  $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$  using the meter. In both cases, use the procedural instructions as given for the type of pH meter used.

## Annex B (normative)

### Determination of aryl amine content as the active dye

#### B.1 Outline of the method

This method estimates aryl amine as diacetyl derivative of aryl amine

#### B.2 Apparatus

B.2.1 Continuous extraction apparatus as illustrated in Figure B.1

All dimensions in millimetres

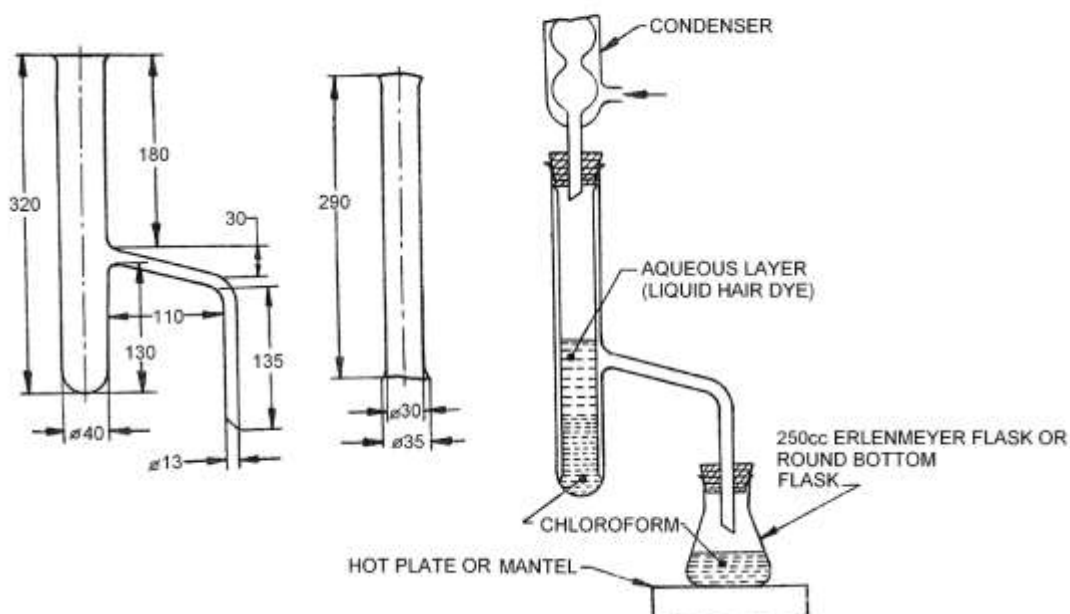


Figure B.1 — Continuous extraction apparatus

B.2.2 G 4 sintered glass crucible

B.2.3 Beaker, 100-mL capacity

#### B.3 Reagents

B.3.1 Chloroform, analytical reagent grade

B.3.2 Acetic anhydride, analytical reagent grade

## B.4 Procedure

**B.4.1** Transfer accurately a weighed quantity (about 5 g) of liquid hair dye ( $M_2$ ), so as to contain 0.1 g - 0.3 g para-phenylenediamine, to the inner tube of the continuous extractor, previously charged with chloroform. Take 60 mL chloroform in the flask and completely extract the dye. About 5 h extraction is sufficient. Remove the flask and transfer chloroform extract to 100-mL beaker, rinsing the flask with few small portions of chloroform.

**B.4.2** Evaporate chloroform to about 25 mL and add 1 mL acetic anhydride slowly, with stirring. Let it stand for one hour and filter on a weighed G4 sintered glass crucible. Wash the beaker and precipitate with three or four 5-mL portions of chloroform. Carefully, remove last traces of precipitate from the beaker. Dry to constant mass at 120 °C and weigh the precipitate ( $M_1$ ) of diacetyl para-phenylenediamine  $C_6H_4(NH_6COCH_3)_2$ .

## B.5 Calculation

The aryl amine content (as para-phenylenediamine) content, expressed as percent, shall be calculated as follows;

$$\frac{M_1 \times 0.5626 \times 100}{M_2}$$

where

$M_1$  is the mass, in grams, of the precipitate; and

$M_2$  is the mass, in grams, of the hair dye taken for extraction.

## Annex C (normative)

### Determination of hydrogen peroxide content

#### C.1 Reagents

C.1.1 Dilute sulphuric acid

C.1.2 Potassium permanganate solution, N/10, freshly standardized

#### C.2 Procedure

Take 10 g of the developer and dilute to 500 mL. Take 25 mL of this dilute solution in a conical flask, add 5 mL of sulphuric acid and titrate against potassium permanganate solution.

#### C.3 Calculation

The hydrogen peroxide content, expressed as percent, shall be calculated as follows:

$$\frac{VN}{M} \times 34.02$$

where

$V$  is the volume of potassium permanganate solution taken for titration;

$N$  is the normality of potassium permanganate solution; and

$M$  is the mass of developer taken to prepare 500 mL solution.

## Bibliography

EAS 844: 2017, *Aryl di-amine-based liquid oxidation hair dyes — Specification*

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