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DRAFT EAST AFRICAN STANDARD

Two-pack epoxy zinc phosphate weldable primer — Specification

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 070, *Paints, varnishes and related 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.

Two-pack epoxy zinc phosphate weldable primer — Specification

1 Scope

This Draft East African Standard specifies requirements, methods of sampling and test for two-pack epoxy zinc phosphate weldable primer. This material is used as a base coat for the painting of steel structures /equipment where corrosion protection and chemical resistance under marine atmospheric conditions are required.

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.

ASTM F735-17, *Standard Test Method for Abrasion Resistance of Transparent Plastics and Coatings Using the Oscillating Sand Method*

ISO 1514, *Paints and varnishes — Standard panels for testing*

ISO 1518-1, *Paints and varnishes — Determination of scratch resistance — Part 1: Constant-loading method*

ISO 1523, *Determination of flash point — Closed cup equilibrium method*

ISO 1524, *Paints, varnishes and printing ink — Determination of fineness of grind*

ISO 2808, *Paints and varnishes — Determination of film thickness*

ISO 2811, (all parts), *Paints and varnishes — Determination of density*

ISO 2812-1, *Paints and varnishes — Determination of resistance to liquids — Part 1: Immersion in liquids other than water*

ISO 2813, *Paints and varnishes — Determination of specular gloss of non-metallic paint films at 20°, 60° and 85°*

ISO 2884-2*, Paints and varnishes — Determination of viscosity using rotary viscometers — Part 2: Disc or ball viscometer operated at a specified speed*

ISO 3251, *Paints varnishes and plastics — Determination of non- volatile matter content*

ISO 3270, *Paints and varnishes and their raw materials — Temperatures and humidities for conditioning and testing*

ISO 3856-6, *Paints and varnishes — Determination of "soluble" metal content — Part 6: Determination of total chromium content of the liquid portion of the paint — Flame atomic absorption spectrometric method*

ISO 4618, *Paints and varnishes — Terms and definitions*

ISO 6503 *Paints and varnishes -- Determination of total lead — Flame atomic absorption spectrometric method*

ISO 6504-3, *Paints and varnishes — Determination of hiding power — Part 3: Determination of contrast ratio of light coloured paints at a fixed spreading rate*

ISO 9117-1, *Paints and varnishes — Drying tests — Part 1: Determination of through-dry state and through-dry time*

ISO 9117-3, *Paints and varnishes — Drying tests — Part 3: Surface-drying test using ballotini*

ISO 11890-1, *Paints and varnishes — Determination of volatile organic compound (VOC) content —Part 1: Difference method*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

ISO 17132, *Paints and varnishes — T-bend test*

3 Terms and definitions

For the purposes of this document, the definitions given in ISO 4618 and the following apply:

3.1
pot life
maximum time during which a coating material supplied as separate components should be used after they have been mixed together

3.2
Volatile organic compound content
the mass of the volatile organic compounds present in a coating material, as determined under specified conditions

3.3
volatile organic compound (VOC)
fundamentally, any organic liquid and/or solid that evaporates spontaneously at the prevailing temperature and pressure of the atmosphere with which it is in contact

3.4
ready for use
the state of a product when it is mixed in accordance with the manufacturer's instructions in the correct proportions and thinned if required using the correct thinners so that it is ready for application by the approved method

4 Requirements

4.1 General requirements

4.1.1 Composition

4.1.1.1 Two-pack epoxy zinc phosphate weldable primer shall be epoxy-based. The manufacturer shall specify the principal type of binder and the curing agent used in the paint. The principal anticorrosive pigment shall be zinc phosphate.

4.1.1.2 The two-pack epoxy zinc phosphate weldable primer shall consist essentially of two components, base and hardener and or a catalyst to be mixed as recommended by the manufacturer so as to satisfy all the requirements of this standard.

4.1.2 Odour

The two-pack epoxy zinc phosphate weldable primer shall be odour free after application and upon curing.

4.1.3 Condition of material in container

When visually examined, two pack epoxy zinc phosphate weldable primer shall be free from skins and lumps. The container shall be free from rust and moulds.

4.1.4 Settling

The two pack epoxy zinc phosphate weldable primer shall be free from settling. Settling if any, shall be easily incorporated by stirring.

4.1.5 Application properties

The two pack epoxy zinc phosphate weldable primer shall be supplied in two containers as a unit. Always mix a complete unit in the proportions applied. The application shall be done in accordance with manufacturer's instructions.

4.2 Specific requirements

4.2.1 Wet coat

The wet mixed material shall also comply with the requirements given in the Table 1 when tested in accordance with the test methods specified therein.

Table 1 — Requirements for the wet coat of two pack epoxy zinc phosphate weldable primer

S/N	Characteristic		Requirement	Test method
i.	Total lead content, ppm, max.		90	ISO 6503
ii.	Solids content, %,m/m, min.		35	ISO 3251
iii.	Skin formation		Shall show no skin formation	Annex A
iv.	Viscosity, pa.s		0.4 – 0.8	ISO 2884-2, Use spindle No.3 of the rotating paddle viscometer at 100 revolutions per min
v.	Pot life, h, max.		8	Annex B
vi.	Flash point, min.		30 °C, min.	ISO 1523
vii.	Specific gravity at 25 ^{o}C		1.25 – 1.55	ISO 2811
viii.	Hiding Power, %, min.		90	ISO 6504-3
ix.	Volatile organic content, g/l, maximum.,		450	ISO 11890-1
x.	Fineness of dispersion, /Fineness of grind Hegman-Type Gage,µm, max.		30	ISO 1524
xi.	Zinc phosphate content, %, min.		15	Annex C
xii.	Drying time at 25 ˚C ± 2 ˚C, h, max.	Hard drying	24	ISO 9117-1
		Surface drying	4	ISO 9117-3
xiii.	Chromium, ppm in dried paints, max.		5	ISO 3856-6

4.2.1 Dry coat

The dry coat of the two pack epoxy primer shall comply with the requirements given in the Table 2 when tested in accordance with the test methods specified therein.

Table 2 — Requirements for the dry coat of two pack epoxy zinc phosphate weldable primer

S/N	Characteristic	Requirement	Test method
i.	Dry film thickness per coat	30 µm, min.	ISO 2808
ii.	Gloss at $60^{0,}$ min.	6 %	ISO 2813
iii.	Scratch hardness using 15 N	No such scratches shall produce a bare metal	ASTM F735-17
iv.	Flexibility and adhesion using 12 mm mandrel	There shall be no visible damage or detachment of film after 48 h	ISO 17132
v.	Resistance to liquids	The film shall not show signs of disintegration or change of colour to a great extent. The loss of gloss shall not be more than 50 % of the original gloss	ISO 2812-1

4.3 Quantity of material

The quantity of material shall not be less than the declared volume at 25 ^{0}C $\pm$ 2 ^{0}C when tested in accordance with Annex D.

5 Packaging and marking

5.1 Packaging

The two pack epoxy zinc phosphate weldable primer shall be packed in suitable container that prevents it from deterioration during storage, transportation and normal handling.

5.2 Marking

5.2.1 Marking on the container

5.2.1.1 The marking shall be either in English, Kiswahili or French or in combination as agreed between the manufacturer and the supplier. Any other language shall be optional.

5.2.1.2 Each container shall be marked legibly and indelibly with the following:

a) The name of the product as “Two-pack epoxy zinc phosphate primer”;

b) manufacturer’s name and physical address

NOTE The name, physical address of the distributor/supplier and trademark may be added as required.

c) net content in L;

d) date of manufacture;

e) instructions for use;

f) pot-life life at 25 °C; and

g) an indication of flammability.

5.2.2 Marking on the label of the container

Each label of the container shall be marked legibly and indelibly with the following:

a) date of manufacture;

b) instructions for use;

c) pot-life;

d) shelf life;

e) colour; and

f) batch number.

7 Sampling

Sampling shall be done in accordance with ISO 15528.

Annex A
(normative)

Examination of skin formation

A.1 Apparatus

The following apparatus are required:

A.1.1 **Container,** one metal container of 250 ml with a tight fitting lid.

A.1.2 **Spatula**

A.2 Test conditions

The test shall be carried out at a temperature of 23 ºC ± 2 ºC and a relative humidity of 65 ± 2 per cent.

A.3 Procedure

The procedure shall be as follows:

A.3.1 Stir and pour 125 ml to 130 ml of the paint into the container, place the lid on tightly and momentarily invert the container to seal the lid.

A.3.2 Allow the container to stand upright for 7 days.

A.3.2 Open the container and test the surface of the paint with a spatula for any skin formation. Examine the walls and the lid for the presence of the skin.

Annex B
(normative)

Determination of pot life

B.1 General

The time taken to double the viscosity from the original value shall be considered the pot life of the material.

B.2 Apparatus

Test panels, complying with ISO 1514.

B.3 Reagents

Component parts, i.e. base and hardener or catalyst.

B.4 Procedure

B.4.1 Thoroughly mix component parts in the ratio specified by the paint manufacturer to give a sample of 200 mL by volume.

B.4.2 Within 10 min of mixing, determine the viscosity using a rotating paddle viscometer.

B.4.3 Allow the mixed sample of paint to stand in a suitable airtight container and determine viscosity at the end of the specified time.

B.5 Report

Report whether viscosity has doubled at 25 °C within 6 h.

Annex C
(normative)

Zinc phosphate content

C.1 General

Metallic zinc is estimated, by determining the total reducing power by dissolving it in acidulated ferric chloride solution and titrating with standard potassium permanganate solution.

C.2 Reagents

C.2.1 Standard potassium permanganate solution (0.1 N) ($KMnO_4$)

Heat 5 g of potassium permanganate ($KMnO_4$) for one hour at 100 ± 2 0C. Dissolve 3.16 g of potassium permanganate in water and dilute it to 1 L. Allow it to stand for 7 days. Filter through a medium porosity fritted disc and standardize against sodium oxalate as follows:

Dissolve 0.25 to 0.30 g of sodium oxalate in 250 mL of hot water (80 °C to 90 °C) and add 15 mL sulphuric acid (1:1). Titrate at once with $KMnO_4$ solution stirring the liquid rigorously and continuously. The $KMnO_4$ shall not be added more rapidly than 10 to 15 mL/min and the last 0.5 mL to 1 mL shall be added drop wise with particular care to allow each drop to be fully decolorized before the next is introduced. The solution shall not be below 60 °C by the time the end point has been reached. Keep the $KMnO_4$ solution in a brown glass-stoppered glass bottle and store in a dark place.

C.2.2 Ferric chloride solution

Prepare a solution containing 20 g of ferric chloride ($FeCl_3.6H_2O$) and 20 mL of 20 % sodium acetate solution. It is advisable to make up one day's requirement at a time.

NOTE 40 mL are required for each determination.

C.2.3 Sodium acetate solution

Dissolve 200 g of anhydrous sodium acetate ($NaC_2H_3O_2$) or 332 g of $NaC_2H_3O_2.3H_2O$ in water and dilute to 1 litre.

C.2.4 Zimmerman – Reinhardt solution

Prepare 1 L of solution containing 67 g of manganese sulphate ($MnSO_4.4H_2O$), 130 mL of sulphuric acid (H_2SO_4) (sp. gr. 1.84) and 138 mL of phosphoric acid (85 %).

C.3 Procedure

C.3.1 Weigh 0.2 g of the sample of the pigment. Transfer immediately to a dry 600-mL heavy-wall Erlenmeyer flask and add 50 mL of the $FeCl_3$ solution. Tightly stopper the flask and agitate constantly for approximately 15 min. As soon as all zinc dust is dissolved, add 50 mL of the Zimmerman – Reinhardt solution and 250 mL of water. Titrate with 0.1 N $KMnO_4$ solution.

C.3.2 Make a blank determination, following the same procedure and using the same amounts of all reagents except the pigment.

Annex C
(normative)

Determination of the quantity of material

D.1 Apparatus

D.1.1 Graduated measuring cylinder

D.1.2 Empty container

D.2 Procedure

Measure out the volume of the paint by pouring it into the measuring cylinder and emptying the paint into an empty container. Measure out until all the paint is finished and record the total volume of the paint by adding up the volume.

D.3 Calculation

The measured volume shall be expressed as follows:

$$\% \text{ of volume measured is } \frac{V - V_1}{V} \times 100$$

where

V_1 is the total measured volume; and

V is the declared volume.

Bibliography

KS 1992, *Two-pack epoxy zinc phosphate weldable primer — Specification*

