Foreword

This Bangladesh Standard was adopted by the Bangladesh Standards and Testing Institution on ..... after the draft finalized by the Soap and Detergent Sectional Committee and approved by the Chemical Divisional Committee.

Epoxy primer refers to a sealer that has a non-porous finish. It is primarily recommended as the first base coat over bare steel. These base coats or epoxy primers can be used over fiberglass, plastic or the black iron phosphate coating as well.

Epoxy primers are used for a wide variety of materials due to their strong adhesion, good mechanical ability, and durable chemical resistance in wet and high-humidity environments. The ability of an epoxy primer to resist corrosion is related to its thickness; the thicker the epoxy primer layer, the better the protection.

Due to its growing demand the sectional committee decided to formulate this standard. While formulating this standard the sectional committee gave due consideration to the views of the producers, consumers and technologists and felt that it should be related to the prevailing trade and manufacturing practices followed in this field in the country.

In the preparation of this standard, assistance derived from the following publications is acknowledged with thanks:

DEAS 1051:2021 Two-pack Epoxy Primer – Specification; East African Community.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value (observed or calculated) expressing the result of a test or analysis, shall be rounded off in accordance with BDS 103.

Bangladesh Standard

Specification for Two-pack Epoxy Primer

1. Scope

1.1 This standard specifies requirements, sampling and test methods for a two- pack epoxy solvent based primer used for protection of iron, steel and galvanized iron and steel against atmospheric corrosion in an industrial or marine environment.

1.2 It is also used as an anticorrosive primer for decks, deck fittings and cargo holds and for use at maintenance and repair or on board maintenance.

2. Normative references

2.1 The following Bangladesh Standards are necessary adjuncts to this Standard. For undated references the latest edition of the publication referred to applies.

BDS 103	Methods of rounding off numerical values.
BDS 1701	Glossary of terms for paints.
BDS ISO 1524	Paints, varnishes and printing ink — Determination of fineness of grind.
ISO 2812 Part 1	Paints and varnishes — Determination of resistance to liquids — Part 1: Immersion in liquids other than water.
BDS ISO 2808	Paints and varnishes — Determination of film thickness.
BDS ISO 2813	Paints and varnishes– Determination of specular gloss of Non-Metalic paints films at 20 degree, 60 degree and 85 degree.
BDS ISO 2884 Part 2	Paints and varnishes — Determination of viscosity using rotational viscometers — Part 2: Relative measurement of viscosity using disc or ball spindles at specified speeds
ISO 3251	Paints varnishes and plastics — Determination of non- volatile matter content
BDS ISO 3856 Part 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
BDS ISO 6503	Paints and varnishes - Determination of total lead - Flame atomic absorption spectrometric method.
ISO 6504 Part 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 Part 1	Paints and varnishes — Drying tests — Part 1: Determination of through-dry state and through-dry time
ISO 9117 Part 3	Paints and varnishes — Drying tests — Part 3: Surface-drying test using ballotini
BDS 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 BDS 1701 and the following apply:

3.1 Components - a term used to describe each of two parts of the paint, which when mixed together form the pigmented epoxy layer.

3.2 Epoxy primer - a paint consisting essentially of epoxy resin base, polyamide, amine adduct or other hardeners with appropriate pigments, solvent and additives mixed together in the proportions recommended by the manufacturer.

3.3 Protective coating system - total number of coats of paint or related product which are to be applied or which have been applied to a substrate to provide corrosion protection

3.4 Pot life - the maximum time during which a coating material supplied as separate components should be used after they have been mixed together.

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

3.6 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.

3.7 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 Condition in the container

When visually examined, the two-pack epoxy primer shall be free from skins, uncharacteristically coarse particles, foreign matter and lumps. The container shall be free from rust and moulds.

4.1.2 Odour

The odour of the two-pack epoxy primer in the container, during and after application shall not be abnormally pungent, offensive or disagreeable.

4.1.3 Settling

The epoxy primer shall be free from settling. Settling if any, shall be easily incorporated by stirring.

4.6 Application properties

The epoxy 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 primer

Sl. No.	Characteristic	Requirement	Test method BDS/Annex
i.	Total lead content, ppm, Max.	90	BDS ISO 6503
ii.	Solids content, %, m/m, Min.	50	ISO 3251
iii.	Skin formation	Shall show no skin formation	A
iv.	Viscosity, pa.s	0.4 – 0.8	BDS ISO 2884 Part 2
v.	Pot life, hours, Max.	8	B
vi.	Hiding power, %, Min.	90	ISO 6504 Part 3
vii.	Fineness of dispersion, /Fineness of grind Hegman-Type Gage, µm, Max.	30	ISO 1524
viii.	Drying time at 25 ± 2 ˚C, hours, Max. Hard Drying Surface Drying	 24 4	 ISO 9117-1 ISO 9117-3
ix.	Chromium, ppm in dried paints, Max.	5	BDS 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, two pack epoxy primer

Sl. No.	Characteristic	Requirement	Test method
i.	Dry film thickness per coat, µm, Min.	30	BDS ISO 2808
ii.	Finish	Smooth, uniform in colour and appearance	Visual
iii.	Gloss at 60°, %, Min.	6	ISO 2813
iv.	Scratch hardness using 15 N	No such scratches shall produce a bare metal	ASTM F735
v.	Flexibility and adhesion using 12 mm mandrel	There shall be no visible damage or detachment of film after 48 hours	ISO 17132
vi.	Resistance to Alkali and Acid solution	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 Part 1

4.3 Quantity of material

The quantity of material shall not be less than the declared volume at 28 ± 2 °C when tested in accordance with Annex D.

NOTE – Tolerence shall be applicable as per Package Commodity Rule 2021 (পণ্য মোড়কজাতকরণ বিধিমালা ২০২১) or its updated version.

5. Packaging and Marking

5.1 Packaging

The epoxy primer shall be packed in suitable containers that prevents it from deterioration during storage, transportation and normal handling.

5.2 Marking

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

a) Name of the product;

b) Manufacturers/distributor/supplier name and address and trademark, if any;

c) Colour;

d) Net content in L;

e) Spreading capacity, in m^2/L (Optional);

f) Batch number.

g) Date of manufacture;

h) Shelf life;

i) Pot-life life at 25 °C;

j) Instructions for use;

k) An indication of flammability; and

l) Any other information required by statutory authorities.

7. Sampling - Sampling shall be done in accordance with BDS 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 ± 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.

B-3 Reagents

B-3.1 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 minutes 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

B-5.1 Report whether viscosity has doubled at 25 °C within 6 hours.

Annex C

(Normative)

Resistance to alkali

C-1 Apparatus

C-1.1 Test panels

C-1.2 Vessel, made of inert material, capable of holding test liquids and test panels.

C-2 Reagents - 5 % sodium hydroxide solution.

C-3 Procedure

C-3.1 Prepare and condition the test panels for at least 16 hours at 23 ± 2 °C and 50 ± 5 % relative humidity.

C-3.2 Immerse panels to a depth of 50 % for 24 hours in 5 % sodium hydroxide solution contained a beaker. Stand or hang the test piece in an approximately vertical position in the beaker. If several test pieces are loaded at the same time, make sure that they are spaced 5 mm apart.

C-3.3 Withdraw the panels, wash with distilled water, and examine immediately for any objectionable alteration in the surface such as discoloration, change in gloss, blistering, softening, swelling, loss of adhesion.

C-3.4 If desired, allow the panels to recover after 24 hours and examine for return of the original properties.

C-3.5 In general, it will not be necessary to seal the edges of the applied film. If the reagent effect is noted only around the panel edges, the test should be repeated using a suitable edge sealer.

C-4 Report

C-4.1 Report the type of effect, if any.

C-4.2 Detail of the test panel (including thickness) and surface pre-treatment of the substrate.

C-4.3 Dry film thickness of the coating, in micrometers.

Annex D

(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.