



BHARAT HEAVY ELECTRICALS LIMITED
PIPING CENTRE, MADRAS-600 017

Title: **Quality Control Procedure for Surface Preparation
and Painting.**

Specification No: QCP:09:1

Project : All

Material : All

Equipment : All

Concurred

Quality Control

OP&C

Engineering

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Page

1

of

10

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Dt 26.12.94

Page 2 of 10

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QUALITY CONTROL PROCEDURE FOR SURFACE
PREPARATION AND PAINTING

| QCP:09:1

Dt 26.12.94

1.0 SCOPE

- 1.1 This procedure covers the requirements of surface preparation, primer and finish painting for piping components .
- 1.2 Any special requirements , as indicated in the respective drawings, or QP shall get precedence over this QCP.
- 1.3 This document is based on PR:QE:104/04 issued by Quality Assurance, BHEL Trichy.

2.0 REFERENCE DOCUMENTS

IS 5	IS 2339
IS 104	IS 2932
IS 2074	

3.0 GENERAL REQUIREMENTS

- 3.1 This procedure specifies the painting requirements to provide adequate surface protection of components upto a period of one year under good storage conditions at site.
- 3.2 Periodic re-preservation is required if components are kept under prolonged storage.
- 3.3 The following guidelines are provided for estimation purpose only.
- 3.3.1 The approximate surface area (sq.m) to weight (tonne) ratio is as follows:

Components	Area (Sq.m) / Wt (Tonne)
a. Structural	30
b. Vessels	1.5
c. Piping	5

- 3.3.2 The spreading capacity for a normal painting is varying from 5 sq.m / litre to 8 sq.m / litre.
- 3.3.3 The dosage of volatile corrosion inhibitor (VCI) pellets / silica gel in sachet shall be 100gms / cu.m.
- 3.4 The surface preparation, primer coat and finish coat for various piping components are detailed in Annexure-I.

QUALITY CONTROL PROCEDURE FOR SURFACE
PREPARATION AND PAINTING

QCP:09:1

Dt 26.12.94

3.5 The approved brands and approved manufacturers of paint, rust preventive fluid, weldable primer and VCI tablet are detailed in Annexure-II.

4.0 SURFACE PREPARATION

4.1 Surfaces of components shall be thoroughly cleaned before the application of primer paint as per the schemes indicated in Annexure-I and shall be free from dust, rust, weld slag, spatters etc.

4.2 The following are the surface preparation schemes indicated in this document.

Scheme No.

Description

SP 1	Solvent cleaning
SP 2	Application of rust converter (Ruskil or equivalent grades)
SP 3	Shot blasting
SP 4	Power tool cleaning (Mechanical wire brushing)
SP 5	Seven tank phosphating

4.3 Shot blasting shall be used as surface preparation method for thermally worked pipes prior to application of primer. For other pipes, power tool cleaning shall be adopted.

5.0 APPLICATION OF SURFACE PROTECTANT

5.1 Surfaces prepared as per the surface preparation scheme indicated in 4.2 shall be applied with primer paint immediately after the preparation.

5.2 The following are the painting schemes indicated in this document.

Painting Scheme

Description

PS 1	One coat of zinc chrome primer (Alkyd base) by brush/spray to IS 104.
PS 2	Zinc chrome primer (Alkyd base) by dip coat as per BHEL specification.

QUALITY CONTROL PROCEDURE FOR SURFACE
PREPARATION AND PAINTING

| QCP:09:1

Dt 26.12.94

PS 3	One coat of synthetic enamel long oil alkyd to IS 2932.
PS 4	One coat of red oxide zinc chrome primer (Alkyd base) to IS 2074.
PS 5	One coat of aluminum paint to IS 2339.
PS 6	One coat of rust preventive fluid by spray, dip or brush.
PS 7	One coat of weldable primer - Deox-aluminate or equivalent.
PS 8	One coat of high build Epoxy. Shade - aluminum.
PS 9	One coat of aliphatic acrylic polyurethane, Shade - French blue.
PS 10	One coat of zinc dust primer, containing minimum 80% of solid zinc dust by brush / spray.
PS 11	One coat of micaceous iron oxide based paint by brush / spray.

- 5.3 Paint shall be used as supplied by the supplier without any addition of thinner.
- 5.4 Paint shall be thoroughly mixed before application.
- 5.5 If any painting scheme calls for special mixing of paints, it shall be according to the instruction of Paint Manufacturer.
- 5.6 Adequate drying time is to be allowed for each coat.
- 5.7 No painting is required in case of Stainless Steel, aluminum and galvanised components, unless otherwise specified in contracts.
- 5.8 For all machined components, rust preventive fluids of approved make shall be used.

QUALITY CONTROL PROCEDURE FOR SURFACE
PREPARATION AND PAINTING

| QCP:09:1

Dt 26.12.94

- 5.9 All weld edge preparation for site welding shall be applied with one coat of weldable primer - Deoxaluminat or equivalent.
- 5.10 For internal protection of tubes and pipes, VCI pellets of required dosage as given in Cl. 3.3.3 shall be used after ensuring sponge cleaning.
- 5.11 VCI pellets shall not be used for Stainless steel components and composite assemblies. Instead silica gel sachet is shall be used which shall be removed at site.
- 5.12 Wherever required, paints and rust preventive protection can be removed using commercial solvents.
- 5.12.1 For rust preventive : Acetone, Carbon tetra chloride (CTC) or Tri-chloro ethylene.
- 5.12.2 For all paints : Alkaline paint strippers
Solvent based paint strippers
available in the market.

6.0 INSPECTION

- 6.1 Surface preparation, primer coating, finish coating shall be checked at appropriate stages by executing agency before proceeding to next operation.
- 6.2 Necessary records shall be maintained by executing agency after inspection at every stage.

QUALITY CONTROL PROCEDURE FOR SURFACE
PREPARATION AND PAINTING

QCP:09:1

Dt 26.12.94

ANNEXURE-I

S.no.	Description	Surface	Primer	Finish Coat					
		Prepar- ation Scheme No	Scheme No	Coats	DFT	System	Coat	DFT	* Color Shade
1.	Hanger Rods	SP 4/ SP 2	PS 4	One	25	PS 3	One	20	Smoke Grey
2.	Pipe clamps - Carbon Steel	SP 4	PS 4	One	25	PS 3	One	20	Smoke Grey
3.	Pipe clamps - Alloy Steel	SP 4	PS 4	One	25	PS 3	Two	20	White
4.	Rigid Struts	SP 3/ SP 4	PS 10	One	40	PS 11	One	40	French Blue. (shade 166 of IS 5).
5.	Fixing Compo- nents, Skin casings	SP 2	PS 4	One	25	-	-	-	-
6.	Oil systems, fuel piping, scanner / exhaust fans, filters	SP 4	PS 4	One	25	PS 3	One	20	Smoke Grey
7.	External Piping, Tanks & Vessels	SP 3/ SP 4	PS 4	One	25	PS 3	One	20	Smoke Grey

QUALITY CONTROL PROCEDURE FOR SURFACE
PREPARATION AND PAINTING

QCP:09:1

Dt 26.12.94

8.	All Conv. valves body & yoke	SP 1/ SP 2	PS 3 PS 5	One One	25 25	-	-	- French Blue for CS Valves Aluminium paint for AS valves
	Arrow	-	PS 3	One	25	-	-	Post Off- ice red
	Hand wheels	SP1/ SP2	PS 5	One	25	-	-	Aluminium paint
	HPLP Valves & QCNRV Body/yoke/cover	SP1/ SP2	PS 3	One	25	-	-	Air craft grey
	Safety & safety relief valves	SP1/ SP2	PS 5	One	25	-	-	Aluminium Paint
	Forged Valves	SP1/ SP5	PS 6	One	25	-	-	-
	Stainless steel Valves	No painting required unless required by customer						

Note: * Prior to painting tubes and pipes shall be dosed with
VCI pellets and ends shall be sealed with plastic/metal
end caps / end covers.

QUALITY CONTROL PROCEDURE FOR SURFACE
PREPARATION AND PAINTING

QCP:09:1

Dt 26.12.94

ANNEXURE - II

I PRIMER AND FINISH PAINTS

1. Abilash Coating, Madras
2. Anuradha Paints, Madras
3. Asian Paints
4. Balu Paints, Tanjore-4
5. Berger Paints India Ltd., Madras
6. Goodlass and Nerolac Paints
7. Jenson & Nicholson Ltd., Calcutta
8. Maruthy Paints, Trichy-10
9. Nova Paints, Trichy-13
10. Rockfort Paints & Chemicals, Trichy
11. Shalimar Paints Ltd., Madras
12. Sigma Paints, Madras-1
13. Solar Paints, Pudukkotal
14. Sudha Enterprises, Trichy
15. Sundram Paints & Chemicals Pvt. Ltd., Thanjavur
16. Titan Paints & Chemicals Pvt. Ltd., Coimbatore
17. Usha Paints, Pudukkotal
18. Western Indian Paint & Colour Co., Madras

II HEAT RESISTANT PAINTS

1. Asian Paints, Madras
2. Berger Paints India Ltd., Madras
3. Bombay Paints, Bombay
4. CDC Carboline, Madras
5. Goodlass and Nerolac Paints, Madras
6. Jenson & Nicholson Ltd, Calcutta
7. Western Indian Paint & Colour Co., Madras

III WELDABLE PRIMERS

- | | Vendor Name | Brand Name |
|----|---|--|
| 1. | Asian Paints, Madras | Silver Streak Mango
(Aluminium paint) |
| 2. | Western India Paint &
Colour Co. Ltd, Madras | Coloxy paint |

QUALITY CONTROL PROCEDURE FOR SURFACE
PREPARATION AND PAINTING

QCP:09:1

Dt 26.12.94

IV TEMPERORY RUST PREVENTIVE FLUIDS

	Vendor Name	Brand Name
1.	Bonita Chemicals, Agra	BONITA RPF (Wax Brand)
2.	Guardian Anti corrosives (P) Ltd., Madras	CHAMPION
3.	Plastic Peel Chemicals, Bombay	TRPF - 320
4.	Sundaram Paints, Tanjore	TRPF
5.	Western Indian Paint & Colour Co., Madras	WICOR - P

V VCI TABLETS

Vendor Names

1. M/s Aquarius Chemicals, Bombay
2. M/s Suprabha Protective Products (P) Ltd, Trichy
3. M/s Trans Dynamic, Pune
4. M/s Venkateswara Enterprises, Trichy