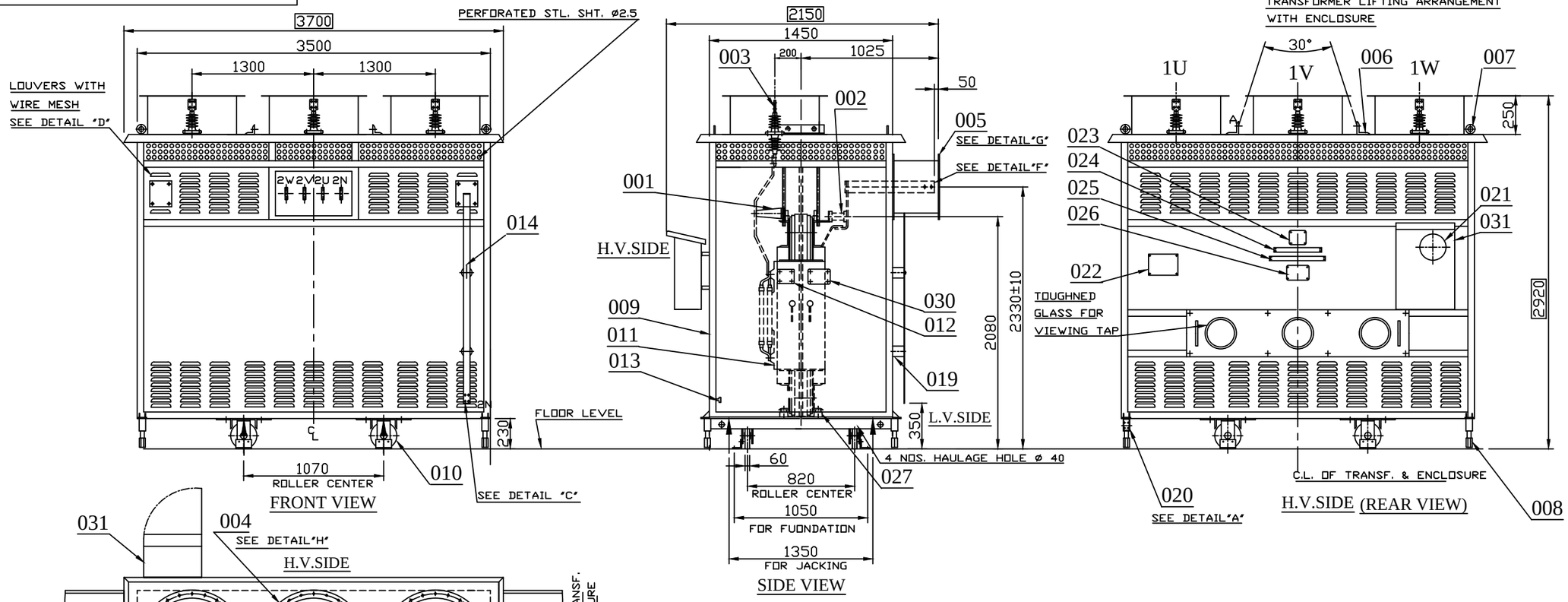
First Angle Projection

All dimensions in 'mm'

DRG.No. 34730051806



NOTES :-

1. FOR NOTES & OTHER DETAILS REFER DRG. 34730051808.
2. FOR LIST OF REF. DRGS. FITTING & SPECIFICATION REFER DRG. 34730051807.

DISTRIBUTION OF PRINTS	TRE	PPC	BAY 1&2	BAY 3, 4&5	BAY 6&7	BAY 8	BAY 9	LMM	Other						
									0						

ADDITIONAL INFORMATION
WO.- 14259P10700

STATUS OF DRAWING

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: 1250KVA, 13.8/0.433KV CAST RESIN DRY TYPE TRANSFORMER M/S:- NEEPCO KAMENG HEP

BHARAT HEAVY ELECTRICALS LTD. JHANSI

	NAME	SIGN	DATE
DRN	SSV		29/04/2014
CHD	MSH1		01/05/2014
APPD	SSY1		09/08/2014

NO. OF VAR

REV	DATE	ALTERED
		CHECKED
		APPROVED
ZONE		

REV	DATE	ALTERED
		CHECKED
		APPROVED
ZONE		

REV	DATE	ALTERED
03	24/04/2015	ALTERED SSV
		CHECKED MSH1
		APPROVED SSY1
ZONE		DRG. REVISED TO CHANGE THE L.V. BUSBAR PHASE SPACING FROM 250 TO 300 mm.

DEPT-TRE	UN. TOL. DIM. C/M/F	SCALE	WEIGHT [KG]	REF. TO ASSY. NO.	ITEM NO	NO. OF ITEM
CODE-406						

TITLE: OUTLINE GENERAL ARRANGEMENT

DRAWING NO. 34730051806 REV. 03

SHT NO 1 NO OF SHT 1

REF. DRG. NO.

SIGN AND DATE

INVENTORY NO.

SIGNATURE NOT REQUIRED AS IT IS SYSTEM GENERATED DRAWING SIZE A3

First Angle Projection

All dimensions in 'mm'

DRG.No. 34730051807

LIST OF FITTINGS

ITEM NO.	DESCRIPTION	QTY. (NOS.)
001	H.V. SUPPORT EPOXY INSULATOR	3 NOS.
002	L.V. BUSBAR SUPPORT EPOXY INSULATOR	4 NOS.
003	H. V. BUSHING EPOXY	3 NOS.
004	H. V. FLANGE	3 NOS.
005	L.V. DUCT	1 NO.
006	LIFTING ANGLE (FOR COMPLETE TRANSFORMER)	2 NOS.
007	LIFTING LUG (FOR ONLY ENCLOSURE LIFTING)	4 NOS.
008	JACKING ARRANGEMENT (FOR ENCLOSURE ONLY)	4 NOS.
009	2 MM.TK. HOT ROLLED STEEL SHEET ENCLOSURE WITH LOUVERS	1 NO.
010	BI-DIRECTIONAL 200 ø ROLLER WITH LOCKING ARRANGEMENT	4 NOS.
011	EPOXY ENCAPSULATED COIL (H.V. + L.V.)	6 NOS.
012	CAUTION PLATE	2 NOS.
013	EARTHING ON DOORS.	4 NOS.
014	NEUTRAL GROUNDING BUSBAR - COPPER	1 NO.
015		
016	HINGED TYPE DOOR	4 NOS.
017	LIMIT SWITCH 5AMP. 220V AC 1 NO + 1 NC CONTACT	4 NOS.
018A	L.V.N.C.T 300/1A, 5P20, 15VA	1 NO.
018B	L.V.N.C.T 2000/5A, PS, Vk= 386Rct+ 285, Ie=150mA at Vk/2	1 NO.
018C	L.V. PHASE C.T 2000/5A, PS, Vk= 386Rct+ 285V, Ie<=150mA at Vk/2	3 NO.
019	L.V.N. GROUNDING INSULATOR	2 NOS.
020	EARTHING STUD	2 NOS.
021	TEMPERATURE SCANNER	1 NO.
022	COMBINED R & D PLATE	1 NO.
023	B.H.E.L.MONOGRAM	1 NO.
024	B.H.E.L.NAME PLATE HINDI	1 NO.
025	B.H.E.L.NAME PLATE ENGLISH	1 NO.
026	WARNING PLATE	1 NO.
027	ANTIVIBRATION PAD	4 NOS.
028		
029		
030	LIFTING INSTRUCTION PLATE	1 NO.
031	MARSHALLING BOX	1 NO.
032		

SPECIFICATIONS

TYPE	DRY TYPE CAST RESIN 3 PHASE
RATED POWER	1250 kVA
VOLTAGE RATIO	13800/433 VOLTS
VECTOR GROUP	Dyn1
OFF-CIRCUIT TAPS ON H.V.	±2.5%, ±5%
METHOD OF COOLING	AN
TEMPERATURE RISE	90°C ABOVE AMBIENT TEMP. OF 50°C
INSULATION CLASS	'F'
STANDARD	CONFORMING TO I.S. 11171-1985
IRON / LOAD LOSSES(KW)	3/12 KW (FIRM).
IMPEDANCE	5% ± I.S. TOL.
PROTECTION CLASS FOR ENCLOSURE	I.P. - 23
CORE COIL ASSY. (KG.)	4500 (APPROX.)
ENCLOSURE (KG.)	1200 (APPROX.)
SHIPPING WEIGHT (KG.)	5700 (APPROX.)

REFERENCE DRAWINGS

34730051806	O.G.A.
34730051808	DETAIL & NOTES
34736250352	WIRING DIAGRAM
34731950955	R. & D. PLATE
34730350265	H.V. BUSHING
34730051809	MARSHALLING BOX

REF. DRG. NO.

SIGN AND DATE

INVENTORY NO.

REV	DATE	ALTERED / CHECKED / APPROVED	ZONE
REV	DATE	ALTERED / CHECKED / APPROVED	ZONE
REV 01	DATE 14/02/2015	ALTERED MSH1 / CHECKED MSH1 / APPROVED SSY1	ZONE
		DRG. REVISED AS PER CUSTOMER'S COMMENTS DATED 13/02/2015.	

ADDITIONAL INFORMATION
WO.- 14259P10700

STATUS OF DRAWING

DISTRIBUTION OF PRINTS

TRE	PPC	BAY 1&2	BAY 3, 4&5	BAY 6&7	BAY 8	BAY 9	LMM	Other
								0

TYPE OF PRODUCT OR 1250KVA, 13.8/0.433KV CAST RESIN DRY
NAME OF CUSTOMER/PROJECT TYPE TRANSFORMER
M/S:- NEEPCO KAMENG HEP

BHARAT HEAVY ELECTRICALS LTD.
JHANSI

	NAME	SIGN	DATE
DRN	SSV		29/04/2014
CHD	MSH1		01/05/2014
APPD	SSY1		09/08/2014

NO. OF VAR

DEPT-TRE	UN. TOL. DIM. C/M/F		SCALE	WEIGHT (KG)	REF. TO ASSY. NO.	ITEM NO	NO. OF ITEM
CODE-406							

TITLE
LIST OF FITTINGS

DRAWING NO. 34730051807 REV. 01

SHT NO 1 NO OF SHT 1

SIGNATURE NOT REQUIRED AS IT IS SYSTEM GENERATED DRAWING SIZE A3

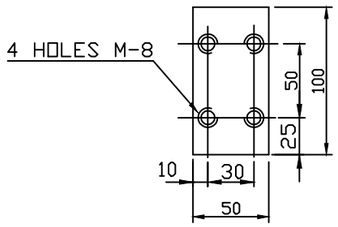
First Angle Projection

All dimensions in 'mm'

DRG.No. 34730051808

NOTES:-

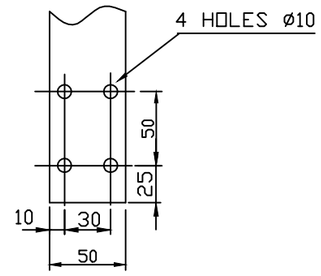
1. EXTERIOR & INTERIOR FINISH TO SHADE 631 OF IS-5 SYNTHETIC ENAMEL PAINT.
2. JACKING POSITION FOR TRANSFORMER ARE PROVIDED.
3. TRANSFORMER CAN BE REMOVED ALONG WITH BASE OF ENCLOSURE.
4. DIMENSIONS MARKED THUS ▭ ARE OVERALL SHIPPING DIMENSIONS EXCLUDING PACKING.
5. ALL HARDWARES FOR ENCLOSURE WILL BE CPP/ZPP.
6. ACCESS COVERS & DOORS WILL BE WITH RUBBER GASKETS
7. ENCLOSURE DIMENSIONS SHALL HAVE ± 20 MM. TOLERANCE.
8. JACKING ARRANGEMENT OF ENCLOSURE TO BE USED FOR WITHDRAWAL OF TRANSFORMER WITH BASE PLATE FROM ENCLOSURE.
9. CLEARANCE - HV SIDE PHASE TO PHASE & PHASE TO EARTH 170 mm.
   LV SIDE PHASE TO PHASE & PHASE TO EARTH 25. mm
10. DOORS ARE PROVIDED WITH HINGES HAVING REMOVABLE PINS. THE PINS CAN BE TAKEN OUT FOR REMOVAL OF THE DOORS.



PAD FOR ENCLOSURE TO STATION EARTHING 12TK. STEEL PLATE

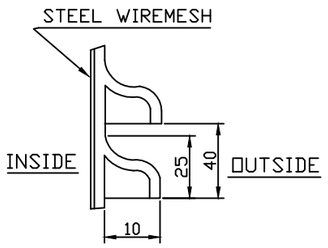
DETAIL-A

020

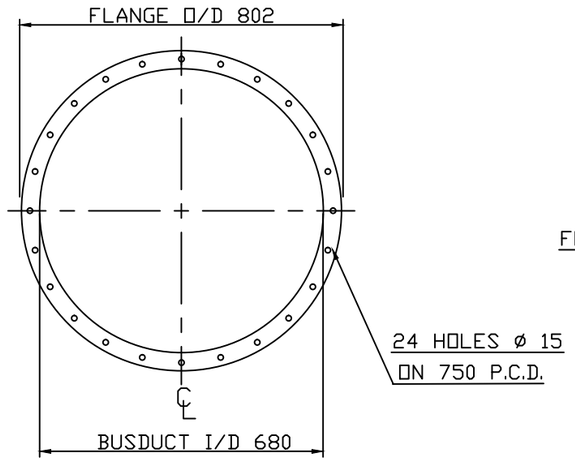


5TK. HARD CPR. STRIP

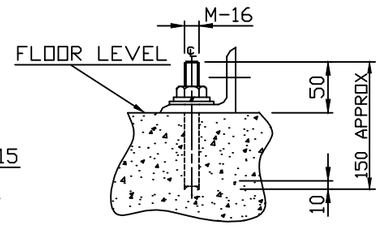
DETAIL "C"



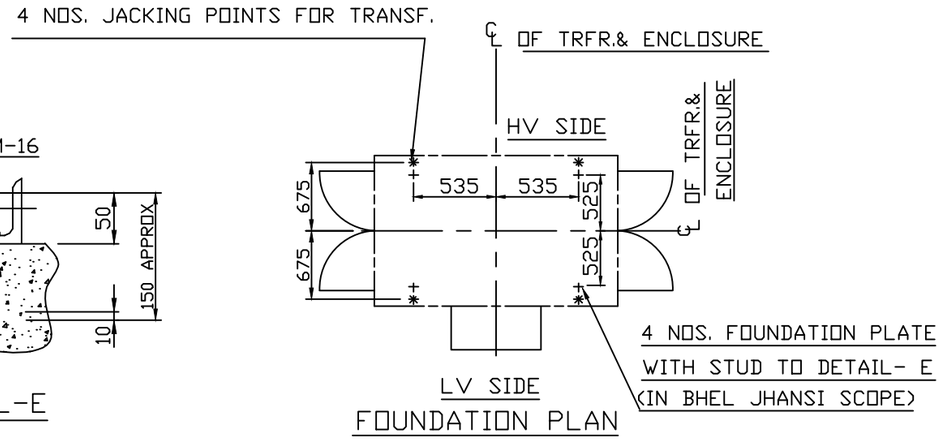
DETAIL-D



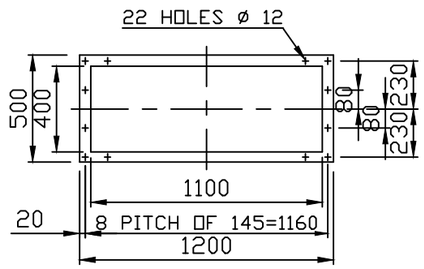
DETAIL- "H"



DETAIL-E

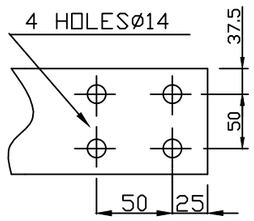


FOUNDATION PLAN



L.V. BUSDUCT MTG. FLANGE

DETAIL-G



10TK.X125 COPPER BUSBAR

DETAIL-F

ADDITIONAL INFORMATION
WO.-14259P10700

STATUS OF DRAWING

DISTRIBUTION OF PRINTS

TRE	PPC	BAY 1&2	BAY 3,4&5	BAY 6&7	BAY 8	BAY 9	LMM	Other
								0

TYPE OF PRODUCT OR 1250KVA, 13.8/0.433KV CAST RESIN DRY
NAME OF CUSTOMER/PROJECT TYPE TRANSFORMER
M/S:- NEEPCO KAMENG HEP

BHARAT HEAVY ELECTRICALS LTD.
JHANSI

	NAME	SIGN	DATE
DRN	SSV		29/04/2014
CHD	MSH1		01/05/2014
APPD	SSY1		09/08/2014

NO. OF VAR

REF. DRG. NO.

SIGN AND DATE

INVENTORY NO.

REV	DATE	ALTERED
		CHECKED
		APPROVED

REV	DATE	ALTERED
		CHECKED
		APPROVED

REV	DATE	ALTERED
01	14/02/2015	MSH1
		CHECKED MSH1
		APPROVED SSY1

ZONE

ZONE

ZONE

DRG. REVISED AS PER CUSTOMER'S COMMENT DATED 13/02/2015.

DEPT-TRE	UN. TOL. DIM. C/M/F		SCALE	WEIGHT [KG]	REF. TO ASSY. NO.	ITEM NO	NO. OF ITEM
CODE-406							

TITLE
DETAIL & NOTES

DRAWING NO. 34730051808 REV. 01

SHT NO 1 NO OF SHT 1

SIGNATURE NOT REQUIRED AS IT IS SYSTEM GENERATED DRAWING SIZE A3

PROCESS FOR PAINTING OF FERROUS SURFACES BY SYNTHETIC PAINT

1. GENERAL :

This Specification details the process to be followed to provide a protective, anticorrosive, synthetic resin air drying Semi glossy paint finish by spraying on ferrous surfaces of locomotives and transformers.

2.0 MATERIAL :

2.1	Anticorrosive priming paint (Red)	: AA - 561 01
2.2	Anticorrosive priming paint (Brown)	: AA - 561 01
2.3	Finishing Paint -	
	Synthetic Semi-Glossy Finishing paint (shade as specified)	: AA - 561 25
	or	
	High Glossy Synthetic Finishing paint	: AA - 561 26
	or	
	Synthetic Aluminium Paint for Loco Roofs	: AA - 561 28
	or	
	Non Yellowing white paint	
2.4	White Spirit	: AA - 567 01
2.5	Nitro Cellulose stopper for locomotives and on less than 3 mm thick sheet for transformer	: AA - 553 06
2.6	Water proof abrasive paper Grit 220	

3.0 PREPARATION OF PAINT :

3.1 Removal of Skin From The Paint :

Before application, any skin formed on the paint in the container shall be carefully removed, any settled pigment broken up and loosened the paint thoroughly stirred to ensure complete and uniform mixing of the constituents. Care shall be taken to avoid entraining air into the paint while stirring. The paint shall be strained through a muslin cloth.

3.1.1 Consistencies of the paints AA - 561 01 and AA - 561 25

The mixed paint shall be used at the consistencies as given below :

Paint Specification	Flow time of paint in IS cup no. B - 4 (IS : 3944)	
	Spraying	Brushing
1. AA - 561 01	30 ± 2 secs.	60 - 70 secs.
2. AA - 561 25/26/27/28	30 ± 2 secs.	60 - 70 secs.

The above consistencies shall be adjusted using white spirit and these flow times shall be maintained independent at shop temperature within normal variations.

4.0 SURFACE PREPARATION :

It is necessary that the surface to be painted is free from loose dust, mill scale, rust, grease, oil, old film etc. For surface cleaning and preparations following steps to be followed :

4.1 Hand scrapping for Locomotive : AA 067 41 01 c1.3.1.1

4.2 Solvent cleaning for Locomotive : AA 067 41 01 c1.2.1.1

4.3 Light rust removing if any for Locomotive : AA 067 41 01 c1.4.1

4.4 General rusting for Transformer : AA 067 41 01 c1.3.2

5.0 APPLICATION OF PAINTS:

5.1 Application of First Coat of Anticorrosive Priming Painter AA - 561 01 :

Over the cleaned surface, one coat of Anticorrosive Priming Paint (Red) to AA 561 01 at the appropriate consistency shall be applied by spraying

5.1.1 Drying of paint :

The painted surface shall be allowed to air dry for a minimum period of 12 hours.

5.1.2 Repair of Damage to the First Coat of Primer :

Any local damage which has been caused to first coat of primer shall be repaired with cleaning by water proof abrasive paper and then by applying a coat of primer AA 561 01 (red) and allow it dry for minimum period of 12 hours.

5.1.3 Application of Cellulose Stopper (Putty):

Nitro Cellulose stopper (ref cl.2.5) shall be applied on exterior surface by putty-blade, if required to fill up dents and scratches and allowed to air dry for a period of 4 - 5 hours. The surface shall then be rubbed down with water proof abrasive paper no. 220. Loose dust shall be washed with water where possible and the surface shall be allowed to dry completely. When water washing is not possible the loose dust shall be wiped off by a blast of air or dry clean cloth.

5.1.4 Application of Second Coat of Anticorrosive Priming Paint -Brown(AA 561 01) :

Immediately before the application of second coat, the surface shall be cleaned with white spirit where necessary

The priming paint AA 561 01 (brown) shall then be applied over the surface in accordance with cl. 5.1 above.

5.1.5 Drying of the Paint :

The painted surface shall be allowed to air dry for a minimum period of 12 hours.

5.1.6 Repair of Damage to the Second Coat of Priming Paint :

Any local damage which has been caused to first two coats of priming paints shall be repaired by Primer AA 561 01 (brown) in accordance with cl. 5.1

5.2 Application of Third Coat with Finishing Paint : (First Finishing Coat) :

Immediately before the application of the finishing coat, the surface shall be cleaned with white spirit where necessary.

One coat of finishing coat as prepared in cl. 3.1 and 3.1.1 shall then be applied over the cleaned surface at the appropriate consistency by spraying.

5.2.1 Drying of the Paint :

The painted surface shall be allowed to air dry for a minimum period of 12 hours.

5.3 Application of Fourth Coat with Finishing Paint (Second finishing coat)

Any local damage which has been caused to the first three coats of paints shall be repaired using AA 561 01 (Brown) and finishing paints, based on depth of the damage. Usual coating to be given by allowing appropriate drying time. For example if bare metal visible due to damage then whole procedure of painting is to be followed from the start. Immediately before the application of the finishing coat, the surface shall be cleaned with white spirit where necessary.

The finishing paint as prepared in cl. 3.1 and 3.1.1 shall then be applied all over the cleaned surface at as described in cl. 5.2

5.3.1 Drying of the Paint :

The painted surface shall be allowed to air dry for a minimum period of 16 hours before handling.

6.0 PROCESS CONTROL :

Inspect and ensure following points.

6.1 Before issue of new paint from store, the shelf life should be checked for expiry. Paints prepared before 6 hours should not be used.

6.2 Before application of paint it is to be ensured that the surface has been cleaned as specified in Cl. 4.0

6.3 The paint as prepared in Cl. 3.1 should be checked for its consistency by flow time cup no. 4 as laid in Cl 3.1.1.

6.4 After each coat of painting the film should be checked for defects / damage and non-uniformity. Defects / damages should be marked and repairing should be ensured.

6.5 Ensure intercoat interval / period as specified in Cl.5 is maintained.

6.6 Finished painted surface should free from defects such as gloss, non uniformity of shade, wrinkles, blistering, peel ing etc.

7.0 ACCEPTANCE CRITERIA :

7.1 Film Thickness :

The thickness of dried primer and finish paint shall be 90 to 140 microns unless stated. Additional finishing coats may be given to achieve the thickness. However at certain local points dry film thickness upto 200 microns shall be acceptable. The thickness of epoxy putty separately shall not exceed 300 microns.

The thickness of inside paint for Transformer tank only shall be within 35 to 70 microns. Localy upto 200 microns shall be acceptable.

7.2 CROSS CUT TEST :

Cross cut/Adhesion test shall be carried out inline with ASTM D3359 or ISO 2808. Use method B for film thickness 50 - 125 microns and method A for film thickness more than 125 microns. The acceptance criteria shall be 4B and 4A respectively (ASTM 3359).

8.0 QUALIFICATION :

8.1 PROCESS :

- One panel (300 x 300, 3 - 5 tk) of mild steel will be selected and cleaned as per cl.4.0.
- Paint of appropriate consistency shall be prepared as per cl 3.1 above.
- The paint will be sprayed on panel by spray gun from a distance of 300 - 600 mm w.r.t sheet, maintaining air pressure 45 - 90 psi (3.15 to 6.3 kg / cm2).
- Guidelines as per cl. 7.0 shall be adhered to for process control.
- The panels will be subjected to inspection as per cl. 7.0.
- On the basis of acceptable results, the process will be qualified.

8.2 OPERATOR :

The Qualification of Operator shall be based on conducting training programs on Process Specification and imparting knowledge regarding recommended practices.

9.0 QUALIFICATION NORMS :

9.1 PROCESS :
PERIODICITY OF REQUALIFICATION :

The Process ones qualified shall remain qualified for a period of five years. After this period it shall be reviewed for Requalification.

REQUALIFICATION DUE TO REVISION OF PROCESS :

For changes of minor nature not affecting the important parameters of the process, requalification shall be done by updation of the documents after due verification of the changes.

For changes in the process where important parameters of the process are affected, the qualification procedure as mentioned above at 9.1 shall be followed.

9.2 OPERATOR :

Requalification of the operator shall be necessary if he is not performing the job continuously for six months.

Requalification procedure shall be same as cl. 8.2 above.

10. REPAIR OF DAMAGED PAINT WORK :

10.1 Local Damage Unrusted :

Where local damage to the paint work has occurred without subsequent rusting, the damaged area shall be cleaned with white spirit. The number of paint coat shall be applied sufficient to provide a dry film thickness, not less than that of the surrounding paint.

10.2 Local Damage rusted :

Where local damage to the paint work with subsequent rusting has occurred, the rust shall be removed by mechanical cleaning as per Cl. 4.0, followed final painting.

10.3 Extensive Damage :

In case of extensive damage, entire old film shall be removed and surface shall be prepared as per Cl. 4.0.

10.4 **The various activities of the process is to be recorded in the checklist format as per BP 0430199.**