



**DALMIA CEMENT (B) LIMITED – CEMENT PLANT
ARIYALUR
ELECTRICAL MANUAL**

Issue No:02	Rev. No: 00	Effective Date: 01.11.2019	SOP/Elect /09
Issued By: MR		Approved By: HOD ELECTRICAL	
SOP for Transformer Maintenance			

Scope/Purpose : This Procedure is to establish for maintenance of Transformer

Responsibility : Section Engineer – Electrical

Accountability : Section Head-Electrical

PPE:

1. Safety helmet,
2. Safety shoe,
3. Rubber Gloves.
4. Cotton gloves.
5. Safety belt

Tools:

1. Tester
2. Megger
3. Tool kit
4. Hand blower
5. Discharge rod
6. BDV Test kit

Hazard Analysis:

Risks associated

Electric Shock
Oil Slippery

Mitigating Measures

Use of proper tool, Tested Electrical Rubber Hand Gloves

Training needs:

1. Usage of tools and Nature of Hazards

Procedure:

1. Take the LOTO permit for HT side of the transformer as per ELEC/SOP/001.
2. Take the LOTO permit for LT side of the transformer as per ELEC/SOP/003.
3. Discharge the power terminals with discharge rod.



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4. Clean the transformer with Wire Brush / Hand Blower / Cloth, while cleaning use PPEs like Nose mask, goggles and hand Gloves.
5. Open the Primary, Secondary terminal box and Bus duct covers while opening handle the covers firmly. While opening the bus duct covers use proper PPEs like Safety belts.
6. Discharge the Primary and Secondary terminals with discharge rod.
7. Clean the Primary Terminal Box, secondary Terminal Box and Bus duct with hand blower /cloth, while cleaning use PPEs like Nose mask, goggles, Safety belt and hand Gloves.
8. Check the Primary, Secondary and Bus Duct power terminal and Joints for tightness with proper tools, while checking the bus duct use proper PPEs like Safety belts.
9. Check the all control terminals for tightness with proper tools.
10. Check the all oil valve for oil leakage.
11. Check the condition of breather and Silica Gel condition if required please replace. If silica gel replaced used silica gel to be returned to store with proper return slip.
12. Check the oil level in the conservator tank and top up if the level is less than the normal indicated level. For makeup oil level, use proper instrument and avoid spillage of oil in the ground.
13. Check the break down voltage test for transformer oil.
14. Check the condition gas operated relay.
15. Check the body earthing and neutral earthing of the transformers.
16. Check the insulators / bushing of the primary , Secondary and Bust Duct.
17. Check the radiators to avoid oil leakage.
18. In case of any oil spillage while working, it is to be collected and recycled and used again.
19. Check the Insulation Resistance, Winding Resistance of the Primary & Secondary windings.
After checking the Insulation resistances again discharge the terminals with discharge rod.
20. Close the all Terminal box and bus duct covers and box up with Silicon Paste to restrict the dust entry, while closing the bus duct covers use proper PPEs like Safety belts.



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21. Clean the LPB and Check the Control Wiring Tightness, while cleaning use PPEs like Nose mask, goggles and hand Gloves.
22. Check the LPB Body earthing.
23. Check the Condition of LPB Actuators and Contacts.
24. Close the LPB Door Properly.
25. Clear the LOTO permit as per ELEC/SOP/002 in the HT Side
26. Clear the LOTO permit as per ELEC/SOP/004 in the LT Side
27. Charge the transformer and record all Check point in the concern Check list.

DON'TS:-

1. Don't start the work before switching "off" the transformer.
2. Don't touch the transformer primary and secondary terminal before discharging.
3. Don't disconnect the Neutral Link when transformer is ON.

Emergency / Emergency Shut OFF:

1. If electrical shock injury or burn is there, give First aid and inform to the Safety department or Call Emergency number 3108/9865152222/9750963761.
2. Switch off Emergency LPB provided nearby transformers.

Records/Annexure:

JSA is enclosed below.



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JOB SAFETY ANALYSIS :(JSA)

Job Safety Analysis	Job: Transformer Maintenance	Date:	Analysis by:	Reviewed by:
Title of employee doing job: Electricians/ Contract supervisor	Supervisor: Section Engineer	Department: Electrical	Section:	Approved by:
Reqd./recommended PPE: Safety helmet, Safety shoe, & Rubber Gloves, Safety belt				
Sequence of Basic Job Steps	Potential Hazards	Recommended Safe Job Procedure	What Could Go Wrong	Corrective Action
Obtain LOTO permits	Electrical shock.	LOTO permit procedure	Usage of Improper tools	Usage of proper tools
Cleaning of transformers	Eye irritation of dust.	Wear goggles	Damaged goggles/non standard goggles/ Not wearing goggle	Periodic replacement / Proper training / Follow SOP
	Respiration problem of dust	Wear Nose mask	Damaged nose mask/Not wearing Nose mask	Periodic replacement/ Proper training/ Follow SOP
	Body injury	Wear safety helmet, safety shoes , hand gloves	Tools and material may fall on human body	Without PPE don't perform the job/ Proper training / Follow SOP
	Electric shock	Use the hand blower with proper plug top	Not using plug top for hand blower	Training for tools handling/ Periodic replacement
Open the terminal cover / Busduct.	Spanner may slip	Use proper tools	Tools may be improper	Tool box training before performing the job.
Discharge the transformer primary and secondary terminals.	Electrical shock	Use Electrical safety gloves	Damaged Gloves	Periodic replacement.
Primary / Secondary Terminations / Bus bar Tightness checkup	Spanner may slip Body injury	Wear safety helmet, safety shoes , hand gloves	Tools and material may fall on human body	Without PPE don't perform the job/ Proper training / Follow SOP
	Fall from height	Wear safety belt	Damaged safety belt	Use belts certified by competent authority and check the validity before use.
Check the oil level /	Oil leakage	Don't leak the oil into	Slippery may occur	Provide drum / tray



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Leakage		the Ground	Ground contamination	for collection
Oil BDV Test	Oil spillage	Keep the oil containers closed and keep oil samples in tray	Improper handling may lead to oil spillage	Handle oil samples with care. Training for tools handling/ Periodic replacement/ Aspect Impact awareness
	Electric shock	Use proper plug top for oil BDV kit. Close the oil test container lid before applying voltage	Non use of plug top / Non checking of lid for interlock	Training on oil BDV testing method / Periodic checkup of plug top
Transformer IR / WR test	Electrical shock	Use Tested Electrical Rubber Hand gloves	Damaged Gloves / Not checked before use	Periodic replacement/ To check for Damage before use
		Use good condition meter and test lead meters	Faulty meters	Lead to be checked before use
LPB / Control wiring tightness checking, cleaning	Eye irritation,	Wear goggles	Damaged goggles/non standard goggles	Periodic replacement
	Respiration problem	Wear Nose mask	Damaged nose mask	Periodic replacement
	Body injury	Wear safety helmet, safety shoes , hand gloves	Tools and material may fall on human body	Without PPE don't perform the job
	Electrical shock	Use Tested Electrical Rubber Hand gloves	Damaged Gloves	Periodic replacement
Boxing up transformer terminal box and bus duct	Body Injury	Use proper tools	Nonstandard /damaged tools	handling/ Periodic replacement
		Wear safety helmet, safety shoes , hand gloves	Tools and material may fall on human body	Without PPE don't perform the job