



BHEL/CQX/
007/0006

QUALITY ASSURANCE
PLAN FOR CUSTOMER
M/s NLC SOLAR
POWER 65MW NEYVELI
SET_I

QUALITY ASSURANCE PLAN FOR
POWER TRANSFORMER
WO. NO. 71733A17700,
27x2700/1350-1350 KVA,
33/0.35-0.35 kV

BHARAT HEAVY ELECTRICALS LIMITED, JHANSI

MATERIAL
INSPECTION/ IN-
PROCESS
INSPECTION/ FINAL
INSPECTION

SUB VENDORS/
VENDORS/
CONTRACTORS
WORK

QP No. QP/PT/ 1212
Rev. No. 03
Date: 03-10-2016
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S No.	Components & operations	Characteristics	Class	Type of check	Sampling	Reference/ Standard	Acceptance norms	Format of record	Applicable codes			Remarks
									M	C	N	
1	RAW MATERIAL											
1.1	Steel plates (For fabricated items)	a. Surface finish b. Thickness c. Chemical & mechanical properties	B B B	V I T	One sample per lot	IS/PS	IS/PS	Supplier TC	P P P	V V V	-- -- --	
1.2	CRGO (CRGO steel)	a. Packing list b. Mill test certificate c. Bill of lading d. Bill of entry e. Specific loss f. Bend test g. Surface resistivity	B B B B B B B	I V V V T T T	One sample per supplier per type	IS/PS	IS/PS	Supplier TC	P P P P P P P	V V V V V V V	-- -- -- -- -- -- --	
1.3	Paper insulated copper conductor (PICC/ CTC)	a. Conductor finish b. Dimensions of bare conductor c. Resistivity/ conductivity	B B B	V V T	One sample per supplier per type	IS/PS	IS/PS	Supplier TC	P P P	V V V	-- -- --	
1.4	Insulating paper (used in PICC & CTC)	a. Dimension, physical condition & cleanliness b. Electric proof strength	B B	V T	One sample per supplier per type	IS/PS	IS/PS	Supplier TC	P P	V V	-- --	
1.5	Press board	a. Dimension, thickness, compressibility, shrinkage in air, oil absorption b. Electric strength in oil, physical condition & cleanliness	B B	V/T V/T	One sample per lot	IS/PS	IS/PS	Supplier TC	P P	V V	-- --	
1.6	Densified wood	a. Dimension/ thickness b. Electric strength in oil c. Physical condition & cleanliness	B B B	I T V	One sample per lot	IS/PS	IS/PS	Supplier TC	P P P	V V V	-- -- --	
1.7	Gasket	a. Thickness b. Compressibility c. Recovery d. Flexibility	B B B B	I T T T	One sample per lot	IS/PS	IS/PS	Supplier TC	P P P P	V V V V	-- -- -- --	
1.8	Transformer oil	a. Electric strength, tan delta, water content, Resistivity	B	T	One sample/ tanker	IS/PS	IS/PS	Supplier TC	P	V	--	

Prepared by

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Checked & Approved by

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31/10/16
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Sr. Engineer(CQX)



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2.	COMPONENTS											
2.1	OLTC/OCTC	MANUFACTURERS TEST CERTIFICATE SHALL BE SUBMITTED FOR REVIEW (THESE ITEMS SHALL BE AS PER CONTRACT / DESIGN)				IS/PS	IS/PS	Supplier TC	P	V	--	
2.2	Radiators					IS/PS	IS/PS		P	V	--	
2.3	Bushings (OIP)					IS/PS	IS/PS		P	V	--	
2.4	Oil pump					IS/PS	IS/PS		P	V	--	
2.5	Buchholz relay					IS/PS	IS/PS		P	V	--	
2.6	OTI & WTI					IS/PS	IS/PS		P	V	--	
2.7	Marshalling box					IS/PS	IS/PS		P	V	--	
2.8	Cooling Fans					IS/PS	IS/PS		P	V	--	
2.9	Pressure relief valve					IS/PS	IS/PS		P	V	--	
2.10	Magnetic oil gauge					IS/PS	IS/PS		P	V	--	
2.11	Bushing CT					IS/PS	IS/PS		P	V	--	
2.12	Air cell					IS/PS	IS/PS		P	V	--	
2.13	OFI					IS/PS	IS/PS		P	V	--	
3.	In Process Inspection											
3.1	Fabrication of tank. Tank cover & conservator											
3.1.1	Welding requirement	Welder qualification	B	T	One sample per WO	ASME manual	ASME manual	BHEL record	P	V	--	
3.1.2	Assembly	a. DP test on load bearing items weld as per drg. b. Dimensional check after final welding c. Tank rim flatness d. Visual check on welds	B B B	V I V V	100%	BHEL drawings	BHEL drawings	Check list	P P P P	V V V V	-- -- -- --	
3.1.3	Testing	a. Leakage test b. Vacuum withstand & permanent deflection measurement c. Pressure withstand & permanent deflection measurement	B A A	T T T	100% One job per WO			Record	P P P	V V V	-- -- --	

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3.1.4	Shot/ sand blasting/ painting	a. Surface cleaning by shot/ sand blasting b. Painting process, paint film thickness (inside & outside) c. Paint film adhesion test	B B B	V V/I T	100%	BHEL drawings	BHEL drawings	Record	P P P	V V V	-- -- --	
3.2	Core assembly	a. Dimension, straightness & roundness of core b. 2 kV insulation test between core & clamping structure	A A	V/I T	100%	BHEL drawings	BHEL drawings	Check list	P P	V V	W/V W/V	CHP at BHEL, Jhansi for one job per WO; record review for remaining
3.3	Winding	a. Brazed joints b. Megger test c. Dimensions	B B B	V T V	100%	BHEL ES/ BHEL Drawing	BHEL ES/ BHEL Drawing	Test report/ check list	P P P	V V V	-- -- --	
3.4	Core & coil assembly	a. Ratio test on all taps, 2kv test b. Check for healthiness of insulation of conductor joints and leads c. Check for Proper cleanliness for absence of dirt & dust d. Dimensional Check for various electrical clearances (after tanking) e. Winding resistance measurement	B B B B B	T V V I T	100%	BHEL drawings/ test schedule	BHEL drawings/ test schedule	Test report/ check list	P P P P P	V V V V V	W/V -- -- W/V W/V	CHP at BHEL, Jhansi for one job per WO; record review for remaining
3.5	Treatment process	Drying, oil impregnation, soaking, servicing & oil filling	A	I	100%	BHEL spec JS690098/ JS690097	BHEL spec JS690098/ JS690097	Process report	P	V	--	
3.6	Final Inspection	a. Electrical tests (i) Routine test (ii) Type tests (as per IS: 2026 clause- 10.1.2 (a, b)) (iii) Special tests (as per IS: 2026 clause- 10.1.3 (b,d,f,g,h,j)))	A A A	T T T	100%	Test schedule/IS	Test schedule/IS	Test report	P P P	V V V	W W W	CHP at BHEL, Jhansi
4	Pre- shipment checks	a. Oil pressure test b. N ₂ gas tightness c. Completeness of transformers & packing of accessories d. Visual checks before dispatch	B B B B	T T V V	100%	BHEL QC checklist/ BHEL spec	BHEL QC checklist/ BHEL spec	Check list	P P P P	V V V V	-- -- -- --	

Legends: CLASSTYPE OF CHECK AGENCY SCOPE OF AGENCY

A: CRITICAL
B: MAJOR
C: MINOR

V: VISUAL
I: MEASUREMENT
T: TEST

M: MANUFACTURER / SUB CONTRACTOR
C: CONT. / NOMINATED INSPECTION AGENCY
N: CUSTOMER

P: PERFORMER
V: VERIFICATION
W: WITNESS

CHP: CUSTOMER HOLD POINT

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