




SUPPLIER'S NAME & ADDRESS		REFERENCE FIELD QUALITY PLAN						TO BE FILLED IN BY NTPC			
 BHEL, PS-WR, 345, KINGSWAY, NAGPUR		SYSTEM/EQUIPMENT:		QP NO.: QPE-EL-005	SIGN OF SUPPLIER	QP NO.: 0000-999-QVE-T-005	REVIEWED BY	APPROVED BY			
		H T MOTORS		REV. NO.: 01		REV NO.: 01	V Shrivastava				
		SUB-SYSTEM: Horizontal & Vertical Motors		DATE: 31.12.2010		DATE: 04/01/2011	O P Niranjani	A K Garg			
				PAGE: 01 OF 06		PAGE: 01 OF 08	P K Basu				
		CHARACTERISTICS/INSTRUMENTS		CLASS OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	REMARKS	
SL. NO	ACTIVITY & OPERATION	3	4	5	6	7	8	9	10		
1	2	3	4	5	6	7	8	9	D*	10	
1.0	MATERIAL RECEIPT										
1.1	Availability of Bill of materials, packing slip, dispatch documents.		C	V	100%	Bill of Materials / Dispatch documents / Packing slip	Availability of documents	Logbook	Raise MDR in case of shortage/damage of materials.		
1.2	Check materials for completeness, correctness, and shortages / excesses as per Bill of Materials / Dispatch documents / Packing slip.		C	V	100%	Dispatch documents/ Packing slip	Completeness of material	Logbook			
1.3	Check components / boxes carefully for physical condition. a) In case of external damage to boxes, remove the top cover so that contents can be seen thoroughly. If the contents are sealed / intact, cover the contents / packing with original plastic sheeting. b) In case of damage to contents, check the contents to ascertain the nature & quantum of damage. Re-pack contents in original packing.		C	V	100%	Work instructions for site Operations	Condition of contents	MDR			
1.4	Ensure that nonconforming / rejected components are identified, stored separately and reported to supplier for rectification / replenishment.		B	V	100%	Work instructions for site Operations	Work instructions for site Operations	Register			
1.5	Control receipt and issue of all components		C	V	100%	Work instructions for site Operations	Work instructions for site Operations	Register			

LEGENDS:



* FORMAT OF RECORD IDENTIFIED WITH "TICK" (✓) MARK SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.

CLASS OF CHECK- A: CRITICAL, B: MAJOR AND C: MINOR.

CLASS 'A' SHALL BE WITNESSED BY NTPC FQA. CLASS 'B' SHALL BE WITNESSED BY ERECTION /CONSTRUCTION DEPTT. CLASS 'C' SHALL BE WITNESSED BY ERECTION SUPPLIER, CLASS 'A' & 'B' CHECK SHALL BE NTPC CHP STAGE.

FORMAT No. QS-01-QAI-P-10/F2-R1

ENGG DIV/ QA & I

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		H T MOTORS		REV. NO.: 01			REV NO.: 01	V Shrivastava			
		SUB-SYSTEM: Horizontal & Vertical Motors		DATE: 31.12.2010			DATE: 04/01/2011	O P Niranjani			
				PAGE: 02 OF 06			PAGE: 02 OF 06	P K Basu			
CHARACTERISTICS/INSTRUMENTS		CLASS OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	REMARKS			
1	2	3	4	5	6	7	8	9	10		
2.0	MATERIAL STORAGE										
2.1	Ensure that motors are not stored in close proximity of the vibrating machinery.	C	V	100%	Instruction manual	Instruction manual					
2.2	Boxes should be stored indoor with original packing.	B	V	100%	Instruction manual	Instruction manual					
2.3	In case materials stored outdoor for transition period, following should be ensured: a. Wooden boxes are covered with tarpaulin, and placed on raised platform to avoid ingress of water, moisture, dust and mud. b. Motors are covered with thick & waterproof polythene and kept inside wooden boxes. c. Condition monitoring of Silica Gel periodically.	B	V	100%	Instruction manual	Instruction manual					
2.4	Ensure that space heaters are switched 'ON' whenever motor is idle and subjected to moisture and condensation.	B	V	100%	Instruction manual	Instruction manual					
2.5	Ensure that Motor shaft is rotated by a quarter of revolution every month during storage. Note: Protective axial locking cover on shaft extension should be used while rotating shaft.	B	V	100%	Instruction manual	Instruction manual					
2.6	In case of long storage of motors, IR value of motors should be checked periodically - 1000 V /2500 V MEGGER.	B	M	100%	Instruction manual	IR > (KV+1) M Ohm, P I ≥ 2.0					

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FORMAT No. QS-01-QAI-P-10/F2-R1

ENGG DIV/ QA & I

SUPPLIER'S NAME & ADDRESS			REFERENCE FIELD QUALITY PLAN						TO BE FILLED IN BY NTPC			
SYSTEM/EQUIPMENT:			QP NO.: QPE-EL-005		SIGN OF SUPPLIER		REV NO.: 01		REVIEWED BY		APPROVED BY	
SUB-SYSTEM: Horizontal & Vertical Motors			REV. NO.: 01		DATE: 31.12.2010		PAGE: 03 OF 06		V Saravastava		A K Garg	
CHARACTERISTICS/INSTRUMENTS			CLASS OF CHECK		TYPE OF CHECK		QUANTUM OF CHECK		REFERENCE DOCUMENT		ACCEPTANCE NORMS	
ACTIVITY & OPERATION			CHECK		CHECK		CHECK		DOCUMENT		FORMAT OF RECORDS	
1	2	3	4	5	6	7	8	9	10			
2.7	Ensure that loose components wrapped in foils are stored in such a way that foil is not damaged.	B	V	100%	Instruction manual	Instruction manual	Instruction manual	Logbook				
2.8	Ensure display of shelf life of materials as applicable.	B	V	100%	Instruction manual	Instruction manual	Logbook					
2.9	Ensure periodic preservation of components.	B	V	100%	Instruction manual	Instruction manual	Logbook					
3.0	PRE ERECTION											
3.1	Check availability of relevant drawings, instruction manual and O & M manual.	C	V	100%	Availability of Documents							
3.2	Ensure that all parts and assemblies of motor are available as per drawing/ shipping list.	C	V	100%								
4.0	MOTOR ERECTION											
4.1	Check foundation location with reference to drawing - Measuring Tape.	B	M	100%	Drawing	Drawing	Logbook					
4.2	Ensure that packing/locking used for transportation is removed.	C	V	100%	Drawing	Drawing	--					
4.3	Ensure that packing/locking used for sleeve bearings during transportation is removed and sleeve bearings are clean.	C	V	100%	--	--	--					
LEGENDS: * FORMAT OF RECORD IDENTIFIED WITH "TICK" (✓) MARK SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. CLASS OF CHECK- A: CRITICAL B: MAJOR AND C: MINOR. CLASS 'A' SHALL BE WITNESSED BY NTPC FQA. CLASS 'B' SHALL BE WITNESSED BY ERECTION DEPTT. CLASS 'C' SHALL BE WITNESSED BY ERECTION SUPPLIER. CLASS 'A' & 'B' CHECK SHALL BE NTPC CHP STAGE. FORMAT No. QS-01-QAI-P-10F2-R1												

ENGG DIV/ QA & I

SUPPLIER'S NAME & ADDRESS			REFERENCE FIELD QUALITY PLAN					TO BE FILLED IN BY NTPC			
 BHEL, PS-WR, 345, KINGSWAY, NAGPUR			SYSTEM/EQUIPMENT: H T MOTORS	QP NO.: QPE-EL-005 REV. NO.: 01 DATE: 31.12.2010 PAGE: 04 OF 06	SIGN OF SUPPLIER 	QP NO.: 0000-999-QVE-T-005 REV NO.: 01 DATE: 04/01/2011 PAGE: 04 OF 06 VALID UPTO: 03/04/2011	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	REVIEWED BY V Shrivastava O P Niranjani P K Basu	APPROVED BY  A K Garg
SL NO	ACTIVITY & OPERATION	CHARACTERISTICS/ INSTRUMENTS	CLASS OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK					REMARKS	
1	2	3	4	5	6	7	8	9	D*	10	
4.4	Ensure minimum 80% contact area in between the following surfaces: a. Packer to Packer. b. Bottom most packer and concrete in case Ordinary Portland Cement (OPC) is used. c. Motor Sole plate (base plate) with topmost packer.		B	V	100%	--			Logbook		
4.5	Note: a. Total thickness of shims between motor feet and bedplate should not exceed 3 mm and number of shims should not be used more than 4 Nos. b. The size of all shims & packers should be with in 1 CM more than size of motor feet in length & width. Grouting as per drawing. Note: Non shrinking free flow high strength grout mix to be used.		B	V	100%	Drawing/ Grout Manufacturer's Instructions	Drawing/ Grout Manufacturer's Instructions				
4.6	Axial clearances in case of sleeve bearings on DE side - Feller Gauge.		A	M	100%	Drawing	Drawing	L-01	✓		
4.7	Alignment of coupling, check axial and radial run out - Dial Gauge.		A	M	100%	Instruction Manual	± 0.03 MM for Rigid coupling/ ± 0.05 MM for Fixed coupling	L-02	✓		
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ENGS DW/ QA & I

SUPPLIER'S NAME & ADDRESS		REFERENCE FIELD QUALITY PLAN						TO BE FILLED IN BY NTPC		
SYSTEM/EQUIPMENT: H T MOTORS		Q.P. NO.: QPE-EL-005	SIGN OF SUPPLIER	Q.P. NO.: 0000-999-QVE-T-005	REV NO.: 01	REVIEWED BY	APPROVED BY			
SUB-SYSTEM: Horizontal & Vertical Motors		REV. NO.: 01	DATE: 31.12.2010	DATE: 04/01/2011	PAGE: 05 OF 06	O P Niranjani	A K Garg			
345, KINGSWAY, NAGPUR		PAGE: 05 OF 06	VALID UPTO: 03/01/2014	P K Basu						
SL. NO	ACTIVITY & OPERATION	CHARACTERISTICS/ INSTRUMENTS	CLASS OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	REMARKS	
1	2	3	4	5	6	7	8	9	10	
4.8	Check horizontal and vertical offset (if applicable) - Vernier/ Feller Gauge.	Check horizontal and vertical offset (if applicable) - Vernier/ Feller Gauge.	A	M	100%	Driven equipment Drawing	Driven equipment Drawing	L-02	✓	
4.9	Coupling gap for equal DE bearings axial clearance on either side of shaft - Vernier/ Feller Gauge/ Dial gauge.	Coupling gap for equal DE bearings axial clearance on either side of shaft - Vernier/ Feller Gauge/ Dial gauge.	A	M	100%	Driven equipment Drawing	Driven equipment Drawing	L-02	✓	
4.10	Check leveling of the motor stool - Precision Level. It should be within 0.05 mm/meter.	Check leveling of the motor stool - Precision Level. It should be within 0.05 mm/meter.	A	M	100%	Instruction Manual	Instruction Manual	Logbook	Applicable for vertical motors only.	
4.11	Ensure contact area between motor bottom flange and top flange of motor stool is 80% minimum.	Ensure contact area between motor bottom flange and top flange of motor stool is 80% minimum.	B	V	100%	Drawing	80% minimum	Logbook	Applicable for vertical motors only.	
4.12	Ensure that insulated bolts and washers are used for fixing of non-driving end housing with end shields in case of insulated bearing.	Ensure that insulated bolts and washers are used for fixing of non-driving end housing with end shields in case of insulated bearing.	B	V	100%	Drawing	Drawing			
4.13	Termination of power cables, space heater cables, RTD Cables and control cables.	Termination of power cables, space heater cables, RTD Cables and control cables.	B	V	100%	Schematic Drawing	Schematic Drawing	Protocol		
4.14	Ensure that stator body and base frame and terminal box are connected to earth.	Ensure that stator body and base frame and terminal box are connected to earth.	B	V	100%	Drawing	Drawing	Logbook		
4.15	Ensure that DE pedestal is connected to earth with base plate in case both pedestals are insulated.	Ensure that DE pedestal is connected to earth with base plate in case both pedestals are insulated.	B	V	100%	Drawing	Drawing			


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 FORMAT No. QS-01-QAI-P-10/F2-R1

ENGG DIV/ QA & I

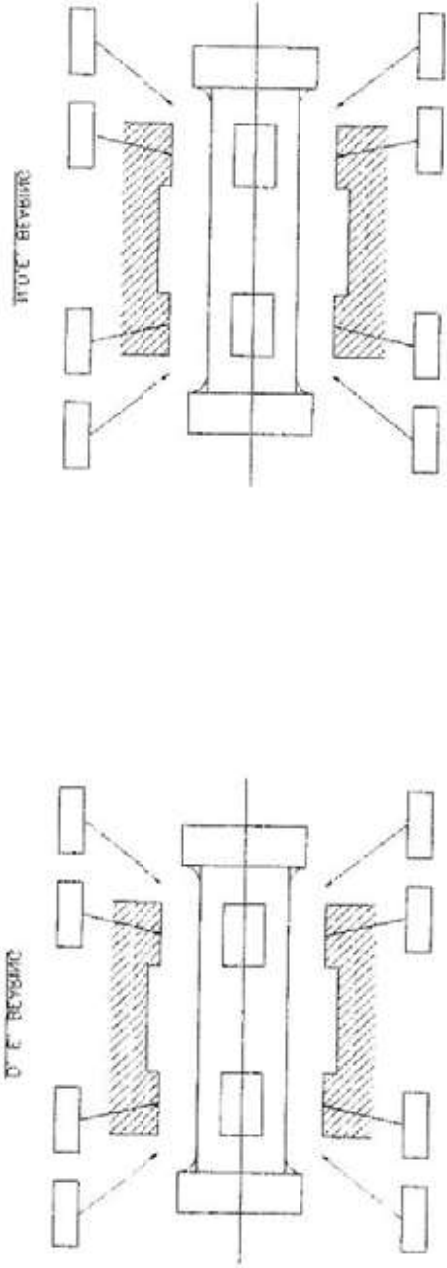
		<h2 style="text-align: center;">RECORD OF QUALITY CHECKS</h2>							
PSER									
SHEET NO. OF FQP	CHECK NO.	RESULTS ACHIEVED OK / NOT OK	DRAWING / DOCUMENT REFERENCE	FORMAT OF RECORD	INSPECTED BY SIGN. & DATE	CLEARED BY SIGN. & DATE	REMARKS		
Note : Any protocol made is to be numbered & mentioned in “Format of Record” column.									
			SYSTEM	SUB-SYSTEM	AREA		FQP NO. : QPE:RKL:250:EL:60		
PROJECT							REV. NO. R 00		
UNIT NO.							LOG SHEET NO. L-00		
RATING							SHEET	/	SHEETS

WI:QLY:03-F10/R0

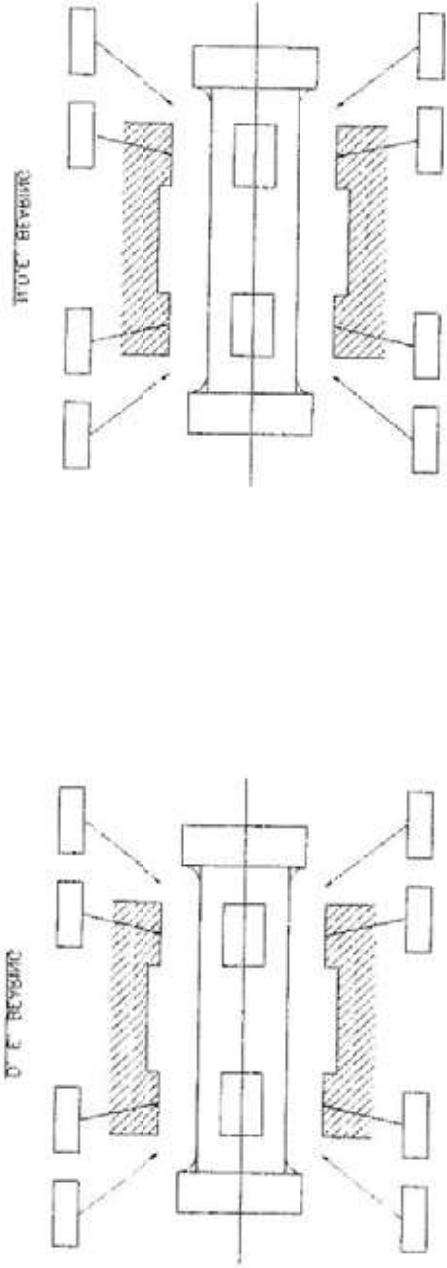
	INSTRUMENT REG. NO./TAG NO.								
	DATE OF INSPECTION								
PSER	DRAWING / DOCUMENT REF.								

MOTOR CLEARANCES

A) AXIAL, SIDE AND TOP CLEARANCES BETWEEN SHAFT AND BEARING




B) CLEARANCE BETWEEN BEARING SLEEVE O.D. AND PEDESTAL COVER I.D. (SPHERICAL CLEARANCE)

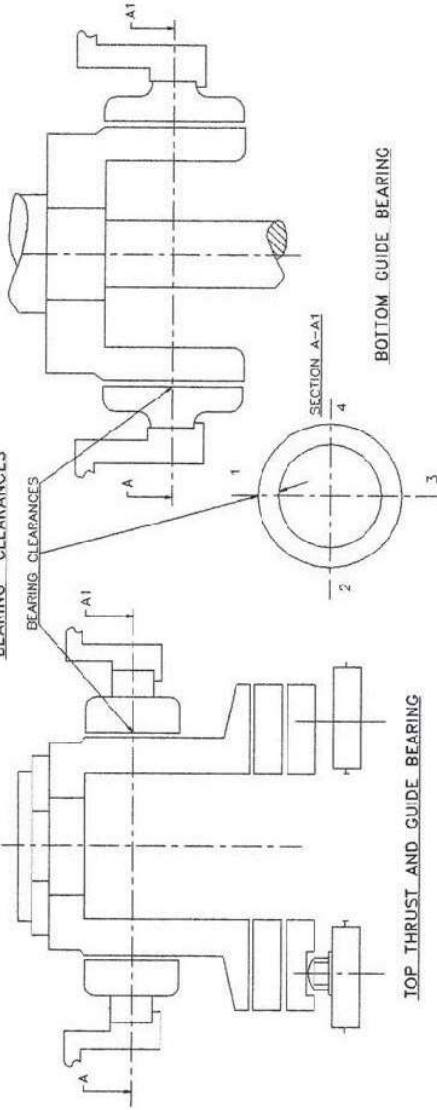


D.E. _____ N.D.E. _____ THIS IS FOR MOTORS WITH JOURNAL BEARINGS ONLY.

			NAME	SIGNATURE / DATE	FQP NO.: QPE:RKL:250:EL:60
PROJECT		INSPECTED BY			REV. NO.: R00
UNIT NO.		CLEARED BY			LOG SHEET NO. L-01
RATING		CUSTOMER			SHEET 1 / 2 SHEETS

	INSTRUMENT REG. NO./TAG NO.									
	DATE OF INSPECTION									
	DRAWING / DOCUMENT REF.									
PSER										

BEARING CLEARANCES




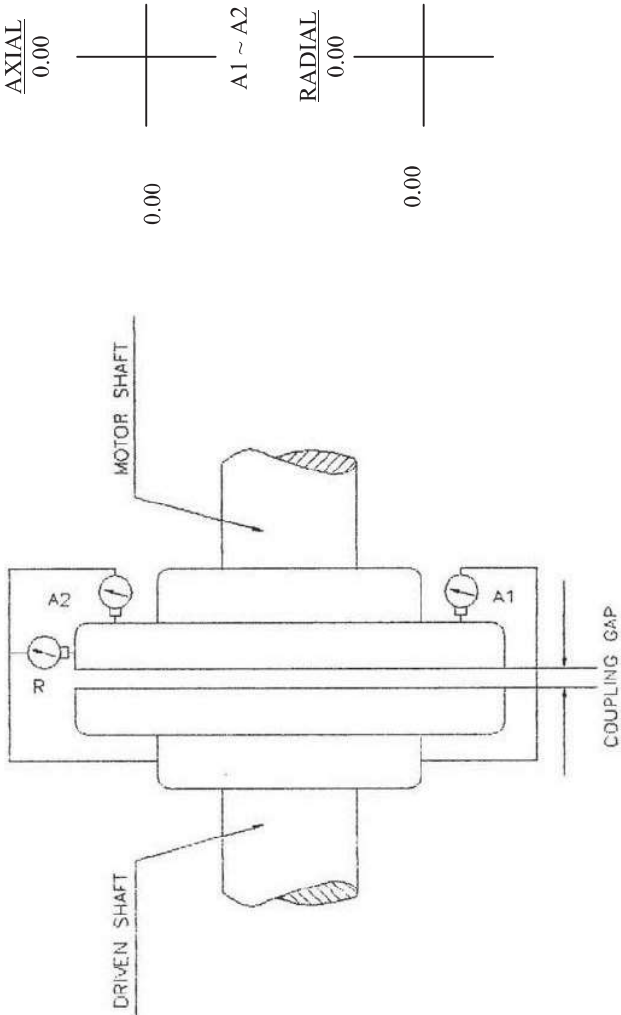
The drawing illustrates the bearing clearances for a mechanical assembly. It includes a side view of the 'TOP THRUST AND GUIDE BEARING' and 'BOTTOM GUIDE BEARING' with dimensions A, A1, and A2. A cross-section 'SECTION A-A1' shows the internal components and their relative positions. The text 'BEARING CLEARANCES' is repeated above the main assembly view.

BEARING	1	2	3	4
TOP GUIDE BEARING				
BOTTOM GUIDE BEARING				

				SIGNATURE / DATE	FQP NO.:QPE:RKL:250:EL:60
PROJECT		INSPECTED BY			REV. NO.: R00
UNIT NO.		CLEARED BY			LOG SHEET NO. L-01
RATING		CUSTOMER			SHEET 2 / 2 SHEETS


WI:QLY:03-F11/R0

	INSTRUMENT REG. NO./TAG NO.								
	DATE OF INSPECTION								
	DRAWING / DOCUMENT REF.								
PSER									

<u>COUPLING DETAILS</u> TYPE _____ DIA _____ <u>DETAILS OF DRIVEN MACHINE</u> M/C _____ MAKE _____ TYPE _____ SL. NO. _____ AS PER DRAWING: COUPLING GAP _____ ACTUAL COUPLING GAP _____		<u>COUPLING ALIGNMENT</u> 	
TYPE OF COUPLING	MAXIMUM MISALIGNMENT RADIAL & AXIAL		
RIGID	±0.03 mm		
FLEXIBLE	±0.05 mm		

PROJECT			NAME		SIGNATURE / DATE		FQP NO. : QPE:RKL:250:EL:60		
UNIT NO.		INSPECTED BY				REV. NO. : R00			
RATING		CLEARED BY				LOG SHEET NO. L-02			
			CUSTOMER			SHEET 1 / 1	SHEETS		

WI:QLY:03-F11/R0


PSER		INSTRUMENT REG. NO./TAG NO.				
		DATE OF INSPECTION				
		DRAWING / DOCUMENT REF.				

IR VALUES

Sl. No.	Description	IR Values			K Factor	PI value
		15 Sec	1 min	10 min		
1.	STATOR WINDING					
	a) Phase to Phase					
	R - Y			xx		xx
	Y - B			xx		xx
	B - R			xx		xx
	b) Phase to Earth					
	R - Earth					
	Y - Earth					
	B - Earth					
	2.	H.T. POWER CABLE			IR Values for 1 min.	
a) Core to core						
Core 1 - 2						
Core 2 - 3						
Core 3 - 1						
b) Core to earth						
Core 1 to Earth						
Core 2 to Earth						
Core 3 to Earth						

			NAME	SIG./DATE	FQP NO. :QPX-STD-500-EL -60
PROJECT		INSPECTED BY			REV. NO.: R00
UNIT NO.		CLEARED BY			LOG SHEET NO. L-03
RATING		CUSTOMER			SHEET 1 / 2 SHEETS

WI:QLY:03-F11/R0

 PSER	INSTRUMENT REG. NO./TAG NO.				
	DATE OF INSPECTION				
	DRAWING / DOCUMENT REF.				

IR VALUES

3. IR VALUES AT 1 MINUTE (R₆₀)

Sl.No.	POSITION	SPACE HEATER CABLE	CONTROL CABLE	RTD CABLE
1.	Core to core			
2.	Core to earth			

4. WINDING RESISTANCES

PHASE	RESISTANCE (in milliOhms)	Ambient temp/RTD temp (° C)
R		
Y		
B		


5. PEDESTAL INSULATION _____ MOhms

NOTES :

- a) Absorption factor = $\frac{\text{IR Value after 1 Minute}}{\text{IR Value after 15 seconds}}$
 (K)
 This value should not be less than 1.25
- b) P.I. Value = $\frac{\text{IR Value after 10 Minutes}}{\text{IR Value after 1 Minute}}$
 This value should not be less than 2
 Note: PI value need not be measured with rated voltage 3.3KV & below.

			NAME	SIG./DATE	FQP NO. :QPE:RKL:250:EL:60
PROJECT		INSPECTED BY			REV. NO.: R00
UNIT NO.		CLEARED BY			LOG SHEET NO. L-03
RATING		CUSTOMER			SHEET 2 / 2 SHEETS

WI:QLY:03-F11/R0

	INSTRUMENT REG. NO./TAG NO.																
	DATE OF INSPECTION																
	DRAWING / DOCUMENT REF.																
PSER																	
<u>MOTOR DRY-OUT</u>																	
Sl. No.	Date	Time (hrs)	Voltage (Volts)	Current (Amps)	RTDs readings (°C)						IR Value with all phases combined (M ohms)			Remarks			
											30 sec	1 min	K factor				
NOTE : 1. Steady state temperature of winding with micalastic insulation to be limited to 60°C maximum in not less than 4 hours. 2. Winding current should be restricted to 50% of rated current																	
PROJECT																	FQP NO. : QPE:RKL:250:EL:60
UNIT NO.																	REV. NO.: R00
RATING																	LOG SHEET NO. L-04
																	SHEET 1 / 1 SHEETS

WI:QLY:03-F11/R0