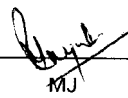
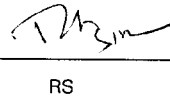
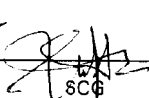
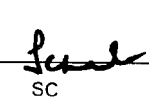


एच वी स्विचबोर्डों के लिये निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR HV SWITCHBOARDS

3	21.11.2013	Revised and Reissued				
2	15.07.2011	Revised and Reissued	GS	SA	AKC	DM
1	28.09.2007	Revised and Reissued	AKG	PPM	MVKK	VC
0	30.04.2002	Issued for implementation	RG	AKC	AK	GRR
Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
						Approved by

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Abbreviations:

AS	:	Alloy Steel	MPT/MT	:	Magnetic Particle Testing
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres	MRT	:	Mechanical Run Test
BIS	:	Bureau of Indian Standard	MTC	:	Material Test Certificate
CCE or CCOE	:	Chief Controller of Explosives	MOC	:	Material of Construction
CEIL	:	Certification Engineers International Limited	NPSH	:	Net Positive Suction Head
CIMFR	:	Central Institute of Mining & Fuel Research	NDT	:	Non Destructive Testing
CE	:	Carbon Equivalent	NEMA	:	National Electrical Manufacturers Association
DFT	:	Dry Film Thickness	PO	:	Purchase Order
DT	:	Destructive Testing	PESO	:	Petroleum Explosive Safety Organization
DPT	:	Dye Penetrate Testing	PQR	:	Procedure Qualification Record
ERTL	:	Electronics Regional Test Laboratory	PR	:	Purchase Requisition
FCRI	:	Fluid Control Research Institute	PMI	:	Positive Material Identification
FM	:	Factory Mutual	PVC	:	Poly Vinyl Chloride
FLP	:	Flame Proof	QC	:	Quality Control
HT	:	Heat Treatment	RT	:	Radiography Testing
HIC	:	Hydrogen Induced Cracking	TC	:	Test Certificate
ITP	:	Inspection and Test Plan	TPI or TPIA	:	Third Party Inspection Agency
IP	:	Ingress Protection	UT	:	Ultrasonic Testing
IC	:	Inspection Certification	UL	:	Under writer Laboratories
IGC	:	Inter Granular Corrosion	VDR	:	Vendor Data Requirement
IEC	:	International Electro technical Commission	WPS	:	Welding Procedure Specification
JEC	:	Japanese Electro technical Committee	WPQ	:	Welders Performance Qualification
LPT	:	Liquid Penetrate Testing	XLPE	:	Cross Linked Poly Ethylene

Inspection Standards Committee

Convenor : Mr. S.C. Gupta

Members:

Mr. R.K. Singh	Mr. Rajeev Kumar	Mr. Himangshu Pal
Mr. Neeraj Mathur	Mr. T Kamalakannan	Mr. Deepak Gupta (Project)
Mr. Mayank Jain		

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1.0 SCOPE:

This Inspection and Test Plan covers the minimum testing requirements of indoor, draw out type High Voltage Switchboards up to and including 33 KV.

2.0 REFERENCE DOCUMENTS:

PO/PR/ Standards referred there in/Job specifications/Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS:

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	Procedures	--	--	--	--	--	--
2.0	Material Inspection						
2.1	Incoming Material like Insulators, Bus Bars, Fabricated items, Bus Bar sleeves , Cable wire(FR), instrument transformers , Relays, Indicating Instruments, Switches, Breakers, Vacuum Bottles etc	Visual, Dimensional, Operational checks, Review of Manufacturer's Certificates etc. as applicable	100%	TC's/ Inspection & Test records / Lab Test Records	H	H	R
3.0	In process Inspection						

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.1	Breaker Truck Assembly	Mechanical Operation including spring charging mechanism, Breaker opening / closing at normal and worst voltage conditions, Opening / closing time and simultaneous closing of all poles, Contact resistance measurement, Gas leakage check (for SF6 breakers), Power Frequency Test.	100% by Supplier and random by EIL/TPIA	Test Records / Inspection Witness Record	-	H	W
3.2	Wiring checks	Size, termination, ferruling, continuity	100%	Suppliers Test Records	--	H	R
4.0	Final Inspection						
4.1	Switchgear Assembly	ACCEPTANCE TESTS: - Visual check including layout, Tag plates, Paint shade, Bus marking and sleeving, Joint shrouding, Identification and location of components etc - Dimension check including operational height, Bus bar size, Clearances, Creepage distances, Compartmentalization, cable gland size, Paint thickness etc. - Verification of Bus bar support arrangement with respect to type tested panel drawings and provision for external cable termination. - Bill of material check.	100%	Test Records / Inspection Witness Record	-	H	H

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
	Switchgear Assembly (Contd.)	- Rack-in and Rack-out of breakers. - Interchangeability of Truck assembly in identical feeders.* - Pressure switches operation for SF6 breaker. - Operation check for auxiliary equipment circuits and auxiliary contacts - Operation checks for all control functions and interlocks as per schematic diagrams in Test and Service position including mechanical interlock check. - Relay operation check through primary / secondary injection.* - Measurement of resistance of main circuit. - Communication check between relays and Data concentrator / HMI (if applicable)* - HMI operation and functional checks as per separate agreed ITP/FAT(if applicable) - Insulation resistance of main, auxiliary and control circuits before and after High Voltage Test. - Power Frequency voltage withstand test on main, auxiliary and control circuits.	100%	Test Records / Inspection Witness Record	-	H	H
4.2	Switchgear Assembly	TYPE TESTS: - Short time current withstand test - Temperature Rise test.	Sample Basis	Test Agency Reports	-	R/W**	R/W**

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		- Internal Arc test. - Impulse and Power Frequency withstand test - Short circuit test duties. - Degree of protection for panels.					
5.0	Painting						
5.1	Painting and Packing	- Visual - Suitable protection to prevent entry of foreign material. - Proper packing to prevent any damage during transportation and storage.	100%	Packing list / Supplier's Records	-	H	-
6.0	Documentation and IC						
6.1	Documentation and IC	- Review of Internal Test Reports - Certification from supplier for complete relay parameterization of numerical relays at works - IC issuance.	100%	Supplier's Test Records / Inspection Certificate	-	-	H
6.2	Final Document submission	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

* Quantum of check is 100% by Supplier & random basis by EIL/TPIA

** Witness if called for in job specifications. In such cases specified Type test will be considered as part of Acceptance Test.

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Legends: H- Hold (Do not proceed without approval, R-Review, RW-Random witness (As specified or 10 % - Samples must include min 1 No of each type), W- Witness (Give due notice, work may proceed after scheduled date).

NOTES :-

1. This document describes the generic test requirements. Any additional test or inspection scope if specified in contract documents shall also be applicable. (Unless otherwise agreed upon).
2. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents