औद्योगिक नियंत्रण स्टेशनो के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR INDUSTRIAL TYPE CONTROL STATIONS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	18.05.2020	Revised and Re-issued	NP	RS	RKS	SKS
3	30.01.2014	Revised and Re-issued	MJ	RS	SCG	SC
2	03.10.2012	Revised and Re-issued	RKP	HVJ	AKC	DM
1	28.09.2007	Revised and Re-issued	AKG	PPM	MVKK	VC
0	30.04.2002	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

BIS	:	Bureau of Indian Standards	MTC	:	Material Test Certificates
BOM	:	Bill of Material	MFR	:	Manufacturer
CEIL	:	Certification Engineers International Limited	NO.	:	Number
CT	:	Current Transformer	NEMA	:	National Electrical Manufacturers Association
EPC	:	Engineering Procurement Construction	PO	:	Purchase Order
HV	:	High Voltage	PR	:	Purchase Requisition
IC	:	Inspection Certification	PT	:	Potential Transformer/Voltage Transformer
IEC	:	International Electro technical Commission	PVC	:	Poly Vinyl Chloride
IP	:	Ingress Protection	QC	:	Quality Control
IRN	:	Inspection Release Note	TC	:	Test Certificate
ITP	:	Inspection and Test Plan	TPI or TPIA	:	Third Party Inspection Agency
Lab.	:	Third Party Laboratory	UL	:	Under writer Laboratories
MOC	:	Material of Construction	VDR	:	Vendor Data Requirement

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Ms. Arvind NP Singh (Engg.)		

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1.0 SCOPE:

This Inspection and Test Plan covers the minimum testing requirements of Industrial type control stations.

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	**Procedure**	-	-	-	-	-	-
2.0	**Material Inspection**						
2.1	Incoming material : Sheet steel, Circuit Breaker, CT/PT, Ammeter, Voltmeter as applicable	Physical & Chemical Properties for Sheet Steel. Make, Model, Rating, Serial, Accuracy etc. as applicable	100%/	MTC / Mfr's TC / Lab. TC	H	H	R
3.0	**Inprocess Inspection**						
3.1	Fabrication of Enclosure and painting /Powder Coating (as applicable)	Visual, Dimension and Routine tests	100%	Supplier's Test Records	H	H	-
3.2	Assembly/Wiring work	Wiring Check & Routine electrical Tests	100%	Supplier's Test Records	H	H	-

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SL. NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.0	**Final Inspection**						
4.1	Acceptance Tests	• Visual Check • BOM Verification. • Dimensional Verification. • Electrical Check/Test : a. Wire Continuity, b. Functional Check of Components and Control Schemes, c. HV Test d. IR Test (before & after HV) • Paint Thickness & Paint Shade	100%	Inspection witness Test Records	-	H	RW
4.2	Submission of Certificates	• Certificate of testing agency for suitability of degree of protection (as specified)	Samples / Prototype	Type Test Certificates	-	H	R
5.0	**Painting and Packing**						
5.1	Painting and Packing	• Visual • Suitable protection to prevent entry of foreign material. • Proper packing to prevent any damage during transportation.	100%	Test records	-	H	-

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SL. NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Report • Issuance of IC/IRN	100%	Supplier's Test Records / IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval,R-Review, RW-Random witness (As specified or 10 %-Samples must include minimum 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
3. For EPC Jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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INSPECTION AND TEST PLAN FOR FLAMEPROOF PLUGS, SOCKETS AND HAND LAMPS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convener	Standards Bureau Chairman
					Approved by	
3	22.05.2020	Revised and reissued	NP	RS	RKS	SKS
2	21.11.2013	Revised and reissued	MJ	RS	SCG	SC
1	29.06.2012	Revised and reissued	AB	HVJ	AKC	DM
0	01.12.2008	Issued for implementation	RB	SKD	SKP	VC

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Abbreviations

ATEX	:	Atmosphère Explosibles	IS	:	India Standard
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres	IRN	:	Inspection Release Note
			MTC	:	Material Test Certificates
BIS	:	Bureau of Indian Standards	ITP	:	Inspection and Test Plan
BOM	:	Bill of Material	Lab.	:	Third Party Laboratory
CEIL	:	Certification Engineers International Limited	Mfr	:	Manufacturer
CT	:	Current Transformers	MOC	:	Material of Construction
CIMFR	:	Central Institute of Mining & Fuel Research	No.	:	Number
DFT	:	Dry Film Thickness	NEMA	:	National Electrical Manufacturers Association
DGMS	:	Directorate General of Mines Safety	PESO	:	Petroleum Explosive Safety Organization
DT	:	Destructive Testing	PO	:	Purchase Order
EPC	:	Engineering Procurement Construction	PR	:	Purchase Requisition
ERTL	:	Electronics Regional Test Laboratory	PT	:	Voltage Transformers
FM	:	Factory Mutual	PVC	:	Poly Vinyl Chloride
HV	:	High Voltage	QC	:	Quality Control
IC	:	Inspection Certification	TC	:	Test Certificate
IEC	:	International Electrotechnical Commission	TPI or TPIA	:	Third Party Inspection Agency
IECEx	:	International Electrotechnical Commission Explosive	UL	:	Under writer Laboratories
IP	:	Ingress Protection	VDR	:	Vendor Data Requirement

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Ms. Arvind NP Singh(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Flameproof Plugs, Sockets and Hand Lamps .

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	QUANTU M OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	**Procedures**	---	---	---	---	---	---
2.0	**Material Inspection**						
2.1	Incoming Material like casting, etc	Physical, chemical & electrical properties as applicable	100%	MTC / Lab. TC	H	H	R
3.0	**In process Inspection**						
3.1	Flameproof plugs Sockets and Hand Lamps assembly	• Visual Check • Dimensional Check • Bill of Material Verification • Routine Press Test on Castings as per latest IS/IEC	100%	Test Records	-	H	R
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual Check • Dimensional (flame path/gap/clearances etc.) • Bill of Material checks. • Compatibility of cable glands with cable sizes/cable entry . • Verification of mechanical and electrical operation.	100%	Test Records	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTU M OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• HV test /Insulation Resistance test before and after HV Test • Colour of metal enclosures.					
4.2	Submission of Certificates & Documents	• Type tests (if specified) • For Electrically Hazardous Area Item: a. Indigenous : Certificates from CIMFR / ERTL / Karandikar Lab, Valid PESO and BIS License for the corresponding Gas Group and Type of Protection as specified. b. Imported: ATEX/ IECex Certification from recognized test authorities and valid PESO approval for the specified gas group and type of protection . c. For use in Projects related to Mines, DGMS approval is required. • Degree of protection certificate (IP) for Instruments housing.	Proto-type from each Model	Certificates from test agencies / Statutory Bodies	-	H	R
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	-

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTU M OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports • Issuance of IC/IRN	100%	Supplier Test Records / IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports , Drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

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
3. For EPC Jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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उच्च वोल्टेज इंडक्शन मोटरों के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR HIGH VOLTAGE INDUCTION MOTORS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
5	06.07.20	Revised and Re-issued	MM	RS	RKS	SKS
4	20.01.20	Revised and Re-issued	MM	RS	RKS	RKT
3	30.01.14	Revised and Re-issued	MJ	RS	SCG	SC
2	29.06.12	Revised and Re-issued	RKP	RJD	AKC	DM
1	24.12.07	Revised and Re-issued	SA	CRM	MVKK	VC

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Abbreviations

BIS	:	Bureau of Indian Standards
BTD	:	Bearing Temperature Detector
CIMFR	:	Central Institute of Mining & Fuel Research
CT	:	Current Transformer
EPC	:	Engineering Procurement Construction
ERTL	:	Electronics Regional Test Laboratory
FM	:	Factory Mutual
FLP	:	Flame Proof
HV	:	High Voltage
IC	:	Inspection Certification
IP	:	Ingress Protection
IS	:	Indian Standard
ITP	:	Inspection and Test Plan
IEC	:	International Electro Technical Commission
JEC	:	Japanese Electro technical Committee
MCP	:	Magnetic Centre point
Min	:	Minimum
MOC	:	Material of Construction
MTC	:	Material Test Certificate
NDT	:	Non Destructive Testing
NEMA	:	National Electrical Manufacturers Association
No	:	Number
PO	:	Purchase Order
PESO	:	Petroleum Explosive Safety Organization
PQR	:	Procedure Qualification Record
PR	:	Purchase Requisition
PMI	:	Positive Material Identification
QC	:	Quality Control
RTD	:	Resistance Temperature Detector
TC	:	Test Certificate
TPI or TPIA	:	Third Party Inspection Agency
UT	:	Ultrasonic Testing
VDR	:	Vendor Data Requirement

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members: Mr. Rajesh Sinha, Mr. Himangshu Pal, Mr. Chandrasekhar, Mrs. Arvind NP Singh (Electrical), Mr. R Muthuramalingam, Mr Avdhesh Agrawal, Mr. Mahendra Mittal

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1.0 SCOPE

This Inspection and Test Plan covers the minimum testing & inspection requirements of High Voltage Squirrel Cage Induction Motors..

2.0 REFERENCE DOCUMENTS

PO/PR & Standards referred there in /Job specifications / Approved documents/BIS/IEC

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	Raw Material - Copper, Frame castings/Fabricated, Core laminations, Insulation material, Shaft	Chemical, Physical properties , finish as per relevant standard Shaft – NDT(Ultrasonic)	100%	Material Test Certificates / Test records / NDT reports	H	H	R
2.2	Bought out items- Cooling fans, Cage covers, Heat Exchanger, Lubrication system, Bearings, CT, RTD, BTD and Terminal box, Cable glands, etc	Functional check	100%	Material Test Certificates / Test records	H	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.0	**In process Inspection**						
3.1	Motor Assembly	Vacuum impregnation and bracing of winding, core assembly, Rotor bars and end rings assembly, Rotor balancing, Tan Delta on stator winding Capsule. Terminal box mounting and clearances in between, Bearing setting, Heat Exchanger type, Lubrication system type etc as per Supplier's internal standards, Gap Between stator & rotor	100%	Test Records	-	H	R
4.0	**Final Inspection**						
4.1	Motor (Routine Tests)	• Visual check (Terminals type, direction of rotation, etc.) • Dimensional check (Including shaft centre height , foundation hole dia and distance, Shaft Dia., distance from shaft end to first foundation hole etc.) • Phase sequence. • Winding resistance • Reduced voltage starting • No load test and measurement of Voltage, Speed, Current, Wattage and no load bearing run • Locked Rotor test at reduced voltage and measurement of Voltage, Current and Wattage. • Insulation resistance before and after High voltage (per Phase) • Polarization Index (per phase) • High Voltage(Per phase)	100%	Inspection test records	-	H	H

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Vibration Measurement (under no-load) • Noise Level (under no-load) • Measurement of Shaft Vibrations in case of sleeve bearing motors (By Vibration probes) • Float measurement and MCP pointer marking verification (in sleeve bearing motors) • Shaft voltage • Shaft Run out • Resistance measurement of Space heaters, RTD's and BTD's. • High voltage and IR measurement of Space heaters, RTD's and BTD's. • Operation of control panel (in case of Ex-p motors)					
4.2	Motor (Type Tests) $	• Full load test and measurement of Voltage, Current, Power, Slip, Efficiency and Power factor at 100%, 75% and 50% load • Temp Rise test (at rated Power) • Momentary overload test • Over speed followed by Vibration measurement • Measurement of Starting Torque, Starting Current, full Load Torque, Pull out torque by JEC/IEC (Logarithmic proportion Current method II). • Tan delta test	One no from each type/rating	Inspection test records	-	H	H
4.3	Submission of Certificates/ Documents	• Test certificate from recognized testing laboratory for area classification. • BIS certificate for FLP motors and accessories as applicable.	1 Machine/ Type/Rating	Statutory Body Test Certificates, Supplier Test Certificates,	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• PESO approved certificates for motors and accessories as applicable. • Fault level of Terminal Box • Degree of protection of enclosure as per latest IS/IEC Standards. • Impulse test certificate for coils • Hydraulic test certificate for coolers		Inspection Test Records			
5.0	**Painting**						
5.1	Painting of Motor Frames	• Visual. • Suitable protection to prevent entry of foreign material. • Proper packing with suitable plugs to prevent Ingress of moisture and any damage during transportation and storage.	100%	Test records	-	H	--
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Review of Internal Test Certificates • IC issuance	100%	Supplier Test Certificates/ Inspection Certificate (IC)	-	H	H
6.2	Final Document submission	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

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).

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NOTES :-

1. **$:-** As a minimum, it is mandatory to carry out Temp rise test and Load test (at various load) by direct loading method for following rating :-
   - Up to 1000 KW for 2 pole and 4 pole motors
   - Up to 900 KW for 6 pole motors
   - Up to 750 KW for 8 pole motors
   - Up to 600 KW for 10 pole motors
2. For VFD application motors, separate FAT procedure to be submitted for EIL /TPIA approval for combined testing(if applicable)
3. This document describes the generic test requirements. Any additional test or inspection scope if specified in contract documents shall also be applicable
4. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents.
5. For EPC jobs, all inspection shall be carried out by TPIA, unless notified otherwise.
6. Supplier to furnish internal test report before scheduled inspection date.

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मध्यम एवं उच्च वोल्टेज केबल तथा सहायक सामग्री के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR MEDIUM AND HIGH VOLTAGE CABLES & ACCESSORIES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	26.05.2020	Revised and Reissued	MM	RS	RKS	SKS
3	30.01.2014	Revised and Reissued	MJ	RS	SCG	SC
2	15.07.2011	Revised and Re-issued	AB	RJD	AKC	DM
1	28.09.07	Revised and Re-issued	AKG	PPM	MVKK	VC
0	30.04.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations:

BIS	:	Bureau of Indian Standard
CEIL	:	Certification Engineers International Limited
Cu	:	Copper
EPC	:	Engineering Procurement & Construction
ERTL	:	Electronics Regional Test Laboratory
FM	:	Factory Mutual
FRLS	:	Flame Retardant Low Smoke
HT	:	High Tension
ITP	:	Inspection and Test Plan
IP	:	Ingress Protection
IC	:	Inspection Certification
IS	:	Indian Standard
IEC	:	International Electro technical Commission
JEC	:	Japanese Electro technical Committee
Min	:	Minimum
MTC	:	Material Test Certificate
NEMA	:	National Electrical Manufacturers Association
No	:	Number
PD	:	Partial Discharge
PO	:	Purchase Order
PR	:	Purchase Requisition
PVC	:	Poly Vinyl Chloride
QC	:	Quality Control
TC	:	Test Certificate
TPI or TPIA	:	Third Party Inspection Agency
VDR	:	Vendor Data Requirement
XLPE	:	Cross Linked Poly Ethylene

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members: Mr. Rajesh Sinha, Mr. Himangshu Pal, Mr. Chandrasekhar, Mrs. Arvind NP Singh (Electrical)

Mr. R Muthuramalingam, Mr Avdhesh Agrawal, Mr. Mahendra Mittal

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1.0 SCOPE

This Inspection and Test Plan covers the minimum testing requirements of PVC/XLPE insulated cables and cable jointing/terminating accessories for high and medium voltage systems.

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 raw material like Copper, Aluminum, Semi conducting compound PVC, XLPE, Galvanized Armour, Cu tape, as applicable	Purity, Dimensions, Physical and Chemical Properties, as applicable	100%	Material Test Certificates/ Test Records/ Third Party Lab certificates	H	H	R
3.0	**In process Inspection**						
3.1	Inspection during insulation, sheathing	Spark test, thickness of insulation, Conductor Resistance	100%	Test Records	--	H	R
4.0	**Final Inspection**						

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.1	Finished Cable	Visual, Drum details, Size, Ends Capping, Marking on outer sheath (such as Incremental Length, Voltage grade, manufacturer's name), Colour coding, etc.	100% for Drum details and Sample drums for balance details	Test Records	-	H	RW/R**
4.2	Finished Cable (Routine Tests)	• Conductor Resistance. • High Voltage • Partial Discharge (for HT cable only)	100%	Supplier's Test Records	-	H	R
4.3	Finished Cable (Acceptance tests)	• Check calibration status of all testing equipment. • Dimension checks – overall dia, over/under armour, thickness of insulation, sheath and semi conducting screen, copper screen, dimension, etc as applicable • Conductor Resistance • Volume resistivity at room temperature and elevated temperature as per IS • Thermal stability test for Insulation (for PVC only) and sheath. • High Voltage tests • Partial Discharge(for HT Cable) • Hot Set (for XLPE insulation) • Tests on Conductor as applicable • Tests on PVC/XLPE Insulation & Sheath * • Armour Galvanization - dip test & coverage • Tensile and elongation (without ageing) • Silicon oil and wafer boil test for insulation and screen (for HT cable).	As per IS sampling plan	Inspection Test Records	-	H	H/R**

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.4	Finished Cable (Special tests)	• Flammability test as per IS 10810 part 61 & part 62 / IEC 60332 Part 1 & part 3 • Smoke density test (for FRLS outer sheet) • Acid Gas generation (for FRLS outer sheet) • Accelerated water absorption test as per NEMA(Electrical method) as applicable # • Test for resistance to Ultra Violet Radiation # • Oxygen Index and temperature index test as per ASTM D2863 • Rodent & Termite repulsion check • Test for circuit integrity for fire survival cables as per IEC • Drum length /surface finish/color/marking check by re-winding (1 or 2 drums)	For ladder test (1 sample/order) 1 Sample/Lot	Inspection test records		H	H/R**
4.5.	Finished Cable (Type tests **)	• Dielectric Retention. • Type tests on PVC insulation and Sheath High Voltage test (Water Immersion) for HT cable • Dielectric power factor tests as function of voltage, temperature. (HT cables) • Heating cycle test (HT Cables) • Impulse withstand test (HT Cables) • Short circuit test on conductor and screen (HT Cable)	On Similar type cable	Test Records		H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.6	Cable accessories	• Visual • Dimensions • Type tests** as per IS/IEC	Sample	Test Records		H	R
5.0	**Painting**	--	--	--	--	--	--
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Review of Routine, Acceptance, Type test reports. • IC issuance	100%	Supplier TC & IC	-	-	H
6.2	Final Document submission	Compilation of Inspection reports, drawings, etc. as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

\# In case TC (not older than one year) from independent test lab is available & type of compound used is same then the same may be accepted.

* Hot deformation, Heat shock and Shrinkage tests on insulation & sheath (One sample/Lot- provided sheath material is from same compound/batch) shall be witnessed by EIL/TPIA, all other tests as per IS/IEC shall be carried out by supplier and test reports shall be reviewed by EIL/TPIA.

** EIL witness for HT cables and EIL surveillance checks on MV Power cable.

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.
3. For EPC jobs, all inspection shall be carried out by TPIA, unless notified otherwise.

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संचार और अग्नि चेतावनी केबल के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR COMMUNICATION AND FIRE ALARM CABLES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	26.05.2020	Revised and Reissued	MM	RS	RKS	SKS
3	30.01.2014	Revised and Reissued	MJ	RS	RKS	SC
2	29.06.2012	Revised and Reissued	RKP	RJD	AKC	SC
1	28.09.2007	Revised and Re-issued	AKG	PPM	MVKK	VC
0	30.04.2002	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations:

BIS	:	Bureau of Indian Standard	MTC	:	Material Test Certificate
DOT	:	Department of Telecommunication	NEMA	:	National Electrical Manufacturers Association
EPC	:	Engineering Procurement & Construction	No	:	Number
ERTL	:	Electronics Regional Test Laboratory	PD	:	Partial Discharge
FM	:	Factory Mutual	PE	:	Polyethylene
ITP	:	Inspection and Test Plan	PO	:	Purchase Order
IP	:	Ingress Protection	PR	:	Purchase Requisition
IC	:	Inspection Certification	PVC	:	Poly Vinyl Chloride
IGC	:	Inter Granular Corrosion	QC	:	Quality Control
IEC	:	International Electro technical Commission	TC	:	Test Certificate
IS	:	Indian Standard	TPI or TPIA	:	Third Party Inspection Agency
JEC	:	Japanese Electro technical Committee	VDR	:	Vendor Data Requirement
Min	:	Minimum	XLPE	:	Cross Linked Poly Ethylene

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members: Mr. Rajesh Sinha, Mr. Himangshu Pal, Mr. Chandrasekhar, Mrs. Arvind NP Singh (Electrical)

Mr. R Muthuramalingam, Mr Avdhesh Agrawal, Mr. Mahendra Mittal

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1.0 SCOPE

This Inspection and Test Plan covers the minimum testing requirements of flame retardant type PVC sheathed cables for use in Plant communication, Fire Alarm systems and Jelly filled telecommunication cables.

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 raw material like Copper ,Aluminum, PVC, PE, XLPE , Jelly Compound, Armour material, etc. (as applicable)	Dimensional, Purity, Physical, Chemical Properties, Tests on jelly compound as per DOT spec.	Sample	Sub supplier TC/Supplier's Test Records/ Third party Lab	H	H	**R**
3.0	**In process Inspection**						
3.1	Manufacturing Stage	Dimensions at various stages, Spark test, Stage Inspection, pursulphate test for conductor.	100%	Supplier's Test Records	-	H	**R**
4.0	**Final Inspection**						

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.1	Final Inspection on completed cable	Visual, Drum details, Size, Ends Capping, Drums Condition, Marking on outer sheath (such as incremental length, voltage grade, manufacturer's name and for jelly filled cables marking as per DOT spec), Color coding/Identification of cores, conductor resistance ,high voltage etc.	100%	Inspection Witness Record	-	H	RW
4.2	Final Inspection on completed Cable(Jelly Filled Cables) Acceptance Test	• Dimension checks. • Test for insulation and sheath. • Continuity of conductors, absence of crossed pairs and absence of contact with poly-al tape • Continuity in poly-al tape and overlap • Color coding • Conductor Resistance, Resistance Unbalance in pair. • Mutual capacitance (pair/average), Capacitance Unbalance (pair to ground and pair to pair) • Cross talk • Attenuation • Drip test • Dielectric Strength/High Voltage test • Insulation Resistance/ Volume resistivity • Conductor Annealing	As per IS sampling plan	Inspection Witness Record	-	H	RW

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Armour Galvanization • Armour coverage • Availability of rip cord • Overall finish and Drum length by re-winding (1 or 2 drum per lot) • Oxygen and temperature index test (1 sample/lot) • Water Penetration test (2 sample per lot) • Cable bend test (1 sample per lot)					
4.3	Final Inspection on completed Cable(Jelly Filled Cables) Type Tests	• Type tests on insulated conductors, compatibility of Insulation and filling compound as per DOT spec. • Type tests on Composite sheath and Jacket as per DOT spec	On Sample	Supplier's Test Records	-	H	R
4.4	Final Inspection on completed Cable(Non Jelly Filled Cables) Acceptance Test	• Dimension checks • Continuity of conductors • Color code • Overlap in poly-al tape and drain wire resistance (if shielding specified) • Conductor Resistance. • Drain wire resistance • Mutual capacitance (pair/average), Capacitance Unbalance (pair to ground and	As per IS sampling plan	Inspection Witness Record	-	H	RW

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		pair to pair) for communication cables • Dielectric Strength/ High Voltage test • Insulation Resistance • Tensile and Elongation (without ageing) • Conductor Annealing • Armour Galvanization & coverage • Availability of rip cord • Tests on Insulation and sheath as per IS/IEC *					
4.5	Final Inspection on completed Cable(Non Jelly Filled Cables) Special Test	• Oxygen & temperature Index Test • Flammability test as per applicable specification (IS 10810 Part 61 & Part 62, Cat AF) • Smoke density test • Acid gas generation test • Test for Rodent & termite repulsion • Surface finish and drum length check by wiring(Rewinding 1 or 2 drum) • Test for circuit integrity for fire survival cables as per IEC (as applicable	1 Sample/Lot For ladder test (1 sample/order)	Inspection Witness Record	-	H	RW
4.6	Final Inspection on completed Cable (Non Jelly Filled Cables) Type Tests	• Type test on conductor as per spec • Type tests on insulation and Sheath as per spec • Test certificate for circuit integrity as per IEC 60331-21(for fire survival cable)	On Sample	Supplier's Test Records	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
5.0	**Painting**						
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Review of Internal Test Reports and MTCs. • IC issuance	-	Supplier's Test Records / Inspection Certificate (IC)	-	H	H
6.2	Final Document submission	Compilation of Inspection reports, drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

* Thermal Stability, Hot deformation, Heat shock and Shrinkage tests on insulation and sheath shall be witnessed by EIL (One Sample/Lot), all other tests as per IS-5831 shall be carried out by supplier and test reports shall be reviewed by EIL.

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
2. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents.
3. For EPC jobs, all inspection shall be carried out by TPIA, unless notified otherwise.

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संकटमय क्षेत्रों के लिए लाईटिंग फिक्सचरों एवं जंक्शन बक्सों के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR HAZARDOUS AREA LIGHTING FIXTURES AND JUNCTION BOXES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4.	20.05.2020	Revised and Reissued	JA	RS	RKS	SKS
3.	21.11.2013	Revised and Reissued	MJ	RS	SCG	SC
2	29.06.2012	Revised and Reissued	AB	HVJ	AKC	DM
1	28.09.2007	Revised and Re-issued	AKG	PPM	MVKK	VC
0	12.08.2002	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

BIS	:	Bureau of Indian Standard	MTC	:	Material Test Certificate
BOM	:	Bill Of Materials	IR	:	Insulation Resistance
CIMFR	:	Central Institute of Mining & Fuel Research	No.	:	Number.
CE	:	Carbon Equivalent	NEMA	:	National Electrical Manufacturers Association
DFT	:	Dry Film Thickness	PD	:	Partial Discharge
DIV	:	Division	PO	:	Purchase Order
DPT	:	Dye Penetrate Testing	PESO	:	Petroleum Explosive Safety Organization
ERTL	:	Electronics Regional Test Laboratory	EPC	:	Engineering Procurement Construction
FCRI	:	Fluid Control Research Institute	PR	:	Purchase Requisition
FLP	:	Flame Proof	PVC	:	Poly Vinyl Chloride
HV	:	High Voltage	IS	:	Indian Standars
ITP	:	Inspection and Test Plan	TPI or TPIA	:	Third Party Inspection Agency
IP	:	Ingress Protection	VDR	:	Vendor Data Requirement.
IC	:	Inspection Certification	UL	:	Under writer Laboratories
IEC	:	International Electrotechnical Commission			

Inspection Standards Committee

Convenor : Mr. R.K.Singh

Members:

Mr. Rajesh Sinha
Mr. R. Muthuramalingam
Ms. Arvind N P Singh (Electrical)
Mr. Himangshu Pal
Mr. Avdhesh Agrawal
Mr. Chandrashekhar
Mr. Mahendra Mittal

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1.0 SCOPE

This Inspection and Test Plan covers the minimum testing requirements of Lighting fixtures, control gearboxes, junction boxes and accessories

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 materials like castings, terminals, Glass, Rubber gaskets, reflectors, Guards, Chokes, Capacitors, etc.	Physical & Chemical Properties, Dimensions, Surface finish, Light transmission thro' glass, tests on glass, Material Certificate, Make, IR for chokes, etc.	Samples as per relevant standard/ supplier's standard	Supplier's Test Records	H	H	R
3.0	**In process Inspection**						
3.1	Well glasses	Static Hydraulic test	100% by supplier and sample basis by EIL	Supplier's Test Records	-	H	R
3.2	Control gear boxes and junction Boxes	Routine Pressure test	100% by supplier and sample basis by EIL	Supplier's Test Records	-	H	R
4.0	**Final Inspection**						

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.1	Final Inspection	Acceptance Tests:- • Physical, Dimensional and BOM Verification • Flame paths, Clearances • Marking on each piece for suitability to area classification, Tag no. and other details as per relevant IS/IEC. • Marking on glass for type and other details as per IS/IEC • Test for restricted breathing enclosure for Div-2 • Impact test (on samples) • Thermal shock test (on samples) • Electrical operation check • Power factor test on choke • HV test • IR test before & after HV	100%	Inspection Witness Test Records	-	H	R
4.2	Type tests:-	• Temperature rise test • Test for suspension for Div 2 fittings • Test for enclosed Break lamp holder for Div 2 fittings. • Pressure Test (As Applicable)	Samples	Certificates from test agencies	-	R	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.3	Submission of Certificate & Documents	• Certificate of Statutory testing agency for suitability of area classification • Certificate of Statutory approval authority like PESO • License for Indigenous fittings from BIS • Degree of Ingress protection certificate.	Samples	Certificates from test agencies	-	H	R
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	100%	Packing list / Supplier's Records	-	H	R
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Review of suppliers internal test reports • Issuance of IC	100%	Internal test reports & IC	-	H	H
6.2	Final Document submission	• Compilation of Inspection reports, drawings etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval, R-Review, RW-Random witness (As specified or 10 % - Samples must include minimum 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.
3. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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ऊर्जा दक्ष मध्यम वोल्टेज मोटरों के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR ENERGY EFFICIENT MEDIUM VOLTAGE MOTORS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
1	15.03.2024	Revised	MM	GS	RK	MN
0	12.11.2018	ISSUED FOR IMPLEMENTATION	MM	RS	RKS	RKT

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Abbreviations

BIS	:	Bureau of Indian Standard	MTC	:	Material Test Certificate
CIMFR	:	Central Institute of Mining & Fuel Research	NEMA	:	National Electrical Manufacturers Association
EIL	:	Engineers India Limited	PO	:	Purchase Order
FM	:	Factory Mutual	PESO	:	Petroleum Explosive Safety Organization
FLP	:	Flame Proof	PR	:	Purchase Requisition
ITP	:	Inspection and Test Plan	QC	:	Quality Control
IP	:	Ingress Protection	TC	:	Test Certificate
IC	:	Inspection Certification	TPI or TPIA	:	Third Party Inspection Agency
IEC	:	International Electro technical Commission	VDR	:	Vendor Data Requirement
JEC	:	Japanese Electro technical Committee	VFD	:	Variable Frequency Drive

Inspection Standards Committee

Convenor : Mr. Rajeev Kumar

Members:

Mr. G Suresh	Mr. Himangshu Pal	Mr. Chandrashekhar	Mr. Avdhesh Agrawal
Mr. Mahendra Mittal	Mr. R Muthuramalingam (RPO Representative)	Mrs Arvind NP Singh (Electrical)	Mr Anil Kumar

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1.0 SCOPE

This Inspection and Test Plan covers the minimum testing & inspection requirements of three phase medium voltage energy efficient squirrel cage induction motors.

2.0 REFERENCE DOCUMENTS

PO/PR & Standards referred therein /Job specifications / Approved documents/ Relevant IEC/IS.

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	Raw Material: Body (casting or fabrication), Rotor Shaft, Core Laminations, Copper, Insulation Material, Bearings, Cable Boxes, Cable Glands, etc.	Chemical, Physical Properties, Finish as per Relevant Standard	100%	Material Test Certificates / Test records	H	H	-

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.0	**In-process Inspection**						
3.1	Motor Assembly	Vacuum Impregnation and Bracing of Winding, Core Assembly, Rotor Bars and End Rings Assembly, Rotor Balancing, Terminal Box Mounting and Clearances in between, Bearing Setting, etc. as per Supplier's Internal Standards	100%	Test Records	-	H	R
4.0	**Final Inspection**						
4.1	Motor (Routine Tests)	• Visual Check (Nameplate, Terminal Box Location, Terminal Type, Clearances, Size, Entries, Space Adequacy & Gland Size, Direction of Rotation etc.) • Dimensions Check (Including Shaft Height etc., Foundation Hole Dia and Distance, Shaft Dia.) • Cable Glands, Cable Lugs Size and No. of Entries in Terminal Box • Winding Resistance • Space heater resistance & IR check • Accessories (RTD, BTD and Thermistor) Resistance measurement check (as applicable) • No Load Test and Measurement of Voltage, Speed, Current, Power Input • Reduced Voltage Starting and Running • Insulation Resistance before & after High Voltage Test • High Voltage (Per Phase)	100%	Inspection test records	-	H	H See Note 4 & 5

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Vibration at No Load • Noise Level at No load					
4.2	Motor (Type Tests)	• Full Load Test and Measurement of Voltage, Current, Power, Slip, Power Factor, Bearing Noise. • Efficiency and Pf at 100%, 75% and 50% Load • Temp Rise Test • Momentary Overload Test • Vibration before and after over speed test • Over Speed • Measurement of Starting Torque, Starting Current, Full Load Torque, Pull Out Torque by JEC/IEC (By Logarithmic Proportion Current Method II	One Motor from each type/rating	Inspection test records	-	H	H See Note 4 & 5
5.0	**Painting**						
5.1	Painting and Packing	• Visual • Suitable protection to prevent entry of foreign material. • Proper packing with suitable plugs to prevent Ingress of Moisture and 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 • Test Certificate from Recognized Testing	100%	Supplier's Test Records /	-	H	H

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		Laboratory for Area Classification. • BIS Certificate for FLP Motors and Accessories as applicable. • PESO approved Certificates for Motors and Accessories as applicable. • Degree of Protection of Terminal Box and Body • IC Issuance		Certificates from statutory bodies / Inspection Certificate (IC)			
6.2	Final Document submission	Compilation of Inspection Reports, Drawings, etc. as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

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. For VFD application motors, separate FAT procedure to be submitted for EIL/ TPIA approval.
2. This document describes the generic test requirements. Any additional test or inspection scope if specified in contract documents shall also be applicable.
3. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred therein/ Job specifications /Approved documents.
4. Motors up to 55 KW would be accepted based on Manufacturer's test certificates. Higher rating will have witness by TPIA appointed by Main Supplier.
5. Motors ordered with integration test (VFD fed motors) requirement as per PR shall be witnessed by EIL/ TPIA (as applicable) and main supplier for integration test (irrespective of rating) at motor manufacturer's works.

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विद्युत मोटर परिचालक वाल्व एक्चुएटरों के लिए निरीक्षण एवं परीक्षण योजना

INSPECTION AND TEST PLAN FOR ELECTRICAL MOTOR OPERATED VALVE ACTUATORS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
3	26.05.2020	Revised and Reissued	MM	RS	RKS	SKS
2	30.01.2014	Revised and Reissued	MJ	RS	SCG	SC
1	29.06.2012	Revised and Reissued	AB	HVJ	AKC	DM
0	08.12.2008	Issued for implementation	RB	SKD	SKP	VC

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Abbreviations:

ATEX	:	Atmospheres Explosibles	IS	:	Indian Standard
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres	Min	:	Minimum
BIS	:	Bureau of Indian Standard	MTC	:	Material Test Certificate
CIMFR	:	Central Institute of Mining & Fuel Research	No	:	Number
DCS	:	Distributed Control System	PLC	:	Programmable Logic Control
EPC	:	Engineering Procurement & Construction	PO	:	Purchase Order
ERTL	:	Electronics Regional Test Laboratory	PESO	:	Petroleum Explosive Safety Organization
FM	:	Factory Mutual	PR	:	Purchase Requisition
FLP	:	Flame Proof	QC	:	Quality Control
ITP	:	Inspection and Test Plan	TC	:	Test Certificate
IP	:	Ingress Protection	TPI or TPIA	:	Third Party Inspection Agency
IC	:	Inspection Certification	UL	:	Under writer Laboratories
IEC	:	International Electro technical Commission	VDR	:	Vendor Data Requirement

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members: Mr. Rajesh Sinha, Mr. Himangshu Pal, Mr. Chandrasekhar, Mrs. Arvind NP Singh (Electrical)

Mr. R Muthuramalingam, Mr Avdhesh Agrawal, Mr. Mahendra Mittal

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1.0 SCOPE

This Inspection and Test Plan covers the minimum testing requirements of Electrical Motor Operated Valve Actuators.

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 motor, actuator unit, position indicator, limit switches , gears, cable glands etc.	• Functional & Electrical tests • Statutory Body Certifications for items (as applicable)	100% by Supplier	Material Test Certificates	H	H	R
3.0	**In process Inspection**						
3.1	Electrical Motor Operated Valve Actuator Assembly	• Visual, Dimensional, Bill of Material	100% by supplier	Supplier's test records	-	H	-

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.2	Actuator Body	• Pressure Test for Flameproof Enclosures	100% by supplier	Supplier's test records	-	H	R
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual and Dimensional checks. • Check calibration status of all testing equipment. • Bill of Material • Functional and calibration test for torque of limit switches • Direction of rotation • Phase reversal. • Response time test, diagnostic checks • Variation of supply voltage and frequency (as per data sheet) • Test on output shaft • Life Test (if called for in specification), otherwise reports shall be submitted for review. • Output speed measurement. • Hand wheel /auto mechanism check. • Functional check on thermostat/Thermistor • Checks on space heater • Electrical and mechanical interlock check for opening and closing operations.	100% by supplier and on random basis by EIL/TPIA	Supplier's Test Records and 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
		• Check all remote contacts & all indications. • Local/Remote operation checks. • Protection features checks. • Compatibility and configuration checks with hand held infrared/blue tooth remote programming device. • High voltage test • Insulation resistance test • Redundancy check in communication with master station/DCS (as applicable). • Communication check with DCS/PLC on applicable protocol. • Checks on remote position indicators(if provided)					
4.2	Submission of certificates / documents	• Certificate from testing agency like ATEX, CIMFR BASEEFA, FM/UL etc. for suitability in specified hazardous area • Certificate for fireproof rating from independent lab • Test for motor as per relevant IS/IEC • Type test certificates for motors • A valid BIS license for indigenous supply • Statutory approval certificates from PESO for use in specified hazardous area. • Degree of protection certificate as applicable.	Sample/ Prototype	Statutory Approval Certificates / Type Test Certificates	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Life cycle test report. • Damp heat recycling test.					
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.	100%	Test records	-	H	-
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Review of Internal Test Reports and MTCs. • IC issuance	-	Supplier's Test Records / Inspection Certificate (IC)	-	H	H
6.2	Final Document submission	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

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.
2. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents.
3. For EPC jobs, all inspection shall be carried out by TPIA, unless notified otherwise.

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इलेक्ट्रोमैगनेटिक फलोमीटरों के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR ELECTROMAGNETIC FLOW METERS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	18.05.20	Revised and Reissued	NP	RS	RKS	SKS
3	20.09.13	Revised and Reissued	MJ	RS	SCG	DM
2	22.03.12	Revised and Reissued	MJ	GS	AKC	DM
1	05.05.08	Revised and Reissued	SA	SKD	SKP	VC
0	25.11.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

AS	:	Alloy Steel
ATEX	:	Atmosphère Explosibles
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres
CEIL	:	Certification Engineers International Limited
CIMFR	:	Central Institute of Mining & Fuel Research
CSA	:	Canadian Standards Association
DGMS	:	Directorate General of Mines Safety
DP/DPT	:	Dye Penetrant Testing
EPC	:	Engineering Procurement Construction
ERTL	:	Electronics Regional Test Laboratory
FCRI	:	Fluid Control Research Institute
FF	:	Fieldbus Foundation
FISCO	:	Fieldbus Intrinsically Safe Concept
FM	:	Factory Mutual
HART	:	Highway Addressable Remote Transducer
HV	:	High Voltage
IC	:	Inspection Certification
IEC	:	International Electrotechnical Commission
IP	:	Ingress Protection
IR	:	Insulation Resistance
IRN	:	Inspection Release Note
ITP	:	Inspection and Test Plan
Lab.	:	Third Party Laboratory
LCIE	:	Laboratorie Central Des Industries Electriques
LPT	:	Liquid Penetrant Testing
MTC	:	Material Test Certificates
MOC	:	Material of Construction
NABL	:	National Accreditation Board for Testing and Calibration Laboratories
NDT	:	Non Destructive Testing
NEMA	:	National Electrical Manufacturers Association
No.	:	Number
PESO	:	Petroleum Explosive Safety Organization
PMI	:	Positive Material Identification
PO	:	Purchase Order
PQR	:	Procedure Qualification Record
PR	:	Purchase Requisition
PTB	:	Physikalisch-Technische Bundesanstalt
PWHT	:	Post Weld Heat Treatment
QC	:	Quality Control
RT	:	Radiography Test
SIL	:	Safety Integrity Level
SS	:	Stainless Steel
TC	:	Test Certificate
TPI or TPIA	:	Third Party Inspection Agency
UL	:	Underwriter's Laboratories
VDR	:	Vendor Data Requirement
WPS	:	Welding Procedure Specification
WPQ	:	Welders Performance Qualification

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Electromagnetic Flow Meters.

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**	--	--	--	--	--	--
1.1	WPS/PQR/WPQ	Welding procedure Qualification for welds as applicable	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Incoming Material like Meter Body, Tube, Flanges, Electrodes, Earthing Rings etc.	Chemical & Mechanical Properties, Heat treatment , Hardness as applicable	100%	MTC / Lab. TC	H	H	R
3.0	**In process Inspection**						
3.1	Machining of components and assembly	Visual, Dimensions, HV/IR, Electrostatic test	100%	Supplier's Test Records	-	H	-

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.2	NDT , PWHT (if specified)	RT, DPT/LPT, PWHT (as applicable)	100%	NDT reports / PWHT chart	-	H	R
3.3	Hydrostatic test	Hydrostatic test for Meters after installation of Electrodes.	100 %	Supplier's Test Records	-	H	R
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual check • Components verification • Dimensional verification. (representative samples) • Dielectric test. • Model decoding on representative sample. • FF check mark for Fieldbus based instruments • Communication & Configuartion check of HART/Fieldbus Transmitters using Hand held Configurator.	100%	Supplier's Test Records and Inspection Witness Record	-	H	RW
		• Wet Calibration including accuracy & repeatability covering the specified range at NABL approved Flow Laboratory unless specifically called for in PR	(1/ Model Series)		--	H	R
4.2	Submission of certificates / Documents	• Manufacturer's Internal Test Reports including Wet Calibration reports,	100%	Test Reports	--	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.3	Statutory Certification & other Specific requirement:	• <u>For Electrically Hazardous Area :</u> a. Indigenous Items: Certificate from CIMFR/ Karandikar Lab. / ERTL and valid BIS License & corresponding valid PESO Certificate for the requisite Hazardous Area Classification b. Imported items: Certificates from testing agency like LCIE, BASEEFA, FM , UL, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification c. For projects related to mining, approval from DGMS-India required. • Intrinsic Safe (entity concept) or FISCO approval for Fieldbus Instruments for Hazardous area . • Degree of Protection(IP) Certification for the Instrument and Transmitter housing • Certificate for electromagnetic compatibility and transient protection. • SIL Certification(if specified.) • Interoperability Certification of Fieldbus & Profibus type Transmitters .	Prototype for each model	Statutory Approval Certificates / Type Test Certificates.	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
5.0	**Painting**						
5.1	Painting	Suitable protection to prevent entry of foreign material.	100%	Test Records	-	H	-
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports, MTC, • Bought out items TC • Issuance of IC/IRN.	100%	Supplier's Test Records / Mfg TC/ IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review of Documents, 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
3. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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INSPECTION AND TEST PLAN FOR ORIFICE PLATES AND FLANGES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	18-05-20	Revised and Reissued	NP	RS	RKS	SKS
3	09.01.14	Revised and Re-issued	MJ	RS	SCG	SC
2	15.07.11	Revised and Re-issued	GS	SA	AKC	DM
1	02.01.08	Revised and Re-issued	AKG	CRM	MVKK	VC
0	29.11.02	Issued for implementation	RB	AKC	AKB	GRR

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Abbreviations

ANSI	:	American National Standards Institute	MOC	:	Material of Construction
AS	:	Alloy Steel	MPT/MT	:	Magnetic Particle Testing
BIS	:	Bureau of Indian Standards	MRA	:	Meter Run Assembly
CEIL	:	Certification Engineers International Limited	NACE	:	National Association of Corrosion Engineers
CE	:	Carbon Equivalent	No.	:	Number
CIMFR	:	Central Institute of Mining & Fuel Research	NDT	:	Non Destructive Testing
CS	:	Carbon Steel	PO	:	Purchase Order
DFT	:	Dry Film Thickness	PMI	:	Positive Material Identification
DT	:	Destructive Testing	PR	:	Purchase Requisition
DP/DPT	:	Dye Penetrant Testing	PWHT	:	Post weld Heat Treatment
EPC	:	Engineering Procurement Construction	PQR	:	Procedure Qualification Record
FCRI	:	Fluid Control Research Institute	QC	:	Quality Control
HIC	:	Hydrogen Induced Cracking	TC	:	Test Certificate
IC	:	Inspection Certification	TPI or TPIA	:	Third Party Inspection Agency
IGC	:	Inter Granular Corrosion	RT	:	Radiography Testing
IRN	:	Inspection Release Note	RTJ	:	Ring Tongue Joint
ITP	:	Inspection and Test Plan	SS	:	Stainless Steel
Lab.	:	Third Party Laboratory	UT	:	Ultrasonic Testing
LPT	:	Liquid Penetrant Testing	VDR	:	Vendor Data Requirement
Mfr	:	Manufacturer	WPS	:	Welding Procedure Specification
MTC	:	Material Test Certificates	WPQ	:	Welders Performance Qualification

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE:

This Inspection and Test Plan covers the minimum testing requirements of Orifice Plates & Flanges, Meter Run Assemblies, Flow Straightner

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**						
1.1	WPS/PQR/WPQ	Welding procedure Qualification for welding involved in the Meter Runs.	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Incoming Material like: Orifice Plate Material, Plate Holders(RTJ type) , Spacer Ring , Forgings and Pipes etc.	Chemical,Mechanical Properties, PMI,Heat Treatment, Hardness etc. as applicable	100%	MTC / Lab.TC	H	H	R
2.2	Flanges , Fasteners and Gaskets.	Chemical and Mechanical Properties, Heat Treatment , Hardness , Dimensions etc. as applicable	100%	MTC / Mfr's TC / Lab. TC	H	H (Note 1)	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/ TPIA
3.0	**Inprocess Inspection**						
3.1	Machining of Flanges, Plates and Pipes	Dimensions, Smoothness verification	100%	Test Records	-	H	-
3.2	NDT , PWHT (If specified)	• RT on Weld joints • DPT on welds. • PWHT of welds.	100%	NDT reports / PWHT chart	-	H	R
4.0	**Final Inspection**						
4.1	Visual, Dimensions, Physical & Hydro Checks	• Visual check. • Dimensions check • Components Verification. • Final Assembly Fitment check • Smoothness of Flow Straightners/Meter run Pipe. • Dye Penetrate Check for all welds. • Hydrotest for MRA and Flow Straightners.	100%	Inspection Witness Record	---	H	RW
4.2	Calibration	Wet Calibration of MRA(if specified)	100%	Calibration Report from Flow Lab	-	H	R
5.0	**Painting**						
5.1	Cleaning for special services, Painting of CS flanges, Meter runs	• Special cleaning and packing for oxygen and chlorine services • Pre-treatment, primer and final paint, shade, thickness	100%	Test Records		H	---

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/ TPIA
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports. • Issuance of IC/IRN	100%	Supplier's Test Records / IC/IRN	-	-	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports , drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

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

NOTES :

1. All NACE, Hydrogen service, AS, SS flanges to be inspected by TPIA appointed by the Main Supplier. CS flanges without any special service requirement upto size 24" – 300# ANSI will be accepted on review of Supplier Test Certificates.
2. 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).
3. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents
4. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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INSPECTION AND TEST PLAN FOR RESTRICTION ORIFICE PLATES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	19.05.20	Revised and Re-issued	NP	RS	RKS	SKS
3	09.01.14	Revised and Re-issued	MJ	RS	SCG	SC
2	15.07.11	Revised and Reissued	GS	SA	AKC	DM
1	09.05.08	Revised and Reissued	RB	SKD	SKP	VC
0	25.11.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

ANSI	:	American National Standards Institute	MPT/MT	:	Magnetic Particle Testing
AS	:	Alloy Steel	MSA	:	Multistage assembly/ Multistage Orifice Assembly
BIS	:	Bureau of Indian Standards	NACE	:	National Association of Corrosion Engineers
CEIL	:	Certification Engineers International Limited	NDT	:	Non Destructive Testing
CE	:	Carbon Equivalent	PO	:	Purchase Order
CS	:	Carbon Steel	PMI	:	Positive Material Identification
DFT	:	Dry Film Thickness	PR	:	Purchase Requisition
DT	:	Destructive Testing	PWHT	:	Post weld Heat Treatment
DP/DPT	:	Dye Penetrant Testing	PQR	:	Procedure Qualification Record
EPC	:	Engineering Procurement Construction	QC	:	Quality Control
HIC	:	Hydrogen Induced Cracking	TC	:	Test Certificate
IC	:	Inspection Certification	TPI or TPIA	:	Third Party Inspection Agency
IGC	:	Inter Granular Corrosion	RT	:	Radiography Testing
IRN	:	Inspection Release Note	RTJ	:	Ring Tongue Joint
ITP	:	Inspection and Test Plan	SS	:	Stainless Steel
Lab.	:	Third Party Laboratory	UT	:	Ultrasonic Testing
LPT	:	Liquid Penetrant Testing	VDR	:	Vendor Data Requirement
Mfr	:	Manufacturer	WPS	:	Welding Procedure Specification
MTC	:	Material Test Certificates	WPQ	:	Welders Performance Qualification
MOC	:	Material of Construction			

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Restriction Orifice Plates and Multistage Orifice Assemblies.

2.0 REFERENCE DOCUMENTS

PO/PR / Standards referred therein /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**						
1.1	WPS/PQR/WPQ	Welding procedure Qualification for welding involved in Multistage orifice Assemblies, Meter Runs etc	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Incoming Material Plates, Pipes, Flanges, RTJ Plate Holders etc.	• Chemical & Mechanical Properties, • PMI, Heat treatment, • Hardness as applicable	100%	MTC / Lab. TC	H	H/R (Note 1)	R
3.0	**In process Inspection**						
3.1	Machining of Plates, Welding/Fabrication etc	Visual & Dimensional.	100%	Test Records	-	H	-

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.2	NDT , PWHT (as specified)	• RT on Weld Joints • DP/DPT/LPT on welds • PWHT of welds,	100%	NDT reports / PWHT chart	-	H	R
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual Check . • Dimensional verification. • Component Verification • DP/DPT/LPT for all welds of MSA • Hydro test of complete assembly (Post PWHT if specified) before painting.	100%	Test Records	-	H	RW
5.0	**Painting**						
5.1	Cleaning for special services, Painting of Multistage assemblies	• Special cleaning and packing for oxygen and chlorine services • Pre treatment, primer and final paint, shade, thickness	100%	Test Records		H	---
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports • Issuance of IC/IRN	100%	Supplier's Test Records / IC/IRN	-	H	H

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), Random -10%, R-Review, RW-Random witness, TC, W- Witness (Give due notice, work may proceed after scheduled date).

NOTES:

1. All NACE, Hydrogen service, AS, SS flanges to be inspected by TPIA appointed by the Main Supplier. Carbon Steel(CS) flanges without any special service requirement upto size 24" – 300# ANSI will be accepted on review of Supplier Test Certificates. Supplier test certificate to be reviewed by TPIA.
2. 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).
3. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.
4. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents

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वेरिएबल एरिया फ्लोमीटरों
के लिए
निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN
FOR
VARIABLE AREA FLOW METERS

Rev. No.	Date	Purpose	Prepared By	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	18.05.2020	Revised and Reissued	NP	RS	RKS	SKS
3	20.09.2013	Revised and Reissued	MJ	RS	SCG	DM
2	22.02.2012	Revised and Reissued	MJ	GS	AKC	DM
1	22.01.2008	Revised and Reissued	AKG	PPM	MVKK	VC
0	30.04.2002	Issued for implementation	RG	AKC	AK	GRR

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Abbreviations

AS	:	Alloy Steel
ATEX	:	Atmosphère Explosibles
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres
CEIL	:	Certification Engineers International Limited
CIMFR	:	Central Institute of Mining & Fuel Research
CSA	:	Canadian Standards Association
DGMS	:	Directorate General of Mines Safety
DP/DPT	:	Dye Penetrant Testing
EPC	:	Engineering Procurement Construction
ERTL	:	Electronics Regional Test Laboratory
FCRI	:	Fluid Control Research Institute
FF	:	Fieldbus Foundation
FISCO	:	Fieldbus Intrinsically Safe Concept
FM	:	Factory Mutual
HART	:	Highway Addressable Remote Transducer
IC	:	Inspection Certification
IEC	:	International Electrotechnical Commission
IP	:	Ingress Protection
IRN	:	Inspection Release Note
ITP	:	Inspection and Test Plan
Lab.	:	Third Party Laboratory
LCIE	:	Laboratorie Central Des Industries Electriques
LPT	:	Liquid Penetrant Testing
Mfr	:	Manufacturer
MTC	:	Material Test Certificates
MOC	:	Material of Construction
NABL	:	National Accreditation Board for Testing and Calibration Laboratories
NDT	:	Non Destructive Testing
NEMA	:	National Electrical Manufacturers Association
No.	:	Number
PESO	:	Petroleum Explosive Safety Organization
PMI	:	Positive Material Identification
PO	:	Purchase Order
PQR	:	Procedure Qualification Record
PR	:	Purchase Requisition
PTB	:	Physikalisch-Technische Bundesanstalt
PWHT	:	Post Weld Heat Treatment
QC	:	Quality Control
RT	:	Radiography Test
SIL	:	Safety Integrity Level
SS	:	Stainless Steel
TC	:	Test Certificate
TPI or TPIA	:	Third Party Inspection Agency
UL	:	Underwriter's Laboratories
VDR	:	Vendor Data Requirement
WPS	:	Welding Procedure Specification
WPQ	:	Welders Performance Qualification

Inspection Standards Committee

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Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Variable Area Flow Meters.

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**	--	--	--	--	--	--
1.1	WPS/PQR/WPQ	Welding procedure Qualification for welds as applicable	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Incoming Material like Metal Tube, Spool Pipes, Flanges, Float Assembly, Float Stoppers, etc.	Chemical & Mechanical Properties, Heat treatment, Hardness etc. as applicable.	100%	MTC/ Lab. TC	H	H	R
2.2	<u>Bought out item:</u> a. Borosilicate Glass Tube b. Acrylic Tube(For Purge Rotameters) c. Transmitter/electronic housing	• Chemical/Mechanical Properties • Thermal Properties (Borosilicate/ Acrylic tube body)	100%	Mfr' TC	H	R	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.0	**In process Inspection**						
3.1	Machining of components and assembly	Visual, Dimensions.	100%	Supplier's Test Records	-	H	-
3.2	NDT , PWHT (as specified)	• RT, DP/DPT/LPT • PWHT	100%	NDT reports / PWHT chart	-	H	R
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual Check • Components verification • Dimensional check • Hydrostatic test of complete flow meter assembly. • Calibration test including accuracy and repeatability (Inhouse or at NABL approved Lab) as applicable. • Functional check with Transmitter with Load Driving Capability & flow switches (if required). • Switches(if specified): Type and Functional Check.	100%	Supplier's Test Records and Inspection Witness Record	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.2	Submission of certificates / Documents	• <u>For Electrically Hazardous Area :</u> a. Indigenous Items: Certificate from CIMFR/ Karandikar Lab. / ERTL and valid BIS License & corresponding valid PESO Certificate for the requisite Hazardous Area Classification b. Imported items: Certificates from testing agency like LCIE, BASEEFA, FM UL, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification c. For projects related to mining, approval from DGMS-India required. • Degree of protection (IP) certificate for transmitter/ switch enclosure. • Certification for Electromagnetic Compatibility as per IEC 61000-4 for meter Electronics/Switch Assembly.	Prototype for each model	Statutory Approval Certificates / Type Test Certificates	-	H	R
5.0	**Painting**						
5.1	Painting	• Special cleaning and packing for oxygen and chlorine services • Pre treatment, primer and final paint, shade, thickness.	100%	Test Records	-	H	-

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports • Manufacturer TC for bought out components. • Issuance of IC/IRN	100%	Supplier's Test Records / IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review of Documents, RW-Random witness (As specified or 10 % - Samples must include minimum 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.
3. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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INSPECTION AND TEST PLAN FOR VORTEX FLOWMETERS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
4	20.05.20	Revised and Reissued	NP	RS	RKS	SKS
3	20.09.13	Revised and Reissued	MJ	RS	SCG	DM
2	22.03.12	Revised and Reissued	MJ	GS	AKC	DM
1	09.05.08	Revised and Reissued	RB	SKD	SKP	VC
0	29.11.02	Issued for implementation	RG	AKC	AKB	GRR

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Approved by

Abbreviations

ATEX	:	Atmosphère Explosibles	LPT	:	Liquid Penetrant Testing
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres	MTC	:	Material Test Certificates
			MOC	:	Material of Construction
CEIL	:	Certification Engineers International Limited	NABL	:	National Accreditation Board for Testing and Calibration Laboratories
CIMFR	:	Central Institute of Mining & Fuel Research			
CSA	:	Canadian Standards Association	NDT	:	Non Destructive Testing
DGMS	:	Directorate General of Mines Safety	NEMA	:	National Electrical Manufacturers Association
DP/DPT	:	Dye Penetrant Testing	No.	:	Number
EPC	:	Engineering Procurement Construction	PESO	:	Petroleum Explosive Safety Organization
ERTL	:	Electronics Regional Test Laboratory	PO	:	Purchase Order
FCRI	:	Fluid Control Research Institute	PQR	:	Procedure Qualification Record
FF	:	Fieldbus Foundation	PR	:	Purchase Requisition
FISCO	:	Fieldbus Intrinsically Safe Concept	PTB	:	Physikalisch-Technische Bundesanstalt
FM	:	Factory Mutual	PWHT	:	Post Weld Heat Treatment
HART	:	Highway Addressable Remote Transducer	QC	:	Quality Control
HV	:	High Voltage	RT	:	Radiography Test
IC	:	Inspection Certification	SIL	:	Safety Integrity Level
IEC	:	International Electrotechnical Commission	TC	:	Test Certificate
IP	:	Ingress Protection	TPI or TPIA	:	Third Party Inspection Agency
IRN	:	Inspection Release Note	UL	:	Underwriter's Laboratories
IS	:	Intrinsic Safety	VDR	:	Vendor Data Requirement
ITP	:	Inspection and Test Plan	WPS	:	Welding Procedure Specification
Lab.	:	Third Party Laboratory	WPQ	:	Welders Performance Qualification
LCIE	:	Laboratorie Central Des Industries Electriques			

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Vortex Flow Meters.

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**	--	--	--	--	--	--
1.1	WPS/PQR/WPQ	Welding procedure Qualification for welds as applicable	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Incoming Material like Castings, Pipes , Flanges, Sensor element etc.	Chemical & Mechanical Properties, Heat Treatment, Hardness as applicable	100%	MTC / Lab. TC	H	H	R
3.0	**In process Inspection**						
3.1	Machining, Welding/Fabrication and assembly	Visual, Dimensions.	100%	Supplier's Test Records	-	H	-
3.2	NDT , PWHT (as specified)	• RT of weld joints • DP/DPT/LPT on Welds • PWHT of welds	100%	NDT Reports/ PWHT Chart	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual Check: • Component Verification etc. • Dimensional Verification • DP Testing on weld joints • FF check mark for Fieldbus based instruments. • Configuration, calibration and diagnostics check through hand held Configurator/ Fieldbus tester for HART/ Fieldbus instruments.	100%	Supplier's Test Records and Inspection Witness Record	-	H	RW
		• Calibration including accuracy & repeatability, Hydrotest at Manufacturer's Factory	100%	Manufacturer's Test Records	H	H	R
		• Calibration including Accuracy & Repeatability covering the specified range of the Instruments at NABL approved Laboratory (on 1unit / model series), unless specifically called for in PR	(1 / Model Series)	Supplier's Test Records and Inspection Witness Record	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.2	Submission of certificates / Documents	• <u>For Electrically Hazardous Area :</u> a. Indigenous Items: Certificate from CIMFR/ Karandikar Lab. / ERTL and valid BIS License & corresponding valid PESO Certificate for the requisite Hazardous Area Classification b. Imported items: Certificates from testing agency like LCIE, BASEEFA, FM UL, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification c. For projects related to mining, approval from DGMS-India required. • IS/FISCO certification for FF transmitters. • Degree of protection certificate (IP) Instrument Housing. • SIL Certification(If specified) • Interoperability Certification for FF and Profibus based Instruments.	Samples	Statutory Approval Certificates / Type Test Certificates	-	H	R
5.0	**Painting**						
5.1	Painting	• Special cleaning and packing for oxygen and chlorine services • Pre treatment, primer and final paint, shade, thickness.	100%	Packing list / Supplier's Records	-	H	-
6.0	**Documentation**						

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.1	Documentation and IC/IRN	• Review of supplier's/manufacturer's Internal Test Reports, MTCs etc. • Issuance of IC/IRN.	100%	Supplier's Test Records / IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review of Documents, RW-Random witness (As specified or 10 % - Samples must include minimum 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
3. For EPC Jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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INSPECTION AND TEST PLAN
FOR
LEVEL INSTRUMENTS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	20.05.20	Revised and Re-issued	NP	RS	RKS	SKS
3	20.09.13	Revised and Re-issued	MJ	RS	SCG	DM
2	22.03.12	Revised and Re-issued	MJ	GS	AKC	DM
1	02.01.08	Revised and Re-issued	SA	CRM	MVKK	VC
0	29.11.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

ATEX	:	Atmosphère Explosibles
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres
CEIL	:	Certification Engineers International Limited
CIMFR	:	Central Institute of Mining & Fuel Research
CSA	:	Canadian Standards Association
DGMS	:	Directorate General of Mines Safety
DP/DPT	:	Dye Penetrant Testing
EPC	:	Engineering Procurement Construction
ERTL	:	Electronics Regional Test Laboratory
FF	:	Fieldbus Foundation
FISCO	:	Fieldbus Intrinsically Safe Concept
FM	:	Factory Mutual
HART	:	Highway Addressable Remote Transducer
IC	:	Inspection Certification
IEC	:	International Electrotechnical Commission
IP	:	Ingress Protection
IRN	:	Inspection Release Note
IS	:	Intrinsic Safety
ITP	:	Inspection and Test Plan
Lab.	:	Third Party Laboratory
LCIE	:	Laboratorie Central Des Industries Electriques
LPT	:	Liquid Penetrant Testing
MTC	:	Material Test Certificates
MOC	:	Material of Construction
NDT	:	Non Destructive Testing
NEMA	:	National Electrical Manufacturers Association
No.	:	Number
PESO	:	Petroleum Explosive Safety Organization
PMI	:	Positive Material Identification
PO	:	Purchase Order
PQR	:	Procedure Qualification Record
PR	:	Purchase Requisition
PTB	:	Physikalisch-Technische Bundesanstalt
PWHT	:	Post Weld Heat Treatment
QC	:	Quality Control
RT	:	Radiography Test
SIL	:	Safety Integrity Level
SS	:	Stainless Steel
TC	:	Test Certificate
TPI or TPIA	:	Third Party Inspection Agency
UL	:	Underwriter's Laboratories
VDR	:	Vendor Data Requirement
WPS	:	Welding Procedure Specification
WPQ	:	Welders Performance Qualification

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Float / Displacer Operated Level Instruments.

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**	--	--	--	--	--	--
1.1	WPS/PQR/WPQ	Welding procedure Qualification for welds as applicable	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Incoming Material like Cage Pipes, Flanges, Forgings for Wafer Body, Float, Torque tube etc.	Chemical & Mechanical Properties, Heat treatment, Hardness as applicable.	100%	MTC / Lab. TC	H	H	R
3.0	**In process Inspection**						
3.1	Machining of components and assembly	Visual, Dimensions.	100%	Supplier's Test Records	-	H	-
4.0	**Final Inspection**						
4.1	NDT , PWHT (as specified)	• RT, DP/DPT/LPT • PWHT	100%	NDT reports / PWHT chart	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.2	Final Inspection	• Visual Check • Components verification • Dimensional checks. • DP Testing. • Hydrotest on Cage and Float/Displacer • Calibration check including accuracy and repeatability. • Load driving capability check on Transmitter as applicable • Communication, Configuration, Diagnostics check by hand held configurator for HART/Fieldbus type Transmitters • Registration/ Check mark for FF type Instruments	100%	Supplier's Test Records and Inspection Witness Record	-	H	RW

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.3	Submission of certificates / Documents	• <u>For Electrically Hazardous Area :</u> a. Indigenous Items: Certificate from CIMFR/ Karandikar Lab. / ERTL and valid BIS License & corresponding valid PESO Certificate for the requisite Hazardous Area Classification b. Imported items: Certificates from testing agency like LCIE, BASEEFA, FM,UL, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification c. For projects related to mining, approval from DGMS-India required. • Certification for Fieldbus Transmitters for IS/FISCO as per PR • Ingress Protection(IP) Certification for Instrument and Transmitter housing . • Certificate for electromagnetic compatibility and transient protection. • SIL certification(if specified). • Interoperability for FF & Profibus based Instruments.	Prototype for each model	Statutory Approval Certificates / Type Test Certificates	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
5.0	**Painting**						
5.1	Painting	• Special cleaning and packing for oxygen and chlorine services • Pre treatment, primer and final paint, shade, thickness.	100%	Test Records	-	H	-
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports & MTC • Issuance of IC/IRN.	100%	Supplier's Test Records / IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review of Documents, RW-Random witness (As specified or 10 % - Samples must include minimum 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.
3. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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INSPECTION AND TEST PLAN
FOR
TANK LEVEL INSTRUMENTS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	24.05.20	Revised and Reissued	NP	RS	RKS	SKS
3	21.11.13	Revised and Reissued	MJ	RS	SCG	SC
2	22.03.12	Revised and Re-issued	MJ	GS	AKC	DM
1	02.01.08	Revised and Re-issued	SA	CRM	MVKK	VC
0	29.11.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

ATEX	:	Atmosphère Explosibles	LCIE	:	Laboratorie Central Des Industries Electriques
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres	LPT	:	Liquid Penetrant Testing
			Mfr	:	Manufacturer
CEIL	:	Certification Engineers International Limited	MTC	:	Material Test Certificates
CIMFR	:	Central Institute of Mining & Fuel Research	NEMA	:	National Electrical Manufacturers Association
CSA	:	Canadian Standards Association	No.	:	Number
DGMS	:	Directorate General of Mines Safety	PESO	:	Petroleum Explosive Safety Organization
EPC	:	Engineering Procurement Construction	PO	:	Purchase Order
ERTL	:	Electronics Regional Test Laboratory	PR	:	Purchase Requisition
FAT	:	Factory Acceptance Test	PTB	:	Physikalisch-Technische Bundesanstalt
FM	:	Factory Mutual	QC	:	Quality Control
IC	:	Inspection Certification	RIU	:	Remote Interfacing Unit.
IEC	:	International Electrotechnical Commission	SIL	:	Safety Integrity Level
IP	:	Ingress Protection	TFMS	:	Tank Farm Management System
iFAT	:	Integrated Factory	TC	:	Test Certificate
IRN	:	Inspection Release Note	TPI or TPIA	:	Third Party Inspection Agency
ITP	:	Inspection and Test Plan	UL	:	Underwriter's Laboratories
IT	:	Information Technology	VDR	:	Vendor Data Requirement
Lab.	:	Third Party Laboratory			

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Tank Level Instruments.

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: 1. For Float Operated Tank level Instruments: Float, and Tank Top Assembly, Flanges, ,Tank Side Indicator , Piping, etc . 2. Servo Operated Tank Level Instruments**:** Displacer/Float, Isolation Valves, Drum housing/drum , Calibration Chamber, Tank side Indicator, water cut probe, Flanges, Piping, Temperature Instruments, Pressure Instruments, Servo Type Tank Level Transmitter etc	Chemical & Mechanical Properties, Heat treatment. Hardness as applicable.	100%	MT / Lab. TC / Mfr's TC	H	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
	3. Radar Type Tank Level Instrument: Antenna, Still Well, Flanges, Piping, Isolation valve , Temperature Instrument , Tank side indicator, water-cut probe, Pressure Instrument etc						
3.0	**In process Inspection**						
3.1	Machining of components and assembly	Visual, Dimensions.	100%	Supplier's Test Records	-	H	-
4.0	**Final Inspection**						
4.1	a. Final Inspection	• Visual check for all items • Dimensional checks • Calibration & functional test for tank level instruments • Calibration for multi-element temperature sensor. • Calibration for water interface probes. • Pressure test on float. • RIU details and Functionality check • Switch and Switch Assembly (As specified). • IT hardware/Software(as specified) • Load Driving Capability of Transmitter as applicable.	100%	Supplier's Test Records and Inspection Witness Record	-	H	RW

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
	b. Integrated FAT (iFAT) of TFMS (Note-1, as applicable)	All components (Transmitter, Tank Side Indicator, RIU, IT hardware, Switches etc shall be integrated as per the Approved System Architecture and iFAT procedure iFAT to be carried out.	--	iFAT Report.	--	H	H
4.2	Submission of certificates / Documents	• <u>For Electrically Hazardous Area :</u> a. Indigenous Items: Certificate from CIMFR/ Karandikar Lab. / ERTL and valid BIS License & corresponding valid PESO Certificate for the requisite Hazardous Area Classification b. Imported items: Certificates from testing agency like LCIE, BASEEFA, FM, UL, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification c. For projects related to mining, approval from DGMS-India required. • Ingress Protection(IP) certificate for Instrument Housings/ enclosures. • Electromagnetic compatibility certificate.	Prototype	Type approval Certificate	--	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• SIL certification if specified					
5.0	**Painting**						
5.1	Painting	• Special cleaning and packing for oxygen and chlorine services • Pre treatment, primer and final paint, shade, thickness.	100%	Packing list / Supplier's Records	-	H	-
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports & MTCs • Issuance of IC/IRN.	100%	Supplier's Test Records / IC/IRN	-	-	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports, drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

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

NOTE:

1. For iFAT of TFMS system Supplier shall generate a FAT procedure and the same shall be approved by concerned authority.
2. 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).
3. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.
4. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents.

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INSPECTION AND TEST PLAN
FOR
MAGNETIC LEVEL INSTRUMENTS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convener	Standards Bureau Chairman
					Approved by	
3	24-05-20	Revised and Re-issued	NP	RS	RKS	SKS
2	20.09.13	Revised and Re-issued	MJ	RS	SCG	DM
1	22.03.12	Revised and Re-issued	MJ	GS	AKC	DM
0	01.12.08	Issued for implementation	RB	SKD	SKP	VC

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Abbreviations

AS	:	Alloy Steel	Mfr	:	Manufacturer
ATEX	:	Atmosphère Explosibles	MTC	:	Material Test Certificates
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres	MOC	:	Material of Construction
			NDT	:	Non Destructive Testing
CEIL	:	Certification Engineers International Limited	NEMA	:	National Electrical Manufacturers Association
CIMFR	:	Central Institute of Mining & Fuel Research	No.	:	Number
CSA	:	Canadian Standards Association	PESO	:	Petroleum Explosive Safety Organization
DGMS	:	Directorate General of Mines Safety	PMI	:	Positive Material Identification
DP/DPT	:	Dye Penetrant Testing	PO	:	Purchase Order
EPC	:	Engineering Procurement Construction	PQR	:	Procedure Qualification Record
FCRI	:	Fluid Control Research Institute	PR	:	Purchase Requisition
FF	:	Fieldbus Foundation	PTB	:	Physikalisch-Technische Bundesanstalt
FISCO	:	Fieldbus Intrinsically Safe Concept	PWHT	:	Post Weld Heat Treatment
FM	:	Factory Mutual	QC	:	Quality Control
HART	:	Highway Addressable Remote Transducer	RT	:	Radiography Test
IC	:	Inspection Certification	SIL	:	Safety Integrity Level
IEC	:	International Electrotechnical Commission	SS	:	Stainless Steel
IP	:	Ingress Protection	TC	:	Test Certificate
IRN	:	Inspection Release Note	TPI or TPIA	:	Third Party Inspection Agency
IS	:	Intrinsic Safety	UL	:	Underwriter's Laboratories
ITP	:	Inspection and Test Plan	VDR	:	Vendor Data Requirement
Lab.	:	Third Party Laboratory	WPS	:	Welding Procedure Specification
LCIE	:	Laboratorie Central Des Industries Electriques	WPQ	:	Welders Performance Qualification
LPT	:	Liquid Penetrant Testing			

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

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Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Magnetic Level Instruments.

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**	--	--	--	--	--	--
1.1	WPS/PQR/WPQ	Welding procedure Qualification for welds as applicable	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Incoming Material : Pipe Flanges , Floats etc.	Chemical & Mechanical Properties, Heat Treatment, Hardness as applicable. Tests for bought out components .	100%	MTC / Lab.TC / Mfr's TC	H	H	R
3.0	**In process Inspection**						
3.1	Machining of components and assembly	Visual, Dimensions.	100%	Supplier's Test Records	-	H	-
3.2	NDT , PWHT (as specified)	• RT, DP/DPT/LPT on Weld Joints. • PWHT of Welds	100%	NDT reports / PWHT chart	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual Check • Dimensional check • Hydrostatic testing of External mounted type Chambers / Cages . • DP testing • External Hydrotest on Float • Functional check on Mechanical Type Level Gauge with Rolling Magnet Indicators. • Functional and Calibration of Electronic Transmitter with Verification of features. • Functional and Calibration of Dial Type indicator for internally mounted type Magnetic level gauge. • Float Failure Indication. • Features of HART/Fieldbus communication to be checked with a Hand Held Communicator • FF check mark on Fieldbus base Transmitters	100%	Supplier's Test Records and Inspection Witness Record	-	H	RW

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.2	Submission of certificates / Documents	• For Electrically Hazardous Area : a. Indigenous Items: Certificate from CIMFR/ Karandikar Lab. / ERTL and valid BIS License & corresponding valid PESO Certificate for the requisite Hazardous Area Classification b. Imported items: Certificates from testing agency like LCIE, BASEEFA, FM, UL, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification c. For projects related to mining, approval from DGMS-India required. • FISCO/IS certification for Fieldbus transmitters. • Degree of protection certificate (IP) • SIL certification(if specified) • Interoperability of FF and Profibus type Instruments. • Load Driving Capability on Transmitter with 4-20mA out put & Power Supply Variation • Certificate for electromagnetic compatibility.	Prototype for each model	Statutory Approval Certificates / Type Test Certificates	-	H	R
5.0	**Painting**						
5.1	Painting	• Special cleaning and packing for oxygen and chlorine services • Pre treatment, primer and final paint, shade, thickness.	100%	Test Records	-	H	-

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports, MTCs • Issuance of IC/IRN.	100%	Supplier's Test Records / IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review, RW-Random witness (As specified or 10 % - Samples must include minimum 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
3. For EPC Jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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प्रैशर,डिफरेंशियल प्रैशर और वैक्यूम गेज

के लिए

निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN
FOR
PRESSURE, DIFFERENTIAL PRESSURE
AND VACUUM GAUGES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
4	20.05.20	Revised and Re-issued	NP	RS	RKS	SKS
3	09.01.14	Revised and Re-issued	MJ	RS	SCG	SC
2	15.07.11	Revised and Re issued	GS	SA	AKC	DM
1	02.01.08	Revised and Re-issued	SA	CRM	MVKK	VC
0	30.04.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

AS	:	Alloy Steel	NDT	:	Non Destructive Testing
BIS	:	Bureau of Indian Standards	No.	:	Number
CEIL	:	Certification Engineers International Limited	PMI	:	Positive Material Identification
DP/DPT	:	Dye Penetrant Testing	PO	:	Purchase Order
EPC	:	Engineering Procurement Construction	PQR	:	Procedure Qualification Record
IC	:	Inspection Certification	PR	:	Purchase Requisition
IP	:	Ingress Protection	QC	:	Quality Control
IRN	:	Inspection Release Note	SS	:	Stainless Steel
ITP	:	Inspection and Test Plan	TC	:	Test Certificate
Lab.	:	Third Party Laboratory	TPI or TPIA	:	Third Party Inspection Agency
MTC	:	Material Test Certificates	VDR	:	Vendor Data Requirement
MOC	:	Material of Construction	WPS	:	Welding Procedure Specification
Mfr	:	Manufacturer	WPQ	:	Welders Performance Qualification

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE:

This Inspection and Test Plan covers the minimum testing requirements for Pressure, Differential Pressure and Vacuum Gauges

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**						
1.1	WPS/PQR/WPQ	Welding procedure Qualification for Welding	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Incoming Material like: Pressure Element, Cases, Flanges, Gauge Savers, Snubber, Syphon, Pipe for extended diaphragm seal type, etc.	Chemical and Mechanical Properties	100%	MTC / Lab. TC / Mfr's TC	H	H	R
3.0	**In process Inspection**						
3.1	Assembly and calibration of pressure gauge	Calibration, Over pressure, Hysteresis, Accuracy	100%	Test records	--	H	-
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual Check • DP testing on the weld joints of Pipe & Flanges(For extended Diaphragm seal type) • Dimensional Check • Calibration check on the Gauge. • Over Pressure	100%	Test records	---	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Vacuum test (if applicable) • Hydro test on Snubbers/Gauges savers (as applicable)					
4.2	Type tests on Assembled Pressure Gauges	• Test for influence of Temperature • Shock test • Endurance test • Weather Proof Construction of housing	One sample per model & range	Type Test Certificates	---	H	R
5.0	**Painting**	As specified in the PR.	100%	Supplier's record	---	H	---
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Reviews of Internal Test Reports • Degree of protection certificate for enclosure • Issuance of IC\IRN	-	Supplier Test Records / Type Test certificate / IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports, drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review of Documents, RW-Random witness (As specified or 10 % - Samples must include minimum 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.
3. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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तापीय यन्त्रों एवं थर्मोवैल्स के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR TEMPERATURE GAUGES AND THERMO WELLS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	21.05.20	Revised and Re-issued	NP	RS	RKS	SKS
3	09.01.14	Revised and Re-issued	MJ	RS	SCG	SC
2	15.07.11	Revised and Re-issued	GS	SA	AKC	DM
1	02.01.08	Revised and Re-issued	SA	CRM	MVKK	VC
0	09.12.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

ANSI	:	American National Standards Institute	NDT	:	Non Destructive Testing
AS	:	Alloy Steel	No.	:	Number
CEIL	:	Certification Engineers International Limited	PMI	:	Positive Material Identification
CS	:	Carbon Steel	PO	:	Purchase Order
DP/DPT	:	Dye Penetrant Testing	PQR	:	Procedure Qualification Record
EPC	:	Engineering Procurement Construction	PR	:	Purchase Requisition
IC	:	Inspection Certification	PWHT	:	Post Weld Heat Treatment
IP	:	Ingress Protection	QC	:	Quality Control
IRN	:	Inspection Release Note	RT	:	Radiography Test
ITP	:	Inspection and Test Plan	SAMA	:	Scientific Apparatus Makers Association
Lab.	:	Third Party Laboratory	SS	:	Stainless Steel
LPT	:	Liquid Penetrant Testing	TC	:	Test Certificate
Mfr	:	Manufacturer	TPI or TPIA	:	Third Party Inspection Agency
MTC	:	Material Test Certificates	VDR	:	Vendor Data Requirement
MOC	:	Material of Construction	WPS	:	Welding Procedure Specification
NACE	:	National Association of Corrosion Engineers	WPQ	:	Welders Performance Qualification

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE:

This Inspection and Test Plan covers the minimum inspection and testing requirements for Temperature Gauges and Thermowells.

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**						
1.1	WPS/PQR/WPQ	Welding procedure Qualification	100%	WPS PQR WPQ	---	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Incoming Materials like Flanges, Thermowell Bar stock, Bimetal strip, Capillary, Pipe, etc.	Chemical & Mechanical Properties , Heat treatment, Hardness etc. as applicable.	100%	MTC / Lab. TC	H	H (Note 1)	R
3.0	**In process Inspection**						
3.1	Machining of components & Assembly.	Calibration, Overpressure, Hysteresis, Accuracy	100%	Test records	-	H	-
3.2	NDT / PWHT on Fabricated Thermowells (as applicable)	• RT, DP/DPT/LPT • PWHT	100%	NDT reports / PWHT chart	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.0	**Final Inspection**						
4.1	Final Inspection: **(Thermowells)**	• Visual Check • Dimensional check • Dye Penetration test . • Hydrostatic Pressure withstand test: a. External at 1.5 x Pressure as per flange rating (For Barstock / Builtup Type TWs) b. Internal Pressure tests at 200kg/cm2 (For Barstock TWs) c. Internal Pressure tests for Built-up type Thermowell as per Mfr's recommendation. • Bore Concentricity & wall thickness	100%	Supplier's Test Records / Inspection Witness Record	---	H	RW (Note-5)
4.2	Final Inspection: **(Temperature Gauges)**	• Visual check • Dimensional check • Check for filling liquid (SAMA class) for filled type temperature gauges. • Calibration checks including accuracy, repeatability, over range, etc.	100%	Test Records	---	H	RW
		• Type test certificate for Hermetic Seal • Case capillary compensation • Dry heat, Liquid immersion tests.	1 sample per model & range	Type Test Certificates	---	H	R
4.3	Assembly	• Confirmation of positive contact between Temperature Gauges and Thermowell Tip.	100%	Test Records	---	H	RW
5.0	**Painting**						

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
5.1	Cleaning for special services, Painting	Special cleaning and packing for oxygen and chlorine services	100%	Test Records	---	H	---
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports • Review of Type test reports • Review of Weatherproof Certificates for Gauges • Issuance of IC/IRN	100%	Type Test Reports / Supplier Test Records / IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

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

NOTES :

1. All NACE, Hydrogen service, AS, SS flanges to be inspected by TPIA appointed by the Main Supplier. CS flanges without special service up to size 24" – 300 ANSI will be accepted on review of Supplier Test Certificates.
2. 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).
3. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents
4. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.
5. Dimensional check shall be witnessed for all Thermowells with flange size- rating :12" - 2500# and above

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प्रैशर रिलीफ वाल्वों के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR PRESSURE RELIEF VALVES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	21.05.20	Revised and Re-issued	NP	RS	RKS	SKS
3	09.01.14	Revised and Re-issued	MJ	RS	SCG	SC
2	22.03.12	Revised and Re-issued	MJ	GS	AKC	DM
1	02.01.08	Revised and Re-issued	SA	CRM	MVKK	VC
0	09.12.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

API	:	American Petroleum Institute	NDT	:	Non Destructive Testing
AS	:	Alloy Steel	No.	:	Number
ASME	:	American Society of Mechanical Engineers	PMI	:	Positive Material Identification
CBSP	:	Cold Bench Test Set Pressure	PO	:	Purchase Order
CEIL	:	Certification Engineers International Limited	PQR	:	Procedure Qualification Record
DP/DPT	:	Dye Penetrant Testing	PR	:	Purchase Requisition
EPC	:	Engineering Procurement Construction	PWHT	:	Post Weld Heat Treatment
IC	:	Inspection Certification	QC	:	Quality Control
IRN	:	Inspection Release Note	RT	:	Radiography Test
ITP	:	Inspection and Test Plan	SS	:	Stainless Steel
Lab.	:	Third Party Laboratory	TC	:	Test Certificate
LPT	:	Liquid Penetrant Testing	TPI or TPIA	:	Third Party Inspection Agency
Mfr	:	Manufacturer	VDR	:	Vendor Data Requirement
MTC	:	Material Test Certificates	WPS	:	Welding Procedure Specification
MOC	:	Material of Construction	WPQ	:	Welders Performance Qualification

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Pressure Relief Valves.

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: Castings for Body/Bonnet/ Cast Nozzle, Forgings for Inlet Nozzle/Disk/Seat Pallet etc.	• Mechanical & Chemical properties • Heat treatment, hardness as applicable	100%	MTC / Lab. TC	H	H	R
2.2	Bought out items: Spring/Bellow/Fasteners, Gaskets/Diaphragm/Pilot etc	• Test requirement as applicable for each Components.	100%	Mfr's TC	H	R	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.0	**In process Inspection**						
3.1	Machining of components , Assembly & Testing.	• Visual, Dimensions.	100%	Supplier's Test Records	-	H	R
		• Hydrostatic test on Body & Inlet Nozzles before assembling.	100%	Supplier's Test Records	-	H	RW (Note-4)
3.2	NDT , PWHT (As specified)	• RT of Castings as applicable • RT on Cast Nozzle	100%	NDT reports	-	H	R
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual check . • Dimensional check • Cold Bench Test Set Pressure(CBSP). • Seat Leakage Test • Back Pressure Test & External Joint Leakage Test	100%	Supplier's Test Records and Inspection Witness Record	-	H	RW
4.2	Submission of certificates / Documents	• Capacity Test as per ASME • Blow Down • Valve Lift test • Valve reclosing pressure test	Prototype for each model	Type Test Certificates	-	H	R
5.0	**Painting**						
5.1	Painting	• Special cleaning and packing for oxygen and chlorine services • Pre treatment, primer and final paint, shade, thickness.	100%	Packing list / Supplier's Records	-	H	-

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports &MTC • Bought out items/accessories TC • Issuance of IC/IRN.	100%	Supplier's Test Records / IC/IRN	-	H	H
6.2	Final Document submission	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review of Documents, RW-Random witness(Random 10%, minimum 1 No. of 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 .
3. For EPC Jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.
4. Supplier to carry out this stage Inspection on all items and EIL/TPIA to decide on Witness of this Stage Inspection.

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रपचर डिस्कों के लिए
निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN
FOR
RUPTURE DISCS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	21.05.20	Revised and Reissued	NP	RS	RKS	SKS
3	20.09.13	Revised and Reissued	MJ	RS	SCG	DM
2	22.03.12	Revised and Reissued	MJ	GS	AKC	DM
1	09.05.08	Revised and Reissued	RB	SKD	SKP	VC
0	25.11.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

API	:	American Petroleum Institute	No.	:	Number
AS	:	Alloy Steel	PMI	:	Positive Material Identification
ASME	:	American Society of Mechanical Engineers	PO	:	Purchase Order
CEIL	:	Certification Engineers International Limited	PQR	:	Procedure Qualification Record
DP/DPT	:	Dye Penetrant Testing	PR	:	Purchase Requisition
EPC	:	Engineering Procurement Construction	PWHT	:	Post Weld Heat Treatment
IC	:	Inspection Certification	QC	:	Quality Control
IRN	:	Inspection Release Note	RT	:	Radiography Test
ITP	:	Inspection and Test Plan	SS	:	Stainless Steel
Lab.	:	Third Party Laboratory	TC	:	Test Certificate
LPT	:	Liquid Penetrant Testing	TPI or TPIA	:	Third Party Inspection Agency
Mfr	:	Manufacturer	VDR	:	Vendor Data Requirement
MTC	:	Material Test Certificates	WPS	:	Welding Procedure Specification
MOC	:	Material of Construction	WPQ	:	Welders Performance Qualification
NDT	:	Non Destructive Testing			

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Rupture Discs.

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**						
1.1	WPS/PQR/WPQ	Welding procedure Qualification on welds as applicable.	100%	WPS PQR WPQ	---	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Incoming Materials Rupture Disc, Disc Holder, Flanges(if required), Fasteners etc.	Chemical & Mechanical Properties, Heat Treatment, Hardness etc. as applicable	100%	MTC & Lab. TC.	H	H	R
3.0	**In process Inspection**						
3.1	Machining of components and assembly of Rupture Disc	Visual, Dimensions	100%	Test Records	---	H	-
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual Check • Dimensional check • Verification of Components and Accessories.	100%	Test Records	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Burst pressure test (on sample-1nos. to be selected from 5nos. Discs per Rupture discs) • Tell Tale assembly verification along with accessories as per Spec. requirement. • Availability of J-bolt for alignment/Alternate Provision					
4.2	Submission of certificates	• Type test certificate for the Rupture Discs. • Capacity certification of the rupture disc wherever the sizing is carried out using ASME stamped capacity co-efficient.	1 no. prototype	Type Test Reports	-	H	R
5.0	**Painting**						
5.1	Cleaning for special services, Painting	• Special cleaning and packing for oxygen and chlorine services • Pre treatment, primer and final paint, shade, thickness	100%	Test Records	-	H	-
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports, MTC • Issuance of IC/IRN	100%	Supplier's Test Records / IC/IRN	-	-	H

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval, R-Review, RW-Random witness (As specified or 10 % - Samples must include minimum 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.
3. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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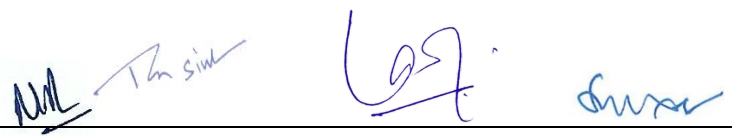
निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN
FOR
CONTROL VALVES



Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	21.05.20	Revised and Reissued	NP	RS	RKS	SKS
3	20.09.13	Revised and Reissued	MJ	RS	SCG	DM
2	22.03.12	Revised and Reissued	MJ	GS	AKC	DM
1	09.05.08	Revised and Reissued	RB	SKD	SKP	VC
0	09.12.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

ASME	:	American Society of Mechanical Engineers
ATEX	:	Atmosphère Explosibles
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres
CEIL	:	Certification Engineers International Limited
CIMFR	:	Central Institute of Mining & Fuel Research
CSA	:	Canadian Standards Association
Cv	:	Valve Flow Coefficient
DGMS	:	Directorate General of Mines Safety
DP/DPT	:	Dye Penetrant Testing
EPC	:	Engineering Procurement Construction
ERTL	:	Electronics Regional Test Laboratory
FCRI	:	Fluid Control Research Institute
FF	:	Fieldbus Foundation
FISCO	:	Fieldbus Intrinsically Safe Concept
FM	:	Factory Mutual
HART	:	Highway Addressable Remote Transducer
IC	:	Inspection Certification
IEC	:	International Electrotechnical Commission
IP	:	Ingress Protection
I/P Converter	:	Current-to-Pneumatic Converter
IR	:	Insulation Resistance
IRN	:	Inspection Release Note
ITP	:	Inspection and Test Plan
Lab.	:	Third Party Laboratory
LCIE	:	Laboratorie Central Des Industries Electriques
IS	:	Intrinsic Safety
LPT	:	Liquid Penetrant Testing
Mfr	:	Manufacturer
MTC	:	Material Test Certificates
MOC	:	Material of Construction
NABL	:	National Accreditation Board for Testing and Calibration Laboratories
NDT	:	Non Destructive Testing
NEMA	:	National Electrical Manufacturers Association
No.		Number
PESO	:	Petroleum Explosive Safety Organization
PMI	:	Positive Material Identification
PO	:	Purchase Order
PQR	:	Procedure Qualification Record
PR	:	Purchase Requisition
PTB	:	Physikalisch-Technische Bundesanstalt
PWHT	:	Post Weld Heat Treatment
QC	:	Quality Control
RT	:	Radiography Test
SIL	:	Safety Integrity Level
SOV	:	Solenoid Valves
TC	:	Test Certificate
TPI or TPIA	:	Third Party Inspection Agency
UL	:	Underwriter's Laboratories
VDR	:	Vendor Data Requirement
WPS	:	Welding Procedure Specification
WPQ	:	Welders Performance Qualification

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Control valve.

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**	--	--	--	--	--	--
1.1	WPS/PQR/WPQ	Welding procedure Qualification for welds, overlays as applicable	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Incoming Material like Forgings & Casting for Body/ Bonnet, Trim , silencers, diffuser plates, Expanders, Reducers, Flanges Fasteners etc. (as applicable)	Chemical & Mechanical Properties, Heat Treatment, Hardness as applicable.	100%	MTC / Lab.TC/ Supplier's TC.	H	H	R
2.2	Accessories such as : Positioners, I/P Converters, Solenoid Valves, Actuator, Limit Switches, Air Filter Regulators etc.(as applicable)	Make, Model no., functional check	100%	Supplier's TC/ Certificate of Compliance	H	R	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.0	**In process Inspection**						
3.1	Machining, Stelliting of Trim (As specified)	• DPT on Stellited/ Hardened Trim (as applicable) • Hardness test on component/test coupon, as per supplier's practice.	100%	Supplier's Internal Test Records/Register	--	H	R
3.2	Valve Sub-Assembly (before mounting Actuator, Positioners,Tubing etc.)	Hydrostatic Shell test as per ASME B16.34	100%	Supplier's Internal Test Reports		H	R
3.3	NDT , PWHT (as specified)	• RT, DP/DPT/LPT • PWHT	100%	NDT reports / Mfr's TC/ PWHT chart	-	H	R
4.0	**Final Inspection**						
4.1	Final Inspection on assembled Valve	• Visual Check • Dimensional Verification on representative samples. • Verify FF Tick Mark & Device Description(DD) Version, as certified by Fieldbus Foundation for Fieldbus positioners • Hydrostatic Shell Test as per B16.34 / Body Mount Leak test at 1.1 times Cold working Pressure for leakage on gland packing (provided Shell test is done as part of 3.2 above). • Seat leak test. • Pneumatic test at supply pressure	100%	Inspection Witness Record	-	H	RW (Note-4)

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Calibration of Valves (Stroke within +/- 1% span for with Smart/FF positioners & 1.5% of span with I/P Convertors) • Functional check for Valve Failure position, SOV, Limit Switch operation, as applicable • Dynamic Response Test, if applicable • Helium Leak Test, if applicable • Verification of FF Check Mark on Fieldbus type Positioners/Instruments. • Verification of provision of spare gaskets/packings for each valve and other spares (as specified) with Certificate of Conformity					
4.2	Valve Capacity in terms of Valve Flow Coefficient(Cv) (as applicable)	Cv Test report from reputed Lab., in case offered Valve Cv is not in the Catalog of the Supplier.	100%	Lab. TC	-	H	R
4.3	Submission of certificates/document	• For Electrically Hazardous Area : a. Indigenous Items: Certificate from CIMFR/ Karandikar Lab. / ERTL and valid BIS License & corresponding valid PESO Certificate for the requisite Hazardous Area Classification. b. Imported items: Certificates from testing agency like LCIE, BASEEFA, FM , UL, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification	Prototype	Statutory Approval Certificates / Type Test Certificates	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		c. For projects related to mining, approval from DGMS-India required. • Degree of protection certificate (IP) for instrument housing. • Fire Safe Certification of valve, Fire Blanketing Certification, as applicable. • Cryogenic Certification, if applicable • SIL certification of valves and accessories, if applicable • Fugitive Emission Certification, if applicable • IBR Form IIIC/ Provisional Certificate, if applicable. • Interoperability Certification of Fieldbus / Profibus Type Instruments. • FISCO/IS certification for Fieldbus type Instruments.					
5.0	**Painting**						
5.1	Packing	• Cleaning for oxygen and chlorine services. • Suitable protection to prevent entry of foreign material. • Lubrication for valves, which require external lubrication.	100%	Test Records	-	H	-

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports, Type Test reports, MTC, Mfr's TC etc. • Issuance of IC/ IRN	100%	Supplier Test Records / IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval, R- Review, RW-Random witness (As specified or 10 % - Samples must include minimum 1No. 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
3. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.
4. Dimensional Check for all Valves of rating 12"-2500# and above, shall be witnessed during Inspection.

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इलेक्ट्रानिक उपकरणों के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR ELECTRONIC INSTRUMENTS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	22.05.20	Revised and Reissued	NP	RS	RKS	SKS
3	21.11.13	Revised and Reissued	MJ	RS	SCG	SC
2	22.03.12	Revised and Reissued	MJ	GS	AKC	DM
1	02.01.08	Revised and Re-issued	SA	CRM	MVKK	VC
0	03.03.03	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

AS	:	Alloy Steel	Mfr	:	Manufacturer
ATEX	:	Atmosphère Explosibles	MTC	:	Material Test Certificates
BIS	:	Bureau of India Standards	MOC	:	Material of Construction
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres	NAMUR	:	Normenarbeitsgemeinschaft für Mess- und Regeltechnik in der Chemischen Industrie
			NDT	:	Non Destructive Testing
CEIL	:	Certification Engineers International Limited	NEMA	:	National Electrical Manufacturers Association
CSA	:	Canadian Standards Association	No.	:	Number
DGMS	:	Directorate General of Mines Safety	PESO	:	Petroleum and Explosives Safety Organisation
DP/DPT	:	Dye Penetrant Testing	PMI	:	Positive Material Identification
EPC	:	Engineering Procurement Construction	PO	:	Purchase Order
ERTL	:	Electronics Regional Test Laboratory	PQR	:	Procedure Qualification Record
FF	:	Fieldbus Foundation	PR	:	Purchase Requisition
FISCO	:	Fieldbus Intrinsically Safe Concept	PTB	:	Physikalisch-Technische Bundesanstalt
FM	:	Factory Mutual	PWHT	:	Post Weld Heat Treatment
FAT	:	Factory Acceptance Test	QC	:	Quality Control
HART	:	Highway Addressable Remote Transducer	RT	:	Radiography Test
IEC	:	International Electrotechnical Commission	SIL	:	Safety Integrity Level
IP	:	Ingress Protection	SS	:	Stainless Steel
IRN	:	Inspection Release Note	TC	:	Test Certificate
IS	:	Intrinsic Safety	TPI or TPIA	:	Third Party Inspection Agency
IT	:	Information Technology	UL	:	Underwriter's Laboratories
ITP	:	Inspection and Test Plan	VDR	:	Vendor Data Requirement
Lab.	:	Third Party Laboratory	WPS	:	Welding Procedure Specification
LCIE	:	Laboratorie Central Des Industries Electriques	WPQ	:	Welders Performance Qualification
LPT	:	Liquid Penetrant Testing			

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements of following types of Electronic Instruments.

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**						
1.1	WPS/PQR/WPQ	Welding procedure Qualification for Welding	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Incoming Material like : Sensors, Housings, Flanges, Pipe, Spacer Ring, Valve Manifolds etc.	Mechanical/Chemical properties, Heat Treatment as applicable.	100%	MTC/ Mfr's TC	H	H	R
3.0	**In process Inspection**						
3.1	Welding: For Extended Diaphragm and Remote or Chemical seal Type Instruments.	DP/DPT/LPT on Welds	100%	Supplier's Test Certificates	H	H	R
3.2	Instrument assembly	As per internal setup procedure by the manufacturer.	100%	Supplier's Test Records	-	H	-

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.0	**Final Inspection**						
4.1	Final Inspection on assembled Instruments	• Visual Check • Components and Accessories Verification. • Dimensional verification. • Field bus registration Check Mark • Over-range/ Static Pressure protection check (as applicable) • Vacuum test on Transmitters required for Vacuum service. • Calibration Check of Instruments. • Load Driving Capability(4-20mA and HART Instruments). • Power supply variation check. • Communication, Configuration & Diagnostics check with Hand Held Configurator or Hart/Fieldbus specified –(on representative sample) • Remote Output Meter: Visual & Configuration of Meter Display. • Field Universal Communicator : Visual & Accessories Verification	100%	Supplier's Test Records / Inspection Witness Record	-	H	RW (Note-4)
4.2	For Integral Orifice / Meter run assembly	The requirements shall be as per Engineers India Ltd's Standard ITP ref. 6-81-2004 shall be followed.	--	--	-	-	-

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.3	Wireless Network Systems (Including Transmitters, signal repeaters, signal Boosters , gateway etc. and other IT hardware) .	Inspection shall be done with a FAT procedure prepared & submitted by the supplier and approved by concerned authorities.	100%	FAT report	-	H	H
4.4	Submission of certificates / Documents	• <u>For Electrically Hazardous Area :</u> a. Indigenous Items: Certificate from CIMFR/ Karandikar Lab. / ERTL and valid BIS License & corresponding valid PESO Certificate for the requisite Hazardous Area Classification b. Imported items: Certificates from testing agency like LCIE, BASEEFA, FM , UL, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification c. For projects related to mining, approval from DGMS-India required. • Certification for Fieldbus Transmitters for IS/FISCO as per PR • Degree of protection certificate for instrument housing. • Certificate for electromagnetic compatibility and transient protection as per IEC 61000-4 • SIL certification, if applicable • O/P updating frequency and Response time for the transmitter (on 1 unit/model)	sample	Statutory Approval Certificates / Type Test Reports	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Compliance to NAMUR NE 43 as applicable • Interoperability certification for the Fieldbus/Profibus Instruments, as applicable					
5.0	**Painting**						
5.1	Painting	• Special cleaning and packing for oxygen and chlorine services	100%	Packing list / Supplier's Records	-	H	-
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports, MTC • Device Description files • Issuance of IC/IRN	100%	Supplier's Test Records / IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Documents Review, RW-Random witness (As specified or 10 % - Samples must include minimum 1No. 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.
3. For EPC jobs, Scope of Inspection shall be under TPIA only , unless specified otherwise.
4. Wherever special type Fasteners(such as Long Studs & Nuts) are specified/required for process connection as per PR- Visual check on all fasteners shall be witnessed during Final Inspection.

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परिनालिका वाल्व
के लिए
निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN
FOR
SOLENOID VALVES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
3	22.05.2020	Revised and Reissued	NP	RS	RKS	SKS
2	21.11.2013	Revised and Reissued	MJ	RS	SCG	SC
1	22.03.2012	Revised and Reissued	MJ	GS	AKC	DM
0	01.12.2008	Issued for implementation	RB	SKD	SKP	VC

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Abbreviations

AS	:	Alloy Steel
ATEX	:	Atmosphère Explosibles
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres
CEIL	:	Certification Engineers International Limited
CIMFR	:	Central Institute of Mining & Fuel Research
CSA	:	Canadian Standards Association
DGMS	:	Directorate General of Mines Safety
DP/DPT	:	Dye Penetrant Testing
EPC	:	Engineering Procurement Construction
ERTL	:	Electronics Regional Test Laboratory
FM	:	Factory Mutual
HART	:	Highway Addressable Remote Transducer
HV	:	High Voltage
IC	:	Inspection Certification
IEC	:	International Electrotechnical Commission
IP	:	Ingress Protection
IR	:	Insulation Resistance
IRN	:	Inspection Release Note
ITP	:	Inspection and Test Plan
Lab.	:	Third Party Laboratory
LCIE	:	Laboratorie Central Des Industries Electriques
LPT	:	Liquid Penetrant Testing
MTC	:	Material Test Certificates
MOC	:	Material of Construction
NDT	:	Non Destructive Testing
NEMA	:	National Electrical Manufacturers Association
No.	:	Number
PESO	:	Petroleum and Explosives Safety Organisation
PMI	:	Positive Material Identification
PO	:	Purchase Order
PQR	:	Procedure Qualification Record
PR	:	Purchase Requisition
PTB	:	Physikalisch-Technische Bundesanstalt
QC	:	Quality Control
SS	:	Stainless Steel
TC	:	Test Certificate
TPI or TPIA	:	Third Party Inspection Agency
UL	:	Underwriter's Laboratories
VDR	:	Vendor Data Requirement
WPS	:	Welding Procedure Specification
WPQ	:	Welders Performance Qualification

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Solenoid valves.

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 Body , Coil Conductor material etc.	Chemical and Physical . Coil conductor test reports	100%	MTC/ Lab.TC/ Mfr's TC	H	H	R
3.0	**In process Inspection**						
3.1	Solenoid valve assembly	Visual, Dimensional	100%	Supplier's test records	-	H	-
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual Checks • Dimensional check • Functional Check including Pick-up / Drop down voltage check. • HV Test • Insulation Resistance test	100%	Supplier's records	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Pneumatic test by Air/Nitrogen. • Seat leakage test by Air /Nitrogen					
4.2	Submission of certificates / Documents	• <u>For Electrically Hazardous Area item:</u> a. Indigenous :Certificate from CIMFR/ Karandikar Lab. / ERTL and valid BIS License & corresponding valid PESO Certificate for the requisite Hazardous Area Classification b. Imported: Certificates from testing agency like LCIE, BASEEFA, FM, UL, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification c. For projects related to mining, approval from DGMS-India required. • Degree of protection certificate (IP) for Instrument housing.	Prototype for each model	Statutory Approval Certificates / Type Test Certificates	-	H	R
5.0	**Painting**						
5.1	Painting and Packing	• Special cleaning and packing for oxygen and chlorine services • Pre treatment, primer and final paint, shade, thickness	100%	Packing list / Supplier's Records	-	H	-

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports, MTC • Issuance of IC/IRN.	100%	Supplier's Test Records / IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

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
3. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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प्रोसेस प्रवाह विश्लेषक के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR PROCESS STREAM ANALYSERS

Rev. No.	Date	Purpose	Prepared by	Checked By	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	22.05.20	Revised and Reissued	NP	RS	RKS	SKS
3	21.11.13	Revised and Reissued	MJ	RS	SCG	SC
2	22.03.12	Revised and Reissued	MJ	GS	AKC	DM
1	09.05.08	Revised and Reissued	RB	SKD	SKP	VC
0	03.03.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

ATEX	:	Atmosphère Explosibles
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres
CEIL	:	Certification Engineers International Limited
CIMFR	:	Central Institute of Mining & Fuel Research
CSA	:	Canadian Standards Association
DGMS	:	Directorate General of Mines Safety
DP/DPT	:	Dye Penetrant Testing
EPC	:	Engineering Procurement Construction
ERTL	:	Electronics Regional Test Laboratory
FM	:	Factory Mutual
IC	:	Inspection Certification
IEC	:	International Electrotechnical Commission
IP	:	Ingress Protection
IRN	:	Inspection Release Note
IT	:	Information Technology
ITP	:	Inspection and Test Plan
Lab.	:	Third Party Laboratory
LCIE	:	Laboratorie Central Des Industries Electriques
IR	:	Infra-Red
LPT	:	Liquid Penetrant Testing
Mfr	:	Manufacturer
MTC	:	Material Test Certificates
No.	:	Number
PESO	:	Petroleum and Explosives Safety Organisation
PMI	:	Positive Material Identification
PO	:	Purchase Order
PQR	:	Procedure Qualification Record
PR	:	Purchase Requisition
PTB	:	Physikalisch-Technische Bundesanstalt
QC	:	Quality Control
SCADA	:	Supervisory control and data acquisition
SHS	:	Sample Handling System
TC	:	Test Certificate
TDLS	:	Tunable Diode Laser Spectrometer
TPI or TPIA	:	Third Party Inspection Agency
UL	:	Underwriter's Laboratories
UV	:	Ultra Violet
VDR	:	Vendor Data Requirement
WPS	:	Welding Procedure Specification
WPQ	:	Welders Performance Qualification

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Process Stream Analysers.

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**	--	--	--	--	--	--
1.1	WPS/PQR/WPQ (for SHS)	Welding procedure Qualification for welds, overlays as applicable	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection** (As applicable)						
2.1	1. Incoming Material for Panels, Sample Handling System including sample probes, pressure reducers, safety relief valves, Gas Cylinders, moisture separators, flow regulators, pressure gauges, Isolation valves, flanges, fittings, pipes & tubing	Chemical and Mechanical Properties	100%	Lab.TC/ Mfr's TC	H	H	R
	2. Other Major Bought outs / Accessories: Air Conditioner, Coolers, Chemical Filters, Sample Pumps, Filters, Purging systems , Safety Relief Valves, Temperature/ Pressure Gauges,Valves, Gas	Make/Model/Calibration/Functional Checks		Lab.TC/ Mfr's TC	H	R	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
	Cylinders,Power Distribution Boards, Junction Boxes, Cables, Restriction Orifice, Manifolds, Flow Indicators, flow regulators, Transmitters, Solenoid valves, Heat tracers etc., as applicable						
3.0	**In process Inspection**						
3.1	Fabrication & Assembly of Racks/Cabinets/Panels, Drain/Inst. Air Piping and Assembly sample handling system(SHS)	• Visual, Dimensional verification, functional • Hydro / Pneumatic test on Assembled SHS	100%	Supplier's Test Records	H	H	R
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual Check, Dimensional Verification • Complete Bill Of Material Check (including spares) of each Analyser, Sample Handling System, IT / SCADA hardware / Software, Calibration Gas Cylinders etc – Make / Model /Specifications of all items • Power Supply Variation check • Leak test for complete Analyser system, including Sample Handling System • Check for retractable Probe mechanism, if applicable • Check Analysers for various system	100%	Inspection records	-	H	H

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		functions, diagnostics & interlocks , auto calibration, stream switching etc. as per PR Datasheets • Following Checks on Shelter / Panels, as applicable: a. Visual/Dimensional b. Operation of Air Conditioners / Vortex Cooler, Redundancy, Shut Down/Restart Interlock as per requirement c. Functionality of all Instruments like LEL Detector, Beacon, Hooter etc. d. Wiring - Check for Analog, Digital, Serial Signals & Power Supply Distribution, as specified e. Grounding Check f. Operation of Purged panel (if applicable) in line with Type of Purging required • Analysers Performance Test (as applicable): a. <u>IR/ UV Analysers:</u> ▪ Response Time, ▪ Repeatability ▪ Zero drift per 8 hours					

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		b. <u>Thermal Conductivity Analyser</u> ▪ Response Time ▪ Repeatability for 8 hrs ▪ Accuracy (at least at 3 points of the range) c. <u>Moisture / Dew Point Analyser</u> ▪ Accuracy (at least at 3 points of the range) ▪ Repeatability ▪ Response Time d. <u>Oxygen Analysers</u> ▪ Accuracy (at least at 3 points of the range) ▪ Repeatability ▪ Response time e. <u>TDLS Analyser</u> ▪ Accuracy (atleast at 3 points of the range) ▪ Repeatability ▪ Response time ▪ Linearity					

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.2	Submission of certificates / Documents	• For Electrically Hazardous Area : a. Indigenous Items: Certificate from CIMFR/ Karandikar Lab. / ERTL and valid BIS License & corresponding valid PESO Certificate for the requisite Hazardous Area Classification b. Imported items: Certificates from testing agency like LCIE, BASEEFA, FM, UL, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification c. For projects related to mining, approval from DGMS-India required. • Degree of protection certificate (IP) for instrument housing, Panel, as applicable • Certificate for electromagnetic compatibility as per IEC 61000-4	Prototype for each model	Statutory Approval Certificates / Type Test Certificates	-	H	R
		• 24hrs Zero Drift test for IR/UV Analysers & 24 hrs Repeatability Test for Thermal Conductivity Analysers	100%	Test Records/Results	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
5.0	**Painting**						
5.1	Painting and Packing (Analyser system)	• Special cleaning and packing for oxygen and chlorine services • Pre treatment, primer and final paint, shade, thickness.	100%	Packing list / Supplier's Records	-	H	-
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports, MTC • Issuance of IC/IRN.	Prototype for each model	Supplier's Test Records / IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports , drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

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

NOTES :-

1. Performance of All Analysers to be witnessed (RW) by EIL/TPIA as part of final inspection. In case of non availability of test facilities, Analysers to be offered for TPIA (H) witness testing at OEM works prior to despatch.
2. Wherever included in the PR, Inspection Test Plan for Shelter to be referred and complied
3. 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).
4. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents
5. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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आँन-आँफ वाल्व
के लिए
निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN
FOR
ON-OFF VALVES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
3	25.05.2020	Revised and Reissued	NP	RS	RKS	SKS
2	21.11.2013	Revised and Reissued	MJ	RS	SCG	SC
1	22.03.2012	Revised and Reissued	MJ	GS	AKC	DM
0	01.12.2008	Issued for implementation	RB	SKD	SKP	VC

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Abbreviations

AS	:	Alloy Steel	Mfr	:	Manufacturer
ATEX	:	Atmosphère Explosibles	MTC	:	Material Test Certificates
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres	MOC	:	Material of Construction
			MVT	:	Manual Valve Test
BIS	:	Bureau of India Standards	NDT	:	Non Destructive Testing
CEIL	:	Certification Engineers International Limited	NEMA	:	National Electrical Manufacturers Association
CIMFR	:	Central Institute of Mining & Fuel Research	No.	:	Number
CSA	:	Canadian Standards Association	PESO	:	Petroleum and Explosives Safety Organisation
DGMS	:	Directorate General of Mines Safety	PMI	:	Positive Material Identification
DP/DPT	:	Dye Penetrant Testing	PO	:	Purchase Order
EIL	:	Engineers India Limited	PQR	:	Procedure Qualification Record
EPC	:	Engineering Procurement Construction	PR	:	Purchase Requisition
ERTL	:	Electronics Regional Test Laboratory	PTB	:	Physikalisch-Technische Bundesanstalt
FM	:	Factory Mutual	PST	:	Partial Stroke Test
HART	:	Highway Addressable Remote Transducer	QC	:	Quality Control
IC	:	Inspection Certification	RT	:	Radiography Test
IEC	:	International Electrotechnical Commission	SIL	:	Safety Integrity Level
IP	:	Ingress Protection	SS	:	Stainless Steel
IR	:	Insulation Resistance	TC	:	Test Certificate
IRN	:	Inspection Release Note	TPI or TPIA	:	Third Party Inspection Agency
ITP	:	Inspection and Test Plan	UL	:	Underwriters Laboratories
Lab.	:	Third Party Laboratory	VDR	:	Vendor Data Requirement
LCIE	:	Laboratorie Central Des Industries Electriques	WPS	:	Welding Procedure Specification
LPT	:	Liquid Penetrant Testing	WPQ	:	Welders Performance Qualification

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for ON-OFF Valves.

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**	--	--	--	--	--	--
1.1	WPS/PQR/WPQ	Welding procedure Qualification for welds as applicable/Stelliting	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	a. Incoming Material : Casting/forging for Body/Bonnet/ Balls/Disc & Forgings for Seat, Rings, Stems, Material for Steam Jacketing & Volume Bottles etc(as applicable) b. Bought out items : I/P converter, Positioners, Quick Exhaust Valves/ Volume Booster (if specified), Limit Switches, Air Filter Regulator, Solenoid Valves etc. (as applicable) c. Pneumatic Actuator: Enclosures & Components/ accessories.	a. Physical and Chemical Properties, Heat Treatment, Hardness etc as applicable. b. Bought out item: Make, Model No , MOC, Serial Rating, Size, Hydro test, Functional checks as applicable.	100%	MTC / Lab.TC/ NDT Reports/ Mfr's TC	H	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.0	**In process Inspection**						
3.1	Castings Material(Body, Bonnet , Disc, Ball etc)	• Radiography as applicable	100%	NDT Report	-	H	R
3.2	Machining, Stelliting , Assembly and Fabrication of Jacketing (for jacketed valves) and Volume Bottles (as applicable).	• Visual, Dimensional, • DPT and Hardness check on the Stellited face.	100%	Supplier's Test Records	-	H	R
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual Check • Dimensional Check. • Hydrostatic test on all valve bodies. • Hydrotest on jacketing. • Seat leakage test. • Leakage test of Pneumatic circuits. • Pneumatic pressure test on actuators. • ON/OFF Stroke Testing & Check of Function of Limit switch operation. • Fail-Safe Function check for failure of electrical or pneumatic connection. • Manual Valve Test(MVT) • Partial Stroke Test(PST) with HART Positioners and Valve Signature (as specified) • Communication and configuration of HART Type Positioners with Hand Held Configurator .	100%	Supplier's Test Records and Inspection Record	-	H	RW (Note-4)

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Opening-Closing operation time • Cryogenic test if specified • Helium leak test if specified • Colour shade : Body, Bonnet, Actuator, Volume Tank, Accessory etc • Pneumatic hook up verification of double acting and fire safe actuator with volume bottle as applicable.					
4.2	Submission of certificates / Documents	• For Electrically Hazardous Area : a. Indigenous Items: Certificate from CIMFR/ Karandikar Lab. / ERTL and Valid BIS License, & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification. b. Imported items: Certificates from testing agency like LCIE, , BASEEFA, FM, UL, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification. c. For projects related to mining, approval from DGMS-India required. • Degree of Protection of enclosures as applicable. • Cryogenic service test certificate as per applicable specification, if specified.	Prototype for each model	Statutory Approval Certificates / Type Test Certificates	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Fire safe type test certificates for fire safe valves as per relevant standards duly witnessed by TPIA, if specified. • Immunity of Positioner to Line/Valve Vibration. • SIL Certifications(if specified)					
5.0	**Painting**						
5.1	Painting and Packing	• Special cleaning and packing for oxygen and chlorine services • Pre-treatment, primer and final paint, shade, thickness.	100%	Packing list / Supplier's Records	-	H	-
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports • Issuance of IC/IRN.	100%	Supplier's Test Records / IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review, RW-Random witness (As specified or 10 % - Samples must include minimum 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.
3. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.
4. Dimensional verification for all Valves of rating 12", 2500# and above shall be witnessed.

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डीसुपरहीटर एवं पीआरडीएस के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR DESUPERHEATERS & PRDS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
3	25.05.2020	Revised and Reissued	NP	RS	RKS	SKS
2	21.11.2013	Revised and Reissued	MJ	RS	SCG	SC
1	22.03.2012	Revised and Reissued	MJ	GS	AKC	DM
0	08.12.2008	Issued for implementation	SA	SKD	SKP	VC

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Abbreviations

AS	:	Alloy Steel
ATEX	:	Atmosphère Explosibles
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres
BIS	:	Bureau of Indian Standards.
CEIL	:	Certification Engineers International Limited
CIMFR	:	Central Institute of Mining & Fuel Research
CSA	:	Canadian Standards Association
DGMS	:	Directorate General of Mines Safety
DP/DPT	:	Dye Penetrant Testing
EIL	:	Engineers India Limited
EPC	:	Engineering Procurement Construction
ERTL	:	Electronics Regional Test Laboratory
FCRI	:	Fluid Control Research Institute
FF	:	Fieldbus Foundation
FISCO	:	Fieldbus Intrinsically Safe Concept
FM	:	Factory Mutual
HART	:	Highway Addressable Remote Transducer
IBR	:	Indian Boiler Regulations
IC	:	Inspection Certification
IEC	:	International Electrotechnical Commission
IP	:	Ingress Protection
IRN	:	Inspection Release Note
ITP	:	Inspection and Test Plan
Lab.	:	Third Party Laboratory
LCIE	:	Laboratorie Central Des Industries Electriques
LPT	:	Liquid Penetrant Testing
Mfr	:	Manufacturer
MTC	:	Material Test Certificates
MOC	:	Material of Construction
NDT	:	Non Destructive Testing
NEMA	:	National Electrical Manufacturers Association
No.	:	Number
PESO	:	Petroleum and Explosives Safety Organisation
PMI	:	Positive Material Identification
PO	:	Purchase Order
PQR	:	Procedure Qualification Record
PR	:	Purchase Requisition
PRDS	:	Pressure Reducing and De-superheating System
PTB	:	Physikalisch-Technische Bundesanstalt
QC	:	Quality Control
RT	:	Radiography Test
SIL	:	Safety Integrity Level
SS	:	Stainless Steel
TC	:	Test Certificate
TPI or TPIA	:	Third Party Inspection Agency
UL	:	Underwriters Laboratories
VDR	:	Vendor Data Requirement
WPS	:	Welding Procedure Specification
WPQ	:	Welders Performance Qualification

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Desuperheaters and PRDS.

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	TPIA/EIL (Note.3)
1.0	**Procedures**	--	--	--	--	--	--
1.1	WPS/PQR/WPQ	Welding procedure Qualification for welds as applicable	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	a. Incoming Material (As applicable): Valve Body Casting, Forgings , Pipes, plug, stem, Wafer body, Atomizing Nozzles, Diffuser , Flanges, Strainers, Line reducer/ Expanders and interconnecting pipes etc as applicable	Chemical, Mechanical Properties, Radiography, Heat treatment, Hardness as applicable.	100%	MTC / Lab.TC/ Mfr's TC	H	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	TPIA/EIL (Note.3)
	b. Actuators, Positioner, Solenoid valves, Air Filter regulator with gauges, Pressure/ Temperature element / transmitters(if specified),	Make, Model No , Functional checks	100%	Mfr's TC	H	H	R
3.0	**In process Inspection**						
3.1	Machining, Fabrication , Stelliting/Hardening/Lining, De-super heaters and PRDS assembly	Visual, Dimensional, NDT (as applicable) DPT for Stellited/Hardened Parts.	100%	Supplier's test records	-	H	R
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual and Dimensional check • Hydrostatic test & Seat Leakage • Functional test consisting of Valve (Plug) characteristics. • Auto/Manual reset check for Solenoid Valves . • Pneumatic test of pneumatic actuator, where applicable • Test on smart positioners for Configuration, calibration and diagnostics check through HART/Fieldbus Configurator • Positioner Performance test with Valve completed with all accessories for Accuracy, Repeatability and Hysteresis. • Verification of Registration/ FF check mark for Fieldbus instruments	100%	Supplier's Test Records and Inspection Witness Record	H	H	RW (Note-4)

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	TPIA/EIL (Note.3)
4.2	Submission of Certificates / Documents	• For Electrically Hazardous Area : a. Indigenous Items: Certificate from CIMFR/ Karandikar Lab. / ERTL and Valid BIS License, & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification b. Imported items: Certificates from testing agency like LCIE, BASEEFA, FM, UL, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification c. For projects related to mining, approval from DGMS-India required. • Degree of protection certificate (IP) for Instrument housing/enclosures as applicable. • Immunity of positioner to line or valve vibration. • Intrinsic Safe (entity concept) or FISCO approval for Fieldbus type Positioners for Hazardous area . • Interoperability Certificates for Fieldbus or Profibus type Positioners as specified.	Prototype for each model	Statutory Approval Certificates / Type Test Certificates	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	TPIA/EIL (Note.3)
5.0	**Painting**						
5.1	Painting and Packing	• Special cleaning and packing for oxygen and chlorine services • Pre treatment, primer and final paint, shade, thickness.	100%	Packing list / Supplier's Records	-	H	-
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Check for availability of IBR forms • Review of Internal Test Reports • IC /IRN issuance.	100%	Supplier's Test Records / IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R- Review, RW- Random witness (As specified or 10 % - Samples must include minimum 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
3. For items under IBR, supplier to proceed as per IBR rules and guidelines. Tests and review of documents not covered by IBR shall be carried out by EIL and for EPC jobs, Tests and review of documents not covered by IBR shall be carried out by TPIA only, unless specified otherwise.
4. For bought out Control Valves, TPIA(appointed by supplier) shall witness the Inspection at sub-supplier's works. EIL to decide on the witness of the Inspection during this stage.

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प्रोग्रामेबल लॉजिक कन्ट्रोलर के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR PROGRAMMABLE LOGIC CONTROLLERS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
3	25.05.2020	Revised and Reissued	NP	RS	RKS	SKS
2	21.11.2013	Revised and Reissued	MJ	RS	SCG	SC
1	22.03.2012	Revised and Reissued	MJ	GS	AKC	DM
0	08.12.2008	Issued for implementation	RB	SKD	SKP	VC

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Abbreviations

AI	:	Analog Input
AO	:	Analog output
ATEX	:	Atmosphère Explosibles
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres
CEIL	:	Certification Engineers International Limited
CIMFR	:	Central Institute of Mining & Fuel Research
CPU	:	Central Processing Unit
CSA	:	Canadian Standards Association
DI	:	Digital Input
DO	:	Digital output
DGMS	:	Directorate General of Mines Safety
EIL	:	Engineers India limited.
EPC	:	Engineering Procurement Construction
ERTL	:	Electronics Regional Test Laboratory
EM/RFI	:	Electromagnetic /Radio frequency Interference
FAT	:	Factory Acceptance Test
FF	:	Fieldbus Foundation
FISCO	:	Fieldbus Intrinsically Safe Concept
FM	:	Factory Mutual
HART	:	Highway Addressable Remote Transducer
IC	:	Inspection Certification
IEC	:	International Electrotechnical Commission
I/O	:	Input/Output
IP	:	Ingress Protection
IRN	:	Inspection Release Note
ISA	:	International Society of Automation
IT	:	Information Technology
ITP	:	Inspection and Test Plan
LCIE	:	Laboratorie Central Des Industries Electriques
Mfr	:	Manufacturer
MTC	:	Material Test Certificates
NEMA	:	National Electrical Manufacturers Association
No.	:	Number
PDB	:	Power distribution Board
PESO	:	Petroleum and Explosives Safety Organisation
PLC	:	Programmable Logic Controller
PO	:	Purchase Order
PR	:	Purchase Requisition
PTB	:	Physikalisch-Technische Bundesanstalt
QC	:	Quality Control
SCADA	:	Supervisory Control and Data Acquisition
SIL	:	Safety Integrity Level
SOE	:	Sequence of Events
TC	:	Test Certificate
TPI or TPIA	:	Third Party Inspection Agency
TUV	:	Technischer Überwachungsverein(Certifying agency)
UL	:	Underwriter's Laboratories
UHF/VHF	:	Ultra High Frequency /Very High Frequency
VDR	:	Vendor Data Requirement

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Programmable Logic Controllers (PLC).

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 : Cabinets/Panels console, PLC Hardware/ Software, IT & Networking Hardware / Software, SCADA Software/ Third party Software. Marshalling / Interposing device/ Signal Conditioning Components, Panel & power supplies, wires, Surge Protectors etc.	Make, Model, specifications. Operational check of components.	100%	MTC/ Mfr's TC	H	H	R
3.0	**In process Inspection**						
3.1	PLC Assembly	• Visual & Dimensions, • Bill of material, • Panel Wiring, • High Voltage, • Insulation Resistance .	100% by Supplier	Supplier's records	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/ TPIA
3.2	Burn-in Test	Burn in test for 30 days (Including FAT Duration)	100 %	Test records	-	H	R
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual Check • Dimensional check. • Bill of material. • High voltage and insulation testing of PDBs • Functional testing as per approved FAT procedure). • Loop continuity. • Redundancy check • Complete system configuration loading check(CPU Loading). • Demonstration of all PLC system builder function, generation of graphics, Trends, reports etc. • Checking of logics : Normal process control ; Shutdown/Interlock/ Sequence Logic • SOE function check. • Check scan time for Combinations: DI-DO AI-DO and AI-AO . • Check all PLC console displays, keyboard and touch-screen operation, printer function • System diagnostic check for all subsystems, including checking of testing software for I/O module, signal conditioning module if specified. • Fail safe (Check output status) on processor failure.	100%	Supplier's Test Records	-	H	RW

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/ TPIA
		• Functionality of Asset Management system if applicable. • Functionality of Alarm Management system. • Check first-out alarm generation • Simulation of power failure and system restart auto boot-up of system configuration and program after power • Momentary power loss of 20 ms check • Reversibility of polarity test • Fan failure check. • Verification of SIL architecture as per SIL certifications.					
4.2	Submission of certificates	• Test reports of I/O cards, controllers, Relays, barriers, Signal distributers etc. • Type test Certificate for IS Barriers issued by a statutory authority like BASEEFA, LC1E, CSA, UL, PTB, CIMFR • Degree of protection of panel boards. • SIL (Safety Integrity Level) certification by TUV /Exida . • EM/RFI, UHF/VHF compatibility test certificate • Environmental coating of PLC Sub-systems and System Components (installed outdoor) complying environmental classification class G3 as per ISA-S71.04,	Prototype for each model	Type Test Certificates	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/ TPIA
		• Surge Immunity (as specified). • For Electrically Hazardous Area : a. Indigenous Items: Certificate from CIMFR/ Karandikar Lab. / ERTL and Valid BIS License, & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification b. Imported items: Certificates from testing agency like LCIE, BASEEFA, FM UL, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification c. For projects related to mining, approval from DGMS-India required.					
5.0	**Painting**						
5.1	Painting and Packing	• Visual • Protection against damage during transportation	100%	Packing list / Supplier's Records	-	H	-
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports • Issuance of IC/IRN	100%	Supplier Test Records / IC/IRN	-	H	H

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/ TPIA
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder / Completeness Certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review, RW-Random witness (As specified or 10 % - Samples must include minimum 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
3. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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थर्मोकपल्स,आर टी डी एवं थर्मोवैल्स के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR THERMOCOUPLES, RTDs AND THERMOWELLS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	08.06.20	Revised and Re-issued	NP	RS	RKS	SKS
3	09.01.14	Revised and Re-issued	MJ	RS	SCG	SC
2	15.07.11	Revised and Re-issued	GS	SA	AKC	DM
1	05.05.08	Revised and Reissued	SA	SKD	SKP	VC
0	09.12.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

ANSI	:	American National Standards Institute	Mfr	:	Manufacturer
AS	:	Alloy Steel	MI Cable	:	Mineral Insulated Cable
ASME	:	American Society of Mechanical Engineers	MOC	:	Material of Construction
ASME PTC	:	ASME Performance Test Code			
ATEX	:	Atmosphère Explosibles	MTC	:	Material Test Certificates
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres	NACE	:	National Association of Corrosion Engineers
			NDT	:	Non Destructive Testing
BIS	:	Bureau of Indian Standards	NEMA	:	National Electrical Manufacturers Association
CEIL	:	Certification Engineers International Limited	No.	:	Number
CIMFR	:	Central Institute of Mining & Fuel Research	PESO	:	Petroleum and Explosives Safety Organisation
CS	:	Carbon Steel	PMI	:	Positive Material Identification
CSA	:	Canadian Standards Association	PO	:	Purchase Order
DGMS	:	Directorate General of Mines Safety	PQR	:	Procedure Qualification Record
DPT	:	Dye Penetrant Testing	PR	:	Purchase Requisition
EIL	:	Engineers India limited.	PTB	:	Physikalisch-Technische Bundesanstalt
EMF	:	Electro-Motive Force	PWHT	:	Post Weld Heat Treatment
EPC	:	Engineering Procurement Construction	QC	:	Quality Control
ERTL	:	Electronics Regional Test Laboratory	RTD	:	Resistance Temperature Detector
FLP	:	Flame Proof	SS	:	Stainless Steel
FM	:	Factory Mutual	TC	:	Test Certificate
IC	:	Inspection Certification	T/C	:	Thermocouple
IEC	:	International Electrotechnical Commission	TPI or TPIA	:	Third Party Inspection Agency
IP	:	Ingress Protection	TW	:	Thermowell
IRN	:	Inspection Release Note	UL	:	Underwriters Laboratories
ITP	:	Inspection and Test Plan	VDR	:	Vendor Data Requirement
Lab.	:	Third Party Laboratory	WFC	:	Wake Frequency Calculations
LCIE	:	Laboratorie Central Des Industries Electriques	WPS	:	Welding Procedure Specification
LPT	:	Liquid Penetrant Testing	WPQ	:	Welders Performance Qualification

Inspection Standards Committee

Convenor	:	Mr. R.K. Singh		
Members	:	Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
		Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
		Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE:

This Inspection and Test Plan covers the minimum inspection and testing requirements for Thermocouples, RTD's, and Thermowells.

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**						
1.1	WPS/PQR/WPQ	Welding procedure Qualification	100%	WPS PQR WPQ	---	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Incoming Materials like: Flanges, Thermo well Bar stock, MI Cable, RTD element, Pipe etc.	• Material Identification, Chemical & Mechanical Properties, Heat Treatment , Hardness (as applicable) • EMF characteristics for T/C element & Temperature / Resistance characteristics for RTD sensing resistor. • Junction Boxes, Cable glands, Interface device etc.	100%	MTC / Lab. TC	H	H (Note 1)	R
3.0	**In process Inspection**						
3.1	a. Temperature Elements: Manufacturing of MI Cables, Forming T/C Hot Junctions, Installing RTD elements , Sealing of Element sheath Tips etc.	• Calibration check after forming T/C Hot Junction & RTD resister installation. • Pneumatic(Nitrogen Gas) Leak check at sealed tip of elements. • Grounding T/C element (as applicable)	100%	Supplier's Test Records	H	H	R
	b. Thermo wells: Machining of components, Fabrication of TWs, and assembly of element.	• Visual & Dimensions	100%	Supplier's Test Records	-	H	-

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.2	NDT , PWHT (as applicable))	• RT of weld joints • DPT/LPT on welds. • PWHT of welds • Hardness check	100%	NDT reports / PWHT chart	-	H	R
4.0	**Final Inspection**						
4.1	Thermo wells(TWs)	• Visual Check • Dimensional check as per the approved Drawings / WFC in line with ASME PTC 19.3 (specified revision as per PR) • DPT/LPT of Weld joints(Random witness) • <u>Pressure withstand test:</u> a. External Hydrotest at 1.5 x Pressure as per flange rating (For Barstock / Builtup Type TWs) b. Internal Hydro tests at 200kg/cm^2 (For Barstock TWs) c. Internal Hydro tests for Built-up type TW as per Mfr. Standard d. Extrenal Hydrotest of Multipoint Thermocouple assembly at 1.5 x Design Pressure. e. Pneumatic Pressure test on Containment Chamber of Muiltipoint Thermocouple assembly (wherever applicable) at 1.1 x Design Pressure. • Bore Concentricity & wall thickness	100%	Test Records	---	H	RW (Note-5)

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.2	RTD / Thermocouples	• Visual and dimensional check • Grounding check (as applicable) • Calibration checks (minimum 3 points)	100%	Test Records	----	H	RW
4.3	Submission of certificates / Documents	• Weather Proof (IP) Certification for Temperature Element Heads. • For FLP Enclosures/Terminal Housing (if specified) a. Indigenous :Certificate from CIMFR/ Karandikar Lab. / ERTL etc. and valid BIS License & corresponding valid PESO Certificate for the requisite Hazardous Area Classification b. Imported: Certificates from testing agency like LCIE, BASEEFA, FM UL, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification c. For projects related to mining, approval from DGMS-India required.	100%	Statutory test certificates / Suppliers test records	----	H	R
5.0	**Painting**						
5.1	Painting	• Special cleaning and packing for oxygen and chlorine services	100%	Test Records	---	H	---

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports, MTC, • Bought out items TC • Issuance of IC/IRN	100%	Supplier's Test Records / Mfr's TC/ IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

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

NOTES:

1. All NACE, Hydrogen service, AS, SS flanges to be inspected by TPIA appointed by the Main Supplier. CS flanges without any special service requirement up to size 24" – 300 ANSI will be accepted on review of Supplier Test Certificates.
2. 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).
3. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in Job specifications /Approved documents
4. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.
5. Dimensional check shall be witnessed for all Thermowells with flange size-rating 12" - 2500# and above

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थर्मोकपल विस्तार केबलों के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR THERMOCOUPLE EXTENSION CABLES

Rev. No.	Date	Purpose	Prepared by	Checked by	Approved by: Standards Committee Convenor	Approved by: Standards Bureau Chairman
4	26.05.20	Revised and Reissued	NP	RS	RKS	SKS
3	21.11.13	Revised and Reissued	MJ	RS	SCG	SC
2	22.03.12	Revised and Reissued	MJ	GS	AKC	DM
1	05.05.08	Revised and Reissued	SA	SKD	SKP	VC
0	30.04.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

BIS	:	Bureau of Indian Standards
CEIL	:	Certification Engineers International Limited
DGMS	:	Directorate General of Mines Safety
EIL	:	Engineers India Limited
e.m.f	:	Electro motive force.
EPC	:	Engineering Procurement Construction
FR	:	Flame Retardant
HV	:	High Voltage
IC	:	Inspection Certification
IR	:	Insulation Resistance
IEC	:	International Electro technical Commission
IRN	:	Inspection Release Note
IS	:	Indian Standard
ITP	:	Inspection and Test Plan
Mfr	:	Manufacturer
MTC	:	Material Test Certificates
MOC	:	Material of Construction
NEMA	:	National Electrical Manufacturers Association
No.	:	Number
PO	:	Purchase Order
PR	:	Purchase Requisition
PVC	:	Poly-Vinyl Cloride
QC	:	Quality Control
TC	:	Test Certificate
T/C	:	Thermocouple
TPI or TPIA	:	Third Party Inspection Agency
VDR	:	Vendor Data Requirement
VR	:	Volume Resistivity
XLPE	:	Cross Linked Poly Ethylene

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Thermocouples Extension cables.

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 Raw Materials like T/C Conductor, Copper Conductors, Insulations, Armours etc	Physical and Chemical Properties. Manufacture's TC for Armours	100%	MTC / Lab. TC/ Mfr's TC	H	H	R
3.0	**In process Inspection**						
3.1	Manufacturing	• Dimensions at various stages of manufacturing, • Spark test, • Stage Inspections as per relevant standard for Conductors (including Thermal-e.m.f characteristics), Insulation, Inner sheath, Armour, Outer sheath etc.	100%	Supplier's Test Records	-	H	-

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual, Drum Markings & Details, Size, Ends capping, Marking on outer sheath (Sequential Length, type, manufacturer's name), Colour coding of cores, Inner and outer sheath colour, Thermocouple material source certificate.	100%	Supplier's Test Records/Inspection witness record	-	H	RW
4.2	Routine Tests	• Thermal e.m.f characteristics. • High Voltage • Spark test. • Conductor resistance. • Armour resistance test (for mining cable). • Mutual capacitance and capacitance between any core & screen. • Inductance.	100%	Supplier's Test Records	-	H	RW
4.3	Acceptance Tests	• Visual check of the Cable • Dimension checks. • Thermal e.m.f Characteristics. • Pair twisting, Shield overlap. • Conductor Resistance, Drain Wire Resistance, Armour resistance (for mining cable). • Insulation resistance. • Volume resistivity(as specified in IS/IEC) • High Voltage Test. • Mutual capacitance, and capacitance between any core or screen. • Inductance test.	100%	Supplier's Test Records	-	H	RW

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Thickness of insulation and sheath. • Tests on Insulation and Sheath as per IS /IEC* • Uniformity of Zinc coating on armour. • Oxygen and Temperature Index • Overall finish and Drum length check.(Unwinding of 1 drum per Inspection lot size wise) • Anti-Rodent & Termite repulsion property check.					
4.4	Type Tests	• FR test as per IS 10810 part-62 • Fire resistance test as per IEC 331 • (If applicable). • Electrostatic Noise Rejection.	Sample basis	Type test report/ Supplier's Witness report	-	H	R
5.0	**Painting**						
5.1	Packing	• Visual, Packing list. • End sealing with Caps • Proper packing to avoid any damage during transportation.	100%	Supplier's Test Records	-	H	-
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports(routine , acceptance, type test), MTC. • Issuance of IC/IRN	100%	Supplier's Test record/ IC/IRN	-	H	H

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

* - Tensile and Elongation (without ageing), Hot deformation, Heat shock and Shrinkage tests on insulation and sheath shall be witnessed by EIL/TPIA, all other tests including volume resistivity as per IS/IEC shall be carried out by supplier and test reports shall be reviewed by EIL/TPIA.

Legends: H- Hold (Do not proceed without approval, R-Review, RW-Random witness (As specified or 10 % - Samples must include minimum 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.
3. The cables for installations under the jurisdiction of Director General of Mines and Safety (DGMS) shall meet all test requirements specified by DGMS.
4. For EPC Jobs, Scope of Inspection shall be under TPIA only , unless specified otherwise.

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सिगनल केबलों
के लिए
निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR SIGNAL CABLES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	26.05.20	Revised and Reissued	NP	RS	RKS	SKS
3	21.11.13	Revised and Reissued	MJ	RS	SCG	SC
2	22.03.12	Revised and Reissued	MJ	GS	AKC	DM
1	05.05.08	Revised and Reissued	SA	SKD	SKP	VC
0	30.04.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

BIS	:	Bureau of Indian Standards			
CEIL	:	Certification Engineers International Limited			
DGMS	:	Directorate General of Mines Safety	L/R	:	Inductance/Resistance
EIL	:	Engineers India Limited	Mfr	:	Manufacturer
EPC	:	Engineering Procurement Construction	MOC	:	Material of Construction
FR	:	Flame Retardant	NEMA	:	National Electrical Manufacturers Association
FRLS	:	Flame Retardant Low Smoke	No.	:	Number
FS	:	Fire Survival	PO	:	Purchase Order
HV	:	High Voltage	PR	:	Purchase Requisition
IC	:	Inspection Certification	PVC	:	Poly-Vinyl Cloride
IEC	:	International Electro technical Commission	QC	:	Quality Control
IR	:	Insulation Resistance	TC	:	Test Certificate
IRN	:	Inspection Release Note	TPI or TPIA	:	Third Party Inspection Agency
IS	:	Indian Standard	VDR	:	Vendor Data Requirement
ITP	:	Inspection and Test Plan	VR	:	Volume Resistivity
MTC	:	Material Test Certificates	XLPE	:	Cross Linked Poly Ethylene

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Signal Cables.

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 Raw Materials like Copper Conductors, Armours etc	Physical and Chemical Properties. Manufacture's TC for Armours	100%	MTC / Lab. TC/ Mfr's TC	H	H	R
3.0	**In process Inspection**						
3.1	Manufacturing	Dimensions at various stages of manufacturing, Spark test, Stage Inspection as per relevant standard for Conductors, Insulation, Inner sheath, Armour, Outer sheath etc.	100%	Supplier's Test Records	-	H	-

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual, Drum markings/details, Size, Ends capping, Marking on outer sheath (Sequential length, type, manufacturer's name), Colour etc.	100%	Supplier's Test Records/ Inspection witness record	-	H	RW
4.2	Routine Tests	• High Voltage & Insulation Resistance • Spark test Conductor resistance. • Armour resistance test. (for mining cables). • Mutual capacitance and capacitance between any core or screen. • Inductance and L/R ratio.	100%	Supplier's Test Records	-	H	RW
4.3	Acceptance Tests	• Visual check • Dimension checks, Laying of cores, Pair twisting, Shield overlap. • Conductor Resistance, Drain Wire Resistance. • Insulation resistance • Volume resistivity • High Voltage. • Armour resistance test (for mining cables). • Test for Anti-rodent and termite repulsion Properties. • Mutual capacitance and capacitance between any core or screen. • Inductance & L/R ratio.	100%	Supplier's Test Records	-	H	RW

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Thickness of insulation and sheath. • Tests on Insulation and Sheath as per IS/IEC * • Uniformity of Zinc coating on armour. • Oxygen Index, Temperature Index, Acid Generation and smoke density check on largest size of the cable if manufactured from the same lot of PVC compound. • FR test as per IS 10810 part 61 (as applicable). • Circuit integrity as per IEC 60331 for Fire Resistance / Fire Survival cables. • Overall finish and Drum length check. • Fire survival test (if applicable)					
4.4	Type Tests	• FR test as per IS-10810 Part 62 Category-AF or IEC 60332 Category-A. • Fire resistance test as per IEC 331 (If applicable). • Electrostatic Noise Rejection Ratio check.	Sample basis	Type test report/ Supplier's test report	-	H	R
5.0	**Packing**						
5.1	Packing	• Visual, Packing list. • Proper packing to avoid any damage during transportation.	100%	Supplier's Test Records	-	H	-

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports (Routine, Acceptance, Type Tets), MTC. • Issuance of IC/IRN.	100%	Supplier's Test Records / IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

* - Tensile and Elongation (without ageing), Hot deformation, Heat shock and Shrinkage tests on insulation and sheath shall be witnessed by EIL/TPIA, all other tests including volume resistivity as per IS-5831 shall be carried out by supplier and test reports shall be reviewed by EIL/TPIA.

Legends: H- Hold (Do not proceed without approval), Random 10% , R-Review, RW-Random witness (As specified or 10 % - Samples must include minimum 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 .
3. The cables for installations under the jurisdiction of Director General of Mines and Safety (DGMS) shall meet all test requirements specified by DGMS.
4. For EPC Jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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जंकसन बक्स और केबल ग्लैंड के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR JUNCTION BOXES AND CABLE GLANDS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	26.05.20	Revised and Re-issued	NP	RS	RKS	SKS
3	09.01.14	Revised and Re-issued	MJ	RS	SCG	SC
2	15.07.11	Revised and Re-issued	GS	SA	AKC	DM
1	09.05.08	Revised and Reissued	RB	SKD	SKP	VC
0	09.12.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

ATEX	:	Atmosphère Explosibles
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres
CEIL	:	Certification Engineers International Limited
CIMFR	:	Central Institute of Mining & Fuel Research
CSA	:	Canadian Standards Association
DGMS	:	Directorate General of Mines Safety
EIL	:	Engineers India limited.
EPC	:	Engineering Procurement Construction
ERTL	:	Electronics Regional Test Laboratory
FM	:	Factory Mutual
HV	:	High Voltage
IC	:	Inspection Certification
IEC	:	International Electrotechnical Commission
IP	:	Ingress Protection
IR	:	Insulation Resistance
IRN	:	Inspection Release Note
ITP	:	Inspection and Test Plan
JB	:	Junction Box
Lab.	:	Third Party Laboratory
LCIE	:	Laboratorie Central Des Industries Electriques
MOC	:	Material of Construction
MTC	:	Material Test Certificates
NEMA	:	National Electrical Manufacturers Association
No.	:	Number
PESO	:	Petroleum and Explosives Safety Organisation
PO	:	Purchase Order
PR	:	Purchase Requisition
PTB	:	Physikalisch-Technische Bundesanstalt
QC	:	Quality Control
TC	:	Test Certificate
TPI or TPIA	:	Third Party Inspection Agency
UL	:	Underwriter's Laboratories
VDR	:	Vendor Data Requirement

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Junction Boxes and Cable Glands.

2.0 REFERENCE DOCUMENTS

PO/PR / Standards referred therein /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 materials like Castings etc.	Visual, Mechanical & Chemical properties of Casting Materials.	100%	MTC / Lab. TC	H	H	R
3.0	**In process Inspection**						
3.1	Machining & Assembly of components	Visual, Dimensions & Hydrotest on Machined Castings for JBs.	100%	Test Records	-	H	R
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual, dimensional, clearance, Air gap, Flame path & Paint shade check for all items. • Verification of Terminal Nos., sizes and no. of entries • Bill of material verification. • Warning plate for junction boxes and marking on cable glands, Adapters, Plugs etc.	100%	Supplier's Test Records	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• HV & IR Check • Air leak test report on pneumatic JBs.					
4.2	Test Reports/ Certificates Submission	• For Electrically Hazardous Area : a. Indigenous Items: Certificate from CIMFR/ Karandikar Lab. / ERTL and valid BIS License & corresponding valid PESO Certificate for the requisite Hazardous Area Classification. b. Imported items: Certificates from testing agency like LCIE, BASEEFA, FM UL, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification. c. For projects related to mining, approval from DGMS-India required. • Degree of protection(IP) certificate for JBs.	Prototype for type tests	Statutory Approval Certificates / Type Test Certificates / Suppliers Internal test records	-	H	R
5.0	**Painting**						
5.1	Painting of JBs (prior to assembly)	Pretreatment, primer, final paint shade, thickness	100%	Suppliers Internal Test Reports	----	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports • Issuance of IC/IRN	100%	Supplier's Test Records / IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review, RW-Random witness (As specified or 10 % - Samples must include minimum 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 document.
3. For EPC Jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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मुख्य नियंत्रण पैनल और सहायक उपकरणों के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR MAIN CONTROL PANEL AND ACCESSORIES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	27.05.20	Revised and Reissued	NP	RS	RKS	SKS
3	21.11.13	Revised and Reissued	MJ	RS	AKC	SC
2	22.03.12	Revised and Reissued	MJ	GS	AKC	DM
1	09.05.08	Revised and Reissued	RB	SKD	SKP	VC
0	27.01.03	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

ATEX	:	Atmosphère Explosibles
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres
BIS	:	Bureau of Indian Standards
BOM	:	Bill of Material
CEIL	:	Certification Engineers International Limited
CIMFR	:	Central Institute of Mining & Fuel Research
CSA	:	Canadian Standards Association
DGMS	:	Directorate General of Mines Safety
EIL	:	Engineers India limited.
EPC	:	Engineering Procurement Construction
ERTL	:	Electronics Regional Test Laboratory
HV	:	High Voltage
IC	:	Inspection Certification
IEC	:	International Electrotechnical Commission
IP	:	Ingress Protection
IR	:	Insulation Resistance
IRN	:	Inspection Release Note
ITP	:	Inspection and Test Plan
Lab.	:	Third Party Laboratory
LCIE	:	Laboratorie Central Des Industries Electriques
Mfr	:	Manufacturer
MTC	:	Material Test Certificates
MOC	:	Material of Construction
NEMA	:	National Electrical Manufacturers Association
No.	:	Number
PESO	:	Petroleum and Explosives Safety Organisation
PO	:	Purchase Order
PQR	:	Procedure Qualification Record
PR	:	Purchase Requisition
PTB	:	Physikalisch-Technische Bundesanstalt
QC	:	Quality Control
SS	:	Stainless Steel
TC	:	Test Certificate
TPI or TPIA	:	Third Party Inspection Agency
UL	:	Underwriter's Laboratories
VDR	:	Vendor Data Requirement

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Main Control Panel And Accessories.

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: Sheet Steel	• Visual & Dimensions • Chemical & Physical Properties	100%	MTC/ Lab. TC	H	H	R
2.2	Bought out components : Annunciators, Recorders, Indicator, Cable Glands, Power Supplies, Instrument Tubings & Fittings , Door limit switch, Cooling Fans, Panel light, Telephone point, communication & network hardware etc.	Visual, Dimensional, Make, Model No, Mfr's Serial No. Functional check.	100%	Mfr's TC / Supplier's TC	H	H	R
3.0	**In process Inspection**						
3.1	Fabrication of Panels, Painting /Powder coating(as applicable), Assembly of components and Wiring	• Pre-coating Chemical treatment, • Visual & Dimensional, • Paint shade and Thickness check • BOM & Functional check	100%	Mfr's TC	H	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual Check • Dimensional verification • BOM verification • High voltage and Insulation Resistance Test • Functional check of Instruments and Accessories, Shut down & interlock system by simulation. • Purging Scheme Verification for purged panel. • Earthing arrangement check • Graphic Panel Function test (if applicable) • Painting-Paint shade, Thickness & Peel check (Randomly by EIL/TPIA)	100%	Supplier's Test Records and Inspection Witness report	-	H	H
4.2	Submission of certificates / Documents	• <u>For Electrically Hazardous Area :</u> a. Indigenous Items: Certificate from CIMFR/ Karandikar Lab. / ERTL and valid BIS License & corresponding valid PESO Certificate for the requisite Hazardous Area Classification	Prototype for each model	Statutory Approval Certificates / Type Test Certificates	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		b. Imported items: Certificates from testing agency like LCIE, UL BASEEFA, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification c. For projects related to mining, approval from DGMS-India required. • Degree of protection certificate (IP) for items as applicable.					
5.0	**Painting and Packing**						
5.1	Paint touch up and Packing	• Visual , Paint thickness, paint shade • Suitable protection to prevent entry of foreign material. • Proper packing to prevent any damage during transportation	100%	Packing list / Supplier's Records	-	H	-
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports • Certificates for all bought out components • Issuance of IC/IRN.	100%	Supplier's Test Records / IC/IRN	-	H	H

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.2	Final Document submission (If applicable)	Compilation of Inspection reports , drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval, R-Review, RW-Random Wwitness (As specified or 10 % - Samples must include minimum 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.
3. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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के लिए
निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN
FOR
INSTRUMENT TUBE FITTINGS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
5	24.08.20	Revised and Re-issued	NP	RS	RKS	SM
4	27.05.20	Revised and Re-issued	NP	RS	RKS	SKS
3	09.01.14	Revised and Re-issued	MJ	RS	SCG	SC
2	15.07.11	Revosed and Reissued	GS	SA	AKC	DM
1	05.05.08	Revised and Reissued	SA	SKD	SKP	VC

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Abbreviations

ASTM	:	American Society for Testing and Materials	MOC	:	Material of Construction
CEIL	:	Certification Engineers International Limited	OD	:	Outer Diameter
DT	:	Destructive Testing	PMI	:	Positive Material Identification
EIL	:	Engineers India limited.	PO	:	Purchase Order
EPC	:	Engineering Procurement Construction	PR	:	Purchase Requisition
IC	:	Inspection Certification	QC	:	Quality Control
IRN	:	Inspection Release Note	SS	:	Stainless Steel
ITP	:	Inspection and Test Plan	TC	:	Test Certificate
Lab.	:	Third Party Laboratory	TPI or TPIA	:	Third Party Inspection Agency
Mfr	:	Manufacturer	VDR	:	Vendor Data Requirement
MTC	:	Material Test Certificates			

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE:

This Inspection and Test Plan covers the minimum inspection and testing requirements for Instrument Tube Fittings.

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 materials like : Bar stock, Forgings, Tube etc.	• Material Identification, • Chemical and Mechanical Properties, • Hardness Check as applicable	100%	MTC/ Lab. TC	H	H	R
3.0	**In process Inspection**						
3.1	Machining of Fittings	Visual, Dimensions.	100%	Test Records	-	H	-
4.0	**Final Inspection**						
4.1	Routine Tests	• Visual • Dimensions verification. • Go/Nogo gauge check for internal diameter. • Crimping of ferrules on tube of suitable size. • Hydrostatic Pressure Test • Pneumatic Pressure Test.	Sampling as per applicable standard	Test Records	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.2	Type tests	Performance test and supplementary test as per ASTM F1387 • Examination of Specimen • Pneumatic proof test • Hydrostatic proof test • Impulse test • Flexure fatigue test • Tensile test • Burst test • Repeated Assembly • Rotary Flexure test • Mecurous Nitrate test (if applicable) • Thermal Cycling test • Elevated temperature Soak test • Stress Corrosion Test • Torsion Test • Shock test • Fire test • Vibration test	To be carried out once for each Size, Material, Rating	Type test report	-	H	R
5.0	**Painting**						
5.1	Cleaning for special services	• Cleaning for oxygen & chlorine services, if applicable	100%	Test record	-	H	-
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports • Issuance of IC /IRN	100%	Supplier's Test Records / IC/IRN	-	-	H

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.2	Final Document submission (if applicable)	Compilation of Inspection reports, drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), Random -10%,R-Review, RW-Random witness, 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
3. For EPC Jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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इंस्ट्रूमेंट ट्यूबिगं के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR INSTRUMENT TUBING

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	27.05.20	Revised and Reissued	NP	RS	RKS	SKS
3	21.11.13	Revised and Reissued	MJ	RS	AKC	SC
2	22.03.12	Revised and Reissued	MJ	GS	AKC	DM
1	05.05.08	Revised and Reissued	SA	SKD	SKP	VC
0	29.11.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

CEIL	:	Certification Engineers International Limited	MOC	:	Material of Construction
DT	:	Destructive Testing	OD	:	Outer Diameter
EIL	:	Engineers India limited.	PO	:	Purchase Order
EPC	:	Engineering Procurement Construction	PVC	:	Polyvinyl Cloride
IC	:	Inspection Certification	PR	:	Purchase Requisition
IRN	:	Inspection Release Note	QC	:	Quality Control
ITP	:	Inspection and Test Plan	SS	:	Stainless Steel
Lab.	:	Third Party Laboratory	TC	:	Test Certificate
Mfr	:	Manufacturer	TPI or TPIA	:	Third Party Inspection Agency
MTC	:	Material Test Certificates	VDR	:	Vendor Data Requirement

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Instrument Tubing.

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 : Mother Pipes, Bars/Billets etc.	Chemical & Mechanical Properties, Heat Treatment as applicable	100%	MTC/ Lab. TC	H	H	R
3.0	**In process Inspection**						
3.1	Cold drawing / Pilger operations, Heat treatment etc.	Dimensions, Finish, Temperature records	100%	Supplier's Test Records	-	H	-
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual check • Dimensional test. • Chemical & Mechanical Properties • Hydrostatic test (for SS & Bare Copper tubes). • Pneumatic test (for PVC coated Copper tubes) • Ball Test (for Copper tubes)	100%	Supplier's Internal Test Records / Supplier's Inspection Witness Record	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Eddy Current Examination of Copper/ SS tubes. • Product markings on tubes / label. • Hardness/ Tension test for SS tube.					
5.0	**Packing**						
5.1	Packing	• Visual • Suitable protection to prevent entry of foreign material. • Proper packing to prevent damage during transportation	100%	Packing list / Supplier's Records	-	H	-
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Traceability of records • Review of Internal Test Reports, MTC • Issuance of IC/IRN.	100%	Supplier's Test Records / IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review, RW-Random witness (As specified or 10 % - Samples must include minimum 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.
3. For EPC Jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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INSPECTION AND TEST PLAN FOR INSTRUMENT VALVES AND MANIFOLDS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	27.05.20	Revised and Reissued	NP	RS	RKS	SKS
3	21.11.13	Revised and Reissued	MJ	RS	AKC	SC
2	22.03.12	Revised and Reissued	MJ	GS	AKC	DM
1	05.05.08	Revised and Reissued	SA	SKD	SKP	VC
0	29.11.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

CEIL	:	Certification Engineers International Limited	MOC	:	Material of Construction
DT	:	Destructive Testing	OD	:	Outer Diameter
EIL	:	Engineers India limited.	PO	:	Purchase Order
EPC	:	Engineering Procurement Construction	PR	:	Purchase Requisition
IC	:	Inspection Certification	QC	:	Quality Control
IRN	:	Inspection Release Note	SS	:	Stainless Steel
ITP	:	Inspection and Test Plan	TC	:	Test Certificate
Lab.	:	Third Party Laboratory	TPI or TPIA	:	Third Party Inspection Agency
Mfr	:	Manufacturer	VDR	:	Vendor Data Requirement
MTC	:	Material Test Certificates			

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Instrument Valves and Manifolds.

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 Forgings, Bar-stock , Ingots, Billets etc.	Chemical & Mechanical Properties, Heat Treatment as applicable	100%	MTC/ Lab. TC	H	H	R
3.0	**In process Inspection**						
3.1	Machining of components and assembly	Visual, Dimension	100%	Supplier's Test Records	-	H	-
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual • Dimensional Check • Bill of Material for Mounting Brackets & Accessories • Functional Check. • Hydrostatic Test for shell and seat. • Pneumatic test for shell and seat.	100%	Supplier's Internal Test Records / Supplier's Inspection Witness Record	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.2	Submission of certificates/Document	• Type tests for each type of valve and manifold as per Standard: MSS-SP-99.	Prototype for each model	Statutory Approval Certificates / Type TC	-	H	R
5.0	**Painting**						
5.1	Painting and Packing	• Visual • Suitable protection to prevent entry of foreign material. • Cleaning for oxygen and chlorine services, if applicable. • Proper packing to prevent damage during transportation	100%	Packing list / Supplier's Records	-	H	-
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports, MTC • Issuance of IC/IRN.	100%	Supplier's Test Records / IC/IRN	-	-	H
6.2	Final Document submission	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review, RW-Random witness (As specified or 10 % - Samples must include minimum 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
3. For EPC Jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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विशेष स्तरीय इन्स्ट्रूमेंटों
के लिए
निरीक्षण एवं परीक्षण योजना

INSPECTION AND TEST PLAN
FOR
SPECIAL LEVEL INSTRUMENTS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
3	27.05.2020	Revised and Reissued	NP	RS	RKS	SKS
2	21.11.2013	Revised and Reissued	MJ	RS	AKC	SC
1	22.03.2012	Revised and Reissued	MJ	GS	AKC	DM
0	01.12.2008	Issued for implementation	SA	SKD	SKP	VC

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Abbreviations

ATEX	:	Atmosphère Explosibles
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres
CEIL	:	Certification Engineers International Limited
CIMFR	:	Central Institute of Mining & Fuel Research
CSA	:	Canadian Standards Association
DGMS	:	Directorate General of Mines Safety
DP/DPT	:	Dye Penetrant Testing
EIL	:	Engineers India Limited.
EPC	:	Engineering Procurement Construction
ERTL	:	Electronics Regional Test Laboratory
FF	:	Fieldbus Foundation
FISCO	:	Fieldbus Intrinsically Safe Concept
FM	:	Factory Mutual
HART	:	Highway Addressable Remote Transducer
IC	:	Inspection Certification
IEC	:	International Electrotechnical Commission
IP	:	Ingress Protection
IR	:	Insulation Resistance
IRN	:	Inspection Release Note
ITP	:	Inspection and Test Plan
Lab.	:	Third Party Laboratory
LCIE	:	Laboratorie Central Des Industries Electriques
LPT	:	Liquid Penetrant Testing
Mfr	:	Manufacturer
MTC	:	Material Test Certificates
MOC	:	Material of Construction
NDT	:	Non Destructive Testing
NEMA	:	National Electrical Manufacturers Association
No.	:	Number
PESO	:	Petroleum and Explosives Safety Organisation
PMI	:	Positive Material Identification
PO	:	Purchase Order
PQR	:	Procedure Qualification Record
PR	:	Purchase Requisition
PTB	:	Physikalisch-Technische Bundesanstalt
PWHT	:	Post Weld Heat Treatment
QC	:	Quality Control
RT	:	Radiography Test
SIL	:	Safety Integrity Level
SS	:	Stainless Steel
TC	:	Test Certificate
TPI or TPIA	:	Third Party Inspection Agency
UL	:	Underwriter's Laboratories
VDR	:	Vendor Data Requirement
WPS	:	Welding Procedure Specification
WPQ	:	Welders Performance Qualification

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection Test Plan covers the minimum inspection and testing requirements for Special level instruments.

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**	--	--	--	--	--	--
1.1	WPS/PQR/WPQ	Welding procedure Qualification for welds (as applicable)	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Raw materials for Chamber(Cages) /Sensor Assembly such as : Pipe, Flanges, Fittings etc	Chemical & Mechanical Properties, Heat treatment, Hardness etc. as applicable	100%	MTC / Lab. TC/ Mfr's TC	H	H/R	R
2.2	Bought out Material : Sensors, probes, Transmitters, converters, Switching Amplifiers etc.	• Make , Model , specification • Performance check	100%	MTC / Supplier's TC	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	Fabrication of Chamber/ Cage	• Visual & Dimensional, • PWHT as applicable • Hydro static Pressure withstand test. • NDT(RT, DP/DPT/LPT) as applicable • Hardness Test on welds as applicable	100%	Mfr's TC/ NDT reports./ PWHT Chart	H	R	R
3.2	Special Level Instruments assembly	Visual. Dimensional,	100%	Supplier's Test Records	-	H	-
4.0	**Final Inspection**						
4.1	Final Inspection (Acceptance Tests)	• Visual checks. • Dimensional checks • Hydrostatic Pressure withstand test on Cages /Chambers as applicable • Check marks of Fieldbus registration for FF Instruments. • Performance check on Transmitters. • Communication, Configuration, and diagnostic checks for Smart and Field bus based instruments with help of Hand Held Configurator. • Effect of power supply variation check . • Load driving capability check as applicable. • Check for accessories and Spares	100%	Supplier's Records / Witness Inspection Reports	-	H	RW

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.2	Submission of certificates / Documents	• For Electrically Hazardous Area : a. Indigenous Items: Certificate from CIMFR/ Karandikar Lab. / ERTL and valid BIS License & corresponding valid PESO Certificate for the requisite Hazardous Area Classification b. Imported items: Certificates from testing agency like LCIE, BASEEFA, FM, UL, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification c. For projects related to mining, approval from DGMS-India required • Degree of protection(IP) certificate for Instrument enclosures and housing for Electronics/Electrical Parts. • SIL Certification(If Specified) • Certification of Fieldbus Instruments as per entity concept or FISCO. • Certificate for electromagnetic compatibility and transient protection as per IEC 61000-4 • Interoperability test certificate for field bus/Profibus transmitters	Prototype for each model	Statutory Approval Certificates / Type Test Certificates	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
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 • Cleaning for oxygen and chlorine service	100%	Packing list / Supplier's Records	-	H	-
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports/Certificates, MTC. • Issuance of IC/IRN	100%	Supplier's Test Records / IC/IRN	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review, RW-Random witness (As specified or 10 % - Samples must include minimum 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.
3. For EPC Jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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मास फ्लोमीटरों के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR MASS FLOWMETERS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	27.05.20	Revised and Reissued	NP	RS	RKS	SKS
3	21.11.13	Revised and Reissued	MJ	RS	SCG	SC
2	22.03.12	Revised and Re-issued	MJ	GS	AKC	DM
1	05.05.08	Revised and Reissued	SA	SKD	SKP	VC
0	29.11.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

ATEX	:	Atmosphère Explosibles
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres
CEIL	:	Certification Engineers International Limited
CIMFR	:	Central Institute of Mining & Fuel Research
CSA	:	Canadian Standards Association
DGMS	:	Directorate General of Mines Safety
DP/DPT	:	Dye Penetrant Testing
EIL	:	Engineers India limited.
EPC	:	Engineering Procurement Construction
ERTL	:	Electronics Regional Test Laboratory
FCRI	:	Fluid Control Research Institute
FF	:	Fieldbus Foundation
FISCO	:	Fieldbus Intrinsically Safe Concept
FM	:	Factory Mutual
HART	:	Highway Addressable Remote Transducer
IC	:	Inspection Certification
IEC	:	International Electrotechnical Commission
IP	:	Ingress Protection
IR	:	Insulation Resistance
IRN	:	Inspection Release Note
ITP	:	Inspection and Test Plan
Lab.	:	Third Party Laboratory
LCIE	:	Laboratorie Central Des Industries Electriques
LPT	:	Liquid Penetrant Testing
MTC	:	Material Test Certificates
MOC	:	Material of Construction
NABL	:	National Accreditation Board for Testing and Calibration Laboratories
NDT	:	Non Destructive Testing
NEMA	:	National Electrical Manufacturers Association
No.	:	Number
PESO	:	Petroleum and Explosives Safety Organisation
PMI	:	Positive Material Identification
PO	:	Purchase Order
PQR	:	Procedure Qualification Record
PR	:	Purchase Requisition
PTB	:	Physikalisch-Technische Bundesanstalt
PWHT	:	Post Weld Heat Treatment
QC	:	Quality Control
RT	:	Radiography Test
SIL	:	Safety Integrity Level
TC	:	Test Certificate
TPI or TPIA	:	Third Party Inspection Agency
UL	:	Underwriter's Laboratories
VDR	:	Vendor Data Requirement
WPS	:	Welding Procedure Specification
WPQ	:	Welders Performance Qualification

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Mass Flow Meters.

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**						
1.1	WPS/PQR/WPQ	Welding procedure Qualification for welds as applicable	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Incoming Material like Meter body, Flanges, Wetted Parts, Steam Jacket etc.	Chemical & Mechanical Properties, Heat Treatment, Hardness as applicable	100%	MTC / Lab. TC	H	H	R
3.0	**Inprocess Inspection**						
3.1	Machining & Fabrication	• Visual, Dimensions. • NDT (RT, DP/DPT/LPT), • Hydro static Prssure test	100%	Supplier's Test Records/ NDT reports	-	H	R
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual check • Dimensional check • Performance of smart & field bus transmitter.	100%	Supplier's Test Reports /Inspection Witness Record	---	H	RW

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Commuinication, Configuration, Diagnostics with hand held configurators. • Load driving capability test for HART transmitter. • Registration/Check mark for FF type Instruments .					
		• Factory Calibration of all Mass flowmeters.	100%	Calibration report	---	H	R
		• Calibration and performance testing including accuracy and repeatability over the entire range as per Data sheet in a NABL accredited Flow Laboratory in India	(1 sample/ type).	Lab. Calibration reports	-	H	R
4.2	Submission of certificates / Documents	• For Electrically Hazardous Area : a. Indigenous Items: Certificate from CIMFR/ Karandikar Lab. / ERTL and valid BIS License & corresponding valid PESO Certificate for the requisite Hazardous Area Classification b. Imported items: Certificates from testing agency like LCIE, BASEEFA, FM,UL, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification	sample	Statutory Approval Certificates / Type Test Reports	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		c. For projects related to mining, approval from DGMS-India required. • Certification of Fieldbus Instruments as per entity concept or FISCO. • Degree of protection (IP) for instrument housing as applicable. • RFI & electromagnetic Interference compatibility as per IEC 61000-4 • Interoperability certification for field bus & Profibus transmitter • SIL certification(if specified)					
5.0	**Painting**						
5.1	Painting and Packing	• Visual • Suitable protection to prevent entry of foreign material. • Proper packing to prevent any damage during transportationice • Cleaning for oxygen and chlorine service	100%	Packing list / Supplier's Records	-	H	---
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports • Issuance of IC/IRN	100%	Supplier's Test Records / IC/IRN	-	H	H

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.2	Final Document submission (if applicable)	Compilation of Inspection reports , drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval, R-Review, RW-Random witness (As specified or 10 % - Samples must include minimum 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
3. For EPC jobs, Scope of inspection shall be under TPIA only, unless specified otherwise.

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स्वचालित नियंत्रण वाल्व/रेगुलेटर के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR SELF ACTUATED CONTROL VALVES/REGULATORS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
5	28.05.20	Revised and Reissued	NP	RS	RKS	SKS
4	01.08.16	Revised and Reissued	MM	TKK	RKS	SC
3	21.11.13	Revised and Reissued	MJ	RS	SCG	SC
2	22.03.12	Revised and Reissued	MJ	GS	AKC	DM
1	10.06.08	Revised and Reissued	SA	SKD	SKP	VC
0	09.12.02	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

AS	:	Alloy Steel
CEIL	:	Certification Engineers International Limited
DP/DPT	:	Dye Penetrant Testing
EIL	:	Engineers India limited.
EPC	:	Engineering Procurement Construction
FCRI	:	Fluid Control Research Institute
IC	:	Inspection Certification
IRN	:	Inspection Release Note
ITP	:	Inspection and Test Plan
Lab.	:	Third Party Laboratory
LPT	:	Liquid Penetrant Testing
Mfr	:	Manufacturer
MTC	:	Material Test Certificates
MOC	:	Material of Construction
MPT/MT	:	Magnetic Particle Testing
NABL	:	National Accreditation Board for Testing and Calibration Laboratories
No.	:	Number
PMI	:	Positive Material Identification
PO	:	Purchase Order
PQR	:	Procedure Qualification Record
PR	:	Purchase Requisition
PTB	:	Physikalisch-Technische Bundesanstalt
PWHT	:	Post Weld Heat Treatment
QC	:	Quality Control
RT	:	Radiography Test
SIL	:	Safety Integrity Level
SS	:	Stainless Steel
TC	:	Test Certificate
TPI or TPIA	:	Third Party Inspection Agency
VDR	:	Vendor Data Requirement

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Self Actuated Control Valves / Regulators.

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 materials like Forgings & Castings for Body / Bonnet, Trim material, Piping Items, Fittings, Springs, Piston/ Cylinders, Pilots etc.	• Mechanical & Chemical properties, heat treatment as applicable, • RT for body casting as applicable	100%	MTC/ Lab. TC / RT Reports/ Mfr'sTC	H	H	R
3.0	**In process Inspection**						
3.1	Machining of components	Visual, Dimensions	100%	Supplier's Test Records	-	H	-
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual check . • Dimensional Verification. • Component Verification. • Hydro test (body). • Set pressure test & Functional test. • Seat leakage test.	100%	Supplier's Internal Test Records/ Inspection Witness Record	-	H	RW

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.2	NDT	• NDT (as specified).	100%	NDT Reports	-	H	R
4.3	Submission of certificates/ Document	• Type test Certificate for droop within 10% or as per data sheet of set point for each type/model.	Sample	Type test report	-	H	R
5.0	**Painting**						
5.1	Painting	• Special cleaning and packing for oxygen and chlorine services • Pre treatment, primer and final paint, shade, thickness	100%	Test Records		H	-
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports & MTCs • Issuance of IC/IRN	100%	Supplier's Test Records / IC/IRN	-	-	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review, RW-Random witness (As specified or 10 % - Samples must include minimum 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.
3. For EPC Jobs, Scope of inspection shall be under TPIA, unless specified otherwise.

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गैस(LEL/H2S) संसूचक प्रणाली के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR GAS DETECTION SYSTEM (LEL/H_2S)

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	28.05.20	Revised and Reissued	NP	RS	RKS	SKS
3	21.11.13	Revised and Reissued	MJ	RS	SCG	SC
2	22.03.12	Revised and Reissued	MJ	GS	AKC	DM
1	10.06.08	Revised and Reissued	SA	SKD	SKP	VC
0	03.03.03	Issued for implementation	RG	AKC	AKB	GRR

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Abbreviations

ATEX	:	Atmosphère Explosibles
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres
BIS	:	Bureau of Indian Standards
BOM	:	Bill Of Material
CEIL	:	Certification Engineers International Limited
CIMFR	:	Central Institute of Mining & Fuel Research
CSA	:	Canadian Standards Association
DGMS	:	Directorate General of Mines Safety
GD	:	Gas Detection
EIL	:	Engineers India limited.
EPC	:	Engineering Procurement Construction
ERTL	:	Electronics Regional Test Laboratory
FAT	:	Factory Acceptance test
FF	:	Fieldbus Foundation
FISCO	:	Fieldbus Intrinsically Safe Concept
FM	:	Factory Mutual
HART	:	Highway Addressable Remote Transducer
HV	:	High Voltage
IC	:	Inspection Certification
IEC	:	International Electrotechnical Commission
IP	:	Ingress Protection
IR	:	Insulation Resistance
IRN	:	Inspection Release Note
IT	:	Information Technology
ITP	:	Inspection and Test Plan
Lab.	:	Third Party Laboratory
LCIE	:	Laboratorie Central Des Industries Electriques
LEL	:	Lower Explosive Limit
Mfr	:	Manufacturer
MTC	:	Material Test Certificates
MOC	:	Material of Construction
NEMA	:	National Electrical Manufacturers Association
No.	:	Number
OEM	:	Original Equipment Manufacturer
OFC	:	Optical Fibre Cables
PC	:	Personal Computer
PESO	:	Petroleum and Explosives Safety Organisation
PLC	:	Programmable Logic Controller
PO	:	Purchase Order
PR	:	Purchase Requisition
PTB	:	Physikalisch-Technische Bundesanstalt
QC	:	Quality Control
RT	:	Radiography Test
SIL	:	Safety Integrity Level
TC	:	Test Certificate
TPI or TPIA	:	Third Party Inspection Agency
UL	:	Underwriter's Laboratories
VDR	:	Vendor Data Requirement

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members :

Mr. Rajesh Sinha	Mr. Himangshu Pal	Mr. Chandrashekhar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal
Mr. Arupjyoti Saikia(Engg.)		

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1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Gas Detection System.

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	**Material& Components:** Gas Detectors, Gas Monitors / Controllers, Portable gas detectors, Calibration Kits, System cabinets, Power supply units, Aspirator assembly Items, Push buttons, Hooters, Beacons, Data loggers, PLC with Hardware , Junction/ Terminal boxes, Panels, IT hardware & Software etc.	Make , Model Number and tests required for each item/Components.	100%	Mfr's TC	H	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.0	**In process Inspection**						
3.1	Assembly of system	Visual & Dimensions, Wiring & Continuity, HV & IR	100%	Supplier's Test Records	-	H	-
4.0	**Final Inspection**						
4.1	a. Final Inspection (At OEM Works)	• Visual Check • Detector's Features & Specifications check. • Calibration of Gas detectors for Performance requirements : Repeatability and Response time .	100%	Supplier's test	-	H	RW
	b. Final Inspection(FAT) at System Integrator's Works. Tests applicable	• Visual Check • Communication Hand held configurator as applicable. • Visual & Dimensional check on Cabinets/panels. • Check for System as per approved System Architecture. • BOM verification • Functional check of gas monitors / controllers with gas detectors. • Functional check of portable gas detectors • Functional check of portable purge calibrators.	100%	FAT Report	-	H	W

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Redundancy check at various Module levels as specified. • Functional Check on Aspirator System. • Functional checks of GD system with PCs, Data loggers, Printers, Hooters, Annunciators, Beacons etc • Functional Check on PLC system and subsystems(System Configuration, Loop check, PLC logic/Cause-&-Effect and other Functionalities as per PR). • Functional check of Bypass Switch with Accessories. • Verification of system diagnostics, System and application software including Graphics (if configured • Interface with purchaser's Control System: Check for Serial/Analog/Digital inputs , Ethernet/OFC communication etc(as specified) • Graphic. Group, Historical Trend/Alarm configuration etc.					

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.2	Submission of certificates/ Document	• For Electrically Hazardous Area : a. Indigenous Items: Certificate from CIMFR/ Karandikar Lab. / ERTL and valid BIS License & corresponding valid PESO Certificate for the requisite Hazardous Area Classification b. Imported items: Certificates from testing agency like LCIE, BASEEFA, FM, UL, PTB, CSA etc. for compliance to ATEX or equivalent recognized standards & corresponding Valid PESO Certificate for the requisite Hazardous Area Classification c. For projects related to mining, approval from DGMS-India required • Degree of protection certificate (IP) for Instruments housing. • Certification for SIL requirement • Electromagnetic compatibility requirements for gas detectors, gas monitors / controllers etc. • Test certificates for calibration gases. • PESO certification for Calibration gas cylinders(as applicable)	Prototype for each model	Statutory Approval Certificates / Type Test Certificates	-	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
5.0	**Painting**						
5.1	Painting	• Pre treatment, primer and final paint, shade, thickness	100%	Test Records		H	-
6.0	**Documentation**						
6.1	Documentation and IC/IRN	• Review of Internal Test Reports, MTC • Issuance of IC/IRN.	100%	Supplier's Test Records / Inspection Certificate	-	H	H
6.2	Final Document submission (if applicable)	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder / Completeness certificate	-	H	H

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.
3. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

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ऑप्टिकल फाइबर केबल के लिये
निरीक्षण और परीक्षण योजना

INSPECTION AND TEST PLAN
FOR
OPTICAL FIBER CABLE

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
1	29.12.2023	Issued for Revision	JA	GS	RK	MN
0	21.02.2018	Issued for implementation	JA	RS	RKS	RN

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Abbreviations

BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres
BIS	:	Bureau of Indian Standard
CEIL	:	Certification Engineers International Limited
CIMFR	:	Central Institute of Mining & Fuel Research
DFT	:	Dry Film Thickness
DT	:	Destructive Testing
EHT	:	Electrical Heat Tracers
ERTL	:	Electronics Regional Test Laboratory
FCRI	:	Fluid Control Research Institute
FLP	:	Flame Proof
FM	:	Factory Mutual
FRP	:	Fiber Reinforced Plastic
GI	:	Galvanized Iron
HIC	:	Hydrogen Induced Cracking
IC	:	Inspection Certification
IEC	:	International Electro technical Commission
IEEE	:	Institute of Electrical & Electronic Engineers
IGC	:	Inter Granular Corrosion
IP	:	Ingress Protection
ITP	:	Inspection and Test Plan
LPT	:	Liquid Penetrate Testing
MPT/MT	:	Magnetic Particle Testing
MTC	:	Material Test Certificate
MOC	:	Material of Construction
NPSH	:	Net Positive Suction Head
NDT	:	Non Destructive Testing
NEMA	:	National Electrical Manufacturers Association
OTDR	:	Optical Time Domain Reflectometer
PVC	:	Poly Vinyl Chloride
PO	:	Purchase Order
PMD	:	Polarization Mode Dispersion
PMI	:	Positive Material Identification
PR	:	Purchase Requisition
QC	:	Quality Control
TPI or TPIA	:	Third Party Inspection Agency
TC	:	Test Certificate
UL	:	Under writer Laboratories
UT	:	Ultrasonic Testing
VDR	:	Vendor Data Requirement
WPS	:	Welding Procedure Specification
XLPE	:	Cross Linked Poly Ethylene

Inspection Standards Committee

Convenor : Mr. Rajeev Kumar

Members:

Mr. G Suresh	Mr. Himangshu Pal	Mr. Chandrashekhar	Mr. Anil Kumar
Mr. R. Muthuramalingam	Mr. Avdhesh Agrawal	Mr. Mahendra Mittal	Mr. ArupJyoti Saikia (Engg)

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1.0 SCOPE

This Inspection and Test Plan covers the minimum testing requirements of Optical Fiber Cable.

2.0 REFERENCE DOCUMENTS

PO/PR/ Standards referred therein/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 Raw Material like Bare Fiber, Core, CLADDING : Outer shells/Cladding, FRP rod, Nylon, Aramid yarn, Water swellable tape, Filling compound, corrugated steel tape, GI wire Aluminium, Kevlar, Polyethylene and Silica-dioxide	Purity, Dimensions, Physical and chemical properties.	100% by Sub-Supplier and on Random Basis by Supplier	Material Test Certificate/ Test records/TPI Lab certificates.	H	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.0	**In process Inspection**						
3.1	Core mode field diameter.	Geometry test	100% by Supplier and on Random Basis by Supplier	MTC/ IEC-793-1-45B	H	H	R
3.2	Attenuation coefficient of bare fiber. Hydrogen Ageing	Attenuation coefficient Test (OTDR Test)		MTC/ IEC 60793-1-40C	H	H	R
	Cut off wavelength.	Special test for measuring wavelength		MTC/ IEC 60793-1-44A	H	H	R
3.3	Geometrical Parameters Like Prim Coating Diameter, MFD, Cladding diameter, Clad Non-circularity, Mode field concentricity	Geometry test & Physical verification		MTC/ Test record IEC 60793-1-20/21	H	H	R
3.4	Chromatic Disperson. Zero dispersion slope & wavelength, PMD	Dispersion wavelength and slope.	One in each lot	PR/IEC 60793-1-42	H	H	R
3.5	Fiber proof test and Curl test	To check fiber proofness and Curvature	One in each lot	PR/IEC 60793-1-30	H	H	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.6	Attenuation Vs wavelength.	Graph between attenuation Vs wavelength	Random	Supplier test record.	H	H	R
4.0	**Final Inspection**						
4.1	**Acceptance Test**	• Impact Test • Torsion Test • Kink Test. • Bend Test and repeated bend test. • Tensile and Crush Test • Attenuation Coefficient Test @ 1310, 1525 & 1625 (Unless otherwise required) Before and after mechanical testing. • Zero dispersion Wavelength. • Physical & Dimensional checks. • Surface finish, Spark and Rewinding. • FRLS & Other test(For PVC Sheath-Refer Note-2)	100% by Supplier and on Random Basis by EIL/TPIA	Test Records / Inspection Witness Record	-	H	H
4.2	**Type Test ****	• Temperature Cycling ($) • Water Immersion test. • Compound Drip/flow test	1 No. per Order for Temp cycling and 1No of Per Sample for others	Inspection test records	-	H	W/R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Review of Routine, Acceptance, Type test reports. • IC issuance/Dispatch Clearance	100%	Supplier's Test Records / Inspection Certificate	-	H	H/R

Legends: H- Hold (Do not proceed without approval), Random 10% , R-Review, RW-Random witness, W- Witness (Give due notice, work may proceed after scheduled date).

NOTES (As applicable):

1. Wherever W/R or H/W is indicated, Inspection Engineer shall decide the option to be exercised for the particular stage and supplier.
2. In case of Outersheeth is PVC, All relevant tests like FRLS, Flame Retardant, Heat Shock, Anti Rodent/Anti Termite test need to be conducted.
2. In case of conflict between purchase specification, contract documents and ITP, more stringent conditions shall be applicable.
3. This document describes generally the requirements pertaining to all types of the item. Requirements specific to PO and the item are only applicable.
4. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred therein/ Job specifications /Approved documents.
5. For EPC jobs, Scope of Inspection shall be under TPIA only, unless specified otherwise.

** Type test and acceptance test shall be done in line with relevant IEC-60794, IEC-60793/ IEC 60332/ TIA/EIA 598/IS-1554 etc

$ Witness required in case of Cable Qty is more than 10Km

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अल्ट्रा सोनिक फ़्लौमेटर के लिये
निरीक्षण और परीक्षण योजना

INSPECTION AND TEST PLAN
FOR
ULTRA SONIC FLOWMETER

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
1	12.07.2023	Issued for Implementation	JA	RS	RK	SM
0	21.02.2018	Issued for implementation	JA	RS	RKS	RN

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Abbreviations

BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres
BIS	:	Bureau of Indian Standard
CEESI	:	Colorado Engineering Experiment Station,Inc
CIMFR	:	Central Institute of Mining & Fuel Research
DFT	:	Dry Film Thickness
DT	:	Destructive Testing
EPC	:	Engineering Procurement & Construction
ERTL	:	Electronics Regional Test Laboratory
FCRI	:	Fluid Control Research Institute
FLP	:	Flame Proof
FM	:	Factory Mutual
FRP	:	Fiber Reinforced Plastic
GI	:	Galvanized Iron
HIC	:	Hydrogen Induced Cracking
IC	:	Inspection Certification
IEC	:	International Electro technical Commission
IEEE	:	Institute of Electrical & Electronic Engineers
IGC	:	Inter Granular Corrosion
IP	:	Ingress Protection
ITP	:	Inspection and Test Plan
LPT	:	Liquid Penetrate Testing
MPT/MT	:	Magnetic Particle Testing
MTC	:	Material Test Certificate
MOC	:	Material of Construction
NPSH	:	Net Positive Suction Head
NDT	:	Non Destructive Testing
NEMA	:	National Electrical Manufacturers Association
PQR	:	Procedure Qualification Record
PVC	:	Poly Vinyl Chloride
PO	:	Purchase Order
PESO	:	Petroleum & Explosive Safety Organization
PMI	:	Positive Material Identification
PR	:	Purchase Requisition
QC	:	Quality Control
TPI or TPIA	:	Third Party Inspection Agency
TC	:	Test Certificate
UL	:	Under writer Laboratories
UT	:	Ultrasonic Testing
UFM	:	Ultrasonic Flow Meter
WPS	:	Welding Procedure Specification
XLPE	:	Cross Linked Poly Ethylene

Inspection Standards Committee

Convenor : Mr. Rajeev Kumar

Members: Mr. Rajesh Sinha, Mr. Himangshu Pal, Mr. Chandrashekhar, Mr. R. Muthuramalingam, Mr. Avdhesh Agrawal, Mr. Mahendra Mittal, Ms. N.P. Singh (Electrical)

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1.0 SCOPE

This Inspection and Test Plan covers the minimum testing requirements of Ultra Sonic Flowmeters

2.0 REFERENCE DOCUMENTS

PO/PR/ Standards referred therein/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**	--	--	--	--	--	--
	WPS/PQR/WPQ	Welding procedure qualification for weld, Overlays as applicable.	100%	WPS PQR WPQ		H	W(New) R(Existing)
2.0	**Material Inspection**						
2.1	**Incoming Raw Material:** Flanges, Pipes, Isolation Valves, Nozzle, Manifold etc. **Bought-Outs**: Sensor Probe/Transducers, Transmitters, Pre-	• Physical and chemical properties. • Make, Model Number and functional checks, Physical & Chemical properties , as applicable	100%	TC's/ Inspection & Test records / Lab Test Records, MTCs	H	H/R	R

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
	/RTD , JBs Cables etc.						
3.0	**In process Inspection**						
3.1	Machining of flow-cell spool piece and components	Visual & Dimensions	100%	Suppliers Test Records	--	H	-
3.2	**Radiography/NDT**	• Radiography X-Ray film for weld joints as specified • PWHT as specified for flow-cell body/Spool piece. • Dye penetration test. • Pickling and passivation for SS weld as specified in PR/DS.		Radiography Report	H	H $	R
4.0	**Final Inspection**						
4.1	**Acceptance Test**	• Visual & Dimensional checks for Flow-cell body, End connection, nozzle size & its orientation etc. • Complete Bill of Material for UFM assembly and accessories. • Hydrostatic test. • Type, make and Model checks for transducers and other electronics. • Power On checks on Electronics/transmitters.	100% by Supplier and on Random Basis by EIL/TPIA	Test Records / Inspection Witness Record	-	H	H

Signature Not Verified
Digitally signed by MD MAZHER ALI
Date: 2026.04.09 18:08:56 IST
Location: eProcure-EPROC

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