सत्यमेव जयते

SIGNAL DIRECTORATE
RESEARCH DESIGNS & STANDARDS ORGANIZATION
Manak Nagar, Lucknow – 226011

SI-F-7.1-0295 Ver. 1.0-d0

Type Test Format for Automatic Fire Detection & Alarm System for Signalling Installations as per RDSO/SPN/217/2016 Ver. 1.0

1.0 Amendment History:

S. No.	Amendment Date	Version	Reasons for Amendment
1.0	---	1.0-d0	Draft

SIGNAL DIRECTORATE
RESEARCH DESIGN AND STANDARD ORGNIZATION
MANAK NAGAR, LUCKNOW- 226 011

Name of the Item: Automatic Fire Detection & Alarm System for Signalling Installations

Reference Specification No. & Drawing No. : RDSO/SPN/217/2016 Ver. 1.0

Name of manufacturer: _____

Serial No. of samples: _____ **Identification Mark:** _____

Type of test: _____

Test Note Reference: _____

Signature of RDSO's Testing Official

1. Visual Inspection (Clause 7.3.1.1 & 9.2):

Date:

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
1(a)	9.2.2 & 2.4	Visual inspection - suitability test	Suitability of installation of detectors	The detectors shall be provided with suitable means for installation.			
1(b)	9.2.2, 2.9, 4.8.4 & 4.8.11	Visual inspection test for command to AFSS	Requisite commands to activate 'Automatic Fire Suppression System'	The control panel of AFDAS shall have PFC minimum 4 NO and 3 NC for each zone.			
1(c)	9.2.2 & 2.10	Visual inspection - Alarm extention test	Extention of the alarm to remote location	It shall have the provision to extend the alarm to remote location.			
1(d)	9.2.2 & 2.17	Visual inspection for Non-incorporation of Radioactive material	Non-incorporation of Radioactive material in system design	The System design shall not incorporate use of any radioactive material. A declaration shall be submitted by the supplier in this regard at the time of product approval.			
1(e)	9.2.2 & 4.2.2.6	Visual inspection for approval of UV & IR flame detector	UL/FM/Vds/EN/LPCB approval	UV & IR flame detector shall be marked with UL/FM/Vds/EN/LPCB and the manufacturer shall submit the certificate for the same at the time of product approval.			
1(f)	9.2.2 & 4.2.2.7	Visual inspection for PFC of UV & IR flame detector	Potential Free Contacts	UV & IR flame detector shall have PFC.			
1(g)	9.2.2 & 4.3.2	Visual inspection for detection chamber	Optical chamber	Heat & smoke multi sensor shall have optical chamber for detection of smoke.			
1(h)	9.2.2 & 4.3.14	Visual inspection for plastic used in Heat & smoke multi sensor	The heat & smoke multi sensor shall be heated to 95°C.	It shall not start softening, deforming or melting.			
1(i)	9.2.2 & 4.4.1	Visual inspection for connectivity of monitoring equipment to aspirating type detector	Suitable port for connection of monitoring equipment to aspirating type detector	The aspirating type detector shall have suitable port for connection of monitoring equipment.			
1(j)	9.2.2 & 4.5.1	Visual inspection on Piping	Material	Copper			
			Diameter	25mm ±5%			
			Thickness	1mm ±5%			
		Visual inspection on Piping & its accessories	Tested as per ASTM E 814	The manufacturer shall submit the test certificate for compliance of Cl. 4.5.1 as per ASTM E 814 from any ILAC/NABL accredited or Government of India recognized laboratory.			

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
1(k)	9.2.2 & 4.6.2	Visual inspection for PFC of UV & IR flame detector	Potential Free Contacts	UV & IR flame detector shall have PFC.			
1(l)	9.2.2 & 4.8.10	Visual inspection- Front Panel	Facilities on front panel of the control panel	The front panel of the Control Panel shall have the facility of buzzer silence, alarm silence and alarm activate, lamp test & reset.			
1(m)	9.2.2 & 4.8.13	Visual inspection test of Connectivity & Networking	(a) Connectivity with laptop	Suitable ports like RS 232/USB or TCP/IP to download data into PC/Laptop/remote location operating on Windows platform or extention of alarm.			
			(b) Networkability	Facility of TCP/IP or other arrangement for networking of control panels.			
1(n)	4.8.19	The control panel	Keyboard	Alphanumeric			
1(o)	9.2.3.1, 9.1, 4.8.12, 4.8.14.2 & 9.2.1	Visual inspection - System Level Checking test	(a) Constructional details	The control panel shall be modular in design.			
				The control panel shall accommodate an Audio Visual Alarm unit.			
	9.2.3.2, 9.1 & 9.2.1		(b) Dimensional check	The unit shall be checked for dimensions as per the drawings provided by the manufacturer. (The drawings shall be attached with the report as Annexure)			
	9.2.3.3, 9.1 & 9.2.1		(c) General workmanship	The unit shall be checked for proper workmanship, proper fitment in its enclosure, connections.			
	9.2.3.4 & 3.0		(d) Configuration	General arrangement of Automatic Fire Detection & Alarm System (AFDAS) shall be as per Clause 3.0.			
1(p)	9.2.4.1	Visual inspection - Card Level Checking test	(a) General track layout.	The General track layout shall be in accordance with the circuit diagram & PCB layout.			
	9.2.4.2		(b) Quality of soldering and component mounting.	The soldering shall be neat and clean and component mounting shall be proper adopting optimum practice for heat dissipation.			
	9.2.4.3		(c) Conformal Coating.	Each PCB shall be conformal coated to protect cards against adverse environmental conditions.			
	9.2.4.4		(d) Legend printing.	Each PCB shall have Legend printing in accordance with the circuit diagram.			
1(q)	9.2.5	Visual inspection - Module Level Checking test:					
	2.12	Indications and displays.	Low battery indication	Alarm and indication			
	2.15.3		Indication or display the location of fire and	It shall Indicate or display the location of fire, such as Relay Room, Power Equipment			

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
			alarm	Room, Data Logger Room, ASM Room etc.			
	2.15.3, 4.3.3, 4.3.4 & 4.3.5		LED indicators- Heat and smoke multi sensor	Normal Healthy Mode			
				Alarm Indication mode			
			Visibility of alarm condition	≥6 Meters			
				Shall be visually different from the indications of the other conditions. (The indications shall be in accordance with firm's datasheet)			
	2.15.3, 4.7.5 & 4.7.6		No. of LED indicators on LHS interface module	Two Nos.; One for Fire indication and other for Fault indication			
			LED indicators- LHS interface module	Normal system operation			
				Faults			
				Pre –alarm			
				Fire– alarm status.			
	2.15.3 & 4.8.10		Visual indication- Control Panel	The front panel shall indicate the status like fire, fault, disable, test, supply, primary supply fault, battery fault, secondary supply fault, and earth fault by respective LEDs/other suitable means. (The indications shall be in accordance with firm's datasheet)			
	2.15.3 & 4.8.16		Visual indication- Stage signals from Aspiration (Air sampling type) heat detector	Level1			
				Level 2			
				Level 3			
				Level 4			
	4.8.18		The Alarm indication of Control Panel	The Alarm of Control Panel shall have means to indicate the room i.e. Relay Room or Power Equipment Room or DG Room etc., from where the alarm situation has been reported and shall also indicate the location of sensor in that room which has reported the alarm situation.			
	4.10.6		Visual indication- Manual call points	Normal operation			
				Activated operation			
	4.8.19		The control panel	Character display (LED/LCD)			
	4.3.1	Mounting and clamping of connectors.	Mounting of Heat & Smoke multi sensor	Heat & Smoke multi sensor shall be robust, rugged, & suitable for surface mounting.			
	4.3.13			The detectors shall be provided with means for mounting (on ceiling/wall) securely and independent of any support from the attached wiring.			

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
	4.9.9		Cable connection to various items	Appropriate 2 hours fire rated glands shall be provided where the cable enters the junction box. (The firm shall submit test certificate in this regard)			
	9.2.5.3	Proper housing of cards.	Visual inspection of the housing arrangement of cards	The cards shall be housed properly in the Control Panel etc.			
1 (r)	10.1	The following information shall be clearly marked at a suitable place on each equipment**:**					
	10.1.1	Name and Address of the manufacturer		As specified			
	10.1.2	Year of the manufacture	Probe type bi-metallic resettable type heat detector	As specified			
			UV/IR flame detector	As specified			
			Heat & smoke multi sensor	As specified			
			Linear Heat Sensing Interface Module	As specified			
			Linear Heat Sensing Cable	As specified			
			Aspirating type smoke detectors	As specified			
			Control Panel	As specified			
			GSM Modem	As specified			
			Battery	As specified			
			Manual Call Point	As specified			
			Audio Visual Alarm	As specified			
			Sounder	As specified			
			Addressable Module	As specified			
	10.1.3	Serial number of Equipment	Probe type bi-metallic resettable type heat detector	As specified			
			UV/IR flame detector	As specified			
			Heat & smoke multi sensor	As specified			
			Linear Heat Sensing Interface Module	As specified			
			Linear Heat Sensing Cable	As specified			
			Aspirating type smoke detectors	As specified			

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
			Control Panel	As specified			
			GSM Modem	As specified			
			Battery	As specified			
			Manual Call Point	As specified			
			Audio Visual Alarm	As specified			
			Sounder	As specified			
			Addressable Module	As specified			
	10.1.4	Specification number	All items except battery- RDSO/SPN/217/2016 Ver. 1.0 Battery- IRS: S 93/96	All items except battery shall be marked with RDSO/SPN/217/2016 Ver. 1.0 Battery- IRS: S 93/96			
	10.1.5	Connection diagram	The connection diagram shall be on the side of control panel cover	As specified (The copy of connection diagram shall be attached with the report as Annexure)			
	10.2	Packing	The equipment and its sub assemblies shall be packed in to withstand bumps and jerks encountered in a road/rail journey	Thermo Cole boxes and the empty spaces shall be filled with suitable filling material. Before keeping in the thermo Cole box, the equipment shall be wrapped with bubble sheet. The equipment shall be finally packed in a wooden case of sufficient strength so that it can withstand bumps and jerks encountered in a road/rail journey.			

2. System Level Test (Clause 7.3.1.4 & 9.5):

RT: RH: Date:

2. (a) Insulation Resistance Test (Clause 7.3.1.4 & 9.5.3):
(Disconnect the MOVs & other protective devices before IR test)

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value (in MΩ)		OK/ Not OK	Remarks
					Before HV Test	After HV Test		
2(a)	4.2.1.4	Insulation Resistance Test (in MΩ)	Probe type bi-metallic heat detector	≥10MΩ				
	4.2.2.9		UV/IR flame detector					
	4.3.6		Heat & smoke multi sensor					
	9.5.3		LHS Cable Interface Module					
			Aspirating type smoke detector					
			Control Panel					
			GSM Modem					
			Manual Call Point					
			Audio Visual Alarm					
			Sounder					

Signature of RDSO's Testing Official

2. (b) High Voltage Test (Clause 7.3.1.4 & 9.5.3):

(Disconnect the MOVs & other protective devices before HV test)

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
2(b)	7.3.1.4 & 9.5.3	High Voltage Test	Probe type bi-metallic heat detector	The equipment shall withstand for one minute without puncture and arcing a test voltage of 2000 volts rms applied between: (a) AC line terminals and earth (b) DC line terminals and earth The test voltage shall be alternating of approximately sinusoidal wave form of any frequency between 50 Hz. and 100 Hz. Printed circuit cards shall be removed.			
			UV/IR flame detector				
			Heat & smoke multi sensor				
			Linear Heat Sensing Interface Module				
			Aspirating (Air sampling) type smoke detectors				
			Control Panel				
			GSM Modem				
			Manual Call Point				
			Audio Visual Alarm				
			Sounder				

2. (c) Environmental Test (Clause 7.3.1.4 & 9.5.3):

(This test shall be conducted after performance test)

The complete AFDAS system shall be subjected to following environmental tests.

2 (c)-I Change of Temperature Test (0-49°C)

After change of temperature test following parameter shall be measured

S. No.	Clause no.	Name of test	Parameters	Specified value	Observation	OK/ Not OK	Remarks
2(c)-I	9.5.3	Observation after Change of Temperature Test	The Complete AFDAS system shall be checked for its functionality.	After this test, the equipment shall be checked visually for any apparent damage & deterioration. The equipment shall be completely operational and functional.			
		Insulation Resistance Test (in MΩ)	Probe type bi-metallic heat detector	≥10MΩ			
			UV/IR flame detector				
			Heat & smoke multi sensor				
			LHS Cable Interface Module				
			Aspirating type smoke detector				
			Control Panel				
			GSM Modem				
			Manual Call Point				
			Audio Visual Alarm				
			Sounder				

2 (c)-II Dry Heat Test (49°C)

After change of temperature test following parameter shall be measured

S. No.	Clause no.	Name of test	Parameters	Specified value	Observation	OK/ Not OK	Remarks
2(c)-II	9.5.3	Observation after Dry Heat Test	The Complete AFDAS system shall be checked for its functionality.	After this test, the equipment shall be checked visually for any apparent damage & deterioration. The equipment shall be completely operational and functional.			
		Insulation Resistance Test (in MΩ)	Probe type bi-metallic heat detector	≥10MΩ			
			UV/IR flame detector				
			Heat & smoke multi sensor				
			LHS Cable Interface Module				
			Aspirating type smoke detector				
			Control Panel				
			GSM Modem				
			Manual Call Point				
			Audio Visual Alarm				
			Sounder				

2 (c)-III Cold Test (0°C)

After change of temperature test following parameter shall be measured

S. No.	Clause no.	Name of test	Parameters	Specified value	Observation	OK/ Not OK	Remarks
2(c)-III	9.5.3	Observation after Cold Test	The Complete AFDAS system shall be checked for its functionality.	After this test, the equipment shall be checked visually for any apparent damage & deterioration. The equipment shall be completely operational and functional.			
		Insulation Resistance Test (in MΩ)	Probe type bi-metallic heat detector	≥10MΩ			
			UV/IR flame detector				
			Heat & smoke multi sensor				
			LHS Cable Interface Module				
			Aspirating type smoke detector				
			Control Panel				
			GSM Modem				
			Manual Call Point				
			Audio Visual Alarm				
			Sounder				

2 (c)-IV Damp heat test (Cyclic) Test (85% Humidity)

After change of temperature test following parameter shall be measured

S. No.	Clause no.	Name of test	Parameters	Specified value	Observation	OK/ Not OK	Remarks
2(c)-IV	9.5.3	Observation after Damp Heat (Cyclic)	The Complete AFDAS system shall be checked for its	After this test, the equipment shall be checked visually for any apparent damage			

S. No.	Clause no.	Name of test	Parameters	Specified value	Observation	OK/ Not OK	Remarks
		Test	functionality.	& deterioration. The equipment shall be completely operational and functional.			
		Insulation Resistance Test (in MΩ)	Probe type bi-metallic heat detector	≥10MΩ			
			UV/IR flame detector				
			Heat & smoke multi sensor				
			LHS Cable Interface Module				
			Aspirating type smoke detector				
			Control Panel				
			GSM Modem				
			Manual Call Point				
			Audio Visual Alarm				
			Sounder				

2 (c)-V Damp heat test (Steady state storage) Test (85% Humidity)

After change of temperature test following parameter shall be measured

S. No.	Clause no.	Name of test	Parameters	Specified value	Observation	OK/ Not OK	Remarks
2(c)-V	9.5.3	Observation after Damp Heat (Steady state storage) Test	The Complete AFDAS system shall be checked for its functionality.	After this test, the equipment shall be checked visually for any apparent damage & deterioration. The equipment shall be completely operational and functional.			
		Insulation Resistance Test (in MΩ)	Probe type bi-metallic heat detector	≥10MΩ			
			UV/IR flame detector				
			Heat & smoke multi sensor				
			LHS Cable Interface Module				
			Aspirating type smoke detector				
			Control Panel				
			GSM Modem				
			Manual Call Point				
			Audio Visual Alarm				
			Sounder				

2 (c)-VI Salt Mist Test (85% Humidity)

After change of temperature test following parameter shall be measured

S. No.	Clause no.	Name of test	Parameters	Specified value	Observation	OK/ Not OK	Remarks
2(c)-VI	9.5.3	Observation after Salt Mist Test	The Complete AFDAS system shall be checked for its functionality.	After this test, the equipment shall be checked visually for any apparent damage & deterioration. The equipment shall be completely operational and functional.			

S. No.	Clause no.	Name of test	Parameters	Specified value	Observation	OK/ Not OK	Remarks
		Insulation Resistance Test (in MΩ)	Probe type bi-metallic heat detector	≥10MΩ			
			UV/IR flame detector				
			Heat & smoke multi sensor				
			LHS Cable Interface Module				
			Aspirating type smoke detector				
			Control Panel				
			GSM Modem				
			Manual Call Point				
			Audio Visual Alarm				
			Sounder				

2 (c)-VII Dust Test

After change of temperature test following parameter shall be measured.

S. No.	Clause no.	Name of test	Parameters	Specified value	Observation	OK/ Not OK	Remarks
2(c)-VII	9.5.3	Observation after Dust Test	The Complete AFDAS system shall be checked for its functionality.	After this test, the equipment shall be checked visually for any apparent damage & deterioration. The equipment shall be completely operational and functional.			
		Insulation Resistance Test (in MΩ)	Probe type bi-metallic heat detector	≥10MΩ			
			UV/IR flame detector				
			Heat & smoke multi sensor				
			LHS Cable Interface Module				
			Aspirating type smoke detector				
			Control Panel				
			GSM Modem				
			Manual Call Point				
			Audio Visual Alarm				
			Sounder				
	4.4.1	Air filtering and auto cleaning facility in aspirating type detector	On board monitoring of air filtering & auto cleaning	The air sampling–type detector system shall be able to withstand dusty environments by onboard monitored air filtering, Auto cleaning facility in optical chamber. (This test shall be conducted after dust test)			

2 (c)-VIII Shock Test:

After change of temperature test following parameter shall be measured

S. No.	Clause no.	Name of test	Parameters	Specified value	Observation	OK/ Not OK	Remarks

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters	Specified value	Observation	OK/ Not OK	Remarks
2(c)-VIII	9.5.3	Observation after Shock Test	The Complete AFDAS system shall be checked for its functionality.	After this test, the equipment shall be checked visually for any apparent damage & deterioration. The equipment shall be completely operational and functional.			

2 (c)-IX Vibration Test

After change of temperature test following parameter shall be measured

S. No.	Clause no.	Name of test	Parameters	Specified value	Observation	OK/ Not OK	Remarks
2(c)-IX	9.5.3	Observation after Vibration Test	The Complete AFDAS system shall be checked for its functionality.	After this test, the equipment shall be checked visually for any apparent damage & deterioration. The equipment shall be completely operational and functional.			
		Insulation Resistance Test (in MΩ)	Probe type bi-metallic heat detector	≥10MΩ			
			UV/IR flame detector				
			Heat & smoke multi sensor				
			LHS Cable Interface Module				
			Aspirating type smoke detector				
			Control Panel				
			GSM Modem				
			Manual Call Point				
			Audio Visual Alarm				
			Sounder				

2(d) Final Performance Test (Clause 7.3.1.2 & 9.3):(This test shall be conducted after before Environmental Test)

Date:

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
2(d)-I	2.2 & 4.8.8	Power Supply Test	19.2V DC	The AFDAS shall be fully functional.			
			24V DC				
			28.8V DC				
			88V AC				
			110V AC				
			132V AC				
			184V AC				
			230V AC				
			276V AC				

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
2(d)-II		In-built Charging Facility Test	Charging voltage at 1/10 of the rated capacity of the battery	27 - 27.6V DC			
			Over voltage cut off	28.44V DC maximum			
			Under voltage cut off	19.2V DC minimum			
			Maximum charging current	Not more than 20% of the rated AH capacity of the battery. (This reading shall be taken after completion of battery backup test)			
			Voltage regulation	±1%			
			Ripple content	480mV DC maximum			
2(d)-III		Battery Backup Test	Battery backup using 24V DC VRLA battery as per IRS: S-93/96(A) or latest.	At least 24 hours			
2(d)-IV		Provision of power to sensors	Probe type bi-metallic heat detector	These devices shall be powered from control panel.			
			UV&IR flame detector				
			Heat & smoke multi sensor				
			Aspiration type detector				
			LHS cable with interface				
			Manual call point				
			Audio visual alarm				
2(d)-V	2.3 & 2.15.2	Health checking and diagnostic feature test	Control Panel	The AFDAS shall be self-checking & diagnostic type, continuously monitor the health of the sensors/ detectors & the complete system including battery.			
2(d)-VI	2.3 & 4.8.6	Data Logging Test	The data regarding health & event shall be logged in the system with date & time stamp, which can be downloaded to a PC/ Laptop at later stage.	Storage of data for up to a minimum of 1000 fire events with date and time stamp.			
				Storage of data for up to a minimum of 1000 other events with date and time stamp.			
2(d)-VII		Clock Synchronization Test	Clock synchronization with real time GPS clock	The clock shall be synchronized with the real time GPS clock.			
2(d)-VIII	9.3.1.1, 2.15.1 & 4.2.2.3	Response time test	UV/IR flame detector (For fire like situation at a distance of 10m)	<10 seconds			
	9.3.1.2 & 2.15.1		Probe type bi-metallic heat detector (When exceeds 55°C.)	≤10 seconds			

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters		Specified value	Observed value	OK/ Not OK	Remarks
	9.3.1.3, 2.15.1 & 4.3.11		Heat and smoke sensor	(When Rate of rise of exceeds 10 °C per minutes)	≤10 seconds			
	9.3.1.4, 2.15.1 & 4.3.11			(When Response to absolute temperature exceeds a value of 58°C)	≤10 seconds			
	9.3.1.6 & 4.7.2		LHS cable (when it senses temperature beyond 70°C.)		≤10 seconds			
2(d)-IX	2.16	Testing of primary source	110V/230VAC is switched on only		The AFDAS shall function with the power from 110V/230VAC only.			
			24VDC is switched on only		The AFDAS shall function with the power from 24VDC only.			
			24VDC is switched on while 110V/230VAC is available		The AFDAS shall be switched over to 24VDC for functioning with the power from 24VDC.			
			110V/230VAC is switched on while 24VDC is available		The AFDAS shall function with the power from 24VDC only.			
2(d)-X		Minimum cut off voltage	The minimum cut off voltage of primary source		≥19.2V DC			
2(d)-XI		Changeover test	The changeover from primary to secondary source		<10 seconds.			
2(d)-XII	4.2.1.2 & 4.2.1.3	Triggering temperature test	The Probe type bi-metallic heat detector shall trigger when the temperature rise above the set value within +5% of the set value. Audio visual alarm shall also be generated form control panel for each corresponding temperature. This test shall be conducted 5 times sequentially.	60°C	60°C ±5%			
					Audio visual alarm shall be activated.			
				65°C	65°C ±5%			
					Audio visual alarm shall be activated.			
				70°C	70°C ±5%			
					Audio visual alarm shall be activated.			
				75°C	75°C ±5%			
					Audio visual alarm shall be activated.			
				80°C	80°C ±5%			
					Audio visual alarm shall be activated.			
				85°C	85°C ±5%			
					Audio visual alarm shall be activated.			
				90°C	90°C ±5%			
					Audio visual alarm shall be activated.			
				95°C	95°C ±5%			
					Audio visual alarm shall be activated.			
				100°C	100°C ±5%			
					Audio visual alarm shall be activated.			

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
2(d)-XIII	4.2.2.2	UV & IR Flame detector Range test	The range of flame detection of UV & IR Flame detector Range test in meter	≥10m			
2(d)-XIV	4.2.2.3	UV & IR Flame detector non-false alarm test	UV & IR Flame detector shall be subjected to sun light condition & electrical lighting such as incandescent lamp, tube light etc.	It shall not initiate false alarm.			
2(d)-XV	4.3.7	Effect of failure of indication on heat & smoke multi sensor	Each indication of heat & smoke multi sensor shall be opened & short circuited and fire like situation shall be created.	It shall reliably transmit the alarm signal.			
2(d)-XVI	4.3.8	Fault isolation test on heat & smoke multi sensor	Open the loop	The detector shall be isolated.			
			Short the loop				
2(d)-XVII	4.3.16	Response Threshold Value test on heat & smoke multi sensor	RTV	≥0.05dB/m			
			Ratio of highest to lowest RTV	≤1.6			
2(d)-XVIII	4.4.1	Time delay test for Aspirating type detector	Time delay test for Aspirating type detector to prevent nuisance alarms	<10seconds			
2(d)-XIX	4.4.1	Event logging test for Aspirating type detector	Aspirating type detector shall have the capability of event logging with date and time stamp.				
2(d)-XX	4.4.1	Clock synchronization test for Aspirating type detector	The clock of Aspirating type detector shall be synchronized with real time GPS clock				
2(d)-XXI	4.3.15	Obscuration test	Heat and smoke multi sensor	When optical density of smoke exceeds 0.1db/m (10 m visibility.)			
	9.3.1.5 4.4.1 & 4.4.3		Aspirating (Air sampling) type smoke detectors	(a) Stage 1 – 0.5 to 0.95% obs/m.			
				(b) Stage 2 – 1.0 to 1.45% obs/m.			
				(c) Stage 3 – 1.5 to 1.95% obs/m.			
				(d) Stage 4 – ≥ 2.0% obs/m.			
2(d)-XXII	4.4.4	Change of stages of alarm test	The values of obscuration shall changed for stages of alarm for Aspirating (Air sampling) type smoke detectors as	(e) Stage 1 – 0.6 to 1.05% obs/m.			
				(f) Stage 2 – 1.1 to 1.55% obs/m.			
				(g) Stage 3 – 1.6 to 2.05% obs/m.			
				(h) Stage 4 – ≥ 2.1% obs/m.			
2(d)-XXIII	4.4.5.3 &	Sensitivity test	Aspirating (Air sampling) type smoke detectors	Alert condition: 0.2 percent per foot obscuration (effective sensitivity at each			

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
	9.3.1.8			port).			
	4.4.5.3 & 9.3.1.9			Alarm condition 1.0 percent per foot obscuration (effective sensitivity at each port).			
2(d)-XXIV	4.6.1, 4.6.9, 4.7.1 & 4.7.2	LHS Cable Heat Detection test	The LHS cable shall be heated by varying temperature linearly	It shall detect the fire condition at 70°C±5% and activate an alarm in control panel through its interface module.			
2(d)-XXV	4.6.6 & 4.7.4	Monitoring of LHS Cable by LHS interface module	Open	Fault alarm on fire alarm panel of control panel.			
			Short of all cores				
			Breakage of LHS Cable				
			Disconnection				
2(d)XXVI	2.5 & 4.7.3	Fire test of LHS Cable	Fire shall be introduced at a length of: 5m	It shall initiate fire alarm at control panel & remote location			
			10m				
			15m				
			20m				
2(d)-XXVII	4.8.2	Fire detection signal processing test on Control panel	Probe type bimetallic heat detectors	The control panel shall provide audible and visual information to the user.			
			UV&IR flame detectors				
			Heat and Smoke multi sensors				
			LHS Interface				
			Aspirating Type Smoke Detectors				
			Manual Call Points				
2(d)-XXVIII	4.8.11	Display the No. of detector & part of LHS cable	The control panel shall communicate and display the exact No. of detectors & part of LHS cable where fire like situation occurred.	The control panel shall communicate and display the exact No. of detector & part of LHS cable where fire like situation occurred for pin pointing of the fire.			
2(d)-XXIX	4.8.14.2 & 4.8.14.3	Actuation of Audio Visual Alarm	In case of fire like situation	Audio visual alarm shall appear with having a provision to reset the hooter from control panel. However visual alarm shall continue till such time the alarm condition exist.			
2(d)-XXX	4.8.14.4	Working Power Supply of Audio Visual Alarm	The nominal working Power Supply of Audio Visual Alarm	24VDC			
2(d)-XXXI	4.8.14.4	Visual alarm	Flashing type	Red colour			
2(d)-XXXII	4.8.14.5	Sounder (Audio Alarm)	Piezo-electric type	Tone type of fire engine.			
2(d)-	4.8.14.5	Sound level test	Adjustable type.	40dB			

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
XXXIII			Measurement shall be taken at distance of 1m from the hooter in dB.	50dB			
				60dB			
				70dB			
				80dB			
				90dB			
2(d)-XXXIV	4.8.16 & 9.3.1.7	Audio visual alarm test for aspirating type smoke detector	Stage 1	Level1- On receiving Stage 1 signal a visual alarm near control panel shall be activated.			
			Stage 2	Level 2 – On receiving Stage 2 signal a visual and audio alarm in the SM Room shall be activated			
			Stage 3	Level 3 – On receiving Stage 3 signal an alarm condition in the Fire Alarm Control Panel to initiate Railway Staff for extinguishing the fire and shutting off the power supply to signalling system.			
			Stage 4	Level 4 – On receiving Stage 4 signal or an alarm is received from any other detector such as cross zoned multi sensor, cross zoned probe type bimetallic heat sensor, cross zoned UV&IR Flame detector and independent LHS module, the automatic suppression system, if provided shall get activated after a time delay adjustable by user up to 10 minutes in multiples of 0.5 minutes.			
2(d)-XXXV	4.10.6 & 4.10.7	Manual call point	Performance of indication of Manual call points	Normal operation			
				Activated operation			
			Fault isolator/alternate arrangement	It shall isolate the Manual call point in case of open/short circuit fault.			
2(d)-XXXVI	9.3.1.11 & 4.2.1.1	Resettability Test	Probe type bi-metallic heat detector	Each of these devices shall be of resettable type.			
	9.3.1.11 & 4.2.2.4		UV/IR flame detectors				
	9.3.1.11 & 4.3.12		Heat & smoke multi sensor				
	9.3.1.11 & 4.6.7		LHS Interface Module with LHS Cable				
	9.3.1.11, 4.8.10 & 4.8.14.3		Control Panel				

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
	9.3.1.11 & 4.10.5		Manual Call Point				
	9.3.1.11 & 4.15.8		Ancillary Equipment				
2(d)-XXXVII	9.3.1.12 & 2.2	Addressability Test	All the detectors shall be addressable.	Indicate which of the detectors have self addressing facility.			
				Indicate which of the detectors require addressing module.			
	9.3.1.12	Addressability Test	Probe type bi-metallic heat detector	Each of these devices shall be of addressable type.			
	9.3.1.12 & 4.1.1		UV/IR flame detectors				
	9.3.1.12 , 4.1.1 & 4.3.10		Heat & smoke multi sensor				
	9.3.1.12 & 4.1.1		Aspirating (Air sampling) type smoke detector				
	9.3.1.12 & 4.1.1		LHS Interface Module with LHS Cable				
	9.3.1.12 , 4.1.1 & 4.10.4		Manual Call Point				
	9.3.1.12 & 4.1.1		Ancillary Equipment				
2(d)-XXXVIII	4.11	Cross Zoning	Only one detector triggers the control panel	It shall give visual alarm.			
			Both the adjacent detectors trigger the control panel	The fire like situation shall be accepted & fire alarm shall be activated.			
			Stage-3 signal from aspirating type smoke detector	The fire like situation shall be accepted & fire alarm shall be activated.			
			Alarm received from LHS interface module	The fire like situation shall be accepted & fire alarm shall be activated.			
			Alarm received from manual call point	The fire like situation shall be accepted & fire alarm shall be activated.			

3. Performance Test (Clause 7.3.1.2 & 9.3):(This test shall be conducted after High Voltage, Insulation Resistance Test & before Environmental Test)

Date:

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
3 (a)	2.2 & 4.8.8	Power Supply Test	19.2V DC	The AFDAS shall be fully functional.			
			24V DC				

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
			28.8V DC				
			88V AC				
			110V AC				
			132V AC				
			184V AC				
			230V AC				
			276V AC				
3 (b)		In-built Charging Facility Test	Charging voltage at 1/10 of the rated capacity of the battery	27 - 27.6V DC			
			Over voltage cut off	28.44V DC maximum			
			Under voltage cut off	19.2V DC minimum			
			Maximum charging current	Not more than 20% of the rated AH capacity of the battery. (This reading shall be taken after completion of battery backup test)			
			Voltage regulation	1% maximum			
			Ripple content	480mV DC maximum			
3 (c)		Battery Backup Test	Battery backup using 24V DC VRLA battery as per IRS: S-93/96(A) or latest.	At least 24 hours			
3 (d)		Provision of power to sensors	Probe type bi-metallic heat detector	These devices shall be powered from control panel.			
			UV&IR flame detector				
			Heat & smoke multi sensor				
			Aspiration type detector				
			LHS cable with interface				
			Manual call point				
			Audio visual alarm				
3 (e)	2.3 & 2.15.2	Health checking and diagnostic feature test	Control Panel	The AFDAS shall be self-checking & diagnostic type, continuously monitor the health of the sensors/ detectors & the complete system including battery.			
3 (e)	2.3 & 4.8.6	Data Logging Test	The data regarding health & event shall be logged in the system with date & time stamp, which can be downloaded to a PC/ Laptop at later stage.	Storage of data for up to a minimum of 1000 fire events with date and time stamp.			
				Storage of data for up to a minimum of 1000 other events with date and time stamp.			
3 (f)		Clock Synchronization Test	Clock synchronization with real time GPS clock	The clock shall be synchronized with the real time GPS clock.			

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
3 (g)	2.7	Test on Loop controller or Radio frequency /electromagnetic interference and electromagnetic compatibility Test	(a) Loop controllers	Loop controllers shall have built in interference nullifier so that separate EMI control circuit is not required.			
			(b) Loop Distance	≤1.2km			
			The limits for EMI shall be 2KV (±10%), 5 KHz (±20%) for Power supply ports and 1KV (±10%), 5 KHz (±20%) for input/output signal, data and control ports (IEC 61000 4-4).	Radio frequency /electromagnetic interference and electromagnetic compatibility must be available.			
3 (h)	2.8	Compatibility test	Backward & forward compatibility	The control panel shall have suitable port to connect addressable module to connect conventional fire alarm system/sensor/detector & shall have connect additional detectors. (This needs to be tested after version change, if any)			
3 (i)	9.3.1.1, 2.15.1 & 4.2.2.3	Response time test	UV/IR flame detector (For fire like situation at a distance of 10m)	<10 seconds			
	9.3.1.2 & 2.15.1		Probe type bi-metallic heat detector (When exceeds 55°C.)	≤10 seconds			
	9.3.1.3, 2.15.1 & 4.3.11		Heat and smoke sensor (When Rate of rise of exceeds 10 °C per minutes)	≤10 seconds			
	9.3.1.4, 2.15.1 & 4.3.11		Heat and smoke sensor (When Response to absolute temperature exceeds a value of 58°C)	≤10 seconds			
	9.3.1.6 & 4.7.2		LHS cable (when it senses temperature beyond 70°C.)	≤10 seconds			
3 (j)	2.16	Testing of primary source	110V/230VAC is switched on only	The AFDAS shall function with the power from 110V/230VAC only.			
			24VDC is switched on only	The AFDAS shall function with the power from 24VDC only.			
			24VDC is switched on while 110V/230VAC is available	The AFDAS shall be switched over to 24VDC for functioning with the power from 24VDC.			
			110V/230VAC is switched on while 24VDC is available	The AFDAS shall function with the power from 24VDC only.			

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters		Specified value	Observed value					OK/ Not OK	Remarks
3 (k)		Minimum cut off voltage	The minimum cut off voltage of primary source		≥19.2V DC							
3 (l)		Changeover test	The changeover from primary to secondary source		<10 seconds.							
3 (m)	4.2.1.1	Conformity to the IS 2189	Probe type bi-metallic heat detector		The vendor shall submit datasheet/invoice & undertaking in this regard.							
3 (n)	4.2.1.2 & 4.2.1.3	Triggering temperature test	The Probe type bi-metallic heat detector shall trigger when the temperature rise above the set value within +5% of the set value. Audio visual alarm shall also be generated form control panel for each corresponding temperature. This test shall be conducted 5 times sequentially.	60°C	60°C ±5%							
					Audio visual alarm shall be activated.							
				65°C	65°C ±5%							
					Audio visual alarm shall be activated.							
				70°C	70°C ±5%							
					Audio visual alarm shall be activated.							
				75°C	75°C ±5%							
					Audio visual alarm shall be activated.							
				80°C	80°C ±5%							
					Audio visual alarm shall be activated.							
				85°C	85°C ±5%							
					Audio visual alarm shall be activated.							
				90°C	90°C ±5%							
					Audio visual alarm shall be activated.							
				95°C	95°C ±5%							
					Audio visual alarm shall be activated.							
				100°C	100°C ±5%							
					Audio visual alarm shall be activated.							
3 (o)	4.2.2.2	UV & IR Flame detector Range test	The range of flame detection of UV & IR Flame detector Range test in meter		≥10m							
3 (p)	4.2.2.3	UV & IR Flame detector non-false alarm test	UV & IR Flame detector shall be subjected to sun light condition & electrical lighting such as incandescent lamp, tube light etc.		It shall not initiate false alarm.							
3 (q)	4.3.7	Effect of failure of indication on heat & smoke multi sensor	Each indication of heat & smoke multi sensor shall be opened & short circuited and fire like situation shall be created.		It shall reliably transmit the alarm signal, even when the indications are not available.							
3 (r)	4.3.8	Fault isolation test on heat & smoke multi sensor	Open the loop		The detector shall be isolated.							
			Short the loop									
3 (s)	4.3.16	Response Threshold	RTV		≥0.05dB/m							

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
		Value test on heat & smoke multi sensor	Ratio of highest to lowest RTV	≤1.6			
3 (t)	4.4.1	Method of detection of Aspirating type detector	The electronic discrimination of particle size, or other listed methods or combinations thereof.	The manufacturer shall submit the test certificate for from ILAC/NABL accredited or Government of India recognized laboratory in this regard.			
3 (u)	4.4.1	Time delay test for Aspirating type detector	Time delay test for Aspirating type detector to prevent nuisance alarms	≤10seconds			
3 (v)	4.4.1	Event logging test for Aspirating type detector	Aspirating type detector shall have the capability of event logging with date and time stamp.				
3 (w)	4.4.1	Clock synchronization test for Aspirating type detector	The clock of Aspirating type detector shall be synchronized with real time GPS clock				
3 (x)	4.4.2	The LED used for detection in Aspirating type detector	Air Sampling Type detector shall use LASER or High power LED	The manufacturer shall submit the test certificate for from ILAC/NABL accredited or Government of India recognized laboratory in this regard.			
3 (y)	4.3.15	Obscuration test	Heat and smoke multi sensor	When optical density of smoke exceeds 0.1db/m (10 m visibility.)			
	9.3.1.5 4.4.1 & 4.4.3		Aspirating (Air sampling) type smoke detectors	(i) Stage 1 – 0.5 to 0.95% obs/m.			
				(j) Stage 2 – 1.0 to 1.45% obs/m.			
				(k) Stage 3 – 1.5 to 1.95% obs/m.			
				(l) Stage 4 – ≥ 2.0% obs/m.			
3 (z)	4.4.4	Change of stages of alarm test	The values of obscuration shall changed for stages of alarm for Aspirating (Air sampling) type smoke detectors as	(m) Stage 1 – 0.6 to 1.05% obs/m.			
				(n) Stage 2 – 1.1 to 1.55% obs/m.			
				(o) Stage 3 – 1.6 to 2.05% obs/m.			
				(p) Stage 4 – ≥ 2.1% obs/m.			
3 (aa)	4.4.5.3 & 9.3.1.8	Sensitivity test	Aspirating (Air sampling) type smoke detectors	Alert condition: 0.2 percent per foot obscuration (effective sensitivity at each port).			
	4.4.5.3 & 9.3.1.9			Alarm condition 1.0 percent per foot obscuration (effective sensitivity at each port).			
3 (ab)	4.4.5.2	Maximum transport time	The maximum transport time for the port at 15m away from the Aspirating (Air sampling) type smoke detectors	≤60seconds			
3 (ac)	4.6.1, 4.6.9 & 4.7.1	LHS Cable Heat Detection test	The LHS cable shall be heated by varying	It shall detect the fire condition at 70°C±5% and activate an alarm in			

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters		Specified value	Observed value	OK/ Not OK	Remarks
			temperature linearly		control panel through its interface module.			
3 (ad)	4.6.2, 4.6.3, & 4.6.4	LHS Cable	The LHS cable shall be analogue temperature sensitive negative temperature co-efficient type insulating material with fire retardant outer sheath & consisting copper core.		The manufacturer shall submit the test certificate for from ILAC/NABL accredited or Government of India recognized laboratory in this regard.			
3 (ae)	4.6.6 & 4.7.4	Monitoring of LHS Cable by LHS interface module	Open		Fault alarm on fire alarm panel of control panel.			
			Short of all cores					
			Breakage of LHS Cable					
			Disconnection					
3 (af)	2.5 & 4.7.3	Fire test of LHS Cable	Fire shall be introduced at a length of:	5m	It shall initiate fire alarm at control panel & remote location			
				10m				
				15m				
				20m				
3 (ag)	4.6.10	LHS cable capability to withstand adverse atmosphere	The Linear heat sensing cable should have strong capability to withstand the mechanical damage, tensile, water and corrosion and electromagnetic interference.		The manufacturer shall submit the test certificate for from ILAC/NABL accredited or Government of India recognized laboratory in this regard.			
3 (ah)	4.6.11	Approval of LHS cable	LHS cable shall be UL/FM/Vds/EN/LPCB approved.		The manufacturer shall submit invoice, datasheet, & approval certificate of UL/FM/Vds/EN/LPCB.			
3 (ai)	4.8.2	Fire detection signal processing test on Control panel	Probe type bimetallic heat detectors		The control panel shall provide audible and visual information to the user.			
			UV&IR flame detectors					
			Heat and Smoke multi sensors					
			LHS Interface					
			Aspirating Type Smoke Detectors					
			Manual Call Points					
3 (aj)	4.8.9 & 4.8.13	Software Test	Visualization & interaction with complete AFDAS		The software shall be capable of Visualization & interaction with complete AFDAS.			
			User friendliness		The software shall be User friendly.			
			Compatibility with latest version of windows OS.		The software shall be Compatible with latest version of windows OS.			
			Facility of downloading and analyzing fault data using the		The software shall have the facility of downloading and analyzing fault data			

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
			software.	using the software.			
3 (ah)	4.8.11	Display the No. of detector & part of LHS cable	The control panel shall communicate and display the exact No. of detector & part of LHS cable where fire like situation occurred.	The control panel shall communicate and display the exact No. of detector & part of LHS cable where fire like situation occurred for pin pointing of the fire.			
3 (ai)	4.8.11	Current carrying capacity of PFC test	Current carrying capacity of PFC shall not be less than 500mA.	Current carrying capacity of PFC shall be verified from invoice & datasheet of the relay used.			
3 (aj)	4.8.14.2 & 4.8.14.3	Actuation of Audio Visual Alarm	In case of fire like situation	Audio visual alarm shall appear with having a provision to reset the hooter from control panel. However visual alarm shall continue till such time the alarm condition exist.			
3 (ak)	4.8.14.4	Working Power Supply of Audio Visual Alarm	The nominal working Power Supply of Audio Visual Alarm	24VDC			
3 (al)	4.8.14.4	Visual alarm	Flashing type	Red colour			
3(am)	4.8.14.5	Sounder	Piezo-electric type	Tone type of fire engine.			
3 (an)	4.8.14.5	Sound level test	Adjustable type. Measurement shall be taken at distance of 1m from the hooter in dB.	40dB			
				50dB			
				60dB			
				70dB			
				80dB			
				90dB			
3 (ao)	4.8.15	Control for ancillary equipments	Extra control shall be provided for successful system operation.	Provision shall be available for controlling ancillary equipments.			
3 (ap)	4.8.16 & 9.3.1.7	Audio visual alarm test for aspirating type smoke detector	Stage 1	Level1- On receiving Stage 1 signal a visual alarm near control panel shall be activated.			
			Stage 2	Level 2 – On receiving Stage 2 signal a visual and audio alarm in the SM Room shall be activated			
			Stage 3	Level 3 – On receiving Stage 3 signal an alarm condition in the Fire Alarm Control Panel to initiate Railway Staff for extinguishing the fire and shutting off the power supply to signalling system.			
			Stage 4	Level 4 – On receiving Stage 4 signal or an alarm is received from any other detector such as cross zoned multi sensor, cross zoned probe type			

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters		Specified value	Observed value	OK/ Not OK	Remarks
					bimetallic heat sensor, cross zoned UV&IR Flame detector and independent LHS module, the automatic suppression system, if provided shall get activated after a time delay adjustable by user up to 10 minutes in multiples of 0.5 minutes.			
3 (aq)	4.8.17	GSM module	Configuration of mobile nos.		At least 5 Nos.			
			SMS Generation for:		Level 2			
					Level 3			
					Level 4			
			Time between generation of SMS and receiving of detection signal		<30 seconds			
			Compatibility with Quad band GSM, Class 10 & rest of the requirement of this clause		To be verified from datasheet.			
3 (aq)	4.8.18	Indication of location of fire	It shall have the provision to indicate the location of fire such as relay room, power equipment room, DG room etc.		By means of LED/LCD.			
3 (ar)	4.8.19	Working in degenerate mode	The control panel shall be so designed that it should also work in degenerate mode.		The manufacturer shall submit the test certificate for from ILAC/NABL accredited or Government of India recognized laboratory in this regard.			
3 (as)	4.9	Fire survival circuit integrity cable	Electrical characteristics for both armored/unarmored cable		The manufacturer shall submit undertaking for suitability of the cable with the system in terms of voltage drop, current carrying capacity, impedance & where appropriate ability to transmit data.			
			Armored cable	2Core x 1.5mm^2	The manufacturer shall submit the invoice, datasheet & test certificate from UL/FM/EN/Vds/LPCB/BRE Global or any Government of India recognized laboratory for the same.			
				Cross linkable low smoke halogen free insulation				
				1000V Di-electric strength rating				
			Unarmored cable	2Core x 1.5mm^2				
				Cross linkable low smoke halogen free				

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
			insulation				
			500V Di-electric strength rating				
			ATC uninsulated circuit protective conductor				
			Aluminum tape screening				
			Fire performance test under simultaneous action of Flame, water stress and impacts at 950°C for minimum 2 hours for both armored & unarmored (CI) cables	The manufacturer shall submit test certificate from LPCB or equivalent for the same.			
3 (at)	4.10.6 & 4.10.7	Manual call point	Performance of indication of Manual call points	Normal operation			
				Activated operation			
			Fault isolator/alternate arrangement	It shall isolate the Manual call point in case of open/short circuit fault.			
3(au)	9.3.1.11 & 4.2.1.1	Resettability Test	Probe type bi-metallic heat detector	Each of these devices shall be of resettable type.			
	9.3.1.11 & 4.2.2.4		UV/IR flame detectors				
	9.3.1.11 & 4.3.12		Heat & smoke multi sensor				
	9.3.1.11 & 4.6.7		LHS Interface Module with LHS Cable				
	9.3.1.11, 4.8.10 & 4.8.14.3		Control Panel				
	9.3.1.11 & 4.10.5		Manual Call Point				
	9.3.1.11 & 4.15.8		Ancillary Equipment				
3(av)	9.3.1.12 & 2.2	Addressability Test	All the detectors shall be addressable.	Indicate which of the detectors have self addressing facility.			
				Indicate which of the detectors require addressing module.			
3(aw)	9.3.1.12 & 4.1.1	Address of the detectors	Probe type bi-metallic heat detector	The address of each detector shall be distinct & different from other detectors.			
	9.3.1.12 & 4.1.1		UV/IR flame detectors				
	9.3.1.12, 4.1.1 &		Heat & smoke multi sensor				

Signature of RDSO's Testing Official

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
	4.3.10						
	9.3.1.12 & 4.1.1		Aspirating (Air sampling) type smoke detector				
	9.3.1.12 & 4.1.1		LHS Interface Module with LHS Cable				
	9.3.1.12, 4.1.1 & 4.10.4		Manual Call Point				
	9.3.1.12 & 4.1.1		Ancillary Equipment				
3(ax)	4.11	Cross Zoning	Two adjacent detector	These shall be addressed for different zones.			
			Only one detector triggers the control panel	It shall give visual alarm.			
			Both the adjacent detectors trigger the control panel	The fire like situation shall be accepted & fire alarm shall be activated.			
			Stage-3 signal from aspirating type smoke detector	The fire like situation shall be accepted & fire alarm shall be activated.			
			Alarm received from LHS interface module	The fire like situation shall be accepted & fire alarm shall be activated.			
			Alarm received from manual call point	The fire like situation shall be accepted & fire alarm shall be activated.			
			Exception from cross zoning	Cross zoning shall not be applicable for Aspirating type smoke detector, LHS interface module & manual call point			

4. Reverse Polarity Test (Clause 7.3.1.3 & 9.4):

Date:

S. No.	Clause no.	Name of test	Parameters	Specified value	Observed value	OK/ Not OK	Remarks
3	9.4.1	Reverse Polarity Test	Reverse Polarity Test	The unit shall be functional after applying 200V DC for one minute in the correct polarity as well as in the reverse polarity.			

Note: The fire test chamber shall be of size 3x3x3 m^3.

***

Signature of RDSO's Testing Official