INDIAN RAILWAYS
RESEARCH DESIGNS & STANDARDS ORGANIGATION
MANAK NAGAR LUCKNOW-226011

NOTICE No. STS/E/AFSS dt. 20/05/2016
FOR INVITING EXPRESSION OF INTEREST

Ministry of Railways, Research Designs & Standards Organization (R.D.S.O.), Lucknow is interested in finalization of specification and Schedule of Technical Requirement for **AUTOMATIC FIRE SUPPRESSION SYSTEM (AFSS) FOR SIGNALLING INSTALLATIONS** as per Functional Requirement Specification available on RDSO's website. Firms who have enough experience and capabilities in the field and ISO certificate and are interested in developing and supply of said item are requested to see the details on RDSO's website www.rdso.indianrailways.gov.in or contact Director/Signal-IV, Signal Labs, RDSO, Lucknow on Telephone No. 0522- 2462641/ email: dsig4rdso@gmail.com on any working day for further details. The firms are requested to submit details in the prescribed format by 27/06/2016 to Director/Signal-IV, Signal Labs, RDSO, Manak Nagar, Lucknow 226011.

Instructions/ Guidelines for the firms expressing their interest against Expression of Interest (EOI) Notice No. STS/E/AFSS dt. 20/05/2016

1. DISCLAIMER

Ministry of Railways, Research, Designs & Standards Organization (RDSO), Signal Directorate has prepared this document to give interested parties background information of the product/ system. While RDSO has taken due care in preparation of information contained herein and believes it to be accurate, neither RDSO nor any of its officers, employees gives any warranty or make any representations, express or implied as to the completeness or accuracy of the information contained in this document or any information which may be provided in association with it. The information is not intended to be exhaustive. Interested parties are required to make their own inquiries and respondents will be required to confirm in writing that they have done so. The information is provided on the basis that it is non-binding on RDSO or any of its officers, employees or advisors.

RDSO reserves the right not to proceed with the project, at a later stage or to change the process or procedure to take the project forward. In such eventualities, RDSO will not be held responsible. It also reserves the right to decline to discuss the project further with any party expressing interest. No reimbursement of cost of any type will be paid to persons, or entities, expressing interest.

2. PURPOSE OF INVITING THE EOI

The purpose of the EOI is to ensure transparency in conceptualizing for developing the specification for Automatic Fire Suppression System (AFSS) for Signalling installations over Indian Railways. The AFSS gets actuated from the Fire Detection and Alarm System as per functional requirement specification.

This Expression of Interest (EOI) is for finalizing the Draft specification and Schedule of Technical Requirement for this item based on functional requirement specification for AUTOMATIC FIRE SUPPRESSION SYSTEM (AFSS) FOR SIGNALLING INSTALLATIONS. The present EOI is being invited to identify knowledgeable firms for the purpose of interacting with them in the process of drawing up the specification. To facilitate the potential respondents, a preliminary Functional Requirement Specification for the item has been drawn up by the signal directorate and interested firms can view the same on the EOI webpage of RDSO.

3. METHOD OF SHORTLISTING OF FIRMS:

S.No.	Item	Marks	Remarks
1.	Turnover of the firms during last 3 years.	20	Firm having maximum will be given full marks and others as percentile.
2.	Details of supplies made in the field of item under EOI	30	This is the turnover of supplies made in the field of item under EOI. The firm having maximum will be given full marks and others as percentile.

S.No.	Item	Marks	Remarks
3.	Experience and expertise for item under EOI.	20	It is based on years of experience in such product. The firm having maximum will be given full marks and others as percentile.
4.	Man power & their qualification	10	No. of persons with professional qualification on firm's direct roll and percentile.
5.	Details of patent held and MOU/agreement with OEM	20	Number of such items and percentile thereof.

4. SUBMISSION OF EOI BY INTERESTED FIRMS

Interested firms are requested to submit their EOI to the following postal address: Director Signal IV, Signal Labs, RDSO, Manak Nagar, Lucknow – 226 011 by 27/06/2016 in the enclosed "Format for Letter of Response". In the EOI, the firms should mention RDSO's Notice No. STS/E/AFSS dated. 20/05/2016. Care may please be taken by the interested firms to read the Functional Requirement Specification in Annexure-B before filling up the "Format for Letter of Response". In the EOI, the respondents must furnish the following details as required in the enclosed "Format for Letter of Response":

(i) Format for letter of response.
(ii) Undertaking in Annexure-A.
(iii) Turn-over of the firm during the last three financial years with the copies of annual report.
(iv) Details of various items being manufactured/consultancy undertaken.
(v) Details of customer(s) and supplies made in the field of item under EOI.
(vi) Experience and expertise for the items proposed in EOI.
(vii) Details of man-power with their qualification and experience.
(viii) Detailed proposal for item proposed in EOI including alternative proposal, if any.
(ix) Details of Intellectual Property Rights (IPR) held, patent filed/held and MoU/ agreement signed.
(x) Details of ISO certification.

5. OTHER INFORMATION

(i) The discussions shall be held with the short listed firms for finalizing the specification/Schedule of Technical Requirement for this item based on Functional Requirement Specification for AUTOMATIC FIRE SUPPRESSION SYSTEM (AFSS) FOR SIGNALLING INSTALLATIONS. Subsequently, the specification will be finalized as per RDSO's procedure.
(ii) The firm(s) referred above shall be Indian firm(s).

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FORMAT FOR LETTER OF RESPONSE

Respondents Ref No.:
Date:

Director Signal IV,
Signal Labs,
Research Designs & Standards Organization
Ministry of Railways
Manak Nagar
Lucknow,
INDIA 226011

Dear Sir,

Subject: RESPONSE TO – EOI FOR PARTICIPATION _____

1. We, the undersigned, offer the following information in response to the Expression of Interest sought by you vide your Notification No. STS/E/AFSS dated 20/05/2016.

2. We are duly authorized to represent and act on behalf of _____ (hereinafter the "respondent").

3. We have examined and have no reservations to the EOI Document including Addenda No(s)_____.

4. We are attaching with this letter, the copies of original documents defining: -

   a) The Respondent's legal status;
   b) Its principal place of business;
   c) Its place of incorporation (if respondents are corporations); or its place of registration (if respondents are cooperative institutions, partnerships or individually owned firms);
   d) Self certified financial statements of Last three years, clearly indicating the financial turn over and net worth.
   e) Copies of any market research, business studies, feasibility reports and the like sponsored by the respondent, relevant to the project under consideration.

5. We shall assist MoR and/or its authorized representatives to obtain further clarification from us, if needed.

   a) RDSO and/or its authorized representatives may contact the following nodal persons for further information on any aspects of the Response:

S. No.	Contact Name	Address	Telephone	E Mail
1				
2				

6. This application is made in the full understanding that:

   a) Information furnished in response to EOI shall be used confidentially by RDSO for the purpose of development of the project.

   b) RDSO reserves the right to reject or accept any or all applications, cancel the EOI and subsequent bidding process without any obligation to inform the respondent about the grounds of same.

   c) We confirm that we are interested in participating in development of the project.

7. We certify that our turnover and net worth in the last three years is as under:

Financial Year	**Turn over**	**Net worth**
2015-16		
2014-15		
2013-14		

8. In response to the EOI we hereby submit the following additional details annexed to this application.

   8.1. Details of various items being manufactured/consultancy undertaken.

   8.2. Details of customer(s) and supplies made in the field of item under EOI.

   8.3. Experience and expertise for the items proposed in EOI.

   8.4. Details of man-power with their qualification and experience.

   8.5. Detailed proposal for items proposed in EOI including alternative proposal, if any.

   8.6. Details of Intellectual Property Rights (IPR) held, patent filed/held and MoU/ agreement signed.

   8.7. Details of ISO certification

   8.8 Undertaking as per Annexure-A.

9. The undersigned declare that the statements made and the information provided in the duly completed application are complete, true, and correct in every detail. We also understand that in the event of any information furnished by us being found later on to be incorrect or any material information having been suppressed, RDSO may delete our name from the list of qualified Respondents. We further understand that RDSO will give first preference to the applicants considered relevant for the purpose.

10. Our response is valid till (date in figures and words): _____ _____

Yours sincerely,

(Sign)
NAME
In the Capacity of
Duly authorized to sign the
response for and on behalf
of
Date

Annexure-A

(To be taken on non-judicial stamp paper of appropriate value as applicable in the respective state and duly notarised & witnessed)

UNDERTAKING

I, son of ……aged about ….....Years resident of ……do hereby solemnly affirm as under –

1. That the deponent is the Authorised signatory of *(Name of the Sole Proprietorship Concern/ Partnership Firm/ Registered Company/ Joint Venture).*

2. That the deponent declares on behalf of *(Name of the Sole Proprietorship Concern/ Partnership Firm/ Registered Company/Joint Venture)* that:

   a) In regard to matters relating to the security and integrity of the country, no charge sheet has been filed by an agency of the Government / conviction by a Court of Law for an offence committed by the ----------(name of the entity) or by any sister concern of the ----------(name of the entity) would result in disqualification.
   b) In regard to matters other than the security and integrity of the country, ----------(name of the entity) has not been convicted by a Court of Law or indicted / passed any adverse order by a regulatory authority against it or it's any sister concern which relates to a grave offence, or would constitute disqualification. Grave offence is defined to be of such a nature that it outrages the moral sense of the community.

DEPONENT

VERIFICATION

I declare that the contents of para 1 to 2 above are true as per my knowledge and nothing has been hidden.

DEPONENT

Annexure-B

FUNCTIONAL REQUIREMENT SPECIFICATION
FOR
AUTOMATIC FIRE SUPPRESSION SYSTEM FOR SIGNALLING INSTALLATIONS

SPECIFICATION No. RDSO/SPN/218/2016 (Draft)
Version 0

Issued by

SIGNAL DIRECTORATE
RESEARCH, DESIGNS & STANDARDS ORGANISATION
MINISTRY OF RAILWAYS
MANAK NAGAR
LUCKNOW – 226 011

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FUNCTIONAL REQUIREMENT SPECIFICATION FOR AUTOMATIC FIRE SUPPRESSION SYSTEM FOR SIGNALLING INSTALLATIONS

1 FOREWORD

The specifications and standards listed below form a part of this specification. The system shall fully comply with the latest issue of these standards, if applicable.

A) Fire Suppression Systems Association (FSSA) and National Fire Protection Association (NFPA):

NFPA 13	Sprinkler Systems.
NFPA 16	Foam/Water Deluge and Spray Systems.
NFPA 2001	Clean Agent Extinguishing Systems.
NFPA 72	National Fire Alarm Code.
NFPA 76	Telecommunication Facilities.
NFPA 318	Clean Room Applications.
NFPA 101	Life Safety Code.
NFPA 90A	Air conditioning & ventilation system.

B) EN54:

EN54-2	Control and Indicating Equipment .
EN54-4	Power Supply Equipment.
EN54-11	Manual Call Points.
EN54-18	Input/ output Devices.

C) IS: 15493:2004 Gaseous fire extinguishing system.

Whenever reference to any specification appears in this document, it shall be taken as a reference to the latest version of that specification unless the year of issue of the specification is specifically stated.

2 SCOPE

2.1 This document sets forth general, operational, technical and performance requirements of Automatic Fire suppression System (AFSS) for signalling installations.

2.2 The system shall have proper listing and/or approval from the following recognized agencies: EN/LPCB/UL/Vds approved.

2.3 ABBREVIATION USED:

Abbreviation used	Description
NFPA	National Fire Protection Association
NFSA	National Fire Suppression Association
ACU	Alarm and Control Unit
IS	Indian Standards

PESO	Petroleum and Explosives Safety Organization.
EPA	Environmental Protection Agency
SNAP	Significant New Alternatives Policy
IMU	International Maritime Organization
NOAEL	No Observed Adverse Effect Level
LOAEL	Lowest Observed Adverse Effect Level
ISO	International Organization for Standardization.
NABL	National Accredited Board for Testing and Calibration
ILAC	International Laboratory Accreditation Co-Operation.
LPCB	Loss Prevention Certification Board.
BSI	British Standard Institutions.
OEM	Original Equipment Manufacturer.
IEC	International Electro Technical Commission.
UL	Underwriter's Laboratories.
PVC	Polyvinyl Chloride.
ABS	Acrylonitrile Butadiene Styrene.
UPVC	Un-plasticised Polyvinyl Chloride.
CPVC	Chlorinated Poly Vinyl Chloride.
ASTM	American Society for Testing and Materials.

3 GENERAL REQUIREMENTS

3.1 Automatic Fire suppression System (AFSS) shall consist of following:

3.1.1 Trigger from Automatic Fire Alarm Detection or Manual Attention.

3.1.2 Clean Agent Filled Cylinders.

3.1.3 Piping System.

3.1.4 Cables & Relays.

3.2 The Fire Suppression System shall be either initiated automatically or manually.

3.3 The system shall be suitable for installation in electrical cabinets, transformers, invertors, cable trays, electronic equipment, power equipment rooms, relay rooms, battery rooms and Diesel Generator rooms.

3.4 The system shall be suitable to suppress fire/ fire like situation in relay room, power equipment room, electronic equipment, electrical wiring etc. and shall be able to extinguish fire before it causes damage to any of the above equipment.

3.5 The system shall not degrade the performance of relays, power equipment, wiring, cables etc. when subjected to fire suppression/extinguishing process.

3.6 The AFSS shall work satisfactorily & reliably over the entire range of following environmental parameters:

3.6.1 Temperature range: -10ºC to + 70ºC

3.6.2 Humidity: 0 to 95 %

3.6.3 Climate: Dusty, Sandy, Desert conditions.

3.7 Radio frequency /Electromagnetic Interference and Electromagnetic Compatibility must be available. 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).

3.8 It shall be possible to interface the existing Fire Alarm System or to be provided with Automatic Fire Detection and Alarm System as per RDSO/SPN/217/2016 (Draft), wherever available, to the Fire Suppressing System covered in this specification.

3.9 The system shall have manual override to initiate fire suppresser or to disable the system.

3.10 The system shall be able to extinguish fire with high degree of reliability.

3.11 The working of the equipment shall not cause interference to other electrical/electronic circuits/systems and shall not damage relays, wiring, power equipment etc.

3.12 All precautions regarding earthing & preventing hazard shall be taken as per requisite clauses of IS 15493-2004.

3.13 Quality requirement & storage shall be as per requisite clauses of IS 15493-2004.

3.14 The extinguishing system should incorporate a pre discharge alarm with a time delay sufficient to allow personnel evacuation prior to discharge.

3.15 Time delay devices should be used only for personnel evacuation or to prepare the hazard area for discharge.

3.16 Automatic/manual switch and lock off devices should be provided at the entrance to the protected area where required.

3.17 The general principles of the Automatic Fire Suppression System

3.17.1 The extinguishing Clean Agent and / or its byproducts shall not leave any residue and shall not be harmful to living beings, environment, electrical equipments, electronic equipments, power equipments, signaling equipments, relays and shall not cause interference to working of electrical/electronic/signaling circuits/systems and shall not damage relays, wiring, power equipment etc.

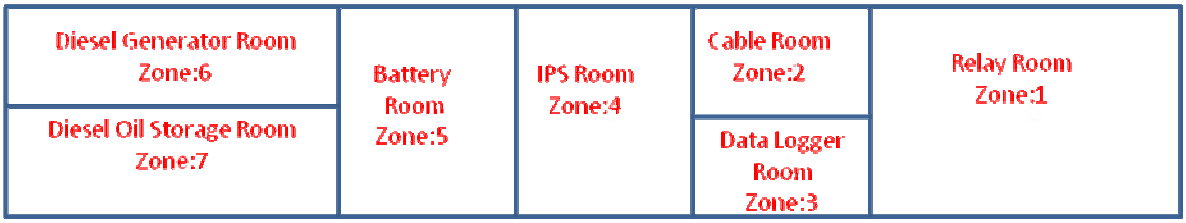
3.17.2 During the course of fire extinguishing process and after that, it shall not provide any conductance or any insulation between relay contacts, terminals and exposed wires.

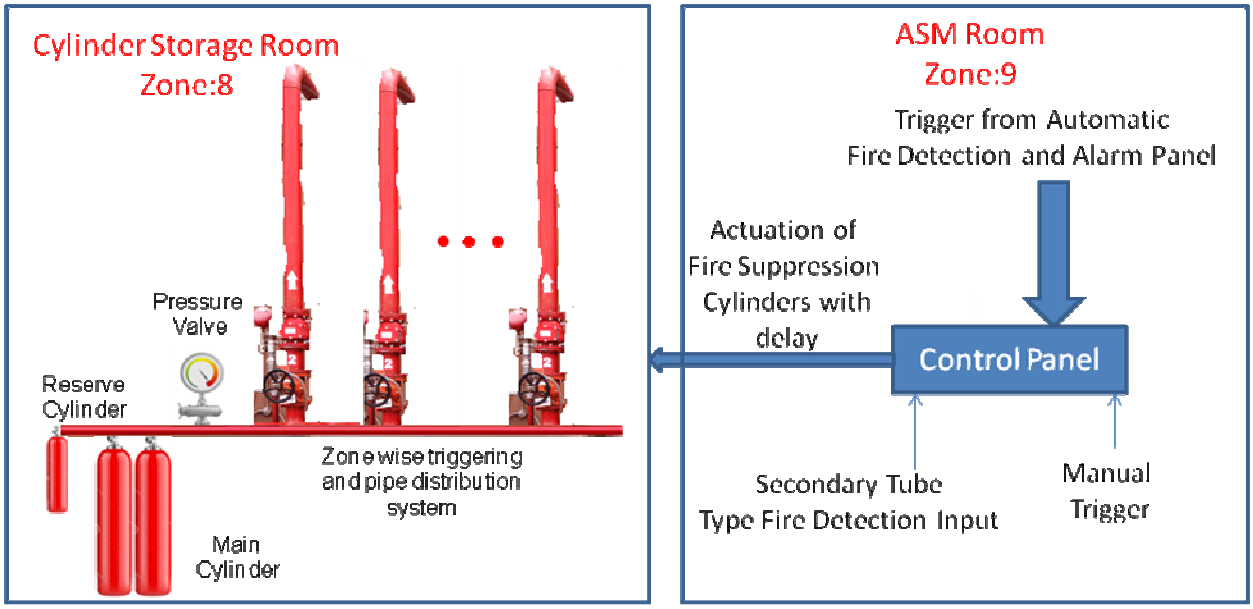
3.17.3 It shall be friendly to the ozone layer & shall not deplete the oxygen content.

3.17.4 The containers shall be made of Seamless Steel cylinders manufactured to IS 7285/BS 5045, and shall be PESO approved.

3.17.5 There shall be an arrangement of refilling once the fire extinguishing system is operated.

4 GENERAL LAYOUT OF AUTOMATIC FIRE SUPPRESSION SYSTEM





5 TECHNICAL REQUIREMENTS

5.1 The fire extinguishing system shall be of clean agent type such as HALOCARBON / equivalent and shall be approved by EN/UL/FM/Vds/LPCB. It should extinguish a fire by removing the free radicals or heat elements from the fire tetrahedron. (Oxygen, Heat, Fuel & Chemical Reaction). The typical concentration of HALOCARBON/equivalent should be 7.9% to 8.5%.

5.2 The following parameters shall be submitted duly certified by an international recognized lab or from a lab recognized by government of India and Original Equipment Manufacturer:

5.2.1 Product chemical formula.

5.2.2 Molecular weight.

5.2.3 Standard Followed in Design.

5.2.4 Design Concentration for fires originated by Electrical apparatus and Diesel fuel respectively.

5.2.5 Boiling Point.

5.2.6 Freezing Point.

5.2.7 Toxicity **Levels:** (**NOAEL /LOAEL**).

5.2.8 Container pressure at 21ºC .

5.2.9 Global Warming Potential.

5.2.10 Ozone Depletion Potential.

5.2.11 Extinguishing Concentration.

5.2.12 Atmospheric Life time.

5.2.13 Decrease in quantity of oxygen present in the chamber due to action of clean agent.

5.2.14 The Protection System shall broadly consists of container, feed lines, ring mains / laterals as required, spray nozzles, signaling equipment and activation devices which shall be tested as per AST E-814 standard.

5.3 The system shall also be capable of being actuated by manual discharge devices located at each hazard exit. Operation of a manual device shall activate the suppression system except that the time delays and abort functions shall be bypassed. The manual discharge station shall be of the electrical/pneumatic actuation type and shall be supervised at the main control panel.

5.4 **Release Switch**: The electric manual release shall be a dual action device which provides a means of manually discharging the suppression system when used in conjunction with the detection system.

5.5 Manual release shall be located at each exit.

5.6 **Fail Safety Device**: The fire suppression system shall be equipped with tube type detector in the area under its influence. This tube type detector shall trigger the suppression agent in case of non-receipt of alarm from the Fire Detection System.

5.7 **Reserve**: Reserve cylinder shall be kept for testing the suppression system efficacy. This can be used to observe blockage in pipes, leakages etc.,

5.8 The system engineering company shall carry out the piping Isometric design and validate the same with a hydraulic flow calculation generated by using the EN/UL/FM/Vds/LPCB approved software. The appropriate fill density shall also be calculated.

5.9 The design & calculation shall be checked & certified by manufacturer / manufacturer trained design engineer.

5.10 Plans and calculations shall be approved prior to installation.

5.11 For safety reasons the clean agent fire suppression system cylinder, valve, discharge hose, nozzles must be provided from the same manufacturer to ensure proper performance as a system with EN/UL/FM/Vds/PESO approvals, thereby giving a confidence that a third party has tested the performance of the whole unit as a system.

5.12 Cylinder shall be seamless steel type manufactured from billets and tested in accordance with IS 7285 / BS 5045 standard approved by PESO.

5.13 Cylinder shall be actuated by either a resettable electric/pneumatic actuator or by manual actuator.

5.14 Each Cylinder shall have a pressure gauge and low pressure switch to provide visual and electrical supervision of the container pressure.

5.15 The complete cylinder shall be Helium leak tested for pressure losses up to 10^{-7} mbar/second. The low-pressure switch shall be wired to the control panel to provide audible and visual "Trouble" alarms in the event the container pressure drops below the value to be specified by Original Equipment Manufacturer.

5.16 The pressure gauge shall be color coded to provide an easy, visual indication of cylinder pressure.

5.17 The pipes used in the pipe network can be made of various materials including copper, PVC, ABS, UPVC and CPVC to cater for ceiling temperature of 69ºC and their assemblies such as couplings, unions, elbows, tees, end caps, capillary tubes, mounting brackets, nozzles and they shall be tested in accordance with ASTM E 814. All distribution piping shall be installed by qualified individuals using accepted practices and quality procedures.

5.18 All piping shall be adequately supported and anchored at all directional changes and nozzle locations.

5.19 All piping shall be reamed, blown clear and swabbed with suitable solvents to remove burrs, mill varnish and cutting oils before assembly.

5.20 All pipe threads shall be sealed with Teflon tape pipe sealant applied to the male thread only. Alternatively pipe fittings are to be welded to the pipe as required.

5.21 Engineered discharge nozzles shall be provided within the manufacturer's guidelines to distribute the clean agent throughout the protected spaces.

5.22 The nozzles shall be designed to provide proper agent quantity and distribution.

5.23 Nozzles shall be available in 1/2 in. through 2 in. pipe sizes. Each size shall be available in 180°and 360°distribution patterns.

5.24 End of line plug for automatic fire suppression tube should be used for fitting at the tube end to terminate the point. Fitting shall be made by brass nickel plated material with elastomeric sealing suitable to ambient temperature range of -10ºC to +70ºC and maximum working pressure as per pressure equipment directives.

5.25 End of line adapter for pressure gauge fitting for automatic fire suppression tube should be used for fitting at the end of the tube for pressurizing and re pressurizing the tube. Fitting shall be made by brass (plated) or stainless steel with elastomeric sealing suitable to ambient temperature range of -10ºC to +70ºC and maximum working pressure as per pressure equipment directives.

5.26 Elbow fittings for pressurized tubes should be made by nickel plated material with elastomeric sealing suitable to ambient temperature range of -10ºC to +70ºC and maximum working pressure as per pressure equipment directives.

5.27 Pressurized tubes should made by nickel plated material with elastomeric sealing suitable to ambient temperature range of -10ºC to +70ºC and maximum working pressure as per pressure equipment directives.

5.28 Control panel should be with monitoring for AC power ON, System ON, system discharge, valve closed, valve open, pressure healthy, and battery low by LED indicators and system operation by LED strobe light and buzzer. Power backup VRLA as per IRS-96 (93A) or latest with 24 hours power backup. Necessary inputs for discharge, valve status, pressure switch, Trigger from primary detection and Secondary detection shall be provided. Zone wise discharge facility shall be available. All the outputs shall have potential free relay contact NO/NC. It shall be

provided with 50 db piezoelectric buzzer output. The control Panel shall be fitted in an IP 65 enclosure.

5.29 It shall be possible to download data from Control unit through suitable ports like RS232/ USB into a PC/Laptop operating on Windows platform. The software for downloading and analyzing fault data shall be provided & shall be compatible with windows operating system.

5.30 Operating devices such as system isolate switches and ancillary equipment; including shutdown equipment; dampers and door closures, required for successful system performance should be considered integral parts of the system. All ancillaries should incorporate manual reset facilities.

5.31 The control panel should have a GSM module and the system shall send SMSs on GSM network to not less than 5 preselected GSM mobile numbers in case of activation of Fire Suppression System or any other fault sensed by the control panel. The mobile numbers shall be configurable. SMS shall be generated within 30 seconds of the control panel receiving the detection signals and if the sending fails, subsequent sending of SMS shall be tried by the system immediately. The SIM required for the GSM modem shall be provided by the purchaser. The GSM modem shall be from reputed make and compatible to Tri-band GSM 850, 900, 1800 and 1900 MHz. It shall support GPRS class 10 and shall work on power supply of the AFSS with suitable power supply adapter. It shall be able to withstand operating temperature -10ºC to +70º C and humidity up to 95%.

5.32 The cables shall be of Fire Survival type and shall be as follows:

5.32.1 Armoured FRLS cables of minimum 2 x 1.5 Sq.mm ATC cables with twisted pair shielded type shall be used.

5.32.2 PVC insulated copper conductor cables conforming to IS 694 having minimum 1.5 Sq.mm cross-sectional area (stranded) shall be used.

5.32.3 Rubber insulated braided cables conforming to IS 968 (Part I) shall be used.

5.32.4 Armoured PVC / rubber insulated cables conforming to IS 1554 (Part 1) shall be used.

5.32.5 Mineral Insulated (MI) cables with overall LSF (Low Smoke and Fumes) shall be used.

6 REQUIREMENTS TO BE FULFILLED BY MANUFACTURER BEFORE APPROVAL

6.1 Certificates/Approvals/Experience of the product/ manufacturer:

6.1.1 The manufacturer must be certified with ISO 9001:2000 (the scope of the ISO Certification has to specifically refer to the manufacturing of the full range of products).

6.1.2 The manufacturer shall submit test report and certificate with full analysis report from NABL/ILAC member accredited lab in reference to Fire Extinguishing System for the followings:

6.1.2.1 During the course of fire extinguishing process & after that, it shall not provide any conductance or any insulation between relay contacts, terminals & exposed wires.

6.1.2.2 The cylinders shall be IS marked to IS 7285, and shall be EN/LPCB/ UL/Vds/PESO approved.

6.1.2.3 It shall react with the free radicals of fire.

6.1.2.4 It shall work in the entire range of environmental parameters mentioned in clause above.

6.1.2.5 Product Certification / Listing of Fire Extinguishing System by any of the following International Accredited Institutes, LPCB, VDS, BSI which certify / list all models and all mechanical components (brackets, etc.) according to the existing standards on Clean Agent fire protection systems.

6.2 Manufacturer shall guarantee for supply of spares during life of the equipment & extend maintenance support, if required by the Railway/purchaser.

6.3 The manufacturer shall supply detailed instructions for proper installation of the system. The manufacturer shall depute his expert/trained engineers/supervisors to the purchaser's site during installation of the equipment.

6.4 The manufacturer shall associate themselves during commissioning, testing and field trials of the system.

6.5 The manufacturer shall install & commission the system at the locations identified for field trials.

6.6 The manufacturer will also offer special tools and instruments separately, which may be required for maintenance.

6.7 The manufacturer shall submit recommended list of spares required for satisfactory maintenance and operation of the AFSS.

6.8 The manufacturer shall submit design manual for the system containing detail functioning of each item and its sub-assembly giving following details about: -

6.8.1 Testing procedure

6.8.2 Diagram & layout.

6.8.3 Write up on the working of Automatic fire Suppression system

6.8.4 Machinery and Plant required for manufacturing.

6.8.5 Testing equipment required for carrying out the Type/Acceptance/Routine tests.

6.8.6 The manufacturer shall supply the user's manual for maintenance and trouble shooting.

6.9 The manufacturer shall be responsible for carrying out improvements and modifications at his own expense on all the equipments supplied, provided such modifications / improvements are decided to be necessary for meeting the requirements of reliability, performance and safety etc, jointly between manufacturer and purchaser.

6.10 For the purpose of technical decisions on improvements/ modifications etc. on equipment, the final authority from the purchaser's side will be RDSO.

7 INSPECTION AND TESTING:

Inspection shall be carried out on the basis of Term and Condition and Guarantee Certificate of the Manufacturer.

7.1 Type, routine and acceptance tests on for automatic fire/smoke suppression /extinguishing system will be conducted by nominated agencies. Type test will be conducted by on one set to verify that product meets the design and performance requirement of the specification. Some or all type test may be repeated after a period of three years to confirm the quality of the product to meet the specified requirement.

7.2 In addition, the manufacturer shall also repeat the type test to be witnessed by either totally or in part in following cases without any additional cost.

7.2.1 Modification of equipment likely to affect its function.

7.2.2 Failure or variations established during type test.

7.3 The routine tests are to be carried out by manufacturer on each unit to verify that properties of the product corresponding to those measured during type test.

7.4 Acceptance test shall be carried out by inspecting agencies nominated to accept supply lot.

7.5 **Type Test**:

For type test, one complete system consisting of Automatic Fire Suppression System shall be subjected to following tests as applicable:

7.5.1 Visual check

7.5.2 Performance test

7.5.3 System level functional tests.

7.5.4 Endurance test

7.5.5 Testing of suppression system casing for IP 65 protection to be certified by the Government approved testing laboratories.

The system shall successfully pass all the type tests for proving conformity with this specification. If any one of the equipment fails in any of the type tests, the purchaser or his nominee at his discretion, may call for another equipment/card(s) of the same type and subject it to all tests or the test(s) in which failure occurred. No failure shall be permitted in the repeat test(s).

7.6 **Acceptance Test**:

Acceptance test shall be carried out on 20% of the lot offered.

7.6.1 Visual check

7.6.2 Performance test

7.6.3 System level functional tests

7.7 **Routine Test**

For Routine test, complete system shall be subjected to following tests by manufacturer

7.7.1 Visual check

7.7.2 Performance test

7.7.3 System level functional tests

7.8 **Visual Inspection:**

7.8.1 The unit shall be checked for proper manufacturing, proper fitment in its enclosure, connection and dimensions as agreed between manufacturer and purchaser.

7.8.2 Each equipment of the system shall be visually inspected to ensure compliance with the requirement of clauses of this specification. The visual inspection shall broadly include:

7.8.2.1 Construction details.
7.8.2.2 Dimensional check.
7.8.2.3 General workmanship.
7.8.2.4 Configuration.
7.8.2.5 Module Level Checking.
7.8.2.6 Indications and displays.
7.8.2.7 Mounting and clamping of connectors.

7.9 **Performance Test**

7.9.1 Effectiveness of Automatic fire suppression system in extinguishing fire shall be checked as per Test method specified in EN/LPCB/UL/Vds/ standards.

7.10 The manufacturer shall furnish results of all the tests and inspection carried out internally and in the presence of Railways representative too.

7.11 Any design improvement found necessary as a result of these tests/trials shall be carried out by the manufacturer in the least possible time free of cost.

8 MARKING AND PACKING

8.1 The following information shall be clearly marked at a suitable place on each equipment:

8.1.1 Name and Address of the manufacturer.

8.1.2 Year of the manufacturer.

8.1.3 Serial number of Equipment

8.1.4 Specification number

8.1.5 Connection diagram of the equipment.

8.2 The equipment and its sub assemblies shall be packed in 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.

9 WARRANTY

Fire suppression system shall be of proven design and the Manufacturer shall give warranty for the complete or part of fire suppressor, for failing or proving unsatisfactory in service due to defective design, material or workmanship within 24 months from the date of regular supply and shall replace the same at his own cost and risk. The Manufacturer shall fix metallic stickers on each fire suppresser mentioning name of the Manufacturer and month of supply of fire suppressers to Indian Railways.

10 TRAINING

The manufacturer shall impart suitable training in operation & maintenance inspection & testing of the AFSS.

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