4151903/2025/Q/o PED/TI/RDSO

Reasoned Document for Final Draft of the Specification No. TI/SPC/PSI/GASCHR/0250

SN	Clause of Draft Spec.	Clause as in the communicated Draft of the Specification	Clause as received in the comments on the communicated Draft of the Specification	Comment Accepted /Not Accepted
1.	4.1	The instrument shall be suitable for indoor use and operate satisfactorily in Coastal areas under normal polluted atmospheric conditions, subjected to normal vibrations and shocks encountered in a Machine, testing shop. It shall operate satisfactorily up to a temperature of 50^0C and RH of 100%.	Comment of Sr. DEE(TRS)/ ANGL Loco Shed The instrument shall be suitable for indoor use and operate satisfactorily in Coastal areas under normal **and** polluted atmospheric conditions, subjected to normal vibrations and shocks encountered in a Machine, testing shop. **Reason:** The word 'and' missing in the clause. In the absence of 'and' the clause gives impression that polluted atmospheric condition is a normal in Coastal Areas.	Comment is justified and accepted.
			Comment of M/s Chromatography & Instruments Co. (CIC) It shall operate satisfactorily up to a temperature of 50^0C and NCRH of 90%	The firm has not communicated any reason for the change. Comment is not accepted.
2.		Nothing mentioned	Comment of M/s Chromatography & Instruments Co. (CIC) The analyser should be type tested from NABL or ISO 17025 accredited laboratory for at least the following standards 1. IEC – 61000-4-2 2. IEC – 61000-4-6 3. IEC – 61000-4-11 4. IEC – 61000-6-4 5. IS-9000 (PART III/Sec 4) 6. IS-9000 (PART V/Sec 2) 7. CE Certification for laboratory DGA The product if manufactured in India or abroad should be tested as per above standard to ensure working in industrial environment. Equivalent Chinese standards are not applicable / allowed.	The suggested IEC are related with the EMC & Environmental Conditions. As this DGA is having the Electronic Cards, the comment is accepted to include the suggested IEC and equivalent IEC of the suggested IS, for uniformity (IEC or IS) in the testing certificates. (Para No. 6.0 of the Final draft) Also, Para no. 2.1 of the specification already mentioned that "It is to be noted that The make in India Policy of government of India shall be applicable."
3.	6.1	The instrument shall be operated by Single Phase, 50Hz AC supply with 230V that may vary by +10% and -15% of rated voltage. Protection against high voltage shall be provided in the form of	Comment of M/s Chromatography & Instruments Co. (CIC) …….. appropriate MOV (Metal Oxide Variastor). If needed supplier must provide appropriate servo stabilizer to take care of voltage variation.	Stabilizer is already mentioned in the Para No. 13.1-iv of the Final Draft as it is an accessory. Thus not need to be included at this para.

		appropriate MOV (Metal Oxide Varistors).		
4.	6.2	The equipment shall be compact unit with three column gas chromatograph with single Flame Ionization Detector (FID) & Thermal Conductivity Detector (TCD).	Comment of M/s Chromatography & Instruments Co. (CIC) The equipment shall be compact unit with a maximum of two columns connected with single Flame Ionization Detector (FID) & Thermal Conductivity Detector (TCD) such that complete analysis is completed in single injection.	Comment is accepted with modification as mentioned below; (Para No. 7.2 of the final Draft) The equipment shall be compact unit with a minimum of two columns connected with single Flame Ionization Detector (FID) & Two Thermal Conductivity Detector (TCD) such that complete analysis is completed in single injection
5.	6.3	The detector modules, power supply units, all should be in one compact unit. The unit should be designed so as to analyse the gases like Hydrogen (H2), Oxygen (O2), Nitrogen (N2), Carbon dioxide (CO2), Carbon monoxide (CO), Methane (CH4), Ethane (C2H6), Ethylene (C2H4), Acetylene (C2H2), Propane (C3H8) and Propylene (C3H6) at ambient temperature. The Gas Circuit should be so designed as to have four separate inlet connections, for carrier gasses and fuel gases. Only one recorder would be used by inter-charging the connecting leads with the help of selector switch. To ensure sturdy and leak proof operation, stainless steel gas tubing connections are preferred for internal gas circuit.	Comment of M/s Chromatography & Instruments Co. (CIC) The detectors, amplifiers, power supply units and pneumatics should be in single compact unit. The unit should be designed to analyse gases like Hydrogen (H2), Oxygen (O2), Nitrogen(N2), Carbon Di Oxide (CO2), Carbon Mono-Oxide(CO), Methane(CH4), Ethane(C2H6), Ethylene(C2H4) & Acetylene (C2H2) at ambient temperature using Argon as carrier gas. As the complete operation is needed in single injection therefore dual channel data system should be provided to be connected to TCD and FID. The pneumatics must have 3 level of control – Through cylinder regulator, through Pressure Regulating valve in GC and through DFC available in GC. All internal and external tubing's must be SS only.	Comment is accepted with modification as using Argon or Helium as carrier gas considering the flexibility, in the configuration system. (Para No. 7.3 of the final Draft).
			Comment of Sr. DEE(TRS)/ ANGL Loco Shed The Detector Modules (FID & TCD), Methanizer, Injection Ports, Column Oven, Power supply unit, all Mechanical Gas flow valves and Temperature Controller circuit and Signal receiving and amplifying units	Comment is justified as per the mentioned reason in comment and is accepted.

			should be in a single Compact unit. **Reason:** Methanizer is not Detector. It is a pre Detector component so needs to be mentioned separately. By writing 'and all' does not give clear idea for all the components to be incorporated in the Single Compact unit.	
6.	6.5.1	Flame Ionization Detector (FID) Operating temperature – Ambient to 250^{0}C. Temperature accuracy – ± 0.5% of the set value.	<u>Comment of M/s Chromatography & Instruments Co. (CIC)</u> Flame Ionization Detector (FID) - Single The FID must have following specifications: Operating Temperature: Ambient to 250 ^{0} C Temperature accuracy: ± 0.1 ^{0} C Amplifier Gain: Low / Hi Sensitivity : At least X1, X2, X4, X8 selections Time Programming : Yes	The firm has not communicated any reason for the change. Comment is not accepted.
			<u>Comment of Sr. DEE(TRS)/ ANGL Loco Shed</u> FID Operating Temperature: Ambient to 400^{o}C. **Reason:** FID Operating Temperature should be higher by 20^{o}C to 50^{o}C than the highest column temperature to prevent condensation of eluted substances and to ensure efficient ionization.	Operating temperature of FID as 250^{0}C, has been mentioned based on the Table 4 of IEC: 60567: 2023. Thus, comment is not accepted.
7.	6.5.2	Thermal Conductivity Detector (TCD) Operating temperature – Ambient to 200 ^{0} C Minimum Temperature accuracy – ±0.5% of set value	<u>Comment of M/s Chromatography & Instruments Co. (CIC)</u> Thermal Conductivity Detector (TCD) . It should be 4 filaments high sensitivity constant current circuit with following specifications. Operating temperature: Ambient to 200 ^{0} C Minimum Temperature accuracy: ±0.1 Deg C Sensitivity: Low / Mid / High	The firm has not communicated any reason for the change. Comment is not accepted.
			<u>Comment of Sr. DEE(TRS)/ ANGL Loco Shed</u> TCD Operating Temperature: Ambient to 400^{o}C Maximum **Reason:** 1. TCD operating temperature should	Operating temperature of TCD as 250^{0}C, has been mentioned based on the Table 4 of IEC: 60567: 2023. Also, specifying the

			be higher by 20°C to 50°C than the highest column temperature to prevent condensation of eluted substances and to ensure efficient ionization. 2. Maximum range of Operating Temperature to be indicated to provide over heating protection for the safety of equipment.	Maximum Temperature Limit will provide the flexibility to the supplier, for selecting any limit below the specified. Thus, comment is not accepted.
8.	6.5.4	Methanizer Operating Temperature: Ambient to 400°C Minimum	Comment of Sr. DEE(TRS)/ ANGL Loco Shed Methanizer Operating Temperature: Ambient to 400°C Maximum Reason: Maximum range of Operating Temperature to be indicated to provide over heating protection for the safety of equipment.	Operating temperature of Methanizer as 400°C, has been mentioned based on the Table 4 of IEC: 60567: 2023. Also, specifying the Maximum Temperature Limit will provide the flexibility to the supplier, for selecting any limit below the specified. Thus, comment is not accepted.
9.	6.5.5	Injector Ports Temperature Range: Ambient to 400°C Minimum	Comment of Sr. DEE(TRS)/ ANGL Loco Shed Injector Ports Temperature Range: Ambient to 400°C Maximum. Reason: Maximum range of Operating Temperature to be indicated to provide over heating protection for the safety of equipment.	Specifying the Maximum Temperature Limit will provide the flexibility to the supplier, for selecting any limit below the specified. Thus, it is not accepted.
10.	6.5.6	~~Column Oven~~	Comment of M/s Chromatography & Instruments Co. (CIC) Column Oven (Title to be added), Title removed by oversight	Comment is accepted, it was typo error. (Para No. 7.5.5 of the final Draft)
11.	6.5.6	Column Oven Temperature Range: Ambient to 450°C Minimum	Comment of Sr. DEE(TRS)/ ANGL Loco Shed Column Oven Temperature Range: Ambient to 450°C Minimum **Reason:** Maximum range of Operating Temperature to be indicated to provide over heating protection for the safety of equipment.	Specifying the Maximum Temperature Limit will provide the flexibility to the supplier, for selecting any limit below the specified. Thus, commented reason is not accepted.
12.	All Clauses	Complete Specification	NWR Comment: NWR is agreed with the RDSO's proposed Draft Specification of GAS Chromatograph. Therefore, comments/suggestions of this Railway on the Draft Specification of Gas Chromatograph may be treated as	Noted

			NIL.	
13.	7.0	**Data System with Associated Hardware and Software:** MS – Windows based program for Data collection, Data handling and generation of report is to be provided. This provides flexibility for the option to shrink or enlarge a graph of interest and creates a quantitative report for percentage Area, & Height.	Comment of M/s Chromatography & Instruments Co. (CIC) Data System with Associated Hardware and Software: Dual Channel Data System should be provided for data acquisition, analysis and report generation. The data system should be suitable to work in Windows 11 (64 Bit OS Environment) along with 22 Bit ADC hardware. The data system software should be supplied with branded i5 (13^{th} Generation or above) Desktop PC (Lenovo / Dell / Asus / HP) with licensed OS. A Suitable B/W laser printer should be supplied along with PC. The hardware for data acquisition should work on Ethernet or USB port only. Along with the data system, suitable licensed DGA Interpretation software should be provided for data interpretation based on Duval Triangle and IEC method & IS method.	Comment is justified and is accepted as below without any make/brand name. (Para No. 8.0 of the final Draft.) Dual Channel Data System should be provided for data acquisition, analysis and report generation. The data system should be suitable to work in Windows 11 (64 Bit OS Environment) or latest, along with 22 Bit ADC hardware. The data system software should be supplied with branded i5 (13th Generation or above with minimum 16 GB RAM) Desktop PC with licensed OS. A Suitable B/W laser printer should be supplied along with PC. 22 Bit Analog to Digital Converter used between PC and Gas Chromatograph for data acquisition, should work on Ethernet as well as USB port. Along with the data system, suitable licensed DGA Interpretation software should be provided for data interpretation based on Duval Triangle and IEC method & IS method.
14.	9.5	Dual-channel software and hardware with USB interface are required to be provided for data acquisition, data analysis and report generation	Comment of M/s Chromatography & Instruments Co. (CIC) Remove from here as already covered in 7.0	Noted. It is covered in Comment of Para 8.0 of the Final Draft.

15.	9.6	DGA calculation and interpretation software for headspace sampling should be provided. The interpretation methods provided should be the Duvall Triangle, IEC cubic and IEC ratio methods.	Comment of M/s Chromatography & Instruments Co. (CIC) Remove from here as already covered in 7.0	
16.	9.7	The PC should be minimum i5 with 19.5-inch monitor along with SSD & HDD. The B/W Laser printer is also to be provided.	Comment of M/s Chromatography & Instruments Co. (CIC) Remove from here as already covered in 7.0	
17.		To be added / amended	Comment of M/s Chromatography & Instruments Co. (CIC) The system should provide with good flexibility for control of important auxiliary devices such as GSV, Headspace auto sampler, External trigger, Pump, other devices with facilities for programming each auxiliary device for 4 times (8 steps) within a single cycle.	The firm has not communicated any reason for the change. Comment is not accepted.
18.		To be added / Amended	Comment of M/s Chromatography & Instruments Co. (CIC) The system should have facility for control up-to 8 temperature and pressure zones with 2 programmable zones.	The firm has not communicated any reason for the change. Comment is not accepted.
19.	10.0	**Vial Head Space Auto Sampler with Vial Preparation Kit** i. Vial Preparation kit with necessary regulator, valves and needles x 1 set ii. Vial Crimping tool x 2 iii. 20 ml Vials x 100 numbers iv. Perforated Aluminium Cap + TFE-fluorocarbon-faced butyl septum X 400 Numbers v. Vial Head Space Auto sampler with heating & Agitation and storage to inject samples up to 2.5	Comment of M/s Chromatography & Instruments Co. (CIC) **At least 12** Vial Head Space Auto Sampler with Vial Preparation Kit. i. Vial preparation kit with necessary regulator, valves and needles x 1set. ii. Vial crimping tool x2. iii. 20 ml vials x100 numbers. iv. Perforated Aluminium cap + TFE-fluorocarbon-faced butyl septum x 500 numbers. v. At least 12 Vial head space auto sampler with heating & agitation and storage to inject samples up to 2.5 ml sample. vi. Fully automatic with incubation, vii. Heating zone should be in- built and included.	The firm has not communicated any reason for mentioning at least 12 Head Space Sampler, Thus, it is not accepted.

		ml vi. Fully automatic vii. Shaker to be in-built & included. viii. Heating zone to be in-built & included. ix. Cleaning system should be integrated in the unit for automated and consistent purging procedures. x. Rotating head design to ensure injector port is always free for manual injections and maintenance. xi. Integrity check for Auto sampler. xii. Automatic leakage checks. xiii. Automatic cleaning system. xiv. Oven temperature - 150°C	viii. Rotating head design ensuring the injector port is always free for manual injections and maintenance. ix. Integrity check for Auto-sampler. x. Automatic cleaning & purging system. xi. Integrated vial Oven temperature up to 150 ^{0} C. xii. A Manual single vial Head Space Sampler must also be supplied so that in event of failure of automated HSS the analysis work is not compromised. This is same as asked in 12.2.vii	
20.	11.0	**Calibration Gas Mixture** (1 No) Calibration Standard Gas Mixture (0.5 Liter Water capacity) with NABL traceability should have the composition as Methane 500 ppm, Ethane 500 ppm , Ethylene 500 ppm, Acetylene 500ppm, Hydrogen 1000 ppm, Carbon monoxide 1000 ppm, Carbon dioxide 2500 ppm, Oxygen 1 %, Nitrogen 3%, balance Argon.	<u>Comment of M/s Chromatography & Instruments Co. (CIC)</u> 3 bottles of Standard Gas Mixture (0.5 Liter Water capacity) with NABL traceability should have composition of Methane, Ethane, Ethylene, Acetylene – 500 ppm each, Hydrogen – 1000 ppm, CO - 1000 ppm, Co2 – 2500 ppm Oxygen – 1%, Nitrogen – 3% Balance Argon.	The firm has not communicated any reason for the change. Comment is not accepted.
21.	12.2.vii	Manual Head Space…..	<u>Comment of M/s Chromatography & Instruments Co. (CIC)</u> To be removed as covered in clause 10.12	Comment is accepted to avoid duplicity in the requirements.
22.	12.2.vii i	The PC should be…..	<u>Comment of M/s Chromatography & Instruments Co. (CIC)</u> To be removed as covered in clause 7.0	Comment is accepted to avoid duplicity in the requirements.
23.	18.0	Guarantee	<u>Comment of M/s Chromatography & Instruments Co. (CIC)</u>	Comment is not accepted as it should be

			Please do not remove this point. It has been deleted by oversight	as per the conditions of the tender/order. to retain the par.