INTERPLANT STANDARD - STEEL INDUSTRY		
IPSS	**CODE OF PRACTICE FOR GAS ANALYSER WITH SAMPLE HANDLING SYSTEM**	**IPSS: 2-07-099-14**
	No Corresponding IS	

0. FORWORD

Equipment sketch/layout with component details.

0.1. Gas Analyzers are widely used in the Process Control Applications. It is used in Monitoring of the process parameters and also in interlocks if any of the process parameters go above or below the desired operating limit.

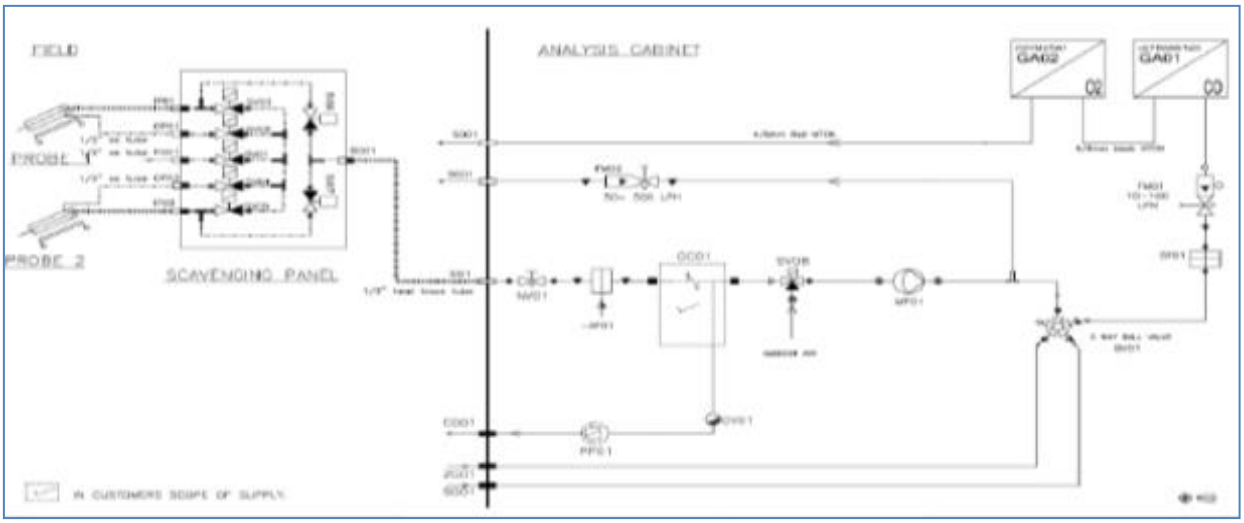
0.2. The main Constituent of the Gas Analyser is its Sample Handling System. Maintenance persons give maximum time and energy to keep the sample handling system healthy and any malfunctioning of this leads to improper process control and unwanted tripping if taken in Interlocks.

0.3.

0.4. The Sample Handling system consists of Probes and its Filters, Gas Cooler to take care of the cooling of the sample gas from the process, pumps to suck the gas from the tapping point to the Analyser panel and also for the condensate removal, Solenoid valve arrangement for sampling two or more points, Flow switches to know the flow in the analyser panel and the Gas Analyser Unit and Finally the calibration of the Analyser modules as per the process requirement.

1. Scope

1.1. The scope of this SMP coversInspection of all the Gas Analyzers (Other than Calorific Value Analyser, Self-Extracting In situ Flue Gas Analysers) having Sample Handling System which are mainly used in Process Gas Analysis, Flue Gas Analysis



2. Inspection Guidelines

i) Running Inspection (Daily Basis)

ii) Running Inspection (Weekly Basis)

iii) Periodical Inspection/Maintenance(Monthly Basis)

TECHNICAL GUIDELINES FOR DAILY CHECKING OF

GAS ANALYSER WITH SAMPLE HANDLING SYSTEM

***Only for Monitoring Purpose. Not to be entered in SAP PM. To be used as Check List.

SL NO	Check Point Details	Frequency	How To Check	Criteria	Action (If out of Criteria)
1	Probe Heater Temperature	Daily	Visually check for temperature reading in the analyser panel	To be between the LCL and the UCL.	• Check for the power in the MCB at the analyser Panel • Check for the power in the Ring Heater at probe • Check for the Coil resistance of the ring heater.
2	Gas Cooler Temperature	Daily	Visually check for the proper Reading of Gas Cooler	To be between the LCL and the UCL.	• In the Gas cooler increase/decreasethe knob as per requirement to cool as per requirement.

3	Heat Traced Temperature	Daily	Visually check for temperature reading in the analyser panel	To be between the LCL and the UCL..	• Check for the power and current in the MCB at the analyser Panel • Check for the Temperature switching unit contacts in the heat traced circuit.
4	Gas Flow and By pass flow of Sample gas	Daily	Physically check in the Rotameter	To be between the LCL and the UCL.	•Check the purging System if flow is more. •Check the Leakage of the Tube if any if flow is more. •Check for choke age of the probe filter if flow less.
5	Gas Flow and By pass flow of N2 Purge Gas	Daily	Physically check in the Rotameter	To be between the LCL and the UCL.	•Check the pressure setting of the of the N2 of the Purge Gas.
6	Level of the Condensate in the Glass Vessel.	Daily	Visually check for the level and drain it.	To be less than ¾ of the vessel volume.	•Remove the condensate and again fit it in the line. •Check for proper functioning of the peristaltic pump and its tubing's.

TECHNICAL GUIDELINES FOR WEEKLY CHECKING OF

GAS ANALYSER WITH SAMPLE HANDLING SYSTEM

***** Only for Monitoring Purpose. Not to be entered in SAP PM. To be used as Check List.

SL NO	Check Point Details	Frequency	How To Check	Criteria	Action (If out of Criteria)
1	Heat Tracer Tube Current	Weekly	Check with the help of Tong tester or with Ammeter if already installed.	To be between the LCL and the UCL.	• Check for the power in the MCB at the analyser Panel • Check for the power in the Temperature Switch. • Check for the proper functioning of the temperature switches.
2	Purging System of Probes	Weekly	Visually check for the proper purging of the solenoid valves at the Scavenging panel.	Should be working and tight shut off	• Check for the purging solenoid valve power in the local panel and the solenoid • Check for flow of the sample with root valve closed. If flow is available check for leakage of the solenoid valve.
3	Glass Vessel condition	Weekly	Visually check for condition of the glass vessel	Should be without leakage and tubing should be without leakages.	• Change the glass vessel if found damaged. • Change the tubing if there is leakage found.

4	Peristaltic Pump Condition	Weekly	Check for the Functioning of the pump and its tubing condition	Should be working based on timer and the tubing should be leakage free.	•Check for the timer system of the pump. •Change the tubing from the pump to the glass vessel if found damaged.
5	Main and By-pass Pump Condition	Weekly	Check for the Functioning of the pump and its tubing.	Should be working continuously and should be leakage free.	•Change the tubing of the pump. •Check for the flow in the Rotameter to the Analyser Module. •Check for the By-pass flow in the Rotameter.
6	Condensate Monitor and its tripping Circuit	Weekly	Check for the Functioning of the Condensate monitor and its tripping circuit.	To trip the main and by pass pump when it gives contact.	•Remove the condensate in the gas cooler and its glass vessel. •Change the filter paper of the Condensate monitor weekly. •Tripping circuit to be simulated on weekly basis.
7	Rotameter and its tripping Circuit	Weekly	Check for the Functioning of the Rotameter and its tripping circuit.	To trip the main and by pass pump when it gives low flow contact.	•Check for the choke age of the filters in the sample line •Check for condensate in the glass vessel. •Check for the temperature of the main pumps. •Check for moisture if any in sample line.
8	Zero Check of the Analyser Module.	Weekly	Check for the Zero of the Analyser Module with Zero Gas.	To be within the range as mentioned in the manual.	•Check for mounting of the analyser module in the panel. •Check for the condition of the vent lines.

TECHNICAL GUIDELINES FOR MONTHLY CHECKING OF GAS ANALYSER WITH SAMPLE HANDLING SYSTEM					
SL NO	**Check Point Details**	**Frequency**	**How To Check**	**Criteria**	**Action (If out of Criteria)**
1	Analyser Module	Monthly	Calibration of the Analyser Module with Span and Zero Gas	To be between the LCL and the UCL and should be done as mentioned in the Operating Manual.	• Recalibrate the Analyser module with Zero Gas • Recalibrate the Analyser Module with Span gas.

3. **Inspection Checklist Format (b. Monthly basis – Calibration of Analyser Module)**

CALIBRATION SHEET FOR GAS ANALYSERS				
TAG NO				
DESCRIPTION OF THE ANALYSER				
DATE				
SL NO	ZERO GAS (%/PPM)	PLAN	ACTUAL	REMARKS
1				Kindly Check the Validity and pressure of Calibration Cylinder

	SPAN GAS (%/PPM)			
2				Kindly Check the Validity and pressure of Calibration Cylinder

4. Inspection Checklist Format (a. Daily/Weekly/Monthly Basis)

Inspection Points for Analyser Maintenance							
SL NO	**Description of Measuring Points**	**Characteristic**	**Value Based**			**STATUS**	**FREQ**
a. Daily Inspection Points of the Analyser Sample Handling System:							
			LCL	UCL	VALUE	Y/N	
1	Probe Heater Temperature	TEMPERATURE(degc)	100	150			1D
2	Heat Traced Tube Temperature	TEMPERATURE(degc)	70	90			1D
3	Sample gas cooler temperature	TEMPERATURE(degc)	2	6			1D
4	Flow of Gas in Rotameter 1-Module 1	FLOW(lpm)	50	80			1D
5	Flow of Gas in Rotameter 2 – Module 2	FLOW(lpm)	50	80			1D
6	Flow of N2 in Rotameter 3 – Purge N2	FLOW(lpm)	100	150			1D
7	Reading of the Analyzer Module 1	PPM/%	0	XXX			1D
8	Reading of the Analyzer Module 2	PPM/%	0	XXX			1D
9	Reading of the Analyzer Module 3	PPM/%	0	XXX			1D
10	Level of Water in the	%	0	100			1D

	Condensate Pot						

b. Weekly Inspection Points of the Analyser Sample Handling System:

1	Current of the Heat Traced Tube	CURRENT	0	10			1W
2	Purging System of Probes and its Solenoid					OK/NOK	1W
3	Condition of Glass vessel					OK/NOK	1W
4	Condition of Peristaltic pump tube					OK/NOK	1W
5	Condition of Main pump.					OK/NOK	1W
6	Tripping circuit of Condensate Monitor					OK/NOK	1W
7	N2 Pressure of the Purging system	PRESSURE(bar)	2	5			1W
8	Tripping ckt of Rotameter 1					OK/NOK	1W
9	Tripping ckt of Rotameter 2					OK/NOK	1W
10	Tripping ckt of Rotameter 3					OK/NOK	1W
11	Changing of Condensate Monitor Filter					OK/NOK	1W
12	Zero Checking of Analyser passing Zero Gas	PPM/%	0	XXX			1W

a. Monthly Inspection Points of the Analyser Sample Handling System: To be part of the SAP PM.

SL NO	Description of Measuring Points	Characteristic	Value Based			STATUS	FREQ
			LCL	UCL	VALUE	Y/N	
1	Probe Heater Temperature	TEMPERATURE(degc)	100	150			1M
2	Heat Traced Tube Temperature	TEMPERATURE(degc)	70	90			1M
3	Sample gas cooler temperature	TEMPERATURE(degc)	2	6			1M
4	Flow of Gas in Rotameter 1 – Module 1	FLOW(lpm)	50	80			1M
5	Flow of Gas in Rotameter 2 – Module 2	FLOW(lpm)	50	80			1M
6	Flow of N2 in Rotameter 3 – Purge N2	FLOW(lpm)	100	150			1M
7	Reading of the Analyzer Module 1	PPM/%	0	XXX			1M
8	Reading of the Analyzer Module 2	PPM/%	0	XXX			1M
9	Reading of the Analyzer Module	PPM/%	0	XX			1M

	3			X			
11	Condition of Probe Filter					OK/NOK	1M
12	Current of the Heat Traced Tube	CURRENT	0	10			1M
13	Purging System of Probes and its Solenoid Valves					OK/NOK	1M
14	Tripping circuit of Condensate Monitor					OK/NOK	1M
15	N2/Air Pressure of the Purging system	PRESSURE(bar)	2	5			1M
16	Tripping ckt of Rotameter 1					OK/NOK	1M
17	Tripping ckt of Rotameter 2					OK/NOK	1M
18	Tripping ckt of Rotameter 3					OK/NOK	1M
19	Condition of the Peristaltic Pump					OK/NOK	1M
20	Condition of the Main Pump					OK/NOK	1M
21	Condition of Rotameter 1					OK/NOK	1M
22	Condition of Rotameter 2					OK/NOK	1M
23	Condition of Rotameter 3					OK/NOK	1M
24	Condition of By-pass Pump					OK/NOK	1M
25	Analyzer Purging vent Lines					OK/NOK	1M
26	Calibration Last done date	DATE					1M
27	Condition of Disposable Filter in Panel					OK/NOK	1M

5. Optional Activities that can be carried out by the Plant Maintenance persons as per Process Requirement and availability of the OEM personnel at site.

a. Probe Filter Cleaning

The frequency of the Probe Filter cleaning shall be dependent upon the process condition. With Auto purging system in place, the frequency shall be very less. If there is no Auto Purging system then the frequency shall be more.

It also depends upon the Process also. If it is Flue gas it shall have less frequency and if It is used in Coal Mill Application it shall have high frequency.

b. Sample Line leakage checking from the Tapping Point to the Analyser Panel.

The main purpose of this shall help us to know if there is any leakage in the Sampling line. If the manual isolation valve at the tapping point is closed the complete line shall be checked for zero leakage or any air infiltration in the sampling line.

If each of the analyser panel has isolation valve at the entry of the sample in line, by closing the same the leakage inside the panel shall be identified and corrected.

c. Checking of Healthiness of Detector RAW Values

By this function we can identify the condition of the detector. When we pass the Zero and span gas through the analyser, the detector raw value should come within the certain range, which can be read from the analyser display. This is a part of maintenance activity and condition monitoring of the detector.

d. Checking of Healthiness of Sample Cell

It is a physical checking of the sample cell. To check, whether sample cell is clean of not, as it directly affect the measurement.