



Appendices

Appendix 1. Trouble shooting

If you find measurement results to be unusual, the causes may be ascribed to:

- (1) the concentration of the substance measured was unusually high or low, or
 - (2) something was wrong with your measurement system, or
 - (3) the measurement was not properly performed, or
 - (4) you are comparing the results with those obtained by other measurement methods (random errors).
- Unusual measurement phenomena, their possible causes, and countermeasures are listed in the following table. In case these countermeasures are not sufficient, consult your local Gastec representative.

Unusual results and countermeasures

⊙ mark shows that this phenomenon may occur at a high rate due to the cause(s) listed.

○ mark shows that this phenomenon may occur at a relatively high rate due to the cause(s) listed.

Unusual phenomena		Possible causes	Countermeasures
Indication			
High	Low		
○	○	Wrong detector tube was used.	Use an appropriate Gastec detector tube, and retry.
⊙	⊙	Detector tube requires temperature correction	Correct the reading in accordance with the temperature correction table given in the instruction sheet for the detector tube.
		Detector tube requires humidity correction.	Correct the reading in accordance with the humidity correction table given in the instruction sheet for the detector tube.
		Detector tube with its tips broken was left for a long time before measurements.	Retry with a fresh tube with its tips broken immediately before the measurement.
		Pumping was not properly performed.	The handle of the pump should be pulled from the initial position to the proper lock position (100 ml or 50 ml lock position) Retry with a fresh tube.
		Sampling volume was inappropriate.	Retry with a fresh tube with its standard sampling volume, if the indication is out of the calibration scale, adjust the sampling volume with another fresh tube and correct the reading properly according to the instruction sheet for the tube.
⊙	⊙	Atmospheric pressure (P) at measurement point was not in the range of 912 to 1114hpa (1013hpa ± 10%).	Correct the reading by the following formula: $\text{True concentration} = \text{Reading} \times \frac{1013}{P}$ If the pressures at the sampling point and at the measurement point are not the same (e.g., if samples within pipelines are measured from the outside), correct the reading or presample into a bag or bottle before measurement.
		Concentration of substance to be measured varied with time.	Collect a long-term sample using a power-driven sampling pump and gas sampling bag. Use a fresh tube to measure the contents of the bag.
		The result was compared with those that had been obtained by other analysis systems.	If the difference is within the range of accuracy allowance of the detector tube, both results would be correct. If not, inspect the accuracy of calibration gases and the dates of calibration of those analysis systems and recalibrate them with correct calibration gases, if necessary, and retry with a fresh tube. Also cross reference the listed interferences for both systems.

Unusual phenomena			Possible causes	Countermeasures
Indication		Undefined colour change		
High	Low			
◎	○	○	Date-expired detector tube was used.	Retry with a valid detector tube.
			Detector tube stored under improper conditions was used.	Retry with a valid detector tube.
			Measuring time was inappropriate.	Measuring time = (sampling time for 1 pump stroke) x (No. of pump strokes) Retry with a fresh tube and read the tube immediately after the measuring time has elapsed.
			Interfering substances existed in the sample	Refer to the influences of the interfering substances given in the instruction sheet for the tube. When the ratio of interfering substances to the target substance is high, accurate measurements of the target substance are usually impossible.
◎	○		Interval(s) between strokes for multiple-stroke sampling were inappropriate.	When multiple-stroke sampling is required, do not allow excess time between strokes. The sampling time for each stroke is prescribed in the instruction sheet for the tube. Retry with a fresh tube.
◎	○		Temperature of sample was higher than 40°C (104°F).	Attach an optional No.340 Hot Probe to the Pump and retry with a fresh tube. Sample cooling might condense water vapour in the sample air. If the target substance is water-soluble, lower indications will result.
○	◎		Temperature of detector tube was too low.	If detector tubes (whose indications need correction for temperature) are just taken out of a refrigerator, expose them in an ambient temperature for about 15 minutes unbroken before measurements. Retry with a fresh tube and correct the reading in accordance with the temperature correction table provided in the instruction sheet for the detector tube.
			Twin tube was not properly connected.	Connect the two fresh tubes properly and retry.
			Inlet clamping nut of the Pump was loosened.	Clamp the nut firmly and retry with a fresh tube.
			Grease applied to the inside of the Pump was soiled.	Wipe away the old grease and apply a small amount of fresh grease evenly around the valve and piston, and retry with a fresh tube.
			Rubber inlet of the Pump was deteriorated.	Replace the old rubber inlet with a new one, and retry with a fresh tube.
			Lip seal was leaking	Overhaul the assembly, apply a small amount of fresh grease evenly, and retry with a fresh tube.
			Detector tube was not properly connected to the Pump.	Connect the tube firmly to the rubber inlet of the Pump, and retry with a fresh tube.
			Attached optional equipment was leaking.	Repair the equipment if possible or replace it with a new one, and retry with a fresh tube.
			Humidity in the sample was too high.	This can happen when a humid sample is measured after being sampled into a bag or bottle (where the water vapour is condensed, lowering the concentration of the target substance). In this case, warm the bag or bottle a little before sampling to prevent condensation, or measure the sample directly without pre-sampling. Retry with a fresh tube.