Kitagawa   NO. 503

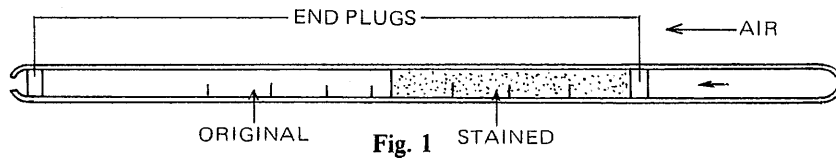# TIME-WEIGHTED-AVERAGE SULFUR DIOXIDE DETECTOR TUBES

PERFORMANCE:
Measuring Range: 0.5 to 20 ppm TWA concentration
                    (depending on sampling duration)
                    0.5 to 6 ppm   (4 to 8 hours duration sampling)
                    * The scale printed on the tube is calibrated at 8 hours sampling, and
                    the air flow rate of 6 ml/min.
Color Change: Purple to Yellow

Fig. 1

SAMPLING:
1. Break tips of a TWA SO$_2$ tube and insert it into the special tube holder provided.
2. Connect the tube holder to the sampling pump with suitable tubing (silicone rubber, pvc, etc.); and if the tube holder is away from the breathing zone, load sampled air from the breathing zone to the tube holder through teflon tubing.
3. Turning the pump on, start sampling with the flow rate of 6 ml/min, and record the starting time or the number figured by a counter on the personal sampler.
4. After completion of sampling, turn the pump off and record the finished time or number on the counter of sampling.

MEASUREMENT:
1. Read the scale printed on the tube at the top of yellow stain.
2. Corerct the reading value by average relative humidity of sampling atmosphere with humidity correction table. (Table 1)
3. In case of 8 hours, with 6 ml/min sampling correctly, corrected value with Table 1 indicates actual TWA concentration.
4. If the sampling duration is less than 8 hours, the actual TWA concentration can be obtained graphically from the chart provided below.
5. If the flow rate is not 6 ml/min, divide the corrected value with table 1 by the ratio of sampled air volume to 2880 ml.

$$\text{Actual TWA concentration (ppm)} = I \times \frac{2880}{n \times Kv}$$

I = Corrected value by Table I.
n = Sampling finished number on the counter − starting number: strokes
                                              (minus)
Kv= Volume coefficient: ml/stroke

TEMPERATURE AND HUMIDITY CORRECTION:
No temperature correction is necessary from 10°C (50°F) to 30°C (86°F).
From 20% to 80% relative humidity, actual value can be determined by Humidity Correction Table (Table I).

INTERFERENCES:
Coexistence of Nitrogen dioxide fades the reagent color, but does not affect the reading value.

Table 1. HUMIDITY CORRECTION TABLE

Scale (ppm) Readings	Correct Concentration (ppm)						
	20%	30%	40%	50%	60%	70%	80%
6.0	4.5	5.0	5.5	6.0	—	—	—
5.5	4.1	4.6	5.1	5.5	5.9	—	—
5.0	3.8	4.2	4.6	5.0	5.4	5.8	—
4.5	3.4	3.8	4.1	4.5	4.8	5.2	5.5
4.0	3.0	3.4	3.7	4.0	4.3	4.6	4.9
3.5	2.6	2.9	3.2	3.5	3.8	4.0	4.3
3.0	2.3	2.5	2.8	3.0	3.2	3.5	3.7
2.5	1.9	2.1	2.3	2.5	2.7	2.9	3.1
2.0	1.5	1.7	1.9	2.0	2.2	2.3	2.4
1.5	1.2	1.3	1.4	1.5	1.6	1.7	1.8
1.0	0.8	0.8	0.9	1.0	1.1	1.2	1.2
0.5	0.4	0.4	0.5	0.5	0.5	0.6	0.6
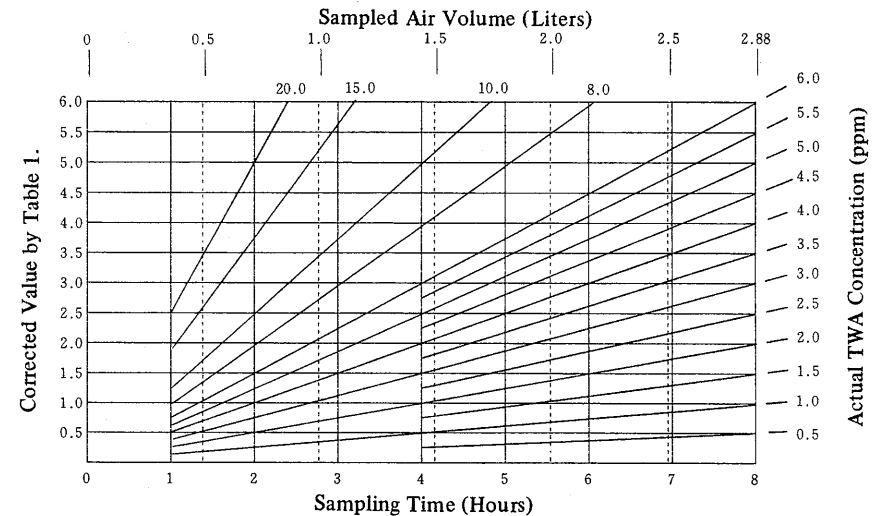
Fig. 2 SCALE CONVERSION CHART

Example: (1) If sampling time is 6 hours and corrected value with Table 1 is 4.5, the Actual TWA concentration is 6.0 ppm.
(2) If sampled air volume is 2.0, and corrected value with Table 1 is 3.5, the Actual TWA concentration is 5.0 ppm.