

GASTEC No.1D Instructions for Carbon Monoxide Passive Dosi-Tube

FOR SAFE OPERATION :

Carefully read this manual before use.

⚠ CAUTION : If not observed, injuries to the operator or damage to the product may result.

1. When breaking the Passive Dosi-Tube, keep the tube away from eyes.
2. Do not touch any broken glass tubes, pieces and reagents with bare hand(s).
3. Keep tubes out of Direct Sunlight, which fades the discolouration of the tube.

△NOTES : For maintaining performance and reliability of the test results.

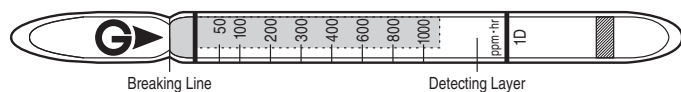
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 0 - 90%.
3. This tube may be interfered with by coexisting gases. Please refer to the "INTERFERENCES".
4. The shelf life and storage condition of the Passive Dosi-tube are marked on the label of the tube box.

APPLICATION OF THE TUBE :

Use this tube for detecting Carbon monoxide in the air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(As a result of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



This tube measures TWA (time-weighted average) gas concentration by utilizing natural diffusion of the target gas without a gas sampling pump.

| | |
|--------------------|---|
| Measuring Range | 1.04 – 2000 ppm |
| Sampling Hours | 0.5 – 48 hours |
| Detecting Limit | 2 ppm (10 hours) |
| Colour Change | Pale Yellow → Brown |
| Reaction Principle | CO + Na ₂ Pd(SO ₃) ₂ → Pd + CO ₂ + SO ₂ + Na ₂ SO ₃ |

Coefficient of Variation: 10% (for 50 to 1000 ppm-hr)

****Shelf Life: Please refer to the Validity Date printed on the tube box.**

****Store the tubes in a dark and cool place.**



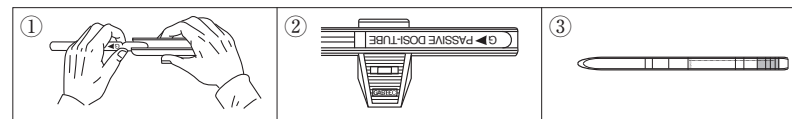
CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Temperature : No correction is required.

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE :



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-Tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube.
4. Average gas concentration can be obtained from half an hour to 48 hours sampling. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula:

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading (ppm-hour)}}{\text{Actual Sampling Time (hours)}}$$

5. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder.

INTERFERENCES :

| Substance | Concentration | Interference | Interference gas only |
|-------------------|---------------|--------------|-----------------------|
| Chlorine | | No | No discolouration |
| Nitrogen dioxide | ≥ 5 ppm | — | No discolouration |
| Hydrogen sulphide | | + | Reddish brown |

The table of the interference gases primarily expresses the interference of each coexisting gas in the gas concentration range that is equivalent to the target gas concentration. Therefore, the test result may be affected by other substances not listed in the table. For more information, please contact us or your Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2014) : 25 ppm

Explosive Range : 12.5 – 74 %

DISPOSAL INFORMATION :

This Dosi-tube does not contain any toxic substances. When disposing of the tube regardless of whether used or unused, follow the rules and regulations of the local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

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IM011DE1
Printed in Japan
15D1Z

GASTEC No.1DL

Instructions for Carbon Monoxide Passive Dosi-Tube

FOR SAFE OPERATION:

Carefully read this manual before use.

⚠ CAUTION : If not observed, injuries to the operator or damage to the product may result.

1. When breaking the Passive Dosi-Tube, keep the tube away from eyes.
2. Do not touch any broken glass tubes, pieces and reagents with bare hand(s).
3. Keep tubes out of Direct Sunlight, which fades the discolouration of the tube.

△ NOTES : For maintaining performance and reliability of the test results.

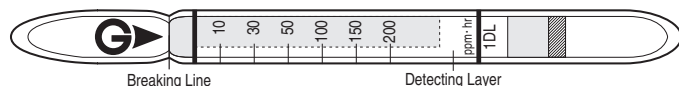
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 20 - 90%.
3. This tube may be interfered with by coexisting gases. Please refer to the "INTERFERENCES".
4. The shelf life and storage condition of the Passive Dosi-tube are marked on the label of the tube box.

APPLICATION OF THE TUBE :

Use this tube for detecting Carbon monoxide in the air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(As a result of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



This tube measures TWA (time-weighted average) gas concentration by utilizing natural diffusion of the target gas without a gas sampling pump

| | |
|--------------------|--|
| Measuring Range | 0.4 – 400 ppm |
| Sampling Hours | 0.5 – 24 hours |
| Detecting Limit | 0.2 ppm (24 hours) |
| Colour Change | Pale Yellow → Brown |
| Reaction Principle | $\text{CO} + \text{Na}_2\text{Pd}(\text{SO}_3)_2 \rightarrow \text{Pd} + \text{CO}_2 + \text{SO}_2 + \text{Na}_2\text{SO}_3$ |

Coefficient of Variation: 10% (for 10 to 200 ppm·hr)

****Shelf Life: Please refer to the Validity Date printed on the tube box.**

****Store the tubes in the refrigerator to keep at 10°C (50°F) or below.**

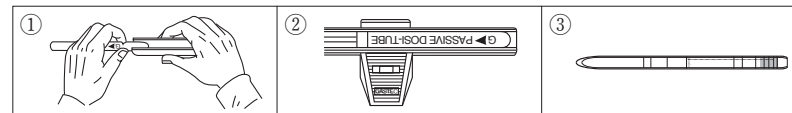
CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Temperature : No correction is required.

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE :



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-Tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube.
4. Average gas concentration can be obtained from half an hour to 24 hours sampling. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula:

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading (ppm} \cdot \text{hour)}}{\text{Actual Sampling Time (hours)}}$$

5. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder.

INTERFERENCES :

| Substance | Concentration | Interference | Interference gas only |
|-------------------|---------------|--------------|-----------------------|
| Nitrogen dioxide | ≤ 1/20 | No | Brown |
| Sulphur dioxide | ≤ 1/1 | No | No discolouration |
| Nitrogen monoxide | ≤ 1/10 | No | No discolouration |

The table of the interference gases primarily expresses the interference of each coexisting gas in the gas concentration range that is equivalent to the target gas concentration. Therefore, the test result may be affected by other substances not listed in the table. For more information, please contact us or your Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2014) : 25 ppm

Explosive Range : 12.5 – 74 %

DISPOSAL INFORMATION :

This Dosi-tube does not contain any toxic substances. When disposing of the tube regardless of whether used or unused, follow the rules and regulations of the local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

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 Printed in Japan
 15D1Z

GASTEC No.2D

Instructions for Carbon Dioxide Passive Dosi-Tube

FOR SAFE OPERATION :

Carefully read this manual before use.

⚠ CAUTION : If not observed, injuries to the operator or damage to the product may result.

1. When breaking the Passive Dosi-Tube, keep the tube away from eyes.
2. Do not touch any broken glass tubes, pieces and reagents with bare hand(s).
3. Keep tubes out of Direct Sunlight, which fades the discolouration of the tube.

⚠ NOTES : For maintaining performance and reliability of the test results.

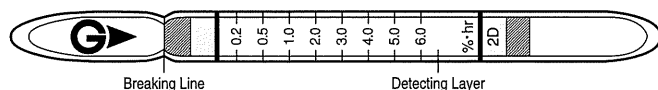
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 0 - 90%.
3. This tube may be interfered with by coexisting gases. Please refer to the "INTERFERENCES".
4. The shelf life and storage condition of the Passive Dosi-tube are marked on the label of the tube box.

APPLICATION OF THE TUBE :

Use this tube for detecting Carbon dioxide in the air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(As a result of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



This tube measures TWA (time-weighted average) gas concentration by utilizing natural diffusion of the target gas without a gas sampling pump.

| | |
|--------------------|--|
| Measuring Range | 0.02 – 12 % |
| Sampling Hours | 0.5 – 10 hours |
| Colour Change | Pale Red → Yellow |
| Reaction Principle | $\text{CO}_2 + 2\text{KOH} \rightarrow \text{K}_2\text{CO}_3 + \text{H}_2\text{O}$ |

Coefficient of Variation: 10% (for 0.2 to 6.0 %-hr)

****Shelf Life: Please refer to the Validity Date printed on the tube box.**

****Store the tubes in a dark and cool place.**

CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

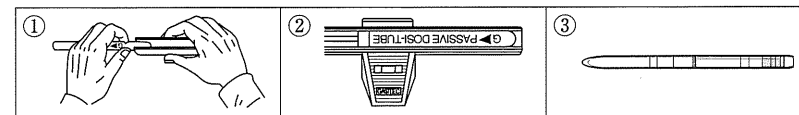
Temperature : Correct for temperature by the table below:

| | | | | | | | | | |
|--------------------|-----------|-----------|------------|------------|------------|------------|------------|------------|-------------|
| Temperature °C(°F) | 0 (32) | 5 (41) | 10 (50) | 15 (59) | 20 (68) | 25 (77) | 30 (86) | 35 (95) | 40 (104) |
| Correction Factor | 1.3 | 1.25 | 1.2 | 1.1 | 1.0 | 1.0 | 1.0 | 0.95 | 0.9 |

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE :



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-Tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube.
4. Average gas concentration can be obtained from half an hour to 10 hours sampling. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula:

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading (\% \cdot \text{hour})}}{\text{Sampling Time (hours)}}$$

5. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder.

INTERFERENCES :

| Substance | Concentration | Interference | Interference gas only |
|-------------------|---------------|--------------|--------------------------------|
| Ammonia | ≤500 ppm | No | No discolouration up to 500ppm |
| Hydrogen chloride | ≤300 ppm | No | No discolouration up to 300ppm |
| Chlorine | ≤10 ppm | No | No discolouration up to 5ppm |
| Hydrogen cyanide | ≤50 ppm | No | No discolouration up to 30ppm |
| Sulphur dioxide | ≤15 ppm | No | No discolouration up to 15ppm |
| Nitrogen dioxide | ≤10 ppm | No | No discolouration up to 10 ppm |
| Hydrogen sulphide | ≤50 ppm | No | No discolouration up to 30 ppm |

The table of the interference gases primarily expresses the interference of each coexisting gas in the gas concentration range that is equivalent to the target gas concentration.

Therefore, the test result may be affected by other substances not listed in the table.
For more information, please contact us or your Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2014) : 5000 ppm

Threshold Limit Value-Short Term Exposure Limit by ACGIH (2014) : 30,000 ppm

DISPOSAL INFORMATION :

This Dosi-tube does not contain any toxic substances. When disposing of the tube regardless of whether used or unused, follow the rules and regulations of the local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

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15D1Z

GASTEC Instructions for No.3D Ammonia Passive Dosi-Tube

FOR SAFE OPERATION :

Carefully read this manual before use.

⚠ CAUTION : If not observed, injuries to the operator or damage to the product may result.

- When breaking the Passive Dosi-Tube, keep away from eyes.
- Do not touch the broken glass tubes, pieces and reagent with bare hand(s).

△ NOTES : For maintaining performance and reliability of the test results.

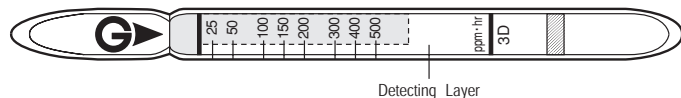
- Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
- Use this tube within the relative humidity range of 25 - 90%.
- This tube may be interfered with by the coexisting gases. Please refer to the "INTERFERENCES".
- Shelf life and storage conditions of the Passive dosi-tube are marked on the label of the box of tube.

APPLICATION OF THE TUBE :

Use of this tube for the detection of Ammonia in air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(As a result of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



| | |
|--------------------|---|
| Measuring Range | 2.5 - 1000 ppm |
| Sampling Hours | 0.5 - 10 hours |
| Detecting Limit | 0.5 ppm (10 hours) |
| Colour Change | Purple → Yellow |
| Reaction Principle | Ammonia neutralises analysing agent to discolour the indicator to yellow. |

Coefficient of Variance : 10% (for 25 to 500 ppm · hr)

**** Shelf Life : Please refer to the Validity Date printed on the box of tube.**

**** Store the tubes in dark and cool place.**

CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Temperature : Correct for temperature by the table below :

| | | | | | | | | | |
|--------------------|-----------|-----------|------------|------------|------------|------------|------------|------------|-------------|
| Temperature °C(°F) | 0 (32) | 5 (41) | 10 (50) | 15 (59) | 20 (68) | 25 (77) | 30 (86) | 35 (95) | 40 (104) |
| Correction Factor | 1.34 | 1.25 | 1.15 | 1.08 | 1.0 | 0.95 | 0.9 | 0.85 | 0.8 |

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE :

- Break tip off a fresh tube with Gastec Passive Dosi-Tube Holder No.710.
- Set the Dosi-tube in the Tube Holder firmly inside the holder so the broken part is not appeared from the edge of the holder. Record the measurement starting time on the peel off numbered label in each box of the tube and put the label on the tube.
- For personal sampling, put the dosi-tube holder to the shirt collar of the personnel or workplace where

- the measurement is required. When the sampling is finished, record the time on the label of the tube.
- Average gas concentration can be obtained from an hour sampling. 4 - 10 hours sampling term is recommended. Calculate actual sampling time and obtain the average gas concentration by the following formula:

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading (ppm hour)}}{\text{Actual Sampling Time (hours)}}$$

- To protect the tube holder of shirt collar from dropping during operation, support the tube holder with string through a small hole of the tube holder.

INTERFERENCES :

| Substance | Interference | Interference gas only |
|-------------------|--------------|-----------------------|
| Amines, Hydrazine | + | Yellow |
| Aromatic amines | No | No discolouration |

The table of this interference gases primarily expresses the interference of each coexisting gas in the gas concentration range, equivalent to the gas concentration. Therefore, the test result may be given positive result by the other substances not listed in the table. For more information, please contact Gastec or Gastec distributors in your territory.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2014) : 25 ppm

Threshold Limit Value-Short Term Exposure Limit by ACGIH (2014) : 35 ppm

Explosive Range: 16 - 25 %

APPLICATION FOR OTHER SUBSTANCES :

The Gastec Passive Dosi-Tube No.3D can also be used for the following substances with each correction factor :

| Substance | Correction Factor | Sampling Time | Measuring Range |
|-------------------------|-------------------|-----------------|-----------------|
| Dimethyl amine | 0.75 | 0.5 to 10 hours | 1.9 - 750 ppm |
| N,N-Dimethylethyl amine | 1.6 | | 4 - 1600 ppm |
| Hydrazine | 0.65 | | 1.6 - 650 ppm |
| Triethyl amine | 2.1 | | 5.3 - 2100 ppm |

CORRECTION FACTOR :

Detector tubes are primarily designed to measure specific gases. But it is also possible to measure other substances of similar chemical properties with the aid of a correction factor or chart. Therefore, please make use of the correction factor/chart measuring ranges as a reference. For more precise factor please contact your Gastec distributor.

DISPOSAL INFORMATION :

Reagent of the tube does not use toxic substances. When dispose of the tube regardless of whether used or unused, follow the rules and regulations of the local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gstec representatives.

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IM013DE1
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14L1Z

GASTEC Instructions for No.3DL Ammonia Passive Dosi-Tube

FOR SAFE OPERATION :

Read this manual carefully before use.

⚠ CAUTION : If not observed, injuries to the operator or damage to the product may result.

1. When breaking the Passive Dosi-Tube, keep away from eyes.
2. Do not touch the broken glass tubes, pieces and reagent with bare hand(s).
3. Keep tubes out of Direct Sunlight. The sunlight fades the discoloration of the tube.

△ NOTES : For maintaining performance and reliability of the test results.

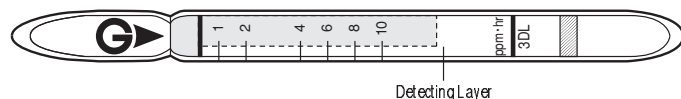
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 0 - 90%.
3. This tube may be interfered with by the coexisting gases. Please refer to the "INTERFERENCES".
4. Shelf life and storage conditions of the Passive dosi-tube are marked on the label of the box of tube.

APPLICATION OF THE TUBE :

Use of this tube for the detection of Ammonia in air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(As a result of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



| | |
|--------------------|---|
| Measuring Range | 0.1 - 10 ppm |
| Sampling Hours | 1 - 10 hours |
| Detecting Limit | 0.02 ppm (10 hours) |
| Colour Change | Pink → Yellow |
| Reaction Principle | $2\text{NH}_3 + \text{H}_2\text{SO}_4 = (\text{NH}_4)_2\text{SO}_4$ |

Coefficient of Variance : 10% (for 1 to 10 ppm·hr)

**** Shelf Life : Please refer to the Validity Date printed on the box of tube.**

**** Store the tubes in dark and cool place.**

CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Temperature : Correct for temperature by the table below :

| | | | | | | | | | |
|--------------------|-------|-------|--------|--------|--------|--------|--------|--------|---------|
| Temperature °C(°F) | 0(32) | 5(41) | 10(50) | 15(59) | 20(68) | 25(77) | 30(86) | 35(95) | 40(104) |
| Correction Factor | 1.25 | 1.18 | 1.1 | 1.05 | 1.0 | 0.96 | 0.92 | 0.88 | 0.84 |

Humidity : No correction is required for 20 - 90% R.H. If humidity is less than 20% R.H., tube reading will be 30 to 35% higher than 50% R.H.

Pressure : No correction is required.

MEASUREMENT PROCEDURE :

1. Break the tube at the score of the tube with Gastec Passive Dosi-Tube Holder No.710.
2. Set the Dosi-tube in the Tube Holder firmly inside the holder so the broken part is not appeared from the edge of the holder. Record the measurement starting time on the peel off numbered label in each box of the tube and put the label on the tube.

3. For personal sampling, put the dosi-tube holder to the shirt collar of the personnel or workplace where the measurement is required. When the sampling is finished, record the time on the label of the tube.
4. Average gas concentration can be obtained from an hour sampling. 4 - 10 hours sampling term is recommended. Calculate actual sampling time and obtain the average gas concentration can be obtained by the following formula :

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading (ppm hour)}}{\text{Actual Sampling Time (hours)}}$$

5. To protect the tube holder of shirt collar from dropping during operation, support the tube holder with string through a small hole of the tube holder.

INTERFERENCES :

| Substance | Interference | Changes colour by itself to |
|-----------|--------------|-----------------------------|
| Amines | + | Yellow |
| Hydrazine | + | Yellow |

The table of this interference gases primarily expresses the interference of each coexisting gas in the gas concentration range, equivalent to the gas concentration. Therefore, the test result may be given positive result by the other substances not listed in the table. For more information is needed, please contact us or our distributors in your territory.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2008) : 25 ppm (7 - 8 hours)

Threshold Limit Value-Short Term Exposure Limit by ACGIH (2008) : 35 ppm (15 minutes)

Explosive Range: 15 - 28%

APPLICATION FOR OTHER SUBSTANCES :

The Gastec Passive Dosi-Tube No.3DL can also be used for the following substances with each correction factor :

| Substance | Correction Factor | Sampling Time | Measuring Range |
|-----------------|-------------------|---------------|-----------------|
| Methyl amine | 1.9 | 1 - 10 hours | 0.19 - 19 ppm |
| Trimethyl amine | 2.3 | 1 - 10 hours | 0.23 - 23 ppm |

CORRECTION FACTOR :

Detector tubes are primarily designed to measure specific gases. But it is also possible to measure other substances of similar chemical properties with the aid of a correction factor or chart. Therefore, please make use of the correction factor/chart measuring ranges as a reference. For more precise factor please contact your Gastec distributor.

DISPOSAL INFORMATION :

Reagent of the tube does not use toxic substances. When dispose of the tube regardless of whether used or unused, follow the rules and regulations of the local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gstec representatives.

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GASTEC Instructions for No.4D Hydrogen Sulphide Passive Dosi-Tube

FOR SAFE OPERATION:

Carefully read this manual before use.

⚠ CAUTION : If you do not observe the following precautions, you may suffer injuries or damage to the product.

1. When breaking the Passive Dosi-tube, keep away from eyes.
2. Do not touch the broken glass tubes, pieces and reagent with bare hand(s).

△ NOTES : For maintaining performance and reliability of the test results, observe the following.

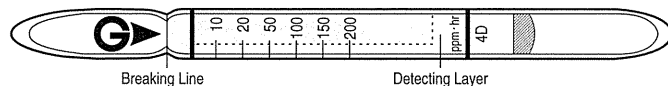
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 0 - 90%.
3. This tube may be interfered with by the coexisting gases. Please refer to the table "INTERFERENCES" below.
4. Shelf life and storage conditions of the Passive Dosi-tube are marked on the label of the box of tube.

APPLICATION OF THE TUBE :

Use this tube for the detection of Hydrogen sulphide in air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(Because of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



This tube measures TWA (time-weighted average) gas concentration by utilising natural diffusion of the target gas without a gas sampling pump.

| | |
|--------------------|--|
| Measuring Range | 0.2- 200 ppm |
| Sampling Hours | 1 - 48 hours |
| Detecting Limit | 0.1 ppm (48 hours) |
| Colour Change | White → Brown |
| Reaction Principle | $\text{H}_2\text{S} + \text{Pb}(\text{CH}_3\text{COO})_2 \rightarrow \text{PbS} + 2\text{CH}_3\text{COOH}$ |

Coefficient of Variation : 10% (for 10 to 200 ppm·hr)

****Shelf Life : Please refer to the validity date printed on the box of tube.**

****Store the tubes in the cool and dark place.**

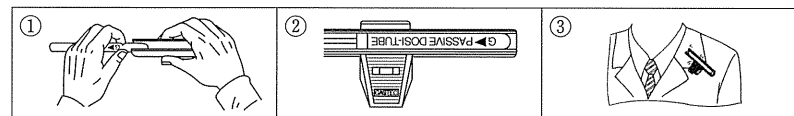
CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Temperature : No correction is required.

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE :



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube.
4. Average gas concentration can be obtained from an hour to 48 hours sampling. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula:

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading (ppm} \cdot \text{hour)}}{\text{Actual Sampling Time (hours)}}$$

INTERFERENCES :

| Substance | Concentration | Interference | Changes colour by itself to |
|------------------|---------------------|--------------|-----------------------------|
| Nitrogen dioxide | $\geq 5\text{ppm}$ | - | No discolouration |
| Sulphur dioxide | $\leq 5\text{ppm}$ | No | No discolouration |
| Chlorine | $\leq 1\text{ppm}$ | No | No discolouration |
| Ammonia | $\leq 25\text{ppm}$ | No | No discolouration |

This table of interference gases primarily expresses the interference of each coexisting gas in the gas concentration range, that is equivalent to the gas concentration. Therefore, the test result may be given positive result by the other substances not listed in the table. For more information is needed, please contact us or Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2016) : 1 ppm

Threshold Limit Value-Short Term Exposure Limit by ACGIH (2016): 5 ppm

INSTRUCTIONS ON DISPOSAL :

The reagent of the tube uses a small amount of lead. When disposing the tube regardless of whether it has been used or not, follow the rules and regulations of your local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

Manufacturer : Gastec Corporation
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IM014DE3
Printed in Japan
17C1Z

GASTEC Instructions for No.5D Sulphur Dioxide Passive Dosi-Tube

FOR SAFE OPERATION:

Carefully read this manual before use.

⚠ CAUTION : If not observed, injuries to the operator or damage to the product may result.

1. When breaking the Passive Dosi-Tube, keep the tube away from eyes.
2. Do not touch any broken glass tubes, pieces and reagents with bare hand(s).

⚠ NOTES : For maintaining performance and reliability of the test results.

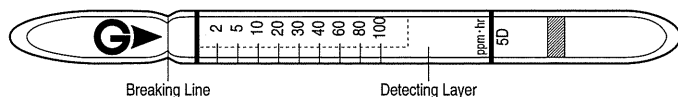
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 0 - 90%.
3. This tube may be interfered with by coexisting gases. Please refer to the "INTERFERENCES".
4. The shelf life and storage condition of the Passive Dosi-tube are marked on the label of the tube box.

APPLICATION OF THE TUBE :

Use this tube for detecting Sulphur dioxide in the air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(As a result of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



This tube measures TWA (time-weighted average) gas concentration by utilizing natural diffusion of the target gas without a gas sampling pump

| | |
|--------------------|--|
| Measuring Range | 0.2- 100 ppm |
| Sampling Hours | 1 - 10 hours |
| Detecting Limit | 0.1 ppm (10 hours) |
| Colour Change | Green → Yellow |
| Reaction Principle | $\text{SO}_2 + \text{BaCl}_2 + \text{H}_2\text{O} \rightarrow \text{BaSO}_3 + 2\text{HCl}$ $\text{HCl} + \text{Base} \rightarrow \text{Chloride}$ |

**Coefficient of Variation : 10% (for 2 to 30 ppm·hr)
5% (for 30 to 100 ppm·hr)**

****Shelf Life : Please refer to the Validity Date printed on the tube box.**

****Store the tubes in a dark and cool place.**

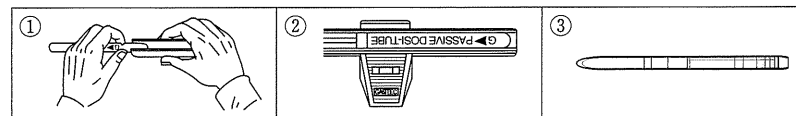
CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Temperature : No correction is required.

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE :



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-Tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube.
4. Average gas concentration can be obtained from an hour to 10 hours sampling. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula:

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading (ppm} \cdot \text{hour)}}{\text{Actual Sampling Time (hours)}}$$

5. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder.

INTERFERENCES :

| Substance | Interference | Interference gas only |
|-------------------|--------------|-----------------------|
| Nitrogen dioxide | — | No discolouration |
| Hydrogen sulphide | + | No discolouration |

The table of the interference gases primarily expresses the interference of each coexisting gas in the gas concentration range that is equivalent to the target gas concentration. Therefore, the test result may be affected by other substances not listed in the table. For more information, please contact us or your Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Short Term Exposure Limit by ACGIH (2014) : 0.25 ppm

DISPOSAL INFORMATION :

This Dosi-tube does not contain any toxic substances. When disposing of the tube regardless of whether used or unused, follow the rules and regulations of the local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

Manufacturer : Gastec Corporation
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IM015DE2
 Printed in Japan
 15D1Z

GASTEC Instructions for No.5DH Sulphur Dioxide Passive Dosi-Tube

FOR SAFE OPERATION :

Carefully read this manual before use.

⚠ CAUTION : If not observed, injuries to the operator or damage to the product may result.

1. When breaking the Passive Dosi-Tube, keep the tube away from eyes.
2. Do not touch any broken glass tubes, pieces and reagents with bare hand(s).
3. Keep tubes out of Direct Sunlight, which fades the discolouration of the tube.

△NOTES : For maintaining performance and reliability of the test results.

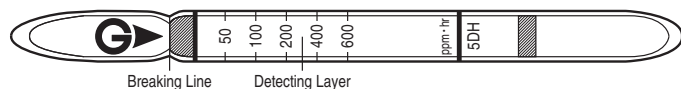
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 0 - 90%.
3. This tube may be interfered with by coexisting gases. Please refer to the "INTERFERENCES".
4. The shelf life and storage condition of the Passive Dosi-tube are marked on the label of the tube box.

APPLICATION OF THE TUBE :

Use this tube for detecting Sulphur dioxide in the air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(As a result of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



This tube measures TWA (time-weighted average) gas concentration by utilizing natural diffusion of the target gas without a gas sampling pump.

| | |
|--------------------|--|
| Measuring Range | 10 – 600 ppm |
| Sampling Hours | 1 – 5 hours |
| Detecting Limit | 1 ppm (5 hours) |
| Colour Change | Bluish Purple → White |
| Reaction Principle | $\text{SO}_2 + \text{I}_2 + \text{H}_2\text{O} \rightarrow 2\text{HI} + \text{H}_2\text{SO}_4$ |

Coefficient of Variation : 10% (for 50 to 600 ppm·hr)

****Shelf Life : Please refer to the Validity Date printed on the tube box.**

****Store the tubes in a dark and cool place.**

CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

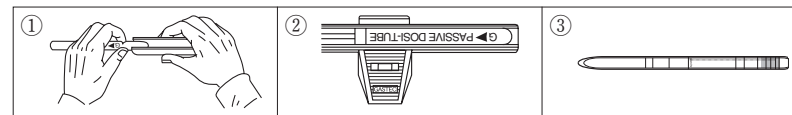
Temperature :

| | | | | | | | | | |
|-------------------|--------|--------|---------|---------|---------|---------|---------|---------|----------|
| Temperature°C(°F) | 0 (32) | 5 (41) | 10 (50) | 15 (59) | 20 (68) | 25 (77) | 30 (86) | 35 (95) | 40 (104) |
| Correction Factor | 1.5 | 1.35 | 1.2 | 1.1 | 1.0 | 0.98 | 0.95 | 0.93 | 0.9 |

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE:



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-Tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube.
4. Average gas concentration can be obtained from an hour to 5 hours sampling. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula:

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading (ppm} \cdot \text{hour)}}{\text{Actual Sampling Time (hours)}}$$

5. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder.

INTERFERENCES :

| Substance | Interference | Interference gas only |
|-------------------|--------------|---|
| Nitrogen dioxide | — | No discolouration |
| Hydrogen sulphide | + | White (brown around demarcation of stain) |

The table of the interference gases primarily expresses the interference of each coexisting gas in the gas concentration range that is equivalent to the target gas concentration. Therefore, the test result may be affected by other substances not listed in the table. For more information, please contact us or your Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Short Term Exposure Limit by ACGIH (2014): 0.25 ppm

DISPOSAL INFORMATION :

This Dosi-tube does not contain any toxic substances. When disposing of the tube regardless of whether used or unused, follow the rules and regulations of the local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

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IM015DHE2
Printed in Japan
15D1Z

GASTEC No.8D

Instructions for Chlorine Passive Dosi-Tube

FOR SAFE OPERATION :

Carefully read this manual before use.

⚠ CAUTION : If not observed, injuries to the operator or damage to the product may result.

1. When breaking the Passive Dosi-Tube, keep the tube away from eyes.
2. Do not touch any broken glass tubes, pieces and reagents with bare hand(s).
3. Keep tubes out of Direct Sunlight, which fades the discolouration of the tube.

△ NOTES : For maintaining performance and reliability of the test results.

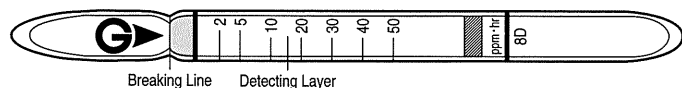
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 0 - 90%.
3. This tube may be interfered with by coexisting gases. Please refer to the "INTERFERENCES".
4. The shelf life and storage condition of the Passive Dosi-tube are marked on the label of the tube box.

APPLICATION OF THE TUBE :

Use this tube for detecting Chlorine in the air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(As a result of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



This tube measures TWA (time-weighted average) gas concentration by utilizing natural diffusion of the target gas without a gas sampling pump.

| | |
|--------------------|---|
| Measuring Range | 0.08 – 100 ppm |
| Sampling Hours | 0.5 – 24 hours |
| Detecting Limit | 0.1 ppm (10 hours) |
| Colour Change | White → Yellow |
| Reaction Principle | Cl ₂ + o-Tolidine → Yellow product |

Coefficient of Variation: 10% (for 2 to 50 ppm-hr)

****Shelf Life: Please refer to the Validity Date printed on the tube box.**

****Store the tubes in a dark and cool place.**

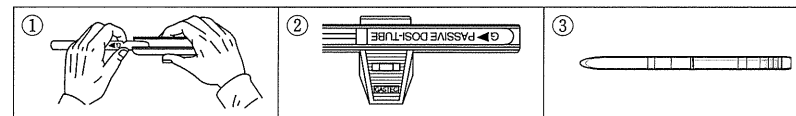
CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Temperature : No correction is required.

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE:



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-Tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube.
4. Average gas concentration can be obtained from half an hour to 24 hours sampling. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula:

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading (ppm-hour)}}{\text{Actual Sampling Time (hours)}}$$

5. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder.

INTERFERENCES :

| Substance | Interference | Interference gas only |
|------------------|--------------|-----------------------|
| Nitrogen dioxide | + | Yellow |
| Halogens | + | Yellow |

The table of the interference gases primarily expresses the interference of each coexisting gas in the gas concentration range that is equivalent to the target gas concentration. Therefore, the test result may be affected by other substances not listed in the table.

For more information, please contact us or your Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2014): 0.5 ppm

Threshold Limit Value-Short Term Exposure Limit by ACGIH (2014): 1 ppm

DISPOSAL INFORMATION :

This Dosi-tube does not contain any toxic substances. When disposing of the tube regardless of whether used or unused, follow the rules and regulations of the local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

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IM018DE1
 Printed in Japan
 15D1Z

GASTEC Instructions for No.9D Nitrogen Dioxide Passive Dosi-Tube

FOR SAFE OPERATION :

Carefully read this manual before use.

CAUTION : If you do not observe the following precautions, you may suffer injuries or damage to the product.

1. When breaking the Passive Dosi-Tube, keep away from eyes.
2. Do not touch any broken glass tubes, pieces and reagents with bare hand(s).
3. Keep tubes out of Direct Sunlight, which fades the discolouration of the tube.

NOTES : For maintaining performance and reliability of the test results, observe the following.

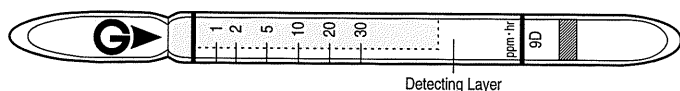
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 0 - 90%.
3. This tube may be interfered with by the coexisting gases. Please refer to the table "INTERFERENCES" below.
4. Shelf life and storage condition of the Passive dosi-tube are marked on the label of the box of tube.

APPLICATION OF THE TUBE :

Use this tube for the detection of Nitrogen dioxide in air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(Because of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



| | |
|--------------------|---|
| Measuring Range | 0.1 – 30 ppm |
| Sampling Hours | 1 – 10 hours |
| Detecting Limit | 0.05 ppm (10 hours) |
| Colour Change | White → Yellow |
| Reaction Principle | NO ₂ + o-Tolidine → Yellow product |

Coefficient of Variation : 10% (for 1 to 30 ppm-hr)

****Shelf Life :** Please refer to the validity date printed on the box of tube.

****Store the tubes in the refrigerator to keep at 10°C (50°F) or below.**

CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

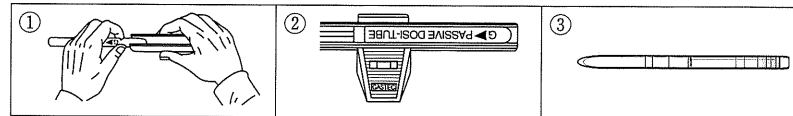
Temperature : Correct for temperature by the table below :

| | | | | | | | | | |
|--------------------|--------|--------|---------|---------|---------|---------|---------|---------|----------|
| Temperature °C(°F) | 0 (32) | 5 (41) | 10 (50) | 15 (59) | 20 (68) | 25 (77) | 30 (86) | 35 (95) | 40 (104) |
| Correction Factor | 1.15 | 1.08 | 1.1 | 1.05 | 1.0 | 0.95 | 0.9 | 0.85 | 0.8 |

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE :



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-Tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube.
4. Average gas concentration can be obtained from an hour to 10 hours sampling. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula:

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading (ppm} \cdot \text{hour)}}{\text{Actual Sampling Time (hours)}}$$

5. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder.
6. If necessary, multiply the readings by the correction factor of temperature.

INTERFERENCES :

| Substance | Interference | Changes colour by itself to |
|-------------------------|--------------|-----------------------------|
| Bromine | + | Yellow |
| Chlorine | + | Yellow |
| Ammonia | No | No discolouration |
| Carbon monoxide | No | No discolouration |
| Nitric oxide | No | No discolouration |
| Sulphur dioxide | No | No discolouration |
| Organic gases & vapours | No | No discolouration |

The table of this interference gases primarily expresses the interference of each coexisting gas in the gas concentration range, that is equivalent to the gas concentration. Therefore, the test result may be given positive result by the other substances not listed in the table. For more information is needed, please contact us or Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2015): 0.2 ppm

INSTRUCTIONS ON DISPOSAL :

This reagent of tube does not use toxic substances. When disposing the tube regardless of whether it has been used or not, follow the rules and regulations of your local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

Manufacturer : Gastec Corporation
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IM019DE2
Printed in Japan
151Z

GASTEC Instructions for No.9DL Nitrogen Dioxide Passive Dosi-Tube

FOR SAFE OPERATION :

Carefully read this manual before use.

⚠ CAUTION : If you do not observe the following precautions, you may suffer injuries or damage to the product.

1. When breaking the Passive Dosi-tube, keep away from eyes.
2. Do not touch the broken glass tubes, pieces and reagent with bare hand(s).
3. Keep tubes out of Direct Sunlight. The sunlight fades the discolouration of the tube.

△NOTES : For maintaining performance and reliability of the test results, observe the following.

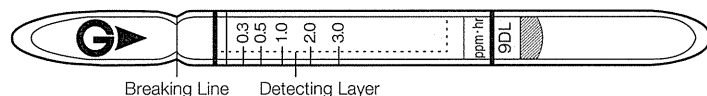
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 0 - 90%.
3. This tube may be interfered with by the coexisting gases. Please refer to the "INTERFERENCES" below.
4. Shelf life and storage condition of the Passive Dosi-tube are marked on the label of the box of tube.

APPLICATION OF THE TUBE :

Use this tube for the detection Nitrogen dioxide in air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(Because of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



This tube measures TWA (time-weighted average) gas concentration by utilising natural diffusion of the target gas without a gas sampling pump.

| | |
|--------------------|--|
| Measuring Range | 0.01 – 3.0 ppm |
| Sampling Hours | 1 – 24 hours |
| Detecting Limit | 0.01 ppm (24 hours) |
| Colour Change | White → Green |
| Reaction Principle | ABTS Reagent + NO ₂ → Green product |

Coefficient of Variance: 10% (for 0.1 to 3.0 ppm-hr)

****Shelf Life : Please refer to the validity date printed on the box of tube.**

****Store the tubes at 10°C (50°F) or below in the refrigerator.**

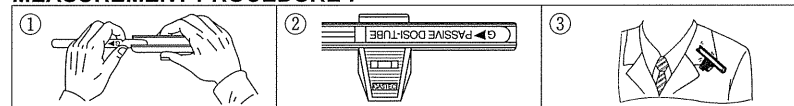
CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Temperature : No correction is required.

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE :



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube.
4. Average gas concentration can be obtained from an hour to 24 hours sampling. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula:

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading (ppm}\cdot\text{hour)}}{\text{Sampling Time (hours)}}$$

※When the average concentration is less than 0.01ppm, please use the result only as reference.

INTERFERENCES :

| Substance | Concentration | Interference | Changes colour by itself to |
|-----------------|---------------|--------------|--------------------------------|
| Carbon monoxide | ≤10 ppm | No | No discolouration (≤10 ppm) |
| Chlorine | ≤0.07 ppm | No | No discolouration (≤0.07 ppm) |
| Ozone | ≤0.045 ppm | No | No discolouration (≤0.045 ppm) |
| Sulphur dioxide | | | No discolouration (≤0.1 ppm) |
| Carbon dioxide | ≤600 ppm | No | No discolouration (≤600 ppm) |
| Formaldehyde | | | No discolouration (≤0.1 ppm) |

This table of interference gases primarily expresses the interference of each coexisting gas in the gas concentration range, that is equivalent to the gas concentration. Therefore, the test result may be given positive result by the other substances not listed in the table. For more information is needed, please contact us or Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2016) : 0.2 ppm

INSTRUCTIONS ON DISPOSAL :

The reagent of the tube does not use toxic substances. When disposing the tube regardless

of whether it has been used or not, follow the rules and regulations of your local government.

WARRANTY :

If you have any questions regarding gas detection and the quality of the tubes, please feel free to contact your Gastec representatives.

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Printed in Japan
17C1Z

GASTEC Instructions for No.12D Hydrogen Cyanide Passive Dosi-Tube

FOR SAFE OPERATION :

Carefully read this manual before use.

⚠ CAUTION : If not observed, injuries to the operator or damage to the product may result.

1. When breaking the Passive Dosi-Tube, keep the tube away from eyes.
2. Do not touch any broken glass tubes, pieces and reagents with bare hand(s).

△ NOTES : For maintaining performance and reliability of the test results.

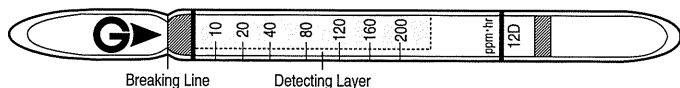
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 0 - 90%.
3. This tube may be interfered with by coexisting gases. Please refer to the "INTERFERENCES".
4. The shelf life and storage condition of the Passive Dosi-tube are marked on the label of the tube box.

APPLICATION OF THE TUBE :

Use this tube for detecting Hydrogen cyanide in the air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(As a result of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



This tube measures TWA (time-weighted average) gas concentration by utilizing natural diffusion of the target gas without a gas sampling pump.

| | |
|--------------------|--|
| Measuring Range | 1 – 200 ppm |
| Sampling Hours | 1 – 10 hours |
| Detecting Limit | 0.3 ppm (10 hours) |
| Colour Change | Yellow → Pink |
| Reaction Principle | Hydrogen cyanide reacts with the reagent to form intermediate material which stains indicator pink |

Coefficient of Variation: 10% (for 10 to 40 ppm-hr), 5% (for 40 to 200 ppm-hr)

****Shelf Life: Please refer to the validity date printed on the tube box.**

****Store the tubes in a dark and cool place.**

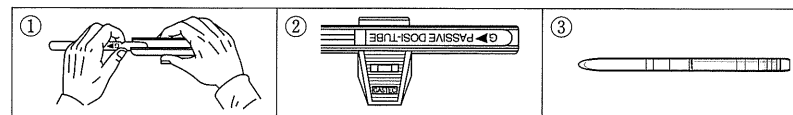
CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Temperature : No correction is required.

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE:



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-Tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube.
4. Average gas concentration can be obtained from 1 hour to 10 hours sampling. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula:

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading (ppm} \cdot \text{hour)}}{\text{Actual Sampling Time (hours)}}$$

5. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder.

INTERFERENCES :

| Substance | Concentration | Interference | Interference gas only |
|-------------------|---------------|--------------|-----------------------|
| Basic gases | | — | No discolouration |
| Acid gases | | + | Pink |
| Nitrogen dioxide | ≥ 0.5 ppm | + | Pink |
| Hydrogen sulphide | | + | Pink |

This table of the interference gases primarily expresses the interference of each coexisting gas in the gas concentration range that is equivalent to the target gas concentration. Therefore, the test result may be affected by other substances not listed in the table.

For more information, please contact us or your Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Ceiling by ACGIH (2014): 4.7 ppm

INSTRUCTIONS ON DISPOSAL :

This Dosi-tube does not contain any toxic substances. When disposing of the tube regardless of whether used or unused, follow the rules and regulations of the local government.

WARRANTY :

If you have any questions regarding gas detection and the quality of the tubes, please feel free to contact your Gastec representatives.

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IM0112DE1
Printed in Japan
15D1Z

GASTEC No.14D Instructions for Hydrogen Chloride Passive Dosi-Tube

FOR SAFE OPERATION :

Carefully read this manual before use.

⚠ CAUTION : If you do not observe the following precautions, you may suffer injuries or damage to the product.

1. When breaking the Passive Dosi-tube, keep away from eyes.
2. Do not touch the broken glass tubes, pieces and reagent with bare hand(s).

△ NOTES : For maintaining performance and reliability of the test results, observe the following.

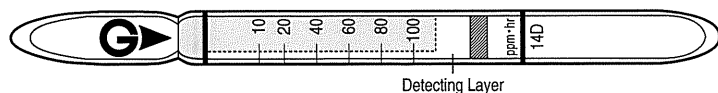
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 30 - 80%.
3. This tube may be interfered with by the coexisting gases. Please refer to the table "INTERFERENCES" below.
4. Shelf life and storage condition of the Passive Dosi-tube are marked on the label of the box of tube.

APPLICATION OF THE TUBE :

Use of this tube for the detection of Hydrogen chloride in air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(Because of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



| | |
|--------------------|-----------------------|
| Measuring Range | 1 - 100 ppm |
| Sampling Hours | 1 - 10 hours |
| Detecting Limit | 0.5 ppm (10 hours) |
| Colour Change | Yellow → Purple |
| Reaction Principle | HCl + Base → Chloride |

Coefficient of Variation: 10% (for 10 to 100 ppm·hr)

****Shelf Life :** Please refer to the validity date printed on the box of tube.

****Store the tubes in the cool and dark place.**

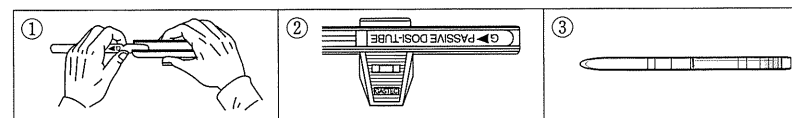
CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Temperature & Humidity : Correct for temperature and humidity by the table below :

| Relative Humidity | Correction Factor | | | | |
|-------------------|-------------------|-------------|-------------|-------------|------------|
| | 0°C (32°F) | 10°C (32°F) | 20°C (68°F) | 30°C (86°F) | 40 (104°F) |
| 30% | 0.7 | 0.6 | 0.5 | 0.45 | 0.45 |
| 40% | 0.9 | 0.8 | 0.7 | 0.65 | 0.6 |
| 50% | 1.2 | 1.1 | 1.0 | 0.9 | 0.8 |
| 60% | 1.6 | 1.5 | 1.3 | 1.2 | 1.1 |
| 70% | 1.9 | 1.8 | 1.7 | 1.6 | 1.4 |
| 80% | 2.4 | 2.3 | 2.2 | 2.0 | 1.7 |

Pressure : No correction is required.

MEASUREMENT PROCEDURE :



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube. If necessary, multiply the readings by the correction factors of temperature with the table.
4. Average gas concentration can be obtained from an hour to 10 hours sampling. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula :

$$\text{Average Concentration} = \frac{\text{Dosi-tube Reading (ppm} \cdot \text{hour)}}{\text{Actual Sampling Time (hours)}}$$

INTERFERENCES :

| Substance | Concentration | Interference | Changes colour by itself to |
|-------------------|---------------|------------------------|-----------------------------|
| Chlorine | ≥ 1/5 | + (Bleaches zero zone) | Bleaches zero zone |
| Nitric acid | ≥ 1/5 | + | Purple |
| Hydrogen fluoride | ≥ 1/1 | + | Purple |

This table of interference gases primarily expresses the interference of each coexisting gas in the gas concentration range, that is equivalent to the gas concentration. Therefore, the test result may be given positive result by the other substances not listed in the table. For more information is needed, please contact us or Gastec representatives.

APPLICATION FOR OTHER SUBSTANCES :

Tube 14D can also be used for other substances as below :

| Substance | Correction factor | Sampling time | Measuring range |
|-------------------|--------------------------|----------------------|------------------------|
| Nitric acid | 0.8 | 1 – 10 hours | 0.8 - 80 ppm |
| Hydrogen fluoride | 2.5 | 1 – 10 hours | 2.5 – 250 ppm |

CORRECTION FACTOR :

Detector tubes are primarily designed to measure specific gases. But it is also possible to measure other substances of similar chemical properties with the aid of a correction factor or chart. Therefore, please make use of the correction factor/chart measuring ranges as a reference. For more precise factor please contact your Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Ceiling by ACGIH (2015) : 2 ppm

INSTRUCTIONS ON DISPOSAL :

The reagent of the tube does not use toxic substances. When disposing the tube regardless of whether it has been used or not, follow the rules and regulations of your local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

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Printed in Japan
15L1Z

GASTEC Instructions for No.17D Hydrogen Fluoride Passive Dosi-Tube

FOR SAFE OPERATION :

Carefully read this manual before use.

⚠ CAUTION : If not observed, injuries to the operator or damage to the product may result.

1. When breaking the Passive Dosi-Tube, keep the tube away from eyes.
2. Do not touch any broken glass tubes, pieces and reagents with bare hand(s).

⚠ NOTES : For maintaining performance and reliability of the test results.

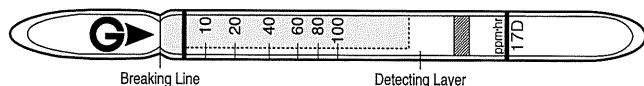
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 30 - 80%.
3. This tube may be interfered with by coexisting gases. Please refer to the "INTERFERENCES".
4. The shelf life and storage condition of the Passive Dosi-tube are marked on the label of the tube box.

APPLICATION OF THE TUBE :

Use this tube for detecting Hydrogen fluoride in the air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(As a result of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



This tube measures TWA (time-weighted average) gas concentration by utilizing natural diffusion of the target gas without a gas sampling pump.

| | |
|--------------------|---------------------------------|
| Measuring Range | 1 – 100 ppm |
| Sampling Hours | 1 – 10 hours |
| Detecting Limit | 0.5 ppm (10 hours) |
| Colour Change | Yellow → Purple |
| Reaction Principle | HF + Indicator → Purple product |

Coefficient of Variation: 15% (for 10 to 20 ppm-hr), 10% (for 20 to 100 ppm-hr)

****Shelf Life : Please refer to the validity date printed on the tube box.**

****Store the tubes in a dark and cool place.**

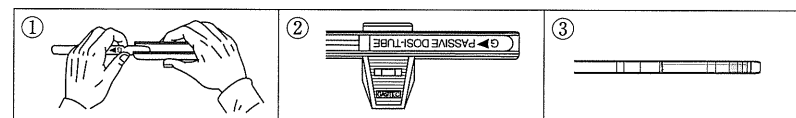
CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Temperature & Humidity : Correct for temperature and humidity by the table below:

| Relative Humidity | Correction factor | | | | |
|-------------------|-------------------|----------------|----------------|----------------|-----------------|
| | 0°C (32°F) | 10°C (50°F) | 20°C (68°F) | 30°C (86°F) | 40°C (104°F) |
| 30% | 1.3 | 0.8 | 0.5 | 0.4 | 0.3 |
| 40% | 1.7 | 1.1 | 0.7 | 0.5 | 0.4 |
| 50% | 2.3 | 1.5 | 1.0 | 0.7 | 0.5 |
| 60% | - | 2.0 | 1.4 | 1.0 | 0.7 |
| 70% | - | - | 1.9 | 1.4 | 1.0 |
| 80% | - | - | 2.5 | 1.9 | 1.3 |

Pressure : No correction is required.

MEASUREMENT PROCEDURE :



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-Tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube.
4. Average gas concentration can be obtained from 1 hour to 10 hours sampling. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula:

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading (ppm} \cdot \text{hour)}}{\text{Actual Sampling Time (hours)}}$$

5. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder.

INTERFERENCES :

| Substance | Concentration | Interference | Interference gas only |
|-------------------|---------------|------------------------|-----------------------|
| Hydrogen chloride | ≥ 1/5 | + | Purple |
| Nitric acid | ≥ 1/5 | + | Purple |
| Chlorine | ≥ 1/5 | + (Bleaches zero zone) | Bleaches zero zone |

The table of the interference gases primarily expresses the interference of each coexisting gas in the gas concentration range that is equivalent to the target gas concentration.

Therefore, the test result may be affected by other substances not listed in the table.

For more information, please contact us or your Gastec representatives.

APPLICATION FOR OTHER SUBSTANCES :

Passive Dosi-Tube No.17D can also be used for other substances as below:

| Substance | Correction Factor | Sampling Time | Measuring Range |
|-------------------|--------------------------|----------------------|------------------------|
| Hydrogen chloride | 0.4 | 1 – 10 hours | 0.4 – 40 ppm |
| Nitric acid | 0.32 | 1 – 10 hours | 0.32 – 32 ppm |

CORRECTION FACTOR :

Detector tubes are primarily designed to measure specific gases. But it is also possible to measure other substances of similar chemical properties with the aid of a correction factor or chart. Therefore, please make use of the correction factor/chart measuring ranges as a reference. For more precise factor please contact your Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2014): 0.5 ppm

Threshold Limit Value-Ceiling by ACGIH (2014): 2 ppm

INSTRUCTIONS ON DISPOSAL :

This Dosi-tube does not contain any toxic substances. When disposing of the tube regardless of whether used or unused, follow the rules and regulations of the local government.

WARRANTY :

If you have any questions regarding gas detection and the quality of the tubes, please feel free to contact your Gastec representatives.

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GASTEC Instructions for No.32D Hydrogen Peroxide Passive Dosi-Tube

FOR SAFE OPERATION :

Carefully read this manual before use.

⚠ CAUTION : If you do not observe the following precautions, you may suffer injuries or damage to the product.

1. When breaking the Passive Dosi-tube, keep away from eyes.
2. Do not touch any broken glass tubes, pieces and reagents with bare hand(s).

△NOTES : For maintaining performance and reliability of the test results, observe the following.

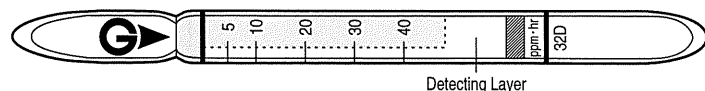
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 0 - 90%.
3. This tube may be interfered with by the coexisting gases. Please refer to the table "INTERFERENCES" below.
4. Shelf life and storage condition of the Passive Dosi-tube are marked on the label of the box of tube.
5. Keep tubes out of Direct Sunlight, which fades the discolouration of the tube.

APPLICATION OF THE TUBE :

Use this tube for the detection of Hydrogen peroxide in air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(Because of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



| | |
|--------------------|---|
| Measuring Range | 0.5 – 40 ppm |
| Sampling Hours | 1 – 10 hours |
| Detecting Limit | 0.3 ppm (10 hours) |
| Colour Change | White → Yellow |
| Reaction Principle | H ₂ O ₂ + Ti (SO ₄) ₂ (white) → Yellow product |

Coefficient of Variation : 10% (for 5 to 40 ppm-hr)

****Shelf Life : Please refer to the validity date printed on the box of tube.**

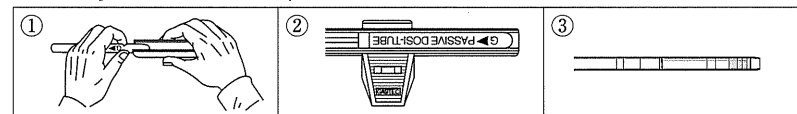
**** Store the tubes in the cool and dark place.**

CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Temperature : Correct for temperature by the table below :

| | | | | | | |
|--------------------|-------|-------|--------|--------|--------|---------|
| Temperature °C(°F) | 0(32) | 5(41) | 10(50) | 20(68) | 30(86) | 40(104) |
| Correction Factor | 1.3 | 1.15 | 1.0 | 1.0 | 0.75 | 0.5 |

Humidity : No correction is required.



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube. If necessary, multiply the readings by the correction factor of temperature.
4. Average gas concentration can be obtained from an hour sampling to 10 hours sampling. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula :

$$\text{Average Concentration} = \frac{\text{Dosi-tube Reading (ppm} \cdot \text{hour)}}{\text{Actual Sampling Time (hours)}}$$

INTERFERENCES :

| Substance | Concentration | Interference | Changes colour by itself to |
|------------------|---------------|---------------------|-----------------------------|
| Chlorine, Ozone | | No | No discolouration |
| Nitrogen dioxide | | No | No discolouration |
| Acetaldehyde | ≧ 20 ppm | Unclear demarcation | No discolouration |
| Formaldehyde | ≧ 10 ppm | — | No discolouration |

This table of interference gases primarily expresses the interference of each coexisting gas in the gas concentration range, that is equivalent to the gas concentration. Therefore, the test result may be given positive result by the other substances not listed in the table. For more information is needed, please contact us or Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2015) : 1 ppm

INSTRUCTIONS ON DISPOSAL :

The reagent of the tube does not use toxic substances. When disposing the tube regardless of whether it has been used or not, follow the rules and regulations of your local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

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IM0132DE1
Printed in Japan
15K1Z

GASTEC Instructions for No.81D Acetic Acid Passive Dosi-Tube

FOR SAFE OPERATION :

Read this manual carefully before use.

⚠ CAUTION : If not observed, injuries to the operator or damage to the product may result.

1. When breaking the Passive Dosi-tube, keep away from eyes.
2. Do not touch the broken glass tubes, pieces and reagent with bare hand(s).
3. The sampling time represents the time necessary to draw the air sample through the tube.
Keep tubes out of Direct Sunlight. The sunlight fades the discoloration of the tube.

△ NOTES : For maintaining performance and reliability of the test results

1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 0 - 90%.
3. This tube may be interfered with by the coexisting gases. Please refer to the "INTERFERENCES".
4. Shelf life and storage conditions of the Passive dosi-tube are marked on the label of the box of tube.

APPLICATION OF THE TUBE :

Use of this tube for the detection of Acetic Acid in air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(As a result of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



| Detecting Layer | |
|--------------------|--|
| Measuring Range | 0.5 - 100 ppm |
| Sampling Time | 1 - 10 hours |
| Detecting Limit | 0.2 ppm (10hours) |
| Colour Change | Purple → Yellow |
| Reaction Principle | $\text{CH}_3\text{CO}_2\text{H} + \text{NaOH} \rightarrow \text{CH}_3\text{CO}_2\text{Na}$ |

Coefficient of Variance : 5% (for 5 to 20 ppm·hr), 10% (for 20 to 100 ppm·hr)

**** Shelf Life : Please refer to the Validity Date printed on the box of tube.**

**** Store the tubes in dark and cool place.**

CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Temperature : To correct for temperature and humidity apply the table below : To correct for temperature by the table below:

| Temperature °C (°F) | 0(32) | 10(50) | 20(68) | 30(86) | 40(104) |
|---------------------|-------|--------|--------|--------|---------|
| Correction Factor | 1.4 | 1.2 | 1.0 | 0.7 | 0.5 |

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE :

1. Break the tube at the score of the tube with Gastec Passive Dosi-Tube Holder No710.
2. Set the Dosi-tube in the Tube Holder firmly inside the holder so broken part is not appeared from the edge of the holder. Record the measurement starting time on the peel off numbered label in each box of the tube and put the label on the tube.

3. For personal sampling, put the dosi-tube holder to the shirt collar of the personnel or workplace where the measurement is required. When the sampling is finished, record the time on the label of the tube.
4. Average gas concentration can be obtained from an hour to 10 hours sampling. 4 - 10 hours sampling term is recommended. Calculate actual sampling time and obtain the average gas concentration can be obtained by the following formula:

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading (ppm} \cdot \text{hour)}}{\text{Actual Sampling Time (hour)}}$$

5. To protect the tube holder of shirt collar from dropping during operation, support the tube holder with string through a small hole of the tube holder.

INTERFERENCES :

| Substance | Interference | Changes colour by itself to |
|-----------------------------------|--------------|-----------------------------|
| Hydrogen chloride, Nitric Acid | Plus error | yellow |
| Chlorine, Nitrogen dioxide | Plus error | yellow |
| Hydrogen cyanide, Sulphur dioxide | Plus error | yellow |

The table of this interference gases primarily expresses the interference of each coexisting gas in the gas concentration range, equivalent to the gas concentration. Therefore, the test result may be given positive result by the other substances not listed in the table. For more information is needed, please contact us or our distributors in your territory.

APPLICATION FOR OTHER SUBSTANCES :

Tube 81D can also be used for other substances as below:

| Substance | Correction Factor | Sampling time | Measuring Range |
|------------------|-------------------|---------------|-----------------|
| Acetic anhydride | 0.6 | 1 - 10 hours | 0.3 - 60 ppm |
| Fomic acid | 1.1 | 1 - 10 hours | 0.55 - 110 ppm |

CORRECTION FACTOR :

Detector tubes are primarily designed to measure specific gases. But it is also possible to measure other substances of similar chemical properties with the aid of a correction factor or chart. Therefore, please make use of the correction factor/chart measuring ranges as a reference. For a more precise factor please contact your Gastec distributor.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2006) : 10 ppm (7-8 hours)

Threshold Limit Value-Short Term Exposure Limit by ACGIH (2006) : 15 ppm (15 minutes.)

DISPOSAL INSTRUCTION :

Reagent of the tube does not use toxic substances. When dispose of the tube regardless of used or unused, follow the rules and regulations of the local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

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GASTEC Instructions for No.91D Formaldehyde Passive Dosi-Tube

FOR SAFE OPERATION :

Carefully read this manual before use.

⚠ CAUTION : If not observed, injuries to the operator or damage to the product may result.

1. When breaking the Passive Dosi-Tube, keep away the tube from eyes.
2. Do not touch any broken glass tubes, pieces and reagents with bare hand(s).
3. Keep tubes out of Direct Sunlight, which fades the discolouration of the tube.

△NOTES : For maintaining performance and reliability of the test results.

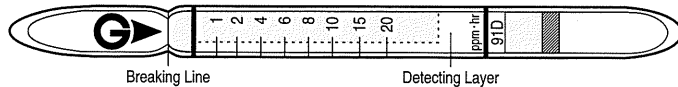
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 0 - 90%.
3. This tube may be interfered with by coexisting gases. Please refer to the "INTERFERENCES".
4. The shelf life and storage condition of the Passive Dosi-tube are marked on the label of the tube box.

APPLICATION OF THE TUBE :

Use this tube for detecting Formaldehyde in the air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(As a result of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



This tube measures TWA (time-weighted average) gas concentration by utilizing natural diffusion of the target gas without a gas sampling pump.

| | |
|--------------------|--|
| Measuring Range | 0.1 – 20 ppm |
| Sampling Hours | 1 - 10 hours |
| Detecting Limit | 0.05 ppm (10 hours) |
| Colour Change | Yellow → Reddish Brown |
| Reaction Principle | $3\text{HCHO} + (\text{NH}_2\text{OH})_3\text{H}_3\text{PO}_4 \rightarrow \text{H}_3\text{PO}_4$ $\text{H}_3\text{PO}_4 + \text{base} \rightarrow \text{Phosphate}$ |

Coefficient of Variation: 10% (for 1 to 20 ppm-hr)

****Shelf Life: Please refer to the Validity Date printed on the tube box.**

****Store the tubes in the refrigerator to keep at 10°C (50°F) or below.**

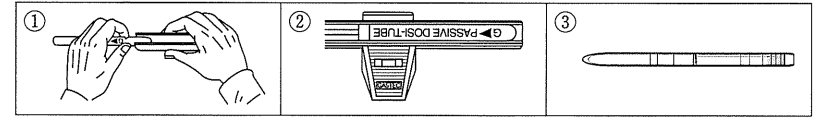
CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Temperature : No correction is required.

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE:



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi - Tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube.
4. Average gas concentration can be obtained from 1 hour to 10 hours sampling. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula:

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading (ppm} \cdot \text{hour)}}{\text{Actual Sampling Time (hours)}}$$

5. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder.

INTERFERENCES :

| Substance | Interference | Interference gas only |
|--------------------------------|--------------|-----------------------|
| Aldehydes, Ketones, Acid gases | + | Reddish brown |

The table of the interference gases primarily expresses the interference of each coexisting gas in the gas concentration range that is equivalent to the target gas concentration. Therefore, the test result may be affected by other substances not listed in the table.

For more information, please contact us or your Gastec representatives.

APPLICATION FOR OTHER SUBSTANCES :

The Gastec Passive Dosi-Tube No.91D can also be used for the following substances with each correction factor:

| Substance | Correction Factor | Sampling Time | Measuring Range |
|---------------------|-------------------|---------------|-----------------|
| Acetaldehyde | 1.0 | 1 to 10 hours | 0.1 – 20 ppm |
| Furfural | 3.0 | | 0.3 – 60 ppm |
| Methyl ethyl ketone | 1.25 | | 0.125 – 25 ppm |

CORRECTION FACTOR :

Detector tubes are primarily designed to measure specific gases. But it is also possible to measure other substances of similar chemical properties with the aid of a correction factor or chart. Therefore, please make use of the correction factor/chart measuring ranges as a reference. For more precise factor please contact your Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Ceiling by ACGIH (2014): 0.3 ppm

Explosive Range : 7 – 73 %

DISPOSAL INSTRUCTION :

This Dosi-tube does not contain any toxic substances. When disposing of the tube regardless of whether used or unused, follow the rules and regulations of the local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

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IM0191DE1
Printed in Japan
15D1Z

GASTEC Instructions for No.112D Ethanol Passive Dosi-Tube

FOR SAFE OPERATION :

Carefully read this manual before use.

⚠ CAUTION : If you do not observe the following precautions, you may suffer injuries or damage to the product.

1. When breaking the Passive Dosi-tube, keep away from eyes.
2. Do not touch any broken glass tubes, pieces and reagents with bare hand(s).

△ NOTES : For maintaining performance and reliability of the test results, observe the following.

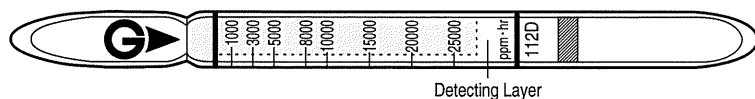
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 0 - 90%.
3. This tube may be interfered with by the coexisting gases. Please refer to the "INTERFERENCES" below.
4. Shelf life and storage condition of the Passive Dosi-tube are marked on the label of the box of tube.

APPLICATION OF THE TUBE :

Use this tube for the detection of Ethanol in air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(Because of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



| | |
|--------------------|--|
| Measuring Range | 100 – 25000 ppm |
| Sampling Hours | 1 – 10 hours |
| Colour Change | Yellow → Brown |
| Reaction Principle | $C_2H_5OH + Cr^{6+} \rightarrow Cr^{3+}$ |

Coefficient of Variation : 10% (for 1000 to 8000 ppm·hr), 5% (for 8000 to 25000 ppm·hr)

****Shelf Life : Please refer to the validity date printed on the box of tube.**

****Store the tubes in the cool and dark place.**

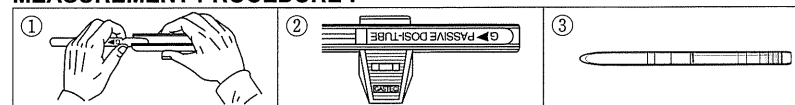
CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Temperature : No correction is required.

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE :



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube.
4. Average gas concentration can be obtained from an hour to 10 hours sampling. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula:

$$\text{Average Concentration} = \frac{\text{Dosi-tube Reading (ppm} \cdot \text{hour)}}{\text{Actual Sampling Time (hours)}}$$

INTERFERENCES :

| Substance | Coefficient of variation | Interference | Changes colour by itself to |
|------------------------|--------------------------|--------------|-----------------------------|
| Isopropyl alcohol | $\geq 1/1$ | + | Brown |
| Other alcohols, Esters | | No | No discolouration |

This table of interference gases primarily expresses the interference of each coexisting gas in the gas concentration range, that is equivalent to the gas concentration. Therefore, the test result may be given positive result by the other substances not listed in the table. For more information is needed, please contact us or Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Short Term Exposure Limit by ACGIH (2015) : 1000 ppm

Explosive Range : 3.3 - 19 %

INSTRUCTIONS ON DISPOSAL :

The reagent of the tube uses a small amount of hexavalent chromium. When disposing the tube regardless of whether it has been used or not, follow the rules and regulations of your local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

Manufacturer : Gastec Corporation
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IM0112DE1
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15K1Z

GASTEC Instructions for No.122DL Toluene Passive Dosi-Tube

FOR SAFE OPERATION :

Carefully read this manual before use.

⚠ CAUTION : If not observed, injuries to the operator or damage to the product may result.

1. When breaking the Passive Dosi-Tube, keep the tube away from eyes.
2. Do not touch any broken glass tubes, pieces and reagents with bare hand(s).
3. Keep tubes out of Direct Sunlight, which fades the discolouration of the tube.

△NOTES : For maintaining performance and reliability of the test results.

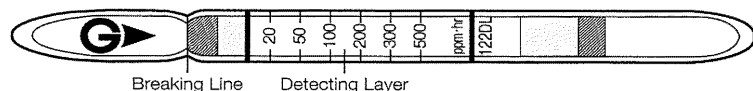
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 0 - 90%.
3. This tube may be interfered with by coexisting gases. Please refer to the "INTERFERENCES".
4. The shelf life and storage condition of the Passive Dosi-tube are marked on the label of the tube box.

APPLICATION OF THE TUBE :

Use this tube for detecting Toluene in the air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(As a result of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



This tube measures TWA (time-weighted average) gas concentration by utilizing natural diffusion of the target gas without a gas sampling pump.

| | |
|--------------------|--|
| Measuring Range | 2 - 500 ppm |
| Sampling Hours | 1 - 10 hours |
| Detecting Limit | 1 ppm (10 hours) |
| Colour Change | White → Brown |
| Reaction Principle | $2C_6H_5CH_3 + HCHO \rightarrow C_6H_4CH_3 - CH_2 - C_6H_4CH_3 + H_2O$ $C_6H_4CH_3 - CH_2 - C_6H_4CH_3 + H_2S_2O_7 \rightarrow \text{Reaction Product}$ |

Coefficient of Variation: 10% (for 20 to 500 ppm-hr)

****Shelf Life: Please refer to the Validity Date printed on the tube box.**

****Store the tubes in a dark and cool place.**

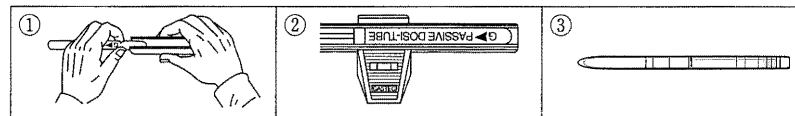
CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Temperature : No correction is required.

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE:



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-Tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube.
4. Average gas concentration can be obtained from 1 hour to 10 hours sampling. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula:

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading (ppm} \cdot \text{hour)}}{\text{Actual Sampling Time (hours)}}$$

5. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder.

INTERFERENCES :

| Substance | Concentration | Interference | Interference gas only |
|---------------------------|---------------|--------------|-----------------------|
| Alcohols, Esters, Ketones | ≤ 30 ppm | No | No discolouration |
| Aromatic hydrocarbons | | + | Brown |

The table of the interference gases primarily expresses the interference of each coexisting gas in the gas concentration range that is equivalent to the target gas concentration. Therefore, the test result may be affected by other substances not listed in the table.

For more information, please contact us or your Gastec representatives.

APPLICATION FOR OTHER SUBSTANCES :

The Gastec Passive Dosi-Tube No.122DL can also be used for the following substances with each correction factor:

| Substance | Correction Factor | Sampling Time | Measuring Range |
|---------------|-------------------|---------------|-----------------|
| Ethyl benzene | 1.4 | 1 - 10 hours | 2.8 - 700 ppm |
| Xylene | 1.7 | 1 - 10 hours | 3.4 - 850 ppm |
| Cumene | 1.7 | 1 - 10 hours | 3.4 - 850 ppm |
| Benzene | 1.2 | 1 - 10 hours | 2.4 - 600 ppm |
| Styrene | 13 | 1 - 10 hours | 26 - 6500 ppm |

CORRECTION FACTOR :

Detector tubes are primarily designed to measure specific gases. But it is also possible to measure other substances of similar chemical properties with the aid of a correction factor or chart. Therefore, please make use of the correction factor/chart measuring ranges as a reference. For more precise factor please contact your Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2014) : 20 ppm

INSTRUCTIONS ON DISPOSAL :

This Dosi-tube does not contain any toxic substances. When disposing of the tube regardless of whether used or unused, follow the rules and regulations of your local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

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Printed in Japan
15D1Z

GASTEC Instructions for No.132D Trichloroethylene Passive Dosi-Tube

FOR SAFE OPERATION :

Carefully read this manual before use.

⚠ CAUTION : If you do not observe the following precautions, you may suffer injuries or damage to the product.

1. When breaking the Passive Dosi-tube, keep away from eyes.
2. Do not touch any broken glass tubes, pieces and reagents with bare hand(s).

△NOTES : For maintaining performance and reliability of the test results, observe the following.

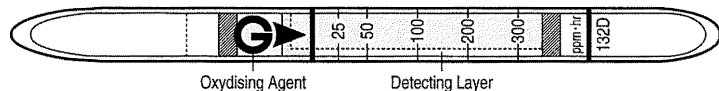
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 20 - 80%.
3. This tube may be interfered with by the coexisting gases. Please refer to the "INTERFERENCES" below.
4. Shelf life and storage condition of the Passive Dosi-tube are marked on the label of the box of tube.

APPLICATION OF THE TUBE :

Use this tube for the detection of Trichloroethylene in air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(Because of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



| | |
|--------------------|---|
| Measuring Range | 3 – 300 ppm |
| Sampling Hours | 1 – 8 hours |
| Colour Change | Yellow → Purple |
| Reaction Principle | $\text{Cl}_2\text{C}:\text{CHCl} + \text{PbO}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{HCl}$ $\text{HCl} + \text{Base} \rightarrow \text{Chloride}$ |

Coefficient of Variation : 10% (for 25 to 300 ppm·hr)

****Shelf Life : Please refer to the validity date printed on the box of tube.**

****Store the tubes in the refrigerator to keep at 10°C (50°F) or below.**

CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

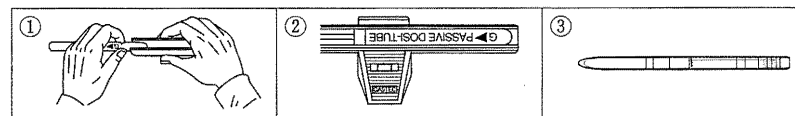
Temperature : Correct for temperature by the table below :

| Tube Reading (ppm) | True Concentration (ppm) | | |
|--------------------|--------------------------|-------------|------------------------|
| | 0°C (32°F) | 10°C (50°F) | 20 - 40°C (68 - 104°F) |
| 200 | 200 | 200 | 200 |
| 100 | 130 | 115 | 100 |
| 50 | 85 | 65 | 50 |
| 25 | 55 | 35 | 25 |

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE :



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube.
4. Average gas concentration can be obtained from an hour to 8 hours sampling. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula :

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading (ppm} \cdot \text{hour)}}{\text{Actual Sampling Time (hours)}}$$

5. If necessary, correct Tube Reading for temperature with the table to have True Concentration.

INTERFERENCES :

| Substance | Interference | Changes colour by itself to |
|---|--------------|-----------------------------|
| Hydrogen chloride, Chlorine | + | Purple |
| 1,2-Dichloroethylene, Tetrachloroethylene | + | Purple |
| Toluene, Xylene | No | No discolouration |

This table of interference gases primarily expresses the interference of each coexisting gas in the gas concentration range, that is equivalent to the gas concentration. Therefore, the test result may be given positive result by the other substances not listed in the table. For more information is needed, please contact us or Gastec representatives.

APPLICATION FOR OTHER SUBSTANCES :

Tube 132D can also be used for other substances as below :

| Substance | Correction factor | Sampling time | Measuring range |
|----------------------|-------------------|---------------|-----------------|
| Hydrogen chloride | 0.6 | 1 to 8 hours | 1.8 – 180 ppm |
| Chlorine | 0.8 | | 2.4 – 240 ppm |
| 1,2-Dichloroethylene | 2.0 | | 6 – 600 ppm |
| Tetrachloroethylene | 0.5 | | 1.5 – 150 ppm |

CORRECTION FACTOR :

Detector tubes are primarily designed to measure specific gases. But it is also possible to measure other substances of similar chemical properties with the aid of a correction factor or chart. Therefore, please make use of the correction factor/chart measuring ranges as a reference. For more precise factor please contact your Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2015) : 10 ppm

Threshold Limit Value-Short Term Exposure Limit by ACGIH (2015) : 25 ppm

INSTRUCTIONS ON DISPOSAL :

The reagent of the tube uses a small amount of lead. When disposing the tube regardless of whether it has been used or not, follow the rules and regulations of your local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

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Printed in Japan
15L1Z

GASTEC No.133D Instructions for Tetrachloroethylene Passive Dosi-Tube

FOR SAFE OPERATION :

Read this manual carefully before use.

⚠ CAUTION : If not observed, injuries to the operator or damage to the product may result.

1. When breaking the Passive Dosi-tube, keep away from eyes.
2. Do not touch the broken glass tubes, pieces and reagent with bare hand(s).
3. Keep tubes out of Direct Sunlight. The Sunlight fades the discolouration of the tube.

△ NOTES : For maintaining performance and reliability of the test result.

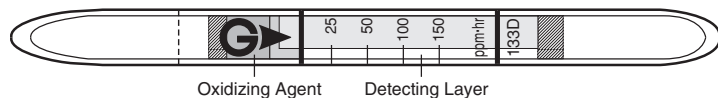
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 20 - 80%.
3. This tube may be interfered with by the coexisting gases. Please refer to the "INTERFERENCES".
4. Shelf life and storage conditions of the Passive dosi-tube are marked on the label of the box of tube.

APPLICATION OF THE TUBE :

Use of this tube for the detection of Tetrachloroethylene in air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(As a result of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



| | |
|--------------------|--|
| Measuring Range | 3 - 150 ppm |
| Sampling Hours | 1 - 8 hours |
| Detecting Limit | 3 ppm (8 hours) |
| Colour Change | Yellow → Purple |
| Reaction Principle | Tetrachloroethylene is oxidized by sulphuric acid to generate hydrogen chloride to change the indicator to purple. |

Coefficient of Variation : 15% (for 25 to 50 ppm·hr), 10% (for 50 to 150 ppm·hr)

**** Shelf Life : Please refer to the Validity Date printed on the box of tube.**

**** Store the tubes in the refrigerator to keep at 10°C (50°F) or below.**

CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

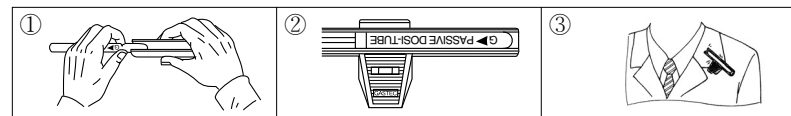
Temperature : Since the tube is affected by the temperature, multiply the correction factor to the tube reading.

| | | | | | | | | | |
|---------------------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
| Temperature °C (°F) | 0 (32) | 5 (41) | 10 (50) | 15 (59) | 20 (68) | 25 (77) | 30 (86) | 35 (95) | 40(104) |
| Correction Factor | 1.8 | 1.4 | 1.2 | 1.1 | 1.0 | 0.95 | 0.9 | 0.85 | 0.8 |

Humidity : No correction is required for humidity range of 20 - 80% RH.

Pressure : No correction is required.

MEASUREMENT PROCEDURE :



1. Break the tube at the score of the tube with Gastec Passive Dosi-Tube Holder No.710.
2. Set the Dosi-tube in the Tube Holder firmly inside the holder so the broken part is not appeared from the edge of the holder. Record the measurement starting time on the peel off numbered label in each box of the tube and put the label on the tube.
3. For personal sampling, put the dosi-tube holder to the shirt collar of the person or workplace where the measurement is required. When the sampling is finished, record the time on the label of the tube.
4. Average gas concentration can be obtained from an hour sampling. 4 - 10 hours sampling term is recommended. Calculate actual sampling time and obtain the average gas concentration can be obtained by the following formula :

$$\text{Average Concentration} = \frac{\text{Dosi - Tube Reading (ppm} \cdot \text{hour)}}{\text{Actual Sampling Time (hour)}}$$

5. To protect the tube holder of shirt collar from dropping during operation, support the tube holder with string through a small hole of the tube holder.

INTERFERENCES :

| Substance | Interference | Change colour by itself |
|---|--------------|-------------------------|
| Hydrogen chloride, Chlorine | + | purple |
| 1,2-Dichloroethylene, Trichloroethylene | + | purple |
| Toluene, Xylene | No | No |

The table of this interference gases primarily expresses the interference of each coexisting gas in the gas concentration range, equivalent to the gas concentration. Therefore, the test result may be given positive result by the other substances not listed in the table. For more information is needed, please contact us or our distributors in your territory.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2005) : 25 ppm (7 - 8 hours)

Threshold Limit Value-Short Term Exposure Limit by ACGIH (2005) : 100 ppm (15 minutes)

DISPOSAL INFORMATION :

This tube contains a small amount of lead. When dispose of the tube regardless of whether used or unused, follow the rules and regulations of the local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

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IM01133DE1
 Printed in Japan
 06B1Z

GASTEC Instructions for No.151D Acetone Passive Dosi-Tube

FOR SAFE OPERATION :

Carefully read this manual before use.

⚠ CAUTION : If you do not observe the following precautions, you may suffer injuries or damage to the product.

1. When breaking the Passive Dosi-tube, keep away from eyes.
2. Do not touch the broken glass tubes, pieces and reagent with bare hand(s).

△ NOTES : For maintaining performance and reliability of the test results, observe the following.

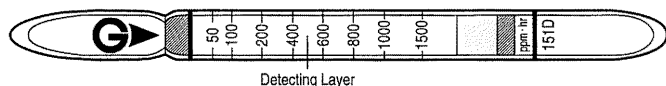
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 0 - 90%.
3. This tube may be interfered with by the coexisting gases. Please refer to the table "INTERFERENCES" below.
4. Shelf life and storage condition of the Passive Dosi-tube are marked on the label of the box of tube.

APPLICATION OF THE TUBE :

Use this tube for the detection of Acetone in air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(Because of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



| | |
|--------------------|---|
| Measuring Range | 5 – 1500 ppm |
| Sampling Hours | 1 – 10 hours |
| Colour Change | Yellow → Reddish brown |
| Reaction Principle | $3\text{CH}_3\text{COCH}_3 + (\text{NH}_2\text{OH})_2\text{H}_3\text{PO}_4 \rightarrow \text{H}_3\text{PO}_4$ $\text{H}_3\text{PO}_4 + \text{Base} \rightarrow \text{Phosphate}$ |

Coefficient of Variation : 10% (for 50 to 1500 ppm·hr)

****Shelf Life : Please refer to the validity date printed on the box of tube.**

****Store the tubes in the refrigerator to keep at 10°C (50°F) or below.**

CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

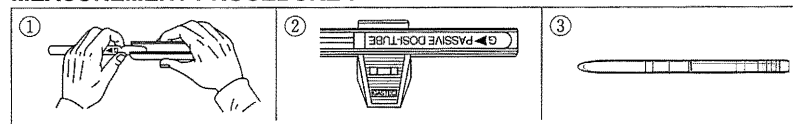
Temperature : Correct for temperature by the table below :

| | | | | | |
|--------------------|-------|--------|--------|--------|---------|
| Temperature °C(°F) | 0(32) | 10(50) | 20(68) | 30(86) | 40(104) |
| Correction Factor | 1.4 | 1.2 | 1.0 | 0.9 | 0.8 |

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE :



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube.
4. Average gas concentration can be obtained from an hour to 10 hours sampling. If necessary, multiply the readings by the correction factors of temperature. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula :

$$\text{Average Concentration} = \frac{\text{Dosi-tube Reading (ppm} \cdot \text{hour)}}{\text{Actual Sampling Time (hours)}}$$

INTERFERENCES :

| Substance | Interference | Changes colour by itself to |
|------------|--------------|-------------------------------------|
| Aldehydes | + | Reddish brown |
| Ketones | + | Reddish brown |
| Acid gases | + | Reddish brown (Unclear demarcation) |

This table of interference gases primarily expresses the interference of each coexisting gas in the gas concentration range, that is equivalent to the gas concentration. Therefore, the test result may be given positive result by the other substances not listed in the table. For more information is needed, please contact us or Gastec representatives.

APPLICATION FOR OTHER SUBSTANCES :

Tube 151D can also be used for other substances as below :

| Substance | Correction factor | Sampling time | Measuring range |
|------------------------|-------------------|---------------|-----------------|
| Acetaldehyde | 0.8 | 1 - 10 hours | 4 – 1200 ppm |
| Methyl isobutyl ketone | 2.3 | 1 - 10 hours | 11.5 – 3450 ppm |
| Methyl ethyl ketone | 1.3 | 1 - 10 hours | 6.5 – 1950 ppm |

CORRECTION FACTOR :

Detector tubes are primarily designed to measure specific gases. But it is also possible to measure other substances of similar chemical properties with the aid of a correction factor or chart. Therefore, please make use of the correction factor/chart measuring ranges as a reference. For more precise factor please contact your Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2015) : 250 ppm
Threshold Limit Value-Short Term Exposure Limit by ACGIH (2015) : 500 ppm
Explosive Range : 2.1 – 13 %

INSTRUCTIONS ON DISPOSAL :

The reagent of the tube does not use toxic substances. When disposing the tube regardless of whether it has been used or not, follow the rules and regulations of your local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

Manufacturer : Gastec Corporation
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IM01151DE1
Printed in Japan
15L1Z

GASTEC Instructions for No.152D Methyl Ethyl Ketone Passive Dosi-Tube

FOR SAFE OPERATION :

Carefully read this manual before use.

⚠ CAUTION : If you do not observe the following precautions, you may suffer injuries or damage to the product.

1. When breaking the Passive Dosi-tube, keep away from eyes.
2. Do not touch the broken glass tubes, pieces and reagent with bare hand(s).

△ NOTES : For maintaining performance and reliability of the test results, observe the following.

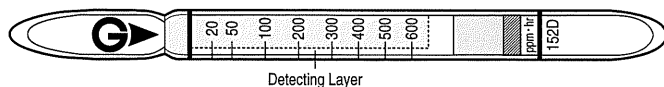
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 0 - 90%.
3. This tube may be interfered with by the coexisting gases. Please refer to table "INTERFERENCES" below.
4. Shelf life and storage condition of the Passive Dosi-tube are marked on the label of the box of tube.

APPLICATION OF THE TUBE :

Use this tube for the detection of Methyl ethyl ketone in air or the industrial areas and environmental atmospheric condition.

SPECIFICATION :

(Because of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



| | |
|--------------------|--|
| Measuring Range | 2 – 600 ppm |
| Sampling Hours | 1 – 10 hours |
| Colour Change | Yellow → Reddish brown |
| Reaction Principle | $3\text{CH}_3\text{COC}_2\text{H}_5 + (\text{NH}_2\text{OH})_3\text{H}_3\text{PO}_4 \rightarrow \text{H}_3\text{PO}_4$ $\text{H}_3\text{PO}_4 + \text{Base} \rightarrow \text{Phosphate}$ |

Coefficient of Variation: 10% (for 20 to 600 ppm-hr)

****Shelf Life :** Please refer to the validity date printed on the box of tube.

****Store the tubes in the refrigerator to keep at 10°C (50°F) or below.**

CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

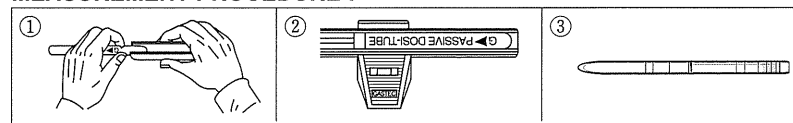
Temperature : Correct for temperature by the table below :

| | | | | | |
|--------------------|-------|--------|--------|--------|---------|
| Temperature °C(°F) | 0(32) | 10(50) | 20(68) | 30(86) | 40(104) |
| Correction Factor | 1.4 | 1.2 | 1.0 | 0.9 | 0.8 |

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE :



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube.
4. Average gas concentration can be obtained from an hour to 10 hours sampling. If necessary, multiply the readings by the correction factors of temperature. Calculate the actual sampling time and the average gas concentration can be obtained by the following formula :

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading (ppm} \cdot \text{hour)}}{\text{Actual Sampling Time (hours)}}$$

INTERFERENCES :

| Substance | Interference | Changes colour by itself to |
|------------|--------------|-------------------------------------|
| Aldehydes | + | Reddish brown |
| Ketones | + | Reddish brown |
| Acid gases | + | Reddish brown (Unclear demarcation) |

This table of interference gases primarily expresses the interference of each coexisting gas in the gas concentration range, that is equivalent to the gas concentration. Therefore, the test result may be given positive result by the other substances not listed in the table. For more information is needed, please contact us or Gastec representatives.

APPLICATION FOR OTHER SUBSTANCES :

Tube 152D can also be used for other substances as below :

| Substance | Correction factor | Sampling time | Measuring range |
|------------------------|-------------------|---------------|-----------------|
| Acetaldehyde | 0.6 | 1 - 10 hours | 1.2 – 360 ppm |
| Acetone | 0.7 | 1 - 10 hours | 1.4 – 420 ppm |
| Methyl isobutyl ketone | 2.0 | 1 - 10 hours | 4 – 1200 ppm |

CORRECTION FACTOR :

Detector tubes are primarily designed to measure specific gases. But it is also possible to measure other substances of similar chemical properties with the aid of a correction factor or chart. Therefore, please make use of the correction factor/chart measuring ranges as a reference. For more precise factor please contact your Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2015) : 200 ppm
Threshold Limit Value-Short Term Exposure Limit by ACGIH (2015) : 300 ppm

INSTRUCTIONS ON DISPOSAL :

The reagent of the tube does not use toxic substances. When disposing the tube regardless of whether it has been used or not, follow the rules and regulations of your local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

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IM01152DE1
Printed in Japan
15L1Z

GASTEC Instructions for No.174D 1,3- Butadiene Passive Dosi-Tube

FOR SAFE OPERATION :

Carefully read this manual before use.

⚠ CAUTION : If you do not observe the following precautions, you may suffer injuries or damage the product.

1. When breaking the Passive Dosi-Tube, keep away the tube from eyes.
2. Do not touch any broken glass tubes, pieces or reagent with bare hand(s).
3. Keep tubes out of Direct Sunlight. The sunlight fades the discolouration of the tube.

△NOTES : For maintaining performance and reliability of the test results, observe the following.

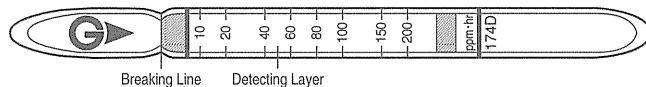
1. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
2. Use this tube within the relative humidity range of 0 - 90%.
3. This tube may be interfered with by coexisting gases. Please refer to the table "INTERFERENCES" below.
4. Shelf life and storage condition of the Passive Dosi-tube are marked on the label of the box of tube.

APPLICATION OF THE TUBE :

Use this tube for detecting 1,3-Butadiene in the air or in industrial areas and for determining the environmental atmospheric condition.

SPECIFICATION :

(Because of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



This tube measures TWA (time-weighted average) gas concentration by utilising natural diffusion of the target gas without a gas sampling pump.

| | |
|--------------------|--|
| Measuring Range | 1.3 – 200 ppm |
| Sampling Hours | 1 – 8 hours |
| Detecting Limit | 1.3 ppm (8 hours) |
| Colour Change | Reddish purple → Pale brown |
| Reaction Principle | $\text{CH}_2\text{CHCH:CH}_2 + \text{MnO}_4 \rightarrow \text{Reaction product}$ |

Coefficient of Variation: 10% (for 10 to 200 ppm-hr)

****Shelf Life:** Please refer to the validity date printed on the box of tubes.

****Store the tubes in a cool and dark place.**

CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

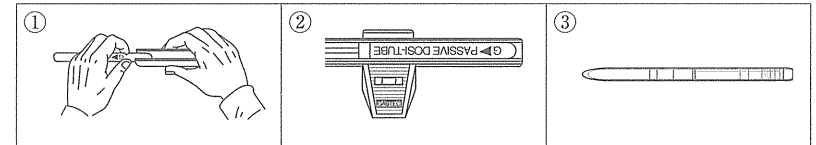
Temperature : Correct for temperature by the table below:

| | | | | | |
|--------------------|-----------|------------|------------|------------|-------------|
| Temperature °C(°F) | 0 (32) | 10 (50) | 20 (68) | 30 (86) | 40 (104) |
| Correction Factor | 1.5 | 1.2 | 1.0 | 0.9 | 0.8 |

Humidity : No correction is required.

Pressure : No correction is required.

MEASUREMENT PROCEDURE :



1. Break a Dosi-tube at the breaking line of the tube by the optional Passive Dosi-Tube Holder No.710.
2. Set the Dosi-tube into the tube holder firmly so the broken tip doesn't appear from the edge of the tube holder. To protect the tube holder at the shirt collar from dropping during operation, it is advisable to support the tube holder with a string through the small hole of the tube holder. Record the measurement starting time on a peel-off numbered label supplied with each box of the tubes and put the label on the Dosi-tube in the tube holder.
3. Clip the tube holder to the clothing (e.g. shirt collar) for personal sampling or place the Dosi-tube in the workplace where the measurement is required. When the sampling is finished, record the measurement finishing time on the label on the Dosi-tube. If necessary, multiply the readings by the correction factors of temperature with the table.
4. Average gas concentration can be obtained from an hour to 8 hours sampling.
Calculate the actual sampling time and the average gas concentration can be obtained by the following formula:

$$\text{Average Concentration} = \frac{\text{Dosi-Tube Reading} * (\text{ppm-hour})}{\text{Actual Sampling Time (hours)}}$$

* This value is after other correction(s), if applied any.

INTERFERENCES :

| Substance | Interference | Changes colour by itself to |
|--------------------------|--------------|-----------------------------|
| Unsaturated hydrocarbons | + | Pale brown |

This table of interference gases primarily expresses the interference of each coexisting gas in the gas concentration range, that is equivalent to the gas concentration. Therefore, the test result may give a positive result from other substances not listed in the table. If more information is needed, please contact us or your Gastec representatives.

APPLICATION FOR OTHER SUBSTANCES :

Tube 174D can also be used for the other substances as below :

| Substance | Correction factor | Sampling time | Measuring range |
|----------------------------|-------------------|---------------|-----------------|
| Ethylene | 1.2 | 1 – 8 hours | 1.5 – 240 ppm |
| Vinyl chloride | 1.2 | 1 – 8 hours | 1.5 – 240 ppm |
| Isoprene | 2.0 | 1 – 8 hours | 2.5 – 400 ppm |
| trans-1,2-Dichloroethylene | 3.0 | 1 – 8 hours | 3.8 – 600 ppm |

CORRECTION FACTOR :

Detector tubes are primarily designed to measure specific gases. But it is also possible to measure other substances of similar chemical properties with the aid of a correction factor or chart. Therefore, please make use of the correction factor/chart measuring ranges as a reference. For a more precise factor please contact your Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2018) : 2 ppm

INSTRUCTIONS ON DISPOSAL :

The reagent of the tube does not use toxic substances. When disposing the tube regardless of whether it has been used or not, follow the rules and regulations of your local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

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