



DTXtape[®]

CARBON DIOXIDE DETECTION TAPE

PRODUCT DATA SHEET

Updated March 2024: This manual replaces all previous versions

Carbon Dioxide Detection Tape

Product Description

Carbon dioxide detection tape allows for the visual detection of carbon dioxide (CO₂) gas leaks by changing color when in contact with CO₂ gas.

Product Features



Tape visually changes color, from purple to yellow, in as little as 5 minutes when exposed to CO₂ gas (depending on the flow rate, temperature, time and percentage of carbon dioxide).



Provides an additional safety net for detecting gas leaks and improves detection time by making it easier to find intermittent leaks.



Is highly sensitive and can detect carbon dioxide gas leaks that contain as little as 3% CO₂ concentration.



Easy to use; applies the same way as a typical silicone / polyester PSA.



Can be used in most indoor environments. Outdoor application is not recommended due to UV sensitivity.



Color fades back to purple in 1 hour if there is no CO₂ leak present (at room temperature).



Superior capability in detecting the location of the CO₂ leak.



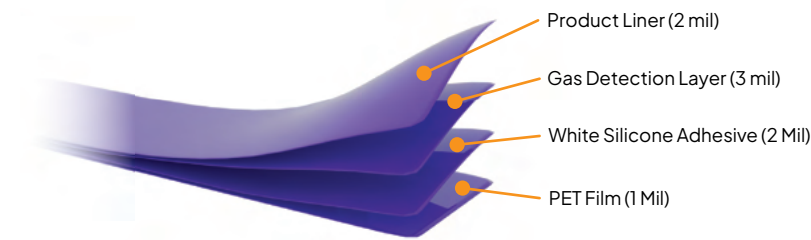
Less likely to be influenced by wind, position, duration, skills, etc. compared to conventional CO₂ gas sensors.



Easy to check vertical and bottom faces of substrates.

Carbon Dioxide Detection Tape

Product Construction



Application

Carbon dioxide detection tape can be easily applied to or wrapped around pipes, flanges, fittings, valves, access panels, etc. to immediately identify a carbon dioxide leak location.

Applications include and are not limited to CO₂ refrigerators, breweries, the beverage industry, CO₂ producers, and chemical plants.

Product Properties

***CAUTION:** The data described in this Product Data Sheet are typical values and should not be used in writing specifications. Customer is responsible to ensure product meets intended application requirements before approving for use.

Color	Purple	
	Imperial	Metric
Total Tape Thickness adhesion Layer	2.88	73µm
Adhesion to Steel	22.6 ozf/10 mm	6.3 N/10 mm

Temperature vs. Reactivity with 100% Carbon Dioxide

Tape (stored at general storage conditions) was exposed to 100% carbon dioxide gas at -20°C, room temperature, 60°C, and 80°C to confirm color-change reaction.

Result: Acceptable color-change from purple to yellow was observed for temperatures up to 80°C. The color change level decreased as operating temperatures increased.

Note: Tape can use at 80°C for short time application (1 day), but not recommend to use the tape for long term exposure at 80°C (>1 day).

* Gas detection layer turns from purple to blue at 60°C and 80°C; however, once exposed to carbon dioxide, it can still undergo a color-change reaction to yellow.

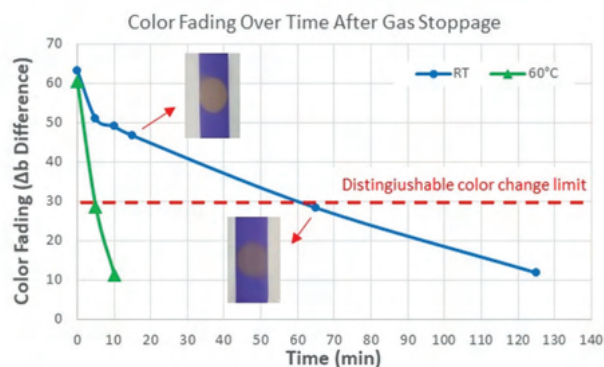
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Color Fading Over Time After Gas Stoppage

When exposure to CO₂ is stopped, the yellow color change tends to reverse over time and return to its original color.

Color reversibility was measured over time at room temperature and 60°C. Color-reversibility time was shorter at higher temperature.

A detectable color-change can last about an hour at room temperature (RT), but less than 5 minutes at 60°C.

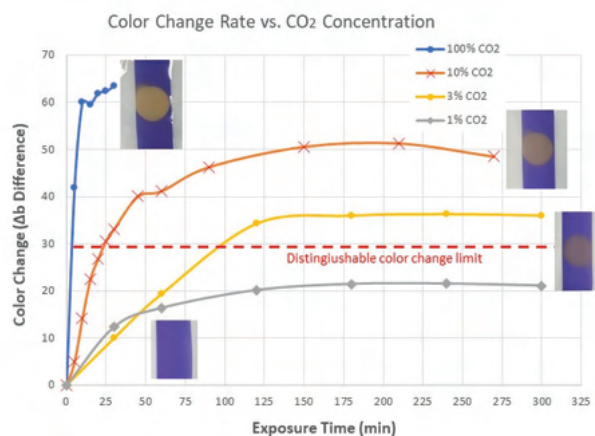


Color-Change vs. CO₂ Gas Concentration

With 100 % CO₂ at 15 ml/min, a full colorchange occurs in 10 minutes at room temperature.

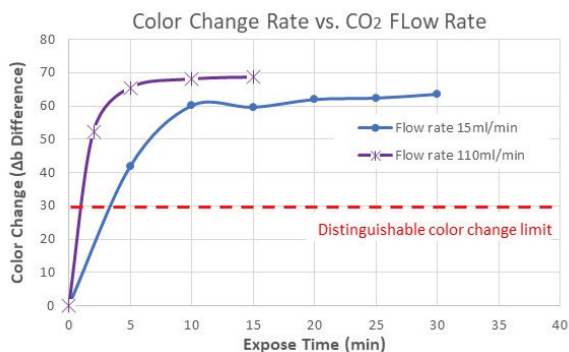
Color-change was observed with 3% CO₂ in air at room temperature and 15 ml/min flow rate after 120 minutes.

1% CO₂ in air does not provide visible colorchange even after 5 hrs of exposure.



Color-Change vs Flow Rate

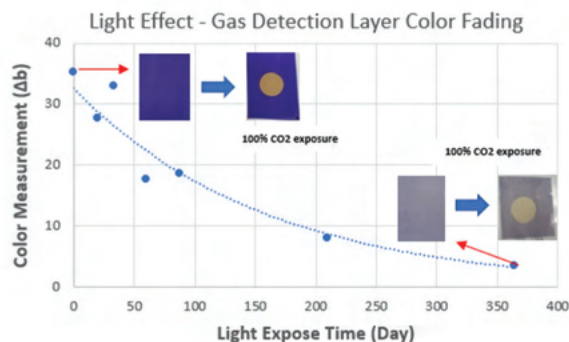
The rate of color-change depends on CO₂ gas flow rate. Graph shows color-change at 15 ml/min and 110 ml/min of 100% CO₂ gas flow rates. Generally higher flow rates require shorter times to provide color-change.



UV-Light Effect

Most room light contains UV. Exposure to UV can cause fading of the detection layer and hence influences CO₂ detectability.

CO₂ still can be detected even with colorfaded tape after 1 year of room light exposure.



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Environmental Durability

Condition	Duration	Color-Change after Aging	After Aging, CO ₂ Exposure
High Temp	50°C, 3 months	No color-change	Reacted, yellow
Low Temp	-15°C, 3 months	No color-change	Reacted, yellow
High Humidity	40°C x 95%RH, 3 months	No color-change	Reacted, yellow
Weather Resistance	Indoor exposure to room light at ambient conditions, 6 months	Slight fading	Reacted, yellow
Water Immersion	Total water immersion (room temp.), 1 year	No color-change	Reacted, yellow

*Tapes applied on SUS316 pipe were aged at various conditions and confirmed for color-change with CO₂ at room temperature.

General Storage Conditions

Store in 50–80°F (10–27°C), 25–50% relative humidity, out of direct sunlight. This product is sensitive to UV light and engine exhaust fumes.

Precaution Reminder

Substrate surface should be clean, free of oil, moisture and dirt before applying. For substrate cleaning, isopropyl alcohol cleaner may be used but the surface must be completely dry before tape application. Pressure-sensitive adhesive tapes may require pressure by roller, hand or press when applying. Not doing so may affect the general properties and appearance of the tape. Please inspect your surface prior to application; this tape may not adhere well to extremely uneven or distorted surfaces. Please remember to allow adequate time for full adhesive strength. If tape is applied on fresh paint, it may permanently change to yellow or lose its ability to detect carbon dioxide gas. Other sections of the tape that are not in direct contact with paint can still detect carbon dioxide gas.

Warnings

This product is intended for use as a localized CO₂ gas indicator and should be used as part of a comprehensive gas detection system. DTX Tape will not prevent CO₂ leaks. Customers should not rely solely on this product to monitor the safety of a facility where flammable or hazardous gases are present. Please do not use this tape for detecting other gases. Not all gases and gas mixtures have been tested. Certain acidic gases such as NO_x and SO_x will permanently change the tape color to yellow. If tape is applied on fresh paint, it may permanently change to yellow or lose its ability to detect carbon dioxide gas. Other sections of the tape that are not in direct contact with paint can still detect carbon dioxide gas.



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