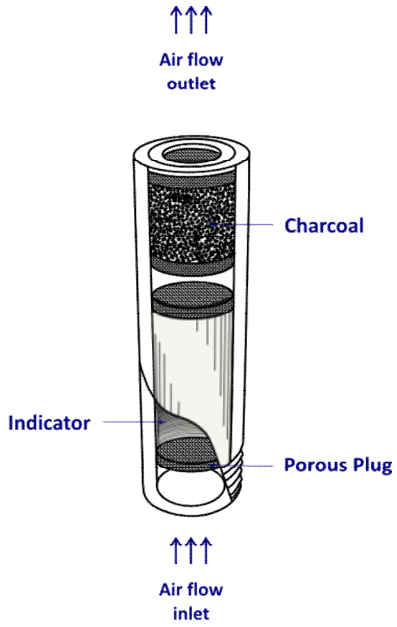
Filter Breakthrough Indicator

Frequently Asked Questions

How does the Breakthrough Indicator Work?

When the filter becomes saturated, toxic gases breakthrough the filter and chemically reacts with the indicating sensor inside the breakthrough indicator producing vivid color change alerting the user to change the filter.

Figure 1



How do I choose the right breakthrough indicator for my scrubber?

A. Identify what contaminant you want to trap in your scrubber and choose the breakthrough indicator that targets that contaminant.

B. Choose the breakthrough indicator that has an outside diameter similar to the outlet diameter of your scrubber.

Do I need to wait until the breakthrough indicator changes color to black to replace my filter?

No, replace the filter when breakthrough indicator shows first color change.

Does the indicator change color only if I have 1ppm of hydrogen sulfide?

No, the indicator works by the principle of exposure dose (D),

$$D = C \cdot T \qquad \text{@ Specific airflow (Fick's Low)}$$

D = Exposure Dose, C = Concentration and T = Time

The hydrogen sulfide indicator requires exposure dose of 1 ppm•min to show a noticeable color change when the airflow rate is 30 sec/sec., irrespective of concentration and time.

Chemteq, Inc., 600 West 24th Street, Suite B, Norfolk, Virginia 23517, Tel 757-622-2223, sales@chemteq.net

MP-915-5100-081012-H

Examples:

A. If the indicator is exposed to 1 ppm of hydrogen sulfide, then

$$1ppm \bullet \min = 1ppm \times T(\min)$$

$$T(\min) = \frac{1ppm}{ppm} = 1\min.$$

Therefore, the indicator requires 1 minute to show noticeable color change.

B. If the indicator is exposed to 0.1 ppm of hydrogen sulfide, then

$$1ppm \bullet \min = 0.1ppm \times T(\min)$$

$$T(\min) = \frac{1ppm}{0.1ppm} = 10\min.$$

Therefore, the indicator requires 10 minutes to show noticeable color change.

C. If indicator is exposed to 10 ppm of hydrogen sulfide, then

$$1ppm \bullet \min = 10\,ppm \times T(\min)$$

$$T(\min) = \frac{1ppm}{10\,ppm} = 0.1\min.(6\sec.)$$

Therefore, the indicator requires 6 seconds to show noticeable color change.

*ppm = part per million

What if the airflow coming out of my filter is higher or lower than 30cm/sec? Does this affect how fast the indicator changes color with hydrogen sulfide?

Yes! Higher airflow results in faster color change and lower airflow results in slower color change. Approximately, sensitivity increases by factor of two when airflow doubles. Sensitivity decreases by 50% when airflow reduced to half.

Examples:

A. The indicator changes color in one minute when 30cm/sec airflow containing 1 ppm hydrogen sulfide passes through it.

B. The indicator changes color in 30 seconds when 60cm/sec airflow containing 1 ppm hydrogen sulfide passes through it.

C. The indicator changes color in two minutes when 15cm/sec airflow containing 1ppm hydrogen sulfide passes through it.

*ppm = part per million

Chemteq, Inc., 600 West 24th Street, Suite B, Norfolk, Virginia 23517, Tel 757-622-2223, sales@chemteq.net

When the indicator changes color, how do I know that this color change is due to the saturation of my filter and not due to the accumulation of trace amounts of hydrogen sulfide from the surrounding environment?

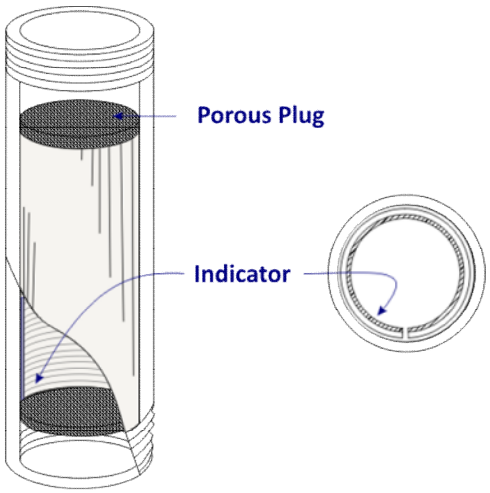
The breakthrough indicator changes color only when your filter is saturated. The indicator is equipped with charcoal filter trap on top of the indicator sensor (figure 1) to protect it from exposure to the surrounding environment. In addition, there is a positive air pressure at the indicator's outlet. Having negative air pressure at the indicator's outlet is highly unlikely.

What is the difference between the breakthrough indicator (BTI) and the breakthrough indicator In-line?

The breakthrough indicator (BTI) designed for installing into the outlet of filters and scrubbers to indicate when they are saturated and exhausted. The BTI is equipped with filter trap on top of the indicator's sensor to protect it from the outside environment (figure 1).

The breakthrough indicator in-line (BTI In-line) designed for installing into a pipeline or tubing within a process to ensure that the air passing through the pipeline or tubing is free from specific contaminants (figure 2). The BTI In-line has minimum backpressure to avoid any interference with the airflow within a process or operation. BTI In-line without the porous plugs is available for processes and operations that are highly sensitive to backpressure. Both BTI and BTI In-line are available in the same sizes.

Figure 2



Our facility is located in hot climate environment; does heat effect the performance of the breakthrough indicator?

Hot and cold ambient conditions have no effect in the performance of the breakthrough indicator. However, if you intend to install the indicator in an environment outside the tolerance range of the acrylic tube of the indicator -40°F to 180°F (-40°C to 82°C), please contact us for breakthrough indicators constructed from glass rather than the standard acrylic tubing.

Chemteq, Inc., 600 West 24th Street, Suite B, Norfolk, Virginia 23517, Tel 757-622-2223, sales@chemteq.net

Does humidity affect the performance of the breakthrough indicator?

No

Does light affect the performance of the breakthrough indicator?

No

Does rain affect the performance of the breakthrough indicator?

Yes, water blocks air pass. Protect the outlet of the breakthrough indicator the same way you protect the outlet of your filter. Use cowl or chimney hood to prevent downdrafts.

If you have a question not answered, please contact us

1 (757) 622-2223

info@chemteq.net

Chemteq, Inc., 600 West 24th Street, Suite B, Norfolk, Virginia 23517, Tel 757-622-2223, sales@chemteq.net