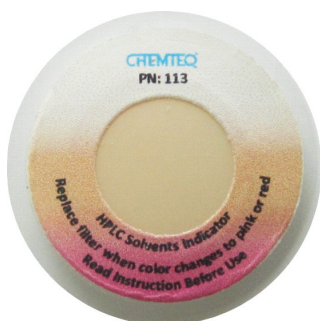


## Filter Breakthrough Indicator Sticker (BTIS LFF)

For Acetone, Acetonitrile, Chloroform, DCM,  
Ethanol, Ethyl acetate, HFIP, Methanol, Phenol,  
Sulfolane and THF Vapors

(PN: 113)



*Manual*



## 1. Application

The Breakthrough Indicator Sticker (PN: 113) is qualitative (yes/no) colorimetric indicator for the exhaustion and end-of-service life of low-flow filters. The indicator is designed to provide real-time indication of the breakthrough of HPLC solvents vapors, including:

- a. Acetone
- b. Acetonitrile
- c. Chloroform
- d. DCM/Methylene Chloride (Dichloromethane)
- e. Ethanol
- f. Ethyl Acetate
- g. HFIP Hexafluoroisopropanol
- h. Methanol
- i. Phenol
- j. Sulfolane
- k. THF (Tetrahydrofuran)

## 2. Specifications

### 2.1. Overall Specification

- |                              |  |
|------------------------------|--|
| a. Weight:                   | 0.4g (0.02oz)                                |
| b. Dimensions:               | 1.5 mm (0.06 in), $\phi$ : 19.05 mm (0.75in) |
| c. Operating temperature:    | 4°C to 35°C (39°F to 95°F)                   |
| d. Operating humidity:       | 5% RH to 85%RH                               |
| e. Minimum detectable limit: | See performance specifications <b>(2.2.)</b> |
| f. Color change:             | Orange to red                                |
| g. Storage temperature:      | 4°C to 25°C, (39°F to 77°F)                  |
| h. Service life:             | 1 year                                       |
| i. Shelf life:               | 14 Mon. at 4°C to 25°C, (39°F to 77°F)       |

### 2.2. Performance Specification

To determine the sensitivity of the breakthrough indicator, a solution/mixture of 10% solvent in water was bubbled with ambient air at a flow rate of 5cc/min. The breakthrough indicator sticker was exposed to the airflow until a color change was observed. The elapsed time to observe the first noticeable and the final colors for the respective organic solvent is depicted in the table below.

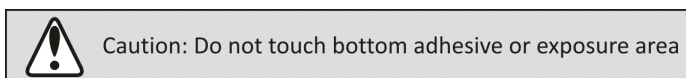
### 2.3. Cross interferences

Basic vapors in high concentrations impair the performance of the organic vapors breakthrough indicator. Acid vapors in high concentrations produce color similar to organic vapors. No other interferences are known.

| Solvent<br>(10% in Water)  | Breakthrough Detection Time     |                      |
|----------------------------|---------------------------------|----------------------|
|                            | First Noticeable Color<br>(min) | Final Color<br>(min) |
| Acetone                    | 10                              | 30                   |
| Acetonitrile               | 10                              | 30                   |
| Chloroform                 | 2                               | 5                    |
| Ethanol                    | 2                               | 5                    |
| Ethyl acetate              | 2                               | 5                    |
| HFIP Hexafluoroisopropanol | 1                               | 4                    |
| Methanol                   | 2                               | 5                    |
| Methylene chloride         | 2                               | 4                    |
| Phenol                     | 4                               | 12                   |
| Sulfolane                  | 8                               | 17                   |
| Tetrahydrofuran            | 10                              | 20                   |

### 3. Operating Instructions

- Ensure that packaging pouch is intact.
- Open packaging pouch by tearing off the top part from one of side notches
- Remove indicator sticker from the packaging pouch.
- Peel off the protective liner to expose the bottom adhesive (Figure 1).



- Hold the sticker from the edges, as shown in Figure 2, and place it on center clean area of the filter's outlet with the reading area (glossy surface) of the sticker facing up.
- Press firmly to attach sticker to the filter's outlet (Figure 3).
- Replace filter when the reading area of the indicator changes color to red.

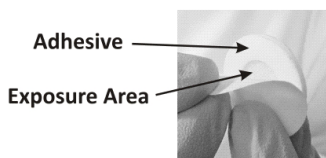


Figure 1



Figure 2

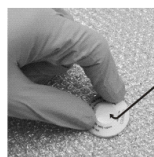


Figure 3