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3M™ Organic Gas & Vapour Service Life Indicator Filters 6051i and 6055i Series

Technical Data Sheet



Description

Introducing 3M™ Organic Gas & Vapour Filters with 3M™ Service Life Indicator technology. Unique to 3M, these innovative and easy-to-use filters help users determine when to change their filter in appropriate environments.*

Approvals

The 6051i and 6055i filters are only CE approved for respiratory protection against certain contaminants when used with the 3M™ Face piece series 6000 and 7000.

Features and Benefits

In appropriate environments the 3M™ Service Life Indicator can help:

- **Engage your workforce in safety**
The simple indicator bar design gives users an easy, visual tool to help determine when to change their filters.
- **Optimise filter use**
Designed to indicate service life based on individual exposure and respiratory use patterns.
- **Provide confidence in protection**
The 3M™ Service Life Indicator can help provide added peace of mind and can help increase compliance with your company's respirator policy and industry regulatory requirements.

How does an organic filter work?

Respirator filters are filled with a material called 'activated carbon'. During the manufacturing process it is 'activated' by heating the material in nitrogen or steam. The resulting material has a significant number of micropores that help adsorb various organic vapours. When organic vapours are drawn through the filter, the air is filtered as vapours condense into the carbon pores. The effective service life is the time until vapours begin to exit the filter. Unlike particle filters, the service life of an organic vapour filter is not indicated by a change in breathing resistance, but by breakthrough, at which point the user will start to be exposed to the hazard.

*Please see the 6051i and 6055i User Instructions or the 3M™ Select and Service Life Software (3M.eu/SLS) to determine if these filters are appropriate for your work environment.



How does the 3M™ Service Life Indicator work?

The 3M™ Service Life Indicator helps wearers in appropriate environments know when they should change their organic vapour filters*. The indicator is adhered to the filter wall, in contact with the carbon bed. As the organic vapours are adsorbed onto the carbon, they are also adsorbed onto the service life indicator. As this happens, the indicator changes colour, visually marking the course of the organic vapours through the carbon bed.

****pictogram (dustbin) ****

3M™ Organic Gas & Vapour Service Life Indicator Filters 6051i and 6055i Series

The 3M™ Service Life Indicator can be used to complement filter change schedules and, in some cases, replace them.

To rely on the ESLI in your workplace environment:

1. Assess organic vapours and exposure levels
2. Organic vapour filters must be appropriate (no chemicals where other types of filters or supplied air is required)
3. If a mixture of organic vapours is present, consider the organic vapour with the shortest filter service life:
 - Worker exposure levels $\geq$ MIL (exposure concentration is high enough to cause noticeable change in indicator),

AND

- MIL $\leq$ occupational exposure limit (OEL) (indicator bar will develop before vapour concentration moving through filter reaches exposure limit)

If your workplace environment doesn't meet the MIL and OEL criteria, then the ESLI can still be used to complement an existing change-out schedule. The indicator cannot be relied upon to indicate when filter change is needed, but, in certain scenarios, for example in a temporary period of higher exposure, the ESLI may indicate that a filter change is required before the existing change-out schedule.

Do I have an 'appropriate' environment?*

The 6000i Series provides the same organic vapour protection as the standard 6000 series. However, it's important to know if you have an appropriate environment for using the 3M™ Service Life Indicator to help determine your change schedules. Like any indicator, the 3M™ Organic Vapour Service Life Indicator has a minimum 'limit of detection'. This is because the human eye also has a limit of detection. To discriminate between two colours, there needs to be a big enough difference in the colours, or 'wavelength shift'. Visibility of the indicator bar will depend on the specific organic vapour and exposure concentration. The vapour concentration that causes a noticeable colour change is called the 'minimum indication level' (MIL). The MIL is different for different compounds. See the MIL table at the end of this data sheet, or refer to the 6051i and 6055i User Instructions or 3MTM Select and Service Life Software — 3M.eu/SLS.

The key is knowing the exposure levels at your site, and this relies upon monitoring. 3M™ Organic Vapour Monitors 3500 or 3520 could be used for sampling many organic vapours. Monitoring results can then be entered into the 3M™ Select and Service Life Software — 3M.eu/SLS. The software is used to give information on whether the End-of-Service-Life Indicator (ESLI) is applicable, as well as an estimate of service life to know how often to check the ESLI in use.

Concern	Solution
Cannot see portion of filter where ESLI is located	• Use a mirror to observe the ESLI. • Rely on a co-worker who can see the ESLI. • Go to a clean area, remove the respirator and view the ESLI.
Cannot see indicator bar	• Re-evaluate the selection process (exposure may be less than MIL). • If in a hot environment, move to a cooler environment to see if appearance changes (rare for most workplaces). • Go to an area with a broader light spectrum (e.g., standard fluorescent or incandescent lighting or outdoors). • If red-green colour-blind, see below.
Poor lighting	• Go to an area with adequate lighting to view the ESLI. • Do not use a light pointed directly at the ESLI, as this may affect the ESLI appearance.
Red-green colour deficiency or colour blindness	• Rely on a co-worker who can see the ESLI.
Tinted eyewear and difficult to see progression of indicator bar	• Go to an area where it is safe to remove eyewear to view the ESLI. • Rely on a co-worker who can see the ESLI.
Glare	• Go to an area where there is less glare to view the ESLI.

*Please see the 6051i and 6055i Series User Instructions or the 3M™ Select and Service Life Software (3M.eu/SLS) to determine if these filters are appropriate for your work environment.

Description	Primary Materials
Filter media	Activated carbon
Body/Base	Polystyrene
Lid	Polystyrene
Retainer	Polypropylene
Optical film sensor	Polymer, acrylate adhesive, speciality polymer
Optical sensor over label	Paper, adhesive

This product does not contain components made from natural rubber latex.

Storage and Transportation

3M™ Organic Gas & Vapour Filters should be stored in the packaging provided in dry, clean conditions away from direct sunlight, sources of high temperature and solvent vapours. Store in accordance with manufacturer's instructions found in the packaging. Average conditions may exceed 86F (30C) / 80% RH for limited periods. They can reach an average of 104F (40C) / 85% RH, provided that this is for no longer than

one month. Before initial use, always check that the product is within the stated three-year shelf life (or use-by date).

Disposal

Dispose in accordance with local regulations.

CAUTION: Failure to properly dispose of used filters contaminated by hazardous materials can result in personal exposures as well as environmental harm.

Warnings and Use Limitations

Proper selection, training, use and appropriate maintenance are essential in order for the product to help protect the wearer. Failure to follow all instructions on the use of these respiratory protection products and/ or failure to properly wear the complete product during all periods of exposure may adversely affect the wearer's health, lead to severe or life-threatening illness or permanent disability.

- Always be sure that the complete product (i.e., face piece and filter) is:
 - Suitable for the application
 - Fitted correctly (i.e., workers undergo fit test and conduct user seal check)
 - Worn during all periods of exposure
 - Replaced when necessary
- Use this respirator system strictly in accordance with all instructions:
 - Do not submerge the filters in liquid
 - Do not use in atmospheres containing less than 19.5% oxygen. (3M definition. Individual countries may apply their own limits on oxygen deficiency. Seek advice if in doubt)
 - Do not use these products in oxygen or oxygen-enriched atmospheres
 - Do not use for respiratory protection against atmospheric contaminants/concentrations that are unknown or immediately dangerous to life and health (IDLH) or against contaminants/concentrations that generate high heats of reaction with chemical filters
- Leave the contaminated area immediately if:
 - Any part of the system becomes damaged
 - Airflow to the face piece decreases or stops
 - Breathing becomes difficult, or increased breathing resistance occurs
 - Dizziness or other distress occurs
 - You smell or taste contaminants, or irritation occurs
 - If any part of the indicator bar reaches the end-of-service line (denoted by trash bin icon on filter label)
- Never alter, modify or repair this device
- The End-of-Service-Life Indicator (ESLI) is not appropriate for all organic vapours and exposure levels*

- The employer must determine whether or not the ESLI is appropriate for their workplace*
- If you have red-green colour blindness or colour deficiency, rely on a colleague who can see the progression of the ESLI indicator bar
- Regardless of ESLI status, the user must exit exposure area and change both filters if contaminant odour, taste or irritation is detected
- If organic vapour concentrations are too low, they will not be detected by the ESLI. For minimum indication levels (MIL) per compound, please see the MIL table that follows or User Instructions. A list of common organic vapours and their minimum indication levels are shown. If you can't find a specific organic vapour, please contact your local 3M office. It is recommended that you search this table by CAS number
- To use the ESLI properly, it is critical that the user or safety manager:
 - Determines whether or not the ESLI is appropriate for the organic vapours in their environment*
 - Is able to read and interpret the ESLI
 - Checks the ESLI regularly
 - Replaces the filters as necessary
- If no part of the indicator bar has appeared after an extensive period (e.g., within a month), the ESLI should not be used as a primary change-out schedule.

*Please see the 6051i and 6055i Series User Instructions or the 3MTM Select and Service Life Software (3M.eu/SLS) to determine if these filters are appropriate for your work environment.

Organic Vapours and Minimum Indication Level (MIL)

Common Organic Vapours and Minimum Indication Level (MIL)

NOTE: This is NOT a list of what the 6051i and 6055i may be used for. See right for a list of common organic vapours and their associated MILs.

In order to rely on the 3MTM Service Life Indicator as a primary method for determining when to change filters, both of the following conditions must be met:

Worker exposure levels $\geq$ MIL, AND MIL $\leq$ occupational exposure limit.

Please refer to the 3M ESLI software at 3M.eu/SLS to help determine if you can rely on the indicator as a primary change-out method.

Compound	CAS#	MIL in parts per million (ppm)
Ethylbenzene	100-41-4	2
Styrene	100-42-5	1
Propyl bromide	106-94-5	147
1,2-Dichloroethane	107-06-2	145
Methyl propyl ketone	107-87-9	23
Propyleneglycol methylether	107-98-2	24
Methyl isobutyl ketone	108-10-1	5
Isopropyl acetate	108-21-4	30
Methoxypropyl acetate (propylene glycol monomethyl ether acetate)	108-65-6	3
Diisobutyl ketone	108-83-8	10
Toluene	108-88-3	8
4-methyl pyridine	108-89-4	2
Chlorobenzene	108-90-7	4
Cyclohexanone	108-94-1	11
3-methyl pyridine	108-99-6	2
n-Propyl acetate	109-60-4	25
2-Methoxyethanol	109-86-4	59
Tetrahydrofuran	109-99-9	280
Isobutyl acetate	110-19-0	5
Methyl amyl ketone	110-43-0	3
n-Hexane	110-54-3	93
2-Ethoxyethanol	110-80-5	20
Ethoxyethyl acetate	111-15-9	2
n-Octane	111-65-9	2
2-Butoxyethanol	111-76-2	1
n-Nonane	111-84-2	1

Common Organic Vapours and Minimum Indication Level (MIL)

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IMPORTANT NOTICE

The use of the 3M product described within this document assumes that the user has previous experience of this type of product and that it will be used by a competent professional. Before any use of this product it is recommended to complete some trials to validate the performance of the product within its expected application.

All information and specification details contained within this document are inherent to this specific 3M product and would not be applied to other products or environment. Any action or usage of this product made in violation of this document is at the risk of the user.

Compliance to the information and specification relative to the 3M product contained within this document does not exempt the user from compliance with additional guidelines (safety rules, procedures). Compliance to operational requirements especially in respect to the environment and usage of tools with this product must be observed. The 3M group (which cannot verify or control those elements) would not be held responsible for the consequences of any violation of these rules which remain external to its decision and control.

Warranty conditions for 3M products are determined with the sales contract documents and with the mandatory and applicable clause, excluding any other warranty or compensation.

Respiratory Protection is only effective if it is correctly selected, fitted and worn throughout the time when the wearer is exposed to respiratory contaminants. 3M offers advice on the selection of products, and training in the correct fitting and usage.

For more information on 3M products and services please contact 3M.

Personal Safety Division

3M Centre
Cain Road, Bracknell
Berkshire RG12 8HT

www.3M.eu/safety

Compound	CAS#	MIL in parts per million (ppm)
Isoamyl alcohol	123-51-3	5
n-Butyl acetate	123-86-4	2
1,4-Dioxane	123-91-1	60
Isoamyl acetate	123-92-2	2
Tetrachloroethylene	127-18-4	20
Xylenes	1330-20-7	2
Limonene (d-)	138-86-3	2
Ethyl acetate	141-78-6	161
n-Heptane	142-82-5	12
Trimethylbenzene (mixture)	25551-13-7	2
3-methyl 2-butanone	563-80-4	46
Propionic acid n-butyl ester	590-01-2	3
2-Hexanone	591-78-6	3
1-Hexene	592-41-6	92
n-Pentyl acetate	628-63-7	3
Isopropanol	67-63-0	650
1-Propanol	71-23-8	300
n-Butyl alcohol	71-36-3	34
Benzene	71-43-2	65
Isobutanol	78-83-1	64
sec-Butyl alcohol	78-92-2	83
Methyl ethyl ketone	78-93-3	175
Trichloroethylene	79-01-6	66
Methyl acetate	79-20-9	950
Stoddard solvent	8052-41-3	1
Methyl methacrylate	80-62-6	16
Diethyl ketone	96-22-0	26
Methyl acrylate	96-33-3	104
Chlorobenzotrifluoride (4-)	98-56-6	5
Isopropyl benzene (cumene)	98-82-8	3

Worker exposure levels ≥ MIL, AND MIL ≤ occupational exposure limit.

Please refer to the 3M ESLI software at 3M.eu/SLS to help determine if you can rely on the indicator as a primary change-out method.

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