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6000i Series FAQ

What is an ESLI and what does it stand for?

ESLI stands for "End-of-service-life indicator." This is a term used to describe an indicator that specifies the end of service life, which is how long cartridges or filters can be used before they need to be changed. Some respirator cartridges have ESLIs to help a user determine when to change.

How do I know if the 3M™ 6000i Series with the 3M™ Service Life Indicator is right for me?

The 3M Service Life Indicator can be used to complement your current cartridge change schedule for organic vapor exposures. You must change your cartridge at the normally scheduled interval or when the ESLI indicates, whichever occurs first.

In some cases you can use the ESLI as a primary method to determine cartridge change, replacing your current change schedule method. The key is knowing the exposure levels at your site, and this relies upon monitoring. 3M™ Organic Vapor Monitors 3500/3510/3520/3530 could be used for sampling many organic vapors. Monitoring results can then be entered into the 3M™ Select and Service Life Software — 3M.com/servicelifesoftware. The software is used to give information on whether the End-of-Service-Life Indicator (ESLI) is applicable as a primary method, as well as an estimate of service life to know how often to check the ESLI in use.

How do I determine if I can rely on the 3M™ Service Life Indicator as my primary method of determining change?

In order to rely on the indicator as your primary method for determining change, the minimum indication level (MIL) for your organic vapors must be less than the occupational exposure limit (OEL), and your exposures must be greater than the MIL. To find out if the 3M Service Life Indicator may be used as the primary method for determining your cartridge change-out schedule:

1) Perform exposure monitoring to quantify the organic vapor exposure levels in your workplace. Visit 3M.com/PPESafety for information on 3M™ Organic Vapor Monitors.

2) Enter the monitoring results in the3M™ Select and Service Life Software(3M.com/SLS). If the ESLI is not applicable as a primary method, it may still be used to complement your current cartridge change schedule.

What is "MIL"?

MIL stands for Minimum Indication Level. Like any indicator, the 3M™ Organic Vapor 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 colors generated by the indicator, there needs to be a big enough difference in the colors, or "wavelength shift." Visibility of the indicator bar will depend on the specific organic vapor and exposure concentration. The MIL is the vapor concentration that causes a noticeable color change in the indicator. The MIL is different for different organic vapors.

What is the MIL for my specific organic vapor(s)?

Refer to the 6000i Series User Instructions, ESLI software or many of the published 6000i Series materials for a list of common organic vapors and their associated minimum indication levels. If a specific organic vapor is not listed, please contact 3M.

What if I have mixtures of organic vapors? How do I compare to the MILs of multiple exposures?

The ESLI must be appropriate for the individual organic vapor in the mixture with shortest service life. Refer to the 3M ESLI software (www.3M.com/servicelifesoftware) to help determine if the indicator is appropriate for you. The software is built to account for mixtures, and can help you compare OELs and MILs for all of your contaminants.

What if I don't know my organic vapor exposures to be able to use the ESLI software or compare to the MIL?

If you don't know the exposure levels at your site to compare with the MIL, you cannot rely on the indicator as a primary method for determining change. The indicator can be used as a back-up method for detecting unexpected spikes in exposures or unusual events – in these cases, you should change at the normally scheduled interval or when the ESLI indicates, whichever occurs first. The backup method can provide an added layer of reassurance that users are not wearing cartridges past the time that they are supposed to.

What does it mean to use the indicator as a complement method?

If the indicator is not appropriate as a primary method based on your organic vapor exposures, it may be useful as a backup method for detecting unexpected spikes in exposures or unusual events. In this case, use your established cartridge change method, or when any part of the indicator bar reaches the end of service line, whichever occurs first. For example, if your established change schedule is every week, continue to change every week, or change sooner if the ESLI bar reaches the end line.

Looking at the indicator, how do I know when to change my cartridge?

If you have determined that you can use the ESLI as a primary method for determining change, cartridges must be replaced when any part of the indicator bar reaches the end-of-service-line, when sensors become covered or difficult to see, if the cartridge is physically damaged, or when odor, taste or irritation from contaminants is experienced inside the respirator. If no part of the indicator bar has appeared after one month, the indicator should not be used as a primary change-out schedule.

If you have determined that you can only use the ESLI as a backup method for determining change, use your established cartridge change method, or the when any part of the indicator bar reaches the end of service line, whichever occurs first.

What if I can't see the indicator progress?

Cannot see portion of cartridge 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 you are red-green color blind, rely on a co-worker who can see the ESLI.
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 color deficiency or color 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.

If no part of the indicator bar has appeared after one month, the indicator should not be used as a primary change-out schedule. In this case, use your established cartridge change method, or the ESLI, whichever occurs first. This could be occurring because exposures are less than MIL.

Is the cartridge 100% done when the indicator hits the end line?

No. It is a NIOSH requirement that an ESLI must reliably indicate depletion at less than or equal to 90% of service life. In order to meet the NIOSH requirement and to provide a safety measure for our customers, 3M has completed extensive laboratory testing under rigorous conditions and proven that the indicator reliably indicates sorbent depletion when there was at least 10% service life remaining. With certain organic vapor(s) and environmental conditions, there could be significantly more remaining service life. Nonetheless, the cartridge should be discarded as soon as the ESLI end line is reached to ensure worker safety.

Other than the addition of the 3M™ Service Life Indicator – does the cartridge have any other differences, or perform differently than the standard 3M™ 6000 Series Organic Vapor Cartridges?

The cartridges have similar organic vapor filtration to the standard 6000 series organic vapor cartridges. However, they are not the same. The primary difference is of course the addition of the 3M™ Service Life Indicator in the 6000i Series as well as a few other minor design changes to accommodate the indicator. These include a clear cartridge body, a new label with a peel back layer to protect the indicator, and a slightly different pattern design to the back of the cartridges. It is not recommended that the 6000i ESLI results be applied to the standard 6000 series cartridges.

How does the indicator work?

The 3M™ Service Life Indicator is located inside the cartridge, next to the activated carbon. As organic vapors travel through the cartridge, they are also adsorbed into the ESLI. This causes polymers in the indicator to swell, changing the refractive index of the material. In appropriate environments (i.e., those with specified concentrations of certain organic

vapors), this will cause a visible change in the ESLI. The clear cartridge wall allows you to monitor the developing indicator bar. The end line of the indicator was determined after testing a wide variety of vapors, concentrations and environments, to accommodate a safe determination of when to change the cartridge.

How do I know I can trust the indicator?

3M has done extensive testing to validate the performance of the ESLI for different organic vapors, exposure levels above the MIL, temperature, humidity, flow rates, and mixtures. The ESLI has also been tested and approved by NIOSH.

Why is the indicator on the side? Shouldn't it be on the middle of the cartridge, or across the whole cartridge since organic vapors can come through across the whole surface?

The 3M™ Service Life Indicator is located inside the cartridge, next to the activated carbon and near the bayonet connection where first breakthrough would occur. It is inside the clear cartridge wall so it may be viewed from the outside.

What does it mean to "optimize cartridge use"?

The 3M™ Service Life Indicator is designed to indicate service life based on individual exposure and respiratory use patterns. Rather than implementing a common change out schedule across all workers regardless of their each worker's activities and exposures, the ESLI allows cartridges used in appropriate environments to be changed based on individual work hours, exposure levels, breathing patterns, environmental conditions and storage/reuse patterns.

For example, company A has a change out schedule of every week, but the length and intensity of exposures greatly across workers. Some workers should be changing every week, but some may need to change faster, or some could change less frequently, based on their exposures. In appropriate environments, the 3M™ Service Life indicator can individualize change schedules, adding confidence for each worker, and in some situations potentially save money for the company.

Why does the indicator show varying service life for one worker versus another? Or, why does the indicator show varying service life each time I use it? For example – during one use it indicates change after three days, another after five days.

The 3M™ Service Life Indicator is designed to indicate service life based on individual exposure and respiratory use patterns. Service life may vary across workers and across the same worker over multiple uses, depending on the individual's environment and use patterns.

Why is the 3M™ Service Life Indicator only available for organic vapor cartridges?

The technology behind the 3M™ Service Life Indicator only applies to organic vapors. Further technology development will be required to provide service life indication for other cartridges and filters.

Will there be more 3M™ Service Life Indicator cartridges and filters in the future, for example ESLI for acid gas, particulates, etc.?

3M continues to explore the area of service life indication for our range of respiratory solutions. We are continually evaluating customer preferences and technically feasibility for future ESLI technologies.