

The Benefits of Upgrading to BSMmax Filters on the LITHOGUARD* Filtration System for Your ASML Tools

* LITHOGUARD 5-high / 7-high / 300

Introduction

This document introduces Donaldson's new **BSMmax** filters (P510610) and explains the benefits of upgrading from the original BSM (P199595) filters. Both filters are designed for Donaldson LITHOGUARD systems used on ASML tools. And both filters remove three groups of contaminants that can affect semiconductor lithography tools and processes: (1) bases, typically amines, NH_3 , etc. (2) acids such as SO_2 , HCl , H_2SO_4 , H_3PO_4 , etc., and (3) condensable volatile organic compounds (VOCs). The improved chemistry and media loading of the BSMmax can now multiply overall filter life by a factor of two and reduce cost of ownership (CoO) by as much as 40%.

BSMmax filters meet ASML's latest specification in this area, which calls for initial breakthrough of basic contaminants prior to the sets when challenged with contamination levels of 25ppb/ NH_3 , 5ppb/ SO_2 and 50ppb/organic compounds. The objective of this specification is to optimize tool protection and reduce tool downtime for lens cleaning procedures.

Filter Description

The LITHOGUARD BSM filter contains five cells packed in "V" formation. Each cell contains an Acid Filter and a Base Filter, as shown in Figure 1. Both the Acid Filter and Base Filter remove VOCs efficiently.

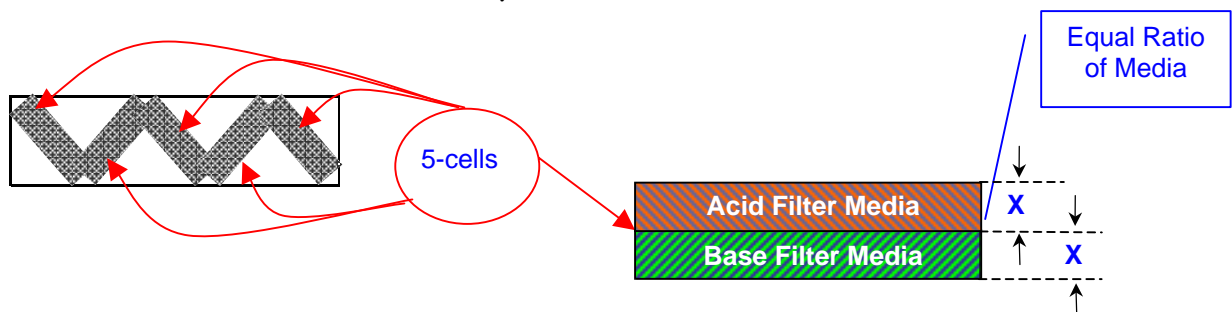


Fig.1

Thanks to several improvements, LITHOGUARD BSMmax filters remove the same contaminants as BSM filters, but they also increase overall filter life:

- 6 cells (BSMmax) versus 5 cells (BSM)
- Increased media thickness in each BSMmax cell (not reflected in the illustration below)
- Improved media chemistry in each BSMmax cell

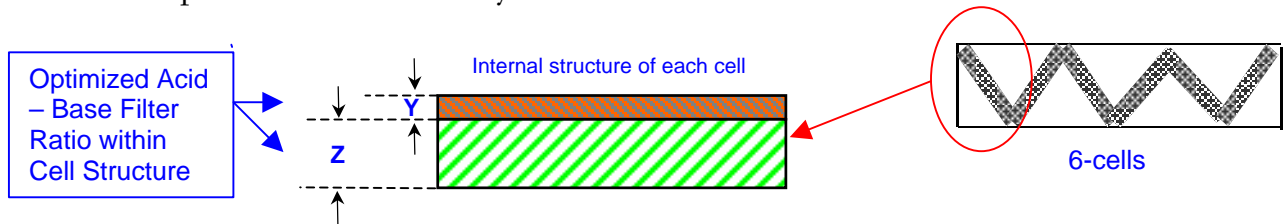
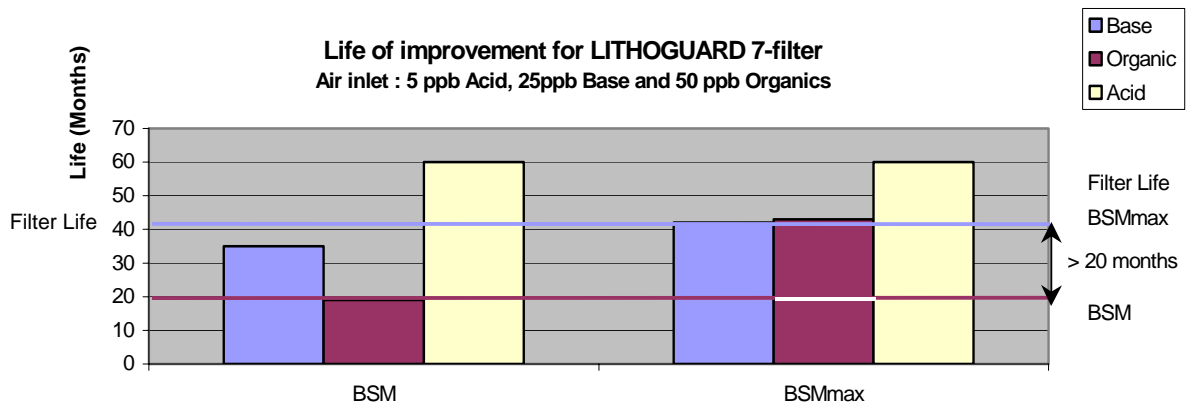


Fig.2

Please note:

- Because BSM and BSMmax filter housings are configured differently, BSMmax filter cells cannot be placed in BSM filter housings. BSMmax filter cells must be placed in BSMmax filter housings.
- BSMmax filters can be refilled up to 3 times with new media.

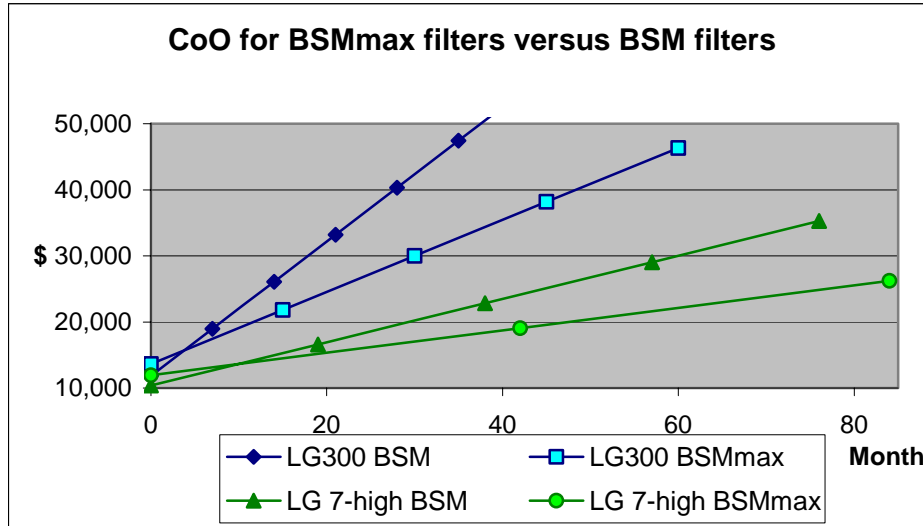
The graph below shows how BSMmax media balancing almost doubles filter life under the same operating conditions.



Cost of Ownership Advantage

The following graph represents one scenario in which a fab is considering the purchase of either BSM or BSMmax filters for use in its LITHOGUARD 7-high or LITHOGUARD 300. The assumptions are:

- Air contamination level: 5ppb Acids, 25 ppb Bases and 50 ppb Organics
- Fab follows Donaldson's optional refill loop procedure (refill whenever possible rather than purchasing new filters each time the media needs to be replaced)
- The refill price is multiplied by a factor of 1.2 to take into account the accumulation of rolling inventory (to accommodate refilling).



Conclusion

BSMmax not only offers more balanced filter life for the different levels and classes of contaminants (acids, bases, organics), but it also offers increased life and a reduced cost of ownership for the typical semiconductor fab air contamination levels.

For additional information on how to estimate filter life, please refer to the Donaldson Life Estimator at: <http://www.donaldson.com/en/semiconductor/>

Filter Part Numbers

BSMmax Filter -- P510610

BSM Filter -- P199595

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