



# High-Volume Optical Filter Manufacturing & Optics Problem Solving

## The Semrock Advantage:

Performance,  
Reliability,  
Repeatability

## Filter and Optical System Design Capabilities:

Versatility,  
Custom Evaluation,  
Personalized Service

## Optimized Manufacturing



ISO 9001:2015

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ID 9108657280

## Sit and stay are so old school.

What new tricks can we  
do for you today?



“These new systems  
represent the pinnacle  
of harsh environment

Raman spectroscopy sensing,”  
said Quentin Morgan, CTO of  
WellDog. “The new systems not  
only provide better sensing  
performance, but are more  
ruggedized and reliable than  
previous generations.”

WellDog announced that its next generation  
of Reservoir Raman Spectroscopy™ systems,  
designed for monitoring challenging in  
situ coal seam environments and utilizing  
Semrock’s rugged and reliable RazorEdge®  
filters, are now in service.

## We’re an Optical Engineer’s Best Friend

You need the experts in optical systems  
and high-volume thin film filters,  
Semrock is there with on-time delivery  
when you need it, guaranteed product  
performance, responsiveness with  
issues, and collaborative solutions.

When you are developing optical instrumentation  
you continually face new challenges: new customer  
requirements and product expectations, evolving  
technologies, changing markets, and the need for  
a rapid and decisive response. To help you conquer  
those challenges, Semrock provides superior  
products and expert, personalized support.

Semrock specializes in the volume production  
of optical filters for the life science and analytical  
instrumentation markets, and also manufactures  
filters for laser and optical systems applications.  
Our products exclusively feature hard, thin-film  
sputtered coatings for proven reliability. These filters  
will not change or degrade in any way as a result  
of humidity or temperature variations, nor will they  
“burn out” with normal use. All of our products are  
backed by our industry-leading ten-year warranty.

Overall, Semrock filters are brighter, more durable,  
and spectrally more sophisticated than those  
made by other coating technologies, driving  
significant improvements for our customers and  
their applications: faster measurement times,  
reduced downtime, repeatable manufacturing,  
and lower optical component count.

We make our unique products with lot-to-lot  
consistency in high volumes, providing our  
OEM customers with a dependable supply.  
We find solutions “within the box” of our  
standard catalog, and “out of the box” with  
the help of our expert design staff, and we  
apply each strategy in the right proportion.

With thousands of in stock items available for  
shipment the same day, combined with our  
ability to custom-size these items (typically in  
less than a week) and perform custom co-  
development engineering with fast prototyping,  
we can quickly provide intelligent solutions  
that meet your price points.



## Our Focus on High-volume Filters

**Dedicated high-volume coating facility** — We now support the needs of our high-volume customers by producing tens-of-thousands of spectrally complex, sputtered optical filters per month. Building on our renowned filter manufacturing capability, we can now match the volume demands of customers in the medical diagnostic point-of-care healthcare markets where high-volume, miniaturized optics will be an enabling technology.

**Rapid prototyping** — For design and production of new prototype filters

**Industry best lead times** — Most catalog orders shipping within one week, one to two weeks for custom-size catalog, and four to six weeks for custom OEM parts.

**Consistent performance** — Our products are measured and reproducible, from the first lot to the latest.

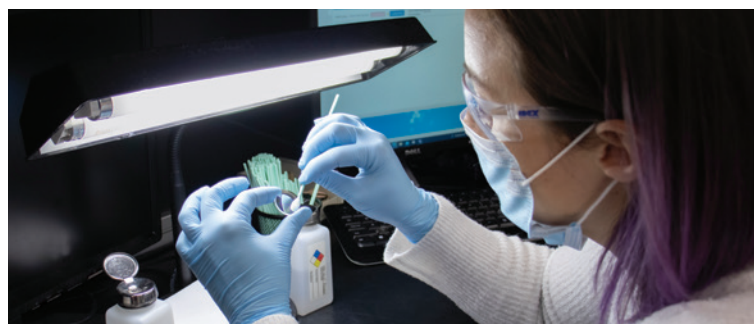
**Scalability** — We can quickly design and develop a prototype filter and then produce it accurately in high volume.

## Filter and Optical System Design Capabilities

**Versatility** — Our design engineers are experts in optical science and engineering, physics, electrical engineering, mechanical engineering, computer science, and biology, and all are experienced problem-solvers.

**Industry's fastest design turnaround** — We've designed and implemented proprietary design software - Firelight. With Firelight we can complete design tasks in minutes that formerly required days or weeks. Now we can typically design and quote a prototype within a week, where previously it could take two to four weeks.

**Modeling toolbox** — We use our own state-of-the-art software to simulate complex coating runs before they reach manufacturing, yielding greater than 97% confidence in the engineering design.



**Custom evaluation** — By evaluating the entire optical system we can design and optimize the right filters. This inclusive approach minimizes system redesigns which add cost and delay to your project development.

**Personalized service** — We are responsive to your needs supplying careful analysis and prompt replies.



## Unique Online Tools

Shorten time-to-market, improve your engineering productivity and final system performance by taking full advantage of our proprietary design software - MyLight™ and SearchLight™.

Need to know if your system selections will play nice with each other? Test in a virtual situation by uploading your elements into our powerful SearchLight™ tool.

MyLight™ is accessible on every single filter detail page to obtain working performance knowledge.



Our powerful online tools light the way to faster design and selection.



## Supply Chain Management (SCM)

We incorporate best SCM practices into disciplined standard operating procedures:

- › Rigorous documentation and revision control
- › **Lead time management** — monitoring tools keep inventory at levels to satisfy delivery goals
- › **Traceability** — complete product histories of each manufactured item
- › Blanket orders, purchasing contract and just-in-time delivery

## Optimized Manufacturing

We stress continuous improvement in our manufacturing processes:

- › **5S** — the five dimensions of workplace organization methodology and streamlining practice
- › **Kaizen** — system problem solving for continual improvements of our manufacturing processes
- › **Lean principles** — continual streamlining to reduce waste

# The Semrock Advantage – Performance, Reliability, Repeatability

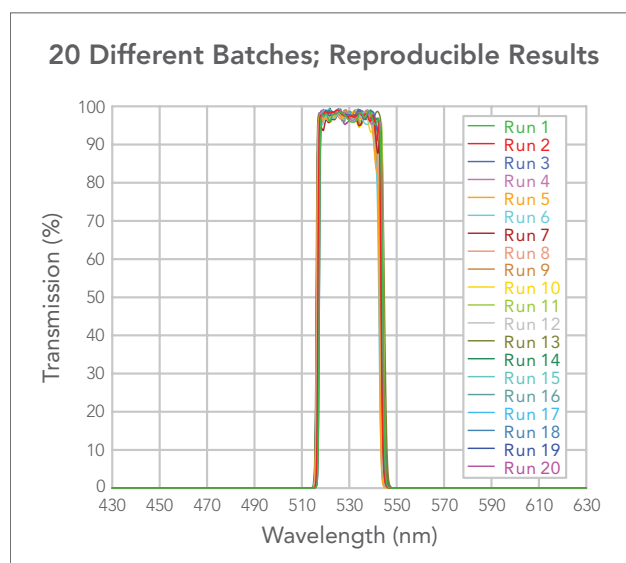
Performance — Semrock optical filters have the highest transmission specifications, yielding better contrast and faster measurements, even at ultraviolet (UV) wavelengths.

	Bandpass	Edge	Notch	Dichroic Beamsplitter
Typical Transmission	> 97%	> 98%	> 95%	> 92 – 95%
Blocking/Reflection	OD 6–8	OD 6	OD 6	Reflection > 98%
Wavelength Range	230 – 1,700 nm	230 – 1,700 nm	230 – 1,100 nm	230 – 1,700 nm
Edge Steepness	< 1.0%	< 0.2%	< 1.0%	< 2.0%

Maximum transmission, optimized blocking and the steepest edges give Semrock filters market-leading performance.

## RELIABILITY

- › Impervious to humidity and temperature induced degradation
- › Lasting high level of performance
- › Meet or exceed requirements for environmental and physical durability in MIL-STD-810F, MIL-C-48497A, MIL-C-675C, and ISO 9022-2.
- › Eliminate replacement costs, decreasing the cost of ownership
- › **Repeatability** — Whether a filter is from the first lot or the last, its spectral properties are the same. Our OEM customers can rely on a secure and dependable supply line.



Every lot performs like the first.

## Markets Served and Applications

We serve key applications across life sciences, analytical instrumentation, science, and technology. Much of our business is in the fluorescence instrumentation markets.

### Fluorescence Instrumentation

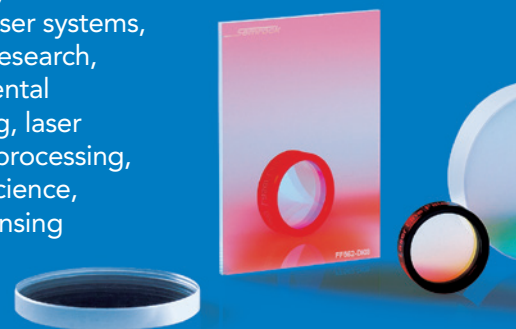
**Filters:** Fluorescence microscopy, DNA sequencing, in-vivo imaging, flow cytometry, quantitative real-time PCR, high content screening, microarray readers, point-of-care diagnostic devices, chemical process monitoring, laboratory fluorometers, microplate readers, gel electrophoresis imaging systems

### Raman Spectroscopy

**Filters:** Raman microscopy, portable and handheld Raman analyzers, Raman microprobes (optical fiber probes), laboratory spectrometers, coherent Raman scattering microscopy, materials characterization, medical diagnostics

### Laser Analytical & Optical System Filters:

Surgical laser systems, scientific research, environmental monitoring, laser materials processing, ultrafast science, remote sensing



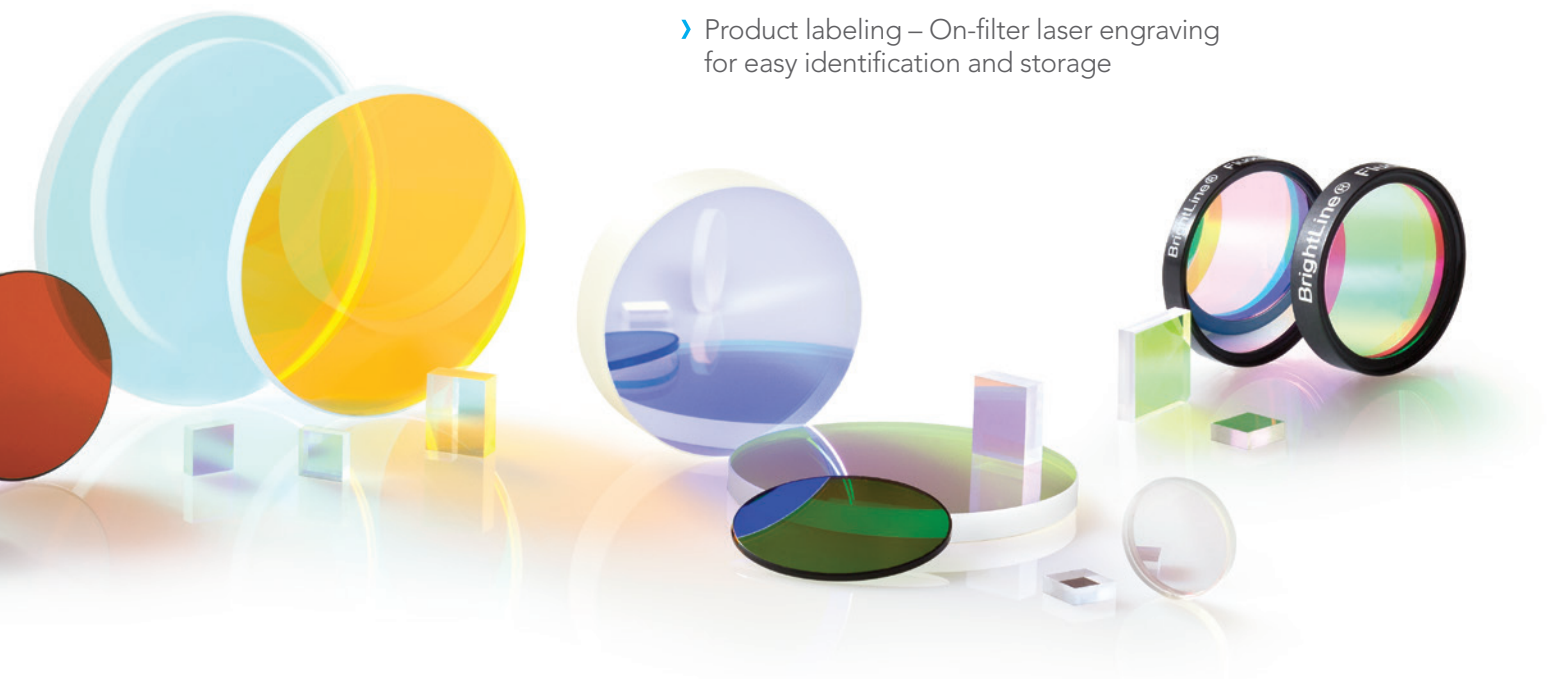
# Product Capabilities

## Types of Filters We Produce:

Fluorescence filters; Raman spectroscopy filters; tunable bandpass filters; deep notch filters and laser-line filters; laser diode clean-up filters; filters to combine or separate laser beams; filters to isolate popular mercury lamp lines; polarization filters; dispersion controlled filter designs and laser mirrors.

## Custom Solutions

- › Wavelength functionality to specification, 230 nm — 2000 nm
- › Ability to produce 10's of thousands of parts per month
- › Sizes down to 1.5 mm x 1.5 mm and as large as 200 mm
- › Spectrally complex custom designs for customers (e.g. LED optimized filter designs)
- › Custom sizing – Round, square, or rectangular, from several mm to a few inches
- › Product labeling – On-filter laser engraving for easy identification and storage



## Our Technology

Thin-film sputtering deposits low-loss, precise-thickness, and reliable optical-thickness layers. Semrock has made it viable for high-volume production using our proprietary processes and optical monitoring technology.

Our manufacturing facilities use state-of-the-art coating chambers in protected cleanroom environments. We are currently expanding to meet increasing demand and planning for continued growth.





# Quality Systems

## Quality & Certification:

We are dedicated to upholding to the highest standards of quality. IDEX Health & Science ensures the quality of both new and existing product designs using Statistical Quality Control (SQC) methods to monitor our processes. We are committed to providing top quality components.

## Environmental Policies:

Semrock products are certified with RoHS, REACH, and TSCA Declaration of Compliance.

At Semrock we adhere to high levels of internal process control and reliability testing that well exceed the industry standard. We have passed 100% of quality audits by our major OEM customers.

## Quality Standards in Place with Thorough Process Documentation

We pride ourselves on our commitment to quality and reliability. For this reason, we have pursued and achieved certification to the ISO (International Organization for Standardization) 9001:2015 standard.

## Conflict Minerals

We are committed to complying fully with the SEC's Conflict Minerals reporting requirements. Semrock will continue to work with applicable suppliers to perform the necessary due diligence in determining the potential for Conflict Minerals in their supply chain and products. Semrock has initiated a due diligence program in accordance with the Organization for Economic Cooperation and Development Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas.

## California Proposition 65

We continuously monitor the Proposition 65 list for any new chemicals and update our customers accordingly.



## Case Study: Collaborative Engineering Project

### The Challenge

- › 18 different large-diameter filters
- › Demanding specifications for transmission, passband, optical density uniformity, wide-angle performance, and scattering for all 18 filters

### The Solution

- › Designed all filters to meet or exceed specifications
- › Re-designed customer's optical cell to solve scattering problems
- › Designed and built a unique, high-volume measurement platform for OD testing
- › Worked with OEM engineering team to analyze test data and confirm system performance

### The Result

- › Continuing delivery of high-volume, high-mix sets with uncompromised performance



Semrock, Inc. manufactures optical filters that set the standard for the life science and analytical instrumentation industries, as well as optical filters and mirrors for laser and optical systems. OEM filters are manufactured in volume using thin-film sputtering and proprietary volume manufacturing technology. All Semrock products carry a ten-year warranty.

Founded in September 2000, Semrock is based in Rochester, New York, a well-known world center for optics, and has sales offices throughout the United States. In October 2008 Semrock became a unit of IDEX Corporation.

For additional information about Semrock, its products, and its team of international distributors, visit the company website at [www.idex-hs.com/semrock](http://www.idex-hs.com/semrock)

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