

# High Performance Filters for Fluorescence Microscopy



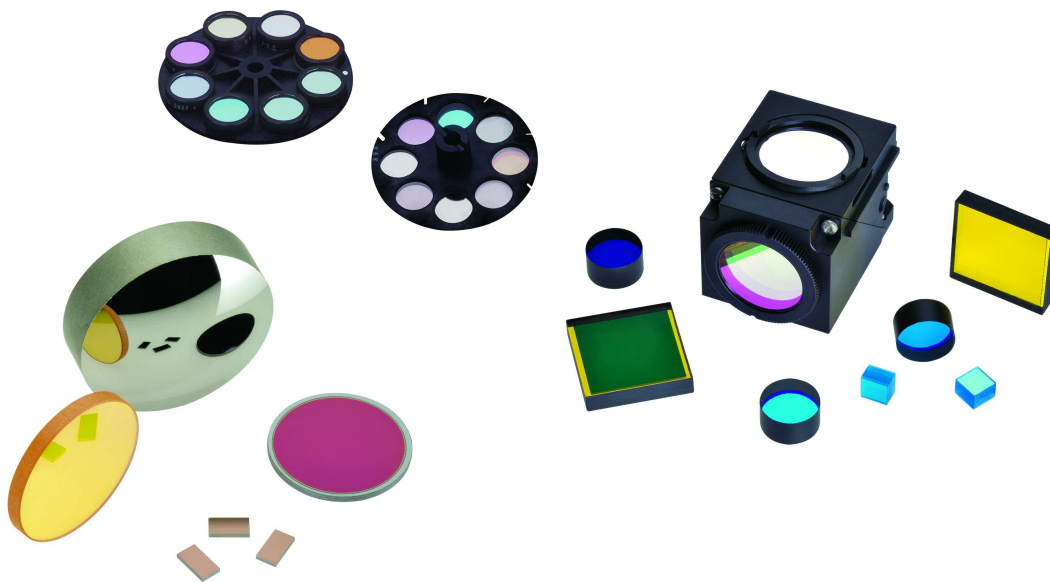
Solutions to  
Make, Manage and Measure Light<sup>SM</sup>

## Trust Our Proven History, For Your Fluorescence Filter Needs

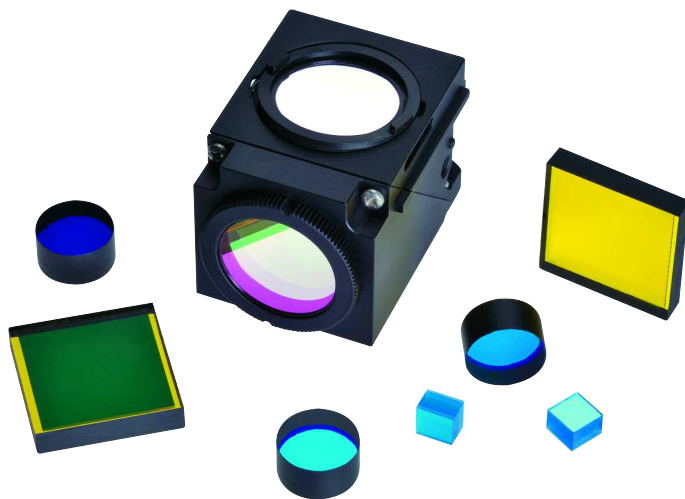
Newport's Corion® Filters have been meeting the needs of our customers for over 35 years. Our fluorescence filters are the result of a perfect blend of proven OEM filter manufacturing and our patented Stabilife® technology. This experience and patented process delivers filters with extremely high transmission, steep transitions from blocking to transmission and superior image quality combined with stable performance under changing environmental conditions. In addition, we have tremendous manufacturing flexibility processing orders from quantities as large as one million and as small as one, and in each case we maintain one of the highest customer satisfaction ratings in the process. During the past decade, Newport has provided unsurpassed fluorescence filter solutions for OEM applications in the areas of Cytometry, DNA Sequencing, In-vivo Imaging and other fluorescence based instrumentation. Serving the OEM community in such a wide range of applications has helped us build a tremendous foundation of fluorescence knowledge supporting our development of new and exciting products for the research community.

## The Perfect Fluorescence Filter For Your Exact Need

What matters most is that you have the best solution for your fluorescence filter needs. Until now, Newport's fluorescence filters have only been available for OEM applications but with the development of this guide, these filters are now being offered to scientists and researchers as standard catalog products. This guide includes a fluorophore reference table that lists the recommended filter set for each listed fluorophore, as well as spectral performance curves for each set as easy reference. Our extensive experience also allows us to create custom solutions, so if you have any questions, need guidance or would like to develop a strategic partnership give Newport a call.



# High Performance Filters for Fluorescence Microscopy



- Patented Stabilife® coatings
- Shift free spectral response @ 0% - 100%RH
- Humidity per MIL-STD-810, Method 507.3, Procedure III, 20 cycles
- Lowest autofluorescence
- Extremely sharp transitions from rejection to transmission regions
- Maximum transmission
- Excellent set signal-to-noise ratio
- Optimized optical fabrication for brilliant imaging
- Superior field life

## Newport HPF™ Filters for Microscopy Applications

Newport's HPF™ series of filters for fluorescence detection is a compilation of filter product designs developed to be used with many of the most popular standard fluorophores and some of the most promising new fluorophores. Since their introduction in the late 1990's, these product designs have served as the starting point for custom designed filters for market leading instruments including DNA Sequencers, Cytometers, MicroPlate Readers, In vivo Imagers, and Thermocyclers. We are now making these OEM proven designs available to the individual researcher through our catalog offering of High Performance Filter sets for Epi-Fluorescence microscopy. HPF™ filters are manufactured using Newport's patented Stabilife® coating technology which provides excellent spectral performance, spectral stability, and physical durability.

HPF™ filter sets have been manufactured to provide maximum performance using several key design features including exceptionally high passband transmission, maximized out-of-band blocking including extended range blocking on excitation filters, extremely steep slopes from rejection to transmission regions, optical finishing for maximum image rendition including precision grinding and polishing and anti-reflection coatings, and filter bandpass specifications of center wavelength and bandwidth providing maximum image brightness and minimum background.

## HPF™ Fluorescence Filters – Typical Specifications

	Excitation Filters	Dichroic Filters	Emission Filters
Passband Transmittance	≥90%	≥90%	≥90%
Dichroic Reflectance	N/A	≥90%	N/A
Spectral Blocking	≥OD6	N/A	≥OD6
Surface Quality	E/E (60/40) per MIL-F-48616 (typical)	E/E (60/40) per MIL-F-48616 (typical)	E/E (60/40) per MIL-F-48616 (typical)
Coating Hardness	MIL-C-48497	MIL-C-48497	MIL-C-48497
Coating Abrasion Resistance	MIL-C-48497	MIL-C-48497	MIL-C-48497
Coating Adhesion	MIL-C-48497	MIL-C-48497	MIL-C-48497
Coating Humidity Resistance	MIL-STD-810, Method 507.3, Procedure III, Modified to 40 cycles**	MIL-STD-810, Method 507.3, Procedure III, Modified to 40 cycles**	MIL-STD-810, Method 507.3, Procedure III, Modified to 40 cycles**
Coating Operating Temperature Range	-100 ° C to 300 ° C**	-100 ° C to 300 ° C**	-100 ° C to 300 ° C**
Filter Size	25 mm	25.5 mm x 36 mm	25 mm
Filter Thickness	5 mm	1 mm	5 mm

\*\*The specifications for humidity resistance and coating operating temperature range listed above apply to exposed coatings only. Humidity resistance and operating temperature range of filters manufactured using Stabilife® coatings and assembled using epoxy systems revert to the humidity resistance and operating temperature range of the epoxy system.

## Filter Set Selection

Newport's HPF™ Fluorescence Filter Sets are listed in the two tables that follow. The Fluorophore Reference table lists the recommended filter set for each listed fluorophore. The Numerical Reference table identifies all of the fluorophores that can be utilized with each filter set. Spectral performance of each filter set is provided for reference in a series of data curves following the tables.

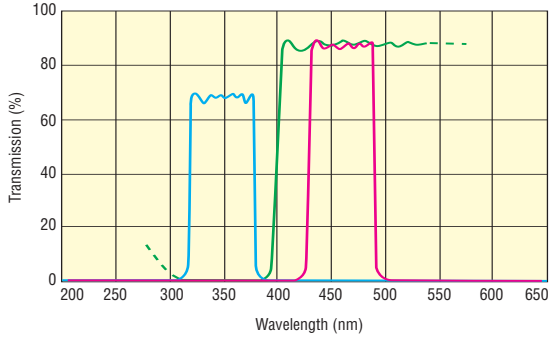
### HPF™ Fluorescence Filter Sets – Numerical Reference

Model	Fluorophore	Excitation	Dichroic	Emission
HPF1200	Hoechst 33342 & 33258	HPX350-60	HPD400	HPM460-60
HPF1205	Alexa Fluor® 350, AMCA, DAPI	HPX360-60	HPD400	HPM460-60
HPF1210	LysoSensor™ Blue (pH5)	HPX380-40	HPD410	HPM460-60
HPF1215	Pacific Blue™	HPX400-30	HPD440	HPM470-30
HPF1220	CFP	HPX440-20	HPD455	HPM480-40
HPF1225	GFP (wt)	HPX450-50	HPD480	HPM510-50
HPF1230	6-JOE	HPX500-20	HPD515	HPM530-LP
HPF1235	Rhodamine Green™, YGFP	HPX500-20	HPD515	HPM535-30
HPF1240	GFP	HPX470-40	HPD495	HPM535-50
HPF1245	5-FAM, Alexa Fluor® 488	HPX475-44	HPD505	HPM535-50
HPF1250	BODIPY® FL, DiO, FITC, Fluor 3, Fluor 4, GFP (rs)	HPX480-40	HPD505	HPM535-50
HPF1255	Alexa Fluor® 430	HPX425-40	HPD490	HPM540-40
HPF1260	Oregon Green™	HPX485-30	HPD515	HPM545-30
HPF1265	YFP	HPX500-20	HPD525	HPM550-40
HPF1270	Eosin	HPX500-40	HPD525	HPM560-50
HPF1275	Alexa Fluor® 532	HPX500-40	HPD530	HPM560-50
HPF1280	6-TET	HPX500-40	HPD530	HPM575-50
HPF1285	BODIPY® R6G	HPX510-40	HPD540	HPM575-50
HPF1290	PE (B,R)	HPX525-45	HPD560	HPM585-40
HPF1295	6-HEX	HPX520-40	HPD550	HPM590-55
HPF1300	Alexa Fluor® 546, Alexa Fluor® 555, TRITC	HPX525-45	HPD560	HPM600-60
HPF1305	BODIPY® TMR	HPX530-40	HPD560	HPM600-60
HPF1310	Cy3™	HPX535-40	HPD565	HPM610-50
HPF1315	Dil (rs)	HPX535-50	HPD565	HPM620-60
HPF1320	DsRed	HPX545-30	HPD570	HPM620-60
HPF1325	Cy3.5™	HPX565-30	HPD580	HPM620-60
HPF1330	Rhodamine	HPX570-20	HPD585	HPM620-60
HPF1335	5-TAMRA, MitoTracker® Orange	HPX525-45	HPD560	HPM620-75
HPF1340	5-ROX, MitoTracker® Red	HPX560-50	HPD590	HPM640-60
HPF1345	Alexa Fluor® 568, Alexa Fluor® 594	HPX560-40	HPD595	HPM640-60
HPF1350	Ethidium Bromide	HPX525-45	HPD565	HPM640-70
HPF1355	BODIPY® TR	HPX570-40	HPD610	HPM645-50
HPF1360	Nile Red	HPX525-45	HPD565	HPM645-60
HPF1365	Calcium Crimson™	HPX570-40	HPD595	HPM645-60
HPF1370	Propidium Iodide	HPX525-45	HPD565	HPM645-75
HPF1375	Resorufin, Texas Red®	HPX560-50	HPD595	HPM645-75
HPF1380	BODIPY® 630/650	HPX604-40	HPD635	HPM670-50
HPF1385	Alexa Fluor® 633	HPX610-60	HPD645	HPM685-50
HPF1390	Cy5™	HPX620-50	HPD655	HPM690-50
HPF1395	BODIPY® 650/665	HPX630-40	HPD660	HPM695-50
HPF1400	Alexa Fluor® 647	HPX620-50	HPD660	HPM700-60
HPF1405	Cy5.5™	HPX645-40	HPD675	HPM710-50
HPF1410	Alexa Fluor® 660	HPX630-60	HPD680	HPM720-60
HPF1415	Alexa Fluor® 680	HPX660-40	HPD695	HPM725-40
HPF1420	Alexa Fluor® 700	HPX660-40	HPD695	HPM740-50
HPF1425	Cy7™	HPX710-50	HPD755	HPM800-70
HPF1430	Alexa Fluor® 750	HPX710-50	HPD760	HPM810-80

## HPF™ Fluorescence Filter Sets – Fluorophore Reference

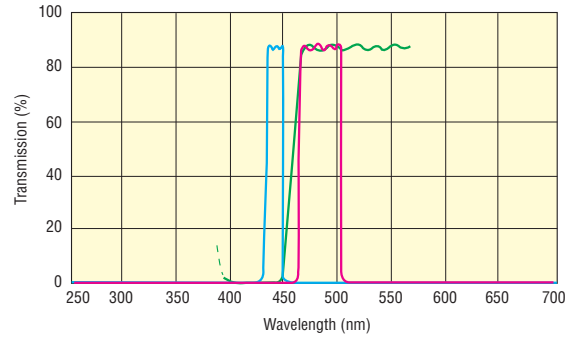
Fluorophore	Filter Set	Excitation Filter	Dichroic Filter	Emission Filter
5-FAM	HPF1245	HPX475-44	HPD505	HPM535-50
5-ROX	HPF1340	HPX560-50	HPD590	HPM640-60
5-TAMRA	HPF1335	HPX525-45	HPD560	HPM620-75
6-HEX	HPF1295	HPX520-40	HPD550	HPM590-55
6-JOE	HPF1230	HPX500-20	HPD515	HPM530LP
6-TET	HPF1280	HPX500-40	HPD530	HPM575-50
Alexa Fluor® 350	HPF1205	HPX360-60	HPD400	HPM460-60
Alexa Fluor® 430	HPF1255	HPX425-40	HPD490	HPM540-40
Alexa Fluor® 488	HPF1245	HPX475-44	HPD505	HPM535-50
Alexa Fluor® 532	HPF1275	HPX500-40	HPD530	HPM560-50
Alexa Fluor® 546	HPF1300	HPX525-45	HPD560	HPM600-60
Alexa Fluor® 555	HPF1300	HPX525-45	HPD560	HPM600-60
Alexa Fluor® 568	HPF1345	HPX560-40	HPD595	HPM640-60
Alexa Fluor® 594	HPF1345	HPX560-40	HPD595	HPM640-60
Alexa Fluor® 633	HPF1385	HPX610-60	HPD645	HPM685-50
Alexa Fluor® 647	HPF1400	HPX620-50	HPD660	HPM700-60
Alexa Fluor® 660	HPF1410	HPX630-60	HPD680	HPM720-60
Alexa Fluor® 680	HPF1415	HPX660-40	HPD695	HPM725-40
Alexa Fluor® 700	HPF1420	HPX660-40	HPD695	HPM740-50
Alexa Fluor® 750	HPF1430	HPX710-50	HPD760	HPM810-80
AMCA	HPF1205	HPX360-60	HPD400	HPM460-60
BODIPY® 630/650	HPF1380	HPX605-40	HPD635	HPM670-50
BODIPY® 650/665	HPF1395	HPX630-40	HPD660	HPM695-50
BODIPY® FL	HPF1250	HPX480-40	HPD505	HPM535-50
BODIPY® R6G	HPF1285	HPX510-40	HPD540	HPM575-50
BODIPY® TMR	HPF1305	HPX530-40	HPD560	HPM600-60
BODIPY® TR	HPF1355	HPX570-40	HPD610	HPM645-50
Calcium Crimson™	HPF1365	HPX570-40	HPD595	HPM645-60
CFP	HPF1220	HPX440-20	HPD455	HPM480-40
Cy3.5™	HPF1325	HPX565-30	HPD580	HPM620-60
Cy3™	HPF1310	HPX535-40	HPD565	HPM610-50
Cy5.5™	HPF1405	HPX645-40	HPD675	HPM710-50
Cy5™	HPF1390	HPX620-50	HPD655	HPM690-50
Cy7™	HPF1425	HPX710-50	HPD755	HPM800-70
DAPI	HPF1205	HPX360-60	HPD400	HPM460-60
Dil(rs)	HPF1315	HPX535-50	HPD565	HPM620-60
DiO	HPF1250	HPX480-40	HPD505	HPM535-50
DsRed	HPF1320	HPX545-30	HPD570	HPM620-60
Eosin	HPF1270	HPX500-40	HPD525	HPM560-50
Ethidium Bromide	HPF1350	HPX525-45	HPD565	HPM640-70
FITC	HPF1250	HPX480-40	HPD505	HPM535-50
Fluo 3	HPF1250	HPX480-40	HPD505	HPM535-50
Fluo 4	HPF1250	HPX480-40	HPD505	HPM535-50
GFP	HPF1240	HPX470-40	HPD495	HPM535-50
GFP(rs)	HPF1250	HPX480-40	HPD505	HPM535-50
GFP(wt)	HPF1225	HPX450-50	HPD480	HPM510-50
Hoechst 33342 & 33258	HPF1200	HPX350-60	HPD400	HPM460-60
LysoSensor™ Blue (pH 5)	HPF1210	HPX380-40	HPD410	HPM460-60
MitoTracker® Orange	HPF1335	HPX525-45	HPD560	HPM620-75
MitoTracker® Red	HPF1340	HPX560-50	HPD590	HPM640-60
Nile Red	HPF1360	HPX525-45	HPD565	HPM645-60
Oregon Green™	HPF1260	HPX485-30	HPD515	HPM545-30
Pacific Blue™	HPF1215	HPX400-30	HPD440	HPM470-30
PE (B,R)	HPF1290	HPX525-45	HPD560	HPM585-40
Propidium Iodide	HPF1370	HPX525-45	HPD565	HPM645-75
Resorufin	HPF1375	HPX560-50	HPD595	HPM645-75
Rhodamine	HPF1330	HPX570-20	HPD585	HPM620-60
Rhodamine Green™	HPF1235	HPX500-20	HPD515	HPM535-30
Texas Red®	HPF1375	HPX560-50	HPD595	HPM645-75
TRITC	HPF1300	HPX525-45	HPD560	HPM600-60
YFP	HPF1265	HPX500-20	HPD525	HPM550-40
YGFP	HPF1235	HPX500-20	HPD515	HPM535-30

## HPF™ Fluorescence Filter Set – Spectral Data



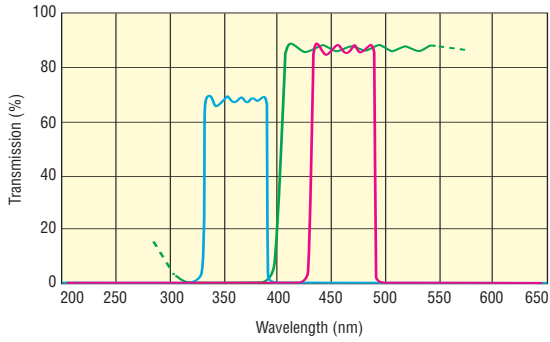
**HPF1200**  
 - Excitation Filter #: HPX 350/60  
 - Dichroic Filter #: HPD 400  
 - Emission Filter #: HPM 460/60

Fluorophores: Hoechst 33342, Hoechst 33258



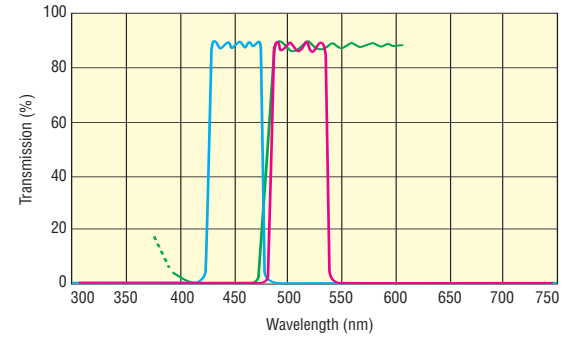
**HPF1200**  
 - Excitation Filter #: HPX 440/20  
 - Dichroic Filter #: HPD 455  
 - Emission Filter #: HPM 480/40

Fluorophores: CFP



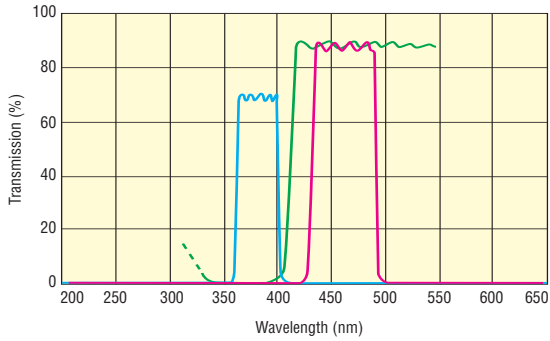
**HPF1205**  
 - Excitation Filter #: HPX 360/60  
 - Dichroic Filter #: HPD 400  
 - Emission Filter #: HPM 460/60

Fluorophores: Alexa Fluor® 350, AMCA, DAPI

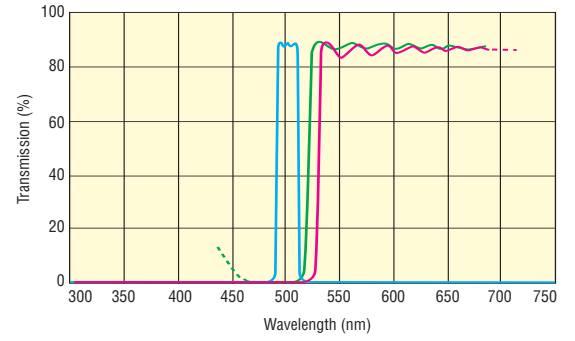


**HPF1225**  
 - Excitation Filter #: HPX 450/50  
 - Dichroic Filter #: HPD 480  
 - Emission Filter #: HPM 510/50

Fluorophores: GFP (wt)



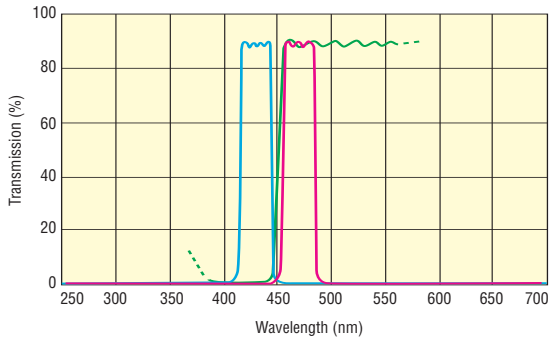
**HPF1210**  
 - Excitation Filter #: HPX 380/40  
 - Dichroic Filter #: HPD 410  
 - Emission Filter #: HPM 460/60



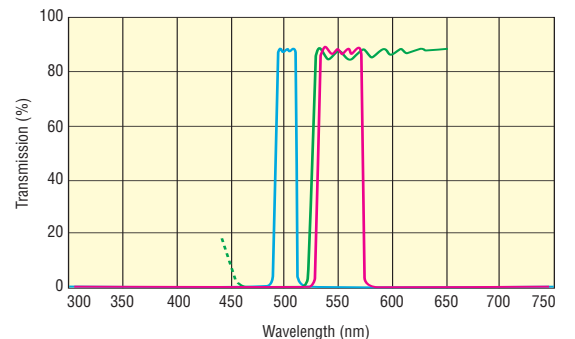
**HPF1230**  
 - Excitation Filter #: HPX 500/20  
 - Dichroic Filter #: HPD 520  
 - Emission Filter #: HPM 530LP

Fluorophores: LysoSensor™ Blue (pH5)

Fluorophores: 6-JOE



**HPF1215**  
 - Excitation Filter #: HPX 430/30  
 - Dichroic Filter #: HPD 450  
 - Emission Filter #: HPM 470/30

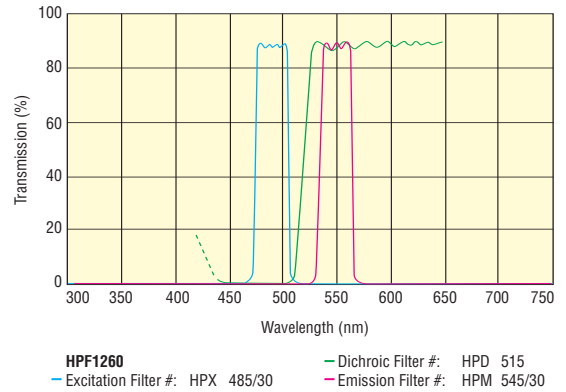
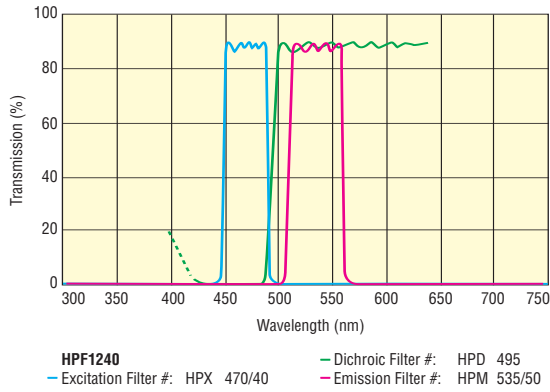


**HPF1235**  
 - Excitation Filter #: HPX 500/20  
 - Dichroic Filter #: HPD 515  
 - Emission Filter #: HPM 535/30

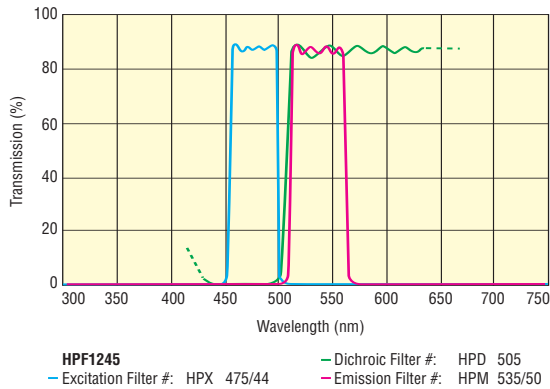
Fluorophores: Pacific Blue™

Fluorophores: Rhodamine Green™, YGFP

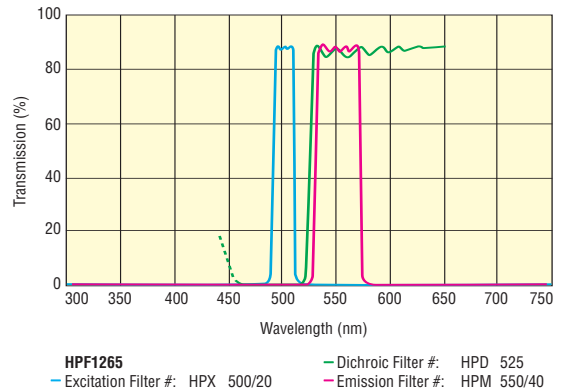
## HPF™ Fluorescence Filter Set – Spectral Data (continued)



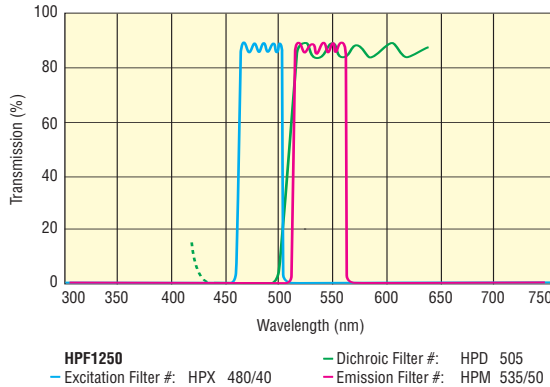
Fluorophores: GFP



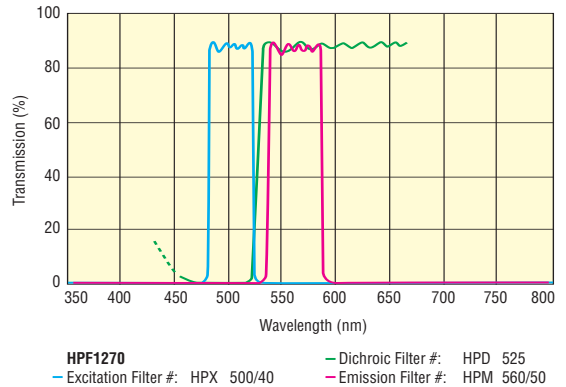
Fluorophores: Oregon Green™



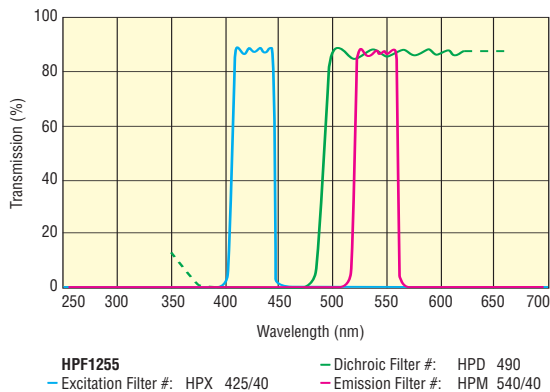
Fluorophores: 5-FAM, Alexa Fluor® 488



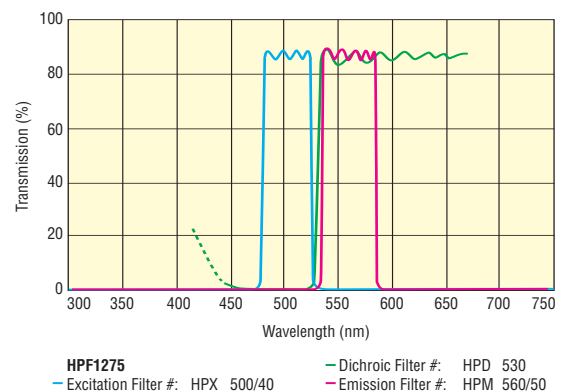
Fluorophores: YFP



Fluorophores: BODIPY® FL, DiO, FITC, Fluo 3, Fluo 4, GFP (rs)



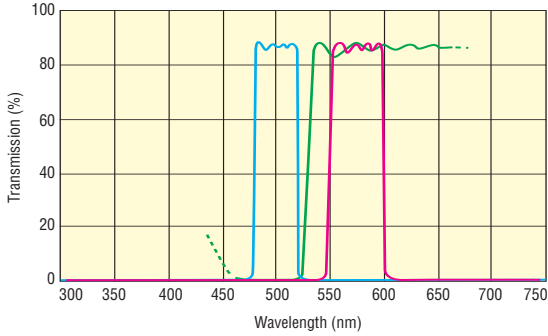
Fluorophores: Eosin



Fluorophores: Alexa Fluor® 430

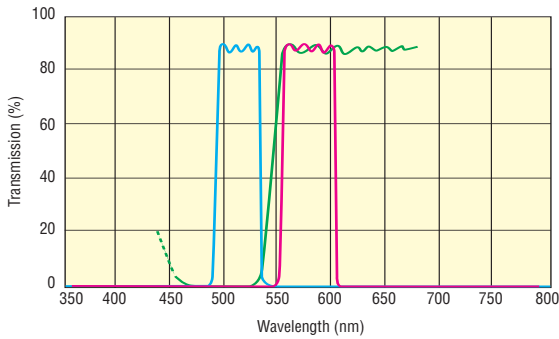
Fluorophores: Alexa Fluor® 532

## HPF™ Fluorescence Filter Set – Spectral Data (continued)



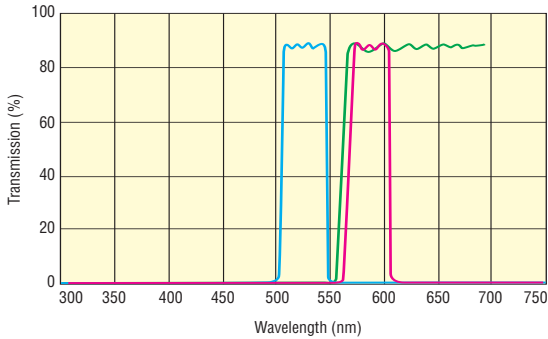
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 Emission Filter #: HPM 575/50

Fluorophores: 6-TET



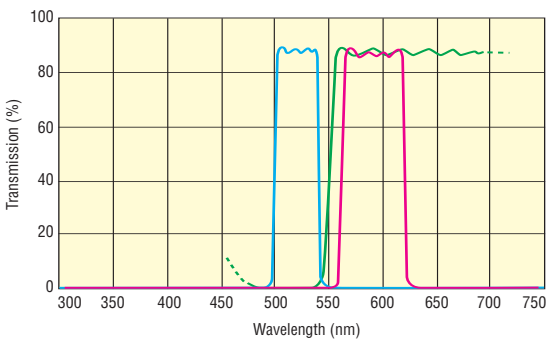
**HPF1285**  
 Excitation Filter #: HPX 510/40      Dichroic Filter #: HPD 540  
 Emission Filter #: HPM 575/50

Fluorophores: BODIPY® R6G



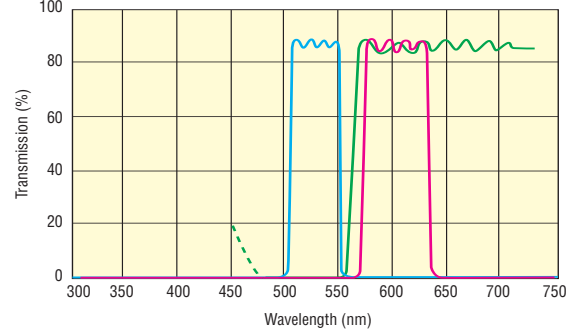
**HPF1290**  
 Excitation Filter #: HPX 525/45      Dichroic Filter #: HPD 560  
 Emission Filter #: HPM 585/40

Fluorophores: PE (B,R)



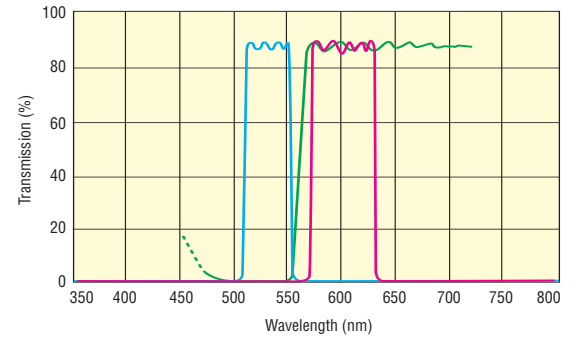
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 Excitation Filter #: HPX 520/40      Dichroic Filter #: HPD 550  
 Emission Filter #: HPM 590/55

Fluorophores: 6-HEX



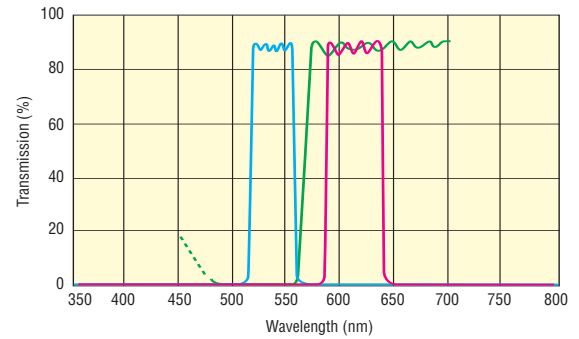
**HPF1300**  
 Excitation Filter #: HPX 525/45      Dichroic Filter #: HPD 560  
 Emission Filter #: HPM 600/60

Fluorophores: Alexa Fluor® 546, Alexa Fluor® 555, TRITC



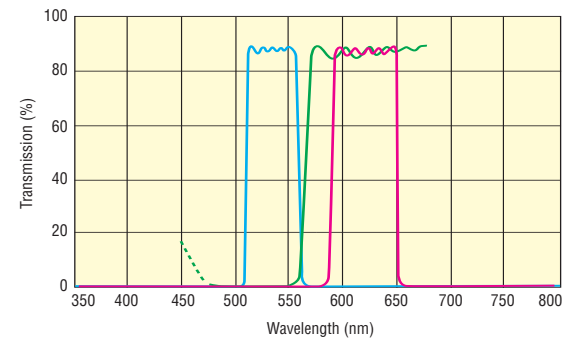
**HPF1305**  
 Excitation Filter #: HPX 530/40      Dichroic Filter #: HPD 560  
 Emission Filter #: HPM 600/60

Fluorophores: BODIPY® TMR



**HPF1310**  
 Excitation Filter #: HPX 535/40      Dichroic Filter #: HPD 565  
 Emission Filter #: HPM 610/50

Fluorophores: Cy3™

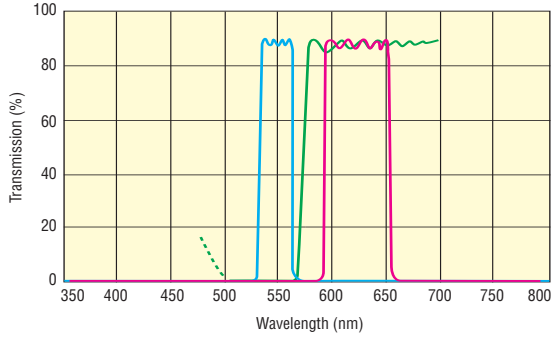


**HPF1315**  
 Excitation Filter #: HPX 535/50      Dichroic Filter #: HPD 565  
 Emission Filter #: HPM 620/60

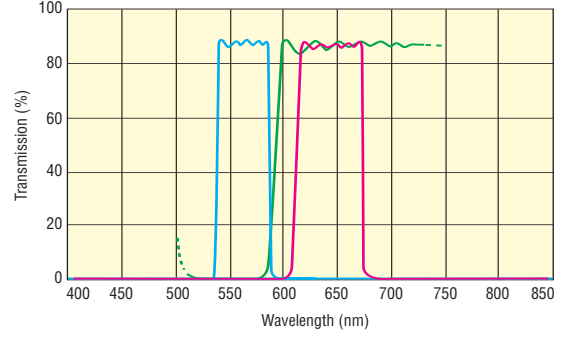
Fluorophores: Dil (rs)



## HPF™ Fluorescence Filter Set – Spectral Data (continued)

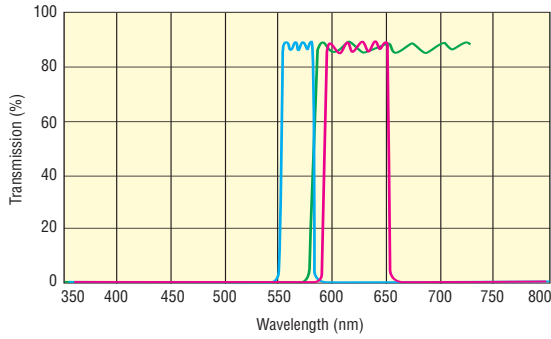


**HPF1320**  
 — Excitation Filter #: HPX 545/30      — Dichroic Filter #: HPD 570  
 — Emission Filter #: HPM 620/60



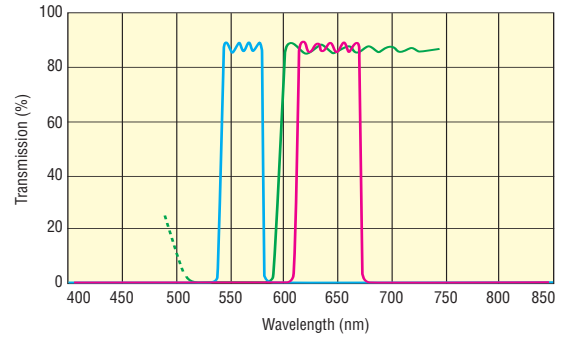
**HPF1340**  
 — Excitation Filter #: HPX 560/50      — Dichroic Filter #: HPD 590  
 — Emission Filter #: HPM 640/60

**Fluorophores: DsRed**



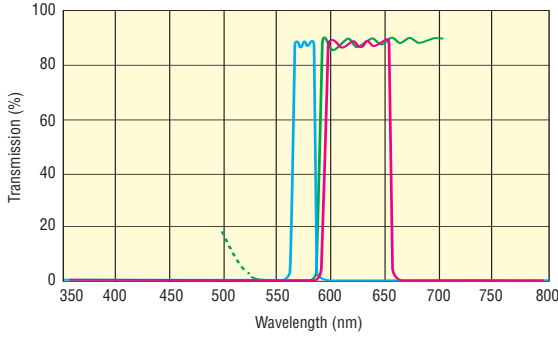
**HPF1325**  
 — Excitation Filter #: HPX 565/30      — Dichroic Filter #: HPD 580  
 — Emission Filter #: HPM 620/60

**Fluorophores: 5-ROX, MitoTracker® Red**



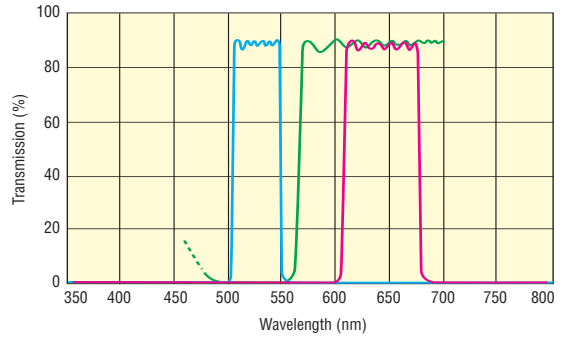
**HPF1345**  
 — Excitation Filter #: HPX 560/40      — Dichroic Filter #: HPD 595  
 — Emission Filter #: HPM 640/60

**Fluorophores: Cy3.5™**



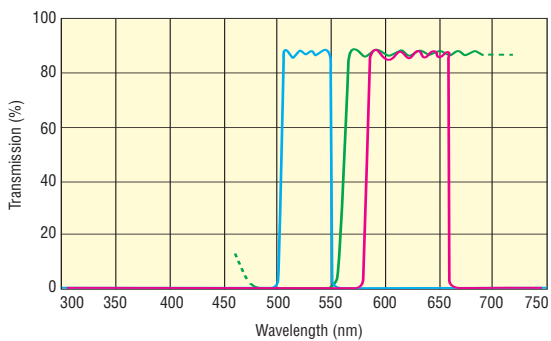
**HPF1330**  
 — Excitation Filter #: HPX 570/20      — Dichroic Filter #: HPD 585  
 — Emission Filter #: HPM 620/60

**Fluorophores: Alexa Fluor® 568, Alexa Fluor® 594**



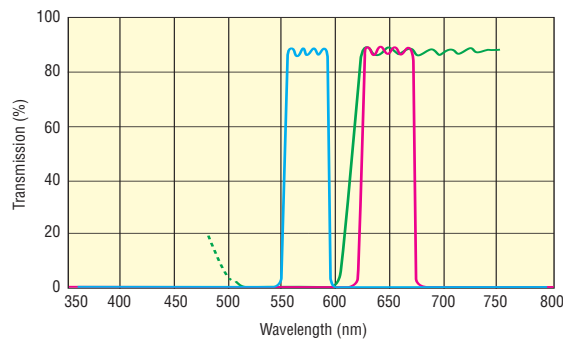
**HPF1350**  
 — Excitation Filter #: HPX 525/45      — Dichroic Filter #: HPD 565  
 — Emission Filter #: HPM 640/70

**Fluorophores: Rhodamine**



**HPF1335**  
 — Excitation Filter #: HPX 525/45      — Dichroic Filter #: HPD 560  
 — Emission Filter #: HPM 620/75

**Fluorophores: Ethidium Bromide**

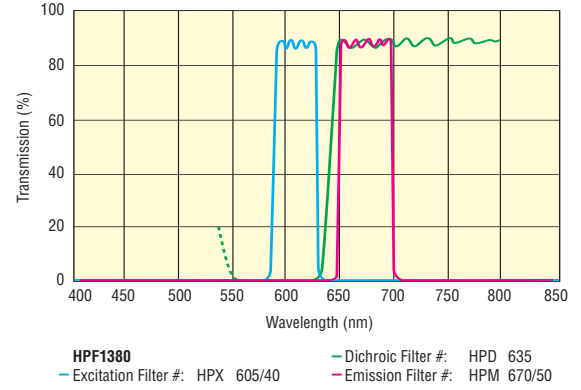
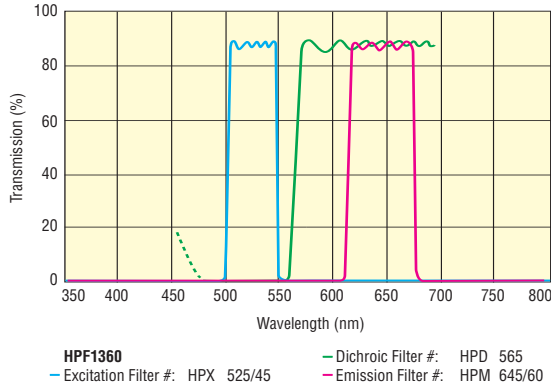


**HPF1355**  
 — Excitation Filter #: HPX 570/40      — Dichroic Filter #: HPD 610  
 — Emission Filter #: HPM 645/50

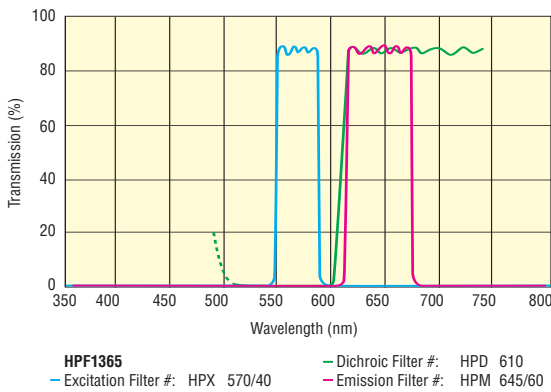
**Fluorophores: 5-TAMRA, MitoTracker® Orange**

**Fluorophores: BODIPY® TR**

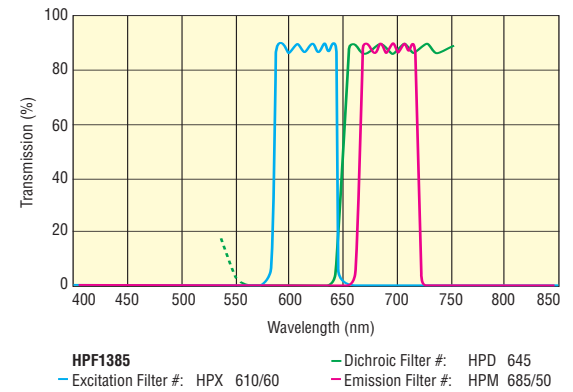
## HPF™ Fluorescence Filter Set – Spectral Data (continued)



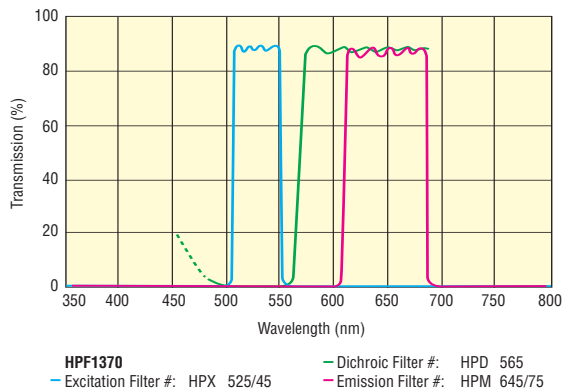
Fluorophores: Nile Red



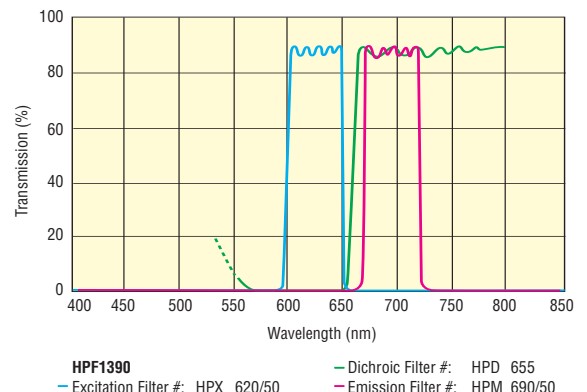
Fluorophores: BODIPY® 630/650



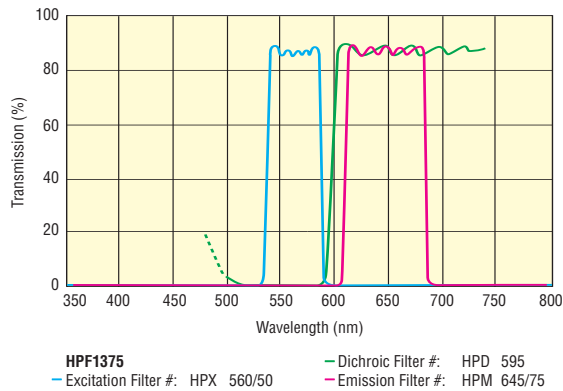
Fluorophores: Calcium Crimson™



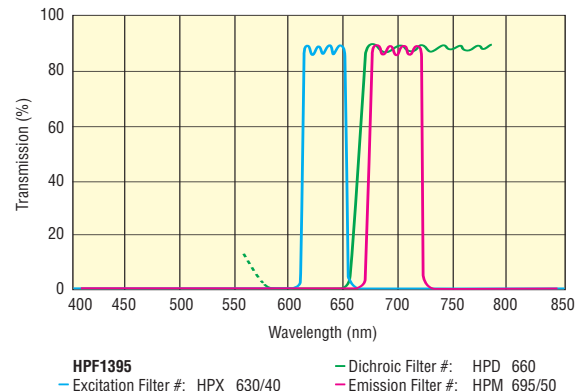
Fluorophores: Alexa Fluor® 633



Fluorophores: Propidium Iodide



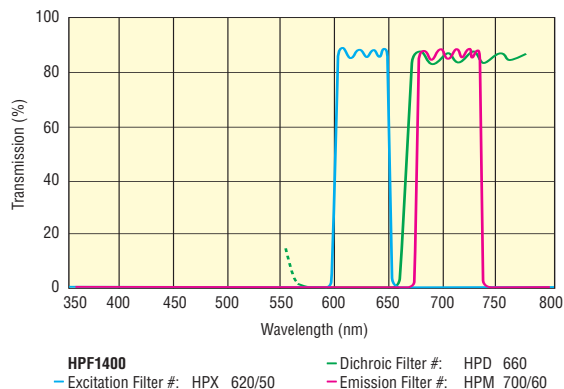
Fluorophores: Cy5™



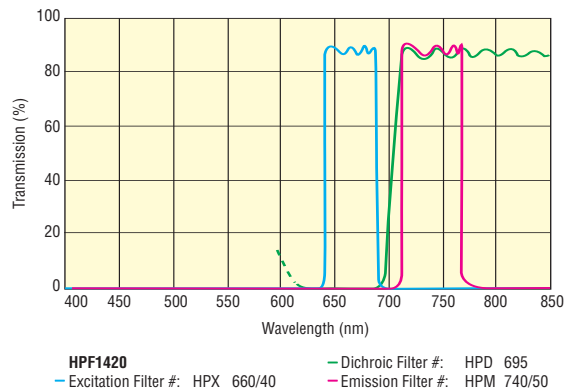
Fluorophores: Resorufin, Texas Red®

Fluorophores: BODIPY® 650/665

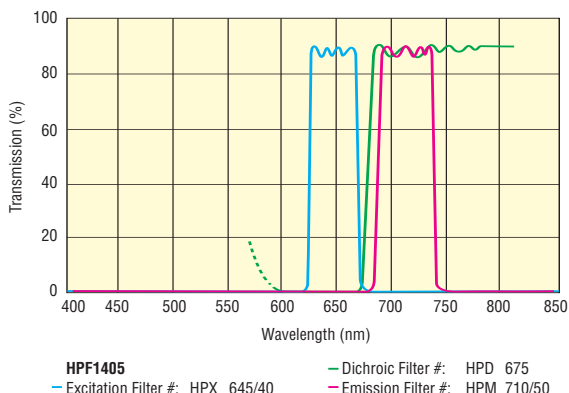
## HPF™ Fluorescence Filter Set – Spectral Data (continued)



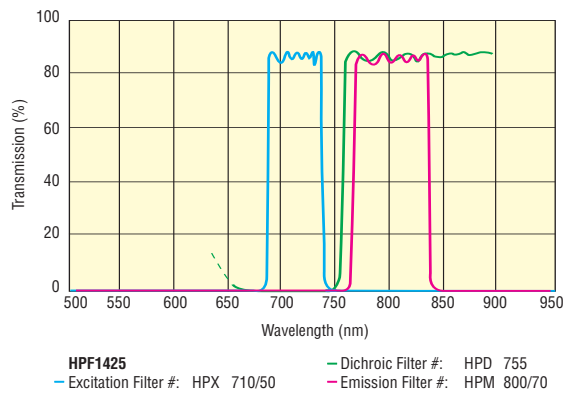
Fluorophores: Alexa Fluor® 647



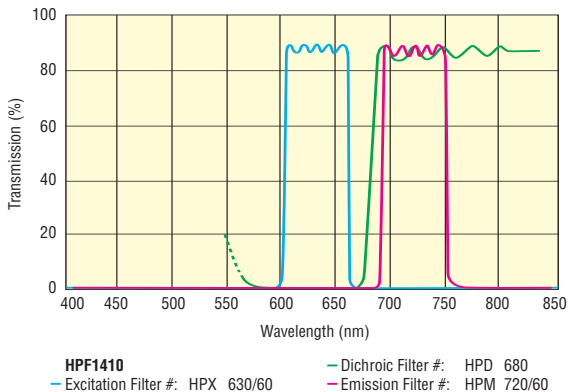
Fluorophores: Alexa Fluor® 700



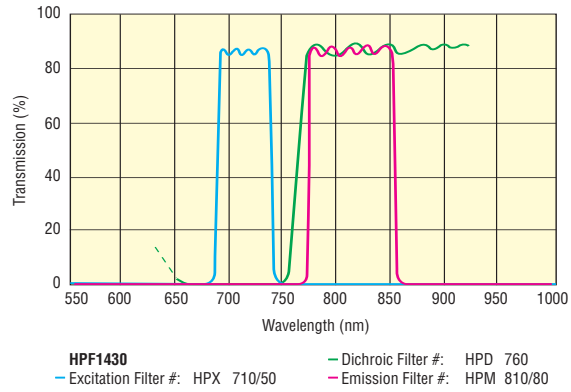
Fluorophores: Cy5.5™



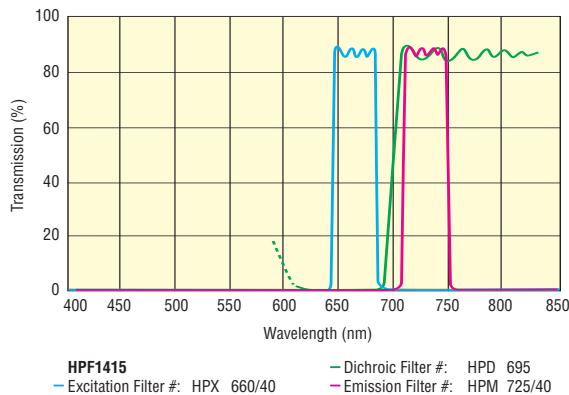
Fluorophores: Cy7™



Fluorophores: Alexa Fluor® 660



Fluorophores: Alexa Fluor® 750



Fluorophores: Alexa Fluor® 680

## Ordering Information

Catalog HPF™ filters are available as complete filter sets including an excitation filter, a dichroic filter, and an emission filter. Please consult a sales professional for pricing information. Filter sets may be ordered using their set number.

Custom sizes of HPF™ filter sets as well as mounting services are available upon request. Please consult a sales engineer for details.

## Stabilife® Coating Technology

Newport's HPF™ fluorescence filters are manufactured using our patented Stabilife® coating technology. Some of the key features and benefits of this technology are provided in the paragraphs that follow.



Newport's Stabilife Reactive Ion Plating Deposition System

Stabilife® optical filters and coatings are manufactured using two patented processes for the deposition of metal oxide thin film optical coatings; Reactive Ion Plating (RIP) and Hybrid Plasma Enhanced Deposition (HPED). Both processes yield highly dense, thin film coatings with extraordinary hardness, abrasion resistance, and adhesion to the substrate. Our Stabilife processes have been in full-scale production at our Corion coating facility in Franklin, Massachusetts since the early 1990s.

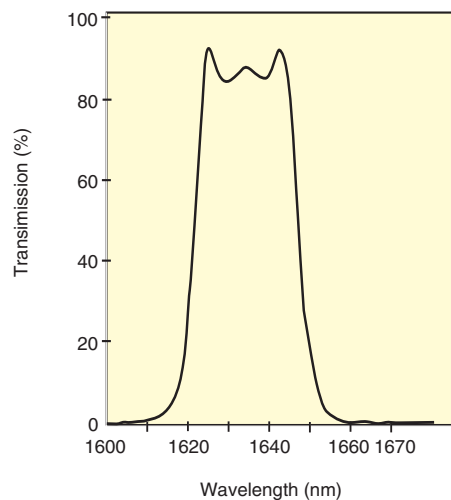
## Spectral Stability

Optical components which directly affect the spectral performance of an optical system must be able to deliver repeatable and accurate wavelength vs transmission response, regardless of the operating conditions. In some applications, un-stabilized metal oxide optical coatings or laminated soft-film coatings are adequate to meet the required performance parameters. However, for some of the more demanding applications such as fluorescence detection, wavelength stability is absolutely critical to insure dependable results. Stabilife optical filters and coatings provide the solution for these high accuracy applications.

## Film Density & Spectral Stability

Film density is a critical factor affecting the spectral stability of an optical coating. Un-stabilized metal oxide thin film coatings typically exhibit a significantly lower packing density than Stabilife coatings. This occurs as a result of the intrinsic growth properties of the coating materials when deposited using methods which do not enhance film densification. The film structure of un-stabilized metal oxide film tends to be columnar with a significant number of voids. The presence of these voids contributes to the occurrence of environmentally induced spectral shift in un-stabilized external coatings. Changes in wavelength, which are influenced by the presence of voids, tend to be elastic in nature and depend upon the ambient relative humidity in which the coating is being used. The permeability of the film will determine the degree to which this phenomenon will occur. Spectral shifts in the range of 2-5% of wavelength are typical of un-stabilized metal oxide coatings. Stabilife coatings have a higher packing density and lower void ratio than un-stabilized metal oxide coatings and are therefore less affected by water absorption. They typically exhibit total wet-to-dry shifts of less than 0.02% of wavelength.

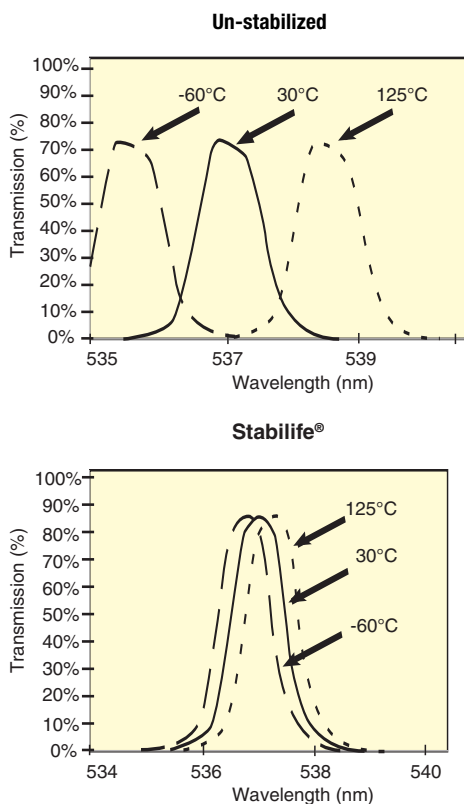
Humidity Stability of Stabilife® Filters



Measured transmittance scans of a Stabilife filter at 0% and 100% relative humidity. Scans are exactly overlaid as no shift is discernable at the standard scan speed for a 30nm bandwidth filter.

## Thermal Properties & Spectral Stability

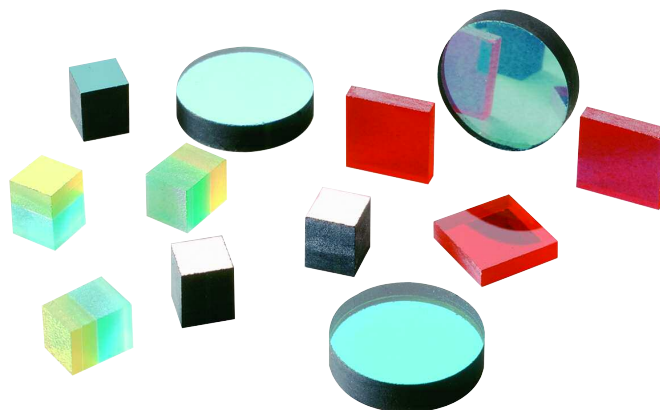
Stabilife films are typically 5 to 10 times less sensitive to thermal variation than un-stabilized metal oxide films as a result of film densification. Temperature change functions as a catalyst for moisture migration in thin films having a significant volume of voids. When un-stabilized films are exposed to high temperatures, moisture migrates out of film voids contributing to the wavelength change discussed earlier. The high film density and reduced permeability resulting from the Stabilife processes reduces this effect providing the maximum spectral stability available for all types of precision coatings including bandpass, dichroic, edge, notch and polarizer coatings.



Measured temperature-induced wavelength shift of an un-stabilized metal oxide ultra-narrow bandpass filter compared to a Stabilife® ultra-narrow bandpass filter.

### Physical Durability

Stabilife® thin-film optical coatings have demonstrated excellent resistance to damage due to handling, extreme nuclear and optical radiation, and severe environmental conditions. In the most severe applications, such as autoclave immersed nuclear reactor monitoring, Stabilife filters have demonstrated spectrally stable performance lifetimes exceeding 8,000 hours. Stabilife filters have been qualified for telecommunications applications per the requirements of Telcordia GR-2883. While most applications are much less demanding than these, the same robust coatings required for extreme applications are routinely supplied for all Stabilife products. In the course of normal production, Stabilife films are tested for adhesion using the snap tape test specified in MIL-C-48497, for abrasion resistance using the eraser test specified in MIL-C-675, and for humidity resistance using the aggravated test specified in MIL-STD-810E. Stabilife thin-film optical coatings require no additional protection such as hermetic sealing using lamination or other processes, to achieve their exceptional durability.



Custom Stabilife® Filters

### Typical Stabilife® General Specifications

Spectral Range	200 nm to 3.0 μm
Surface Quality	F/F (80/50) per MIL-F-48616 (typical); D/C (40/20) or C/B (20/10) achievable
Coating Hardness	MIL-C-48497
Coating Abrasion Resistance	MIL-C-48497
Coating Adhesion	MIL-C-48497
Coating Humidity Resistance	MIL-STD-810, Method 507.3, Procedure III, Modified to 40 cycles**
Coating Operating Temperature Range	-100 ° C to 300 ° C**
Filter Size Range	1 mm to 300 mm
Filter Thickness Range	0.5 mm to 20 mm

\*\*The specifications for humidity resistance and coating operating temperature range listed above apply to exposed coatings only. Humidity resistance and operating temperature range of filters manufactured using Stabilife® coatings and assembled using epoxy systems revert to the humidity resistance and operating temperature range of the epoxy system.

### Newport's Corion Optical Filters & Coatings History

Established in 1967, Newport's Franklin facility has been supplying Corion brand optical filters and coatings for more than 35 years. With the acquisition of Spectra-Physics® Lasers and Photonics, which included the Franklin coating facility, Newport significantly expanded its thin-film coating capability. In addition to the Irvine coating operations, we manufacture optical coatings in our Tucson, AZ, Rochester, NY, Mt. View, CA, and Franklin, MA facilities. A significant portion of this coating capacity is devoted to vertically integrated manufacturing such as our intra-cavity laser optics coating facility, supporting our laser manufacturing operations, and our Rochester coating facility which supports diffraction grating manufacturing. Newport's Franklin facility is focused upon manufacturing optical filters and coatings for direct sale as components to OEMs and end-users.

## Products

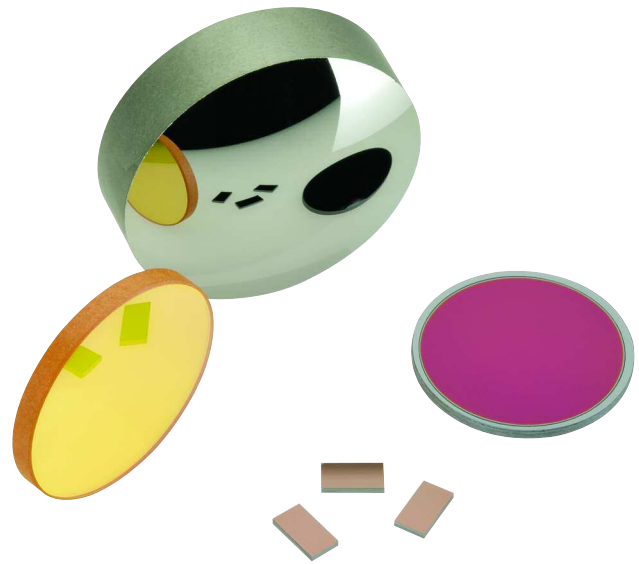
We manufacture a wide variety of products based upon thin-film coating technology. Our products span the spectrum from 150 nm to 16  $\mu\text{m}$ . Our major product families include:

- Anti-reflection
- Bandpass
- Beamsplitter
- Conformal
- Dichroic
- Fluorescence
- Long/Short wave pass
- Metallic reflector
- Neutral density
- Notch

## Applications

Our custom filters are the enabling optical technology in instruments ranging from DNA Analyzers to Desktop Printers. We collaborate with OEM instrument design engineers to define filters & coatings that will deliver optimum performance in their application. Below are just a few of the many applications where Newport filters and coatings are the preferred choice:

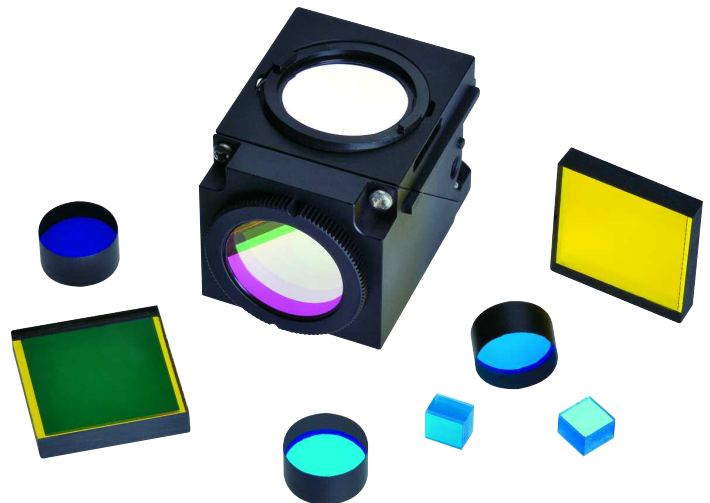
- Clinical Chemistry Systems
- DNA Analysis Systems
- Rangefinders
- Laser Safety Eyewear
- Paint Color Matching Systems
- Thermal Imaging Systems
- Confocal Microscopy Systems
- Flow Cytometers
- Environmental Monitoring Systems
- Endoscopes
- Moisture Measurement Systems



*Filters & coatings for mid-wave and long-wave infrared applications*



*Filter wheels for clinical chemistry analyzers*



*Filters for fluorescence detection*

## Manufacturing/Inspection

We process orders for quantities as large as one million and as small as one and we maintain one of the highest customer satisfaction ratings in the process. We have coating chambers that coat 1 – 6" square plate at a time and chambers that coat 16 – 6" squares at a time. We coat a wide variety of substrates including optical glasses, semiconductors, and crystals in a full range of shapes containing plano, spherical, and aspherical surfaces. To insure that our products perform to the high standards required by today's sophisticated technologies, we maintain inspection capabilities that allow us to perform high precision spectral measurements from 150 nm to 30  $\mu\text{m}$ , as well as measurements of physical, optical and environmental parameters ranging from humidity resistance to transmitted wavefront error.

## Precision Optics

Newport's precision optics manufacturing operation, located in Irvine, CA, provides a comprehensive fabrication capability for plano, spherical and aspherical optics in a wide variety of transmissive materials ranging from Fused silica for Ultraviolet optics to II-IV materials for infrared optics, as well as metals for reflective optics. Our fabrication processes include traditional grinding and polishing, diamond machining, and Magnetorheological Finishing. To support our optics fabrication, we maintain a large array of optical metrology equipment which allows us to test for wavefront distortion, focal length, MTF, wedge, and surface roughness. We fabricate optics ranging from 10 mm to 250 mm in size, from 80/50 to 10/5 in surface quality, and from commercial flatness to  $\lambda/40$ . In addition to providing a wide variety of optics for our catalog product offering, high precision laser optics for our laser manufacturing, and large volume OEM optics, Newport's precision optics operation is the principal provider of spherical and aspherical optics for the Franklin coating operation.

## Trademark Information

Alexa Fluor<sup>®</sup>, BODIPY<sup>®</sup>, Calcium Crimson<sup>™</sup>, LysoSensor<sup>™</sup>, MitoTracker<sup>®</sup>, Oregon Green<sup>®</sup>, Pacific Blue<sup>™</sup>, Rhodamine Green<sup>™</sup>, and Texas Red<sup>®</sup> are trademarks of Molecular Probes, Inc., Cy is a trademark of GE Healthcare, Ltd., Corion<sup>®</sup>, Stabilife<sup>®</sup>, XM<sup>™</sup> and HPF<sup>™</sup> are trademarks of Newport Corporation.



*Germanium and Zinc Selenide optics*

[www.newport.com](http://www.newport.com)



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**Newport Corporation, Irvine, California, has been certified compliant with ISO 9001 by the British Standards Institution.**

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