

Whatman™ FFHP membranes

LATERAL-FLOW ASSAY MEMBRANES

Nitrocellulose membranes are a key functional part of a lateral-flow assay (LFA). The role of the membrane is to provide sufficient protein binding capacity to facilitate the formation of a sharp and intense capture line while ensuring the level of nonspecific background is low enough to allow easy interpretation of results. Nitrocellulose membranes are available in a range of wicking rates and formulations.

Fast flow, high performance (FFHP) membranes are part of the AE family of backed nitrocellulose membranes. They are available in standard, thick, and plus thick ranges to allow incorporation into already optimized LFAs with minimal optimization work required.

- **FF80HP membranes:** Backed and highly consistent membranes for use with high-density samples (e.g., undiluted serum) in a lateral-flow assay.
- **FF120HP membranes:** Backed and highly consistent membranes for use with most sample types in a lateral-flow assay.
- **FF170HP membranes:** Backed and highly consistent membranes for use with low-viscosity samples in a lateral-flow assay.

FFHP membranes are an excellent solution as either a replacement for competitive products or a simple secondary supply option for an existing validated component. They were created for easy swap-out of similar nitrocellulose membranes used for lateral-flow immunoassay tests and assay development.

FFHP membranes were developed using improved casting procedures to yield a uniform, powder-free surface that delivers razor-sharp lines and highly reproducible results. Benefits include:

- Excellent intra- and inter-lot consistency as demonstrated by a coefficient of variation (CV) for capillary rise of < 10%.
- Fine structure fiber distribution provides large internal surfaces for binding proteins.
- Manufacturing process that reduces the likelihood of any hydrophobic patches in the membrane.



Fig 1. FFHP membranes can be supplied in reels.

- Reduced assay optimization requirements (cost and time) compared to a less consistent membrane.
- Minimal amount of unincorporated nitrocellulose powder (often referred to as “sticky dust”) on the surface of the membrane, providing enhanced consistency in application.

Spotlight on FFHP Plus thick membranes

The FFHP Plus thick membranes have an enhanced surfactant to ease optimization in your assay:

- **Capillary flow time:** 60 to 210 s (dependent on grade) with water for 4 cm distance on a 10 mm wide membrane strip, cross-web, strip mounted perpendicular to the lab bench
- **Thickness:** Up to 235 µm
- **Format:** Available in custom slit reel format, card, sheet, or strip format

Based on the quality testing of a group of validated samples in terms of thickness and flow rate, our data demonstrates that our membranes are manufactured within the promised range and only deviate approximately $\pm 10\%$ in terms of thickness and flow rate from the given norm.

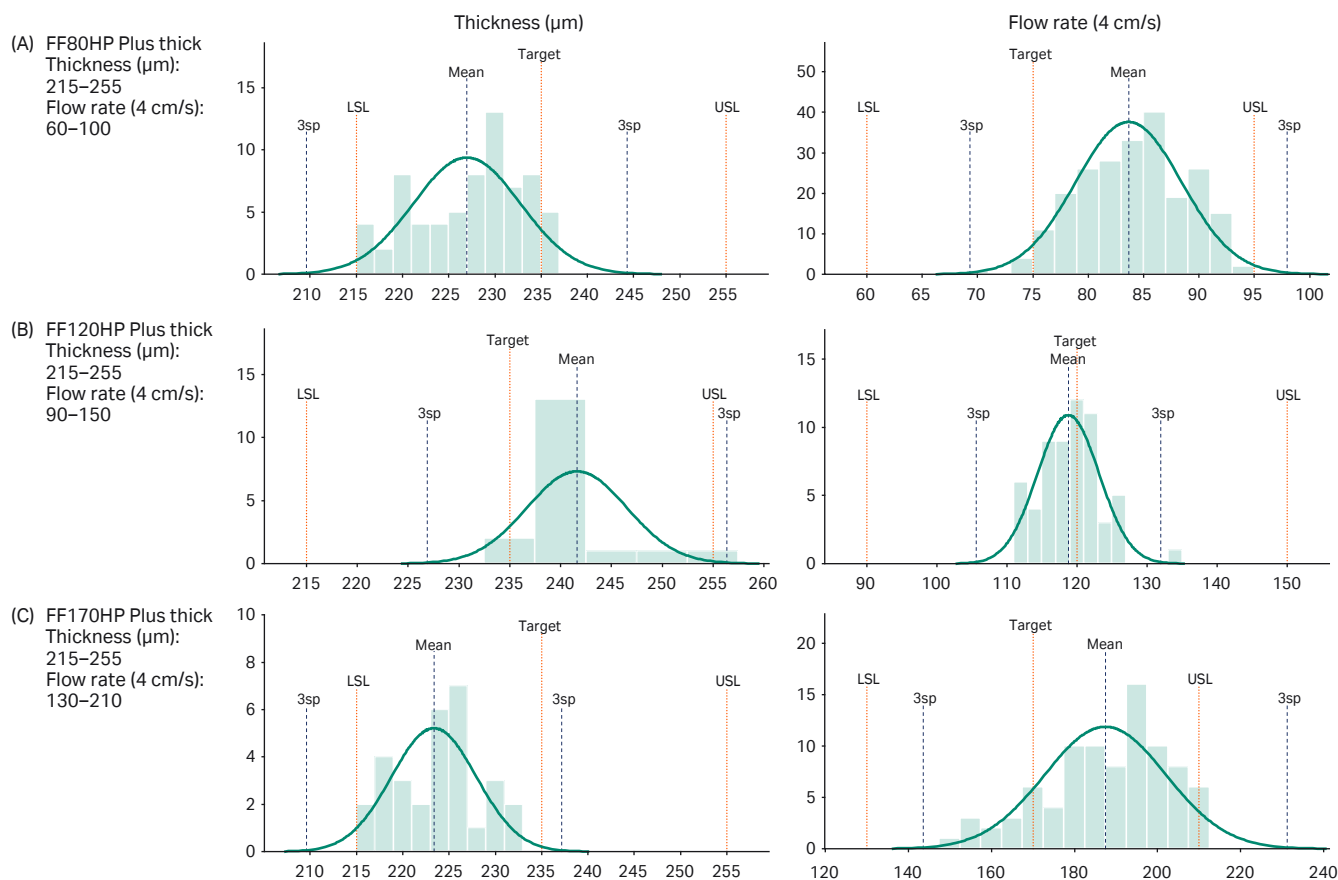
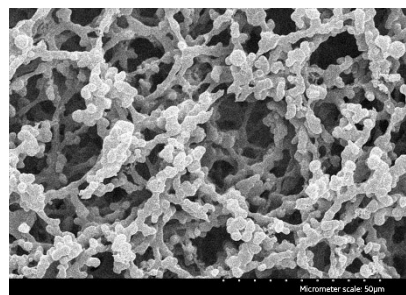


Fig 2. Thickness and flow rates for (A) FF80HP Plus thick membranes, (B) FF120HP Plus thick membranes, and (C) FF170HP Plus thick membranes.

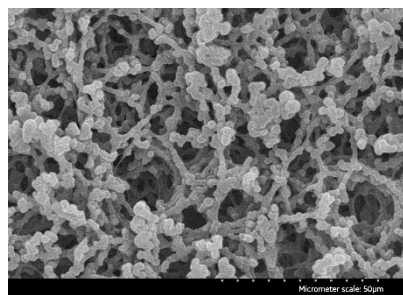
Surface quality

As demonstrated by the images in Figure 3, the surface of these membranes is uniform with minimal amounts of unincorporated nitrocellulose powder, while the fine structure fiber distribution provides large internal surfaces for binding proteins. This surface structure ensures the membranes are of the highest levels of quality for LFAs.

FF80HP Plus thick



FF120HP Plus thick



FF170HP Plus thick

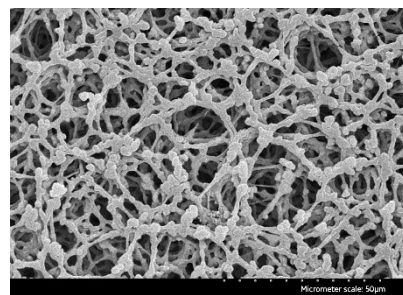


Fig 3. Uniform surface and fine structure fiber distribution of the FF80HP Plus thick membranes.

Flow rates and sensitivity

Our nitrocellulose membranes are available in a range of wicking rates and formulations. The wicking rate of a membrane has a significant impact on test sensitivity.

Table 1. Sensitivity is inversely proportional to the flow rate

Membrane	Flow rate (4 cm/s)	Flow rate	Sensitivity
FF80HP Plus thick	60–100	Fastest	Least sensitive
FF120HP Plus thick	90–150	↓	↑
FF170HP Plus thick	130–210	Slowest	Most sensitive

*Note: Customized versions of the grade are also available when a bespoke flow rate is required (minimum order quantities may apply).

Quality control and assurance

All our FFHP Plus thick membranes are manufactured within factories that have a certified quality system of ISO 9001 and EN ISO 13485, and the product is tested in accordance with documented quality procedures and approved as a result of meeting the required specification. There is immediate availability for sampling with unrestricted production.

To demonstrate that the membranes are manufactured to the same standards each time, you will find a detailed certificate of analysis (COA) for every lot of our FFHP Plus thick membranes indicating the quality control (QC) test data and specific lot information.

Ordering information

Below are the details of the most popular versions of our FFHP membranes. Please reach out to your local Diagnostic Account Manager if you require any other format. We offer a full customization service including bespoke dimensions such as different reel widths or pack sizes.

Grade	Dimensions	Capillary flow rate (4 cm/s)	Thickness	Product code
FF80HP	20 mm × 50 m	60–100	200 µm	10547002
	25 mm × 50 m	60–100	200 µm	10547003
	210 × 297 mm	60–100	200 µm	13549206
	60 (25) × 300 mm	60–100	200 µm	10547020
FF80HP Plus	210 × 297 mm (A4)	60–100	200 µm	10547118
	20 mm × 50 m	60–100	200 µm	10547041
	25 mm × 50 m	60–100	200 µm	10547042
	20 mm × 100 m	60–100	200 µm	10547121
	25 mm × 100 m	60–100	200 µm	10547119
	35 mm × 50 m	60–100	200 µm	10547138
FF80HP Plus thick	20 mm × 50 m	60–100	235 µm	10547155
	25 mm × 50 m	60–100	235 µm	10547156
	210 × 297 mm	60–100	235 µm	13547204
	60 (25) × 300 mm	60–100	235 µm	10547154
FF120HP	20 mm × 50 m	90–150	200 µm	10547006
	25 mm × 50 m	90–150	200 µm	10547001
	210 × 297 mm	90–150	200 µm	13549205
	60 (25) × 300 mm	90–150	200 µm	10547021
FF120HP Plus	20 mm × 50 m	90–150	200 µm	10547126
	25 mm × 50 m	90–150	200 µm	10547125
	210 × 297 mm	90–150	200 µm	10547117
	60 (25) × 300 mm	90–150	200 µm	10547129
FF120HP Plus thick	20 mm × 50 m	90–150	235 µm	10547152
	25 mm × 50 m	90–150	235 µm	10547149
	210 × 297 mm	90–150	235 µm	13547200
	60 (25) × 300 mm	90–150	235 µm	13547202
FF170HP	20 mm × 50 m	140–200	200 µm	10547004
	25 mm × 50 m	140–200	200 µm	10547005
	210 × 297 mm	140–200	200 µm	13549204
	60 (25) × 300 mm	140–200	200 µm	10547023
FF170HP Plus	20 mm × 50 m	140–200	200 µm	10547043
	25 mm × 50 m	140–200	200 µm	10547044
	210 × 297 mm	140–200	200 µm	10547116
	20 mm × 100 m	140–200	200 µm	10547122
	25 mm × 100 m	140–200	200 µm	10547120
	60 × 300 mm	140–200	200 µm	10547142
FF170HP Plus thick	20 mm × 50 m	130–210	235 µm	10547153
	25 mm × 50 m	130–210	235 µm	10547147
	210 × 297 mm	130–210	235 µm	13547201
	60 (25) × 300 mm	130–210	235 µm	13547203

*Note: The '60 (25) × 300 mm' description above refers to a 25 × 300 mm nitrocellulose membrane ready-mounted on a 60 × 300 mm laminate card, allowing easy assembly of your LFA strip.

Related products

As we offer a full range of components for LFAs, please see below details of other related products.

Product	Grade	Dimension	Product code
Sample pad	CF1	22 mm × 50 m	8111-2250
	CF3	22 mm × 50 m	8113-2250
	CF4	22 mm × 50 m	8114-2250
	Grade 470	22 mm × 50 m	10539995
	ST14	22 mm × 50 m	8133-2250
	ST17	22 mm × 50 m	8134-2250
Conjugate release pad	GF/DVA	22 mm × 50 m	8145-2250
	ST14	22 mm × 50 m	8133-2250
	ST17	22 mm × 50 m	8134-2250
Absorbent pad	Fusion 5	22 mm × 50 m	8151-9915
	CF3	22 mm × 50 m	8113-2250
	CF4	22 mm × 50 m	8114-2250
	CF5	22 mm × 50 m	8115-2250
	CF7	22 mm × 50 m	8117-2250

Alternatively, we suggest the following sample kits, which contain 3 × A4 sheets of each grade for easier screening of different grades during development:

Product	Description	Product code
CF/GF starter pack	A sample pack containing all our cellulose and glass fiber pads including all blood separators, sample pads, conjugate pads, and absorbent pads	29363634
Nitrocellulose membrane starter pack	A sample of all our nitrocellulose grades for LFA	13549210
Combo starter pack	A pack containing both our CF/GF and nitrocellulose starter packs	29428668

Custom lamination service

Start-up diagnostic developers can benefit from our laminated cards and custom lamination service:

- Alleviate the financial burden of capital equipment expenditures
- Improve intra- and inter-lot consistency of product through the use of our automated lamination technologies
- Reduce the costs associated with selection of materials for a specific application
- Avoid issues related to adhesive contamination of the membrane and components of the lateral-flow test
- Take advantage of our many years' experience with immunoassay development and custom manufacturing capabilities

Whatman™ laminated cards feature a 25 mm width of FF high performance (HP), large-pore, direct-cast nitrocellulose membrane bound to a 60 × 300 mm polystyrene card backing. The backing thickness is 10 mil (254 µm). These cards can be customized for your application. Customization possibilities include:

- Lateral-flow membranes laminated on self-adhesive backings with custom card dimensions and/or material positions
- Ability to dispense multiple lines (e.g., for allergy or autoimmune disease diagnostics) on small pore-sized membranes with a backed version of the membrane

- Backing with custom printing (e.g., a logo or test name)
- Backing for a line assay that has adhesive on both sides, or an adhesive-free zone

If you require a specific backing material and/or custom dimensions, your Diagnostic Account Manager will request a drawing of the backing card describing the dimensions required and the specifications of the backing material.

Note: Maximum card dimensions: 60 cm long; 10 cm wide.

Point of care immunoassay development

Our immunoassay development services provide early-stage developers access to our point-of-care, lateral-flow expertise, infrastructure, and proven development methodologies.

Dr. Klaus Hochleitner, an industry-recognized authority in point-of-care diagnostics development, leads our team of experienced specialists in state-of-the-art laboratories in Dassel, Germany. The team can help you solve challenges and optimize your prototype development to shorten time to commercialization. We also provide hands-on training and education, both on-site at our labs or off-site at locations convenient to you. Your team can learn from us while advancing the development of your prototype.

Find out more: [cytiva.com/immunoassay-development-services](https://www.cytiva.com/immunoassay-development-services)

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