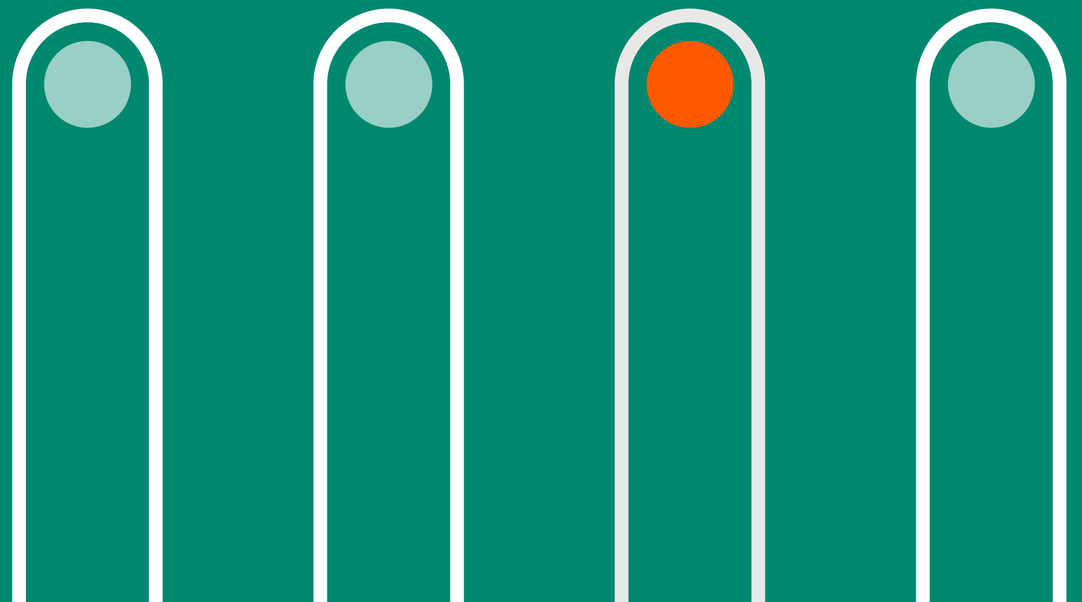
Helping you build a smarter diagnostic assay

Customizable components and reagents and a selection of services for immunoassay and molecular diagnostic applications



cytiva

Contents

01	**Helping you build a smarter diagnostic assay**	3
02	**Point-of-care immunoassays**	4
03	**Lab-based immunodiagnostics**	28
04	**Point-of-care molecular assays**	33
05	**Lab-based molecular diagnostics**	36
06	**Diagnostic services**	41

Helping you build a smarter diagnostic assay

When you collaborate with Cytiva you get access to a wide selection of high performance, customizable components and solutions for immunoassay and molecular diagnostic applications. Our innovative stabilization technologies enable you to manufacture diagnostic kits that don't require refrigeration during shipping and storage, helping you to reach more patients at point of care. You also benefit from Cytiva's extensive experience and expertise, not only when unexpected issues emerge, but from design stage through launch. Our experts will help you optimize components, identify the best-suited technologies, and offer invaluable assistance to help expand your customer base and get you in-market earlier. That's what smart, reliable, and cost-efficient diagnostic solutions are made of.

Point-of-care immunoassays

Cytiva is an established technology component provider for point-of-care immunodiagnostic assays, specifically:

- Lateral-flow immunoassays
- Flow-through immunoassays
- Dipstick colorimetric assays

We produce a vast array of cellulose and glass fiber substrates and nitrocellulose membranes to an assured quality, ensuring accurate and reproducible results.

Lateral-flow immunoassay

With a diverse array of products, Cytiva is one of the leading suppliers in lateral-flow technology. Our offering includes our wide range of blood separation products, conjugate release pads, nitrocellulose membranes, and absorbents.

Developments in lateral-flow immunoassay systems allow for single step assays that require only the addition of a sample. The sample flows through the device and comes in contact with dried reagents, usually a tagged secondary antibody. The antibody and analyte migrate to a capture zone of membrane-immobilized antibody. Any unreacted tagged antibody flows past the capture zone.

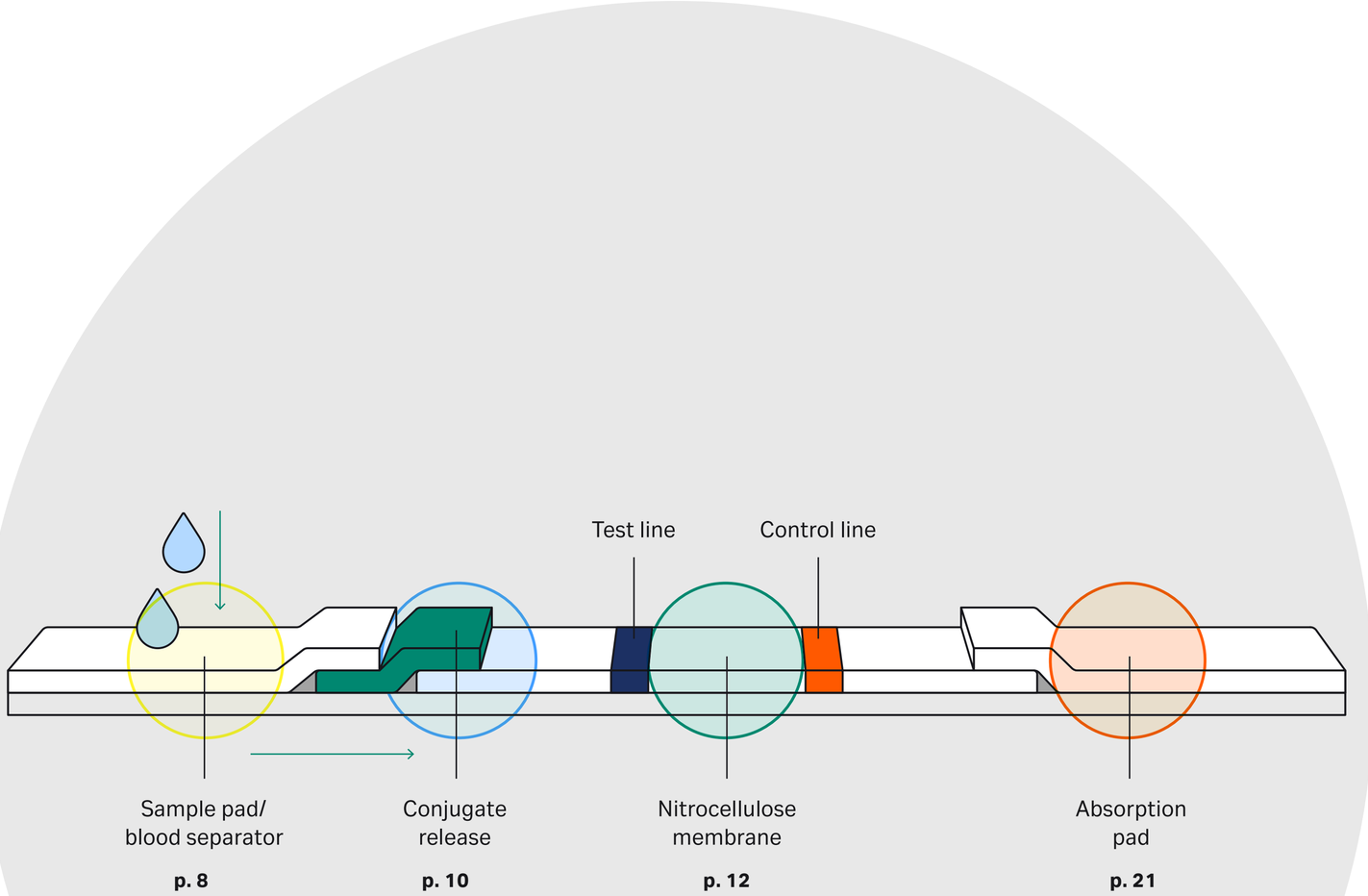


Fig 1. Drawing of a lateral flow immunoassay, showing its different components.

Sample pads for lateral-flow immunoassay

Sample pads begin the assay by transporting samples from the point of application to the test components.

To ensure that your assay begins without complications, Cytiva offers a complete range of high-quality sample pad materials.

Features and benefits:

- **Consistent absorbency and wicking rates:** Ensures test-to-test reproducibility
- **Product manufactured in controlled environments from highest-quality material:.** No false results due to sample contamination
- **Low protein binding:** Minimal loss of analyte, so test sensitivity is maintained
- **Naturally hydrophilic:** Rapid rewetting after prolonged storage
- **Wide range of thickness, absorbency and wicking rate**
- **Compatible with most styles of housings**
- **Minimal leakage along the strip:** No contamination of test results

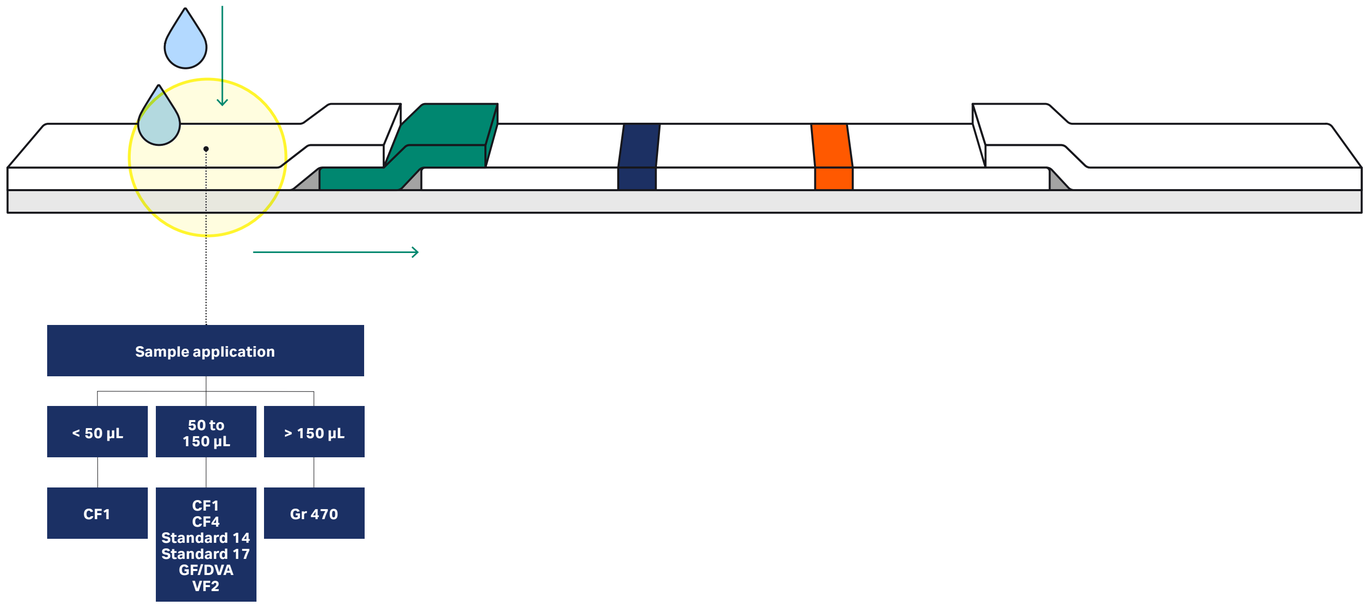


Fig 2. Sample pads selection tree.

Technical properties / ordering information

Product code	Product	Material	Properties	Thickness (µm @ 53 kPA)	Wicking rate (s/4 cm)	Water absorption (mg/cm²)	Dimensions
8111-2250	CF1	100% cotton linter	Light, thin grade suitable for small volume	176	207.3	18.7	CF1 22 mm × 50 m
8114-2250	CF4			482	67.3	49.9	CF4 22 mm × 50 m
8133-2250	Gr470			840	77	78	STD 14 22 mm × 50 m
8134-2250	Standard 14	Bound glass fiber	Faster flow than cotton, with lower sample retention	355	23.1	50.9	STD 17 22 mm × 50 m
8124-1750	Standard 17			370	34.5	44.9	VF2 17 mm × 50 m
10539995	GF/DVA		Works well with saliva samples and can act as a blood separator as well	785	28.2	93	GRADE 470 22 mm × 50 m
8124-1750	VF2			785	23.8	86.2	VF2 17 mm x 50 m

Custom sizes and specifications available on request. Contact your local Diagnostic account manager.

Blood separators for lateral-flow immunoassays

Because of the increasing demand for whole-blood assays, Cytiva offers a family of blood separators to meet the strict requirements of the rapid diagnostic market. Our blood separators for lateral-flow immunoassays enable whole blood analysis, with no red cell hemolysis.

The highly asymmetric Vivid plasma separation membranes are optimized for one-step plasma separation from whole blood without the need for centrifugation and our patented Leukosorb leukocyte removal medium is a highly wettable, fibrous matrix designed for use in procedures requiring isolation of leukocytes from whole blood samples.

Features and benefits:

- **Separation in 30 to 120 s:** Rapid assays save time
- **No appreciable red cell hemolysis:** Improved reproducibility
- **Consistency of materials:** Reliability
- **Materials suitable for use in a range of tests:** Flexibility in test optimization
- **Choice of separation times:** Allows for test optimization
- **Separators appropriate for a range of blood volumes:** Enhances the separation rate according to the volume of blood available

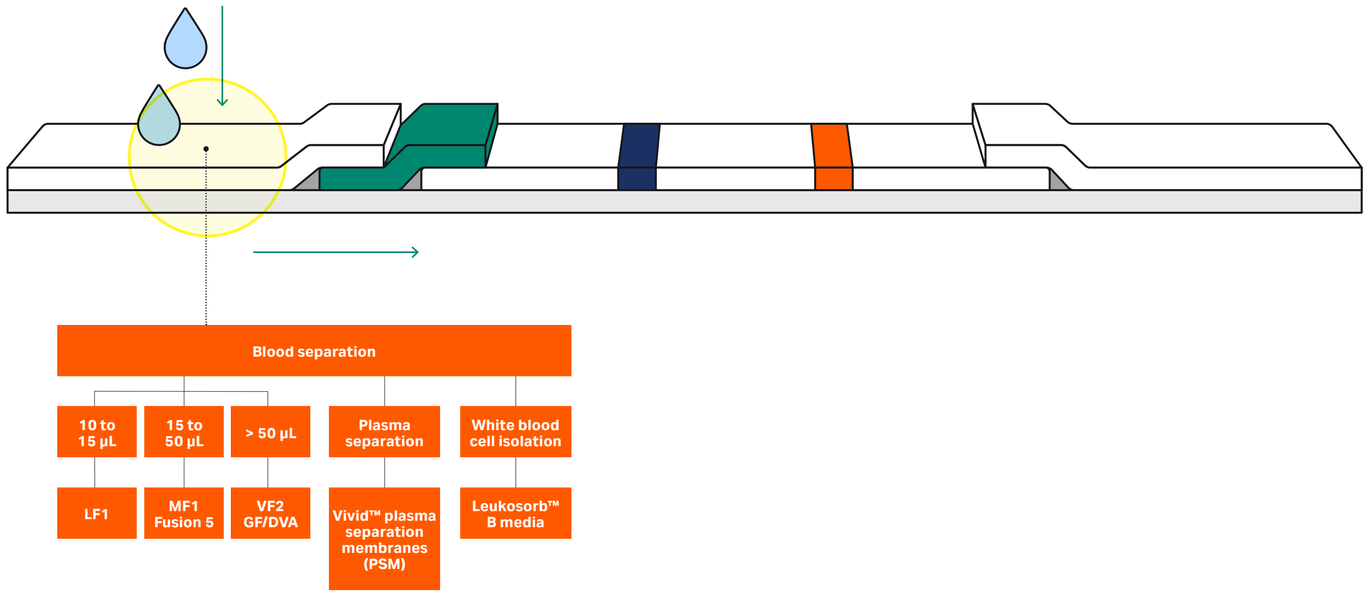


Fig 3. Blood separator selection tree.

Technical properties / ordering information

Product code	Product	Properties	Thickness (µm @ 53 kPA)	Wicking rate (s/4 cm)	Water absorption (mg/cm²)	Dimensions
8145-2250	GF/DVA	Bound glass fiber	785	28.2	93	22 mm × 50 m
8121-1750	LF1	May be used for lateral flow assays. Works well with one drop of whole blood	247	35.6	25.3	17 mm × 50 m
8122-2250	MF1	Used for lateral- or vertical-flow assays. Typically used for whole-blood voulmes around 100 µL	367	29.7	39.4	22 mm × 50 m
8124-1750	VF2	Vertical separator used as single or multiple layers for separation of a wide range of blood volumes	785	23.8	86.2	17 mm × 50 M
8151-9915	Fusion 5	Can be used as a lateral flow blood separator with two drops of whole blood	370	43.9	42.3	25 mm × 50 M
T9EXPPA0200S00A	VIVID PSM GF	Highly asymmetric membranes allowing the cellular components of the blood to be captured in the larger pores without lysis, while the plasma flows down into smaller pores on the downstream side of the membranes	330	-	-	8" × 11" sheet 9" reel
T9EXPPA0200S00X	VIVID PSM GX		330	-	-	8" × 11" sheet 9" reel
T9EXPPA0200S00R	VIVID PSM GR		330	-	-	8" × 11" sheet 9" reel
BSP0669	Leukosorb	Highly wettable, fibrous matrix designed for use in procedures requiring isolation of leukocytes from whole blood samples	355.6 to 558.8	-	-	8" × 10" sheet 9" reel

Custom sizes and specifications available on request. Contact your local Diagnostic account manager.

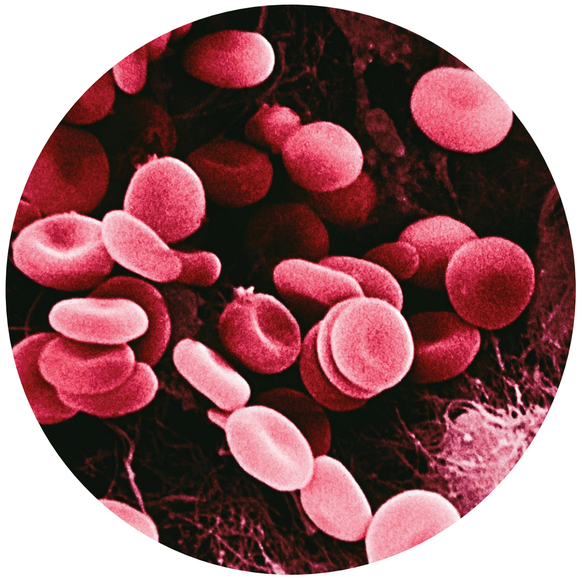


Fig 4. Enlarged view of blood separation.

Conjugate release for lateral-flow immunoassay

Conjugate release pads are critical to lateral-flow immunoassays. To ensure consistent performance, the conjugate must dry without damage or aggregation and release rapidly when the sample comes into contact with it.

Whatman™ conjugate release pads do not require treatment prior to conjugate application, as they are inherently hydrophilic. The open structure of the material allows rapid penetration by both conjugate and sample.

Features and benefits:

- **Higher level of conjugate release:** Less waste means reduced reagent costs
- **Higher capture line intensity, as more conjugate gets to the capture line:** Improved sensitivity
- **Pad rewets naturally and rapidly every time:** Improved consistency

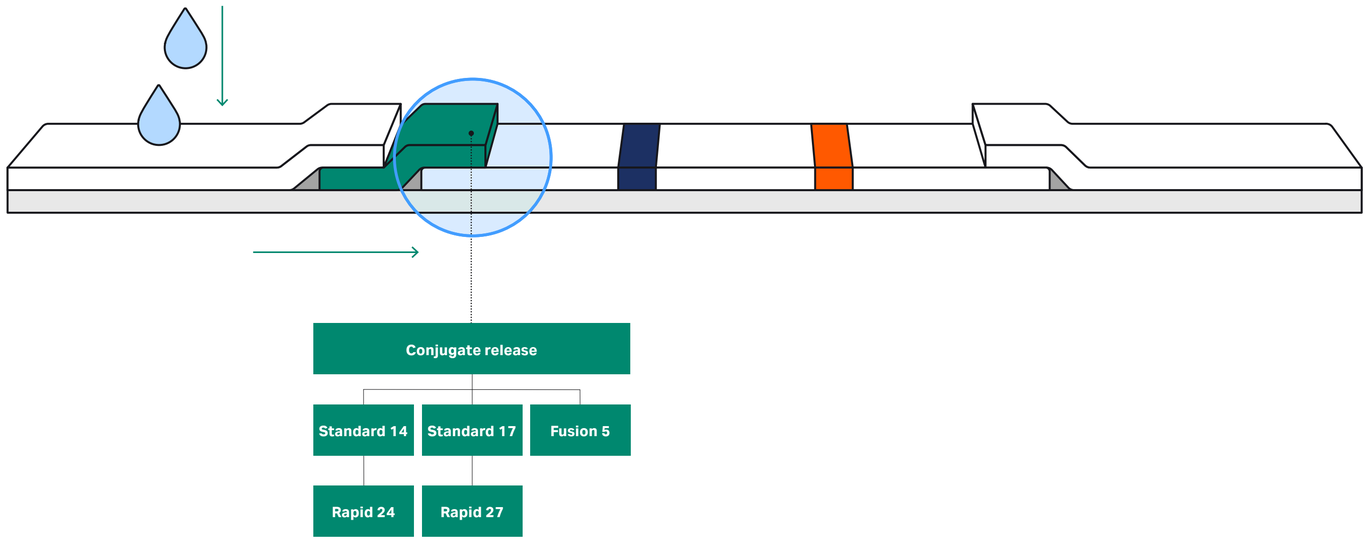


Fig 5. Conjugate release selection tree.

Technical properties / ordering information

Product code	Grade	Thickness (µm @ 53 kPA)	Wicking rate (s/4 cm)	Water absorption (mg/cm²)	Percent release of gold conjugate (after 90 s)	Dimensions
8133-2250	Standard 14	355	23.1	50.9	75	STD 14 22 mm × 50 m
8134-2250	Standard 17	370	34.5	44.9	75	STD 17 22 mm × 50 m
8151-9915	Fusion 5	370	43.9	42.3	>94	Fusion 5 22 mm × 50 m
8131-2250	Rapid 24	348	20	52	80	22 mm × 50 m
8132-2250	Rapid 27	370	28	49	80	22 mm × 50 m

Other slit widths are available; please contact your Cytiva representative for more information.

Membranes for lateral-flow immunoassays

Nitrocellulose membranes are a key functional part of lateral-flow immunoassays.

The membrane must provide sufficient protein binding to produce a sharp and intense capture line, but at the same time the level of nonspecific background must be low enough for easy interpretation of the results.

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.

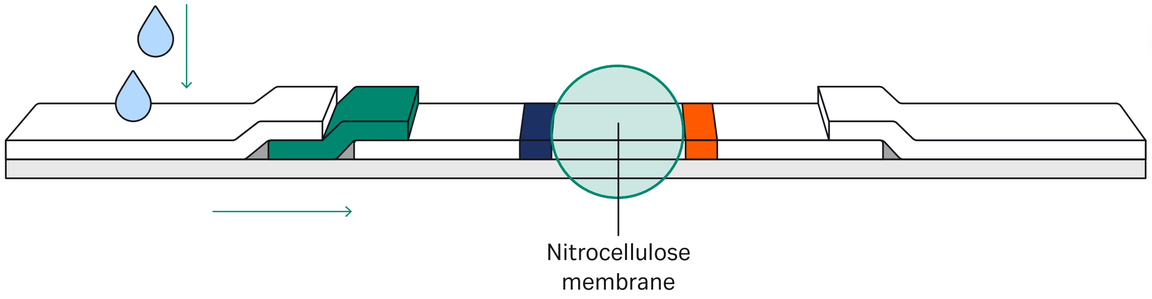


Fig 6. FF120HP membrane.

Membrane selector according to sample type

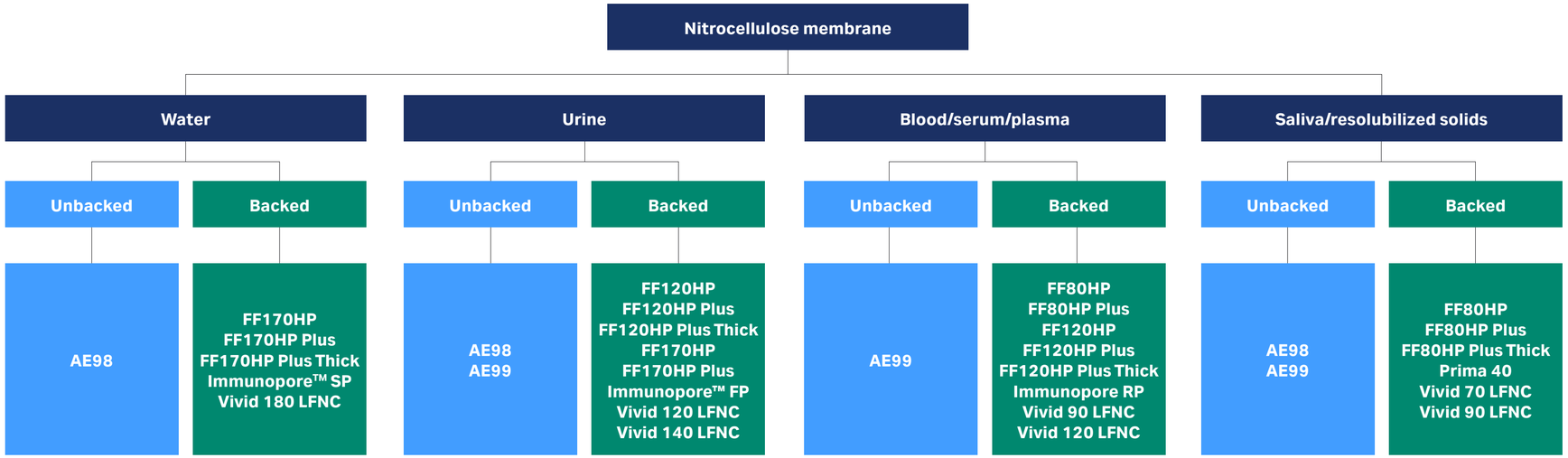


Table 2: Comparison between backed and unbacked membrane features

Backed membrane	Unbacked membrane
• Increased mechanical strength of the membranes, simplifying use in reel-to-reel machines • Direct contact is prevented between the nitrocellulose material and the adhesive from the lamination card where the test elements are mounted	• Enables assay suitability tests of both air and belt side of the membrane

AE nitrocellulose membranes

Constructed of 100% nitrocellulose, the AE membrane family offers a higher level of purity and performance than that seen in post-treated materials. AE membranes have been used extensively since the development of the original lateral flow tests and have become a standard for manufacturers worldwide. There is a long history of success and experience for assay optimization using these products.

AE membranes are unbacked, which means either belt or air side of the membrane can be used.

Technical properties / ordering information

Product code	Grade	Capillary rise (s/4 cm)	Total caliper (µm)	Properties	Dimensions
10549916	AE98	160 to 210	120	An unsupported membrane that gives good line intensity for use with low-viscosity samples	AE98 25mm x 50m 1/pk
10548081	AE99	120 to 160	120	A general-purpose membrane for use with most sample types giving a good combination of sensitivity with fast wicking	AE99 25 mm × 50 m 1/pk

Custom sizes and specifications available on request. Contact your local Diagnostic account manager.

FF high performance — backed nitrocellulose membranes

FF High Performance (HP) membranes are part of the AE family (see page 21) that are directly cast onto a plastic film.

The FF HP membranes are a result of improved membrane casting procedures, which result in enhanced intra- and inter-lot consistency and sharper lines.

The surface is uniform without any unincorporated nitrocellulose powder and the fine structure fiber distribution provides large internal surfaces for binding proteins.

A carefully designed and rigorous manufacturing process results in membranes with high reproducibility and very low intra- and inter-lot variability.

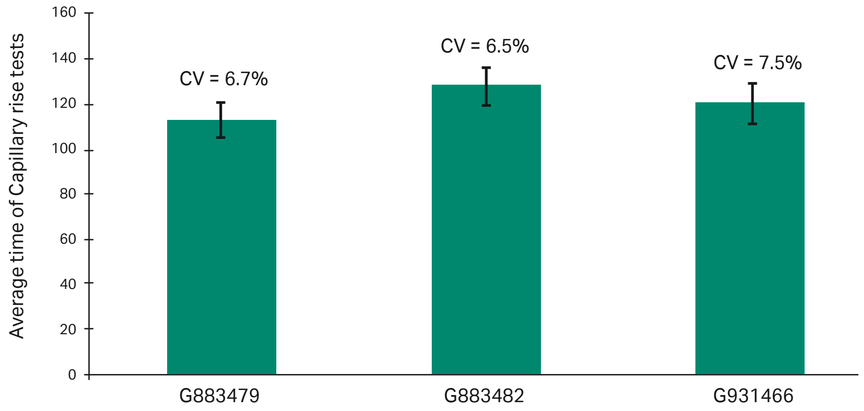


Fig 7. CV and average time of capillary rise tests of three batches. The average time of capillary rise for Lot G883479 was 112.6 ± 7.6 s while that of Lot G883482 was 127.7 ± 8.2 s. In addition, Lot G931466 had an average of 119.7 ± 8.9 s. The CVs for all three batches were 6.7%, 6.5%, and 7.5%, respectively.

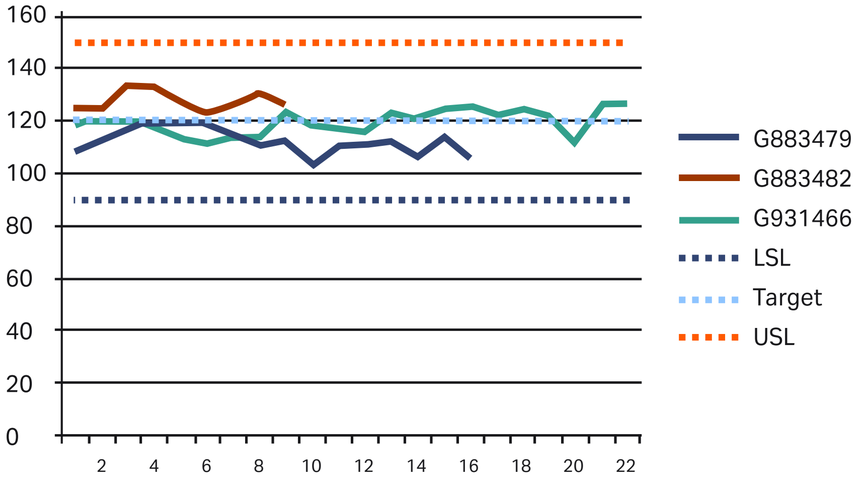


Fig 8. Representation of the capillary rise results shown in figure 10.

Technical properties / ordering information

Product code	Grade	Capillary flow rate s/4cm	Thickness	Properties	Dimensions
10547002	FF80HP	60 to 100	200 µm	A very fast wicking membrane for use with highly viscous samples (e.g. undiluted serum)	20 mm × 50 m
10547003	FF80HP	60 to 100	200 µm		25 mm x 50 m
13549206	FF80HP	60 to 100	200 µm		210 mm × 297 mm
10547020	FF80HP	60 to 100	200 µm		60 (25) mm × 300 mm
10547118	FF80HP Plus	60 to 100	200 µm	A version of the FF80HP membrance with additional surfactant	210 x 297 mm (A4)
10547041	FF80HP Plus	60 to 100	200 µm		20 mm × 50 m
10547042	FF80HP Plus	60 to 100	200 µm		25 mm x 50 m
10547121	FF80HP Plus	60 to 100	200 µm		20 mm × 100 m
10547119	FF80HP Plus	60 to 100	200 µm		25 mm × 100 m
10547138	FF80HP Plus	60 to 100	235 µm		35 mm × 50 m
10547155	FF80HP Plus Thick	60 to 100	235 µm	A thicker version of the FF80HP Plus, to aid sample flow	20 mm × 50 m
10547156	FF80HP Plus Thick	60 to 100	235 µm		25 mm x 50 m
13547204	FF80HP Plus Thick	60 to 100	235 µm		210 mm × 297 mm
10547154	FF80HP Plus Thick	60 to 100	235 µm		60 (25) mm × 300 mm

Custom sizes and specifications available on request. Contact your local Diagnostic account manager.

Technical properties / ordering information

Product code	Grade	Capillary flow rate s/4cm	Thickness	Properties	Dimensions
10547006	FF120HP	90 to 150	200 µm	A general-purpose membrane for use with most sample types	20 mm × 50 m
10547001	FF120HP	90 to 150	200 µm		25 mm x 50 m
13549205	FF120HP	90 to 150	200 µm		210 mm × 297 mm
10547021	FF120HP	90 to 150	200 µm		60 (25) mm × 300 mm
10547126	FF120HP Plus	90 to 150	200 µm	A version of the FF120HP membrance with additional surfactant	20 mm × 50 m
10547125	FF120HP Plus	90 to 150	200 µm		25 mm x 50 m
10547117	FF120HP Plus	90 to 150	200 µm		210 mm × 297 mm
10547129	FF120HP Plus	90 to 150	200 µm		60 (25) mm × 300 mm
10547152	FF120HP Plus Thick	90 to 150	235 µm	A thicker version of the FF120HP Plus, to aid sample flow	20 mm × 50 m
10547149	FF120HP Plus Thick	90 to 150	235 µm		25 mm x 50 m
13547200	FF120HP Plus Thick	90 to 150	235 µm		210 mm × 297 mm
13547202	FF120HP Plus Thick	90 to 150	235 µm		60 (25) mm × 300 mm
10547004	FF170HP	140 to 200	200 µm	A membrane for use with low viscosity samples	20 mm × 50 m
10547005	FF170HP	140 to 200	200 µm		25 mm x 50 m
13549204	FF170HP	140 to 200	200 µm		210 mm × 297 mm
10547023	FF170HP	140 to 200	200 µm		60 (25) mm × 300 mm

Custom sizes and specifications available on request. Contact your local Diagnostic account manager.

Technical properties / ordering information

Product code	Grade	Capillary flow rate s/4cm	Thickness	Properties	Dimensions
10547043	FF170HP Plus	140 to 200	200 µm	A version of the FF170HP membrance with additional surfactant	20mm x 50m
10547044	FF170HP Plus	140 to 200	200 µm		25 mm x 50 m
10547116	FF170HP Plus	140 to 200	200 µm		210 mm × 297 mm
10547122	FF170HP Plus	140 to 200	200 µm		20mm x 100m
10547120	FF170HP Plus	140 to 200	200 µm		25mm x 100m
10547142	FF170HP Plus	140 to 200	200 µm		60 x 300mm
10547153	FF170HP Plus Thick	130 to 210	235 µm	A thicker version of the FF170HP Plus, to aid sample flow	20 mm × 50 m
10547147	FF170HP Plus Thick	130 to 210	235 µm		25 mm x 50 m
13547201	FF170HP Plus Thick	130 to 210	235 µm		210 mm × 297 mm
13547203	FF170HP Plus Thick	130 to 210	235 µm		60 (25) mm × 300 mm

Custom sizes and specifications available on request. Contact your local Diagnostic account manager.

Vivid lateral-flow nitrocellulose membranes

Nitrocellulose is the globally preferred membrane substrate in point-of-care diagnostic tests where antigen-antibody binding occurs, e.g., pregnancy tests, urine-albumin tests, and C-reactive protein (CRP) detection. Vivid LFNC membranes fulfil all the criteria to enable the development and manufacture of a diverse range of tests with reliability and reproducibility. Vivid LFNC membranes are designed and tested specifically for diagnostic applications to ensure the materials meet stringent requirements for diagnostic assay development and manufacturing.

- Coefficients of variation (CV) between 5% and 10%
- Designed for assay reproducibility and sensitivity — High sensitivity with dilute concentrations of target analytes.
- Strong consistency and high duplication rate — When measuring intra- and inter-lot performance for wicking time and thickness Vivid LFNC membranes provide consistent results, resulting in low defined coefficients of variation.
- Clear surface appearance — Controlled surface quality of the membrane ensures freedom from visual defects, discoloration and dust.
- Clear results — Demonstrates low background levels which enable crisp capture lines and easy-to-read results.

The reliable, large-scale, manufacturing capacity with lot-to-lot traceability, choice of defined capillary speeds to select sensitivity of diagnostic test and straight and uniform migration front make Vivid nitrocellulose membranes a popular choice with diagnostic assay developers.

Technical properties / ordering information

Product code	Product name	Thickness	Wicking rate (sec / 4 cm)	Properties	Dimensions
VIV7025100R	Vivid 70 LFNC	190 to 230 µm includes 95 to 105 µm polyester support	64 to 90	Reliable yet cost-effective media for development, manufacturing, and use of lateral-flow diagnostic point-of-care tests	25 mm × 100 m
VIV702550R	Vivid 70 LFNC	190 to 230 µm includes 95 to 105 µm polyester support	64 to 90		25 mm × 50 m
VIV702503R	Vivid 70 LFNC	190 to 230 µm includes 95 to 105 µm polyester support	64 to 90		25 mm × 3 m
VIV902503R	Vivid 90 LFNC	190 to 230 µm includes 95 to 105 µm polyester support	70 to 110		25mm × 3m
VIV902550R	Vivid 90 LFNC	190 to 230 µm includes 95 to 105 µm polyester support	70 to 110		25mm × 50m
VIV1202503R	Vivid 120 LFNC	190 to 230 µm includes 95 to 105 µm polyester support	95 to 135		25mm × 3m
VIV1202550R	Vivid 120 LFNC	190 to 230 µm includes 95 to 105 µm polyester support	95 to 135		25mm × 50m
VIV14025100R	Vivid 140 LFNC	190 to 230 µm includes 95 to 105 µm polyester support	120 to 160		25 mm × 100 m
VIV1402550R	Vivid 140 LFNC	190 to 230 µm includes 95 to 105 µm polyester support	120 to 160		25 mm × 50 m
VIV1402503R	Vivid 140 LFNC	190 to 230 µm includes 95 to 105 µm polyester support	120 to 160		25 mm × 3 m
VIV180200100R	Vivid 180 LFNC	190 to 230 µm includes 95 to 105 µm polyester support	120 to 160		200 mm × 100 m
VIV180205100R	Vivid 180 LFNC	190 to 230 µm includes 95 to 105 µm polyester support	160 to 200		205 mm × 100 m
VIV1802503R	Vivid 180 LFNC	190 to 230 µm includes 95 to 105 µm polyester support	160 to 200		25 mm × 3 m
VIV18025100R	Vivid 180 LFNC	190 to 230 µm includes 95 to 105 µm polyester support	160 to 200		25 mm × 100 m
VIV1802550R	Vivid 180 LFNC	190 to 230 µm includes 95 to 105 µm polyester support	160 to 200		25 mm × 50 m

Custom sizes and specifications available on request. Contact your local Diagnostic account manager.

Absorption pads

Absorption pads at the downstream end of tests control sample flow along the strip. Cytiva has also developed pads with excellent wicking characteristics that give rise to greater consistencies. Choosing an absorbent with sufficient capacity is an important consideration when designing an immunoassay.

Features and benefits:

- **Consistent absorbency:** Ensures test-to-test reproducibility
- **Product manufactured in controlled environments from highest-quality materials:** No false results due to contamination
- **Naturally hydrophilic:** Minimal loss of analyte, so test sensitivity is maintained
- **Wide range of thickness, absorbency and wicking rate:** Rapid rewetting after prolonged storage
- **Minimal Leakage along the strip:** No contamination of test results

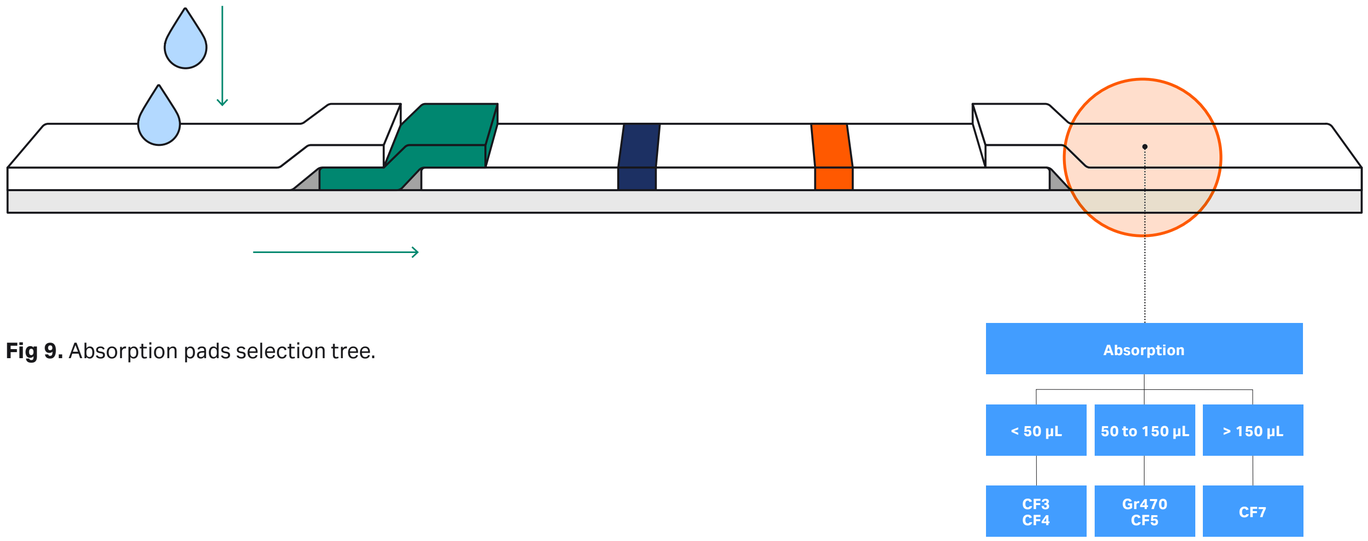


Fig 9. Absorption pads selection tree.

Technical properties / ordering information

Product code	Product	Material	Properties	Thickness (µm @ 53 kPA)	Wicking rate (s/4 cm)	Water absorption (mg/cm²)	Dimensions
8113-2250	CF3	100% cotton linter	Medium weight	322	174.3	34.6	CF3 22 mm × 50 m
8114-2250	CF4			482	67.3	49.9	CF4 22 mm × 50 m
8115-2250	CF5			954	63.3	99.2	CF5 22 mm × 50 m
8117-2250	CF7		Thick materials suitable for high sample volume	1873	35	252.3	CF7 22 mm × 50 m
8133-2250	Gr470		Light, thin grade suitable for small volume	840	77	78	STD 14 22 mm × 50 m

Custom sizes and specifications available on request. Contact your local Diagnostic account manager.

Flow-through immunoassays

In a flow-through immunoassay the sample is applied directly to the membrane surface and is allowed to wick through the membrane into an absorbent paper below.

Nitrocellulose membranes

Small-pore unsupported membranes such as BA83 and BA85 can be used; they are highly sensitive small-pore membranes with large surface area and high protein-binding capacity. However, they have to be carefully encapsulated, ensuring good contact between the membrane and the absorbent, to give good flow.

Features and benefits:

- **Manufactured for vertical-flow assays:** Eliminates problems caused by capillary rise
- **Small pore structure:** Accurate results; low nonspecific binding; greater sensitivity
- **One hundred percent pure nitrocellulose:** Provides high binding capacity

Absorbents

The absorbents used for flow-through assays must wick fast and be highly water absorbent. The volumes of liquids used in flow-through assays can be much higher than those in lateral flow. Thicker cellulose materials with fast wicking are therefore the material of choice.

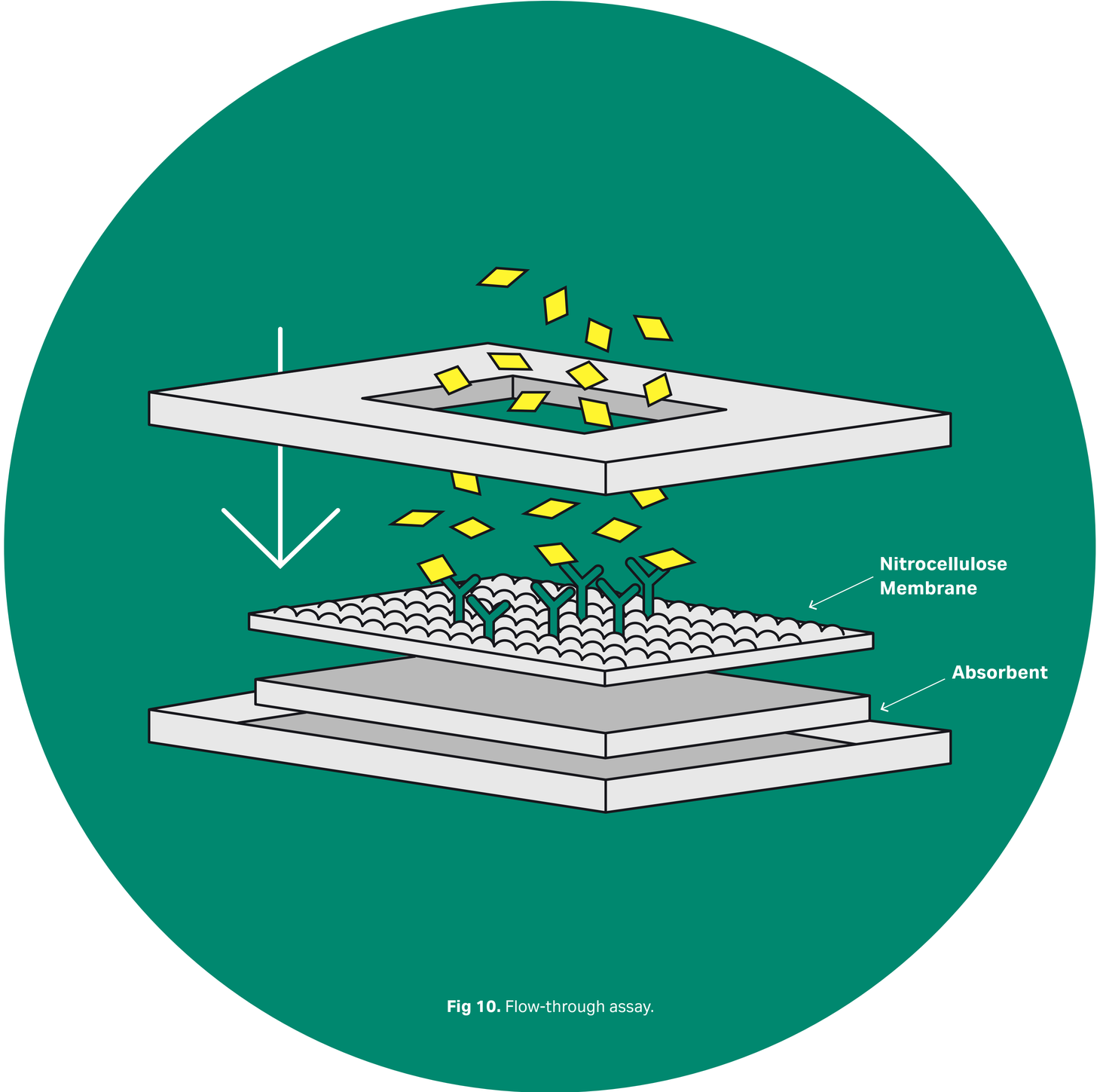
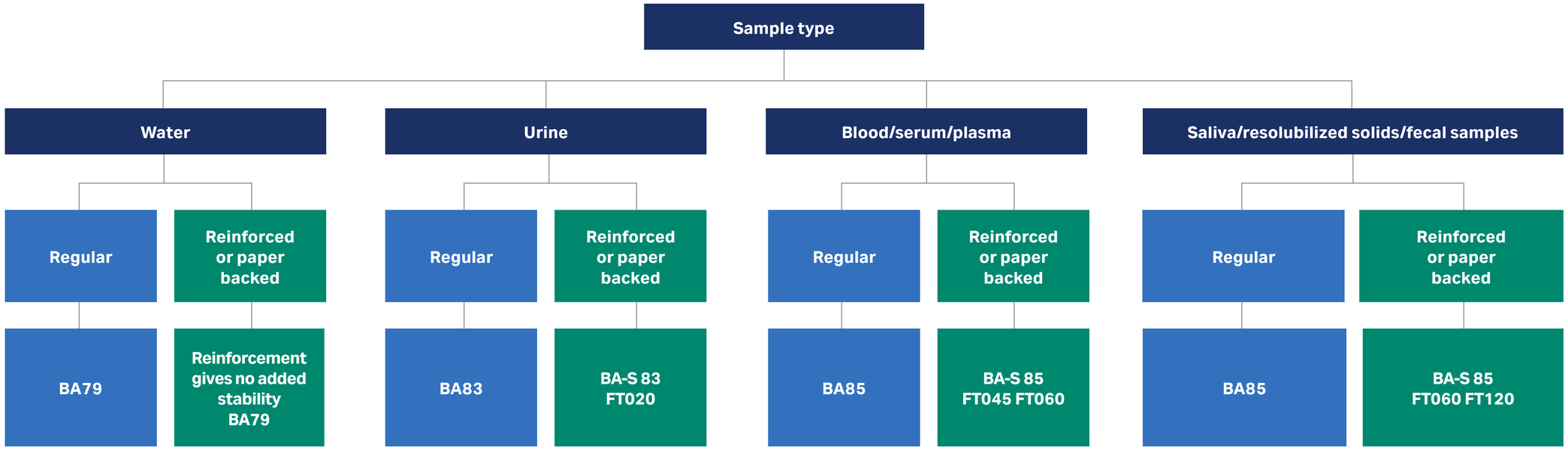


Fig 10. Flow-through assay.

Membrane selector according to sample type



Technical properties

Membranes

Grade	Pore size (µm)	Thickness (µm @ 53 kPA)
BA 79	0.10	120
BA 83	0.20	120
BA 85	0.45	120

Absorbents

Product	Thickness (µm @ 53 kPA)	Wicking rate (s/4 cm)	Water absorption (mg/cm^2)
CF4	482	67.3	49.9
CF5	954	63.3	99.2
CF6	1450	65	136.3
CF7	1873	35	252.3

Ordering information

BA Nitrocellusose membranes

Catalog Number	Description
10549371	BA79, 89 mm x 127 mm
10549372	BA79, 89 mm x 381 mm
10401380	BA83, 300 mm × 600 mm
10401180	BA85, 300 mm × 600 mm

Absorbents

Catalog Number	Description
8114-2250	CF4 22 mm × 50 m
8115-2250	CF5 22 mm × 50 m
8116-2250	CF6 22 mm × 50 m
8117-2250	CF7 22 mm × 50 m

Custom sizes and specifications available on request. Contact your local Diagnostic account manager.

Dipstick colorimetric assays

Dipstick colorimetric assays, in which a cellulose pad is impregnated with a color reagent, are widely used in everything from urine testing to environmental assays. The base cellulose is a key part of the system, and the correct choice of absorbency, wicking rate, and wet strength are critical to producing a working assay. The Cytiva range of cellulose materials for dipstick colorimetric assays offers highly consistent and inert substrates for absorption of the active chemicals required for development of dipstick tests.

The purity of the cellulose base material coupled with Cytiva quality manufacturing practices make these papers an exceptional choice for large-scale manufacturing. The Cytiva range of Whatman papers also includes a wet strengthened grade.

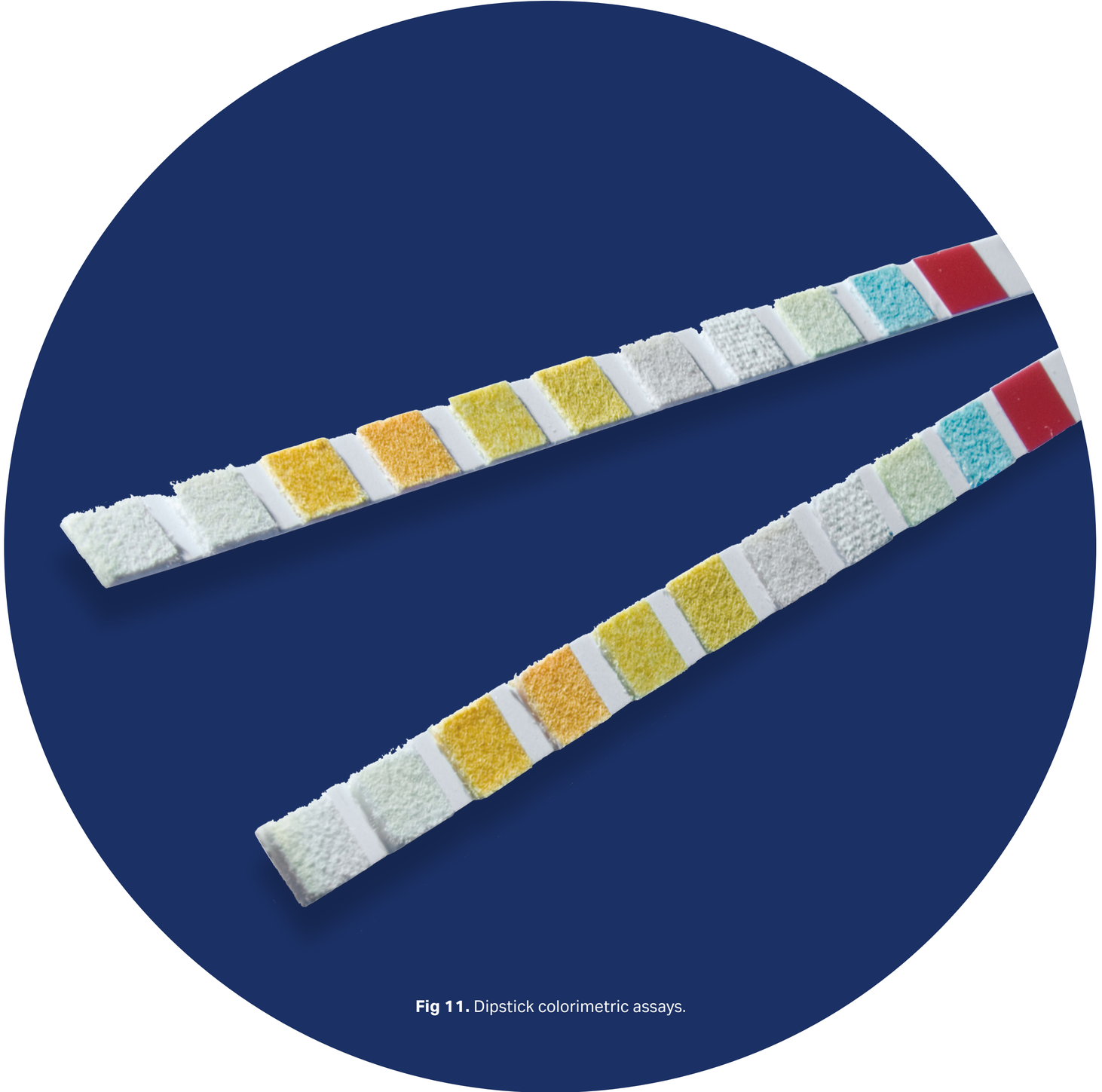


Fig 11. Dipstick colorimetric assays.

Technical properties / ordering information

Product code	Grade	Thickness (µm @ 53 kPA)	Water absorption (mg/cm^2)	Dimensions
8111-2250	CF1	176	18.7	CF1 22 mm × 50 m
8112-2250	CF2	172	16.1	CF2 22 mm × 50 m
8113-2250	CF3	322	34.6	CF3 22 mm × 50 m
8114-2250	CF4	782	49.9	CF4 22 mm × 50 m
8117-2250	CF7	1873	252.3	CF7 22 mm × 50 m

Custom sizes and specifications available on request. Contact your local Diagnostic account manager.

Lab-based immunodiagnostics

Immunoassay techniques have moved on substantially since the early days of radioactive immunoassays (RIAs). From enzyme-linked immunosorbent assays (ELISAs), to fluorescence spectroscopy, and more recent innovations such as multiplex assays and biosensors, these technological advancements have enabled the development of highly sensitive and specific assays for a broad and ever-growing range of analytes.

Sera-Mag™ carboxylate beads

Sera-Mag™ carboxylate-modified magnetic beads combine a fast magnetic response time and high binding capacity, sensitivity, stability and physical integrity.

- **Ease of use:** Covalent coupling of proteins, nucleic acids, etc. to carboxyl groups on the surface using standard coupling technologies
- **Convenient:** Isolation, selection and clean-up of nucleic acids or direct conjugation of specific oligos and enzymes
- Coefficients of variation (CV) between 5% and 10%

Technical properties / ordering information

Product code	Quantity	Product name
24152105050250	15 mL	Sera-Mag carboxylate-modified [E7] magnetic particles
24152105050350	100 mL	Sera-Mag carboxylate-modified [E7] magnetic particles
24152105050450	1000 mL	Sera-Mag carboxylate-modified [E7] magnetic particles
44152105050250	15 mL	Sera-Mag carboxylate-modified [E3] magnetic particles
44152105050350	100 mL	Sera-Mag carboxylate-modified [E3] magnetic particles
44152105050450	1000 mL	Sera-Mag carboxylate-modified [E3] magnetic particles

Custom sizes and specifications available on request. Contact your local Diagnostic account manager.

Sera-Mag streptavidin-coated magnetic particles

Sera-Mag streptavidin-coated magnetic beads provide solid phase support in immunoassays and molecular biology applications.

The magnetic streptavidin particles can also be used as a universal base particle for coating biotinylated proteins, oligos or other ligands to the particle surface.

- **Optimized application:** Contain covalently bound streptavidin with low (2500 to 3500 pmol/mg), medium (3500 to 4500 pmol/mg) or high (4500 to 5500 pmol/mg) biotin binding capacities, providing a choice of biotin-binding capacity
- **High capacity and precision:** For enrichment and targeted sequencing applications

Technical properties / ordering information

Product code	Quantity	Product name
30152103011150	1 mL	Sera-Mag streptavidin-coated magnetic particles — 2500 to 3500 (low) pmol per mg
30152103010150	5 mL	Sera-Mag streptavidin-coated magnetic particles — 2500 to 3500 (low) pmol per mg
30152103010350	100 mL	Sera-Mag streptavidin-coated magnetic particles — 2500 to 3500 (low) pmol per mg
30152104011150	1 mL	Sera-Mag streptavidin-coated magnetic particles — 3500 to 4500 (med) pmol per mg
30152104010150	5 mL	Sera-Mag streptavidin-coated magnetic particles — 3500 to 4500 (med) pmol per mg
30152104010350	100 mL	Sera-Mag streptavidin-coated magnetic particles —- 3500 to 4500 (med) pmol per mg
30152105011150	1 mL	Sera-Mag streptavidin-coated magnetic particles — 4500 to 5500 (high) pmol per mg
30152105010150	5 mL	Sera-Mag streptavidin-coated magnetic particles — 4500 to 5500 (high) pmol per mg
30152105010350	100 mL	Sera-Mag streptavidin-coated magnetic particles — 4500 to 5500 (high) pmol per mg

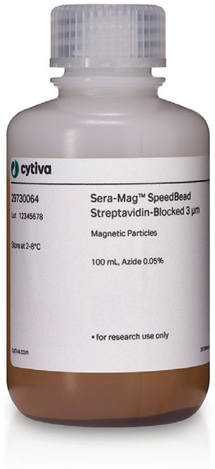
Custom sizes and specifications available on request. Contact your local Diagnostic account manager.

Sera-Mag streptavidin-blocked magnetic beads

Sera-Mag speedbeads streptavidin-blocked magnetic particles provide high biotin-binding capacity along with a strong affinity for targeted, biotin-labelled molecules such as nucleic acids, proteins and peptides with very low nonspecific binding.

When the beads are combined with any of these molecules the strong non-covalent associate between the Streptavidin and biotin ensures efficient capture of the target molecule.

- **Increased throughput and precision:** The speedbead particles combine fast reaction kinetics and low, non-specific binding
- **Optimized for demanding applications:** Including bead-in PCR and enrichment



Technical properties / ordering information

Product code	Quantity	Product name
21152104011150	1 mL	Sera-Mag speedbeads streptavidin-blocked magnetic particles
21152104010150	5 mL	Sera-Mag speedbeads streptavidin-blocked magnetic particles
21152104010350	100 mL	Sera-Mag speedbeads streptavidin-blocked magnetic particles
21152104010450	1000 mL	Sera-Mag speedbeads streptavidin-blocked magnetic particles

Custom sizes and specifications available on request. Contact your local Diagnostic account manager.

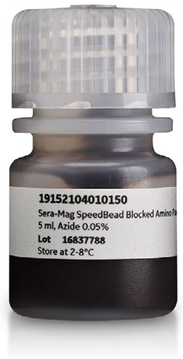
Sera-Mag amine-blocked magnetic beads

Provides low non-specific binding of proteins from the sample matrix.

Sera-Mag speedbeads amine blocked magnetic particles are uniform, colloidally stable, mono-dispersed, non-porous super-paramagnetic spheres made by a proprietary core-shell method. The core is a carboxylate-modified particle made by free radical emulsion polymerization of styrene and acid monomer. Magnetite (Fe3O4) is coated onto this core particle and then encapsulated with propriety polymers. The final surface is blocked using a proprietary method to help prevent nonspecific binding of proteins.

Sera-Mag speedbeads amine-blocked particles combine fast magnetic reaction kinetics and high binding capacity due to large surface area.

- Feature a non-surfactant, non-protein blocked surface to reduce the undesired adsorption of proteins from a sample matrix.
- Fast reaction kinetics increases throughput and precision, also enabling faster movement through viscous solutions.
- Unique cauliflower-like surface provides increased area for binding reactions compared to smooth surface particles.
- Uniform, nominal 1 µm diameter provides excellent lot-to-lot reproducibility.



Technical properties / ordering information

Product code	Quantity	Product name
19152104011150	1 mL	Sera-Mag speedbeads amine-blocked particles
19152104010150	5 mL	Sera-Mag speedbeads amine-blocked particles
19152104010350	100 mL	Sera-Mag speedbeads amine-blocked particles

Custom sizes and specifications available on request. Contact your local Diagnostic account manager.

Point-of-care molecular assays

Molecular testing in remote areas of the world is becoming a real possibility thanks to the developments in point-of-care testing devices which could prove a game-changer for the diagnosis of diseases such as tuberculosis, drug-resistant tuberculosis, HIV, and Ebola virus. These devices often contain highly sensitive membranes to effectively capture the cells or microorganisms for further analysis.

Track-etched membranes for diagnostic applications

Cytiva provides a range of Whatman track-etched membranes (TEMs) whose advanced technical specifications make them an outstanding choice for a wide range of diagnostic applications.

TEMs have very tightly controlled pore size distribution. This allows for quantification of cells or micro-organisms, which are captured on the membrane surface. TEMs are usually transparent at larger pore sizes, which allows complete transmission of light, ensuring excellent signal-to-noise ratio.

Features	Benefits
Biologically inert	Whole cell assays can be performed
Low protein binding and low extractables	There is no interference with assay results because of membrane
Choice of surface properties (hydrophilic and hydrophobic version available)	Assays can be designed with the appropriate flow or retention characteristics
Does not bind stains or labels	Gives lower background signal than traditional materials
True surface capture on a flat, smooth surface	Cells or particles are highly visible or available for sample recovery by backflushing
Low hold-up volume	Practically all the applied sample is available for analysis
Controllable optical properties (transparent, translucent, and/or dyed)	The optical properties can be chosen to ensure excellent signal-to-noise ratio. Clear materials allow complete transmission of light, whereas dyed varieties block signal from behind the membrane
PC or PET material	Allows easy attachment to a range of housings for design of components

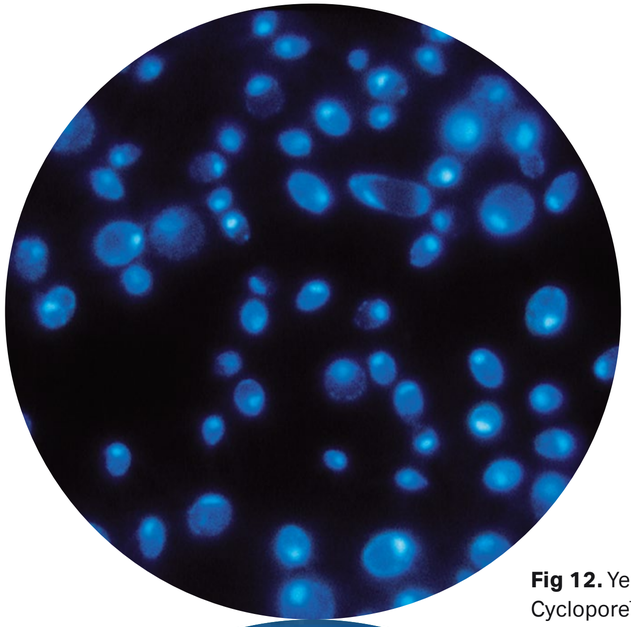


Fig 12. Yeast cells on Black Cyclopore™ with DAPI Stain.

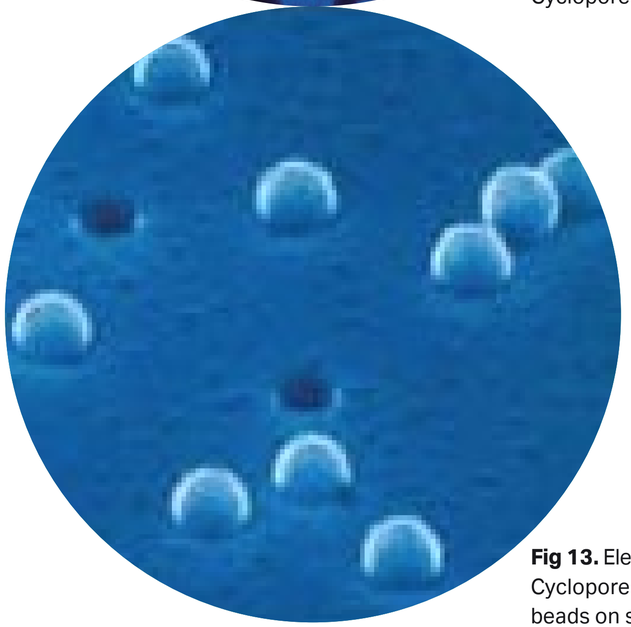


Fig 13. Electron micrograph of Cyclopore membrane with latex beads on surface.

Application examples

Cell capture

Since TEMs have tightly controlled filtration characteristics, they can be used in cell capture applications. This application allows for easier identification of marked cells in a number of formats. The retention of cells upon the membrane surface allows cells to be stained and observed in a very clear environment. The improved resolution and accuracy have applications in any area of clinical chemistry in which cells are observed. The reduced likelihood of a false diagnosis also has a significant impact, especially in large-scale screening procedures.

Particle-capture assays

Using membranes for particle-capture tests is a relatively well-known technique. The usefulness of these assays can be enhanced by using dyed or fluorescent latex particles as a label. Such labels can produce a more sensitive or stable assay. Using a TEM for particle capture allows for a more specific capture reaction, and capturing the particles on the membrane surface rather than in the depth of the membrane matrix enhances sensitivity.

Biosensors

TEMs provide accurate flow control of diffusion properties in biosensor applications in which the membrane acts as a barrier to biological cells and controls their flow to the sensor. The membrane also serves as a barrier to many potential contaminants, improving the assay's specificity. In applications involving the presence of biochemical reagents to measure the reaction, the pores can be filled with the desired materials (e.g., antigen or enzymes). The complete biosensor can therefore be dried onto the membrane.

Cytiva offers a complete range of track-etched membranes manufactured using proprietary technology to produce a precision membrane filter with a closely controlled pore size distribution.

Request a sample of our track-etched membranes visit: https://info.cytivalifesciences.com/wdx-molecular-lab-poc-assay

Lab-based molecular diagnostics

Molecular diagnostic tests using nucleic acid-based assays have become an essential component in the evaluation and early detection of many diseases. Applications in the areas of infectious diseases, oncology, inherited disorders, and prediction of genetic disease risk are rapidly becoming commonplace and are increasingly applied in the field of personalized medicine.

Reduce cost, gain greater geographical access, and simplify your workflow from sample collection to result by using our stabilization products and services:

- Product design
- Sample purification or isolation
- Assay components and room-temperature stabilization
- Sample clean-up and detection

SeraSil-Mag™ silica beads

SeraSil-Mag™ silica coated superparamagnetic beads deliver a high purity extraction solutions for highly sensitive applications when sample is scarce. The beads provide an optimal binding surface, with regular morphology, to optimize binding efficiency and reduce variability, simplifying the transition from column purification to bead-based purification. Optimized to isolate highly purified DNA/RNA for downstream applications such as qPCR or sequencing.

High iron oxide content (60 emu/g): Fast magnetic response (~5 s) shortens time of magnetic steps during isolation

- **Uniformity:** Particles are uniform in size (submicroscale diameter 700 nm and 400 nm [monodispersed]), providing narrow size distribution
- **Low sedimentation rate:** Good buoyancy enhances ease of handling, automation, and reproducibility
- **Purity:** Used to isolate and purify genomic DNA from whole human blood providing A260/A280 ratios between 1.70 to 1.90 and A260/A230 ratios as high as 2

Technical properties / ordering information

Product code	Quantity	Product name
29357369	5 mL	SeraSil-Mag 400 nm magnetic particles
29357371	60 mL	SeraSil-Mag 400 nm magnetic particles
29357372	450 mL	SeraSil-Mag 400 nm magnetic particles
29357373	5 mL	SeraSil-Mag 700 nm magnetic particles
29357374	60 mL	SeraSil-Mag 700 nm magnetic particles
29357375	450 mL	SeraSil-Mag 700 nm magnetic particles

Custom sizes and specifications available on request. Contact your local Diagnostic account manager.

Sera-Mag speedbead carboxylate-modified magnetic particles

Sera-Mag speedbeads have a second layer of magnetite applied through the same core shell design process, allowing a reaction twice as fast as the Sera-Mag carboxylate-modified beads when in the presence of a magnetic field. Speedbeads are especially useful where the reaction medium is highly viscous, and in clinical assays requiring a faster magnetic response time.

- **Convenient:** Isolation, selection and clean-up of nucleic acids or direct conjugation of specific oligos and enzymes
- **Reliable:** Fast, precise, and high binding capacity for sample preparation, nucleic acid isolation, proteomics and immunoassay applications

Technical properties / ordering information

Product code	Quantity	Product name
45152105050250	15 mL	Sera-Mag speedbead carboxylate-modified [E7] magnetic particle
45152105050350	100 mL	Sera-Mag speedbead carboxylate-modified [E7] magnetic particle
45152105050450	1000 mL	Sera-Mag speedbead carboxylate-modified [E7] magnetic particle
65152105050250	15 mL	Sera-Mag speedbead carboxylate-modified [E3] magnetic particle
65152105050350	100 mL	Sera-Mag speedbead carboxylate-modified [E3] magnetic particle
65152105050450	1000 mL	Sera-Mag speedbead carboxylate-modified [E3] magnetic particle

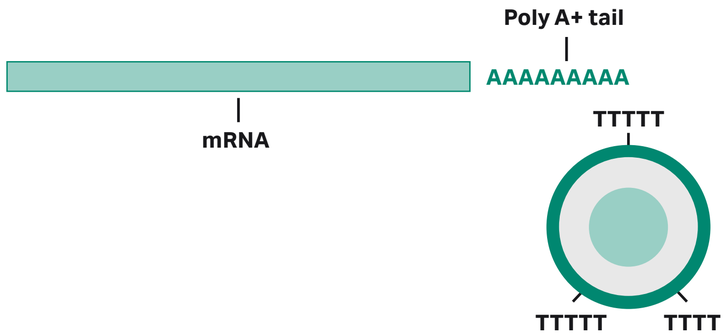
Custom sizes and specifications available on request. Contact your local Diagnostic account manager.

Sera-Mag oligo (dT) coated magnetic particles

Colloidally stable Sera-Mag oligo (dT) coated magnetic particles contain covalently bound oligo (dT)14 and will remain in suspension for extended periods of time in the absence of a magnetic field, making them well suited for capturing or isolating mRNA from a variety of sources.

Oligo (dT) particles can also be used as a universal base particle for coupling unique oligo sequences. Simply synthesize the oligo with a poly-A tail for easy attachment to the oligo (dT) particles.

- **Versatile:** Once isolated, selective purification of mRNA from total RNA for NGS, RT-PCR, cDNA library construction, or subtractive hybridization can be performed
- **Performance:** The approximate mRNA binding-capacity is 11 µg of mRNA per mg of particles (dependent upon sample and message length)
- Custom Oligo (dT) available for more specific sample focus binding



Technical properties / ordering information

Product code	Quantity	Product name
38152103011150	1 mL	Sera-Mag oligo (dT) coated magnetic particles
38152103010150	5 mL	Sera-Mag oligo (dT) coated magnetic particles
38152103010350	100 mL	Sera-Mag oligo (dT) coated magnetic particles

Custom sizes and specifications available on request. Contact your local Diagnostic account manager.

Sera-Mag streptavidin-coated magnetic particles

Sera-Mag streptavidin-coated magnetic beads provide solid phase support in immunoassays and molecular biology applications.

The magnetic streptavidin particles can also be used as a universal base particle for coating biotinylated proteins, oligos or other ligands to the particle surface.

- **Optimized application:** Contain covalently bound streptavidin with low (2500 to 3500 pmol/mg), medium (3500 to 4500 pmol/mg) or high (4500 to 5500 pmol/mg) biotin binding capacities, providing a choice of biotin-binding capacity
- **High capacity and precision:** For enrichment and targeted sequencing applications

Technical properties / ordering information

Product code	Quantity	Product name
30152103011150	1 mL	Sera-Mag streptavidin-coated magnetic particles — 2500 to 3500 (low) pmol per mg
30152103010150	5 mL	Sera-Mag streptavidin-coated magnetic particles × 2500 to 3500 (low) pmol per mg
30152103010350	100 mL	Sera-Mag streptavidin-coated magnetic particles × 2500 to 3500 (low) pmol per mg
30152104011150	1 mL	Sera-Mag streptavidin-coated magnetic particles × 3500 to 4500 (med) pmol per mg
30152104010150	5 mL	Sera-Mag streptavidin-coated magnetic particles × 3500 to 4500 (med) pmol per mg
30152104010350	100 mL	Sera-Mag streptavidin-coated magnetic particles × 3500 to 4500 (med) pmol per mg
30152105011150	1 mL	Sera-Mag streptavidin-coated magnetic particles × 4500 to 5500 (high) pmol per mg
30152105010150	5 mL	Sera-Mag streptavidin-coated magnetic particles × 4500 to 5500 (high) pmol per mg
30152105010350	100 mL	Sera-Mag streptavidin-coated magnetic particles × 4500 to 5500 (high) pmol per mg

Custom sizes and specifications available on request. Contact your local Diagnostic account manager.

Diagnostic services to accelerate diagnostic test development and manufacture

Scale up and speed up without staffing up or making capital investments with our Diagnostic Services

Lyo-Stable™ stabilization manufacturing regionally in US and Europe, to chosen batch sizes and to cGMP standards, providing expertise, capabilities, scale and troubleshooting support.

Magnetic bead customization draws on extensive experience with magnetic separation technology and applies custom development and modification methodologies to raw beads or final kits. Includes: conjugation, concentration, custom packaging, custom kitting and private label, buffer exchange and stabilization.

Lateral-flow development services provides point-of-care lateral-flow expertise, coaching and training workshops, supporting infrastructure and proven development methodologies on a personal level for any size project.

Membrane and pad customization provides fast-track access to membranes and pads that can be made to required performance specifications (for example thickness and wicking rates) in chosen formats or can have the physical characteristics of an existing high performing membrane adapted.

Our tailored **contract manufacturing service**, for large or small batch sizes, applies the knowledge and familiarity of the wide portfolio of diagnostic components already manufactured to supplement in-house capabilities without the upfront investment and without expanding the portfolio of suppliers.

Custom multiwell plates are tailored to required specifications, developed with a proprietary process to encapsulate the filter membrane and can be labelled/barcoded to your requirements utilizing our extensive knowledge and range of in-house and insourced membranes or resins.

Molecular biology reagent customization services provides the opportunity to tailor configurations, formulations, pack sizes or concentrations of molecular biology reagents using existing reliable catalogue products, reducing waste, providing convenience and resulting in the most cost-effective solution.

Find out more cytiva.com/diagnostic-services

Custom and contract manufacturing

A collaboration with Cytiva offers real benefits

Many of Cytiva's products are used as tools and/or components in a range of applications in life sciences, diagnostics, pharmaceuticals, and environmental sciences. In addition, Cytiva can provide the extensive capabilities offered by our ISO-certified manufacturing centers, process rigor, lean manufacturing. Taken together, the portfolio and capabilities of Cytiva offer a world-class custom and contract manufacturing operation that provides all aspects of the manufacturing process to an assured quality.

Certification for our quality management systems

- ISO 9001
- ISO 13485

Table 1. Example of the scope of custom and contract manufacturing services

Contract manufacturing	Custom manufacturing

• Assay validation
• Formulation
• Kitting capability
  – Assembly and packaging
• Analytical services
• Final product testing
• Product design capability
	• Customer-specific products
	• Bulk supply
	• Room temperature assay stabilization
	  – Individual reagents
	  – Complete multiplex assays
	• Product design capability

bsi.

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 13485: 2003

This is to certify that: **Cytiva**
The Maynard Centre
Forest Farm est. Whitchurch
Cardiff
South Glamorgan
CF14 9FR
United Kingdom

Holds Certificate Number: MD 588911

and operates a Quality Management System which complies with the requirements of ISO 13485: 2003 for the following scope:

Design, control of manufacture and distribution of specimen collection devices for downstream analysis applications.

For and on behalf of BSI:
Gary Fenton, Global Assurance Director

Originally registered: 19/10/2012 Latest Issue: 19/10/2012 Expiry Date: 18/10/2015

Page: 1 of 1

...making excellence a habit.

This certificate was issued electronically and remains the property of BSI and is bound by the conditions of contract.
An electronic certificate can be authenticated online. Printed copies can be validated at www.bsigroup.com/ClientDirectory

Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowlhill, Milton Keynes MK5 8PP. Tel: + 44 845 080 9000
BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.
A Member of the BSI Group of Companies.

Certificate of Registration

Intertek

This is to certify that the quality management system of

Whatman GmbH

Main site: Hahnestrasse 3, 37586 Dassel, Germany

has been assessed and registered by Intertek as conforming to the requirements of

EN ISO 13485:2012

The quality management system is applicable to

Design and development, production and distribution of medical devices and related services for separation and analytical applications

Certificate Number: 52592
Initial Certification Date: 16 November 2009
Certificate Issue Date: 14 September 2015
Certificate Expiry Date: 26 June 2018

Thomas Andersson, CEO
Intertek Certification AB
P.O. Box 1103, SE-164 22 Kista, Sweden

In the issuance of this certificate, Intertek assumes no liability to any party other than to the Client, and then only in accordance with the agreed upon Certification Agreement. This certificate's validity is subject to the organization maintaining their r system in accordance with Intertek's requirements for systems certification. Validity may be confirmed via email at certificate.validation@intertek.com or by scanning the code to the right with a smartphone.

The certificate remains the property of Intertek, to whom it must be returned upon request.

1639
ISO/IEC 17021

Fig 14. ISO certificates.

Contact us to learn more about our custom and contract manufacturing capabilities

Product design

Cytiva has extensive capabilities for design optimization and development of custom components. If you start working with our custom design team while you're still in the conceptual stage, we can help you design towards optimal manufacturing.

We can help design and prototype your vials, tubes, and other cartridge and holder devices for stabilized reagents.

Table 3. Examples of Cytiva capabilities in design optimization and development of custom components

Conception	Certification	Specific manufacturing	Rigor
3D CAD	**ISO Certifications:** • ISO 9001 • ISO 13485	**Ultrasonic and UV welding** **Thermal bonding** **Custom labeling** **Hot stamping and pad printing** **Scale-up capabilities** **Kit manufacturing**	**Supply chain rationalization** • Source and validate raw materials • Shelf-life management **Logistics efficiency** • Streamlined transportation and storage • Security of supply

Assay components and room-temperature stabilization

Lyo-Stable™ technology for custom reagent and assay stabilization

Cytiva's patented Lyo-Stable stabilization technology allows ambient-temperature shipping and storage of your individual reagents or complete multiplex assays in a convenient cake or bead format based on your existing assay composition.

We offer:

cGMP-compliant manufacturing - Providing quality assurance for sensitive applications and consistent pharmaceutical-grade quality through strict controls.

Regional (US and Europe) manufacturing - Reduced logistical hurdles, shorter transit times, fewer customs complications, minimizes development time and degradation to sample and assay quality.

Flexible, scalable production - Bespoke production scales from early-stage development to full commercial manufacturing in small or large batch sizes to minimize waste and manage cost.

Technical support and experience - Team of specialists with over 30 years' experience providing end-to-end support and troubleshooting across formulation, lyophilization, and quality control steps.

Find out more: https://www.cytivalifesciences.com/solutions/genomics/products-and-technologies/custom-genomic-services/lyo-stable

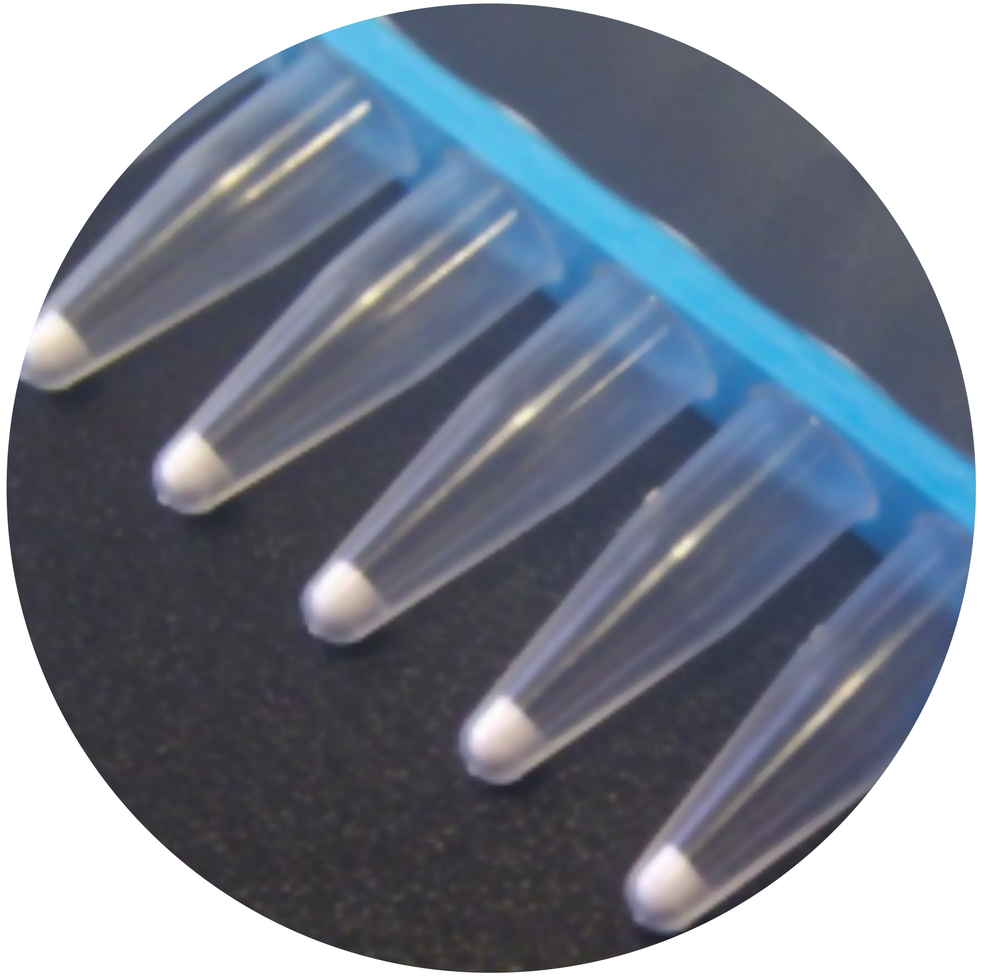
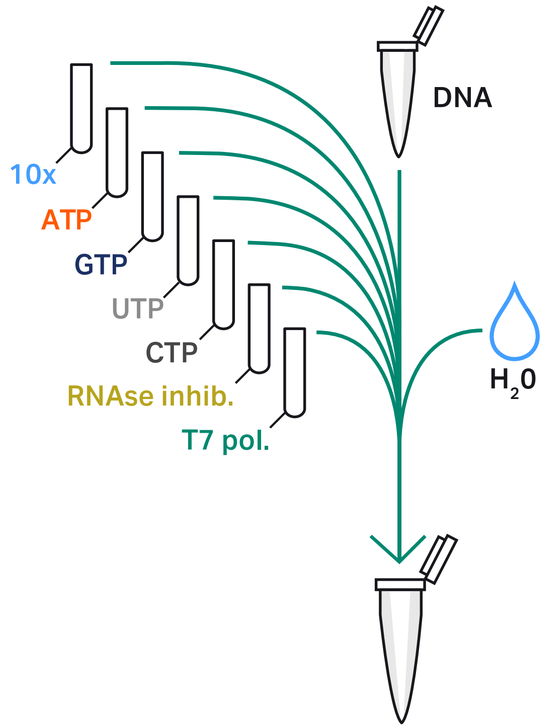


Fig 15. Example of a Ready-To-Go™ strip well format.

Comparison between Lyo-Stable and conventional approaches

Conventional approach



Lyo-Stable approach

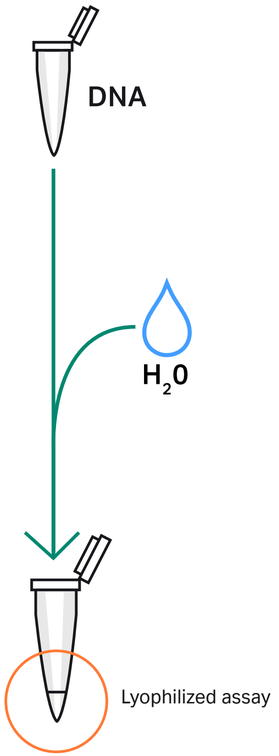


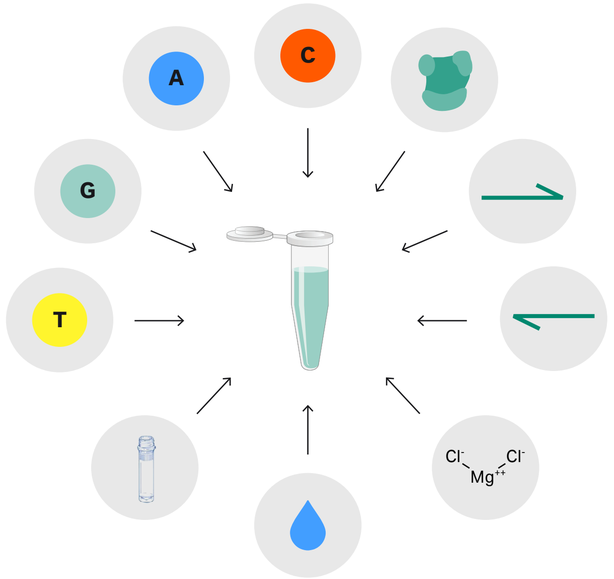
Fig 16. Moving from a multiple step conventional approach to a simplified two-step custom Lyo-Stable solution.

Benefits of Lyo-Stable technology

	Benefits for diagnostic kit manufacturers	Benefits for diagnostic kit users
Stabilization of assay mixtures	• Two-year stability at ambient temperature • Suitable for complex mixtures including sensitive enzymes and master mix components • Customizable formulation	• Two-year stability at ambient temperature
Simplification — Pre-dispensed, single-dose reagents	• Supports reduced training requirements • Compatible with downstream applications and automation	• Supports reduced training requirements • Compatible with downstream applications and automation • Fewer pipetting steps reduces cross-contamination risk and improves data reliability and overall quality of the assay
Shipping — Does not require dry or wet ice	• Simplifies shipping across countries and protects from unforeseen delays • Enables access to remote regions • Provides significant cost savings • Eco friendly	
Storage — No need for refrigerator or freezer storage	• Simplified inventory management • Reduces storage space and costs • Reduced energy consumption • Opens up new markets and target groups for your assays	• Simplified inventory management • Reduces storage space and costs • Reduced energy consumption • Supports applications for in-field or near-patient use

Fig 17. Example of a Ready-To-Go 96-well format.

Lyo-Stable stabilization services — flexible on format of delivery



Your master mix

+

Proprietary excipient mix

Dispense, then lyophilize

Cake

Capacity: 5k to 20k reactions

Reaction volume: 5 µL and up

Dispense: Manual or automated

Formats: PCR plates, strips, tubes, POC device

Throughput: Low to medium

Lyophilize, then dispense

Bead

Capacity: 5k to 350k reactions

Volume: 8 to 30 µL

Dispense: Manual or automated

Formats: PCR plates, strips, tubes, POC device

Throughput: Medium to high

Both formats allow the use of standard and custom plates, tubes, or vials

cytiva

cytiva.com

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FF High Performance (HP) membranes and Immunpore membranes are sold under license to DE10102744 and foreign equivalents thereof.

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For local office contact information, visit cytiva.com/contact

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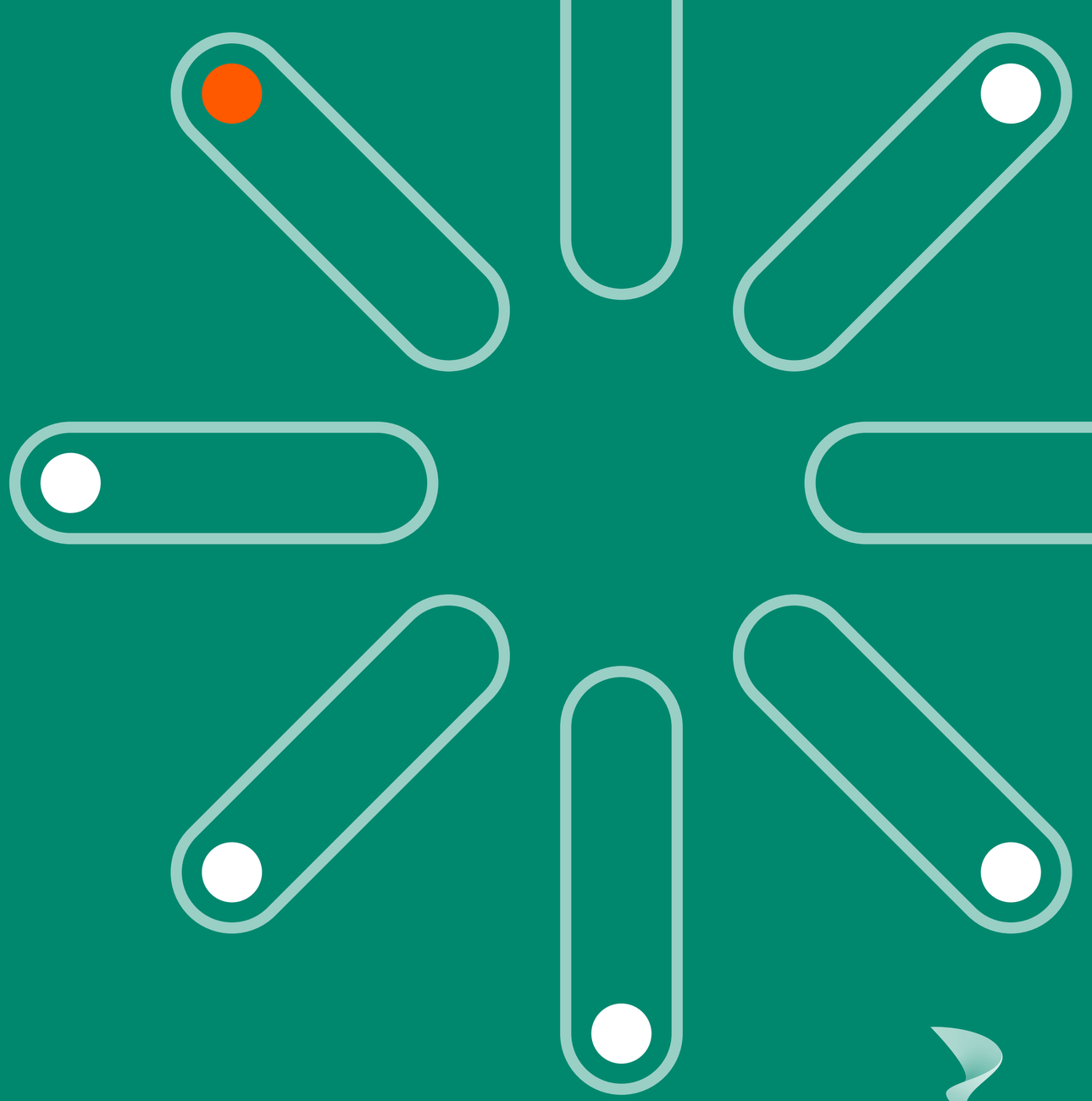

danaher