

UniSart®
0.22 µm and 0.45 µm Nitrocellulose
Membranes for protein blotting



Sartorius Stedim Biotech at a glance

Sartorius was founded in Goettingen, in 1870 by Florenz Sartorius and started initially manufacturing short-beam analytical balances.

In 1929, Sartorius started the first ever industrial production of cellulose nitrate membranes. The Sartorius group has become an internationally leading laboratory and process technology provider with core areas of expertise in biotechnology and mechatronics.

Today, the recent combination of the Sartorius Biotechnology Division and Stedim, the pioneer in disposable aseptic bag systems, creates a global biopharmaceutical supplier. Sartorius Stedim Biotech is a leading provider of cutting-edge equipment and services for the development, quality assurance and production processes of the biopharmaceutical industry. Our integrated solutions covering fermentation, filtration, purification, fluid management and lab technologies are supporting the biopharmaceutical industry around the world to develop and produce

drugs safely, timely and economically. For next generation processes, we focus on single-use technologies and added-value services to meet upcoming requirements of the industry we serve. Strongly rooted in the scientific community and closely allied with customers and technology partners, we are dedicated to our philosophy of "Turning science into solutions".

Headquartered in Aubagne, France, and with main operations in Germany and the US, Sartorius Stedim Biotech owns production and sales companies worldwide and employs over 2,200 people. In the diagnostic field, based on its long experience of microporous membrane and its tradition of high quality, Sartorius Stedim Biotech has developed large pore size cellulose nitrate membrane, which are now a reference for consistency.





UniSart® 0.22 µm and 0.45 µm Nitrocellulose Membranes for Protein Blotting

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Line or dot blot strips are still widely used for in vitro diagnostic test. Many infectious diseases generate a complex immuno response and necessitate checking the patient serum for the presence of several antibodies. For this purpose, the different Immunodominant antigen proteins have to be applied in line or dots onto a uniform binding substrate. Today, long ago after a first membrane was used in blotting, the nitrocellulose membrane is still the best substrate for proteins.

The UniSart® 0.22 µm and 0.45 µm nitrocellulose membranes have been designed to show exceptional consistency in IVD blot strips

All blotting applications

Gel blotting

The UniSart® 0.22 µm and 0.45 µm membranes are well adapted to all protein blotting systems such as; electro transfer, semi-dry or simply capillary blotting. It can be easily cut to the desired gel dimension. Under the electrical field and some capillary drive, proteins move from the gel to the UniSart® membrane which binds them immediately.

Line and dot printing

Today, most of the antigenic proteins can be obtained through recombinant techniques in purer state and larger quantities. As a result, these proteins can easily be dispensed in line or dots onto the membrane, rather than to be transferred from a gel. The smooth surface of the UniSart® 0.22 µm and 0.45 µm allows for an easy dispensing either with contact tip, in this case the hard and smooth UniSart® 0.22 µm and 0.45 µm surface is well adapted for that, either with non contact nozzles, allowing for sharp dot spots .

Consistency in your assay

Consistency

The request for consistency is the main one for IVD strip manufacturers. Only a very consistent nitrocellulose membrane, showing the same characteristics inside a batch and from batch to batch will allow the IVD manufacturer to maintain its production inside the targeted CVs.

The consistency of the final developed signal in a line or blot strip assay is closely dependent on the homogeneity of the membrane surface and Sartorius with its unique know how on membrane production has developed the UniSart 0.22 μm and 0.45 μm nitrocellulose membranes in order to show always the same characteristics inside a lot as well as inter lot. (see graphs)

A consistent membrane simply means:

- higher productivity
- reduced scrap rates
- reduced time to market
- reduced overall cost

Consistent wetting

Though nitrocellulose polymers are inherently hydrophobic, which contributes greatly to their very high protein binding capacity, the UniSart membrane has been specifically manufactured with hydrophilic reagents in order to show a fast and uniform wetting. The lines or dots that you will apply onto the membrane will always show the same shape. The best way to check it is to visually control the shape of the lines or dot immediately after dispensing. The wet lines or dots should then appear with clean and sharp edges. The width or size of lines and dots will be directly proportional to the dispensed volume.

Consistent binding

The UniSart 0.22 μm and 0.45 μm membranes shows an optimum structure for blotting. The small pore size allow for a huge protein binding capacity onto the sponge like 3 dimensional structure, up to 200 μg of equivalent IgG could be adsorbed in one cm^2 of UniSart membrane. At the same time the high ratio of pores allow for a fast flow through the membrane, as it can be noticed from the electron microscope photo.

The staining of the transferred proteins for control purposes can easily be done with standard methods like with Ponceau S, Coomassie Blue or Amido Black.

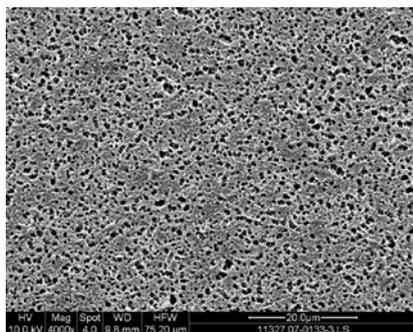
After transfer, the UniSart nitrocellulose can be blocked and rinsed according to the most usual protocol.

Consistent detection

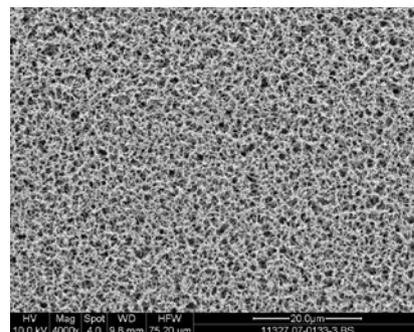
After incubation with the test samples, the antibody-antigen complex can be revealed on the membrane strip following different methods. The most used being: colorimetric adding conjugate antibody with alkaline phosphatase or HRP for enzymatic die detection, but also chemiluminescent and fluorescent with specific labeled molecules or even particles, as also used in lateral flow immuno assays.

Consistent sidedness

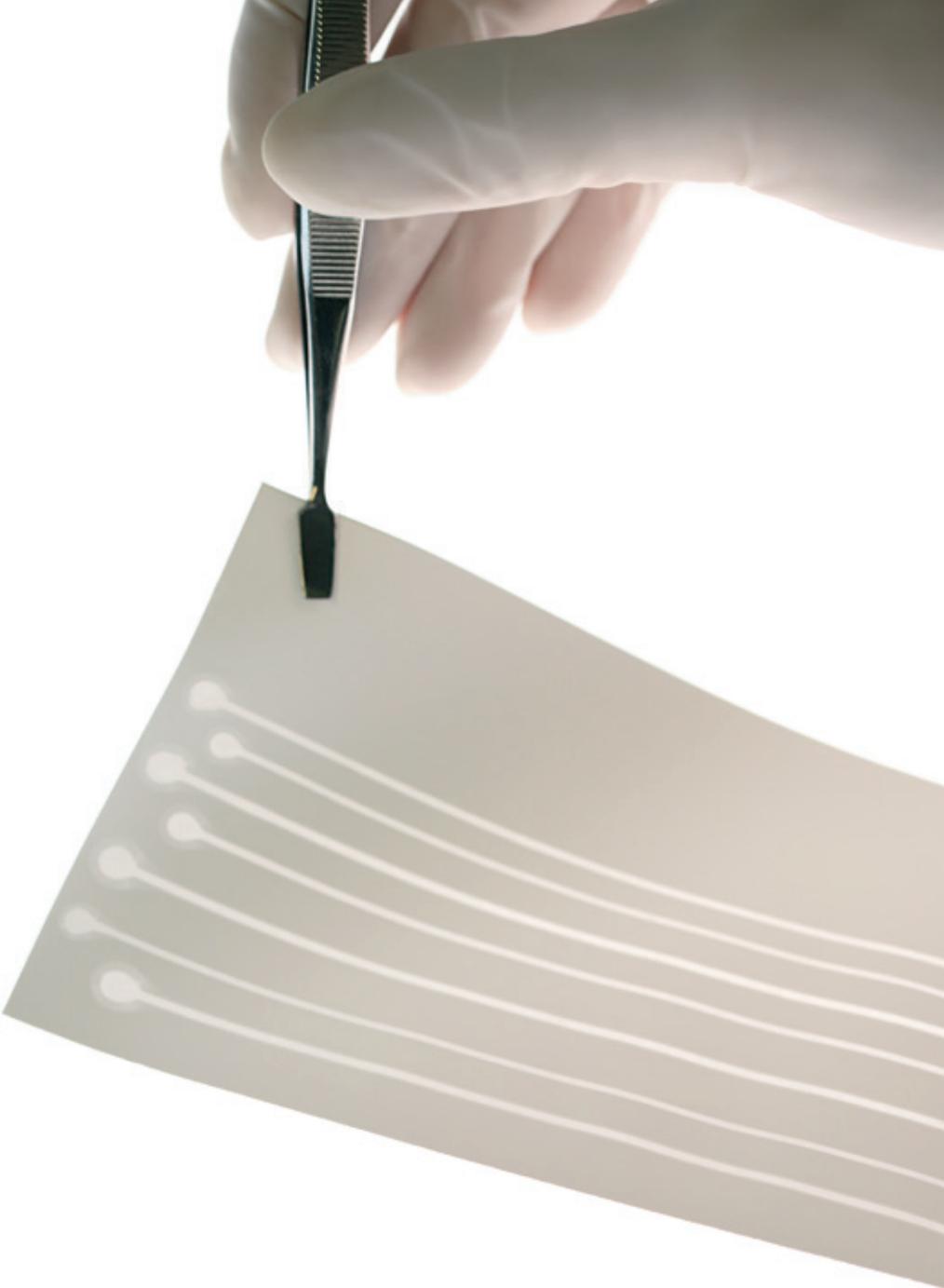
Due to the production process, the non supported nitrocellulose membranes like the UniSart 0.22 μm and 0.45 μm , always present two different sides. Both membrane sides should be first evaluated before selecting one.



Scan Electron Microscope photo of the Air side of the UniSart® 0.22 μm membrane $\times 4000$ magnification



Scan Electron Microscope photo of the belt side of the UniSart® 0.22 μm membrane $\times 4000$ magnification



Nitrocellulose production at Sartorius

Being the first ever manufacturer of cellulose nitrate membranes, Sartorius has many years of experience in the formulation of the lacquer as well as in the building of state-of-the-art casting equipment. In our new facility 2001 in Germany we have rigid environmental and process controls to provide a stable and clean manufacturing process.

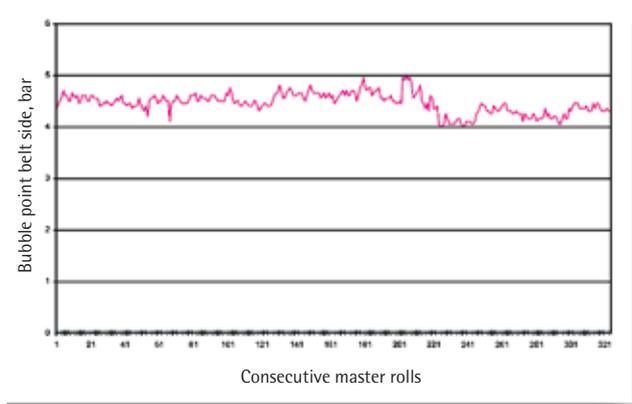
Intra and inter lot consistency

The request for consistency is the main one for IVD strip manufacturers. Only a very consistent nitrocellulose membrane, showing the same characteristics inside a batch and from batch to batch will allow the IVD manufacturer to maintain its production inside the targeted CVs.

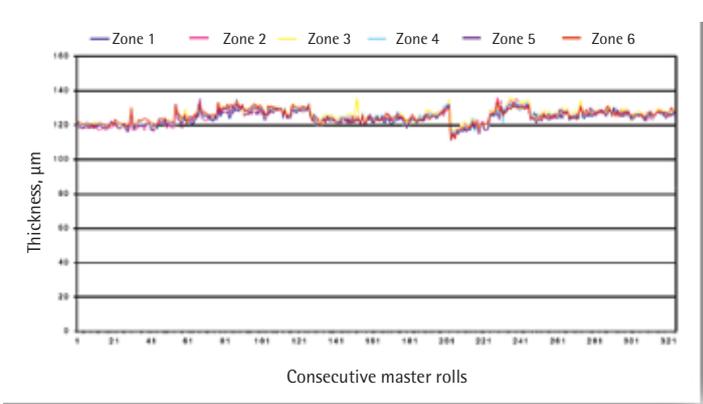
The consistency of the final developed signal in a line or blot strip assay is closely dependent on the homogeneity of the membrane surface and structure.

Sartorius with its unique know how on membrane production has developed the UniSart 0.22 µm and 0.45 µm nitrocellulose membranes in order to show always the same characteristics inside a lot as well as inter lot (see graphs).

Down and cross web thickness values of consecutive master rolls of UniSart 0.22 µm.



Graph Intra & inter lot consistency bubble point values on consecutive master rolls of UniSart® 0.22 µm membrane



of UniSart® 0.22 µm



Characteristics 0.22 μm and 0.45 μm :

The slightly more open structure will allow a faster flow through the membrane, with a limited decrease in total binding capacity. These two membranes 0.22 μm and 0.45 μm with slightly different characteristics will allow you to choose the best one for your particular assay.

Improved handling:

Both nitrocellulose membranes show an improved strength for ease of handling and cutting. They can also be easily glued with non solvent water resistant adhesives onto various plastic backing.

Versatile formats

Cut from wide master rolls, both membranes are available either in roll stock or as flat sheet. Any custom dimensions are available upon request.

Typical parameter value of the UniSart 0.22 μm and 0.45 μm :

	0.22 μm	0.45 μm
Flow rate for water:	27	70 [ml/(min.cm ² bar)]
Bubble point with water:	4.4	2.4 [bar]
Extractable content in water:	<1	<1 [%]
Thickness:	120	130 [μm]
Burst pressure:	0.8	0.2 [bar]
Wetting with water:	<1	<1 [secs]

Storage and handling of UniSart® membranes

Characteristics and certificate of quality

Perfect Quality assurance system is a prerequisite for manufacturing consistent membrane. Our QA encompasses all the membrane manufacturing steps. Detailed quality controls are performed from incoming materials, through casting process to the final release of a batch. Complete traceability of each UniSart membrane lot is then assured. The lot size is defined by the total membrane surface produced out of one mixing tank. All UniSart shipment is delivered with a certificate of quality.

Shelf life

The UniSart nitrocellulose membranes have a shelf life of 3 years after the Date of manufacturing. The end product manufacturer must determine the shelf life of the membrane once it is processed. Please refer to the Storage and Handling recommendations at www.sartorius-stedim.com/unisart.

Safety data

The unbacked nitrocellulose membrane material is considered for shipment as a dangerous good according to UN3270. Please refer to the Safety Data Sheet, available at www.sartorius-stedim.com/unisart.

Available materials and dimensions:

– UniSart 0.22 µm and 0.45 µm are available in roll stock or as flat sheet or disc.

Examples of packaging:

Product number	description
11327-160-110-N	UniSart 0.22 µm membrane sheets 160 mm × 110 mm box of 100
11327-----77	UniSart 0.22 µm membrane roll 300 mm on 50 m
11306-----77	UniSart 0.45 µm membrane roll 300 mm on 50 m



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