PALL Life Sciences

Membranes for Transfer and Immobilization

BioTrace™, Biodyne®, FluoroTrans® and UltraBind™ Membranes

A variety of membrane chemistries for sensitive detection and consistent results in all applications and detection systems

- **BioTrace NT membrane—**pure unsupported nitrocellulose is used for colony and plaque lifts and has low burn-through in protein transfer applications.
- **BioTrace PVDF membrane—**versatile membrane with broad chemical resistance, ideally suited for protein transfers.
- **Biodyne membranes—**intrinsically hydrophilic Nylon 6,6 membranes provide high sensitivity and low background for enhanced resolution. Ideal for nucleic acid blots and protein ELISA tests.
- **FluoroTrans PVDF membranes—**increased sensitivity, ideal for a wide variety of protein analysis applications including sequencing and western transfers.

- **UltraBind membrane—**affinity membrane is recommended for covalent protein binding.

Applications

- Nucleic acid and protein transfer and detection:
  - Northern, Southern, and Western transfers
  - Colony and plaque lifts
  - Replica plating
  - Dot/slot blots
  - DNA fingerprinting
- Protein sequencing
- Solid phase ELISAs
- Affinity separations
- Macroarrays
- Microarrays

Ordering Information

		Product Numbers											
Description	Packaging	BioTrace NT Membrane	BioTrace PVDF Membrane	Biodyne A Membrane, 0.2 µm	Biodyne A Membrane, 0.45 µm	Biodyne A Membrane, 1.2 µm	Biodyne B Membrane, 0.45 µm	Biodyne C Membrane, 0.45 µm	Biodyne Plus Membrane, 0.45 µm	FluoroTrans W Membrane 0.2 µm	FluoroTrans Membrane 0.2 µm	UltraBind Membrane 0.45 µm
82 mm discs	50/pkg	66487			60102		60202	60316	60402			
85 mm discs	50/pkg	66595			60103		60203	60317	60403			
132 mm discs	50/pkg	66518			60104		60204	60318	60404			
137 mm discs	50/pkg	66488			60105		60205	60319	60405			
7 x 8.5 cm sheets	10/pkg	66593	66594		60101		60201	60315	60401		PVM020C-160	
7 x 9 cm sheets	10/pkg									BSP0158		
8.5 x 9 cm sheets	20/pkg										PVM020C-195	
10 x 15 cm sheets	10/pkg									BSP0157	PVM020C1015	
13 x 14 cm sheets	10/pkg										PVM020C-196	
20 x 20 cm sheets	10/pkg	66489	66542		60100		60200	60314	60400	BSP0159	PVM020C2020	66544
30 cm x 3 m roll	1/pkg	66485	66543	60113	60106	60108	60207	60320	60406			66545
20 cm x 1 m roll	1/pkg		66547				60209					
20 cm x 3 m roll	1/pkg				60120		60208					
3.3 m roll	1/pkg									BSP0161	PVM020C-099	

In addition to standard sizes, these membranes can be cut to size to suit your specifications. For information on special-sized cuts, call your local Pall Life Sciences office.

Transfer and Affinity Membrane Selection Guide

Pall Life Sciences offers membranes for use in transfer and immobilization procedures. These membranes can be used for nucleic acid and protein applications and are compatible with radioactive, as well as nonradioactive detection systems.

Product	Biodyne® A Membrane	Biodyne B/Plus Membrane	Biodyne C Membrane
Description	Amphoteric Nylon 6,6	Positively-charged Nylon 6,6	Negatively-charged Nylon 6,6
Works best for:	Colony/Plaque Lifts, DNA and RNA Transfers	DNA and RNA Transfers, Multiple Reprobings	Reverse Dot Blots
Also suited for:	Gene Probe Assays, DNA Fingerprinting, Nucleic Acid Dot/Slot Blots, Replica Plating, ELISAs	DNA Fingerprinting, Nucleic Acid Dot/Slot Blots, Colony/Plaque Lifts (Biodyne B membrane), Replica Plating (Biodyne B membrane)	Protein Immobilization, Affinity Purification, ELISAs
Advantages	– High sensitivity – Low background – Net charge can be controlled by changing pH – Ability to strip and reprobe	– Positive charge over broad pH range – Highest sensitivity for nucleic acid applications (Biodyne B membrane) – Ability to strip and reprobe	– Negative charge over broad pH range – Surface carboxyl groups can be derivatized – Ability to strip and reprobe
Binding Interaction	Hydrophobic & Electrostatic	Hydrophobic & Electrostatic	Hydrophobic & Electrostatic
Method of Immobilization	UV Crosslink Baking	Can be baked or UV crosslinked, although not required	Derivatization
Detection Methods	Radiolabeled Probes, Enzyme-antibody Conjugates – Chemiluminescent – Chromogenic	Radiolabeled Probes, Enzyme-antibody Conjugates – Chemiluminescent – Chromogenic – Chemifluorescent (Biodyne Plus Membrane)	Radiolabeled Probes, Enzyme-antibody Conjugates – Chromogenic

Product	BioTrace™ NT Membrane	BioTrace PVDF Membrane	FluoroTrans® Membrane	UltraBind™ Membrane
Description	100% Pure Nitrocellulose	Polyvinylidene Fluoride	Polyvinylidene Fluoride	Modified Polyethersulfone
Works best for:	Colony/Plaque Lifts	Protein Transfers	Western Transfers (FluoroTrans W) N-terminal Protein Sequencing (FluoroTrans PVDF)	Solid-phase ELISAs
Also suited for:	Nucleic Acid and Protein Transfers, Protein Dot/Slot Blots	Protein Dot/Slot Blots		Affinity Chromatography, Hybridoma Screening
Advantages	– Excellent strength – No support fabric – No detergents added – 100% pure nitrocellulose	– Chemical resistance – No discoloration – Nonflammable – High strength	– Strong protein binding – Sensitive detection – Very low burn-through – Good chemical compatibility	– Covalent binding – No preactivation required – High protein-binding capacity
Binding Interaction	Hydrophobic & Electrostatic	Hydrophobic	Hydrophobic	Covalent
Method of Immobilization	UV Crosslink Baking (Vacuum Oven)			Direct Spotting Perfusion
Detection Methods	Radiolabeled Probes, Direct Stain, Fluorescence, Enzyme-antibody Conjugates – Chemiluminescent – Chromogenic	Direct Stain, Enzyme-antibody Conjugates – Chemiluminescent – Chromogenic	Direct Stain with Coomaisse blue, Amido black, Ponceau S, and colloidal gold (FluoroTrans W membrane). Enzyme-antibody Conjugates – Chemiluminescent – Chromogenic	Radiolabeled Probes, Enzyme-antibody Conjugates – Chromogenic

Biodyne® Transfer Membranes

- High sensitivity and low background for enhanced detection and resolution.
- Do not crack, shrink, or tear when subjected to multiple cycles of hybridization, stripping, and reprobing.
- Intrinsically hydrophilic for easy wetting.
- Superior performance with radioactive (Biodyne B membrane) and nonradioactive (Biodyne A membrane) detection systems.
- Ideal for nucleic acid detection.

Applications

Four chemistries provide versatile adsorption properties:

1. Biodyne A Membrane: Amphoteric Nylon 6,6. Membrane zeta potential can be modulated by changes in pH. Ideal for single probe or multiple rehybridizations, and applications where background is troublesome.
2. Biodyne B Membrane: Positively-charged Nylon 6,6. Pore surfaces are populated by a high density of quaternary ammonium groups. Our highest sensitivity nylon membrane for nucleic acid applications.
3. Biodyne C Membrane: Negatively-charged Nylon 6,6. Can be derivatized by coupling reactions through the carboxyl groups on the pore surfaces.
4. Biodyne Plus Membrane: Positively-charged Nylon 6,6 with an extremely high isoelectric point. With certain nonradioactive detection systems, it is more sensitive than Biodyne A membrane while exhibiting lower background than Biodyne B membrane.

Specifications

Media
Nylon 6,6

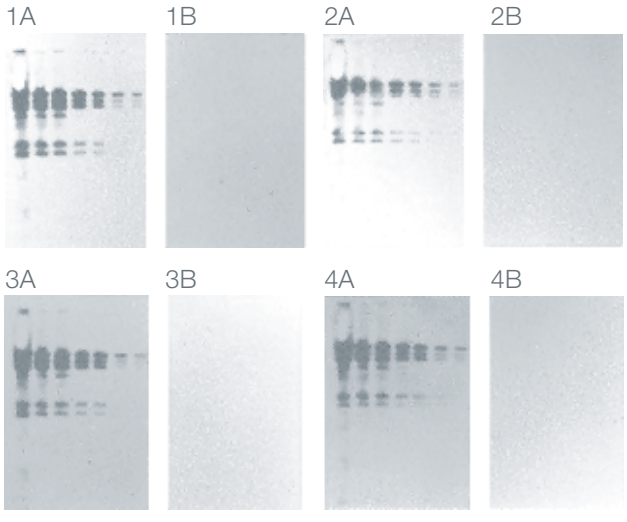
Typical Thickness
6.0 mils ± 0.5 mils

Pore Sizes
0.2, 0.45, or 1.2 µm

Solvent Compatibility
Resistant to common solvents such as acetone, alcohol, chlorinated aliphatic hydrocarbons, formamide, 2 M NaOH, DMSO, and dimethylformamide.
Not compatible with concentrated formic acid (> 50%), HCl (> 4 M), oxidizing agents, and long exposures (days to weeks) at pH < 2.

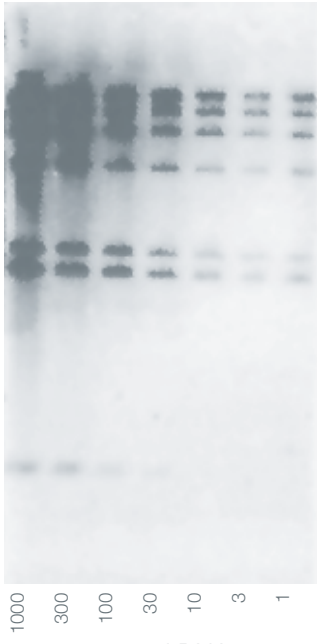
Performance

Biodyne B Membrane Withstands Multiple Cycles of Stripping and Reprobing



Lambda-Hind II DNA fragments were separated in an agarose gel and transferred to Biodyne B membrane using the Pall Improved Alkaline Transfer method. The blot was stripped completely and reprobed four times without loss of signal intensity. Bands were detected using a chemiluminescent detection system.
Panels A (1A - 4A): blot after (re)probing
Panels B (1B - 4B): blot after stripping, prior to (re)probing

Superior Fluorescent Detection of DNA Using Biodyne Plus Membrane



Dilutions of Hind III-digested l-DNA (1,000-1 ng/lane) were separated in an agarose gel and transferred to Biodyne Plus membrane. Signal was generated using a fluorescein-labeled probe, antifluorescein-alkaline phosphatase conjugate, and precipitating substrate. The image was generated by scanning the blot with a FluorImager system.*

BioTrace™ PVDF Transfer Membrane

- Versatile membrane for nucleic acid and protein transfers.
- Broad compatibility with commonly-used solvents.
- Low background with chemiluminescent detection systems.

Applications

- Western transfers
- Southern transfers

Specifications

Media
Polyvinylidene fluoride

Typical Thickness
147 µm (5.8 mils)

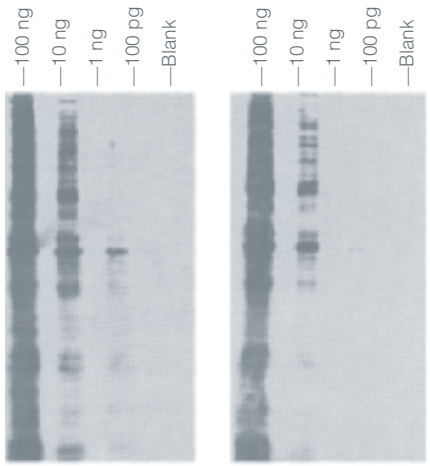
Pore Size
0.45 µm

Tensile Strength
28 bar (410 psi)

Solvent Compatibility
Resistant to methanol, phenol, and chloroform. Also resistant to 10% dimethyl sulfoxide, 15% acetic acid, 70% formic acid, 25% triethylamine, 1 N NaOH, and 1 N KOH.

Performance

Western Transfer to BioTrace PVDF Membrane



BioTrace PVDF Membrane | Brand A PVDF Membrane

Serial dilutions of E. coli lysates were transferred from a 10 - 20% gradient gel to BioTrace PVDF and a competitive PVDF membrane, then probed with rabbit anti-E. coli antibodies. Proteins were visualized using peroxidase-conjugated goat anti-rabbit antibodies and 4-chloro-1-naphthol substrate solution.

BioTrace™ NT Transfer Membrane

- Pure unsupported nitrocellulose membrane is ideal for colony/plaque lifts and protein transfers.
- Strong and durable, less likely to tear or crack than competitor nitrocellulose.
- High binding capacity for proteins and nucleic acids.
- Lower protein burn-through than competitors in electrophoretic transfers.

Applications

- Colony/plaque lifts
- Protein transfers

Specifications

Media
Nitrocellulose

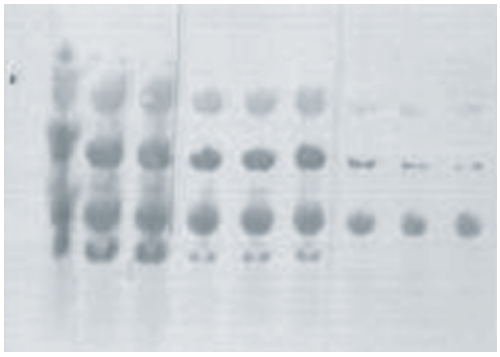
Pore Size
0.2 µm

Typical Thickness
145 µm (5.7 mils)

Protein Binding Capacity
209 µg/cm^2

Performance

BioTrace NT Membranes Exhibit Low Protein Burn-through



Prestained proteins were separated in a polyacrylamide gel and electrophoretically transferred to the indicated nitrocellulose membranes. A double layer of membrane was used, one directly against the gel, followed by the second layer. Signal intensity on the second layer is indicative of burn-through, which can lead to loss of signal.

FluoroTrans® PVDF Membrane

- Sensitive protein detection with low background and very low burn-through.
- Membranes provide high surface area for strong hydrophobic interactons and typically adsorb 50% more protein than nylon or nitrocellulose.
- FluoroTrans W membrane is optimized for Western transfer applications.
- FluoroTrans PVDF membrane is optimized for N-terminal protein sequencing.

Applications

FluoroTrans W Membrane:

- Western transfers
- Southern transfers

FluoroTrans Membrane:

- N-terminal protein sequencing

- FluoroTrans media have high tensile strength and will not tear, crack, or curl during handling. This allows for easy removal of target bands for protein sequencing applications.

Specifications

Media
Hydrophobic polyvinylidene fluoride

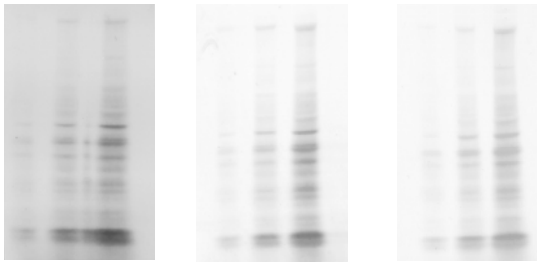
Pore Size
0.2 µm

Chemical Compatibility
Resistant to acetone, DMSO, dimethyl formamide, methanol, trifluoroacetic acid, and triethylamine.

Performance

FluoroTrans Membrane has Excellent Sensitivity, Signal, and Background in Western Transfers

Western Transfers to PVDF Membranes



FluoroTrans PVDF Membrane | FluoroTrans W Membrane | Competitor PVDF Membrane

Rabbit reticulocyte lysate (Amersham) was loaded in lanes of polyacrylamide gels at f.s., 1/3 and 1/10 dilutions. After electrophoresis, proteins were transferred to membranes. Membranes were stained with 0.1% Amido Black, 45% methanol, 2% acetic acid for 4 minutes and were then destained for 5 minutes with two changes of 90% methanol, 2% acetic acid. Stained membranes were rinsed in water and air dried.

UltraBind™ Affinity Membrane

- Modified polyethersulfone (PES) membrane for covalent protein binding.
- Proteins can be efficiently attached without prior membrane derivitization.

Applications

- ELISA
- Affinity separation

Specifications

Media
Modified polyethersulfone with aldehyde surface chemistry

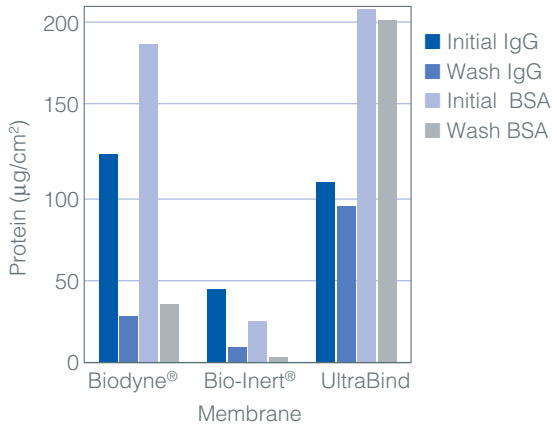
Pore Size
0.45 µm

Typical Thickness
152 µm (6 mils)

Typical IgG Binding Capacity
135 µg/cm^2

Performance

UltraBind Membrane Binds and Retains Proteins



Membrane discs (13 mm) were soaked in a protein solution and washed to determine the capacity and strength of protein binding. Discs were soaked in radioactively labeled IgG and BSA (200 g unlabeled protein with 100,000 cpm of ^{125}I-labeled tracer) for 60 minutes with agitation, rinsed, and either read in a gamma counter or stripped using a 1% SDS/2 M Urea wash. Biodyne B membrane (charged nylon transfer membrane) and Bio-Inert membrane (modified Nylon 6,6 membrane) were used as high and low binding capacity controls respectively. UltraBind membrane efficiently bound protein and retained it after the SDS/Urea wash.

Antigen Detection (dot blot ELISA) with UltraBind Membrane

Dilutions of human serum albumin (hSA) ranging 2000 to 0.5 pg/spot were applied to UltraBind membrane using a 96-pin transfer tool on a Matrix PlateMate Liquid Handling Station. The membrane was then blocked with 0.5% Hammerstein-grade casein in PBS. hSA was detected with rabbit anti-hSA antibody followed with alkaline phosphatase conjugated goat anti-rabbit IgG. Signal was generated by reaction with BCIP/NBT substrate allowing detection of as little as 0.5 pg hSA.*

Complementary Products

- **Centrifugal Devices** provide precise, rapid processing of the following sample volumes:

Device	Sample Volumes
Nanosep® Device	50 to 500 µL
Microsep™ Device	500 µL to 3.5 mL
Macrosep® Device	1 mL to 15 mL
Jumbosep™ Device	15 mL to 60 mL

- **AcroWell™ 96- and 384-well Filter Plates** with BioTrace Membranes exhibit high binding capacities for proteins and nucleic acids.
- **AcroPrep™ 96- and 384-well Filter Plates** can be used for a variety of molecular biology, combinatorial chemistry, and screening applications.
- **Vivid™ Gene Array Slides** feature a unique membrane construction that allows high signal-to-noise ratios, requires less template, and provides consistent results. Protocols are easy to follow with simple immobilization steps.

Technical Literature

- Discover Endless Potential: Products for Genomics, Proteomics, and Drug Discovery Brochure, Pall Life Sciences, PN33286
- Transfer and Detection Procedures for Pall Life Sciences Membranes and Kits, Pall Life Sciences, PN33167
- Explore the Possibilities: High Throughput Separation, Purification, and Detection Technologies Brochure, Pall Life Sciences, PN33252

PALL Life Sciences

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