Diagnostic nylon membranes

For biomolecule detection

Our nylon membranes offer high sensitivity, low background, and lot-to-lot consistency for all radioactive and nonradioactive detection methods. The intrinsically hydrophilic nature of our nylon membranes result in easy wetting across the membrane. When subjected to multiple cycles of hybridization, stripping, and reprobing, the stability and durability of our supported nylon membranes is showcased as they will not crack, shrink, or tear.

Applications

- Nucleic acid binding
- Covalent ligand immobilization
- Dot blots

Sealing

- Mechanical
- Heat
- Insert molding

We have five gamma sterilizable chemistries available that provide versatile adsorption and high biomolecule binding properties:

- **Amphoteric nylon 6,6**
  The net charge of this membrane can be modulated by changes in pH. It is a good choice for single probe or multiple rehybridizations and in applications where background is troublesome. The binding mechanism for this membrane is through hydrophobic and electrostatic interactions. Nucleic acids can be immobilized to this membrane via UV crosslinking and baking. It is well suited for nucleic acid dot blots, gene probe assays, and DNA fingerprinting.

- **Positively-charged nylon 6,6**
  The pore surfaces of this membrane are populated by a high density of quaternary ammonium groups. It offers high sensitivity in nucleic acid detection applications. The binding mechanism for this membrane is through electrostatic interactions. Nucleic acids can be immobilized to this membrane via UV crosslinking and baking although it is not required. It is well suited for nucleic acid dot blots, DNA fingerprinting, and colony/plaque lifts.

- **Positively-charged nylon 6,6 with high isoelectric point**
  This membrane has an extremely high isoelectric point that provides greater sensitivity than the amphoteric nylon while exhibiting lower background than the standard positively-charged nylon membrane in certain nonradioactive detection systems. It is our most sensitive nylon membrane for nucleic acid detection. The binding mechanism for this membrane is through electrostatic interactions. Nucleic acids can be immobilized to this membrane via UV crosslinking and baking although it is not required. It is well suited for nucleic acid dot blots and DNA fingerprinting.

- **Negatively-charged nylon 6,6**
  The surface of this membrane is covered with a high density of carboxyl groups that can be derivatized for protein attachment. The binding mechanism for this membrane is through electrostatic interactions. It is well suited for protein immobilization, ELISAs, and affinity purification via ligand attachment.

- **Modified nylon 6,6**
  This membrane is surface modified through proprietary chemistry that allows for covalent binding and stable ligand immobilization. The membrane is preactivated to form covalent linkages with nucleophilic groups found on proteins and other biological macromolecules. Primary reactivity is with amine groups at neutral pH. The microporous structure of the membrane provides an available immobilization area of up to 300 cm^2 for each cm^2 of planar membrane. It is intrinsically hydrophilic and exhibits instantaneous wetting on contact with low ionic strength aqueous solutions. High capillarity and rapid absorbent wicking are obtainable without the necessity of surface modifying wetting agents. Prewetting is not required prior to contact with ligand solutions. This membrane offers greater binding capacity for proteins than traditional nonporous solid phase surfaces.

Product specifications

Typical membrane characteristics

Base material	Pore size	Thickness		Functional group	Charge
	µm	mils	µm		
Amphoteric supported nylon 6,6 (Biodyne™ A)	0.2	5.5–7.0	139.7–177.8	None	Amphoteric
	0.45	5.7–6.7	144.8–170.2		
	1.2	5.5–7.0	139.7–177.8		
Positively charged supported nylon 6,6 (Biodyne B)	0.45	5.7–6.7	144.8–170.2	Quaternary	Positive
	0.8	5.5–7.0	139.7–177.8		
Positively charged supported nylon 6,6 with high isoelectric point (Biodyne Plus)	0.45	5.7–6.7	144.8–170.2	Quaternary	Positive
Negatively charged supported nylon (Biodyne C)	0.45	11.0–13.0*	279.4–330.2*	Carboxyl	Negative
	1.2	5.5–7.0	139.7–177.8		
Modified nylon 6,6 (Immunodyne™ ABC)	0.45	11.0–13.0*	279.4–330.2*	Proprietary	Neutral
	1.2	5.5–7.0	139.7–177.8		

Typical performance characteristics

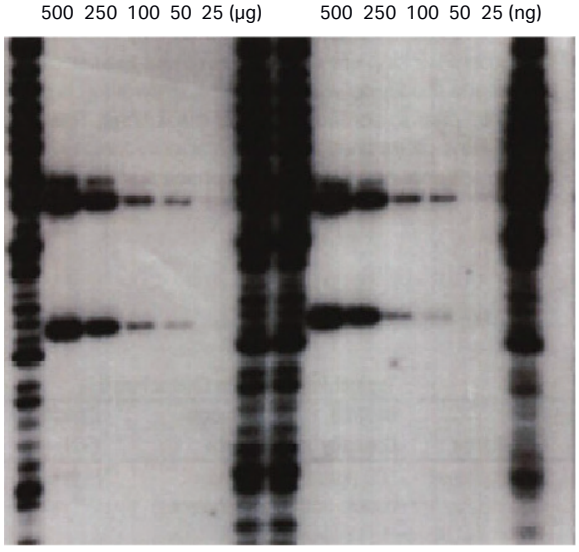
Binding capacity	Detection system	Sensitivity (S:N)
500 µg/cm^2 nucleic acid	Alkaline phosphatase	High
500 µg/cm^2 nucleic acid	Radioactivity chemiluminescent	High
500 µg/cm^2 nucleic acid	Nonradioactive detection with DIG probes, chemifluorescent	Highest
-	Radioactivity, chromagenic	Moderate
High	N/A	N/A

*Dual layer measurement

Note: Exact binding capacities are difficult to determine because biomolecules tend to layer on the membrane surface when applied at very high concentrations. Highest effective loads for nucleic acids and proteins are typically less than 100 µg/cm^2. Higher loads usually do not result in higher activity due to steric hindrance or other phenomena. For molecular detection, maximum signal is usually detected with less than 10 µg/cm^2, or 1 µg/µL of applied solution. Biomolecules tend to concentrate near the surface of nylon membranes as they bind quickly to the nylon membranes and separate (similar to chromatography) from the solvent carrier. Because of this, binding to the membrane depends less on the total internal surface area of the membrane than expected. Spotting biological levels of nucleic acid will produce similar binding to 0.2 or 1.2 µm nylon membranes, despite the much greater internal surface area of the smaller pore size membrane.

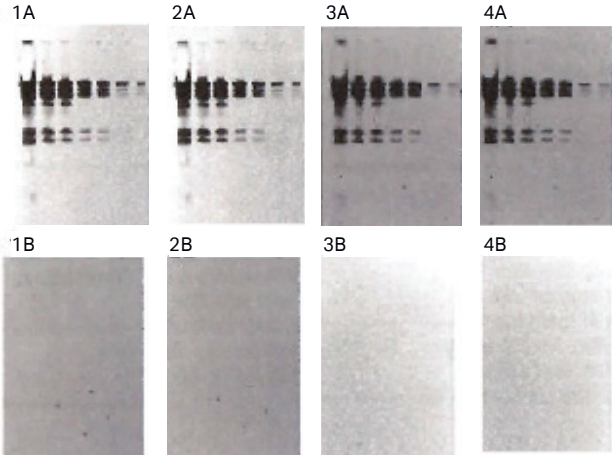
Performance

Detection of genomic markers with ^{32}P-labeled probe on positively-charged nylon 6,6 membrane



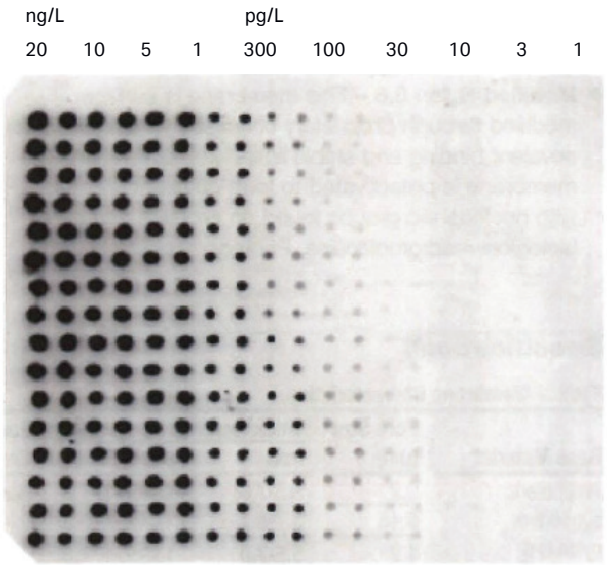
Dilutions of HAE III digested human DNA, from 500 ng to 25 ng per lane were electrophoresed and transferred to positively-charged nylon (Biodyne B) membrane. Membranes were hybridized with ^{32}P-labeled D1S7 probe. Autorad with 24-hour exposure shown with two ladder lanes per series. Faint positives are seen with as little as 25 ng total DNA per lane.

Positively-charged nylon 6,6 membrane withstands multiple cycles of stripping and reprobing



Lambda-Hind III fragments were separated in an agarose gel and transferred to positively charged nylon (Biodyne B) membrane. The blot was stripped completely and reprobed four times without loss of signal intensity. Bands were detected using a chemiluminescent detection system.
1A–4A: blot after (re)probing.
1B–4B: blot after stripping, prior to (re)probing.

Chemifluorescent dot blot on positively-charged nylon with high isoelectric point membrane



Spots (200 nL each) of diluted Lambda Hind III DNA were printed on an 8 ×12 cm Biodyne Plus membrane using a MATRIX PlateMate robot fitted with a plastic pin tool replicator. Two columns were printed at each concentration. Membrane was hybridized with DIG labeled Lambda DNA. Detection used anti-DIG antibody conjugated to alkaline phosphatase and Attophos chemifluorescent substrate. The membrane was scanned in a GE Healthcare Storm (488 nm excitation) 30 minutes after substrate addition.

Ordering information

Product	Product code
Biodyne A membrane, 0.2 µm, 8" × 10" sheet	BNRG810S
Biodyne A membrane, 0.45 µm, 8" × 10" sheet	BNXG810S
Biodyne A membrane, 1.2 µm, 8" × 10" sheet	BNNF810S
Biodyne B membrane, 0.45 µm, 8" × 10" sheet	BNBZF810S
Biodyne B membrane, 0.8 µm, 8" × 10" sheet	BNHZF810S
Biodyne Plus membrane, 0.45 µm, 8" × 10" sheet	ZNXGH810S
Biodyne C membrane, 0.45 µm, 8" × 10" sheet	BNBCH810S
Biodyne C membrane, 1.2 µm, 8" × 10" sheet	BNNCH810S
Immunodyne ABC membrane, 0.45 µm, 8" × 10" sheet	BC045H810S
Immunodyne ABC membrane, 1.2 µm, 8" × 10" sheet	BC120H810S

For more details on custom sizes and specific requests, or if you'd like to request a sample, please reach out to us.
info.cytivalifesciences.com/wdx-molecular-lab-poc-assay

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