



Life Sciences

USD 2185⁽¹⁾



Pall Mustang[®] Q Capsules

The High Throughput Disposable Capsules for Process Scale Anion Exchange Chromatography



Filtration. Separation. Solution.SM

Mustang® Q Chromatography Capsules

The High Throughput Disposable Capsules for Process Scale Anion Exchange Chromatography

Pall **Mustang** Q disposable products are designed to capture negatively charged biomolecules in downstream bioprocessing by anion exchange. These products will be used either for the initial capture of the target biomolecule in a purification process or for the removal of negatively charged contaminants in subsequent purification steps.



Description

Mustang Q membrane is an innovative new anion exchange support with pendant quaternary amine functional groups in a crosslinked polymeric coating. The 0.8 μm pores in **Mustang** Q membranes are large enough to allow large biomolecules to access all the binding sites by direct fluid convection. This produces a very high dynamic capacity for very high molecular weight molecules (i.e DNA, plasmid), or even particles as large as viruses. This is in contrast to conventional chromatographic beads with diffusive pores that typically have much lower throughputs and dynamic binding capacities.

Combining this high capacity Q membrane with a unique pleated design resulted in the **Mustang** Q disposable products. Each **Mustang** Q element contains 16 layers of pleated membrane that will bind negatively charged biomolecules. These units are specifically designed to be single use to eliminate cleaning and cleaning validation. They are available in capsule or cartridge format to accommodate the entire range of volumes used in the biopharmaceutical processes. The 16-layer construction has been held constant from the laboratory "coin" product (0.35 mL) to the industrial scale. The ease of linear scale-up ensures a shortened development time.

DNA Removal Efficiency

Mustang Q units will typically reduce the DNA level in a solution of sonicated calf thymus DNA from 10 $\mu\text{g}/\text{mL}$ to less than 10 pg/mL in one pass. This is a removal efficiency of 6 logs. The presence of host cell protein or other contaminants, and the flow rates used may influence test sensitivity, efficiency of binding and capacity. Performance capability in a specific solution must be determined and validated by the user. For more information, contact Pall.

Features and Benefits

- Binding efficiency – Positively charged biomolecules are readily bound in a single pass
- Speed – High flow rates enable the processing of large volumes in less than one shift
- Scalability – A full range of sizes accommodate different volumes and capacities needed in biopharmaceutical processing
- Convenience – Ready to use and autoclavable
- Flexibility – Available in capsule or cartridge format
- Cost – Lower operating costs and capital investment compared to conventional columns that need validated packing and cleaning

High Quality Standards

- Manufactured to high quality assurance standards in accordance with BS EN ISO9002; 1997
- Membrane lots tested for dynamic protein binding capacity, and peak position using standard proteins
- Identified by a lot number and a unique serial number for complete traceability of manufacturing history satisfying stringent QC/QA requirements
- Supplied with Certificate of Analysis to confirm the quality and quality control of Pall
- Meets USP Biological reactivity tests *in vivo* in accordance with USP Class VI 50°C and all materials listed in Drug Master File submitted to the FDA

Comprehensive Validation

- Extensive validation to ensure consistent and reliable performance
- Comprehensive validation guide available on request

Mustang Q Capsules

Technical Specifications

Materials of Construction

	Novasip™ Capsule CLxMSTGQP1	Kleenpak™ Nova Capsule NPxMSTGQP1
Membrane	Modified hydrophilic polyethersulfone	Modified hydrophilic polyethersulfone
Membrane Support and Drainage Layer Assembly	Polypropylene	Polypropylene
Endcaps, Core and Cage	Polypropylene	Polypropylene
Housing Bowl	Polyetherimide	Polypropylene
Housing Head	Polyetherimide with TiO ₂	Polypropylene with TiO ₂
O-rings	Silicone elastomer	Silicone elastomer

Note:
For CLxMSTGQP1, x =
M05 for a unit with a bed volume of 10 mL
3 for a unit with a bed volume of 60 mL

For NPxMSTGQP1, x =
6 for a unit with a bed volume of 260 mL
7 for a unit with a bed volume of 520 mL
8 for a unit with a bed volume of 780 mL

Capsules Operating Characteristics¹

Maximum operating pressure	3.0 bar (43.5 psi) at 40° C (104°F)
Maximum differential pressure	3.0 bar (43.5 psi) at 40° C (104°F)
Maximum sanitization conditions	1 M NaOH for 30 minutes for one cycle only
Maximum autoclave conditions	121°C (250°F) for 30 minutes for one cycle only

¹ With fully compatible fluids that do not soften, swell or adversely affect the capsule or its materials of construction

1bar = 100kPa

Available Sizes and Typical Dynamic Binding Capacity

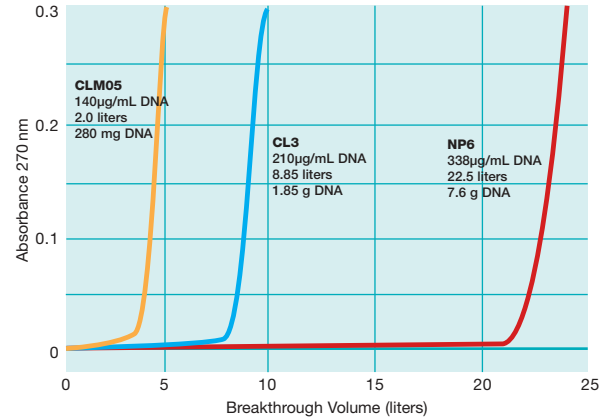
Part number	Bed volume (mL)	Typical BSA binding capacity (mg)	Flow rate (L/min/bar Delta P) [Ⓢ]
MSTG18Q16	0.35	17	6.4 mL/min (0.43 mL/min/psi)
CLM05MQTGSP1	10	500	0.245 (17 mL/min/psi)
CL3MSTGQP1	60	3,000	1.25 (86 mL/min/psi)
NP6MSTGQP1/ AB1MSTGQ7PH4	260	13,000	3.9 (269 mL/min/psi)
NP7MSTGQP1/ AB2MSTGQ7PH4	520	26,000	7.8 (538 mL/min/psi)
NP8MSTGQP1/ AB3MSTGQ7PH4	780	39,000	11.7 (807 mL/min/psi)

[Ⓢ] For liquid of 1 cP. For other liquids divide the flow rate by the viscosity expressed in cP.

Nominal Dimensions for Capsules

Capsule type	CLM05MSTGQP1	CL3MSTGQP1	NP6MSTGQP1	NP7MSTGQP1	NP8MSTGQP1
Maximum Diameter Including Valves	123 mm (4.8 in.)	123 mm (4.8 in.)	154 mm (6.1 in.)	154 mm (6.1 in.)	154 mm (6.1 in.)
Length with 38 mm (1½") Sanitary Flange	84 mm (3.3 in.)	157 mm (6.2 in.)	333 mm (13.1 in.)	581 mm (22.9 in.)	831 mm (32.7 in.)
Bed Volume (mL)	10	60	260	520	780

DNA Breakthrough Curves on Mustang Q Capsules



DNA breakthrough curves above demonstrate the high breakthrough capacity of **Mustang Q** capsules. After preconditioning and equilibration with 25mM Tris-HCl pH 8.0, a solution of 140 µg/mL, 210 µg/mL and 338 µg/mL of herring sperm DNA in 25mM Tris-HCl pH8.0 was pumped respectively through the 10 mL, 60 mL and 260 mL capsules at a flow rate of 10-20 CV/min. The absorbance at 260 nm was continuously monitored downstream of the capsule.

Scaling Down Unit Characteristics

Materials of Construction

Membrane	Modified hydrophilic polyethersulfone
Housing	316L stainless steel
Support frit	316B stainless steel
Housing clamp	300 series stainless steel housing
O-rings	Silicone elastomer

Nominal Dimensions

Coin device	18 mm outer diameter
Housing	51 mm height
Fittings	M6 male to ½" OD tubing and M6 male to luer lock female fittings

Operating Characteristics

Maximum temperature	40° C (104°F)
Maximum differential pressure	17 bar (246.5 psi)

Ordering Information

Part number	Product description	Packaging
MSTG18Q16	Mustang Q coin	10/box
MSTG18H16	Stainless steel coin housing assembly	1/box
MSTG18H16F	Mustang coin housing frits	2 frits/box
MSTG18H16G	Mustang coin housing gaskets	2 gaskets/box
CLM05MSTGQP1	Mustang Q capsule, 10mL, connections 1" / 1½" compatible Tri-Clamp	1/box
CL3MSTGQP1	Mustang Q capsule, 60mL, connections 1" / 1½" compatible Tri-Clamp	1/box
NP6MSTGQP1	Mustang Q capsule, 260mL, connections 1" / 1½" compatible Tri-Clamp	1/box
NP7MSTGQP1	Mustang Q capsule, 520mL, connections 1" / 1½" compatible Tri-Clamp	1/box
NP8MSTGQP1	Mustang Q capsule, 780mL, connections 1" / 1½" compatible Tri-Clamp	1/box
AB1MSTGQ7PH4	Mustang Q cartridge, 260mL, code 7	1/box
AB2MSTGQ7PH4	Mustang Q cartridge, 520mL, code 7	1/box
AB3MSTGQ7PH4	Mustang Q cartridge, 780mL, code 7	1/box

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