2023AUGV1.0

UNISOL
Membrane Technology

AMS Membrane Series

CATALOGUE

Specialty Spiral Wound Elements

UNISOL MEMBRANE TECHNOLOGY

www.unisol-global.com

Contents

Product Introduction

UNISOL MEMBRANE TECHNOLOGY is a membrane & membrane module supplier, providing a wide portfolio of products and seriousness in business proceedings according to customer needs.

AMS membrane series represent our chemically and thermally stable ultrafiltration (UF) and nanofiltration (NF) membranes and modules.

Today these membranes have become state of the art with significant improvement in the economics of organic and inorganic compounds recovery.

We offer a complete product line of extreme acid, alkaline, solvent, thermal- and pressure-stable membranes. Our core technology adds significant value in various applications and industries; by way of cost savings, improved recovery rates, greater supply reliability and clear environmental benefits.

AMS membrane series primarily are focused on the mineral extraction sector (mining) and industries with harsh operating environments such as: pharma, pulp, rayon, beverages and chemicals.

Product History

2000. Bio Pure Technology Ltd (BPT) is founded to develop novel NF membranes for industrial and agricultural applications.

2012. Former BPT is renamed into AMS Technologies (AMS) and belongs now to a group of investors from the mining industry.

2022. Integration of the AMS Technologies (AMS) products into the UNISOL Membrane Technology products portfolio. Today, UNISOL Membrane Technology markets products and continuously develops novel membranes to address complex tasks in various industries worldwide.

Project Approach

Initial assessment. Knowing the composition of the solution it is possible to carry out a simulation, which gives an approximate result of the separation. Clients are asked to provide details on solution's composition. This information enables UNISOL experts to provide an initial analysis.

Lab testing. After the initial analysis, it is recommended to follow up with laboratory testing. For the purpose of lab testing, UNISOL can provide the adequate testing modules or flat sheet membrane to determine feasibility

Proof of concept. Client together with UNISOL evaluates the preliminary business case of the application by analyzing potential benefits to expected costs.

Pilot plant. In collaboration with an EPC, UNISOL designs and builds a testing system at the client's site.

Full-scale plant. Lastly, an EPC will be engaged to fabricate the full-scale operating plant.

AMS Membrane Products Overview

Product Line	Stability	Membrane	Cut-off [Da]	pH Range	Typical Solutions
NanoPro™	Acid	A–3011	100	0 – 12	20% H_2SO_4 20% HCl 4% HNO_3 30% H_3PO_4 15% CH_3COOH
		A–3012	200	0 – 12	
		A–3014	400	0 – 12	
	Base	B–4021	100	3 – 14	20% NaOH 10% KOH
		B–4022	200	3 – 14	
	Solvent	S–3011	100	2 – 12	Methanol, Ethanol, Propanol, Hexane, THF, Acetone, Acetonitrile, Ethyl acetate, DMF
		S–3012	200	2 – 12	
		S–3014	400	2 – 12	
UltraPro™	Acid	A–U301	2,500	0 – 12	20% H_2SO_4 20% HCl 4% HNO_3 30% H_3PO_4 15% CH_3COOH
		A–1801	10,000	0 – 12	
	Solvent	S–U301	2,500	2 – 12	Methanol, Ethanol, Propanol, Hexane, THF, Acetone, Acetonitrile, Ethyl acetate, DMF
		S–1801	10,000	2 – 12	

AMS NanoPro™ A–3011

Acid Stable Nanofiltration Spiral Wound Element

Description	The AMS NanoPro™ membrane is developed for long-term performance with high and stable fluxes in very acidic environment, featuring high pressure and temperature compatibility. AMS NanoPro™ elements are used for acid purification and metals concentration in low pH streams. Typical solutions include: • 20% H_2SO_4 • 20% HCl • 30% H_3PO_4 • 10% CH_3COOH				
Performance	Cut-off Rate(1):	100 dalton			
	Water Flux(2, 3):	65 liter/m^2/hour (38 gal/ft/day)			
	$MgSO_4$ Rejection(2, 4):	≥ 99 %			
Limits	Typical operating pressure:	15-40 bar (217-580 psi)			
	Max Pressure Drop:	0.5 bar (7.3 psi)			
	Max Temperature(5):	Operating: 50 °C (122 °F)			
		Cleaning: 50 °C (122 °F)			
	pH Range(5):	Operating: 0 – 12			
		Cleaning: 0 – 13			
	Recirculation Flow:	1.8″ element: 4.0 – 8.0 liter/min (1.0 – 2.1 gal/min)			
		2.5″ element: 7.5 – 17 liter/min (2.0 – 4.4 gal/min)			
		4″ element: 22 – 42 liter/min (5.8 – 11.1 gal/min)			
		8″ element: 90 – 167 liter/min (23 – 42.7 gal/min)			
	Pressurization& Depressurization rate	< 0.7 bar/second (10psi/second)			
	Heating & cool down rate	< 5°C /minute (41 °F/minute)			
Area	**m^2 (ft^2)**	1812	2540	4040	8040
	B 31 mil Spacer	0.32 (3.4)	1.8 (19)	6.2 (67)	29 (312)
	C 46 mil Spacer	0.25 (2.7)	1.6 (17)	4.9 (53)	24 (260)

(1) Only for indication;

(2) Test conditions: pressure 40 bar (580 psi), temperature 30 °C (86 °F);

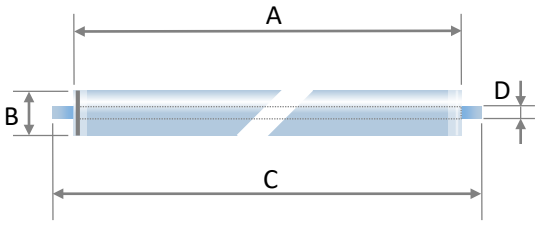
(3) Flux measured with demineralized (RO) water, flux may vary for individual element within ±20% range;

(4) Feed solution is 0.2% $MgSO_4$ in demineralized (RO) water;

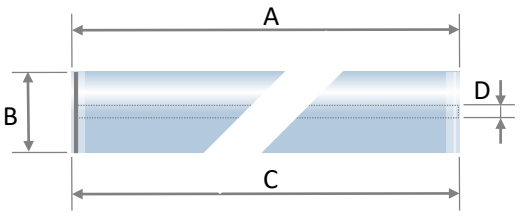
(5) Consult UNISOL Membrane Technology when intend to operate at elevated pressure, temperature or concentrations.

Dimensions

Male Configuration



Female Configuration



mm (inch)	1812	2540	4040	8040
Type	Female	Male	Male	Female
A	305 (12)	965 (38.0)	965 (38.0)	1016 (40.0)
B (⌀)	46 (1.8)	62 (2.4)	99.4 (3.9)	200.5 (7.9)
C	305 (12)	1016 (40.0)	1016 (40.0)	1016 (40.0)
D (⌀)	16 (0.6)	19 (0.75)	19 (0.75)	28.8 (1.125)

Handling

Recommended Cleaning Materials. Depending on the nature of the feed material, a choice can be made among the following cleaning agents:

- Sodium hydroxide at pH 10 – 12, temperature ⩽ 40 °C (104 °F);
- Hydrochloric acid at pH 1 – 2, temperature ⩽ 40 °C (104 °F);
- Nitric acid at pH 1 – 2, temperature ⩽ 40 °C (104 °F);
- Na-EDTA of 0.2 – 1.0 % w/w at pH 10.5 – 11, temperature ⩽ 35 °C (91 °F);
- Anionic surfactant (e.g. sodium dodecyl sulfate) of 0.5 % at pH 10.5 – 11, temperature ⩽ 35 °C (91 °F).

Only demineralized (RO) water must be used for cleaning. Consult UNISOL Membrane Technology regarding the use of other cleaning materials.

Lubricants. During installation, use only water or glycerin to lubricate seals. The use of petroleum or vegetable-based oils or solvents may damage the element and void any warranty.

Preservation and Storage. Plan ahead to use new membranes. The element should not be allowed to dry: store it in a sealed bag, at 4 – 30 °C (39 – 86 °F). Storage solutions should be made with: 1.5 % w/w sodium metabisulfite. Please refer to “UNISOL Membrane Element Storage and Handling Instructions.”

Chemical Exposure. Do not expose the membrane to chlorine or other oxidants. Sodium metabisulfite (without catalysts such as cobalt) is the preferred chemical to eliminate free chlorine or other oxidizers in the feed.

AMS NanoPro™ A–3012

Acid Stable Nanofiltration Spiral Wound Element

Description	The AMS NanoPro™ membrane is developed for long-term performance with high and stable fluxes in very acidic environment, featuring high pressure and temperature compatibility. AMS NanoPro™ elements are used for acid purification and metals concentration in low pH streams. Typical solutions include: • 20% H_2SO_4 • 20% HCl • 30% H_3PO_4 • 10% CH_3COOH				
Performance	Cut-off Rate(1):	200 dalton			
	Water Flux(2, 3):	75 liter/m^2/hour (39 gal/ft/day)			
	MgSO4 Rejection(2, 4):	≥ 96 %			
Limits	Typical operating pressure:	15-40 bar (217-580 psi)			
	Max Pressure Drop:	0.5 bar (7.3 psi)			
	Max Temperature(5):	Operating: 50 °C (122 °F)			
		Cleaning: 50 °C (122 °F)			
	pH Range(5):	Operating: 0 – 12			
		Cleaning: 0 – 13			
	Recirculation Flow:	1.8″ element: 4.0 – 8.0 liter/min (1.0 – 2.1 gal/min)			
		2.5″ element: 7.5 – 17 liter/min (2.0 – 4.4 gal/min)			
		4″ element: 22 – 42 liter/min (5.8 – 11.1 gal/min)			
		8″ element: 90 – 167 liter/min (23 – 42.7 gal/min)			
	Pressurization& Depressurization rate	< 0.7 bar/second (10psi/second)			
	Heating & cool down rate	< 5°C /minute (41 °F/minute)			
Area	**m^2 (ft^2)**	1812	2540	4040	8040
	B 31 mil Spacer	0.32 (3.4)	1.8 (19)	6.2 (67)	29 (312)
	C 46 mil Spacer	0.25 (2.7)	1.6 (17)	4.9 (53)	24 (260)

(1) Only for indication;

(2) Test conditions: pressure 40 bar (580 psi), temperature 30 °C (86 °F);

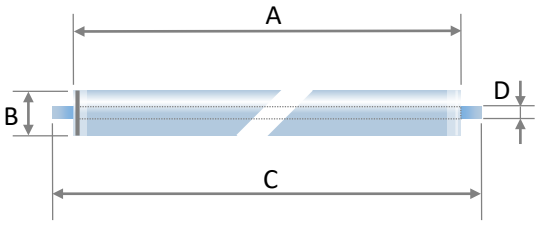
(3) Flux measured with demineralized (RO) water, flux may vary for individual element within ±20% range;

(4) Feed solution is 0.2% $MgSO_4$ in demineralized (RO) water;

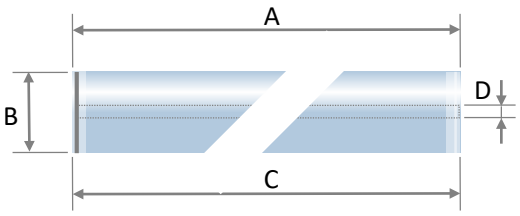
(5) Consult UNISOL Membrane Technology when intend to operate at elevated pressure, temperature or concentrations.

Dimensions

Male Configuration



Female Configuration



mm (inch)	1812	2540	4040	8040
Type	Female	Male	Male	Female
A	305 (12)	965 (38.0)	965 (38.0)	1016 (40.0)
B (⌀)	46 (1.8)	62 (2.4)	99.4 (3.9)	200.5 (7.9)
C	305 (12)	1016 (40.0)	1016 (40.0)	1016 (40.0)
D (⌀)	16 (0.6)	19 (0.75)	19 (0.75)	28.8 (1.13)

Handling

Recommended Cleaning Materials. Depending on the nature of the feed material, a choice can be made among the following cleaning agents:

- Sodium hydroxide at pH 10 – 12, temperature ⩽ 40 °C (104 °F);
- Hydrochloric acid at pH 1 – 2, temperature ⩽ 40 °C (104 °F);
- Nitric acid at pH 1 – 2, temperature ⩽ 40 °C (104 °F);
- Na-EDTA of 0.2 – 1.0 % w/w at pH 10.5 – 11, temperature ⩽ 35 °C (91 °F);
- Anionic surfactant (e.g. sodium dodecyl sulfate) of 0.5 % at pH 10.5 – 11, temperature ⩽ 35 °C (91 °F).

Only demineralized (RO) water must be used for cleaning. Consult UNISOL Membrane Technology regarding the use of other cleaning materials.

Lubricants. During installation, use only water or glycerin to lubricate seals. The use of petroleum or vegetable-based oils or solvents may damage the element and void any warranty.

Preservation and Storage. Plan ahead to use new membranes. The element should not be allowed to dry: store it in a sealed bag, at 4 – 30 °C (39 – 86 °F). Storage solutions should be made with: 1.5 % w/w sodium metabisulfite. Please refer to “UNISOL Membrane Element Storage and Handling Instructions.”

Chemical Exposure. Do not expose the membrane to chlorine or other oxidants. Sodium metabisulfite (without catalysts such as cobalt) is the preferred chemical to eliminate free chlorine or other oxidizers in the feed.

AMS NanoPro™ A–3014

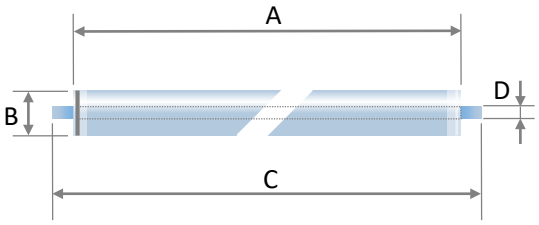
Acid Stable Nanofiltration Spiral Wound Element

Description	The AMS NanoPro™ membrane is developed for long-term performance with high and stable fluxes in very acidic environment, featuring high pressure and temperature compatibility. AMS NanoPro™ elements are used for acid purification and metals concentration in low pH streams. Typical solutions include:: • 20% H_2SO_4 • 20% HCl • 30% H_3PO_4 • 10% CH_3COOH				
Performance	Cut-off Rate(1):	400 dalton			
	Water Flux(2, 3):	90 liter/m^2/hour (53 gal/ft/day)			
	$MgSO_4$ Rejection(2, 4):	≥ 92 %			
Limits	Typical operating pressure:	15-40 bar (217-580 psi)			
	Max Pressure Drop:	0.5 bar (7.3 psi)			
	Max Temperature(5):	Operating: 50 °C (122 °F)			
		Cleaning: 50 °C (122 °F)			
	pH Range(5):	Operating: 0 – 12			
		Cleaning: 0 – 13			
	Recirculation Flow:	1.8″ element: 4.0 – 8.0 liter/min (1.0 – 2.1 gal/min)			
		2.5″ element: 7.5 – 17 liter/min (2.0 – 4.4 gal/min)			
		4″ element: 22 – 42 liter/min (5.8 – 11.1 gal/min)			
		8″ element: 90 – 167 liter/min (23 – 42.7 gal/min)			
	Pressurization& Depressurization rate	< 0.7 bar/second (10psi/second)			
	Heating & cool down rate	< 5°C /minute (41 °F/minute)			
Area	**m^2 (ft^2)**	1812	2540	4040	8040
	B 31 mil Spacer	0.32 (3.4)	1.8 (19)	6.2 (67)	29 (312)
	C 46 mil Spacer	0.25 (2.7)	1.6 (17)	4.9 (53)	24 (260)

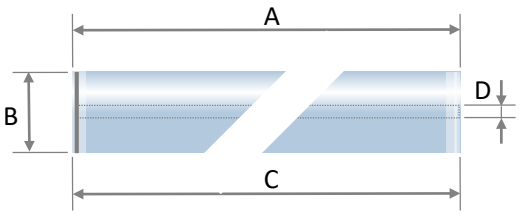
(1) Only for indication;
(2) Test conditions: pressure 40 bar (580 psi), temperature 30 °C (86 °F);
(3) Flux measured with demineralized (RO) water, flux may vary for individual element within ±20% range;
(4) Feed solution is 0.2% $MgSO_4$ in demineralized (RO) water;
(5) Consult UNISOL Membrane Technology when intend to operate at elevated pressure, temperature or concentrations.

Dimensions

Male Configuration



Female Configuration



mm (inch)	1812	2540	4040	8040
Type	Female	Male	Male	Female
A	305 (12)	965 (38.0)	965 (38.0)	1016 (40.0)
B (⌀)	46 (1.8)	62 (2.4)	99.4 (3.9)	200.5 (7.9)
C	305 (12)	1016 (40.0)	1016 (40.0)	1016 (40.0)
D (⌀)	16 (0.6)	19 (0.75)	19 (0.75)	28.8 (1.13)

Handling

Recommended Cleaning Materials. Depending on the nature of the feed material, a choice can be made among the following cleaning agents:

- Sodium hydroxide at pH 10 – 12, temperature ⩽ 40 °C (104 °F);
- Hydrochloric acid at pH 1 – 2, temperature ⩽ 40 °C (104 °F);
- Nitric acid at pH 1 – 2, temperature ⩽ 40 °C (104 °F);
- Na-EDTA of 0.2 – 1.0 % w/w at pH 10.5 – 11, temperature ⩽ 35 °C (91 °F);
- Anionic surfactant (e.g. sodium dodecyl sulfate) of 0.5 % at pH 10.5 – 11, temperature ⩽ 35 °C (91 °F).

Only demineralized (RO) water must be used for cleaning. Consult UNISOL Membrane Technology regarding the use of other cleaning materials.

Lubricants. During installation, use only water or glycerin to lubricate seals. The use of petroleum or vegetable-based oils or solvents may damage the element and void any warranty.

Preservation and Storage. Plan ahead to use new membranes. The element should not be allowed to dry: store it in a sealed bag, at 4 – 30 °C (39 – 86 °F). Storage solutions should be made with: 1.5 % w/w sodium metabisulfite. Please refer to “UNISOL Membrane Element Storage and Handling Instructions.”

Chemical Exposure. Do not expose the membrane to chlorine or other oxidants. Sodium metabisulfite (without catalysts such as cobalt) is the preferred chemical to eliminate free chlorine or other oxidizers in the feed.

AMS NanoPro™ B–4021

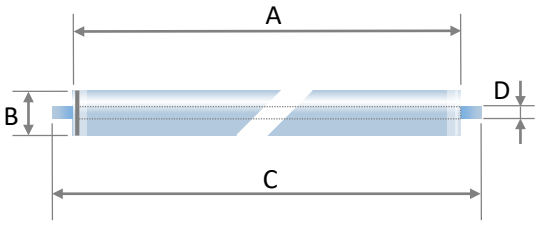
Base Stable Nanofiltration Spiral Wound Element

Description	The AMS NanoPro™ B-series membranes are developed for long-term performance with high and stable fluxes in a very base environment, featuring high pressure and temperature compatibility. AMS NanoPro™ B-series elements are used for alkali purification and components concentration in high-pH streams. Typical solutions include: • 20% NaOH • 10% KOH				
Performance	Cut-off Rate(1):	100 dalton			
	Water Flux(2, 3):	45 liter/m^2/hour (26 gal/ft/day)			
	$MgSO_4$ Rejection(2, 4):	≥ 99 %			
Limits	Typical operating pressure:	15-40 bar (217-580 psi)			
	Max Pressure Drop:	0.5 bar (7.3 psi)			
	Max Temperature(5):	Operating: 50 °C (122 °F)			
		Cleaning: 50 °C (122 °F)			
	pH Range(5):	Operating: 3 – 14			
		Cleaning: 2 – 14			
	Recirculation Flow:	1.8″ element: 4.0 – 8.0 liter/min (1.0 – 2.1 gal/min)			
		2.5″ element: 7.5 – 17 liter/min (2.0 – 4.4 gal/min)			
		4″ element: 22 – 42 liter/min (5.8 – 11.1 gal/min)			
		8″ element: 90 – 167 liter/min (23 – 42.7 gal/min)			
	Pressurization& Depressurization rate	< 0.7 bar/second (10psi/second)			
	Heating & cool down rate	< 5°C /minute (41 °F/minute)			
Area	**m^2 (ft^2)**	1812	2540	4040	8040
	B 31 mil Spacer	0.32 (3.4)	1.6 (17)	6.1 (66)	28 (300)
	C 46 mil Spacer	Not available	Not available	4.7 (51)	23 (250)

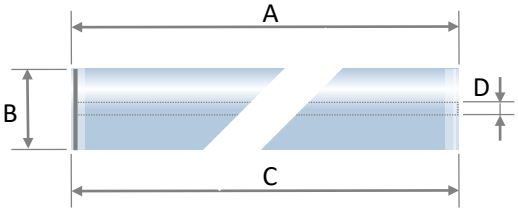
(1) Only for indication;
(2) Test conditions: pressure 40 bar (580 psi), temperature 30 °C (86 °F);
(3) Flux measured with demineralized (RO) water, flux may vary for individual element within ±20% range;
(4) Feed solution is 0.2% $MgSO_4$ in demineralized (RO) water;
(5) Consult UNISOL Membrane Technology when intend to operate at elevated pressure, temperature or concentrations.

Dimensions

Male Configuration



Female Configuration



mm (inch)	1812	2540	4040	8040
Type	Female	Male	Male	Female
A	305 (12)	965 (38.0)	965 (38.0)	1016 (40.0)
B (⌀)	46 (1.8)	62 (2.4)	99.4 (3.9)	200.5 (7.9)
C	305 (12)	1016 (40.0)	1016 (40.0)	1016 (40.0)
D (⌀)	16 (0.6)	19 (0.75)	19 (0.75)	28.8 (1.13)

Handling

Recommended Cleaning Materials. Depending on the nature of the feed material, a choice can be made among the following cleaning agents:

- Sodium hydroxide at pH 10 – 12, temperature ⩽ 40 °C (104 °F);
- Hydrochloric acid at pH 1 – 2, temperature ⩽ 40 °C (104 °F);
- Nitric acid at pH 1 – 2, temperature ⩽ 40 °C (104 °F);
- Na-EDTA of 0.2 – 1.0 % w/w at pH 10.5 – 11, temperature ⩽ 35 °C (91 °F);
- Anionic surfactant (e.g. sodium dodecyl sulfate) of 0.5 % at pH 10.5 – 11, temperature ⩽ 35 °C (91 °F).

Only demineralized (RO) water must be used for cleaning. Consult UNISOL Membrane Technology regarding the use of other cleaning materials.

Lubricants. During installation, use only water or glycerin to lubricate seals. The use of petroleum or vegetable-based oils or solvents may damage the element and void any warranty.

Preservation and Storage. Plan ahead to use new membranes. The element should not be allowed to dry: store it in a sealed bag, at 4 – 30 °C (39 – 86 °F). Storage solutions should be made with: 1.5 % w/w sodium metabisulfite. Please refer to “UNISOL Membrane Element Storage and Handling Instructions.”

Chemical Exposure. Do not expose the membrane to chlorine or other oxidants. Sodium metabisulfite (without catalysts such as cobalt) is the preferred chemical to eliminate free chlorine or other oxidizers in the feed.

AMS NanoPro™ B–4022

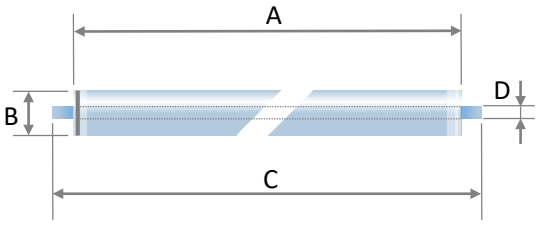
Base Stable Nanofiltration Spiral Wound Element

Description	The AMS NanoPro™ B-series membranes are developed for long-term performance with high and stable fluxes in a very base environment, featuring high pressure and temperature compatibility. AMS NanoPro™ B-series elements are used for alkali purification and components concentration in high-pH streams. Typical solutions include: • 20% NaOH • 10% KOH				
Performance	Cut-off Rate(1):	200 dalton			
	Water Flux(2, 3):	70 liter/m^2/hour (41 gal/ft/day)			
	$MgSO_4$ Rejection(2, 4):	≥ 96 %			
Limits	Typical operating pressure:	15-40 bar (217-580 psi)			
	Max Pressure Drop:	0.5 bar (7.3 psi)			
	Max Temperature(5):	Operating: 50 °C (122 °F)			
		Cleaning: 50 °C (122 °F)			
	pH Range(5):	Operating: 3 – 14			
		Cleaning: 2 – 14			
	Recirculation Flow:	1.8″ element: 4.0 – 8.0 liter/min (1.0 – 2.1 gal/min)			
		2.5″ element: 7.5 – 17 liter/min (2.0 – 4.4 gal/min)			
		4″ element: 22 – 42 liter/min (5.8 – 11.1 gal/min)			
		8″ element: 90 – 167 liter/min (23 – 42.7 gal/min)			
	Pressurization& Depressurization rate	< 0.7 bar/second (10psi/second)			
	Heating & cool down rate	< 5°C /minute (41 °F/minute)			
Area	**m^2 (ft^2)**	1812	2540	4040	8040
	B 31 mil Spacer	0.32 (3.4)	1.6 (17)	6.1 (66)	28 (300)
	C 46 mil Spacer	Not available	Not available	4.7 (51)	23 (250)

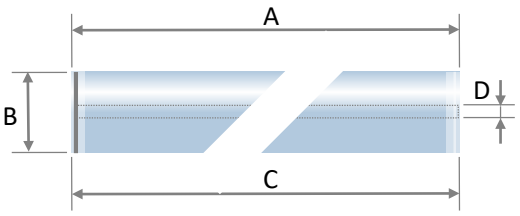
(1) Only for indication;
(2) Test conditions: pressure 40 bar (580 psi), temperature 30 °C (86 °F);
(3) Flux measured with demineralized (RO) water, flux may vary for individual element within ±20% range;
(4) Feed solution is 0.2% $MgSO_4$ in demineralized (RO) water;
(5) Consult UNISOL Membrane Technology when intend to operate at elevated pressure, temperature or concentrations.

Dimensions

Male Configuration



Female Configuration



mm (inch)	1812	2540	4040	8040
Type	Female	Male	Male	Female
A	305 (12)	965 (38.0)	965 (38.0)	1016 (40.0)
B (⌀)	46 (1.8)	62 (2.4)	99.4 (3.9)	200.5 (7.89)
C	305 (12)	1016 (40.0)	1016 (40.0)	1016 (40.0)
D (⌀)	16 (0.6)	19 (0.75)	19 (0.75)	28.8 (1.13)

Handling

Recommended Cleaning Materials. Depending on the nature of the feed material, a choice can be made among the following cleaning agents:

- Sodium hydroxide at pH 10 – 12, temperature ⩽ 40 °C (104 °F);
- Hydrochloric acid at pH 1 – 2, temperature ⩽ 40 °C (104 °F);
- Nitric acid at pH 1 – 2, temperature ⩽ 40 °C (104 °F);
- Na-EDTA of 0.2 – 1.0 % w/w at pH 10.5 – 11, temperature ⩽ 35 °C (91 °F);
- Anionic surfactant (e.g. sodium dodecyl sulfate) of 0.5 % at pH 10.5 – 11, temperature ⩽ 35 °C (91 °F).

Only demineralized (RO) water must be used for cleaning. Consult UNISOL Membrane Technology regarding the use of other cleaning materials.

Lubricants. During installation, use only water or glycerin to lubricate seals. The use of petroleum or vegetable-based oils or solvents may damage the element and void any warranty.

Preservation and Storage. Plan ahead to use new membranes. The element should not be allowed to dry: store it in a sealed bag, at 4 – 30 °C (39 – 86 °F). Storage solutions should be made with: 1.5 % w/w sodium metabisulfite. Please refer to “UNISOL Membrane Element Storage and Handling Instructions.”

Chemical Exposure. Do not expose the membrane to chlorine or other oxidants. Sodium metabisulfite (without catalysts such as cobalt) is the preferred chemical to eliminate free chlorine or other oxidizers in the feed.

AMS NanoPro™ S–3011

Solvent Stable Nanofiltration Spiral Wound Element

Description	The AMS NanoPro™ membrane is developed for long-term performance with high and stable fluxes in presence of solvents, featuring high pressure and temperature compatibility. AMS NanoPro™ elements are used for solvent purification and component concentration. Typical solvents include*: • Methanol, Ethanol, Propanol • Hexane • THF • Acetone, Acetonitrile • Ethyl acetate • DMF				
Performance	Cut-off Rate(1):	100 dalton			
	Water Flux(2, 3):	65 liter/m^2/hour (38 gal/ft/day)			
	$MgSO_4$ Rejection(2, 4):	≥ 99 %			
Limits	Typical operating pressure:	15-40 bar (217-580 psi)			
	Max Pressure Drop:	0.5 bar (7.3 psi)			
	Max Temperature(5):	Operating: 50 °C (122 °F)			
		Cleaning: 50 °C (122 °F)			
	pH Range(5):	Operating: 2 – 12			
		Cleaning: 1 – 13			
	Recirculation Flow:	1.8″ element: 4.0 – 8.0 liter/min (1.0 – 2.1 gal/min)			
		2.5″ element: 7.5 – 17 liter/min (2.0 – 4.4 gal/min)			
		4″ element: 22 – 42 liter/min (5.8 – 11.1 gal/min)			
		8″ element: 90 – 167 liter/min (23 – 42.7 gal/min)			
	Pressurization& Depressurization rate	< 0.7 bar/second (10psi/second)			
	Heating & cool down rate	< 5°C /minute (41 °F/minute)			
Area	**m^2 (ft^2)**	1812	2540	4040	8040
	B 31 mil Spacer	0.32 (3.4)	1.8 (19)	6.2 (67)	29 (312)
	C 46 mil Spacer	0.25 (2.7)	1.6 (17)	4.9 (53)	24 (260)

(1) Only for indication;

(2) Test conditions: pressure 40 bar (580 psi), temperature 30 °C (86 °F);

(3) Flux measured with demineralized (RO) water, flux may vary for individual element within ±20% range;

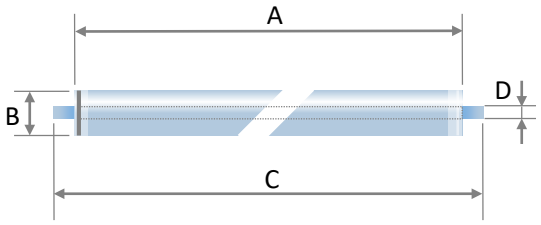
(4) Feed solution is 0.2% $MgSO_4$ in demineralized (RO) water;

(5) Consult UNISOL Membrane Technology when intend to operate at elevated pressure, temperature or concentrations.

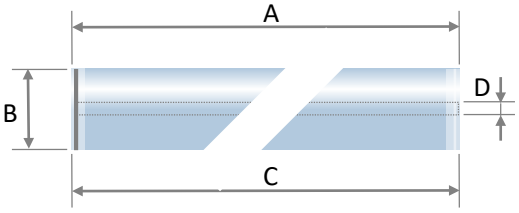
** Consult UNISOL Membrane Technology about the concentration for these typical solvents.*

Dimensions

Male Configuration



Female Configuration



mm (inch)	1812	2540	4040	8040
Type	Female	Male	Male	Female
A	305 (12)	954 (37.6)	965 (38.0)	1016 (40.0)
B (⌀)	46 (1.8)	62 (2.4)	99.4 (3.9)	200.5 (7.9)
C	305 (12)	1016 (40.0)	1016 (40.0)	1016 (40.0)
D (⌀)	16 (0.6)	19 (0.75)	19 (0.75)	28.8 (1.13)

Handling

Recommended Cleaning Materials. Depending on the nature of the feed material, a choice can be made among the following cleaning agents:

- Sodium hydroxide at pH 10 – 12, temperature ⩽ 40 °C (104 °F);
- Hydrochloric acid at pH 1 – 2, temperature ⩽ 40 °C (104 °F);
- Nitric acid at pH 1 – 2, temperature ⩽ 40 °C (104 °F);
- Na-EDTA of 0.2 – 1.0 % w/w at pH 10.5 – 11, temperature ⩽ 35 °C (91°F);
- Anionic surfactant (e.g. sodium dodecyl sulfate) of 0.5 % at pH 10.5 – 11, temperature ⩽ 35 °C (91 °F).

Only demineralized (RO) water must be used for cleaning. Consult UNISOL Membrane Technolgoy regarding the use of other cleaning materials.

Lubricants. During installation, use only water or glycerin to lubricate seals. The use of petroleum or vegetable-based oils or solvents may damage the element and void any warranty.

Preservation and Storage. Plan ahead to use new membranes. The element should not be allowed to dry: store it in a sealed bag, at 4 – 30 °C (39 – 86 °F). Storage solutions should be made with: 1.5 % w/w sodium metabisulfite. Please refer to “UNISOL Membrane Element Storage and Handling Instructions.”

Chemical Exposure. Do not expose the membrane to chlorine or other oxidants. Sodium metabisulfite (without catalysts such as cobalt) is the preferred chemical to eliminate free chlorine or other oxidizers in the feed.

AMS NanoPro™ S–3012

Solvent Stable Nanofiltration Spiral Wound Element

Description	The AMS NanoPro™ membrane is developed for long-term performance with high and stable fluxes in presence of solvents, featuring high pressure and temperature compatibility. AMS NanoPro™ elements are used for solvent purification and component concentration. Typical solvents include*: • Methanol, Ethanol, Propanol • Hexane • THF • Acetone, Acetonitrile • Ethyl acetate • DMF				
Performance	Cut-off Rate(1):	200 dalton			
	Water Flux(2, 3):	75 liter/m^2/hour (44 gal/ft/day)			
	$MgSO_4$ Rejection(2, 4):	≥ 96 %			
Limits	Typical operating pressure:	15-40 bar (217-580 psi)			
	Max Pressure Drop:	0.5 bar (7.3 psi)			
	Max Temperature(5):	Operating: 50 °C (122 °F) Cleaning: 50 °C (122 °F)			
	pH Range(5):	Operating: 2 – 12 Cleaning: 1 – 13			
	Recirculation Flow:	1.8″ element: 4.0 – 8.0 liter/min (1.0 – 2.1 gal/min) 2.5″ element: 7.5 – 17 liter/min (2.0 – 4.4 gal/min) 4″ element: 22 – 42 liter/min (5.8 – 11.1 gal/min) 8″ element: 90 – 167 liter/min (23 – 42.7 gal/min)			
	Pressurization& Depressurization rate	< 0.7 bar/second (10psi/second)			
	Heating & cool down rate	< 5°C /minute (41 °F/minute)			
Area	**m^2 (ft^2)**	1812	2540	4040	8040
	B 31 mil Spacer	0.32 (3.4)	1.8 (19)	6.2 (67)	29 (312)
	C 46 mil Spacer	0.25 (2.7)	1.6 (17)	4.9 (53)	24 (260)

(1) Only for indication;

(2) Test conditions: pressure 40 bar (580 psi), temperature 30 °C (86 °F);

(3) Flux measured with demineralized (RO) water, flux may vary for individual element within ±20% range;

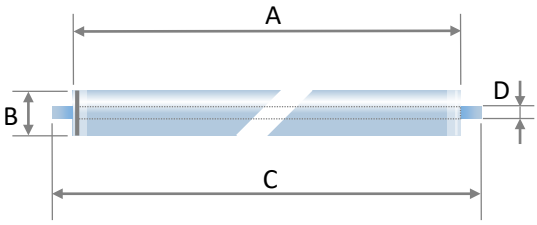
(4) Feed solution is 0.2% $MgSO_4$ in demineralized (RO) water;

(5) Consult UNISOL Membrane Technology when intend to operate at elevated pressure, temperature or concentrations.

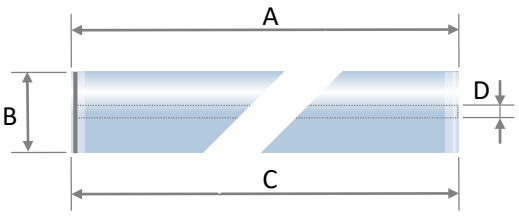
** Consult UNISOL Membrane Technology about the concentration for these typical solvents.*

Dimensions

Male Configuration



Female Configuration



mm (inch)	1812	2540	4040	8040
Type	Female	Male	Male	Female
A	305 (12)	954 (37.6)	965 (38.0)	1016 (40.0)
B (⌀)	46 (1.8)	62 (2.4)	99.4 (3.9)	200.5 (7.9)
C	305 (12)	1016 (40.0)	1016 (40.0)	1016 (40.0)
D (⌀)	16 (0.6)	19 (0.75)	19 (0.75)	28.8 (1.13)

Handling

Recommended Cleaning Materials. Depending on the nature of the feed material, a choice can be made among the following cleaning agents:

- Sodium hydroxide at pH 10 – 12, temperature ≤ 40 °C (104 °F);
- Hydrochloric acid at pH 1 – 2, temperature ≤ 40 °C (104 °F);
- Nitric acid at pH 1 – 2, temperature ≤ 40 °C (104 °F);
- Na-EDTA of 0.2 – 1.0 % w/w at pH 10.5 – 11, temperature ≤ 35 °C (91 v);
- Anionic surfactant (e.g. sodium dodecyl sulfate) of 0.5 % at pH 10.5 – 11, temperature ≤ 35 °C (91 °F).

Only demineralized (RO) water must be used for cleaning. Consult UNISOL Membrane Technology regarding the use of other cleaning materials.

Lubricants. During installation, use only water or glycerin to lubricate seals. The use of petroleum or vegetable-based oils or solvents may damage the element and void any warranty.

Preservation and Storage. Plan ahead to use new membranes. The element should not be allowed to dry: store it in a sealed bag, at 4 – 30 °C (39 – 86 °F). Storage solutions should be made with: 1.5 % w/w sodium metabisulfite. Please refer to “UNISOL Membrane Element Storage and Handling Instructions.”

Chemical Exposure. Do not expose the membrane to chlorine or other oxidants. Sodium metabisulfite (without catalysts such as cobalt) is the preferred chemical to eliminate free chlorine or other oxidizers in the feed.

AMS NanoPro™ S–3014

Solvent Stable Nanofiltration Spiral Wound Element

Description	The AMS NanoPro™ membrane is developed for long-term performance with high and stable fluxes in presence of solvents, featuring high pressure and temperature compatibility. AMS NanoPro™ elements are used for solvent purification and component concentration. Typical solvents include*: • Methanol, Ethanol, Propanol • Hexane • THF • Acetone, Acetonitrile • Ethyl acetate • DMF				
Performance	Cut-off Rate(1):	400 dalton			
	Water Flux(2, 3):	90 liter/m²/hour (53 gal/ft/day)			
	$MgSO_4$ Rejection(2, 4):	≥ 92 %			
Limits	Typical operating pressure:	15-40 bar (217-580 psi)			
	Max Pressure Drop:	0.5 bar (7.3 psi)			
	Max Temperature(5):	Operating: 50 °C (122 °F)			
		Cleaning: 50 °C (122 °F)			
	pH Range(5):	Operating: 2 – 12			
		Cleaning: 1 – 13			
	Recirculation Flow:	1.8″ element: 4.0 – 8.0 liter/min (1.0 – 2.1 gal/min)			
		2.5″ element: 7.5 – 17 liter/min (2.0 – 4.4 gal/min)			
		4″ element: 22 – 42 liter/min (5.8 – 11.1 gal/min)			
		8″ element: 90 – 167 liter/min (23 – 42.7 gal/min)			
	Pressurization& Depressurization rate	< 0.7 bar/second (10psi/second)			
	Heating & cool down rate	< 5°C /minute (41 °F/minute)			
Area	**m^2 (ft^2)**	1812	2540	4040	8040
	B 31 mil Spacer	0.32 (3.4)	1.8 (19)	6.2 (67)	29 (312)
	C 46 mil Spacer	0.25 (2.7)	1.6 (17)	4.9 (53)	24 (260)

(1) Only for indication;

(2) Test conditions: pressure 40 bar (580 psi), temperature 30 °C (86 °F);

(3) Flux measured with demineralized (RO) water, flux may vary for individual element within ±20% range;

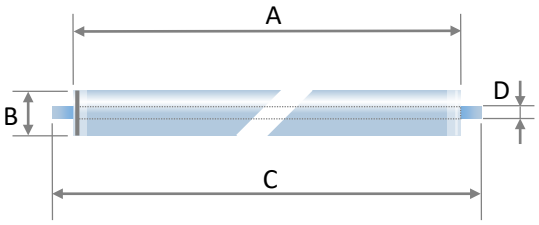
(4) Feed solution is 0.2% $MgSO_4$ in demineralized (RO) water;

(5) Consult UNISOL Membrane Technology when intend to operate at elevated pressure, temperature or concentrations.

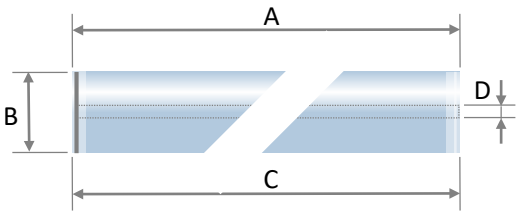
** Consult UNISOL Membrane Technology about the concentration for these typical solvents.*

Dimensions

Male Configuration



Female Configuration



mm (inch)	1812	2540	4040	8040
Type	Female	Male	Male	Female
A	305 (12)	954 (37.6)	965 (38.0)	1016 (40.0)
B (⌀)	46 (1.8)	62 (2.4)	99.4 (3.9)	200.5 (7.9)
C	305 (12)	1016 (40.0)	1016 (40.0)	1016 (40.0)
D (⌀)	16 (0.6)	19 (0.75)	19 (0.75)	28.8 (1.13)

Handling

Recommended Cleaning Materials. Depending on the nature of the feed material, a choice can be made among the following cleaning agents:

- Sodium hydroxide at pH 10 – 12, temperature ⩽ 40 °C (104 °F);
- Hydrochloric acid at pH 1 – 2, temperature ⩽ 40 °C (104 °F);
- Nitric acid at pH 1 – 2, temperature ⩽ 40 °C (104 °F);
- Na-EDTA of 0.2 – 1.0 % w/w at pH 10.5 – 11, temperature ⩽ 35 °C (91 °F);
- Anionic surfactant (e.g. sodium dodecyl sulfate) of 0.5 % at pH 10.5 – 11, temperature ⩽ 35 °C (91 °F).

Only demineralized (RO) water must be used for cleaning. Consult UNISOL Membrane Technology regarding the use of other cleaning materials.

Lubricants. During installation, use only water or glycerin to lubricate seals. The use of petroleum or vegetable-based oils or solvents may damage the element and void any warranty.

Preservation and Storage. Plan ahead to use new membranes. The element should not be allowed to dry: store it in a sealed bag, at 4 – 30 °C (39 – 86 °F). Storage solutions should be made with: 1.5 % w/w sodium metabisulfite. Please refer to “UNISOL Membrane Element Storage and Handling Instructions.”

Chemical Exposure. Do not expose the membrane to chlorine or other oxidants. Sodium metabisulfite (without catalysts such as cobalt) is the preferred chemical to eliminate free chlorine or other oxidizers in the feed.

AMS UltraPro™ A–U301

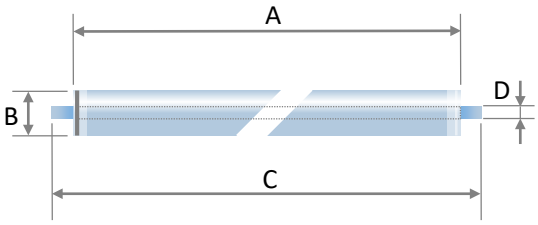
Acid Stable Ultrafiltration Spiral Wound Element

Description	The AMS UltraPro™ membrane is developed for long-term performance with high and stable fluxes in very acidic environment, featuring high pressure and temperature compatibility. AMS UltraPro™ elements are used for either pre-filtration before nanofiltration or as stand-alone membranes in acid purification and metals concentration. Typical solutions include: • 20% H_2SO_4 • 20% HCl • 30% H_3PO_4 • 10% CH_3COOH				
Performance	Cut-off Rate(1):	> 2,500 dalton			
	Water Flux(2, 3):	100 liter/m^2/hour (59 gal/ft/day)			
Limits	Max Pressure:	40 bar (580 psi)			
	Max Pressure Drop:	0.5 bar (7.3 psi)			
	Max Temperature(5):	Operating: 50 °C (122 °F)			
		Cleaning: 50 °C (122 °F)			
	pH Range(5):	Operating: 0 – 12			
		Cleaning: 0 – 13			
	Recirculation Flow:	1.8″ element: 4.0 – 8.0 liter/min (1.0 – 2.1 gal/min)			
		2.5″ element: 7.5 – 17 liter/min (2.0 – 4.4 gal/min)			
		4″ element: 22 – 42 liter/min (5.8 – 11.1 gal/min)			
		8″ element: 90 – 167 liter/min (23 – 42.7 gal/min)			
	Pressurization& Depressurization rate	< 0.7 bar/second (10psi/second)			
	Heating & cool down rate	< 5°C /minute (41 °F/minute)			
Area	**m^2 (ft^2)**	1812	2540	4040	8040
	B 31 mil Spacer	0.32 (3.4)	1.8 (19)	6.2 (67)	29 (312)
	C 46 mil Spacer	0.25 (2.7)	1.6 (17)	4.9 (53)	24 (260)

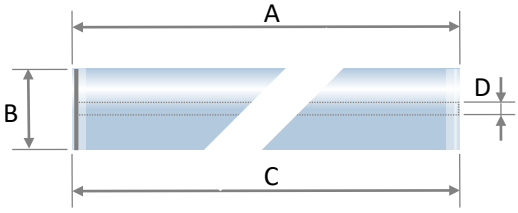
(1) Only for indication;
(2) Test conditions: pressure 40 bar (580 psi), temperature 30 °C (86 °F);
(3) Flux measured with demineralized (RO) water, flux may vary for individual element within ±20% range;
(4) Cut-off rate was determined by suitable markers (please consult UNISOL Membrane Technology);
(5) Consult UNISOL Membrane Technology when intend to operate at elevated pressure, temperature or concentrations.

Dimensions

Male Configuration



Female Configuration



mm (inch)	1812	2540	4040	8040
Type	Female	Male	Male	Female
A	305 (12)	965 (38.0)	965 (38.0)	1016 (40.0)
B (⌀)	46 (1.8)	62 (2.4)	99.4 (3.9)	200.5 (7.9)
C	305 (12)	1016 (40.0)	1016 (40.0)	1016 (40.0)
D (⌀)	16 (0.6)	19 (0.75)	19 (0.75)	28.8 (1.13)

Handling

Recommended Cleaning Materials. Depending on the nature of the feed material, a choice can be made among the following cleaning agents:

- Sodium hydroxide at pH 10 – 12, temperature ⩽ 40 °C (104 °F);
- Hydrochloric acid at pH 1 – 2, temperature ⩽ 40 °C (104 °F);
- Nitric acid at pH 1 – 2, temperature ⩽ 40 °C (104 °F);
- Na-EDTA of 0.2 – 1.0 % w/w at pH 10.5 – 11, temperature ⩽ 35 °C (91 °F);
- Anionic surfactant (e.g. sodium dodecyl sulfate) of 0.5 % at pH 10.5 – 11, temperature ⩽ 35 °C (91 °F).

Only demineralized (RO) water must be used for cleaning. Consult UNISOL Membrane Technology regarding the use of other cleaning materials.

Lubricants. During installation, use only water or glycerin to lubricate seals. The use of petroleum or vegetable-based oils or solvents may damage the element and void any warranty.

Preservation and Storage. Plan ahead to use new membranes. The element should not be allowed to dry: store it in a sealed bag, at 4 – 30 °C (39 – 86 °F). Storage solutions should be made with: 1.5 % w/w sodium metabisulfite. Please refer to “UNISOL Membrane Element Storage and Handling Instructions.”

Chemical Exposure. Do not expose the membrane to chlorine or other oxidants. Sodium metabisulfite (without catalysts such as cobalt) is the preferred chemical to eliminate free chlorine or other oxidizers in the feed.

AMS UltraPro™ A–1801

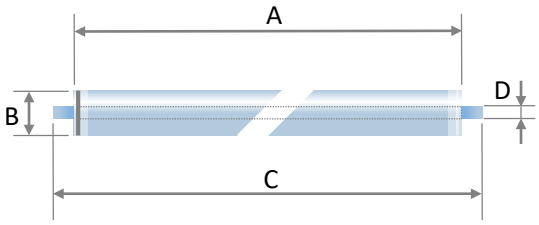
Acid Stable Ultrafiltration Spiral Wound Element

Description	The AMS UltraPro™ membrane is developed for long-term performance with high and stable fluxes in very acidic environment, featuring high pressure and temperature compatibility. AMS UltraPro™ elements are used for either pre-filtration before nanofiltration or as stand-alone membranes in acid purification and metals concentration. Typical solutions include: • 20% H_2SO_4 • 20% HCl • 30% H_3PO_4 • 10% CH_3COOH				
Performance	Cut-off Rate(1):	> 10,000 dalton			
	Permeability(2, 3):	18 liter/m^2/hour/bar (0.73 gal/ft/day/psi)			
Limits	Max. pressure:	10 bar (145 psi)			
	Max Pressure Drop:	0.5 bar (7.3 psi)			
	Max Temperature(5):	Operating: 50 °C (122 °F)			
		Cleaning: 50 °C (122 °F)			
	pH Range(5):	Operating: 0 – 12			
		Cleaning: 0 – 13			
	Recirculation Flow:	1.8″ element: 4.0 – 8.0 liter/min (1.0 – 2.1 gal/min)			
		2.5″ element: 7.5 – 17 liter/min (2.0 – 4.4 gal/min)			
		4″ element: 22 – 42 liter/min (5.8 – 11.1 gal/min)			
		8″ element: 90 – 167 liter/min (23 – 42.7 gal/min)			
	Pressurization& Depressurization rate	< 0.7 bar/second (10psi/second)			
	Heating & cool down rate	< 5°C /minute (41 °F/minute)			
Area	**m^2 (ft^2)**	1812	2540	4040	8040
	B 31 mil Spacer	0.32 (3.4)	1.8 (19)	6.2 (67)	29 (312)
	C 46 mil Spacer	0.25 (2.7)	1.6 (17)	4.9 (53)	24 (260)

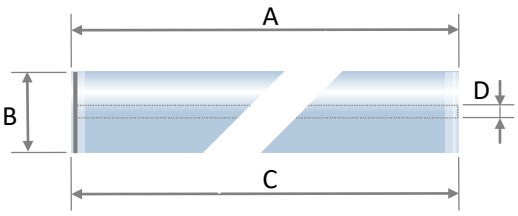
(1) Only for indication;
(2) Test conditions: pressure 2 bar (30 psi), temperature 30 °C (86 °F);
(3) Flux measured with demineralized (RO) water, flux may vary for individual element within ±20% range;
(4) Cut-off rate was determined by suitable markers (please consult UNISOL Membrane Technology);
(5) Consult UNISOL Membrane Technology when intend to operate at elevated pressure, temperature or concentrations.

Dimensions

Male Configuration



Female Configuration



mm (inch)	1812	2540	4040	8040
Type	Female	Male	Male	Female
A	305 (12)	965 (38.0)	965 (38.0)	1016 (40.0)
B (⌀)	46 (1.8)	62 (2.4)	99.4 (3.9)	200.5 (7.9)
C	305 (12)	1016 (40.0)	1016 (40.0)	1016 (40.0)
D (⌀)	16 (0.6)	19 (0.75)	19 (0.75)	28.8 (1.13)

Handling

Recommended Cleaning Materials. Depending on the nature of the feed material, a choice can be made among the following cleaning agents:

- Sodium hydroxide at pH 10 – 12, temperature ⩽ 40 °C (104 °F);
- Hydrochloric acid at pH 1 – 2, temperature ⩽ 40 °C (104 °F);
- Nitric acid at pH 1 – 2, temperature ⩽ 40 °C (104 °F);
- Na-EDTA of 0.2 – 1.0 % w/w at pH 10.5 – 11, temperature ⩽ 35 °C (91 °F);
- Anionic surfactant (e.g. sodium dodecyl sulfate) of 0.5 % at pH 10.5 – 11, temperature ⩽ 35 °C (91 °F).

Only demineralized (RO) water must be used for cleaning. Consult UNISOL Membrane Techonology regarding the use of other cleaning materials.

Lubricants. During installation, use only water or glycerin to lubricate seals. The use of petroleum or vegetable-based oils or solvents may damage the element and void any warranty.

Preservation and Storage. Plan ahead to use new membranes. The element should not be allowed to dry: store it in a sealed bag, at 4 – 30 °C (39 – 86 °F). Storage solutions should be made with: 1.5 % w/w sodium metabisulfite. Please refer to “UNISOL Membrane Element Storage and Handling Instructions.”

Chemical Exposure. Do not expose the membrane to chlorine or other oxidants. Sodium metabisulfite (without catalysts such as cobalt) is the preferred chemical to eliminate free chlorine or other oxidizers in the feed.

AMS UltraPro™ S–U301

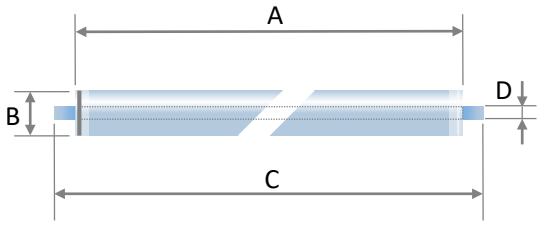
Solvent Stable Ultrafiltration Spiral Wound Element

Description	The AMS UltraPro™ membrane is developed for long-term performance with high and stable fluxes in presence of solvents, featuring high pressure and temperature compatibility. AMS UltraPro™ elements are used for either pre-filtration before nanofiltration or as stand-alone membranes in solvent purification and component concentration. Typical solvents include*: • Methanol, Ethanol, Propanol • Hexane • THF • Acetone, Acetonitrile • Ethyl acetate • DMF				
Performance	Cut-off Rate(1):	> 2,500 dalton			
	Water Flux(2, 3):	100 liter/m²/hour (59 gal/ft/day)			
Limits	Max Pressure:	40 bar (580 psi)			
	Max Pressure Drop:	0.5 bar (7.3 psi)			
	Max Temperature(5):	Operating: 50 °C (122 °F)			
		Cleaning: 50 °C (122 °F)			
	pH Range(5):	Operating: 2 – 12			
		Cleaning: 1 – 13			
	Recirculation Flow:	1.8" element: 4.0 – 8.0 liter/min (1.0 – 2.1 gal/min)			
		2.5" element: 7.5 – 17 liter/min (2.0 – 4.4 gal/min)			
		4" element: 22 – 42 liter/min (5.8 – 11.1 gal/min)			
		8" element: 90 – 167 liter/min (23 – 42.7 gal/min)			
	Pressurization& Depressurization rate	< 0.7 bar/second (10psi/second)			
	Heating & cool down rate	< 5°C /minute (41 °F/minute)			
Area	**m² (ft²)**	1812	2540	4040	8040
	B 31 mil Spacer	0.32 (3.4)	1.6 (17)	6.1 (66)	28 (300)
	C 46 mil Spacer	0.25 (2.7)	1.3 (14)	4.7 (51)	23 (250)

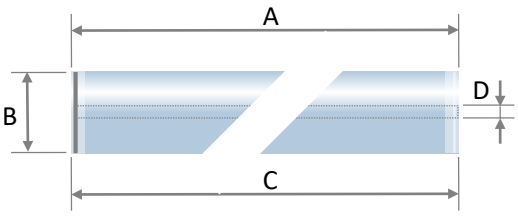
(1) Only for indication;
(2) Test conditions: pressure 40 bar (580 psi), temperature 30 °C (86 °F);
(3) Flux measured with demineralized (RO) water, flux may vary for individual element within ±20% range;
(4) Cut-off rate was determined by suitable markers (please consult UNISOL Membrane Technology);
(5) Consult UNISOL Membrane Technology when intend to operate at elevated pressure, temperature or concentrations.
** Consult UNISOL Membrane Technology about the concentration for these typical solvents.*

Dimensions

Male Configuration



Female Configuration



mm (inch)	1812	2540	4040	8040
Type	Female	Male	Male	Female
A	305 (12)	954 (37.6)	965 (38.0)	1016 (40.0)
B (⌀)	46 (1.8)	62 (2.4)	99.4 (3.9)	200.5 (7.9)
C	305 (12)	1016 (40.0)	1016 (40.0)	1016 (40.0)
D (⌀)	16 (0.6)	19 (0.75)	19 (0.75)	28.8 (1.13)

Handling

Recommended Cleaning Materials. Depending on the nature of the feed material, a choice can be made among the following cleaning agents:

- Sodium hydroxide at pH 10 - 12, temperature ≤ 40 °C (104 °F);
- Hydrochloric acid at pH 1 - 2, temperature ≤ 40 °C (104 °F);
- Nitric acid at pH 1 - 2, temperature ≤ 40 °C (104 °F);
- Na-EDTA of 0.2 - 1.0 % w/w at pH 10.5~11, temperature ≤ 35 °C (91 °F);
- Anionic surfactant (e.g. sodium dodecyl sulfate) of 0.5 % at pH 10.5 – 11, temperature ≤ 35 °C (91 °F).

Only demineralized (RO) water must be used for cleaning. Consult UNISOL Membrane Technology regarding the use of other cleaning materials.

Lubricants. During installation, use only water or glycerin to lubricate seals. The use of petroleum or vegetable-based oils or solvents may damage the element and void any warranty.

Preservation and Storage. Plan ahead to use new membranes. The element should not be allowed to dry: store it in a sealed bag, at 4 – 30 °C (39 – 86 °F). Storage solutions should be made with: 1.5 % w/w sodium metabisulfite. Please refer to “UNISOL Membrane Element Storage and Handling Instructions.”

Chemical Exposure. Do not expose the membrane to chlorine or other oxidants. Sodium metabisulfite (without catalysts such as cobalt) is the preferred chemical to eliminate free chlorine or other oxidizers in the feed.

AMS UltraPro™ S–1801

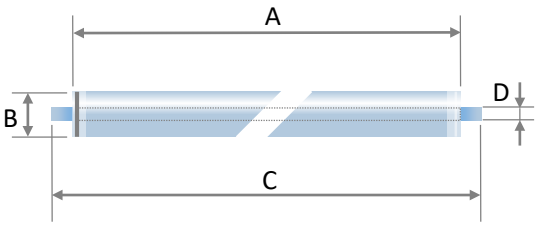
Solvent Stable Ultrafiltration Spiral Wound Element

Description	The AMS UltraPro™ membrane is developed for long-term performance with high and stable fluxes in presence of solvents, featuring high pressure and temperature compatibility. AMS UltraPro™ elements are used for either pre-filtration before nanofiltration or as stand-alone membranes in solvent purification and component concentration. Typical solvents include*: • Methanol, Ethanol, Propanol • Hexane • THF • Acetone, Acetonitrile • Ethyl acetate • DMF				
Performance	Cut-off Rate(1):	> 10 000 dalton			
	Permeability(2, 3):	18 liter/m²/hour/bar (0.73 gal/ft/day/psi)			
Limits	Max Pressure:	10 bar (145 psi)			
	Max Pressure Drop:	0.5 bar (7.3 psi)			
	Max Temperature(5):	Operating: 50 °C (122 °F) Cleaning: 50 °C (122 °F)			
	pH Range(5):	Operating: 2 – 12 Cleaning: 1 – 13			
	Recirculation Flow:	1.8″ element: 4.0 – 8.0 liter/min (1.0 – 2.1 gal/min) 2.5″ element: 7.5 – 17 liter/min (2.0 – 4.4 gal/min) 4″ element: 22 – 42 liter/min (5.8 – 11.1 gal/min) 8″ element: 90 – 167 liter/min (23 – 42.7 gal/min)			
	Pressurization& Depressurization rate	< 0.7 bar/second (10psi/second)			
	Heating & cool down rate	< 5°C /minute (41 °F/minute)			
Area	**m² (ft²)**	1812	2540	4040	8040
	B 31 mil Spacer	0.32 (3.4)	1.6 (17)	6.1 (66)	28 (300)
	C 46 mil Spacer	0.25 (2.7)	1.3 (14)	4.7 (51)	23 (250)

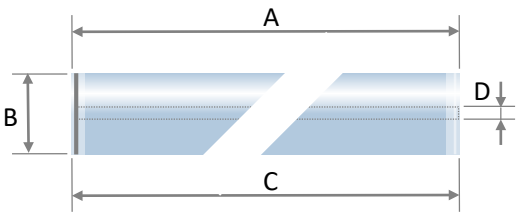
(1) Only for indication;
(2) Test conditions: pressure 2 bar (30 psi), temperature 30 °C (86 °F);
(3) Flux measured with demineralized (RO) water, flux may vary for individual element within ±20% range;
(4) Cut-off rate was determined by suitable markers (please consult UNISOL Membrane Technology);
(5) Consult UNISOL Membrane Technology when intend to operate at elevated pressure, temperature or concentrations.
** Consult UNISOL Membrane Technology about the concentration for these typical solvents.*

Dimensions

Male Configuration



Female Configuration



mm (inch)	1812	2540	4040	8040
Type	Female	Male	Male	Female
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C	305 (12)	1016 (40.0)	1016 (40.0)	1016 (40.0)
D (⌀)	16 (0.6)	19 (0.75)	19 (0.75)	28.8 (1.13)

Handling

Recommended Cleaning Materials. Depending on the nature of the feed material, a choice can be made among the following cleaning agents:

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- Nitric acid at pH 1 – 2, temperature ≤ 40 °C (104 °F);
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- Anionic surfactant (e.g. sodium dodecyl sulfate) of 0.5 % at pH 10.5 – 11, temperature ≤ 35 °C (91 °F).

Only demineralized (RO) water must be used for cleaning. Consult UNISOL Membrane Technology regarding the use of other cleaning materials.

Lubricants. During installation, use only water or glycerin to lubricate seals. The use of petroleum or vegetable-based oils or solvents may damage the element and void any warranty.

Preservation and Storage. Plan ahead to use new membranes. The element should not be allowed to dry: store it in a sealed bag, at 4 – 30 °C (39 – 86 °F). Storage solutions should be made with: 1.5 % w/w sodium metabisulfite. Please refer to “UNISOL Membrane Element Storage and Handling Instructions.”

Chemical Exposure. Do not expose the membrane to chlorine or other oxidants. Sodium metabisulfite (without catalysts such as cobalt) is the preferred chemical to eliminate free chlorine or other oxidizers in the feed.

UNISOL
Membrane Technology

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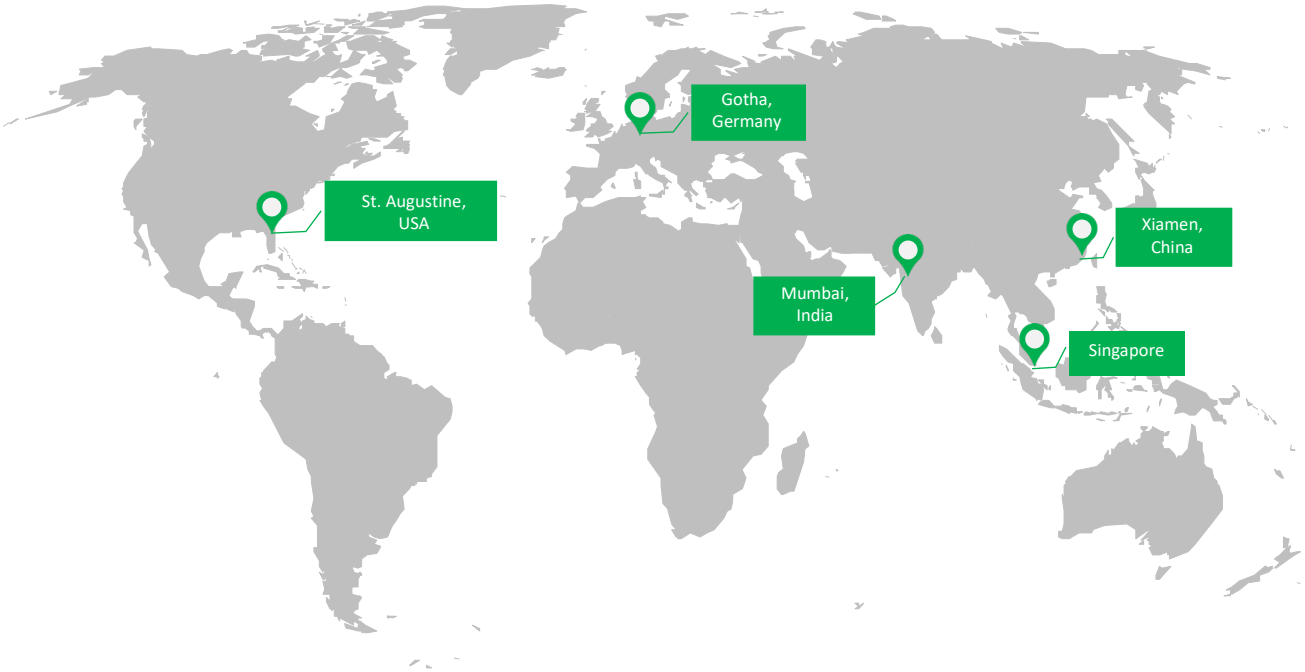

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