VIS & SON COMPANY LIMITED

HDPE GEOMEMBRANE -SMOOTH

0.30 mm (300 micron)

PROPERTY	TEST METHOD	FREQUENCY	UNIT	VALUE
Thickness (avg. values)	ASTM D5199	every roll	mm	0.30
Thickness (min.)	ASTM D5199	every roll	mm	0.29
Melt Index 190/2.16	ASTM D1238	1/batch	g/10 min	1.0
Density	ASTM D792	every 10 rolls	g/cc	≥ 0.94
Tensile Properties (2)	ASTM D6693	every 2 rolls		
Strength at Yield			kN/m	4
Strength at Break			kN/m	9
Elongation at Yield			%	12
Elongation at Break			%	700
Tear Resistance	ASTM D1004	every 5 rolls	N	40
Puncture Resistance	ASTM D4833	every 5 rolls	N	130
Carbon Black Content	ASTM D4218	every 2 rolls	%	2-3
Carbon Black Dispersion	ASTM D5596	every 10 rolls	Category	Cat.1 / Cat.2
OIT - standard	ASTM D3895	1/batch	min	> 140
Oven Aging at 85°C	ASTM D5721	per formulation		
Standard OIT - after 90 days	ASTM D3895		%	55
UV Resistance	ASTM D7238	per formulation		
High pressure OIT	ASTM D3895		%	50
Roll Width			m	7.1
Roll Length			m	200
Roll Area			m^2	1420

NOTES:

1.Testing frequency based on standard roll dimension and one batch is approximately 84,000 kgs.

2.Machine direction (MD) and cross machine direction(XMD or TD)average values should be on basis of 5 test specimens each direction.

* All values are nominal test results, except as minimum or maximum when specified.

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VIS & SON COMPANY LIMITED

HDPE GEOMEMBRANE -SMOOTH

0.50 mm (500 micron)

PROPERTY	TEST METHOD	FREQUENCY	UNIT	VALUE
Thickness (avg. values)	ASTM D5199	every roll	mm	0.50
Thickness (min.)	ASTM D5199	every roll	mm	0.47
Melt Index 190/2.16	ASTM D1238	1/batch	g/10 min	1.0
Density	ASTM D792	every 10 rolls	g/cc	≥ 0.94
Tensile Properties (2)	ASTM D6693	every 2 rolls		
Strength at Yield			kN/m	9
Strength at Break			kN/m	15
Elongation at Yield			%	13
Elongation at Break			%	700
Tear Resistance	ASTM D1004	every 5 rolls	N	75
Puncture Resistance	ASTM D4833	every 5 rolls	N	200
Carbon Black Content	ASTM D4218	every 2 rolls	%	2-3
Carbon Black Dispersion	ASTM D5596	every 10 rolls	Category	Cat.1 / Cat.2
OIT - standard	ASTM D3895	1/batch	min	> 140
Oven Aging at 85°C	ASTM D5721	per formulation		
Standard OIT - after 90 days	ASTM D3895		%	55
UV Resistance	ASTM D7238	per formulation		
High pressure OIT	ASTM D3895		%	50
Roll Width			m	7
Roll Length			m	280
Roll Area			m^2	1960

NOTES:

1.Testing frequency based on standard roll dimension and one batch is approximately 84,000 kgs.

2.Machine direction (MD) and cross machine direction(XMD or TD)average values should be on basis of 5 test specimens each direction.

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VIS & SON COMPANY LIMITED

HDPE GEOMEMBRANE -SMOOTH

0.75 mm (750 micron)

PROPERTY	TEST METHOD	FREQUENCY	UNIT	VALUE
Thickness (avg. values)	ASTM D5199	every roll	mm	0.75
Thickness (min.)	ASTM D5199	every roll	mm	0.70
Melt Index 190/2.16	ASTM D1238	1/batch	g/10 min	1.0
Density	ASTM D792	every 10 rolls	g/cc	≥ 0.94
Tensile Properties (2)	ASTM D6693	every 2 rolls		
Strength at Yield			kN/m	13
Strength at Break			kN/m	25
Elongation at Yield			%	13
Elongation at Break			%	700
Tear Resistance	ASTM D1004	every 5 rolls	N	110
Puncture Resistance	ASTM D4833	every 5 rolls	N	340
Carbon Black Content	ASTM D4218	every 2 rolls	%	2-3
Carbon Black Dispersion	ASTM D5596	every 10 rolls	Category	Cat.1 / Cat.2
OIT - standard	ASTM D3895	1/batch	min	> 100
Oven Aging at 85°C	ASTM D5721	per formulation		
Standard OIT - after 90 days	ASTM D3895		%	55
UV Resistance	ASTM D7238	per formulation		
High pressure OIT	ASTM D3895		%	50
Roll Width			m	7
Roll Length			m	280
Roll Area			m^2	1960

NOTES:

1.Testing frequency based on standard roll dimension and one batch is approximately 84,000 kgs.

2.Machine direction (MD) and cross machine direction(XMD or TD)average values should be on basis of 5 test specimens each direction.

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VIS & SON COMPANY LIMITED

HDPE GEOMEMBRANE -SMOOTH

1.00 mm (1000 micron)

PROPERTY	TEST METHOD	FREQUENCY	UNIT	VALUE
Thickness (avg. values)	ASTM D5199	every roll	mm	1.00
Thickness (min.)		every roll	mm	0.90
Melt Index 190/2.16	ASTM D1238	1/batch	g/10 min	1.0
Density	ASTM D792	every 10 rolls	g/cm³	≥ 0.94
Tensile Properties (2)	ASTM D6693	every 2 rolls		
Strength at Yield			kN/m	18
Strength at Break			kN/m	33
Elongation at Yield			%	13
Elongation at Break			%	700
Tear Resistance	ASTM D1004	every 5 rolls	N	145
Puncture Resistance	ASTM D4833	every 5 rolls	N	410
Carbon Black Content	ASTM D4218	every 2 rolls	%	2-3
Carbon Black Dispersion	ASTM D5596	every 10 rolls	Category	Cat.1 / Cat.2
OIT - standard	ASTM D3895	1/batch	min	> 100
Oven Aging at 85°C	ASTM D5721	per formulation		
Standard OIT - after 90 days	ASTM D3895		%	55
UV Resistance	ASTM D7238	per formulation		
High Pressure OIT	ASTM D3895		%	50
Roll Width			m	7
Roll Length			m	210
Roll Area			m²	1470

NOTES:

1.Testing frequency based on standard roll dimension and one batch is approximately 84,000 kgs.

2.Machine direction (MD) and cross machine direction(XMD or TD)average values should be on basis of 5 test specimens each direction.

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VIS & SON COMPANY LIMITED

HDPE GEOMEMBRANE -SMOOTH

1.25 mm (1250 micron)

PROPERTY	TEST METHOD	FREQUENCY	UNIT	VALUE
Thickness (avg. values)	ASTM D5199	every roll	mm	1.25
Thickness (min.)		every roll	mm	1.20
Melt Index 190/2.16	ASTM D1238	1/batch	g/10 min	1.0
Density	ASTM D792	every 10 rolls	g/cm³	≥ 0.94
Tensile Properties (2)	ASTM D6693	every 2 rolls		
Strength at Yield			kN/m	20
Strength at Break			kN/m	40
Elongation at Yield			%	13
Elongation at Break			%	700
Tear Resistance	ASTM D1004	every 5 rolls	N	190
Puncture Resistance	ASTM D4833	every 5 rolls	N	500
Carbon Black Content	ASTM D4218	every 2 rolls	%	2-3
Carbon Black Dispersion	ASTM D5596	every 10 rolls	Category	Cat.1 / Cat.2
OIT - standard	ASTM D3895	1/batch	min	> 100
Oven Aging at 85°C	ASTM D5721	per formulation		
Standard OIT - after 90 days	ASTM D3895		%	55
UV Resistance	ASTM D7238	per formulation		
High Pressure OIT	ASTM D3895		%	50
Roll Width			m	7
Roll Length			m	168
Roll Area			m²	1176

NOTES:

1.Testing frequency based on standard roll dimension and one batch is approximately 84,000 kgs.

2.Machine direction (MD) and cross machine direction(XMD or TD)average values should be on basis of 5 test specimens each direction.

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VIS & SON COMPANY LIMITED

HDPE GEOMEMBRANE -SMOOTH

1.50 mm (1500 micron)

PROPERTY	TEST METHOD	FREQUENCY	UNIT	VALUE
Thickness (avg. values)	ASTM D5199	every roll	mm	1.50
Thickness (min.)		every roll	mm	1.40
Melt Index 190/2.16	ASTM D1238	1/batch	g/10 min	1.0
Density	ASTM D792	every 10 rolls	g/cm³	≥ 0.94
Tensile Properties (2)	ASTM D6693	every 2 rolls		
Strength at Yield			kN/m	26
Strength at Break			kN/m	50
Elongation at Yield			%	13
Elongation at Break			%	700
Tear Resistance	ASTM D1004	every 5 rolls	N	240
Puncture Resistance	ASTM D4833	every 5 rolls	N	590
Carbon Black Content	ASTM D4218	every 2 rolls	%	2-3
Carbon Black Dispersion	ASTM D5596	every 10 rolls	Category	Cat.1 / Cat.2
OIT - standard	ASTM D3895	1/batch	min	> 100
Oven Aging at 85°C	ASTM D5721	per formulation		
Standard OIT - after 90 days	ASTM D3895		%	55
UV Resistance	ASTM D7238	per formulation		
High Pressure OIT - after 1600 hrs	ASTM D3895		%	50
Roll Width			m	7
Roll Length			m	140
Roll Area			m²	980

NOTES:

1.Testing frequency based on standard roll dimension and one batch is approximately 84,000 kgs.

2.Machine direction (MD) and cross machine direction(XMD or TD)average values should be on basis of 5 test specimens each direction.

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VIS & SON COMPANY LIMITED

HDPE GEOMEMBRANE -SMOOTH

1.80 mm (1800 micron)

PROPERTY	TEST METHOD	FREQUENCY	UNIT	VALUE
Thickness (avg. values)	ASTM D5199	every roll	mm	1.80
Thickness (min.)		every roll	mm	1.70
Melt Index 190/2.16	ASTM D1238	1/batch	g/10 min	1.0
Density	ASTM D792	every 10 rolls	g/cm³	≥ 0.94
Tensile Properties (2)	ASTM D6693	every 2 rolls		
Strength at Yield			kN/m	29
Strength at Break			kN/m	53
Elongation at Yield			%	13
Elongation at Break			%	700
Tear Resistance	ASTM D1004	every 5 rolls	N	270
Puncture Resistance	ASTM D4833	every 5 rolls	N	640
Carbon Black Content	ASTM D4218	every 2 rolls	%	2-3
Carbon Black Dispersion	ASTM D5596	every 10 rolls	Category	Cat.1 / Cat.2
OIT - standard	ASTM D3895	1/batch	min	> 100
Oven Aging at 85°C	ASTM D5721	per formulation		
Standard OIT - after 90 days	ASTM D3895		%	55
UV Resistance	ASTM D7238	per formulation		
High Pressure OIT - after 1600 hrs	ASTM D3895		%	50
Roll Width			m	7
Roll Length			m	117
Roll Area			m²	819

NOTES:

1.Testing frequency based on standard roll dimension and one batch is approximately 84,000 kgs.

2.Machine direction (MD) and cross machine direction(XMD or TD)average values should be on basis of 5 test specimens each direction.

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VIS & SON COMPANY LIMITED

HDPE GEOMEMBRANE -SMOOTH

2.00 mm (2000 micron)

PROPERTY	TEST METHOD	FREQUENCY	UNIT	VALUE
Thickness (avg. values)	ASTM D5199	every roll	mm	2.00
Thickness (min.)		every roll	mm	1.90
Melt Index 190/2.16	ASTM D1238	1/batch	g/10 min	1.0
Density	ASTM D792	every 10 rolls	g/cm³	≥ 0.94
Tensile Properties (2)	ASTM D6693	every 2 rolls		
Strength at Yield			kN/m	37
Strength at Break			kN/m	67
Elongation at Yield			%	13
Elongation at Break			%	700
Tear Resistance	ASTM D1004	every 5 rolls	N	290
Puncture Resistance	ASTM D4833	every 5 rolls	N	670
Carbon Black Content	ASTM D4218	every 2 rolls	%	2-3
Carbon Black Dispersion	ASTM D5596	every 10 rolls	Category	Cat.1 / Cat.2
OIT - standard	ASTM D3895	1/batch	min	> 100
Oven Aging at 85°C	ASTM D5721	per formulation		
Standard OIT - after 90 days	ASTM D3895		%	55
UV Resistance	ASTM D7238	per formulation		
High Pressure OIT - after 1600 hrs	ASTM D3895		%	50
Roll Width			m	7
Roll Length			m	105
Roll Area			m²	735

NOTES:

1.Testing frequency based on standard roll dimension and one batch is approximately 84,000 kgs.

2.Machine direction (MD) and cross machine direction(XMD or TD)average values should be on basis of 5 test specimens each direction.

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