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(PHOTO) MANUAL FOR THE INSTALLATION OF Nicolon® MEMBRANES

Date: March 2017 (version1)





INTRODUCTION

TenCate Geosynthetics BV is a producer of non-wovens, technical yarns and fabrics which are used in a wide range of coated and uncoated forms in numerous applications such as geotextiles, agriculture, leisure and industry.

In this manual we will focus on the range of membranes that tenCate Geosynthetics is producing.

The membranes coming from our mills have always a reinforcement fabric and are based on a LD-PE as raw material.

The applications where you will find these Nicolon® reinforced membranes are in Agriculture at greenhouses for the storage of (rain-) water, Manure storages in wire steel silos and basins, as a liner for the storage of water under sport fields in a Permavoid® system, at biogas plants for the storage of effluent and in many other specialist areas.

tenCate Geosynthetics BV is offering their liners always in a pre-welded execution.

The big advantage of this approach is the factory controlled conditions under which these liners are produced. This minimizes on-site installation times and panels are simply installed under all types of weather circumstances.

The welding of panels on site is easy to realize with a hot air welding machine or can be glued together with our tapes.

The range of Nicolon® membranes is very keen. The membranes differ in weight, strength but are always durable and sustainable!

In this manual you will find the installing instructions by article:

1. Nicolon® C881/100 (former Nicotarp 100)
2. Nicolon® C881/MC285 (former Nicotarp MC285)

3. Nicolon® C669/600flex (former Nicoflex600 HSPO)

4. Nicolon® C119/800 (former Nicoflex 800HSPO)



Application of Nicolon® C881/100 (former Nicotarp® 100)

- Liner for water storages
- Liner for floating covers on water basins
- Capping of waste disposals
- D.I.Y. pond liners for house and garden
- Barriers in the soil

Advantages:

Light weight membrane of 290 g/m²

Welded up to 4000m² in one liner

Also available as standard rolls of 6,0 x 50m

High UV stable

Strong 500 micron membrane with a reduced elongation

Installation manual : see page



Land fill capping in Germany 34.000m²



Application of Nicolon® C881MC285(former Nicotarp® MC285)

- Liner for water storage
- Liner for sport fields
- Half round Poly Tunnels
- In colors grey and green available
- Capping of land fill in natural surroundings

Advantages:

- Light weight membrane
- High UV stable in green and grey
- Welded up to 4000m² in one liner
- HDPE tape fabric inside
- Chemical resistant against most acids
- Proven product over 30 years, the world around

Installation manual : see page ...



Frost protection water basin in Germany 10.000m³



APPLICATION OF NICOLON[®] C669/600flex (former Nicoflex[®] 600 HSPO)

- Water storage in basins
- Lining water storages in silos
- Easy welding on site
- Covers for tanks and silos
- Long life storages of liquids
- Swimming ponds
- Conical connections for pipes

Advantages:

- Big panels of 4000m²
- Scrim reinforcement for reduced elongation
- Thickness 700 micron
- High UV- stable
- Easy to weld on site with an hot air machine
- Unique flexible membrane

Installation manual : see page ...



Sportsfield water storage with PP – units in South Africa. Several projects.



APPLICATION OF NICOLON® C119/800 (former Nicoflex® 800HSPO)

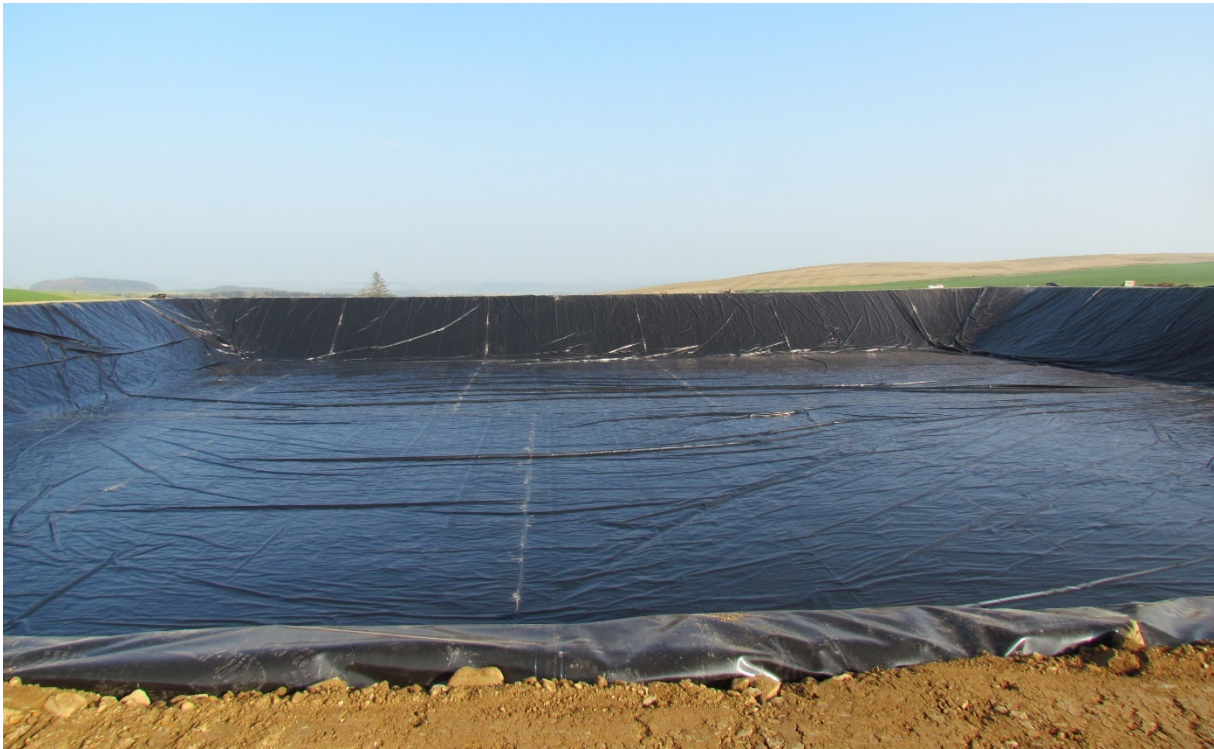
- Manure storage
- Effluent storage from biogas digesters
- Floating covers for basins and silos
- Retention basins
- Slurry reservoirs
- Geotechnical solutions
- Separation under fuel stations
- Separation at railway stations
- Alternative for HD-PE in many cases
- Fish-farming ponds

Advantages:

- Flexible liner of 1,0 mm thickness
- Liners up to 4000m²

- More than 25 years in practice
- Metallocene LD-PE
- BRL certificate from KIWA/TBU
- Bi-axial strength
- Durable
- On site welding by hot air and hot wedge

Installation: see page...



Manure liner 90.000m³ in Schotland



Liner and floating cover in a silo of \varnothing 30,0 m



General installation for:

Nicolon® C881/100 (former Nicotarp 100) ,

Nicolon® C881MC285 (former Nicotarp MC285),

Nicolon® C669/600flex (former Nicoflex 600HSPO)

Nicolon® C119/800(former Nicoflex 800 HSPO)

Follow YouTube:

<https://www.youtube.com/watch?v=2v7YcYzOzWg>

<https://www.youtube.com/watch?v=8TE8seQzhZE>

<https://www.youtube.com/watch?v=WFP1BUJRgkA>

See photos:



Package unloaded at the place marked with a blue cross!

Folding plan is on the outer package and on the membrane itself.



perfect shape of the roll to unwind by hand craft. Or, push a steel bar through the inner core and pull with 2 chains each side to unroll.



After unrolling, unfold the membrane to the other side.



Bring extra air under the membrane to make the foil drifting on the air below.



A wire is placed to follow the membrane





The job is done within one hour!



A small project of only 2000m²



A double sided butyl tape to connect to membranes



tenCate double sided butyl tape 63,0 mm x 20m

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Additional tools:

Flexible conical connections/ sleeves made of Nicolon C669/600flex in different sizes:

pipe \varnothing 63 - 90 mm conical connection \varnothing 40 - 140mm.

pipe \varnothing 110 - 125 mm conical connection \varnothing 80 -160mm.

pipe \varnothing 160 mm conical connection \varnothing 140 - 200 mm.

pipe \varnothing 200 mm conical connection \varnothing 180 - 250 mm.

pipe \varnothing 250 mm conical connection \varnothing 230 - 300 mm.

pipe \varnothing 315 mm. conical connection 290 - 400mm.

pipe \varnothing 400 mm conical connection \varnothing 380 - 500 mm.

Adhesive tapes in different sizes, technical data sheet enclosed

tenCate butyl tape double sided	63,0 mm x 20,0 m x 1,0mm
tenCate Covertape single sided	150,0 mm x 10,0 m x 0,8 mm
tenCate Nicotape	50,0 cm x 10,0m x 7,0mm
Vedatex butyl	2 kg salami

Repair:

- Adhesive tapes as mentioned , or
- Welding by a hot air Leister machine and a roller with the membrane that is used

MARKET SEGMENT : WATER MANAGEMENT
PRODUCT GROUP : NICOLON® WATER STORAGE LINERS/CAPPING

PRODUCT : NICOLON® C881/100 I

CONSTRUCTION	Unit		Standard
Basic material fabric		HDPE	
Basic material coating		LDPE	
Colour		green/grey	
Weight	gr/m ²	295	EN 965
Thickness	micron	430	EN 964-1

MECHANICAL PROPERTIES

Machine direction:			
Nominal tensile strength	KN / m	31	EN13859
Elongation at nominal tensile strength	%	20	EN 13859
Cross direction:			
Nominal tensile strength	kN / m	26	EN 13859
Elongation at Nominal tensile strength	%	20	EN 13859
CBR	kN	4,1	ISO 12236
Dynamic perforation	mm	14	EN-ISO13433

STANDARD ROLL AND PANEL SIZES

Roll length	m	500
Roll width	m	2.00
Maximum dimension panels	m ²	4000
Maximum width panels	m	50
Maximum weight panels	kg	1200

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MARKET SEGMENT : WATER MANAGEMENT
PRODUCT GROUP : NICOLON® WATER STORAGE LINERS

PRODUCT : NICOLON® C881/MC285

CONSTRUCTION	Unit		Standard
Basic material fabric		HDPE	
Basic material coating		LDPE	
Colour		green/grey	
Weight	gr/m ²	335	EN 965
Thickness	micron	430	EN 964-1

MECHANICAL PROPERTIES

Machine direction:			
Nominal tensile strength	KN / m	28	EN13859
Elongation at nominal tensile strength	%	22	EN 13859
Cross direction:			
Nominal tensile strength	kN / m	26	EN 13859
Elongation at nominal tensile strength	%	24	EN 13859

STANDARD ROLL AND PANEL SIZES

Roll length	m	100
Roll width	m	2.00
Maximum dimension panels	m ²	5000
Maximum width panels	m	50
Maximum weight panels	kg	2000

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MARKET SEGMENT: AGRICULTURE
PRODUCT GROUP: NICOLON® C119 MEMBRANES

CONSTRUCTION	800	1000	
Raw material scrim	PET	PET	
Raw material coating	HSPO	HSPO	
Yarn type scrim	Multifil	Multifil	
Colour	Black	Black	

MECHANICAL PROPERTIES

WARP:

Nominal tensile strength	kN/m	24	24	prEN 13859-1/2
Elongation at break	%	12,5	12,5	prEN 13859-1/2
Tear resistance	N	400	400	DIN 53363

Weft:

Nominal tensile strength	kN/m	24	24	prEN 13859-1/2
Elongation at break	%	17	17	prEN 13859-1/2
Tear resistance	N	400	400	DIN 53363
Joint strength	%	> 50	> 50	prEN 13859-1/2

Perforation resistance:

Resistance	mm	300	350	DIN 16726
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PROPERTIES

Water permeability	m ³ /m ² /day	1,00E-0,6	1,00E-0,6	EN14150
Gas permeability	m ³ /m ² /day	3,00E-0,3	1,00E-03	ASTM D1434
Water tightness	mPA/72hours	0,6	0,6	DIN 16726

PHYSICAL PROPERTIES

Weight	g/m ²	970	1130	EN 965
Calculated thickness	micron	950	1150	DIN 53353
Film thickness	micron	800	1000	DIN 53353
Thickness overall	micron	1200	1350	DIN 53353
Roll width	cm	305	305	

DURABILITY

UV resistance, Chemical resistance, Crack pressure test, Environmental stress cracking Resistance and Perforation are all conform BRL 546/05

- 10 years warranty on outdoor exposure Western –Europe, with a life expectancy of 20 years
- Manure resistant(MB), Acid resistant(ZB), Mineral oil resistant(OB), Percolation water resistant(PB) following BRL 546/05

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MORE INFORMATION:
WWW.TENCATE.COM

MARKET SEGMENT : WATER MANAGEMENT
PRODUCT GROUP : NICOLON® WATER STORAGE LINERS

PRODUCT : NICOLON® C669/600 flex

CONSTRUCTION	Unit		Standard
Basic material fabric		PP	
Basic material coating		LDPE	
Colour		black	
Weight	gr/m ²	600	EN 965
Thickness	micron	660	EN 964-1

MECHANICAL PROPERTIES

Machine direction:			
Nominal tensile strength	N / 5cm	700	EN13859
Elongation at nominal tensile strength	%	22	EN 13859
Cross direction:			
Nominal tensile strength	N / 5 cm	500	EN 13859
Elongation at nominal tensile strength	%	12	EN 13859

STANDARD ROLL AND PANEL SIZES

Roll length	m	400
Roll width	m	3,05
Maximum dimension panels	m ²	4000
Maximum width panels	m	50
Maximum weight panels	kg	2000

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PRODUCT DATA SHEET

COVER TAPE butyl tape

version 1

application

properties
application temperature range: +5°C to +40°C
shelf life: 24 months when stored flat in original packaging in cool, dry conditions.

instructions

Surface preparation: All surfaces should be clean, dry and free from frost, grease and loose materials. When cleaning contaminated substrates, TenCate Geosynthetics recommend that propan-2-ol(IPA) is used and allowed to dry prior to the application of the butyl tape.
Application: Remove the backing paper and press the exposed butyl onto the substrate. Press firmly into place. The use of a roller to roll the joint, using firm pressure, is recommended to get a good bond

packaging

1,0 mm x 60 mm x 30 m Available in a black color
siliconised release paper.

tolerances

rectangular sections:
Thickness: +/- 10%
Width: +/- 2mm

general

this butyl tape is meant for construction, liquid storage and connections with PE membranes

The information given in this product data sheet is based on laborat tests and experience which we believe to be correct. Properties quoted are typical and do not therefore constitute a specification. In view of the wide variability of use, we would advise that our product should be tested by the user to establish suitability for this intended application.

product data sheet



version 1

COVER TAPE butyl tape

DESCRIPTION

This product is a high performance extruded butyl tape with a permanent PE film backing, designed for taping over joints in membranes.

KEY FEATURES

Excellent adhesion to a wide range of substrates.	Good UV resistance
Highly conformable	Easy and accurate to use with little waste and no mess
remains flexible throughout its service life	High tack

USES

For taping over joints in membranes used in building and construction, for example damp proof membranes and vapour control layers, as an additional seal to Membrane Tape or High Performance Membrane Tape

PERFORMANCE

	UNIT	NOMINAL VALUE	TEST METHOD
T- Peel Adhesion to 250 micron PE membrane	N/cm	12	HAS
Specific Gravity	g/cm ³	1,6	DIN EN ISO 10563
Moisture Vapour Transmission Rate	g/m ² /24h/mm	0,13	ISO9932/ BS ISO 15106
Service Temperature Range	°C	-40°C to 90°C	

TENCATE		FOLDING PLAN	
Productcode:	1103106		
Description:	C881/MC285 GREY/GREEN L29 X B44 M.		
WO Number:	191508-334749		
Y to X = welding direction			
1	length: 44,00 mtr		
↑ ROLL out THIS WAY			
		length: 44,00 mtr	
← ± 2 mtr →			
pallet 100x200+ chipboard			
Dimensions: length: 29 mtr width: 44 mtr total: 1276 m ² weight: 427 kg		Remarks: 0 0	
			date 22-mrt-17



Declaration of Performance (DoP)

DoP No

**TenCate Nicolon® C119/ 800 HSPO 2017-01-04
5.1**

1.

TenCate

Nicolon®

**Unique identification code of the product type:
C119/ 800 HSPO 5.1**

2.

Nicolon®

**Product type
C119/ 800 HSPO 5.1**

3.

**EN 13361 Reservoir and dams
EN 13362 Canals**

**Intended use
EN 13491 Tunnels and underground structures
EN 13492 Liquid waste disposal sites, transfer
stations or secondary containment**

EN 13493 Solid waste storage and disposal sites

Functions

polymeric geosynthetic barrier (GBR-P)

Intended use

fluid/gas barrier

4.

TenCate Geosynthetics Netherlands bv

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PO box 9

7440 AA NIJVERDAL, THE NETHERLANDS

Tel : + 31 546 544 811

email : service.nl@tencate.com

Contact address

5.

System 2+

System or systems of assessment

6.

**In case of the declaration of performance (DoP)
concerning a construction product covered by a**

harmonized standard:

0799

**Notified Body No. 0799 Kiwa GmbH, Niederlassung TBU 48268 Greven,
performed the initial inspection of the manufacturing plant and of factory production control
and the continuous surveillance, assessment and evaluation of
factory production control under system 2+**

7.

Essential characteristics value	Mean	Declared performance test standard *)		tolerance		
		min	max			
Tensile strength	MD	N/50mm	1200	0	-	EN ISO 527-4
CD	N/50mm	1200	0	-	-	EN ISO 527-4
Water permeability	m ³ /m ² /day	1E-06	-	0	-	EN 14150
Oxygen permeability	cm ³ /m ² /day	1E+03	-	0	-	ASTM D 3985/1434
Puncture resistance (CBR)	kN	2	-1	-	-	EN ISO 12236
Oxidation resistance	% UTS	100	-10	-	-	EN 14575
Environmental stress cracking	NPD	-	-	-	-	EN 14576
Weathering resistance	% UTS	75	-	EN 12224	-	after 350 MJ/m ²

*) corresponding to harmonized technical specifications or application standards mentioned under item 3

8.

Declaration

The performance of the product identified in points 1 and 2 is in conformity with the declared performance in point 7.

This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4

Signed for and on behalf of the manufacturer by:

J. van Melis

Nijverdal

2017-01-27

Quality Manager



Declaration of Performance (DoP)

Dop No	TenCate Nicolon® C881 / 100	2016-05-17
1.	TenCate	Unique identification code of the producttype: C881/ 100
2.	Nicolon®	Product type C881/ 100
3.	EN 13361 Reservoir and dams EN 13362 Canals	Intended use EN 13491 Tunnels and underground structures EN 13492 Liquid waste disposal sites, transfer stations or secondary containment
	EN 13493 Solid waste storage and disposal sites	
	Functions	polymeric geosynthetic barrier (GBR-P)
	Intended use	fluid/gas barrier
4.	TenCate Geosynthetics Netherlands bv Hoge Dijkje 2 PO box 9 7440 AA NIJVERDAL, THE NETHERLANDS Tel : + 31 546 544 811 email : service.nl@tencate.com	Contact address
5.	System 2+	System or systems of assessment
6.		In case of the declaration of performance (DoP) concerning a construction product covered by a

harmonized standard:
0799

Notified Body No. 0799 Kiwa GmbH, Niederlassung TBU 48268 Greven, performed the initial inspection of the manufacturing plant and of factory production control and the continuous surveillance, assessment and evaluation of factory production control under system 2+

Essential characteristics value	Mean	Declared performance test standard *)		tolerance	
		min	max		
Tensile strength	MD	N/50mm	1300	-130 -	EN ISO 527-4
CD	N/50mm	1100	-110	-	EN ISO 527-4
Water permeability	m³/m²/day	3E-02	-	0	EN 14150
Oxygen permeability	cm³/m²/day	4E+03	-	0	ASTM D 3985/1434
Puncture resistance (CBR)	kN	3	-1	-	EN ISO 12236
Oxidation resistance	% UTS	100	-10	-	EN 14575
Environmental stress cracking	NPD	-	-	-	EN 14576
Weathering resistance	% UTS	75	EN 12224	-	after 350 MJ/m2

*) corresponding to harmonized technical specifications or application standards mentioned under item 3

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Signed for and on behalf of the manufacturer by:

J. van Melis

Nijverdal

2017-01-27

Quality Manager



Declaration of Performance (DoP)

Dop No

TenCate Nicolon® C881/ MC285 2017-01-04

grey/green

1.

TenCate

Nicolon®

Unique identification code of the producttype:
C881/ MC285 grey/green

2.

Nicolon®

Product type
C881/ MC285 grey/green

3.

EN 13361 Reservoir and dams

EN 13362 Canals

Intended use
EN 13491 Tunnels and underground structures
EN 13492 Liquid waste disposal sites, transfer stations or secondary containment

EN 13493 Solid waste storage and disposal sites

Functions

Intended use

polymeric geosynthetic barrier (GBR-P)
fluid/gas barrier

4.

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Contact address

5.

System 2+

System or systems of assessment

6.

In case of the declaration of performance (DoP)
concerning a construction product covered by a

harmonized standard:

0799

Notified Body No. 0799 Kiwa GmbH, Niederlassung TBU 48268 Greven,
performed the initial inspection of the manufacturing plant and of factory production control
and the continuous surveillance, assessment and evaluation of
factory production control under system 2+

7.

Essential characteristics

Mean

Declared performance
test standard *)

tolerance

value

min

max

Tensile strength

MD

N/50mm

1400

-140

-

EN ISO 527-4

CD

N/50mm

1300

-130

-

EN ISO 527-4

Water permeability

m³/m²/day

1E-06

-

0

EN 14150

Oxygen permeability

cm³/m²/day

3E+03

-

0

ASTM D

Puncture resistance (CBR)

kN

3

-1

-

EN ISO 12236

Oxidation resistance

% UTS

100

-10

-

EN 14575

Environmental stress cracking

NPD

-

-

-

EN 14576

Weathering resistance

% UTS

75

-

EN 12224

after 350 MJ/m²

*) corresponding to harmonized technical specifications or application standards mentioned under item 3

8.

Declaration

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Signed for and on behalf of the manufacturer by:

J. van Melis
Nijverdal

2017-01-27

Quality Manager



VI			
VII			
VIII			
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XXX			

TENCATE
 materials that make a difference

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Tube dimensions \varnothing 63 - 90 mm conical connection \varnothing 40 - 140 mm.

Tube dimensions \varnothing 110-125mm conical connection \varnothing 80-160 mm.

Tube dimensions \varnothing 160 conical connection \varnothing 140-200 mm.

Tube dimensions \varnothing 200 mm conical connection \varnothing 180-250 mm.

Tube dimensions \varnothing 250mm conical connection \varnothing 230-300 mm.

