

TECHNICAL FILE: TF-12.

PRODUCT: LIGHTWEIGHT CHEMICAL CLOTHING.

ISSUE 2

Technical Files Replaced:

TF 12 Issue 1

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1. **DESCRIPTION OF THE MODEL.**

These chemical resistant garments are made from NCN 101 Northnylon PVC coated material i.e. PVC coated on nylon. The nylon base is woven from 235-decidex high tenacity nylon 66. The garments are unlined and do not offer thermal protection against cold.

These garments are rated as TOP RISK garments.

The PVC coating, specially formulated, plus the use of high tenacity, low twist Nylon in the base fabric, produces excellent waterproofness and flexibility at low temperatures.

The outer surface is matt with the glossier side inner most.

All seams are sewn and welded to ensure that they are liquid proof.

There is a machine label attached to the hem showing size, machinist initials and batch number.

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2. OUTLINE DETAILS OF METHOD OF MANUFACTURE.

2.1 Base Fabric

The Nylon 66 base fabric is supplied with a manufacturers certificate of conformity stating conformity to specified width, construction, fabric weight and fibre type.

2.2 Coating

The base fabric is passed twice through the hot melt coater to coat first one side then the other.

2.3 Coated Fabric

2 Samples per 1000m supplied are tested by Q.C as follows:-

Weight
Thickness
Degree of cure
Coating adhesion strength
Waterproofness
Chemical breakthrough time.

One sample per batch is tested for stability to heat.
At least one sample per 10,000m is tested as follows.
All coated fabric is inspected visually over light.

Abrasion
Flex cracking
Puncture resistance
Tear resistance
Seam strength.

2.4 Garments in production.

On each new batch a 'first off' check is made against the criteria sample. Random inspection of garments in production is carried out by supervisors and QC personnel.

2.5 Finished garments.

All finished garments are inspected using inspection plan no. NP13A.

2.6 Packaging

Garments are packed in clear polythene bags that are then sealed. A computer printed traceability sticker is attached. Bagged garments are packed into cardboard cartons. Quality Control inspects the packaging and checks that Batch details are correct.

Notes

North Safety Products QC Laboratory, operating under the ISO9002 Quality Assurance Scheme, checks, inspects and tests these garments and inspects all marking and packaging to ensure they meet CEN requirements.

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3. EXHAUSTIVE LIST OF BASIC SAFETY REQUIREMENTS AND HARMONISED STANDARDS TAKEN INTO ACCOUNT IN THE DESIGN OF THE MODEL.

89/686 EEEEC Annex 11: Section 1: All clauses and clauses 2.2, 2.4, 2.5, 2.8, 2.12, 2.14, 3.3 and 3.10.2.

BSEN340:	1993
BSEN374.3:	1994
EN465:	1996
EN467:	1996
EN368:	1996

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4. RESULTS OF PROTOTYPE TESTS TO ASSIST WITH THE VERIFICATION OF COMPLIANCE WITH THE BASIC REQUIREMENTS.

Test data on garment material after 5 washing/drying cycles (40°C normal wash and drip-dry)

<u>Test</u>	<u>Method</u>	<u>Result</u>
Abrasion Resistance	EN467 4.4 EN530	Level 6
Stability to heat	EN467 4.5 ISO5978	Level 2
Flex Cracking Resistance	EN467 4.6 ISO7854(B)	Level 5
Tear Resistance	EN467 4.8 ISO4674 (A1)	Level 4
Puncture Resistance	EN 863 EN467 4.7	Level 2
Seam Strength	EN465 5.2	Level 5
Coating Adhesion	ISO 2411	Level 3
Spray test on complete Boiler suit and Hood	EN465 6.2 EN468	Pass
Resistance to permeation by liquids After 5 washes @ 40°C	EN465 6.2	BSEN374 part 3.
Sulphuric Acid 98%	BSEN 374 pt 3	Level 1
Glacial Acetic Acid	BSEN 374 p t3	Level 1
Xylene	BSEN 374 pt 3	Level 0
Acetone	BSEN 374 pt 3	Level 0

Test Reports:

TX 83378/JM/94

TX 83711/JM/94

PP0016

CP 41032/PMO/94

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6. MARKING

The following are copies of the labels associated with these garments. Fig 1 is the label inside the

garment, while Fig 2 shows the marking on the packaging. Each package contains a copy of the information leaflet XXXXX which explains the labels below.

Fig 1.

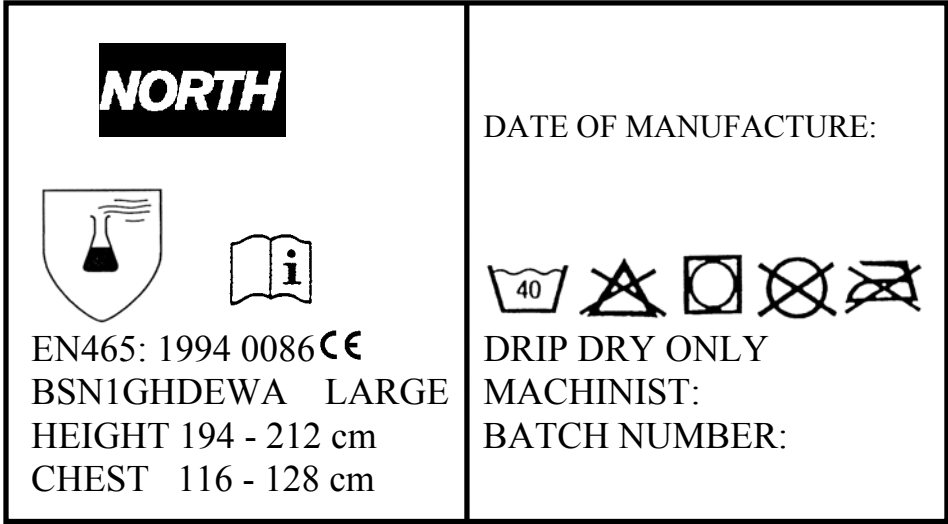


Fig 2.



WASHING INSTRUCTIONS.

This product should be washed at a maximum of 40°C on a normal wash cycle then drip dry only.

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APPENDIX A TF-12

DESIGN 1: Chemical Boilersuit (BSN1G, BSN1G/EWA, BSN1G/HD, BSN1G/HD/EW, BSN1G/HD/EWA, AC, HW)

The suits are an all-in-one suit with or without a hood. They are also available with or without elasticated wrist and ankles. They have a two flap facing with a plastic chemical resistant zip, which is covered by the flap using 5 plastic covered metal press studs, part no's 378-601, 378-611, 378-621 and 378-465. The studs are delivered with a certificate of conformity to the specification laid down in Appendix B.

There are no pockets and the outer surface is matt with the glossier side inner most.

All seams are sewn and welded to ensure that they are liquid proof.

There is a machine label attached to the hem showing size, machinist initials and batch number.

Possible Variations:

BNS1G	Boilersuit with collar
BSN1G/EWA	Boilersuit with collar and elasticated wrists and ankles.
BSN1G/HD	Boilersuit with hood
BSN1G/HD/EW	Boilersuit with hood and elasticated wrists
BSN1G/HD/EWA	Boilersuit with hood and elasticated wrist and ankles
AC and HW	BSNIG/HD/EWA with double wrist and ankles

Sizing

Sizes Available. (in this product range). According to EN340: 1993

	HEIGHT	CHEST
Small (S)	182-200 cm	104-120 cm
Medium (M)	188-206 cm	112-124 cm
Large (L)	194-212 cm	116-128 cm
Xlarge (XL)	194-218 cm	120-132 cm
XXLarge (XXL)	194-218 cm	132-148 cm
XXXLarge (XXXL)	212-218 cm	132-156 cm

The chest girth is larger than Table 1 of EN340 suggests. This is because this suit is an overgarment worn over outer clothing.

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DESIGN 1: Chemical Boilersuit(BSN1G, BSN1G/EWA, BSN1G/HD, BSN1G/HD/EW, BSN1G/HD/EWA, AC, HM)

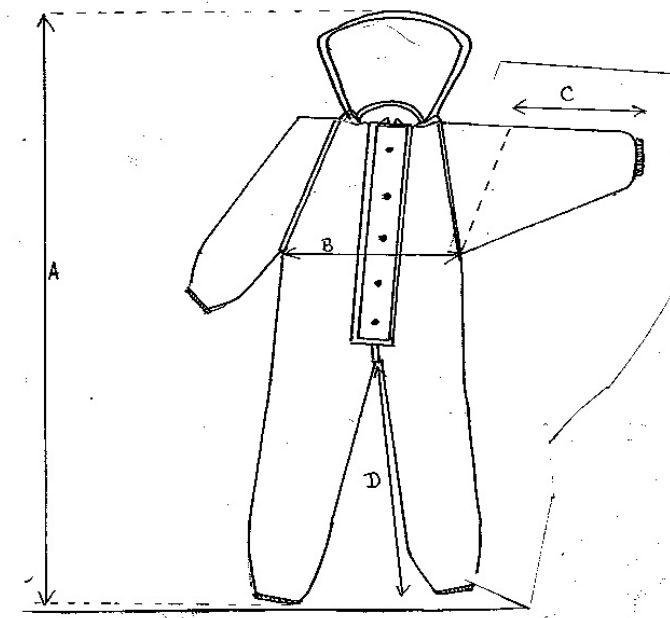
OTHER DIMENSIONS. (in cms $\pm$ 2cm)

Size	A	B	C	D
Small	145	118	79	72
Medium	149	122	79	75
Large	153	126	79	75
X Large	167	130	82	80
XX Large	172	148	92	80
XXX Large	174	158	92	83

A = Overall Length
B = Actual Chest Measurement.
C = Arm Length.
D = Inside Leg

Hood: (All sizes)

Around face 28 cm
Centre front
to back of neck: 48 cm



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DESIGN 2: Lightweight Chemical Aprons (N40, N42, N48,)

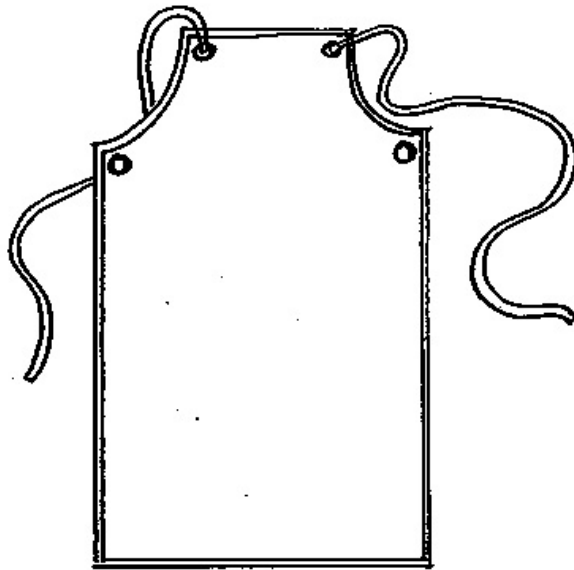
The lightweight chemical resistant aprons are made form NCN 101 Northylon PVC coated material at a total weight of approximately 339g/m². It is designed to be worn with a jacket and trousers in the NCN101 Material to achieve overall protection against chemicals.

The apron has ties to ensure a good fit when pulled tight

Sizing

The lightweight aprons are made in the following sizes

	Length	Width
N40	40'' (104 cm)	36'' (92 cm)
N42	42'' (107 cm)	36'' (92 cm)
N48	48'' (123 cm)	36'' (92 cm)



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DESIGN 3: Chemical Trousers (TN)

The chemical resistant leggings are made form NCN 101 Northnylon PVC coated material at a total weight of approximately 339g/m². They are designed to be worn with a jacket in the NCN101 Material to achieve overall protection against chemicals.

The leggings are supplied in pairs. They are seamed at the inside leg and have an apron front which ties behind the back from the waist and chest. They do not provide protection for the users behind as they stop at the top of the legs.

Sizing

Sizes Available. (in this product range). According to EN340: 1993

		HEIGHT	WAIST
Small	(S)	182 – 200	60 – 108 cm
Medium	(M)	188 – 206	72 – 112 cm
Large	(L)	194 – 212	76 – 116 cm
Xlarge	(XL)	194 - 218	80 – 128 cm

The chest girth is larger than Table 1 of EN340 suggests. This is because this suit is an overgarment worn over outer clothing.

OTHER DIMENSIONS. (in cms $\pm$ 2cm)

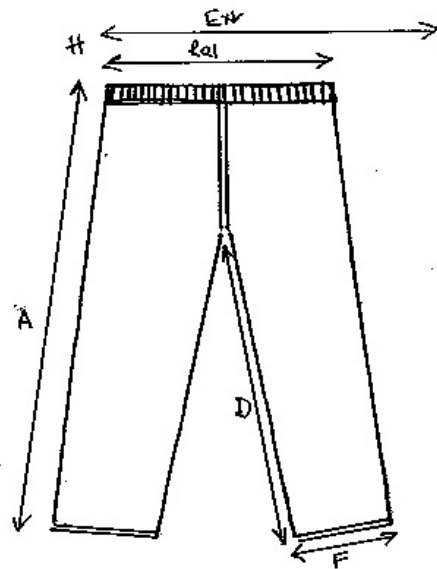
Size	A	D	F	H/Rel	H/Ext
Small	98	70	25	60	106
Medium	108	74	26	72	110
Large	110	76	26	74	120
X Large	112	78	26	84	124

A = Overall length of trousers

D = Inside leg

F = Width bottom leg

H = Waist - Actual relaxed
- Actual extended.



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DESIGN 4: Chemical Leggings (L2N)

The chemical resistant leggings are made form NCN 101 Northnylon PVC coated material at a total weight of approximately 339g/m². The leggings are designed to be worn with a jacket in the NCN101 Material to achieve overall protection against chemicals.

The leggings are supplied in pairs. They are seamed at the inside leg and have a strap sewn on at the top outside leg position which carries an adjustable loop attachment for securing to a button on the clothing worn with them or a specially designed belt.

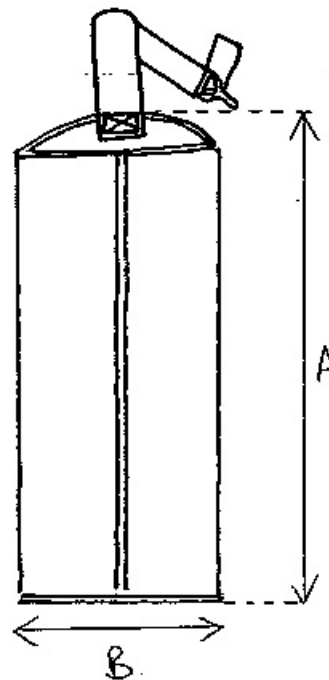
Sizing

Sizes Available. (in this product range). According to EN340: 1993

This product is available in one size only as shown below

A = One length only 80 – 84cm

B = Width at bottom of leg 50 – 54cm



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DESIGN 5: Chemical Sleeves (S11N and S15N)

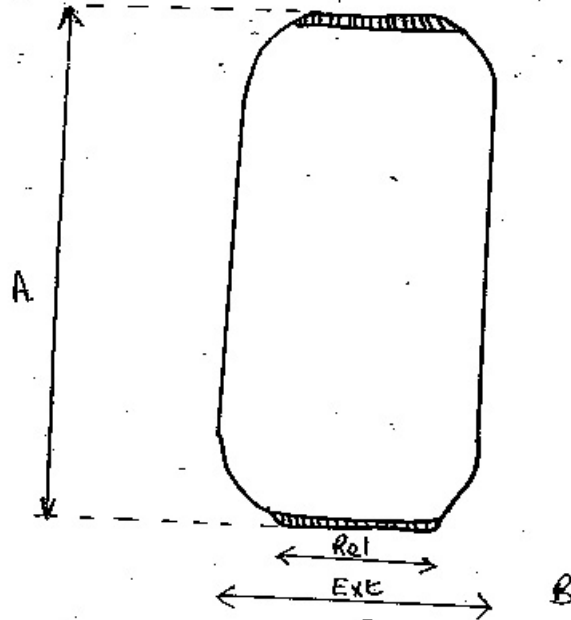
The chemical resistant sleeves are made form NCN 101 Northnylon PVC coated material at a total weight of approximately 339g/m². They are designed to be worn with a jacket and trousers in the NCN101 Material to achieve overall protection against chemicals.

The garment is a pull on sleeve elasticated at both ends

Sizing

Sizes Available. (in this product range).

	<u>Length</u>
S11N	2 to 14 inches
S15N	15 to 24 inches
Both cuffs – Relaxed	20 – 24cm
- Extended	30 – 34cm



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DESIGN 6: Chemical Jackets (C35N)

The chemical resistant jackets are made from NCN 101 Northnylon PVC coated material at a total weight of approximately 339g/m². They are designed to be worn with trousers in the NCN101 Material to achieve overall protection against chemicals.

The jacket has a turn down collar and long sleeves. It is fastened down the front with 4 plastic coated metal studs, part Nos. 378 – 601, 378 – 611, 378 – 621 and 378 – 465. The studs are delivered with a certificate of conformity to the specification laid down in Appendix B, the studs are enclosed in a fly strip. There are no pockets.

Sizing

Sizes Available. (in this product range). According to EN340: 1993

		HEIGHT	CHEST
Small	(S)	182 – 200 cm	104 – 120 cm
Medium	(M)	188 – 206 cm	120 – 128 cm
Large	(L)	194 – 212 cm	128 – 140 cm
Xlarge	(XL)	194 – 218 cm	140 – 144 cm

The chest girth is larger than Table 1 of EN340 suggests. This is because this suit is an overgarment worn over outer clothing.

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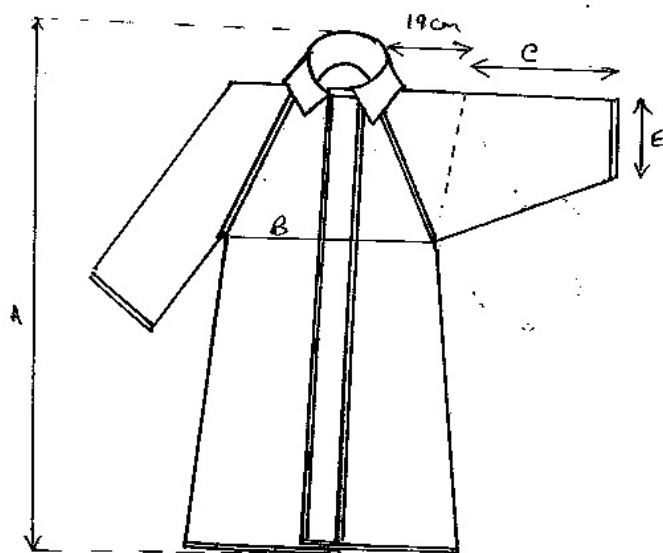
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DESIGN 6 (cont'd): Chemical Jacket (C35N)

OTHER DIMENSIONS. (in cms $\pm$ 2cm)

Size	A	B	C	E
Small	82	120	60	17
Medium	82	128	62	17
Large	82	140	63	17
X Large	82	145	63	17

A = Overall Length for C35
B = Actual Chest Measurement.
C = Arm Length.
E = Width of cuff



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DESIGN 7: Chemical Surgical Coat (ST46N)

The chemical resistant surgical coats are made form NCN 101 Northnylon PVC coated material at a total weight of approximately 339g/m². They are designed to be worn with trousers in the NCN101 Material to achieve overall protection against chemicals.

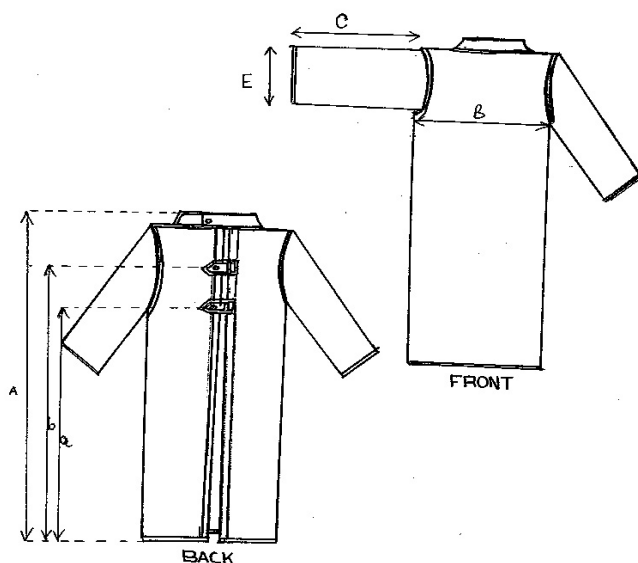
The surgical coat has a stand up collar and long sleeves. It is fastened at the top back with 3 plastic coated metal studs, part Nos. 378 – 601, 378 – 611, 378 – 621 and 378 – 465. The studs are delivered with a certificate of conformity to the specification laid down in Appendix B, the studs are enclosed in a fly strip. There are no pockets.

Sizing

Sizes Available. (in this product range). According to EN340: 1993

	HEIGHT	CHEST
Medium (M)	188 – 206 cm	104 – 132 cm
Large (L)	194 – 212 cm	132 – 144 cm

The chest girth is larger than Table 1 of EN340 suggests. This is because this suit is an overgarment worn over outer clothing.



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DESIGN 7 (Cont'd): Chemical Surgical Coat (ST46N)

OTHER DIMENSIONS. (in cms $\pm$ 2cm)

Size	A	B	C	E
Medium	112	132	82	19
Large	112	144	82	19

A = Overall Length

B = Actual Chest Measurement.

C = Arm Length.

E = Width of cuff

a Bottom of coat to centre of bottom tab – 85 cm for all sizes

b Bottom of coat to centre of top tab – 102 cm for all sizes

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TECHNICAL DATA SHEET.

PRODUCT : Northylon Clothing.

Description of Model: Northylon Clothing is made from a PVC coated nylon material. This consists of a PVC coated Nylon base with a typical weight of 340 g/m².

The fabric has been tested to the appropriate European Standard EN 465. The test results below refer to Mechanical Properties of the fabric after 5 wash cycles to EN 266330:1994 (30°C).

Clause of EN 465 And Description.	<u>Before Washing</u>	<u>After Washing</u>
4.4 Abrasion Resistance	Level 6	Level 4
4.5 Stability to Heat (Blocking Resistance).	Level 2	Level 1
4.6 Flex Cracking Resistance.	Level 4	Level 2
4.7 Puncture resistance.	Level 5	Level 1
4.8 Tear Resistance.	Level 5	Level 5
4.9 Coating Adhesion Strength.	Level 5	Level 2
5.2 Seam Strength.	Level 5	Level 4

Chemical Tests on the Northylon Fabric.

Breakthrough times shown below are a combination of North Safety Products results and results obtained from an approved test house (SGS). Breakthrough times that are stated to EN 374.3 are the time taken for the challenge liquid to permeate through the fabric. All tests are carried out before washing, as the washing process will affect the chemical resistance of the fabric. All products are approved to EN368 (spray test). This test shows that liquids will not penetrate the complete suit. Test results before washing.

Challenge Liquid	Breakthrough Time EN 374.3	Challenge Liquid	Breakthrough Time EN 374.3
Acetic Acid 10%	>24 hours	Methyl Methacrylate	4 minutes
Acetic Acid 40%	2 hours	Naphtha	11 minutes
Acetic Acid (glacial)	64 minutes SGS Results	Nitric Acid	10 minutes
Acetone	3 minutes	Nitric Acid (fuming)	20 minutes
Acetonitrile	5 minutes	Iso-octane	45 minutes
Ammonia	13 minutes	Perchloric Acid	>24 hours
Benzene	15 minutes	Pentyl Acetate	9 minutes
2-Butanone	3 minutes	Petroleum Spirit	7 minutes
Butyl Acetate	5 minutes	Phosphoric Acid 85%	>24 hours
Butyl Alcohol	50 minutes	Potassium Hydroxide 47%	>24 hours
Carbon Tetrachloride	1 hour 30 minutes	Propanoic Acid	28 minutes



TECHNICAL DATA SHEET.

PRODUCT : Northylon Clothing.

Chemical tests carried out at North Safety Products laboratory (continued)

Challenge Liquid	Breakthrough Time EN 374.3		
Chloroform	5 minutes	Iso-Propanol	1 hour 3 minutes
Chromic Acid	1 hour 15 minutes	n-Propanol	>8 hours
Cyclohexanone	22 minutes	Iso-Propylalcohol	1 hour 3 minutes
Dichloromethane	2 minutes	Iso-Propylamine	2 minutes
Diesel Oil	5 hours	1,2 Propylene oxide	2 minutes
1,4 Dioxan	11 minutes	Sodium Carbonate Sat. sol'n	>24 hours
2-Ethoxyethylacetate	13 minutes	Sodium Hydroxide 40%	>72 hours
Ethyl Acetate	4 minutes	Styrene	5 minutes
Ethyl Alcohol	>24 hours	Sulphuric Acid 40%	>24 hours
Ethyl Benzene	6 minutes	Sulphuric Acid 98%	1 hour 18 minutes SGS RESULT
Formic Acid 100%	1 hour 27 minutes	Tetrachloroethylene	23 minutes
Glycerin	>24 hours	Tetrahydrofuran	3 minutes
Hexane	10 minutes	Toluene	10 minutes
Hydrochloric Acid 10%	>76 hours	Trichloroethylene	3 minutes
Hydrochloric Acid 37%	5 hours	Xylene	12 minutes SGS RESULT
Hydrofluoric Acid 40%	3 hours 30 minutes		
Hydrogen peroxide 100%	>72 hours		
Methanol	6 minutes		

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These garments are made from NCN101 PVC coated Nylon and are classed as “Top Risk” products. The user must select the appropriate garment for the task in hand.

Warning: The material these garments are made from are impermeable to water vapour. If worn for long periods at high temperatures or high work rates, this could cause heat exhaustion.

List of garments covered by this leaflet.

Full body protection to EN465: 1994

Codes: BSN1G, BSN1GHD, BSN1GHDEWA, AC or HW + Normal Code

(Sizes: S, M, L, XL, XXL, XXXL – for dimensions see clothing labels).

When used with the hood in place, covering the head, the entire combination will overall coverage to EN468:1994 Resistance to Penetration by spray (Spray Test). If no hood is attached these garments should be used in conjunction with a chemical splash hood to provide overall protection.

Partial body protection to EN467:1994

Codes: L2N (**not to be worn with ST46N**), TN, ST46N, C35N,

(Sizes: L2N –one size only: TN + C35N – S, M, L, XL: ST46N – M, L: for dimensions see clothing labels)

When used with the appropriate equipment to provide overall coverage, the entire combination will overall coverage to EN468:1994 Resistance to Penetration by spray (Spray Test).

Limited body protection to EN467: 1994

Codes: N40 (40”x36”), N42 (42”x36”), N48 (48”x36”), S11N (11”), S15N (15”).

These garments only give protection to the area covered. If chemical splashes hit these garments they are liable to run down onto unprotected areas (with the aprons - legs and feet). **Please be aware that when sleeves are attached to gloves, the area above the seam (the sleeve) will only provide splash protection and not give protection against total immersion.**

All of the above garments can be used with various accessories from the North Safety Products range of personal protective equipment and can be used for chemical and mechanical hazards, but only in the temperature range -15°C to +60°C.

Warning: All closures should be secured, (zips, cover flaps etc., as appropriate) before use so as to provide a liquidproof garment.

Physical Properties of NCN101: (After 5 wash cycles to EN26330: 1994 as shown below). According to EN467:1995.

Clause	Test	Standard	Level	Actual Test Result
4.4	Abrasion Resistance	prEN530	6	> 2000 Cycles
4.5	Stability to Heat	ISO 5978	2	No Blocking
4.6	Flex Cracking Resistance	ISO 7854 B	5	> 300,000 Cycles
4.7	Puncture Resistance	prEN863	2	>10 < 50 N
4.8	Tear Resistance	ISO 4674 A1	4	> 80 < 150 N
4.9	Coating Adhesion Strength	ISO 2411	3	> 500 < 750 N/m
5.2	Seam Strength	ISO 5082 A2	5	345 N

Chemical Permeation Data for NCN101: According to EN 374 Pt3: 1994

Before Washing After Washing

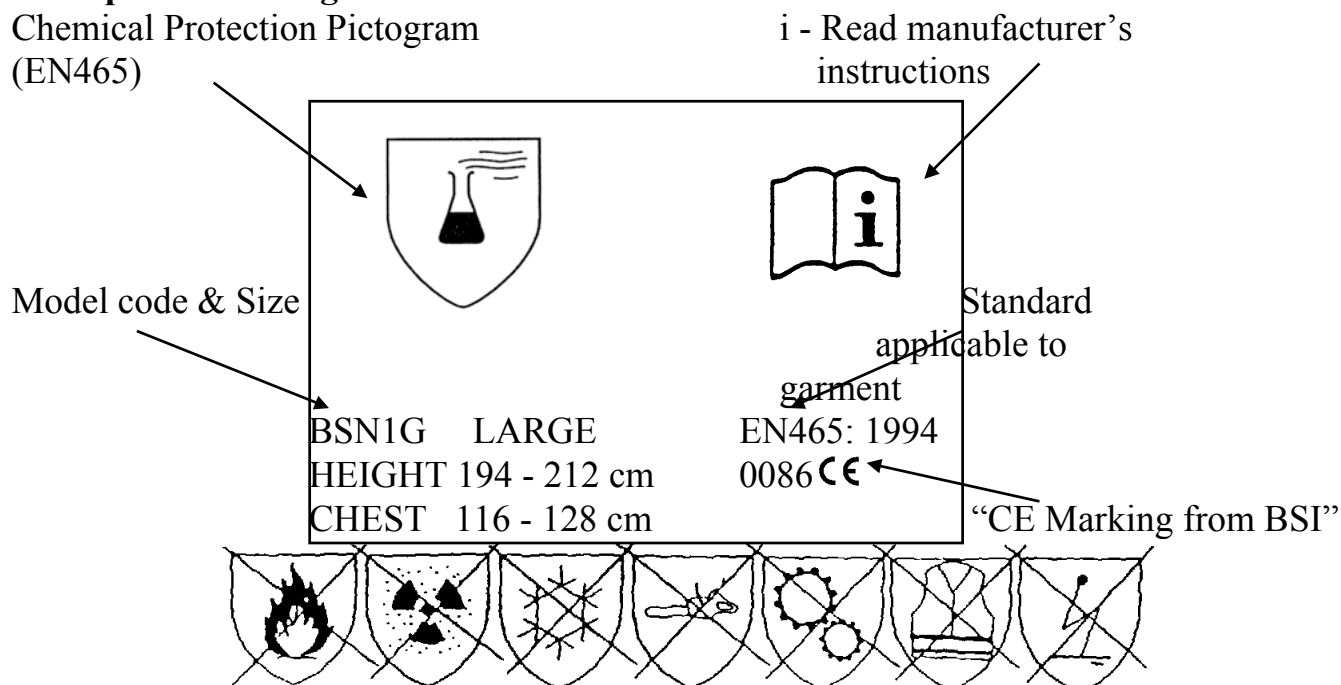
Reagents	Level	Breakthrough	Level	Breakthrough
Sulphuric Acid 98%	3	78 mins	1	22 mins
Glacial Acetic Acid	3	64 mins	1	23 mins
Xylene	1	12 mins	0	9 mins

Figures are the result of type testing at **SGS United Kingdom Ltd.**, Ellesmere Port, CH65 3EN, UK. (Notified Body No: 0120). For additional Chemical Resistance Data contact **North Safety Products Customer Service Department**.

Explanation of marking: The date and month of manufacture and size of the garment is shown on the label attached to the garment.

Example of marking

Chemical Protection Pictogram
(EN465)



Storage: Ideally at 25°C and 50% RH, after decontamination (see warning No. 2) and washing. Shelf life - 5 years. Service life - Dependant on use.

Cleaning & Maintenance: Garments should be decontaminated before removal by hosing down with constant running water. Do not use solvents or abrasive materials to remove contaminants. Garments should be washed at 40°C on a normal wash according to EN 26330: 1994 and allowed to drip dry.



New and used garments should be thoroughly inspected for wear, mechanical damage or chemical degradation before use. For further information about these garments contact North Safety Products Customer Services at the address given below.

North Safety Products Noordmonsterweg 1, 4332 SC Middelburg, The Netherlands, TEL: +31 (0) 118 656400
Fax: +31 (0) 118 627535

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<u>Code</u>	<u>Item</u>	<u>Material</u>	<u>Finish</u>
378-465	Cap	Brass (non rust or toxic)	Nickel Plated.
378-601	Socket	Brass (non rust or toxic)	Nickel Plated.
378-611	Stud	Brass (non rust or toxic)	Nickel Plated.
378-621	Eyelet	Brass (non rust or toxic)	Nickel Plated.
378-800	Cap	Nylon/Brass (non rust or toxic)	Dyed.
541-495	Eyelet	Brass (non rust or toxic)	Black Oxidised.
541-496	Washer	Brass (non rust or toxic)	Black Oxidised.
541-188	Eyelet	Brass (non rust or toxic)	Black Oxidised.
542-194	Washer	Brass (non rust or toxic)	Black Oxidised.

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