INTERTEK TEST REPORT

3933 US ROUTE 11 CORTLAND, NEW YORK 13045

INITIAL CERTIFICATION OF "LPS KPR 01 V07"
TO
NFPA 1992
STANDARD ON LIQUID SPLASH – PROTECTIVE ENSEMBLES AND CLOTHING FOR HAZARDOUS MATERIALS EMERGENCIES
2012 EDITION

REPORT NO.: G100759013CRT-001

RENDERED TO:

KAPPLER USA, INC.
115 GRIMES DRIVE
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INTRODUCTION

This report describes the results of the test program conducted in accordance with NFPA 1992, Standard on Liquid Splash – Protective Ensembles and Clothing for Hazardous Materials Emergencies, 2012 Edition, on specimens identified as brand name Zytron® 300, Model No. ANC3E, submitted on behalf of the Safety Equipment Institute by Kappler USA, Inc. Pristine samples were received between 05/04/12 and 12/13/12 and were tested between 05/16/12 and 12/17/12. The test evaluations were conducted by Intertek located in Cortland, NY.

Details of instrument calibrations are maintained in laboratory records.

AUTHORIZATION

Testing of the above mentioned sample liquid splash - protective ensemble began only upon Intertek's receipt of the Test Authorization form identified by the Safety Equipment Institute with the designator "LPS KPR 01 V07". The test was authorized by a laboratory service agreement signed by Patricia A. Gleason representing the client, The Safety Equipment Institute.

PRODUCT DESCRIPTION

The Zytron® 300 / Sigmon System model referenced above is a liquid splash protective garment with elastic hood, attached gloves and sock boots with boot flaps, charcoal liner fabric in hood and behind zipper.

TEST OBJECTIVE

The NFPA 1992 – 2012 edition shall be used to establish a minimum level of protection for emergency services personnel against adverse liquid splash and particulate environments during hazardous materials incidents. The standard is also intended to provide minimum level of limited liquid splash - protective protection, for escape only in the event of a chemical flash fire, as an option for compliant liquid splash – protective ensembles or liquid splash – protective clothing items. The purpose of this option shall be to allow users with the flexibility to choose a combination of features that match the anticipated exposure and expected needs. Controlled laboratory test used to determine compliance with the performance requirements of this standard shall not be deemed as establishing performance levels for all situations to which personnel can be exposed. This standard is not intended to be utilized as a detailed manufacturing or purchase specification but shall be permitted to be referenced in purchase specifications as minimum requirements.

PERFORMANCE

The following tests were conducted on samples of liquid splash-protective ensembles, identified as brand name Zytron® 300, Model No. ANC3E, to determine compliance with the minimum test requirements of NFPA 1992, Standard on Liquid Splash – Protective Ensembles and Clothing for Hazardous Materials Emergencies, 2012 Edition.

SECTION	TEST	COMP./NON-COMP.
6.1	Garment Design Requirements	Compliant
6.2	Glove Design Requirements	*Compliant
7.1.1	Liquidtight Integrity One	Compliant
7.1.2	Overall Garment Function & Integrity Test	Compliant
7.1.3	Chemical Penetration Resistance – Garment Material	*Compliant
7.1.4	Burst Strength – Garment Material	*Compliant
7.1.5	Puncture Propagation Tear Resistance – Garment Material	*Compliant
7.1.6	Cold Temperature Performance One – Garment Material	*Compliant
7.1.8.1	Chemical Penetration Resistance – Garment Seam	*Compliant
7.1.8.1	Chemical Penetration Resistance – Glove to Garment Sleeve Seam	*Compliant
7.1.8.2	Seam Breaking Strength – Garment Seam	*Compliant
7.1.8.2	Seam Breaking Strength – Charcoal Fabric to Garment Seam	Compliant
7.1.8.2	Seam Breaking Strength – Glove to Garment Sleeve Seam	*Compliant
7.1.9.2	Closure Breaking Strength	Compliant
7.2.1	Liquidtight Integrity Two – Gloves	*Compliant
7.2.2	Chemical Penetration Resistance – Gloves	*Compliant
7.2.3	Cut Resistance – Gloves	*Compliant
7.2.4	Puncture Resistance One – Gloves	*Compliant
7.2.5	Cold Temperature Performance One – Gloves	*Compliant
7.2.6	Glove Hand Function	*Compliant
7.2.7	Chemical Penetration Resistance– Glove Seam	*Compliant

*Test Data taken from Intertek Test Report No. G100687221CRT-001

CONCLUSION

The sample liquid splash-protective ensemble, identified as brand name brand name Zytron® 300, Model No. ANC3E, manufactured by Kappler USA, Inc., **met** the minimum performance requirements defined in NFPA 1992 Standard on Liquid Splash – Protective Ensembles and Clothing for Hazardous Materials Emergencies, 2012 Edition. Test data sheets are attached as an appendix (12 pages following).

Report Prepared by:

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APPENDIX
SECTION 7.1.1
LIQUIDTIGHT INTEGRITY TEST ONE

PRODUCT DESCRIPTION: Phoenix Group - Zytron® 300 – ANC3E

CONDITIONING: In accordance with Section 8.1.2; at a temperature 21°C ± 3°C (70°F ± 5°F) and a relative humidity of 65% ± 5% until equilibrium is reached or for at least 24 hours, whichever is shortest.

SURFACE TENSION	APPARENT	CORRECTED
MEASUREMENT 1	37	33
MEASUREMENT 2	37	33
MEASUREMENT 3	37	33
AVERAGE		33
CORRECTION FACTOR		0.90

WETNESS DETECTED IN THE FOLLOWING AREAS: None

SURFACE TENSION	APPARENT	CORRECTED
MEASUREMENT 1	37	33
MEASUREMENT 2	37	33
MEASUREMENT 3	37	33
AVERAGE		33
CORRECTION FACTOR		0.90

WETNESS DETECTED IN THE FOLLOWING AREAS: None

SURFACE TENSION	APPARENT	CORRECTED
MEASUREMENT 1	37	33
MEASUREMENT 2	37	33
MEASUREMENT 3	37	33
AVERAGE		33
CORRECTION FACTOR		0.90

WETNESS DETECTED IN THE FOLLOWING AREAS: None

SECTION 7.1.2
OVERALL GARMENT FUNCTION AND INTEGRITY TEST

PRODUCT DESCRIPTION: Phoenix Group - Zytron® 300 – ANC3E

CONDITIONING: In accordance with Section 8.1.2; at a temperature 21°C ± 3°C (70°F ± 5°F) and a relative humidity of 65% ± 5% until equilibrium is reached or for at least 24 hours, whichever is shortest.

SUIT SIZE: XL

Procedure A	Compliant (yes/no)	Procedure B	Compliant
Section 8.8.1	Yes	**Section 8.9.1**	Yes
Section 8.8.2	Yes	**Section 8.9.2**	Yes
Section 8.8.3	Yes	**Section 8.9.3**	Yes
Section 8.8.4	Yes	**Section 8.9.4**	Yes
Section 8.8.5	Yes	**Section 8.9.5**	Yes
Section 8.8.6	Yes	**Section 8.9.6**	Yes
Section 8.8.7	Yes	**Section 8.9.7**	Yes
Section 8.8.8	Yes		

	COMPLIANT (yes/no)
Did Garment/Ensemble allow test subject to complete tasks? Yes	Yes
Time to complete tasks: 7 min. 53 sec.	Yes
Visual Acuity of Test Subject while in Suit: N/A	N/A
Did ensemble accommodate head protection throughout exercises (Meeting Type I, Class G Helmets of ANSI Z89.1)? Yes	Yes
After tasks; were protective flaps still fully engaged? Yes	Yes
After tasks; were closures still fully engaged? Yes	Yes
Did Garment/Ensemble pass Liquid Tight Integrity; section 8.2, after task completion? Yes	Yes

SECTION 7.1.3
CHEMICAL PENETRATION RESISTANCE TEST

PRODUCT DESCRIPTION: Zytron® 300 Z3H427 92 Garment Material

CONDITIONING: In accordance with Section 8.4.8 Flexing and Abrading **TEST TEMP.** 22°C - 27°C / 80% ± 5%

PROCEDURE USED: "Procedure C" exposure protocol = 5 minutes ambient pressure, 1 minute @ 2 psig, 54 minutes ambient pressure

CHALLENGE CHEMICAL	CONCENTRATION:	TIME TO PENETRATION (min)		
		SAMPLE 1	SAMPLE 2	SAMPLE 3
Acetone	99+%	>60	>60	>60
Dimethyl Foramide	99.5%	>60	>60	>60
Ethyl Acetate	99.5+%	>60	>60	>60
Nitrobenzene	99.9%	>60	>60	>60
Sodium Hydroxide	50%	>60	>60	>60
Sulfuric Acid	93.1%	>60	>60	>60
Toluene	99+%	>60	>60	>60

SECTION 7.1.4
BURST STRENGTH TEST

PRODUCT DESCRIPTION: Zytron® 300 Z3H427 92 Garment Material

CONDITIONING: In accordance with Section 8.1.2; at a temperature 21°C ± 3°C (70°F ± 5°F) and a relative humidity of 65% ± 5% until equilibrium is reached or for at least 24 hours, whichever is shortest.

SAMPLE NO.	BURSTING STRENGTH (N)	DID SAMPLE BURST
1	247.4	Yes
2	262.6	Yes
3	259.5	Yes
4	288.9	Yes
5	289.0	Yes
6	306.7	Yes
7	256.8	Yes
8	231.1	Yes
9	266.7	Yes
10	244.8	Yes
AVG.	265.3	

SECTION 7.1.5
PUNCTURE PROPAGATION TEAR RESISTANCE TEST

PRODUCT DESCRIPTION: Zytron® 300 Z3H427 92 Garment Material

CONDITIONING: In accordance with Section 8.1.2; at a temperature 21°C ± 3°C (70°F ± 5°F) and a relative humidity of 65% ± 5% until equilibrium is reached or for at least 24 hours, whichever is shortest.

MACHINE DIRECTION: **CARRIAGE WEIGHT (Kg):** 0.6819

SAMPLE NO.	THICKNESS (mils)	TEAR LENGTH (mm)	TEAR RESISTANCE (N)	TYPE OF TEAR "V" OR SLIT
1	17	58	58.2	V
2	16	69	48.8	V
3	16	69	48.8	V
4	16	69	48.8	V
5	17	67	50.3	V
AVG.			51.0	

CROSS-MACHINE DIRECTION: **CARRIAGE WEIGHT (Kg):** 0 .6819

SAMPLE NO.	THICKNESS (mils)	TEAR LENGTH (mm)	TEAR RESISTANCE (N)	TYPE OF TEAR "V" OR SLIT
1	16	51	66.2	V
2	17	50	67.5	V
3	17	52	64.9	V
4	16	51	66.2	V
5	16	57	59.2	V
AVG.			64.8	

SECTION 7.1.6
COLD TEMPERATURE PERFORMANCE TEST ONE

PRODUCT DESCRIPTION: Zytron® 300 Z3H427 92 Garment Material

CONDITIONING: In accordance with Section 8.1.2; at a temperature 21°C ± 3°C (70°F ± 5°F) and a relative humidity of 65% ± 5% until equilibrium is reached or for at least 24 hours, whichever is shortest.

TEST TEMPERATURE: -25°C (-13° F) **SPAN (in):** 0.5

MACHINE DIRECTION **MOMENT WEIGHT (in-lb):** 0.080

SAMPLE NO.	THICKNESS (mils)	WIDTH (in)	LOAD SCALE READING (%)	BENDING MOMENT (N/m)
1	16	1.00	60	0.0054
2	16	1.00	42	0.0038
3	16	1.00	57	0.0052
4	15	1.00	49	0.0044
5	15	1.00	51	0.0046
AVERAGE			52	0.0047

CROSS- MACHINE DIRECTION **MOMENT WEIGHT (in-lb):** 0.080

SAMPLE NO.	THICKNESS (mils)	WIDTH (in)	LOAD SCALE READING (%)	BENDING MOMENT (N/m)
1	16	1.00	33	0.0030
2	17	1.00	45	0.0041
3	16	1.00	35	0.0032
4	16	1.00	37	0.0033
5	20	1.00	74	0.0067
AVERAGE			45	0.0040

SECTION 7.1.8.1
CHEMICAL PENETRATION RESISTANCE

PRODUCT DESCRIPTION: Zytron® 300 Z3H427 92 Garment Seam

CONDITIONING: 24 hours @ 21ºC ±3ºC (70ºF ±5ºF) and RH of 65% ±5% **TEST TEMP.** 22°C - 27°C / 80% ± 5%

PROCEDURE USED: "Procedure C" exposure protocol = 5 minutes ambient pressure, 1 minute @ 2 psig, 54 minutes ambient pressure

CHALLENGE CHEMICAL	CONCENTRATION:	CUMULATIVE AMOUNT DETECTED ($\mu g/cm^2$)		
		SAMPLE 1	SAMPLE 2	SAMPLE 3
Isopropanol	100%	>60	>60	>60
Sulfuric acid	93.1%	>60	>60	>60

PRODUCT DESCRIPTION: Zytron® 300 Z3H427 92 Glove to Garment Sleeve Seam

CHALLENGE CHEMICAL	CONCENTRATION:	CUMULATIVE AMOUNT DETECTED ($\mu g/cm^2$)		
		SAMPLE 1	SAMPLE 2	SAMPLE 3
Isopropanol	100%	>60	>60	>60
Sulfuric acid	93.1%	>60	>60	>60

SECTION 7.1.8.2
SEAM BREAKING STRENGTH

PRODUCT DESCRIPTION: Zytron® 300 Z3H427 92 Garment Seam

CONDITIONING: In accordance with Section 8.1.2; at a temperature 21°C ± 3°C (70°F ± 5°F) and a relative humidity of 65% ± 5% until equilibrium is reached or for at least 24 hours, whichever is shortest

SAMPLE NO.	BREAKING POINT (lbf/2in)	IF APPLICABLE, DID FAILURE OCCUR IN SEAM OR FABRIC
1	38.8	Seam
2	40.3	Seam
3	39.7	Seam
4	39.2	Seam
5	41.3	Seam
AVERAGE	39.9	

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PRODUCT DESCRIPTION: Phoenix Group - Zytron® 300 Charcoal Fabric to Garment Seam

SAMPLE NO.	BREAKING POINT (lbf/2in)	IF APPLICABLE, DID FAILURE OCCUR IN SEAM OR FABRIC
1	33.0	Seam
2	45.2	Seam
3	34.9	Seam
4	28.1	Seam
5	34.3	Seam
AVERAGE	35.1	

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PRODUCT DESCRIPTION: Zytron® 300 Z3H427 92 Glove to Garment Sleeve Seam

SAMPLE NO.	BREAKING POINT (lbf/2in)	IF APPLICABLE, DID FAILURE OCCUR IN SEAM OR FABRIC
1	15.3	Seam
2	16.3	Seam
3	16.6	Seam
4	18.3	Seam
5	15.8	Seam
AVERAGE	16.5	

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SECTION 7.1.9.2
CLOSURE BREAKING STRENGTH TEST

PRODUCT DESCRIPTION: Phoenix Group - Zytron® 300 – ANC3E Closure Assembly

CONDITIONING: In accordance with Section 8.1.2; at a temperature 21°C ± 3°C (70°F ± 5°F) and a relative humidity of 65% ± 5% until equilibrium is reached or for at least 24 hours, whichever is shortest.

SAMPLE NO.	BREAKING POINT (lbf/2in)	IF APPLICABLE, DID FAILURE OCCUR IN SEAM OR FABRIC
1	15.9	Zipper
2	28.9	Zipper
3	20.3	Zipper
4	37.4	Zipper
5	28.7	Zipper
AVERAGE	26.2	

SECTION 7.2.1
LIQUID TIGHT INTEGRITY TEST TWO

PRODUCT DESCRIPTION: Whole Glove (Ansell Barrier Model #2-100 Inner Glove/Ansell Neoprene Glove # 116318 Outer Glove)

PRE-CONDITIONING: Dexterity Tested as per Section 8.15

CONDITIONING: In accordance with Section 8.1.2; at a temperature 21ºC ± 3º (70ºF ± 5ºF) and a relative humidity of 65% ± 5% until equilibrium is reached or for at least 24 hours, whichever is shorter

SAMPLE NO.	IMMEDIATE LEAKAGE (yes/no)	LEAKAGE AFTER 1 HOUR (yes/no)
1	No	No
2	No	No
3	No	No
4	No	No
5	No	No
6	No	No
7	No	No
8	No	No
9	No	No
10	No	No

SECTION 7.2.2
CHEMICAL PENETRATION RESISTANCE TEST

PRODUCT DESCRIPTION: Glove Material (Ansell Barrier Model #2-100 Inner Glove/Ansell Neoprene Glove # 116318 Outer Glove)

PRE-CONDITIONING: Abrade 25 Cycles & Dexterity Tested as per Section 8.13 **TEST TEMP.** 22º - 23ºC

CONDITIONING: In accordance with Section 8.1.2; at a temperature 21ºC ± 3º (70ºF ± 5ºF) and a relative humidity of 65% ± 5% until equilibrium is reached or for at least 24 hours, whichever is shorter

PROCEDURE USED: "Procedure C" exposure protocol = 5 minutes ambient pressure, 1 minute @ 2 psig, 54 minutes ambient pressure

CHALLENGE CHEMICAL	CONCENTRATION:	TIME TO PENETRATION (min)		
		Sample 1	Sample 2	Sample 3
Acetone	99+%	> 60	> 60	> 60
Dimethyl formamide	99.5%	> 60	> 60	> 60
Ethyl acetate	99.5+%	> 60	> 60	> 60
Nitrobenzene	99.9%	> 60	> 60	> 60
Sodium hydroxide	50%	> 60	> 60	> 60
Sulfuric acid	93.1%	> 60	> 60	> 60
Toluene	99+%	> 60	> 60	> 60

DETECTION ENHANCEMENT: Tissue Blot

SECTION 7.2.3
CUT RESISTANCE TEST

PRODUCT DESCRIPTION: Glove Material (Ansell Barrier Model #2-100 Inner Glove/Ansell Neoprene Glove # 116318 Outer Glove)

CONDITIONING: In accordance with Section 8.1.2; at a temperature 21ºC ± 3º (70ºF ± 5ºF) and a relative humidity of 65% ± 5% until equilibrium is reached or for at least 24 hours, whichever is shorter

SAMPLE NO.	CUT LOAD (g)	CUT DISTANCE (mm)	NORMALIZED CUT DISTANCE (mm)
1	50	>50	>44.5
2	50	>50	>44.5
3	50	>50	>44.5
AVG.		>50	>44.5

SECTION 7.2.4
PUNCTURE RESISTANCE TEST ONE

PRODUCT DESCRIPTION: Glove Material (Ansell Barrier Model #2-100 Inner Glove/Ansell Neoprene Glove # 116318 Outer Glove)

CONDITIONING: In accordance with Section 8.1.2; at a temperature 21ºC ± 3º (70ºF ± 5ºF) and a relative humidity of 65% ± 5% until equilibrium is reached or for at least 24 hours, whichever is shorter.

SAMPLE NO.	PUNCTURE NO.	FORCE TO PUNCTURE (N)
1	**1**	29
	2	27
	3	29
2	**1**	24
	2	23
	3	24
3	**1**	21
	2	22
	3	22
Average		25

SECTION 7.2.5
COLD TEMPERATURE PERFORMANCE TEST ONE

PRODUCT DESCRIPTION: Glove Material (Ansell Barrier Model #2-100 Inner Glove/Ansell Neoprene Glove # 116318 Outer Glove)

CONDITIONING: In accordance with Section 8.1.2; at a temperature 21ºC ± 3º (70ºF ± 5ºF) and a relative humidity of 65% ± 5% until equilibrium is reached or for at least 24 hours, whichever is shorter.

ISOTROPIC MATERIAL **MOMENT WEIGHT (in-lb):** 0.025

SAMPLE NO.	THICKNESS (mils)	WIDTH (in)	LOAD SCALE READING (%)	BENDING MOMENT (N/m)
1	21	1.0	18	0.0005
2	22	1.0	30	0.0008
3	20	1.0	24	0.0007
4	21	1.0	27	0.0008
5	22	1.0	24	0.0007
6	21	1.0	25	0.0007
7	20	1.0	20	0.0006
8	21	1.0	22	0.0006
9	22	1.0	29	0.0008
10	21	1.0	20	0.0006
AVERAGE			24	0.0007

SECTION 7.2.6
GLOVE HAND FUNCTION TEST

PRODUCT DESCRIPTION: Whole Glove (Ansell Barrier Model #2-100 Inner Glove/Ansell Neoprene Glove # 116318 Outer Glove)

CONDITIONING: In accordance with Section 8.1.2; at a temperature 21ºC ± 3º (70ºF ± 5ºF) and a relative humidity of 65% ± 5% until equilibrium is reached or for at least 24 hours, whichever is shorter.

GLOVE SIZE: Small

BASELINE TIMES:

REPETITION NO.	1	2	3	AVG.
TIME (sec)	36	38	37	37

TEST DATA (WITH GLOVES):

	REPETITION NO.	1	2	3	AVG.
1	TIME (sec)	54	52	55	53.7
	% BARE-HANDED CONTROL	145.94	140.54	148.65	145.04

	REPETITION NO.	1	2	3	AVG.
2	TIME (sec)	48	46	46	46.7
	% BARE-HANDED CONTROL	129.72	124.32	124.32	126.12

	REPETITION NO.	1	2	3	AVG.
3	TIME (sec)	46	44	44	44.7
	% BARE-HANDED CONTROL	124.32	118.92	118.92	120.72

GLOVE SIZE: Large

BASELINE TIMES:

REPETITION NO.	1	2	3	AVG.
TIME (sec)	39	39	39	39

TEST DATA (WITH GLOVES):

	REPETITION NO.	1	2	3	AVG.
1	TIME (sec)	45	46	46	45.7
	% BARE-HANDED CONTROL	115.38	117.95	117.95	117.10

	REPETITION NO.	1	2	3	AVG.
2	TIME (sec)	46	44	44	44.7
	% BARE-HANDED CONTROL	117.95	112.82	112.82	114.53

	REPETITION NO.	1	2	3	AVG.
3	TIME (sec)	46	45	45	45.3
	% BARE-HANDED CONTROL	117.95	115.38	115.38	116.24

SECTION 7.2.7
CHEMICAL PENETRATION RESISTANCE TEST

PRODUCT DESCRIPTION: Glove Seam (Ansell Barrier Model #2-100 Inner Glove/Ansell Neoprene Glove # 116318 Outer Glove)

CONDITIONING: 24 hours ambient **TEST TEMP.** 22°C - 27°C / 80% ± 5%

PROCEDURE USED:"Procedure C" exposure protocol = 5 minutes ambient pressure, 1 minute @ 2 psig, 54 minutes ambient pressure

CHALLENGE CHEMICAL	CONCENTRATION:	CUMULATIVE AMOUNT DETECTED ($\mu g/cm^2$)		
		SAMPLE 1	SAMPLE 2	SAMPLE 3
Isopropanol	100%	>60	>60	>60
Sulfuric acid	93.1%	>60	>60	>60