



August 21, 2014

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File	SA33023
UL Project	4786816846
Product Service Description	CITS (Developmental) Industrial Head Protection Testing per ANSI/ISEA Z89.1-2014 (2014-01-01)
Product	Model : NTC (Type II, Class E)

Dear Mr. Wang,

Per your request, a project was opened according to the Product Service Description detailed above. The test data collected is provided below.

UL LLC did not select the samples, determine whether the samples were representative of production samples or witness the production of the test samples, nor were we provided with information relative to the formulation or identification of component materials used in the test samples. The test results apply only to the actual samples tested.

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This letter will serve to report that all tests on the subject product have been completed. This letter will also serve to close the UL Project (noted above), and you will be invoiced for the charges incurred during the Project.

Thank you for the opportunity to provide your company with these services. Please do not hesitate to contact us if you should have any questions or comments.

Best Regards,

Reviewed By,



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### Sample Photographs:



FLAMMABILITY TEST – HELMETS	ANSI Z89.1-2014, SECTION 10.1
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## 1.0 PROCEDURE

### 1.1 Test in accordance with:

TEST NAME	ANSI Z89.1-2014 SECTION
Flammability Test	10.1

## 2.0 RESULTS

Helmet Model:	NTC White Shell w/Ratchet Suspension (6pt.), Non-Vented
Sample ID	Afterflame (sec)
12	0
Specification:	< 5

## 3.0 COMPLIANCE CRITERIA

### 3.1 Specimens shall have an afterflame of less than 5 seconds.

**FORCE TRANSMISSION TEST – HELMETS**

ANSI Z89.1-2014, SECTION 10.2

**1.0 PROCEDURE**
**1.1 Test in accordance with:**

TEST NAME	ANSI Z89.1-2014 SECTION
Force Transmission Test	10.2

**2.0 RESULTS**

Helmet Model: NTC White Shell w/Ratchet Suspension (6pt.), Non-Vented

Sample ID	Conditioning (°C)	Velocity (m/s)	Force (N)	Specified Value (N)	Observations
1	49 ± 2	5.52	3282	≤ 4450	-
2		5.51	3194		-
3		5.51	3686		-
4		5.49	2879		-
5		5.49	2691		-
6		5.48	3326		-
7		5.46	2952		-
8		5.45	2718		-
9		5.48	3372		-
10		5.50	3159		-
11		5.49	3023		-
12		5.47	2688		-
Average			3081	≤ 3780	
13	-18 ± 2	5.50	3182	≤ 4450	-
14		5.47	3177		-
15		5.48	3210		-
16		5.49	3178		-
17		5.52	3153		-
18		5.46	3250		-
19		5.49	3277		-
20		5.45	2968		-
21		5.46	3315		-
22		5.46	3304		-
23		5.49	3162		-
24		5.52	3164		-
Average			3195	≤ 3780	
Specification:		5.50 ± 0.05			

**3.0 COMPLIANCE CRITERIA**

- 3.1
  1. Specimens shall have an average force of no more than 3780 N (850 lbf).
  2. Specimens shall have an individual force of no more than 4450 N (1000 lbf).

APEX PENETRATION TEST – HELMETS	ANSI Z89.1-2014, SECTION 10.3
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## 1.0 PROCEDURE

### 1.1 Test in accordance with:

TEST NAME	ANSI Z89.1-2014 SECTION
Apex Penetration Test	10.3

## 2.0 RESULTS

Helmet Model:	NTC White Shell w/Ratchet Suspension (6pt.), Non-Vented
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CONDITIONING: SEE TABLE BELOW

Sample ID	Conditioning (°C)	Velocity (m/s)	Electrical Contact (Yes/ No)	Observations
25	49 ± 2	7.0	No	-
26		6.9	No	-
27		7.0	No	-
28	-18 ± 2	7.0	No	-
29		7.0	No	-
30		7.0	No	-
Specification:		7.0 ± 0.1	No Electrical Contact Allowed	

Impact Velocity: 23 ± 0.3 ft/s

## 3.0 COMPLIANCE CRITERIA

### 3.1 Specimens shall not exhibit electrical or physical contact between the penetration test striker and the headform.

ELECTRICAL INSULATION TEST – HELMETS	ANSI Z89.1-2014, SECTION 10.7
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## 1.0 PROCEDURE

### 1.1 Test in accordance with:

TEST NAME	ANSI Z89.1-2014 SECTION
Electrical Insulation Test	10.7

## 2.0 RESULTS – CLASS E HELMETS

Helmet Model:	NTC White Shell w/Ratchet Suspension (6pt.), Non-Vented
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CONDITIONING: AS RECEIVED

Sample ID	Leakage (mA)	Burn Through (Yes/ No)	Observations
1	6.3	No	-
24	6.0	No	-
Specification:	Class E: $\leq$ 9 mA	No Burn Through Allowed	

Class E - 20,000 volts, 60 Hz, 3 minutes, 30,000 volts no burn through.

## 3.0 COMPLIANCE CRITERIA – CLASS E HELMETS

- 3.1
  1. Specimens shall have a leakage current of no more than 9 mA.
  2. Specimens shall not burn through.



IMPACT ENERGY ATTENUATION – TYPE II HELMETS

ANSI Z89.1-2009, SECTION 9.4

1.0 PROCEDURE

1.1 Test in accordance with:

TEST NAME	ANSI Z89.1-2009 SECTION	UL WORK INSTRUCTION
Impact Energy Attenuation Test	9.4	03-LO-W0048

2.0 RESULTS

Helmet Model: NTC White Shell w/Ratchet Suspension (6pt.), Non-Vented

CONDITIONING: SEE TABLE BELOW

Sample ID	Conditioning (°C)	Velocity (m/s)	Acceleration (g)	Observations
2	49 ± 2	3.5	246	-
3		3.5	271	-
4		3.5	267	-
5		3.5	256	-
14	-18 ± 2	3.5	241	-
15		3.5	232	-
16		3.5	232	-
17		3.5	250	-
6	23 ± 2	3.5	245	-
7		3.5	257	-
18		3.5	258	-
19		3.5	255	-
Specification:		3.5 ± 0.1	≤ 150	

Impact Velocity: 11.5 ± 0.3 ft/s

3.0 COMPLIANCE CRITERIA

3.1 Specimens shall have an acceleration of no more than 150 Gn.



**OFF CENTER PENETRATION TEST – TYPE II HELMETS**
**ANSI Z89.1-2009, SECTION 9.5**
**1.0 PROCEDURE**
**1.1 Test in accordance with:**

TEST NAME	ANSI Z89.1-2009 SECTION	UL WORK INSTRUCTION
Off Center Penetration Test	9.5	03-LO-W0048

**2.0 RESULTS**

Helmet Model:	NTC White Shell w/Ratchet Suspension (6pt.), Non-Vented
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**CONDITIONING: SEE TABLE BELOW**

Sample ID	Location	Conditioning (°C)	Velocity (m/s)	Electrical/ Physical Contact Between Striker and Headform [Y/N]
8	Front	49 ± 2	5.0	No
	Side		4.9	No
9	Rear		5.0	No
	Left		5.0	No
20	Front	-18 ± 2	5.0	No
	Side		5.0	No
21	Rear		5.0	No
	Left		5.0	No
10	Front	23 ± 2	5.0	No
	Side		5.0	No
22	Rear		5.0	No
	Left		5.0	No
Specification:			5.0 ± 0.1	

Impact Velocity: 16.4 ± 0.3 ft/s

**3.0 COMPLIANCE CRITERIA**
**3.1 Specimens shall not exhibit electrical or physical contact between the penetration test striker and the headform.**

CHIN STRAP RETENTION TEST – TYPE II HELMETS	ANSI Z89.1-2009, SECTION 9.6
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## 1.0 PROCEDURE

### 1.1 Test in accordance with:

TEST NAME	ANSI Z89.1-2009 SECTION	UL WORK INSTRUCTIONS
Chin Strap Retention Test	9.6	03-LO-W0XXX

## 2.0 RESULTS

Helmet Model:	NTC White Shell w/Ratchet Suspension (6pt.), Non-Vented
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Sample ID	Conditioning (°C)	Deflection Value	Chin Strap Remained Attached (Yes/No)	Observations
11	49 ± 2	0	Yes	-
13	-18 ± 2	0	Yes	-
23	23 ± 2	0.1065	Yes	-
Specification:		≤ 25 mm	Chin strap shall remain attached to helmet	

Drop Height: 4.0 ± .02 in.

## 3.0 COMPLIANCE CRITERIA

- 3.1
  1. Specimens shall have an elongation of no more than 25 mm (1.0 in.).
  2. Specimens shall remain intact