# INTERTEK TEST REPORT

3933 US ROUTE 11 CORTLAND, NEW YORK 13045

**TEST REPORT NO.: G100148523CRT-003**

**ANSI Z87.1-2003**
**"AMERICAN NATIONAL STANDARD, OCCUPATIONAL AND EDUCATIONAL PERSONAL EYE AND FACE PROTECTION DEVICES"**

**TESTING OF**
**CLEMCO INDUSTRIES- CLEMCO**
**MODEL NUMBER(S):**
**APOLLO 600 (#23824) HELMET ASSEMBLY**
**(LENS # 04493 CLEMCO Z87)**

**RENDERED TO:**
**CLEMCO INDUSTRIES**
**ONE CABLE CAR DRIVE**
**WASHINGTON, MO 63090**

## Abstract

The protective faceshields (Clemco lens # 04493), (attached to Clemco SAR Helmet, Assembly # 23824, red in color) identified as a Clemco Industries Apollo 600, submitted by the manufacturer, was received in the pristine condition on 06/04/10 and 09/17/10 and was evaluated in accordance with the requirements of ANSI Z87.1-2003 entitled "American National Standard, Occupational and Educational Personal Eye and Face Protection Devices", Section 9-"Faceshields", between 07/08/10 and 09/17/10.

Details of the instrument calibration are maintained in laboratory records.

## Introduction

This report describes the results of the test program conducted in accordance with ANSI Z87.1-2003 entitled "American National Standard, Occupational and Educational Personal Eye and Face Protection Devices", Section 9-"Faceshields", performed on specimens submitted by the manufacturer. The test evaluations were conducted by Intertek located in Cortland, NY.

## Product Description

Intertek received 20 production protective helmets. The test samples were identified as specimens 1-20. Individual lenses marked "Z87+" were also provided for the evaluation.

## Authorization

The test was authorized by quote number 500240394, signed by Mr. Tom Enger.

**Photos:**


## Performance Test Results:

### 9.2: Impact Testing Requirements

9.2.1: Faceshield Frame/Crown Tests

9.2.1.1: High Mass Impact, (ref. section 14.1)

Testing is performed concurrently with Section 9.3.1.1 (See that test section for test results)

9.2.1.2: High Velocity Impact, (ref. section 14.2)

Testing is performed concurrently with Section 9.3.1.2 (See that test section for test results)

### 9.2.2: "BASIC" (Z87) Impact Window Tests

9.2.2.1: Drop Ball Impact, (ref. section 14.4)

Sample Description: **Lens/window only # 04493**

| Sample # | Impact Location | Compliant |
|---|---|---|
| 4 | Apex in line with eyes | Yes |
| 1 | Apex in line with eyes | Yes |
| 8 | Apex in line with eyes | Yes |
| 6 | Apex in line with eyes | Yes |

9.2.2.2: Minimum Thickness

Sample Description: **Lens/window only # 04493**

| Sample # | Thickness, mm, (in.) | Compliant |
|---|---|---|
| 5 | 1.10 | Yes |

9.2.2.3: Plastic Window Penetration Test, (ref. section 14.5)

The test is identical to Section 9.3.1.3 (high Impact), see that section for the test results.

**9.3: "HIGH IMPACT" (Z87+) Testing Requirements**

9.3.1.1: High Mass Impact Test, (ref. section 14.1)

Sample Description: **Lens/window only (# 04493)**

| Sample # | Impact Location | Compliant |
|---|---|---|
| 1 | Left Eye | Yes |
| 2 | Left Eye | Yes |
| 3 | Right Eye | Yes |
| 4 | Right Eye | Yes |

Sample Description: **Lens/window Frame**

| Sample # | Impact Location | Compliant |
|---|---|---|
| 1 | Left Eye | Yes |
| 2 | Left Eye | Yes |
| 3 | Right Eye | Yes |
| 4 | Right Eye | Yes |

9.3.1.2: High Velocity Impact Test, (ref. section 14.2)

| Sample Description: | **Lens/window only (#04493)** | | **Right Side Impacts** |
|---|---|---|---|
| Sample # | Impact Location | Impact Velocity (ft/s) | Compliant |
| 5 | 15° Nasal Lt. Eye | 299.8 | Yes |
| 5 | 0° Lt. Eye | 302.8 | Yes |
| 5 | 15° Lt. Eye | 301.4 | Yes |
| 5 | 30° Lt. Eye | 302.1 | Yes |
| 5 | 45° Lt. Eye | 302.1 | Yes |
| 5 | 60° Lt. Eye | 303.0 | Yes |
| 5 | 75° Lt. Eye | 302.5 | Yes |
| 5 | 90° Lt. Eye | 301.2 | Yes |
| 5 | *90° Lt. Eye (above) | 298.2 | Yes |
| 5 | *90° Lt. Eye (below) | 301.2 | Yes |

| Sample Description: | **Lens/window only (#04493)** | | **Left Side Impacts** |
|---|---|---|---|
| Sample # | Impact Location | Impact Velocity (ft/s) | Compliant |
| 6 | 15° Nasal Lt. Eye | 301.8 | Yes |
| 7 | 0° Lt. Eye | 301.4 | Yes |
| 6 | 15° Lt. Eye | 300.7 | Yes |
| 6 | 30° Lt. Eye | 300.7 | Yes |
| 6,7 | 45° Lt. Eye | 300.9 | Yes |
| 7 | 60° Lt. Eye | 302.1 | Yes |
| 7 | 75° Lt. Eye | 301.4 | Yes |
| 7 | 90° Lt. Eye | 301.4 | Yes |
| 7 | *90° Lt. Eye (above) | 301.6 | Yes |
| 7 | *90° Lt. Eye (below) | 301.2 | Yes |

| Sample Description: | **Frame** | | **Right Side Impacts** |
|---|---|---|---|
| Sample # | Impact Location | Impact Velocity (ft/s) | Compliant |
| 7 | 15° Nasal Lt. Eye | 300.0 | Yes |
| 7 | 0° Lt. Eye | 301.8 | Yes |
| 7 | 15° Lt. Eye | 303.0 | Yes |
| 7 | 30° Lt. Eye | 301.4 | Yes |
| 7 | 45° Lt. Eye | 301.4 | Yes |
| 7 | 60° Lt. Eye | 300.5 | Yes |
| 7 | 75° Lt. Eye | 301.8 | Yes |
| 7 | 90° Lt. Eye | 302.1 | Yes |
| 7 | *90° Lt. Eye (above) | 301.2 | Yes |
| 7 | *90° Lt. Eye (below) | 301.2 | Yes |

| Sample Description: | **Frame** | | **Left Side Impacts** |
|---|---|---|---|
| Sample # | Impact Location | Impact Velocity (ft/s) | Compliant |
| 7 | 15° Nasal Lt. Eye | 301.4 | Yes |
| 7 | 0° Lt. Eye | 299.4 | Yes |
| 7 | 15° Lt. Eye | 302.3 | Yes |
| 7 | 30° Lt. Eye | 302.8 | Yes |
| 7 | 45° Lt. Eye | 301.2 | Yes |
| 7 | 60° Lt. Eye | 301.6 | Yes |
| 7 | 75° Lt. Eye | 301.4 | Yes |
| 7 | 90° Lt. Eye | 303.4 | Yes |
| 7 | *90° Lt. Eye (above) | 301.6 | Yes |
| 7 | *90° Lt. Eye (below) | 302.1 | Yes |

9.3.1.3: Penetration Test, (ref. section 14.5)

| Sample # | Impact Location | Compliant |
|---|---|---|
| 5 | Apex in line with eyes | Yes |
| 4 | Apex in line with eyes | Yes |
| 1 | Apex in line with eyes | Yes |
| 8 | Apex in line with eyes | Yes |

**9.4: Optical Requirements for Plano Faceshield Windows**

9.4.1: Optical Qualities

| Sample # | Note Any Imperfections (visually inspection only) | Compliant |
|---|---|---|
| 20 | none | Yes |

9.4.2: Prismatic Power Test, (ref. section 14.9)

| Sample # | Left Side Diopters | Right Side Diopters | Compliant |
|---|---|---|---|
| 20 | 0.036 | 0.080 | Yes |
| | Vertical Imbalance | | ---------- |
| | 0.036 | | Yes |
| | Imbalance horizontal diopter | | ---------- |
| | 0.036 bo | | Yes |

9.4.3: Resolving Power, (ref. section 14.10)

| Sample # | Compliant |
|---|---|
| 20 | Yes |

9.4.4: Haze Test, (ref. section 14.11)

| Sample # | Percent Haze | | Compliant |
|---|---|---|---|
| 20 | Left =0.3 | Right = 0.4 | Yes |

9.4.5: Transmittance, (ref. section 14.12)

| Sample # | Shade | Percent Transmittance | | Compliant |
|---|---|---|---|---|
| 20 | clear | Left = 90.9 | Right = 90.2 | Yes |

**9.5: Wire Screen Windows**

| Sample # | Condition of Exposed Borders | Compliant |
|---|---|---|
| NA | Not this type | NA |

**9.6: Flammability Test**, (ref. section 14.6)

Requirements: The test sample shall not burn at a rate greater than 75mm/min.

Sample Description: **Helmet**

| Sample # | Time (sec) | Burn Length (mm) | Burn Rate (mm per min) | Compliant |
|---|---|---|---|---|
| 4A | 273 | 75 | 16.4 | Yes |
| 4B | 367 | 75 | 12.2 | Yes |
| 4C | 386 | 75 | 11.6 | Yes |
| 4D | Per ASTM D635, section 9.8, no further testing required | | | |
| 4E | | | | |
| 4F | | | | |
| 4G | | | | |
| 4H | | | | |
| 4I | | | | |
| 4J | | | | |

Sample Description: **Window/lens only (# 04493)**

| Sample # | Time (sec) | Burn Length (mm) | Burn Rate (mm per min) | Compliant |
|---|---|---|---|---|
| 2A | na | Did not burn to first mark | na | Yes |
| 2B | na | Did not burn to first mark | na | Yes |
| 2C | na | Did not burn to first mark | na | Yes |
| 2D | na | Did not burn to first mark | na | Yes |
| 2E | na | Did not burn to first mark | na | Yes |
| 2F | na | Did not burn to first mark | na | Yes |
| 2G | na | Did not burn to first mark | na | Yes |
| 2H | na | Did not burn to first mark | na | Yes |
| 2I | na | Did not burn to first mark | na | Yes |
| 2J | na | Did not burn to first mark | na | Yes |

Sample Description: **Window/lens holder (frame)**

| Sample # | Time (sec) | Burn Length (mm) | Burn Rate (mm per min) | Compliant |
|---|---|---|---|---|
| 2A | 165 | 75 | 27.3 | Yes |
| 2B | 184 | 75 | 24.5 | Yes |
| 2C | 154 | 75 | 29.2 | Yes |
| 2D | Per ASTM D635, section 9.8, no further testing required | | | |
| 2E | | | | |
| 2F | | | | |
| 2G | | | | |
| 2H | | | | |
| 2I | | | | |
| 2J | | | | |

**9.7: Corrosion Resistance**, (ref. section 14.7)

| Sample # | Part Description | Compliant |
|---|---|---|
| NA | Frame is rubber, no metal parts | NA |

**9.8: Cleanability**, (ref. section 14.8)

| Sample # | Requirements | Compliant |
|---|---|---|
| 5 | Function | Yes |
| | Markings | Yes |

**9.9: Replacement Faceshield Windows**

| Replacement Window Model # | Requirements | Compliant |
|---|---|---|
| NTT | Not replaceable | NA |

**9.10: Marking**

| Sample # | Results | Compliant |
|---|---|---|
| 20 | Permanent, legible, no interference | Yes |

9.10.1: Frame/Crown Marking

| Sample # | Results | Compliant |
|---|---|---|
| NTT | Helmet with non replaceable lens | NA |

9.10.2: Window Marking

Requirement: Windows shall be marked with the manufacturer's mark and either "Z87" or "Z87+" as appropriate to the testing done.

| Sample # | Results | Compliant |
|---|---|---|
| 20 | Marked "Z87 +" on lens | Yes |

9.10.3: Markings for Non-removable lenses

| Sample # | Results | Compliant |
|---|---|---|
| 20 | Marked "Z87 +" on lens | Yes |

**15.2: Warning Label**

Requirement: A clearly visible, removable label or hang tag shall be affixed to any protector which does not meet the high impact requirements of this standard. The label or tag shall contain an appropriate warning indicating that the lens meets basic impact requirements, but should not be relied upon for protection from high impact exposures. The label or tag shall also state that it is to be removed only by the user.

| Sample # | Results | Compliant |
|---|---|---|
| 20 | Not required, meets high impact, "Z87+" requirement | NA |

**Conclusion**

The protective faceshields (Clemco lens # 04493), (attached to Clemco SAR Helmet, Assembly # 23824) identified as a Clemco Industries Apollo 600 **met** the minimum performance requirements of "Z87+" as defined in ANSI Z87.1-2003 entitled, "American National Standard, Occupational and Educational Personal Eye and Face Protection Devices", Section 9- "Faceshields".

Testing Performed by:

Brian Bishop
Engineer
Performance Group

Report Approved by:

Sara Ensign
Technician I
Performance Group

September 17, 2010

Intertek Order No.: G100148523

Tom Enger
Clemco Industries
One Cable Car Drive
Washington, MO 63090

Dear Mr. Enger:

Enclosed please find one copy of Intertek Report No.: G100148523CRT-003, covering the test evaluations that were conducted on your protective faceshields (Clemco lens # 04493), (attached to Clemco SAR Helmet, Assembly # 23824) identified as a Clemco Industries Apollo 600.

The test was authorized by a signed quotation dated June 18th, 2010.

Thank you for choosing Intertek for your testing needs. If we can be of further assistance to you please feel free to contact me at (607) 758-6714.

Sincerely,

Brian Bishop
Engineer
Performance Group

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