Project Overview

- Purpose of Tests
- Goal
- General Assumptions
- Type of Durability Test
  - Assumptions
- Rationale for the Test
Project Overview

Purpose of Tests: To ensure that integrity is integral to the design and packaging of the CBRN Escape Respirator because of the One-Time Use Application.

Goal: To ensure APR provides adequate respiratory protection after being subjected to potential environmental and normal transportation storage conditions by the user.
General Assumptions

- Tests represent conditions induced by the user from the point of issue.
- CBRN Escape Respirator will be subjected to test conditions in the “Ready-to-Use” Configuration, individual unit pack.
- CBRN Escape Respirator individual unit pack will remain sealed until use.
- Non-industrial use scenario – for CBRN emergency use only.
Type of Environmental Test

- **High Temperature:** 71 °C (160 °F), Constant; MIL-STD-810F, Method 501.4.

- **Duration:** 5 weeks

- **Assumption:** Simulates Solar Loading Representative of Climatic Conditions in southwest U.S.

- **Rationale:** Meteorological Data obtained for Phoenix, AZ from ASU and NOAA; factored in Inducement Factor from MIL-STD-810F
Type of Environmental Test

- Low Temperature: $-31^\circ$C ($-24^\circ$F), Constant;
- Duration: 3 Days
- Assumption: Simulates outside storage in the
  U.S. Basic Cold Region.
- Rationale: Representative of minimum
  temperature in U.S. intermediate zones per
  MIL-STD-810F (Basic Cold); Duration is minimum
  $810F$ recommended exposure period.
Type of Environmental Test

- Duration: 5 Days ("quick look")
- Assumption: Represents natural temperature and humidity profile in humid regions of U.S. per MIL-STD-810E such cities as Miami, FL.
- Rationale: Duration is minimum 810E recommended exposure period.
Type of Transportation Test

- Vibration: MIL-STD-810F, Method 514.5, Annex A, Category 4, Over U.S. Highways, Figure 514.5C-1, Unrestrained
- Duration: 3 Axes, 12 Hours per axis (36 hours total = 12,000 miles simulation)

Assumption: replicates conditions of an unrestrained Respirator stored in a vehicle driven over U.S. roadways.

Rationale: To determine if there are any potential initial life cycle failures.
3 Axes of Vibration

- Transverse
- Longitudinal
- Vertical
Rough Handling Test

- **Drop Test:** Height of 3 Feet
- **Duration:** Intent is to Drop Each Unit on each of the 3 Axes (1 Impact Surface per Axis)
- **Assumption:** To replicate several falls from a table or an automobile trunk
- **Rationale:** To ensure that integrity is integral to the design and packaging of the CBRN Air-Purifying Escape Respirator
Axes of Drops

Drop 1

Drop 2

Drop 3
<table>
<thead>
<tr>
<th>Test</th>
<th>Test Condition</th>
<th>Test Method</th>
<th>Duration</th>
<th>Description</th>
</tr>
</thead>
</table>
| Hot Constant | Basic Cold, -32 °C (24 °F), Constant | MIL-STD-810F, 502.4 | 3 Days | Realistic, Natural Cycle
| Cold Constant | 71 °C (160 °F), Constant | MIL-STD-810E, 507.3 | 5 Days “quick look” | Humidity Profiles in the U.S.
| | | | | Table 507.3-II |
| Transportation Vibration | U.S. Roadway Vibration, Unrestrained | MIL-STD-810F, 514.5 | 12 hours/axis, 3 Axes; Total Duration = 36 hours = 12,000 miles |
| Drop | | | | 1 Drop on each of the 3 Axes per Unit |

Drop Height of 3 Feet

Adopted from NIOSH, CBRN Full Facemask Gas Mask