HazMat Pe Entry & Rehab

**Prehospital goal:** To properly manage exertional heat stress and fatigue

**Indications:** Complete pre-entry screening and post entry rehab for any technician donning chemical or vapor resistant PPE

**Pre-entry surveillance:** Complete for all individuals wearing chemical liquid, splash, and vapor protective clothing in either the hot or warm zones. Technicians performing decontamination in PPE for extended periods of time should also be monitored.

<table>
<thead>
<tr>
<th>Pre Entry</th>
<th>→</th>
<th>Post Entry</th>
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</thead>
<tbody>
<tr>
<td><strong>Vital Signs</strong></td>
<td></td>
<td><strong>Monitor</strong></td>
</tr>
<tr>
<td>Skin: Examine skin for rashes, open sores, and wounds.</td>
<td></td>
<td>Blood Pressure (subject seated)</td>
</tr>
<tr>
<td>Mental status: Individual should be alert and oriented with normal gait and clear speech</td>
<td></td>
<td>Pulse (pulse oximeter acceptable)</td>
</tr>
<tr>
<td><strong>Medical history</strong></td>
<td></td>
<td>Oral Temperature</td>
</tr>
<tr>
<td>Document new medications since last team physical including OTC.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Document alcohol consumption over past 24 hours and ANY illness over the past 72 hours.</td>
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<tr>
<td><strong>Weight:</strong> Document weight wearing pants with empty pockets, shirt, and socks.:</td>
<td></td>
<td><strong>Mental status</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Individual should be alert and oriented with normal gait and clear speech.</td>
</tr>
<tr>
<td><strong>Hydration:</strong> Provide the subject with 8 – 16 oz. of sport drink or sport drink diluted 50% with water.</td>
<td></td>
<td><strong>Weight:</strong> Document weight wearing pants with empty pockets, shirt, and socks.:</td>
</tr>
<tr>
<td>Document any volume consumed after weighing.</td>
<td></td>
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</tbody>
</table>

- “Call Medical Command”
- “Refer to Notes”
**Rehab sector goals:**

**Shelter:** Consider the elements. Avoid extremes of heat, cold, or high humidity. If possible, establish the rehab sector out of sight of the incident.

**Rest:** Most studies have shown that temperature may not return to baseline temperature after 20-minutes of rehab even with active cooling and rehydration. If manpower allows, extend rehab to 30 minutes or reduce work times before returning to the rehab sector.

**Provide hydration 🌿**

**Provide temperature correction 🌿**

**Provide food for long duration incidents**

Any technician with an estimated core temperature greater than 103°F (39.4°C) with signs and symptoms of exertional heat illness should immediately receive 1 – 2 liters of 0.9 NS IV and be transported to the emergency department. Consider cold water immersion followed by rapid transport and intravenous fluids for any firefighter with a core temperature over 104°F (40°C). Confirm this temperature rectally if possible.

**Technician may redon PPE if appropriate rehydration has occurred and the following vital sign criteria are met.**

- Heart rate < 100
- Systolic BP between 100 and 160
- Diastolic BP < 90
- Oral temperature < 98.6°F (37°C)
Notes:

**Pre Entry Vital Signs**
Pulse: deny entry of greater than 70% of age predicted max: (220 – age)*0.7
Blood pressure: deny entry if diastolic BP > 105
Respiratory rate: deny entry if greater than 24/min
Temperature (oral): deny entry if greater than 99.5°F

**New Medications**
- Certain medications affect hear rate response and thermoregulation. Contact medic command before donning PPE if any new medications are identified. *The subject must be cleared by physician prior to donning PPE.*

**Hydration:** Calculate sweat rates using the following. Note: weights must be in kg and assumes no urine has been excreted or fluids consumed

\[
[(\text{Pre entry weight (kg)} - \text{Post entry weight (kg)} + 1) \times 1000] = \text{ml fluid replacement needed}
\]

Oral fluid replacement should be 110-150% (multiplication factor of 1.1 - 1.5) of the amount lost in PPE to return to baseline. Optimally, the full replacement volume should be consumed before re-donning PPE. If this is not possible, 50% should be consumed on scene in addition to meeting vital sign criteria to return to the incident. The total replacement volume lost should be consumed during the same day.

Example:

Pre entry weight = 61.7 kg
Post entry weight = 61.3 kg
90 minutes in PPE

\[
61.7 - 61.3 + 1 = 1.4
1.4 \times 1000 = 1400 \text{ mL lost by sweat}
1400 \times 1.1 = 1540 \text{ mL or (2100 mL for 1400*1.5) of oral fluids OR 1400 mL 0.9NS IV fluids}
\]

- Consider providing intravenous fluids for subjects with symptoms of exertional heat illness.
- 1.5 to 2.0 liters of room temperature fluid should provide 0.5°C reduction in core temperature
- If available, a rapid infusion of one liter of cold (4°C) saline should provide 1.0°C reduction in core temperature. *Note: Rapid cold saline infusion can be uncomfortable in hyperthermic individuals and should only be used to treat true heat emergencies."

**Cooling:** Remove all PPE after decontamination.

In hot environments (>90°F or 32°C) or in high humidity employ active cooling (e.g. forearm immersion). Cold towels and misting fans can be used to increase technician comfort but are unlikely to result in significant additional cooling.

Do *not* use fans when temperatures exceed 95°F (35°C) as this may inhibit thermoregulation.
Do *not* use fine water mist in high humidity (> 70% RH)

Passive cooling in moderate temperature (approximately 72°F or 22°C) and low humidity is an efficient means of cooling individuals. Air-conditioned vehicles (e.g. fire apparatus, ambulance, bus) or portable shelters can be used to create an optimal environment.

<table>
<thead>
<tr>
<th>Quality Indicators</th>
<th>Response to Therapy</th>
<th>Temperature correction</th>
<th>Adverse Effects</th>
<th>Provision of adequate hydration</th>
</tr>
</thead>
</table>

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- “Refer to Notes”