

LG-SOP-ARS14 | REV. 1.1

ARS[®] Needle Decompression (14ga)

Field Manual

Emergency management of tension pneumothorax — for trained and authorized medical personnel operating under TCCC, TEMS, or equivalent advanced pre-hospital trauma protocols.

SECTION 1

Mission Brief & Intended Use

Operational Context

The ARS® Needle Decompression Kit performs a **needle thoracostomy** for emergency management of a **tension pneumothorax** — a life-threatening condition where air accumulates in the pleural space via a one-way valve effect from chest injury.

Progressive lung collapse and mediastinal shift cause cardiovascular collapse. This is a **leading cause of preventable combat death**.

Intended Use

Rapidly convert a **tension pneumothorax** into a simple pneumothorax by venting trapped air, restoring hemodynamic stability and enabling casualty evacuation to definitive care.

The ARS® is specifically engineered to overcome the failures of standard IV catheters in this high-stakes environment.

- ❑ Authorized for use by personnel certified in **TCCC, TEMS**, or equivalent advanced pre-hospital trauma protocols only.

SECTION 2

Equipment & Component Familiarization



Deployment & Protection System

- **Rigid, Crush-Resistant Container:** Hard-shell case protecting needle/catheter from damage and contamination. Ensures device is field-ready in IFAK or aid bag.
- **Textured Twist Top:** Designed for positive grip and one-handed, gross-motor opening — even with gloved or fluid-covered hands.
- **Pen Clip:** Integrated clip for secure stowage in MOLLE loops or pockets for immediate access.



Needle & Catheter Assembly

- **14ga × 3.25-inch Needle/Catheter:** The 3.25" (8.25cm) length ensures pleural space penetration in **over 99% of adults**, where shorter IV catheters fail.
- **Capless Flash Chamber:** Open, vented hub providing immediate visible confirmation of correct placement via blood or air flash. Eliminates uncapping step.
- **Radio-opaque Catheter:** X-ray visible for verification of placement by hospital providers during definitive care. No field application.

SECTION 3

Standard Operating Procedure

- ☐ **Scenario:** Casualty with penetrating torso trauma exhibiting progressive respiratory distress, tachypnea, anxiety, unilateral diminished breath sounds, and suspected hypoxia. Primary diagnosis: **tension pneumothorax.**



Step 1

Confirm Indication & Identify Site



Step 2

Prepare Equipment



Step 3

Needle Insertion



Step 4

Catheter Placement & Needle Removal



Step 5

Secure & Reassess

SECTION 3 — STEPS 1 & 2

Confirm, Identify & Prepare

Step 1: Confirm Indication & Identify Site

Assess casualty for signs of tension pneumothorax:

- Severe or progressive respiratory distress
- Absent/decreased breath sounds on affected side
- Hypotension
- Jugular vein distention or tracheal deviation (*late signs — often absent in the field*)

Expose the chest. Identify the **primary insertion site**: 2nd intercostal space (ICS) in the mid-clavicular line (MCL) on the affected side. Locate the sternal notch → angle of Louis → move laterally to 2nd rib → identify space just below it in the MCL.

- ☐ **Secondary Site:** If the primary site is unavailable (injury or body armor), use the **4th or 5th ICS in the anterior axillary line (AAL)**.

Step 2: Prepare Equipment

1. Remove the ARS® kit from its pouch or IFAK location.
2. Grasp the container firmly and **twist the textured cap** to break the tamper-evident seal.
3. Remove the cap.
4. Remove the needle/catheter assembly from the container.

SECTION 3 — STEPS 3, 4 & 5

Insert, Secure & Reassess

1 Needle Insertion

Clean the site if time permits. Insert needle at **90° to the chest wall**, directly over the **superior aspect (top) of the 3rd rib** (2nd ICS site) or 5th/6th rib (4th/5th ICS site) — minimizing risk to the intercostal neurovascular bundle. Advance firmly. A distinct '**pop**' may be felt. Confirm placement by audible air rush and/or flash in the capless chamber.

2 Catheter Placement & Needle Removal

Once placement is confirmed, advance the catheter off the needle until the hub is **flush with the skin**. Immediately withdraw the needle, leaving the catheter in place. **DO NOT REINSERT THE NEEDLE** once separated from the catheter. Secure the exposed needle in a sharps shuttle immediately.

3 Secure & Reassess

Leave the catheter hub **open to atmosphere** to allow continued venting. Do not attach a one-way valve unless protocol dictates. Secure the hub to the chest wall with tape or a commercial securing device. Continuously reassess: respiratory rate and effort, mental status, radial pulses. **Be prepared for a second decompression** if signs return due to catheter clotting or kinking.

Critical Warnings, Limits & Safety

Scope of Practice & Liability

Needle thoracostomy is an **invasive procedure with high potential for iatrogenic injury.**

Must only be performed by certified, trained, and authorized personnel under direct orders or established protocols.

Unauthorized use risks fatal hemorrhage, cardiac tamponade, and carries significant legal and professional liability.

Operational Hazards

- **Incorrect Placement:** Risk of lung laceration, major vessel damage (intercostal/subclavian artery, aorta), or cardiac tamponade from medial 2nd ICS placement.
- **Hemorrhage:** Insertion through the inferior neurovascular bundle can cause significant bleeding.
- **Catheter Failure:** Kinking, occlusion, or dislodgement may require a second decompression.
- **Negative Decompression:** If no tension pneumothorax is present, the procedure will cause a simple (open) pneumothorax.

Device Limitations

- The 3.25" needle may be **insufficient** for casualties with exceptional muscle mass or subcutaneous fat over the chest wall.
- **Single use only.** Do not resterilize or reuse.
- Inspect the tamper-evident seal before use. **Do not use if the container is open or damaged.**

SECTION 5

Readiness, Inspection & Sustainment

Inspection Protocol

During all routine IFAK, aid bag, and medical station checks, physically inspect the ARS® kit:

- Outer case intact and uncracked
- Tamper-evident seal on twist-top unbroken
- Manufacturer expiration date within limits
- Replace any expired units immediately

Storage & Carriage

Store in designated pouch or slot, **readily accessible** and protected from crushing forces. Use the integrated clip to secure the device if not placed in a fitted elastic loop.

Post-Use & Replacement

After deployment, dispose of the **entire unit** — needle/catheter and case — per biohazard and sharps protocols.

Immediately replenish the vacated slot with a new, in-date unit to maintain operational readiness.