LESSON PACKET

Sealed System Tools & Service Workflow

TMM Academics – Sealed System Training

Lesson Overview

This lesson introduces the complete tool set and workflow required to perform sealed system repairs. It focuses not only on what tools are needed, but how they are used in sequence to complete a job efficiently, safely, and correctly in the field.

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1. Job Preparation (Before You Start)

Before performing any sealed system repair:

- Check all tools, supplies, and parts
- Confirm you have everything needed
- Avoid leaving the job site due to missing tools

👉 Example: Missing UV light for leak detection delays job completion

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Service Area Setup

- Inspect work area before bringing tools
- Ensure enough space to work
- Move obstacles if needed

👉 Think like an installer — plan before acting

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2. Step-by-Step Service Workflow

Step 1 – Add Access Valves & Start Recovery

- Install temporary access valves
- Connect:
  - Recovery tank
  - Gauges
  - Recovery machine

👉 Start recovery immediately to save time

Step 2 – Bring Remaining Tools

While refrigerant is recovering:

- Bring in remaining tools
- Prepare parts

👉 Use time efficiently

Step 3 – Remove Components

- Compressor
- Filter dryer
- Any damaged components

Step 4 – Install New Components

- Replace compressor or parts
- Prepare for leak testing

🔹 3. Leak Testing (CRITICAL STEP)

⚠️ NEVER pull a vacuum to check for leaks

Correct Method:

Use **Nitrogen Pressure Test**

- Pressurize system (~100 PSI)
- Close gauges
- Monitor pressure

If pressure drops:

- Leak is present
- Use soap solution to locate leak

⚠️ DO NOT:

- Use vacuum to check leaks
- Apply soap during vacuum

👉 This introduces moisture into system

🔹 4. Evacuation (Vacuum Process)

After confirming no leaks:

- Connect vacuum pump
- Use micron gauge
- Pull down to:

👉 **500 microns**

Why this matters:

- Removes air

- Removes moisture
- Prevents contamination

👉 Moisture + oil = system failure

🔹 5. Charging the System

Use a **refrigerant scale**

Process:

- Place tank on scale
- Zero the scale
- Charge required amount

Example:

- System requires 6 oz
- Scale reads -6 oz → done

👉 Accurate charging = proper system performance

🔹 6. Final Steps

- Seal system (pinch off & braze)
- Remove access valves
- Verify operation

⚠️ Do NOT leave valves on system

👉 They can leak later and cause call-backs

🔹 7. Essential Tools Overview

🔧 Core Tools

- Manifold gauges
- Recovery machine
- Recovery tank
- Vacuum pump
- Micron gauge
- Refrigerant scale

🔥 Brazing Tools

- Turbo torch
- Oxy-acetylene torch
- Striker
- Flame guard

🧰 Tubing Tools

- Tube cutter
- Capillary cutter
- Reamer
- Swaging tools
- Flaring block

🔩 Service Tools

- Access valves
- Core removal tool
- Pinch-off pliers

🧪 Supplies

- Sand cloth (cleaning)
- Flux (sil-fos)
- Brazing rods (15% / 45%)
- Filter dryers
- Refrigerant (R134a / R600a)

🔹 8. Key Field Principles

Cleanliness

👉 Dirty pipe = leaks

- Always clean before brazing
- Do not rush

Heat Control

- Avoid damaging:
  - Plastic
  - Wiring
  - Insulation

👉 Use heat shields when needed

Efficiency

- Start recovery first
- Work while machines run

Consistency

👉 Follow same process every time

🔹 9. Common Mistakes

❌ Forgetting tools
❌ Using vacuum to check leaks
❌ Not cleaning tubing
❌ Overheating components
❌ Leaving access valves installed
❌ Rushing job

🔹 10. Real-World Insight

“If you don’t have time to do it right the first time, when will you have time to do it over?”

👉 Rushing creates more work

📝 Review Questions

Multiple Choice

1. What should you do before starting a sealed system job?
   A. Start brazing
   B. Check tools and parts
   C. Add refrigerant
   D. Replace compressor

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2. What is the correct method to check for leaks?
   A. Vacuum
   B. Nitrogen pressure
   C. Air pressure
   D. Water test

3. What is the target vacuum level?
   A. 1000 microns
   B. 750 microns
   C. 500 microns
   D. 100 microns

Short Answer

4. Why should access valves be removed after service?

5. Why is cleanliness important when brazing?

Scenario

6. You pull a vacuum and it won't hold. What is the correct next step?

7. You forgot a tool and must leave the job. What should have been done first?

Answer Key

1. B – Check tools and parts
2. B – Nitrogen pressure
3. C – 500 microns

4. They can leak and cause system failure

5. Dirt prevents proper sealing and causes leaks

6. Perform nitrogen pressure test

7. Verify tools before starting the job