

LESSON PACKET

Torch Setup & Brazing Fundamentals

TMM Academics – Sealed System Training

Lesson Overview

This lesson introduces the tools and procedures used for brazing in sealed system repair. Students will learn how to properly set up torches, understand the function of regulators, safely light and control a flame, and apply correct brazing techniques. Mastering these fundamentals is critical to preventing leaks and ensuring safe, professional repairs.

◆ Section 1: Types of Torches

There are two primary torches used in sealed system work:

- Oxy-Acetylene Torch (oxygen + acetylene)
- Turbo Torch (acetylene with air mixture)

The oxy-acetylene torch produces a smaller, more precise flame, making it ideal for tight spaces. The turbo torch produces a larger flame that is easier to use but less precise.

Key Point:

Choosing the right torch depends on the job and the level of control needed.

◆ Section 2: Advantages and Disadvantages

Oxy-acetylene allows for a smaller, controlled flame, which is useful around sensitive components like wiring and plastic parts. However, it requires proper adjustment of two gases.

The turbo torch is easier to use and quicker to light but produces a larger flame that can damage nearby components if not controlled.

◆ Section 3: The Regulator

A regulator controls the pressure coming from the tank and ensures a consistent flow of gas.

Without a regulator, tank pressure would be too high and dangerous to use. The regulator also maintains steady pressure even as tank conditions change.

Key Point:

The regulator protects both the technician and the equipment by controlling gas pressure.

◆ Section 4: Proper Setup and Connections

When installing a regulator:

- Tighten fittings by hand first
- Use proper wrenches (never pliers)
- Ensure correct thread direction (acetylene = left-hand thread)

Incorrect installation can damage fittings or create dangerous leaks.

◆ Section 5: Lighting the Torch

A striker should always be used to light the torch. Lighters are unsafe because they place your hand too close to the flame.

Proper technique includes:

- Opening gas slowly
 - Using the striker correctly
 - Keeping hands away from flame
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◆ Section 6: Flame Adjustment

The flame must be adjusted properly for safe and effective brazing.

- Yellow flame → not enough oxygen
- Proper flame → clean blue

A poor flame can produce soot, which contaminates surfaces and creates poor brazing connections.

Key Point:

A clean blue flame indicates proper combustion and efficient heating.

◆ **Section 7: Safety Considerations**

Torch use presents several hazards if not handled correctly:

- Flames can damage nearby components
- Hoses can become damaged or leak
- Tanks can fall if not secured

Always:

- Keep hoses untangled
 - Position tanks securely
 - Work in a clear area
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◆ **Section 8: Brazing Fundamentals**

Brazing joins two metals using a filler material. Unlike welding, brazing uses lower temperatures and relies on the base metal being heated, not the filler rod directly.

Important Concept:

The pipe must be hot enough to melt the solder — not the flame.

◆ **Section 9: Brazing Materials**

Common brazing rods include:

- 15% Silver (Sil-Fos 15)
- 45% Silver (easier flow, lower heat required)

Higher silver content requires less heat and is better for dissimilar metals like copper to steel.

◆ **Section 10: Surface Preparation**

Proper preparation is critical before brazing:

- Clean tubing (no oil or dirt)
- Sand surfaces to bright metal
- Avoid touching cleaned surfaces with hands

Contaminants can cause weak joints or leaks.

◆ **Section 11: Using Flux**

Flux is used when brazing dissimilar metals, such as copper to steel.

Flux helps:

- Prevent oxidation
 - Improve bonding
 - Ensure proper flow of filler material
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◆ **Section 12: Common Mistakes**

Common beginner mistakes include:

- Heating the rod instead of the pipe
- Using too much flame
- Not cleaning tubing properly
- Improper flame adjustment

These mistakes often result in leaks or weak joints.

◆ **Section 13: Final Understanding**

Brazing is one of the most critical skills in sealed system repair.

Improper technique leads to:

- Refrigerant leaks
- System failure
- Repeat service calls

Proper setup, flame control, and preparation are essential for long-term reliability.



Review Questions

Multiple Choice

1. What is the purpose of a regulator?
 - A. Increase heat
 - B. Control gas pressure
 - C. Store gas
 - D. Cool the torch

 2. What type of flame is correct for brazing?
 - A. Yellow
 - B. Blue
 - C. Red
 - D. Orange

 3. Why should a striker be used instead of a lighter?
 - A. Faster
 - B. Cheaper
 - C. Safer
 - D. Brighter

 4. What happens if the pipe is not hot enough during brazing?
 - A. Solder flows correctly
 - B. Joint becomes stronger
 - C. Solder will not bond properly
 - D. Flame increases
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Short Answer

5. Why is surface preparation important before brazing?
 6. What is the advantage of higher silver content in brazing rods?
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Scenario-Based

7. A technician applies the flame directly to the brazing rod instead of the pipe.
What problem will this cause?
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Answer Key

1. B – Control gas pressure
2. B – Blue
3. C – Safer
4. C – Solder will not bond properly
5. To ensure a clean surface for proper bonding and prevent leaks
6. It requires less heat and flows more easily
7. The solder will not properly bond to the pipe, leading to a weak or leaking joint