

ELECTRICAL CERTIFICATION

Soldering

CATALOG: E2

OBJECTIVE

For members to be able to solder connectors and wires in a way that meets quality requirements.

COMPLETION REQUIREMENTS

All Electrical subteam members required to complete this certification.

SOLDERING INTRODUCTION

Trainer Qualifications

Electrical Lead and Mentors with relevant experience are able to administer this certification.

Major Assignment

1. Demonstrate safe practices while soldering.
2. To be able to solder 2 wires in a way that provides a strong connection and will not break when tugged from both ends.
3. To be able to solder a connector in a way that provides a strong connection and doesn't break when tugged from both ends.

Location

Robotics Center

Materials

Wire

Soldering iron

Solder

Wire strippers

Clamp

WHAT IS SOLDERING?

Soldering is a process used for joining metal parts to form a mechanical or electrical bond. It typically uses a low melting point metal alloy (solder) which is melted and applied to the metal parts to be joined and this bonds to the metal parts and forms a connection when the solder solidifies.

Parts that are joined together could be a component lead, a circuit board, or a wire lead to a metal terminal.

The soldering materials must be both clean and free of contaminants. Possible contaminants can include dirt, grease, oil, rust, and oxidation. Soldering tips can be cleaned using a brass wire cleaning ball or a solder tip cleaner.

Quality solder joints are a combination of proper technique
and proper equipment and materials.

Practice will help with mastering this important skill!

SAFETY CONCERNS

- The soldering iron is hot. Care should be taken while using, and make sure to safely place the iron in its stand when not in use.
 - Should you get burnt by the hot soldering iron, run the burned area under tap water for 15 minutes. You can expect a blister to form, which should heal in a few weeks.
 - Notify your lead, mentor, and the Safety Lead of the injury, *even if you think it is minor!*
- Solder can contain lead – use a fan/adequate ventilation when soldering
- When possible use lead free solder
- Safety glasses should be worn when soldering
- When finished soldering, ensure that the iron is turned off and the station is clean before you leave

HOW TO SOLDER

1. **Gather your materials:** soldering iron, solder, and materials to be soldered together.
2. **“Tin” the soldering iron tip:** this involves melting a small blob of solder in the end of the soldering iron. This helps to improve heat flow from the iron to the lead.
 - Carefully place the tip (with the blob of solder) where you want the pieces to be joined. The blob should touch both pieces.
3. **Feed the solder wire onto the interface.** The parts should be heated enough at this time for the solder to melt into the connection point, not on the tip of the iron. The molten solder should “cling” to the parts being joined together.
 - If the solder is not melting onto the desired area, the most likely cause is insufficient heat or the surface needs to be cleaned.
4. **Stop feeding solder once gaps are filled** and the surfaces are wetted.
 - You will want to stop adding solder once it forms a flat, shiny patch that evenly covers the surfaces being joined
 - Too much solder will result in a blob
 - Too little solder will result in an irregular, concave joint
5. **Let the solder cool completely before testing the connection.**
6. **Keep the tip of the soldering iron clean.** A dirty tip will prevent the formation of a good solder. It is recommended that you clean the tip between each component that you solder, using a damp sponge or bronze/brass wool.

