

4 JOINING AND FASTENING MATERIALS

UNIT 1 • JOINING PROCESSES



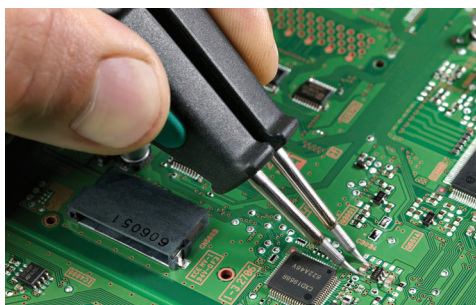
1

Listen to the following text on soldering and complete it with the words in the box.

appear • elevated • flux • joint • layer • pre-coat • quickly • solder
• soldering iron • surfaces • temperature

General Soldering Tips

- a. Clean the to be soldered and apply the
- b. Tin the surfaces, that is them with a thin film of solder. This may be carried out with a and resin-cored solder.
- c. Solder as as possible.
- d. Use the lowest possible soldering that yields acceptable joints. If the temperature is insufficient, there will be a layer of solid beneath the melted solder and amalgamation will not take place.
- e. Avoid repeated soldering just to make the look better. Added exposure to high temperatures only increases the inter-metallic The joint may look pretty but is in fact weaker.
- f. Avoid operating temperatures for the end product. Keep it well below the soldering temperature as much as possible.
- g. Remove any flux and inspect the joint which should fresh and bright.





2

PAIR WORK. Follow the instructions of the previous activity and work out a dialogue between two students: Student A has problems soldering; Student B gives advice.

STUDENT A	STUDENT B
Ask what you have to do before soldering	Answer the question
Ask what you have to do next	Answer the question
Ask if you need to use a high soldering temperature	Answer the question
Ask if you have to repeat the operation	Answer the question
Ask why	Answer the question
Ask what you have to do at the end of the soldering	Answer the question
Thank	Answer





3

Fill in the following table with the missing information.

TECHNIQUE	PROCEDURE	MATERIALS/PRODUCTS
		Only stronger plastics are suitable for this method since the joint must survive the strain of assembly, service load, and possible repeated use.
Hot-gas welding		
	The parts are heated by pressing them together and vibrating one of the parts at 120 to 240 Hz, in the plane of the joint. After 2 to 3 sec, vibration is stopped and pressure is maintained while the softened plastic cools.	
Ultrasonic welding		
		This technique is suitable for difficult-to-weld plastics such as polypropylene.
	This technique uses the breakdown of plastic under high voltages and frequencies (13 to 120 MHz) to produce dielectric heating and fuse the plastic.	
Fusion bonding		
		This process is limited to thermoplastics.



4

Complete the following sentences.

- a. In oxyacetylene welding, flame and pressure can be varied according to
- b. Forge, friction and ultrasonic welding are examples of
- c. Electric arc welding is widely employed because it allows obtaining and avoiding
- d. Gas welding equipment includes
- e. Mechanical joining is used as an alternative to welding or brazing when
- f. Mechanical fasteners are usually classified as
- g. Hole preparation in mechanical joining involves
- h. Self-tapping screws or bolts are often employed with because they do not require



5

Match the following sentence beginnings and ends.

- | | |
|--|--------------------------|
| a. Dielectric welding uses the breakdown of plastic | <input type="checkbox"/> |
| b. Hot-gas welding is a low-speed process during which a thermoplastic rod | <input type="checkbox"/> |
| c. Only stronger plastics are suitable for mechanical fastening since | <input type="checkbox"/> |
| d. In solvent bonding the plastic molecules mix together, and | <input type="checkbox"/> |
| e. Solvent-bonded parts must be pressed together for 10 to 30 sec before | <input type="checkbox"/> |
| f. Soldering and brazing and most adhesive bonding methods | <input type="checkbox"/> |
| g. Solders are commonly classified as soft and hard solders, | <input type="checkbox"/> |
| h. Soldering is an ancient technique that has been used practically | <input type="checkbox"/> |
| i. Both in soldering and brazing the filler metal distributes itself | <input type="checkbox"/> |
-
1. the joint must survive the strain of assembly, service load, and possible repeated use.
 2. the joined parts can be handled.
 3. under high voltages and frequencies (13 to 120 MHz) to produce dielectric heating and fuse the plastic.
 4. is heated with the parts to be joined until they soften and can be pushed together.
 5. as long as humans have been making items out of metal.
 6. depending upon their melting points and strengths.
 7. between the surfaces to be bonded by capillary action.
 8. the parts bond when the solvent evaporates.
 9. are usually defined as "liquid-solid" state processes.

UNIT 2 • SAFETY IN THE WORKPLACE



1

Complete the chart with the precautions on the right.

Precautions	Type of hazard	Initials	Pictogram
	Explosive	E	
	Extremely flammable	F+	
	Highly flammable	F	
	Oxidising	O	
	Very toxic	T+	
	Toxic	T	
	Harmful	Xn	
	Corrosive	C	
	Irritant	XI	
	Dangerous for the environment	N	

PRECAUTIONS

- Avoid contact with eyes and skin. Do not breathe vapours.
- Keep away from sources of heat, particularly sparks and flames.
- Do not discharge in the soil or emit in the air. Dispose of at suitable collection points.
- Avoid contact with skin, eyes and clothing. Do not breathe vapours.
- Avoid heat, bumps, frictions, fire, sparks, collision.
- Keep away from sources of heat, particularly sparks and flames.
- Avoid contact with the body and do not breathe vapours, as some substances may cause carcinogenic effects, genetic alterations and sterility. Do not misuse!
- Avoid contact with flammable substances. Serious risk of combustion, possible spread of non-extinguishable fires.



2

Quotes are often effective workplace safety reminders. First connect each of the following terms or expressions to its definition and then read the list of safety reminders below.

- | | | |
|--------------------|--------------------------|---|
| a. absence of mind | <input type="checkbox"/> | 1. To feel sorry for something bad or wrong that you did. |
| b. accident | <input type="checkbox"/> | 2. A country whose ruler is a king or a queen. |
| c. alert | <input type="checkbox"/> | 3. A mental condition. |
| d. alive | <input type="checkbox"/> | 4. The state of being protected from danger or harm. |
| e. aware | <input type="checkbox"/> | 5. Watchful and prompt to meet danger or emergency. |
| f. kingdom | <input type="checkbox"/> | 6. Lack of self-control. |
| g. prevent | <input type="checkbox"/> | 7. An event that occurs by chance. |
| h. repent | <input type="checkbox"/> | 8. Continuing to exist, not dead. |
| i. safety | <input type="checkbox"/> | 9. To keep something from happening. |
| j. state of mind | <input type="checkbox"/> | 10. Conscious, awake. |

- Alert today, alive tomorrow.
- Safety is a state of mind – accidents are absence of mind.
- Make safety a way of life.
- Is better to lose one minute in life... than to lose life in a minute.
- Your workplace is your kingdom. Make it a safe one.
- The safe way is the best tools.
- Ensuring the only way.
- Safety... yesterday, today and tomorrow.
- Life did not begin by accident. Don't end it as one.
- Prepare and prevent instead of repair and repent.
- Safety is a full-time job, don't make it a part-time practice.
- Safety is everybody's business.
- Be alert, be aware, be alive.

