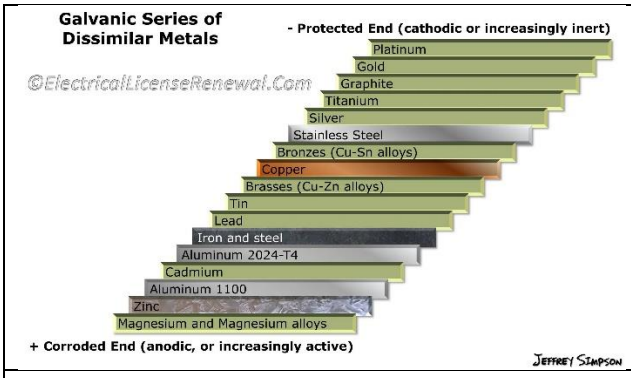
TIG (HELI-ARC) WELDING

11.1. Vocabulary

Ex. 1. *Match the words with their definitions.*

1. compressed shielding gas 	a. two or more types of metals that have different chemical compositions and properties being joined together in a weld.
2. bead	b. a non-consumable electrode used in TIG welding to create an electric arc for melting metal.
3. hand-fed	c. a manual feeding method where the filler metal is added by hand during welding.
4. tungsten electrode	d. locations that are difficult to reach with standard welding equipment due to limited space or obstacles.
5. amperage control pedal	e. the presence of unwanted substances or impurities in the weld zone that can weaken the final weld.
6. hard-to-access areas	f. a foot-operated device that allows welders to adjust the electrical current during welding.
7. weld puddle/pool	g. small, hot particles that are emitted during welding and can pose a safety hazard.
8. contamination	h. the molten metal created during the welding process before it solidifies into a joint.
9. dissimilar metals	i. a gas used to protect the weld area from atmospheric contamination during welding.

	
10. flying sparks	j. a raised line of deposited metal left after a pass of the welding torch.

Ex. 2. *Complete the sentences with the given words:*

compressed shielding gas, hard-to-access areas, flying sparks, weld puddle, hand-feed, amperage control pedal, dissimilar metals, tungsten electrode, bead, Contamination

The _____(1) is crucial for creating a stable arc in TIG welding.

Skilled welders use the _____(2) to precisely adjust their welding current.

The _____(3) protects the weld puddle from atmospheric contamination.

Welders may _____(4) the filler rod during intricate TIG welding tasks.

A skilled welder carefully manipulates the _____(5) to achieve strong weld joints.

The _____(6) created during TIG welding signifies a successfully completed weld.

_____(7) must be avoided at all costs for high-quality TIG welds.

Welders wear protective gear to shield themselves from _____(8) during TIG welding.

Experienced welders excel in reaching _____(9) when performing TIG welding.

When welding _____(10), proper techniques must be used to ensure a strong bond.

11.2. Reading

Ex. 1. *Read the text.*

TIG Welding

TIG welding (Tungsten Inert Gas) is a type of arc welding that uses a tungsten electrode to produce the weld. The weld area is protected from atmospheric contamination by a shielding gas, usually an inert gas such as argon. A constant-current welding power supply produces electrical energy, which is conducted across the arc through a column of highly ionized gas and metal vapors known as a plasma.

TIG welding is most commonly used to weld thin sections of stainless steel and light metals such as aluminum, magnesium, and copper alloys. The process grants the operator greater control over the weld than competing processes such as shielded metal arc welding and gas metal arc welding, allowing for stronger, higher quality welds. However, TIG welding is comparatively more complex and difficult to master and furthermore, it is significantly slower than most other welding techniques.

The main advantages of TIG welding are that it can be used to weld a wider range of materials and that it can be used in hard-to-reach areas. For example, the operator can hold the torch with one hand and add filler material to the weld pool with the other hand. This is why TIG welding is sometimes called "hand-fed" welding. The welder must keep the torch close enough to the weld puddle so that the filler rod can be easily fed into the weld puddle.

One of the most challenging aspects of TIG welding is maintaining the correct arc length. If the arc is too long, the weld puddle will not have enough heat and the weld bead will be weak. On the other hand, if the arc is too short, the tungsten electrode will become contaminated with molten metal and the weld bead will be porous and brittle. When the welder starts the arc, he or she must quickly dip the electrode into the weld

puddle and then lift it up slightly. This creates a small ball on the end of the electrode and allows the welder to maintain the correct arc length.

When TIG welding, it is important to wear protective clothing and a welding helmet to protect against flying sparks and ultraviolet radiation.

Ex. 2. *Answer the questions.*

1. What is TIG welding and how does it differ from other welding processes?

2. Which materials are commonly welded using TIG welding?

3. What advantages does TIG welding offer in terms of operator control?

4. Why is maintaining the correct arc length crucial in TIG welding?

5. How can an operator feed filler material into the weld pool during TIG welding?

6. What are some challenges associated with TIG welding compared to other welding techniques?

7. Why is it important for a welder to wear protective clothing and a welding helmet during TIG welding?

11.3. Communication

Ex. 1. *Make sentences using the following words:*

1. operate/welder
2. requires/hand/focus
3. protective/gear/safety
4. tried/welding/before
5. produces/results
6. materials/welded/TIG
7. uses/electrode/tungsten
8. adjusts/heat/settings
9. show/set/welder
10. used/automotive/repairs

Ex. 2. *Make question using the following words:*

1. explain/process/TIG

2. materials/joined/TIG
3. cleanliness/welding/area
4. safety/precautions/follow
5. preferred/thin/materials
6. advantages/using/TIG
7. machine/work/TIG
8. kind/gas/used
9. describe/appearance/weld
10. common/applications/TIG