

INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

First School Year

NON-CONVENTIONAL METHODS OF WELDING

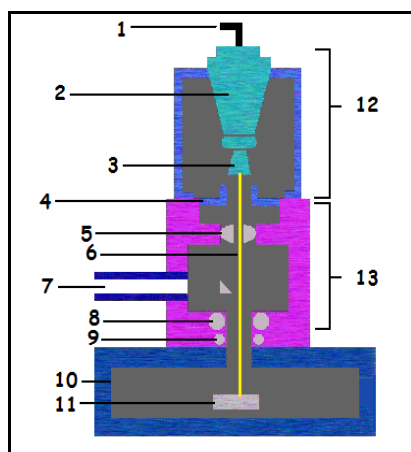
1. We use these methods for welding *poorly* or non-weldable materials.
2. We know the following *non-conventional* methods:

2.1 Welding using electronic beams

The principle of this method is using the kinetic energy of electrons. These electrons are *emitted* through a wolfram electrode placed in a vacuum *chamber*. The electrons are accelerated and after *impact* their energy changes to heat.

You can see equipment for this welding method in Picture 1.

Picture 1



- | | |
|-------------------------------|-----------------------------------|
| 1. <i>High voltage source</i> | 8. Magnetic <i>lens</i> |
| 2. Insulator | 9. <i>Deflecting coil</i> |
| 3. Wolfram cathode | 10. Working vacuum <i>chamber</i> |
| 4. Anode | 11. Welded part |
| 5. <i>Deflecting flap</i> | 12. Upper equipment part |
| 6. Electronic <i>beam</i> | 13. Lower equipment part |
| 7. Optics | |

2.2 Welding using a laser

The principle of the method is in a concentration of the electrical-magnetic radiation of visible light. This radiation is concentrated on a small surface to the weld point.

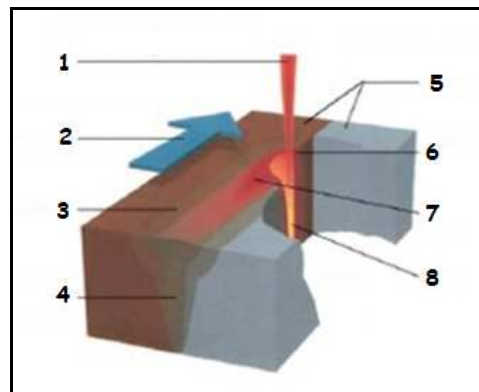
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This method is used for welding materials which are:

- not possible to weld by other methods
- for welding minimal thicknesses
- for welding materials with a high **melting** point

You can see a description of laser welding in Picture 2.

Picture 2



1. Laser **bundle**
2. Welding direction
3. Thermally affected area
4. **Melted** metal
5. Connected parts
6. Connection due to surface **tension**
7. **Molten** pool
8. **Keyhole**

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VOCABULARY

beam	paprsek
bundle	svazek
chamber	komora
coil	cívka
deflecting	odchylovací, vychylovací
emit	emitovat, vyzařovat
flap	klapka
high voltage source	zdroj vysokého napětí
impact	náraz
keyhole	klíčová dírka
lens	čočka
melted	roztavený
melting	tavení, tavba
molten	tavený, roztavený
non-conventional	nekonvenční
poorly	špatně
tension	napětí
thickness	tloušťka

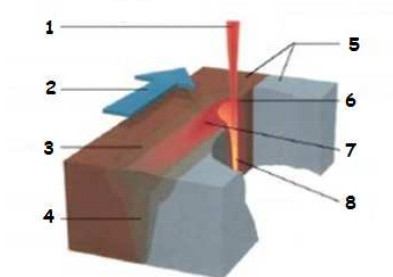
COMPREHENSION QUESTIONS

1. When do we use the non-conventional methods of welding?
2. What non-conventional methods of welding do you remember from the text?
3. Can you describe the principle of welding using a laser?

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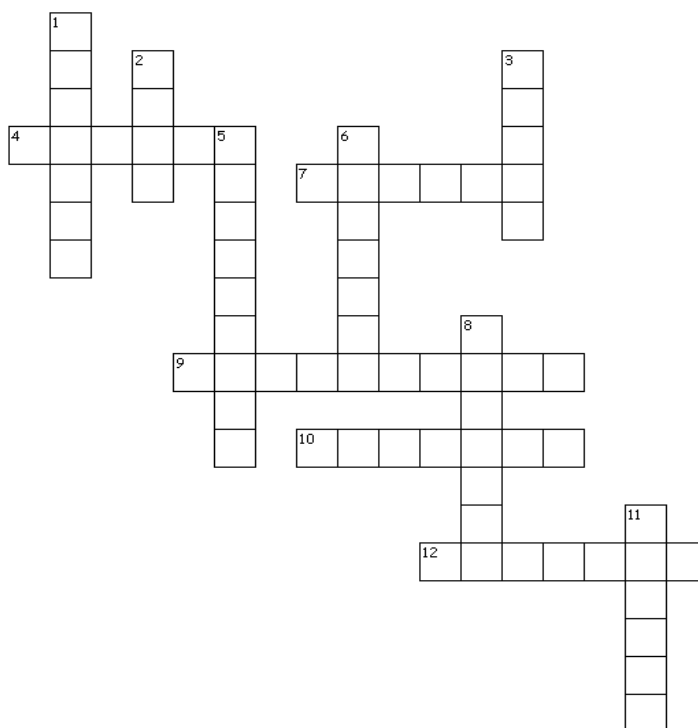
EXERCISES

1. Describe the picture – Welding using laser



- 1 _____
- 2 _____
- 3 _____
- 4 _____
- 5 _____
- 6 _____
- 7 _____
- 8 _____

2. Criss Cross puzzle - 12 words were placed into the puzzle.



Across

4. náraz
7. svazek
9. vychylovací
10. svařování
12. napětí

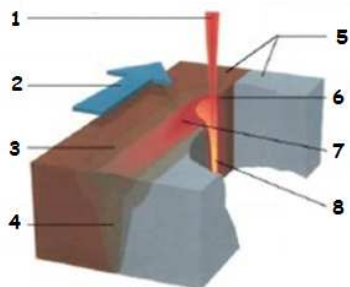
Down

1. komora
2. paprsek
3. spodní
5. tloušťka
6. povrch
8. viditelný
11. špatně

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EXERCISES – KEY FOR TEACHERS

1. Describe the picture



1. Laser **bundle**
2. Welding direction
3. Thermally affected area
4. Melted metal
5. Connected parts
6. Connection due to surface **tension**
7. **Molten** pool
8. **Keyhole**

2. Criss Cross Puzzle

Across

4. impact
7. bundle
9. deflecting
10. welding
12. tension

Down

1. chamber
2. beam
3. lower
5. thickness
6. surface
8. visible
11. poorly