

# The welding process:

## MMA

### Manual metal arc

#### How it works

The rod electrode is connected to one of the power source terminals via an electrode holder and welding power-lead. In order to close the circuit, the other terminal is attached to the workpiece using the return lead cable and the clamp. AC or DC can be used, although not all welding electrodes are compatible with alternating current.

#### Power source

The power source transforms high mains voltage into low welding voltage and adapts the parameters according to the welding task. Thanks to the drooping characteristic, the power sources can also be used for the TIG process.

#### Rod electrodes

The rod electrode consists of a core rod and coating. These protect the weld pool from the harmful ingress of air and stabilise the arc. In addition, a layer of slag accumulates that protects and shapes the weld seam. The electrode is an arc carrier and filler metal in one.

**Rutile electrodes** are easy to weld and produce an attractive, flat seam. The slag can be removed easily, material is transferred in the form of fine droplets.

### The Process

After turning on the power source, the arc is ignited by bringing the rod electrode into contact with the workpiece. It burns between the rod electrode and the workpiece and thus creates the necessary heat of fusion and weld seam. The protective slag and gas shroud are created by the consumable core wire and the consumable coating of the electrode.

**ISO 4063 111**

**Basic electrodes** are more difficult to weld and produce a small amount of weld seam crowning. Material is transferred in the form of large droplets. Used for higher-quality joints.

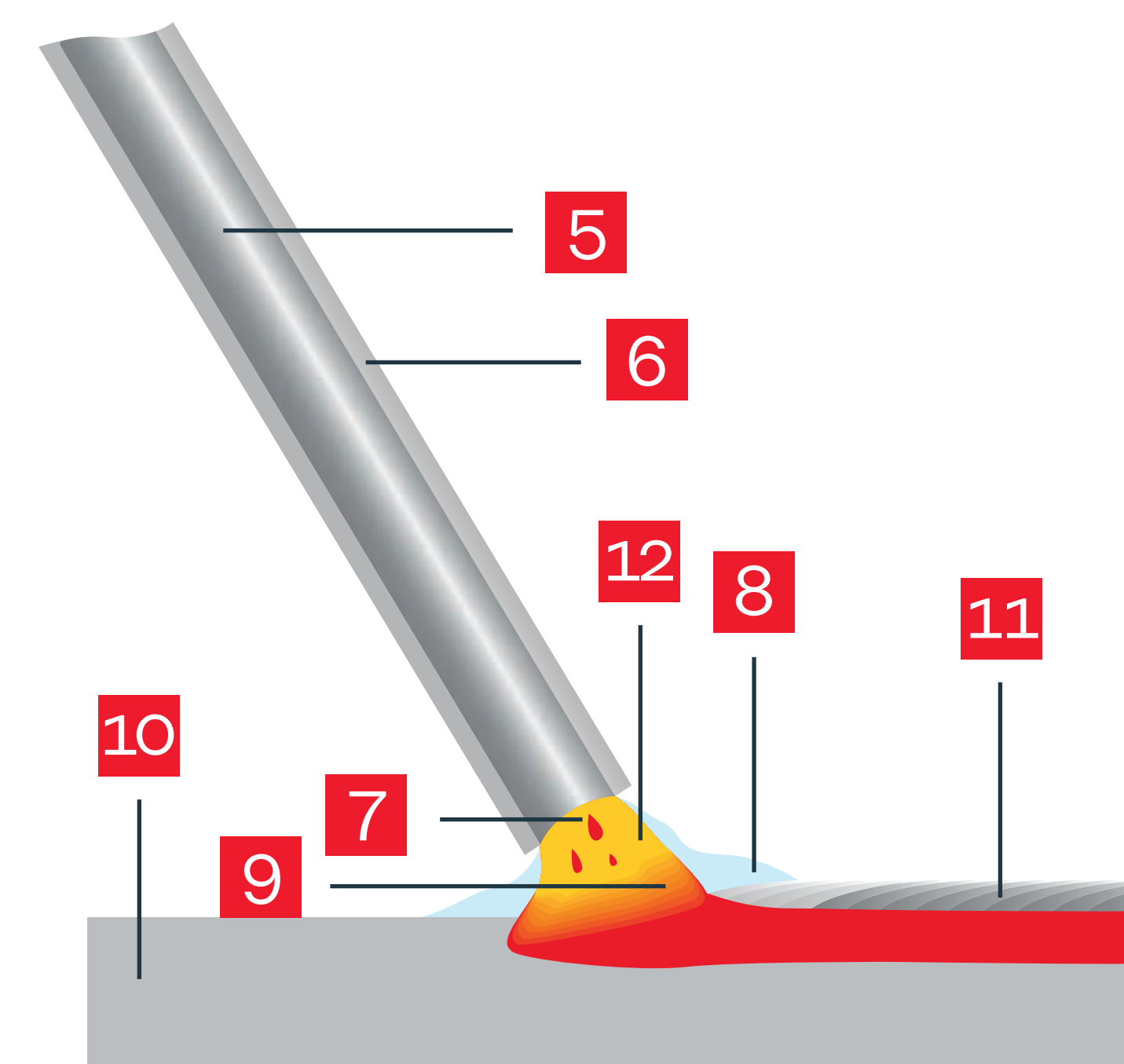
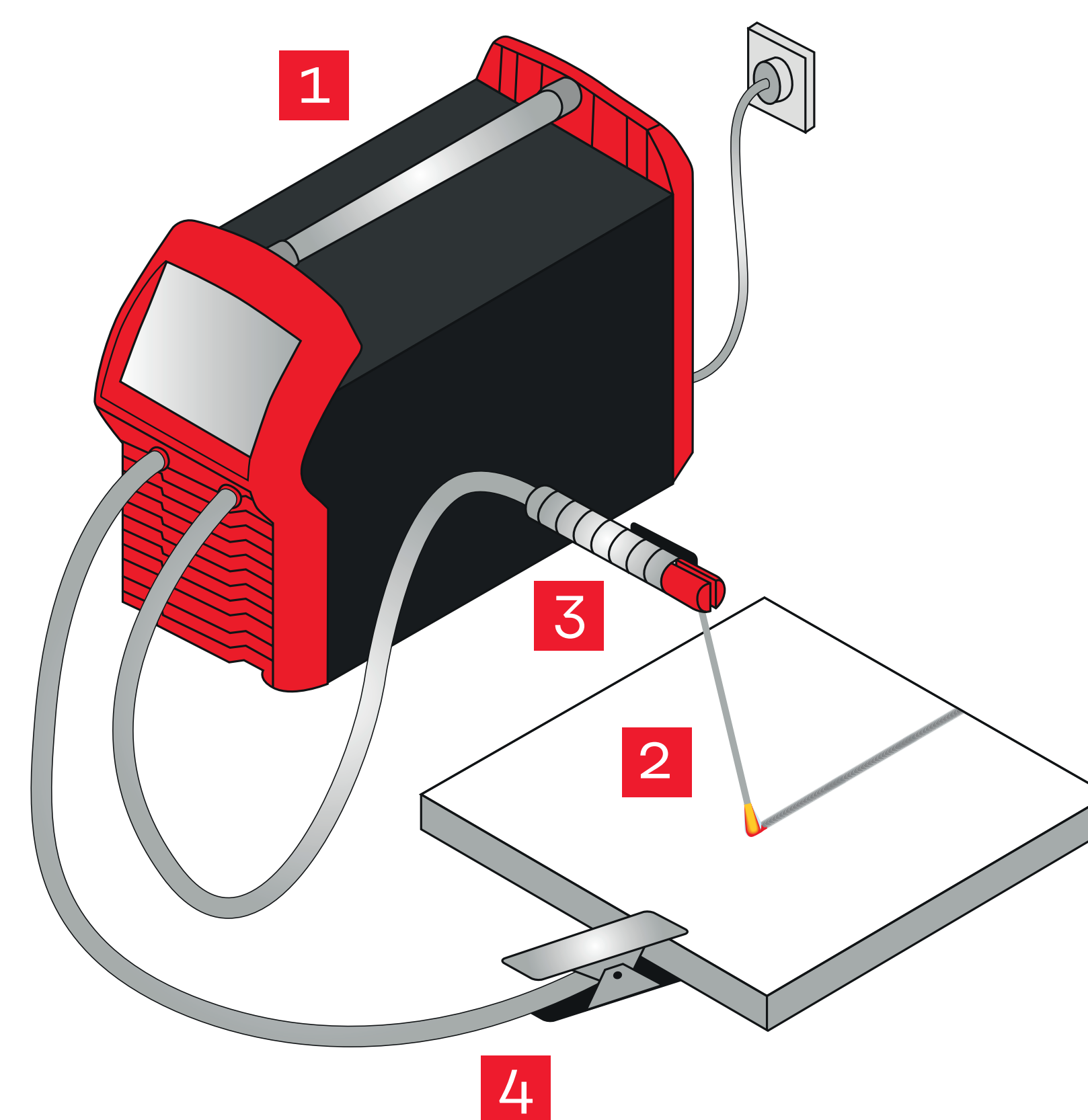
**Cellulose electrodes** can be welded in all positions, have deep penetration and good mechanical properties.

#### Advantages

- Can weld almost all metallic materials
- Easy to use
- Low purchase costs
- Weld seam is protected by slag formation
- Relatively unaffected by contamination
- High-quality weld seam and mechanical properties

#### Application areas

- Steel and pipeline construction
- Assembly areas, workshops and construction sites
- Also yields good results outside and underwater



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|--|---------------------|
| 1 Power source                             | 7 Metal droplets    |
| 2 Rod electrode                            | 8 Gas shroud        |
| 3 Welding power-lead with electrode holder | 9 Liquid weld metal |
| 4 Return lead cable                        | 10 Workpiece        |
| 5 Core                                     | 11 Solidified slag  |
| 6 Coating                                  | 12 Arc              |

