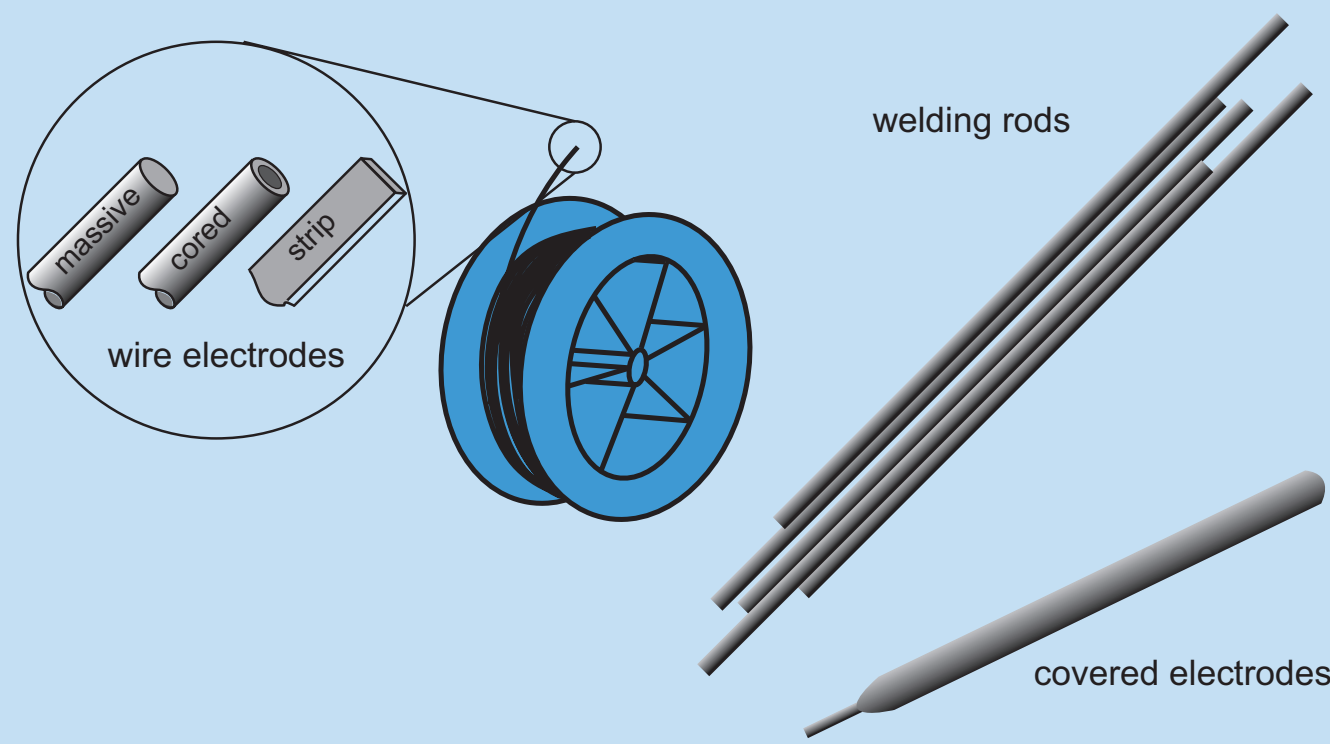


## Welding Consumables

Welding consumables are products that become molten during welding and flow together with the molten base material. Thereby they contribute to the formation of the weld (joint welding) or the coating (surfacing). They significantly determine the properties of the weld such as strength, deformation capacity and corrosion resistance. When joint welding, the deposited weld metal usually has the same properties (such as strength, ductility, strain) as the base material due to the welding consumable that was used. When surfacing, the deposited weld metal often has different properties than the base material (such as higher hardness, wear resistance, corrosion resistance).

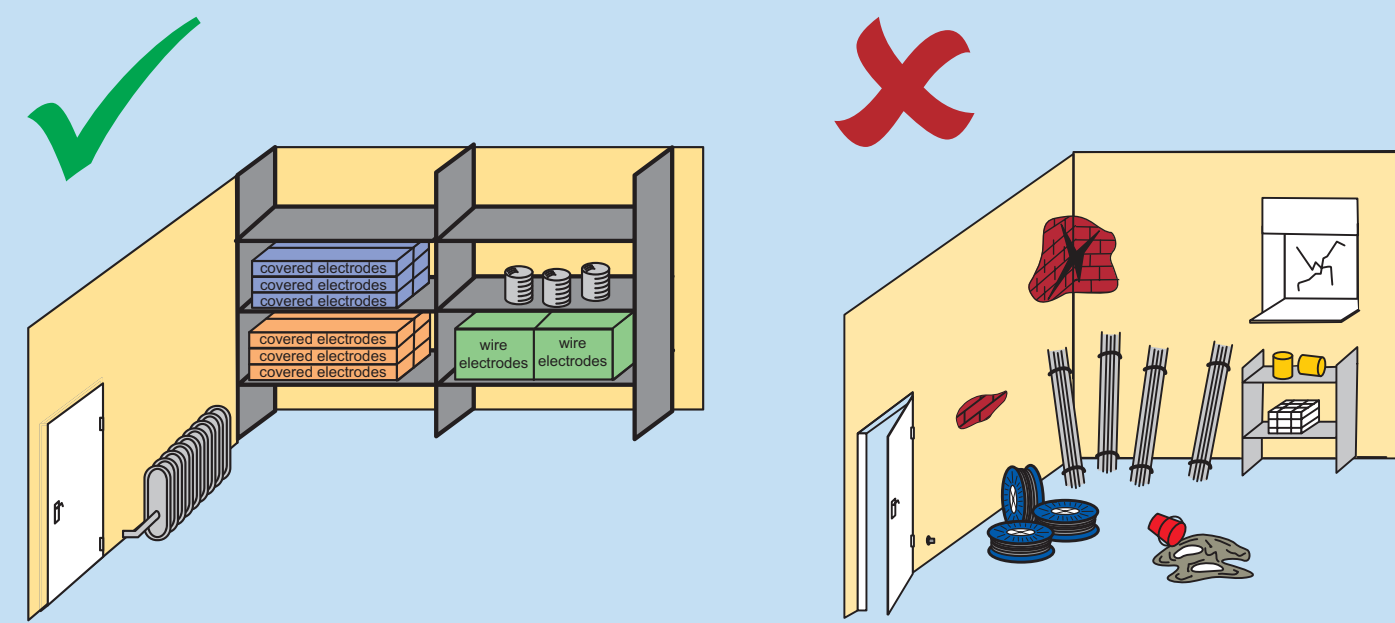
### Product geometry

Solid wires are used most frequently, either in the shape of welding rods and covered electrodes or as quasi-endless wire electrodes. A variant are strip electrodes with their rectangular cross-section that are often used for surfacing. Quite a complex product form of their own are cored wires. They consist of a metallic mantle with powder filling. With some welding processes loose powder is used as a filler.



### Proper storage

Welding consumables have to be stored in such a way that their temperature never falls below the dew point during the whole storage time. This can be achieved by keeping the room temperature above 15° C and the relative humidity below 50 %. Pay heed that the original packing remains undamaged. When withdrawing stock, the product with the oldest production-date must be used first (FIFO). Consumables that were not used up must be wrapped again for storage. Basic covered electrodes for example must be re-dried according to the manufacturer's specifications before using.



### Designation examples

**wire electrode GMAW and pure weld metal** ISO 14341-A-G 46 5 M21 3Si1

standard \_\_\_\_\_  
 welding process (gas shielded metal arc welding) \_\_\_\_\_  
 mechanical properties of the pure weld metal (min. yield strength 460 N/mm<sup>2</sup>, tensile strength 530-680 N/mm<sup>2</sup>, min. strain at break 20 %) \_\_\_\_\_  
 impact energy (47 J bei -50 °C) \_\_\_\_\_  
 shielding gas (gas mix M21) \_\_\_\_\_  
 chemical composition (in %: C 0,06-0,14 Si 0,7-1,0 Mn 1,3-1,6 Ni 0,15 Mo 0,15 Al 0,02 Ti and Zr 0,15)

**high alloy welding rod TIG** ISO 14343-A-W 18 8 Mn

standard \_\_\_\_\_  
 welding process (tungsten inert-gas welding) \_\_\_\_\_  
 chemical composition (18: 17-20% Cr, 8: 7-10% Ni, 5-8% Mn)

**self shielding flux-cored wire and pure weld metal** ISO 17632-A-T 38 3 W 1 H10

standard \_\_\_\_\_  
 product type (cored wire) \_\_\_\_\_  
 mechanical properties of the pure weld metal (min. yield strength 380 N/mm<sup>2</sup>, tensile strength 470-600 N/mm<sup>2</sup>, min. strain at break 20 %) \_\_\_\_\_  
 impact energy (47 J bei -30 °C) \_\_\_\_\_  
 type of core (W: basic/fluoride, slow freezing slag) \_\_\_\_\_  
 welding positions (1: all positions) \_\_\_\_\_  
 hydrogen content \_\_\_\_\_

### Selection

The choice the right consumable for a welding task depends on the base material to be welded and on the welding process that is used. Consumables are described by international or European standards. Among other things, the standardized designations of consumables are explained in these regulations. The designations consist of various codes and figures that explain for example the chemical composition of the consumable and the mechanical properties of a pure weld metal that was produced with this filler.

Most manufacturers use brand names for their products. The designation according to the particular standard is also given on the packaging. The standardized designation gives information about the properties and facilitates the comparison of different products.

### Marking on the packaging

#### Wire electrode

„brand name“ designation(s): ISO 14341-A-G3Si1  
 AWS A5.18: ER 70 S-6

wire electrode for GMAW of unalloyed and low-alloy steel

Ø 1,0 15 kg

approvals: TÜV, GL, DB

standardized designation, here: international and american standard

remarks of the manufacturer about usability and welding properties

diameter in mm and weight of wire

approvals for the legally regulated section

symbolic representation of applicable welding positions

current and polarity here: DC with electrode as plus-pole

#### Stick electrode

„brand name“ designation(s): ISO 2560-A-E 42 0 RR 12  
 AWS A5.1: E6013

rutill covered electrode for MMA welding of mild steel in all welding positions

Ø 2,0 x 250

ampere 45 - 65

approvals: TÜV, GL, DB

standardized designation, here: international and american standard

remarks of the manufacturer about usability and welding properties

range of welding current

dimensions in mm

approvals for the legally regulated section

symbolic representation of applicable welding positions

current and polarity here: DC with electrode as negative-pole or AC

### Standardization of consumables

type of base material	welding processes and welding consumables					
	gas shielded metal arc welding wire electrodes	tungsten inert gas welding welding rods	submerged arc welding wire electrodes	manual metal arc welding covered electrodes	cored electrodes	gas welding welding rods
unalloyed steel, fine grained steel	EN ISO 14341	EN ISO 636	EN ISO 14171	EN ISO 2560	EN ISO 17632	EN 12536
heat resistant steel	EN ISO 21952		EN ISO 24598	EN ISO 3580	EN ISO 17634	EN 12536
high-strength steel	EN ISO 16834		EN ISO 26304	EN ISO 18275	EN ISO 18276	-
stainless steel		EN ISO 14343		EN ISO 3581	EN ISO 17633	-
nickel and its alloys		EN ISO 18274		EN ISO 14172	EN ISO 12153	-
aluminum and its alloys	EN ISO 18273		-	-	-	-
copper and its alloys	EN ISO 24373		-	-	-	-
titanium and its alloys	EN ISO 24034		-	-	-	-

