



**HIGH EFFECTIVE COMPOSITE WELDING WIRE: TECHNOLOGY OF  
MANUFACTURE AND PROPERTIES**



- Developed a new approach to designing of wide range of the composite welding wire with usage of unified matrix
- Untraditional method for enter of various microalloying and flux additions was mastered which foresees to put of additions in axes symmetric cavity into a center of wire

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- It is achieved the high level of microalloying and modifying effect to welds' metal by additions of the active elements (zirconium, titanium, rare earth elements, vanadium, niobium etc) were entered by wire directly in the welding pool



- Composite welding wire manufacture by high-productive metallurgical methods provides the comparative low prime cost (the same for usual wire with similar systems of microalloying).

- Principle of the use of unified matrix allows us to produce a wide range of various wire without the change of technology of their melting.

It is perspective the manufacture of the self shielded welding wire, allowing to obtaine the high-quality welded joint at the automatic welding without the usage of shielded gases.

**PROPERTIES OF THE MICROALLOYED COMPOSITE WELDING WIRE**

Commercial manufacture of two brands of the microalloyed composite welding wires with SG2 matrix were made.

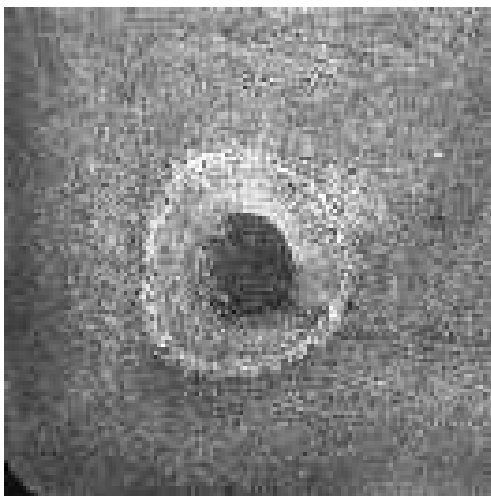
Base composition:

C	Mn	Si	S	P
0.05-0.11	1.8-2.1	0.7-0.95	≤0.02	≤ 0.02

Microalloying additions in an amount 0.02-0.2% mass: zirconium or rare earth metals.

**MICROALLOYED BY REE AND BY ZIRCONIUM WIRES PROVIDED:**

- high stability of process at MIG/MAG welding;
- spattering (including melting losses) no more than 3-7%;
- increasing of welding productivity (on 15-20% compare to SG2);
- modifying effect (structure dispersion and mechanical properties increase) of welds' metal.



**An economic effect appears due to reduce:**

- of ferroalloys losses (consumption) in metallurgical production;
- of welding works costs due to providing of the high properties of welds because low cost of wire and diminishment of its consumption (minimization of spattering and melting loses) for wire consumers.