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At present, there is a need to solve a lot of production problems related to welding materials. Many companies use mixtures based on argon as a shielding gas, but most of welding materials are intended for welding in carbon dioxide. There is not enough information about using cheaper welding wires with a low content of deoxidizers for welding in gas mixtures. It lowers the cost of welding consumables very much.

The arc burns between the work piece and the wire that is melted and fed into the weld zone. To obtain a quality weld, the molten metal must be protected. For this purpose the shielding gas is fed into the weld zone through a nozzle of an arc welding torch. It displaces the air and creates the necessary conditions for the welding arc. The most common protective gas is carbon dioxide. This gas is rather cheap and is now widely used for welding.

The advantages of gas mixtures in comparison with carbon dioxide are well known: the best form and appearance of the weld, low spatter, reduced labor and welding costs. However, most enterprises do not use advantages of gas mixtures in comparison with welding in carbon dioxide.

A number of experiments were carried out to determine the possibility of using a wire with a low content of deoxidizers. We chose Charpy impact test of the weld metal at different temperatures to compare mechanical properties of welded joints with the use of wires having different chemical composition. The specimens were tested on the pendulum, which is presented on this slide. The mechanical properties of welded joints such as toughness and character of fracture were determined. We used the liquid carbon dioxide in the special chamber. This allowed controlling temperature and maintaining it at a constant level.

The welded joints obtained by using proposed welding wires with a lower content of deoxidizers have an area of viscous fiber in the fracture which is significantly larger than that of the specimens obtained by using the traditional type of wire, even at the lowest temperatures of the tests. This suggests that the transformation of weld metal to the brittle state occurs at lower temperatures, which extends the application of such welded joints.

The experimental research showed that the use of wires with a low content of deoxidizers while welding in mixtures based on argon not only reduces the cost of welding consumables, but also improves the values of strength properties of welded joints.