

Original Magnetizing Systems for ROTARC Welding

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ABSTRACT

The rotating arc welding of the pipes (ROTARC) use a rotating electric arc for heating the extremities of two pipes, which turns due to the electromagnetic force created between the arc column (which is equivalent to a non-fixed wire through which an electric current passes along an axial direction) and a magnetic field having a constant intensity conducted along the radial direction.

Within the "Pressure Welding Technologies" laboratory in "Dunărea de Jos" University - Galați both magnetising systems have been manufactured and tested, redesigned and experimented for several variants and original technical solutions have been found.

First the work presents the principle of ROTARC welding and several original equipment developed by the team. Then, a classic longitudinal magnetising system and some results and conclusions of the experiments are presented. It is pointed out the classic displacement of the arc into the gap between the extremities; the only obvious disadvantage of this magnetising system is the pull out of the pipes into the fixing systems, which is only possible along the axial direction.

The results lead to the conclusions that the transversal magnetising systems present both constructive and practical utility problems. The lateral displacement of the system against the gap is not enough due to the low value of the magnetic field. Beside the doubling of the transversal system (the symmetrical left-right arrangement against the gap) it is also necessary: to increase the magnetising current; and the number of the coil turns or to decrease the shunt magnetic fields through the fixing system which forms the support of the magnetising system. The solution is to use diamagnetic materials.

The systems were designed, developed and experimented in the laboratories of the "Robotics and Welding Department", the Faculty of Mechanical Engineering of "Dunarea de Jos" University from Galați - ROMÂNIA. Appropriate conclusions are drawn at the end of the paper.

References

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