

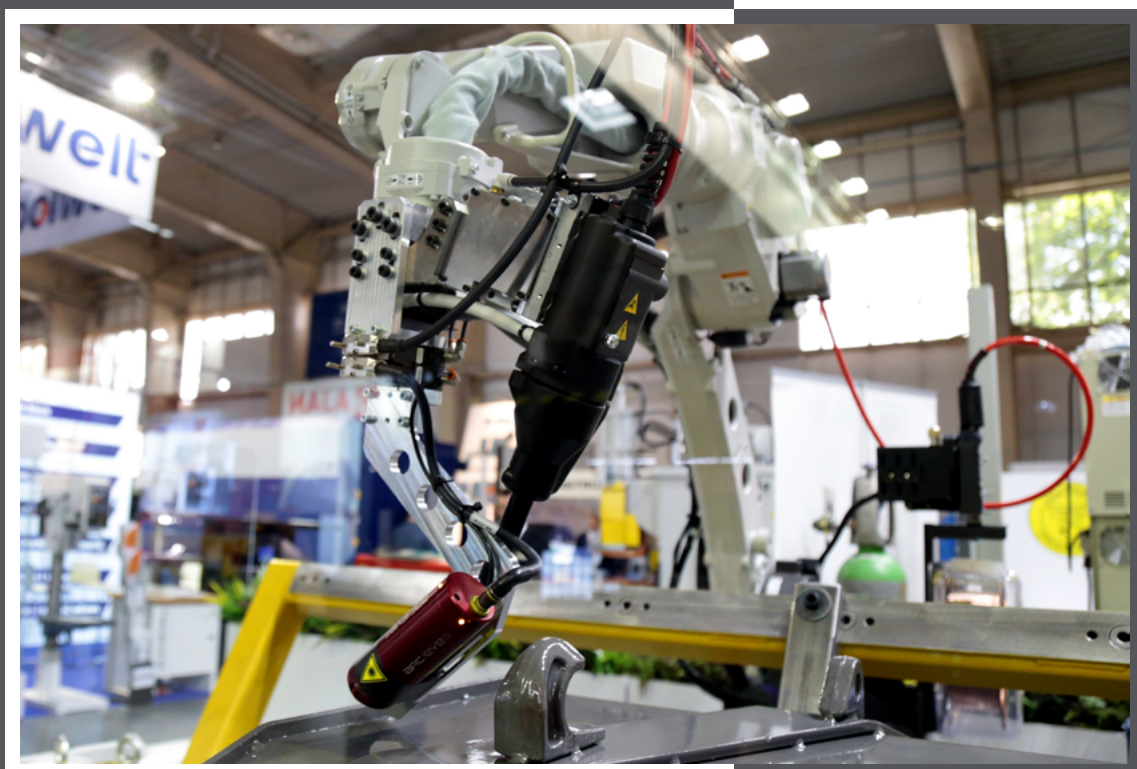
BIULETYN INSTYTUTU SPAWALNICTWA

BULLETIN

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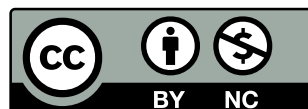
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BIMONTHLY

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The International Institute of Welding
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Summaries of the articles

Aleksander Lisiecki, Zbigniew Rokita, Dariusz Ginalski, Andrzej Kośny, Wojciech Pakieła - Laser Welding of Ferritic Stainless Steel 1.4509 Used in the Manufacturing of Catalyst Housings and Diesel Particulate Filters

DOI: [10.17729/ebis.2022.3/1](https://doi.org/10.17729/ebis.2022.3/1)

The article discusses the results of tests as well as quality assessments of test joints made of tubes having a nominal thickness of 1.5 mm, a rectangular cross-section and a width of 140 mm and a length of 240 mm, made of ferritic stainless steel grade 1.4509 with the addition of microagents and used in the production of catalyst housings and diesel particulate filters. Test joints were made using a prototype line equipped with a TruDisk 2002 disk laser (TRUMPF) at a ROCH production plant in Tarnowskie Góry. The tests involved the preparation of an experimental batch of tubes. The tubes used in the tests were subjected to various procedures, i.e. only to laser welding (5 specimens), to the rolling of the weld surface after laser welding (5 specimens) and to the additional heat treatment of the joint area after welding (5 specimens). Most of the test welded joints represented high quality level B and were characterised by tensile strength not lower than that of the base material as well as by high plasticity confirmed in the Erichsen cupping test. However, slight undercuts of the weld root revealed in the tests indicated the risk of the partial lack of penetration or the formation of excessive undercuts in the production process. The foregoing necessitates the strict application of the welding procedure and, in particular, the ensuring of the high precision of laser beam positioning and accuracy when preparing sheet edges before welding.

Andrzej Wójtowicz, Patrycja Janiak, Santina Topolska - Testing the Quality of Welded Joints in Thick-Walled Pipes Used in the Power Industry

DOI: [10.17729/ebis.2022.3/2](https://doi.org/10.17729/ebis.2022.3/2)

The article discusses tests concerning the quality of joints in relation to the service life of thick-walled pipes made of steel P355NH using the TIG welding method (141) and filler metal alloy grade SNI6625 (Inconel 625). Because of its mechanical properties, corrosion resistance and high-temperature resistance, the above-named material is commonly used in various industries. The test joints were subjected to structural, non-destructive and corrosion resistance-related tests.

Antoni Sawicki - Modelling of Electric Processes in Circuits of Arc Plasma Torches. Part 2. Dynamic States in Circuits with Single-Phase Plasma Torches

DOI: [10.17729/ebis.2022.3/3](https://doi.org/10.17729/ebis.2022.3/3)

The article discusses modified formulas identifying static current-voltage characteristics of arc in AC plasma torches. The modified formulas, making it possible take into account preset values of discharge ignition voltage, were used in the Mayr-Pentegov universal mathematical model. As a result, it was possible to simulate the operation of additional ionising and stabilising systems, commonly used in AC plasma torches. The article also presents results of numerical simulations concerning processes taking place in electric circuits with single-phase plasma torches of various operating parameters.

Agnieszka Kurc-Lisiecka, Aleksander Lisiecki - Laser Welding of High-Strength Steel S960QL

DOI: [10.17729/ebis.2022.3/4](https://doi.org/10.17729/ebis.2022.3/4)

The article discusses the results of tests concerning the effect of parameters used during the

basic bead-on-plate laser welding (i.e. location of the laser beam focus, welding rate and linear welding energy) of 4.0 mm thick sheets made of high-strength steel S960QL on the quality and properties of simulated butt joints. The welding tests were performed using a YAG TruDisk 3302 Yb disk laser (TRUMPF) having a maximum output power of 3.3 kW and provided with a head focusing the laser beam spot to a

diameter of 200 μm . The simulated butt welded joints were made without the filler metal, using a technique which consisted in the laser beam melting of sheets. Macroscopic and microscopic tests as well as impact strength tests, fractographic tests and microhardness measurements involved the cross-section of the simulated specimens.

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