

Overview on the Industrial Brazing

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Abstract

An overview of the state-of-art in research and industrial implementation of the innovative brazing of the thin plates, underscoring details of the experimental procedures, setups and results is targeted. Comparative analysis of the conclusions of various researches is aimed, as too.

MIG Brazing (MIGB) started to be tested and industrially implemented (mainly in the automotive industry for galvanised steel plates), as well as other (hybrid) Brazing variants, namely AC-MIGB, LASER Brazing, LASER - MIGB, Plasma Brazing being meant to replace the MIG Welding, which usually introduces too much heat in the joint during the welding process.

Due to the actual trend, which requires a wider use of innovative brazing processes in various manufacturing processes of similar and dissimilar metallic and non-metallic materials, the paper aims at contributing to underscore the main features of the innovative brazing procedures, mainly targeting the optimisation of the technological factors, with the assurance of all the quality indicators of the joint. Final conclusions regarding the further trends in new brazing technologies, research and industrial applications are presented.

REFERENCES

1. Dilthey, U., Höcker, F., Latest Developments and Applications of GMA Brazing, The 57th International Conference of IIW - Osaka, 15-16 July, 2004, CONF-2004-04, ISBN 4-906110 46-6, p. 31-41.
2. Dilthey, U., Stein, L., The 57th International Conference of IIW - Osaka, 15-16 July 2004, CONF-2004-03, ISBN 4-906110 46-6, p. 19-30.
3. Matsui, H., Technical Trends and Future Prospectives of the Arc Welding in Chassis Parts, The 57th International Conference of IIW - Osaka, 15-16 July, 2004, ISBN 4-906110 46-6, p. 07-17.
4. Larsson, J.K., Overview of joining technologies in the automotive industry, Welding in World, p. 233-249, Volvo Car Corp., IIW doc. CONF-2002-20 & CONF-2002-D1.
5. Dilthey, U. Bachem, H. GMA-Brazing of Galvanised and Alloyed Steels- an alternative joining technology in vehicle construction, IIW-Doc. XII-1630-00. 2000.
6. Dilthey, U., Increased Productivity by GMA Tandem Welding and Brazing and by Laser GMA Hybrid Welding, Gas metal arc welding for the 21th century, Proc. AWS, Dec. 6-8, 2000, Orlando, Fl. ISBN 0-87171-649-6, S. 133-143.
7. Staufer, H., Laser hybrid welding and laser brazing: State of the art on technology and practice by the examples of the Audi A8 and VW-Phaeton, Fronius international GmbH, Proc. 56th IIW International Conference (2003), IIW Doc. XII-1777-03.
8. Nakata K., Tanaka M., Takao S., Ueyama T., Yazawa I., Nakano T., Koshiishi F., Chen L., Hybrid LASER-MAG welding of galvanized steel sheets, Osaka 2004, IIW doc. XII-1820-04.
9. Tomita N., Ueyama T., Hasegawa S., Yasufuku T., Ueda Y., Development of Laser-Arc Hybrid Welding robot system, Osaka 2004, IIW doc. XII-1791-04.
10. Miyazawa Y., Namekata T., Miyamoto Y., Ariga T., Fabrication of stainless steel heat exchanger by using brazing technology, The 57th International Conference of IIW - Osaka, 15-16 July 2004, p. 392-399, CONF-2004-45.

11. Miyazawa Y., Watanabe K., Shirai M., Fukushima A., Ariga T., Fillet formability for brazing of H-II A rocket engine nozzle skirt, The 57th International Conference of IIW - Osaka, 15-16 July 2004, p. 533-538, CONF-2004-67.
12. Joseph, A., Webb, C., Haramia, M. and Yapp, D., Variable Polarity (AC) Arc Weld
13. Brazing of Galvanized Sheets, Proc. 56th IIW Annual Assembly (2003), IIW Doc. XII-1779-03.
14. Dilthey U., GMA-brazing of coated steel plates - An alternative joining technology, ISF, University of Aachen, 2003, IIW Doc. XII-1780-03
15. Ebbinghaus, M., Hackl, H., Lahnsteiner, R., MIG brazing of galvanised sheet metals and profiles, San Francisco, 1997, p. 121-137, IIW doc. XII-1501-97.
16. Rohde, H., Katic, J. and Paschold, R. (ESAB GmbH, Solingen), ESAB pulsed gas-shielded metal arc brazing of surface-coated sheets, Svetsaren, nr. 3, (2000), p. 20-23.
17. Kersche, A. and Trube, S. (Linde AG, Linde Gas Division, Hoellriegelskreuth), Shielding Gases for Gas-shielded Metal Arc Brazing, Lecture at "Thin Sheet Metal Conference", SLV Munich, 28th March (2000), Special edition, Nr. 50/02 (2002).
18. Hackl, H., MIG brazing of galvanised light-gauge sheets, Fronius International GmbH, 2001 International Conference, Ljubljana, 12 July 2001, publ. in Welding in the World, July 2001, vol. 45, special issue, pp. 57-63, IIW doc. CONF-2001-05.
19. Opderbecke, T., Fortain, J.M., New solutions for thin-sheet welding on galvanized sheet metal in automobile construction by arc weld-brazing and welding, Air Liquide CTAS, Cergy-Pontoise, France, 2002, internal report.
20. Hedegard, J.1, Nerman, P.1, Anderson, J.1, Tolf, E.1 and Ohman, E.2 (1SIMR Joining Technology Centre and KTH Brinell Centre; 2KTH; Sweden), High quality joining of galvanised steels, JOM 11 International Conference, Helsingør, Denmark (2003).
21. Iordachescu, D., Quintino, L., Extreme Procedures for MIG Brazing of 0.8mm Zinc Coated Automotive Plates, The 57th International Conference of IIW - Osaka, 15-16 July 2004, pp. 300-307, IIW doc. CONF-2004-32, ISBN 4-906110 46-6
22. LEPISTÖ J.S., MARQUIS G.B., MIG brazing as a means of fatigue life improvement, Osaka, 2004, XIII-2013-04.
23. Iordachescu, D., Quintino, L., Duarte, J., Metal Transfer Modes in Automate MIG Brazing, EWF International Conference EUROJOIN 5, 13-15 May 2004, Vienna, Austria
24. Iordachescu, D., Quintino, L., Contributions to the Classification of the Metal Transfer in Arc Welding, Osaka, 12-14 July, 2004, IIW doc. No.XII-1798-04
25. Murakami t., Nakata, K., Tong, H., Ushio, M., Dissimilar Metal Joining of Aluminium to Steel by Lap Joint MIG Arc Brazing Using Flux Cored Wire, Proc. 56th IIW International Conference (2003), IIW Doc. XII-1768-03
26. Draugelates, U., Bouaifi, B., Helmich, A., Ouaissa, B., Bartzsch, J., Plasma arc brazing: a low-energy joining technique for sheet metal, Welding Journal. Vol. 81, no. 3, pp. 38-42. Mar. 2002
27. Bouaifi, B., Ouaissa, B., Tuchtfeld, J., Ait-Mekideche, A., Radscheit, C., Plasma brazing of galvanised [steel] sheet - situation and developmental trends in car body building, DVS Berichte, no.204. Welding and Cutting '99, Proceedings, Welding Conference, Weimer; 15-17 Sept. 1999.