

WELDING GALVANIZED STEEL – SAFELY – CMT WELDING CASE STUDY

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Zinc protects the steel by acting as a "sacrificial layer". If, for some reason, rust does take hold on the surface of galvanized steel, the zinc will get corroded first. This allows the zinc that is spread over the breach or scratch to prevent rust from reaching the steel.

The degree of galvanizing is usually represented as the zinc's weight per surface area rather than the thickness of the zinc, because this gives a better representation of how much metal has been applied. Steel often gets galvanized after individual parts have been formed, such as braces, nails, screws, beams, or studs. However, raw galvanized steel in sheets will withstand some bending and forming without flaking.

Metal fume fever is illness caused primarily by exposure to certain metal fumes. Chemicals such as zinc oxide often cause this through breathing fumes created by heating or welding certain metals, such as galvanized steel.

The symptoms are nonspecific but are generally flu-like including fever, chills, nausea, headache, fatigue, muscle aches, and joint pains.

The difference between welding galvanized steel and welding uncoated steel is a result of the low vaporization temperature of the zinc coating. The vaporized zinc increases the volume of welding smoke and fumes.

As the CMT process functions with less heat input, it almost incidentally has another, added advantage: lower pollutant emissions. As shown by numerous test results, the concentrations of pollutant investigated in CMT brazing are far below those encountered in MIG brazing – nearly 90% less copper fumes and as much as 63% less zinc than with conventional dip-transfer arc technology.

Bibliography

- [1] BRUCKNER, J., HACKL, H.: *Der Cold Metal Transfer (CMT)*, Proceeding, 10. International Aachener Schweißtechnik Kolloquium, Schweißtechnik und Fügetechnik, 24-25.10.2007, Aachen, pp.477-490
- [3] GOLDFRANK, L.R.: *Goldfrank's toxicologic emergencies*, 8-th Ed. New York, 2006, ISBN 13 978-0-07-143763-9
- [7] MITSUAKI, T. and KAZUMASA, N.: *Welding and galvanized steel sheet and aluminum alloy using CMT welding*, PRESS WORKING, JAPAN, 2007, p. 62-69
- [8] PEKKARI, B.: *Awareness of hygiene, security and environment welding*, SOUDER, ISSN 0246-1900, vol.24, nr. 5, 1999, pp. 18-27
- [9] POPESCU, M., MAGDA, A., MOCUTA, G.E., DEMIAN, C., PERIANU, I.A., *Comparative approach of MIG/MAG brazing and CMT galvanized steel joining processes for automotive applications*, Scientific Bulletin of the „POLITEHNICA” University of Timișoara, Romania, Transactions on MECHANICS, 2008, Tom 53 (67), Fasc. 2, p.62-67, ISSN 1224-6077