



POBOLJŠANI PROCESI ZAVARIVANJA PRIMJENOM "BIOTEC" FLUIDA

ENHANCED WELDING PROCESSES THROUGH BIOTEC FLUIDS

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Ključne riječi: sprej protiv prskotina, kontaktna maziva za žicu za zavarivanje, "biotec" fluid

Key words: anti-spatter spray, welding wire contact lubricant, biotec fluids

Sažetak:

Zaštita površine radnog komada se provodi gdje je:

- potrebna zaštita od prskotina
- postoje kriteriji, koristi, ekonomski aspekti i kritične točke za primjenu fluida protiv prskotina
- postoje aspekti procesa od zavarivanja do čišćenja i oblaganja
- radi sigurnosti i održivosti.

Kontaktna maziva za žicu za zavarivanje:

- Povećavaju stabilnost procesa kroz redukciju otpora dobavi žice
- Sprječavaju greške paljenja.

Abstract:

Work piece surface protection

- where and why is spatter protection needed
- criteria for anti-spatter fluids, benefits, economical aspects and critical points
- process aspects from welding to cleaning and coating
- safety and sustainability

Welding wire contact lubricant

- Enhanced process stability through reduced wire feeding resistance
- Avoiding ignition faults.

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1. WORKPIECE SURFACE PROTECTION IN WELDING PROCESSES

Anti-spatter spray is a product that originally was developed to protect torches against spatter. Increasing demands on productivity and surface quality have tempted the industry to use these sprays for workpiece protection – a great idea but the wrong product. Traditional anti-spatter sprays have often led to coating errors and also frequently pose a certain safety risk. PROTEC is embarking on a new path with bio anti-spatter fluids that provide process stability as well as safety for the user and the environment.

More and more metal working companies are discovering the enormous potential of protecting workpieces against welding spatter. Rework can be prevented by wetting the surface with an appropriate anti-spatter agent beforehand. Why waste precious time clearing away spatter when you merely achieve, at best, the initial surface quality you had before welding.



Figure 1. Example of zinc coating faults

Criteria for anti-spatter sprays are

- Safety for the user: non-flammable, bio-technology
- Optimal overwelding
- No porosity in the welding seam
- 100% anti-adhesion effect against spatter, effective protection in wet and dry phases
- Can be washed off without any residues in the standard degreasing process, supports cleaning processes
- Perfect coating results (zinc-coating, electro-coating, water-born primer, etc.).

The correct choice of anti-spatter agent is imperative, as the quality of the welding seam as well as the coating must not be allowed to suffer. Using torch anti-spatter sprays that are usually found in the work shop is risky: The origins of most conventional anti-spatter sprays can be found in the protection of nozzles. Most sprays have not been designed for the broad set of requirements called for by workpiece protection - and these results in side effects.

While the important criteria of overwelding is assessed directly onsite at the welding shop, there are major hidden error sources. Overwelding causes heat influence of the agent beside the weld, which turns into a critical zone for subsequent coating processes. At this point, the welder is unaware that subsequent massive wetting faults can occur during coating, e.g. in hot dip zinc-coating, electro-coating, varnishing, powder-coating, etc. In practice this often gives rise to unpleasant scenarios - discussions with regard to determining the fault between the coater and the steelworker are common consequences.

Is there a solution that actually saves costs and prevents side effects?

An important step is the implementation of anti-spatter sprays that have been designed for all areas of application (nozzle, workpiece, jigs). The anti-spatter agent must not only be approved for the welding process but also for cleaning and coating. Furthermore, the can should not be filled with flammable propellants but should instead be equipped with "bag-in-can" technology for instance (figure 2). With this technology, the anti-spatter agent is contained in a bag within the spray can, surrounded by compressed air. A further trend, in particular with larger components, is the use of canisters and refillable sprayers. This very environmentally-friendly option is also extremely economical.



Figure 2. The anti-spatter agent

The Austrian company PROTEC [1] offers such a universal product for surface protection: "METALLOTION PROTEC CE15L". This product provides optimum long-term protection and contains an integrated vegetable-based degreasing component. PROTEC CE15L is pH-neutral and has no negative effects on pretreatment baths.

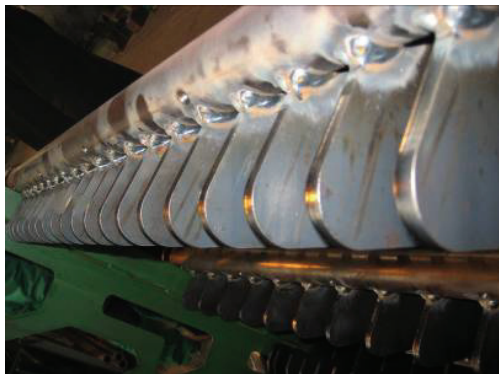


Figure 3. Protection with PROTEC CE15L



Figure 4. The PROTEC product range

For over ten years now, PROTEC has been a specialist in vegetable-based bio anti-spatter agents (non-flammable, biodegradable), which they have developed in collaboration with renowned users. Special focus in this respect is always placed on maximum process stability. The aim for the user is higher productivity through the elimination of rework and the retention of surface quality.

The PROTEC product range focuses on surface protection for welding and cutting (anti-spatter products such as the Metallotion PROTEC CE15L) and wire cleaning/coating fluids (PROTEC WLS) for improved welding processes. PROTEC counts several international customers to its client base, from automotive OEMs to steel contraction companies. There are many big names found in the reference list, such as BMW, Mercedes-Benz, Volkswagen, Caterpillar or Unger Steel.

2. WELDING WIRE LUBRICATION SYSTEM (WLS)

Wire speed and electric contact have great impact on joining processes with wire electrodes, such as MIG/MAG welding, MIG brazing etc. Actual welding systems are equipped with high end control units to constantly adjust and optimize all parameters.

In practice, this control always has a certain delay and the process is not always stable. Especially in the starting phase, when changing from (higher) static to (lower) dynamic resistance, it takes some time to stabilize the process, even when using creep start etc. Shifting resistance and other variable disturbance force the systems to their limit, which lead to faults. Especially in robotic and automated processes like e.g. orbital welding each fault costs lots of time and money.

The feeding resistance generally is influenced by many factors like wire surface, material, liner (length, material, curves etc.). In practice the resistance is not constant in many cases. The goal is to reach minimum and constant resistance, this leads to most stable processes.

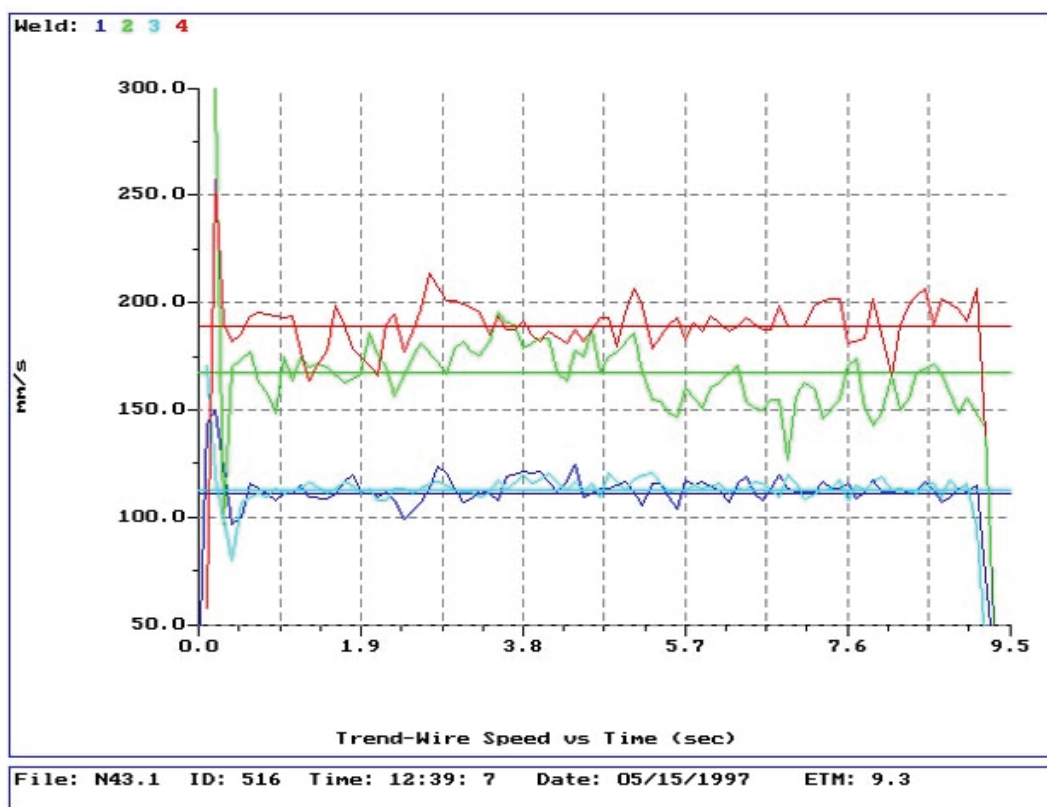


Figure 5. Example of wire speed, measured at tip



Wire-Balm PROTEC WLS04 is a contact lubricant, which leads to a perfect clean wire, lubrication and better electric contact. This means easier start due to lower static resistance, better feeding ability of the wire (even high alloyed steel, but no aluminum) and better contact in the tip.

The result is a stable process with almost no ignition faults and higher lifetime of feeder and tip. Studies of different automotive OEM clients show that these aspects bring measurable benefits, like higher uptime, higher productivity and lower cost for wear parts (figure 5).

3. CONCLUSION

More and more metal working companies are discovering the enormous potential of protecting workpieces against welding spatter. For over ten years now, PROTEC has been a specialist in vegetable-based bio anti-spatter agents (non-flammable, biodegradable), which they have developed in collaboration with renowned users. Special focus in this respect is always placed on maximum process stability. The aim for the user is higher productivity through the elimination of rework and the retention of surface quality.

Also in this paper the Wire-Balm PROTEC WLS04 (a contact lubricant), which leads to a perfect clean wire, lubrication and better electric contact is presented.

4. REFERENCES

[1] www.protec-austria.com