

WELDAPRIME

Anti-Corrosion Zinc-Free Primer for Steel

The WeldaPrime project aim was to develop a primer which is zinc-free, has low organic content, and can be applied as a thin coating to provide weld-through capability without affecting weld quality and yet providing adequate corrosion protection.

Steel, especially carbon steel, is used widely in number of industry sectors, such as oil and gas, chemical, construction and marine industries. The protection of carbon steel against corrosion is critical not only in-use but also during transportation and storage at the steel yard. Zinc-based primers are the most commonly used method for corrosion protection of the steel, protecting the steel via sacrificial galvanic protection mechanisms. However, maintaining a balance between corrosion protection and weldability can be a challenge.



Typically, coatings thicker than 25-50 microns are necessary to achieve good protection against corrosion but this can lead to difficulties in the welding process due to the inability to strike a weld through the thick primer. Additionally, the incorporation of organic materials from the coating in the weld or entrapment of zinc fumes and gas can make the weld porous and have a significant negative impact on weld quality.

Thus, removal of the primer is often undertaken by grinding or blast-cleaning before welding, leading to an additional step and hence additional costs. In addition, by-products like zinc fumes from zinc-rich primers have a significant health hazard associated with them and can potentially lead to zinc fever for the welders. Overall, the use of traditional zinc-rich primers can lead to increased post-weld cleaning costs, reduced quality, greater rework, and an overall reduction in productivity.



The WeldaPrime consortium wanted to provide the European steel fabrication industry with an enabling technology that allows the steel to be protected with a new, high performance primer coating, with high levels of corrosion protection simultaneously with good weldability and without the use of zinc. Through the 3 years' project, the focus of WELDPRIME project partners achieved an understanding of the key chemical and nano-structural components necessary to allow such a primer coating film to be developed. The use of sol-gel chemistry and suitably functionalised nano-additives allowed the development of a unique low-organic but flexible, durable and weldable primer, with the following attributes:



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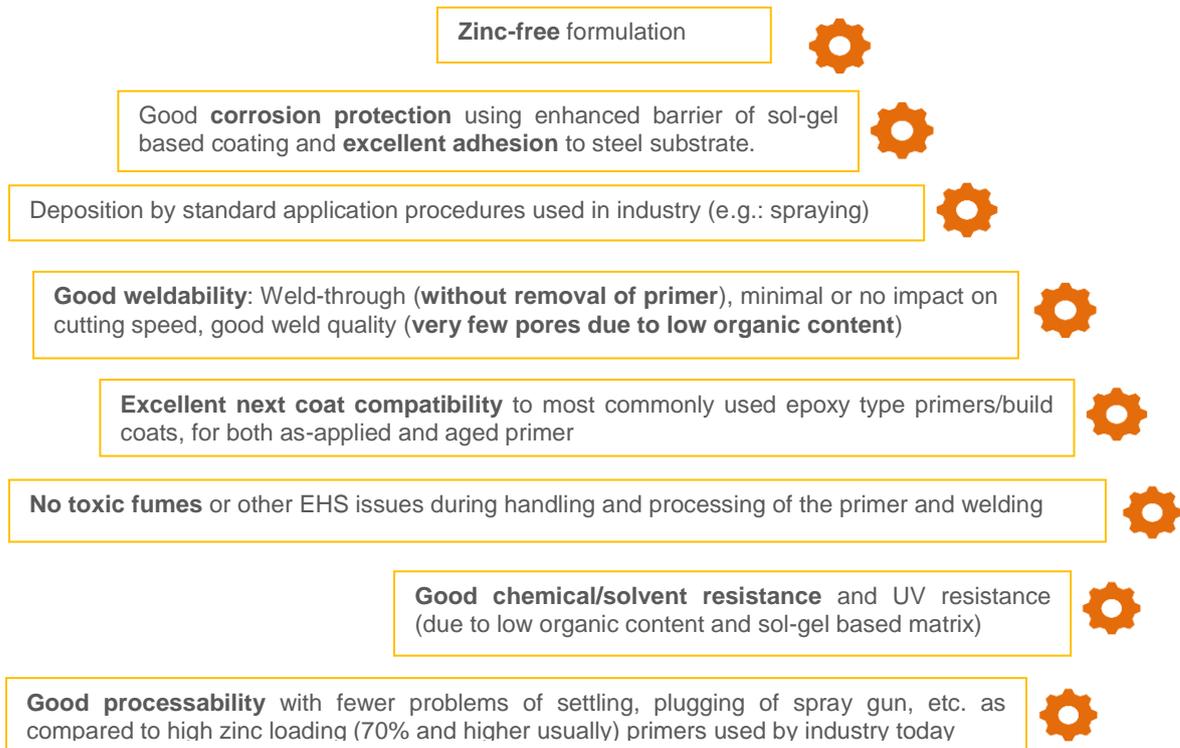
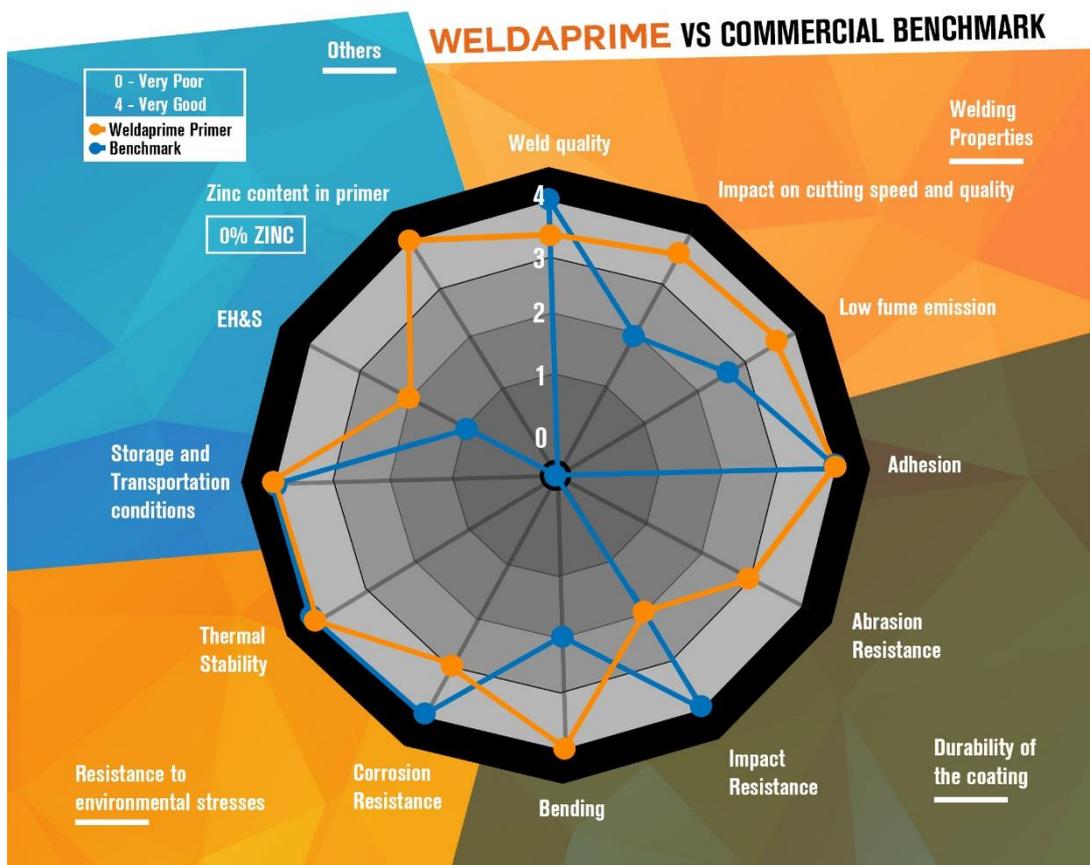


Figure 1 - Attributes of the zinc-free weldable primer



The project **WeldaPrime – “Self-repairable Zinc-free Weldable Anti-Corrosion Primer for the Steel protection”**, started on February, 1st 2014 and was coordinated by the European Federation of Welding, Joining and Cutting, has reached its end. The project was sponsored by the EC FP7 Research for the benefit of SME associations.



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