

## **HYDROGEN DELAYED CRACKING ASSESSMENT FOR SUPER HIGH STRENGTH HOT ROLLED HEAVY GAUGE MARTENSITIC STEELS**

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Hydrogen delayed cracking has largely been studied during the past decades on cold rolled UHSS for automotive applications as it was one of the main issues on car body structures. Recently, the development of novel heavy gauges hot rolled (HR) direct quenched (DQ) martensitic UHSS (>1500MPa yield strength) concepts brought up the risk assessment for hydrogen delayed cracking in the final coiled material. Obviously, the boundary conditions for this case of HR DQ material are different from the CR materials (e.g. hydrogen ingress and effusion during process, thermomechanical history, no presence of coating, mechanical solicitation...).

The study here conducted assesses the risk of hydrogen delayed cracking and links it to the process parameters (hydrogen content, stress...) on industrial reproduced conditions for hot rolled super high strength martensitic steels. The hydrogen distribution/redistribution through plate thickness during the process, mechanical response under tensile and bending stress states is established in combination with model predictions. The first guidelines to understand, evaluate and prevent delayed cracking in these HR SHSS are formulated. “