

APPLICATION OF HIGH STRENGTH STEELS TO RESPONSIBLE WELDED STRUCTURES ON MOTOR VEHICLES

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INTRODUCTION

For considered vehicle several very responsible assemblies are made, and the aim of this paper is to propose welding technology which will ensure obtaining reliable welds. In paper is estimated the weldability of high strength steel on which number of factors have influence. Some of them are chemical composition of the base metal (BM), type of filler material (FM) and welding method, amount of diffusible hydrogen from weld metal into base metal, thickness, type and positions of welds, heat input, type of applied heat treatment, sequence of welding, etc. The optimal welding parameters are based on the results obtained from the mechanical tests performed at room as well as at elevated temperatures, visual inspection of joint and measured hardness and metallographic examinations of some zones of welded joints, and special with regards on results obtained for impact toughness.

WELDABILITY OF THE BASE METAL

The S690QL class steel belongs into a group of special thermo-mechanical (TMO) low alloyed steels. The producer provides declaration of chemical composition on delivery [1-3]. The carbon content is limited to 0.20%, so the steel should possess good weldability. Microalloying elements cause improvement of mechanical properties of those steels. Especially effective are niobium and boron, which are deoxidizing the steels and cause the fragmentation of metal grains. There are three different modifications of the S690 steels: S690Q, S690QL and S690L1, which only differ with regard to guaranteed impact toughness: S690Q – KV = 27 J at -20°C; S690QL – KV = 69 J at -40°C, S690QL1 – KV = 27 J at -60°C [2, 3]. Mass application of the high strength steel of this class occurred due to exceptional mechanical characteristics (tensile strength and yield stress) as well as favorable impact toughness. Basic data provided by the steel manufacturer can be found in corresponding references [1-3, 5].

It should be emphasized that the commercial mark of this steel is WELDOX 700 (SSAB Sweden).

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