

УДК 621.791.763.2

THE POSSIBILITY OF USING DUPLEX STAINLESS STEELS
IN WELDING PRODUCTION

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As the oil and gas industry moves further offshore into deeper waters, the need for stronger, lighter and more corrosion-resistant materials is more acute than ever. Today, the use of duplex stainless steels, has become commonplace for meeting such challenges.

Ferritic-austenitic stainless steels also referred to as duplex stainless steels, combine many of the beneficial properties of ferritic and austenitic steels. Due to the high content of chromium and nitrogen, these steels offer good resistance to localised and uniform corrosion. The duplex micro-structure contributes to the high strength and high resistance to stress corrosion cracking.

The characteristic properties of duplex steels are the following: very good resistance to uniform corrosion, very good resistance to pitting and crevice corrosion, high resistance to stress corrosion cracking and corrosion fatigue, high mechanical strength, good abrasion and erosion resistance, good fatigue resistance, high energy absorption, low thermal expansion.

Despite the fact that duplex stainless steels have good weldability, there exist some difficulties, such as critical temperature ranges: with a long stay in those ranges steel loses corrosion and mechanical properties. Therefore, the welding of duplex steels should be carried out strictly in accordance with the welding technology. As a part of our research, we are trying to create the techniques of welding of duplex steels. At present we are studying the impact of various options of the protecting gas for Gas-shielded arc welding on the properties and structure of duplex steel. Various combinations of gases allow to obtain different properties.

Besides when using different shielding gases during welding, the temperature changes and as a consequence it is possible to avoid staying of duplex steels in critical temperature ranges. The chemical composition of the gas may favorably affect the structure of the duplex steel. Now, we are conducting experiments related to the protective gas and we hope to find out what protecting gas will be the best one for duplex stainless steels welding.