

ENVIRONMENTALLY FRIENDLY FREE-MACHINING STAINLESS STEEL WITHOUT LEAD

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The work describes obtaining experimental cast samples and rolled products of a new environmentally friendly free-machining stainless steel with no lead additions and containing low-melting and low-boiling elements like bismuth and calcium to improve machinability. Quality characteristics of the steel (mechanical properties and non-metallic inclusions content) is in accordance with existing industrial standards for stainless steels. At the same time, the studied steel has lower by 0.001–0.002 % nitrogen concentration in rolled product, finer austenite grain (ASTM grain size number 6–7), more uniform distribution of free-machining additions along the height and cross-section of ingot or billet, better macrostructure (no macroscopic inclusions of addition elements). Machinability of the steel is 10–15 % greater than that of currently used analogous stainless steels.

Keywords: Free-machining steels, machinability, alternative lead-free steels, ecological aspects of steel production, bismuth

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