

Improvement in Properties of Ni-Cr-Mo-V Steel through Process Control

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Abstract : Although gun barrel steels are an important variety from defense view point, available literatures are very limited. In the present work, an IF grade Ni-Cr-Mo-V high strength low alloy steel is produced in Electric Earth Furnace-ESR Route. Ingot was hot forged to desired dimension with a reduction ratio of 70-75% followed by homogenization, hardening and tempering treatment. Sample chemistry, NMIR, macro and micro structural analyses were done. Mechanical properties which include tensile, impact, and fracture toughness were studied. Ultrasonic testing was done to identify internal flaws. The existing high strength low alloy Ni-Cr-Mo-V steel shows improved properties in modified processing route and heat treatment schedule in comparison to properties noted earlier for manufacturing of gun barrels. The improvement in properties seems to withstand higher explosive loads with the same amount of steel in gun barrel application.

Keywords : gun barrel steels, IF grade, chemistry, physical properties, thermal and mechanical processing, mechanical properties, ultrasonic testing

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