

# **THE IMPORTANCE OF STEEL ALLOYING ELEMENTS IN SAFETY-CRITICAL CHAIN AND -COMPONENTS**

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Most chain- and component specifications for safety-critical lifting applications specify certain minimum quantities of alloying elements in its steel chemistry. Why is this important and what is the function of these elements?

Safety critical chain products are heat treated to a certain strength grade and certain alloying elements such as Chromium, Molybdenum and to a lesser extent, Nickel will ensure that the final product has sufficient hardenability. This is the ability of a steel section to undergo full transformation upon quenching or cooling to reach a certain strength requirement.

Nickel and Aluminium are very important alloying elements for ensuring sufficient toughness of steel at low temperatures. The latter provides resistance to strain age embrittlement in service and is the only element that increases strength and toughness at the same time.

To verify if a safety-critical lifting product is safe to use, it is important to confirm that it complies with the relevant lifting standards as far as specified steel alloying elements are concerned. It is good practice to always insist on a test certificate when safety-critical lifting products are purchased. The test certificate must confirm that the supplied product is compliant with the applicable standards and specifications with regard to mechanical properties –and steel chemistry requirements. It must also clearly state the applicable South African- and international standards that the products comply with.