

## Structure and Mechanical Properties of Aluminium Alloy Sampled from a Firefighter Ladder

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Firefighter ladders are manufactured of aluminium alloy AA 6063. These ladders are a widely used technical tool for firefighting, for intervening firefighters and for rescued persons. The quality of the ladders is checked by so-called "user test" which is a non-destructive deflection test defined by CSN EN 1147. Unfortunately, this test is not sufficiently conclusive in terms of safety. Therefore, the project called "Safety improvement of extension ladders for firefighters" (VI20162020021) is focused on the complex assessment of the existing firefighter ladders through mathematical modelling, material analysis and real testing. In the present work structure and mechanical properties of samples (aluminium alloy AA 6063) taken from different areas of a firefighter ladder are presented. The obtained result confirm excellent mechanical properties of selected samples, such as tensile yield strength and ultimate tensile strength, at laboratory temperature but a huge decrease in these properties after exposure to temperatures above 200 °C for even short times. This results in the necessity to control temperatures in the proximity of the ladder, especially in the case when the ladder is located near a flame.

**Keywords:** Aluminium alloy 6063, firefighter ladder, Electron microscopy, Mechanical characterization

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