

# Thermal cutting of structural steel and EN 1090-2 Standard outlining hardness restrictions for bolt holes and free edges

White paper

## Overview

Plasma cutting offers a great balance of initial investment, increased productivity, and lower operational costs compared to alternative cutting methods.

Plasma technology has found widespread success in many structural steel applications. Its versatility spans various tasks like shape cutting, weld surface prep, beam coping, and hole cutting for bolted construction.

The thermal cutting of structural steel, including plasma cutting, is regulated by multiple international and local standards. We come across numerous instances when codes permit the use of plasma cutting, yet misunderstandings of the standards lead to its improper restriction or disapproval.

## European standard EN 1090-2

European standard EN 1090-2 introduced hardness restrictions for bolt holes and free edges in 2014, which created questions about whether a certain thermal cutting process is still suitable for a particular application and ultimately limited usage of thermal cutting, including plasma, laser, and oxyfuel. All three thermal cutting technologies can produce various degrees of free edge surface hardening depending on steel grades and material thicknesses. Depending on the hardness test method applied, they could either comply or not comply with the standard's hardness restrictions.

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However, four years later the new version of the EN 1090-2 standard was introduced and it removed the hardness restriction for carbon steels up to grade S460.

For steels  $\geq$  S460 the hardness of free edge surfaces shall be no more than 450 (HV10) (EN 1090-2:2018).

S460 is a high-strength steel designed to be used in harsh environments. If you cut this type of steel and above, it may still be possible to use plasma cutting. Hypertherm Associates' cut optimization specialists can help you with parameters adjustment or suggest applicable additional treatments, such as preheating, which will help meet the new standard's requirements for high strength steels.

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