

## **Comparison of dry and wet fibre laser precision cutting for coronary stent manufacture**

### **Abstract**

High precision laser micromachining is extensively used in medical device industry. In medical stent fabrication, the processed stents must exhibit mechanically robust structures and high surface quality. High cost of post processing requires high accuracy in machining. Small and thin tubes heat up quickly and it is crucial to manage heat distribution in the stent fabrication process. Meanwhile, molten material removal in profile cutting of small diameter tubes creates back wall damage to the opposite wall. This paper compares wet (with water flowing through the tubes) and dry pulsed fibre laser profile cutting of 316L stainless steel tubes (<4 mm diameter, < 200  $\mu\text{m}$  wall thickness). Wet cutting has demonstrated efficient back wall damage prevention of hot particles adhesion. On the other hand, kerf width, surface roughness and dross deposition have also been improved compared with the dry cutting process.

**Keywords;** Coronary stents; Dry and wet; Dry cutting; Fabrication process; Fibre lasers; Laser micro-machining; Medical device industry; Medical stent; Thin tubes; Wet cutting