



Research for the Benefit of SMEs		
<p>Title: Development of a solvent-free coating process for wooden facades</p> <p>Acronym: DURAWOOD</p> <p>Grant Agreement Number: 232296</p> <div style="text-align: center;"></div>		
Deliverable 4.1	Report on the construction of a pre-industrial prototype and evaluation of the prototype at laboratory	
Associated WP	WP4 – Design and development of an industrial DURAWOOD system	
Associated Task	Task 4.1: Design of a plasma DBD system enabled for industrial operation Task 4.2: Construction of a pre-industrial prototype Task 4.3: Evaluation of the industrial prototype at laboratory Task 4.4: Risk and Quality Management	
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Dissemination Level	CO	

Publishable Executive Summary

This report outlines the work carried out as part of an EC funded project called DURAWOOD - Development of a solvent-free coating process for wooden facades.

The work carried out in Work Package (WP) 4 – *Design and development of an industrial DURAWOOD system* consists of the design and further development of a pre-industrial prototype to produce a plasma surface treatment of wood and its subsequent evaluation at laboratory trials. The work is based on the results of WP2 – *Laboratory validation of the plasma technology for improving wettability and waterproofing effects*, where two effects of plasma were measured: hydrophobisation and hydrophilisation. Results predominantly depended on the distance between the plasma electrode and the wood surface.

The main scope of the work performed by IRIS in WP4 is reported in this deliverable 4.1 *Report on the construction of a pre-industrial prototype and evaluation of the prototype at laboratory*.

To start, the specification of the system is briefly summarised based on the work previously reported in both WP1 – *Stakeholder targeting and industrial specifications* and WP2, providing a short description of the lab test rig. Improvements made during the scaling up of the system from the lab set up to the pre-industrial prototype are then described, the main difference being the continuous treatment of larger wood panels.

The system layout is then described, as well as each sub-system contained within. Finally the results of the in-house validation tests are reported. Overall, plasma treatment performed with the prototype proved to have an effect on the wettability of the woods tested (oak and ash), both towards either an increase in their hydrophilicity or hydrophobicity depending on the conditions of the treatment. The magnitude of the hydrophobisation effect is relatively similar to the results obtained at lab scale whereas the hydrophilisation effect is slightly weaker.

Before the end of the project, further improvements to be made to the prototype include the improvement of the exhaust cabin, a pressure system to overcome bending of some wood panels, and the finalisation of the control system and its automation. Improvements will be reported in Deliverable D5.1- *Manual of installation instructions of the DURAWOOD prototype*. The efficiency of such improvements, e.g. to maximise hydrophilisation, will be tested during industrial validation trials by the SMEPs.