connected to the percent of weight loss due to thermodegradation, allowing the use of chemical composition to predict fungi durability. Carbon and oxygen contents and/or oxygen to carbon ratio of heat treated wood can be therefore used as valuable markers to develop quality control assessment of heat treated wood.

Keywords: heat treatment, thermodegradation; mass loss; elemental composition, durability, treatment intensity; quality assessment; wood

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Decay Resistance and Durability of hygro-thermally treated European hardwoods

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German Hardwoods, especially Beech (Fagus silvatica) and Ash (Fraxinus excelsior) are highly appreciated for interior use. but their use under changing humidity/outside climate conditions is limited due to relatively high swelling/shrinking coefficients and limited natural resistance to fungal decay. Thermal treatment may improve resistance to decay.

Extensive studies have been carried out on beech, ash and oak (Quercus petreae) samples on which . a hygrothermal pressure treatment (WTT) was applied with 2 temperature levels (160°, 180°C)

Durability tests according to ENV 807(CEN/TS 15083-1:soft-rotting micro-fungi-soil contact trials) and EN 113 (CEN/TS 15083-2:basidiomycetes-agar-block tests) were carried out for the assessment of durability in accordance with EN 350-1.

Compared to the untreated samples, the test specimens showed a significantly lower weight loss already at the 160° C level and was further reduced at 180°C. Accordingly and in line with CEN/TS 15083-1 an upgrade of the species from durability class 5 (DC 5: non-durable) to DC 2 (durable) in most cases or even to DC 1 (durable) in some cases was possible.

However all tests were carried out with defect-free small test samples, and a long-term testing of real-size specimen may be advised to verify these results.

Furthermore it must be considered that thermal treatment especially at the 180°C level reduces strength and elasticity properties, which limits the use of thermally treated products to non load bearing constructions like floors, decks ore wall claddings.

Keywords: Thermal treatment, durability,. fungal decay, European hardwoods,

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Differences between heat treated *Pinus pinaster* heartwood and sapwood

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Heat treatment is a well known process to improve the durability and dimensional stability of less noble wood. The treatment can be applied for heartwood unlike the traditional treatments based on impregnation due to the difficulty of impregnating heartwood.

Pure sapwood and pure heartwood samples were treated in an oven at 190ºC and 200ºC for 2h, 4h and 6h. Dimensional stability, measured as Anti Shrinking Efficiency (ASE) between 0% and 65% relative humidity, durability, mechanical resistance (MOE and MOR) and density were determined for both treated and untreated sapwood and heartwood.

One of the main differences between treated sapwood and heartwood was the presence of resin on the surface of the heartwood treated wood samples. The results showed that for the same treatment conditions the dimensional stability improved more for sapwood than for heartwood. However when the comparison is made at the same mass loss, the differences were not significant. ASEradial reached 80% for sapwood and 50% for heartwood while ASEtangential reached 50% and 40% respectively. In relation to mechanical properties, MOE increased slightly at the beginning of treatment decreasing afterwards. No significant differences were found between sapwood and heartwood. MOR decreased for both heartwood and sapwood reaching almost a 50% and 30% decrease for sapwood and heartwood respectively. Once again if the comparison is made at the same mass loss, no significant differences were found between sapwood and heartwood. Durability against Postia placenta was only evaluated, by the mini-block method, for sapwood and heartwood samples treated at 190ºC and 200ºC for 2h and 4h. A significant increase in durability was found for both heartwood and sapwood at the higher temperature and for heartwood only at 190º for 4h.

The results showed that the heat treatment is equally efficient for sapwood and heartwood when comparing at the same mass loss. Since temperature and treatment time influenced differently on heartwood and sapwood i.e. on mass loss, the extent of improvements varied between sapwood and heartwood with the same treatment conditions i.e. the improvement was higher for sapwood.

Keywords: Dimensional stability; durability; heartwood; heat treatment; mechanical properties; sapwood