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Object: **Report on the NO_x abatement by “Extra White Active” tiles**

In response to your request, on the basis of an extensive literature review and the photocatalytic experimental results (1), we have verified the contribution that the product “Extra White Active” is able to give to the atmospheric nitrogen oxides (NO_x) abatement and reduction, in comparison to trees.

Whereas the reactive species, collectively referred to as NO_x, are composed of both nitric oxide (NO) and nitrogen dioxide (NO₂), the NO_x abatement mechanisms operated by trees and those related to photocatalysis are different. In particular, trees remove NO_x, basically NO₂, through adsorption uptake. In photocatalysis, NO_x reduction involves the degradation of NO by oxidation and the degradation of NO₂ through reaction with hydroxyl radicals.

This comparison is not related to mechanisms, parameters and other qualitative characteristics of the two different processes which are hardly comparable, but it is aimed to give an indicative evaluation of the relative contribution of each process to overall NO_x abatement.

Extra White Active

According to the results of the experimental laboratory photocatalytic tests in gas phase (0.008 mg/h of NO abatement by a surface of 0.0064 m² in the test condition specified in (1)) and assuming 2455 h/year of daylight (average for Italy in 2008 (2)), it is possible to calculate that 1000 m² of Extra White Active are able to remove 3.1 kg/(year*1000 m²) of NO, in the above mentioned conditions.

Trees

As reported in (3), trees of class d.b.h (diameter at breast height) 62-76 cm (mature trees) are characterized by an estimated value of NO₂ abatement of 0.15 kg/(year*tree).

Result

On the basis of the above reported data and the literature review, 1000 m² of photocatalytic tiles “Extra White Active” are able to give a relative contribution to the overall NO_x reduction comparable to 20 mature trees.



The Director

Prof. Ing. Giorgio Timellini

References:

- (1) Report about the results of the research – Centro Ceramico Bologna – 23/07/2009
- (2) Rapporto ISPRA 12/2009. Gli indicatori del clima in Italia nel 2008, pag. 131 (http://www.apat.gov.it/site/_contentfiles/00156200/156220_stato_amb_12_09_ind_clima2008.pdf)
- (3) McPherson G.E., Nowak D.J., Rowntree R.A. (1994). Chicago's urban forest ecosystem: results of the Chicago Urban Forest Climate Project. US Dept of Agriculture Forest Service. General Technical Report NE-186, pag. 77 (http://www.nrs.fs.fed.us/pubs/gtr/gtr_ne186.pdf)