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WETTABILITY CHARACTERIZATION OF MDF COMPOSITE MATERIALS USED FOR INDUSTRIAL PRODUCTS

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Introduction

The growing concern for the environment, in relation to the need for more versatile polymer-based materials, has led to a high interest in research into polymer composites filled with natural-organic fillers, which come from renewable sources. MDF is a high grade, composite material and it is made from recycled wood fibers and resin, and it is less expensive This composite material is dried and pressed to produce dense, stable sheets and because of this process, MDF does not warp or crack like wood. And since MDF is made from small particles, it doesn't have noticeable grain patterns, showed by electronic microscopy. This will result in a smoother finish for the industrial product. In general, wood contracts or expands when it is exposed to changing heat and humidity and can appear some cracks on the industrial products. In this paper were realized water absorption tests on the MDF samples, in function of different temperature and humidity levels. The water absorption content for each piece of MDF composite material is represented as a percentage of the weight of the water and oven-dry weight. The humidity absorption depends on the composite material type, their structure, and it depends on the environment in which the product is used. The quality and moisture resistance of a composite material is extremely important for the durability and degradation degree of an industrial product.

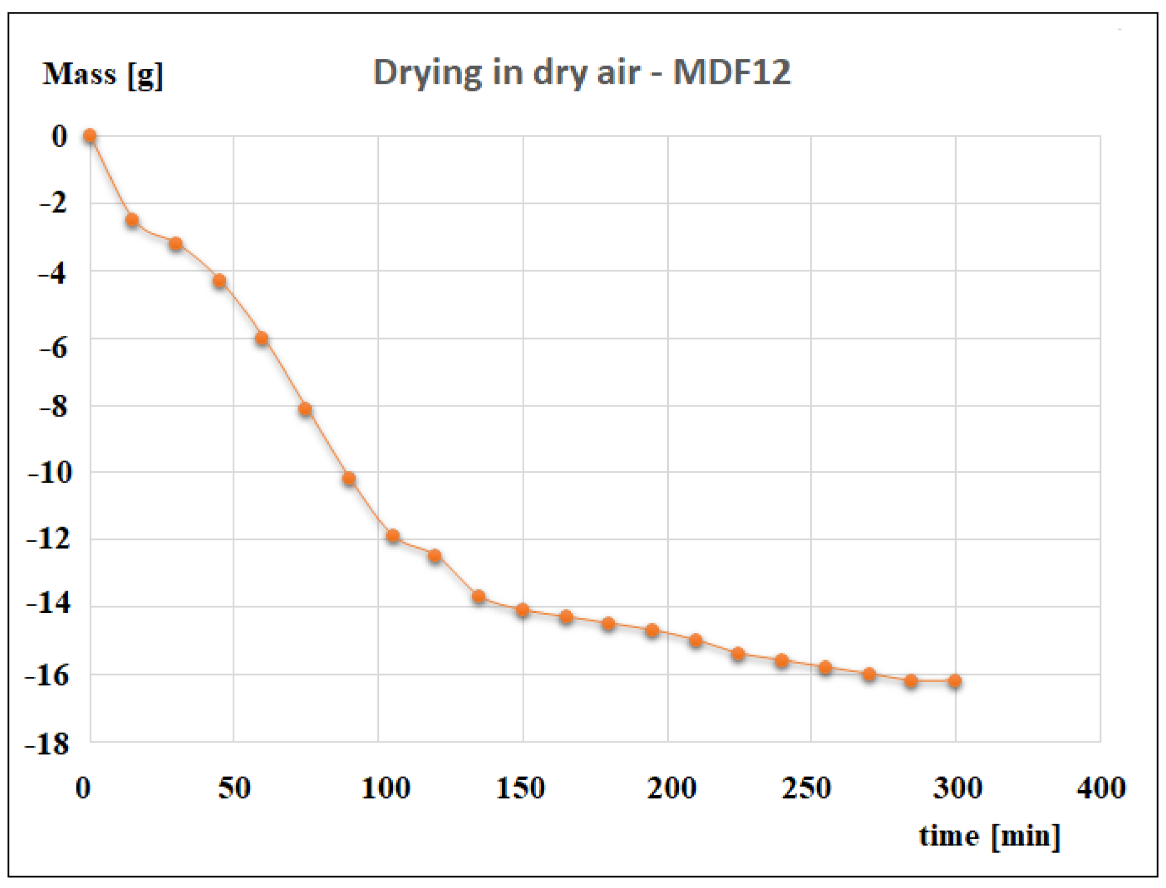

Fig.1. Drying in dry air for MDF.12 composite material

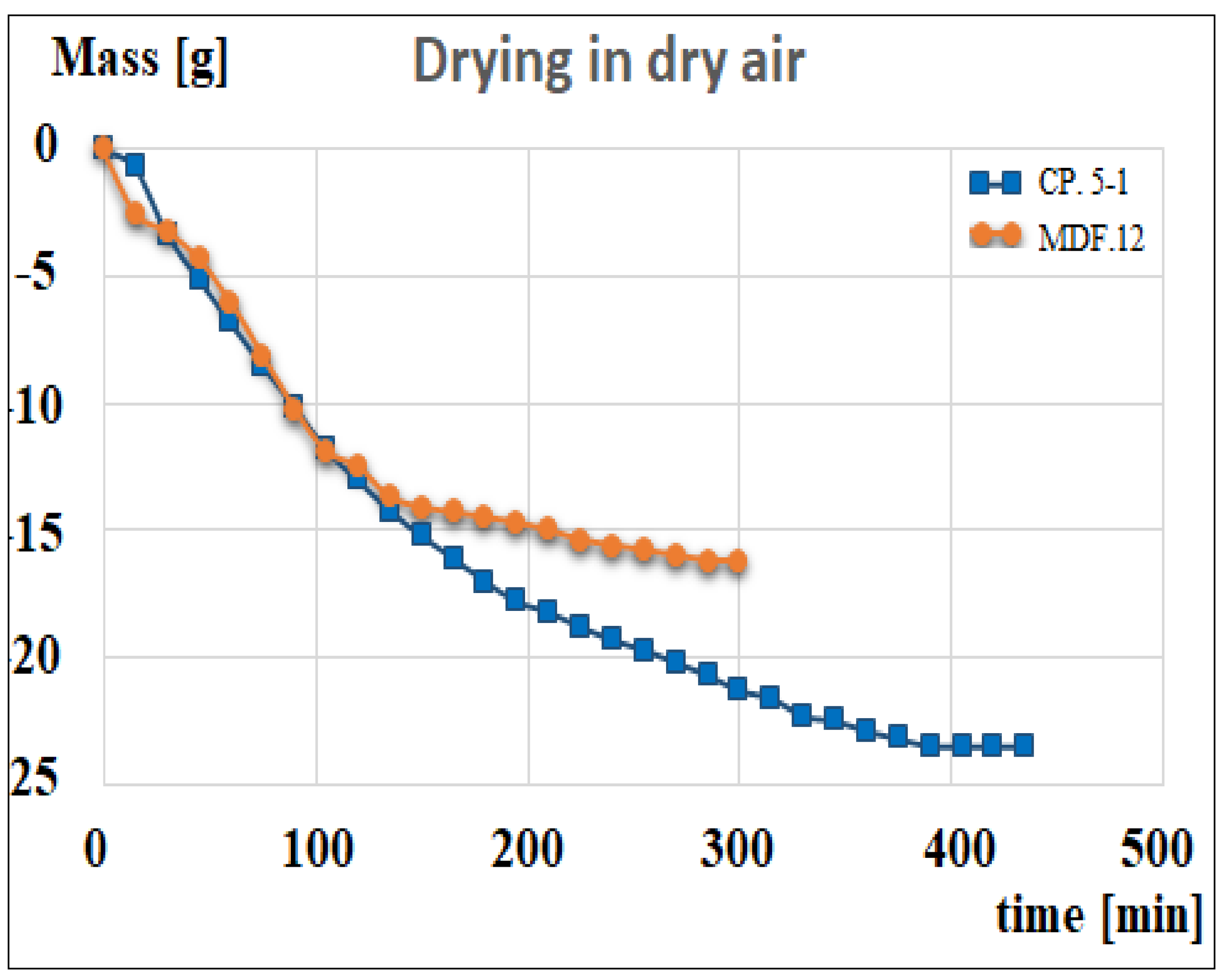

Fig.2. Comparison of drying behaviour of the two composite materials CP5-1 and MDF.12

Research

The whole of the thermostatically controlled enclosure regulated in temperature and humidity includes: a test enclosure with its conditioning, the installation support, in which the machinery and the control panel are placed. The measuring device used is of the H.M.P.230 type and is a microprocessor transmitter for measuring the relative humidity and air temperature. Based on these data, the absolute humidity can be calculated, dew point temperature, temperature humidity relationship and wet bulb temperature.

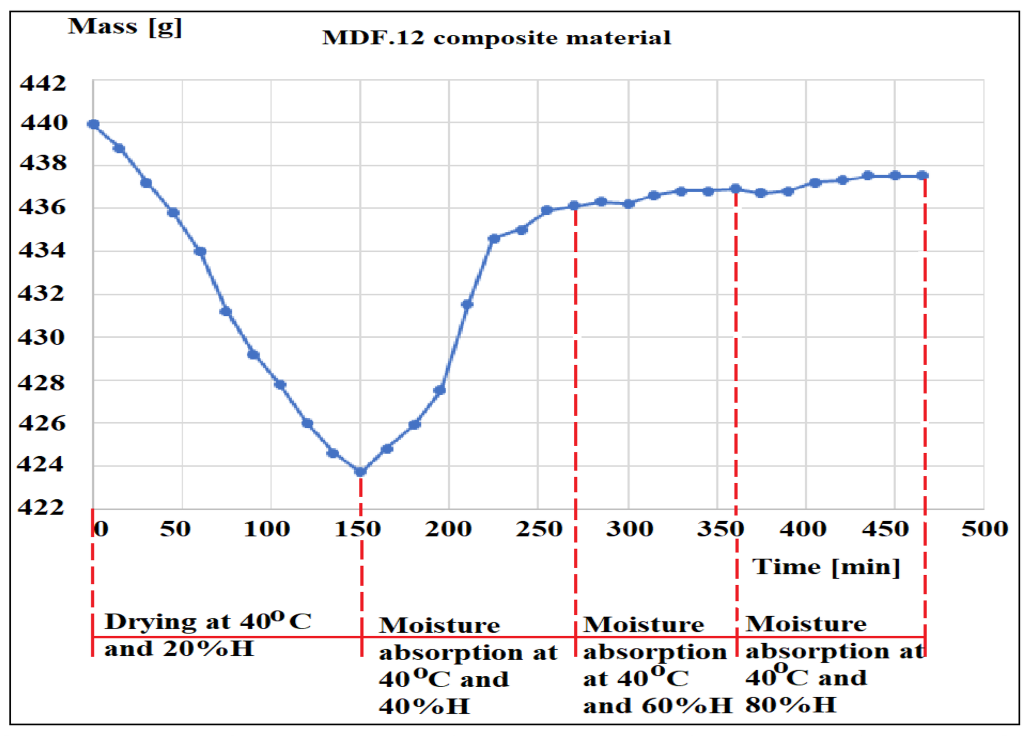

Fig. 3. Graph of variation between the mass values and time for the temperature of 40°C and different moisture coefficients (20%H, 40%H, 60%H, 80%H)

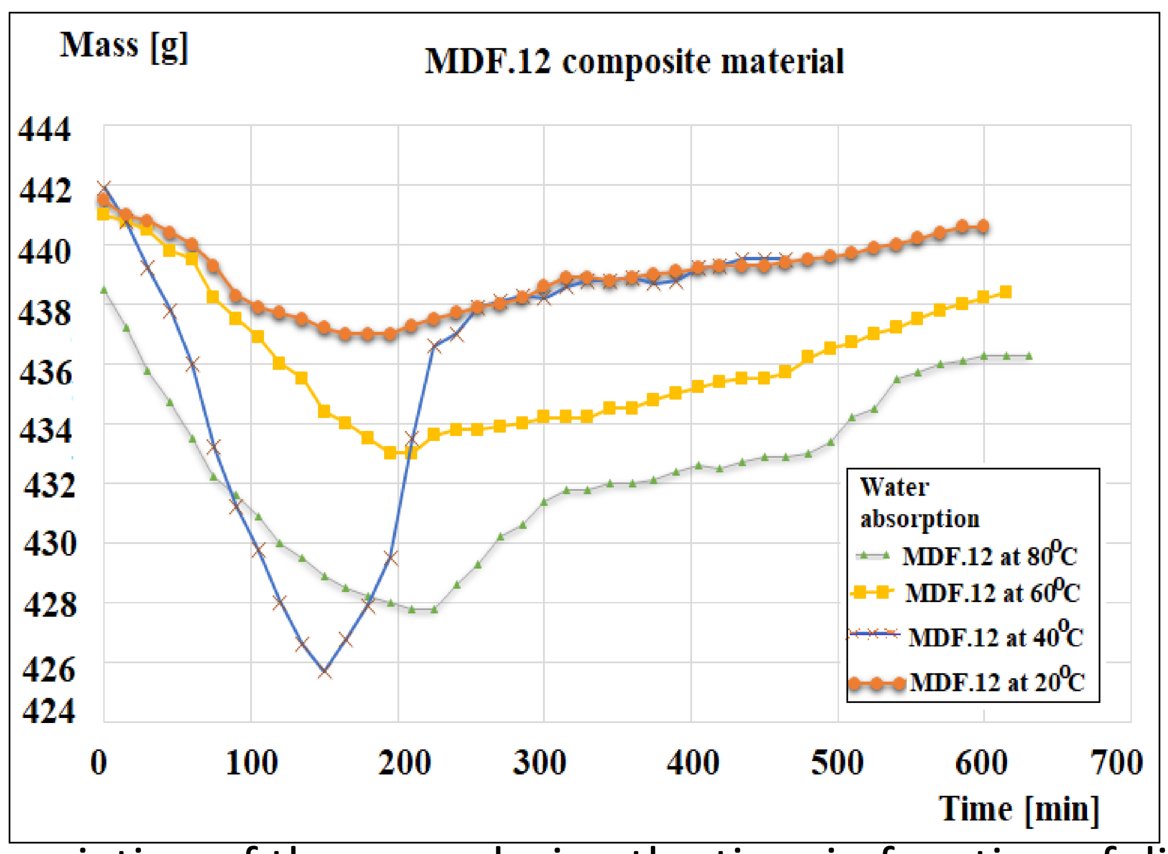

Fig. 4. Curves of the variation of the mass during the time in function of different temperatures for MDF.12

Results

MDF.12 composite material presents high strength and high efficiency, elastic modulus is better than steel, with excellent creep resistance, corrosion resistance, light weight, good flexibility and for this it is used in a variety of industries. The MDF.12 composite materials has a higher moisture resistance in comparison with different other composites and absorbs less water than CP.05 composite material.

At the temperature of 20°C, all composites have a drying process for the composite materials, if it increases the temperatures and it varies the humidity values, can remark an increase of mass values proportional with the humidity percents, because of the water absorption in the composite materials, although the temperature rises.

Due to the superior mechanical properties, these composite materials of MDF.12 type will be able to successfully replace non-degradable plastics, being degradable materials.

Acknowledgement

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