1.Local Processing of Non-Metal Materials with Concentrated Energy Flow

Abstract - In this study, the features of local thermal treatment with a concentrated light energy flux of non-metallic materials are traced. Mathematical relationships are presented for determining the surface density of the absorbed power – W(r), the thermal power – Po, and other characteristics during local thermal impact on the surface of non-metallic materials with a concentrated light energy flux.

2.Factors Influencing the Ldser Marking of Non-metal Materials

Abstract - This study examines the factors that influence contrast in laser marking of non-metallic materials. Four main groups of factors related to the type of material being processed, the type of laser used, the technological characteristics of the process, as well as factors related to the complex action of marking the studied materials were examined.

3.Determination of the Penetration Depth of Lazer Markking of Polimeric Materials

Abstract - This publication examines the penetration depth of laser radiation generated by a 50W Fiber laser when marking polymeric materials. The statistical error at penetration depth 0.5 mm and scattering ± 0.1 mm was determined. Samples of 10 to 400 details were studied, and the obtained experimental results are presented in tabular and graphical form.

4. Determination of the Penetration Depth of Laser Marking of Glass Fiber Reinforced Polymers

Abstract – Due to the need for identification of industrial products, laser marking has been increasingly used in recent years. It is the preferred method for achieving permanent and contrasting surface markings on both metals and a wide variety of non-metallic materials. In the present study, the change in the energy parameters of a laser installation based on Fiber lazer - RFFL-P-502B was tracked.on the penetration depth when marking layered composites based on epoxy resins. Graphical and tabular results are presented of marking with V=50mm/s; f = 50Hz and P = 5÷50W.

5. Elements of the energy balance in laser marking of layered reinforced polymer matrix composites

Abstract – The publication examines the features and elements of the energi balance equation in laser marking of layer-reinforced composites with a polymer matrix. The mechanism of interaction of the laser bean with substance, the stages through which the process of marking the studied materials takes place, as well as a scheme for the elements of the energy balance equation during laser marking of the studied composites are presented.

6. Influence of the Technological Parameters of the Laser Marking Process on the Strike Width in Layer Reinforced Composites with a Polymer Matrix

Abstract - In the present study, the influence of the change in the technological parameters of a laser installation based on a fiber laser - RFFL-P-502B on the stroke width during marking of layer-reinforced polymer-based composites was tracked. In order to determine their influence on the width of the marked strokes, experiments were carried out at marking speed V= 50÷250mm/s, output power P=5÷50W, pulse frequency f=50kHz and focal spot diameter 40μm. Graphical dependences of the obtained experimental results are presented

7. Influence of the Parameters of the Lasser marking process of the depth of penetration in layer-reinforced composites

Abstract— In the present study, the influence of the change in the energy parameters of a laser installation based on Fiber lazer - RFFL-P-502B, was tracked. on the depth of penetration in marking layer-reinforced polymer-based composites. In order to determine their influence on the depth of the marked strokes, experiments were carried out at speed V= 50÷250mm/s, output power P = 5÷50W, pulse frequency f = 50kHz and diameter of the focal spot 40μm. Tabular results and graphical dependences of the obtained experimental results are presented.

8. Penetration Depth in Laser Marking of Composite Materials with Textile Reinforcement Phase

Abstract - This publication investigates the influence of the technological parameters of the laser marking process on the penetration depth of the laser beam in composite materials based on phenolic laminate with a textile reinforcing phase. Studies was conducted at the output power of the laser radiation - P=5÷50 W, marking speed - V=50mm/s and pulse frequency - f=50Hz. A graphical

dependence of the obtained experimental results in comparison with the theoretical values is presented.