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# OPTIMALIZATION OF BATCHING PLANT POLYMER WORKING IN HIGH-VOLTAGE FIELD

**Abstract:**
*This report is talking about optimalization of batching plant which is working under high-voltage field. The evaluation of suitable material for constructions hopper and tube batching the polymer into the tub. This solution of batching plant is dimension for a rated durability and amount of polymer. The aim of the methodology is to concept an optimized device batching polymer, heating at 200°C.*

**Keywords:**
*High-voltage, the polymer,optimalization,ansys*

## INTRODUCTION

*This report is talking about optimalization of batching plant which is working under high-voltage field. The evaluation of suitable material for constructions hopper and tube batching the polymer into the tub. This solution of batching plant is dimension for a rated durability and amount of polymer. The aim of the methodology is to concept an optimized device batching polymer, heating at 200°C.*

## PRESENTATION OF THE BATCHING PLANT

*Suggested machinery is constructively limited by inner proportions of current machine. The space between baths for addition polymer and the high was fully limited by the space of (100x200x1500mm). Necessary limits were made because of observing safe separation distance for values of 100kV with descending reduction 5kV = 1 inch = 25,4 mm.*

*Basic element of the injector is made by readily available percussion roller with upstroke of 30 mm with the diameter of servo piston 16mm. The pressure of compressed air is 6 Bar used in percussion repudiation of whole machinery. Primal suggestion of percussion roller with pull-back spring was canceled and it was replaced by double-acting piston because of the mason of small reversing power. The body is made of aluminum and its piston is made of stainless steel.*

*The temperature isolation is made by block of PTFE which recently makes the function of regulator of the stainless piston which compresses molten material. On the stainless body of the injection, there is located jet rating unit with longitudinal fading output with its functional temperature under 300°C, which accomplishes requirements of the submitter with maximal potential temperatures of melting under 250°C.*

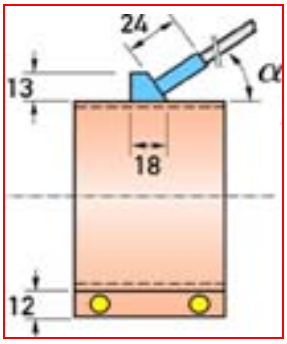


*Fig. 1 Heating body*

*The piston of the injecting machinery is made from stainless steel with the diameter of 16h6. The piston is fasten-down to the working piston by female screw made of stainless steel because of observing accurate distances and safety. On the injector body there is fasten-down adjusting sleeve with feeding hopper made from the stainless lamination with the strength of 1mm. Each of these components are chosen out of stainless steel materials because of its higher resistance in aggressive atmosphere. The only exception is injecting tube which is made of copper. Copper has much better heat-transmission value considering the possibility of caking of the polymer in its ending part.*

## THE SYSTEM OF FEEDING

*The most important part which is necessary for correct function of the injector is the space where the polymer is molten. In this part of the body there is a change in the state o matter and consequently the change in the capacity which is necessary to respect in next construction. Polymer is cut with diameter of 2mm.*

## MKP - TEMPERATURE ANALYSIS

*The temperature analysis is elaborated because of the reason of figuring thermal insulating character of PTFE block, which has the function of isolation for percussion roller because of confined running temperature, suitable use of the material for output tube and for the verification of the storage of the heating body. In the simulation there is visible decrease of the transmission of the heating to the body of the percussion roller altogether with the combination of suitable diffusion of the warmness in heating body.*

*The extract of the marginal conditions of the warmness analysis: The temperature of the heating body is always 200 °C, the temperature of the surrounding is assessed in the first simulation to the value of 20 °C with enduring result value of 74 °C in the coldest part, average load was selected on 40 °C with the result value of 87 °C and for the highest running load it was increased to the value of 80 °C with the result value of 115 °C. Polymer is in work place of the roller melted to chosen temperature, in this state of matter it is enabled the running of the smelt into disposed bath.*

*At the same analysis is developed for the alternative model, using the tube 8x1mm place 6X1mm. The tube has better conditions for the batching, the polymer has a lower tendency dries. The speed benefits of the polymer is reduced.*

*Stainless steel hopper is replaced with copper. Granules using a higher temperature for melting. Overall, the increase in temperature hopper.*

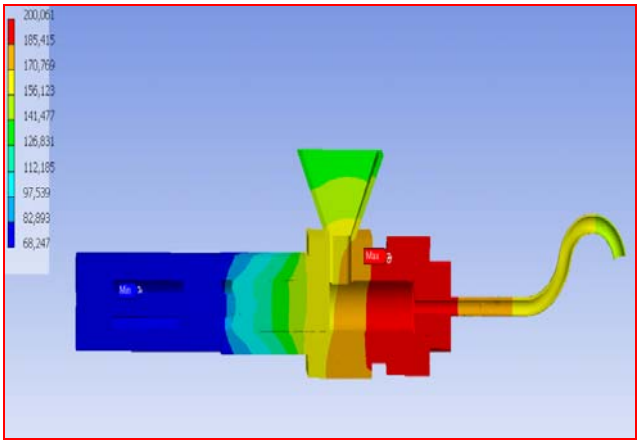


*Fig. 2 Temperature analysis for surrounding temperature of 20°C*

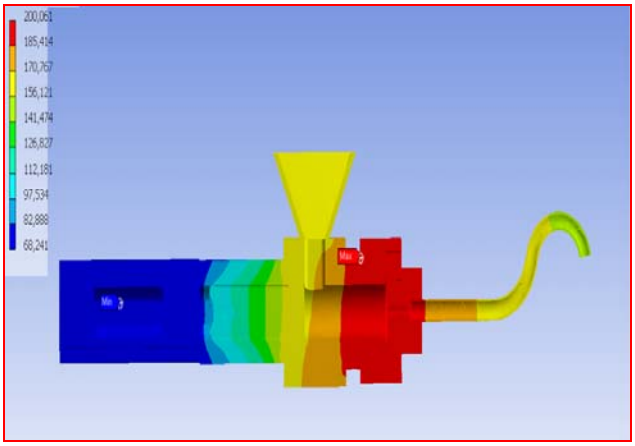


*Fig. 3 Temperature analysis for surrounding temperature of 20 °C (new)*

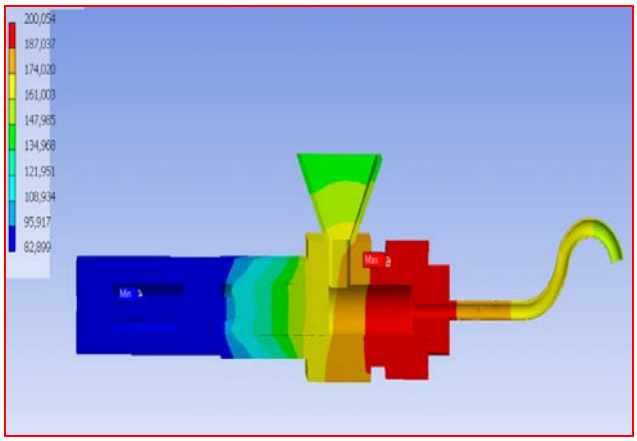


*Fig. 4 Temperature analysis for surrounding temperature of 40 °C*

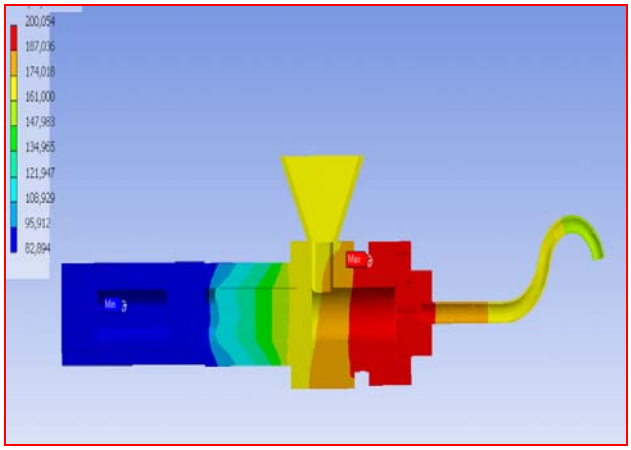


*Fig. 5 Temperature analysis for surrounding temperature of 40 °C (new)*

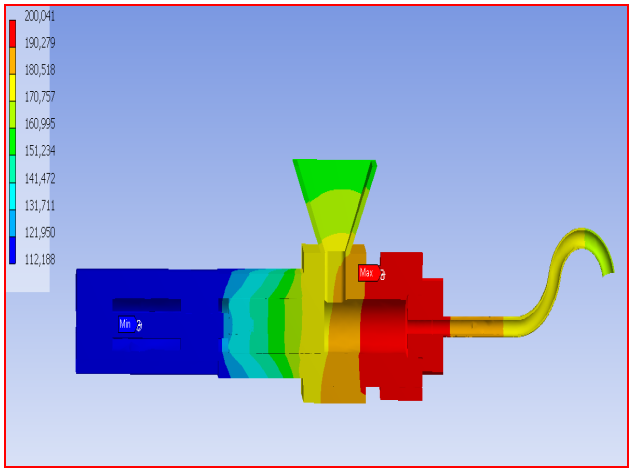


*Fig. 6 Temperature analysis for surrounding temperature of 80 °C*

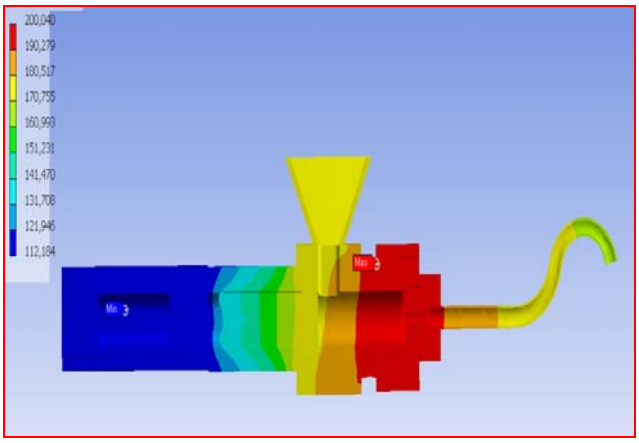


*Fig. 7 Temperature analysis for surrounding temperature of 80 °C (new)*

## CONCLUSION

*Introduced report presents one of the possibilities of the solving batching plant of polymerization production in high-voltage field. In this case, this resolution can´t be considered to be optimal. To set pre-conditions can be argued that the proposal is conforming but the final option will be subject to long-term burden.*

## ACKNOWLEDGMENT

*This report was originated on the basis for solving project MPO-2A-3TP1/120/2008 The machinery for preparation of nanofibre made of melting polymer.*

## REFERENCES

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