

## Review of Diploma Thesis

Student: Devang Kanaiyalal Prajapati

Topic: Study of Weldability Utilizing Laser Welding for Thermoplastics Modified with Different Additives with Respect to Production Requirement of Injection Moulding

The aim of work was to increase the weldability of thermoplastics and evaluate the quality of the welded joint using tensile strength testing. To enhance a welding process, the various parameters were optimized including observation of the effect of the additives, specifically carbon black and glass fibers.

The work is logically structured from the description of welding principles, welding techniques, suitability of polymers to use of various additives. With respect to the title of the work the content could be more oriented toward some issue of the real injection-moulded part and more emphasis could be put on real production requirement, what would bring certain added value to this diploma thesis and could be more beneficial for the industry.

The work contains all formal necessities – introduction, statement of the aim, description and the evaluation of the results and conclusion. The linguistic level of the work is very good. Especially the theoretical part I find successfully accomplished. However, the description of experiments in practical part seems to be a bit indefinite due to frequent use of the word “some” (page 53), what can reduce reporting value of the work. Regarding the references used in work, student should use more relevant literature (books, scientific articles) than for example company websites.

On the basis of the submitted work, several questions arise:

- In the text you mentioned that the molecular weight affects the welding process. Would you please explain the effect of various molecular weight on welded joint (including branched vs. linear polymer chain, molecular weight distribution etc.)
- Regarding the quality of welded joint. What are further reliable methods for its evaluation and diagnostics? How would you analyse residual stress in joint welded using TTLW technique?
- If we consider the clamping system well optimized, what else could bring obstacles in welding process locally? Could the distribution of the additives in substrate affect somehow the weldability? How would you examine the homogeneity of the distribution of additives in polymer?

Reviewed work fulfils the assignment and reaches formal level corresponding to the requirements of master thesis and thus I hereby recommend the work for the defence.

I propose to evaluate the work with following grade:

**“Very good”**

In Liberec, 4.6. 2018

  
Ing. Alena Pavelková, Ph.D.  
(Magna Exteriors Bohemia s.r.o.)