

Review of the Doctoral Thesis

“INVESTIGATION OF POLYMER MELT FLOW THROUGH DIFFERENT MIXING ELEMENTS AND WAVING SCREW CHANNELS”

by Pavel Kubík

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The presented doctoral thesis consists of four parts:

- The introductory part (12 pp.) is dominantly devoted to the historical development of screw design and mixing elements.
- Second part (6 pp.) describes the aims of the Ph.D. Thesis, the copies of abstracts from the contributions 1-4 (final part) are presented. This part is concluded by the section Conclusions (one and half pages).
- Third part summarizes the literature cited in the introductory part.
- Fourth part presents the copies of the following contributions:

Pavel Kubik, Jiri Vlcek, Costas Tzoganakis, Luke Miller - Method of analyzing and quantifying the performance of mixing sections. Polymer Engineering and Science 52 (2012), 1232-1240.

Pavel Kubik, Jiri Vlcek, Jiri Svabik, Martin Zatloukal - 3D simulation of the fluted mixer element behavior. Annual Technical Conference - ANTEC, Conference Proceedings, 1, 773-778 (2010).

Pavel Kubik, Martin Zatloukal, Yutaro Asai, Ryuichi Haruna, Yoshihiko Iwasaki, Jiri Vlcek, Ilja Paseka - Experimental and numerical analysis of the performance of two fluted mixer designs. Submitted to Plastics, Rubber and Composites.

Pavel Kubik, Martin Zatloukal, Jiri Vlcek, Tim Womer - Three-dimensional finite element method simulation study of the fusion screw geometry. Plastics, Rubber and Composites (accepted).

The thesis is written in good English, a number of misprints is very limited. However, in some parts a reader seems to be a little confused:

- The introductory part does not deal with the topics presented in the four contributions and practically bypasses the presented aims (p. 20). It contradicts to the Thesis for State Doctoral Examination where an approach was described in more detail. Here, the only possibility providing an outline about the research topics, is to read the individual contributions. In this sense the introductory part is misleading.
- The third part (References) concerns almost exclusively the historical development of extruders and no literature necessary for fulfilling the aims is introduced. From this viewpoint the Thesis for State Doctoral Examination provided better insight.
- Based on the preceding points, the only part where a reader can be informed about the results achieved by the applicant is cumulated in the fourth part (in the second part the descriptions of the individual contributions are literally copied abstracts).
- The number of pages of the Thesis is artificially increased, pages containing five, six rows could be remarkably condensed.

In the introduced contributions the applicant proved a sufficiently broad knowledge of the present state in the topic analysed and an ability to present it correctly and well balanced. Nevertheless, the following points should be answered:

- Why the titles of the Ph.D. Thesis and the Thesis for State Doctoral Examination are different?
- How was derived a participation of the applicant in the individual contributions?
- Visualization techniques are always accompanied with a lot of negative features, this discussion is completely missing.
- The applicant presents five aims of his Thesis. Discussion of the achieved results related to the individual aims would be beneficial.

As a whole, the thesis fulfils the demands imposed to this type of work. I recommend to accept the introduced Thesis.

Prague, 16 September, 2014

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