

# Preamble

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What is the purpose of the publication of this book?

This book was actually written and published in the year 2000 [1] in the form of articles in various Russian and foreign journals or conference papers.

You can find all these «thermal engineering» publications on the two websites: <http://tw.t.mpei.ac.ru/ochkov/work1.htm> and <http://tw.t.mpei.ac.ru/ochkov/work2.htm>.

So why do you need an additional publication in book form? Especially nowadays the traditional ("paper") book publishing is going through hard times. Usually are only those books published, where the costs of publication are paid in advance, either by the author, state, university, research institute or a business organization. But in this case, you have to save on everything: on the reviewers, scientific and literary editors, proofreaders, etc. So the quality of many books is reduced<sup>1</sup>. Therefore still numerous inaccuracies or/and errors remain in the text and because of this, books often unfortunately are overlooked. However, publishers often have no alternatives to this method. The competition between traditional publishing and electronic (by internet) publishing is very difficult. Often someone just scans the book and posts it on the internet and consequently blocks its sale fully or partially. Further details on this topic are provided in [1-3].

But it was possible to publish this book and the reader is able to hold it in his hands and read it. What's the price - this is the second question. The authors do not think about the commercial success of the book. The most important thing for the authors is, that this book is useful for the readers. It does not matter how the book is published: hard copy, electronic form including live internet calculations, etc.

So, why is this book was published as a hard copy?!

First, "there is nothing more pleasant than to smell a printed book." Especially, if you are one of the authors and you can see your own name on the book. The internet has nowadays a great speed and accessibility, but traditional technical books usually are published as hard copies. If you have printed version of the book, you can present it to somebody, to a research institute or even to a university. This cannot be done with an internet site. Although an internet site has also its own advantages: you can hotfix bugs, add new material or diagrams, illustrations, etc. We will not argue about what is better one- the book or the website, and will actively take the advantages of both "media products". Another advantages of paper books is, that you can read on the coach or even when you are on a trip. But nowadays there are also e-books or tablet computers, with which can also read on the coach and additionally make electronic bookmarks and fast search in the text. The authors of both fear and hope that after their book was published, someone will scan it and posted on the Internet (see above). Fear because the publishers and authors lose money. Hope because it is an indirect indication that the book is interesting and it is demanded by the readers. Bad books, which nobody reads, are not pirated and posted on the internet.

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<sup>1</sup> It is often said: "reduced to the level of the Internet". But the Internet has also a lot of decent titles with proper content and design.

Now, about the authors of this book.

There are Aleksandrov AA, Voloshchuk VA, VE Znamenskii, KA Orlov, Ochkov AV, Kyaw Ko Ko, Andreas Look and finally VF Ochkov. All of them are from the Moscow Power Engineering Institute ([www.mpei.ru](http://www.mpei.ru)) except Voloshchuk VA, who works at the National University of Water Management and Natural Resources (Rivne, Ukraine - [www.nuwm.rv.ua](http://www.nuwm.rv.ua)) and Andreas Look of the University Friedrich - Alexander (Erlangen, Germany [www.uni-erlangen.de](http://www.uni-erlangen.de)). VF Ochkov and KA Orlov also work in the thermocenter, named V.P. Glushko, Joint Institute for High Temperatures, Russian Academy of Sciences ([www.jiht.ru](http://www.jiht.ru)). Usually you say which of the authors of the book has written which chapter of the book. But in this book, it's hard to do. Here it is better to talk about the contribution by each of the authors. One of them created a function on the properties of substances (working fluid), the other one created a website and the third one wrote and debugged Mathcad-programs. Most texts are written by VF Ochkov and edit by all of the other authors. If the reader encounters in the book the word "author", then all of the above persons will be meant. With the words "I", "we", "me", "my" etc. in the texts of this book are all its authors and readers are meant, like "as we noted above", "we see on the chart", etc.

In the book, the reader will not find the traditional description of thermal processes. The authors do not add anything new to these descriptions and only rewrite existing texts<sup>2</sup> available in "more respectable journals" [4-7]. The purpose of the book is how to use modern software tools, in particular Mathcad and the Internet for the calculations of thermal processes.

The book contains *Studies*. What is this? In the language of musicians and chess players, "Studies" - are a little exercise to practice some elements of the game. The studies of this book do not want to teach those, who wish to work professionally with Mathcad. The studies shall show the basics of working with Mathcad, «work out some elements of the game» in the environment of the program. The examples are shown for simple and clear problems involving current issues of computational mathematics (solution of equations and systems - algebraic and differential, optimization, statistics, mathematical modeling, the technique of symbolic transformations, graphs and animations, etc.). The word "study" in art means a sketch, which is a part of a future picture. Studies of this book are not only exercises, but also a kind of sketches, where the attentive reader will find many useful tips and interesting ideas, that will be useful to him in the future when writing large Mathcad-paintings, related not only to heat engineering.

The website of the book is: <http://twf.mpei.ac.ru/TTHB/2/tdc.html>, where readers will also find how to contact the author. A lot of effort and money is invested in the website. The development of the website is supported by grants of the Russian Foundation for Basic Research ([www.rffi.ru](http://www.rffi.ru)) and the budgetary funds allocated for the development of the Moscow power Engineering Institute ([www.mpei.ru](http://www.mpei.ru)) as a national research university. Files of some tasks from this books are also available on the website of the company PTC ([www.ptc.com](http://www.ptc.com)).

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<sup>2</sup> So, by the way, many authors of study books do this.