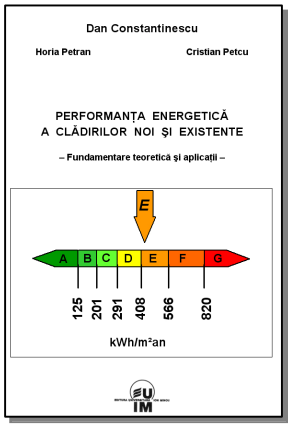

ENERGY PERFORMANCE OF NEW AND EXISTING BUILDINGS

Theoretical fundaments and applications

D. Constantinescu, H. Petran, C. Petcu

The aim of the book **Energy Performance of New and Existing Buildings** is to present the theoretical bases of the energy audit of buildings, *with reference to thermal* processes, as well as the most suggestive applications, complementary to the theoretical substantiation. The book presents the mathematical and physical support of the energy assessment, diagnosis, certification and auditing activities, specific to new and existing buildings, and is addressed to the research, design and higher education professionals in civil engineering, building equipment and architecture. As form of presentation and contents, the book is useful also to students and postgraduate students which intend to become energy auditors for buildings. Even if the book does not represent a guideline for the calculation of Building Energy Performance, Chapter **VIII** was conceived as a *calculation sheet*, in order to facilitate the software implementation of the analytical expressions given both by the Romanian technical regulations (those in the developing of which the authors have participated and those which have shown and show their utility, presented in Chapter VIII of the book), as well as in the present work. The bases of the work were established by the research carried out at INCERC Bucharest by the authors during different periods, starting with 1969. In 2000, the authors of the book developed the first Romanian technical regulations concerning energy certification and audit of buildings, known under the codified identifications NP 048-2000, NP 047-2000 and NP 049-2000. The merit of the Romanian regulations is, in the first place, that of being prefaced the European Directive 91 / 2002 / CE and that of orienting towards a phenomenological approach which frequently lacks to the methods recommended by certain European standards. The “European” approach is energy-oriented and refers to time periods pre-defined directly through the result of the integration of thermal flows in the form of the quantity of heat. The hot season, characterized by significant daily oscillations of the climate parameters is considered by the use of simplified calculation methods, in which the notion of *degrees-days* does not find any phenomenological justification. The calculation methods that use the analogy between the electrical network and the building envelope of living spaces represent an unacceptable simplification, which deforms both the field of temperatures and the profile of interior temperatures in those spaces.

The Energy Performance of Buildings represents one of the major subjects of concern in the activity of the authors, at the laboratory of *Building Equipment and Energy Efficiency in Buildings* at INCERC Bucharest. Practically, the book is written starting from the idea that the issuing of an energy performance certificate or that of analyzing packages of technical solutions for the energy upgrading of existing buildings, together with conceiving a new state-of-the-art building from the energy point of view, represent thinking models having in common the quantitative simulation of the heat and mass transfer processes, based on experimentally validated models, either into detail, at process level, or globally, at building level. The support of the validations presented in the paper is represented by the collective residential buildings in Bucharest and by the Experimental Building with controlled climate at INCERC Bucharest. By contents and approach, the book represents a novelty in the technical literature in Romania.

Editura Universitară Ion Mincu
ISBN: 978-973-1884-10-3
Anul: 2008