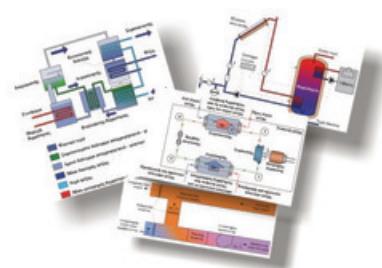


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Abstract

The book aspires to be a complete scientific and technical manual for: a. the calculation of space conditioning loads and hot water production loads, b. the sizing of thermal power generation and distribution systems for space conditioning and hot water production, c. the presentation of the principles of installation of thermal power generation and distribution systems. First, basic relevant theoretical concepts from thermodynamics and heat transfer are developed. Then the basic calculations of air conditioning systems are presented with the help of the psychrometric chart. The basic concepts of psychrometry are introduced, leading to the solution of real cases of space air conditioning in heating and cooling. This is followed by the presentation of concepts from solar geometry and radiation, which, through the introduction of solar gain coefficients, leads to the calculation of solar gains from transparent and opaque surfaces. The next chapter presents the methodologies for calculating

thermal and cooling loads. The categories of thermal losses are presented and methodologies for their estimation are given. The chapter concludes with typical results of heating and cooling loads for different types of buildings in different geographical locations. This is followed by a presentation of thermal power generation and distribution systems (boilers, heat pumps, air ducts, single-pipe and double-pipe systems, etc.). Sizing methods and principles of their installation are given. The basic refrigeration cycle and its variants (supercooling, superheating, multistage compression) are then presented. This is followed by a presentation of the basic refrigeration production equipment with a detailed description of their components and their sizing. Finally, the detailed sizing procedure of the air duct networks is given. The book concludes with basic principles and methods for maximizing the efficiency of air conditioning systems, and relevant examples are provided.

