

Cooling Load Calculation Example

The complete guide to building technology This comprehensive guide provides complete coverage of every aspect of the building technologist's profession. It details design and installation procedures, describes all relevant equipment and hardware, and illustrates the preparation of working drawings and construction details that meet project specifications, code requirements, and industry standards. The author establishes procedures for professional field inspections and equipment operations tests, provides real-world examples from both residential and nonresidential construction projects, and makes specific references to code compliance throughout the text. This new edition incorporates changes in building codes, advances in materials and design techniques, and the emergence of computer-aided design (CAD), while retaining the logical structure and helpful special features of the first edition. More than 1,100 drawings, tables, and photographs complement and illustrate discussions in the text. Topics covered include: * Heating, ventilating, and air conditioning systems- equipment and design * Plumbing systems- equipment and design * Electrical and lighting systems- equipment and design * Testing, adjusting, and balancing procedures for all building systems * Every aspect of the building technologist's profession, from the creation of working drawings through on-site supervision and systems maintenance Extensive appendices include conversion factors; duct design data; test report forms for use in field work; design forms and schedules for electrical, HVAC, and plumbing work; and more. This handbook contains detailed descriptions of proper temperature management for perishables and commercial methods of cooling fruits, vegetables, and cut flowers. Includes a complete discussion of design for hydro-cooler and forced-air cooler systems.

Heating and cooling load calculations are carried out to estimate the required capacity of heating and cooling systems, which can maintain the required conditions in the conditioned space. To estimate the required cooling or heating capacities, one has to have information regarding the design indoor and outdoor conditions, specifications of the building, specifications of the conditioned space (such as the occupancy, activity level, various appliances and equipment used etc.) and any special requirements of the particular application. For comfort applications, the required indoor conditions are fixed by the criterion of thermal comfort, while for industrial or commercial applications the required indoor conditions are fixed by the particular processes being performed or the products being stored. Generally, heating and cooling load calculations involve a systematic and stepwise procedure, which account for all the building energy flows. In practice, a variety of methods ranging from simple rules-of-thumb to complex transfer function methods are used to arrive at the building loads. This short quick book provides a procedure for preparing a manual calculation for cooling load using CLTD/CLF method suggested by ASHRAE and includes two detailed examples. For more advanced methods such as TFM, the reader should refer to ASHRAE and other handbooks. Learning Objective At the end of this course, the student should be able to: 1. Understand the basic terminology and definitions related to air conditioning load calculations 2. Explain the differences between heating and cooling load design considerations 3. Explain the difference between 1) space heat gain v/s cooling load 2) space cooling v/s cooling load and 3) external loads v/s internal loads 4. Differentiate between sensible and latent loads 5. List commonly used methods for estimating cooling loads 6. Estimate the internal and external cooling loads using CLTD/CLF method from building specifications, design indoor and outdoor conditions, occupancy etc. 7. Describe various equations and the information sources to determine conductive load through opaque building elements. 8. Describe various equations and information sources to determine the solar transmission load through glazing. 9. Describe various equations and information sources to determine the internal load due to people, lights and power appliances. 10. Determine the supply air flow rate 11. Learn by examples the detailed methodology to cooling load calculations 12. Learn the functional parameters of software programs such as TRACE 700 and CHVAC

This book provides a first course in Refrigeration and Air Conditioning. The subject matter has been developed in a logical and coherent manner with neat illustrations and a fairly large number of solved examples and unsolved problems. The text, developed from the author's teaching experience of many years, is suitable for the senior-level undergraduate and first-year postgraduate students of mechanical engineering, automobile engineering as well as chemical engineering. The text commences with an introduction to the fundamentals of thermodynamics and a brief treatment of the various methods of refrigeration. Then follows the detailed discussion and analysis of air refrigeration systems, vapour compression and vapour absorption refrigeration systems with special emphasis on developing sound physical concepts and gaining problem solving skills. Refrigerants are exhaustively dealt with in a separate chapter. The remainder chapters of the book deal with psychrometry and various processes required for the analysis of air conditioning systems. Technical descriptions of compressors, evaporators, condensers, expansion devices and ducts are provided along with design practices for cooling and heating load calculations. Finally, a brief review of the basic principles and applications of cryogenic gases and air liquefaction systems are given.

ANSI/ACCA 2 Manual J8AE - 2016 Residential Load Calculation (8th Edition - AE)

The Third Edition of ANSI/ACCA Manual D is the Air Conditioning Contractors of America procedure for sizing residential duct systems. This procedure uses Manual J (ANSI/ACCA, Eighth Edition) heating and cooling loads to determine space air delivery requirements. This procedure matches duct system resistance (pressure drop) to blower performance (as defined by manufacturer's blower performance tables). This assures that appropriate airflow is delivered to all rooms and spaces; and that system airflow is compatible with the operating range of primary equipment. The capabilities and sensitivities of this procedure are compatible with single-zone systems, and multi-zone (air zoned) systems. The primary equipment can have a multi-speed blower (PSC motor), or a variable-speed blower (ECM or constant torque motor, or a true variable speed motor). Edition Three, Version 2.50 of Manual D (D3) specifically identifies normative requirements, and specifically identifies related informative material.

The heating, ventilation, and air conditioning (HVAC) system is arguably the most complex system installed in a house and is a substantial component of the total house energy use. A right-sized HVAC system will provide the desired occupant comfort and will run efficiently. This Strategy Guideline discusses the information needed to initially select the equipment for a properly designed HVAC system. Right-sizing of an HVAC system involves the selection of equipment and the design of the air distribution system to meet the accurate predicted heating and cooling loads of the house. Right-sizing the HVAC system begins with an accurate understanding of the heating and cooling loads on a space; however, a full HVAC design involves more than just the load estimate calculation - the load calculation is the first step of the iterative HVAC design procedure. This guide describes the equipment selection of a split system air conditioner and furnace for an example house in Chicago, IL as well as a heat pump system for an example house in Orlando, Florida. The required heating and cooling load information for the two example houses was developed in the Department of Energy Building America Strategy Guideline: Accurate Heating and Cooling Load Calculations.

Whole System Design is increasingly being seen as one of the most cost-effective ways to both increase the productivity and reduce the negative environmental impacts of an engineered system. A focus on design is critical as the output from this stage of the project locks in most of the economic and environmental performance of the designed system throughout its life which can span from a few years to many decades. Indeed it is now widely acknowledged that all designers - particularly engineers architects and industrial designers - need to be able to

understand and implement a whole system design approach. This book provides a clear design methodology based on leading efforts in the field and is supported by worked examples that demonstrate how advances in energy materials and water productivity can be achieved through applying an integrated approach to sustainable engineering. Chapters 1-5 outline the approach and explain how it can be implemented to enhance the established Systems Engineering framework. Chapters 6-10 demonstrate through detailed worked examples the application of the approach to industrial pumping systems passenger vehicles electronics and computer systems temperature control of buildings and domestic water systems. Published with The Natural Edge Project the World Federation of Engineering Organizations UNESCO and the Australian Government.

"This book presents the most current design procedures in heating, ventilation and air conditioning (HVAC), available in handbooks, like the ASHRAE (American Society of Heating, Refrigeration and Air Conditioning Engineers) Handbook-2013 Fundamentals, in a way that is easier for students to understand. Every effort is made to explain in detail the fundamental physical principles that form the basis of the various design procedures. A novel feature of the book is the inclusion of about 15 worked examples in each chapter, carefully chosen to highlight the diverse aspects of HVAC design. The solutions for the worked examples clarify the physical principles behind the design method. In addition, there are problems at the end of each chapter for which numerical answers are provided. The book includes a series of MATLAB programs that may be used to solve realistic HVAC design problems, which in general, require extensive and repetitive calculations."--

The Code of Federal Regulations is a codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the United States Federal Government.

Keep it cool or heat things up This third volume of Audel's HVAC Library gives you a comprehensive, hands-on guide to installing, servicing, and repairing all basic air-conditioning systems in both new and older construction. You'll also find complete coverage of specialized heating units-radiators, radiant heating systems, stoves, fireplaces, heat pumps, and indoor/outdoor pool heaters, plus fans, exhaust systems, air filters, and more. It's what you need to complete your HVAC reference library. * Make accurate calculations for AC system output * Tailor AC systems for older construction * Learn to install and service today's popular electronic air cleaners and filters * Service less common heating systems such as coal-fired furnaces * Install, maintain, and repair humidifiers and dehumidifiers * Handle radiators, convectors, and baseboard heating units

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Based on the most recent standards from ASHRAE, the sixth edition provides complete and up-to-date coverage of all aspects of heating, ventilation, and air conditioning. The latest load calculation procedures, indoor air quality procedures, and issues related to ozone depletion are covered. New to this edition is the inclusion of additional realistic, interactive and in-depth examples available on the book website (www.wiley.com/college/mcquiston) that enable students to simulate various scenarios to apply concepts from the text. Also integrated throughout the text are numerous worked examples that clearly show students how to apply the concepts in realistic scenarios. The sixth edition has also been revised to be more accessible to students for easier comprehension. Suitable for one or two semester, Junior/Senior/Graduate course in HVAC taught in Mechanical Engineering, Architectural Engineering, and Mechanical Engineering Technology departments.

This revised edition presents an engineering design approach to ventilation and air conditioning as part of the comprehensive environmental control of the mine atmosphere. It provides an in-depth look, for practitioners who design and operate mines, into the health and safety aspects of environmental conditions in the underground workplace.

* A broad range of disciplines--energy conservation and air quality issues, construction and design, and the manufacture of temperature-sensitive products and materials--is covered in this comprehensive handbook * Provide essential, up-to-date HVAC data, codes, standards, and guidelines, all conveniently located in one volume * A definitive reference source on the design, selection and operation of A/C and refrigeration systems

Heating and Cooling Load Calculations is a handbook that covers various concerns in calculating heating and cooling. The title provides a logical study of the physical and engineering factors that affect the heating and cooling load. The coverage of the text includes heat transfer; heating loads and its reduction; and design temperature conditions. The text also covers the cooling design conditions and the components of cooling load and its reduction. The book will be of great use to both student and professional engineers.

"This manual focuses on the calculation of cooling and heating loads for commercial buildings. The heat balance method (HBM) and radiant time series method (RTSM) (as well as how to implement these methods) are discussed. Heat transfer processes and their analysis, psychrometrics, and heating load calculations are also considered"--

The Latest Information and "Tricks of the Trade" for Achieving First-Rate HVAC Designs on Any Construction Job! HVAC Equations, Data, and Rules of Thumb presents a wealth of state-of-the-art HVAC design information and guidance, ranging from air distribution to piping systems to plant equipment. This popular reference has now been fully updated to reflect the construction

industry's new single body of codes and standards. Featuring an outline format for ease of use, the Second Edition of this all-in-one sourcebook contains: Updated HVAC codes and standards, including the 2006 International Building Code Over 200 equations for everything from ductwork to air-handling systems ASME and ASHRAE code specifications Over 350 rules of thumb for cooling, heating, ventilation, and more New material including: coverage of the new single body of construction codes now used throughout the country Inside This Updated HVAC Design Guide • Definitions • Equations • Rules of Thumb for Cooling, Heating, Infiltration, Ventilation, Humidification, People/Occupancy, Lighting, and Appliance/Equipment • Cooling Load Factors • Heating Load Factors • Design Conditions and Energy Conservation • HVAC System Selection Criteria • Air Distribution Systems • Piping Systems (General, Hydronic, Glycol, Steam, Steam Condensate, AC Condensate, Refrigerant) • Central Plant Equipment (Air-Handling Units, Chillers, Boilers, Cooling Towers, Heat Exchangers) • Auxiliary Equipment (Fans, Pumps, Motors, Controllers, Variable-Frequency Drives, Filters, Insulation, Fire Stopping) • Automatic Controls/Building Automation Systems • Equipment Schedules • Equipment Manufacturers • Building Construction Business Fundamentals • Architectural, Structural, and Electrical Information • Conversion Factors • Properties of Air and Water • Designer's Checklist • Professional Societies and Trade Organizations • References and Design Manuals • Cleanroom Criteria and Standards

Manual J 8th Edition is the national ANSI-recognized standard for producing HVAC equipment sizing loads for single-family detached homes, small multi-unit structures, condominiums, town houses, and manufactured homes. This new version incorporates the complete Abridged Edition of Manual J. The manual provides quick supplemental details as well as supporting reference tables and appendices. A proper load calculation, performed in accordance with the Manual J 8th Edition procedure, is required by national building codes and most state and local jurisdictions.

Heating and Cooling of Buildings: Principles and Practice of Energy Efficient Design, Third Edition is structured to provide a rigorous and comprehensive technical foundation and coverage to all the various elements inherent in the design of energy efficient and green buildings. Along with numerous new and revised examples, design case studies, and homework problems, the third edition includes the HCB software along with its extensive website material, which contains a wealth of data to support design analysis and planning. Based around current codes and standards, the Third Edition explores the latest technologies that are central to design and operation of today's buildings. It serves as an up-to-date technical resource for future designers, practitioners, and researchers wishing to acquire a firm scientific foundation for improving the design and performance of buildings and the comfort of their occupants. For engineering and architecture students in undergraduate/graduate classes, this comprehensive textbook:

Provide a comprehensive source of theory, procedures and data for cooling and heating load calculations for other than residential buildings.

For more than half a century, this book has been a fixture in architecture and construction firms the world over. Twice awarded the AIA's Citation for Excellence in International Architecture Book Publishing, Mechanical and Electrical Equipment for Buildings is recognized for its comprehensiveness, clarity of presentation, and timely coverage of new design trends and technologies. Addressing mechanical and electrical systems for buildings of all sizes, it provides design guidelines and detailed design procedures for each topic covered. Thoroughly updated to cover the latest technologies, new and emerging design trends, and relevant codes, this latest edition features more than 2,200 illustrations--200 new to this edition--and a companion Website with additional resources.

Issues in Energy Research and Application / 2011 Edition is a ScholarlyEditions™ eBook that delivers timely, authoritative, and comprehensive information about Energy Research and Application. The editors have built Issues in Energy Research and Application: 2011 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Energy Research and Application in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Issues in Energy Research and Application: 2011 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at <http://www.ScholarlyEditions.com/>.

Analysis and Design of Heating, Ventilating, and Air-Conditioning Systems, Second Edition, provides a thorough and modern overview of HVAC for commercial and industrial buildings, emphasizing energy efficiency. This text combines coverage of heating and air conditioning systems design with detailed information on the latest controls technologies. It also addresses the art of HVAC design along with carefully explained scientific and technical content, reflecting the extensive experience of the authors. Modern HVAC topics are addressed, including sustainability, IAQ, water treatment and risk management, vibration and noise mitigation, and maintainability from a practical point of view. The art and the science of building systems design evolve continuously as designers, practitioners, and researchers all endeavor to improve the performance of buildings and the comfort and productivity of their occupants. Retaining coverage from the original second edition while updating the information in electronic form, Heating and Cooling of Buildings: Design for Efficiency, Revised Second Edition presents the technical basis for designing the lighting and mechanical systems of buildings. Along with numerous homework problems, the revised second edition offers a full chapter on economic analysis and optimization, new heating and cooling load procedures and databases, and simplified procedures for ground coupled heat transfer calculations. The accompanying CD-ROM contains an updated version of the Heating and Cooling of Buildings (HCB) software program as well as electronic appendices that include over 1,000 tables in HTML format that can be searched by major categories, a table list, or an index of topics. Ancillary information is available on the book's website www.hcbcentral.com From materials to computers, this edition explores the latest technologies exerting a profound effect on the design and operation of buildings. Emphasizing design optimization and critical thinking, the book continues to be the ultimate resource for understanding energy use in buildings.

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