Thermal Performance Modeling Of Cross Flow Heat Exchangers Springerbriefs In Applied Sciences And Technology

AVERY ALESSANDRO

Reliability in Power Electronics and Electrical Machines: Industrial Applications and Performance Models John Wiley & Sons
Thermal Performance Modeling of Cross-Flow Heat ExchangersSpringer
Design of Thermal Energy Systems Springer
Underground Cable Thermal Backfill documents the proceedings of the ""Symposium on Underground Cable Thermal Backfill,"" held in Toronto, Canada, 17-18 September 1981. The symposium brought together research, design, and installation engineers from utilities, cable manufacturers, and universities to present and discuss developments in the field. The contributions of researchers at the symposium are organized into five chapters. Chapter 1 presents an overview of the state-of-the-art of cable backfill materials and soil thermal property measurements. The papers in Chapter 2 deal with developments in cable backfill materials. These include materials stabilized with moisture substitutes, pumpable materials, and materials stabilized with bound water. Chapter 3 covers thermal property measurements of soils and backfills. Through the automation of measurements and analysis using microprocessor based instruments and better control of experimental conditions, substantial improvements have been made in the area of measurement technology. Chapter 4 reports developments in the study of soil thermal stability and the implication thereof for thermal cable design. Chapter 5 discusses various aspects of thermal cable design, including methods for incorporating historical weather records to predict worst case soil and backfill thermal conductivities. This volume should serve as a useful introduction to the subject of cable thermal design for engineers involved in underground transmission and distribution systems.
Publications of the National Institute of Standards and Technology ... Catalog Elsevier
Presenting contributions from renowned experts in the field, this book covers research and development in fundamental areas of heat exchangers, which include: design and theoretical development, experiments, numerical modeling and simulations. This book is intended to be a useful reference source and guide to researchers, postgraduate students, and engineers in the fields of heat exchangers, cooling, and thermal management.
Federal Software Exchange Catalog Springer
Doctoral Thesis on the topic of Modeling and Performance Analysis of Alternative Heat Exchangers for Heavy Vehicles Popular Science Description: Low fuel consumption, and reduced exhaust emissions, as well as improved performance and durability become much more important than before for the vehicle industry. These requirements lead to a number of additional equipment installed in the vehicles. All these efforts increase the operating temperature in the engine compartment and reduce the available free space in the vehicle. In order to keep the engine working at its optimal condition, a huge amount of heat has to be removed from the engine to the surrounding air. In modern heavy vehicles, this heat is so huge that a conventional heat exchanger (HEX) cannot handle it easily. In addition, more and more electric powertrains are introduced to heavy vehicles. Because of the increased demand in cooling power, a larger heat exchanger size with a huge cooling surface area is required for the vehicle cooling system. However, the space in such vehicles is limited. It is impossible to increase the size of the conventional HEX to dissipate

the required amount of heat from the vehicle. All these factors imply a need for a revolution of the HEX design in vehicles. Based on literature review, there are two ideas available for developing an alternative heat exchanger for heavy vehicles: 1) Changing the position of heat exchangers: Moving the HEX from the front of the vehicles to the roof of the driver compartment, which might increase the possibility to increase the size of the HEX. Based on the air flowing direction and the engine coolant direction, a countercurrent flow HEX is introduced at the roof position instead of a cross flow HEX. 2) Introducing new materials: Using graphite foam as a thermal material for HEXs in vehicles. Nowadays aluminum HEXs are very common in the vehicle industry. Due to the increasing cooling power and the space limitation in vehicles, a highly compact HEX is required. Graphite foam has even higher thermal conductivity, large specific surface area, and low density. These characteristics imply that graphite foam is a potentially good thermal material for HEXs (instead of the conventional aluminum HEX). However, due to its porous structure, the flow resistance of graphite foam is very high. In order to find an appropriate fin configuration with good performance in the HEX, a computational method is applied to simulate the performance of the HEX with different fin configurations. The numerical model is verified by experimental results from literature. The analysis of the results shows: 1) The overall size and weight of a countercurrent flow HEX can be reduced compared to the cross flow HEX because of the high power density and high compactness factor achieved by the countercurrent flow HEX. 2) Because of the high thermal conductivity and low density of the graphite foam, the graphite foam wavy corrugated fin provides higher power density and higher compactness factor than an aluminum louver fin. A graphite foam fin with two-side dimples exhibits higher coefficient of performance (COP) than an aluminum louver fin, and it becomes very efficient in energy saving. Thus, the graphite foam has a very high potential as an alternative material for heat exchanger applications. The countercurrent flow HEXs made from graphite foam can be designed to be much lighter and smaller than the convectional cross flow aluminum HEXs. A light and compact HEX is not only good for the thermal management of the vehicle, but also it reduces the weight of the vehicle which has an effect on the fuel consumption and overall cost. The present work is based on a research project "Development of new cooling systems for heavy vehicles - for reduced fuel consumption and lower carbon dioxide emission," which has been financially supported partly by the Swedish Energy Agency (STEM).

Proceedings of the ... National Passive Solar Conference Thermal Performance Modeling of Cross-Flow Heat Exchangers

Thermofluid Modeling for Sustainable Energy Applications provides a collection of the most recent, cutting-edge developments in the application of fluid mechanics modeling to energy systems and energy efficient technology. Each chapter introduces relevant theories alongside detailed, real-life case studies that demonstrate the value of thermofluid modeling and simulation as an integral part of the engineering process. Research problems and modeling solutions across a range of energy efficiency scenarios are presented by experts, helping users build a sustainable engineering knowledge base. The text offers novel examples of the use of computation fluid dynamics in relation to hot topics, including passive air cooling and thermal storage. It is a valuable resource for academics, engineers, and students undertaking research in thermal engineering. Includes contributions from experts in energy efficiency modeling across a range of engineering fields Places thermofluid modeling and simulation at the center of engineering design and development, with theory supported by detailed, real-life case studies Features hot topics in energy and sustainability engineering, including thermal storage and passive air cooling Provides a valuable resource for academics, engineers, and students undertaking research in thermal engineering

Thermal Performance Modeling of Cross-Flow Heat Exchangers CRC Press

Conjugate Heat and Mass Transfer in Heat Mass Exchanger Ducts bridges the gap between fundamentals and recent discoveries, making it a valuable tool for anyone looking to expand their knowledge of heat exchangers. The first book on the market to cover conjugate heat and mass transfer in heat exchangers, author Li-Zhi Zhang goes beyond the basics to cover recent advancements in equipment for energy use and environmental control (such as heat and moisture recovery ventilators, hollow fiber membrane modules for humidification/dehumidification, membrane modules for air purification, desiccant wheels for air dehumidification and energy recovery, and honeycomb desiccant beds for heat and moisture control). Explaining the data behind and the applications of conjugated heat and mass transfer allows for the design, analysis, and optimization of heat and mass exchangers. Combining this recently discovered data into one source makes it an invaluable reference for professionals, academics, and other interested parties. A research-based approach emphasizing numerical methods in heat mass transfer Introduces basic data for exchangers' design (such as friction factors and the Nusselt/Sherwood numbers), methods to solve conjugated problems, the modeling of various heat and mass exchangers, and more The first book to include recently discovered advancements of mass transfer and fluid flow in channels comprised of new materials Includes illustrations to visually depict the book's key concepts

Building Performance Analysis Elsevier

In modern industries, electrical energy conversion systems consist of two main parts: electrical machines and power electronic converters. With global electricity use at an all-time high, uninterrupted operation of electrical power converters is essential. Reliability in Power Electronics and Electrical Machines: Industrial Applications and Performance Models provides an in-depth analysis of reliability in electrical energy converters as well as strategies for designing dependable power electronic converters and electrical machines. Featuring a comprehensive discussion on the topics of reliability design and measurement, failure mechanisms, and specific issues pertaining to quality, efficiency, and durability, this timely reference source offers practical examples and research-based results for use by engineers, researchers, and advanced-level students.

CFD Modeling and Optimization Analysis of Thermal Energy Storage Based Solar Collectors BoD – Books on Demand

The 5th International Congress on Design and Modeling of Mechanical Systems (CMSM) was held in Djerba, Tunisia on March 25-27, 2013 and followed four previous successful editions, which brought together international experts in the fields of design and modeling of mechanical systems, thus contributing to the exchange of information and skills and leading to a considerable progress in research among the participating teams. The fifth edition of the congress (CMSM´2013), organized by the Unit of Mechanics, Modeling and Manufacturing (U2MP) of the National School of Engineers of Sfax, Tunisia, the Mechanical Engineering Laboratory (MBL) of the National School of Engineers of Monastir, Tunisia and the Mechanics Laboratory of Sousse (LMS) of the National School of Engineers of Sousse, Tunisia, saw a significant increase of the international participation. This edition brought together nearly 300 attendees who exposed their work on the following topics: mechatronics and robotics, dynamics of mechanical systems, fluid structure interaction and vibroacoustics, modeling and analysis of materials and structures, design and manufacturing of mechanical systems. This book is the proceedings of CMSM´2013 and contains a careful selection of high quality contributions, which were exposed during various sessions of the congress. The original articles presented here provide an overview of recent research advancements accomplished in the field mechanical engineering.

Preprints Springer Science & Business Media

Explores and brings together the existent body of knowledge on building performance analysis Building performance is an important yet surprisingly complex concept. This book presents a comprehensive and systematic overview of the subject. It provides a working definition of building performance, and an in-depth discussion of the role building performance plays throughout the building life cycle. The book also explores the perspectives of various stakeholders, the functions of buildings, performance requirements, performance quantification (both predicted and measured), criteria for success, and the challenges of using performance analysis in practice. Building Performance Analysis starts by introducing the subject of building performance: its key terms, definitions, history, and challenges. It then develops a theoretical foundation for the subject, explores the complexity of performance assessment, and the way that performance analysis impacts on actual buildings. In doing so, it attempts to answer the following questions: What is building performance? How can building performance be measured and analyzed? How does the analysis of building performance guide the improvement of buildings? And what can the building domain learn from the way performance is handled in other disciplines? Assembles the current body of knowledge on building performance analysis in one unique resource Offers deep insights into the complexity of using building performance analysis throughout the entire building life cycle, including design, operation and management Contributes an emergent theory of building performance and its analysis Building Performance Analysis will appeal to the building science community, both from industry and academia. It specifically targets advanced students in architectural engineering, building services design, building performance simulation and similar fields who hold an interest in ensuring that buildings meet the needs of their stakeholders.

ITHERM John Wiley & Sons

Still the Most Complete, Up-To-Date, and Reliable Reference in the FieldDrying is a highly energy-intensive operation and is encountered in nearly all industrial sectors. With rising energy costs and consumer demands for higher quality dried products, it is increasingly important to be aware of the latest developments in industrial drying technolog

Publications Nova Publishers

Semiannual, with semiannual and annual indexes. References to all scientific and technical literature coming from DOE, its laboratories, energy centers, and contractors. Includes all works deriving from DOE, other related government-sponsored information, and foreign nonnuclear information. Arranged under 39 categories, e.g., Biomedical sciences, basic studies; Biomedical sciences, applied studies; Health and safety; and Fusion energy. Entry gives bibliographical information and abstract. Corporate, author, subject, report number indexes.

Building Technology Publications Academic Press

Heat exchangers are essential in a wide range of engineering applications, including power plants, automobiles, airplanes, process and chemical industries, and heating, air-conditioning, and refrigeration systems. Revised and fully updated with new problem sets, Heat Exchangers: Selection, Rating, and Thermal Design, Fourth Edition presents a systematic treatment of heat exchangers, focusing on selection, thermal-hydraulic design, and rating. Topics discussed include Classification of heat exchangers Basic design methods of heat exchangers for sizing and rating problems Single-phase forced convection correlations for heat exchangers Pressure drop and pumping power for heat exchangers and piping circuits Design methods of heat exchangers subject to fouling Thermal design methods and processes for double-pipe, shell-and-tube, gasketed-plate, compact, and polymer heat exchangers Two-phase convection correlations for heat exchangers Thermal design of condensers and evaporators Micro/nanoheat transfer The Fourth Edition contains updated information about microscale heat exchangers and the enhancement heat transfer for applications to heat exchanger design and experiment with nanofluids. The Fourth Edition is designed for courses/modules in process heat transfer, thermal systems design, and heat exchanger technology. This text includes full coverage of all widely used heat exchanger types. A complete solutions manual and figure slides of the text's illustrations are available for qualified adopting instructors.

NBS Special Publication CreateSpace

This monograph introduces a numerical computational methodology for thermal performance modeling of cross-flow heat exchangers, with applications in chemical, refrigeration and automobile industries. This methodology allows obtaining effectiveness-number of transfer units (e-NTU) data and has been used for simulating several standard and complex flow arrangements configurations of cross-flow heat exchangers. Simulated results have been validated through comparisons with results from available exact and approximate analytical solutions. Very accurate results have been obtained over wide ranges of NTU and C* values in all cases. The proposed procedure constitutes a useful research tool for both theoretical and experimental studies of cross-flow heat exchangers. The following are the unique features of the book: - The monograph includes the computational code named HETE (Heat Exchanger Thermal Effectiveness) in Chapter 5. A version of this code is available for downloading. - The computational procedure could be used for reducing experimental data using the effectiveness - NTU (e-NTU) method in research and industrial laboratories. - Even after more than one century in heat exchanger research, the search for new flow arrangements with higher effectiveness still is an unsolved problem. The present methodology could be a useful tool in pursuing that goal.

Applied Mathematical Modeling CRC Press

This monograph introduces a numerical computational methodology for thermal performance modeling of cross-flow heat exchangers, with applications in chemical, refrigeration and automobile industries. This methodology allows obtaining effectiveness-number of transfer units (e-NTU) data and has been used for simulating several standard and complex flow arrangements configurations of cross-flow heat exchangers. Simulated results have been validated through comparisons with results from available exact and approximate analytical solutions. Very accurate results have been obtained over wide ranges of NTU and C* values in all cases. The proposed procedure constitutes a useful research tool for both theoretical and experimental studies of cross-flow heat exchangers. The following are the unique features of the book: - The monograph includes the computational code named HETE (Heat Exchanger Thermal Effectiveness) in Chapter 5. A version of this code is available for downloading. - The computational procedure could be used for reducing experimental data using the effectiveness - NTU (e-NTU) method in research and industrial laboratories. - Even after more than one century in heat exchanger research, the search for new flow arrangements with higher effectiveness still is an unsolved problem. The present methodology could be a useful tool in pursuing that goal.

Applied Mechanics Reviews IGI Global
Among various types of solar collectors, evacuated tube solar collector (ETC) has attracted much attention, especially for their application in solar water heating systems (SWHs). However, due to the intermittency in solar intensity, the ETCs may not work at their maximum functionality. In this study, the computational fluid dynamics (CFD) modeling of a heat pipe ETC (HPETC) with and without the integration of phase change materials (PCMs) is performed. In order to cross-validate the obtained results from CFD and recent experimental analysis, the boundary conditions are set as the field-testing data. The simulation results show an acceptable agreement with the experimental data with an average deviation of 4.8%. In order to further increase the accuracy of a numerical model, the volume of fluid (VOF) approach is adopted to simulate two-phase (evaporation-condensation process) phenomena inside a heat pipe. The result showed a 0.78% increase in numerical model accuracy when the heat pipe is simulated as a two-phase device in comparison with the simplified approach (in which HP is considered a high thermal conductive device). The result of this study showed improvement in numerical model accuracy when the VOF model is adopted. However, the VOF approach is found very time-consuming. As a result, a simplified numerical approach is adopted to optimize the thermal performance of an HPETC system. The performance of an HPETC is optimized by investigating the effect of HP position and various energy storage materials in both normal and on-demand operations. The results show that the solid-to-liquid phase change process was expedited by 48 minutes when the HP shifted from the top to the center of the glass tube. On the other hand, during normal operation, the maximum liquid fraction of PCM reached up to 98% in an optimized system whereas the conventional system reached up to only 74%. During normal operation, It is observed that the HPETC system integrated with PCM struggled to reach a melting fraction of 100% due to its poor thermal conductivity. The issue of poor thermal conductivity is addressed by impregnation of high thermal conductive porous metal to the PCM. To demonstrate the viability of the proposed approach, experimental analysis is carried out. The proposed system has reported maximum thermal efficiency of 71.71% while the conventional system showed maximum thermal efficiency of only 29.14%. Impregnation of porous metal to the PCM showed promising results and improved thermal performance in the HPETC system. The same approach is used to improve the electrical and thermal performance of a photovoltaic-thermal (PVT) system. CFD analysis is performed to assess the effect of integrating PCM + Cu porous metal with the PVT system. In addition, during the simulation, a real-time transient solar radiation boundary condition is applied to accurately predict the performance parameters such as the surface temperature of the PV cell, melting fraction of PCM, and the thermal energy stored by the system. The PVT system integrated with PCM + Cu porous metal system exhibited electrical efficiency of 11.49% which is 12.09% higher compared with the PVT system integrated with pure PCM. In addition, PV cell temperature is also decreased by 23.03 oC for the PVT system integrated with PCM + Cu porous metal. The outcome of this study can be a benchmark for further optimization of thermal energy storage-based solar collectors.
ASTM International
The Handbook of Clean Energy Systems brings together an international team of experts to present a comprehensive overview of the latest research, developments and practical applications throughout all areas of clean energy systems. Consolidating information which is currently scattered across a wide variety of literature sources, the handbook covers a broad range of topics in this interdisciplinary research field including both fossil and renewable energy systems. The development of intelligent energy systems for efficient energy processes and mitigation technologies for the reduction of environmental pollutants is explored in depth, and environmental, social and economic impacts are also addressed. Topics covered include: Volume 1 - Renewable Energy: Biomass resources and biofuel production; Bioenergy Utilization; Solar Energy; Wind Energy; Geothermal Energy; Tidal Energy. Volume 2 - Clean Energy Conversion Technologies: Steam/Vapor Power Generation; Gas Turbines Power Generation; Reciprocating Engines; Fuel Cells; Cogeneration and Polygeneration. Volume 3 - Mitigation Technologies: Carbon Capture; Negative Emissions System; Carbon Transportation; Carbon Storage; Emission Mitigation Technologies; Efficiency Improvements and Waste Management; Waste to Energy. Volume 4 - Intelligent Energy Systems: Future Electricity Markets; Diagnostic and Control of Energy Systems; New Electric Transmission Systems; Smart Grid and Modern Electrical Systems; Energy Efficiency of Municipal Energy Systems; Energy Efficiency of Industrial Energy Systems; Consumer Behaviors; Load Control and Management; Electric Car and Hybrid Car; Energy Efficiency Improvement. Volume 5 - Energy Storage: Thermal Energy Storage; Chemical Storage; Mechanical Storage; Electrochemical Storage; Integrated Storage Systems. Volume 6 - Sustainability of Energy Systems: Sustainability Indicators, Evaluation Criteria, and Reporting; Regulation and Policy; Finance and Investment; Emission Trading; Modeling and Analysis of Energy Systems; Energy vs. Development; Low Carbon Economy; Energy Efficiencies and Emission Reduction. Key features: Comprising over 3,500 pages in 6 volumes, HCES presents a comprehensive overview of the latest research, developments and practical applications throughout all areas of clean energy systems, consolidating a wealth of information which is currently scattered across a wide variety of literature sources. In addition to renewable energy systems, HCES also covers processes for the efficient and clean conversion of traditional fuels such as coal, oil and gas, energy storage systems, mitigation technologies for the reduction of environmental pollutants, and the development of intelligent energy systems. Environmental, social and economic impacts of energy systems are also addressed in depth. Published in full colour throughout. Fully indexed with cross referencing within and between all six volumes. Edited by leading researchers from academia and industry who are internationally renowned and active in their respective fields. Published in print and online. The online version is a single publication (i.e. no updates), available for one-time purchase or through annual subscription.
ERDA Energy Research Abstracts CRC Press
Today's society has developed an ever-increasing dependence on electronic components, making it a critical challenge to match the rising demand for size reduction and performance reliability with efficient cooling strategies. Heat sinks are still the most common form of heat rejecting devices used in electronic cooling, and it has been shown in recent years that heat sinks with variable geometry can lead to efficiency improvement. The geometrical complexity and multi-scale nature of heat sinks make their modeling a challenging, and often time consuming, task. Volume Averaging Theory (VAT) has been shown to be a valid alternative to standard modeling techniques because of its ability to obtain accurate predictions of system performance parameters with a significant reduction in computational time. In this work, the theoretical fundamentals of VAT are examined in detail. Its mathematical fundamentals are discussed, and analogies with other averaging procedures are presented to illustrate the bases of the averaging process. The VAT transport equations are then derived and closed. The developed VAT model is applied to heat sinks with non-uniform geometry. Two numerical solution methods are applied to efficiently solve the resulting set of partial differential equations: a Galerkin method and a fractional step finite difference method. The fractional step method, based on Strang splitting, is used to address the coupling between the VAT solid and fluid energy conservation equations. In addition, a variable time-step approach is derived to accelerate the convergence to steady state. A new solution method, based on a spectral decomposition of the interface temperature and a quasi-Newton iteration method, is also proposed to address the coupling between the homogeneous base of the heat sink and the geometrically homogenized heat sink channel. Overall, the solution method provides a significant improvement in computational time over previously used methods. To determine the limits of applicability of the VAT model for systems with non-uniform geometry, a scaling procedure is applied to the governing equations. Through physical and mathematical arguments, it is determined that the momentum equation limits the applicability of the model, and it is shown that three non-dimensional parameters, M1, M2 and M3, can be used to provide estimates of these limits. For heat sinks with constant geometry, it is found that the solution is accurate when the boundaries of the system do not significantly affect the solution in the bulk, and the parameter M1 provides a quantitative estimate of these effects. For heat sinks with geometry variations in the cross-flow direction, it is determined that the accuracy of the solution is determined by the magnitude of the gradients induced by porosity variation, which are quantified through a parameter M2. Finally, for the case in which the geometry changes in the stream-wise direction, the VAT model is observed to be accurate when porosity variations do not affect local flow. This is quantified by a third parameter M3, which it is found to be Reynolds number dependent. In all three cases, it was shown that for low values of these parameters the VAT model is very accurate for a wide range of porosities, Reynolds numbers, geometries, and material combinations. The vast improvement in computational speed, along with the defined limits, is exploited to carry a series of optimization studies to determine the effects of the added geometric degrees of freedom of the system on its performance. A Genetic Algorithm is employed to determine optimal solutions for entropy generation and thermal resistance for three types of micro-channel heat sink geometries: straight, trapezoidal, and converging (or diverging). It is found that although straight channels provide an optimal combination of pumping power and thermal resistance, the limited geometric degrees of freedom do not allow for efficient heat transfer improvement. It is determined that straight channels present no efficient means to improve heat transfer and, in order to reduce the thermal resistance of a straight channel heat sink by 20%, a 200% increase in pumping power is required. It is also concluded that trapezoidal channels do not provide significant advantages over straight channels for either entropy generation or thermal resistance. On the contrary, an optimal converging channel configuration resulted in a 6% improvement in thermal resistance and a 23% decrease in pumping power, with respect to the thermally optimized straight channel. The results of the optimization studies are then combined to manually design a trapezoidal converging heat sink that features the same thermal performance of an optimal straight micro channel, but a 44% reduction in pumping power. Therefore, it is concluded that the added geometric degrees of freedom allow for a more efficient heat transfer improvement of the system.
Modeling and Optimization of Spatially Evolving Heat Sinks Using Volume Averaging Theory John Wiley & Sons
Design of Thermal Energy Systems Pradip Majumdar, Northern Illinois University, USA A comprehensive introduction to the design and analysis of thermal energy systems Design of Thermal Energy Systems covers the fundamentals and applications in thermal energy systems and components, including conventional power generation and cooling systems, renewable energy systems, heat recovery systems, heat sinks and thermal management. Practical examples are used throughout and are drawn from solar energy systems, fuel cell and battery thermal management, electrical and electronics cooling, engine exhaust heat and emissions, and manufacturing processes. Recent research topics such as steady and unsteady state simulation and optimization methods are also included. Key features: Provides a comprehensive introduction to the design and analysis of thermal energy systems, covering fundamentals and applications. Includes a wide range of industrial application problems and worked out example problems. Applies thermal analysis techniques to generate design specification and ratings. Demonstrates how to design thermal systems and components to meet engineering specifications. Considers alternative options and allows for the estimation of cost and feasibility of thermal systems. Accompanied by a website including software for design and analysis, a solutions manual, and presentation files with PowerPoint slides. The book is essential reading for: practicing engineers in energy and power industries; consulting engineers in mechanical, electrical and chemical engineering; and senior undergraduate and graduate engineering students.
Thermofluid Modeling for Energy Efficiency Applications ASTM International
This new book focuses on important research related to the mathematical modelling of engineering and environmental processes, manufacturing, and industrial systems. It includes heat transfer, fluid mechanics, CFD, and transport phenomena; solid mechanics and mechanics of metals; electromagnets and MHD; reliability modelling and system optimisation; finite volume, finite element, and boundary element procedures; decision sciences in an industrial and manufacturing context; civil engineering systems and structures; mineral and energy resources; relevant software engineering issues associated with CAD and CAE; and materials and metallurgical engineering.
Publications of the National Bureau of Standards ... Catalog
This book deals with certain aspects of material science, particularly with the release of thermal energy associated with bond breaking. It clearly establishes the connection between heat transfer rates and product quality. The editors then sharply draw the thermal distinctions between the various categories of welding processes, and demonstrate how these distinctions are translated into simulation model uniqueness. The book discusses the incorporation of radiative heat transfer processes into the simulation model.