

Comfort Air Handling Units S K M Air Con

Revised to reflect significant advances in pharmaceutical production and regulatory expectations, Handbook of Validation in Pharmaceutical Processes, Fourth Edition examines and blueprints every step of the validation process needed to remain compliant and competitive. This book blends the use of theoretical knowledge with recent technological advancements to achieve applied practical solutions. As the industry's leading source for validation of sterile pharmaceutical processes for more than 10 years, this greatly expanded work is a comprehensive analysis of all the fundamental elements of pharmaceutical and bio-pharmaceutical production processes. Handbook of Validation in Pharmaceutical Processes, Fourth Edition is essential for all global health care manufacturers and pharmaceutical industry professionals. Key Features: Provides an in-depth discussion of recent advances in sterilization Identifies obstacles that may be encountered at any stage of the validation program, and suggests the newest and most advanced solutions Explores distinctive and specific process steps, and identifies critical process control points to reach acceptable results New chapters include disposable systems, combination products, nano-technology, rapid microbial methods, contamination control in non-sterile products, liquid chemical sterilization, and medical device manufacture This book of Proceedings presents the latest thinking and research in the rapidly evolving world of architecture and sustainable development through 255 selected papers by authors coming from over 60 countries.

Air Distribution in Buildings is a concise and practical guide to air distribution system design and managing air conditioning systems in buildings. Making use of 40 years of experience in the design of air conditioning and ventilations systems, and other electromechanical services, this structured reference for built environment engineering offers in-depth coverage of air distribution technology. The text brings together a wide range of information and offers technical guidance on the design, calculation, and efficient operation of air distribution in buildings. The text highlights the special characteristics of air distribution in individual spaces. It presents the basic and fundamental concepts of air distribution as it relates to grilles and outlets, room space, and buildings. It focuses on air distribution systems in large buildings, starting with simple rooms and then moving on to more complex configurations. It also sums up the latest standards and best practices in air conditioning engineering. Includes knowledge of the new trends in buildings' air distribution Provides systematic analyses of the air flow regimes, heat transfer, and relative humidity in a collection of special built environments Presents energy analyses of the air conditioning systems for operating theaters and sporting facilities in unusual and severe climatic conditions Offers a description of flow characteristics in archeological monuments with emphasis on combating excessive moisture Introduces examples of very dense occupancy built environments, moisture

sensitive environments, and open space air conditioning Details advanced treatment of flow characterization in large public buildings This text serves as an ideal resource for air conditioning engineers, contractors, and consultants. It also benefits mechanical and architectural engineering students.

Designed for students and professional engineers, the fifth edition of this classic text deals with fundamental science and design principles of air conditioning engineering systems. W P Jones is an acknowledged expert in the field, and he uses his experience as a lecturer to present the material in a logical and accessible manner, always introducing new techniques with the use of worked examples.

A practical guide to industrial safety. It seeks to assist specialists in managing operations in industrial settings, including high-risk personal exposure such as inhalation hazards and direct chemical contact. It covers hazards in the chemical process industries, inhalation hazards in refineries, indoor air quality management, personal protective equipment, process safety emergency preparedness, safety in the laboratory, and more. There are Web site listings, NFPA hazard ratings, and other sources of information.

Building owners and managers expect fully automated and energy efficient operations, on line diagnostic of systems parameters to prevent failures, and on line diagnostic of problems prior to exposing occupants to deteriorating environmental conditions. A simple HVAC control is no longer acceptable by current standards. Controls and Automation for Facilities Managers examines principles and applications of HVAC engineering, outlining information for design, development of operations, logic, systems diagnostics, and building of environmental conditions with reliability and minimum operating cost. The book moves from the principles of mechanical engineering (related to HVAC systems) through DDC applications engineering, thereby summarizing complex topics of electrical engineering for mechanical engineers. Individual chapters: Provide essential information on related mechanical (HVAC) engineering, controls strategies, and examples of basic algorithms for on line diagnostics Guide (DDC) application engineers to a more thorough understanding of mechanical engineering disciplines (i.e., the psychrometric chart) as well as guide mechanical engineers to a more thorough understanding of DDC applications engineering (i.e., direct digital controllers and systems) Outline information on current topics Discussions also include: Indoor air quality - presenting material for facilities engineers as well as controls and consulting engineers Utilities metering - describing the distribution of real time data over a network, including consumption, alarms, diagnostics, trends, and reports On line problem diagnostics - outlining HVAC and environmental problems Controls and Automation for Facilities Managers serves as an exceptional guide for facilities managers and engineers, architects and consulting engineers, vendors and contractors, and other professionals in the design, application, and implementation of controls and automation systems for industrial, educational, institutional,

and governmental facilities. This reference will enhance design, systems implementation, systems operation, and maintenance, effecting the ultimate goal of its readers - implementation of fully automated environmental control systems, trouble-free operation, and optimization of operating and maintenance cost.

Energy Technology is an integral part of the degree, postgraduate & diploma curriculum of various branches of engineering. besides, it is also a compulsory paper for various associate membership examination conducted by professional bodies like institution of engineering (AMIE), Indian Institute of Metals (AMIIM), Indian Institute of Chemical Engineering (AMIIChE), BEE etc. This book has been prepared strictly as per the syllabus of these examinations. Short questions & answer and multiple-choice questions & answers drawn from the examination papers of various engineering colleges and professional bodies examinations given at the end of the book enhances its utility for the student.

During the past 20 years, the field of mechanical engineering has undergone enormous changes. These changes have been driven by many factors, including: the development of computer technology worldwide competition in industry improvements in the flow of information satellite communication real time monitoring increased energy efficiency robotics automatic control increased sensitivity to environmental impacts of human activities advances in design and manufacturing methods These developments have put more stress on mechanical engineering education, making it increasingly difficult to cover all the topics that a professional engineer will need in his or her career. As a result of these developments, there has been a growing need for a handbook that can serve the professional community by providing relevant background and current information in the field of mechanical engineering. The CRC Handbook of Mechanical Engineering serves the needs of the professional engineer as a resource of information into the next century.

This e-book is a compilation of papers presented at the Mechanical Engineering Research Day 2017 (MERD'17) - Melaka, Malaysia on 30 March 2017.

Since the first edition of this comprehensive handbook was published ten years ago, many changes have taken place in engineering and related technologies. Now, this best-selling reference has been updated for the 21st century, providing complete coverage of classic engineering issues as well as groundbreaking new subject areas. The second edition of The CRC Handbook of Mechanical Engineering covers every important aspect of the subject in a single volume. It continues the mission of the first edition in providing the practicing engineer in industry, government, and academia with relevant background and up-to-date information on the most important topics of modern mechanical engineering. Coverage of traditional topics has been updated, including sections on thermodynamics, solid and fluid mechanics, heat and mass transfer, materials, controls, energy conversion, manufacturing and design, robotics, environmental engineering, economics and project management, patent law, and transportation. Updates to these sections include new references and information on computer technology related to the topics. This edition also includes coverage of new topics such as nanotechnology, MEMS, electronic packaging, global climate change, electric and hybrid vehicles, and bioengineering.

Environmental stress caused by water continuously exposes buildings to microbial colonization. This is highly evident when both minor dampness and mass flooding occur. The text describes how microbiological corrosion of buildings and the structures and substances derived from these hazards are responsible for adverse health effects on people exposed to these contaminated environments. *Microbiological Corrosion of Buildings: A Guide to Detection, Health Hazards, and Mitigation* describes the key elements and methods for neutralising and removing microbiological contamination, and the operating algorithm for checking the effectiveness of preventative solutions. Ideal for construction engineers, microbiologists and professionals in the field. Features: Latest methods for detection of indoor microbial hazards Identifies the tools needed for natural, non-destructive and non-invasive methods of bio-corrosion removal Describes the social and health problems associated with exposure to microbiological hazards Provides case studies and examples of microorganisms responsible for microbial corrosion. 'Climate change and the associated adverse effects, such as floods and whirlwinds, make the problem of microbiological corrosion of buildings that generates health risks and economic losses on a global scale, the focus of science and technology. The monograph presents a complex problem of building bio-corrosion, that requires knowledge of the distant fields of microbiology and building technology, for the use of both scientists and practitioners. This pioneering work of an interdisciplinary nature harmoniously combines knowledge on specific microbiological issues relating to the process of bio-corrosion and the associated health risks with detailed issues of construction technology concerning the prevention of bio-corrosion and its removal. The authors succeeded in combining a very high scientific level in the monograph with an accessible and understandable presentation of complex problems. The extensive references, ranging from "classical" items from many years ago to the most recent articles presenting the state of the art in this field, are worth emphasising.' —Prof. Jacek Dutkiewicz, Ph.D., D.Sc., Institute of Rural Health in Lublin

The *Air Conditioning Manual* assists entry-level engineers in the design of air-conditioning systems. It is also usable - in conjunction with fundamental HVAC&R resource material - as a senior- or graduate-level text for a university course in HVAC system design. The manual was written to fill the void between theory and practice - to bridge the gap between real-world design practices and the theoretical calculations and analytical procedures or on the design of components. This second edition represents an update and revision of the manual. It now features the use of SI units throughout, updated references and the editing of many illustrations. * Helps engineers quickly come up with a design solution to a required air conditioning system. * Includes issues from comfort to cooling load calculations. * New sections on "Green HVAC" systems deal with hot topic of sustainable buildings.

This dazzlingly original work of literary nonfiction interweaves the science and history of the powerful refrigerant (and dangerous greenhouse gas) Freon with a haunting meditation on how to live meaningfully and morally in a rapidly heating world. In *After Cooling*, Eric Dean Wilson braids together air-conditioning history, climate science, road trips, and philosophy to tell the story of the birth, life, and afterlife of Freon, the refrigerant that ripped a hole larger than the continental United States in the ozone layer. As he traces the refrigerant's life span from its invention in the 1920s—when it was hailed as a miracle of scientific progress—to efforts in the 1980s to ban the chemical (and the resulting

political backlash), Wilson finds himself on a journey through the American heartland, trailing a man who buys up old tanks of Freon stockpiled in attics and basements to destroy what remains of the chemical before it can do further harm. Wilson is at heart an essayist, looking far and wide to tease out what particular forces in American culture—in capitalism, in systemic racism, in our values—combined to lead us into the Freon crisis and then out. It's a story that offers a rare glimpse of environmental hope, suggesting that maybe the vast and terrifying problem of global warming is not beyond our grasp to face.

This book highlights the significance of using sustainable energy to prevent the deterioration of our planet using heat pumps. Energy sustainability can be achieved through improved energy efficiency. In this regard, heat pumps offer an energy-efficient alternative for heating and cooling. To drive the adoption of heat pumps as a key component of sustainable buildings, the authors focus on examining sustainable practices in heat pump operations and innovative system design. In view of the growing desire to use sustainable energy to meet heating and cooling demands and improve indoor air quality, this book offers a valuable reference guide to the available options in HVAC (heating, ventilation, and air-conditioning) system design. To begin with, the authors define sustainable energy and discuss the trend of “thinking green” in building design. They then discuss sustainable practices and heat pump applications in mapping out HVAC systems. In turn, they examine the use of green operations to promote sustainable practices and, in order to highlight the importance of innovative design, discuss the configuration options and precision control aspects. In closing, the authors illustrate innovative sustainable design on the basis of several energy-efficient cases. The book's main goal is to drive the adoption of sustainable energy solutions. Heat pumps, it argues, represent the most efficient system for meeting commercial/recreational/residential heating and cooling demands. The book not only examines industrial practices in heat pump application, but also discusses advanced heat pump technologies and innovative heat pump designs.

English abstracts from Kholodil'naia tekhnika.

This book covers all important, new, and conventional aspects of building electrical systems, power distribution, lighting, transformers and rotating electric machines, wiring, and building installations. Solved examples, end-of-chapter questions and problems, case studies, and design considerations are included in each chapter, highlighting the concepts, and diverse and critical features of building and industrial electrical systems, such as electric or thermal load calculations; wiring and wiring devices; conduits and raceways; lighting analysis, calculation, selection, and design; lighting equipment and luminaires; power quality; building monitoring; noise control; building energy envelope; air-conditioning and ventilation; and safety. Two chapters are dedicated to distributed energy generation, building integrated renewable energy systems, microgrids, DC nanogrids, power electronics, energy management, and energy audit methods, topics which are not often included in building energy textbooks. Support materials are included for interested instructors. Readers are encouraged to write their own solutions while solving the problems, and then refer to the solved examples for more complete understanding of the solutions, concepts, and theory.

Heating, ventilation, and air conditioning (HVAC) is the technology responsible to maintain temperature levels and air quality in buildings to certain standards. In a commercial setting, HVAC systems accounted for more than 50% of the total energy cost of the building in 2013 [13]. New control methods are always being worked on to improve the effectiveness and efficiency of the system. These control systems include model predictive control (MPC), evolutionary algorithm (EA), evolutionary programming (EP), and proportional-integral-derivative (PID) controllers. Such control tools are used on new HVAC system to ensure the ultimate efficiency and ensure the comfort of occupants.

However, there is a need for a system that can monitor the energy performance of the HVAC system and ensure that it is operating in its

optimal operation and controlled as expected. In this thesis, an air handling unit (AHU) of an HVAC system was modeled to analyze its performance using real data collected from an operating AHU using a wireless monitoring system. The purpose was to monitor the AHU's performance, analyze its key parameters to identify flaws, and evaluate the energy waste. This system will provide the maintenance personnel to key information to them to act for increasing energy efficiency. The mechanical model was experimentally validated first. Then a baseline operating condition was established. Finally, the system under extreme weather conditions was evaluated. The AHU's subsystem performance, the energy consumption and the potential wastes were monitored and quantified. The developed system was able to constantly monitor the system and report to the maintenance personnel the information they need. It can be used to identify energy savings opportunities due to controls malfunction. Implementation of this system will provide the system's key performance indicators, offer feedback for adjustment of control strategies, and identify the potential savings. To further verify the capabilities of the model, a case study was performed on an air handling unit on campus for a three month monitoring period. According to the mechanical model, a total of 63,455 kWh can be potentially saved on the unit by adjusting controls. In addition the mechanical model was able to identify other energy savings opportunities due to set point changes that may result in a total of 77,141 kWh.

Air handling unit systems are the series of mechanical systems that regulate and circulate the air through the ducts inside the buildings. In a commercial setting, air handling units accounted for more than 50% of the total energy cost of the building in 2013. To make the system more energy efficient and reduce amount of CO₂ gases and energy waste, it is very important for building energy management systems to have an accurate model to help predict and optimize the energy usage and eliminate the energy waste. In this work, two models are described to focus on the energy usage for heating/cooling coils as well as fans for the air handling unit. Enthalpy based effectiveness and Dry Wet coil methods were identified and compared for the system performance. Two different types of control systems were modeled for this research, and the results are shown based on occupancy reflected by the collected CO₂ data. Discrete On/O and fuzzy logic controller techniques were simulated using Simulink MATLAB software and compared based on energy reduction and system performance. Air handling unit located in the basement of one campus building is used for the test case of this study. The data for model inputs is collected wirelessly from the building using fully function device (FFD) and pan coordinator to send/receive the data wirelessly. The air handling unit modeling also is done using Engineering Equation Solver EES Software for the coils and AHU subsystems. Current building management system Metasys software was used to get additional data as model inputs. Moving Average technique was utilized to make the model results more readable and less noisy. Simulation results show that in humid regions where there is more than 45% of relative humidity, the dry wet coil method is the effective way to provide more accurate details of the heat transfer and energy usage of the air handling unit comparing to the other method enthalpy-based effectiveness. Also, fuzzy logic controller results show that 62% of the current return fan energy can be reduced weekly using this method without sacrificing the occupant comfort level comparing to the ON/OFF method. Air quality can be optimized inside the building using fuzzy logic controller. At the same time, system performance can be increased by taking the appropriate steps to prevent the loss of static pressure in the ducts. The implementation of the method developed in this study will improve the energy efficiency of the AHU.

Our energy system faces a fundamental transformation and renewable energies will play a dominant role in the future energy supply. One of the promising solutions is the use of solar thermal energy in buildings, for cooling, heating and domestic hot water preparation. Solar thermal systems for providing heat and cold to industrial processes show a high

potential, too. In the last decade, the application of solar driven cooling systems achieved a significant progress. Steps forward have been taken in the design of system concepts to specific needs and in more reliable and efficient operation of the installed plants. New systems are available on the market and cover a broad range of cooling capacities and driving temperatures. This handbook provides an overview on the various solutions to convert solar heat into useful cooling, reports about experiences made with realized installations and gives support in the design process. Its use will strongly contribute to achieve high quality solar cooling systems which provide significant energy savings and fulfil the user's requirements in a safe and reliable way.

This comprehensive handbook is recognized as the definitive stand-alone energy manager's desk reference, used by tens of thousands of professionals throughout the energy management industry. This new ninth edition includes new chapters on energy management controls systems, compressed air systems, renewable energy, and carbon reduction. There are major updates to chapters on energy auditing, lighting systems, boilers and fired systems, steam and condensate systems, green buildings waste heat recovery, indoor air quality, utility rates, natural gas purchasing, commissioning, financing and performance contracting and much more with numerous new and updated illustrations, charts, calculation procedures and other helpful working aids.

This book provides readers with essential knowledge enabling the successful design of today's new energy efficient HVAC systems. The author introduces important concepts such as Knowledge Categorization, Performance Based Design Standards, and Quantification of Uncertainty in Energy Modeling for Buildings. Pivotal topics that all HVAC and architectural engineers must master in order to navigate the green building renaissance are given focused attention, including the role of renewables, air quality, automatic controls, and thermal comfort. Relevant ASHRAE standards, as well as sustainability scoring systems such as BREEAM, HQE, LEED and CASBEE are explained in depth. Armed with the material contained in this practical reference, students and practitioners alike will become more effective and prepared for engineering success.

Since 1932, the ten editions of Architectural Graphic Standards have been referred to as the "architect's bible." From site excavation to structures to roofs, this book is the first place to look when an architect is confronted with a question about building design. With more than 8,000 architectural illustrations, including both reference drawings and constructible architectural details, this book provides an easily accessible graphic reference for highly visual professionals. To celebrate seventy-five years as the cornerstone of an industry, this commemorative Eleventh Edition is the most thorough and significant revision of Architectural Graphic Standards in a generation. Substantially revised to be even more relevant to today's design professionals, it features: An entirely new, innovative look and design created by Bruce Mau Design

that includes a modern page layout, bold second color, and new typeface Better organized-- a completely new organization structure applies the UniFormat(r) classification system which organizes content by function rather than product or material Expanded and updated coverage of inclusive, universal, and accessible design strategies Environmentally-sensitive and sustainable design is presented and woven throughout including green materials, LEEDS standards, and recyclability A bold, contemporary new package--as impressive closed as it is open, the Eleventh Edition features a beveled metal plate set in a sleek, black cloth cover Ribbon Markers included as a convenient and helpful way to mark favorite and well used spots in the book All New material Thoroughly reviewed and edited by hundreds of building science experts and experienced architects, all new details and content including: new structural technologies, building systems, and materials emphasis on sustainable construction, green materials, LEED standards, and recyclability expanded and updated coverage on inclusive, universal, and accessible design strategies computing technologies including Building Information Modeling (BIM) and CAD/CAM new information on regional and international variations accessibility requirements keyed throughout the text new standards for conducting, disseminating, and applying architectural research New and improved details With some 8,500 architectural illustrations, including both reference drawings and constructible architectural details, Architectural Graphic Standards continues to be the industry's leading, easily accessible graphic reference for highly visual professionals.

This book highlights key recent developments in air conditioning technologies for cooling and dehumidification with the specific objectives to improve energy efficiency and to minimize environmental impact. Today, air conditioning, comprising cooling and dehumidification, is a necessity in commercial and residential buildings and even in many industrial processes. This book provides key update on recent developments in air conditioning systems, cooling cycles and innovative cooling/dehumidification technologies. Key technologies related to cooling include heat-driven absorption and adsorption cooling and water-based dew point evaporative cooling. Technologies connected with dehumidification involve new generations of adsorbent-desiccant dehumidifiers, liquid-based desiccants and membranes that sieve out water vapor from air. Losses in cooling cycles and thermo-economic analysis for a sustainable economy are also judiciously documented.

Heating Ventilation and Air Conditioning by J. W. Mitchell and J. E. Braun provides foundational knowledge for the behavior and analysis of HVAC systems and related devices. The emphasis of this text is on the application of engineering principles that features tight integration of physical descriptions with a software program that allows performance to be directly calculated, with results that provide insight into actual behavior. Furthermore, the text offers more examples, end-of-chapter problems, and design projects that represent situations an engineer might face in

practice and are selected to illustrate the complex and integrated nature of an HVAC system or piece of equipment. "Faber and Kell" has for over fifty years been accepted as the most practical and comprehensive book on heating and air conditioning design and is regarded as the standard reference book for both students and practitioners. In order to provide up-to-date information, this ninth edition has been revised to include the latest changes to system design and covers many aspects in greater depth, whilst still retaining the character of previous editions. Building services engineers, architects and others involved in the construction industry will find no better place for accessible and easily assimilated information on all aspects of the heating and air conditioning of buildings. revised throughout including a new chapter on natural ventilation and new information on facade engineering including photovoltaics full comparative summary of all air conditioning techniques makes this the essential reference for the professional

The text begins by reviewing, in a simple and precise manner, the physical principles of three pillars of Refrigeration and Air Conditioning, namely thermodynamics, heat transfer, and fluid mechanics. Following an overview of the history of refrigeration, subsequent chapters provide exhaustive coverage of the principles, applications and design of several types of refrigeration systems and their associated components such as compressors, condensers, evaporators, and expansion devices. Refrigerants too, are studied elaboratively in an exclusive chapter. The second part of the book, beginning with the historical background of air conditioning in Chapter 15, discusses the subject of psychrometrics being at the heart of understanding the design and implementation of air conditioning processes and systems, which are subsequently dealt with in Chapters 16 to 23. It also explains the design practices followed for cooling and heating load calculations. Each chapter contains several worked-out examples that clarify the material discussed and illustrate the use of basic principles in engineering applications. Each chapter also ends with a set of few review questions to serve as revision of the material learned.

An air conditioning system consists of components and equipment arranged in sequential order to control and maintain an indoor environment. The goal is to provide a healthy and comfortable climate with acceptable air quality while being energy efficient and cost effective. Air Conditioning and Refrigeration Engineering covers all types of systems from institutional and commercial to residential. The book supplies the basics of design, from selecting the optimum system and equipment to preparing the drawings and specifications. It discusses the four phases of preparing a project: gathering information, developing alternatives, evaluating alternatives, and selling the best solution. In addition, the author breaks down the responsibilities of the engineer, design documents, computer aided design, and government codes and standards. Air Conditioning and Refrigeration Engineering provides you with an easy reference to all aspects of the topic. This resource addresses the most current areas of interest, such as computer-aided design and drafting, desiccant air conditioning and energy conservation. It is a thorough and convenient guide to air conditioning and refrigeration engineering.

This expanded edition of David Chadderton's Air Conditioning is a textbook for undergraduate courses in building services and environmental engineering, and for BTEC continuing education diploma, higher national diploma and certificate courses in building services engineering. It will also be of considerable help to students on national certificate and diploma programmes. The book includes a new chapter on application of fans to airduct systems.

The Handbook of Air Pollution Prevention and Control provides a concise overview of the latest technologies for managing industrial air pollution in petrochemical, oil and gas, and allied industries. Detailed material on equipment selection, sizing, and troubleshooting operations is provided along with practical design methodology. Unique to this volume are discussions and information on energy-efficient technologies

and approaches to implementing environmental cost accounting measures. Included in the text are sidebar discussions, questions for thinking and discussing, recommended resources for the reader (including Web sites), and a comprehensive glossary. The Handbook of Air Pollution Prevention and Control also includes free access to US EPA's air dispersion model SCREEN3. Detailed examples on the application of this important software to analyzing air dispersion from industrial processes and point sources are provided in the Handbook, along with approaches to applying this important tool in developing approaches to pollution prevention and in selecting control technologies. By applying SCREEN3, along with the examples given in the Handbook, the user can: evaluate the impact of processes and operations to air quality, and apply the model to assess emergency scenarios to help in planning, to develop environmental impact assessments, to select pollution control technologies, and to develop strategies for pollution prevention. Two companion books by Cheremisinoff are available: Handbook of Water and Wastewater Treatment Technologies, and Handbook of Solid Waste Management and Waste Minimization Technologies. Uniquely combines prevention and control concepts while covering the practices and technologies that are applied to the prevention of air pollution in the chemicals manufacturing, oil and gas, iron and steel, and pharmaceutical industries, and to the cleaning and control of industrial air emissions. Provides a bridge for today's environmental manager by focusing on an integrated approach to managing air pollution problems within industrial operations. Shows you how to calculate financial returns from pollution prevention projects.

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