

## Handbook Of Fire Protection Engineering

Master an Approach Based on Fire Safety Goals, Fire Scenarios, and the Assessment of Design Alternatives Performance-Based Fire Safety Design demonstrates how fire science can be used to solve fire protection problems in the built environment. It also provides an understanding of the performance-based design process, deterministic and risk-based ana

Revised and significantly expanded, the fifth edition of this classic work offers both new and substantially updated information. As the definitive reference on fire protection engineering, this book provides thorough treatment of the current best practices in fire protection engineering and performance-based fire safety. Over 130 eminent fire engineers and researchers contributed chapters to the book, representing universities and professional organizations around the world. It remains the indispensable source for reliable coverage of fire safety engineering fundamentals, fire dynamics, hazard calculations, fire risk analysis, modeling and more. With seventeen new chapters and over 1,800 figures, the this new edition contains: Step-by-step equations that explain engineering calculations Comprehensive revision of the coverage of human behavior in fire, including several new chapters on egress system design, occupant evacuation scenarios, combustion toxicity and data for human behavior analysis Revised fundamental chapters for a stronger sense of context Added chapters on fire protection system selection and design, including selection of fire safety systems, system activation and controls and CO<sub>2</sub> extinguishing systems Recent advances in fire resistance design Addition of new chapters on industrial fire protection, including vapor clouds, effects of thermal radiation on people, BLEVEs, dust explosions and gas and vapor explosions New chapters on fire load density, curtain walls, wildland fires and vehicle tunnels Essential reference appendices on conversion factors, thermophysical property data, fuel properties and combustion data, configuration factors and piping properties "Three-volume set; not available separately"

Written by an engineer for engineers, this book is both training manual and on-going reference, bringing together all the different facets of the complex processes that must be in place to minimize the risk to people, plant and the environment from fires, explosions, vapour releases and oil spills. Fully compliant with international regulatory requirements, relatively compact but comprehensive in its coverage, engineers, safety professionals and concerned company management will buy this book to capitalize on the author's life-long expertise. This is the only book focusing specifically on oil and gas and related chemical facilities. This new edition includes updates on management practices, lessons learned from recent incidents, and new material on chemical processes, hazards and risk reviews (e.g. CHAZOP). Latest technology on fireproofing, fire and gas detection systems and applications is also covered. An introductory chapter on the philosophy of protection principles along with fundamental background material on the properties of the chemicals concerned and their behaviours under industrial conditions, combined with a detailed section on modern risk analysis techniques makes this book essential reading for students and professionals following Industrial Safety, Chemical Process Safety and Fire Protection Engineering courses. A practical, results-oriented manual for practicing engineers, bringing protection principles and chemistry together with modern risk analysis techniques Specific focus on oil and gas and related chemical facilities, making it comprehensive and compact Includes the latest best practice guidance, as well as lessons learned from recent incidents

Fundamentally, fire prevention and control refer to systems and practices that increase a facility's ability to avoid fires, limit the development and spread of fires, and rapidly and effectively control fires. Changing safety codes and regulations along with recent technological advances have rendered the first edition of this popular handbook somewhat out of date and left fire safety professionals without a current, reliable reference devoted to their needs. Comprehensive, uniquely focused, and completely up to date, the Industrial Fire Protection Handbook, Second Edition provides a practical guide for improving fire prevention and protection within a work environment. The author has made extensive revisions, significantly expanded his discussions in key areas, and added numerous examples and illustrations to provide a better-than-ever overview of all essential areas of fire protection, including loss control programs, fire behavior, life safety, hazard control, and emergency planning. New in the Second Edition: Discussions of new extinguishing agents, including wet chemical and clean agents designed to replace halon Significantly expanded coverage of general loss control programs More in-depth treatment of hazard control and life safety issues Broader coverage of installed fire protection systems More examples covering selection, placement, and maintenance of fire extinguishers

This book arrives at just the right time to facilitate understanding of performance-based fire risk assessment in buildings – an integral part of the global shift in policy away from traditional prescriptive codes. Yung, an internationally recognised expert on the subject of fire risk assessment, introduces the basic principles and techniques that help the reader to understand the various methodologies that are currently in place or being proposed by different organisations. Through his illustration of basic principles and techniques he enables the reader to conduct their own fire risk assessments. He demonstrates how the probabilities of fire scenarios are assessed based on the probabilities of success and failure of fire protection measures that are in place. He also shows how the consequences of fire scenarios are assessed based on the intensity and speed of fire and smoke spread, the probability and speed of occupant response and evacuation, and the effectiveness and speed of fire department response and rescue efforts. Yung's clear and practical approach to this highly topical subject enables the reader to integrate the various tools available into a quantitative framework that can be used for decision making. He brings an invaluable resource to all those involved in fire engineering and risk assessment, including students, academics, building designers, fire protection engineers, structural engineers, regulators and risk analysts.

This booklet provides a summary of the information on which estimation of the injuries and damage caused by the blast and consequent missile effects of large explosions can be made for planning and design purposes.

This is a basic book for fire officers, security and safety officers and all others concerned with the prevention of fires. It deals with the fundamentals of fire engineering. Precautionary measures, extinction and elimination of risks in industrial establishments have been given special importance.

From the publisher's website: "The Handbook is a massive resource, consisting of 1116 pages, tightly set in a 2-column, 8.5" x 11" (215 x 280 mm) format. The book includes 627 black-and-white figures, 447 tables, and 140 color plates. The Handbook is divided into two main sections: Chapters 1 through 13 include presentations of the fundamental principles of ignition sources and of the response of ignitable materials to heat or energy in various forms. Chapters 14 and 15 constitute an "encyclopedia of ignition," containing extensive information on individual materials, devices, and products. Chapter 14 comprises alphabetically-arranged narrative descriptions of ignition properties and hazards for substances ranging from "Accelerants in incendiary fires" to "Zirconium." Chapter 15 contains database tables giving information on 473 pure chemical compounds and over 500 commercial or natural products, including such substances as dusts, fuels, lubricants, plastics, and woods."

Loss prevention engineering describes all activities intended to help organizations in any industry to prevent loss, whether it be through injury, fire, explosion, toxic release, natural disaster, terrorism or other security threats. Compared to process safety, which only focusses on preventing loss in the process industry, this is a much broader field. Here is the only one-stop source for loss prevention principles, policies, practices, programs and methodology presented from an engineering vantage point. As such, this handbook discusses the engineering needs for manufacturing, construction, mining, defense, health care, transportation and quantification, covering the topics to a depth that allows for their functional use while providing additional references should more

information be required. The reference nature of the book allows any engineers or other professionals in charge of safety concerns to find the information needed to complete their analysis, project, process, or design.

Fire Safety is the science of fire and the means of protection against it. Being multidisciplinary in nature, the subject is closely related to chemical engineering, building services, electrical, electronics, structural and civil engineering and industrial engineering. There is a dearth of books on this subject, and therefore, the author aims to provide readers with a lucidly written, comprehensive text explaining the fundamentals of the fire process and means of protection. Comprising twelve chapters, this well-illustrated book with data tables begins with the introduction of the subject and then proceeds to explain fire process, its chemistry, heat and temperature in fire, hydraulics, active and passive fire protection systems, risk management and insurance, and finally investigations and reconstructions of fire incidents. The book appends useful information on fire safety including cases to explain the causes of fire, Indian Standards on fire safety, explosion and properties of some flammable materials. NEW TO THE SECOND EDITION • A chapter on Modelling for Fire Safety • Updated data tables and text wherever necessary TARGET AUDIENCE B.Tech. (Safety and Fire Engineering) B.Tech. (Chemical Engineering)

Andrew Furness and Martin Muckett give an introduction to all areas of fire safety management, including the legal framework, causes and prevention of fire and explosions, fire protection measures, fire risk assessment, and fire investigation. Fire safety is not treated as an isolated area but linked into an effective health and safety management system. Introduction to Fire Safety Management has been developed for the NEBOSH Certificate in Fire Safety and Risk Management and is also suitable for other NVQ level 3 and 4 fire safety courses. The text is highly illustrated in full colour, easy to read and supported by checklists, report forms and record sheets. This practical approach makes the book a valuable reference for health and safety professionals, fire officers, facility managers, safety reps, managers, supervisors and HR personnel in companies, as well as fire safety engineers, architects, construction managers and emergency fire services personnel. Andrew Furness CFIOSH, GFireE, Dip2OSH, MIIRSM, MRSH, is Managing Director of Salvus Consulting Limited who specialise in Fire Safety. He was the chairman of the NEBOSH / IOSH working party that developed the NEBOSH Fire Safety and Risk Management certificate. Martin Muckett MA, MBA, CMIOSH, MIFireE, Dip2OSH, former Principal Health and Safety Advisor to The Fire Service Inspectorate and Principal Fire Safety Officer, Martin is currently Salvus Consulting Limited's Senior Fire Safety Trainer / Consultant. \* Fully covers the syllabus for the NEBOSH Certificate in Fire Safety and Risk Management \* Student-friendly presentation in full colour packed with illustrations and photographs \* Includes a summary of legislation relevant to fire safety, ideal as a reference for students as well as practitioners

Like New, No Highlights, No Markup, all pages are intact.

A quick, easy-to-consult source of practical overviews on wide-ranging issues of concern for those responsible for the health and safety of workers This new and completely revised edition of the popular Handbook is an ideal, go-to resource for those who need to anticipate, recognize, evaluate, and control conditions that can cause injury or illness to employees in the workplace. Devised as a "how-to" guide, it offers a mix of theory and practice while adding new and timely topics to its core chapters, including prevention by design, product stewardship, statistics for safety and health, safety and health management systems, safety and health management of international operations, and EHS auditing. The new edition of Handbook of Occupational Safety and Health has been rearranged into topic sections to better categorize the flow of the chapters. Starting with a general introduction on management, it works its way up from recognition of hazards to safety evaluations and risk assessment. It continues on the health side beginning with chemical agents and ending with medical surveillance. The book also offers sections covering normal control practices, physical hazards, and management approaches (which focuses on legal issues and workers compensation). Features new chapters on current developments like management systems, prevention by design, and statistics for safety and health Written by a number of pioneers in the safety and health field Offers fast overviews that enable individuals not formally trained in occupational safety to quickly get up to speed Presents many chapters in a "how-to" format Featuring contributions from numerous experts in the field, Handbook of Occupational Safety and Health, 3rd Edition is an excellent tool for promoting and maintaining the physical, mental, and social well-being of workers in all occupations and is important to a company's financial, moral, and legal welfare.

This Guide provides information on special topics that affect the fire safety performance of very tall buildings, their occupants and first responders during a fire. This Guide addresses these topics as part of the overall building design process using performance-based fire protection engineering concepts as described in the SFPE Engineering Guide to Performance Based Fire Protection. This Guide is not intended to be a recommended practice or a document that is suitable for adoption as a code. The Guide pertains to "super tall," "very tall" and "tall" buildings. Throughout this Guide, all such buildings are called "very tall buildings." These buildings are characterized by heights that impose fire protection challenges; they require special attention beyond the protection features typically provided by traditional fire protection methods. This Guide does not establish a definition of buildings that fall within the scope of this document.

This single resource for the fire safety community distills the most relevant and useful science and research into a consensus-based guide whose key factors and considerations impact the response and behavior of occupants of a building during a fire event. The Second Edition of SFPE's Engineering Guide: Human Behavior in Fire provides a common introduction to this field for the broad fire safety community: fire protection engineers/fire safety engineers, human behavior scientists/researchers, design professionals, and code authorities. The public benefits from consistent understanding of the factors that influence the responses and behaviors of people when threatened by fire and the application of reliable methodologies to evaluate and estimate human response in buildings and structures. This Guide also aims to lessen the uncertainties in the "people components" of fire safety and allow for more refined analysis with less reliance on arbitrary safety factors. As with fire science in general, our knowledge of human behavior in fire is growing, but is still characterized by uncertainties that are traceable to both limitation in the science and unfamiliarity by the user communities. The concepts for development of evacuation scenarios for performance-based designs and the technical methods to estimate evacuation response are reviewed with consideration to the limitation and uncertainty of the methods. This Guide identifies both quantitative and qualitative information that constitutes important consideration prior to developing safety factors, exercising engineering judgment, and using evacuation models in the practical design of buildings and evacuation procedures. Besides updating material in the First Edition, this revision includes new information on: Incapacitating Effects of Fire Effluent & Toxicity Analysis Methods Occupant Behavior Scenarios Movement Models and Behavioral Models Egress Model Selection, Verification, and Validation Estimation of Uncertainty and Use of Safety Factors Enhancing Human

**Response to Emergencies & Notification of Messaging** The prediction of human behavior during a fire emergency is one of the most challenging areas of fire protection engineering. Yet, understanding and considering human factors is essential to designing effective evacuation systems, ensuring safety during a fire and related emergency events, and accurately reconstructing a fire. The security and economic stability of many nations and multinational oil companies are highly dependent on the safe and uninterrupted operation of their oil, gas and chemical facilities. One of the most critical impacts that can occur to these operations are fires and explosions from accidental or political incidents. This publication is intended as a general engineering handbook and reference guideline for those personnel involved with fire and explosion protection aspects of critical hydrocarbon facilities. Design guidelines and specifications of major, small and independent oil companies as well as information from engineering firms and published industry references have been reviewed to assist in its preparation. Some of the latest published practices and research into fire and explosions have also been mentioned.

**Handbook of Fire and Explosion Protection Engineering Principles: for Oil, Gas, Chemical and Related Facilities** is a general engineering handbook that provides an overview for understanding problems of fire and explosion at oil, gas, and chemical facilities. This handbook offers information about current safety management practices and technical engineering improvements. It also provides practical knowledge about the effects of hydrocarbon fires and explosions and their prevention, mitigation principals, and methodologies. This handbook offers an overview of oil and gas facilities, and it presents insights into the philosophy of protection principles. Properties of hydrocarbons, as well as the characteristics of its releases, fires and explosions, are also provided in this handbook. The book includes chapters about fire- and explosion-resistant systems, fire- and gas-detection systems, alarm systems, and methods of fire suppression. The handbook ends with a discussion about human factors and ergonomic considerations, including human attitude, field devices, noise control, panic, and security. People involved with fire and explosion prevention, such as engineers and designers, will find this book invaluable. A unique practical guide to preventing fires and explosions at oil and gas facilities, based on the author's extensive experience in the industry An essential reference tool for engineers, designers and others facing fire protection issues Based on the latest NFPA standards and interpretations

This text details the step-by-step instructions needed to write specifications, go out to bid, evaluate the bids, inspect the apparatus, and save your department money. Chief Peters provides insight into various apparatus features, real-life mishaps, maintenance programs, and warranty information that will help you and the department purchase the right vehicle for the job.

**The Fire Protection Engineering PE Exam Study Guide** contains over 100 example test problems with solutions, a recommended list of materials for a Test-Day Resource Library(c), and more. Working through the example problems and assembling a Test-Day Resource Library(c) will give you a huge advantage over other test-takers. The sample problems cover the topics as outlined at NCEES.org. This resource is designed to help you prepare for the PE Exam by following these 3 steps: Work through the information in the Study Guide ... follow the references ... dig deep. Work as many problems as you can find and note where you have difficulties. Take the time to put together a comprehensive Test-Day Resource Library(c)

This Handbook is focused on structural resilience in the event of fire. It serves as a single point of reference for practicing structural and fire protection engineers on the topic of structural fire safety. It is also stands as a key point of reference for university students engaged with structural fire engineering.

"In handbook form to be useful to practicing engineers and other professionals, this book addresses smoke control design, smoke management, controls, fire and smoke control in transport tunnels, and full scale fire testing. For those getting started with computer models CONTAM and CFAST, there are simplified instructions with examples"--

Designing structures to withstand the effects of fire is challenging, and requires a series of complex design decisions. This third edition of **Fire Safety Engineering Design of Structures** provides practising fire safety engineers with the tools to design structures to withstand fires. This text details standard industry design decisions, and offers expert design advice, with relevant historical data. It includes extensive data on materials' behaviour and modeling -- concrete, steel, composite steel-concrete, timber, masonry, and aluminium. While weighted to the fire sections of the Eurocodes, this book also includes historical data to allow older structures to be assessed. It extensively covers fire damage investigation, and includes as far back as possible, the background to code methods to enable the engineer to better understand why certain procedures are adopted. What's new in the Third Edition? An overview in the first chapter explains the types of design decisions required for optimum fire performance of a structure, and demonstrates the effect of temperature rise on structural performance of structural elements. It extends the sections on less common engineering materials. The section on computer modelling now includes material on coupled heat and mass transfer, enabling a better understanding of the phenomenon of spalling in concrete. It includes a series of worked examples, and provides an extensive reference section. Readers require a working knowledge of structural mechanics and methods of structural design at ambient conditions, and are helped by some understanding of thermodynamics of heat transfer. This book serves as a resource for engineers working in the field of fire safety, consultants who regularly carry out full fire safety design for structure, and researchers seeking background information. Dr John Purkiss is a chartered civil and structural engineer/consultant and former lecturer in structural engineering at Aston University, UK. Dr Long-Yuan Li is Professor of Structural Engineering at Plymouth University, UK, and a Fellow of the Institution of Structural Engineers.

**Fundamentals of Fire Protection for the Safety Professional** provides safety managers with a guide for incorporating fire hazard awareness and protection into their safety management plans. Industrial fires pose one of the greatest threats to organizations in terms of financial, human, and property losses. Understanding fire safety basics, the physics of fire, and the properties and classes of common hazards is key to designing fire safety management programs that not only protect an organization's assets but also ensure the safe evacuation of all involved. **Fundamentals of Fire Protection for the Safety Professional** takes an in-depth look at fire hazards in the workplace—from the substances required to do business to the building construction itself—and provides practical fire safety principles that can be applied in any work environment. Readers will learn how to develop emergency action plans and fire prevention plans, implement effective alarm and detection systems and fire extinguishment systems, and develop a comprehensive fire program management plan that is in compliance with Federal Emergency Management Agency, Occupational Safety and Health Administration,

Environmental Protection Agency, and National Fire Protection Association standards. Each chapter includes a chapter summary and sample problems, making this an ideal training tool in the workplace or the classroom. Answers to chapter questions and a comprehensive glossary and index are provided at the end of the book.

This handy volume is a ready "go to" reference for the chemical engineer, plant manager, process engineer, or chemist working in industrial settings where dust explosions could be a concern, such as the process industries, coal industry, metal industry, and others. Though dust explosions have been around since the Earth first formed, and they have been studied and written about since the 1500s, they are still an ongoing concern and occur almost daily somewhere in the world, from bakeries to fertilizer plants. Dust explosions can have devastating consequences, and, recently, there have been new industrial standards and guidelines that reflect safer, more reasonable methods for dealing with materials to prevent dust explosions and resultant fires. This book not only presents these new developments for engineers and managers, but it offers a thorough and deep coverage of the subject, starting with a complete overview of dust, how it forms, when it is in danger of exploding, and how this risk can be mitigated. There is also a general coverage of explosions and the environments that foster them. Further chapters cover individual industries, such as metal and coal, and there is an appendix that outlines best practices for preventing dust explosions and fire and how these risks can be systematically mitigated by these implementations. There is also a handy glossary of terms for easy access, not only for the veteran engineer or chemist, but for the student or new hire. This ready reference is one of the most useful texts that an engineer or chemist could have at their side. With so many accidents still occurring in industry today and so many hazards, this volume pinpoints the most common and easiest ways for the engineer to go about his daily business safely, efficiently, and profitably, with no extraneous tables or theoretical treatises. A must have for any engineer, scientist, or chemist working with materials that could result in dust explosions or fire.

Prepared by the Fire Protection Committee of the Structural Engineering Institute of ASCE Structural Fire Engineering provides best practices for the field of performance-based structural fire engineering design. When structural systems are heated by fire, they experience thermal effects that are not contemplated by conventional structural engineering design. Traditionally, structural fire protection is prescribed for structures after they have been optimized for ambient design loads, such as gravity, wind, and seismic, among others. This century-old prescriptive framework endeavors to reduce the heating of individual structural components with the intent of mitigating the risk of structural failure under fire exposure. Accordingly, the vulnerability of buildings to structural failure from uncontrolled fire varies across jurisdictions - which have differing structural design requirements for ambient loads - and as a function of building system and component configuration. As an alternative approach, Standard ASCE 7-16 permits the application of performance-based structural fire design (also termed structural fire engineering design) to evaluate the performance of structural systems explicitly under fire exposure in a similar manner as other design loads are treated in structural engineering practice. Structural fire engineering design is the calculated design of a structure to withstand the thermal load effects of fire, which have the potential to alter the integrity of a structure, based on specific performance criteria. This manual, MOP 138, addresses the current practice, thermal and structural analysis methods, and available information to support structural fire engineering design. It covers - Background information on the protection of structures from fire and the effects of fire on different types of construction, - Key distinctions between standard fire resistance design and structural fire engineering design, - Guidance for evaluating thermal boundary conditions on a structure because of fire exposure and on conducting heat transfer calculations based on the material thermal properties, - Performance objectives for structures under fire exposure, and - Analysis techniques that can be used to quantify structural response to fire effects. This Manual of Practice is a valuable resource for structural engineers, architects, building officials, and academics concerned with performance-based design for structural fire safety.

The Fire Chief's Handbook, 7th Edition continues Fire Engineering's 82-year tradition of publishing the definitive resource for advanced fire service training. The text has been completely updated to meet the changing environment and added responsibilities of the fire service. Returning authors have rewritten their chapter to address today's leadership and administrative concerns, while new authors are also introduced to offer new perspectives. This comprehensive guidebook is designed for firefighters, company officers, and chief officers of all ranks and department types who want the latest information on the fundamentals of leadership in the fire service, as well as managing the day-to-day operations of a fire department.

Safety managers today are required to go beyond compliance with the latest fire codes to implement proactive fire safety management programs that improve profitability. By reducing property loss insurance premiums and fostering an efficient work environment to help realize quality gains, safety managers can add to the bottom line; however, they need a solid understanding of the duties and responsibilities for which they are accountable. The Fire Safety Management Handbook is every safety manager's must-have guide for developing a successful fire safety management program. Emphasizing proactive fire safety activities that achieve optimal results, the text presents the key elements that comprise an effective fire safety management program, including a basic knowledge of: Types and functions of fire control equipment Identification and control of hazardous materials Homeland security during disasters and emergencies Fire chemistry, building construction, and efforts to reduce losses due to fire Commonly installed fire detection systems and their maintenance and inspection National Fire Codes (NFPA) and federal, state, and local legislation and enforcement Available resources, fire safety organizations, and the United States Fire Administration (USFA) To provide current and future safety professionals with a better understanding of emergency management within the fire safety discipline, each chapter of the Third Edition includes learning objectives at the beginning and questions at the end. Case studies have been added, codes and standards have been updated, and a new chapter on emergency response planning has been included. Plus, a school fire safety plan that can be used as a template is now part of the appendices.

An Introduction to Fire Dynamics Second Edition Dougal Drysdale University of Edinburgh, UK Fire Safety Engineering, identified in the original edition as 'a relatively new discipline', has since grown significantly in stature, as Fire Safety Engineers around the world begin to apply their skills to complex issues that defy solution by the old 'prescriptive' approach to fire safety. This second edition has the same structure as the first highly successful text, but has been updated with the latest research results. Fire processes are discussed and quantified in terms of the mechanisms of heat transfer and fluid flow. Problems addressed include: \* The conditions necessary for ignition and steady burning of combustible materials to occur \* How large a fire has to become before fire detectors and sprinkler heads will operate \* The circumstances that can lead to flashover in a compartment This book is unique in that it identifies fire science and fire dynamics and provides the scientific background necessary for the development of fire safety engineering as a professional discipline. It is essential reading for all those involved in this wide ranging field, from Fire Prevention Officers to Consulting Engineers, whether involved in problems of fire risk assessment, fire safety design, or fire investigation. It will also be of considerable interest and value to research scientists working in building design, fire physics and chemistry.

John Norman has updated his best-selling book, a guide for the firefighter and fire officer who, having learned the basic mechanics of the trade, are looking for specific methods for handling specific situations. In this new fourth edition, readers will find a new chapter on lightweight construction, a new chapter on electrical fires and emergencies, updates to many chapters including such topics as wind-driven fires, and many new illustrations.

Disk to accompany text "Design of Water-Based Fire Protection Systems."

The first handbook devoted to the coverage of materials in the field of fire engineering. Fire Protection Building Materials Handbook walks you through the challenging maze of choosing from the hundreds of commercially available materials used in buildings today and tells you which burn and /or are weakened during exposure to fire. It is the burning characteristics of materials, which usually allow fires to begin and propagate, and the degradation of materials that cause the most damage. Providing expert guidance every step of the way, Fire Protection Building Materials Handbook helps the architect, designers and fire protection engineers to design and maintain safer buildings while complying with international codes.

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