

smacna manual pdf

smacna manual pdf is a critical resource for professionals in the HVAC, sheet metal, and construction industries, offering comprehensive guidelines and standards for fabricating, installing, and maintaining mechanical systems. This manual by the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) serves as an authoritative reference, ensuring quality, efficiency, and compliance with industry best practices. Accessing the smacna manual pdf allows contractors, engineers, and architects to streamline project workflows, adhere to safety regulations, and optimize system performance. The document covers a wide range of topics, including duct construction, air sealing, insulation, and installation techniques, making it an indispensable tool for both design and field personnel. This article delves into the significance of the smacna manual pdf, its key contents, benefits, and how to effectively utilize it in professional applications. Readers will gain insight into the structure of the manual and practical advice on maximizing its value for various project requirements.

- Overview of the SMACNA Manual
- Key Sections in the SMACNA Manual PDF
- Benefits of Using the SMACNA Manual PDF
- How to Access and Use the SMACNA Manual PDF
- Applications of the SMACNA Manual in Industry

Overview of the SMACNA Manual

The SMACNA manual is a standardized publication developed by the Sheet Metal and Air Conditioning Contractors' National Association to provide detailed technical information and best practices for sheet metal and HVAC systems. This manual is widely recognized across the United States and internationally as a benchmark for quality and safety standards in mechanical contracting. The smacna manual pdf format offers convenient and immediate access to these standards, facilitating easy reference during project planning, installation, and inspection phases.

The manual addresses complex challenges in air distribution and mechanical systems, guiding professionals through design criteria, fabrication methods, and installation procedures. It incorporates the latest industry research, technological advancements, and regulatory updates to maintain relevance and accuracy. By following the recommendations outlined in the smacna manual pdf, users can ensure their projects meet rigorous performance and durability requirements.

Key Sections in the SMACNA Manual PDF

The smacna manual pdf is organized into several critical sections, each focusing on specialized topics within sheet metal and HVAC construction. These sections provide comprehensive guidance tailored to different aspects of mechanical contracting work.

Duct Construction Standards

This section defines the specifications for designing and fabricating ductwork, including dimensions, materials, and installation techniques. It emphasizes airtightness, minimizing leakage, and ensuring structural integrity under various pressure conditions.

Air Sealing and Leakage Control

Proper air sealing is essential for energy efficiency and indoor air quality. The manual details methods for sealing joints, seams, and connections to prevent air loss and maintain system performance.

Thermal Insulation Guidelines

Insulation requirements are outlined to enhance energy conservation, reduce condensation, and control temperature variations within duct systems. The manual recommends appropriate insulation types and installation practices based on environmental factors.

Fabrication and Installation Techniques

This section covers best practices for cutting, bending, assembling, and securing sheet metal components, ensuring durability and compliance with safety standards. It also includes recommendations for field installation procedures.

Safety and Compliance Standards

The smacna manual pdf includes guidelines for workplace safety, regulatory compliance, and quality assurance. These standards help contractors maintain safe work environments and meet legal requirements.

- Duct sizing and layout principles
- Material selection criteria

- Pressure class definitions
- Leakage testing procedures
- Maintenance and inspection protocols

Benefits of Using the SMACNA Manual PDF

Utilizing the smacna manual pdf offers numerous advantages for professionals engaged in mechanical contracting and HVAC system design. This resource serves as a comprehensive guide that enhances accuracy, efficiency, and consistency in project execution.

- **Standardization:** Ensures uniform application of industry standards across projects, promoting quality and reducing errors.
- **Efficiency:** Streamlines design and fabrication processes by providing clear instructions and specifications.
- **Compliance:** Facilitates adherence to local codes, regulations, and safety requirements through updated guidelines.
- **Cost Savings:** Reduces rework and material waste by following proven installation and construction methods.
- **Training Resource:** Acts as an educational tool for new employees and ongoing professional development.

Moreover, the digital format of the smacna manual pdf allows easy searching, bookmarking, and annotation, which enhances usability on job sites and in office settings.

How to Access and Use the SMACNA Manual PDF

The smacna manual pdf is typically available for purchase or licensed download from official SMACNA channels and authorized distributors. Some organizations provide access to the manual as part of membership benefits or subscription services.

Once obtained, users can integrate the manual into their workflow by:

1. Using keyword searches to quickly locate relevant sections.
2. Referencing technical drawings and tables during planning and installation.

3. Employing checklists and procedural outlines to ensure compliance with standards.
4. Sharing specific excerpts with team members to coordinate work efforts.

Proper utilization of the smacna manual pdf requires familiarity with its structure and terminology, which can be enhanced through training or guided study sessions. Regular updates to the manual necessitate monitoring for new editions to maintain current knowledge.

Applications of the SMACNA Manual in Industry

The smacna manual pdf is widely applied across various sectors involved in mechanical and sheet metal work, including commercial construction, industrial projects, and residential HVAC installations. Its influence extends to architects, engineers, contractors, and inspectors.

Commercial and Industrial HVAC Systems

In large-scale projects, the manual provides essential specifications for complex duct networks, air distribution systems, and ventilation solutions. It supports the design of efficient, safe, and code-compliant systems that meet the demands of commercial buildings and manufacturing facilities.

Sheet Metal Fabrication Workshops

Fabricators rely on the smacna manual pdf to standardize production processes, ensuring that components meet required tolerances and strength criteria. This helps maintain product consistency and reduces defects.

Quality Control and Inspection

Inspectors use the manual as a reference to verify that installations comply with SMACNA standards, checking for proper sealing, insulation, and structural integrity. This ensures that completed projects achieve the expected performance and longevity.

Training and Certification Programs

Educational institutions and training centers incorporate the smacna manual pdf in curricula to prepare students and trainees for careers in mechanical contracting, emphasizing industry standards and practical skills.

Frequently Asked Questions

What is the SMACNA Manual PDF?

The SMACNA Manual PDF is a digital version of the Sheet Metal and Air Conditioning Contractors' National Association's technical standards and guidelines for HVAC, duct construction, and sheet metal work.

Where can I download the SMACNA Manual PDF?

The SMACNA Manual PDF can be purchased and downloaded directly from the official SMACNA website or authorized distributors to ensure you have the latest and most accurate version.

Is the SMACNA Manual PDF free to access?

No, the SMACNA Manual is a copyrighted document and is typically not available for free. It must be purchased or accessed through membership or authorized channels.

What topics are covered in the SMACNA Manual PDF?

The manual covers topics including duct construction standards, HVAC systems, fabrication methods, installation guidelines, safety practices, and industry best practices for sheet metal contractors.

How often is the SMACNA Manual PDF updated?

The SMACNA Manual is periodically updated, typically every few years, to reflect the latest industry standards, technologies, and regulatory changes.

Can I use the SMACNA Manual PDF for HVAC design and installation?

Yes, the SMACNA Manual is widely used by HVAC professionals for design, fabrication, and installation guidance to ensure compliance with industry standards.

What are the benefits of using the SMACNA Manual PDF?

Using the SMACNA Manual ensures standardized quality, improved safety, efficient fabrication, and compliance with industry regulations in sheet metal and HVAC projects.

Are there different versions of the SMACNA Manual PDF for various specialties?

Yes, SMACNA publishes different manuals for specialties such as HVAC duct construction, industrial sheet metal, architectural sheet metal, and energy recovery ventilation systems.

How can I cite the SMACNA Manual PDF in a professional report?

To cite the SMACNA Manual PDF, include the title, edition, publication year, publisher (SMACNA), and the URL or DOI if accessed online, following the citation style required for your report.

Additional Resources

1. SMACNA HVAC Duct Construction Standards - Metal and Flexible

This manual is an essential resource for professionals involved in HVAC duct construction. It provides detailed guidelines on the fabrication and installation of metal and flexible duct systems. The book emphasizes quality, safety, and industry standards to ensure optimal performance and durability in HVAC projects.

2. SMACNA Architectural Sheet Metal Manual

A comprehensive guide focused on the design and installation of architectural sheet metal systems. This manual covers a wide range of applications, from roofing and wall panels to rainwater systems, highlighting best practices and industry standards. It is an invaluable reference for architects, contractors, and sheet metal workers.

3. SMACNA Industrial Duct Construction Standards

This book addresses the specialized requirements for industrial duct construction, including heavy gauge metals and complex configurations. It offers detailed fabrication and installation procedures to manage the unique challenges of industrial environments. The manual is ideal for engineers and contractors working with industrial ventilation systems.

4. SMACNA Fire, Smoke, and Radiation Damper Installation Guide

Focused on the critical aspects of damper installation, this guide explains the standards for fire, smoke, and radiation dampers used in HVAC systems. It includes clear instructions to ensure compliance with safety codes and regulatory requirements. The book is a must-have for HVAC professionals aiming to enhance building fire safety.

5. SMACNA HVAC Systems Duct Design Manual

This manual provides in-depth coverage of HVAC duct design principles, including airflow, pressure loss, and system layout. It offers practical examples and calculations to aid engineers and designers in creating

efficient ductwork systems. The book supports the development of energy-efficient and code-compliant HVAC installations.

6. *SMACNA Indoor Air Quality Guidelines*

Dedicated to improving indoor air quality, this guide discusses best practices for HVAC system design, maintenance, and operation. It highlights the importance of ventilation, filtration, and contaminant control to promote healthier indoor environments. The manual is beneficial for building owners, engineers, and facility managers focused on occupant health.

7. *SMACNA Mechanical Insulation Manual*

This comprehensive manual covers the selection and application of insulation materials in mechanical systems, including HVAC ducts and piping. It addresses thermal, acoustic, and fire protection considerations to optimize system performance. The book serves as a valuable reference for insulation contractors, engineers, and designers.

8. *SMACNA Air Duct Leakage Test Manual*

This manual outlines standardized procedures for conducting air duct leakage tests to ensure system integrity and efficiency. It provides detailed testing protocols, equipment recommendations, and interpretation of results. The guide is essential for contractors and inspectors aiming to meet energy codes and improve HVAC system performance.

9. *SMACNA Sustainable HVAC Design Practices*

Focusing on environmentally responsible HVAC design, this book explores strategies to reduce energy consumption and environmental impact. It integrates sustainable materials, energy-efficient systems, and innovative technologies within the framework of SMACNA standards. The manual is ideal for engineers and designers committed to green building practices.

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SMACNA Manual PDF: Your Guide to HVAC Ductwork Excellence

Author: HVAC Engineering Solutions

Contents:

Introduction: The Importance of the SMACNA Manual and its Applications

Chapter 1: Fundamentals of Duct Design: Sheet Metal Gauge Selection, Duct Construction Methods, and Design Considerations.

Chapter 2: HVAC System Types and Duct Design: Applications of the SMACNA Manual to different

HVAC systems (e.g., VAV, Constant Volume).

Chapter 3: Leakage and Airflow: Understanding Air Leakage Standards and its impact on HVAC efficiency.

Chapter 4: Insulation and Fire Dampers: Best practices for Insulation, Fire Damper selection, and installation.

Chapter 5: Testing and Balancing: Methods and Procedures for Testing and Balancing HVAC systems.

Chapter 6: Safety and Compliance: Regulatory compliance and safety procedures for HVAC installation.

Chapter 7: Advanced Duct Design Techniques: Exploring more complex duct design scenarios and solutions.

Conclusion: Putting it all together and maintaining HVAC system efficiency.

SMACNA Manual PDF: A Deep Dive into HVAC Ductwork Design and Installation

The Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) Manual is the industry bible for HVAC ductwork design and installation. This comprehensive guide offers invaluable information for engineers, contractors, and anyone involved in the design, construction, and maintenance of HVAC systems. Understanding and utilizing this manual is crucial for ensuring efficient, safe, and code-compliant HVAC installations. This article delves into the key aspects covered within the SMACNA Manual PDF, providing a detailed overview for both seasoned professionals and those new to the field.

Introduction: The Importance of the SMACNA Manual and its Applications

The SMACNA Manual isn't just a collection of guidelines; it's a critical resource that directly impacts the efficiency, safety, and longevity of HVAC systems. Its detailed specifications ensure proper air distribution, minimizing energy waste and improving indoor air quality. The manual's widespread adoption across the industry ensures consistency and adherence to best practices, making it an indispensable tool for collaboration among different project stakeholders. From specifying the right gauge of sheet metal to understanding complex airflow dynamics, the SMACNA Manual provides the technical foundation for successful HVAC projects. Failing to adhere to its guidelines can lead to costly rework, compromised system performance, and potential safety hazards.

Chapter 1: Fundamentals of Duct Design: Sheet Metal Gauge Selection, Duct Construction Methods, and Design

Considerations

This foundational chapter explores the essential elements of duct design. It starts with understanding sheet metal gauges – the thickness of the metal used in duct construction. Selecting the appropriate gauge is vital for ensuring structural integrity and longevity while balancing cost-effectiveness. The manual details the various factors influencing gauge selection, including duct size, pressure, and environmental conditions. Furthermore, it outlines various duct construction methods, such as spiral lock seam, rectangular seam, and other specialized techniques. Each method offers unique advantages and disadvantages in terms of cost, strength, and air tightness, and the SMACNA Manual provides the guidance necessary for choosing the optimal method for a given application. Finally, this chapter covers crucial design considerations, including proper duct sizing calculations based on airflow requirements and minimizing pressure losses for efficient system operation.

Chapter 2: HVAC System Types and Duct Design: Applications of the SMACNA Manual to Different HVAC Systems (e.g., VAV, Constant Volume)

HVAC systems vary greatly in their design and operation, and the SMACNA Manual adapts its guidance accordingly. This chapter emphasizes the application of its principles to different system types. For instance, Variable Air Volume (VAV) systems, which adjust airflow based on demand, require a different approach to duct design compared to constant volume systems. The manual provides specific guidelines for designing ductwork to accommodate the fluctuating airflow characteristics of VAV systems, minimizing pressure drop and ensuring efficient operation. Similarly, it addresses the unique design considerations for other system types, including fan coil units, packaged units, and dedicated outside air systems (DOAS), ensuring that the ductwork is optimized for each specific application.

Chapter 3: Leakage and Airflow: Understanding Air Leakage Standards and its Impact on HVAC Efficiency

Air leakage in ductwork is a significant factor impacting HVAC system efficiency and energy consumption. This chapter of the SMACNA Manual details the importance of minimizing air leakage and outlines methods for achieving this. It covers the various standards and testing procedures used to measure leakage rates, such as the SMACNA Leakage Test Standard. Understanding these standards is crucial for ensuring that ductwork meets the required performance levels. The chapter also explains the impact of air leakage on energy efficiency, highlighting how uncontrolled air leakage can lead to increased energy consumption, reduced heating/cooling capacity, and compromised indoor air quality. It explores strategies for minimizing leakage, including proper sealing techniques, joint design, and the selection of appropriate materials.

Chapter 4: Insulation and Fire Dampers: Best Practices for Insulation, Fire Damper Selection, and Installation

Proper insulation and fire damper installation are crucial for both energy efficiency and fire safety in HVAC systems. This chapter delves into best practices for both. It covers the various types of insulation materials suitable for HVAC applications, discussing their thermal performance, moisture resistance, and durability. The selection of appropriate insulation depends on factors such as duct location, climate conditions, and temperature requirements. The manual provides guidance on calculating the required insulation thickness to meet specific energy performance standards. Regarding fire dampers, the chapter details their importance in preventing the spread of fire and smoke through ductwork. It explains the various types of fire dampers available and provides guidance on their selection, installation, and testing to ensure compliance with fire codes.

Chapter 5: Testing and Balancing: Methods and Procedures for Testing and Balancing HVAC Systems

Testing and balancing (TAB) is a critical process for verifying that an HVAC system performs as designed. This chapter details the methods and procedures involved in TAB, ensuring that airflow rates are correctly balanced throughout the system. It explains the various testing methods used to measure airflow, pressure drop, and other critical parameters. The manual provides step-by-step instructions for conducting a comprehensive TAB procedure, highlighting the importance of accurate measurements and documentation. Furthermore, it details the procedures for adjusting airflow rates to achieve the desired balance and addresses troubleshooting common issues that may arise during the testing process. Proper TAB is crucial for optimizing system efficiency and ensuring occupant comfort.

Chapter 6: Safety and Compliance: Regulatory Compliance and Safety Procedures for HVAC Installation

Safety and compliance are paramount in HVAC installation. This chapter outlines the necessary safety procedures and regulatory requirements for ensuring compliance with relevant codes and standards. It covers topics such as fall protection, lockout/tagout procedures, and personal protective equipment (PPE) usage. The chapter also discusses the importance of adhering to local, state, and national building codes, including those relating to fire safety and energy efficiency. Understanding these regulations is vital for preventing accidents and ensuring compliance with legal requirements. The SMACNA Manual emphasizes the responsibility of HVAC contractors to prioritize safety in all aspects of the installation process.

Chapter 7: Advanced Duct Design Techniques: Exploring More Complex Duct Design Scenarios and Solutions

Beyond the basics, the SMACNA Manual also addresses more complex duct design scenarios. This chapter explores advanced techniques for handling challenging situations. This might include designing ductwork for high-velocity systems, dealing with complex building geometries, or integrating ductwork with other building systems. It covers specialized duct designs, such as flexible ductwork, high-pressure systems, and systems requiring noise attenuation. The chapter explores advanced computational fluid dynamics (CFD) simulations and other analytical methods for optimizing duct design in complex situations. It also addresses the challenges of integrating ductwork into existing buildings or retrofitting systems.

Conclusion: Putting it all Together and Maintaining HVAC System Efficiency

The SMACNA Manual serves as a comprehensive guide for achieving HVAC excellence. Following its guidelines ensures efficient, safe, and code-compliant installations. By understanding its principles, professionals can optimize energy performance, improve indoor air quality, and enhance the overall lifespan of HVAC systems. Regular maintenance and adherence to the manual's recommendations are crucial for sustaining optimal system performance and minimizing potential issues. Investing in proper training and utilizing the SMACNA Manual is a critical step toward ensuring HVAC systems operate at peak efficiency and meet the highest industry standards.

FAQs

1. What is the SMACNA Manual? It's a comprehensive guide published by the Sheet Metal and Air Conditioning Contractors' National Association, outlining best practices for HVAC ductwork design and installation.
2. Who should use the SMACNA Manual? Engineers, contractors, technicians, and anyone involved in the design, installation, or maintenance of HVAC systems.
3. Is the SMACNA Manual legally required? While not always explicitly mandated by law, adherence to its guidelines is often required by building codes and is considered industry best practice.
4. How often is the SMACNA Manual updated? It's regularly updated to reflect advancements in technology and changes in building codes.
5. Where can I purchase the SMACNA Manual PDF? It's available for purchase directly from SMACNA or authorized distributors.

6. What are the key benefits of using the SMACNA Manual? Improved system efficiency, enhanced safety, minimized energy waste, and compliance with industry standards.
7. Can I find free resources related to the SMACNA Manual online? Some excerpts and summaries may be available online, but the full manual requires purchase.
8. Does the SMACNA Manual cover all aspects of HVAC? No, it primarily focuses on ductwork design and installation.
9. What happens if I don't follow the SMACNA Manual guidelines? Potential issues include system inefficiencies, safety hazards, code violations, and costly rework.

Related Articles:

1. HVAC Ductwork Design Basics: A beginner's guide to fundamental concepts in HVAC ductwork design.
2. Understanding HVAC System Types: An explanation of different HVAC system types and their applications.
3. Importance of Airflow in HVAC Systems: Detailing the crucial role of proper airflow in efficient HVAC operations.
4. HVAC Insulation Best Practices: A comprehensive guide to selecting and installing HVAC insulation.
5. HVAC Fire Damper Safety and Compliance: A detailed explanation of fire damper regulations and safety measures.
6. HVAC Testing and Balancing Procedures: A step-by-step guide to performing HVAC testing and balancing.
7. Advanced HVAC Duct Design Techniques (Beyond Basics): Exploring complex design scenarios and solutions.
8. Troubleshooting Common HVAC Ductwork Problems: Identifying and resolving frequent issues in HVAC ductwork.
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smacna manual pdf: HVAC Testing, Adjusting, and Balancing Field Manual John Gladstone, W. David Bevirt, 1996-12-22 Publisher's Note: Products purchased from Third Party sellers are not guaranteed by the publisher for quality, authenticity, or access to any online entitlements included with the product. Take Advantage of the Latest Guidance on the Hottest Area in HVAC! As health problems related to poor indoor air quality become increasingly evident, demand for better quality and efficiency in air systems is skyrocketing--making HVAC testing, adjusting, and balancing (TAB) the fastest-growing HVAC discipline. Here is a practical, nuts-and-bolts manual devoted to this specialty, now revised and updated with new information about such vital topics as: Indoor air quality; Energy recovery systems; Fan surge; Duct leakage; System performance; Temperature control verification; And more! You'll also find new chapters on systems balancing, controls, clean rooms, sound vibration, and solutions to TAB problems, as well as a chapter with a model standard for TAB cost-estimating. Sponsored by the National Environmental Balancing Bureau, the book's clear, step-by-step explanations will help you understand and meet requirements for testing, measuring, adjusting, balancing, troubleshooting, and cost-estimating TAB function for tall buildings, restaurants, hospitals, and other institutional settings.

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Moisture Barrier Systems Category 2 Planning Fact Sheet No. 2.1, How Do Siting and Design Decisions Affect the Owner's Costs? Fact Sheet No. 2.2, Selecting a Lot and Siting the Building Category 3 Foundations Fact Sheet No. 3.1, Foundations in Coastal Areas Fact Sheet No. 3.2, Pile Installation Fact Sheet No. 3.3, Wood-Pile-to-Beam Connections Fact Sheet No. 3.4, Reinforced Masonry Pier Construction Fact Sheet No. 3.5, Foundation Walls Category 4 Load Paths Fact Sheet No. 4.1, Load Paths Fact Sheet No. 4.2, Masonry Details Fact Sheet No. 4.3, Use of Connectors and Brackets Category 5 Wall Systems Fact Sheet No. 5.1, Housewrap Fact Sheet No. 5.2, Roof-to-Wall and Deck-to-Wall Flashing Fact Sheet No. 5.3, Siding Installation in High-Wind Regions Fact Sheet No. 5.4, Attachment of Brick Veneer In High-Wind Regions Category 6 Openings Fact Sheet No. 6.1, Window and Door Installation Fact Sheet No. 6.2, Protection of Openings Shutters and Glazing Category 7 - Roofing Fact Sheet No. 7.1, Roof Sheathing Installation Fact Sheet No. 7.2, Roof Underlayment for Asphalt Shingle Roofs Fact Sheet No. 7.3, Asphalt Shingle Roofing for High-Wind Regions Fact Sheet No. 7.4, Tile Roofing for High-Wind Areas Fact Sheet No. 7.5, Minimizing Water Intrusion through Roof Vents in High-Wind Regions Fact Sheet No. 7.6, Metal Roof Systems in High-Wind Regions Category 8 Attachments Fact Sheet No. 8.1, Enclosures and Breakaway Walls Fact Sheet No. 8.2, Decks, Pools, and Accessory Structures Fact Sheet No. 8.3, Protecting Utilities Category 9 Repairs Fact Sheet No. 9.1, Repairs, Remodeling, Additions, and Retrofitting Flood Fact Sheet No. 9.2, Repairs, Remodeling, Additions, and Retrofitting Wind Category G Guide Fact Sheet No. G.1, Technical Fact Sheet Guide Fact Sheet No. G.2, References and Resources

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smacna manual pdf: HVAC Arthur A. Bell, 2000 The ultimate reference book on the most frequently used HVAC data, chock-full of equations, data, and rules of thumb--a necessary addition to any library for mechanical, architectural, and electrical engineers, HVAC contractors and technicians, and others. Features over 216 equations for everything from air change rates to swimming pools to steel pipes. Includes both ASME and ASHRAE code information, and follows the CSI MasterFormat TM.

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smacna manual pdf: Load Calculation Applications Manual (I-P Edition) Jeffrey D. Spitler, 2014-10-01 This manual focuses on the calculation of cooling and heating loads for commercial buildings. The heat balance method (HBM) and radiant time series method (RTSM) (as well as how to implement these methods) are discussed. Heat transfer processes and their analysis, psychrometrics, and heating load calculations are also considered--

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smacna manual pdf: Moisture Control Guidance for Building Design, Construction and Maintenance American Society of Heating, Refrigerating and Air-Conditioning Engineers, Ashrae, United States Environmental Protection Agency, 2016-06-21 Moisture control is fundamental to the proper functioning of any building. Controlling moisture is important to protect occupants from adverse health effects and to protect the building, its mechanical systems and its contents from physical or chemical damage. Yet, moisture problems are so common in buildings, many people consider them inevitable. Excessive moisture accumulation plagues buildings throughout the United States, from tropical Hawaii to arctic Alaska and from the hot, humid Gulf Coast to the hot, dry Sonoran Desert. Between 1994 and 1998, the U.S. Environmental Protection Agency (EPA) Building Assessment Survey and Evaluation (BASE) study collected information about the indoor air quality of 100 randomly selected public and private office buildings in the 10 U.S. climatic regions.

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