

AIR HANDLING UNIT SELECTION WORKSHEET

Project:		Date:	
Project No.:		Calc. By:	
Unit Identification			
Number:	AHU-1		
Total CFM of Constant Vol. Boxes	=	60000 cfm	
Total CFM of Variable Vol. Boxes	=	0 cfm	
Diversity of VAV System (%)	=	100%	
CFM of VAV Boxes with Diversity	=	0 cfm	

COOLING COIL DATA			
Total CFM of Constant Vol. Boxes	=	60000 cfm	
Total CFM of Variable Vol. Boxes	=	0 cfm	
Total CFM	=	60000 cfm	
Scheduled AHU CFM	=	60000 cfm	
Coil Area @ 500 fpm	=	120.0 sf	

Total Exhaust CFM	=	10800 cfm
Percent Outside Air	=	20%
Outside Air	=	12000 cfm
Scheduled Outside Air CFM	=	12000 cfm
Percent Pressurization	=	10.0%
Is pressure between 0% and 10%?	=	YES
Return Air CFM	=	48000 cfm

	DB	WB
Outside Air Temp. =	96.0°F	74.0°F
Return Air Temp. =	75.0°F	62.6°F

Number of People	=	100
Total Sensible Heat (with)	=	1,745,605 Btuh
Total Latent Heat (with)	=	207,530 Btuh
Return Air Temperature	=	75.0°F
Room Delta T	=	20.0°F

Fan Location/Type	=	Blow Thru
Motor Heat Gain	=	152,155 Btuh
Temperature Rise	=	2.3°F

	DB	WB	Enthalp
Entering Air Temp. =	81.94°F	64.84°F	29.16
Leaving Air	55.00°F	54.50°F	22.87

Grand Total Heat (with 0% SF)	=	1,698,380 Btuh
Tonnage	=	141.5 tons
Leaving Water Temperature	=	58.0°F
Entering Water Temperature	=	44.0°F
Chilled Water Flow	=	242.6 gpm

Outside Air Temperature	=	10.0°F
Return Air Temperature	=	75.0°F
Entering Air Temperature	=	62.0°F
Pre-Heat Coil BTU	=	Not Required

Entering (or Outside) Air Temperature	=	62.0°F
Leaving Air Temperature	=	100.0°F
Re-Heat (or Heating) Coil BTU	=	2,462,400

AHU STATIC PRESSURE CALCS			
External Static Pressure			
Discharge Plenum		0.25 in.	0.00 in.
Final		1.00 in.	0.00 in.
Med. Pressure Duct		0 ft.	0.00 in.
Terminal		0.75 in.	0.00 in.
Reheat		0.25 in.	0.00 in.
Low Pressure S.A.		200 ft.	0.16 in.
Volume Damper	1	0.10 in.	0.10 in.
Supply Air Grille	1	0.10 in.	0.10 in.
Return Air Device	1	0.10 in.	0.10 in.
Low Pressure R.A.		200 ft.	0.16 in.
Return Air Plenum	1	0.25 in.	0.25 in.
Pre-Filter	1	0.60 in.	0.60 in.
Fire Dampers	1	0.20 in.	0.20 in.
Smoke Dampers		0.20 in.	0.00 in.
Fire/Smoke		0.20 in.	0.00 in.
O.A.	1	0.15 in.	0.15 in.
Outside Air Damper	1	0.10	0.10 in.
Outside Air Duct		100 ft.	0.08 in.
Misc.			0.00 in.
Misc.			0.00 in.
Misc.			0.00 in.
Total External Static Pressure			2.00 in.

Scheduled		2.00 in.
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Internal Static Pressure			
Pre-Filter		0.50 in.	0.00 in.
Mixing		0.25 in.	0.00 in.
Blender/Dampers		0.20 in.	0.00 in.
Pre-Heat Coil		0.25 in.	0.00 in.
Cooling	1	0.35 in.	0.35 in.
Reheat Coil	1	0.25 in.	0.25 in.
Diffuser Section		0.40 in.	0.00 in.
Cartridge/Final	1	1.20 in.	1.20 in.
Discharge Plenum		0.15 in.	0.00 in.
Total Internal Static Pressure	=		1.80 in.
Total Static Pressure	=		3.80 in.

Scheduled Total S.P.	=	3.80 in.
Brake Horsepower	=	59.79 BHP

PRE-HEAT COIL DATA	
Entering Water Temperature	= 200.0°F
Leaving Water Temperature	= 160.0°F
Leaving Air Temperature	= 60.0°F
Hot Water Flow (GPM)	= 0.0

RE-HEAT (OR HEATING) COIL DATA	
Entering Water Temperature	= 200.0°F
Leaving Water Temperature	= 160.0°F
Hot Water Flow (GPM)	= 123.1

Manual J Commercial Calculation

Upstryve Inc



Manual J Commercial Calculation:

Manual J - Residential Load Calculation Hank Rutkowski, 2011-11-01 Manual J 8th Edition is the national ANSI recognized standard for producing HVAC equipment sizing loads for single family detached homes small multi unit structures condominiums town houses and manufactured homes This new version incorporates the complete Abridged Edition of Manual J The manual provides quick supplemental details as well as supporting reference tables and appendices A proper load calculation performed in accordance with the Manual J 8th Edition procedure is required by national building codes and most state and local jurisdictions Energy Research and Development and Small Business United States. Congress.

Senate. Select Committee on Small Business, 1975

Precision HVAC Sizing: The Consultant's Guide to Load Calculation and System Selection Charles Nehme, The efficiency longevity and ultimate performance of any built environment be it a skyscraper a hospital or a family home hinges critically on one fundamental engineering task the precise sizing of its Heating Ventilation and Air Conditioning HVAC system An HVAC system is not merely a collection of machines it is the building's respiratory and thermoregulatory center When correctly sized it provides an invisible blanket of comfort maintains optimal air quality and operates with a silent sustainable efficiency When improperly sized it becomes a source of wasted energy occupant discomfort and costly premature failure In my more than three decades as a global HVAC and MEP consultant I have witnessed firsthand the substantial economic and environmental penalties incurred when the art and science of sizing are neglected Oversized systems short cycle failing to dehumidify effectively and wasting energy while undersized systems run perpetually struggling to meet demand and burning out components long before their time This book is dedicated to demystifying the complex interplay of thermodynamics building science and climate data that governs the sizing process It is a practical guide that bridges the gap between theoretical load calculations and real world system selection drawing on international standards and practical field experience My goal is to equip designers engineers and students with the methodologies tools and critical thinking required to ensure every HVAC system they touch is perfectly matched to its application delivering the trifecta of comfort energy efficiency and reliable longevity Precision is not a luxury in HVAC design it is a necessity Let this guide be your essential companion on the path to mastering it **Energy Research**

and Development and Small Business: how much? How much more from small business? How soon? United States. Congress. Senate. Select Committee on Small Business, 1975

Olin's Construction H. Leslie Simmons, 2011-11-16 Get the updated industry standard for a new age of construction For more than fifty years Olin's Construction has been the cornerstone reference in the field for architecture and construction professionals and students This new edition is an invaluable resource that will provide in depth coverage for decades to come You'll find the most up to date principles materials methods codes and standards used in the design and construction of contemporary concrete steel masonry and wood buildings for residential commercial and institutional use Organized by the principles of the MasterFormat 2010

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Modern HVAC Systems: A Training Module for Engineers Charles Nehme, In the ever evolving landscape of modern engineering the mastery of heating ventilation and air conditioning HVAC systems is not merely a specialized skill but a foundational necessity From the complex industrial facilities that power our economies to the intricate commercial and residential spaces where we live and work the performance of the built environment hinges critically on the efficiency reliability and safety of its climate control systems This training module is designed to bridge the gap between theoretical principles and practical application providing a robust in depth guide for engineers at all stages of their careers My career spanning over three decades as a global HVAC and MEP consultant has afforded me a unique vantage point from which to observe and contribute to this vital field I have witnessed firsthand the transformative power of innovative design and the critical importance of a deep nuanced understanding of the underlying physics and engineering principles This book is the culmination of that experience distilled into a structured accessible format It is intended to serve as more than just a textbook it is a resource for problem solving a reference for design and a guide for achieving optimal performance energy efficiency and indoor air quality in any project anywhere in the world The chapters ahead are meticulously crafted to build knowledge progressively starting with the fundamental laws of thermodynamics and fluid mechanics before advancing to the complex interactions of system components and control strategies We will explore the psychrometric chart not as a static tool but as a dynamic map of air properties that informs every design decision We will demystify the refrigeration cycle and analyze its components in detail My goal is to empower you the engineer with the comprehensive understanding needed to tackle the challenges of modern HVAC design with confidence and precision This book is a testament to the belief that the best engineering solutions are born from a solid theoretical foundation combined with practical wisdom

Load Calculation ,1988 ASHRAE Handbook & Product Directory ,1975 *HVAC Installations Best Practices* Charles Nehme, Introduction The purpose of this guide is to provide a

comprehensive set of best practices for HVAC Heating Ventilation and Air Conditioning installations These practices are designed to ensure optimal system performance energy efficiency safety and customer satisfaction Whether you are an HVAC contractor installer or technician adhering to these guidelines will help you deliver high quality installations that meet or exceed industry standards

Planning and Design Load Calculation Perform accurate load calculations using recognized methods such as Manual J for residential and Manual N for commercial buildings to ensure the system is appropriately sized

System Selection Choose HVAC systems that match the load requirements and consider factors such as energy efficiency ratings SEER EER HSPF environmental impact refrigerant type and client preferences

Ductwork Design Design ductwork to minimize pressure losses and ensure balanced airflow Use Manual D for residential duct design and ensure proper sizing and layout to prevent issues like hot and cold spots

Installation Best Practices Site Preparation Ensure the installation site is clean accessible and complies with local building codes Verify that there is sufficient space for equipment and maintenance access

Proper Mounting and Leveling Mount and level all HVAC equipment correctly to prevent operational issues and enhance longevity Use appropriate mounting hardware and check levels using a spirit level

Refrigerant Piping Size and install refrigerant piping according to manufacturer specifications to prevent pressure drops and ensure efficient refrigerant flow Insulate refrigerant lines to prevent heat loss or gain

Electrical Connections Ensure all electrical connections are secure and comply with the National Electrical Code NEC Verify correct voltage and amperage and install appropriate circuit protection devices

Duct Sealing and Insulation Seal all duct joints with mastic or UL 181 rated tape to prevent air leakage Insulate ducts in unconditioned spaces to improve energy efficiency

Ventilation Requirements Install ventilation systems according to local codes and standards such as ASHRAE 62.2 for residential ventilation Ensure proper placement of intake and exhaust vents to optimize air quality and system performance

Commissioning and Testing System Startup Follow manufacturer guidelines for system startup procedures Verify that all components are functioning correctly and that there are no abnormal noises or vibrations

Airflow Measurement Measure and adjust airflow to meet design specifications Use tools like anemometers or balometers to ensure balanced and adequate airflow throughout the system

Refrigerant Charge Verification Verify that the refrigerant charge is correct using superheat and subcooling methods Adjust the charge if necessary to ensure optimal system performance and efficiency

Maintenance and Documentation Maintenance Plan Develop a maintenance plan that includes regular inspections filter changes and system tune ups Educate the customer on the importance of routine maintenance to prolong the system's lifespan and maintain efficiency

Customer Education Provide the customer with a detailed user manual and a walkthrough of the system's features and maintenance requirements Ensure they understand how to operate the thermostat change filters and recognize signs of potential issues

Documentation Keep detailed records of all installation steps system specifications and any modifications made during the process This documentation will be invaluable for future maintenance and troubleshooting

Safety and Compliance Code Compliance

Ensure that all installations comply with local building codes safety regulations and manufacturer guidelines This includes securing necessary permits and passing all required inspections Safety Protocols Follow all safety protocols during installation such as using appropriate personal protective equipment PPE ensuring proper ventilation when working with refrigerants and maintaining a clean and hazard free work area Environmental Considerations Dispose of old equipment and refrigerants responsibly following EPA guidelines and local regulations Consider recommending environmentally friendly options to customers such as high efficiency systems and eco friendly refrigerants Quality Assurance Final Inspection Conduct a thorough final inspection of the entire HVAC system checking for correct installation proper operation and compliance with all specifications Customer Satisfaction Ensure the customer is satisfied with the installation Address any concerns or questions they may have before concluding the job Warranty and Support Provide information on warranties and support services Ensure the customer knows who to contact in case of any future issues or questions By adhering to these best practices HVAC professionals can ensure high quality installations that provide reliable efficient and safe heating and cooling solutions for their customers

2023 Florida County PROV Class B Air Conditioning Contractor Exam Prep

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AC Limited with a prep course designed by 1ExamPrep to help you conquer the Prov Master Air Conditioning AC Limited computer based examination Our courses make it convenient and easy for EVERY type of student who is attempting to obtain a contractor s license The course includes Test taking techniques and tips Tab and highlight locations for every required book Hundreds of Practice questions We base these per book so you can understand which questions come from which book to better know where to find the answer as well as final exams to reinforce your test taking skills **Building Technology**

Benjamin Stein,1996 The complete guide to building technology This comprehensive guide provides complete coverage of every aspect of the building technologist s profession It details design and installation procedures describes all relevant equipment and hardware and illustrates the preparation of working drawings and construction details that meet project specifications code requirements and industry standards The author establishes procedures for professional field inspections and equipment operations tests provides real world examples from both residential and nonresidential construction projects and makes specific references to code compliance throughout the text This new edition incorporates changes in building codes advances in materials and design techniques and the emergence of computer aided design CAD while retaining the logical structure and helpful special features of the first edition More than 1 100 drawings tables and photographs complement and illustrate discussions in the text Topics covered include Heating ventilating and air conditioning systems equipment and design Plumbing systems equipment and design Electrical and lighting systems equipment and design Testing adjusting and balancing procedures for all building systems Every aspect of the building technologist s profession from the creation of working drawings through on site supervision and systems maintenance Extensive appendices include conversion factors duct design data test report forms for use in field work design forms and schedules for electrical HVAC and plumbing work and more **What do HVAC Technicians Do & How They Do it** Charles Nehme , Heating Ventilation and Air

Conditioning HVAC technicians are skilled professionals who play a crucial role in maintaining repairing and installing heating ventilation and air conditioning systems in residential commercial and industrial settings Their expertise is essential for ensuring optimal indoor air quality thermal comfort and energy efficiency in various buildings and environments As the demand for climate control and energy efficient systems grows HVAC technicians have become increasingly vital in creating comfortable and safe living and working environments They are well versed in the latest technology and industry standards enabling them to address a wide range of HVAC related challenges effectively The responsibilities of HVAC technicians encompass a diverse array of tasks and their expertise extends beyond just heating and cooling systems Some of their key roles include 1 Installation HVAC technicians are involved in setting up new heating ventilation and air conditioning systems They carefully follow blueprints technical specifications and safety regulations to ensure proper system assembly and integration 2 Maintenance Regular maintenance of HVAC systems is critical to ensure their efficient operation and longevity Technicians perform routine inspections clean components lubricate moving parts and conduct tests to identify and fix any

issues before they escalate into major problems

- 3 Repair When HVAC systems malfunction or breakdown technicians are called upon to diagnose and repair the problem They use diagnostic tools and their expertise to troubleshoot issues replace faulty parts and restore the system to proper working order
- 4 System Upgrades and Retrofitting As technology advances and energy efficiency becomes a priority HVAC technicians may upgrade older systems to meet modern standards They might also retrofit existing systems with new components to improve performance and reduce energy consumption
- 5 Refrigerant Management HVAC technicians handle and manage refrigerants used in cooling systems ensuring that they are properly handled stored and disposed of to protect the environment
- 6 Customer Service HVAC technicians often work directly with clients understanding their needs providing advice and offering solutions to optimize HVAC performance based on individual requirements
- 7 Safety and Compliance HVAC technicians must adhere to safety protocols and industry regulations to prevent accidents and ensure the systems they work on are compliant with relevant standards
- 8 Troubleshooting Identifying and resolving complex HVAC issues requires a deep understanding of mechanical electrical and electronic components as well as a methodical approach to problem solving

In summary HVAC technicians are vital professionals who ensure our comfort and well being by maintaining and optimizing heating ventilation and air conditioning systems Their expertise in system installation maintenance repair and safety make them indispensable in the modern world s quest for efficient and sustainable climate control

HVAC Q A What is HVAC HVAC stands for heating ventilation and air conditioning It is a system of technology that controls the temperature humidity and ventilation of indoor and restricted spaces How does HVAC work HVAC systems typically use a combination of heating and cooling elements fans and ductwork to control the indoor environment The specific components and operation of an HVAC system will vary depending on the type of system and the specific needs of the building What are the different types of HVAC systems There are many different types of HVAC systems but some of the most common include Central heating and cooling systems Split systems Ductless mini split systems Heat pumps Furnaces Air conditioners How do I choose the right HVAC system for my home When choosing an HVAC system for your home there are a number of factors to consider such as the size of your home the climate you live in your budget and your energy efficiency goals It is important to consult with a qualified HVAC professional to get the best advice for your specific needs What is the best way to maintain my HVAC system The best way to maintain your HVAC system is to have it inspected and serviced by a qualified professional on a regular basis This will help to ensure that your system is operating efficiently and safely You should also change your air filter regularly according to the manufacturer s recommendations

Short answer HVAC stands for heating ventilation and air conditioning It is a system of technology that controls the temperature humidity and ventilation of indoor and restricted spaces There are many different types of HVAC systems and the best way to choose the right one for your home is to consult with a qualified HVAC professional To maintain your HVAC system have it inspected and serviced by a qualified professional on a regular basis and change your air filter regularly

Refrigeration

Fundamentals and Applications Charles Nehme, Welcome to the fascinating world of Refrigeration Fundamentals and Applications This book serves as a comprehensive guide for understanding the principles techniques and applications of refrigeration systems Whether you are a student an aspiring engineer or a seasoned professional in the field this book will provide you with a solid foundation and a practical understanding of refrigeration technology Refrigeration plays a vital role in our daily lives from preserving food and medicine to creating comfortable living and working environments It has revolutionized various industries including food processing healthcare manufacturing and transportation With the constant advancements in technology and the growing need for energy efficiency it has become crucial to have a deep understanding of the fundamentals and applications of refrigeration In this book we will embark on a journey that explores the core principles of refrigeration We will delve into topics such as thermodynamics heat transfer fluid mechanics and system components which form the building blocks of refrigeration technology By mastering these fundamental concepts you will gain the necessary knowledge to design operate and troubleshoot refrigeration systems with confidence Throughout the chapters we will cover a wide range of applications including vapor compression systems absorption refrigeration cryogenics and refrigeration cycles We will discuss the selection of refrigerants system components and the importance of energy efficiency Additionally we will explore emerging trends in refrigeration technology such as environmentally friendly refrigerants and advanced control systems This book is designed to be approachable and accessible to readers with varying levels of expertise It combines theoretical explanations with practical examples and real world case studies allowing you to bridge the gap between theory and application Whether you are seeking a conceptual understanding or hands on guidance you will find valuable insights within these pages It is important to note that this field is constantly evolving New technologies regulations and environmental concerns continue to shape the landscape of refrigeration While this book provides a solid foundation it is essential to stay updated on the latest advancements through continuous learning and engagement with industry developments We would like to express our gratitude to the many experts researchers and professionals who have contributed to the field of refrigeration Their pioneering work and invaluable insights have paved the way for this comprehensive exploration We also extend our appreciation to the readers whose curiosity and enthusiasm continue to drive innovation and progress We hope that this book serves as a valuable resource on your journey to understanding refrigeration fundamentals and applications May it inspire you to explore new possibilities contribute to sustainability and make a positive impact in this exciting field Happy reading Charles Nehme Energy Savings Calculations for Commercial Building Energy Efficiency Upgrades Anthony J. Buonicore, 2024-07-02 Code compliant building materials and equipment will typically have a lower initial cost however the lifetime energy savings of the high efficiency equipment will often justify the upfront cost premium and result in a more cost effective solution Energy Savings Calculations for Commercial Building Energy Efficiency Upgrades assists energy professionals contractors building owners and managers

in developing energy savings estimates that can facilitate a quick assessment of the potential energy savings that might be realized when replacing existing building components with the highest efficiency equipment. It also provides algorithms to estimate greenhouse gas emission reductions that may be achieved by building energy efficiency upgrades and the impact these upgrades can have on building electrification decarbonization projects. This book focuses on the development of energy savings estimates based upon a whole building's energy consumption and the energy consumption associated with building end uses such as space heating, space cooling, ventilation, lighting, and so forth. Includes over 70 illustrative examples using algorithms to demonstrate how energy savings and greenhouse gas emission reductions may be estimated utilizing different strategies and equipment.

Supplement to the London Catalogue of Books, Edition Dated 1839 Containing the New Works and New Editions Published in London from January 1839 to January 1844, ... ,1844 *Supplement to the London Catalogue of Books, edition dated 1839. Containing the new works and new editions published in London from January 1839 to January 1844, etc. [Compiled by Thomas Hodgson.] ,1844*

How to Design an HVAC System: A Comprehensive Guide Charles Nehme, In an era where our lives are increasingly spent indoors, the quality of our built environments has never been more paramount. From the air we breathe to the thermal comfort we experience, the unseen forces of heating, ventilation, and air conditioning (HVAC) systems silently orchestrate our well-being, productivity, and health. Yet for many, the intricate workings of HVAC remain a mystery, often relegated to an afterthought in the grand scheme of architectural design. This oversight, however, comes at a significant cost, not only in terms of comfort and health but also in substantial energy consumption and environmental impact. Having dedicated over three decades to the dynamic world of HVAC and MEP consulting across diverse global landscapes, I've witnessed firsthand the transformative power of well-designed systems and the profound consequences of their neglect. From the complex industrial facilities that power our economies to the towering commercial structures where innovation thrives, and the intimate residential spaces we call home, the principles of optimal air management remain universal, yet their application demands nuanced understanding and precise execution. This book, *Mastering HVAC System Design: A Comprehensive Guide*, is born from that extensive experience and a deep-seated commitment to demystifying the art and science of HVAC engineering. It is crafted not just for seasoned professionals seeking to refine their expertise but also for aspiring engineers, architects, building owners, and anyone keen to understand the critical backbone of modern structures. My aim is to bridge the gap between theoretical knowledge and practical application, providing a holistic framework that empowers you to design systems that are not only efficient and effective but also sustainable and resilient. We will embark on a journey from the fundamental principles of heat transfer and psychrometrics through the meticulous process of load calculations to the intricate dance of equipment selection and sophisticated control strategies. We will delve into the critical aspects of indoor air quality, energy efficiency, and the long-term stewardship of these vital systems through proper commissioning and maintenance. My hope is that this guide serves as

your trusted companion illuminating the path to creating environments that are healthier more comfortable and significantly more sustainable for generations to come Let us design smarter buildings so we can all breathe better Charles Nehme Global HVAC and MEP Consultant

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