

# AIR HANDLING UNIT SELECTION WORKSHEET

Project:  
Project  
No.:

Date:  
Calc. By:

Unit Identification

Number:	<b>AHU-1</b>
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
<b>Scheduled AHU CFM</b>	= <b>60000 cfm</b>
Coil Area @ 500 fpm	= 120.0 sf

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

	<b>DB</b>	<b>WB</b>
Outside Air Temp. =	98.0°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

	<b>DB</b>	<b>WB</b>	<b>Enthalpy</b>
Entering Air Temp. =	81.94°F	64.84°F	29.16
Leaving Air	55.00°F	54.50°F	22.87

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

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

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

## 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

### 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
<b>Hot Water Flow (GPM)</b>	= <b>0.0</b>

## RE-HEAT (OR HEATING) COIL DATA

Entering Water Temperature	= 200.0°F
Leaving Water Temperature	= 160.0°F
<b>Hot Water Flow (GPM)</b>	= <b>123.1</b>

# Manual J Commercial Calculation

**R Pring**



## **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 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 Update this edition Covers sitework concrete steel masonry wood and plastic materials sound control mechanical and electrical systems doors and windows finishes industry standards codes barrier free design and much more Offers extensive coverage of the metric system of measurement Includes more than 1 800 illustrations 175 new to this edition and more than 200 others revised to bring them up to date Provides vital descriptive information on how to design buildings detail components specify materials and products and avoid common pitfalls Contains new information on sustainability expanded coverage of the principles of construction management and the place of construction managers in the construction process and construction of long span structures in concrete steel and wood The most comprehensive text on the subject Olin's Construction covers not only the materials and methods of building construction but also building systems and equipment utilities properties of materials and current design and contracting requirements Whether you're a builder designer contractor or manager join the readers who have relied on the principles of Olin's Construction for more than two generations to master construction operations **Load Calculation**, 1988 *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

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**HVAC A to Z - A Comprehensive Guide to Heating, Ventilation, and Air Conditioning** Charles Nehme, A Comprehensive Guide to Heating Ventilation and Air Conditioning The field of heating ventilation and air conditioning HVAC is a crucial aspect of modern living impacting our comfort health and overall well being As we strive for energy efficiency and sustainability the significance of HVAC systems has never been greater This comprehensive guide aims to provide a detailed exploration of all aspects of HVAC from its historical development to cutting edge technologies and practices Whether you

are a seasoned HVAC professional a building owner or someone curious about the inner workings of HVAC systems this guide has something to offer We start by understanding the fundamental principles of heating ventilation and air conditioning including thermodynamics heat transfer and psychrometrics With this knowledge as a foundation we delve into the different types of heating and cooling systems their components and efficient operation Energy efficiency is a key theme throughout this guide and we explore various strategies to optimize energy use reduce environmental impact and cut operating costs From load calculations and efficiency ratings to smart building automation and renewable energy integration we aim to equip readers with tools to create sustainable and eco friendly HVAC solutions We also place a strong emphasis on indoor air quality and the role of ventilation in maintaining a healthy and comfortable indoor environment Discussions on mechanical and natural ventilation methods help shed light on the importance of fresh air in our daily lives Beyond the technical aspects we address broader considerations such as compliance with building codes and safety standards the integration of IoT technology in HVAC systems and the potential for demand response and peak load management to create a more balanced energy grid The challenges and opportunities in the HVAC industry are not overlooked as we explore how evolving technologies and changing environmental concerns present new avenues for growth and innovation In conclusion this comprehensive guide aims to be a valuable resource for anyone seeking a deeper understanding of heating ventilation and air conditioning As we strive for sustainable practices and energy efficient solutions the knowledge shared within these pages can pave the way for a more comfortable healthier and environmentally conscious future 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 ASHRAE Handbook & Product Directory, 1975 *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

**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

**Adjusting Central Air Conditioning Systems for Maximum Comfort** National Environmental Systems Contractors Association, 1957      **2023 Prov Master Air Conditioning (AC - Limited)** Upstryve Inc, Get one step closer to becoming a Prov Master Air Conditioning AC Limited with a prep course designed by 1ExamPrep

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**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

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*Supplement to the London Catalogue of Books, with Their Sizes, Prices, and Publishers. Containing the New Works and New Editions Published in London from January 1839 to January 1844, Etc Catalogues, 1844*

*HVACR Principles and Applications* Nuggenhalli S. Nandagopal, 2024-03-07 This book provides a clear and concise understanding of the principles and applications of HVACR using a rigorous yet easy to follow presentation The coverage is broad including relevant support areas such as fluid mechanics heat transfer thermodynamics psychrometrics with specific applications to HVACR design and calculations and main topics such as air conditioning processes cooling heating load calculations refrigeration cycles and HVACR equipment and systems The book integrates and illustrates the use of data and information from ASHRAE Handbooks and Standards in step by step calculations of cooling and heating loads and other aspects of HVACR Elucidation of the principles is further reinforced by examples and practice problems with

detailed solutions Firmly grounded in the fundamentals the book maximizes readers capacity to take on new problems and challenges in the field of HVACR with confidence and conviction Providing a ready reference and review of essential principles and their applications in HVACR the book is ideal for HVACR practitioners undergraduate engineering students and those specializing in HVACR as well as for practicing engineers preparing for the engineering license exams FE and PE in USA and abroad The book uses both Inch Pound I P and S I systems of units to facilitate global readership and use

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## **Manual J Commercial Calculation Introduction**

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