BUFFALO

AIR HANDLING

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1
General Information

BUFFALO
AIR HANDLING

MISSION STATEMENT

The mission of Buffalo Air Handling is to operate our business in such a manner that it satisfies the needs of our customers, our employees, and our owners.

To Satisfy the Needs of Our Customers...

We will consistently strive to manufacture a quality product to the highest standard of workmanship, and to satisfy their delivery requirements in a warm, friendly, and courteous manner, thereby demonstrating a sincere appreciation of their business.

To Satisfy the Needs of Our Employees...

We will provide a comfortable, safe work environment, fair treatment, recognition of accomplishments, and a commitment to assist in their growth and career goals through training and development.

To Satisfy the Needs of Our Owners...

We will provide an adequate return on their investments and protect their assets today and in the future. We will operate in a manner consistent with the highest business ethics, which provides recognition from our community as a good corporate citizen.

BUFFALO
AIR HANDLING

PRESIDENTIAL STATEMENT

Buffalo Air Handling is uniquely qualified to design, build and service your air handling unit requirements.

Our Sales Engineers have access to engineering standards, drawing programs, and pricing that ensures prompt response to our customers.

Buffalo Air Handling Quality standards ensure that specifications are reviewed, and met or exceeded.

Our Service people are dedicated and responsible for startup and erection supervision. They are capable of conducting maintenance seminars which enhance the life of our equipment.

Lead-times for drawing submittal and equipment delivery are very competitive. Our schedules are accurate. We have an ontime delivery performance of over 90%. We regularly ship 40 - 50 units per month.

Buffalo Air Handling has a Model K PDQ quick delivery program where units can be shipped in seven weeks.

Whether your needs dictate a custom unit or a modular, standard unit, Buffalo Air Handling has a quality, competitively priced solution.

We look forward to working with you.

BUFFALO
AIR HANDLING

Quality

Buffalo Air Handling has instituted numerous training programs and procedures designed to enhance our product quality.

Listed below are procedures and actions taken to insure that our customers receive a quality product.

- Buffalo Air Handling Quality Manual
- Air Handling Cabinet Inspection Report
- Vibration check of fan within the Air Handling Cabinet
- 808 Base Department Checklist
- 805 Cabinet Assembly Checklist
- Quality Training Seminars
- Blueprint Reading Training
- Continued Participation on Kodak Q1 Team
- Field Problem Review Meetings
- Order Tracking System
- Establishment of Dedicated Customer Service Representative
- Dedicated Service Personnel
- Bearing Assembly Seminars Conducted
- Fan Balance Checked Three Times
- Air Pressure Applied to Coils after Assembly
- Participation in University Quality First Programs
- Establishment of over 150 Engineering Standards

Buffalo Air Handling has a Quality Assurance Program incorporating the principles of ISO 9000. The Quality Assurance manual clearly establishes responsibilities and guidelines for design and manufacture of Buffalo Air Handling equipment.

Checklists exist for each manufacturing department. Shop personnel who build the equipment are responsible for ensuring that quality procedures are followed.

Engineering standards clearly identify the design criteria for our units.

Our Quality Assurance Program is the responsibility of the Manager of Engineering.

Thank you for the opportunity to review Buffalo Air Handling's progress toward a Total Quality Program.

BUFFALO
AIR HANDLING

Advantages & Benefits

- Air moving experience ***since 1878***
- ***Experienced*** Field Sales Engineers
- Fan and coil experience of ***Buffalo Air Handling people***
- ***Complete*** service manuals
- ***Longevity*** of equipment, typically 25-30 years
- Follow-up to ensure ***customer satisfaction***
- ***State of the art*** panel forming process insuring low leakage units
- Dedicated ***90,000 sq. ft.*** facility
- Application engineering ***expertise*** to solve demanding HVAC requirements
- Capable of shipping ***$3,500,000*** per month
- Full time ***start-up*** servicemen
- ***Team approach*** with major consulting engineers
- Consistent ***market strategy*** for pharmaceutical, hospital, institutional, chemical, semiconductor, automotive, telecommunications and specialty markets.
- Quality ***checklists*** for shop personnel
- Unit ***fit-up*** at factory
- ***Full perimeter angles*** at unit splits for tight, field fit up
- Heavy ***structural steel*** channel bases and vibration bases
- Full height and width ***diffuser plate*** for blow through applications
- Heavy ***casing construction***
- ***Fiberglass*** or ***foam insulation***
- **“No-thru metal”** construction available
- Maximum ***½% to 1%*** casing leakage rate
- Units completely ***shrink wrapped*** for shipment
- ***Knock down construction*** available for renovation projects

BUFFALO
AIR HANDLING

Advantages & Benefits

- Major project experience:

• Saturn	$15,000,000	GM Shreveport	$ 7,900,000
• Hartsfield-Jackson Int'l Airport	$ 6,000,000	N.I.S.T.	$ 5,925,000
• IBM - Manassas	$ 4,500,000	Partners Healthcare – BWH	$ 4,100,000
• Eastman Kodak - Rochester	$ 4,000,000	Infineon	$ 3,900,000
• Confidential Pharma	$ 3,500,000	World Financial Center	$ 3,500,000
• Eastman Kodak – China	$ 3,050,000	National Archives	$ 3,000,000
• Charles River Labs – NV	$ 3,000,000	NWU Lurie Research Center	$ 2,795,000
• Princess Margaret Hospital	$ 2,500,000	University of Michigan	$ 2,500,000
• Charles River Labs – MA	$ 2,450,000	Dowelanco	$ 2,400,000
• WorldCom	$ 2,300,000	GM Delta	$ 2,200,000
• GM Tonawanda	$ 2,100,000	Raleigh Durham Airport	$ 2,100,000
• Northeast GA Medical Center	$ 1,900,000	Confidential Pharma 80B	$ 1,800,000
• Portsmouth Naval Hospital	$ 1,800,000	Motorola-China-Bechtel	$ 1,800,000
• IBM - Essex Junction	$ 1,800,000	University of Pennsylvania	$ 1,790,000
• Eastman Kodak – Rochester	$ 1,750,000	WorldCom/Uunet	$ 1,700,000
• Howard Hughes Med. Institute	$ 1,640,000	Bosch	$ 1,600,000
• NIH Building 33	$ 1,580,000	Lockheed Martin F-22	$ 1,575,000
• Dulles Airport	$ 1,500,000	Ford Motor	$ 1,500,000
• Lockheed Martin	$ 1,480,000	Confidential Pharma	$ 1,450,000
• Aventis Pharmaceuticals	$ 1,410,000	Confidential Pharma	$ 1,380,000
• Yale Univ. School of Medicine	$ 1,375,000	Taiwan Software Park	$ 1,350,000
• Loyola Univ. Medical Center	$ 1,320,000	Millennium Pharmaceuticals	$ 1,300,000
• J&J PRD	$ 1,230,000	Confidential Pharma	$ 1,225,000
• Child Health Center of NJ	$ 1,220,000	Human Genome Sciences	$ 1,210,000
• Confidential Pharma	$ 1,170,000	Confidential Pharma	$ 1,100,000
• Toppan Phase III	$ 1,100,000	Confidential Pharma	$ 1,100,000
• Harris Semiconductor	$ 1,100,000	Confidential Pharma	$ 1,100,000
• UMB Health Science	$ 1,060,000	MSKCC Infill	$ 1,000,000

BUFFALO
AIR HANDLING

Statement of Capabilities

- Manufactures ***custom*** air handling units ranging in air flow from 500 CFM to 200,000 CFM. Units are called Big Buffalo.
- Manufactures ***modular, standard air handling units*** which have specific sizes and components, ranging in air flow from 3000 CFM to 60,000 CFM. Units are called Model K, or BA2000.
- Manufactures ***humidifiers*** such as wetted media, called Aerofil and FinFil and sprayed coil units, called PCLW.
- ***Components*** of the Big Buffalo, Model K and BA2000 include fans of all types, heating coils, cooling coils, filters, attenuators, humidifiers, desiccant dehumidifiers, flow measuring devices, controls, vibration isolators, blenders and electrical components.
- Over ***100 years*** of expertise in the air moving and conditioning industry; founded 1878.
- ***State of the art metal forming*** process to provide high quality, economical construction.
- ***CAD design*** of units with integration to CAM process for unit manufacture.
- ***SolidWorks*** 3D modeling.
- ***COSMOS*** structural design program
- Application engineering ***expertise*** to solve customers' most demanding HVAC requirements.
- Units ***designed for long service*** for markets such as chemical, process, hospital, pharmaceutical, paper, institutions, automotive and semi-conductor.
- Our ***90,000 sq. ft. facility*** located in Amherst, VA in south central Virginia and employing 200 - 225 people.

    Engineering and Quality
    - Tom Kent, Engineering Manager
    - Staff of 9

    Sales, Marketing and Applications
    - Ted Krueger, Vice President, Sales
    - Staff of 6
    - Sales Representatives in over 50 cities across the US and Canada

    Manufacturing and Purchasing
    - Jim Land, Vice President, Manufacturing
    - Staff of 15 & Shop of 195

- Automated pricing and component selection programs utilized.

BUFFALO
AIR HANDLING

User's List

Pharmaceutical

Abbott Laboratories
Alcon Laboratories
Amgen
Andrx Pharmaceuticals
Astra Zeneca
Aventis Pasteur
Aviron
Barr Labs
Bausch & Lomb
Baxter Healthcare
Bayer
Ben Venue Laboratories
BioReliance Corp.
Boehringer Ingelheim
Bristol Myers Squibb
Cambrex
Cardinal Health
CDC
Cephalon
Ciba Geigy
Ciba/Life Technologies
Connaught Laboratories
Core Pharma
Dowelanco
DSM Pharmaceuticals
Eli Lilly
Ethicon Inc.
Extract Technology
Gambro Pharmaceuticals
Genentech
Genzyme
GlaxoSmithKline
Healthstar Pharmaceutical
Heine Pharmaceutical
Hoechst Marion Roussel
Hosokawa Bepex Corporation
Hospira
Imclone Systems
Janssen Products
Johnson & Johnson
Knoll Pharmaceutical
Lancaster Labs
Mallinckrodt
McNeil Consumer Healthcare
McNeil Consumer Products
MedImmune
Merck
Millennium Pharmaceuticals
Nelson Nutriceutical
Nova Pharmaceutical
Noramco
Organon Pentasaccharide
Organogenesis
Ortho-McNeil Pharmaceutical
Osiris Therapeutics
Parke-Davis Pharmaceutical
Parkedale Pharmaceutical
Pfizer
Pharmacia
Procter & Gamble
Purdue Pharma
Qiagen
R.P. Scherer
Regeneron
Ross Labs
Roxane Labs
Sanofi
Schering Plough Corporation
Searle
Skyepharma
Vistakon
Watson Labs
Whitehall-Robbins
Wyeth Ayerst Labs
Wyeth Lederle

BUFFALO
AIR HANDLING

USER'S LIST

Hospitals

Alabama
- Caraway Medical Hospital
- Helen Keller Hospital

California
- Hoag Hospital

Connecticut
- Bridgeport Hospital
- Charlotte Hungerford Hospital
- Hartford Hospital
- John Dempsey Hospital
- St. Mary's Hospital
- St. Vincent's Hospital
- Yale School of Medicine

Delaware
- Christiana Care Health Systems
- Wilmington Medical Center

Florida
- V.A. Medical Center – Bay Pines
- St. Joseph's Hospital - Tampa

Georgia – Atlanta
- Candler Hospital
- Henry County Medical Center
- King Bay Hospital
- Medical Center of Central Georgia
- Northeast Georgia Medical Center

Illinois
- Children's Memorial Hospital
- Community Hospital North
- Condell Medical Center
- Illinois Masonic Hospital
- Loyola Medical Center
- Memorial Hospital - Carbondale
- Memorial Medical Center Springfield
- Michael Reese Hospital
- Northwestern University Hospital
- Rockford Memorial Hospital

Illinois (continued)
- Rush Presbyterian
- Skiff Medical Center
- St. Anthony Hospital - Effingham
- St. Elizabeth's Hospital – Belleville
- St. Elizabeth's Hospital - Effingham
- St. Francis Hospital
- St. Joe's Hospital - Chicago
- St. John's Hospital - Springfield
- St. Luke Hospital
- St. Mary's Hospital - Decatur
- St. Mary's Hospital - Streator
- Swedish Covenant Hospital
- University of Illinois - Champaign
- V.A. Medical Center - Chicago

Indiana
- Clarian Methodist Hospital
- Clarian Riley Outpatient Center
- Community Hospital North
- Decatur County Memorial Hospital
- Elkhart Hospital
- Henry County Memorial Hospital
- Indiana University Cancer Research
- Indiana University – Lilly Clinic
- Indiana University – University Hospital
- Johnson Memorial Hospital
- LaPorte Hospital
- St. Mary's Medical Center
- White County Hospital

Iowa
- Mary Greeley Medical Center
- University of Iowa Hospitals & Clinics

Kentucky
- University of Kentucky

BUFFALO
AIR HANDLING

Louisiana
- Oschner Hospital

Maryland
- Bon Secours – Maryland
- Calvert Memorial Hospital
- Franklin Square Hospital
- Garrett County Memorial Hospital
- Genetic Therapy Institute
- Johns Hopkins Bayview Med. Center
- Johns Hopkins University Hospital
- Medical Biotech Center
- Peninsula Regional Medical Center
- Sibley Memorial Hospital
- Terumo Medical Corporation
- Uniformed Services University of Health & Sciences
- University of Maryland Med. Center
- WRAMC Building

Massachusetts – Boston
- Beth Israel
- Beyer Hospital
- Cambridge Hospital
- Eisai Research
- Lahey Clinic
- Morton Hospital
- New England Deaconess
- Newton Wellesley
- Partners Healthcare
- Quincy Hospital
- Transkaryotic Therapies
- University Hospital
- Wentworth – Douglas
- Women's & Infant's Hospital

Michigan
- Annapolis Hospital
- Beaumont Hospital–Troy & Royal Oak
- Cottage Hospital
- Detroit Rehab Center
- Grace Hospital
- Graduate Hospital
- Harper Hospital
- Henry Ford Hospital

Michigan (continued)
- Mott Hospital
- Port Huron Hospital
- Providence Hospital
- Riverview Hospital
- Saline Hospital
- Sparrow Hospital
- St. John's Hospital
- St. Joseph's Hospital
- St. Mary's Hospital
- St. Raphael Hospital
- University of Michigan-Ann Arbor

Minnesota
- Mayo Clinic
- University of Minnesota

Missouri
- Cardinal Glennon Hospital
- DePaul Healthcare
- Heartland Hospital
- Memorial Hospital of Carbondale
- Spellman Memorial Hospital
- St. Anthony's Hospital
- Trenton Community Hospital
- V.A. Medical Center

New Hampshire
- Exeter Hospital
- University of New Hampshire

New Jersey
- Atlantic City Medical Center
- Child Health Center of New Jersey
- Englewood Hospital
- Morristown Memorial Hospital

New York
- Buffalo General Hospital
- Community General Hospital
- Cornell Veterinary – Ithaca
- Cortland Memorial Hospital
- Crouse Irving Memorial Hospital
- Erie County Medical Center
- Millard Fillmore – Buffalo

BUFFALO
AIR HANDLING

New York (continued)
- St. Joseph's Hospital – Syracuse
- St. Mary's Hospital
- Strong Memorial – Rochester
- V.A. Medical Center

New York – New York City
- Albert Einstein Hospital
- Columbia University Medical Center
- Cornell Medical Center
- Hospital for Special Surgery
- Long Island Cottage Hospital
- Mt. Sinai
- Memorial Sloan Kettering Cancer Center
- North Shore University Hospital
- NYU Medical Center
- Presbyterian Hospital
- Rockefeller University Hospital
- St. Luke's Hospital

North Carolina
- Alamance Hospital
- Betsy Johnson Hospital
- Beaufort County Hospital
- Bowman-Gray, Winston–Salem
- Brenner's Children's Hospital
- Cabarrus Memorial Hospital
- Caldwell Hospital
- Cardinal Health
- Carolinas Medical Center
- Catawba Valley Medical Center
- Chowan Hospital
- Duke Ambulatory Surgery Center
- Durham Regional Hospital
- ECU Cardiovascular Hospital
- Forsythe Memorial Hospital
- Halifax Hospital
- Lenoir Memorial Hospital
- Maria Parham Memorial Hospital
- Moore Regional Medical Center
- Moses Cone Hospital
- North Carolina Baptist Hospital
- North East Medical Center
- Northcross Health Care Services
- Northern Surry Hospital

North Carolina (continued)
- Onslow Hospital
- Outer Banks Hospital
- Pardee Hospital
- Pitt County Hospital
- Presbyterian Hospital
- Rex Hospital
- Richmond County Memorial Hospital
- Rutherford Hospital
- Scotland County Memorial Hospital
- University of North Carolina Hospital
- V.A. Hospital – Durham
- Wake Medical Center
- Watauga Medical Center
- Wayne Memorial Hospital

Ohio
- Christ Hospital - Cincinnati
- Medical University of Ohio - Toledo
- Ohio Valley – Akron
- St. Vincent Hospital – Toledo
- University Hospital of Cleveland

Pennsylvania
- Allegheny General Hospital
- Butler Memorial Hospital
- Children's Hospital
- Divine Providence Hospital - Williamsport
- Jefferson Medical Center
- Lehigh Valley Hospital
- Paoli Hospital
- Reading Hospital
- St. Margaret's Hospital

Pennsylvania – Philadelphia
- Abington Memorial Hospital
- Beebe Medical Center
- Bryn Mawr Hospital
- Chester County Hospital
- CHOP
- Genetics Institute
- Fox Chase Medical Center
- Hahnemann University Hospital

BUFFALO
AIR HANDLING

Pennsylvania (continued)
- Harrisburg Hospital
- Hospital of University of Pennsylvania
- Holy Spirit Hospital
- Lankenau Hospital
- St. Christopher's Hospital
- Warrick Hospital

Pennsylvania – Pittsburgh
- Allegheny General Children's Hospital
- Federal North Hospital
- Magee Hospital
- Sewickley Shadyside Hospital
- Shenango Valley Hospital
- UPMC Children's Hospital
- UPMC Health Systems
- UPMC Horizon Hospital
- UPMC Jefferson Hospital
- UPMC Passavant
- V.A. Medical Center

South Carolina
- B.J. Workman Hospital
- Lexington Medical Center
- Medical University of South Carolina
- Self Regional Memorial Hospital
- Spartanburg Regional Healthcare
- UPM Greenville

Texas
- Baylor Outpatient Clinic

Virginia
- Culpepper Hospital
- Fair Oaks Hospital
- Fairfax Hospital
- Georgetown University
- Greensville Hospital
- Halifax Memorial Hospital
- Henrico Doctor's Hospital – Richmond
- Howard Hughes Medical Institute
- Inova Heart Institute
- King's Daughter – Norfolk
- Loudon Hospital
- Martinsville Hospital

Virginia (continued)
- Martha Jefferson Health Services
- Mary Washington Hospital
- Medical College of Virginia
- Memorial Regional
- NIH – Building 10 & Building 49
- Norfolk General Hospital
- Northern Hospital of Surry County
- Pinnacle Health System
- Portsmouth Naval – Acute Care
- Prince George's Hospital
- Providence Hospital
- Richmond Memorial Hospital
- Riverside Hospital
- Sentara Bayside Hospital
- Stonewall Jackson Hospital
- V.A. Ambulatory Hospital
- VCU Massey Cancer Center
- Washington Children's Hospital
- Washington Hospital Center
- Williamsburg Community Hospital

West Virginia
- CDC – Morgantown
- West Virginia University Hospital
- Wheeling Hospital

Wisconsin
- Holy Family
- Milwaukee County Medical Complex
- Sacred Heart Hospital
- St. Joseph Hospital – Chippewa Falls
- St. Joseph Hospital – Marshfield
- St. Mary's Hospital – Green Bay
- St. Nicholas Hospital - Sheboygan
- St. Vincent Hospital – Green Bay

BUFFALO
AIR HANDLING

USER'S LIST

Aerospace/Transportation

Boeing EELV
Boeing Helicopters
Cape Kennedy Launch Sites
Cherry Point Air Station
China Airlines
Delta Airlines
Dulles Airport
Grand Central Station
Hughes Missile Systems
Lockheed Martin F-22
Metro North
NASA
Vandenberg Air Force Base
Wright Patterson Air Force Base

Automotive

ABB – Paints
Akebono
BF Goodrich
Chrysler Sterling
Cummins Engine
Daimler Chrysler
Ford – Allen Park
Ford SRL
GM Doraville
GM Mexico
GM Proving Grounds
GM Shreveport
Honda TKS
Michelin
Saturn
Vitro AFG SA de CV (Ford Mexicali)
Yokohama Tire

Chemical

AET
Air Products and Chemical
Arco Chemical
BASF
Boehringer Chemicals
Buhler Miag
Chemtex
Corning
DuPont
Eastman Chemical Company
Gaines Chemical
Great Lakes Chemical Corporation
Hercules
Hoechst Celanese
ISP Technologies
Koch Hydrocarbon
Kodak
Mesa Petroleum
Monsanto Company
PPG Industries
Polaroid
Procter & Gamble
Rohm & Haas
Salisbury Chemicals
SF Phosphates
Sherwin Williams
Solutra
Spruance Textile Fibers

BUFFALO
AIR HANDLING

Communications

AOL Time Warner
AT&T
Bell Atlantic
Bell South Melbourne
Lakeside Technical Center
NBC
Qwest
Uunet
Verizon
WorldCom

Food

Anheuser Busch
Barilla America
Cargill Flour Milling Division
Hershey
Kraft General Foods
Lipton
M&M/Mars
Minnesota Corn Processors
Nestle
Peter Paul Mounds

Government

Annapolis District Courthouse
Ann Arundel Courthouse
AOC, Hart Senate Office Building
Architect of the Capitol
Brunswick County Courthouse
CIA
EPA
Fort Belvoir
Fort Meade
Illinois Dept. of Natural Resources
Indiana Workforce Development
Largo City Hall
Lawrence District Courthouse
Naval Research Laboratory
Queen's Supreme Courthouse
Rome Law Enforcement
St. Clair County Office Building
Westchester County Courthouse

BUFFALO
AIR HANDLING

Institutional

Archives II
Brookhaven National Labs
Chase Manhattan Bank
Christopher Columbus Center
Crestar Bank
Federal Reserve Bank
IMF Energen
Intercontinental Building
Koppers Building
Mendell
Met Life
National Trade Center
Navy Federal Credit Union
New York Life
New York Stock Exchange
Rockefeller Center
Signet Bank
W.A. Soefker & Son
West Bloomfield Library
Wheat First Securities
World Bank
World Financial Center Met Life

Manufacturing

Aeroglide Corporation
Airmech
Alcan Rolled Products
Burlington Menswear
Carrier
Cree, Inc.
Gillette Company
GTI Harbor
Johns Manville
Kolostat Inc.
Newport News Shipbuilding
Owens Corning
Plomberie - Chauffage
Sanofi Winthrop
Schuller International
Schuller Manville
Toppan Manufacturing

Miscellaneous

Astrodome
Clear Radar Upgrade
Dominion Resources
Ethyl Corporation
Gates Rubber
Georgia World Congress Center
Kerr McGee
Norfolk Naval Base
Northrup B1 Bomber
Revlon Building
Rust Engineering

BUFFALO
AIR HANDLING

Paper

AET Packaging Films
Cerex Advanced Fabrics
Confab
CT Films
Ft. Howard Paper
Ft. James
Georgia Pacific Paper
International Paper
Mead Paper
Shasta Mill
Scott Paper
Union Camp
Weyerhauser

Printing

Quad Graphics
Richmond News
R.R. Donnelly
Washington Post

Power Plant

Baltimore Gas & Electric
BM Waste Water Plant
Cape May County Utilities
Duke Power Nuclear
Jacksonville Electric Authority
Nuclear Fuels
Pacific Gas & Electric Company
Pioneer Natural Resources
Tennessee Valley Authority
Westinghouse Electric Corp.
Westinghouse Savannah River

Research Facility

BioReliance
CDC Facility Atlanta
CDC Facility Niosh Campus
Chesapeake Biological Labs
Delaware Biotech Institute
Exxon Mobil
HLM Cancer Center & Research Institute
Hoechst Marion Roussell
Human Genome Sciences
IU Cancer Research Center
Mobil R&D Corporation
National Institute of Standards & Testing
National Research Laboratory
NIH
Paulsboro Laboratory
PQ Corporation
Princeton Plasma Physics Lab
Rhodes Technologies
Teradyne
Tetra Technologies
University of Pennsylvania
Virginia Biotech DCLS
Whitehall - Robbins

BUFFALO
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Semiconductor

Adtech
Clestra
Harris Semiconductor
Hewlett Packard
IBM
Intel
Lucent Technologies
MEMC
Motorola
Photocircuits
Sony
Taiwan Software Park
Thomson Consumer
Whiteoak Semiconductor

Specialty/Museum

Albany Institute
Andy Warhol Museum
Brooklyn Museum of Art
Chrysler Museum
Clay Fine Arts Center
Columbus (GA) Performing Arts Center
Farragut Center
Figge Art Center
J. Carter Walker Arts Center
Lincoln Center of Performing Arts
Massachusetts Historical Society
Morgan State Fine Arts Center
Museum of Fine Arts
National Aquarium
National Gallery of Art
New Bedford Whaling Museum
New Jersey Performing Arts Center
O'Reilly Theater
Pennsylvania Regional Performing Arts Center
Shubert Theater
Smithsonian NASM
Smithsonian NMAH
Smithsonian NMAI
Smithsonian NMNH
Smithsonian Remwick Gallery
SUNY Buffalo – Fine Arts
Wintergarden Theater

BUFFALO
AIR HANDLING

USER'S LIST

University/Schools

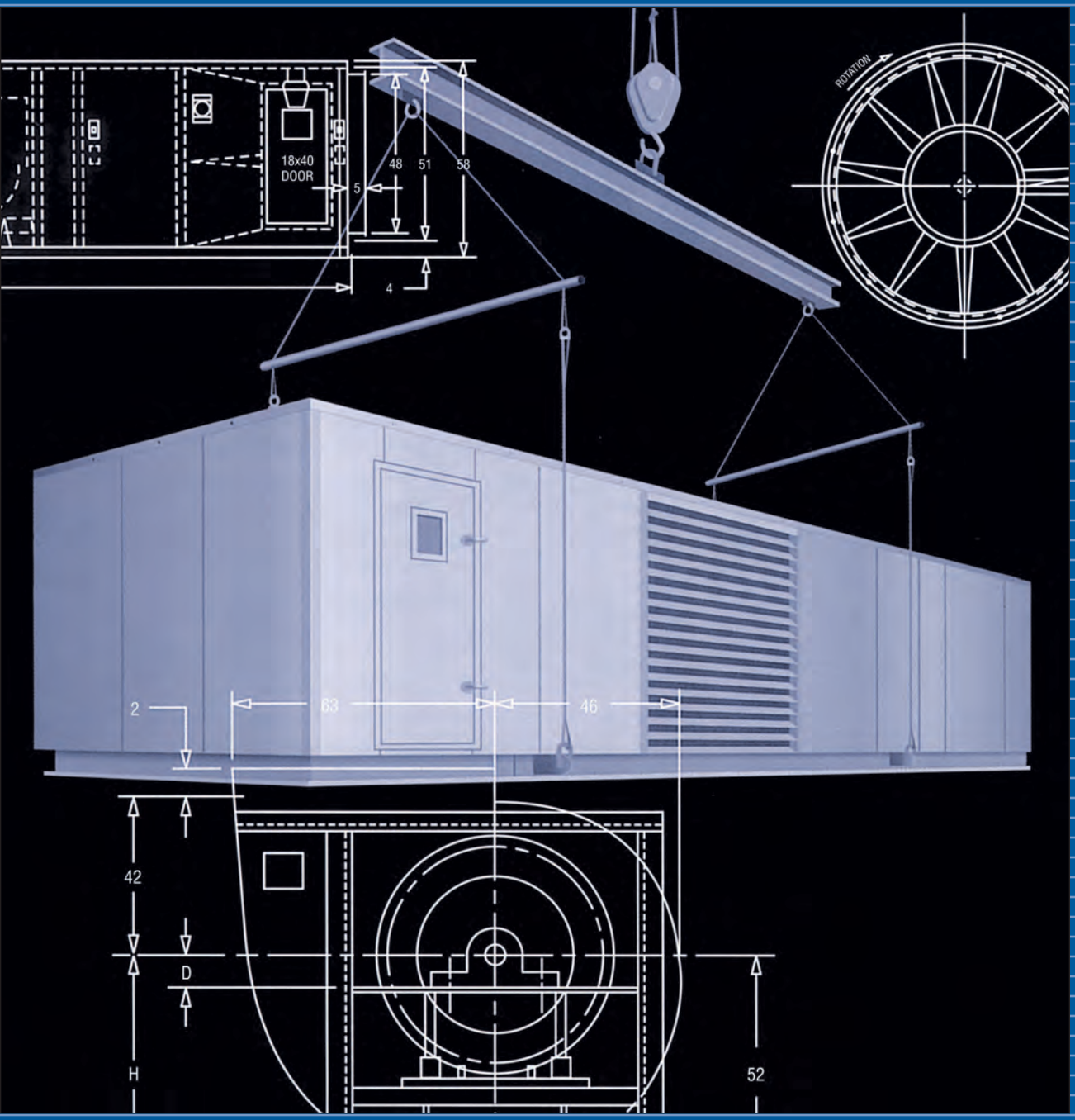
Albert Einstein College
Boston University
Brandeis University
Brooklyn College
Brown University
Cleveland State University
Colgate University
Columbia School of Dentistry
Columbia University
Cornell University
Dartmouth College
Duke University
Duquesne University
East Carolina University
Eastern Michigan University
Elon College
Florida International University
Georgetown University
Goucher College
Harvard University
Indiana University
J. Sargent Reynolds Community College
King George County & Elementary
Michigan State University
Monroe Community College
Montclair State University
New Jersey Institute of Technology
New York University
North Carolina State University
Northwestern University
Oberlin College
Pensacola Christian College
Princeton University
Purdue University
Randolph Macon College
Rockefeller University
Rutgers University
Sheridan College
Sinclair Community College
SUNY at Buffalo
Syracuse University
Troy State University
UMAB School of Law
UMAB School of Nursing
Uniformed Services-University of Health Sciences
University of Connecticut
University of Delaware
University of Georgia
University of Illinois
University of Iowa
University of Kentucky
University of Miami
University of Michigan
University of Minnesota
University of North Carolina - Chapel Hill
University of North Carolina - Wilmington
University of Pennsylvania
University of Pittsburgh
University of South Carolina
University of Virginia
Virginia Commonwealth University
Virginia Tech
Washington University
Wayne State University
West Virginia University
Yale University

2
Big Buffalo

Bulletin **C6200**
MAY 2003

Buffalo
Air Handling

Big Buffalo



Custom Applications

Buffalo Air Handling
Big Buffalo

The historic strength of Buffalo Air Handling is the custom designed air handling equipment that controls the indoor environment of some of the world's most prominent buildings. Helping you improve the environment in which we live and work is Buffalo Air Handling's most important job.

Big Buffalo is the most efficient way to factory fabricate large air handling systems for today's sophisticated buildings. With an almost unlimited range of capacities, pressures, and component arrangements to choose from, you can design the most economically sized air handling system to meet your HVAC requirements.

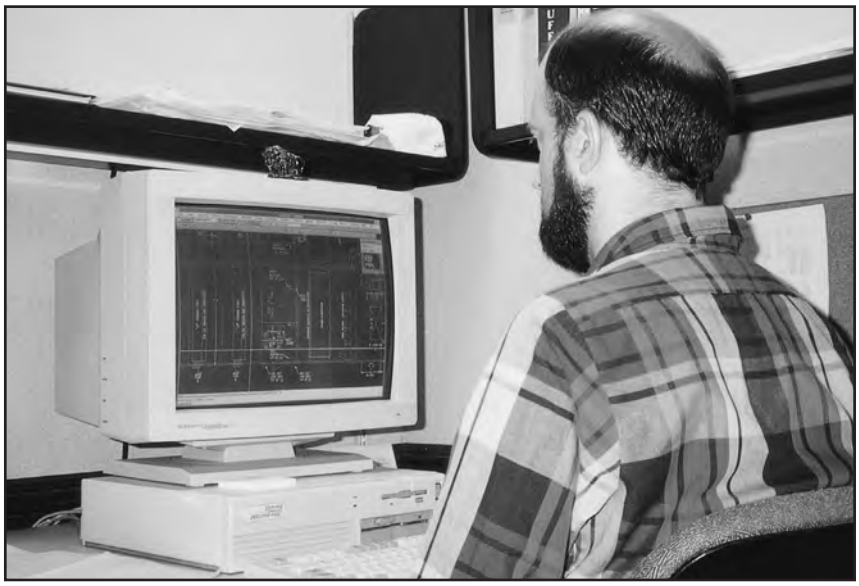
This bulletin is a thought starter on how to put Big Buffalo to work for you, illustrating several equipment arrangements and construction features. Also, included in this bulletin are typical air handling unit guideline specifications to assist in creating your own specifications.

Utilize the experience of a Buffalo Sales Engineer as you review these Big Buffalo air handling systems. As graduate engineers, schooled in the fundamentals of psychrometrics and air flow, they are anxious to share with you their practical experience in the application of these versatile air handling systems.

The backbone of a Big Buffalo system is the heavy gauge double-wall panel mounted on a welded structural steel channel base. Basic casing design consists of 2" or 4" double-wall G90 mill galvanized steel panels; 14 gauge outer and 20 gauge inner, with 2" or 4" – 3lb/ft^3 fiberglass insulation. Stainless steel or aluminum double-wall construction is available.

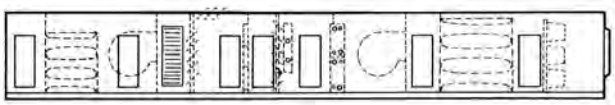
All three members of the building team – owner, engineer, and contractor – benefit from our Big Buffalo equipment because of the following features:

- **Reduced time in design and field installation**
- **Single-source system responsibility; a manufacturer who designs, builds, and guarantees its own casing, and channel base, along with the performance of the fans and coils**
- **Standardization of component construction**
- **Controlled uniform quality during manufacturing**
- **Built-in serviceability**
- **Reduced operating and maintenance costs**
- **Optimum performance from quality components**
- **Startup and installation supervision**
- **Factory performance, sound, vibration and leakage testing; substantiates the validation procedures required by many owners**

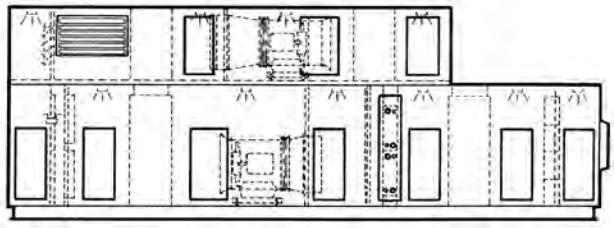


Buffalo Air Handling's Engineering Design Department can provide detailed drawings in 2D and 3D formats, which can be electronically submitted to the customer

Typical Systems



This roof-mounted variable volume central station cabinet contains centrifugal supply and return fans, economizer section, sound attenuation, and high efficiency filtration. The application is for a hospital operating room.



The advantage of factory built equipment is Buffalo Air Handling's complete unit assembly prior to shipment, which reduces field installation time and expense.

Specific clean room requirements were incorporated into a compact design with low vibration axial fans. Direct drive plenum fans have also been utilized for clean room applications.

This all stainless steel unit was supplied to a pharmaceutical facility. The fan was also constructed of stainless steel.

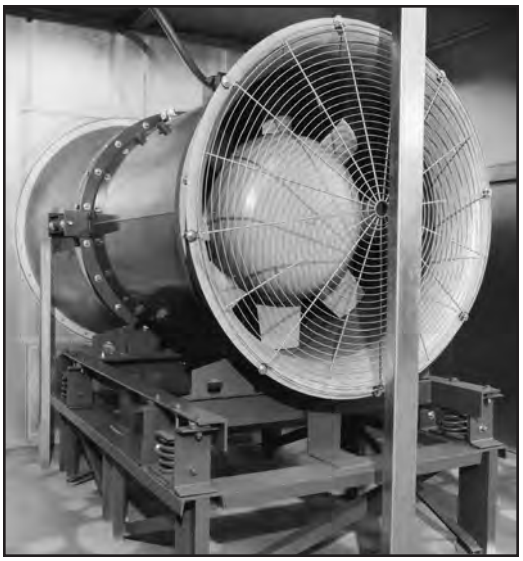
Fan Features

This fan section is the heart of a Big Buffalo air handling system. Buffalo Air Handling guarantees the performance on all centrifugal, plenum and axial fans used in our Big Buffalo air handling cabinets.

Applications requiring a centrifugal double inlet fan are provided with a reliable flat backward inclined or airfoil fan. The flat backward inclined or airfoil shaped blades produce non-overloading performance characteristics. The fan bearings are designed for a minimum L10 life of 40,000 hours (80,000 hours, L10 life optional). Axial flow fan applications use fans with adjustable-pitch blades at rest or inflight.

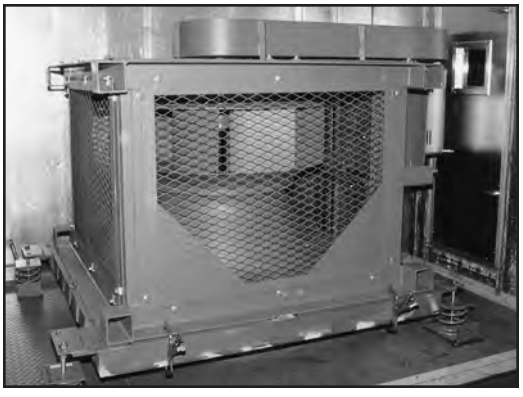
Plenum fans can be provided for return fan applications and where multiple discharges are required.

Fans combined with variable frequency drives provide the most energy efficient air handling system. Factory installation assures single source responsibility.



Axial flow fans with adjustable blades are frequently specified where space is at a premium. Mixed flow fans can be provided.

Internal vibration on an all-welded structural steel channel base is essential for reliable fan performance. High pressure and critical applications may require an inertia vibration base where concrete is field installed. A heavy-duty flexible connection between the fan and unit casing is provided for internally isolated fans.



Plenum fans can be efficiently selected for return fan applications where space is critical.

The fan, motor and drive are mounted on a heavy all-welded structural steel vibration isolation base with isolators properly selected for specified vibration efficiency.

Component Features

Heating and cooling coils in our Big Buffalo air handling systems are manufactured by Aerofin. As an option, Buffalo Air Handling can provide installation for alternate coil manufacturers.

Aerofin heating, cooling and heat recovery coils are provided in both plate and helically wound fin designs in either aluminum or copper. Tube wall thickness varies from 0.020" to 0.049", as required for the application. Fin thicknesses from 0.0075" to 0.010" are most commonly specified. Features such as individually drainable headers, removable headers, and stainless steel casings are frequently specified.

Aeromix integral face-and-bypass coils are available for maximum freeze protection in 100% outside air applications.

Steam coils with either 5/8" or 1" O.D. tubes in a variety of fin spacings provide even leaving air temperatures over a wide range of modulation.

Rotary heat wheels, heat pipes, and glycol run-around coils can be provided for heat recovery systems.

System components, such as inlet louvers, dampers, blenders, filters, sound attenuators, humidifiers, desiccant dehumidifiers and access plenums, are provided as specified.

Buffalo Air Handling's revolutionary "Aerofil" provides low cost, low maintenance evaporative cooling or humidification for year-round operation.

Independent coil support racks can be provided to permit individual removal of heating or cooling coils. Cooling coils stacked two or more high have individual extended drain troughs and downspouts to properly drain condensation.

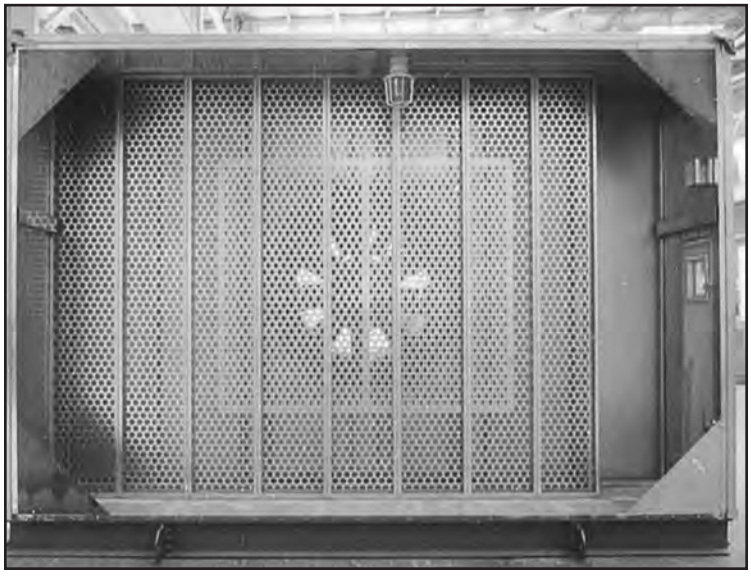
Buffalo Air Handling provides all-welded, patented, triple-sloped, IAQ stainless steel drain pans downstream of the cooling coils.

Construction Features

Double-wall heavy gauge galvanized steel construction using 14 gauge outer and 20 gauge inner panel is standard. Perforated inner wall construction of galvanized steel or aluminum are available as options. Special applications for operating pressures to 30" WG can also be provided.

All units are constructed on a welded structural steel channel base with a heavy gauge floor sheet to support internal components. Also shown are perimeter angles for ease of joining unit sections together in the field.

Accessibility can be designed into units where inspection, maintenance and service is required. Double-wall flush-mounted doors are designed to open opposite the unit's operating pressure.



Illustrated is a full height, full width distribution plate that reduces pressure drops by 50% or greater when compared to conventional diffusers.

Sound control is extremely important with high pressure systems. Big Buffalo double-wall panels have been tested by an independent laboratory and have the following certified sound transmission loss characteristics:

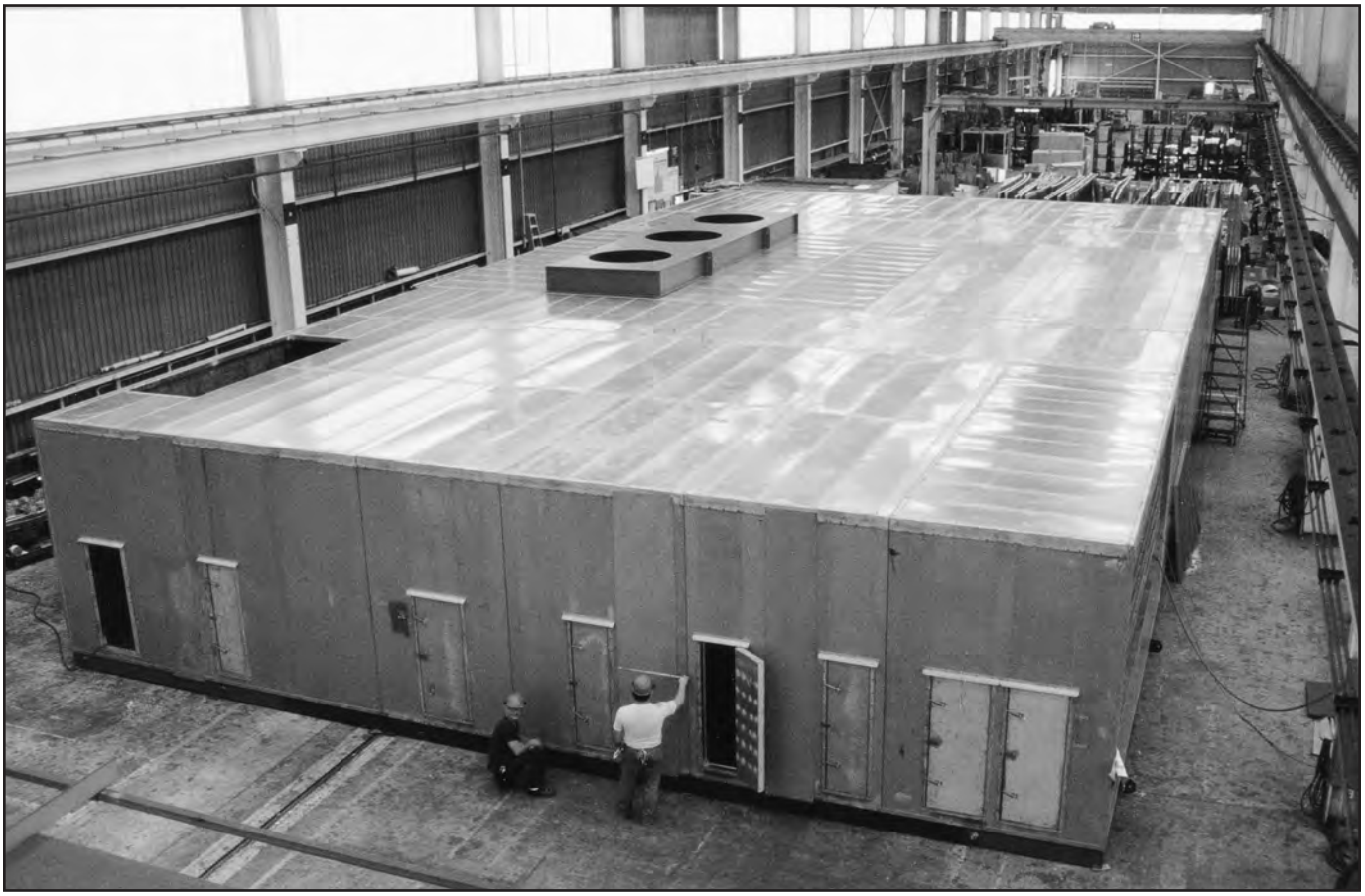
Perforated inner panel construction for sound absorption is often specified for supply and return fan sections.

Buffalo Air Handling can provide sound power levels at inlet/discharge opening(s) and casing radiated values.

Octave Band Analysis of Sound Transmission Loss in dB (2" Panels)

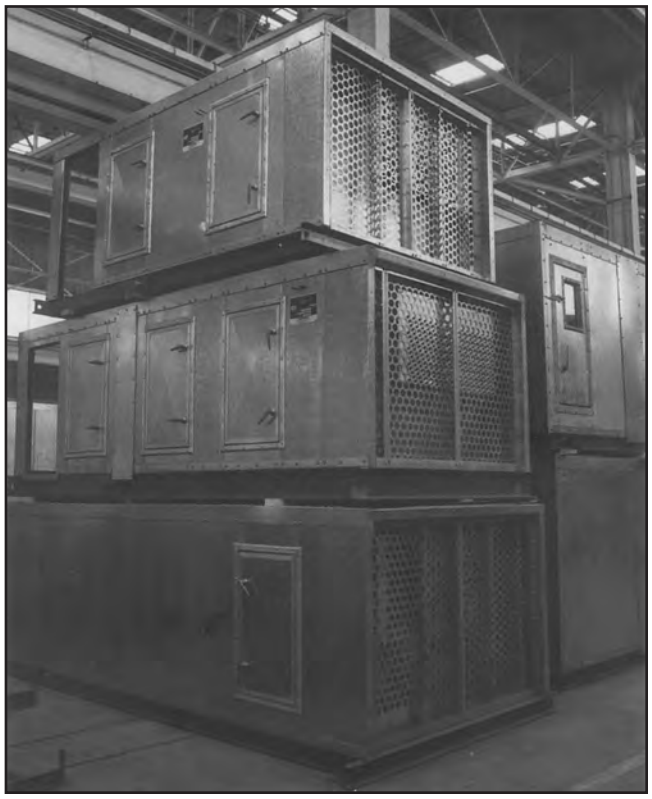
Octave Band	**2**	**3**	**4**	**5**	**6**	**7**
Solid Inner Panel (14 GA/20GA/3lb/ft^3)	25	39	48	54	58	58
Perforated Inner Panel (14 GA/20GA/3lb/ft^3)	21	25	34	44	51	53

Illustrated is a bank of sound attenuators.



Buffalo Air Handling has the facility and capability to manufacture large air handling units.

Unit Features



Buffalo Air Handling provides units that will withstand heavy loading.

Units are completely fabricated and pre-assembled at the factory to ensure proper fit when joined in the field. These units are shipped in large modules requiring the least amount of field assembly and installation time.

All units, or unit sections, are shrink wrapped and tarped prior to shipment to protect the equipment from wear and tear during transportation.

Buffalo Air Handling Service Representatives are available to assist in the start-up, erection and testing of your equipment.

Removable lifting lugs are provided as an option on all sections for convenient rigging at the job site.

Big Buffalo Air Handling Unit Specifications

1. GENERAL

1.1 Provide factory assembled air handling units, complete with all components as specified herein. Each unit shall include all components, installed at the factory. Field fabrication of units and their components will not be accepted. All units shall be inspected and factory run tested to insure structural integrity prior to shipment. Each unit, or unit section, shall be shrink wrapped in plastic prior to shipment

2. PRODUCT

2.1 Basis of design is ***Buffalo Air Handling***.

3. UNIT CONSTRUCTION

3.1 **Walls and roof** shall be constructed of 2" thick, "double wall," self supporting, acoustical thermal panels. All additional panel supports shall be constructed of galvanized steel. Carbon steel shall not be used in the panel support framing system. Outer wall and roof panels shall be constructed of minimum 14 gauge G90 galvanized steel sheet. Exterior walls shall be flush with no external standing flanges. The inner wall shall be minimum 20 gauge perforated aluminum, except in the cooling coil sections, where inner wall shall be solid 20 gauge 304 stainless steel. The insulation shall be 2" - 3 lb/ft^3 density fiberglass and shall be full 2" thick throughout the unit height and width.

Casing panels shall be rated for sound transmission loss in accordance with ASTM E413 and shall be minimum values:

Octave Band (Hz)	2	3	4	5	6	7
Transmission Loss (dB)	21	25	34	44	51	53

Provide floor, roof and side perimeter angles located inside units at shipping splits to allow for field bolting of sections. Unit manufacturer to provide necessary hardware, tape sealer, and caulk required to field join and seal the sections.

3.2 **Doors** shall be provided as indicated on the contract drawings to provide adequate access to each unit component. Doors to be 2" thick insulated solid double wall panel construction. Doors under 2" nominal thickness are not acceptable. Each door will be provided with a double pane viewing port (deadlite). Doors will be minimum 24" x 60" and shall open against the section's operating pressure. Provide doors with two (2) chrome plated Ventlok Model 310 latches, operable from either side of door. Door opening will be fully gasketed with extruded gasket fitted into retainer slots in the door panel and frame. Door frames are to be aluminum with the exterior side of the door flush with the unit. Access doors shall have been tested in an independent laboratory in accordance with ASTM E283.

Each access section is to be provided with a marine light having impact resistant plastic globe and wire guard. The light shall be wired to a switch with an indicating light, located on the outside of the unit near the access door. The switch shall be similar to the Hubbell Model 1201PL with a protective dust cover. Marine light shall be similar to the Crouse Hinds Model VX11F-126. Fluorescent light fixtures are an available option.

3.3 The **unit floor** is to be constructed of a minimum 3/16" thick steel, epoxy mastic coated, welded to a 6" - 8.2 lb/ft structural full perimeter channel base. Tubular or formed channel steel shall not be used as the perimeter base. Where sections of the floor join together, the joints shall be welded and caulked. Immediately beneath the floor, there shall be insulation. The insulation will be further protected by a 20 gauge galvanized steel cover sheet on the underside of the channel base. Additional cross members shall be provided to support the internal components. The unit base is to be provided with lifting lugs, minimum four (4) per section.

The **unit base** shall be prime coated with an epoxy mastic. In cooling coil sections, the floor shall be recessed and constructed as a continuously welded positively sloping 12 gauge 304 stainless steel drain pan with a minimum depth of 4" at the drain. The drain pan shall be insulated with 2" insulation and a 20 gauge galvanized steel coversheet.

3.4 Downstream of the fan in a blow-through application shall be a full height and full width 16 gauge galvanized steel **distribution plate**. This plate shall contain 50% free area over the entire cross-sectional area of the unit except at the fan discharge area. This area shall be a 25% free area over an area 1.4 times the fan discharge width and 1.2 times the fan discharge height.

Big Buffalo Air Handling Unit Specifications

4. FACTORY INSTALLED COMPONENTS

4.1 **Centrifugal fans** shall be non-overloading, double width - double inlet (DWDI), backward inclined airfoil bladed for sizes 30" or larger. Fan diameters under 30" shall be backward inclined bladed. Manufacturer's fan ratings shall be based upon tests performed in strict accordance with AMCA Standard 210. Fans must carry the seal authorized by AMCA, indicating that the ratings are certified by the organization and are a member in good standing with AMCA. Fans not meeting this criteria will not be accepted.

Fan housing shall be constructed of hot-rolled carbon steel, continuously welded and adequately braced with structural steel for rigidity. Provide access door in the fan scroll complete with quick-opening latches for fan inspection and a fan scroll drain.

Fan shafts are to be solid, ground and polished, carbon steel, machined to close tolerances, keyed to the fan wheel. Coat the fan shaft with a rust inhibitor after machining.

Fan bearings are to be horizontally split, pillow block, foot mounted bearings with a minimum L-10 life of 80,000 hours at maximum operating conditions. Bearings are to be mounted on the integral fan scroll bracing. Extend the fan bearing lubrication lines to an easily accessible location on the unit.

The fan and motor are to be mounted on all-welded structural steel, prime coated, internal isolation base with springs selected to provide 97% isolation efficiency. Each spring shall be unhoused, free-standing type, welded to a base plate with a 1/4" thick ribbed neoprene sound deadening pad and leveling bolt. Base plates shall be mounted on two threaded studs welded to unit floor for ease of spring replacement. The outlet of the fan is to be separated from the unit casing by means of a factory installed flexible connection.

The drive motor is to be provided on a 2-screw NEMA slide rail base to allow proper adjustment of belt tension. Provide a four-sided OSHA belt guard having sides of galvanized steel and expanded metal face with 2 openings for tachometer readings. Provide adjustable V-belt drives for motors 15 HP and below and fixed V-belt drives for motors 20 HP and above. Drives shall be selected for 100% of motor horsepower with minimum 1.3 drive selection service factor.

4.2 **Centrifugal plenum (unhoused) fans** shall meet the requirements for centrifugal fans (Section 4.1). Plenum fans shall be furnished with an open-mesh protective enclosure screen. The fan shall carry the AMCA seal.

4.3 **Cooling and hot water heating coils** shall be constructed with 5/8" O.D. copper tubes with minimum 0.035" tube wall thickness. Fins shall be 0.010" thick aluminum. Coil casing shall be minimum 16 gauge galvanized steel for heating applications and 304 stainless steel for cooling applications. Headers shall be non-ferrous barrels with vents and drain connections. Coil connections are to extend through the casing wall by the unit manufacturer. All coils shall be ARI certified.

Each coil section shall be provided with an individual coil support rack, where the coils are stacked more than one high to allow for easy removal of a lower coil without disturbing the upper coil(s). Where individual coil support racks are utilized, provide an intermediate drain pan with a trough and downspout at each end. Coil support racks, intermediate drain pans and downspouts shall be constructed of 304 stainless steel material.

Steam heating coils shall be steam distributing type and constructed with 1" x 0.035" copper outer tubes and 5/8" x 0.020" copper inner distributing tubes. Fins shall be 0.010" aluminum and the headers shall be non-ferrous. Casings shall be 16 gauge galvanized steel.

4.4 **Pre-filters** shall be 2" deep and shall not have less than 15 pleats per linear foot, with an average effective media area of 4.6 square ft. per 1.0 square ft. of filter face area. Filters shall be UL 900, Class 2 listed, and provide 30% efficiency per ASHRAE Standard 52 test method using atmospheric dust.

Final filters shall be high efficiency, replaceable filter type, constructed of a fine-fiber all-glass medium. Filters shall have individual pleats and have a minimum depth of 12". The final filters shall be UL 900, Class 2 listed, 85% efficiency per ASHRAE Standard 52.

Both pre-filters and final filters shall be face-load mounted and properly sealed to prevent air bypass in a 16 gauge galvanized steel holding frame with clips. Each filter bank shall be furnished with a Dwyer 2002 magnehelic gauge to measure the filter pressure drop, with two static pressure tips and vent valves. The gauge shall be factory-mounted on the exterior of the unit.

4.5 **Dampers** shall be low leakage airfoil bladed dampers. Frames shall be constructed of extruded aluminum hat channel with mounting flanges on both sides of the damper frame. Blades shall be airfoil type extruded aluminum with integral structural reinforcing tube running full length of each blade. Blade edge seal shall be extruded vinyl double-edge design. Bearings shall be non-corrosive two piece molded synthetic. Linkage shall be concealed in the frame. Damper actuators shall be furnished by air temperature contractor.

4.6 **Louvers** shall be a stationary drainable type with drain gutter in each blade and downspout in each jamb and mullion. Frames shall be 6" deep and constructed of 0.10" wall thick 6063T5 extruded aluminum.

4.7 **Sound attenuators** shall be constructed of 18 gauge galvanized steel outer casing and 24 gauge galvanized perforated steel. Sound attenuator performance, including attenuators with fiberglass cloth and mylar encapsulated media, must have been substantiated by laboratory testing in accordance with ASTM E477 and so certified.

5. TESTING

5.1 Each unit shall be factory-run tested with unit fully assembled. Fan vibration readings shall be taken in accordance with ANSI S2.19 grade G6.3. Maximum fan vibration measured on fan bearings shall not exceed 0.16 inch per second (IPS).

5.2 Each unit shall be fully factory assembled and leakage tested as follows:

a. Unit openings are to be closed off and sealed. If applicable, a close-off plate shall be installed between the positive and negative sections. A test fan is ducted to the unit and set at the test pressure.

b. The test pressure is 1.25 times the operating static pressure within the section. The test pressure shall not exceed 1.1 times the fan shut-off pressure.

c. Air leakage into or from the section shall be determined by use of a calibrated orifice plate mounted within the interconnecting ductwork between the test fan and the section.

d. Total leakage for all sections shall not exceed 1% of the unit CFM capacity, or 50 CFM, whichever is greater.

5.3 Each air handling unit shall be fully assembled and have a witnessed factory performance test as follows:

a. Unit fan performance shall be taken for two testing points, one each on either side of the point of rating.

b. A test duct shall be mounted to the inlet. The duct is to be sized to produce an average velocity between 2,500 and 3,500 feet per minute. The unit discharge will be throttled to produce the test static pressure. The test static pressure is the static pressure across the fan bulkhead.

c. Air flow capacity at each test pressure shall be calculated by multiplying the root mean square velocity pressure, converted to velocity at standard conditions, by the test duct area. Motor voltage, current and power factor shall be recorded for each test point. Motor horsepower, including v-belt drive loss, will be calculated by using the motor manufacturer's guaranteed minimum efficiency.

d. A test fan performance curve shall be drawn between the two performance points, parallel to the fan manufacturer's performance curve. The test performance curve shall pass within +/-2.5% of the static pressure, +/-5% of the CFM and +/-5% of the brake horsepower (net, less drive loss) point of rating to be deemed correct.

Due to ongoing product improvements, we reserve the right to change system specifications and construction without notice.

Buffalo
Air Handling

Sales Engineers in cities throughout North America
For the nearest one call:
Telephone (434) 946-7455
Fax: (434) 946-7941
www.buffaloair.com

March 2005

Foam Panel Construction

BUFFALO
AIR HANDLING

Features and Benefits

- 2", 2½", and 3" Panels
- Aluminum Extrusions
- No Through Metal
- 'R' Value of 6.8/inch
- Strength and Rigidity
- Aesthetics

Specifications

Aluminum Walls

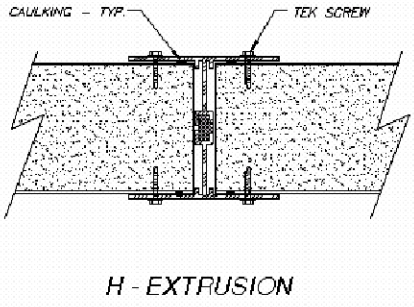
All panels shall be double wall and fabricated of .063" (.050") (.040") embossed aluminum outer shell with a .040 solid aluminum inner. The unit casing shall be no through metal construction using aluminum extrusions with a polyurethane resin thermal bridge. All panel seams will be caulked with sealant.

Galvanized Walls

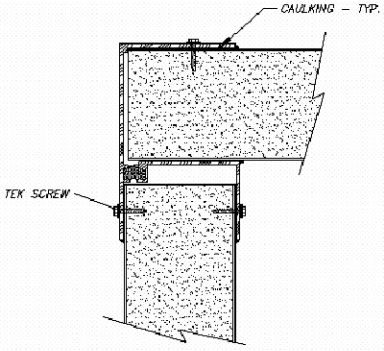
All panels shall be double wall and fabricated of 14 gauge (16) (18) G90 galvanized steel outer shell with an 18 gauge (20) (22) solid galvanized inner, except in the chilled water coil section and downstream of the final filters, which shall be solid 18 gauge (20) 304 stainless steel. The unit casing shall be no through metal construction using aluminum extrusions with a polyurethane resin thermal bridge. All panel seams will be caulked with sealant.

Insulation

All exterior panels and roof shall be insulated with polyurethane foam insulation fill between the outer wall and inner liner. Floors shall be insulated with a minimum of 2" thick foam insulation to completely fill all contours on the underside of the floor. Insulation is UL Class I rated. A bottom cover sheet shall completely encapsulate the insulation.



H - EXTRUSION



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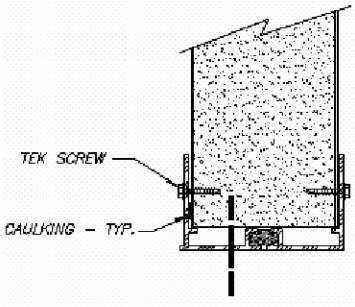

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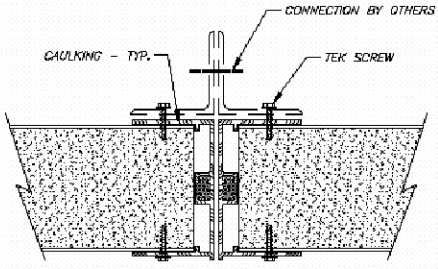

F - EXTRUSION

Buffalo Air Handling ◆ 467 Zane Snead Drive ◆ Amherst, VA 24521 ◆ Phone: (434) 946-7455 ◆ Fax: (434) 946-7941
www.buffaloair.com ◆ Email: sales@buffaloair.com

Big Buffalo Custom AHU's

HERE TO STAY

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BUFFALO
AIR HANDLING

Big Buffalo Custom AHU's

WE LISTEN

Whatever your need, Buffalo Air Handling can provide the custom air handling unit for your application.

- Indoor or Outdoor Construction
- New or Retrofit Applications (Knockdown Capability)
- Tight Floor Space or Height Restrictions
- Stacked, L-Shaped, or U-Shaped Units
- Outdoor Units Available with Sloped or Peaked Roofs (Upturned Flanges or Membrane Roof); with or without Corridor
- Galvanized, Aluminum, or Stainless Steel Casings and Structural Channel Bases
- 1.5", 2", 2.5", 3", or 4" Wall Thickness
- Fiberglass or Foam Insulation
- Centrifugal, Plenum, or Axial Flow Fans
- Direct or Belt Drive Fans
- Fans in Parallel for Redundancy in Critical Applications
- Vibration Isolation – Standard or Seismic; Channel or Inertia Base
- Accelerometers and Auto Lubrication
- Cooling and Heating Coils (Steam, Hot Water, or Integral Face and Bypass)
- Stacked and Staggered Coil Configuration
- Humidification and Desiccant Dehumidification
- ASHRAE, HEPA, Carbon, or Chemical Filtration
- Sound Attenuation
- Heat Recovery and Energy Recovery – Wheels, Heat Pipes, Run Around Coils
- Factory Acceptance Testing – Performance, Sound, Leakage, Deflection, Vibration
- ETL Listed
- Capacity to Handle Large Projects
- Financial Stability

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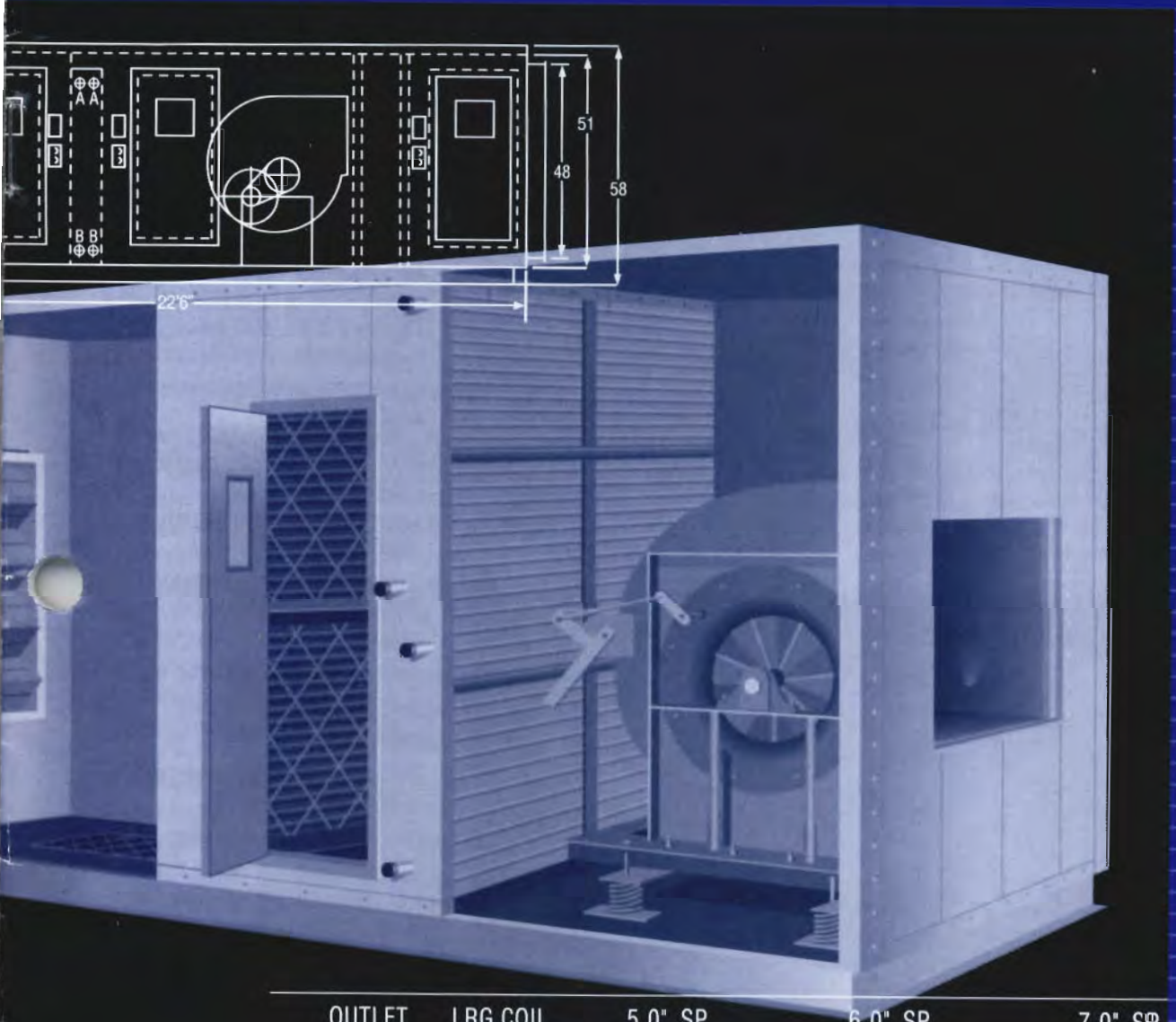
BUFFALO
AIR HANDLING

3
Model K

Bulletin **C6100**
DECEMBER 2003

Buffalo Air Handling Model K

Standard Modular Construction



OUTLET		LRG COIL	5.0" SP			6.0" SP			7.0" SP	
CFM	VEL	VEL	RPM	BHP	PWL	RPM	BHP	PWL	RPM	BHP
22000	2376	373	1281	22.3	95	1369	26.5	96	1454	30.7
24000	2592	407	1317	24.9	96	1401	29.2	97	1483	33.7
26000	2808	441	1357	27.7	98	1437	32.2	98	1515	36.9
28000	3024	475	1400	30.7	99	1477	35.5	99	1551	40.5

BUFFALO
AIR HANDLING

Model K
Air Handling Systems

Modular Air Handling Systems

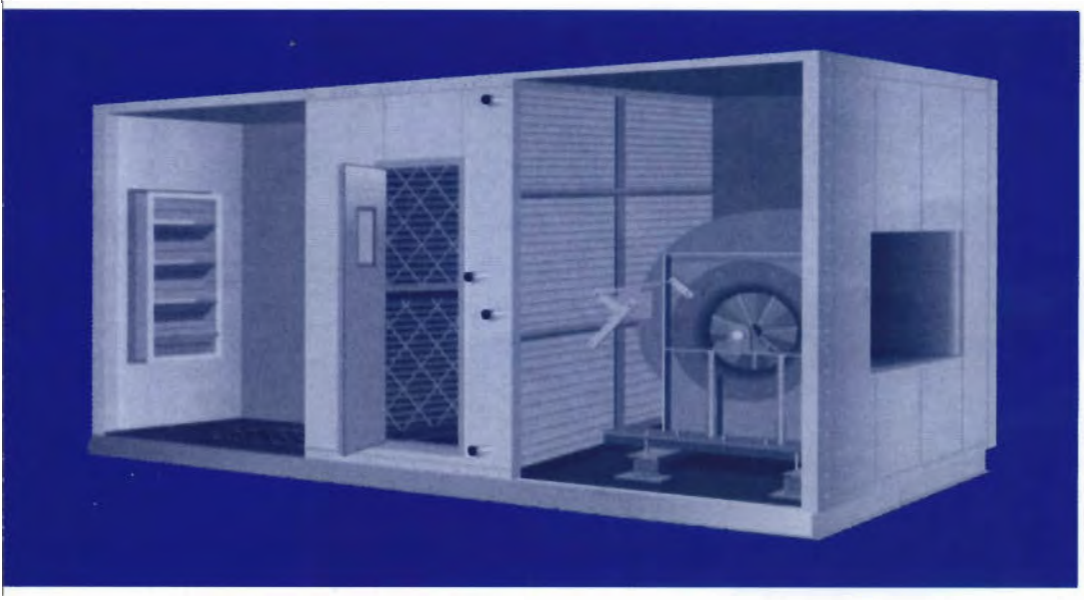
Buffalo Air Handling introduces Model K, our standard Air Handling Unit. Model K is a totally new design. All components are in modular sections that allow you to configure an Air Handling Unit to meet your specific demands.

Buffalo Air Handling has combined 100 plus years of experience in the Air Moving Industry with today's modern manufacturing techniques and computer aided design to provide you with reliable quality equipment with single source responsibility for fans, coils, casing and base.

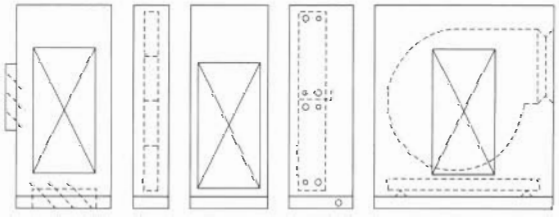
Model K features precision roll formed galvanized casing panel construction with a smooth exterior surface and inherent structural integrity. After insulation is inserted, an inner skin is economically added of perforated or solid galvanized sheet resulting in a rugged "double wall" configuration. On less demanding applications, the inner skin may be omitted, providing a single wall system which affords further savings.

Design Features of Model K include: Capacities from 3,500 cfm to 60,000 cfm, pressures to 10" wg and beyond, fourteen unit sizes for optimum selections and twenty-nine standard modules to satisfy most requirements.

All this at less than custom built prices to meet demanding budgets.



▸ *Typical Model K cabinet based on modular design.*



Advantages

All three members of the building team, owner, engineer, and contractor, benefit from Model K equipment because of these features:

- **Reduced time in design and field installation.**
- **Single source system responsibility; a manufacturer who designs, builds and guarantees its own fan, casing, channel base, and coil components.**
- **Optional plate fin coils available.**
- **Standardization of cabinet construction.**
- **Controlled uniform quality during manufacturing.**
- **Controlled cost information that eliminates budget overruns.**
- **Built-in serviceability.**
- **Reduced operating and maintenance costs.**
- **Optimum performance from quality components.**
- **Startup and installation supervision.**
- **Factory testing.**

Bulletin Information

This new Model K Bulletin allows the engineer to select and specify top quality Buffalo air handling units in the easiest possible manner. The logical format will efficiently define:

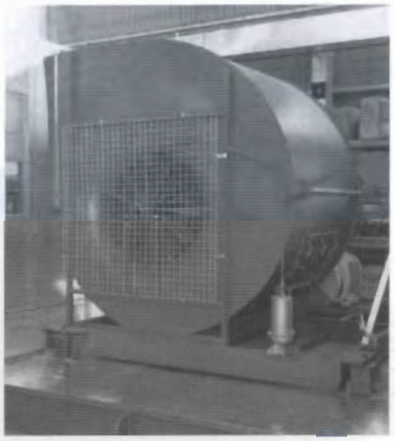
- **Unit dimensions.**
- **Unit weights.**
- **Centrifugal DWDI Fan Performance**
- **Basic sound power data.**
- **Component details: fan, coil and filter data.**
- **Construction specifications**

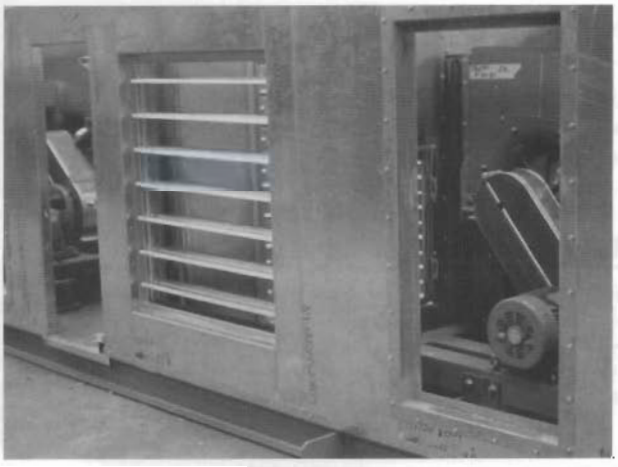
For the Conceptual Engineer

We have provided on page 4 typical arrangements of assembled modules along with overall dimensions. These will allow you in the early stages of design, to rough out equipment room size or to determine cabinet limitations within a given or fixed area. Operational weights are listed to assist the structural engineer.

For the Design Engineer

We present a two page format for each unit size. When combined with the Air Friction Charts displayed on page 35, which folds out, all data necessary to select and specify each complete unit is conveniently presented.





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For smaller air handling units, contact your local Buffalo sales representative.

For custom air handling units, refer to Big Buffalo Bulletin C6200.

How to use this Bulletin

All the information you need to select and specify Buffalo Model K air handling units is at your fingertips:
Dimensions, Weights, Pressure Losses, Fan Performance, Motor Selection, Sound Power Levels and Construction Specifications.

Step 1 & 2

Define unit requirements and select size

28,000 CFM, 2.8" External Static Pressure. 100% outside air unit with heating and cooling, prefilter and final 90% efficiency filtration. Divide CFM by 100 to determine nominal size 28,000/100 = K 300
From index on page 2 find 300 K size design data on page 25 & 26.
Turn to these pages and fold out the back cover air friction chart.

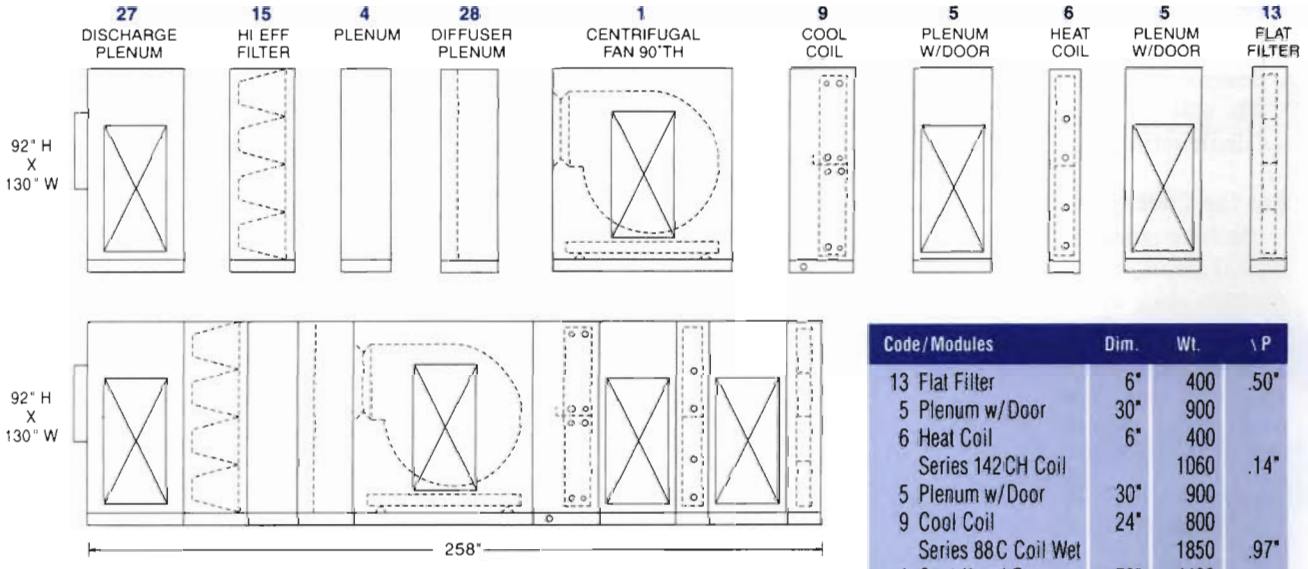
Select coils

Select heating and cooling coils from Aerofin software based on your calculated load requirements. Typical 100% OA cooling for this example would be a Series 80, 8 row Type C and Series 140, 2 row CH hot water heating coil. Size K 300 coil sizing is 58.96 sq ft for large face area (475 ft/min face velocity).

Step 3

Design layout

Layout the desired unit configuration from available modules and determine unit dimensions, weights and internal air pressure losses.



Code/Modules	Dim.	Wt.	\P
13 Flat Filter	6"	400	.50"
5 Plenum w/Door	30"	900	
6 Heat Coil	6"	400	
Series 142 CH Coil		1060	.14"
5 Plenum w/Door	30"	900	
9 Cool Coil	24"	800	
Series 88 C Coil Wet		1850	.97"
1 Centrifugal Fan	78"	4400	
Fan System Effect			.29"
28 Diffuser Plenum	18"	900	.24"
4 Plenum	12"	500	
15 Filter 90% 12" Rig.	18"	900	1.00"
27 Discharge Plenum	36"	1350	.09"
	258"	14,360	3.23"
Motor 40 HP FR 324T		550	
Total lbs.		14,910	

Step 4

Select the proper fan, define performance and sound power.

28,000 CFM @ 3.2" Internal SP
(refer to p. 25) 2.8" External SP
6.0" Total SP

Fan Size 600 AF
Wheel Diameter 30.0"

OUTLET		6.0" SP		
CFM	VEL	RPM	BHP	PWL
26,000	2808	1437	32.2	98
28,000	**3024**	**1477**	**35.5**	**99**
30,000	3240	1519	39.1	101

Octave band analysis
(refer to p. 36)

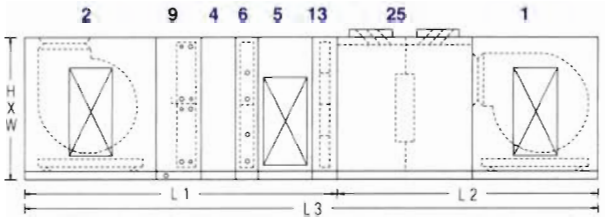
125	250	500	1000	2000	4000	8000
99	99	99	99	99	99	99
-2	0	-1	-7	-12	-16	-21
97	99	98	92	87	83	78

Sound Power db re 10^{-12} watts

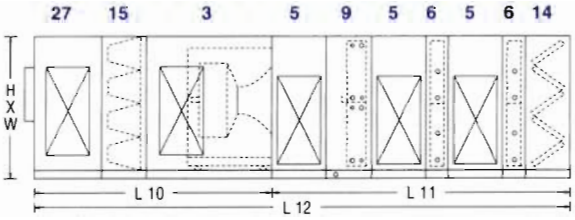
Summary:
Size K 300 Model K
28,000 CFM @ 6.0" SP
Fan Size 600 AF DWDI, 1477 RPM, 35.5 BHP
Motor Size 40 HP FR 324T
Dimensions: 258" L x 92" H x 130" W
Weight: 14,910 Pounds

For the Conceptual Engineer

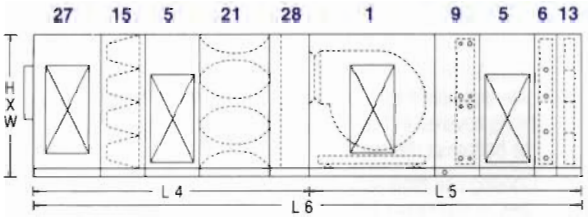
Typical unit arrangements showing overall dimensions in inches and complete unit operating weight in pounds.



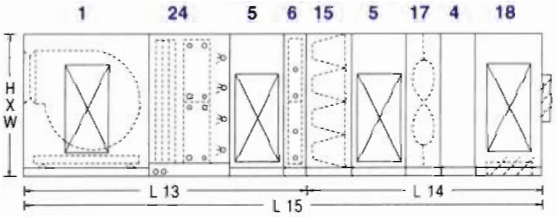
A - SUPPLY & RETURN FANS WITH ECONOMIZER



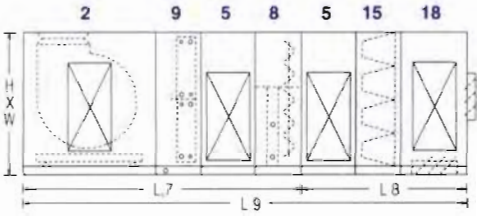
D - PLENUM FAN FINAL FILTERS PREHEAT & REHEAT



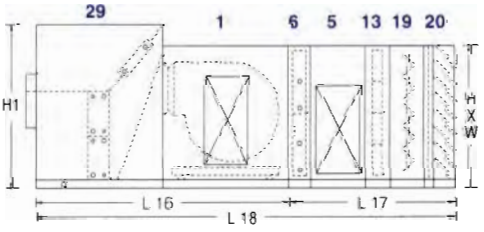
B - DRAW THRU - BLOW THRU WITH SILENCER



E - SPRAYED COIL & BLENDER



C - DRAW THRU WITH MIXING BOX & F & BP HC



F - MULTIZONE WIYH INLET LOUVER & FACE DAMPER

Code/Modules

1 Cent Fan 90°TH/270° BH
2 Cent Fan 360° UB/180° DB
3 Cent Plenum Fan
4 Plenum
5 Plenum with Door
6 Heating Coil
7 Integral F & BP HC
8 Conventional F & BP HC
9 Cooling Coil
10 Conventional F & BP CC
11 Eliminator
12 Steam Humidifier
13 Flat Filter
14 Angle Filter
15 Hi Eff Filter
16 Roll Filter
17 Blender
18 Mixing Box w/Door
19 Face Damper
20 Louver w/Screen
21 Sound Trap
22 Aerolii
23 FinFil
24 Sprayec Coil
25 Economizer Indoor
26 Economizer Outdoor
27 Discharge Plenum
28 Diffuser Plenum
29 Multi Zone/Dual Duct

ARR	DIM WT	K45	K60	K85	K105	K125	K155	K180	K200	K240	K300	K350	K400	K450	K500
A	L 1	84	84	90	96	96	102	108	114	120	126	132	144	168	168
	L 2	114	120	126	132	144	150	156	174	174	198	204	210	246	246
	L 3	198	204	216	228	240	252	264	288	294	324	336	354	414	414
	WT	4,565	4,685	5,825	6,990	7,935	9,970	11,300	12,510	15,400	17,650	20,865	23,800	29,800	32,700
B	L 4	120	120	120	120	132	138	138	144	144	150	150	162	168	168
	L 5	96	102	108	114	120	126	132	138	138	144	150	156	180	180
	L 6	216	222	228	234	252	264	270	282	282	294	300	318	348	348
	WT	4,565	4,625	5,890	7,110	7,890	10,500	11,600	12,700	15,100	17,230	19,270	20,510	25,700	27,200
C	L 7	114	114	120	126	132	138	144	150	156	162	168	180	204	204
	L 8	66	66	66	66	72	78	78	78	78	84	84	96	102	102
	L 9	180	180	186	192	204	216	222	228	134	246	252	276	306	306
	WT	3,880	4,265	4,925	6,000	6,690	8,600	9,480	10,700	12,800	14,700	16,150	18,500	21,700	23,500
D	L 10	78	84	90	96	102	108	114	126	126	138	144	162	186	182
	L 11	132	132	132	132	150	150	150	150	150	150	150	150	150	150
	L 12	210	216	222	228	252	258	264	276	276	288	294	312	336	336
	WT	3,020	4,330	5,260	6,120	7,040	9,200	10,000	11,270	13,510	15,550	17,400	19,960	24,500	25,550
E	L 13	114	120	126	132	138	144	150	156	156	162	168	174	198	198
	L 14	90	90	90	90	102	102	102	102	102	108	108	120	126	156
	L 15	204	210	216	222	240	246	252	258	258	270	276	294	324	354
	WT	4,280	5,060	5,740	6,870	8,200	10,200	12,350	13,995	15,600	17,990	21,900	24,560	27,690	31,000
F	L 16	84	84	96	108	108	114	126	138	144	150	162	174	N/A	N/A
	L 17	54	54	54	54	60	60	60	60	60	60	60	60	N/A	N/A
	L 18	138	138	150	162	168	174	186	198	204	210	222	234	N/A	N/A
	H 1	72	72	84	84	98	98	98	108	108	120	124	142	N/A	N/A
	WT	3,600	3,845	4,780	5,710	6,720	7,530	10,000	11,235	13,200	15,730	17,990	20,250	N/A	N/A
All	H	47	49	57	59	62	68	76	84	86	92	100	113	132	144
All	W	58	64	70	82	88	106	106	106	124	130	136	136	136	136

L 1 - L 18 = Lengths H & H 1 = Heights W = Widths WT = Weights

Typical Construction Specification

GENERAL

Design Each unit shall consist of unpainted heavy duty mill galvanized casing mounted on an all welded structural steel channel base. All parts of the Air Handling Unit manufactured of black steel including all interior and exterior parts of the fan, channel base, drain pan and other bracing shall be coated with a single coat, 5-6 mil, epoxy paint.

Capability Unit manufacturer shall have similar equipment installed for a minimum of 10 years.

Responsibility Unit manufacturer shall accept total responsibility for construction and performance.

Submittals Submit certified sound power data for unit inlet and discharge at 10^{-12} watts for 8 octave bands. Submit fan performance curves showing CFM versus static pressure and brake horsepower. Curves shall show fan performance tested in accordance with AMCA Standard 210. Where specified, provide factory testing for sound, performance and leakage rate.

GALVANIZED CASING

Basic Design The unit casing shall be 2-⅛" thick roll formed inward turned double flange.

Outer Wall 14 ga. mill galvanized steel. 16 ga. optional.

Inner Wall 20 ga. mill galvanized steel, solid or perforated. 18 ga. optional.

Insulation 2" - 3 lb./ft³ density fiberglass.

Molding Galvanized steel molding at corners and shipping splits.

Fasteners Zinc plated fasteners on minimum 6" centers.

Sealant Panels to be sealed water and air tight with butyl rubber tape. Removable panels to be sealed with ¼" neoprene gasketing.

Sound Casing panels shall be rated for sound transmission loss in accordance with ASTM E413-73 and have minimum values:

Octave Band	2	3	4	5	6	7
14 ga./20 ga. Solid w/ 3 lb/ft³	25	39	48	54	58	58
14 ga./20 ga. Perf. w/ 3 lb/ft³	21	25	34	44	51	53
16 ga./20 ga. Solid w/ 3 lb/ft³	21	38	46	53	57	56

Outdoor Outdoor unit roof panels to be provided with 1½" upstanding flanges, sealed with butyl rubber tape and fastened on 6" centers. The upstanding flanges to be further sealed by vinyl covered capped U-Strips which are secured by additional mechanical fasteners. Units exceeding 8'0" in width to have a sloped roof with a pitch of ⅛" per foot width. All access doors to have drip covers.

SUBBASE

Structural Frame The entire unit shall be supported on an all welded structural steel channel base around the complete perimeter of each major section. The unit base shall include intermediate cross-member channels as required to support major components. Perimeter channels shall be 4" 5.4 lbs/ft for sizes K45-K125 and 6" 8.2 lbs/ft for sizes K155-K500.

Floor Sheet Unit floor shall be 12 gauge black steel for sizes K45-K125 and 10 gauge black steel for sizes K155-K500. Floor sheet to be welded to the structural steel channel base.
Optional Insulation: The underside of the floor sheet shall be insulated with 2" 3 lbs/cuft insulation held in place with weld pins and adhesive. Floor insulation to be further protected by being covered with a 16 gauge galvanized steel sheet welded to the bottom of the channel base.

Drain Pan Cooling coil module to have sloped steel or optional galvanized steel or stainless steel drain pan with 1" 1.5 lbs/cuft insulation for sizes K45-K125 and 2" 3 lbs/cuft insulation for sizes K155-K500. Insulation to be covered with a 16 gauge galvanized steel sheet welded to the bottom of the channel base. Pan sides are to be insulated with 2" 3 lbs/cuft insulation with steel cover sheet. Drain connections to be 1" MPT for sizes K45-K125 and 2" MPT for sizes K155-K500 located on side of drain pan. Drain pans can be provided in all sections of the unit.

Lifting Lugs Located 4 per shipping section (removable where required).

Finish Single coat, 5-6 mil, epoxy paint.

AEROCLINE™ CENTRIFUGAL FAN

Wheel / Shaft DWDI BI or AF bladed with common backplate. All Hi strength steel welded construction with straight bored cast iron hub, keyed and set screwed to TGP solid steel fan shaft. Constant rising pressure curve and non-overloading horsepower characteristics.

Housing Steel fabricated with structural steel bearing supports.

Bearings Grease lubricated, bearings, 80,000 Hr L-10 life split pillow block with double row, self-aligning spherical roller bearings are standard.

Isolation All welded structural steel base with NEMA motor base for integral mounting of fan/motor/drive assembly on individually selected isolators and fiberglass reinforced flexible connection.

Finish Fan interior, exterior, wheel and isolation base to have a single coat, 5-6 mil, epoxy paint.

Accessories Variable inlet vanes with interconnecting linkage suitable for automatic operation; Safety OSHA inlet and outlet screens; Safety OSHA belt guards; special coatings; outlet dampers and scroll access door.

SAFETY EQUIPMENT WARNING

ROTATING PARTS AND ACCESS TO HIGH VELOCITY AIR STREAMS ARE DANGEROUS TO LIFE AND LIMB OF PERSONNEL AND SAFETY ACCESSORIES ARE REQUIRED. The responsibility for providing safety accessories for equipment manufactured by Buffalo Air Handling is that of the user and installer of the equipment. Neither Buffalo Air Handling nor its sales representatives can make the determination that safety accessories are required. Proper selection and use of safety accessories is based on the location of installation, the accessibility of employees and other persons to the equipment, adjacent equipment, applicable building codes and requirements of the Federal Occupational Safety and Health Act. Buffalo Air Handling offers various safety accessories which will be supplied in accordance with the order placed by the purchaser. Users and installers must read "Recommended Safety Practices for Users and Installers of Industrial and Commercial Fans" as published by the Air Movement and Control Association, Inc., 30 West University Drive, Arlington Heights, Illinois 60004-1893, USA. A copy of this publication is attached to all shipments from Buffalo Air Handling and is also available on request.

Typical Construction Specification (Continued)

AEROCLINE PLENUM FAN

Wheel/Shaft	SWSI AF bladed continuously welded to wheel flange and backplate. All Hi strength steel construction with straight bored cast iron hub, keyed and set screwed to TGP solid steel fan shaft. Constant rising pressure curve and non-overloading horsepower characteristics.
Bearings	Grease lubricated, ball or roller bearings, single deep groove, self-aligning heavy pillow block type with 40,000 Hr L-10 life. 80,000 Hr L-10 life split pillow block with double row, self-aligning spherical roller bearings are optional.
Isolation	All welded structural steel base with NEMA motor base for integral mounting of fan/motor/drive assembly on individually selected isolators and a fiberglass reinforced flexible connection.
Finish	Fan interior, exterior, wheel and isolation base to have a single coat, 5-6 mil, epoxy paint.
Accessories	Safety OSHA inlet screen, safety enclosure, Safety OSHA belt guard, variable inlet vanes and special coatings.

STEAM HEATING COILS

Type	Aerofin ARI certified helically wound mechanically bound fin tubing with inner distributing tube non-freeze design.
Casing	16 ga. galvanized steel. Optional 304 SS available.
Fins	.010" aluminum or copper (solder coated) fins. Optional fin thickness to .020".
Header	Carbon steel. Optional non-ferrous material available.
Tubes	5/8" OD seamless copper tubes, .020" thick. Optional .025", .035" and .049" are available. 1" OD seamless copper tubes, .030" thick. Optional .049" and .065" are available.
Testing	Designed for working pressure of 200 psig and 400° F, tested at 250 psig air under water.
Options	Plate fin coil design available. Refer to Buffalo Representative.

WATER COILS

Type	Aerofin ARI certified helically wound mechanically bound finned tube heat transfer surface.
Casing	16 ga. galvanized steel. Optional 304 SS available.
Fins	.010" aluminum or copper (solder coated) fins. Optional fin thickness of .016" and .020".
Header	Carbon steel. Optional non-ferrous material available.
Tubes	5/8" OD seamless copper tubes, .020" thick. Optional .025", .035" and .049" are available.
Return Bends	.032" thick seamless copper. Optional .049".
Testing	Designed for working pressure of 200 psig and 400° F, tested at 250 psig air under water.
Options	Plate fin coil design available. Refer to Buffalo Representative.

COILS GENERAL

Installation	Coils are mounted on heavy coil support stand and blanked off with galvanized sheets to prevent bypass. Removable panels are provided at the end of each section to facilitate coil removal from the designated side without disturbing the structural integrity of the unit.

TESTING

Performance Guidelines	When specified, factory testing to be provided in general accordance set forth in AMCA Standard 210. Acceptance criteria to be -2.5% CFM; - 5% SP;+ 5% BHP.
Sound	When specified sound power or sound pressure level testing of inlet, discharge, and unit casing shall be provided.
Leakage	When specified leakage rate test shall verify unit leakage to be less than 1% of unit capacity at 1.25 times the operating static pressure.
Vibration	When specified vibration test shall verify filter-in horizontal, vertical and axial readings not to exceed .16 ips horizontal/ vertical and .32 ips axial.

ACCESSORIES

Marine Lights	Vapor proof, weather tight incandescent light with guard. Optional florescent light.
Switch	SPDT switch in a weather tight enclosure wired to the light in a sealed metal conduit.
Receptacle	1/60/120V receptacle in a weather tight enclosure wired to external junction box.
Access Doors	2" double wall galvanized (aluminum) with extruded aluminum frame, stainless steel piano hinge, full perimeter gasket and two severe duty handles. Optional single pane or thermal pane dead lite.
Filter	Face loaded pre-filter, final filter, carbon filter or HEPA filter bank per standard ASHRAE filter efficiencies are available. Optional side service available on smaller sizes.
Diffuser	Blow through applications shall include a full height by full width diffuser panel. Manufacturer shall guarantee downstream component performance based on velocity profile of diffuser.
Humidifier	Factory installed steam grid and air atomization humidifiers are available.
Dampers	16 ga. galvanized steel damper in a galvanized steel frame. Optional aluminum airfoil shaped blade dampers are available.
Louvers	6" deep galvanized steel louver with birdscreen. Optional features include drainable blade and aluminum blade designs.
Eliminator	3 bend galvanized steel moisture eliminators on 1⅛" centers. Optional 304 SS available.
Blenders	Quantity and size are listed on individual selection pages.
Mixing Boxes	Parallel blade galvanized dampers are standard.
Sound Traps	Refer to page 36 for insertion loses.
Economizers	Are available for both indoor and outdoor locations.
Aerofil Finfil Spraycoil	Refer to specific Buffalo Air Handling literature or your local Buffalo-Howden sales representative for selections and specifications.

Due to ongoing product improvements, we reserve the right to change system specifications and construction without notice.

Model K Performance Data

Centrifugal DWDI Fan Performance, Coil Velocity, Filter and Coil Data

SIZE K 45

Low Pressure

FAN SIZE 245 BI
WHEEL DIAMETER 12.25"
OUTLET AREA 1.55 SQ FT

MAX MOTOR FRAME
ODP - 184T
TEFC - 184T
(SEE NOTE 10)

OUTLET CFM	OUTLET VEL	LRG COIL VEL	0.5" SP RPM	0.5" SP BHP	0.5" SP PWL	1.0" SP RPM	1.0" SP BHP	1.0" SP PWL	1.5" SP RPM	1.5" SP BHP	1.5" SP PWL	2.0" SP RPM	2.0" SP BHP	2.0" SP PWL	2.5" SP RPM	2.5" SP BHP	2.5" SP PWL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL
3500	2258	371	1993	1.07	87	2175	1.41	89	2353	1.78	89	2520	2.16	89	2678	2.55	90	2825	2.94	90
3750	2419	397	2110	1.26	88	2280	1.62	90	2448	2.01	90	2609	2.41	91	2762	2.82	91	2905	3.24	91
4000	2581	424	2229	1.48	89	2388	1.86	91	2547	2.26	92	2701	2.69	92	2848	3.12	92	2989	3.57	92
4250	2742	450	2349	1.73	89	2499	2.12	92	2649	2.55	93	2796	2.99	93	2938	3.44	93	3074	3.91	94
4500	2903	477	2470	2.01	90	2611	2.42	93	2753	2.86	94	2894	3.32	94	3030	3.79	94	3162	4.28	95
4750	3065	503	2592	2.31	91	2726	2.74	94	2860	3.20	95	2994	3.68	95	3125	4.17	96	3253	4.68	96
5000	3226	530	2715	2.65	91	2842	3.10	95	2969	3.57	96	3097	4.07	96	3223	4.58	97	3346	5.11	97
5250	3387	556	2839	3.03	92	2959	3.49	96	3080	3.98	97	3202	4.49	97	3323	5.03	98	3442	5.57	98
5500	3548	583	2963	3.43	93	3077	3.91	97	3193	4.42	98	3309	4.95	98	3425	5.50	99	3539	6.07	99
5750	3710	609	3088	3.88	94	3197	4.38	98	3307	4.90	99	3418	5.45	99	3530	6.02	100	3640	6.60	100

Medium Pressure

FAN SIZE 245 BI
WHEEL DIAMETER 12.25"
OUTLET AREA 1.55 SQ FT

MAX MOTOR FRAME
ODP - 184T
TEFC - 184T
(SEE NOTE 10)

OUTLET CFM	OUTLET VEL	LRG COIL VEL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL	3.5" SP RPM	3.5" SP BHP	3.5" SP PWL	4.0" SP RPM	4.0" SP BHP	4.0" SP PWL	4.5" SP RPM	4.5" SP BHP	4.5" SP PWL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	5.5" SP RPM	5.5" SP BHP	5.5" SP PWL
3500	2258	371	2825	2.94	90	2964	3.35	91	3095	3.76	92	3220	4.17	92	3340	4.59	93	3456	5.02	94
3750	2419	397	2905	3.24	91	3042	3.67	92	3171	4.10	92	3294	4.54	93	3412	4.98	94	3526	5.43	94
4000	2581	424	2989	3.57	92	3122	4.01	93	3249	4.47	93	3370	4.93	94	3487	5.40	94	3598	5.87	95
4250	2742	450	3074	3.91	94	3204	4.38	94	3329	4.86	94	3448	5.35	94	3563	5.83	95	3673	6.33	95
4500	2903	477	3162	4.28	95	3289	4.78	95	3411	5.28	95	3528	5.79	95	3641	6.30	96	3750	6.82	96
4750	3065	503	3253	4.68	96	3376	5.20	96	3496	5.73	96	3610	6.26	96	3721	6.79	96	3829	7.33	97
5000	3226	530	3346	5.11	97	3466	5.65	97	3582	6.20	97	3694	6.75	97	3803	7.31	97	3909	7.88	98
5250	3387	556	3442	5.57	98	3558	6.14	98	3671	6.70	98	3781	7.28	98	3887	7.86	98	3991	8.45	98
5500	3548	583	3539	6.07	99	3652	6.65	99	3762	7.24	99	3869	7.84	99	3973	8.45	99	4075	9.06	99
5750	3710	609	3640	6.60	100	3748	7.20	100	3855	7.82	100	3959	8.44	100	4061	9.06	100	4161	9.70	100

High Pressure

FAN SIZE 245 BI
WHEEL DIAMETER 12.25"
OUTLET AREA 1.55 SQ FT

MAX MOTOR FRAME
ODP - 184T
TEFC - 184T
(SEE NOTE 10)

OUTLET CFM	OUTLET VEL	LRG COIL VEL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	6.0" SP RPM	6.0" SP BHP	6.0" SP PWL	7.0" SP RPM	7.0" SP BHP	7.0" SP PWL	8.0" SP RPM	8.0" SP BHP	8.0" SP PWL	9.0" SP RPM	9.0" SP BHP	9.0" SP PWL	10.0" SP RPM	10.0" SP BHP	10.0" SP PWL
3500	2258	371	3340	4.59	93	3567	5.46	95	3781	6.37	97	3983	7.31	99	4177	8.29	100	4364	9.32	102
3750	2419	397	3412	4.98	94	3636	5.89	95	3845	6.83	97	4044	7.80	98	4234	8.80	100	4416	9.85	101
4000	2581	424	3487	5.40	94	3707	6.35	96	3913	7.32	97	4108	8.32	98	4295	9.35	100	4474	10.4	101
4250	2742	450	3563	5.83	95	3780	6.83	96	3983	7.84	97	4176	8.86	98	4359	9.95	100	4535	11.0	101
4500	2903	477	3641	6.30	96	3855	7.34	97	4056	8.40	97	4246	9.47	99	4427	10.6	100	4601	11.7	101
4750	3065	503	3721	6.79	96	3932	7.88	97	4132	8.99	98	4318	10.1	99	4497	11.2	100	4668	12.4	101
5000	3226	530	3803	7.31	97	4011	8.44	98	4207	9.59	99	4392	10.8	99	4569	11.9	100	4738	13.1	101
5250	3387	556	3887	7.86	98	4092	9.04	99	4285	10.2	99	4468	11.4	100	4643	12.7	100	4810	13.9	101
5500	3548	583	3973	8.45	99	4174	9.67	99	4364	10.9	100	4545	12.2	100	4718	13.4	101	4884	14.7	102
5750	3710	609	4061	9.06	100	4258	10.3	100	4445	11.6	101	4624	12.9	101	4795	14.2	101	4959	15.6	102

Filter Data

FULL SIZE - 24" x 24"
HALF SIZE - 24" x 12"

TYPE	NO. OF FILTERS HEIGHT	NO. OF FILTERS WIDTH	FACE AREA SQ FT	CFM 500 FT/MIN
FLAT, CUBE, BAG, HEPA	1.5	2	12.0	6,000
ANGLE	2	2	16.0	8,000
VERTICAL ROLL	NA	NA	NA	NA

For plenum fan performance refer to your local Buffalo sales representative

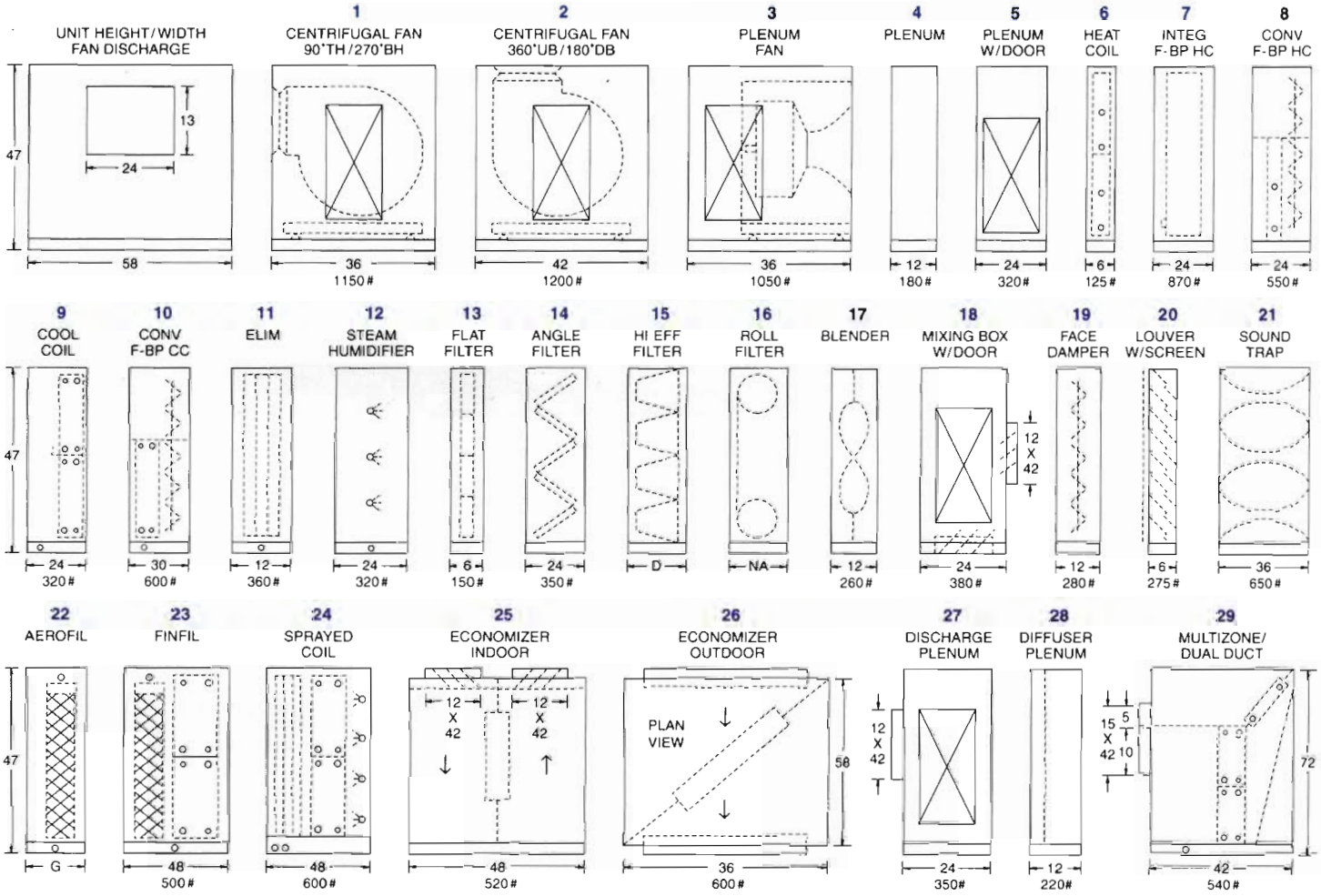
Coil Data

SIZE	TYPE	FACE AREA SQ FT	QTY	TUBE FACE	TUBE LENGTH	WEIGHT (POUNDS) 1 ROW	2 ROW	4 ROW	6 ROW	8 ROW
LARGE	COOL OR HEAT	9.44	1	24	3'-6"	125	150	220	250	280
MEDIUM	COOL OR HEAT	8.26	1	21	3'-6"	105	115	170	200	235
SMALL	COOL OR HEAT	5.92	1	15	3'-6"	95	105	150	180	210
-	BLOW THRU REHEAT	4.74	1	12	3'-6"	80	100	-	-	-
-	INTEGRAL FACE & BYPASS	7.38	1	16	2'-0"	-	-	-	-	-

Model K Modules

Dimensions in Inches and Weights in Pounds

SIZE K 45



DRAWING DIMENSION REFERENCE

A) Larger Plenums, Module 4, available in 6" increments.

B) All doors are 18" x 30" size.

C) Blower module has 2 doors, one each side.

D) Filter Depth and Weight, Module 15.

Type	Dim D	Weight
12" rigid	18"	300#
22" bag	24"	360#
28" bag	30"	425#
32" bag	36"	480#

E) Blender, Module 17, quantity 1, size 24".
Allow equal dimension downstream.
Allow half dimension upstream.

F) Sound Traps, Module 21, are also available in 60" optional size, increase weight by 65%.

G) Aerofil, Module 22, dimension and weight.

Fill depth	Dim G	Weight
6"	24"	340#
12"	30"	430#

H) For unit inlet weather hood add 24" to overall length.

Notes:

1) Dimensions and weights are for reference only, not for construction. Air flow is right to left.
2) Weights are for double wall construction, deduct 10% for single wall.
3) Overall dimensions do not allow for coil connections, door handles, or lifting lugs. **Add 6" for clearance.**
4) Outlet dimensions are for low pressure fan, horizontal discharge.
5) All filters are face loaded as standard. Side service optional.
6) Coil weights are based on aluminum fins. For copper fins multiply by 1.3. Cooling coils 4, 6 and 8 rows are 80 series. For series 140, multiply by 1.25.
7) All weights are shipping weights. To obtain operating weights multiply by the following factors:
a) Water Coils x 1.25 b) Aerofil x 1.8 c) Finfil x 1.7 d) Spray Coil x 1.6
8) Plenum fans should be preceeded by Plenum with door.
9) For Conventional Face and Bypass, Module 8 and 10, use small face area coil. For Sprayed Coil, Module 24, use medium face area coil, 600 ft/min design face velocity, Series 80, maximum 6 rows.
10) Additional Centrifugal DWDI fan module length required for larger motor frames for fan discharges:

Discharge	90° TH 270° BH	360° UB 180° DB	ODP & TEFC (MAX. FRAME)
Low Pressure	24"	18"	256T
Medium Pressure	24"	18"	256T
High Pressure	24"	18"	256T

Model K Performance Data

Centrifugal DWDI Fan Performance, Coil Velocity, Filter and Coil Data

SIZE **K 60**

Low Pressure

FAN SIZE 300 BI
WHEEL DIAMETER 15.0"
OUTLET AREA 2.33 SQ FT

MAX MOTOR FRAME
ODP - 184T
TEFC - 184T
(SEE NOTE 10)

OUTLET CFM	OUTLET VEL	LRG COIL VEL	0.5" SP RPM	0.5" SP BHP	0.5" SP PWL	1.0" SP RPM	1.0" SP BHP	1.0" SP PWL	1.5" SP RPM	1.5" SP BHP	1.5" SP PWL	2.0" SP RPM	2.0" SP BHP	2.0" SP PWL	2.5" SP RPM	2.5" SP BHP	2.5" SP PWL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL
4000	1717	328	1322	0.87	84	1511	1.29	85	1682	1.73	86	1835	2.19	87	1974	2.66	88	2103	3.14	89
4500	1931	369	1442	1.12	86	1613	1.58	87	1774	2.07	88	1921	2.57	88	2056	3.09	89	2182	3.61	90
5000	2146	411	1565	1.43	88	1721	1.92	89	1871	2.45	90	2012	3.00	90	2143	3.56	91	2265	4.14	91
5500	2361	452	1692	1.80	89	1834	2.32	91	1974	2.89	92	2115	3.52	92	2233	4.09	92	2351	4.71	93
6000	2575	493	1821	2.23	90	1951	2.79	93	2081	3.40	93	2206	4.03	94	2327	4.68	94	2441	5.35	94
6500	2790	534	1952	2.73	91	2072	3.33	94	2192	3.97	95	2310	4.64	95	2425	5.34	95	2535	6.05	96
7000	3004	575	2085	3.32	92	2195	3.95	95	2307	4.62	96	2418	5.33	97	2527	6.07	97	2632	6.82	97
7500	3219	616	2218	3.98	93	2321	4.65	96	2426	5.36	97	2530	6.10	98	2633	6.88	98	2733	7.67	98
8000	3433	657	2353	4.74	94	2449	5.44	97	2547	6.19	98	2645	6.97	99	2742	7.77	99	2838	8.61	99
8500	3648	698	2489	5.59	95	2579	6.33	98	2671	7.11	99	2763	7.92	100	2855	8.77	100	2946	9.64	100

Medium Pressure

FAN SIZE 300 BI
WHEEL DIAMETER 15.0"
OUTLET AREA 2.33 SQ FT

MAX MOTOR FRAME
ODP - 184T
TEFC - 184T
(SEE NOTE 10)

OUTLET CFM	OUTLET VEL	LRG COIL VEL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL	3.5" SP RPM	3.5" SP BHP	3.5" SP PWL	4.0" SP RPM	4.0" SP BHP	4.0" SP PWL	4.5" SP RPM	4.5" SP BHP	4.5" SP PWL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	5.5" SP RPM	5.5" SP BHP	5.5" SP PWL
4000	1717	328	2103	3.14	89	2224	3.64	91	2338	4.16	93	2448	4.69	94	2553	5.25	95	2655	5.82	95
4500	1931	369	2182	3.61	90	2299	4.15	91	2411	4.70	93	2517	5.27	94	2618	5.85	95	2716	6.44	96
5000	2146	411	2265	4.14	91	2379	4.72	92	2488	5.31	93	2591	5.91	94	2690	6.53	95	2786	7.15	96
5500	2361	452	2351	4.71	93	2463	5.34	93	2569	5.98	94	2670	6.62	95	2767	7.28	95	2861	7.94	96
6000	2575	493	2441	5.35	94	2550	6.02	94	2654	6.71	95	2753	7.40	95	2848	8.09	96	2939	8.80	97
6500	2790	534	2535	6.05	96	2640	6.77	96	2741	7.50	96	2838	8.24	97	2931	8.98	97	3021	9.73	97
7000	3004	575	2632	6.82	97	2734	7.59	97	2832	8.36	97	2926	9.15	98	3018	9.94	97	3105	10.7	98
7500	3219	616	2733	7.67	98	2831	8.48	98	2926	9.30	98	3018	10.1	98	3107	11.0	98	3193	11.8	99
8000	3433	657	2838	8.61	99	2932	9.46	99	3023	10.3	99	3112	11.2	99	3198	12.1	99	3283	13.0	100
8500	3648	698	2946	9.64	100	3035	10.5	100	3123	11.4	100	3209	12.4	100	3293	13.3	100	3375	14.2	102

High Pressure

FAN SIZE 245 BI
WHEEL DIAMETER 12.25"
OUTLET AREA 1.55 SQ FT

MAX MOTOR FRAME
ODP - 213T
TEFC - 213T
(SEE NOTE 10)

OUTLET CFM	OUTLET VEL	LRG COIL VEL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	6.0" SP RPM	6.0" SP BHP	6.0" SP PWL	7.0" SP RPM	7.0" SP BHP	7.0" SP PWL	8.0" SP RPM	8.0" SP BHP	8.0" SP PWL	9.0" SP RPM	9.0" SP BHP	9.0" SP PWL	10.0" SP RPM	10.0" SP BHP	10.0" SP PWL
5000	3226	411	3803	7.31	97	4011	8.44	98	4207	9.59	99	4392	10.8	99	4569	11.9	100	4738	13.1	101
5250	3387	431	3887	7.86	98	4092	9.04	99	4285	10.2	99	4468	11.4	100	4643	12.7	100	4810	13.9	101
5500	3548	452	3973	8.45	99	4174	9.67	99	4364	10.9	100	4545	12.2	100	4718	13.4	101	4884	14.7	102
5750	3710	472	4061	9.06	100	4258	10.3	100	4445	11.6	101	4624	12.9	101	4795	14.2	101	4959	15.6	102
6000	3871	493	4151	9.71	101	4344	11.0	101	4528	12.4	101	4704	13.7	102	4873	15.1	102	5035	16.5	102
6250	4032	513	4243	10.4	102	4431	11.8	102	4612	13.1	102	4786	14.5	102	4953	16.0	103	5113	17.4	103
6500	4194	534	4337	11.1	102	4521	12.5	103	4699	14.0	103	4869	15.4	103	5034	16.9	103	5193	18.3	104
6750	4355	554	4432	11.9	103	4612	13.4	103	4786	14.8	103	4954	16.3	104	5117	17.8	104	5273	19.3	104
7000	4516	575	4530	12.7	104	4705	14.2	104	4876	15.7	104	5041	17.3	104	5201	18.8	104	5355	20.4	105
7250	4677	595	4629	13.6	105	4800	15.1	104	4967	16.7	104	5129	18.2	104	5286	19.8	105			

Filter Data

FULL SIZE - 24"x 24"
HALF SIZE - 24"x 12"

TYPE	NO. OF FILTERS HEIGHT	NO. OF FILTERS WIDTH	FACE AREA SQ FT	CFM 500 FT/MIN
FLAT, CUBE, BAG, HEPA	1.5	2	12.0	6,000
ANGLE	2	2	16.0	8,000
VERTICAL ROLL	NA	NA	NA	NA

For plenum fan performance refer to your local Buffalo sales representative

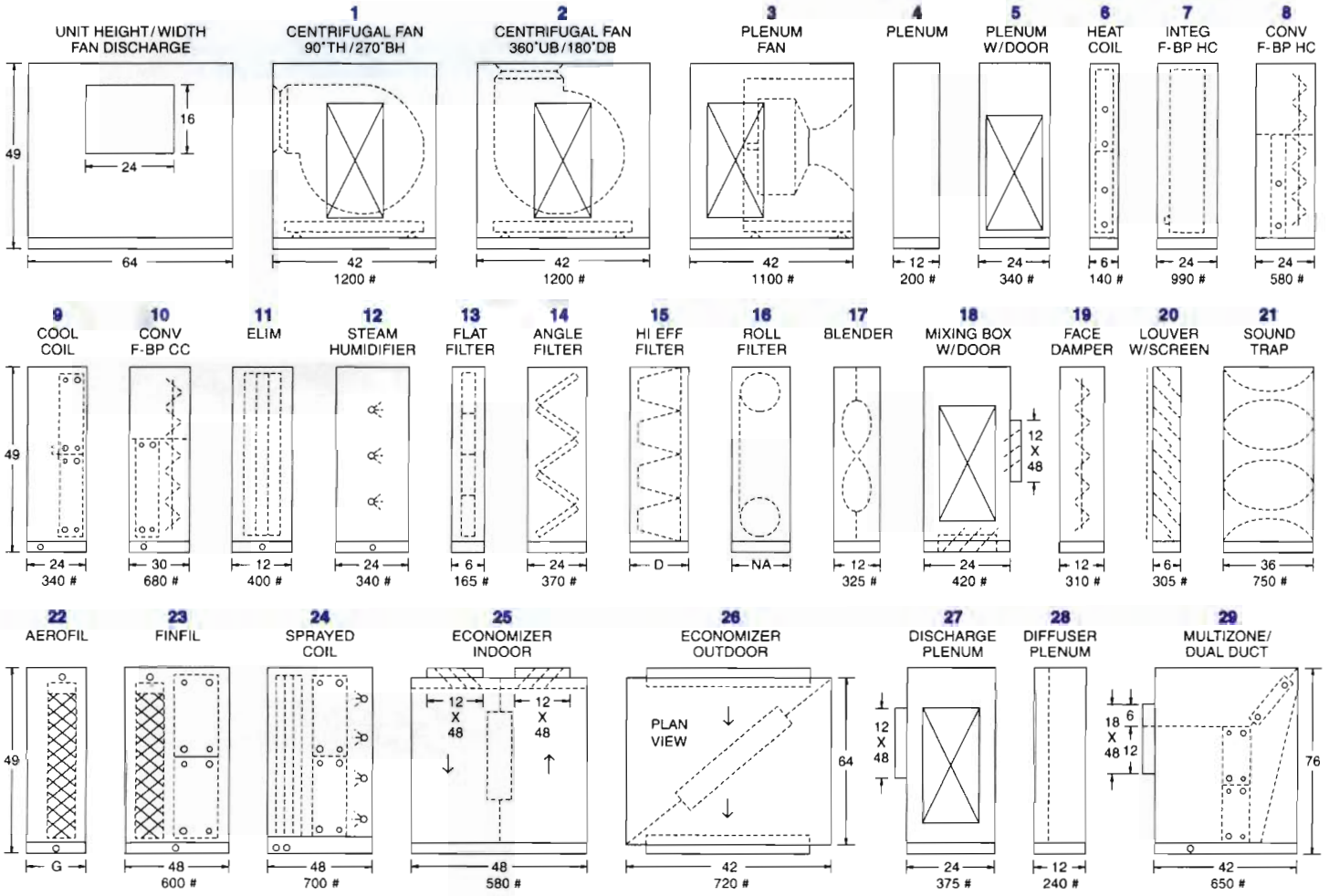
Coil Data

SIZE	TYPE	FACE AREA SQ FT	QTY	TUBE FACE	TUBE LENGTH	WEIGHT (POUNDS) 1 ROW	2 ROW	4 ROW	6 ROW	8 ROW
LARGE	COOL OR HEAT	12.18	1	27	4'- 0"	160	210	290	340	410
MEDIUM	COOL OR HEAT	10.84	1	24	4'- 0"	150	180	250	300	360
SMALL	COOL OR HEAT	8.14	1	18	4'- 0"	140	150	200	260	310
-	BLOW THRU REHEAT	5.45	1	12	4'- 0"	90	120	-	-	-
-	INTEGRAL FACE & BYPASS	8.30	1	16	2'- 3"	-	-	-	-	-

Model K Modules

Dimensions in Inches and Weights in Pounds

SIZE K 60



DRAWING DIMENSION REFERENCE

A) Larger Plenums, Module 4, available in 6" increments.

B) All doors are 18" x 30" size.

C) Blower module has 2 doors, one each side.

D) Filter Depth and Weight, Module 15.

Type	Dim D	Weight
12" rigid	18"	320#
22" bag	24"	385#
28" bag	30"	450#
32" bag	36"	500#

E) Blender, Module 17, quantity 1, size 30".
Allow equal dimension downstream.
Allow half dimension upstream.

F) Sound Traps, Module 21, are also available in 60" optional size, increase weight by 65%.

G) Aerofil, Module 22, dimension and weight.

Fill depth	Dim G	Weight
6"	24"	360#
12"	30"	460#

H) For unit inlet weather hood add 24" to overall length.

Notes:

1) Dimensions and weights are for reference only, not for construction. Air flow is right to left.
2) Weights are for double wall construction, deduct 10% for single wall.
3) Overall dimensions do not allow for coil connections, door handles, or lifting lugs. **Add 6" for clearance.**
4) Outlet dimensions are for low pressure fan, horizontal discharge.
5) All filters are face loaded as standard. Side service optional.
6) Coil weights are based on aluminum fins. For copper fins multiply by 1.3. Cooling coils 4, 6 and 8 rows are 80 series. For series 140, multiply by 1.25.
7) All weights are shipping weights. To obtain operating weights multiply by the following factors:
a) Water Coils x 1.25 b) Aerofil x 1.8 c) Finfil x 1.7 d) Spray Coil x 1.6
8) Plenum fans should be preceeded by Plenum with door.
9) For Conventional Face and Bypass, Module 8 and 10, use small face area coil. For Sprayed Coil, Module 24, use medium face area coil, 600 ft/min design face velocity, Series 80, maximum 6 rows.
10) Additional Centrifugal DWDI fan module length required for larger motor frames for fan discharges:

Discharge	90° TH 270° BH	360° UB 180° DB	ODP & TEFC (MAX. FRAME)
Low Pressure	24"	24"	254T
Medium Pressure	24"	24"	256T
High Pressure	24"	24"	284T

Model K Performance Data

Centrifugal DWDI Fan Performance, Coil Velocity, Filter and Coil Data

SIZE K 85

Low Pressure

FAN SIZE 365 AF
WHEEL DIAMETER 18.25"
OUTLET AREA 3.45 SQ FT

MAX MOTOR FRAME
ODP - 213T
TEFC - 213T
(SEE NOTE 10)

OUTLET CFM	OUTLET VEL	LRG COIL VEL	0.5" SP RPM	0.5" SP BHP	0.5" SP PWL	1.0" SP RPM	1.0" SP BHP	1.0" SP PWL	1.5" SP RPM	1.5" SP BHP	1.5" SP PWL	2.0" SP RPM	2.0" SP BHP	2.0" SP PWL	2.5" SP RPM	2.5" SP BHP	2.5" SP PWL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL
6500	1884	387	1215	1.45	83	1324	1.98	84	1425	2.52	85	1519	3.07	86	1607	3.63	87	1691	4.22	89
7000	2029	417	1291	1.73	84	1394	2.29	86	1491	2.86	86	1581	3.45	87	1665	4.05	88	1746	4.66	89
7500	2174	446	1369	2.04	85	1466	2.63	87	1558	3.25	87	1645	3.87	88	1727	4.51	89	1804	5.15	90
8000	2319	476	1448	2.40	86	1539	3.01	88	1627	3.67	89	1711	4.33	89	1790	5.00	90	1865	5.68	90
8500	2464	506	1527	2.80	87	1613	3.44	89	1697	4.13	90	1778	4.83	90	1854	5.54	91	1927	6.26	91
9000	2609	536	1607	3.24	88	1688	3.92	90	1769	4.63	91	1846	5.37	91	1920	6.12	92	1991	6.87	92
9500	2754	565	1688	3.74	89	1765	4.44	91	1841	5.19	92	1916	5.96	92	1987	6.74	93	2056	7.54	93
10000	2899	595	1769	4.28	89	1842	5.01	92	1915	5.79	93	1986	6.60	93	2055	7.42	94	2122	8.25	94
10500	3043	625	1850	4.88	90	1919	5.64	93	1989	6.45	94	2058	7.28	94	2125	8.14	95	2189	9.01	95
11000	3188	655	1932	5.54	92	1998	6.32	94	2064	7.16	94	2131	8.03	95	2195	8.92	95	2258	9.83	96

Medium Pressure

FAN SIZE 365 AF
WHEEL DIAMETER 18.25"
OUTLET AREA 3.45 SQ FT

MAX MOTOR FRAME
ODP - 213T
TEFC - 213T
(SEE NOTE 10)

OUTLET CFM	OUTLET VEL	LRG COIL VEL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL	3.5" SP RPM	3.5" SP BHP	3.5" SP PWL	4.0" SP RPM	4.0" SP BHP	4.0" SP PWL	4.5" SP RPM	4.5" SP BHP	4.5" SP PWL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	5.5" SP RPM	5.5" SP BHP	5.5" SP PWL
6500	1884	387	1691	4.22	89	1773	4.82	90	1854	5.44	91	1933	6.09	93	2013	6.78	94	2092	7.49	96
7000	2029	417	1746	4.66	89	1824	5.29	90	1901	5.94	91	1975	6.61	93	2050	7.30	94	2123	8.02	95
7500	2174	446	1804	5.15	90	1879	5.81	91	1952	6.48	92	2023	7.17	93	2093	7.88	94	2163	8.62	95
8000	2319	476	1865	5.68	90	1937	6.37	91	2007	7.08	92	2075	7.79	93	2142	8.53	94	2208	9.28	95
8500	2464	506	1927	6.26	91	1997	6.98	92	2065	7.72	93	2130	8.47	93	2195	9.23	94	2258	10.0	95
9000	2609	536	1991	6.87	92	2059	7.64	93	2124	8.41	93	2188	9.19	94	2250	9.98	95	2311	10.8	95
9500	2754	565	2056	7.54	93	2122	8.34	93	2186	9.14	94	2248	9.96	94	2308	10.8	95	2367	11.6	96
10000	2899	595	2122	8.25	94	2186	9.09	94	2248	9.93	95	2309	10.8	95	2367	11.6	96	2425	12.5	96
10500	3043	625	2189	9.01	95	2252	9.89	95	2313	10.8	95	2371	11.7	96	2429	12.5	96	2484	13.4	97
11000	3188	655	2258	9.83	96	2319	10.7	96	2378	11.7	96	2435	12.6	97	2491	13.5	97	2546	14.5	97

High Pressure

FAN SIZE 300 BI
WHEEL DIAMETER 15.0"
OUTLET AREA 2.33 SQ FT

MAX MOTOR FRAME
ODP - 215T
TEFC - 215T
(SEE NOTE 10)

OUTLET CFM	OUTLET VEL	LRG COIL VEL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	6.0" SP RPM	6.0" SP BHP	6.0" SP PWL	7.0" SP RPM	7.0" SP BHP	7.0" SP PWL	8.0" SP RPM	8.0" SP BHP	8.0" SP PWL	9.0" SP RPM	9.0" SP BHP	9.0" SP PWL	10.0" SP RPM	10.0" SP BHP	10.0" SP PWL
6500	2790	387	2931	8.98	97	3108	10.5	98	3273	12.0	99	3430	13.6	100	3579	15.2	101	3722	16.9	102
7000	3004	417	3018	9.94	98	3191	11.5	99	3353	13.2	100	3507	14.8	100	3654	16.5	101	3794	18.3	102
7500	3219	446	3107	11.0	99	3276	12.7	100	3436	14.4	100	3587	16.1	101	3732	17.9	102	3870	19.7	103
8000	3433	476	3198	12.1	100	3364	13.9	101	3521	15.7	101	3670	17.5	102	3812	19.4	102	3949	21.3	103
8500	3648	506	3293	13.3	101	3455	15.2	102	3609	17.1	102	3755	19.0	102	3895	21.0	103	4030	22.9	104
9000	3863	536	3391	14.6	103	3548	16.6	103	3699	18.6	103	3843	20.6	103	3980	22.6	104	4113	24.7	104
9500	4077	565	3491	16.0	104	3644	18.0	104	3791	20.1	104	3932	22.3	104	4067	24.4	105	4198	26.6	105
10000	4292	595	3594	17.5	105	3742	19.6	105	3886	21.8	105	4024	24.0	105	4157	26.3	105	4285	28.5	106
10500	4506	625	3700	19.1	106	3843	21.3	106	3983	23.6	106	4117	25.9	106	4248	28.2	106	4374	30.6	106
11000	4721	655	3809	20.8	107	3947	23.1	107	4082	25.5	107	4230	28.2	107	4341	30.3	107			

Filter Data

FULL SIZE - 24"x 24"
HALF SIZE - 24"x 12"

TYPE	NO. OF FILTERS HEIGHT	NO. OF FILTERS WIDTH	FACE AREA SQ FT	CFM 500 FT/MIN
FLAT, CUBE, BAG, HEPA	2	2.5	20.0	10,000
ANGLE	2	2.5	20.0	10,000
VERTICAL ROLL	NA	NA	NA	NA

For plenum fan performance refer to your local Bulfalo sales representative

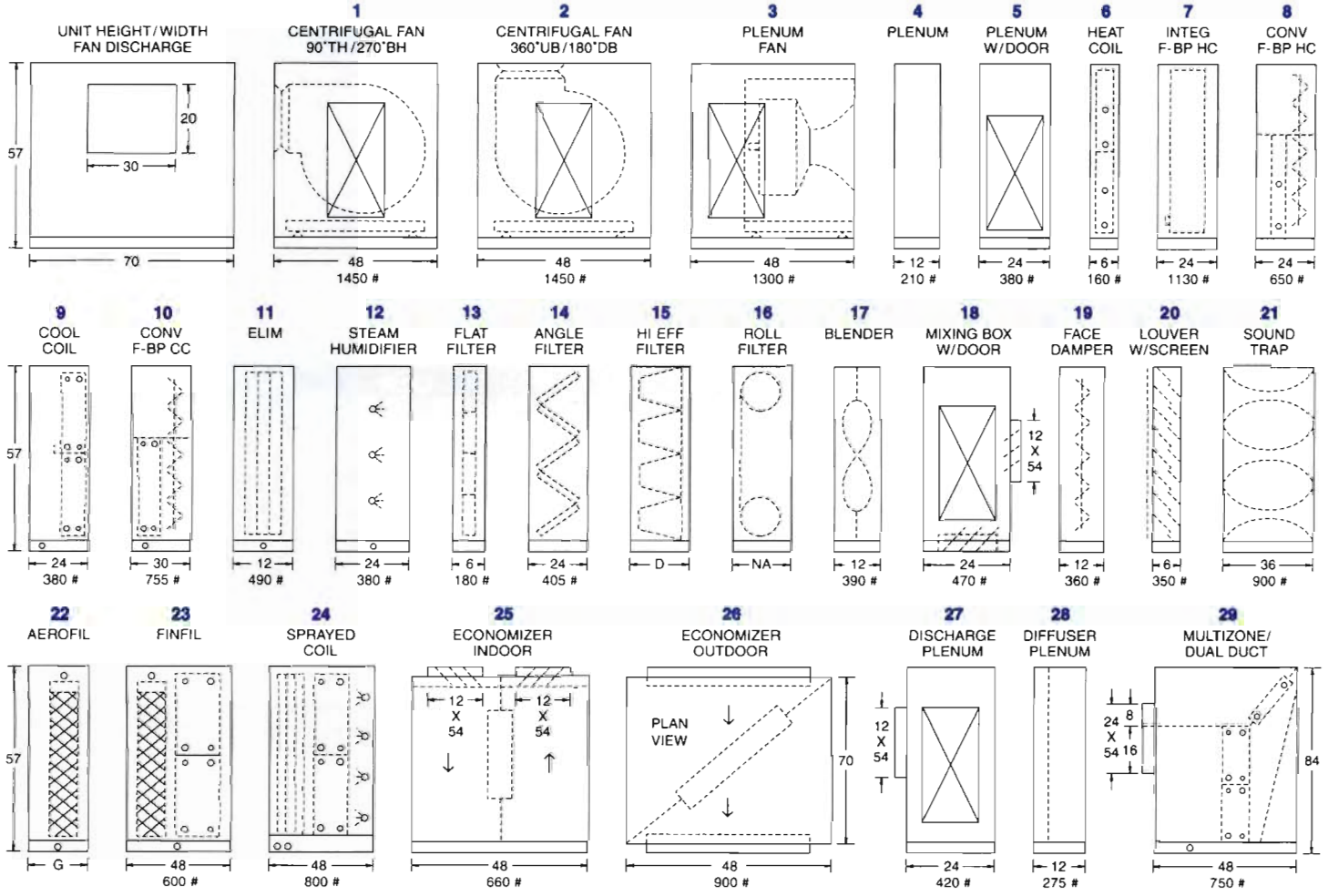
Coil Data

SIZE	TYPE	FACE AREA SQ FT	QTY	TUBE FACE	TUBE LENGTH	WEIGHT (POUNDS) 1 ROW	2 ROW	4 ROW	6 ROW	8 ROW
LARGE	COOL OR HEAT	16.80	1	33	4'-6"	220	280	375	445	535
MEDIUM	COOL OR HEAT	13.76	1	27	4'-6"	198	260	330	396	466
SMALL	COOL OR HEAT	10.71	1	21	4'-6"	180	220	275	333	395
-	BLOW THRU REHEAT	7.67	1	15	4'-6"	115	150	-	-	-
-	INTEGRAL FACE & BYPASS	12.67	1	20	2'-9"	-	-	-	-	-

Model K Modules

Dimensions in Inches and Weights in Pounds

SIZE K 85



DRAWING DIMENSION REFERENCE

A) Larger Plenums, Module 4, available in 6" increments.

B) All doors are 18" x 40" size.

C) Blower module has 2 doors, one each side.

D) Filter Depth and Weight, Module 15.

Type	Dim D	Weight
12" rigid	18"	370#
22" bag	24"	445#
28" bag	30"	525#
32" bag	36"	580#

E) Blender, Module 17, quantity 1, size 36".
Allow equal dimension downstream.
Allow half dimension upstream.

F) Sound Traps, Module 21, are also available in 60" optional size, increase weight by 65%.

G) Aerofil, Module 22, dimension and weight.

Fill depth	Dim G	Weight
6"	24"	400#
12"	30"	480#

H) For unit inlet weather hood add 24" to overall length.

Notes:

1) Dimensions and weights are for reference only, not for construction. Air flow is right to left.
2) Weights are for double wall construction, deduct 10% for single wall.
3) Overall dimensions do not allow for coil connections, door handles, or lifting lugs. **Add 6" for clearance.**
4) Outlet dimensions are for low pressure fan, horizontal discharge.
5) All filters are face loaded as standard. Side service optional.
6) Coil weights are based on aluminum fins. For copper fins multiply by 1.3. Cooling coils 4, 6 and 8 rows are 80 series. For series 140, multiply by 1.25.
7) All weights are shipping weights. To obtain operating weights multiply by the following factors:
a) Water Coils x 1.25 b) Aerofil x 1.8 c) Finfil x 1.7 d) Spray Coil x 1.6
8) Plenum fans should be preceeded by Plenum with door.
9) For Conventional Face and Bypass, Module 8 and 10, use small face area coil. For Sprayed Coil, Module 24, use medium face area coil, 600 ft/min design face velocity, Series 80, maximum 6 rows.
10) Additional Centrifugal DWDI fan module length required for larger motor frames for fan discharges:

Discharge	90° TH 270° BH	360° UB 180° DB	ODP & TEFC (MAX. FRAME)
Low Pressure	24"	30"	286T
Medium Pressure	24"	30"	286T
High Pressure	24"	30"	324T

Model K Performance Data

Centrifugal DWDI Fan Performance, Coil Velocity, Filter and Coil Data

SIZE K 105

Low Pressure

FAN SIZE 400 AF
WHEEL DIAMETER 20.0"
OUTLET AREA 4.14 SQ FT

MAX MOTOR FRAME
ODP - 215T
TEFC - 215T
(SEE NOTE 10)

OUTLET CFM	OUTLET VEL	LRG COIL VEL	0.5" SP RPM	0.5" SP BHP	0.5" SP PWL	1.0" SP RPM	1.0" SP BHP	1.0" SP PWL	1.5" SP RPM	1.5" SP BHP	1.5" SP PWL	2.0" SP RPM	2.0" SP BHP	2.0" SP PWL	2.5" SP RPM	2.5" SP BHP	2.5" SP PWL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL
8500	2053	412	1189	2.13	85	1282	2.81	87	1370	3.51	87	1452	4.22	88	1528	4.95	89	1602	5.69	90
9000	2174	436	1248	2.45	86	1337	3.15	88	1421	3.89	88	1500	4.64	89	1575	5.41	90	1646	6.18	90
9500	2295	460	1308	2.80	87	1392	3.53	89	1473	4.31	89	1550	5.10	90	1623	5.90	90	1692	6.71	91
10000	2415	484	1368	3.19	88	1448	3.95	90	1527	4.76	90	1601	5.59	91	1671	6.42	91	1738	7.27	92
10500	2536	509	1429	3.61	88	1505	4.40	90	1580	5.24	91	1652	6.11	92	1721	6.98	92	1786	7.87	92
11000	2657	533	1490	4.08	89	1563	4.90	91	1635	5.77	92	1705	6.67	92	1771	7.58	93	1835	8.50	93
11500	2778	557	1551	4.58	90	1621	5.43	92	1690	6.33	93	1758	7.27	93	1823	8.22	94	1885	9.18	94
12000	2899	581	1613	5.13	90	1679	6.01	93	1746	6.94	94	1811	7.91	94	1875	8.89	94	1935	9.89	95
12500	3019	606	1674	5.72	91	1738	6.63	93	1803	7.59	94	1866	8.59	95	1927	9.61	95	1986	10.6	95
13000	3140	630	1737	6.37	92	1798	7.30	94	1860	8.29	95	1921	9.32	96	1980	10.4	96	2038	11.5	96

Medium Pressure

FAN SIZE 365 AF
WHEEL DIAMETER 18.25"
OUTLET AREA 3.45 SQ FT

MAX MOTOR FRAME
ODP - 254T
TEFC - 254T
(SEE NOTE 10)

OUTLET CFM	OUTLET VEL	LRG COIL VEL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL	3.5" SP RPM	3.5" SP BHP	3.5" SP PWL	4.0" SP RPM	4.0" SP BHP	4.0" SP PWL	4.5" SP RPM	4.5" SP BHP	4.5" SP PWL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	5.5" SP RPM	5.5" SP BHP	5.5" SP PWL
8500	2464	412	1927	6.26	91	1997	6.98	92	2065	7.72	93	2130	8.47	93	2195	9.23	94	2258	10.0	95
9000	2609	436	1991	6.87	92	2059	7.64	93	2124	8.41	93	2188	9.19	94	2250	9.98	95	2311	10.8	95
9500	2754	460	2056	7.54	93	2122	8.34	93	2186	9.14	94	2248	9.96	94	2308	10.8	95	2367	11.6	96
10000	2899	484	2122	8.25	94	2186	9.09	94	2248	9.93	95	2309	10.8	95	2367	11.6	96	2425	12.5	96
10500	3043	509	2189	9.01	95	2252	9.89	95	2313	10.8	95	2371	11.7	96	2429	12.5	96	2484	13.4	97
11000	3188	533	2258	9.83	96	2319	10.7	96	2378	11.7	96	2435	12.6	96	2491	13.5	97	2546	14.5	97
11500	3333	557	2327	10.7	96	2386	11.6	97	2444	12.6	97	2500	13.6	97	2555	14.5	97	2608	15.5	98
12000	3478	581	2398	11.6	97	2455	12.6	98	2511	13.6	98	2566	14.6	98	2619	15.6	98	2671	16.6	98
12500	3623	606	2469	12.6	98	2525	13.6	98	2579	14.7	98	2633	15.7	99	2685	16.8	99	2736	17.8	99
13000	3768	630	2541	13.7	99	2595	14.7	99	2648	15.8	99	2701	16.9	100	2752	18.0	100	2802	19.1	100

High Pressure

FAN SIZE 365 AF
WHEEL DIAMETER 18.25"
OUTLET AREA 3.45 SQ FT

MAX MOTOR FRAME
ODP - 254T
TEFC - 254T
(SEE NOTE 10)

OUTLET CFM	OUTLET VEL	LRG COIL VEL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	6.0" SP RPM	6.0" SP BHP	6.0" SP PWL	7.0" SP RPM	7.0" SP BHP	7.0" SP PWL	8.0" SP RPM	8.0" SP BHP	8.0" SP PWL	9.0" SP RPM	9.0" SP BHP	9.0" SP PWL	10.0" SP RPM	10.0" SP BHP	10.0" SP PWL
8500	2464	412	2195	9.23	94	2320	10.8	96	2443	12.4	98	2565	14.2	99	2686	16.0	101	2808	17.9	102
9000	2609	436	2250	9.98	95	2371	11.6	96	2489	13.3	98	2605	15.0	99	2720	16.9	101	2834	18.8	102
9500	2754	460	2308	10.8	95	2425	12.5	96	2538	14.2	98	2649	16.0	99	2759	17.8	100	2868	19.8	102
10000	2899	484	2367	11.6	96	2481	13.4	97	2591	15.2	98	2698	17.0	99	2803	18.9	100	2907	20.9	102
10500	3043	509	2429	12.5	96	2539	14.4	97	2646	16.2	98	2749	18.1	99	2851	20.0	100	2951	22.0	101
11000	3188	533	2491	13.5	97	2599	15.4	98	2703	17.3	98	2803	19.3	99	2902	21.2	100	2998	23.3	101
11500	3333	557	2555	14.5	97	2660	16.5	98	2761	18.5	99	2859	20.5	100	2955	22.5	101	3049	24.6	102
12000	3478	581	2619	15.6	98	2722	17.6	99	2822	19.7	99	2917	21.8	100	3011	23.9	101	3102	26.0	102
12500	3623	606	2685	16.8	99	2786	18.9	99	2883	21.0	100	2977	23.1	101	3068	25.3	101	3157	27.5	102
13000	3768	630	2752	18.0	100	2850	20.1	100	2945	22.3	100	3037	24.6	101	3126	26.8	102	3213	29.1	102

Filter Data

FULL SIZE - 24" x 24"
HALF SIZE - 24" x 12"

TYPE	NO. OF FILTERS HEIGHT	NO. OF FILTERS WIDTH	FACE AREA SQ FT	CFM 500 FT/MIN
FLAT, CUBE, BAG, HEPA	2	3	24.0	12,000
ANGLE	2	3	24.0	12,000
VERTICAL ROLL	NA	NA	NA	NA

For plenum fan performance refer to your local Buffalo sales representative

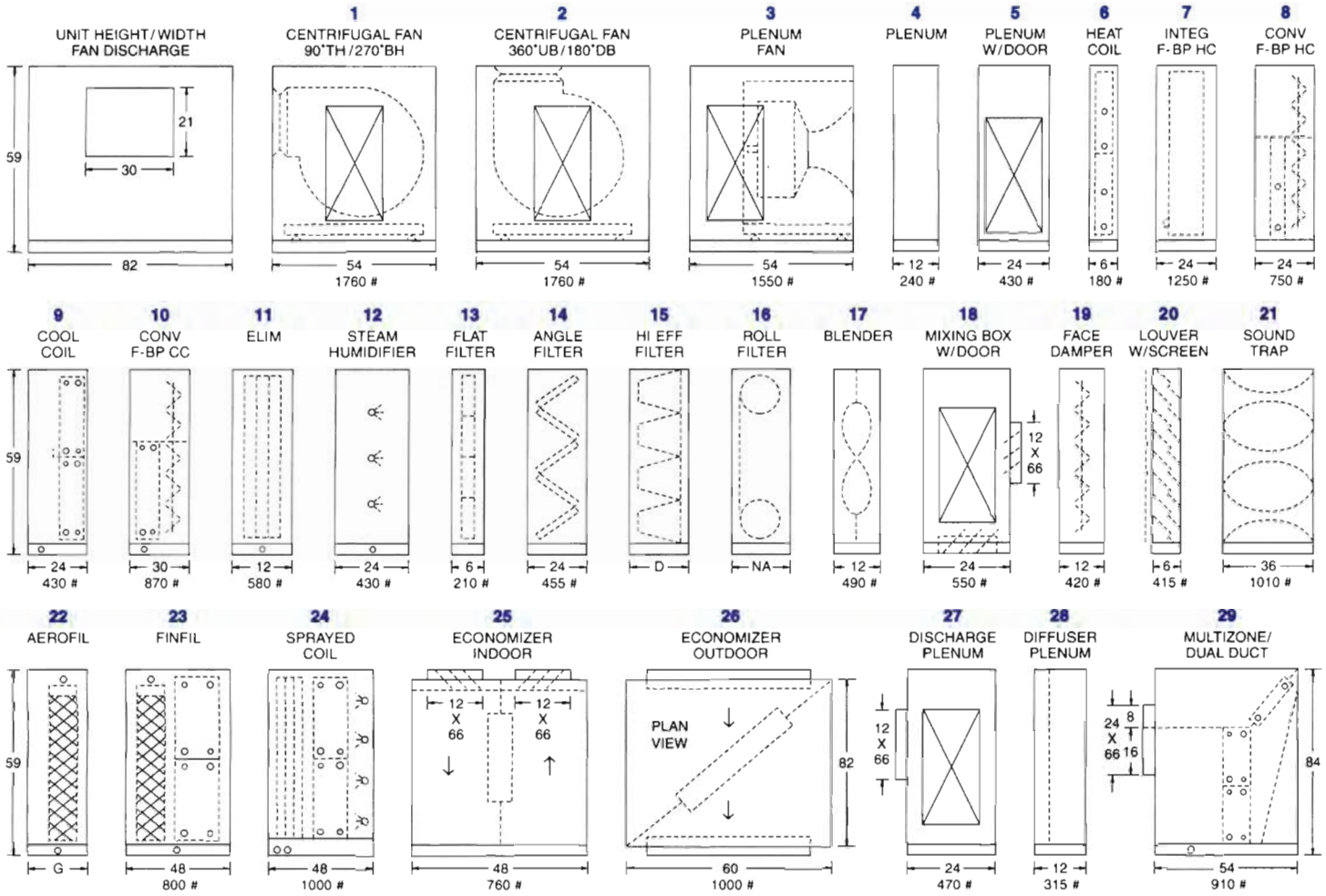
Coil Data

SIZE	TYPE	FACE AREA SQ FT	QTY	TUBE FACE	TUBE LENGTH	WEIGHT (POUNDS) 1 ROW	2 ROW	4 ROW	6 ROW	8 ROW
LARGE	COOL OR HEAT	20.64	1	33	5'-6"	295	380	480	600	720
MEDIUM	COOL OR HEAT	16.90	1	27	5'-6"	220	290	380	450	530
SMALL	COOL OR HEAT	13.16	1	21	5'-6"	200	265	320	400	460
-	BLOW THRU REHEAT	9.42	1	15	5'-6"	140	190	-	-	-
-	INTEGRAL FACE & BYPASS	13.83	1	20	3'-0"	-	-	-	-	-

Model K Modules

Dimensions in Inches and Weights in Pounds

SIZE K 105



DRAWING DIMENSION REFERENCE

A) Larger Plenums, Module 4, available in 6" increments.

B) All doors are 18" x 40" size.

C) Blower module has 2 doors, one each side.

D) Filter Depth and Weight, Module 15.

Type	Dim D	Weight
12" rigid	18"	420#
22" bag	24"	520#
28" bag	30"	620#
32" bag	36"	690#

E) Blender, Module 17, quantity 2, size 30".
Allow equal dimension downstream.
Allow half dimension upstream.

F) Sound Traps, Module 21, are also available in 60" optional size, increase weight by 65%.

G) Aerofil, Module 22, dimension and weight.

Fill depth	Dim G	Weight
6"	24"	450#
12"	30"	540#

H) For unit inlet weather hood add 24" to overall length.

Notes:

1) Dimensions and weights are for reference only, not for construction. Air flow is right to left.
2) Weights are for double wall construction, deduct 10% for single wall.
3) Overall dimensions do not allow for coil connections, door handles, or lifting lugs. **Add 6" for clearance.**
4) Outlet dimensions are for low pressure fan, horizontal discharge.
5) All filters are face loaded as standard. Side service optional.
6) Coil weights are based on aluminum fins. For copper fins multiply by 1.3. Cooling coils 4, 6 and 8 rows are 80 series. For series 140, multiply by 1.25.
7) All weights are shipping weights. To obtain operating weights multiply by the following factors:
a) Water Coils x 1.25 b) Aerofil x 1.8 c) Finfil x 1.7 d) Spray Coil x 1.6
8) Plenum fans should be preceeded by Plenum with door.
9) For Conventional Face and Bypass, Module 8 and 10, use small face area coil. For Sprayed Coil, Module 24, use medium face area coil, 600 ft/min design face velocity, Series 80, maximum 6 rows.
10) Additional Centrifugal DWDI fan module length required for larger motor frames for fan discharges:

Discharge	90° TH 270° BH	360° UB 180° DB	ODP & TEFC (MAX. FRAME)
Low Pressure	18"	24"	284T
Medium Pressure	18"	24"	286T
High Pressure	18"	24"	326T

Model K Performance Data

Centrifugal DWDI Fan Performance, Coil Velocity, Filter and Coil Data

SIZE K 125

Low Pressure

FAN SIZE 445 AF
WHEEL DIAMETER 22.25"
OUTLET AREA 5.12 SQ FT
MAX MOTOR FRAME
ODP - 254T
TEFC - 254T
(SEE NOTE 10)

OUTLET CFM	OUTLET VEL	LRG COIL VEL	0.5" SP RPM	0.5" SP BHP	0.5" SP PWL	1.0" SP RPM	1.0" SP BHP	1.0" SP PWL	1.5" SP RPM	1.5" SP BHP	1.5" SP PWL	2.0" SP RPM	2.0" SP BHP	2.0" SP PWL	2.5" SP RPM	2.5" SP BHP	2.5" SP PWL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL
10500	2051	427	1047	2.59	86	1139	3.46	87	1228	4.35	88	1308	5.24	89	1382	6.13	90	1451	7.05	91
11000	2148	447	1089	2.89	87	1177	3.80	88	1263	4.73	89	1342	5.66	90	1415	6.59	90	1483	7.54	91
11500	2246	467	1131	3.22	88	1214	4.16	89	1298	5.13	90	1375	6.10	90	1447	7.08	91	1514	8.06	92
12000	2344	488	1173	3.57	88	1253	4.55	90	1333	5.56	91	1409	6.57	91	1480	7.59	92	1546	8.61	92
12500	2441	508	1216	3.96	89	1292	4.97	91	1369	6.01	91	1444	7.07	92	1514	8.13	92	1579	9.18	92
13000	2539	528	1259	4.37	89	1331	5.41	91	1406	6.50	92	1479	7.59	92	1547	8.69	93	1612	9.79	93
13500	2637	549	1302	4.81	90	1371	5.88	92	1443	7.01	93	1514	8.15	93	1581	9.29	94	1645	10.4	94
14000	2734	569	1345	5.28	90	1411	6.39	93	1481	7.55	93	1550	8.73	94	1616	9.91	94	1679	11.1	95
14500	2832	589	1389	5.79	91	1452	6.93	93	1519	8.12	94	1586	9.34	95	1651	10.6	95	1713	11.8	96
15000	2930	610	1433	6.33	91	1493	7.50	94	1558	8.73	95	1623	9.99	95	1686	11.3	95	1747	12.5	96

Medium Pressure

FAN SIZE 400 AF
WHEEL DIAMETER 20.0"
OUTLET AREA 4.14 SQ FT
MAX MOTOR FRAME
ODP - 284T
TEFC - 284T
(SEE NOTE 10)

OUTLET CFM	OUTLET VEL	LRG COIL VEL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL	3.5" SP RPM	3.5" SP BHP	3.5" SP PWL	4.0" SP RPM	4.0" SP BHP	4.0" SP PWL	4.5" SP RPM	4.5" SP BHP	4.5" SP PWL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	5.5" SP RPM	5.5" SP BHP	5.5" SP PWL
10500	2536	427	1786	7.87	92	1849	8.76	93	1910	9.66	94	1969	10.6	94	2027	11.5	95	2084	12.5	96
11000	2657	447	1835	8.50	93	1897	9.43	94	1956	10.4	94	2014	11.3	95	2070	12.3	95	2125	13.3	96
11500	2778	467	1885	9.18	94	1945	10.1	94	2003	11.1	95	2059	12.1	95	2114	13.1	96	2168	14.1	97
12000	2899	488	1935	9.89	95	1994	10.9	95	2051	11.9	95	2106	12.9	96	2159	14.0	96	2212	15.0	97
12500	3019	508	1986	10.6	95	2044	11.7	96	2099	12.7	96	2153	13.8	96	2206	14.9	97	2257	15.9	98
13000	3140	528	2038	11.5	96	2094	12.5	96	2149	13.6	97	2201	14.7	97	2253	15.8	97	2303	16.9	98
13500	3261	549	2091	12.3	97	2145	13.4	97	2199	14.5	97	2250	15.7	98	2301	16.8	98	2350	18.0	99
14000	3382	569	2144	13.2	98	2197	14.3	98	2249	15.5	98	2300	16.7	98	2350	17.9	98	2398	19.0	99
14500	3502	589	2197	14.1	98	2250	15.3	98	2301	16.5	99	2350	17.7	99	2399	19.0	99	2446	20.2	100
15000	3623	610	2251	15.1	99	2302	16.4	99	2352	17.6	99	2401	18.9	99	2449	20.1	100	2495	21.4	100

High Pressure

FAN SIZE 365 AF
WHEEL DIAMETER 18.25"
OUTLET AREA 3.45 SQ FT
MAX MOTOR FRAME
ODP - 286T
TEFC - 284T
(SEE NOTE 10)

OUTLET CFM	OUTLET VEL	LRG COIL VEL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	6.0" SP RPM	6.0" SP BHP	6.0" SP PWL	7.0" SP RPM	7.0" SP BHP	7.0" SP PWL	8.0" SP RPM	8.0" SP BHP	8.0" SP PWL	9.0" SP RPM	9.0" SP BHP	9.0" SP PWL	10.0" SP RPM	10.0" SP BHP	10.0" SP PWL
10500	3043	427	2429	12.5	96	2539	14.4	97	2646	16.2	98	2749	18.1	99	2851	20.0	100	2951	22.0	101
11000	3188	447	2491	13.5	97	2599	15.4	98	2703	17.3	98	2803	19.3	99	2902	21.2	100	2998	23.3	101
11500	3333	467	2555	14.5	97	2660	16.5	98	2761	18.5	99	2859	20.5	100	2955	22.5	101	3049	24.6	102
12000	3478	488	2619	15.6	98	2722	17.6	99	2822	19.7	99	2917	21.8	100	3011	23.9	101	3102	26.0	102
12500	3623	508	2685	16.8	99	2786	18.9	99	2883	21.0	100	2977	23.1	101	3068	25.3	101	3157	27.5	102
13000	3768	528	2752	18.0	100	2850	20.1	100	2945	22.3	100	3037	24.6	101	3126	26.8	102	3213	29.1	102
13500	3913	549	2819	19.2	100	2916	21.5	101	3009	23.8	101	3099	26.1	101	3186	28.4	102	3271	30.7	103
14000	4058	569	2887	20.6	101	2982	22.9	101	3073	25.3	102	3162	27.6	102	3247	30.0	102	3331	32.4	103
14500	4203	589	2956	22.0	102	3049	24.4	102	3139	26.8	102	3225	29.3	103	3310	31.7	103	3392	34.2	103
15000	4348	610	3026	23.5	102	3117	26.0	102	3205	28.5	103	3290	31.0	103	3373	33.5	103	3453	36.1	104

Filter Data

FULL SIZE - 24" x 24"
HALF SIZE - 24" x 12"

TYPE	NO. OF FILTERS HEIGHT	NO. OF FILTERS WIDTH	FACE AREA SQ FT	CFM 500 FT/MIN
FLAT, CUBE, BAG, HEPA	2	3	24.0	12,000
ANGLE	2	3	24.0	12,000
VERTICAL ROLL	NA	NA	NA	NA

For plenum fan performance refer to your local Buffalo sales representative

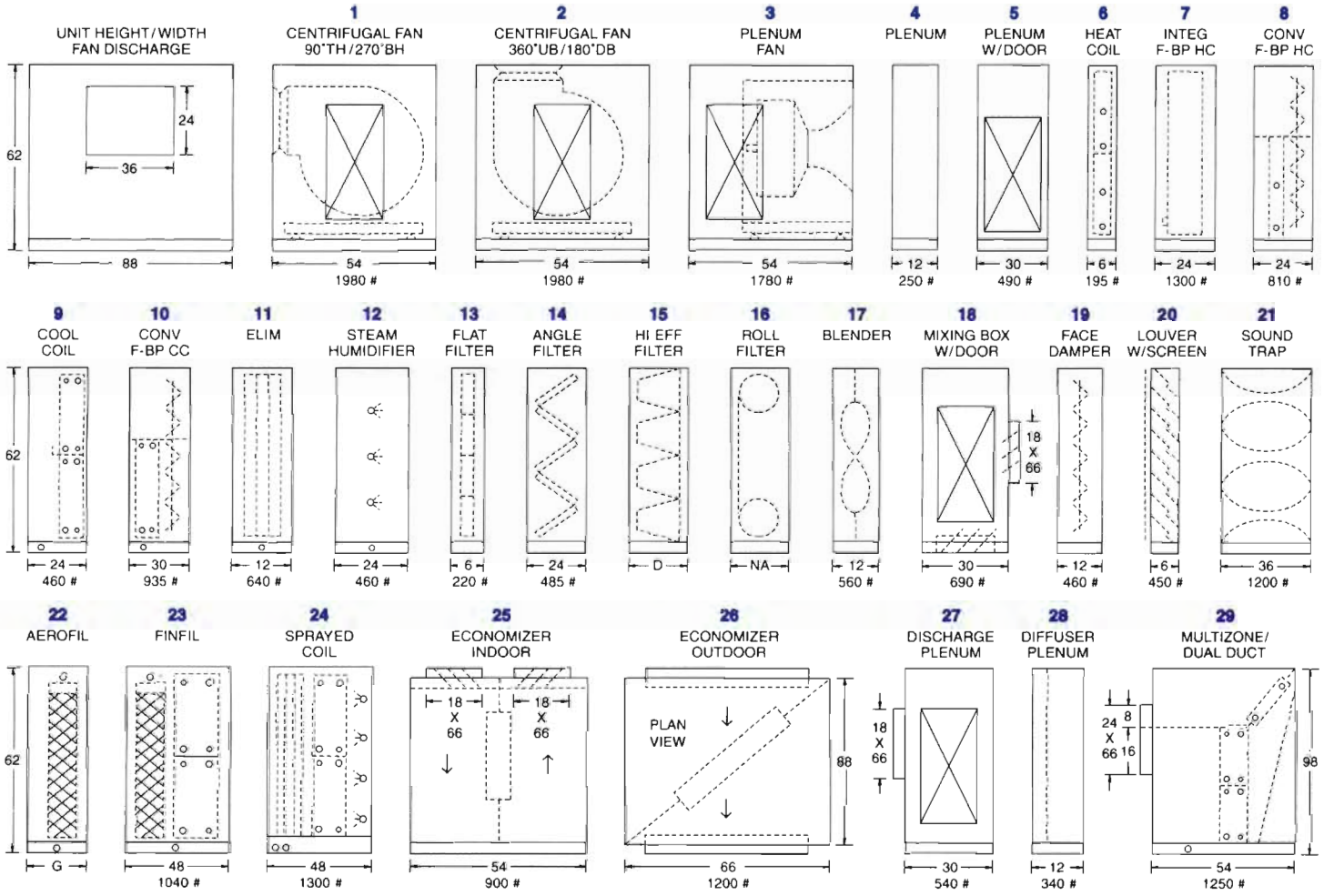
Coil Data

SIZE	TYPE	FACE AREA SQ FT	QTY	TUBE FACE	TUBE LENGTH	WEIGHT (POUNDS) 1 ROW	2 ROW	4 ROW	6 ROW	8 ROW
LARGE	COOL OR HEAT	24.60	1	36	6'-0"	320	406	550	680	805
MEDIUM	COOL OR HEAT	20.51	1	30	6'-0"	230	303	430	525	620
SMALL	COOL OR HEAT	16.43	1	24	6'-0"	220	274	395	460	550
-	BLOW THRU REHEAT	12.34	1	18	6'-0"	200	152	-	-	-
-	INTEGRAL FACE & BYPASS	17.97	1	24	3'-3"	-	-	-	-	-

Model K Modules

Dimensions in Inches and Weights in Pounds

SIZE K 125



DRAWING DIMENSION REFERENCE

A) Larger Plenums, Module 4, available in 6" increments.

B) All doors are 24" x 48" size.
Optional 18" x 48" door in 24" space is available for:
Plenum with Door Module 5
Mixing Box Module 18
Discharge Plenum Module 27

C) Blower Module has one door optional side.

D) Filter Depth and Weight, Module 15.

Type	Dim D	Weight
12" rigid	18"	440#
22" bag	24"	530#
28" bag	30"	630#
32" bag	36"	750#

E) Blender, Module 17, quantity 2, size 30".
Allow equal dimension downstream.
Allow half dimension upstream.

F) Sound Traps, Module 21, are also available in 60" optional size, increase weight by 65%.

G) Aerofil, Module 22, dimension and weight.

Fill depth	Dim G	Weight
6"	24"	480#
12"	30"	510#

H) For unit inlet weather hood add 24" to overall length.

Notes:

1) Dimensions and weights are for reference only, not for construction. Air flow is right to left.
2) Weights are for double wall construction, deduct 10% for single wall.
3) Overall dimensions do not allow lor coil connections, door handles, or lilting lugs. **Add 6" for clearance.**
4) Outlet dimensions are for low pressure fan, horizontal discharge.
5) All filters are face loaded as standard. Side service optional.
6) Coil weights are based on aluminum fins. For copper fins multiply by 1.3. Cooling coils 4, 6 and 8 rows are 80 series. For series 140, multiply by 1.25.
7) All weights are shipping weights. To obtain operating weights multiply by the following factors:
a) Water Coils x 1.25 b) Aerofil x 1.8 c) Finfil x 1.7 d) Spray Coil x 1.6
8) Plenum fans should be preceeded by Plenum with door.
9) For Conventional Face and Bypass, Module 8 and 10, use small face area coil. For Sprayed Coil, Module 24, use medium face area coil, 600 ft/min design face velocity, Series 80, maximum 6 rows.
10) Additional Centrifugal DWDI fan module length required for larger motor frames for fan discharges:

Discharge	90° TH 270° BH	360° UB 180° DB	ODP & TEFC (MAX. FRAME)
Low Pressure	18"	24"	286T
Medium Pressure	18"	24"	324T
High Pressure	18"	24"	326T

Model K Performance Data

Centrifugal DWDI Fan Performance, Coil Velocity, Filter and Coil Data

SIZE K 155

Low Pressure

FAN SIZE 490 AF
WHEEL DIAMETER 24.5"
OUTLET AREA 6.21 SQ FT

MAX MOTOR FRAME
ODP - 284T
TEFC - 284T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	0.5" SP RPM	0.5" SP BHP	0.5" SP PWL	1.0" SP RPM	1.0" SP BHP	1.0" SP PWL	1.5" SP RPM	1.5" SP BHP	1.5" SP PWL	2.0" SP RPM	2.0" SP BHP	2.0" SP PWL	2.5" SP RPM	2.5" SP BHP	2.5" SP PWL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL
11000	1771	356	826	2.29	88	920	3.22	87	1003	4.16	86	1079	5.12	86	1151	6.11	86	1220	7.14	87
12000	1932	389	883	2.78	90	973	3.80	90	1052	4.81	89	1125	5.84	88	1193	6.90	88	1259	7.99	88
13000	2093	421	941	3.34	91	1027	4.45	92	1103	5.54	91	1173	6.65	90	1238	7.77	90	1301	8.92	90
14000	2254	453	999	3.98	92	1081	5.18	93	1155	6.36	93	1222	7.54	92	1285	8.74	92	1345	9.95	91
15000	2415	486	1058	4.70	93	1137	5.99	95	1208	7.26	95	1273	8.52	94	1334	9.79	93	1392	11.1	93
16000	2576	518	1117	5.51	94	1193	6.90	96	1262	8.25	96	1324	9.60	96	1384	10.9	95	1440	12.3	95
17000	2738	551	1177	6.41	94	1250	7.90	97	1316	9.35	98	1377	10.8	97	1435	12.2	97	1489	13.6	96
18000	2899	583	1237	7.41	95	1308	9.00	98	1372	10.5	99	1431	12.1	99	1487	13.6	98	1540	15.1	98
19000	3060	615	1297	8.52	95	1366	10.2	99	1428	11.8	100	1485	13.5	100	1540	15.1	100	1591	16.6	99
20000	3221	648	1358	9.74	96	1424	11.5	100	1485	13.3	101	1541	15.0	101	1593	16.6	101	1643	18.3	101

Medium Pressure

FAN SIZE 445 AF
WHEEL DIAMETER 22.25"
OUTLET AREA 5.12 SQ FT

MAX MOTOR FRAME
ODP - 324T
TEFC - 324T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL	3.5" SP RPM	3.5" SP BHP	3.5" SP PWL	4.0" SP RPM	4.0" SP BHP	4.0" SP PWL	4.5" SP RPM	4.5" SP BHP	4.5" SP PWL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	5.5" SP RPM	5.5" SP BHP	5.5" SP PWL
11000	2148	356	1483	7.54	91	1547	8.51	92	1609	9.51	93	1669	10.5	94	1729	11.6	96	1788	12.7	97
12000	2344	389	1546	8.61	92	1609	9.64	93	1668	10.7	94	1726	11.8	95	1782	12.9	96	1837	14.0	97
13000	2539	421	1612	9.79	93	1673	10.9	94	1731	12.0	95	1786	13.1	95	1840	14.3	96	1893	15.5	97
14000	2734	453	1679	11.1	95	1738	12.3	95	1795	13.5	95	1849	14.7	96	1901	15.9	97	1952	17.1	97
15000	2930	486	1747	12.5	96	1805	13.8	96	1860	15.1	96	1914	16.3	97	1965	17.6	97	2014	18.9	98
16000	3125	518	1816	14.1	97	1873	15.4	97	1927	16.8	98	1979	18.1	98	2029	19.5	98	2078	20.9	99
17000	3320	551	1887	15.8	98	1942	17.2	98	1995	18.6	99	2046	20.1	99	2095	21.5	99	2143	23.0	99
18000	3516	583	1960	17.6	99	2014	19.2	99	2064	20.7	100	2114	22.2	100	2162	23.7	100	2209	25.2	100
19000	3711	615	2034	19.6	100	2085	21.2	100	2135	22.8	101	2183	24.4	101	2230	26.0	101	2276	27.6	101
20000	3906	648	2109	21.8	101	2158	23.5	101	2206	25.2	102	2253	26.9	102	2299	28.6	102	2344	30.2	102

High Pressure

FAN SIZE 400 AF
WHEEL DIAMETER 20.0"
OUTLET AREA 4.14 SQ FT

MAX MOTOR FRAME
ODP - 364T
TEFC - 326T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	6.0" SP RPM	6.0" SP BHP	6.0" SP PWL	7.0" SP RPM	7.0" SP BHP	7.0" SP PWL	8.0" SP RPM	8.0" SP BHP	8.0" SP PWL	9.0" SP RPM	9.0" SP BHP	9.0" SP PWL	10.0" SP RPM	10.0" SP BHP	10.0" SP PWL
11000	2657	356	2070	12.3	95	2179	14.3	97	2285	16.3	98	2389	18.4	100	2492	20.6	101	2595	22.9	103
12000	2899	389	2159	14.0	96	2263	16.1	97	2363	18.2	99	2461	20.4	100	2557	22.7	101	2652	25.0	102
13000	3140	421	2253	15.8	97	2352	18.0	98	2448	20.3	99	2541	22.6	100	2632	25.0	101	2720	27.4	102
14000	3382	453	2350	17.9	98	2445	20.2	99	2537	22.6	100	2626	25.1	101	2712	27.6	101	2797	30.1	102
15000	3623	486	2449	20.1	100	2541	22.6	100	2630	25.2	101	2715	27.8	101	2798	30.4	102	2879	33.0	103
16000	3865	518	2550	22.6	101	2639	25.2	101	2728	28.0	102	2808	30.6	102	2888	33.4	103	2966	36.2	103
17000	4106	551	2654	25.2	102	2740	28.1	102	2823	30.9	103	2903	33.8	103	2981	36.7	103	3057	39.6	104
18000	4348	583	2760	28.2	103	2843	31.1	103	2923	34.1	104	3001	37.2	104	3076	40.2	104	3150	43.3	105
19000	4589	615	2867	31.3	104	2947	34.5	104	3025	37.6	105	3100	40.8	105	3174	44.0	105			
20000	4831	648	2976	34.8	105	3053	38.1	105	3128	41.4	105	3202	44.7	106						

Filter Data

FULL SIZE - 24" x 24"
HALF SIZE - 24" x 12"

TYPE	NO. OF FILTERS HEIGHT	NO. OF FILTERS WIDTH	FACE AREA SQ FT	CFM 500 FT/MIN
FLAT, CUBE, BAG, HEPA	2	4	32.0	16,000
ANGLE	2.5	7	70.0	35,000
VERTICAL ROLL	NA	NA	NA	NA

For plenum fan performance refer to your local Buffalo sales representative

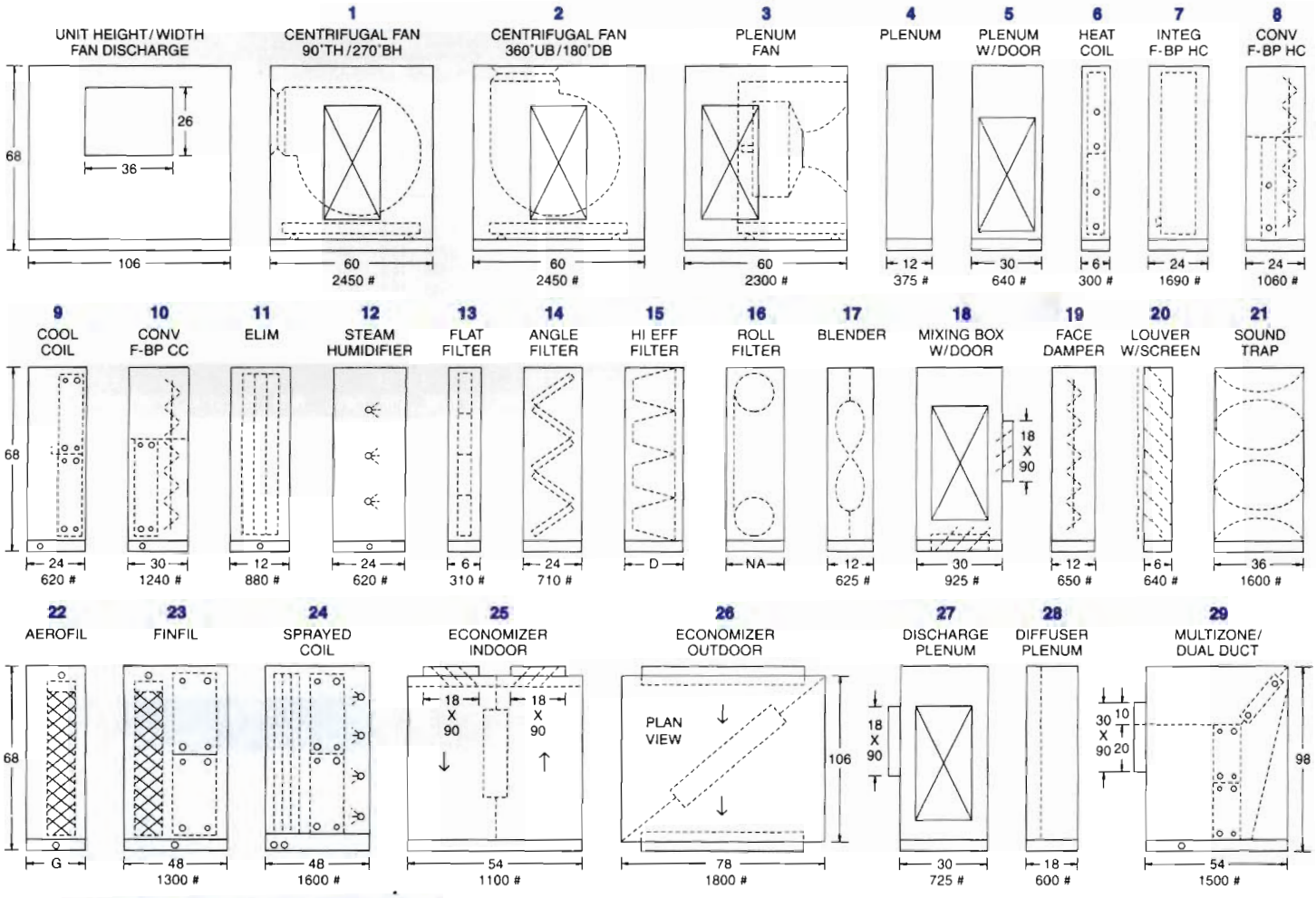
Coil Data

SIZE	TYPE	FACE AREA SQ FT	QTY	TUBE FACE	TUBE LENGTH	WEIGHT (POUNDS) 1 ROW	2 ROW	4 ROW	6 ROW	8 ROW
LARGE	COOL OR HEAT	30.88	1	36	7'-6"	440	540	670	800	900
MEDIUM	COOL OR HEAT	25.75	1	30	7'-6"	366	450	600	750	890
SMALL	COOL OR HEAT	20.62	1	24	7'-6"	260	333	470	575	680
-	BLOW THRU REHEAT	15.49	1	18	7'-6"	222	270	-	-	-
-	INTEGRAL FACE & BYPASS	22.54	1	28	3'-6"	-	-	-	-	-

Model K Modules

Dimensions in Inches and Weights in Pounds

SIZE K 155



DRAWING DIMENSION REFERENCE

A) Larger Plenums, Module 4, available in 6" increments.

B) All doors are 24" x 48" size.
Optional 18" x 48" door in 24" space is available for:
Plenum with Door Module 5
Mixing Box Module 18
Discharge Plenum Module 27

C) Blower Module has one door optional side.

D) Filter Depth and Weight, Module 15.

Type	Dim D	Weight
12" rigid	18"	625#
22" bag	24"	750#
28" bag	30"	880#
32" bag	36"	970#

E) Blender, Module 17, quantity 2, size 30".
Allow equal dimension downstream.
Allow half dimension upstream.

F) Sound Traps, Module 21, are also available in 60" optional size, increase weight by 65%.

G) Aerofil, Module 22, dimension and weight.

Fill depth	Dim G	Weight
6"	24"	650#
12"	30"	700#

H) For unit inlet weather hood add 24" to overall length.

Notes:

1) Dimensions and weights are for reference only, not for construction. Air flow is right to left.
2) Weights are for double wall construction, deduct 10% for single wall.
3) Overall dimensions do not allow for coil connections, door handles, or lifting lugs. **Add 6" for clearance.**
4) Outlet dimensions are for low pressure fan, horizontal discharge.
5) All filters are face loaded as standard.
6) Coil weights are based on aluminum fins. For copper fins multiply by 1.3. Cooling coils 4, 6 and 8 rows are 80 series. For series 140, multiply by 1.25.
7) All weights are shipping weights. To obtain operating weights multiply by the following factors:
a) Waler Coils x 1.25 b) Aerofil x 1.8 c) Finfil x 1.7 d) Spray Coil x 1.6
8) Plenum fans should be preceeded by Plenum with door.
9) For Conventional Face and Bypass, Module 8 and 10, use small face area coil. For Sprayed Coil, Module 24, use medium face area coil, 600 ft/min design face velocity, Series 80, maximum 6 rows.

Model K Performance Data

Centrifugal DWDI Fan Performance, Coil Velocity, Filter and Coil Data

SIZE K 180

Low Pressure

FAN SIZE 540 AF
WHEEL DIAMETER 27.5"
OUTLET AREA 7.54 SQ FT

MAX MOTOR FRAME
ODP - 324T
TEFC - 324T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	0.5" SP RPM	0.5" SP BHP	0.5" SP PWL	1.0" SP RPM	1.0" SP BHP	1.0" SP PWL	1.5" SP RPM	1.5" SP BHP	1.5" SP PWL	2.0" SP RPM	2.0" SP BHP	2.0" SP PWL	2.5" SP RPM	2.5" SP BHP	2.5" SP PWL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL
14000	1857	388	777	3.09	90	860	4.27	89	933	5.45	88	1001	6.67	88	1064	7.91	88	1125	9.20	89
15000	1989	415	819	3.61	91	900	4.88	91	971	6.14	90	1036	7.43	90	1097	8.74	89	1155	10.1	90
16000	2122	443	863	4.19	92	940	5.55	93	1009	6.90	92	1072	8.25	91	1131	9.64	91	1187	11.0	91
17000	2255	471	906	4.83	93	981	6.29	94	1048	7.72	94	1109	9.15	93	1166	10.6	92	1221	12.1	92
18000	2387	498	950	5.54	93	1023	7.09	95	1087	8.61	95	1146	10.1	94	1202	11.7	94	1255	13.2	94
19000	2520	526	994	6.33	94	1065	7.98	96	1127	9.58	96	1185	11.2	96	1239	12.8	95	1291	14.4	95
20000	2653	554	1039	7.19	95	1107	8.93	97	1168	10.6	98	1224	12.3	97	1277	14.0	97	1327	15.7	96
21000	2785	581	1083	8.12	95	1150	9.97	98	1209	11.8	99	1264	13.5	98	1315	15.3	98	1365	17.1	98
22000	2918	609	1128	9.15	96	1193	11.1	99	1251	13.0	100	1304	14.8	100	1354	16.7	99	1402	18.5	99
23000	3050	637	1173	10.3	96	1236	12.3	100	1293	14.3	101	1345	16.2	101	1394	18.2	100	1441	20.1	100

Medium Pressure

FAN SIZE 490 AF
WHEEL DIAMETER 24.5"
OUTLET AREA 6.21 SQ FT

MAX MOTOR FRAME
ODP - 326T
TEFC - 326T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL	3.5" SP RPM	3.5" SP BHP	3.5" SP PWL	4.0" SP RPM	4.0" SP BHP	4.0" SP PWL	4.5" SP RPM	4.5" SP BHP	4.5" SP PWL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	5.5" SP RPM	5.5" SP BHP	5.5" SP PWL
14000	2254	388	1345	9.95	91	1405	11.2	91	1460	12.5	92	1514	13.8	92	1567	15.1	93	1619	16.5	94
15000	2415	415	1392	11.1	93	1448	12.4	93	1502	13.7	93	1554	15.1	93	1606	16.5	94	1656	17.9	94
16000	2576	443	1440	12.3	95	1494	13.7	94	1546	15.1	94	1597	16.5	94	1646	18.0	94	1695	19.4	95
17000	2738	471	1489	13.6	96	1542	15.1	96	1592	16.6	96	1641	18.1	96	1689	19.6	96	1736	21.1	96
18000	2899	498	1540	15.1	98	1590	16.6	97	1640	18.2	97	1687	19.7	97	1734	21.3	97	1779	22.9	97
19000	3060	526	1591	16.6	99	1641	18.3	99	1688	19.9	98	1735	21.6	98	1780	23.1	98	1824	24.8	98
20000	3221	554	1643	18.3	101	1692	20.0	100	1738	21.7	100	1783	23.4	100	1827	25.1	99	1870	26.8	99
21000	3382	581	1696	20.1	102	1743	21.9	102	1789	23.7	101	1833	25.4	101	1876	27.2	101	1917	29.0	100
22000	3543	609	1750	22.1	103	1796	23.9	103	1840	25.8	102	1883	27.6	102	1925	29.5	102	1966	31.4	102
23000	3704	637	1805	24.1	104	1849	26.1	104	1893	28.0	104	1935	29.9	103	1976	31.9	103	2015	33.8	103

High Pressure

FAN SIZE 445 AF
WHEEL DIAMETER 22.25"
OUTLET AREA 5.12 SQ FT

MAX MOTOR FRAME
ODP - 364T
TEFC - 364T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	6.0" SP RPM	6.0" SP BHP	6.0" SP PWL	7.0" SP RPM	7.0" SP BHP	7.0" SP PWL	8.0" SP RPM	8.0" SP BHP	8.0" SP PWL	9.0" SP RPM	9.0" SP BHP	9.0" SP PWL	10.0" SP RPM	10.0" SP BHP	10.0" SP PWL
14000	2734	388	1901	15.9	97	2001	18.4	98	2097	21.0	99	2191	23.7	101	2284	26.5	102	2378	29.6	103
15000	2930	415	1965	17.6	97	2062	20.2	98	2155	22.9	100	2244	25.7	101	2332	28.6	102	2419	31.6	103
16000	3125	443	2029	19.5	98	2125	22.2	99	2215	25.0	100	2301	27.9	101	2385	30.9	102	2467	33.9	103
17000	3320	471	2095	21.5	99	2189	24.4	100	2277	27.3	101	2361	30.3	101	2443	33.4	102	2522	36.5	103
18000	3516	498	2162	23.7	100	2254	26.7	101	2341	29.8	101	2423	32.9	102	2503	36.1	103	2579	39.3	103
19000	3711	526	2230	26.0	101	2320	29.3	101	2406	32.5	102	2487	36.7	102	2565	39.0	103	2640	42.4	104
20000	3906	554	2299	28.6	102	2388	31.9	102	2472	35.3	103	2551	38.7	103	2628	42.1	104	2701	45.6	104
21000	4102	581	2369	31.2	103	2456	34.8	103	2538	38.3	103	2617	41.9	104	2692	45.5	104	2765	49.1	105
22000	4297	609	2441	34.1	104	2525	37.8	104	2606	41.5	104	2683	45.3	105	2758	49.0	105	2829	52.7	105
23000	4492	637	2513	37.2	105	2595	41.0	105	2674	44.9	105	2751	48.8	105	2824	52.7	106	2894	56.6	106

Filter Data

FULL SIZE - 24" x 24"
HALF SIZE - 24" x 12"

TYPE	NO. OF FILTERS HEIGHT	NO. OF FILTERS WIDTH	FACE AREA SQ FT	CFM 500 FT/MIN
FLAT, CUBE, BAG, HEPA	2.5	4	40.0	20,000
ANGLE	2.5	7	70.0	35,000
VERTICAL ROLL	5'-0"	8'-0"	30.3	15,166

For plenum fan performance refer to your local Buffalo sales representative

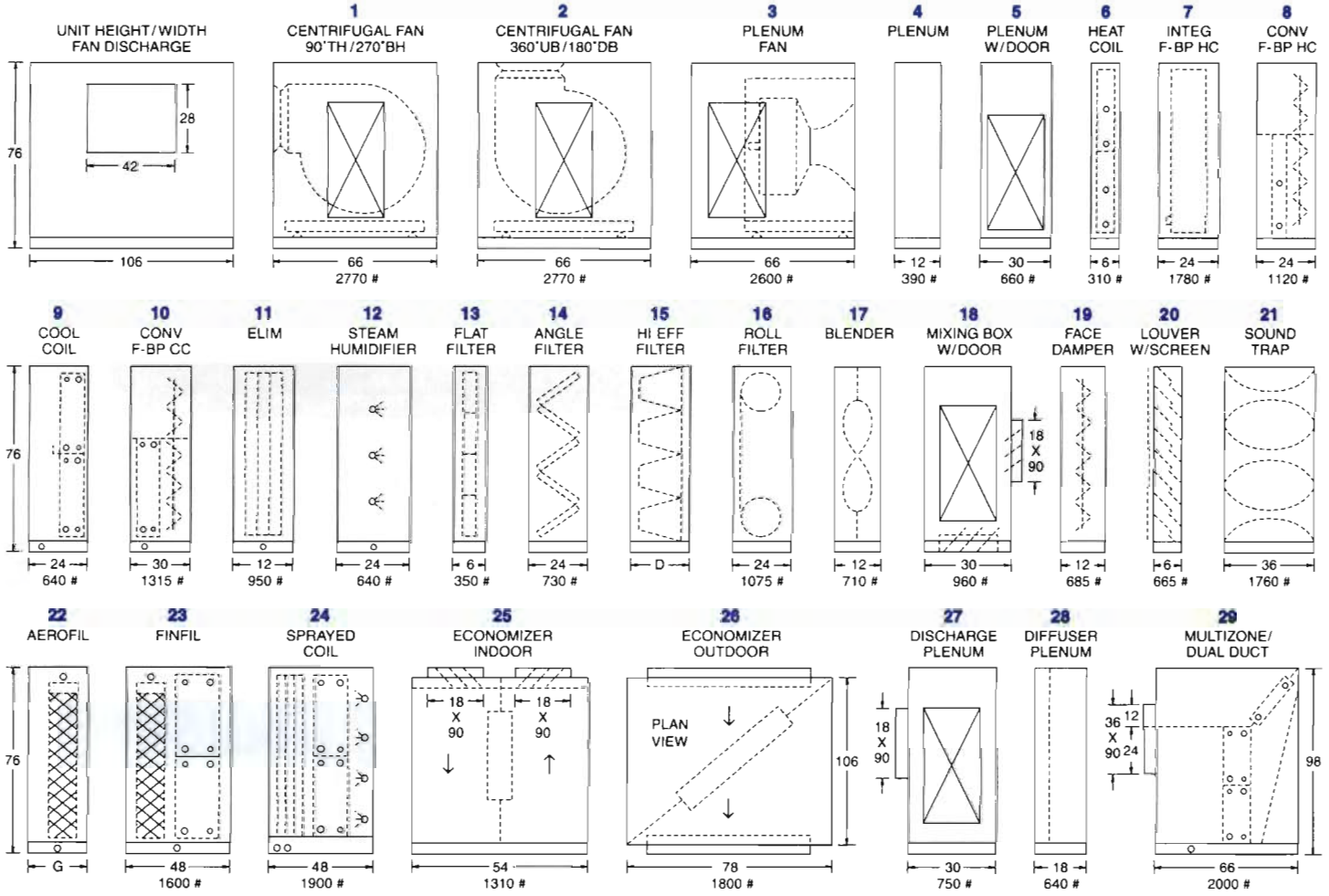
Coil Data

SIZE	TYPE	FACE AREA SQ FT	QTY	TUBE FACE	TUBE LENGTH	WEIGHT (POUNDS) 1 ROW	2 ROW	4 ROW	6 ROW	8 ROW
LARGE	COOL OR HEAT	36.12	2	42	7'-6"	480	605	790	960	1133
MEDIUM	COOL OR HEAT	30.88	1	36	7'-6"	443	540	670	803	950
SMALL	COOL OR HEAT	25.75	1	30	7'-6"	352	450	605	750	886
-	BLOW THRU REHEAT	18.06	1	21	7'-6"	240	310	-	-	-
-	INTEGRAL FACE & BYPASS	25.76	1	28	4'-0"	-	-	-	-	-

Model K Modules

Dimensions in Inches and Weights in Pounds

SIZE K 180



DRAWING DIMENSION REFERENCE

A) Larger Plenums, Module 4, available in 6" increments.

B) All doors are 24" x 48" size.
Optional 18" x 48" door in 24" space is available for:
Plenum with Door Module 5
Mixing Box Module 18
Discharge Plenum Module 27

C) Blower Module has one door optional side.

D) Filter Depth and Weight, Module 15.

Type	Dim D	Weight
12" rigid	18"	700#
22" bag	24"	820#
28" bag	30"	940#
32" bag	36"	1020#

E) Blender, Module 17, quantity 2, size 36".
Allow equal dimension downstream.
Allow half dimension upstream.

F) Sound Traps, Module 21, are also available in 60" optional size, increase weight by 65%.

G) Aerofil, Module 22, dimension and weight.

Fill depth	Dim G	Weight
6"	24"	680#
12"	30"	725#

H) For unit inlet weather hood add 24" to overall length.

Notes:

1) Dimensions and weights are for reference only, not for construction. Air flow is right to left.
2) Weights are for double wall construction, deduct 10% for single wall.
3) Overall dimensions do not allow for coil connections, door handles, or lifting lugs. **Add 6" for clearance.**
4) Outlet dimensions are for low pressure fan, horizontal discharge.
5) All filters are face loaded as standard.
6) Coil weights are based on aluminum fins. For copper fins multiply by 1.3. Cooling coils 4, 6 and 8 rows are 80 series. For series 140, multiply by 1.25.
7) All weights are shipping weights. To obtain operating weights multiply by the following factors:
a) Water Coils x 1.25 b) Aerofil x 1.8 c) Finfil x 1.7 d) Spray Coil x 1.6
8) Plenum fans should be preceeded by Plenum with door.
9) For Conventional Face and Bypass, Module 8 and 10, use small face area coil. For Sprayed Coil, Module 24, use medium face area coil, 600 ft/min design face velocity, Series 80, maximum 6 rows.

Model K Performance Data

Centrifugal DWDI Fan Performance, Coil Velocity, Filter and Coil Data

SIZE **K 200**

Low Pressure

FAN SIZE 600 AF
WHEEL DIAMETER 30.0"
OUTLET AREA 9.31 SQ FT

MAX MOTOR FRAME
ODP - 286T
TEFC - 286T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	0.5" SP RPM	0.5" SP BHP	0.5" SP PWL	1.0" SP RPM	1.0" SP BHP	1.0" SP PWL	1.5" SP RPM	1.5" SP BHP	1.5" SP PWL	2.0" SP RPM	2.0" SP BHP	2.0" SP PWL	2.5" SP RPM	2.5" SP BHP	2.5" SP PWL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL
16000	1728	388	636	2.83	89	711	4.07	88	782	5.38	87	849	6.74	87	914	8.17	88	975	9.65	89
17000	1836	412	666	3.23	90	737	4.54	90	805	5.90	89	870	7.33	88	932	8.82	89	992	10.4	90
18000	1944	436	697	3.68	91	765	5.04	91	830	6.47	90	892	7.96	90	952	9.51	90	1009	11.1	90
19000	2052	461	728	4.16	92	793	5.59	93	855	7.09	92	915	8.64	91	972	10.2	91	1028	11.9	91
20000	2160	485	759	4.70	93	821	5.19	94	881	7.75	93	939	9.36	93	994	11.0	92	1048	12.7	92
21000	2268	509	791	5.28	94	850	6.84	95	908	8.46	95	963	10.1	94	1017	11.9	93	1069	13.6	93
22000	2376	533	823	5.91	94	880	7.54	96	935	9.23	96	989	11.0	95	1041	12.8	95	1091	14.6	94
23000	2484	558	855	6.60	95	910	8.30	97	963	10.0	97	1015	11.8	96	1066	13.7	96	1114	15.6	95
24000	2592	582	888	7.34	95	940	9.11	98	992	10.9	98	1042	12.8	97	1090	14.7	97	1138	16.7	96
25000	2700	606	921	8.15	96	971	9.98	99	1021	11.9	99	1069	13.8	98	1116	15.8	98	1162	17.8	98

Medium Pressure

FAN SIZE 540 AF
WHEEL DIAMETER 27.5"
OUTLET AREA 7.54 SQ FT

MAX MOTOR FRAME
ODP - 326T
TEFC - 326T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL	3.5" SP RPM	3.5" SP BHP	3.5" SP PWL	4.0" SP RPM	4.0" SP BHP	4.0" SP PWL	4.5" SP RPM	4.5" SP BHP	4.5" SP PWL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	5.5" SP RPM	5.5" SP BHP	5.5" SP PWL
16000	2122	388	1187	11.0	91	1242	12.5	91	1294	14.0	92	1346	15.5	93	1396	17.1	93	1445	18.7	96
17000	2255	412	1221	12.1	92	1273	13.6	92	1324	15.1	93	1374	16.7	93	1422	18.3	94	1469	20.0	96
18000	2387	436	1255	13.2	94	1306	14.8	93	1356	16.4	93	1404	18.0	94	1450	19.7	94	1496	21.4	96
19000	2520	461	1291	14.4	95	1341	16.1	95	1388	17.7	95	1435	19.4	95	1480	21.1	95	1525	22.9	96
20000	2653	485	1327	15.7	96	1376	17.4	96	1422	19.1	96	1468	20.9	96	1512	22.7	96	1555	24.5	96
21000	2785	509	1365	17.1	98	1412	18.9	97	1457	20.7	97	1501	22.5	97	1544	24.3	97	1586	26.2	97
22000	2918	533	1402	18.5	99	1448	20.4	98	1493	22.3	98	1536	24.2	98	1578	26.1	98	1619	28.0	98
23000	3050	558	1441	20.1	100	1486	22.0	100	1529	24.0	98	1571	26.0	99	1612	28.0	99	1652	30.0	99
24000	3183	582	1480	21.8	101	1524	23.8	101	1566	25.8	100	1607	27.9	100	1648	29.9	100	1687	32.0	100
25000	3316	606	1519	23.5	102	1562	25.6	102	1604	27.7	101	1644	29.9	101	1684	32.0	101	1722	34.1	102

High Pressure

FAN SIZE 490 AF
WHEEL DIAMETER 24.5"
OUTLET AREA 6.21 SQ FT

MAX MOTOR FRAME
ODP - 364T
TEFC - 364T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	6.0" SP RPM	6.0" SP BHP	6.0" SP PWL	7.0" SP RPM	7.0" SP BHP	7.0" SP PWL	8.0" SP RPM	8.0" SP BHP	8.0" SP PWL	9.0" SP RPM	9.0" SP BHP	9.0" SP PWL	10.0" SP RPM	10.0" SP BHP	10.0" SP PWL
16000	2576	388	1646	18.0	94	1742	20.9	95	1834	24.0	96	1924	27.2	98	2011	30.5	99	2096	33.9	101
17000	2738	412	1689	19.6	96	1782	22.6	96	1871	25.8	97	1957	29.1	98	2041	32.5	99	2124	36.0	100
18000	2899	436	1734	21.3	97	1823	24.5	97	1910	27.8	97	1993	31.2	98	2075	34.7	99	2154	38.2	100
19000	3060	461	1780	23.1	98	1867	26.5	98	1951	29.9	98	2032	33.4	99	2111	37.0	99	2188	40.7	100
20000	3221	485	1827	25.1	99	1912	28.6	99	1994	32.1	99	2072	35.8	99	2149	39.5	100	2224	43.2	100
21000	3382	509	1876	27.2	101	1958	30.8	100	2038	34.5	100	2115	38.3	100	2189	42.1	100	2262	46.0	101
22000	3543	533	1925	29.5	102	2006	33.2	101	2083	37.1	101	2158	40.9	101	2231	44.9	101	2302	48.9	102
23000	3704	558	1976	31.9	103	2054	35.8	103	2130	39.7	102	2203	43.7	102	2275	47.8	102	2344	51.9	102
24000	3865	582	2027	34.4	104	2104	38.5	104	2178	42.6	103	2250	46.7	103	2319	50.9	103	2387	55.2	103
25000	4026	606	2079	37.1	105	2154	41.3	105	2227	45.6	104	2297	49.9	104	2365	54.2	104	2431	58.6	104

Filter Data

FULL SIZE - 24" x 24"
HALF SIZE - 24" x 12"

TYPE	NO. OF FILTERS HEIGHT	NO. OF FILTERS WIDTH	FACE AREA SQ FT	CFM 500 FT/MIN
FLAT, CUBE, BAG, HEPA	3	4	48.0	24,000
ANGLE	2.5	7	70.0	35,000
VERTICAL ROLL	6'-0"	8'-0"	37.3	18,666

For plenum fan performance refer to your local Buffalo sales representative

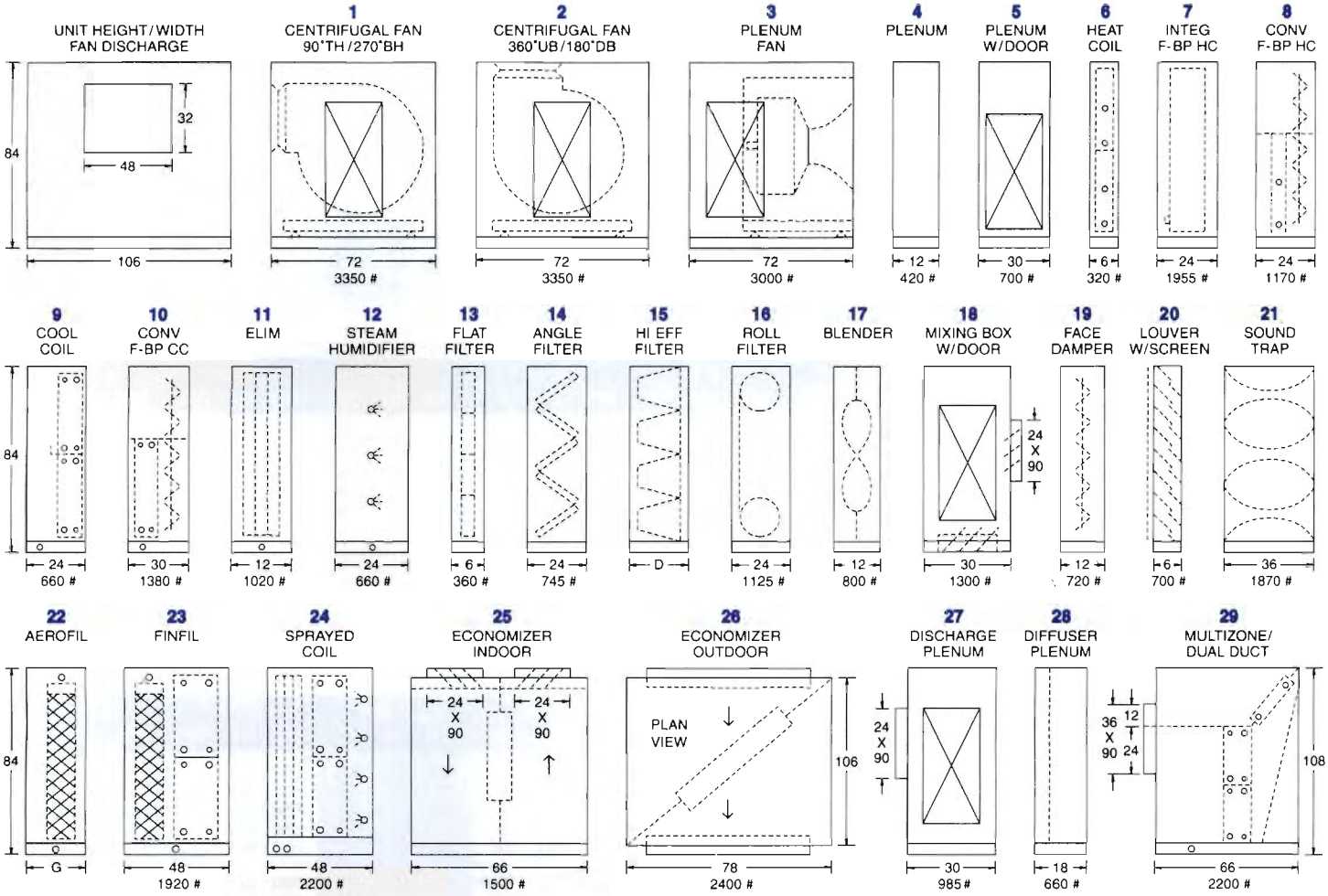
Coil Data

SIZE	TYPE	FACE AREA SQ FT	QTY	TUBE FACE	TUBE LENGTH	WEIGHT (POUNDS) 1 ROW	2 ROW	4 ROW	6 ROW	8 ROW
LARGE	COOL OR HEAT	41.25	2	48	7'-6"	529	673	864	1044	1242
MEDIUM	COOL OR HEAT	36.12	2	42	7'-6"	486	608	697	890	1058
SMALL	COOL OR HEAT	28.32	1	33	7'-6"	394	514	630	822	1037
-	BLOW THRU REHEAT	20.62	1	24	7'-6"	262	340	-	-	-
-	INTEGRAL FACE & BYPASS	32.20	1	28	5'-0"	-	-	-	-	-

Model K Modules

Dimensions in Inches and Weights in Pounds

SIZE K 200



DRAWING DIMENSION REFERENCE

A) Larger Plenums, Module 4, available in 6" increments.

B) All doors are 24" x 60" size.
Optional 18" x 60" door in 24" space is available for:
Plenum with Door Module 5

C) Blower Module has one door optional side.

D) Filter Depth and Weight, Module 15.

Type	Dim D	Weight
12" rigid	18"	725#
22" bag	24"	845#
28" bag	30"	960#
32" bag	36"	1060#

E) Blender, Module 17, quantity 2, size 36".
Allow equal dimension downstream.
Allow half dimension upstream.

F) Sound Traps, Module 21, are also available in 60" optional size, increase weight by 65%.

G) Aerofil, Module 22, dimension and weight.

Fill depth	Dim G	Weight
6"	24"	710#
12"	30"	800#

H) For unit inlet weather hood add 24" to overall length.

Notes:

1) Dimensions and weights are for reference only, not for construction. Air flow is right to left.
2) Weights are for double wall construction, deduct 10% for single wall.
3) Overall dimensions do not allow for coil connections, door handles, or lifting lugs. **Add 6" for clearance.**
4) Outlet dimensions are for low pressure fan, horizontal discharge.
5) All filters are face loaded as standard.
6) Coil weights are based on aluminum fins. For copper fins multiply by 1.3. Cooling coils 4, 6 and 8 rows are 80 series. For series 140, multiply by 1.25.
7) All weights are shipping weights. To obtain operating weights multiply by the following factors:
a) Water Coils x 1.25 b) Aerofil x 1.8 c) Finfil x 1.7 d) Spray Coil x 1.6
8) Plenum fans should be preceeded by Plenum with door.
9) For Conventional Face and Bypass, Module 8 and 10, use small face area coil. For Sprayed Coil, Module 24, use medium face area coil, 600 ft/min design face velocity, Series 80, maximum 6 rows.

Model K Performance Data

Centrifugal DWDI Fan Performance, Coil Velocity, Filter and Coil Data

SIZE K 240

Low Pressure

FAN SIZE 660 AF
WHEEL DIAMETER 33.0"
OUTLET AREA 11.27 SQ FT

MAX MOTOR FRAME
ODP - 324T
TEFC - 324T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	0.5" SP RPM	0.5" SP BHP	0.5" SP PWL	1.0" SP RPM	1.0" SP BHP	1.0" SP PWL	1.5" SP RPM	1.5" SP BHP	1.5" SP PWL	2.0" SP RPM	2.0" SP BHP	2.0" SP PWL	2.5" SP RPM	2.5" SP BHP	2.5" SP PWL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL
16000	1429	322	504	2.32	86	584	3.61	84	657	4.98	84	726	6.44	85	791	7.98	88	852	9.58	90
18000	1607	363	547	2.94	88	620	4.35	87	688	5.85	86	752	7.42	87	813	9.07	88	871	10.8	90
20000	1786	403	592	3.68	91	659	5.22	90	722	6.84	89	782	8.53	89	839	10.3	89	894	12.1	92
22000	1964	443	638	4.55	92	700	6.22	92	758	7.96	92	814	9.78	91	869	11.7	91	921	13.6	94
24000	2143	484	686	5.57	94	742	7.37	95	797	9.24	94	850	11.2	93	901	13.2	93	950	15.2	96
26000	2321	524	733	6.75	95	786	8.68	96	837	10.7	96	887	12.7	95	935	14.9	95	982	17.0	99
28000	2500	564	782	8.11	96	831	10.2	98	879	12.3	98	926	14.5	97	971	16.7	97	1016	19.0	101
30000	2679	604	831	9.65	96	877	11.9	99	922	14.1	99	966	16.4	99	1010	18.8	99	1052	21.2	102
32000	2857	645	880	11.4	97	924	13.7	100	966	16.1	101	1008	18.6	101	1049	21.1	100	1089	23.6	104
34000	3036	685	930	13.4	98	971	15.8	101	1011	18.3	102	1051	20.9	102	1090	23.5	102	1128	26.2	105

Medium Pressure

FAN SIZE 600 AF
WHEEL DIAMETER 30.0"
OUTLET AREA 9.31 SQ FT

MAX MOTOR FRAME
ODP - 365T
TEFC - 365T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL	3.5" SP RPM	3.5" SP BHP	3.5" SP PWL	4.0" SP RPM	4.0" SP BHP	4.0" SP PWL	4.5" SP RPM	4.5" SP BHP	4.5" SP PWL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	5.5" SP RPM	5.5" SP BHP	5.5" SP PWL
16000	1728	322	975	9.65	88	1034	11.2	90	1091	12.8	92	1146	14.4	94	1199	16.1	96	1251	17.8	96
18000	1944	363	1009	11.1	90	1065	12.7	91	1119	14.4	92	1171	16.2	93	1221	17.9	95	1270	19.8	96
20000	2160	403	1048	12.7	92	1101	14.5	92	1151	16.3	93	1201	18.1	94	1249	20.0	94	1296	22.0	95
22000	2376	443	1091	14.6	95	1140	16.5	94	1188	18.4	94	1235	20.3	95	1281	22.3	95	1326	24.4	96
24000	2592	484	1138	16.7	97	1184	18.6	96	1229	20.7	96	1274	22.8	96	1317	24.9	96	1360	27.0	97
26000	2808	524	1187	19.0	99	1231	21.1	98	1274	23.2	98	1316	25.4	98	1357	27.7	98	1398	29.9	98
28000	3024	564	1238	21.5	101	1280	23.8	100	1321	26.1	100	1361	28.4	100	1400	30.7	99	1439	33.1	99
30000	3240	604	1292	24.4	102	1331	26.8	102	1370	29.2	102	1408	31.6	101	1446	34.1	101	1482	36.6	101
32000	3456	645	1347	27.5	104	1385	30.0	104	1421	32.6	103	1458	35.1	103	1493	37.7	103	1529	40.4	103
34000	3672	685	1404	31.0	105	1440	33.6	105	1475	36.3	105	1509	39.0	105	1543	41.7	104	1577	44.4	104

High Pressure

FAN SIZE 540 AF
WHEEL DIAMETER 27.5"
OUTLET AREA 7.54 SQ FT

MAX MOTOR FRAME
ODP - 404T
TEFC - 365T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	6.0" SP RPM	6.0" SP BHP	6.0" SP PWL	7.0" SP RPM	7.0" SP BHP	7.0" SP PWL	8.0" SP RPM	8.0" SP BHP	8.0" SP PWL	9.0" SP RPM	9.0" SP BHP	9.0" SP PWL	10.0" SP RPM	10.0" SP BHP	10.0" SP PWL
16000	2122	322	1396	17.1	93	1493	20.3	96	1587	23.7	98	1678	27.3	100	1767	31.1	103	1854	35.0	105
18000	2387	363	1450	19.7	94	1541	23.1	96	1629	26.7	97	1714	30.5	99	1797	34.4	101	1878	38.4	103
20000	2653	403	1512	22.7	96	1597	26.4	96	1680	30.2	97	1759	34.1	99	1837	38.1	100	1913	42.3	101
22000	2918	443	1578	26.1	98	1659	30.0	98	1737	34.0	98	1813	38.2	99	1886	42.4	100	1958	46.8	101
24000	3183	484	1648	29.9	100	1725	34.1	100	1800	38.4	100	1872	42.7	100	1942	47.2	101	2010	51.7	101
26000	3448	524	1720	34.2	102	1795	38.6	102	1866	43.2	101	1935	47.8	101	2002	52.5	102	2067	57.3	102
28000	3714	564	1795	38.9	104	1867	43.6	103	1935	48.4	103	2002	53.3	103	2066	58.3	103	2129	63.3	103
30000	3979	604	1872	44.1	106	1941	49.1	105	2007	54.2	105	2071	59.4	105	2133	64.6	105	2194	69.9	104
32000	4244	645	1951	49.8	107	2017	55.2	107	2081	60.6	107	2143	66.0	106	2203	71.5	106	2262	77.1	106
34000	4509	685	2030	56.0	109	2095	61.7	109	2157	67.5	108	2217	73.2	108	2275	79.0	108	2332	84.9	107

Filter Data

FULL SIZE - 24" x 24"
HALF SIZE - 24" x 12"

TYPE	NO. OF FILTERS HEIGHT	NO. OF FILTERS WIDTH	FACE AREA SQ FT	CFM 500 FT/MIN
FLAT, CUBE, BAG, HEPA	3	4.5	54.0	27,000
ANGLE	3	8	96.0	48,000
VERTICAL ROLL	6'-0"	9'-0"	42.7	21,333

For plenum fan performance refer to your local Bulfalo sales representative

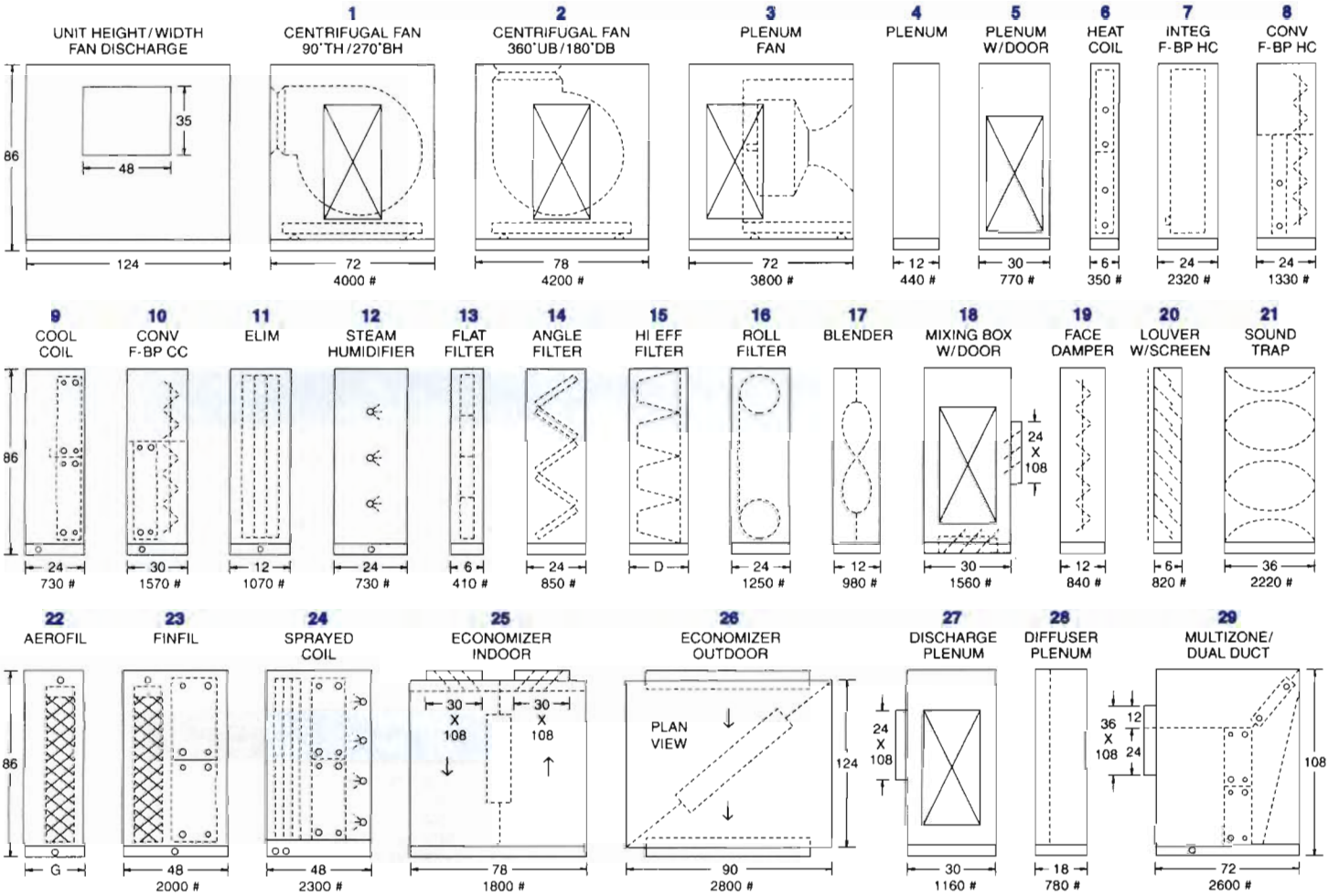
Coil Data

SIZE	TYPE	FACE AREA SQ FT	QTY	TUBE FACE	TUBE LENGTH	WEIGHT (POUNDS) 1 ROW	2 ROW	4 ROW	6 ROW	8 ROW
LARGE	COOL OR HEAT	49.63	2	48	9'-0"	617	786	1065	1278	1518
MEDIUM	COOL OR HEAT	43.46	2	42	9'-0"	570	727	900	1113	1324
SMALL	COOL OR HEAT	37.16	1	36	9'-0"	465	604	712	916	1086
-	BLOW THRU REHEAT	24.82	1	24	9'-0"	306	388	-	-	-
-	INTEGRAL FACE & BYPASS	41.40	1	36	5'-0"	-	-	-	-	-

Model K Modules

Dimensions in Inches and Weights in Pounds

SIZE K 240



DRAWING DIMENSION REFERENCE

A) Larger Plenums, Module 4, available in 6" increments.

B) All doors are 24" x 60" size.
Optional 18" x 60" door in 24" space is available for:
Plenum with Door Module 5

C) Blower Module has one door optional side.

D) Filter Depth and Weight, Module 15.

Type	Dim D	Weight
12" rigid	18"	830#
22" bag	24"	965#
28" bag	30"	1100#
32" bag	36"	1210#

E) Blender, Module 17, quantity 3, size 36".
Allow equal dimension downstream.
Allow half dimension upstream.

F) Sound Traps, Module 21, are also available in 60" optional size, increase weight by 65%.

G) Aerofil, Module 22, dimension and weight.

Fill depth	Dim G	Weight
6"	24"	825#
12"	30"	875#

H) For unit inlet weather hood add 24" to overall length.

Notes:

1) Dimensions and weights are for reference only, not for construction. Air flow is right to left.
2) Weights are for double wall construction, deduct 10% for single wall.
3) Overall dimensions do not allow for coil connections, door handles, or lifting lugs. **Add 6" for clearance.**
4) Outlet dimensions are for low pressure fan, horizontal discharge.
5) All filters are face loaded as standard.
6) Coil weights are based on aluminum fins. For copper fins multiply by 1.3. Cooling coils 4, 6 and 8 rows are 80 series. For series 140, multiply by 1.25.
7) All weights are shipping weights. To obtain operating weights multiply by the following factors:
a) Water Coils x 1.25 b) Aerofil x 1.8 c) Finfil x 1.7 d) Spray Coil x 1.6
8) Plenum fans should be preceeded by Plenum with door.
9) For Conventional Face and Bypass, Module 8 and 10, use small face area coil. For Sprayed Coil, Module 24, use medium face area coil, 600 ft/min design face velocity, Series 80, maximum 6 rows.

Model K Performance Data

Centrifugal DWDI Fan Performance, Coil Velocity, Filter and Coil Data

SIZE K 300

Low Pressure

FAN SIZE 730 AF
WHEEL DIAMETER 36.5"
OUTLET AREA 13.79 SQ FT

MAX MOTOR FRAME
ODP - 326T
TEFC - 324T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	0.5" SP RPM	0.5" SP BHP	0.5" SP PWL	1.0" SP RPM	1.0" SP BHP	1.0" SP PWL	1.5" SP RPM	1.5" SP BHP	1.5" SP PWL	2.0" SP RPM	2.0" SP BHP	2.0" SP PWL	2.5" SP RPM	2.5" SP BHP	2.5" SP PWL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL
22000	1595	373	495	3.59	89	560	5.31	88	622	7.14	87	680	9.07	88	735	11.1	89	788	13.2	90
24000	1740	407	528	4.31	91	589	6.17	90	647	8.12	89	702	10.2	89	754	12.3	90	804	14.5	91
26000	1885	441	562	5.15	93	619	7.13	92	673	9.21	91	725	11.4	91	775	13.6	91	823	15.9	92
28000	2030	475	596	6.10	94	650	8.21	94	701	10.4	93	750	12.7	93	798	15.1	93	844	17.5	93
30000	2175	509	631	7.17	95	681	9.42	96	730	11.7	95	777	14.2	95	822	16.6	94	856	19.2	94
32000	2321	543	667	8.38	96	714	10.8	97	760	13.2	97	805	15.8	96	848	18.4	96	890	21.0	95
34000	2466	577	702	9.74	96	747	12.2	99	791	14.8	99	833	17.5	98	875	20.2	97	915	23.0	97
36000	2611	611	738	11.2	97	781	13.9	100	823	16.6	100	863	19.4	99	903	22.2	99	941	25.2	98
38000	2756	645	775	12.9	98	815	15.7	101	855	18.5	101	894	21.5	101	932	24.4	100	969	27.5	100
40000	2901	678	811	14.7	98	850	17.7	102	888	20.6	102	925	23.7	102	961	26.8	102	997	30.0	101

Medium Pressure

FAN SIZE 660 AF
WHEEL DIAMETER 33.0"
OUTLET AREA 11.27 SQ FT

MAX MOTOR FRAME
ODP - 365T
TEFC - 365T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL	3.5" SP RPM	3.5" SP BHP	3.5" SP PWL	4.0" SP RPM	4.0" SP BHP	4.0" SP PWL	4.5" SP RPM	4.5" SP BHP	4.5" SP PWL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	5.5" SP RPM	5.5" SP BHP	5.5" SP PWL
22000	1964	373	921	13.6	91	971	15.6	92	1019	17.7	93	1067	19.8	94	1112	21.9	95	1157	24.1	97
24000	2143	407	950	15.2	93	998	17.4	93	1044	19.5	94	1089	21.7	94	1133	24.0	95	1176	26.3	96
26000	2321	441	982	17.0	94	1028	19.3	94	1071	21.6	95	1115	23.9	95	1157	26.3	96	1196	28.7	96
28000	2500	475	1016	19.0	96	1059	21.4	96	1101	23.8	96	1143	26.2	96	1183	28.7	96	1222	31.3	97
30000	2679	509	1052	21.2	98	1093	23.7	98	1133	26.2	98	1173	28.8	98	1211	31.4	98	1249	34.1	98
32000	2857	543	1089	23.6	100	1129	26.2	99	1167	28.9	99	1205	31.5	99	1242	34.3	99	1279	37.1	99
34000	3036	577	1128	26.2	101	1166	28.9	101	1203	31.7	101	1239	34.5	100	1275	37.4	100	1310	40.3	100
36000	3214	611	1168	29.1	103	1204	31.9	103	1240	34.8	102	1275	37.7	102	1309	40.7	102	1343	43.7	102
38000	3393	645	1210	32.1	104	1244	35.1	104	1278	38.1	104	1311	41.2	103	1344	44.3	103	1377	47.4	103
40000	3571	678	1252	35.5	106	1285	38.6	105	1318	41.7	105	1350	44.9	105	1381	48.1	104	1413	51.4	104

High Pressure

FAN SIZE 600 AF
WHEEL DIAMETER 30.0"
OUTLET AREA 9.31 SQ FT

MAX MOTOR FRAME
ODP - 404T
TEFC - 365T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	6.0" SP RPM	6.0" SP BHP	6.0" SP PWL	7.0" SP RPM	7.0" SP BHP	7.0" SP PWL	8.0" SP RPM	8.0" SP BHP	8.0" SP PWL	9.0" SP RPM	9.0" SP BHP	9.0" SP PWL	10.0" SP RPM	10.0" SP BHP	10.0" SP PWL
22000	2376	373	1281	22.3	95	1369	26.5	96	1454	30.7	98	1536	35.1	100	1614	39.6	102	1690	44.3	104
24000	2592	407	1317	24.9	96	1401	29.2	97	1483	33.7	98	1561	38.3	99	1637	43.1	101	1710	47.9	103
26000	2808	441	1357	27.7	98	1437	32.2	98	1515	36.9	99	1590	41.8	100	1663	46.8	101	1734	51.8	102
28000	3024	475	1400	30.7	99	1477	35.5	99	1551	40.5	100	1623	45.5	100	1693	50.7	101	1762	56.0	102
30000	3240	509	1446	34.1	101	1519	39.1	101	1590	44.3	101	1659	49.6	101	1727	55.0	102	1793	60.5	102
32000	3456	543	1493	37.7	103	1563	43.0	102	1632	48.4	102	1698	54.0	102	1763	59.6	103	1827	65.4	103
34000	3672	577	1543	41.7	104	1610	47.2	104	1676	52.9	104	1740	58.7	104	1803	64.5	104	1864	70.5	104
36000	3888	611	1595	46.0	106	1659	51.8	105	1722	57.7	105	1784	63.7	105	1844	69.8	105	1903	76.0	105
38000	4104	645	1648	50.7	107	1710	56.7	107	1770	62.9	107	1830	69.1	106	1888	75.5	106	1945	81.9	106
40000	4320	678	1703	55.7	109	1762	62.0	108	1820	68.4	108	1877	74.9	108	1933	81.5	107	1989	88.2	107

Filter Data

FULL SIZE - 24"x 24"
HALF SIZE - 24"x 12"

TYPE	NO. OF FILTERS HEIGHT	NO. OF FILTERS WIDTH	FACE AREA SQ FT	CFM 500 FT/MIN
FLAT, CUBE, BAG, HEPA	3	5	60.0	30,000
ANGLE	3	9	108.0	54,000
VERTICAL ROLL	6'-6"	10'-0"	52.5	26,250

For plenum fan performance refer to your local Buffalo sales representative

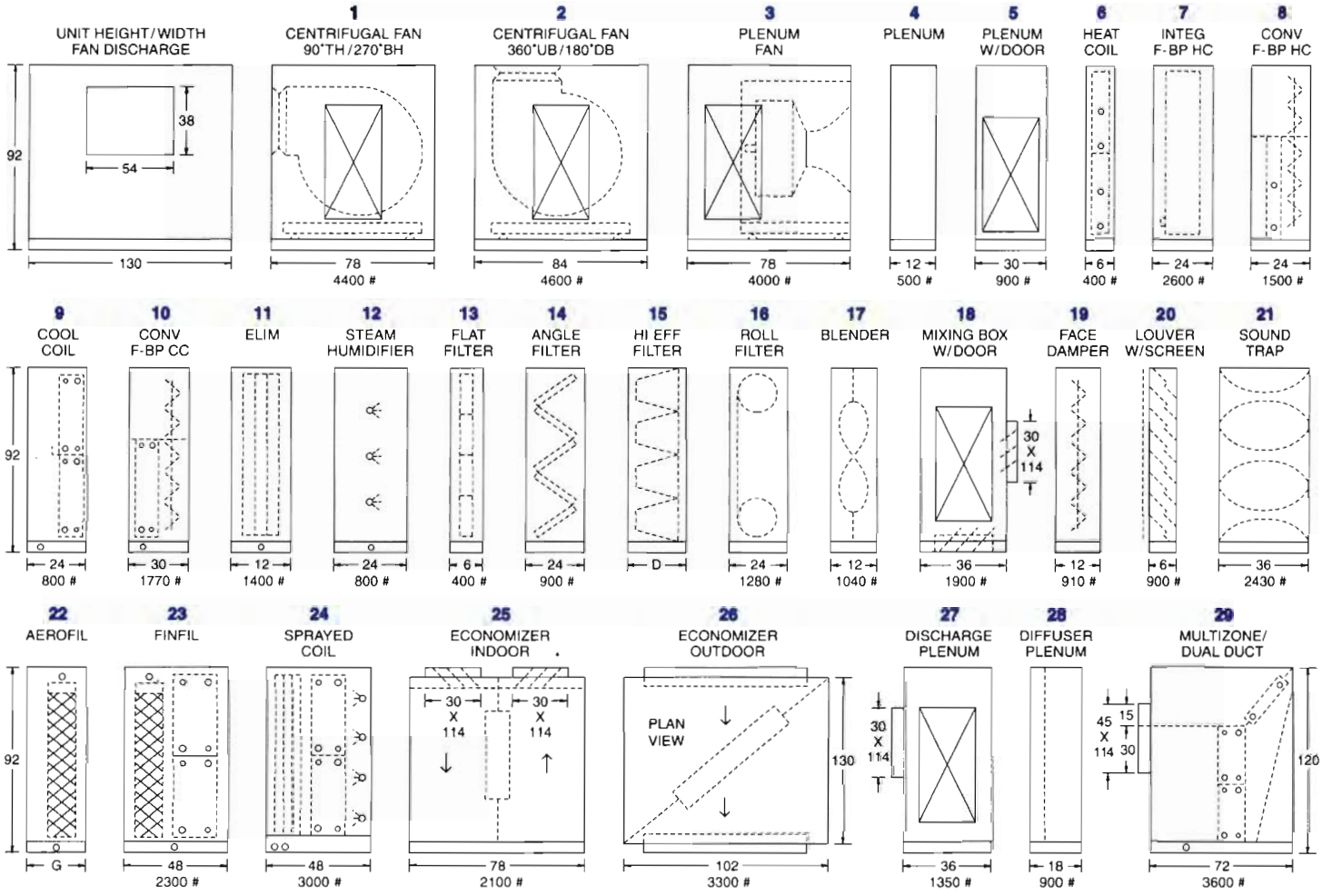
Coil Data

SIZE	TYPE	FACE AREA SQ FT	QTY	TUBE FACE	TUBE LENGTH	WEIGHT (POUNDS) 1 ROW	2 ROW	4 ROW	6 ROW	8 ROW
LARGE	COOL OR HEAT	58.96	2	54	9'-6"	900	1060	1220	1580	1850
MEDIUM	COOL OR HEAT	49.18	2	45	9'-6"	690	880	1190	1400	1660
SMALL	COOL OR HEAT	39.26	1	36	9'-6"	620	750	900	1140	1350
-	BLOW THRU REHEAT	29.48	1	27	9'-6"	390	495	-	-	-
-	INTEGRAL FACE & BYPASS	45.54	1	36	5'-6"	-	-	-	-	-

Model K Modules

Dimensions in Inches and Weights in Pounds

SIZE K 300



DRAWING DIMENSION REFERENCE

A) Larger Plenums, Module 4, available in 6" increments.

B) All doors are 24" x 60" size.
Optional 18" x 60" door in 24" space is available for:
Plenum with Door Module 5

C) Blower Module has one door optional side.

D) Filter Depth and Weight, Module 15.

Type	Dim D	Weight
12" rigid	18"	900#
22" bag	24"	1050#
28" bag	30"	1200#
32" bag	36"	1350#

E) Blender, Module 17, quantity 3, size 36".
Allow equal dimension downstream.
Allow half dimension upstream.

F) Sound Traps, Module 21, are also available in 60" optional size, increase weight by 65%.

G) Aerofil, Module 22, dimension and weight.

Fill depth	Dim G	Weight
6"	24"	1000#
12"	30"	1200#

H) For unit inlet weather hood add 24" to overall length.

Notes:

1) Dimensions and weights are for reference only, not for construction. Air flow is right to left.
2) Weights are for double wall construction, deduct 10% for single wall.
3) Overall dimensions do not allow for coil connections, door handles, or lifting lugs. **Add 6" for clearance.**
4) Outlet dimensions are for low pressure fan, horizontal discharge.
5) All filters are face loaded as standard.
6) Coil weights are based on aluminum fins. For copper fins multiply by 1.3. Cooling coils 4, 6 and 8 rows are 80 series. For series 140, multiply by 1.25.
7) All weights are shipping weights. To obtain operating weights multiply by the following factors:
a) Water Coils x 1.25 b) Aerofil x 1.8 c) Finfil x 1.7 d) Spray Coil x 1.6
8) Plenum fans should be preceeded by Plenum with door.
9) For Conventional Face and Bypass, Module 8 and 10, use small face area coil. For Sprayed Coil, Module 24, use medium face area coil, 600 ft/min design face velocity, Series 80, maximum 6 rows.

Model K Performance Data

Centrifugal DWDI Fan Performance, Coil Velocity, Filter and Coil Data

SIZE K 350

Low Pressure

FAN SIZE 805 AF
WHEEL DIAMETER 40.25"
OUTLET AREA 16.77 SQ FT

MAX MOTOR FRAME
ODP - 364T
TEFC - 364T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	0.5" SP RPM	0.5" SP BHP	0.5" SP PWL	1.0" SP RPM	1.0" SP BHP	1.0" SP PWL	1.5" SP RPM	1.5" SP BHP	1.5" SP PWL	2.0" SP RPM	2.0" SP BHP	2.0" SP PWL	2.5" SP RPM	2.5" SP BHP	2.5" SP PWL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL
26000	1550	377	434	4.14	89	494	6.22	88	547	8.33	88	597	10.5	88	646	12.7	89	693	15.1	89
28000	1670	406	458	4.82	91	515	7.05	90	566	9.31	89	614	11.6	89	660	14.0	90	704	16.4	90
30000	1789	435	482	5.58	92	536	7.95	92	586	10.4	91	632	12.8	91	676	15.3	91	718	17.8	91
32000	1908	464	507	6.44	94	559	8.95	94	606	11.5	93	651	14.1	92	693	16.7	92	733	19.4	92
34000	2027	493	533	7.40	95	581	10.0	95	627	12.8	94	670	15.5	94	711	18.3	93	750	21.1	93
36000	2147	522	558	8.46	96	605	11.2	97	649	14.1	96	690	17.0	95	730	19.9	95	767	22.8	95
38000	2266	551	584	9.64	96	628	12.5	98	671	15.5	97	711	18.6	97	749	21.6	96	786	24.7	96
40000	2385	580	610	10.9	97	652	13.9	99	693	17.1	99	732	20.3	98	769	23.5	97	805	26.7	97
42000	2504	609	637	12.4	98	677	15.5	100	716	18.7	100	754	22.1	99	790	25.5	99	824	28.9	99
44000	2624	638	663	13.9	98	702	17.1	101	740	20.5	101	776	24.0	100	811	27.6	100	845	31.1	100

Medium Pressure

FAN SIZE 730 AF
WHEEL DIAMETER 36.5"
OUTLET AREA 13.79 SQ FT

MAX MOTOR FRAME
ODP - 404T
TEFC - 365T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL	3.5" SP RPM	3.5" SP BHP	3.5" SP PWL	4.0" SP RPM	4.0" SP BHP	4.0" SP PWL	4.5" SP RPM	4.5" SP BHP	4.5" SP PWL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	5.5" SP RPM	5.5" SP BHP	5.5" SP PWL
26000	1885	377	823	15.9	92	869	18.3	92	914	20.8	94	957	23.3	95	999	25.9	95	1040	28.6	96
28000	2030	406	844	17.5	93	888	20.0	93	931	22.6	94	973	25.2	95	1014	27.9	95	1053	30.7	96
30000	2175	435	866	19.2	94	909	21.8	94	950	24.5	95	990	27.3	95	1030	30.1	95	1068	33.0	96
32000	2321	464	890	21.0	95	931	23.8	95	971	26.6	96	1010	29.5	96	1047	32.4	96	1085	35.4	97
34000	2466	493	915	23.0	97	954	25.9	97	993	28.8	97	1030	31.8	97	1067	34.8	97	1103	37.9	97
36000	2611	522	941	25.2	98	979	28.2	98	1016	31.2	98	1052	34.3	98	1088	37.5	98	1122	40.7	98
38000	2756	551	969	27.5	100	1005	30.6	100	1041	33.8	99	1076	37.0	99	1110	40.3	99	1143	43.6	99
40000	2901	580	997	30.0	101	1032	33.2	101	1066	36.5	101	1100	39.8	100	1133	43.2	100	1166	46.7	100
42000	3046	609	1026	32.6	103	1060	36.0	102	1093	39.4	102	1125	42.9	102	1157	46.4	102	1189	49.9	101
44000	3191	638	1056	35.5	104	1088	39.0	103	1120	42.5	103	1152	46.1	103	1183	49.7	103	1213	53.4	103

High Pressure

FAN SIZE 660 AF
WHEEL DIAMETER 33.0"
OUTLET AREA 11.27 SQ FT

MAX MOTOR FRAME
ODP - 405T
TEFC - 405T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	6.0" SP RPM	6.0" SP BHP	6.0" SP PWL	7.0" SP RPM	7.0" SP BHP	7.0" SP PWL	8.0" SP RPM	8.0" SP BHP	8.0" SP PWL	9.0" SP RPM	9.0" SP BHP	9.0" SP PWL	10.0" SP RPM	10.0" SP BHP	10.0" SP PWL
26000	2321	377	1157	26.3	96	1238	31.2	97	1316	36.3	99	1391	41.5	101	1463	46.9	103	1532	52.5	105
28000	2500	406	1183	28.7	96	1261	33.9	97	1336	39.2	99	1409	44.7	100	1479	50.3	102	1546	56.1	104
30000	2679	435	1211	31.4	98	1287	36.8	98	1359	42.3	99	1429	48.0	100	1497	53.8	102	1563	59.8	103
32000	2857	464	1242	34.3	99	1314	39.9	99	1384	45.6	100	1452	51.5	101	1518	57.6	102	1582	63.8	103
34000	3036	493	1275	37.4	100	1344	43.2	100	1412	49.2	101	1477	55.3	101	1541	61.6	102	1603	68.1	103
36000	3214	522	1309	40.7	102	1376	46.8	101	1441	53.0	102	1504	59.4	102	1566	65.9	102	1626	72.6	103
38000	3393	551	1344	44.3	103	1409	50.8	103	1472	57.1	103	1533	63.7	103	1593	70.4	103	1651	77.3	103
40000	3571	580	1381	48.1	104	1444	54.7	104	1504	61.4	104	1564	68.2	104	1622	75.2	104	1678	82.3	104
42000	3750	609	1419	52.3	106	1480	59.1	105	1538	66.0	105	1596	73.1	105	1652	80.3	105	1707	87.7	105
44000	3929	638	1459	56.7	107	1517	63.7	107	1573	70.9	106	1629	78.2	106	1684	85.7	106	1737	93.3	106

Filter Data

FULL SIZE - 24" x 24"
HALF SIZE - 24" x 12"

TYPE	NO. OF FILTERS HEIGHT	NO. OF FILTERS WIDTH	FACE AREA SQ FT	CFM 500 FT/MIN
FLAT, CUBE, BAG, HEPA	3.5	5	70.0	35,000
ANGLE	3.5	9	126.0	63,000
VERTICAL ROLL	7'-6"	10'-0"	61.5	30,750

For plenum fan performance refer to your local Buffalo sales representative

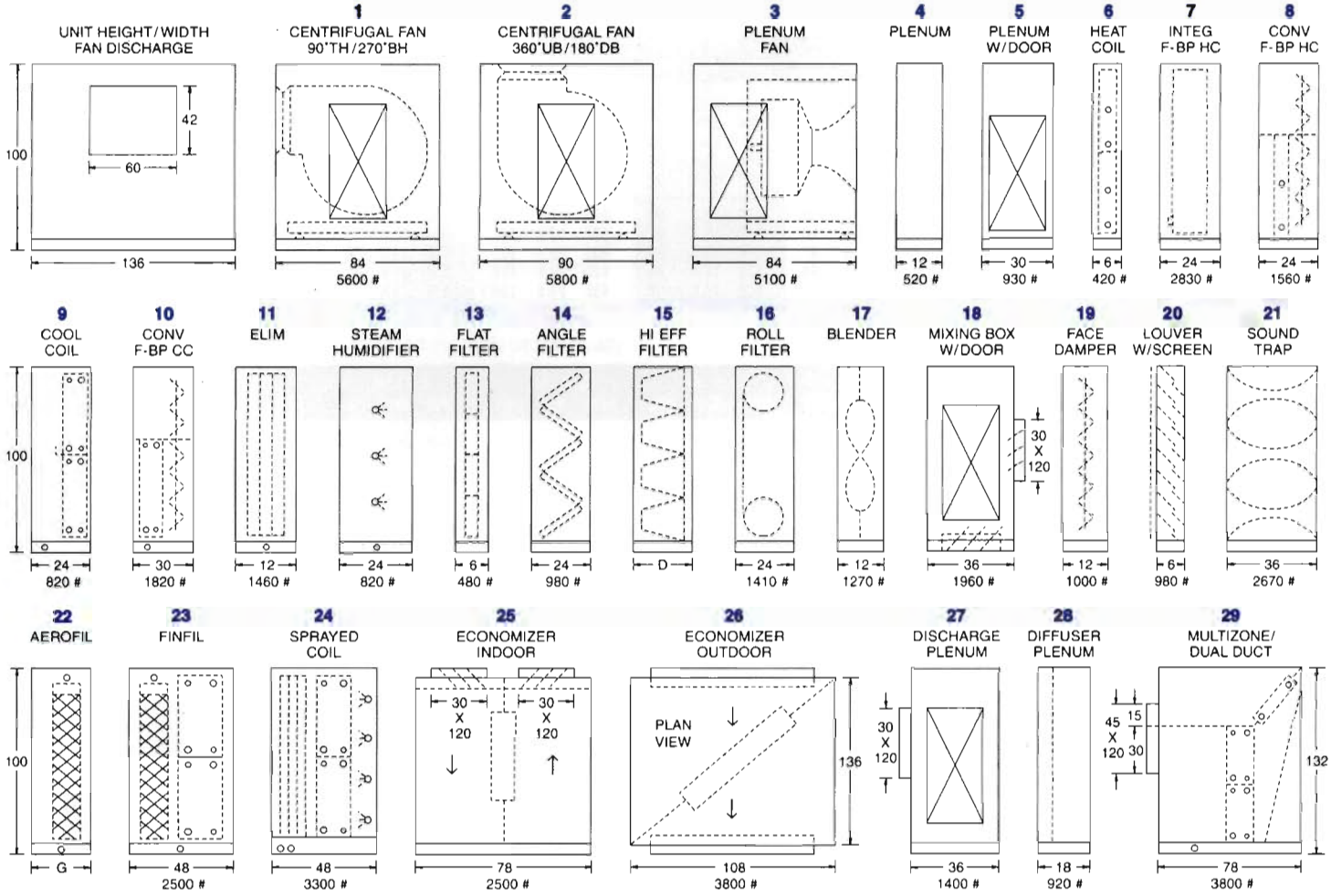
Coil Data

SIZE	TYPE	FACE AREA SQ FT	QTY	TUBE FACE	TUBE LENGTH	WEIGHT (POUNDS) 1 ROW	2 ROW	4 ROW	6 ROW	8 ROW
LARGE	COOL OR HEAT	68.96	2	60	10'-0"	900	1100	1435	1738	2067
MEDIUM	COOL OR HEAT	58.66	2	51	10'-0"	816	965	1100	1425	1700
SMALL	COOL OR HEAT	44.93	2	39	10'-0"	630	800	935	1273	1510
-	BLOW THRU REHEAT	34.48	1	30	10'-0"	480	600	-	-	-
-	INTEGRAL FACE & BYPASS	55.14	1	40	6'-0"	-	-	-	-	-

Model K Modules

Dimensions in Inches and Weights in Pounds

SIZE K 350



DRAWING DIMENSION REFERENCE

A) Larger Plenums, Module 4, available in 6" increments.

B) All doors are 24" x 60" size.
Optional 18" x 60" door in 24" space is available for:
Plenum with Door Module 5

C) Blower Module has one door optional side.

D) Filter Depth and Weight, Module 15.

Type	Dim D	Weight
12" rigid	18"	925#
22" bag	24"	1115#
28" bag	30"	1255#
32" bag	36"	1380#

E) Blender, Module 17, quantity 3, size 42".
Allow equal dimension downstream.
Allow half dimension upstream.

F) Sound Traps, Module 21, are also available in 60" optional size, increase weight by 65%.

G) Aerofil, Module 22, dimension and weight.

Fill depth	Dim G	Weight
6"	24"	1200#
12"	30"	1400#

H) For unit inlet weather hood add 24" to overall length.

Notes:

1) Dimensions and weights are for reference only, not for construction. Air flow is right to left.
2) Weights are for double wall construction, deduct 10% for single wall.
3) Overall dimensions do not allow for coil connections, door handles, or lifting lugs. **Add 6" for clearance.**
4) Outlet dimensions are for low pressure fan, horizontal discharge.
5) All filters are face loaded as standard.
6) Coil weights are based on aluminum fins. For copper fins multiply by 1.3. Cooling coils 4, 6 and 8 rows are 80 series. For series 140, multiply by 1.25.
7) All weights are shipping weights. To obtain operating weights multiply by the following factors:
a) Water Coils x 1.25 b) Aerofil x 1.8 c) Finfil x 1.7 d) Spray Coil x 1.6
8) Plenum fans should be preceeded by Plenum with door.
9) For Conventional Face and Bypass, Module 8 and 10, use small face area coil. For Sprayed Coil, Module 24, use medium face area coil, 600 ft/min design face velocity, Series 80, maximum 6 rows.

Model K Performance Data

Centrifugal DWDI Fan Performance, Coil Velocity, Filter and Coil Data

SIZE K 400

Low Pressure

FAN SIZE 890 AF
WHEEL DIAMETER 44.5"
OUTLET AREA 20.49 SQ FT

MAX MOTOR FRAME
ODP - 365T
TEFC - 364T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	0.5" SP RPM	0.5" SP BHP	0.5" SP PWL	1.0" SP RPM	1.0" SP BHP	1.0" SP PWL	1.5" SP RPM	1.5" SP BHP	1.5" SP PWL	2.0" SP RPM	2.0" SP BHP	2.0" SP PWL	2.5" SP RPM	2.5" SP BHP	2.5" SP PWL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL
32000	1562	404	394	5.13	91	448	7.69	89	497	10.3	93	542	12.9	92	585	15.7	92	628	18.6	92
34000	1659	429	412	5.81	92	464	8.52	91	511	11.3	94	554	14.0	94	596	16.9	93	636	19.9	93
36000	1757	454	430	6.56	93	480	9.41	92	525	12.3	96	567	15.2	95	607	18.2	95	646	21.3	95
38000	1855	479	448	7.38	94	496	10.4	94	540	13.4	97	581	16.5	97	619	19.6	96	657	22.8	96
40000	1952	505	467	8.29	95	513	11.4	95	555	14.6	99	595	17.8	98	632	21.1	97	668	24.4	97
42000	2050	530	486	9.27	96	530	12.5	96	571	15.9	100	609	19.3	99	646	22.7	99	681	26.1	99
44000	2147	555	505	10.3	96	547	13.7	97	587	17.2	101	624	20.8	100	660	24.3	100	694	27.9	100
46000	2245	580	524	11.5	97	564	15.0	98	603	18.6	102	640	22.3	102	674	26.1	101	708	29.8	101
48000	2343	606	543	12.8	98	582	16.4	99	620	20.2	103	655	24.0	103	689	27.9	102	722	31.8	102
50000	2440	631	563	14.1	98	600	17.8	100	636	21.8	104	671	25.8	104	704	29.8	103	736	33.8	103

Medium Pressure

FAN SIZE 805 AF
WHEEL DIAMETER 40.25"
OUTLET AREA 16.77 SQ FT

MAX MOTOR FRAME
ODP - 404T
TEFC - 365T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL	3.5" SP RPM	3.5" SP BHP	3.5" SP PWL	4.0" SP RPM	4.0" SP BHP	4.0" SP PWL	4.5" SP RPM	4.5" SP BHP	4.5" SP PWL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	5.5" SP RPM	5.5" SP BHP	5.5" SP PWL
32000	1908	404	733	19.4	93	772	22.1	93	811	25.0	95	850	28.0	96	889	31.1	97	928	34.5	98
34000	2027	429	750	21.1	94	787	23.9	94	824	26.8	95	861	29.9	96	897	33.0	97	934	36.3	98
36000	2147	454	767	22.8	95	804	25.8	95	839	28.8	95	874	32.0	96	908	35.2	97	943	38.5	98
38000	2266	479	786	24.7	96	821	27.8	96	855	31.0	96	888	34.2	97	921	37.5	97	954	40.9	98
40000	2385	505	805	26.7	97	839	30.0	97	872	33.3	97	904	36.6	97	936	40.0	98	967	43.4	99
42000	2504	530	824	28.9	98	858	32.3	98	890	35.7	98	921	39.1	98	952	42.6	98	982	46.2	99
44000	2624	555	845	31.1	99	877	34.7	99	908	38.2	99	939	41.8	99	969	45.4	99	998	49.1	99
46000	2743	580	865	33.5	101	897	37.2	100	927	40.9	100	957	44.6	100	986	48.4	100	1015	52.2	100
48000	2862	606	886	36.0	102	917	39.8	101	947	43.7	101	976	47.6	101	1004	51.5	101	1032	55.4	101
50000	2982	631	908	38.6	103	938	42.6	102	969	47.0	102	996	50.7	102	1023	54.8	102	1050	58.8	102

High Pressure

FAN SIZE 730 AF
WHEEL DIAMETER 36.5"
OUTLET AREA 13.79 SQ FT

MAX MOTOR FRAME
ODP - 405T
TEFC - 404T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	6.0" SP RPM	6.0" SP BHP	6.0" SP PWL	7.0" SP RPM	7.0" SP BHP	7.0" SP PWL	8.0" SP RPM	8.0" SP BHP	8.0" SP PWL	9.0" SP RPM	9.0" SP BHP	9.0" SP PWL	10.0" SP RPM	10.0" SP BHP	10.0" SP PWL
32000	2321	404	1047	32.4	97	1121	38.4	98	1191	44.7	100	1259	51.1	102	1324	57.7	104	1386	64.6	106
34000	2466	429	1067	34.8	97	1138	41.1	98	1206	47.6	100	1272	54.2	101	1335	61.1	103	1397	68.1	105
36000	2611	454	1088	37.5	98	1156	43.9	99	1223	50.6	100	1287	57.5	101	1348	64.6	103	1408	71.8	104
38000	2756	479	1110	40.3	99	1176	47.0	100	1241	53.9	100	1303	61.0	101	1363	68.3	102	1423	75.9	104
40000	2901	505	1133	43.2	100	1198	50.2	100	1260	57.3	101	1321	64.6	102	1379	72.2	102	1437	79.9	104
42000	3046	530	1157	46.4	101	1220	53.6	101	1281	60.9	102	1340	68.5	102	1397	76.2	103	1453	84.2	104
44000	3191	555	1183	49.7	103	1243	57.2	102	1302	64.8	102	1360	72.6	103	1415	80.5	103	1470	88.7	104
46000	3336	580	1209	53.3	104	1268	60.9	103	1325	68.8	103	1381	76.8	103	1435	85.0	104	1488	93.4	104
48000	3481	606	1236	57.1	105	1293	65.0	104	1349	73.0	104	1403	81.3	104	1456	89.7	104	1508	98.3	105
50000	3626	631	1264	61.0	106	1319	69.2	105	1373	77.5	105	1426	86.0	105	1478	94.7	105	1529	103.5	105

Filter Data

FULL SIZE - 24"x 24"
HALF SIZE - 24"x 12"

TYPE	NO. OF FILTERS HEIGHT	NO. OF FILTERS WIDTH	FACE AREA SQ FT	CFM 500 FT/MIN
FLAT, CUBE, BAG, HEPA	4	5	80.0	40,000
ANGLE	4	9	144.0	72,000
VERTICAL ROLL	8'-6"	10'-0"	70.5	35,250

For plenum fan performance refer to your local Buffalo sales representative

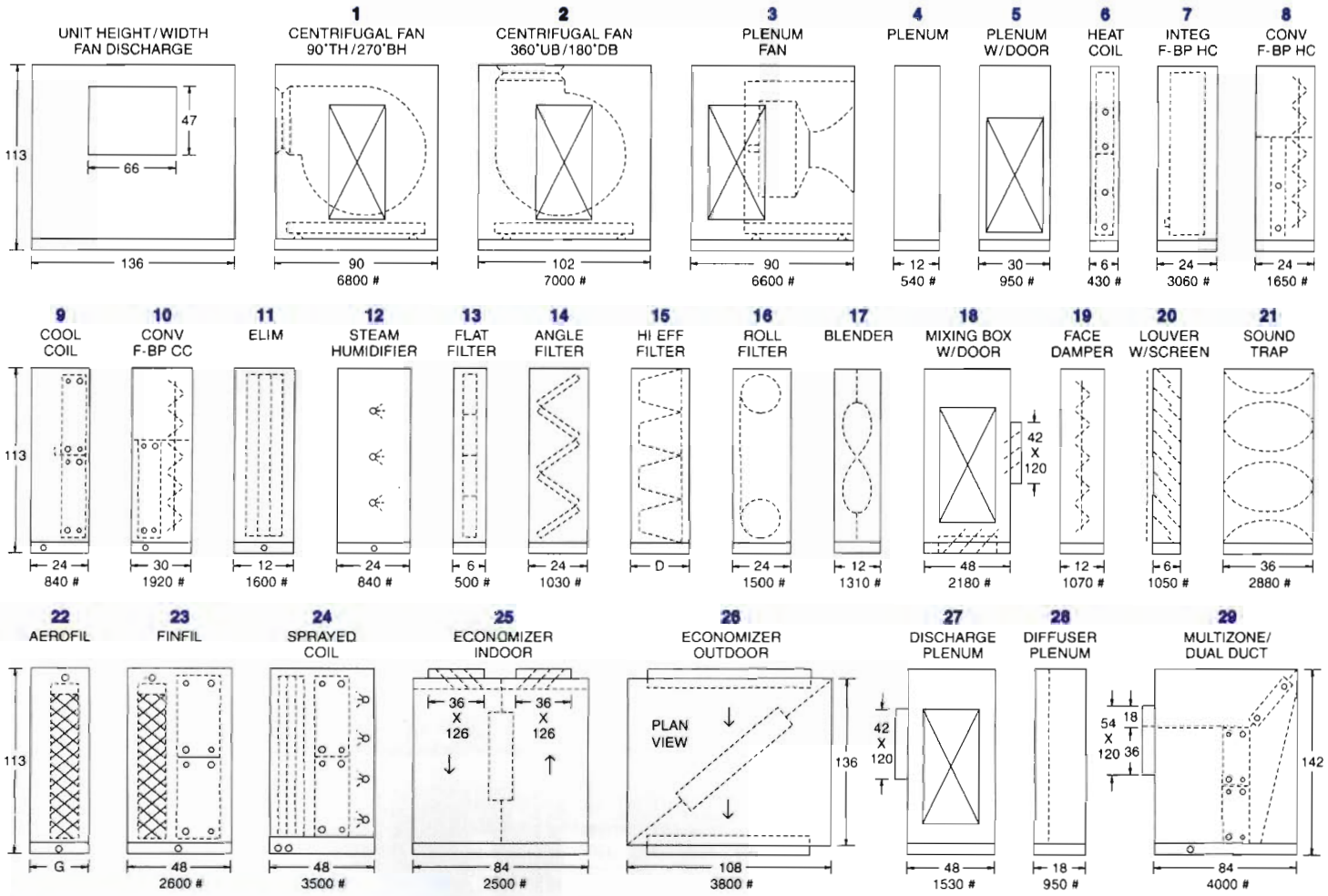
Coil Data

SIZE	TYPE	FACE AREA SQ FT	QTY	TUBE FACE	TUBE LENGTH	WEIGHT (POUNDS) 1 ROW	2 ROW	4 ROW	6 ROW	8 ROW
LARGE	COOL OR HEAT	79.27	2	69	10'-0"	1050	1297	1680	2031	2411
MEDIUM	COOL OR HEAT	65.53	2	57	10'-0"	951	1118	1281	1661	1974
SMALL	COOL OR HEAT	51.79	2	45	10'-0"	730	926	1088	1484	1761
-	BLOW THRU REHEAT	37.92	1	33	10'-0"	558	686	-	-	-
-	INTEGRAL FACE & BYPASS	64.33	1	40	7'-0"	-	-	-	-	-

Model K Modules

Dimensions in Inches and Weights in Pounds

SIZE K 400



DRAWING DIMENSION REFERENCE

A) Larger Plenums, Module 4, available in 6" increments.

B) All doors are 24" x 60" size.
Optional 18" x 60" door in 24" space is available for:
Plenum with Door Module 5

C) Blower Module has one door optional side.

D) Filter Depth and Weight, Module 15.

Type	Dim D	Weight
12" rigid	18"	1020#
22" bag	24"	1150#
28" bag	30"	1280#
32" bag	36"	1460#

E) Blender, Module 17, quantity 3, size 42".
Allow equal dimension downstream.
Allow half dimension upstream.

F) Sound Traps, Module 21, are also available in 60" optional size, increase weight by 65%.

G) Aerofil, Module 22, dimension and weight.

Fill depth	Dim G	Weight
6"	24"	1400#
12"	30"	1600#

H) For unit inlet weather hood add 24" to overall length.

Notes:

1) Dimensions and weights are for reference only, not for construction. Air flow is right to left.
2) Weights are for double wall construction, deduct 10% for single wall.
3) Overall dimensions do not allow for coil connections, door handles, or lifting lugs. **Add 6" for clearance.**
4) Outlet dimensions are for low pressure fan, horizontal discharge.
5) All filters are face loaded as standard.
6) Coil weights are based on aluminum fins. For copper fins multiply by 1.3. Cooling coils 4, 6 and 8 rows are 80 series. For series 140, multiply by 1.25.
7) All weights are shipping weights. To obtain operating weights multiply by the following factors:
a) Water Coils x 1.25 b) Aerofil x 1.8 c) Finfil x 1.7 d) Spray Coil x 1.6
8) Plenum fans should be preceeded by Plenum with door.
9) For Conventional Face and Bypass, Module 8 and 10, use small face area coil. For Sprayed Coil, Module 24, use medium face area coil, 600 ft/min design face velocity, Series 80, maximum 6 rows.

Model K Performance Data

Centrifugal DWDI Fan Performance, Coil Velocity, Filter and Coil Data

SIZE K 450

Low Pressure

FAN SIZE 890 AF
WHEEL DIAMETER 44.5"
OUTLET AREA 20.49 SQ FT

MAX MOTOR FRAME
ODP - 404T
TEFC - 405T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	0.5" SP RPM	0.5" SP BHP	0.5" SP PWL	1.0" SP RPM	1.0" SP BHP	1.0" SP PWL	1.5" SP RPM	1.5" SP BHP	1.5" SP PWL	2.0" SP RPM	2.0" SP BHP	2.0" SP PWL	2.5" SP RPM	2.5" SP BHP	2.5" SP PWL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL
36000	1757	401	430	6.56	93	480	9.41	92	525	12.3	91	567	15.2	91	607	18.2	92	646	21.3	92
38000	1855	424	448	7.38	94	496	10.4	94	540	13.4	93	581	16.5	92	619	19.6	92	657	22.8	93
40000	1952	446	467	8.29	95	513	11.4	95	555	14.6	94	595	17.8	93	632	21.1	93	668	24.4	94
42000	2050	468	486	9.27	96	530	12.5	96	571	15.9	95	609	19.3	95	646	22.7	94	681	26.1	95
44000	2147	490	505	10.3	96	547	13.7	97	587	17.2	97	624	20.8	96	660	24.3	96	694	27.9	96
46000	2245	513	524	11.5	97	564	15.0	98	603	18.6	98	640	22.3	97	674	26.1	97	708	29.8	97
48000	2343	535	543	12.8	98	582	16.4	99	620	20.2	99	655	24.0	98	689	27.9	98	722	31.8	98
50000	2440	557	563	14.1	98	600	17.8	100	636	21.8	100	671	25.8	99	704	29.8	99	736	33.8	99
52000	2538	580	582	15.6	99	618	19.4	101	654	23.5	101	687	27.6	100	720	31.8	100	751	36.0	100
54000	2635	602	602	17.2	99	637	21.1	102	671	25.3	102	704	29.6	101	735	33.9	101	766	38.3	101

Medium Pressure

FAN SIZE 805 AF
WHEEL DIAMETER 40.25"
OUTLET AREA 16.77 SQ FT

MAX MOTOR FRAME
ODP - 404T
TEFC - 405T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL	3.5" SP RPM	3.5" SP BHP	3.5" SP PWL	4.0" SP RPM	4.0" SP BHP	4.0" SP PWL	4.5" SP RPM	4.5" SP BHP	4.5" SP PWL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	5.5" SP RPM	5.5" SP BHP	5.5" SP PWL
36000	2147	401	767	22.8	95	804	25.8	95	839	28.8	95	874	32.0	96	908	35.2	97	943	38.5	98
38000	2266	424	786	24.7	96	821	27.8	96	855	31.0	96	888	34.2	97	921	37.5	97	954	40.9	98
40000	2385	446	805	26.7	97	839	30.0	97	872	33.3	97	904	36.6	97	936	40.0	98	967	43.4	99
42000	2504	468	824	28.9	98	858	32.3	98	890	35.7	98	921	39.1	98	952	42.6	98	982	46.2	99
44000	2624	490	845	31.1	99	877	34.7	99	908	38.2	99	939	41.8	99	969	45.4	99	998	49.1	100
46000	2743	513	865	33.5	101	897	37.2	100	927	40.9	100	957	44.6	100	986	48.4	100	1015	52.2	101
48000	2862	535	886	36.0	102	917	39.8	101	947	43.7	101	976	47.6	101	1004	51.5	101	1032	55.4	102
50000	2982	557	908	38.6	103	938	42.6	102	969	47.0	102	996	50.7	102	1023	54.8	102	1050	58.8	103
52000	3101	580	930	41.4	104	959	45.6	104	988	49.7	103	1015	53.9	103	1042	58.1	103	1069	62.4	104
54000	3220	602	952	44.3	105	981	48.7	105	1008	53.0	104	1036	57.3	104	1062	61.7	104	1088	66.1	105

High Pressure

FAN SIZE 730 AF
WHEEL DIAMETER 36.5"
OUTLET AREA 13.79 SQ FT

MAX MOTOR FRAME
ODP - 405T
TEFC - 444T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	6.0" SP RPM	6.0" SP BHP	6.0" SP PWL	7.0" SP RPM	7.0" SP BHP	7.0" SP PWL	8.0" SP RPM	8.0" SP BHP	8.0" SP PWL	9.0" SP RPM	9.0" SP BHP	9.0" SP PWL	10.0" SP RPM	10.0" SP BHP	10.0" SP PWL
36000	2611	401	1088	37.5	98	1156	43.9	99	1223	50.6	100	1287	57.5	101	1348	64.6	103	1408	71.8	104
38000	2756	424	1110	40.3	99	1176	47.0	100	1241	53.9	100	1303	61.3	101	1363	68.3	102	1424	75.6	104
40000	2901	446	1133	43.2	100	1198	50.2	100	1260	57.3	101	1321	64.6	102	1379	72.2	102	1437	79.9	104
42000	3046	468	1157	46.4	101	1220	53.6	101	1281	60.9	102	1340	68.5	102	1397	76.2	103	1453	84.2	104
44000	3191	490	1183	49.7	103	1243	57.2	102	1302	64.8	102	1360	72.6	103	1415	80.5	103	1470	88.7	104
46000	3336	513	1209	53.3	104	1268	60.9	103	1325	68.8	103	1381	76.9	103	1435	85.0	104	1488	93.4	104
48000	3481	535	1236	57.1	105	1293	65.0	104	1349	73.0	104	1403	81.3	104	1456	89.7	104	1508	98.3	105
50000	3626	557	1264	61.0	106	1319	69.2	105	1373	77.5	105	1426	86.0	105	1478	94.7	105	1529	103.5	105
52000	3771	580	1292	65.3	107	1346	73.7	107	1399	82.2	106	1450	91.0	106	1501	99.9	106	1550	108.9	106
54000	3916	602	1321	69.7	108	1374	78.4	108	1425	87.2	107	1475	96.2	107	1524	105.3	107	1572	114.6	107

Filter Data

FULL SIZE - 24" x 24"
HALF SIZE - 24" x 12"

TYPE	NO. OF FILTERS HEIGHT	NO. OF FILTERS WIDTH	FACE AREA SQ FT	CFM 500 FT/MIN
FLAT, CUBE, BAG, HEPA	4.5	5	90.0	45,000
ANGLE	4	9	144.0	72,000
VERTICAL ROLL	10'-0"	10'-0"	84.0	42,000

For plenum fan performance refer to your local Buffalo sales representative

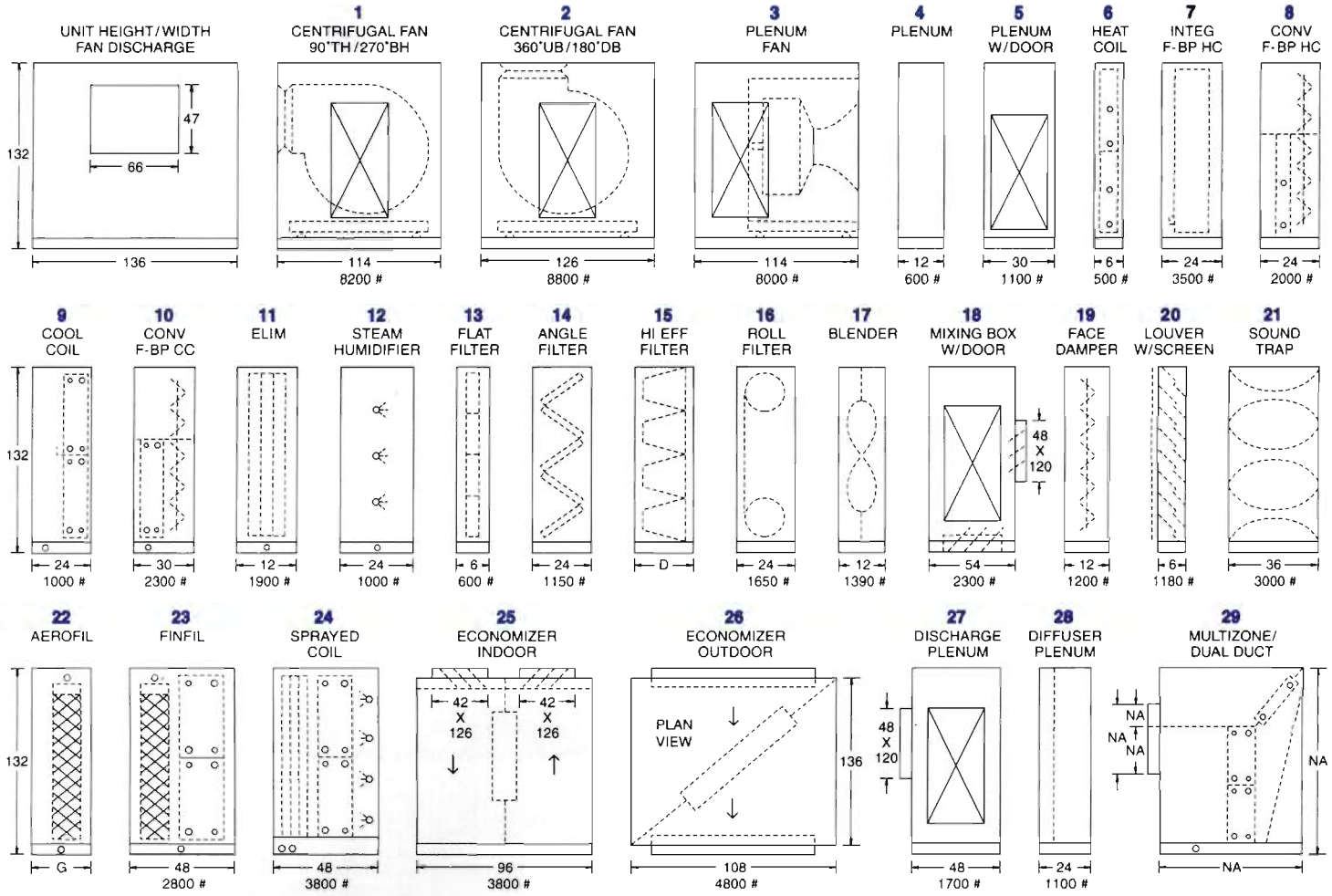
Coil Data

SIZE	TYPE	FACE AREA SQ FT	QTY	TUBE FACE	TUBE LENGTH	WEIGHT (POUNDS) 1 ROW	2 ROW	4 ROW	6 ROW	8 ROW
LARGE	COOL OR HEAT	89.71	3	78	10'-0"	1150	1400	1840	2235	2650
MEDIUM	COOL OR HEAT	75.84	2	66	10'-0"	1040	1220	1405	1820	2170
SMALL	COOL OR HEAT	62.15	2	54	10'-0"	1800	1010	1350	1620	1900
-	BLOW THRU REHEAT	NA	NA	NA	NA	-	-	-	-	-
-	INTEGRAL FACE & BYPASS	73.52	1	40	8'-0"	-	-	-	-	-

Model K Modules

Dimensions in Inches and Weights in Pounds

SIZE K 450



DRAWING DIMENSION REFERENCE

A) Larger Plenums, Module 4, available in 6" increments.

B) All doors are 24" x 60" size.
Optional 18" x 60" door in 24" space is available for:
Plenum with Door Module 5

C) Blower Module has one door optional side.

D) Filter Depth and Weight, Module 15.

Type	Dim D	Weight
12" rigid	18"	1200#
22" bag	24"	1350#
28" bag	30"	1500#
32" bag	36"	1650#

E) Blender, Module 17, quantity 3, size 42".
Allow equal dimension downstream.
Allow half dimension upstream.

F) Sound Traps, Module 21, are also available in 60" optional size, increase weight by 65%.

G) Aerofil, Module 22, dimension and weight.

Fill depth	Dim G	Weight
6"	24"	1600#
12"	30"	1800#

H) For unit inlet weather hood add 24" to overall length.

Notes:

1) Dimensions and weights are for reference only, not for construction. Air flow is right to left.
2) Weights are for double wall construction, deduct 10% for single wall.
3) Overall dimensions do not allow for coil connections, door handles, or lifting lugs. **Add 6" for clearance.**
4) Outlet dimensions are for low pressure fan, horizontal discharge.
5) All filters are face loaded as standard.
6) Coil weights are based on aluminum fins. For copper fins multiply by 1.3. Cooling coils 4, 6 and 8 rows are 80 series. For series 140, multiply by 1.25.
7) All weights are shipping weights. To obtain operating weights multiply by the following factors:
a) Water Coils x 1.25 b) Aerofil x 1.8 c) Finfil x 1.7 d) Spray Coil x 1.6
8) Plenum fans should be preceeded by Plenum with door.
9) For Conventional Face and Bypass, Module 8 and 10, use small face area coil. For Sprayed Coil, Module 24, use medium face area coil, 600 ft/min design face velocity, Series 80, maximum 6 rows.

Model K Performance Data

Centrifugal DWDI Fan Performance, Coil Velocity, Filter and Coil Data

SIZE K 500

Low Pressure

FAN SIZE 980 AF
WHEEL DIAMETER 49.0"
OUTLET AREA 24.85 SQ FT

MAX MOTOR FRAME
ODP - 365T
TEFC - 365T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	0.5" SP RPM	0.5" SP BHP	0.5" SP PWL	1.0" SP RPM	1.0" SP BHP	1.0" SP PWL	1.5" SP RPM	1.5" SP BHP	1.5" SP PWL	2.0" SP RPM	2.0" SP BHP	2.0" SP PWL	2.5" SP RPM	2.5" SP BHP	2.5" SP PWL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL
42000	1690	420	380	7.32	93	426	10.7	92	468	14.1	91	507	17.5	91	544	21.0	92	580	24.7	93
44000	1771	440	393	8.10	94	438	11.5	94	479	15.1	93	517	18.7	93	553	22.3	93	588	26.1	94
46000	1851	460	407	8.92	95	450	12.5	95	490	16.2	94	527	20.0	94	562	23.7	94	596	27.6	94
48000	1932	480	421	9.81	96	463	13.6	96	501	17.4	95	538	21.3	94	572	25.2	94	605	29.2	94
50000	2012	500	435	10.8	96	475	14.6	97	513	18.7	96	548	22.7	95	582	26.7	95	614	30.9	95
52000	2093	520	449	11.8	97	488	15.8	98	525	20.0	97	560	24.1	96	592	28.4	96	624	32.6	96
54000	2173	540	463	12.9	98	501	17.0	99	537	21.3	98	571	25.7	98	603	30.0	97	633	34.4	97
56000	2254	560	478	14.1	98	514	18.3	100	549	22.8	99	582	27.3	99	614	31.8	98	644	36.3	98
58000	2334	580	492	15.4	99	527	19.7	101	562	24.3	100	594	28.9	99	625	33.6	99	654	38.3	99
60000	2414	600	507	16.7	99	541	21.2	101	574	25.9	101	606	30.7	100	636	35.5	99	665	40.4	99

Medium Pressure

FAN SIZE 890 AF
WHEEL DIAMETER 44.5"
OUTLET AREA 20.49 SQ FT

MAX MOTOR FRAME
ODP - 405T
TEFC - 444T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	3.0" SP RPM	3.0" SP BHP	3.0" SP PWL	3.5" SP RPM	3.5" SP BHP	3.5" SP PWL	4.0" SP RPM	4.0" SP BHP	4.0" SP PWL	4.5" SP RPM	4.5" SP BHP	4.5" SP PWL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	5.5" SP RPM	5.5" SP BHP	5.5" SP PWL
42000	2050	420	681	26.1	95	715	29.6	95	748	33.2	96	781	37.0	97	813	40.8	98	846	44.9	99
44000	2147	440	694	27.9	96	727	31.5	96	759	35.3	97	790	39.1	97	822	43.0	98	853	47.0	99
46000	2245	460	708	29.8	97	739	33.6	97	771	37.4	97	801	41.3	98	831	45.3	98	861	49.4	99
48000	2343	480	722	31.8	98	753	35.7	98	783	39.7	97	813	43.6	98	842	47.7	99	871	51.9	99
50000	2440	500	736	33.8	98	766	37.9	98	796	42.0	98	825	46.1	98	853	50.3	99	881	54.6	99
52000	2538	520	751	36.0	100	780	40.2	99	809	44.4	99	837	48.7	99	865	53.0	100	892	57.4	100
54000	2635	540	766	38.3	101	795	42.6	101	823	47.0	100	851	51.4	100	878	55.9	100	904	60.4	100
56000	2733	560	781	40.6	101	810	45.2	102	837	49.7	101	864	54.2	101	891	58.8	101	916	63.4	101
58000	2831	580	796	43.1	102	825	47.8	103	852	52.5	102	878	57.2	102	904	61.9	102	929	66.7	102
60000	2928	600	812	45.7	103	840	50.5	103	866	55.4	103	892	60.2	102	918	65.1	102	942	70.0	102

High Pressure

FAN SIZE 805 AF
WHEEL DIAMETER 40.25"
OUTLET AREA 16.77 SQ FT

MAX MOTOR FRAME
ODP - 444T
TEFC - 445T

OUTLET CFM	OUTLET VEL	LRG COIL VEL	5.0" SP RPM	5.0" SP BHP	5.0" SP PWL	6.0" SP RPM	6.0" SP BHP	6.0" SP PWL	7.0" SP RPM	7.0" SP BHP	7.0" SP PWL	8.0" SP RPM	8.0" SP BHP	8.0" SP PWL	9.0" SP RPM	9.0" SP BHP	9.0" SP PWL	10.0" SP RPM	10.0" SP BHP	10.0" SP PWL
42000	2504	420	952	42.6	99	1012	49.8	99	1071	57.3	101	1130	65.3	102	1190	73.7	104	1250	82.8	105
44000	2624	440	969	45.4	99	1027	52.8	99	1084	60.5	101	1140	68.5	102	1196	76.9	103	1253	85.9	105
46000	2743	460	986	48.4	100	1043	56.0	100	1098	63.9	101	1152	72.0	102	1206	80.5	103	1260	89.4	104
48000	2862	480	1004	51.5	101	1059	59.4	101	1113	67.5	101	1165	75.7	103	1217	84.3	103	1268	93.3	104
50000	2982	500	1023	54.8	102	1077	62.9	102	1129	71.2	102	1180	79.7	103	1230	88.4	103	1279	97.5	104
52000	3101	520	1042	58.1	103	1095	66.6	103	1146	75.2	103	1195	83.9	103	1243	92.8	104	1291	101.9	105
54000	3220	540	1062	61.7	104	1114	70.4	104	1163	79.3	104	1211	88.2	104	1258	97.3	104	1305	106.7	105
56000	3339	560	1082	65.4	104	1133	74.4	104	1181	83.6	104	1228	92.8	105	1274	102.1	105	1320	111.6	105
58000	3459	580	1103	69.2	105	1152	78.6	105	1200	88.0	105	1246	97.5	106	1291	107.1	106	1335	116.8	106
60000	3578	600	1124	73.3	106	1172	82.9	106	1219	92.7	106	1264	102.4	106	1308	112.3	106	1351	122.3	106

Filter Data

FULL SIZE - 24"x 24"
HALF SIZE - 24"x 12"

TYPE	NO. OF FILTERS HEIGHT	NO. OF FILTERS WIDTH	FACE AREA SQ FT	CFM 500 FT/MIN
FLAT, CUBE, BAG, HEPA	5	5	100.0	50,000
ANGLE	4	9	144.0	72,000
VERTICAL ROLL	11'- 0"	10'- 0"	93.0	46,500

For plenum fan performance refer to your local Buffalo sales representative

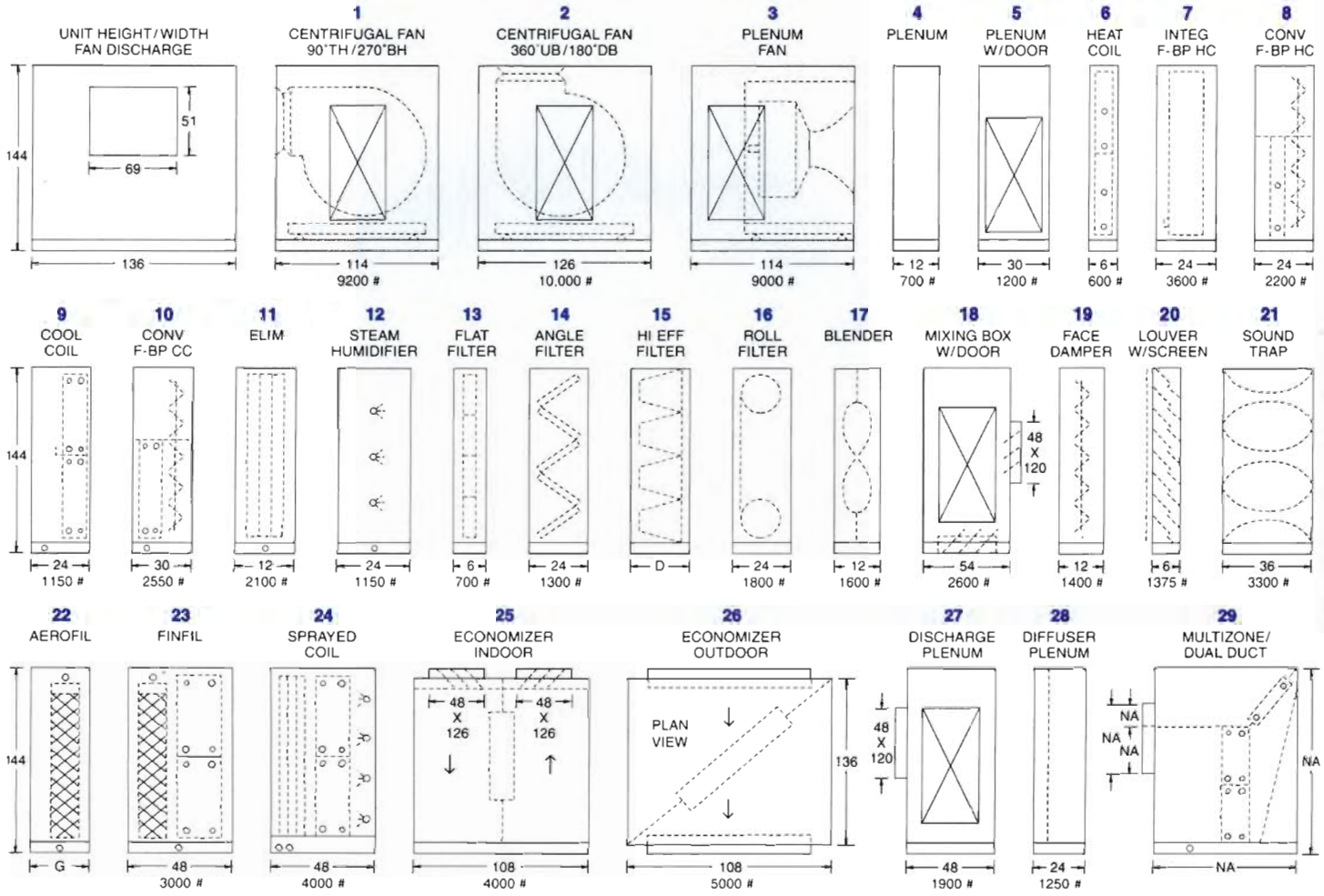
Coil Data

SIZE	TYPE	FACE AREA SQ FT	QTY	TUBE FACE	TUBE LENGTH	WEIGHT (POUNDS) 1 ROW	2 ROW	4 ROW	6 ROW	8 ROW
LARGE	COOL OR HEAT	100.01	3	87	10'- 0"	1260	1500	2000	2500	2910
MEDIUM	COOL OR HEAT	86.27	3	75	10'- 0"	1100	1320	1550	2000	2400
SMALL	COOL OR HEAT	72.40	2	63	10'- 0"	870	1100	1445	1700	2090
-	BLOW THRU REHEAT	NA	NA	NA	NA	-	-	-	-	-
-	INTEGRAL FACE & BYPASS	73.52	1	40	8'- 0"	-	-	-	-	-

Model K Modules

Dimensions in Inches and Weights in Pounds

SIZE K 500



DRAWING DIMENSION REFERENCE

A) Larger Plenums, Module 4, available in 6" increments.

B) All doors are 24" x 60" size.
Optional 18" x 60" door in 24" space is available for:
Plenum with Door Module 5

C) Blower Module has one door optional side.

D) Filter Depth and Weight, Module 15.

Type	Dim D	Weight
12" rigid	18"	1400#
22" bag	24"	1550#
28" bag	30"	1700#
32" bag	36"	1900#

E) Blender, Module 17, quantity 3, size 48".
Allow equal dimension downstream.
Allow half dimension upstream.

F) Sound Traps, Module 21, are also available in 60" optional size, increase weight by 65%.

G) Aerofil, Module 22, dimension and weight.

Fill depth	Dim G	Weight
6"	24"	1800#
12"	30"	2000#

H) For unit inlet weather hood add 24" to overall length.

Notes:

1) Dimensions and weights are for reference only, not for construction. Air flow is right to left.
2) Weights are for double wall construction, deduct 10% for single wall.
3) Overall dimensions do not allow for coil connections, door handles, or lifting lugs. **Add 6" for clearance.**
4) Outlet dimensions are for low pressure fan, horizontal discharge.
5) All filters are face loaded as standard.
6) Coil weights are based on aluminum fins. For copper fins multiply by 1.3. Cooling coils 4, 6 and 8 rows are 80 series. For series 140, multiply by 1.25.
7) All weights are shipping weights. To obtain operating weights multiply by the following factors:
a) Water Coils x 1.25 b) Aerofil x 1.8 c) Finfil x 1.7 d) Spray Coil x 1.6
8) Plenum fans should be preceded by Plenum with door.
9) For Conventional Face and Bypass, Module 8 and 10, use small face area coil. For Sprayed Coil, Module 24, use medium face area coil, 600 ft/min design face velocity, Series 80, maximum 6 rows

Air Friction Losses

Unit Components

CODE	COMPONENT	LARGE COIL FACE VELOCITY - FPM 300	400	500	600	700
1, 2	CENTRIFUGAL AF DW FAN SYSTEM EFFECT*	.20	.25	.30	.40	.50
1, 2, 3	V.I.V. EFFECT 100% OPEN	.07	.12	.20	.27	.37
7	INTEGRAL HC/F & BP	.14	.22	.33	.45	.58
8, 10	CONVENTIONAL F & BP HC & CC (LESS COIL)	.04	.07	.10	.14	.18
11	ELIMINATOR	.01	.06	.10	.15	
13, 14	2" OR 4" PREFILTER TO 30% EFFICIENCY			.50**		
15	EXTENDED SURFACE BAG OR RIGID FILTER TO 65% EFFICIENCY			.75**		
15	EXTENDED SURFACE BAG OR RIGID FILTER TO 95% EFFICIENCY			1.00**		
16	ROLL FILTER			.50		
17	BLENDER	.05	.10	.15	.20	.25
18	MIXING BOX WITH DOOR	.02	.03	.05	.07	.09
19	FACE DAMPER	.01	.03	.04	.06	.08
20	INLET LOUVER C/W SCREEN	.04	.06	.08	.11	.13
21	36" SOUND TRAP	.03	.04	.06	.09	.12
21	60" SOUND TRAP	.04	.05	.07	.11	.14
22, 23	AEROFIL - FIN FIL 6" MEDIA (LESS COIL)	.04	.07	.12	.17	.23
22, 23	AEROFIL - FIN FIL 12" MEDIA (LESS COIL)	.06	.11	.18	.27	.38
24	SPRAYED COIL - SEE AEROFIN DATA BELOW					
25	ECONOMIZER INDOOR	.03	.04	.05	.06	.07
26	ECONOMIZER OUTDOOR	.03	.04	.05	.06	.07
27	DISCHARGE PLENUM	.02	.06	.10	.14	.18
28	DIFFUSER PLENUM	.15	.20	.25	.30	.35
29	MULTI-ZONE / DUAL DUCT	.26	.39	.63	.94	1.10

* The rating tables of fan performance herein are based on AMCA standard 210 "Laboratory Methods of Testing Fans for Ratings".
The "System Effect Factor" must be applied to all selections to take into account the reduced performance of a fan in a cabinet.

** Filter pressure drops are recommended maximum prior to media change.

Motor Weights

1800 RPM

MOTOR HP	T FRAME	WEIGHT
3	182T	60
5	184T	90
7.5	213T	145
10	215T	160
15	254T	230
20	256T	250
25	284T	355
30	286T	390
40	324T	550
50	326T	610
60	364T	835
75	365T	920
100	404T	830
100*	405T	1260
125	405T	915
125*	444T	1515
150	444T	1095
150*	445T	1785

* TEFC sizes and weights. All other frame sizes apply to both ODP and TEFC. Weights are for TEFC. ODP weights are slightly less.

Aerofin Cooling Coils Type C, CD, DP, R, and RC

SERIES NO.	SURFACE COND.	ROWS DEEP	FACE VELOCITY - FPM 300	350	400	450	500	550	600
80	DRY*	4	.13	.17	.21	.25	.30	.36	.41
		6	.19	.24	.30	.37	.44	.52	.60
		8	.25	.33	.41	.50	.60	.70	.82
80	WET	4	.26	.32	.39	.46	.53	.60	.68
		6	.39	.48	.58	.68	.79	.90	1.00
		8	.51	.63	.76	.90	1.04	1.18	1.34
80	SPRAYED*	4	.41	.53	.66	.81	.97	1.16	1.37
		6	.54	.69	.85	1.03	1.23	1.46	1.68
140	DRY*	4	.17	.21	.26	.31	.36	.43	.48
		6	.24	.31	.39	.47	.55	.64	.74
		8	.33	.42	.52	.64	.74	.86	.99
140	WET	4	.33	.42	.51	.60	.70	.81	.92
		6	.50	.63	.77	.92	1.08	1.23	1.41
		8	.68	.86	1.03	1.23	1.44	1.65	1.89

* Including sprays and eliminators.

Aerofin Heating Coils Type CH (Hot Water)

SERIES NO.	FACE VELOCITY - FPM 300	400	500	600	700	800	900	1000	1100
141	.038	.060	.087	.117	.151	.189	.227	.270	.320
142	.070	.110	.153	.205	.258	.318	.380	.450	.530

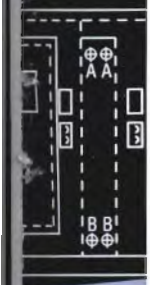
Aerofin Heating Coils Type A Non-Freeze (Steam)

SERIES NO.	FACE VELOCITY - FPM 300	400	500	600	700	800	900	1000	1100
51	.020	.033	.048	.065	.084	.105	.128	.154	.180
61	.031	.051	.074	.100	.130	.163	.198	.237	.278
71	.039	.063	.092	.126	.162	.205	.248	.298	.349
81	.058	.094	.138	.187	.245	.309	.325	.450	.525
91	.062	.101	.147	.201	.262	.326	.406	.475	.561
101	.080	.130	.188	.255	.328	.410	.498	.591	.680

Aerofin Heating Coils Type B Non-Freeze (Steam)

SERIES NO.	FACE VELOCITY - FPM 300	400	500	600	700	800	900	1000	1100
N-1	.012	.021	.032	.046	.062	.081	.010	.124	.150
W-1	.022	.037	.055	.077	.102	.130	.155	.190	.222
X-1	.027	.045	.067	.093	.122	.156	.190	.231	.272
Y-1	.038	.060	.087	.117	.151	.189	.232	.275	.320
U-2	.045	.072	.105	.142	.184	.230	.274	.330	.389
V-2	.047	.076	.110	.151	.194	.243	.284	.345	.405
W-2	.050	.081	.118	.161	.208	.262	.329	.396	.413
X-2	.060	.098	.142	.192	.250	.312	.381	.455	.535

Technical Data



Sound Rating

PWL Values shown in the performance tables for DWDI Centrifugal fans are the highest sound power levels in the octave band spectrum.
A full octave band analysis of the sound radiated by the fan inlet or outlet can be calculated by subtracting values in Table 1 from PWL in rating table.

Table 1:

Unit Size Low	Unit Size Med.	Unit Size High	Fan RPM	Octive Band Ctr. Frequency (HZ)* 125	250	500	1000	2000	4000	8000
45 THRU 60	45 THRU 60	45 THRU 60	< 1327	0	-2	-3	-5	-10	-14	-19
			1327-2655	-2	0	-3	-5	-10	-14	-19
			> 2655	-2	0	-1	-7	-12	-16	-21
85 THRU 180	85 THRU 200	85 THRU 240	< 885	0	-2	-3	-5	-10	-14	-19
			885-1770	-2	0	-3	-5	-10	-14	-19
			> 1770	-2	0	-1	-7	-12	-16	-21
200 THRU 500	240 THRU 500	300 THRU 500	< 664	0	-2	-3	-5	-10	-14	-19
			664-1327	-2	0	-3	-5	-10	-14	-19
			> 1327	-2	0	-1	-7	-12	-16	-21

Example:
Find octave band sound power levels of size 240 Model K delivering 24,000 CFM at 4" SP. From page 23 fan speed = 1229 RPM PWL = 96 db.

Octive Band Frequency HZ	125	250	500	1000	2000	4000	8000
PWL	96	96	96	96	96	96	96
Table 1 Values	-2	0	-3	-5	-10	-14	-19
Sound Power Level (db re 10^{-12} walls)	94	96	93	91	86	82	77

The values above are approximate and include the effects of fan efficiency and are sound power levels generated by the fan at rated capacity and pressure. Octave band PWL values are in decibels (db) referred to 10^{-12} watts determined by the method specified in AMCA Bulletin 300. For certified sound power data refer to your Buffalo Air Handling representative.

Sound Attentuators

Methods of predicting natural attenuation and room sound pressure levels are detailed in the sound control chapter of the Ashrae Guide which also contains recommended sound levels for various types of occupied spaces.

Where natural attenuation is insufficient to provide acceptable sound levels in occupied spaces the use of a sound attentuator module may be warranted.

Static insertion losses in db are as follows: (I.L.)

Octive Band	1	2	3	4	5	6	7	8
Static I. L. - 36" Module	4	9	15	27	27	23	19	12
Static I. L. - 60" Module	7	16	23	38	40	32	25	16

Sound attentuators with higher insertion losses and corresponding higher pressure losses are available.

Fan Heat of Compression and Motor Winding Heat

Approximately 1/2°F per inch WG of static pressure must be included in cooling load. In Draw-thru unit it will reheat the air which has been cooled and dehumidified by the cooling coil. It will be absorbed in the cooling coil of a Blow-thru unit but must be accounted for by additional subcooling in a Draw-thru unit.
The fan motor is located within the cabinet; therefore the additional winding heat must be added. Motor Winding Heat (BTU/HR) = BHP/n x 2545 (where n is motor efficiency at operating load)

Carry-Over Prevention and Drainage Considerations

Troughs and downspouts are furnished between dehumidifying coils when height and drain pan configuration require it. Standard construction prevents carry-over for most conditions of dehumidifying loads up to 40 grains of moisture per pound of dry air and a face velocity of 500 ft. per minute or dehumidifying loads of 25 grains and coil face velocities of 550 ft. per minute. If rating exceeds these levels, contract your Buffalo Air Handling representative to determine required modification. This may involve an additional plenum, extended splash pan with additional plenum, or eliminators.

Draining of coils, drain pans and tanks is required to prevent freezing and/or water damage. Fan sections, plenums, accessories or other sections that might collect condensate from dehumidifying coils, or are subject to water from weather, should have drain pans. All drain lines must be trapped properly to permit free flow of water. Steam coils should be piped in accordance with Aerofin recommendations. Water coils, which may be exposed to freezing air, should be drained and blown out with compressed air or protected with a Glycol solution.

Density Correction

Rating tables are based on standard air at 70°F at sea level (pressure 29.92" Hg). Most comfort air conditioning occurs in the normal (standard) temperature range so the effect of temperature on fan performance is not great. However the effect of altitude on density can be significant.

Use the following table for density correction as explained in the example.

Air Temp. °F	Altitude in Feet Above Sea Level 0	1000	2000	3000	4000	5000	6000	7000
	Barometric Pressure in Inches Hg 29.9	28.8	27.8	26.8	25.8	24.8	23.9	23.0
40°	1.060	1.022	.986	.950	.916	.882	.849	.818
70°	1.000	.964	.930	.896	.864	.832	.801	.772
100°	.946	.912	.880	.848	.818	.787	.758	.730

Assume the previous example for a size 240 unit handling 24,000 CFM @ 4" SP @ 100°F and 5,000 ft elevation. From chart, density correction factor = .787. Equivalent SP = 4" ÷ .787 = 5.1". Select fan RPM from page 23 = 1326 RPM and BHP = 25.3. Actual BHP = 25.3 x .787 = 19.9 BHP.

Certified Data

Your Buffalo-Howden sales representative is equipped to provide certified arrangement drawings, fan performance, sound and coil data to supplement the information presented in this bulletin.

BUFFALO AIR HANDLING

Sales Engineers in 67 cities throughout North America
For the nearest one, call:
Telephone (434) 946-7455
Fax (434) 946-7941
www.buffaloair.com

4
BA2000

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Air Handling

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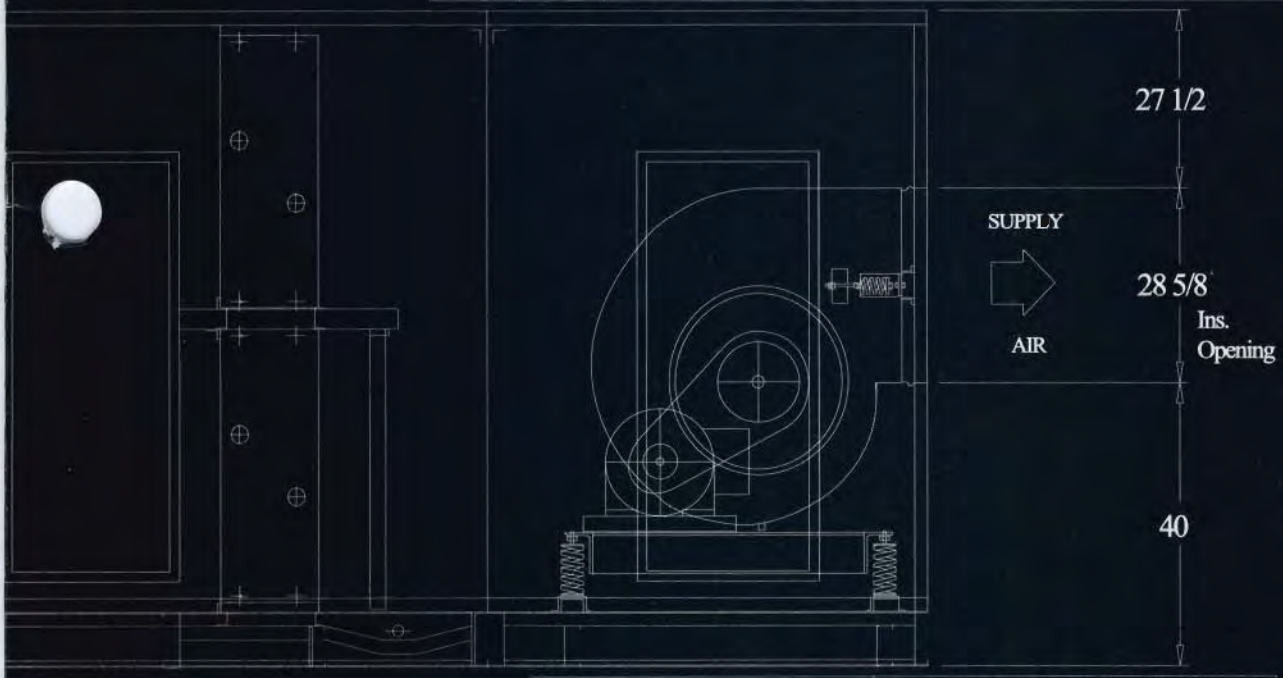
QTY	ITEM	TITLE
X	1	ASSEMBLY
X	2	PANEL ASSEMBLY
1	3	ISOLATION BASE
6	4	DOOR (24 X 60)
1	5	FAN / MOTOR / DRIVE
2	6	COOLING COIL
4	7	DAMPER (96 X 24)
15	8	PRE - FILTER



BA2000 MAIN ASSEMBLY

THIRD ANGLE PROJECTION	BUFFALO AIR HANDLING AMHERST, VA		
	DWG. STATUS RECORD	DWG. NO.	REV.
JOB. NO. 00579	ID. NO. 980218-01	E-8211	A

Introduction

The Buffalo Air Handling BA2000 unit offers a pre-engineered air handling unit that meets the performance requirements of owners and engineers. The following specification is provided as a guide, and contains details of construction and performance which will ensure a high quality, cost effective air handling unit.

General

Air handling units will be of the type and arrangement as shown on the specification drawings and as described in this specification. Furnish and install equipment as manufactured by Buffalo Air Handling or prior approved equal.

Manufacturer of equipment will accept total responsibility for the construction and performance of the complete air handling unit, including all components. Unit performance will be as shown on the equipment schedule. The unit manufacturer will submit certified performance curves for each fan at the rated capacity in accordance with AMCA Standard 210.

Fan performance curves will show CFM versus static pressure and horsepower from free delivery to shut off.

Submit certified sound power data for each air handling unit at the unit inlet and outlet. Data will be referenced as sound power level to the 10^{-12} watts. Sound power levels will be obtained from fan tests conducted in accordance with AMCA Standard 300.

The general design of each unit will consist of an unpainted heavy duty double wall galvanized unit casing mounted on a welded galvanized steel support base. All casing reinforcement and structural support will be galvanized steel construction. All parts of the air handling unit manufactured of non-galvanized black steel will be coated with an epoxy mastic coating. The fan will be completely coated with thermosetting polyester urethane.

Each shipping split will be provided with matching and pre-fitted full perimeter angles for field joining of unit sections. Gasketing and hardware will be provided for each shipping split.

All unit sections will be shrink wrapped before shipment.

Unit Casing

The double wall outer casing will be 2-1/8" thick inward turned double flanged, 16 gauge galvanized steel construction with 2", 3-lbs./cu. ft. insulation. The unit casing is to have a maximum deflection of 1/200 at design operating pressure. Panel flanges are to be welded with full length sealed gasket tape sealer in between the panels. The inner panel will be 20 gauge galvanized steel. Perforated galvanized steel 20 gauge inner panels will be provided where indicated. The unit will be designed for a maximum air leakage rate of 1% of the total capacity at the unit operating pressure.

Double wall solid casing panels will be rated for sound transmission loss in accordance with ASTM E413-73 and have minimum values as shown:

Octave Band (Hz)	2	3	4	5	6	7
Transmission Loss (dB)	21	38	46	53	57	56

Galvanized casing panels will be G90 (.90 oz/ft^2 total) hot dip processed zinc coated galvanized and conform to ASTM 527 for panels of 16 gauge and lighter. All insulating materials will meet the requirements of NFPA-90A.

Painted units will have outer panels constructed of galvannealed steel with a G60 (.60 oz/ft^2 total) hot dipped process coating, heat treated to produce a zinc-iron alloy surface. Exterior surfaces will have one coat enamel primer and one finish coat of enamel paint, factory applied.

Outdoor unit roof panels are to be provided with 1-1/2" upstanding flanges, sealed with two strips of caulking and welded on 6" centers. In addition, the standing seam will be sealed at the top with metal reinforced U-strips. Units exceeding 8'0" in width will have a sloped roof with a pitch of 1/8" per foot width. All access doors will have drip covers.

Unit Base

The entire unit will be supported on an all welded 10 gauge G90 galvanized steel support base around the complete perimeter of each major section. The base will include intermediate cross members as required to support major components. The unit floor will be 16 gauge G90 galvanized steel welded to the support base. The underside of the floor sheet will be insulated with 2", 3 lbs./cu. ft. fiberglass insulation. Floor insulation is to be covered with a 20 gauge galvanized steel sheet on the underside of the unit. Provide a minimum of four heavy duty lifting lugs for each shipping section.

Cooling coil section is to have a 16 gauge 304 stainless steel drain pan with 2", 3 lbs./cu. ft. insulation and covered with a 20 gauge galvanized steel sheet. Pan sides are to be insulated with a 2", 3 lbs./cu. ft. insulation with a galvanized steel cover sheet. Each coil drain pan section will have a properly sized MPT drain connection on the side of the unit. The drain pan will be double sloped toward the drain connection for positive drainage and extend 12" beyond the leaving face of the coil.

Each drain pan will be dye penetrant checked after welding to assure no leakage will occur.

Flat Filters

Where required, the unit will have an upstream (downstream) service flat filter box containing 12" x 24" and 24" x 24" pleated media filters. Filter efficiency, media depth, UL class, and manufacturer will be as noted on the equipment schedule. Filters are to be secured in galvanized steel universal holding frames with the appropriate filter clips.

Cube Filter

Where required, the unit will have an extended media upstream service filter section containing 12" x 24" and 24" x 24" filters. Filter efficiency, media depth, UL class, and manufacturer will be as noted on the equipment schedule. Filters are to be secured in sealed and assembled holding frames with internal stiffeners where required. Area around filter frames and casing panels is to be blanked off with galvanized steel to prevent air by-pass.

Where required, the unit will have an extended media side service filter section containing 12" x 24" and 24" x 24" filters. Filter efficiency, media depth, UL class, and manufacturer will be as noted on the equipment schedule. Filters are to be mounted in extruded aluminum side service filter tracks. Filter service will be through a quick opening hinged access door (no deadlite required). Side service filter sections will be for draw through applications only.

Extended media filters may be provided with either 2" or 4" pre-filters, as noted on the equipment schedule.

Intake/Mixing Box Section

Where required, the unit will contain an intake, or mixing box, section with openings in either the roof, floor or end.

Where dampers are required, dampers will have 16 gauge galvanized steel hat channel frames with double skin airfoil shaped blades, blade and jamb seals. When required the unit will contain a jackshaft assembly section. Access to damper jackshafting is through the intake/mixing box door. Damper operators are supplied and mounted by others.

When a floor damper opening is provided it will contain an expanded metal walking grate to prevent damage to the damper.

Where louvers are required, the unit will contain a 6" deep galvanized steel drainable inlet louver with bird screen. The inlet louver will be sized to handle the total unit capacity without carryover.

Provide an air inlet hood where shown on the specification drawings. The inlet hood is to be a multiple tier design and constructed of the same material and gauge as the outer walls of the unit. The leading edge of each hood will be sized for less that 500 FPM inlet velocity.

The intake/mixing box section will contain a walk-in access door.

Unit Testing

When specified, each unit will be fully factory assembled and leakage tested in accordance with manufacturer's submitted test procedure.

When specified, each unit will have a factory witnessed performance test of the design capacity and pressure in general accordance with procedures outlined in AMCA Standard 210.

A test report is to be written and submitted for permanent record with other unit documentation.

Construction Notes:

1.) Dimensions are for reference only, not for construction. Air flow is right to left. Dimensions are in inches; face area in square feet.

2.) Width dimensions do not allow for coil connections, door handles, lifting lugs, etc.

3.) Height includes 6" base.

4.) Fan sizes and module dimensions are as follows:

Low Pressure = 0"- 3" WG; B_1, C_1, D_1, E_1

Medium Pressure = 3"- 6" WG; B_2, C_2, D_2, E_2

High Pressure = 6"- 9" WG; B_3, C_3, D_3, E_3

5.) IFB coil modules based on horizontal tubes through size 100; vertical tubes for size 120 and up.

6.) All filters are face loaded as standard. Add 6" for side service applications.

7.) High efficiency filter module depth depends on filter type and size.

8.) Blender section requires a downstream plenum equal in length to one blender width (W).

9.) Diffuser module dimensions are without (M_1), and with (M_2), door, respectively.

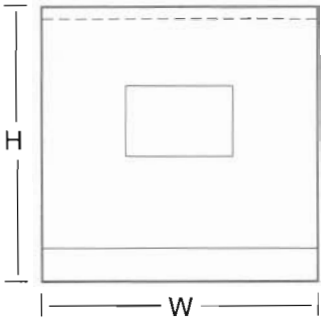
10.) Weather hoods are 24" in direction of airflow.

11.) Access doors are 18" x 30", 18" x 40", 18" x 48", 18" x 60", 18" x 72", 24" x 48", 24" x 60", or 24" x 72".

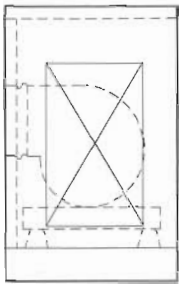
SIZE	NOM. CFM	CENTRIFUGAL FAN PRESSURE AND MOTOR SIZING						PLENUM FAN PRESSURE AND MOTOR SIZING					
		LOW (0"- 3")		MEDIUM (3"- 6")		HIGH (6"- 9")		LOW (0"- 3")		MEDIUM (3"- 6")		HIGH (6"- 9")	
		DIA	HP	DIA	HP	DIA	HP	DIA	HP	DIA	HP	DIA	HP
40	4,000	13½"	5	12¼"	7½	12¼"	15	16½"	7½	15"	15	13½"	15
60	6,000	16½"	7½	15"	15	13½"	20	20"	7½	18¼"	15	18¼"	20
80	8,000	18¼"	10	16½"	15	15"	25	22¼"	10	22¼"	20	20"	25
100	10,000	20"	15	18¼"	20	18¼"	25	24½"	10	24½"	20	22¼"	30
120	12,000	22¼"	15	20"	25	18¼"	40	30"	20	27"	25	24½"	40
140	14,000	24½"	15	24½"	25	22¼"	40	30"	20	30"	25	27"	40
160	16,000	27"	15	24½"	30	24½"	40	33"	20	30"	30	27"	50
180	18,000	30"	15	27"	30	24½"	50	33"	20	30"	40	30"	50
200	20,000	30"	20	27"	40	24½"	50	33"	20	33"	40	30"	60
225	22,500	33"	20	30"	40	27"	60	36½"	20	36½"	40	33"	60
250	25,000	33"	25	30"	40	27"	60	40¼"	20	36½"	50	33"	75
275	27,500	33"	25	30"	50	30"	75	44½"	30	40¼"	50	36½"	75
300	30,000	36½"	25	33"	50	30"	75	44½"	30	40¼"	50	36½"	100
325	32,500	40¼"	25	36½"	50	33"	75	44½"	30	44½"	60	40¼"	100
350	35,000	40¼"	30	36½"	60	33"	100	49"	30	44½"	60	40¼"	100
375	37,500	44½"	30	40¼"	60	36½"	100	49"	30	44½"	75	40¼"	100
400	40,000	44½"	30	40¼"	60	36½"	100	54¼"	50	49"	75	44½"	100
425	42,500	44½"	40	40¼"	60	36½"	100	54¼"	50	49"	75	44½"	100
450	45,000	44½"	40	40¼"	75	36½"	100	60"	50	54¼"	75	49"	100
475	47,500	49"	40	44½"	75	40¼"	100	60"	50	54¼"	75	49"	125
500	50,000	49"	40	44½"	75	40¼"	125	60"	50	54¼"	100	49"	125

SIZE	NOM. CFM	CENTRIFUGAL TH/BH			CENTRIFUGAL UB/DB			PLENUM			PLENUM		
		LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
		B_1	B_2	B_3	C_1	C_2	C_3	D_1	D_2	D_3	E_1	E_2	E_3
40	4,000	42	42	48	42	42	54	66	66	66	42	42	42
60	6,000	54	54	54	60	60	60	72	72	72	48	48	48
80	8,000	48	54	60	54	66	66	72	72	72	48	48	48
100	10,000	48	48	48	60	54	54	72	72	72	48	48	48
120	12,000	54	48	48	60	60	54	84	84	78	54	54	48
140	14,000	54	54	54	66	66	60	84	84	84	54	54	54
160	16,000	60	54	54	72	66	66	90	84	84	60	54	54
180	18,000	66	60	54	78	72	66	90	84	84	60	54	54
200	20,000	66	60	54	78	72	66	90	90	84	60	60	54
225	22,500	72	66	60	84	78	72	96	96	96	60	60	60
250	25,000	72	66	60	84	78	72	102	96	96	66	60	60
275	27,500	72	66	66	84	78	78	102	96	96	66	60	60
300	30,000	78	72	66	90	84	78	102	102	96	66	66	60
325	32,500	84	78	72	96	90	84	108	108	108	66	66	66
350	35,000	84	78	72	96	90	84	114	108	108	72	66	66
375	37,500	90	84	78	108	96	90	114	108	108	72	66	66
400	40,000	90	84	78	108	96	90	120	114	108	78	72	66
425	42,500	108	84	78	126	96	90	120	114	108	78	72	66
450	45,000	108	84	78	126	96	90	126	120	114	84	78	72
475	47,500	114	108	108	126	126	120	126	120	114	84	78	72
500	50,000	114	108	114	126	126	126	126	120	114	84	78	72

UNIT HEIGHT/WIDTH
FAN DISCHARGE

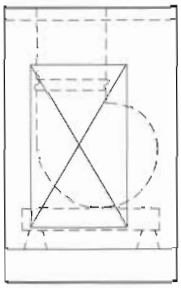


CENTRIFUGAL
FAN TH/BH



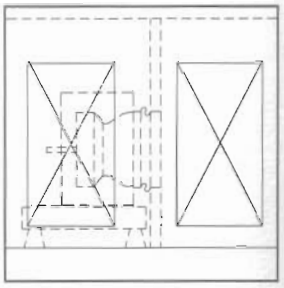
B

CENTRIFUGAL
FAN UB/DB



C

PLENUM FAN
SUPPLY

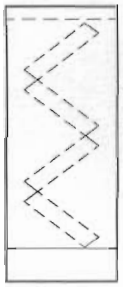


D

FLAT
FILTER

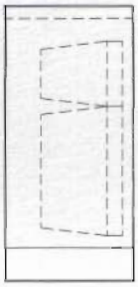
6

ANGLE
FILTER



24

HI EFF
FILTER

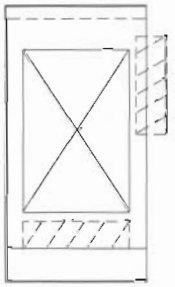


12, 18, 24, 30, 36
(6, 12, 18, 24, 30)
Media Depth

BLENDER

12

MIXING BOX
W/DOOR



G

FACE
DAMPER

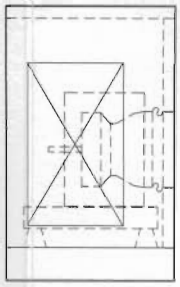
12

SIZE	NOM. CFM	H	W
40	4,000	49	64
60	6,000	54	64
80	8,000	58	70
100	10,000	60	82
120	12,000	65	88
140	14,000	69	100
160	16,000	75	100
180	18,000	79	106
200	20,000	79	106
225	22,500	86	124
250	25,000	86	124
275	27,500	90	124
300	30,000	92	130
325	32,500	100	136
350	35,000	100	136
375	37,500	110	136
400	40,000	112	136
425	42,500	124	136
450	45,000	132	136
475	47,500	140	136
500	50,000	140	136

F	TUBE FACE	NTL	FA	IFB FA
30	(1) 21	48	11.71	7.54
30	(1) 22	51	13.02	9.56
30	(1) 26	57	17.12	11.21
30	(1) 27	69	21.50	17.59
36	(1) 30	75	25.91	19.36
36	(1) 32	87	32.02	24.69
36	(1) 17 / (1) 18	87	35.57	27.91
36	(2) 18	93	39.07	30.05
36	(2) 19	93	41.17	30.05
36	(2) 21	108	52.69	43.47
36	(2) 21	111	54.15	43.47
36	(1) 22 / (1) 23	111	57.91	46.23
42	(2) 23	117	62.36	47.61
42	(2) 24	123	68.33	58.97
42	(1) 25 / (1) 26	123	72.50	58.97
42	(2) 28	123	79.44	66.63
42	(1) 29 / (1) 30	123	83.60	68.16
42	(1) 21 / (2) 22	123	92.78	73.52
42	(1) 22 / (2) 23	123	96.95	73.52
42	(1) 23 / (2) 24	123	101.11	73.52
42	(2) 24 / (1) 25	123	103.89	73.52

FILTER (H x W) FLAT, CUBE	ANGLE
1 x 2	2 x 2
1½ x 2	2 x 2
2 x 2½	3 x 2½
2 x 3	3 x 3
2 x 3	4 x 3
2½ x 3½	2½ x 6
2½ x 3½	2½ x 6
2½ x 4	2½ x 7
2½ x 4	2½ x 7
3 x 4½	3 x 7
3 x 4½	3 x 7
3 x 4½	3 x 7
3 x 5	3 x 8
3½ x 5	3 x 9
3½ x 5	3 x 9
4 x 5	4 x 9
4 x 5	4 x 9
4½ x 5	4 x 9
4½ x 5	5 x 9
5 x 5	5 x 9
5 x 5	5 x 9

PLENUM FAN RETURN

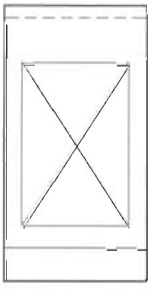


E

PLENUM

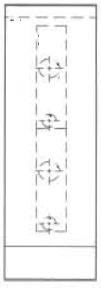
6, 12, 18

PLENUM W/ DOOR



24, 30, 36, 42

HEATING COIL

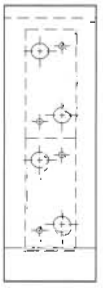


6, 12

INTEG F-BP HC

24

COOL COIL



F

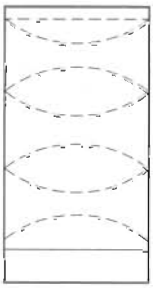
STEAM HUMIDIFIER

12

LOUVER W/SCREEN

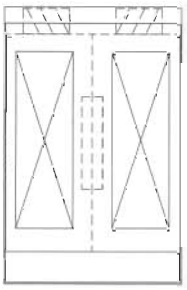
6

SOUND TRAP



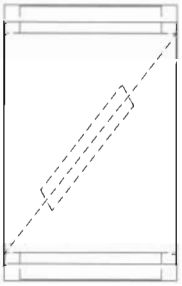
36, 60

ECONOMIZER INDOOR



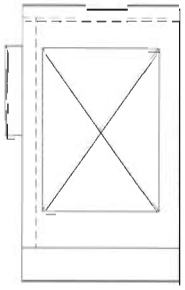
H

ECONOMIZER OUTDOOR



J

DISCHARGE PLENUM



K

DIFFUSER PLENUM

M

BLENDER (W X H)	MIX BOX/DISCHARGE G	MIX BOX/DISCHARGE OPENING	ECONOMIZER LOUVER (W x H) H	J	OA	EA	MIX DMPR	K	M_1	M_2	SIZE
(1) 24 x 24	24	14 x 30	48	48	42 x 36	36 x 36	18 x 36	24	12	30	40
(1) 30 x 30	24	14 x 36	48	60	54 x 42	42 x 42	18 x 42	24	12	30	60
(1) 30 x 30	24	14 x 54	48	78	72 x 42	54 x 42	30 x 42	24	12	30	80
(1) 36 x 36	24	14 x72	48	72	66 x 48	54 x 48	30 x 48	24	12	30	100
(1) 42 x 42	24	18 x 66	48	78	72 x 54	60 x 54	30 x 56	24	18	30	120
(1) 42 x 42	24	18 x 78	48	90	84 x 54	72 x 54	36 x 54	24	18	30	140
(1) 48 x 48	24	18 x 90	48	90	84 x 60	72 x 60	30 x 60	24	18	30	160
(1) 48 x 48	24	18 x 90	48	90	84 x 66	72 x 66	30 x 66	24	18	30	180
(1) 54 x 54	30	19¾ x 96	60	102	96 x 60	84 x 60	36 x 60	30	18	30	200
(2) 44 x 36	30	19¾ x 108	60	102	96 x 72	87 x 72	36 x 72	30	18	30	225
(2) 46 x 38	30	24 x 108	60	114	108 x 72	84 x 72	42 x 72	30	18	30	250
(2) 48 x 40	36	25½ x 114	72	126	120 x 66	108 x 66	48 x 66	36	18	30	275
(2) 50 x 42	36	25½ x 120	72	138	132 x 72	108 x 72	48 x 72	36	18	30	300
(2) 52 x 44	36	25½ x 120	72	126	120 x 84	96 x 84	42 x 84	36	18	30	325
(2) 48 x 48	36	30 x 120	72	138	132 x 84	108 x 84	48 x 84	36	18	30	350
(3) 38 x 46	48	37 x 120	96	126	120 x 96	96 x 96	48 x 96	48	24	30	375
(3) 40 x 48	48	37 x 120	96	138	132 x 96	108 x 96	54 x 96	48	24	30	400
(3) 42 x 42	54	37 x120	108	126	120 x 108	96 x 108	48 x 108	54	24	30	425
(3) 42 x 50	54	37 x 120	108	126	120 x 120	96 x 120	48 x 120	54	24	30	450
(3) 44 x 52	54	37 x 120	108	126	120 x 120	108 x 120	48 x 120	54	24	30	475
(3) 44 x 52	54	48 x 120	108	138	132 x 120	108 x 120	48 x 120	54	24	30	500

Access Door

Where shown, provide a 2" double wall galvanized steel insulated heavy-duty access door with full perimeter gasketing. Provide a minimum of two handles operable from inside and outside, and full-length stainless steel piano hinges. (Provide a double thickness 9" x 9" deadlite in each door.)

Marine Lights

Each access section is to be provided with a marine light having an impact resistant plastic globe and wire guard, wired to a switch with indicator light, located on the outside of the unit, near the access door. Switch will be similar to GE Model SP1 1 1-8G with protective dust cover. Marine light will be similar to MAJOR XVP20 DG incandescent fixtures.

Fan Section

Furnish backward inclined or airfoil supply and return fans, as indicated in the schedule. Fans will be arr. 3 DWDI centrifugal, or SWSI plenum fans, having non-overloading horsepower characteristics. Fans are to be constructed of steel and coated with a thermosetting polyester urethane finish.

The wheels are to be all welded construction using high strength steels. Blades are to be welded to the spun wheel flange and backplate. Double width, double inlet wheels are to have the same construction with a common backplate. Fan wheel assembly is to be secured to the shaft with a key and two set screws.

The fan shaft is solid, cold finished steel, turned, ground and polished. The complete rotating assembly is designed so that the first critical speed is at least 25% greater than the design speed.

Fan bearings have a minimum L-10 life of 80,000 hours as defined by ASA and the Anti- Friction Bearings Manufacturer's Association. Bearings will be rigidly supported on structural steel supports.

Fan housings are to be constructed of heavy gauge steel sides and scroll. Housing to be fitted with a spun inlet cone which is designed to match the fan wheel flange for smooth efficient air flow from the fan inlet to the fan discharge. Fan housing structural members will be designed to allow removal of fan wheel, shaft and bearings without disturbing the structural integrity of the fan housing. Provide variable inlet vanes (VIV's) where indicated on the schedule, suitable for maximum fan inlet velocities and pressures at design speed. Double width, double inlet fans to have interconnecting linkage between inlets for one control lever operation. Furnish lever and locking bar suitable for either manual or automatic operation.

The entire fan assembly is to be factory run tested and dynamically balanced not to exceed 0.16 ips horizontally and vertically and 0.32 ips in the axial direction as measured by an Entek IRD computer balance analyzer.

The fan, motor and drive assembly will be integrally mounted internally on a vibration isolation base with a 1" (2") nominal spring deflection. The isolators will be individually selected for each load bearing location to maintain equal deflection. The isolation base will be provided with an adjustable NEMA motor slide base. The fan will be joined to the unit housing by a fiberglass reinforced neoprene coated flexible connection. The isolation base will be provided with adequate tie-down mechanisms to prevent movement during shipment.

V-belt drive selection will maintain a minimum service factor of 1.3 times the motor horsepower. Fixed pitch drives will be provided on all units.

Diffuser Section

Blow through units will contain a diffuser section with a full height by full width 16 gauge galvanized steel distribution plate, downstream of the fan. This plate will contain 50% free area over the entire cross-sectional area of the unit except at the fan discharge area. This area will be a 25% free area over an area 1.4 times the fan discharge width and 1.2 times the fan discharge height. With each submittal, provide a detail drawing of distribution plate with verification of pressure loss and velocity profile performance.

Cooling and Heating Coils

All coils will be securely mounted and encased with galvanized steel blank-off sheets to prevent air bypass. Coils will be removable through the unit casing via bolted and gasketed panels. Coil removal will not require the dismantling of upstream or downstream components. Cooling coil sections with more than one coil high will have individual drain troughs and downspouts attached to the leaving side of each coil. All coils will be rated in accordance with ARI 410-81 and will meet the specified performance. Fins will be 0.012" helically wound, aluminum (solder coated copper). Headers will be carbon steel. Coil casings will be minimum 16 gauge stainless steel for cooling coils and galvanized steel for heating coils. Water coils will have 5/8" OD with 0.020" (0.025", 0.035", 0.049") copper wall tubes, and be designed for a minimum working pressure of 200 psig and be factory tested at 250 psig air under water. Steam coils will be steam distribution type with 1" (5/8") x 0.035" (0.049") copper outer tubes and 5/8" (3/8") x 0.020" copper inner distributing tubes. Steam coils will be designed for a minimum working pressure of 200 psig steam, 400° F, and be factory tested at 250 psig air under water.

Buffalo
Air Handling

Sales Engineers in cities throughout North America. For the nearest office, call: *Telephone (804) 946-7455*
Telefax (804) 946-7941

5
Project Bulletins

Historic Milam Building

San Antonio, TX

Owner:
Principal Mutual Life Insurance Company

Mechanical Contractor:
Gillette Company

Managed By:
Trammel Crow Company

The Milam Building was the tallest reinforced-concrete structure and the first air conditioned high-rise office building in the world. Carrier offered this building the first-of-a-kind air conditioning equipment by allowing doors and windows to be closed, reducing dirt and noise from the street. "Buffalo" units were installed in 1928. Several of the units were refurbished during the renovations made between 1989 and 1994.

Buffalo Air Handling

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Telefax (804) 946-7941

Pennsylvania Convention Center

Philadelphia, PA

Equipment:
Twenty (20) Custom Big Buffalo units handling over 1,000,000 cfm. Twelve (12) roof mounted, eight (8) indoor units with components including fans, heating and cooling coils, high efficiency filters, dampers and louvers.

Design Architects:
Thompson, Ventulett, Stainback & Associates

Mechanical Contractor:
Fluidics, Inc./ The Poole & Kent Company, Joint Venture

Mechanical Engineer:
Pennell and Wiltberger Inc.

When transforming the Reading Terminal Train Shed into its current form, Philadelphia Convention Center, the engineers were faced with a couple of large obstacles to overcome. The natural design of the building posed a problem with "indoor weather" and heating/cooling efficiency. The massive structure itself was used to solve the former problem while Buffalo Air Handling was part of the efficiency solution. Buffalo Air Handling supplied the convention center with twenty of its air handling units to help condition the nearly three city block structure.

BUFFALO AIR HANDLING

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Telephone: (434) 946-7455
Telefax: (434) 946-7941

www.buffaloair.com

Photography by: Mofle Photography, Green Bay, WI

Prairie Heart Institute at St. John's Hospital

Springfield, IL

Equipment:
Buffalo Air Handling supplied fourteen air handling units totaling 320,470 CFM. The units are 2" double-wall construction and include fans, heating, heat recovery and cooling coils, pre, final and gas phase filtration, dampers and humidifiers.

Owner:
Hospital Sisters Health System

Design Architect & Engineer:
Berners-Schober Associates, Inc.

Construction Manager:
Evans Construction Co.

Mechanical Contractor:
E. L. Pruitt Co.

The Prairie Heart Institute (PHI) of St. John's Hospital is a 170,000 sq. ft. Combination In/Outpatient Cardiac Service Center.

The air handling units are located in the 2nd floor mechanical mezzanine space and in the 6th floor penthouse. Conditioned air is provided to the outpatient cardiac catheterization waiting and prep areas located directly below the after care centers at the 1st floor Rehabilitation and Life Style Center. The units also serve the surgery rooms on the 3rd floor, catheterization on the 4th, and diagnostic and consultation on the 5th, as well as administrative and physician offices throughout.

Space constraints required that some units be stacked to utilize the available floor space. The surgery room units are variable volume based on the occupancy in the room.

Buffalo Air Handling's experience in the hospital/healthcare market, familiarity with heat recovery, variable volume and custom design, and a reputation for long lasting, reliable equipment were reasons the owner, engineer and contractor selected Buffalo units.

BUFFALO
AIR HANDLING

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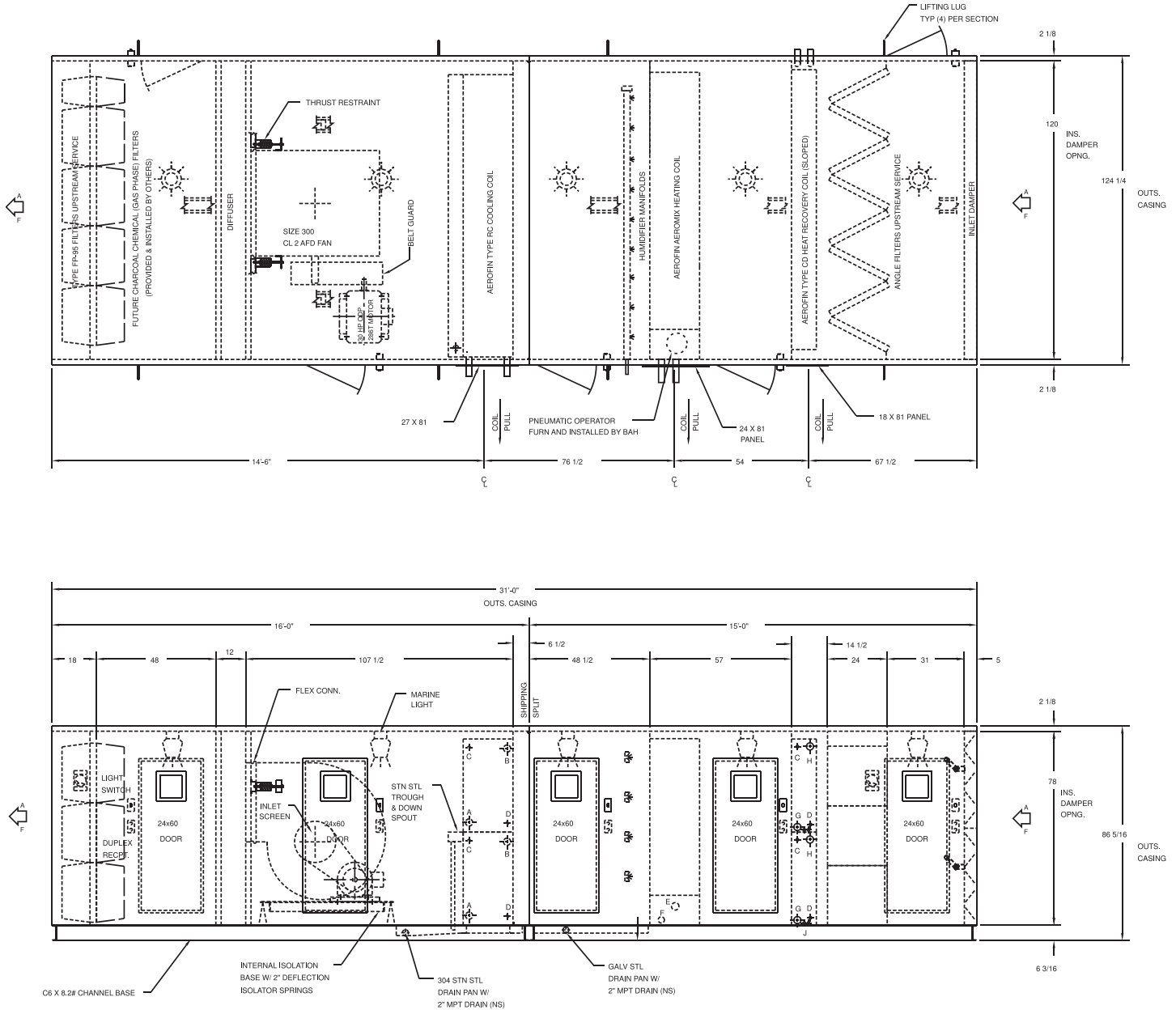
Buffalo Air Handling

Hospital



Sizes:

- 3,000 - 39,100 CFM

Construction:

- 2" double-wall, G90 galvanized steel, 14 gauge outer, 20 gauge solid inner
- 3#/ft^3 density insulation
- 6" structural steel channel base
- 10 gauge galvanized steel floor
- 12 gauge 304 stainless steel drain pan

Components:

- Class 1 and 2 DWDI centrifugal fans
- Premium efficient, open drip proof motors, suitable for VFD service
- Internal isolation bases with 2" deflection springs
- Full height, full width diffuser
- Aerofin CD (completely drainable) heat recovery coils, .025" copper tube, .010" aluminum fin
- Aerofin RC (removable header) cooling coils, .025" copper tube, .010" aluminum fin, 304 stainless steel casing
- Aeromix integral face and bypass vertical tube, steam heating coils
- 30% efficient pre-filters
- 95% efficient rigid final filters
- Gas phase filtration filters; activated carbon and potassium permanganate
- Steam grid humidifiers
- Opposed and parallel blade dampers
- Access doors
- Marine lights, switches and receptacles

Bayer Corporation Pharmaceutical Division

West Haven, Connecticut

Equipment:
Buffalo Air Handling supplied five (5) air handling units totaling 200,000 CFM for the Bayer Corporation. The units have 4" double wall, thermal break construction with supply and return fans, heating and cooling coils, filters, dampers, humidifiers and sound attenuators.

Owner:
Bayer Corporation

General Contractor:
Gilbane Building Company

Project Engineers:
Affiliated Engineers, Inc.

Mechanical Contractor:
Tucker Mechanical

Pharmaceutical is one of nine divisions within the Bayer Corporation, all dedicated to "Changing the world with great care". The West Haven site specifically directs its research in the areas of cancer, diabetes, obesity and osteoperosis. Also, a new drug for Alzheimer sufferers is being manufactured at this facility. With its efforts, Bayer intends to capture a greater share of the global pharmaceutical market.

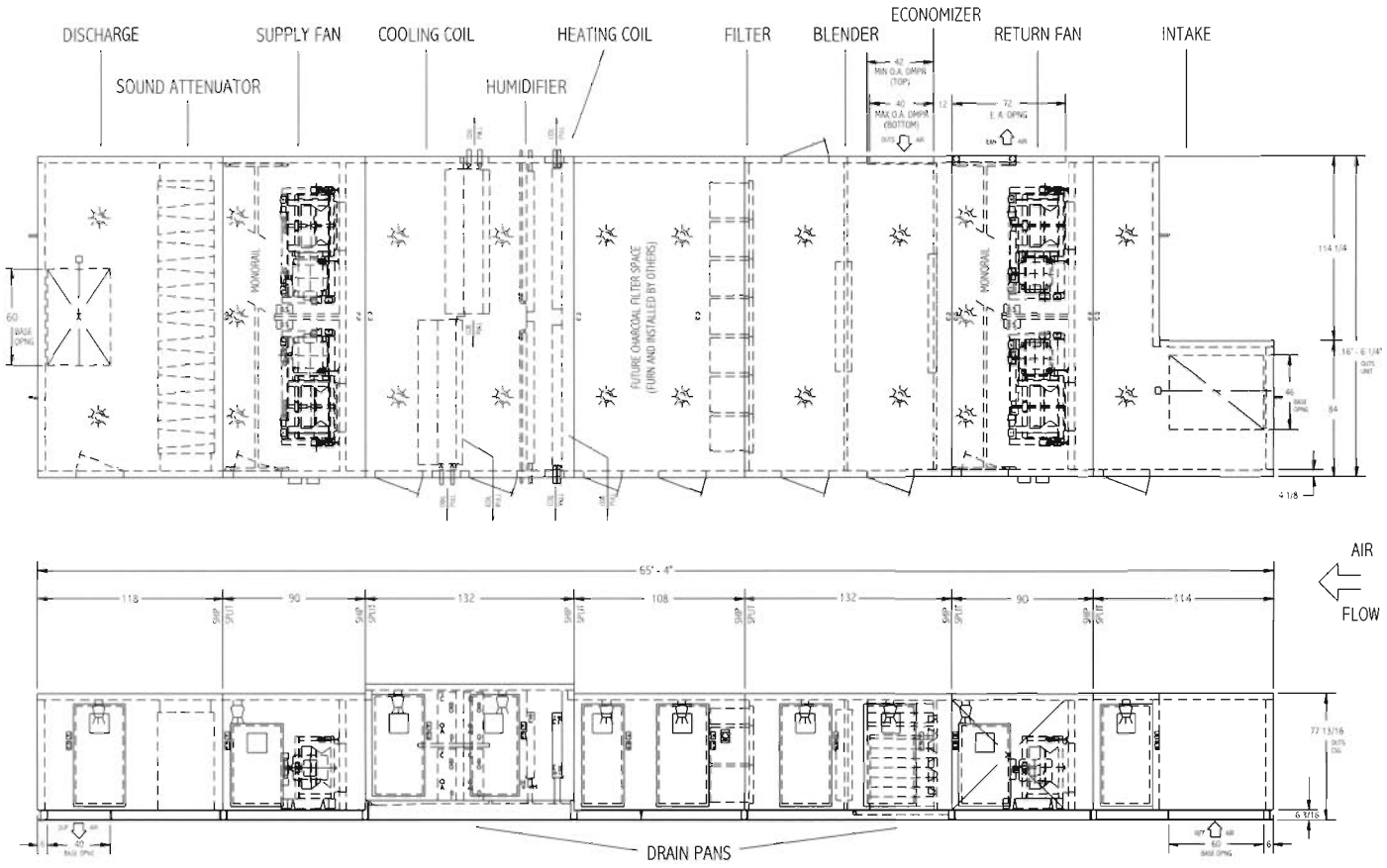
In Bayer's last expansion, Buffalo Air Handling was asked to provide air handling equipment that would meet the specific needs of Bayer. The units were low profile construction to satisfy space constraints at the facility. The units were designed with notches, such that when laid end to end on the site, they created an air handling unit over 180' long, which fits percisely over several air ducts on the underside of the unit.

All the units passed stringent testing requirements in the factory and on site. Pressure and leakage testing were conducted to verify a maximum permissible leakage rate of 1% at 10" static pressure water gauge.

Buffalo Air Handling

Sales Engineers in cities throughout North America. For the nearest office, call: *Telephone (804) 946-7455*
Telefax (804) 946-7941

Buffalo Air Handling *Pharmaceutical*



Big Buffalo

Sizes:

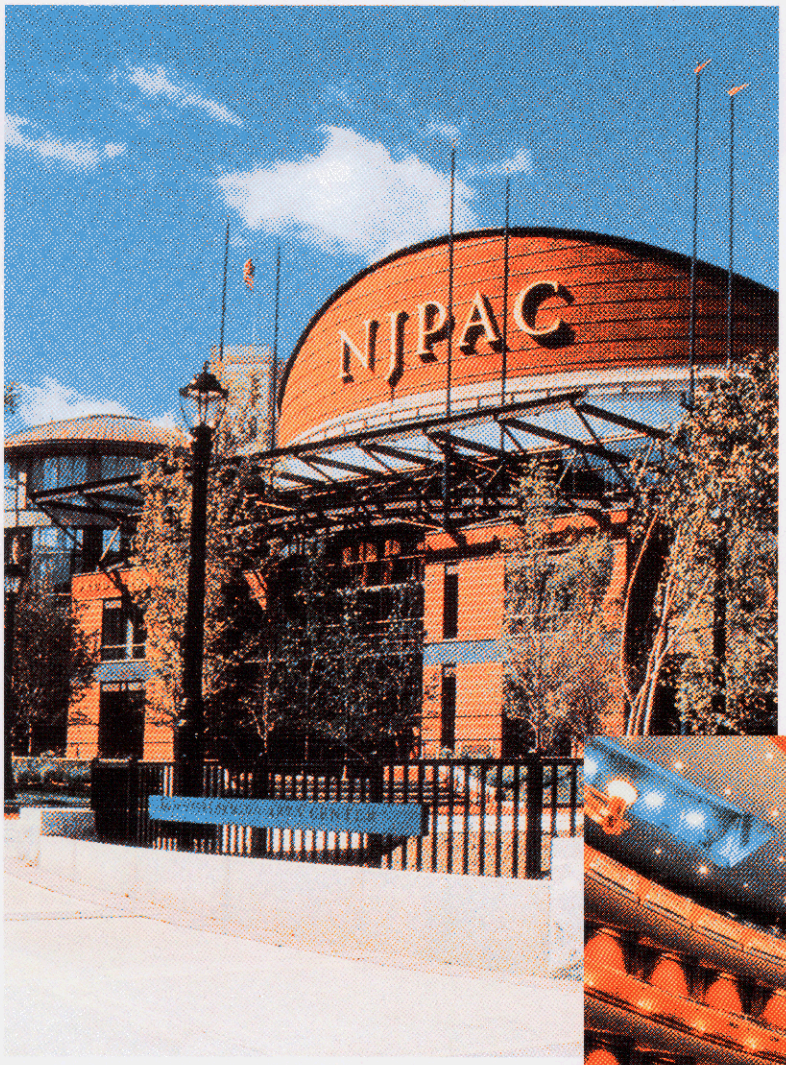
- (3) 35,000 CFM, 8" SP
- (1) 40,000 CFM, 9" SP
- (1) 55,000 CFM, 9" SP

Construction:

- 4" double wall
- 3#/ft³ density insulation
- Galvanized steel, 14 gauge outer, 16 gauge solid inner, 20 gauge perforated inner in fan sections
- Thermal break construction
- 6" structural steel channel base
- 12" structural steel channel base in coil section
- 10 gauge galvanized floor with non-skid paint
- 12 gauge 304 stainless steel drain pan
- 304 stainless steel coil racks for individual coil removal
- Coils designed for side or face removal

Components:

- Class 3 plenum supply and Class 2 plenum return fans
- Monorails in fan section for fan wheel and motor removal
- Seismic spring isolators
- Premium efficient, ODP motors
- Nema 1 non-fused disconnects
- Aerofin CHP heating coils, aluminum fin, copper tube
- Aerofin CP cooling coils, aluminum fin, copper tube
- 30% efficient pre-filters
- 90% efficient final bag filters
- Blenders
- Panel humidifiers
- Sound attenuators
- Parallel and opposed blade dampers
- Access doors with double pane, wire reinforced deadlights and safety chains
- Marine lights, switches and receptacles
- 120V single point wiring



New Jersey Performing Arts Center

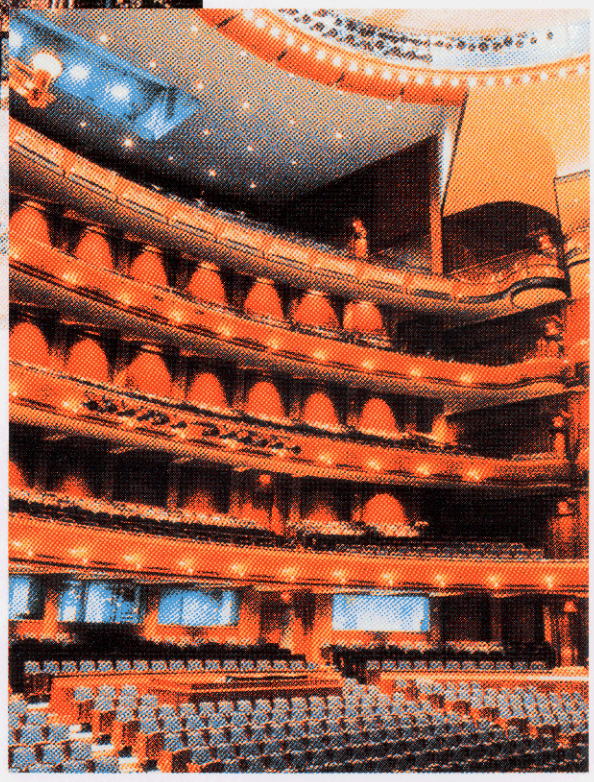
Newark, New Jersey

Design Architect:
Barton Myers

Project Engineers:
Ove Arup and Partners

Construction Manager:
Turner Construction Company

Mechanical Contractor:
Frank A. McBride Company



The New Jersey Performing Arts Center consisting of a 2,750-seat multi-use Prudential Hall, a 514-seat Victoria Theater, and a 3,000 square foot rehearsal space is a partnership between public and private interests. All those involved with the project see it as a sparking of economic and social revitalization of the oldest city in New Jersey, Newark. The facility anticipates performances by both national and international performing artists and companies.

A total of eighteen Buffalo Air Handling units were designed to air condition the 250,000 square foot structure. Our Big Buffalo and Model K units were provided with a variety of components including; fans, motors, Aerofin heating and cooling coils, humidifiers, dampers and filters.

Sound was a critical factor in the design process. Special sound absorbing construction reduced the amount of noise generated by the units. A series of comprehensive tests were performed at our Amherst, Virginia facility to ensure that the units met stringent sound and aerodynamic criteria.

BUFFALO
AIR HANDLING

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Telefax: (434) 946-7941

www.buffaloair.com

The Hartsfield-Jackson Atlanta International Airport (H-JAIA)

Atlanta, GA

Equipment:
Buffalo Air Handling supplied 68 rooftop air handling units totaling 1,437,600 CFM. The units are 2" double wall construction with service corridors and include supply and return/exhaust fans, heating and cooling coils, pre and final filters, dampers, variable frequency drives and factory mounted controls.

Owner:
The Atlanta Airlines Terminal Corporation (AATC)

Engineer:
Newcomb & Boyd

Construction Manager:
Comprehensive Program Services, Inc. (CPS)

The Hartsfield-Jackson Atlanta International Airport (H-JAIA) has a total area of 4,700 acres, of which the Terminal Building, Concourses T, A, B, C, D and E, and the International Concourse total 130 acres. H-JAIA is also one of the world's busiest airports, handling upwards of 250,000 travelers and 2,600 flights per day.

The Buffalo Air Handling roof mounted units service Concourses A, B, C and D. We supplied 19 units for Concourse A, 17 units for Concourse B, 17 units for Concourse C and 15 units for Concourse D.

Buffalo Air Handling supplied 68 air handling units (AHU's) to replace existing equipment. The AHU's had to be designed to handle additional capacity, while maintaining the existing footprint and matching the existing openings exactly. With flights arriving as early as 5:00 AM and taking off as late as midnight, the work had to be staged and conducted at night. There could be no delays or gate closures.

The sixty-eight units were shipped in ten phases, beginning 10 weeks after order placement and continuing two weeks apart to completion. The units arrived with controls completely mounted and wired, so the installing contractors could have the replacement units up and running by the following morning. All units arrived as promised and all concourses operated continuously throughout the process.

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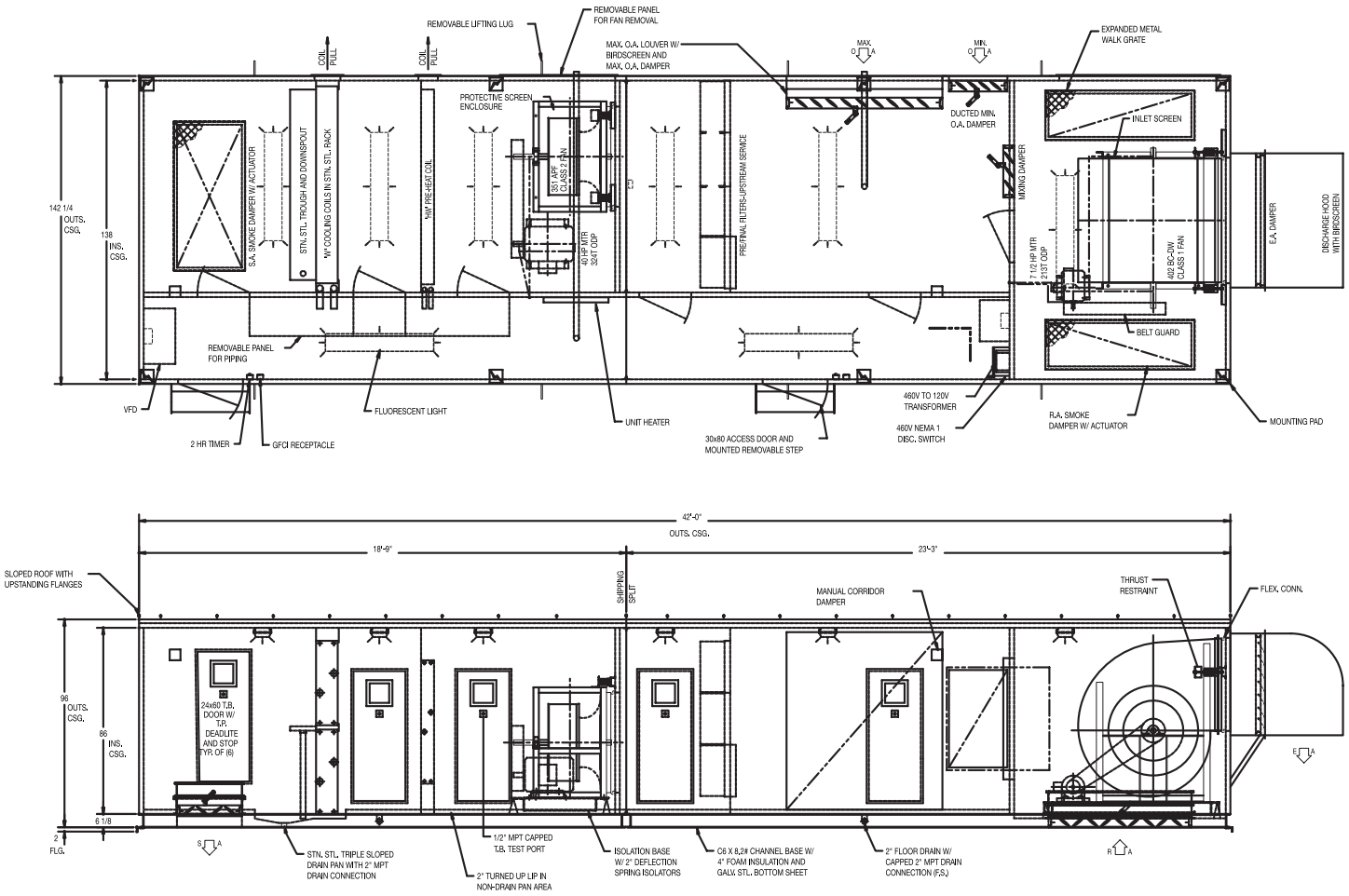
Buffalo Air Handling *Transportation*



Sizes:

- 68 AHU's ranging from 8,000 to 36,000 CFM

Construction:

- 2" double-wall, 16 gauge, G90 galvanized steel outer, 20 gauge aluminum solid inner wall, except perforated in fan sections
- Flat finish exterior coating
- 3 pcf density insulation
- 6" structural steel channel base with roof curb caps
- 12 gauge, continuously welded HRS floor with 2" turned up lip, non-skid paint and exterior curb flange
- 18 gauge 304 stainless steel, IAQ drain pan

Components:

- Class 2 and 3 plenum supply fans
- Class 1 and 2 AF-DWDI centrifugal return / exhaust fans
- Premium efficient, open drip proof motors, suitable for VFD service
- Internal isolation bases with 2" deflection springs
- Aerofin plate fin hot water and chilled water coils; 5/8" O.D., .025" copper tubes and .0095" aluminum fins
- 30% efficient pre-filters
- 85% efficient final filters
- Opposed and parallel blade dampers
- Supply and return smoke dampers
- Variable frequency drives
- Single point wiring with 460-120 volt transformer for lights, switches and receptacles
- Customer controls mounted and wired
- Finned tubular heater with thermostat for corridor
- Access doors with window and test ports
- Stairs to corridor access doors

Photography by: Danille A. Swick

Grand Central Station

New York, New York

Equipment:
Buffalo Air Handling units ranging in CFM from 4,500 to 30,000 were supplied to Grand Central Station, replacing three (3) existing Buffalo units dating back to 1918 and adding eighteen (18) new units. These units included supply and return fans, heating and cooling coils, pre-filters, final filters, dampers and louvers.

Owner:
Metro North

Design Architect:
Beyer, Blinder, Belle

Project Engineers:
Goldman Copeland Associates

Construction Manager:
Lehrer McGovern Bovis

Mechanical Contractor:
Penguin Air Conditioning

Cooling the more than 500,000 passengers per day that pass through Grand Central Station was no small feat to overcome. With its high cathedral like ceiling and the moving of trains in and out of the station, engineers had to design a way to control the air flow and regulate its temperature.

Keeping the historic nature of the building in tact through the renovation process was a large concern. The original design of the building had large, hollow columns on each side of the concourse which now supply the air, and rosette vents in the ceiling that exhaust the air and smoke. Existing space was at a premium. The air handling units supplied had to be "knocked down" and reconstructed in very confined areas such as elevator shafts.

Buffalo Air Handling units were chosen for this project because of their past experience, rugged construction, dependable and long lasting service, and ability to provide these "knock-down" units.

Buffalo Air Handling

Sales Engineers in cities throughout North America. For the nearest office, call: *Telephone (804) 946-7455*
Telefax (804) 946-7941

Model K & Big Buffalo

Sizes:

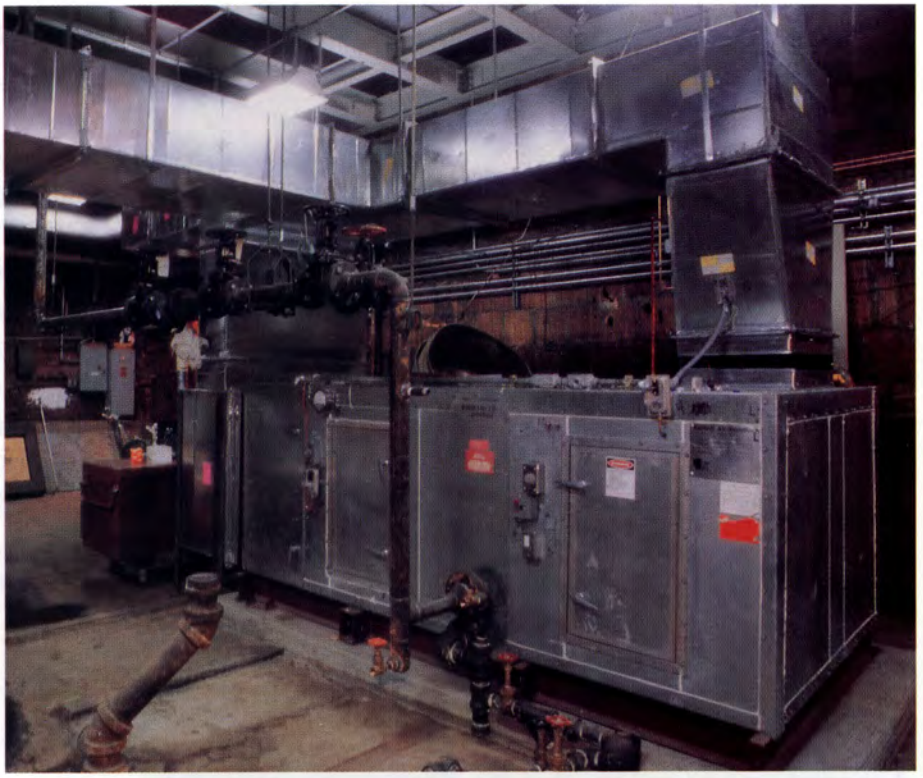
- 4,500 - 30,000 CFM

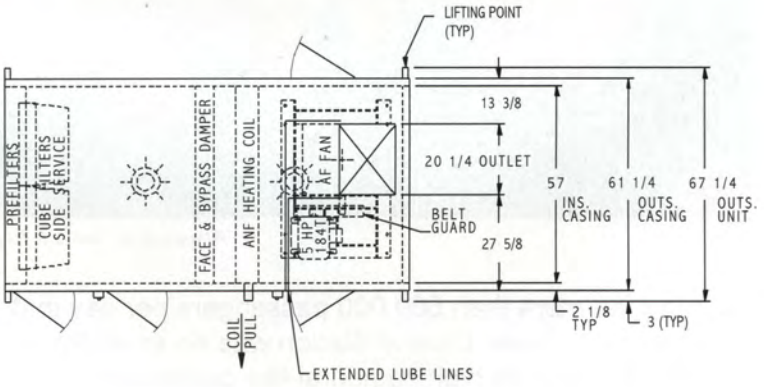
Construction:

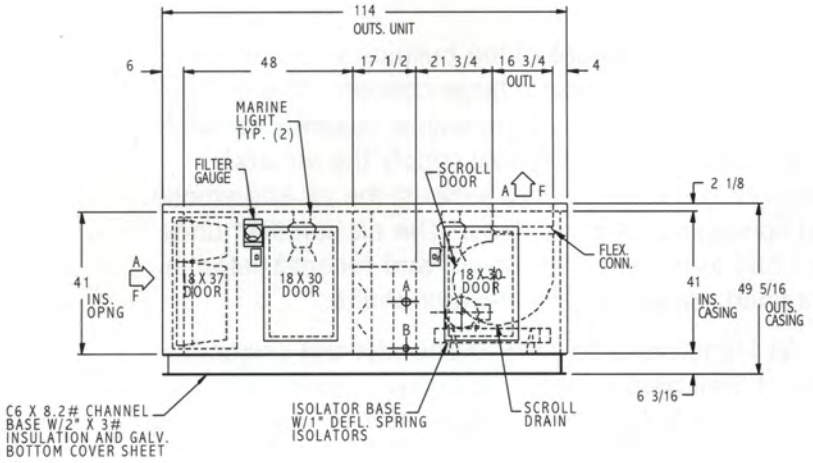
- 2" wall
- 3# insulation
- Galvanized steel, 16 Ga outer/20 Ga inner
- Knock down construction

Components:

- Centrifugal supply fans
- Plenum return fans
- Premium efficient, open drip proof motors
- Aerofin ANF heating coils, aluminum fin, copper tube
- Aerofin CP cooling coils, aluminum fin, copper tube
- 30% efficiency pre-filters
- 65% efficiency final filters
- Blenders
- Weather hoods
- Opposed blade dampers
- Aluminum louvers
- Access doors
- Unit heaters
- Marine lights, receptacles and switches
- Single point wiring



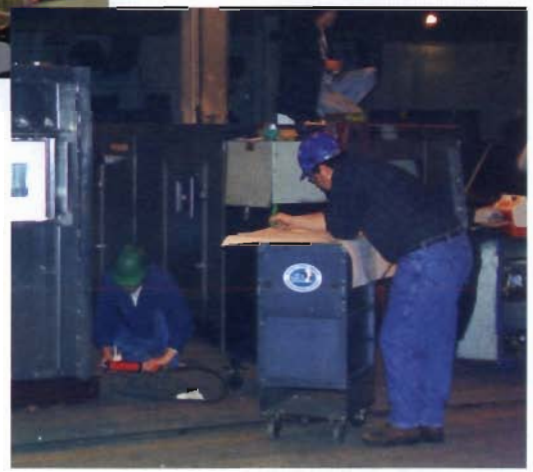


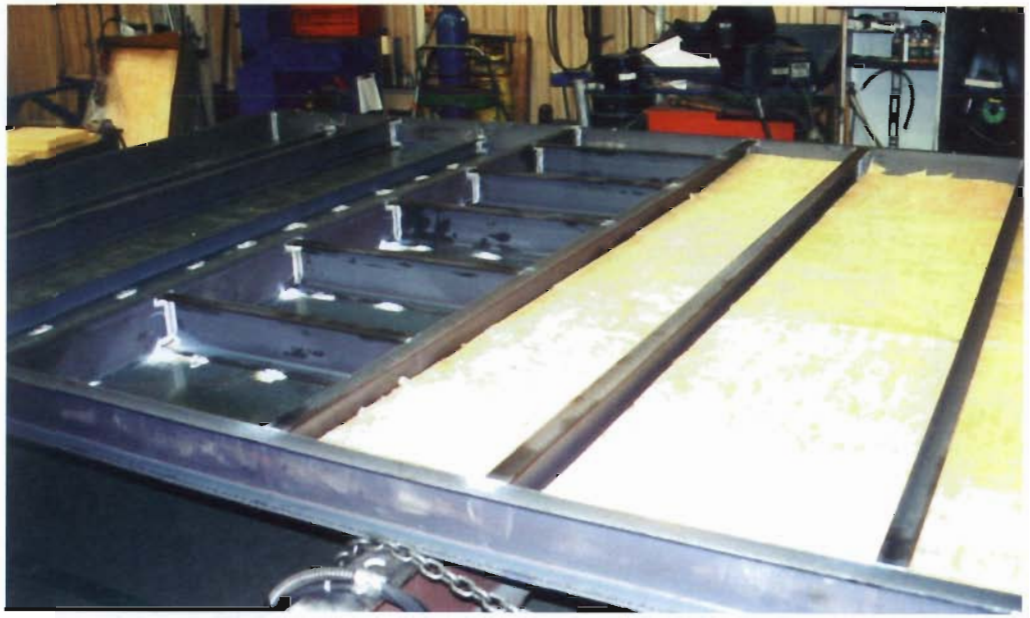


6
Photographic Samples

Buffalo Air Handling located in Amherst, VA has a 90,000 square foot facility dedicated to producing top quality, cost effective air handling equipment.

Buffalo Air Handling's people are there with you from conception to completion of each project.



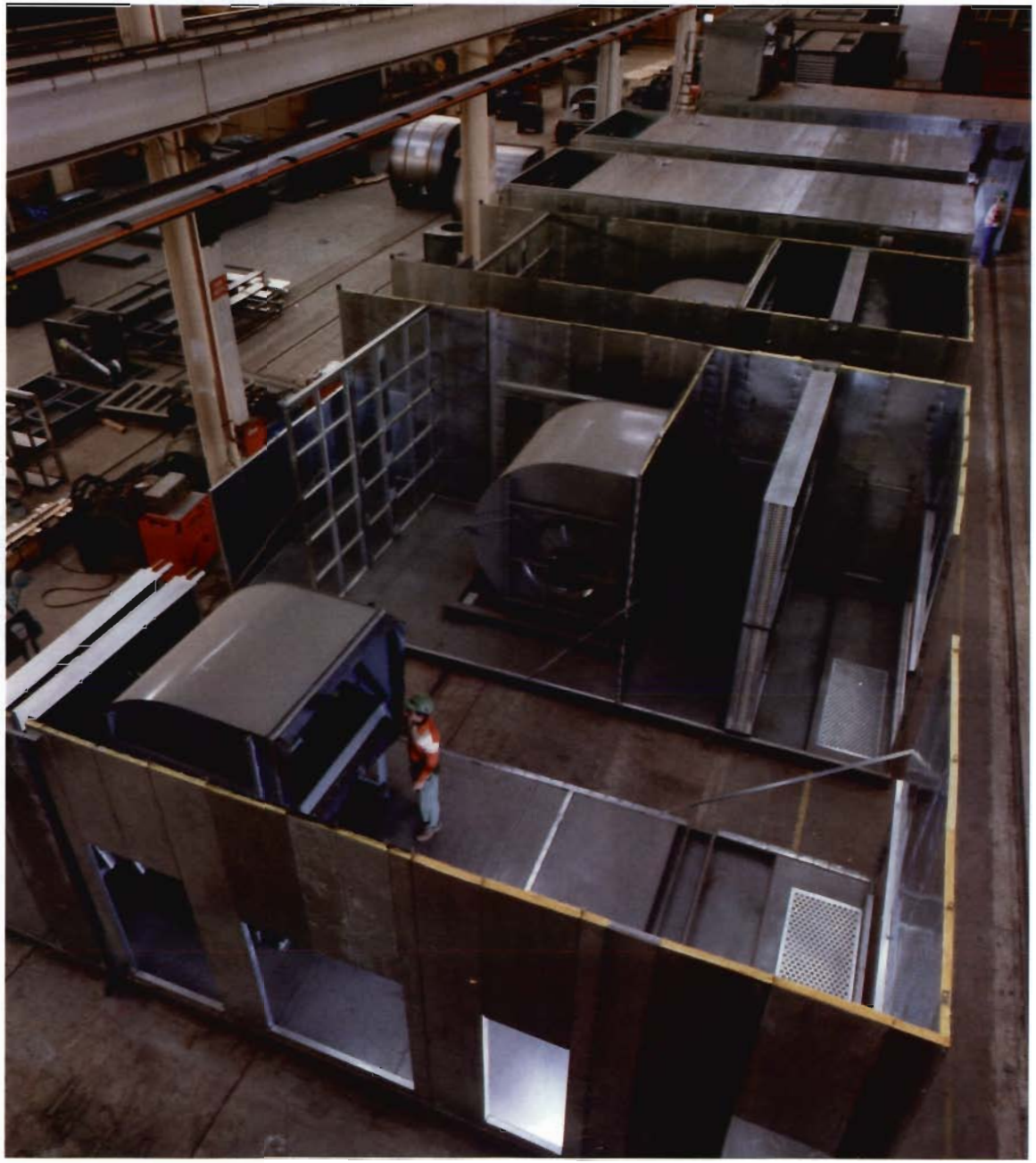


Structural steel bases provide rigid support and help prevent racking when units are installed.

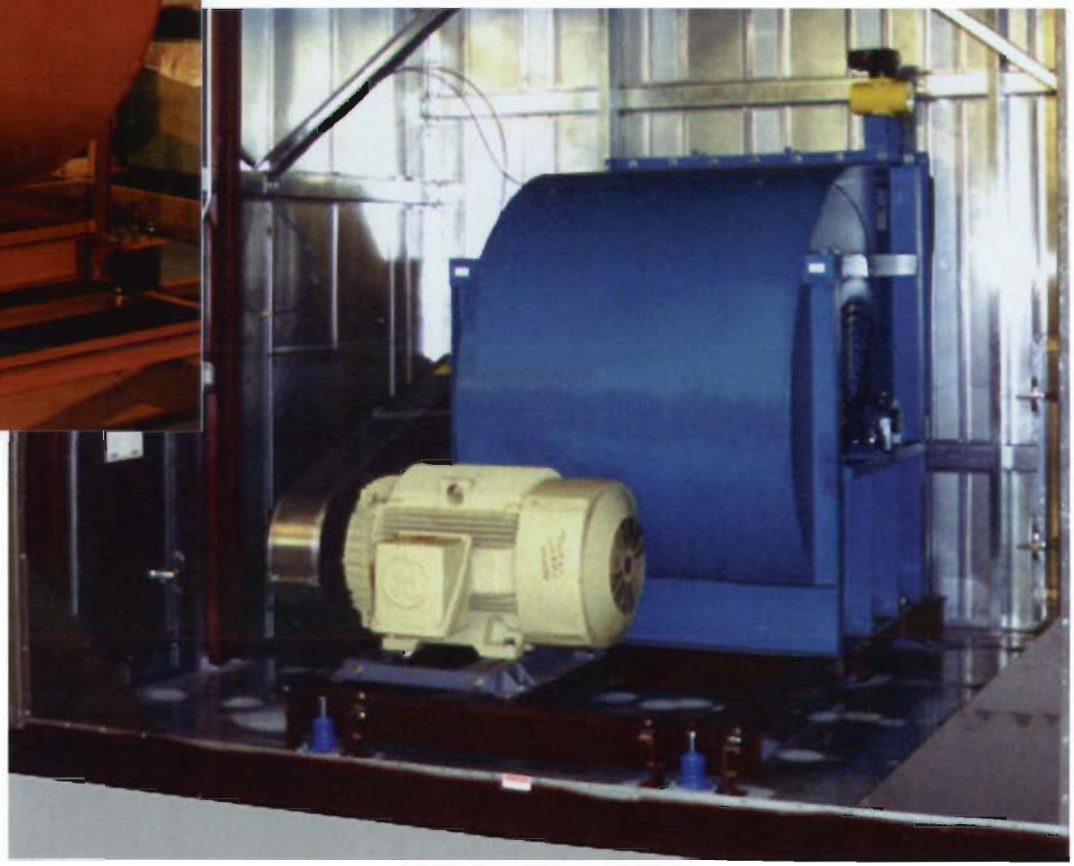
3/16" treadplate floors are an available option.

Our panels are 2" or 4" double wall, galvanized steel with 3# insulation. Walls are constructed using our state of the art metal forming process. Aluminum and stainless steel options are available.

Walls are constructed and components are placed into the unit prior to setting the roof. This overview shows a detailed look at several units before completion.

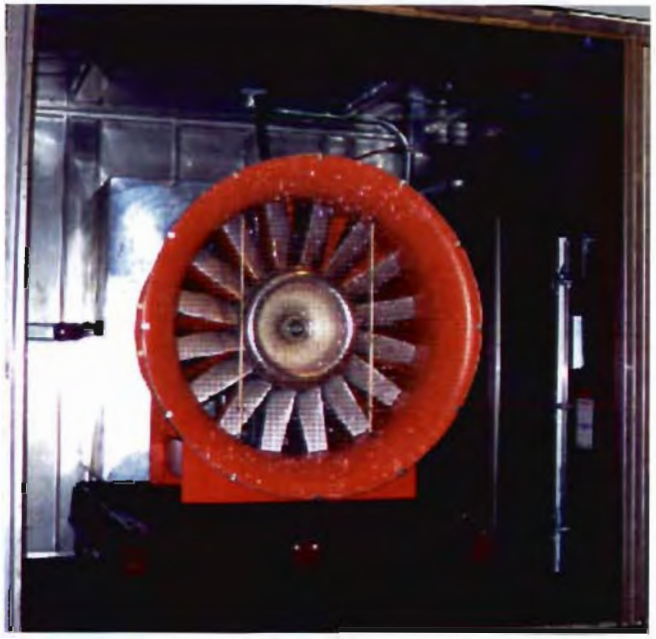


This unit will be installed outdoors on a roof.
Note the service corridor for piping.



DWDI centrifugal fans are internally isolated on springs with flex connections so vibration is not transmitted outside the unit.

Fan can be v-belt or direct drive.



Plenum and vaneaxial fans are available.

Plenum fans are good for applications with multiple discharges.

Vaneaxial fans reduce the sound generated in the lower octave bands.

Cooling coils are available with or without coil racks for independent removal. Connections are sealed when they penetrate the housing to prevent leakage.

Double pitched drain pans enhance the drainage of all coil condensate.

Various standard ASHRAE filters are offered as well as HEPA, carbon and chemical filtration. Shown are universal mounting frames and carbon filter frames.

These samples of our Model K, Big Buffalo and BA2000 units display two standard finishes; G90 galvanized and enamel coated.

This all stainless steel unit includes a desiccant dehumidifier and is for use in a candy manufacturing process.

These unit sections have a stucco aluminum exterior and will be used by a pharmaceutical company.

Evaporative cooling units are available and often used for telecommunication switch gear applications and automotive spray booths.

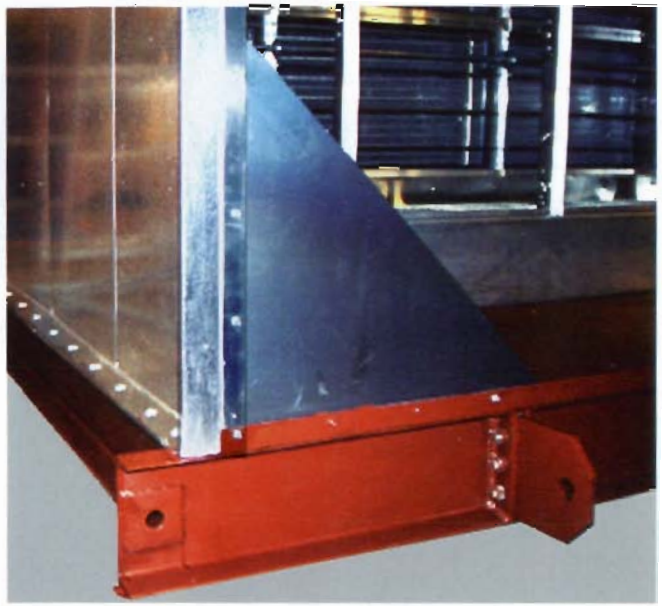
Full Control Packages are available.

Units may be pre-piped in the factory. Extra care is required in shipping.

Electrical packages include fully wired lights, switches and receptacles.

Single point wiring is available.

Vibration testing is performed on all units. Factory leakage, performance and sound testing are available and often witnessed by our customers.



Full perimeter angles at shipping splits allow for ease of installation at the job site.

Units are thoroughly cleaned prior to packaging. Note the fluorescent light; a common option.

All units or unit sections are shrink wrapped and tarped prior to shipment to protect the equipment from wear and tear during transportation.

7
Specifications

BUFFALO
AIR HANDLING

Product Listing

Model K Units

A series of air handling units which incorporate a modular set of components that include: centrifugal and plenum fans, cooling and heating coils, steam humidifiers, sound attenuators, dampers, louvers, isolators, motors, drives, pre-filters, bag or cartridge filters and lighted access sections.

These standard Model K units have capacity ranging from 3,000 CFM to 60,000 CFM and from 2" SP to 10" SP. Dimensions are standardized, thereby resulting in shorter lead times and lower cost.

Big Buffalo Units

Custom designed air handling units ranging in capacity from 500 CFM to 200,000 CFM and in pressures from 2" SP to 40" SP.

Components of all types and sizes can be incorporated, within proper design parameters. Components would include all types of fans, cooling and heating coils, all types of humidifiers, desiccant dehumidifiers, sound attenuation, dampers, louvers, isolators, motors, drives, pre-filters, all types of filters, including carbon and HEPA, mixing sections, lighted access sections, wiring, controls and gas-fired.

These Custom Big Buffalo units are designed on a specific project requirement basis to match customer's needs.

BA2000 Units

A series of air handling units which incorporate a modular set of components, mounted on a formed channel base. Twenty-one (21) standard unit sizes range from 4,000 CFM to 50,000 CFM.

This series was designed with the light industrial and commercial market in mind.

Aerofil

Humidification equipment that employs a wetted surface to humidify air. Aerofil units incorporate pump systems for recirculation of water or can be designed for once through systems. Aerofil units provide evaporative cooling for efficient use of water as a cooling medium.

PCLW

PCLW's are sprayed cooling coil units which spray water onto chilled water coils. Units include a tank and pumps to spray and recirculate water, if desired. PCLW's provide precise cooling, humidification and dehumidification of commercial and industrial processes.

Factory Performance Test Procedure

Introduction

This report outlines the test procedure to be used in the performance evaluation of a production air-handling unit. The test will be performed at the factory of Buffalo Air Handling**,** Amherst, Virginia. The in accordance with AMCA Publication 203-90, Field Performance Measurements of Fan Systems. The test will form the basis for production qualification or acceptance by determining the unit air performance for comparison with acceptance criteria in accordance with the established Buffalo Air Handling policy. The tests may be witnessed at the discretion of the parties involved.

Scope

A completed air handling unit which has passed mechanical run tests will be set up for the performance test. This test will determine unit flow rate, total static pressure across the fan, available external static pressure to overcome system losses, fan speed, input power to the fan(s) and air density. The test results shall be compared to acceptance criteria. If corrective action is required the preliminary test results will be projected to the revised operating speed based upon Fan Laws.

Test Setup

AMCA 203-90 utilizes the concept of a pitot tube traverse of the velocity pressures in a short section of straight ductwork. A test duct shall be attached to either inlet or discharge opening(s) of the air handling unit. The duct will be sized to increase the air velocity to approximately 2,500 ft/min. The test duct shall not induce non-uniform airflow resulting in an additional system effects on the fan or other components.

The test setup will not include filters. Filter losses, component losses and external losses shall be simulated by reducing the cross sectional area of a component such as the heating coil, cooling coil or another component. Throttling shall minimize non-uniform airflow to the fan resulting in an additional system effect.

The test shall include two performance test points (test pressures). The test points shall be achieved by throttling the unit as stated above.

Test Measurements and Calculations:

The test data and the calculation of results shall be as contained in AMCA Publication 203-90 as applied to an air-handling unit. In general, the planes of pressure measurement are designated as follows:

Plane 1:	Plane of the fan inlet.
Plane 2:	Plane of the fan outlet.
Plane 3:	Plane of the pitot tube traverse for flow rate (for calculation of the air density during the test).

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In addition to flow rate and pressure, the fan speed and input power will be measured for each test point. Brake horsepower values may either be calculated using input electrical measurements to the motor in conjunction with established motor efficiency values or, in cases where the motor is powered through a Variable Speed Drive, a Load Control meter shall be used. The Load Control meter shall be located across the line upstream of the Variable Speed Drive so that it will not be effected by the distorted sine wave. An allowance for V-belt drive loss, when applicable, shall be taken from Appendix L of AMCA 203.

Fan System Effect

Buffalo Air Handling shall submit an Air Handling Unit Pressure Drop Calculation. This calculation shall include internal static pressure losses for each component, external static pressure requirement, fan system effects, and extra static pressure.

For a fan in a system to perform as rated in a catalog it is necessary for the system to be constructed in such a way that the airflow pathways into and out of the fan are similar to the conditions present during the tests performed to develop the fan manufacturer's ratings. This means that the fan's inlet and outlet are free from immediate obstruction. Due to accessory requirements or space limitations their effect upon fan performance must be taken into account during fan selection.

System effects may be encountered from the proximity of walls to the fan inlet, fan inlet screens, flow measuring devices, belt guards, V-belt drives, attenuators, dampers mounted directly on a fan inlet or outlet, etc. These fan losses have been calculated from component catalog data and system effect estimates taken from AMCA Bulletin 201, Fan and Systems. These un-measurable performance losses (appurtance losses) and system effects are listed in the Air Handling Unit Pressure Drop Calculation.

Establishing Performance Point of Rating

The performance test point of rating shall be the fan rating point minus the fan system effect and extra static pressure. Refer to the Air Handling Unit Pressure Drop Calculation for the fan system effect(s) and extra static pressure. The point of rating is the combination of the internal component static pressure losses and the external static pressure requirement.

AMCA Tolerance Box

An AMCA tolerance box shall be established about the point of rating. The boundaries of the box shall be +/- 5% of the performance point of rating pressure and +/- 3% of the design CFM.

Data Points

A minimum of two data points will be taken. Data points will be at approximately +5% and –5% of design flow. The data points will be plotted on the fan manufacturers fan curve. A line shall be drawn connecting the two data points and shall parallel the fan curve. This line represents the fan performance test curve.

Acceptance Criteria

The AMCA Tolerance Box shall be plotted on the manufacturer's performance curve. If the fan performance test curve passes through or above the AMCA tolerance box and motor horsepower, including drive losses, is below nameplate horsepower, airflow shall be deemed acceptable.

Results

Upon the completion of testing a report containing test data, fan curve, AMCA Tolerance Box calculation and performance curve shall be issued. A description of any performance modification made to the unit shall be included. The report shall be forwarded to all parties involved. A sample of this data is attached.

Attached are examples of the Air Handling Unit Pressure Drop Calculation, AMCA Tolerance Box Calculation Sheet, Fan Performance Test Data, and the fan manufacturer's performance curve with performance data and AMCA Tolerance Box plotted.

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Sample: Air Handling Unit Pressure Drop Calculation

Buffalo Air Handling, Pressure Drop Program
Results Page

Version 3.04

Program User Name: SAMPLE
Date: 1/1/2010
Order Number:
Mark:
Customer Name:
Engineer:
Design AirFlow (CFM): 10500
Fan Quantity: 1
Additional Information:

Upstream External Losses (in. W.G.): 1.50
Downstream External Losses (in. W.G.): 1.50

"NOTE: A pressure drop value followed by "" indicates a user defined value.*

UpStream Components

Face Velocity	Pressure Drop	Component
727	0.02	Inlet - Wall or Ceiling, Damper
438	0.77*	Filter - 2" Pleated, Cleanliness = Dirty
438	1.15*	Filter - 12" Rigid, 95%, Cleanliness = Dirty
500	1.02*	Cooling Coil - Plate, 8 Rows
Section Total	2.96	

Fan Components

Face Velocity	Pressure Drop	Component
	0.08	Inlet screen reduction
	0.01	Outlet screen reduction
	0.25	Last component reduction
	0.20	Fan Extra Pressure
2642	0.54	Fan - Supply, Plenum, Arrangement 4, 27.00 Wheel dia.

Summary
Fan Static Pressure = 6.50

Total Internal Losses (in. W.G.): 3.50
Total External Losses (in. W.G.): 3.00
Total: 6.50

(Extra Static Pressure = 0.20, Fan Section)

Disclaimer: This program is based on performance estimates provided by original equipment manufacturers. It should be applied with reasonable engineering assumptions and the results verified.

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Sample: AMCA Tolerance Box Calculation Sheet

BUFFALO
AIR HANDLING

AMCA Performance Tolerance Box Calculation

Fan Rating Static Pressure:	6.50
Fan Rating Airflow Capacity:	10500
Fan System Effect Losses:	0.34
Fan Extra Static Pressure:	0.20
Total Fan Losses:	0.54
Center of AMCA Tolerance Box:	10500 @ 5.96
CFM Tolerance of 3%:	315 CFM
AMCA Tolerance Box Higher CFM Limit:	10815
AMCA Tolerance Box Lower CFM Limit:	10185
SP Tolerance of 5%:	0.33 in. WG
AMCA Tolerance Box Upper SP Limit:	6.29
AMCA Tolerance Box Lower SP Limit:	5.64

BAH SO No: SAMPLE Mark: _____

Customer: _____

Date: _____

Name: _____

Witness: _____

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BUFFALO AIR HANDLING

DRAWING NO. (REF. JO#): ES-8104

REV.: B

Sample: Fan Performance Test Data

BUFFALO AIR HANDLING

Buffalo Air Handling
Amherst, VA

JOB #:	SAMPLE
[illegible]:	0
[illegible]:	8.5
ACFM:	10500
[illegible]:	15.09
MOTOR HP:	20
FLA:	24.4

Plane 1: FAN INLET PLENUM
Plane 2: FAN DISCHARGE PLENUM
Plane 3: TEST DUCT (can be on unit intake or unit discharge)

INPUT DATA

SP1	SP2	SP3
-2.40	0.20	-0.44

BAROM.	TEMP. 1	TEMP. 3	DUCT DIM. 1	DUCT DIM. 2	FAN RPM
29.83	77	74	18.00	36.00	1763

VFD Angle	VFD % HZ	VFD VOLTS	Power Meter HP	VFD Hz	Motor EFF	BELT LOSS FACTOR
19.0	75.00%	460	15.0	60.0	0.83	0.00

VPS READINGS

0.10	0.10	0.16	0.41	0.29	0.25	0.40	0.19
0.11	0.26	0.17	0.42	0.28	0.25	0.29	0.18
0.05	0.26	0.29	0.29	0.38	0.58	0.17	0.18

CALCULATION RESULTS

CALC. RMS VP: 0.235 "H20

DENS.1: 0.0728 lbm/cu.ft.
DENS.3: 0.0741 lbm/cu.ft.

FAN CFM: 9033 cu.ft./min.

FAN TOTAL SP: 6.62 "H20 gauge

MOTOR BHP: 15.5 hp
FAN BHP: 15.5 hp

All fan and motor calculated data is based on an air density of 0.0750 lbs/cu.ft., an elevation of 0 feet and an air temperature of 70 deg F.

(Technician Signature) (Date)

(Witness Signature) (Date)

(Engineering Manager Signature) (Date)

Certified to be Correct

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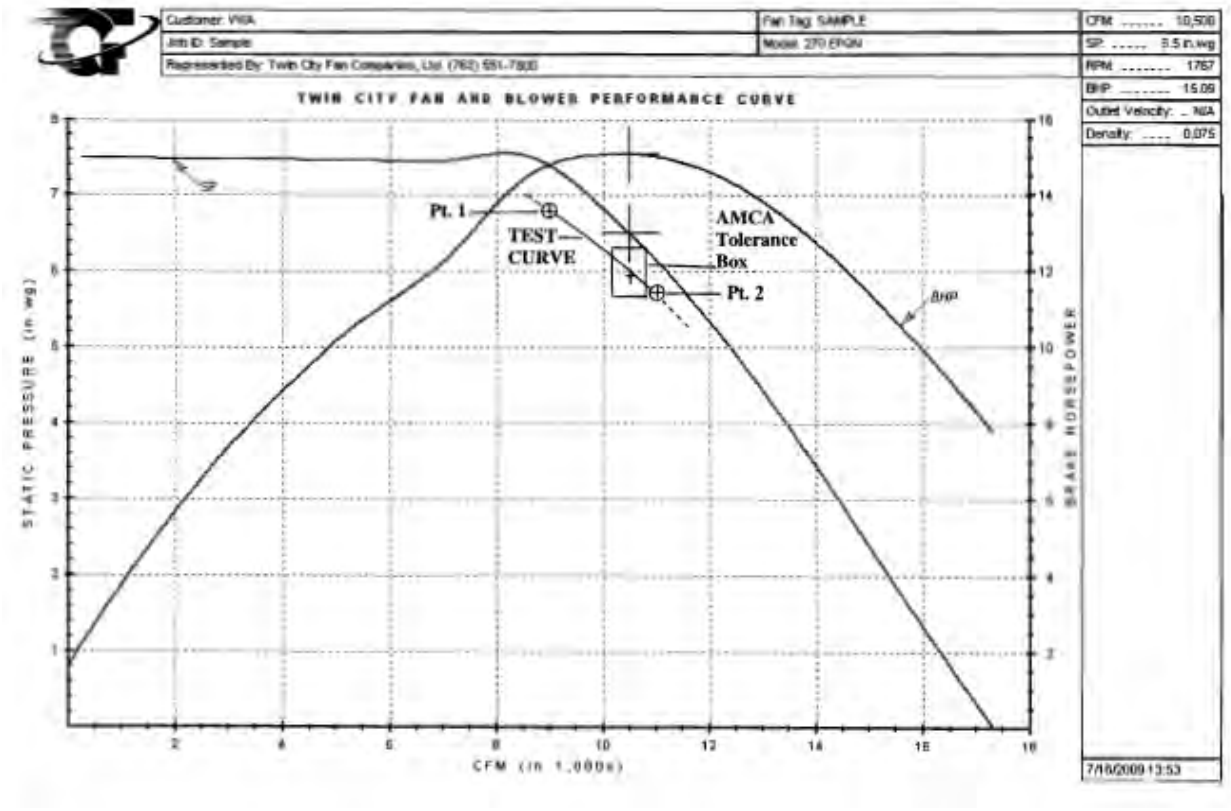
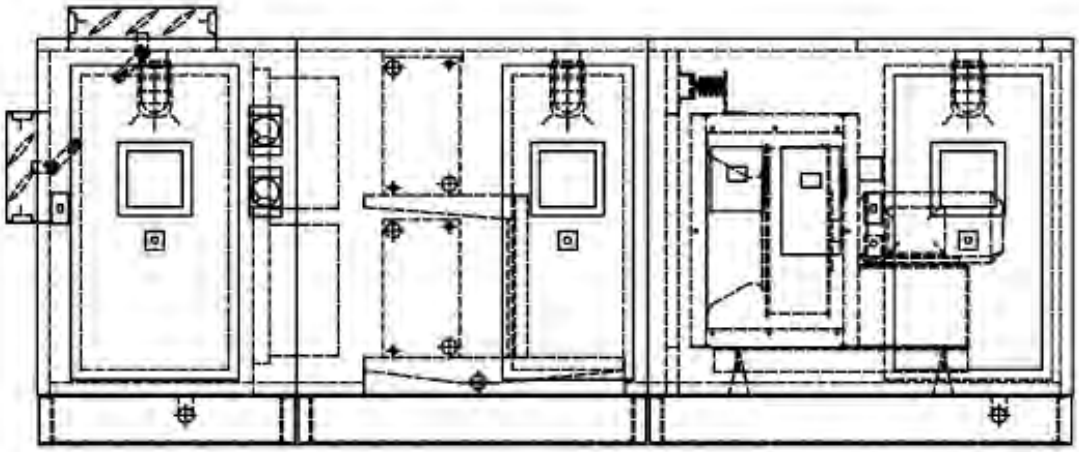
Sample: Fan Curve With Plot of AMCA Tolerance Box and Typical Fan Performance Data





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Factory Sound Power Test Procedure

Introduction

This report outlines the test procedure to be used in the sound power level evaluation of a production air handling unit. The unit will be tested at the Buffalo Air Handling factory in Amherst, Virginia. The test will be conducted in general accordance with ANSI Standard S12.12, 1992 and/or AMCA 320-08 utilizing the sound intensity method of determining sound power level. The test forms a basis for product qualification or acceptance in accordance with Buffalo Air Handling policy or as contained in specifications.

Scope

A completed air handling unit, which has passed a mechanical run test, will be set up for a sound intensity test. The test may be conducted prior to or in conjunction with a performance test provided there is assurance that the unit is performing properly and that it will closely satisfy performance requirements.

Sound intensity measurements will be made at designated openings of the air handling unit for comparison with acceptance criteria.

Test Setup

There shall be sufficient space maintained between openings and adjacent equipment on the shop floor, roughly 4 meters for return openings and 6 meters for supply air openings. Background noise shall be minimized and may require measurements to be made during non-manufacturing periods.

Throttling of the air handling unit shall be done in such a manner as to not create extra noise at the measurement location. Openings to be tested shall be unobstructed. Internal throttling shall be achieved by adding resistance to an internal component that does not add or subtract from the noise level and does not produce uneven velocity profile which could result in a system effect on the fan or a component.

Test Measurements

Test measurements will be made using ANSI Standard S12.12-1992 (R 2007), “Engineering Method for the Determination of Sound Power Levels of Noise Sources Using Sound Intensity” as a basis. Test instrumentation shall be an integrating real time analyzer with built-in sound intensity software in conjunction with a dual microphone pressure-velocity sound intensity probe. Measurements to be taken with a Bruel & Kjaer Model 2260 Real Time Analyzer and a Bruel & Kjaer Model 3520 Sound Intensity Probe. This instrumentation conforms to the ANSI requirements for Type 1 microphones and analyzers. The instrument shall be under current calibration traceable to NIST and field calibrated prior to testing according to the manufacturers specifications.

Test Measurements (continued)

The test surfaces should account for all sound emanating from the source at the openings. A suitable wind screen should be used to minimize the effects of air velocity over the probe. It is permissible to use a piece of acoustically transparent filter media between the opening and the microphone to further reduce the effects of air velocity. To further reduce the effects of air velocity, an imaginary boundary of a known area around the surface being surveyed can be laid out. Using a microphone sweep rate of less than three meters/second a traverse of the test surface using a manual scanning method utilizing a horizontal orthogonal offset pattern is made. Measurements will be taken simultaneously in all 1/3 octave bands between 50 Hz and 1250 Hz utilizing a 50 mm spacer between the two calibrated and phase matched microphones as per the ANSI test. Measurements shall be taken simultaneously in all 1/3 octave bands between 100 Hz and 10kHz utilizing a 12 mm spacer. The results are reported in full octave bands between 63 Hz and 8 kHz octave bands. The results are reported as sound power level (dB – ref. 1 pW) in each octave band. The area of each test opening and fan performance (static pressure and airflow volume) shall be reported.

Acceptance Criteria

In general the radiated sound level from each opening should be within AMCA Certified Ratings Program tolerance of sound levels containing in the specification. That is +6 dB in the first octave band and +3 dB in each succeeding octave band. Consideration should also be given to the fact that the first three octave bands determine the overall sound level leaving and the possibility of a greater tolerance in bands 4-8.

ES-8105

BUFFALO AIR HANDLING

Buffalo Air Handling

Factory Sound Power Test Report

Shop Order No.: _____
Job Order No.: _____
Customer: _____
End User: _____
Engineer: _____
Mark No.: _____

Date: _____
Technician: _____

Instrument: Bruel & Kjaer D-2260: 3560
Unit Static Pressure: _____
Unit CFM _____

Octave Band		1	2	3	4	5	6	7	8	
(Center Frequency, Hz)		63	125	250	500	1000	2000	4000	8000	

Sound Power level (dB - ref: 1pW)

(Test report based on Buffalo Air Handling Engineering Standard ES-8105A)

_____
(Technician Signature, witness test) (Date)

_____
(Witness Signature) (Date)

_____
(Engineering Manager Signature) (Date)

Certified to be Correct

REV.		
A	1. REVISED ENTIRE ES.	
B	1. CHANGED TITLE BLOCK LOGO.	1/22/10

REFERENCE:

TITLE: Factory Sound Power Test Procedure			
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK	
BUFFALO AIR HANDLING	DATE: 8/26/09	PAGE: 3 of 3	
	DRAWING NO. (REF. JO#): ES-8105	REV.: B	

Factory Sound Pressure Test Procedure

Introduction

This report outlines the test procedure to be used in the sound pressure evaluation of a production air-handling unit. The test will be conducted at the factory of Buffalo Air Handling, Amherst, Virginia. The test forms the basis for product qualification or acceptance by determining the sound pressure levels at the openings of the unit for comparison with acceptance criteria as established Buffalo Air Handling policy or with that contained in the specification.

Scope

A completed air-handling unit that has passed mechanical run tests will be set up for sound pressure tests. The sound test may be conducted prior to or in conjunction with a performance test provided there is assurance that the unit is performing properly and that it will closely satisfy performance requirements.

Test Setup

The unit will be operated at or close to the point of rating. The total static pressure will be achieved by throttling an internal component thus adding internal resistance. Throttling shall neither add or subtract from the sound nor create non-uniform velocity patterns, which could result in a system effect upon the fan or a component.

Test Measurement

The sound pressure test will be conducted with the unit operating at the desired rating point. A Bruel & Kjaer D2238 Sound Level Meter or equal, which is capable of measuring in eight octave bands on a C scale with a slow response, will be used to measure the sound pressure level emanating from the openings. The measurements will be made in a manner so as to maintain a constant distance of three feet from the opening or at a distance contained in specification.

Conversion to other distances by the inverse square law may be made if agreed to by the parties involved. An average/representative reading will be obtained over as much of the opening as practical to minimize the possibility of standing waves or masking of the sound by an obstruction.

Since this type of test is greatly influenced by background noise, care must be exercised so as to minimize intrusions from other sound sources. It may be necessary to conduct the tests during manufacturing down time or outside working hours.

Acceptance Criteria

The sound pressure level will be within the AMCA Certified Rating Program tolerance or sound levels contained in the specification. That is +6 dB in the first octave band and +3 dB in each succeeding octave band. Reasonable judgment must be used in that the first three octave bands dictate the overall sound pressure level, thus leaving the possibility of a greater tolerance in the upper bands increasing the overall sound pressure level.

REV.		
A	1. REVISED ENTIRE ES.	
B	1/22/10	1. CHANGED TITLE BLOCK LOGO.

REFERENCE:

TITLE: Factory Sound Pressure Test Procedure		
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK
BUFFALO AIR HANDLING	DATE: 8/18/09	PAGE: 1 of 2
	DRAWING NO. (REF. JO#): ES-8106	REV.: B

BUFFALO AIR HANDLING

Buffalo Air Handling

Factory Sound Power Test Report

Shop Order No.: _____
Job Order No.: _____
Customer: _____
End User: _____
Engineer: _____
Mark No.: _____

Date: _____
Technician: _____

Instrument: Bruel & Kjaer D-2260: 3560
Unit Static Pressure: _____
Unit CFM _____

Octave Band		1	2	3	4	5	6	7	8	
(Center Frequency, Hz)		63	125	250	500	1000	2000	4000	8000	

Sound Power level (dB - ref: 1pW)

(Test report based on Buffalo Air Handling Engineering Standard ES-8105A)

(Technician Signature, witness test) (Date)

(Witness Signature) (Date)

(Engineering Manager Signature) (Date)

Certified to be Correct

REV.	
A	1. REVISED ENTIRE ES.
B	1/22/10 1. CHANGED TITLE BLOCK LOGO.

REFERENCE:

TITLE: Factory Sound Pressure Test Procedure			
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK	
BUFFALO AIR HANDLING	DATE: 8/18/09	PAGE: 2 of 2	
	DRAWING NO. (REF. JO#): ES-8106	REV.: B	

ES-8107

Factory Vibration Test Procedure

Introduction

This report outlines the test procedure to be used in the vibration evaluation of a production air-handling unit fan. The test will be conducted at the factory of Buffalo Air Handling, Amherst, Virginia. The test forms the basis for product qualification or acceptance criteria as established in accordance with ANSI/AMCA Standard 204-05, Balance Quality and Vibration Levels for Fans.

Scope

A completed air handling unit with a fan which has been aligned, balanced and in which there is no looseness will be run at design speed and as close as practical to the design pressure.

Test Procedure

A vibration analyzer, CSI Model 2120A Series from RBM Consultants or equal, will be used to measure the vibration levels in velocity (in/sec peak). The readings will be taken in the horizontal, axial (where accessible) and vertical direction on the housing of fan and motor bearings. When safe access is not available, as on direct driven axial fans, the vibration readings shall be taken on the fan housing adjacent to the motor bearings. All readings shall be reported in tabular form.

Acceptance Criteria

Acceptance is based upon ANSI/AMCA Standard 204-05, which specifies the peak vibration limit for fan tests conducted at the factory. A function of this acceptance criteria is whether the equipment is mounted upon fixed (rigid) supports or on spring isolators (flexible) supports.

Fan applications are sub-divided into balance and vibration categories BV-1 through BV-5. The balance and vibration category divisions reflect their application and drive power to arrive at appropriate balance and vibration (BV) levels as defined in ANSI/AMCA Standard 204-05. Those vibration levels for air-handling unit fans are as follows:

Application Factory, Filter-in	Driver Horsepower	Fan Application Category, BV	Rigid Mounting (in/sec)	Flexible Mounting (in/sec)
HVAC	≤ 5.0	BV-2	0.20	0.30
	> 5.0	BV-3	0.15	0.20

Buffalo Air Handling flexible mounting fan vibration acceptance criteria have been established at levels below the AMCA tolerance. Those factory test vibration levels are as follows.

Application Factory, Filter-in	Driver Horsepower	Fan Application Category, BV	Rigid Mounting (in/sec)	Flexible Mounting (in/sec)
HVAC	≤ 5.0	BV-2	0.16	0.16
	> 5.0	BV-3	0.15	0.16

REV.		
A	1. REVISED ENTIRE ES.	
B	1. CHANGED TITLE BLOCK LOGO.	1/22/10

REFERENCE:

TITLE: Factory Vibration Test			
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK	
BUFFALO AIR HANDLING	DATE: 7/22/09	PAGE: 1 of 4	
	DRAWING NO. (REF. JO#): ES-8107		REV.: B

Buffalo Air Handling will monitor the “overall” “filter-out” vibration levels at each location to check possible vibration sources other than balance. Overall vibration levels shall not exceed those stated below and will not be reported.

Application Factory, Filter-out	Driver Horsepower	Fan Application Category, BV	Rigid Mounting (in/sec)	Flexible Mounting (in/sec)
HVAC	≤ 5.0	BV-2	0.25	0.30
	> 5.0	BV-3	0.20	0.30

The field (*in-situ*) fan vibration level is not the responsibility of Buffalo Air Handling unless specified in the purchase contract and agreed to by Buffalo Air Handling. ANSI/AMCA 204-5 does not designate “filter-in” field fan vibration levels.

When verification of fan balance in the field is provided by Buffalo Air Handling the acceptance criteria shall be “filter-in” factory level as stated in ANSI/AMCA 204-5. Those vibration levels are as stated below.

Application Start-up, Filter-in	Driver Horsepower	Fan Application Category, BV	Rigid Mounting (in/sec)	Flexible Mounting (in/sec)
HVAC	≤ 5.0	BV-2	0.20	0.30
	> 5.0	BV-3	0.15	0.20

ANSI/AMCA 204-5 does designate field “filter-out” fan vibration levels. Buffalo Air Handling shall verify that the fan vibration levels are below ANSI/AMCA 204-5. Overall field “filter-out” vibration levels will not reported.

Application Start-up, Filter-out	Driver Horsepower	Fan Application Category, BV	Rigid Mounting (in/sec)	Flexible Mounting (in/sec)
HVAC	≤ 5.0	BV-2	0.30	0.50
	> 5.0	BV-3	0.25	0.35

When required and accepted by Buffalo Air Handling a velocity spectrum may be provided for the range of 0-200Hz (0-120,000 cpm) at the fan operating speed. A velocity spectrum analysis is not part of the standard vibration test.

Prior to acceptance of an order Buffalo Air Handling must review vibration criteria in addition to or exceeding those stated above.

REV.		
A	1. REVISED ENTIRE ES.	
B	1. CHANGED TITLE BLOCK LOGO.	1/22/10

REFERENCE:

TITLE: Factory Vibration Test

DRAWING STATUS: Complete

DESIGNER: D.M. /T.R.K.

APPROVED BY: TRK

DATE: 7/22/09

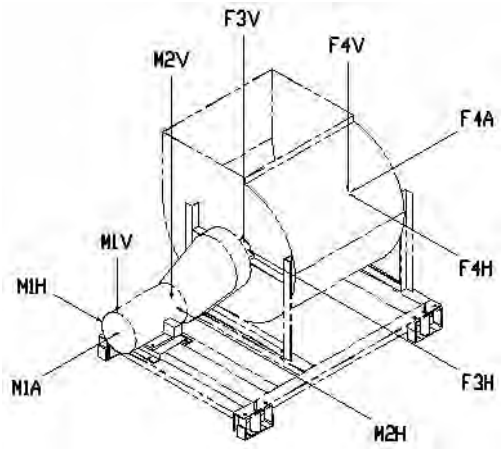
BUFFALO AIR HANDLING

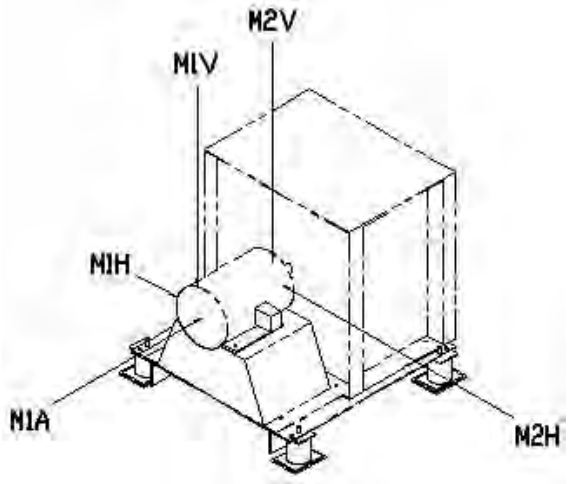
DRAWING NO. (REF. JO#): ES-8107

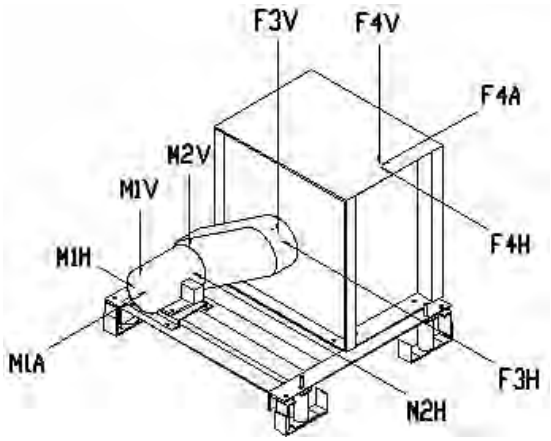
REV.: B

Vibration Readings

Vibration readings shall be taken at fan and motor bearing locations a noted below.







Vibration Report

A factory vibration report shall be provided to all parties involved. It shall be as shown below with a drawing of a representative fan. (Plenum fan vibration report sample below.)

REV.		
A	1. REVISED ENTIRE ES.	
B	1/22/10	1. CHANGED TITLE BLOCK LOGO.

REFERENCE:

TITLE: Factory Vibration Test

DRAWING STATUS: Complete

DESIGNER: D.M. /T.R.K.

APPROVED BY: TRK

DATE: 7/22/09

PAGE: 3 of 4

BUFFALO AIR HANDLING

DRAWING NO. (REF. JO#): ES-8107

REV.: B

ES-8107

BUFFALO
AIR HANDLING

Buffalo Air Handling

Vibration Report Plenum

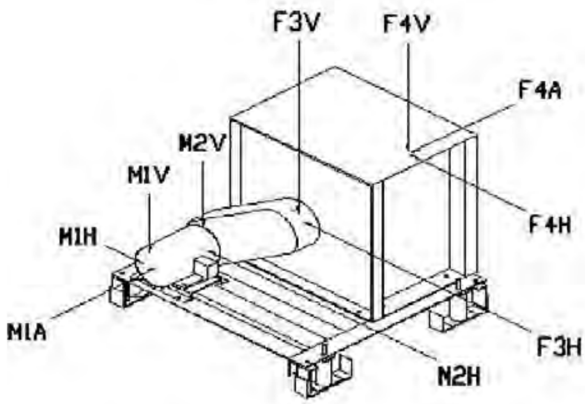
Factory Vibration Test Report:

Shop Order No.: __________
Job Order No.: __________
Customer: __________
End User: __________
Engineer: __________
Mark No.: __________

Number of Fans: __________
Fan RPM: __________
Fan Mounting: __________
Fan Rating: __________
Fan Vibration Limit: __________
Pass/ Fail: __________

Date: __________
Technician: __________

Vibration Instrument: CSI 2120
Serial Number: __________



Vibration Readings (in/sec):

M1H __________
M1V __________
M1A __________
M2H __________
M2V __________

F3H __________
F3V __________
F4H __________
F4V __________
F4A __________

____
(Technician Signature, witness test) (Date)

____
(Witness Signature) (Date)

____
(Engineering Manager Signature) (Date)

Certified to be Correct

REV. A 1. REVISED ENTIRE ES.
REV. B 1/22/10 1. CHANGED TITLE BLOCK LOGO.

REFERENCE:

TITLE Factory Vibration Test		
DRAWING STATUS Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK
BUFFALO AIR HANDLING	DATE: 7/22/09	PAGE: 4 of 4
	DRAWING NO. (REF. JO#) ES-8107	REV. B

Velocity Profile Test Procedure

Introduction

This report outlines the test procedure to be used in a velocity profile test of a production air handling unit. The test will be conducted at the Buffalo Air Handling factory in Amherst, Virginia. The test forms a base for product qualification or acceptance by determining the face velocity distribution across the face of a component with acceptance criteria in accordance with established Buffalo Air Handling policy.

Scope

A completed air-handling unit will be operated at design speed and in close proximity to design pressure. The effective area of each component to be profiled will be divided into four quadrants through which airflow will pass.

Each quadrant will be subdivided into a grid pattern as follows:

Filter velocity profile test: One velocity measurement will be recorded within the perimeter of each half (12" x 24") and/or whole (24" x 24") filter frame. Each filter frame will have two 23% free area, 3/16" holes on 3/8" centers, staggered hole pattern galvanized steel panels mounted within the frame to simulate filter pressure drop.

Hot water heating, steam heating and cooling coil velocity profile test: Coil finned surfaces may be produced in numerous dimensional increments. Buffalo Air Handling velocity measurements will be 8" to 18" on center. Measurements may overlap or have a gap between each 14" x 14" velocity probe location. A sufficient number of readings shall be taken to insure a representative distribution of airflow through the effective coil area.

Velocity measurements will be taken using a Shortridge Instruments, Inc. Airdata Multimeter AMD-870 electronic micromanometer utilizing the Shortridge Velgrid Assembly. The instrument shall be calibrated by the manufacturer per NIST.

Acceptance Criteria

The general acceptance criteria will be such that no individual velocity measurement shall exceed the average velocity of its quadrant by more than 20%. The velocity reading average for a quadrant shall not exceed the overall component velocity reading by more than 10%. See special considerations for additional criteria.

REV.		
A	1. REVISED ENTIRE ES.	
B	1/22/10	1. CHANGED TITLE BLOCK LOGO.

REFERENCE:

TITLE: Factory Velocity Profile Test Procedure			
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK	
BUFFALO AIR HANDLING	DATE: 12/1/08	PAGE: 1 of 5	
	DRAWING NO. (REF. JO#): ES-8108		REV.: B

Special Considerations:

1. Component spacing, component effective area and/or physical layout of a unit, such as the location of an inlet or outlet opening adjacent to a component, may adversely affect the velocity profile readings. Inlet and outlet openings must be axially aligned to the measured component. The angle formed by a tangential line between the sides of two components in succession cannot be more than 45 degrees. Acceptance criteria are based upon components of roughly equal effective area separated by a minimum of 24 inches. Consult factory for revised acceptance criteria if layout does not meet stated conditions.
2. Buffalo Air Handling reserves the right to disregard velocity measurement anomalies due to the distribution of airflow through successive components of different effective areas. Anomalies shall be defined as one or two readings in each quadrant that may exceed the average of the quadrant by more than 20% but be less than 35% of the quadrant average. Anomalies shall be circled on the test report.
3. Where component access and/or component performance will not be compromised, high velocity spikes may be corrected by the placement of an upstream perforated plate.

Test Report

Velocity measurements shall be submitted to the customer in the format as shown on pages 4 and 5 of this procedure. The data shall be provided with a summary of the test procedure as shown on page 3.

REFERENCE:

TITLE: Factory Velocity Profile Test Procedure			
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK	
BUFFALO AIR HANDLING	DATE: 12/1/08	PAGE: 2 of 5	
	DRAWING NO. (REF. JO#): ES-8108		REV.: B

Velocity Profile Test Report

1. The velocity profile test was conducted per Buffalo Air Handling Engineering Standard Velocity Profile Test Procedure, ES-8108A, dated December 1, 2008.
2. Velocity measurements were collected with a Shortridge Instruments, Inc. AirData Multimeter, Model ADM-870, Electronic Micromanometer utilizing the VelGrid air velocity probe.
3. VelGrid air velocity probe measurements represents 16 velocity pressure points over the 14" x 14" VelGrid air velocity probe.
4. Shortridge Instruments, Inc. requires that measurements be taken at a minimum of 1-1/2" from the edge of a coil casing or perimeter of a filter bank.
5. Velocity measurements are shown on the test report(s). Separate reports are issued for each filter and/or coil to be tested in each unit.
6. Downstream measurements are preferred as they are more representative of airflow through the component. Velocity measurements may be recorded upstream of the component when requested and approved by Buffalo Air Handling.
7. The component effective airflow area is divided into four quadrants. Velocity measurements are made in each quadrant according to procedures in ES-8108A. Quadrants are numbered from top to bottom and left to right in orientation. Quadrant number one is in the upper left corner.
8. Ancillary information concerning the component being tested is shown on the report.
9. Quadrant average velocities, quadrant maximum velocities, overall average velocity and comparison of maximum velocity to quadrant and overall velocities are provided.
10. Average component velocity multiplied by the effective area is an estimate of the airflow capacity of the unit. Estimated capacity may vary by +/- 15% when compared to data obtained by a fan performance test.
11. Electronic Multimeter VelGrid velocities may be adversely affected by the presence of the Technician recording measurements and/or instantaneous measurement changes due to the instrument sensitivity. For this reasons Buffalo Air Handling reserves the right to disregard up to two velocity anomalies in each quadrant provided that they fall within 35% of the quadrants' average velocity. Anomalies shall be circled on the test report.
12. Air velocity measurements in height of a coil casing are centered between 8" and 11". VelGrid air probe measurements therefore overlap one another. This permits Buffalo Air Handling to obtain more velocity measurements to reflect the profile within the finned area.
13. Air velocity measurements in length of a coil casing are centered between 10" and 18". VelGrid air probe readings may overlap or have a small gap between centers. This spacing will provide representative data for short tube length coils by overlapping measurements and reduce measurements on long tube length coils.
14. Air velocity measurements will be recorded at the center of each 24" x 24" filter frame. When filter frames are 12" x 24", the velocity probe shall overlap the adjoining filter frame and maintaining a 1-1/2" offset from the outer perimeter of the filter bank.
15. Filter frame shall have two layers of perforated plate installed to simulate filter resistance. The approximate pressure drop across the perforated plates is 0.75" WG.

REV.		
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B	1/22/10	1. CHANGED TITLE BLOCK LOGO.

REFERENCE:

TITLE: Factory Velocity Profile Test Procedure			
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK	
BUFFALO AIR HANDLING	DATE: 12/1/08	PAGE: 3 of 5	
	DRAWING NO. (REF. JO#): ES-8108		REV.: B

SO No: Sample Data
Test Pressure:
Technician:
Date:
Mark No:
Customer:

(Engineering Manager Signature) (Date)

Certified to be Correct

(Witness Signature) (Date)

(Technician Signature, witness test) (Date)

Please Note: Quadrant #1 is shaded.
Quadrant #2 is below Quadrant #1.
Quadrants #3 and #4 are on the right.

Filter Bank Size and Identification

	Filters High	Filters Wide		Face Area
Prefilter	6.0	12.0	=	288.0
Intermediate Filter			=	0.0
Final Filter			=	0.0
HEPA Filter			=	0.0
Filter Bank Face Area =				288.0sqft

1. Data collection was: Upstream ☒ Downstream ☐

2. Access door located on the: Right ☒ Left ☐

Data points in width.

Data points in height.	1	2	3	4	5	6	7	8	9	10	11	12
	525	555	550	425	525	525	550	550	425	525	425	565
	550	525	425	525	550	550	525	425	525	550	550	525
	425	525	550	525	425	425	525	550	525	425	426	525
	550	425	525	550	425	550	425	525	550	425	525	425
	425	525	550	525	425	425	525	550	525	425	426	525
	550	425	525	550	425	550	425	525	550	425	525	425

Quadrant #1	Average Velocity:	506fpm	Maximum Velocity:	555fpm
Quadrant #2	Average Velocity:	496fpm	Maximum Velocity:	550fpm
Quadrant #3	Average Velocity:	507fpm	Maximum Velocity:	565fpm
Quadrant #4	Average Velocity:	485fpm	Maximum Velocity:	550fpm

Filter Bank Average Velocity: 498fpm

Quadrant #1	Maximum Velocity <1.2 x Average Velocity	Yes, <20%
Quadrant #2	Maximum Velocity <1.2 x Average Velocity	Yes, <20%
Quadrant #3	Maximum Velocity <1.2 x Average Velocity	Yes, <20%
Quadrant #4	Maximum Velocity <1.2 x Average Velocity	Yes, <20%

Quadrant #1	Quadrant #1 Average Velocity <1.1 Filter Bank Average Velocity?	Yes, <10%
Quadrant #2	Quadrant #2 Average Velocity <1.1 Filter Bank Average Velocity?	Yes, <10%
Quadrant #3	Quadrant #3 Average Velocity <1.1 Filter Bank Average Velocity?	Yes, <10%
Quadrant #4	Quadrant #4 Average Velocity <1.1 Filter Bank Average Velocity?	Yes, <10%

Estimated Unit Capacity: 143528 CFM

REV.		
A	1. REVISED ENTIRE ES.	1/22/10
B	1. CHANGED TITLE BLOCK LOGO.	

REFERENCE:

TITLE: Factory Velocity Profile Test Procedure			
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK	
BUFFALO AIR HANDLING	DATE: 12/1/08	PAGE: 4 of 5	
	DRAWING NO. (REF. JO#): ES-8108	REV.: B	

ES-8108

BUFFALO AIR HANDLING

SO No:	Sample Data
Test Pressure:	
Technician:	
Date:	
Mark No:	
Customer:	

(Engineering Manager Signature) (Date)

Certified to be Correct

(Witness Signature) (Date)

(Technician Signature, witness test) (Date)

Coil Finned Surface

	Fin Height	x	Fin Width	=	Face Area
1	36.0	x	102.0	=	25.5
2	36.0	x	102.0	=	25.5
3		x		=	0.0
4		x		=	0.0

Coil Bank Total Face Area: 51.0 Sq.ft.

Please Note: Quadrant #1 is shaded. Quadrant #2 is below Quadrant #1. Quadrants #3 and #4 are on the right.

Data points in width:

Data points in height	1	2	3	4	5	6
1	500	525	560	525	585	566
2	510	525	580	512	545	522
3	515	575	588	580	514	512
4	500	525	560	525	585	566
5	510	525	580	512	545	522
6	515	575	588	580	514	512

1. Data collection was:
   - Upstream ☐
   - Downstream ☒
2. Access door located on the:
   - Right ☒
   - Left ☐
3. Coil bank duty:
   - Cooling ☒
   - Heating ☐

Quadrant #1	Average Velocity:	542	fpm	Maximum Velocity:	588	fpm
Quadrant #2	Average Velocity:	542	fpm	Maximum Velocity:	588	fpm
Quadrant #3	Average Velocity:	540	fpm	Maximum Velocity:	585	fpm
Quadrant #4	Average Velocity:	540	fpm	Maximum Velocity:	585	fpm

Coil Bank Average Velocity: 541 fpm

Quadrant #1	Maximum Velocity <1.2 x Average Velocity	Yes, <20%
Quadrant #2	Maximum Velocity <1.2 x Average Velocity	Yes, <20%
Quadrant #3	Maximum Velocity <1.2 x Average Velocity	Yes, <20%
Quadrant #4	Maximum Velocity <1.2 x Average Velocity	Yes, <20%

Quadrant #1	Quadrant #1 Average Velocity <1.1 Coil Bank Average Velocity?	Yes, <10%
Quadrant #2	Quadrant #2 Average Velocity <1.1 Coil Bank Average Velocity?	Yes, <10%
Quadrant #3	Quadrant #3 Average Velocity <1.1 Coil Bank Average Velocity?	Yes, <10%
Quadrant #4	Quadrant #4 Average Velocity <1.1 Coil Bank Average Velocity?	Yes, <10%

Estimated Unit Capacity: 27594 CFM

REV. A 1. REVISED ENTIRE ES.
REV. B 1/22/10 1. CHANGED TITLE BLOCK LOGO.

REFERENCE:

TITLE Factory Velocity Profile Test Procedure

DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK
BUFFALO AIR HANDLING	DATE: 12/1/08	PAGE: 5 of 5
	DRAWING NO. (REF. JO#) ES-8108	REV. B

Deflection Test Procedure

Introduction

This report outlines the test procedure to be used to determine the deflection of the unit casing while subjected to an internal positive or negative pressure. The test will be conducted at the factory of Buffalo Air Handling, Amherst, Virginia. The test forms a basis for product qualification or acceptance by determining casing deflection for comparison with the acceptance criteria in accordance with established Buffalo Air Handling policy or with that contained in the applicable specification.

Scope

A completed air handling unit, which has passed mechanical run tests, shall be subjected to a positive and/or negative internal static pressure equal to 1.25 times the operating static pressure.

The operating pressure is defined as the maximum pressure an individual air handling unit section experiences under normal operating conditions. The operating pressure for an air handling unit is the summation of the external static pressure experienced by that section plus the internal pressure losses of the components within the section such as coils, dampers, filters, and/or other appurtenance losses that may be assigned to that section of the unit.

The difference between operating static pressure and other referenced pressures is as follows:

1. Design pressure is the pressure for which the unit has been designed. It would not occur during normal operation of the unit.

2. Fan static pressure is the rated pressure of the air handling unit fan. It incorporates both positive and negative internal and external pressures. These pressures are not applicable to all sections of an air handling unit during normal operation.

3. Fan peak pressure or shut off pressure are attributes of fan curve away from the operating pressure. These pressures would not occur during normal operation of the unit.

Test Procedure

Unit/section openings shall be closed off using plywood or sheet metal and sealed around the edges. A pressure gage shall be connected to the unit to monitor internal static pressure. Positive and/or negative pressure sections shall be connected to a test fan with ductwork. The test fan shall be throttled with an inlet plate or discharge damper to the test pressure. A taunt line will be drawn at mid-height along each side and at mid-width along the roof of the pressurized sections. Measurement to the nearest 1/16th inch will be recorded at panel extrusions between the line and the air handling unit before pressurization. Each measurement will be repeated at the test pressure. Deflection shall be defined as the difference between the two measurements.

REV.		
A	1. REVISED ENTIRE ES.	
B	1/22/10	1. CHANGED TITLE BLOCK LOGO.

REFERENCE:

TITLE: Factory Deflection Test Procedure			
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK	
BUFFALO AIR HANDLING	DATE: 8/19/09	PAGE: 1 of 2	
	DRAWING NO. (REF. JO#): ES-8109		REV.: B

Acceptance Criteria

. The air handling wall deflection shall not exceed 1/200th of the unit height and/or section length which ever is shorter. The air handling roof deflection shall not exceed 1/200th of the unit width and/or section length which ever is shorter.

Special Considerations

1. Exterior sides/surfaces containing more than 50% surface area of components such as filters, dampers or louvers are not subject to the deflection criteria.
2. The factory prior to acceptance of an order must approve test pressures in excess of 1.25 times the operating static pressure.
3. A negative pressure deflection test may be applied to an air handling unit, which has both positive and negative sections, as long as the negative sections comprise at least three fourths of the unit. The test pressure shall be 1.25 times the greater operating pressure. An example would be a draw through unit with a return fan and mixing sections. The return air section (negative) and mixing section (positive) would be incorporated into the negative pressure test of the draw through unit.

Test Report

Upon completion of the test a report shall be forwarded to all parties designated in the specification.

REV.		
A	1. REVISED ENTIRE ES.	
B	1/22/10	1. CHANGED TITLE BLOCK LOGO.

REFERENCE:

BUFFALO AIR HANDLING

TITLE: Factory Deflection Test Procedure			
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK	
	DATE: 8/19/09	PAGE: 2 of 2	
	DRAWING NO. (REF. JO#): ES-8109		REV.: B

Factory Leakage Test Procedure for an Air Handling Unit with Positive and Negative Pressure Sections

Introduction

This report outlines the leakage test of a production air handling unit with positive and negative pressure sections. The test shall be conducted at the Buffalo Air Handling factory, Amherst Virginia. This test forms a basis for product qualification and/or acceptance.

Scope

A completed air handling unit will be set up for both a positive pressure and negative pressure leakage tests. All opening (inlet and discharge) will be closed off using plywood or sheet metal and sealed around the edges. Negative pressure sections of the air handling unit will be connected to the inlet of a test fan with ductwork containing a calibrated orifice, see Figure 1. Positive pressure sections of the air handling unit will be connected to the discharge of a test fan with ductwork containing a calibrated orifice, see Figure 2.

A test pressure of 1.25 times the operating pressure shall be applied to the positive and negative pressure sections, respectively.

The operating pressure is defined as the maximum pressure an individual air handling unit section experiences under normal operating conditions. The operating pressure for an air handling unit is the summation of the external static pressure experienced by that section plus the internal pressure losses of the components within the section such as coils, dampers, filters, and/or other appurtenance losses that may be assigned to that section of the unit.

The difference between operating static pressure and other referenced pressures is as follows:

1. Design pressure is the pressure for which the unit has been designed. It would not occur during normal operation of the unit.
2. Fan static pressure is the rated pressure of the air handling unit fan. It incorporates both positive and negative internal and external pressures. These pressures are not applicable to all sections of an air handling unit during normal operation.
3. Fan peak pressure or shut off pressure are attributes of fan curve away from the operating pressure. These pressures would not occur during normal operation of the unit.

A negative pressure leak test may be applied to an air handling unit, which has both positive and negative sections, as long as the negative sections comprise at least three fourths of the unit. The test pressure shall be 1.25 times the greater operating pressures. An example would be a draw through unit with a return fan and mixing sections. The return air section (negative) and mixing section (positive) would be incorporated into the negative pressure test of the draw through unit.

REV.		
A	1. REVISED ENTIRE ES.	
B	1. CHANGED TITLE BLOCK LOGO.	1/22/10

REFERENCE:

TITLE: Factory Leakage Test, Positive and Negative Pressure			
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK	
BUFFALO AIR HANDLING	DATE: 6/18/09	PAGE: 1 of 4	
	DRAWING NO. (REF. JO#): ES-8110		REV.: B

Test Procedure

A manometer is connected to the air handling unit section to monitor the test pressure. The test fans are energized and throttled by means of the damper or throttle plate until the test pressures are achieved. The static pressure drop across each calibrated orifice plate is recorded. Airflow through the orifices are determined from the calibrated orifice chart specific to its size. Air passing through the orifice is equal to the air entering (negative section) or escaping (positive section) the air handling unit. The density of the air is assumed to be 0.075 lb/cu-ft since the ambient conditions within the factory remain fairly constant year round.

Acceptance Criteria

The tested air handling unit is deemed acceptable if the total leakage rate (positive and negative tests) is equal to or below one percent (1%) or 50 CMF, which ever is greater, of the unit capacity. (It is not practical to utilize a one percent minimum leakage for air handling units below 5000 CFM. Casing surface areas are small yet component penetrations and number of access doors is high.) Buffalo Air Handling must approve leakage criteria in addition to or exceeding that stated above.

Test Report

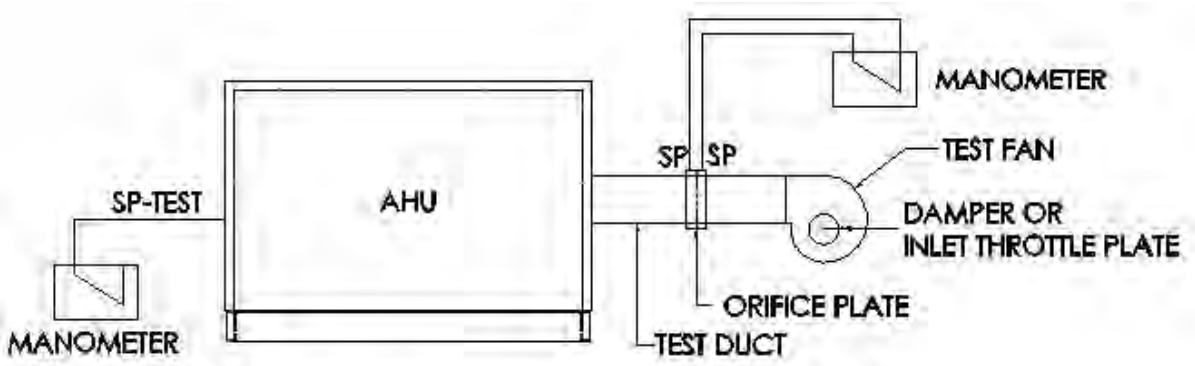
Upon completion of the test a report containing shall be forwarded to all parties designated in the specification.

REV.		
A	1. REVISED ENTIRE ES.	
B	1. CHANGED TITLE BLOCK LOGO.	1/22/10

REFERENCE:

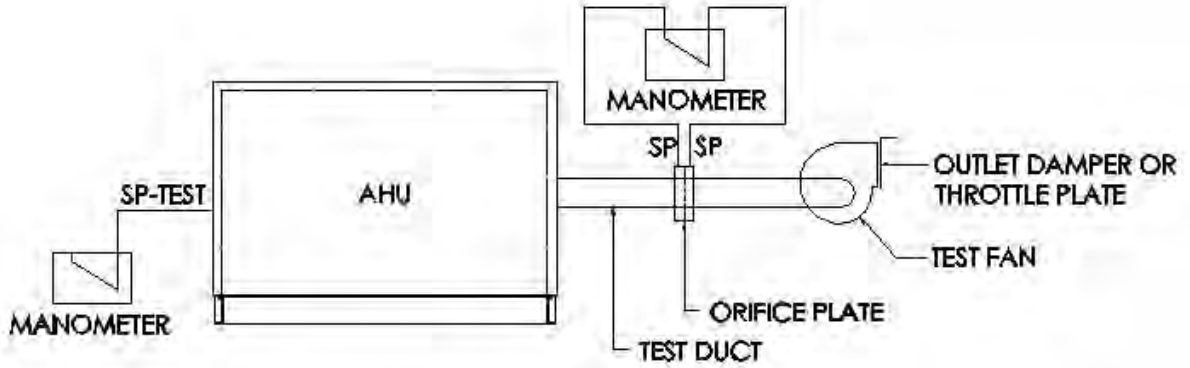
BUFFALO AIR HANDLING

TITLE: Factory Leakage Test, Positive and Negative Pressure			
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK	
	DATE: 6/18/09	PAGE: 2 of 4	
	DRAWING NO. (REF. JO#): ES-8110		REV.: B



POSITIVE PRESSURE LEAKAGE TEST ARRANGEMENT

FIGURE 1



NEGATIVE PRESSURE LEAKAGE TEST ARRANGEMENT

FIGURE 2

REV.		
A	1. REVISED ENTIRE ES.	
B	1. CHANGED TITLE BLOCK LOGO.	1/22/10

REFERENCE:

TITLE: Factory Leakage Test, Positive and Negative Pressure		
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK
BUFFALO AIR HANDLING	DATE: 6/18/09	PAGE: 3 of 4
	DRAWING NO. (REF. JO#): ES-8110	REV.: B

ES-8110

Buffalo Air Handling

Factory Leakage Test Report - Negative & Postive Pressure Test

Shop Order No.: _____
Job Order No.: _____
Customer: _____
End User: _____
Engineer: _____
Mark No.: _____

Negative Presure: _____
Negative Leakage: _____
DP Orifice = _____
Positive Pressure: _____
Postive Leakage: _____
DP Orifice = _____
Total Leakage: _____
Total Leakage Allowed: _____

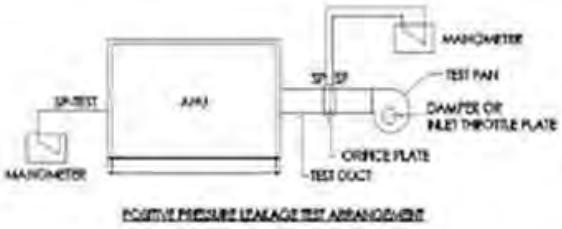


FIGURE 1

FIGURE 2

Calibrated Orifice Performance Chart: 4" Pipe with 2" orifice

Delta Pressure	Leakage CFM	Delta Pressure	Leakage CFM	Delta Pressure	Leakage CFM	Delta Pressure	Leakage CFM	Delta Pressure	Leakage CFM
0.1	18	1.3	62	2.5	84	3.7	101	4.9	118
0.2	23	1.4	64	2.6	86	3.8	102	5.0	119
0.3	28	1.5	67	2.7	87	3.9	104	5.1	120
0.4	33	1.6	69	2.8	89	4.0	105	5.2	122
0.5	37	1.7	71	2.9	90	4.1	107	5.3	123
0.6	41	1.8	73	3.0	91	4.2	108	5.4	124
0.7	44	1.9	75	3.1	93	4.3	110	5.5	125
0.8	48	2.0	76	3.2	94	4.4	111	5.6	126
0.9	51	2.1	78	3.3	96	4.5	112	5.7	127
1.0	54	2.2	80	3.4	97	4.6	114	5.8	128
1.1	57	2.3	81	3.5	98	4.7	115	5.9	129
1.2	59	2.4	83	3.6	100	4.8	116	6.0	129

_____
(Technician Signature, witness test) (Date)

_____
(Witness Signature) (Date)

_____
(Engineering Manager Signature) (Date)

Certified to be Correct

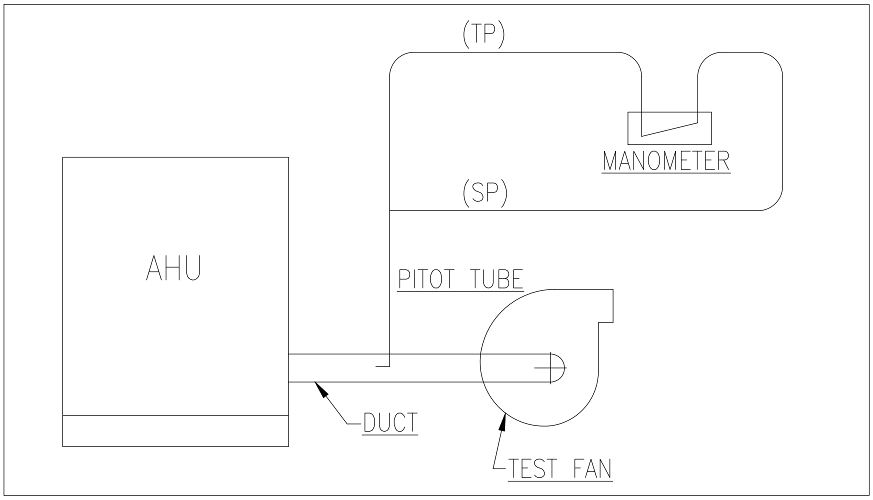
REV.		
A	1. REVISED ENTIRE ES.	
B	1. CHANGED TITLE BLOCK LOGO.	1/22/10

REFERENCE:

TITLE: Factory Leakage Test, Positive and Negative Pressure		
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK
BUFFALO AIR HANDLING	DATE: 6/18/09	PAGE: 4 of 4
	DRAWING NO. (REF. JO#): ES-8110	REV.: B

ES-8203

TEST ARRANGEMENT



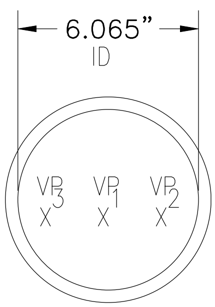
VELOCITY PRESSURE

VP_1 (CENTERLINE) @ $\frac{ID}{2}$

$VP_{2,3}$ @ $\frac{ID}{4}$

$$VP_{AVG} = \left[VP_1 + \frac{VP_2 + VP_3}{2} \right] \div 2$$

6" DUCT

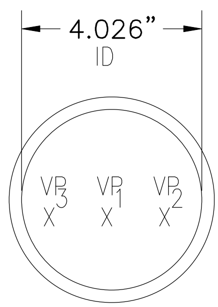


6" SCHEDULE 40 PVC DUCT

$$A = \frac{\left(\frac{6.065}{2}\right)^2 \pi}{144}$$

$A = .201\ FT^2$

4" DUCT

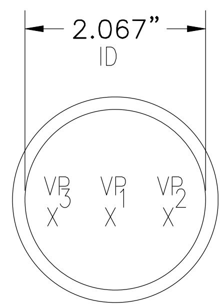


4" SCHEDULE 40 PVC DUCT

$$A = \frac{\left(\frac{4.026}{2}\right)^2 \pi}{144}$$

$A = .088\ FT^2$

2" DUCT



2" SCHEDULE 40 PVC DUCT

$$A = \frac{\left(\frac{2.067}{2}\right)^2 \pi}{144}$$

$A = .023\ FT^2$

LEAKAGE RATE

$$Q(CFM) = (1096)(A)\left(\frac{VP_{AVG}}{d}\right)^{1/2}$$

SP = STATIC PRESSURE (IN. W.G.)
VP = VELOCITY PRESSURE (IN. W.G.)
TP = TOTAL PRESSURE (IN. W.G.)
A = AREA (FT^2)
Q = CAPACITY (CFM)
d = AIR DENSITY (.075 lb/ft^3)
ID = INSIDE DIAMETER (IN.)

REV.	DATE	DESCRIPTION
A	1/22/10	1. CHANGED TITLE BLOCK LOGO.

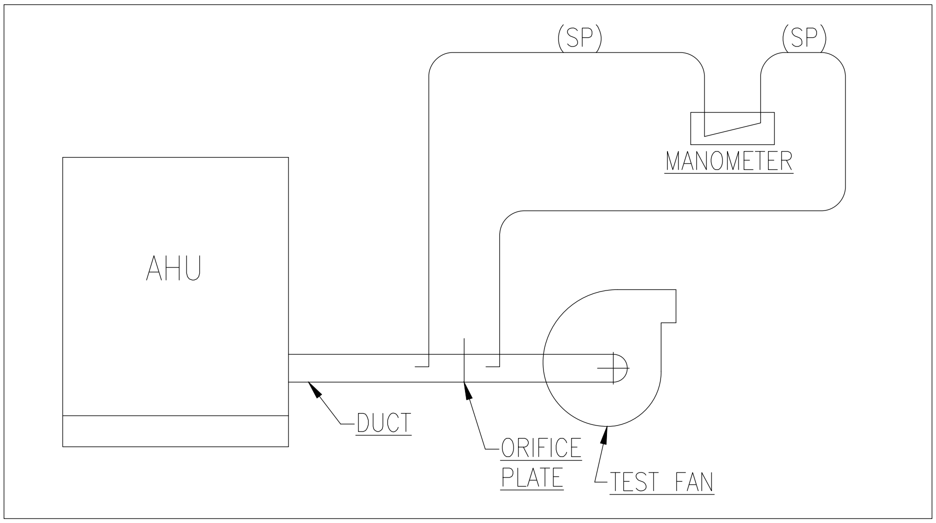
REFERENCE: –

TITLE: AHU LEAKAGE TEST NEGATIVE PRESSURE

DRAWING STATUS	DESIGNER:	APPROVED BY:
–	T.PIGG	–
BUFFALO AIR HANDLING	DATE: 5/31/95	PAGE: 1 of 1
	DRAWING NO. (REF. JO#): ES-8203	REV.: A

ES-8207

TEST ARRANGEMENT



REV. A 1/22/10
1. CHANGED TITLE BLOCK LOGO.

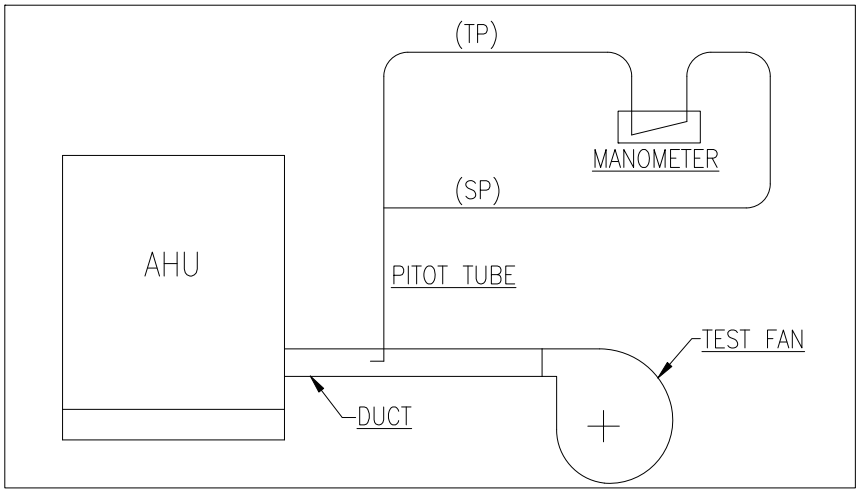
REFERENCE: –

TITLE: AHU LEAKAGE TEST NEGATIVE PRESSURE – CALIBRATED ORIFICE

DRAWING STATUS	DESIGNER:	APPROVED BY:
–	E.W.	D.M.
BUFFALO AIR HANDLING	DATE: 1/19/01	PAGE: 1 of 1
	DRAWING NO. (REF. JO#): ES-8207	REV.: A

ES-8204

TEST ARRANGEMENT



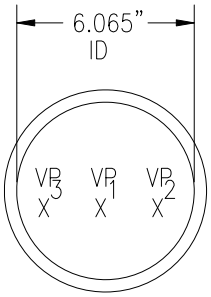
VELOCITY PRESSURE

VP_1 (CENTERLINE) @ $\frac{ID}{2}$

$VP_{2,3}$ @ $\frac{ID}{4}$

$$VP_{AVG} = \left[VP_1 + \frac{VP_2 + VP_3}{2} \right] \div 2$$

6" DUCT

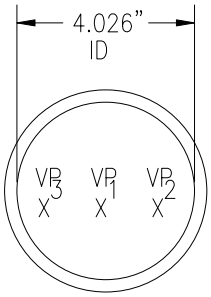


6" SCHEDULE 40 PVC DUCT

$$A = \frac{\left(\frac{6.065}{2}\right)^2 \pi}{144}$$

$A = .201\ FT^2$

4" DUCT

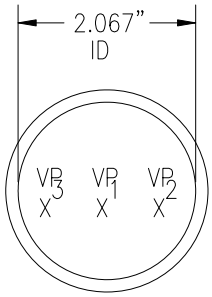


4" SCHEDULE 40 PVC DUCT

$$A = \frac{\left(\frac{4.026}{2}\right)^2 \pi}{144}$$

$A = .088\ FT^2$

2" DUCT



2" SCHEDULE 40 PVC DUCT

$$A = \frac{\left(\frac{2.067}{2}\right)^2 \pi}{144}$$

$A = .023\ FT^2$

LEAKAGE RATE

$$Q(CFM) = (1096)(A)\left(\frac{VP_{AVG}}{d}\right)^{1/2}$$

SP = STATIC PRESSURE (IN. W.G.)
VP = VELOCITY PRESSURE (IN. W.G.)
TP = TOTAL PRESSURE (IN. W.G.)
A = AREA (FT^2)
Q = CAPACITY (CFM)
d = AIR DENSITY (.075 lb/ft^3)
ID = INSIDE DIAMETER (IN.)

REV. A 1/22/10
1. CHANGED TITLE BLOCK LOGO.

REFERENCE: –

TITLE: AHU LEAKAGE TEST POSITIVE PRESSURE

DRAWING STATUS	DESIGNER:	APPROVED BY:
–	T. PIGG	–
	DATE: 5/31/95	PAGE: 1 of 1

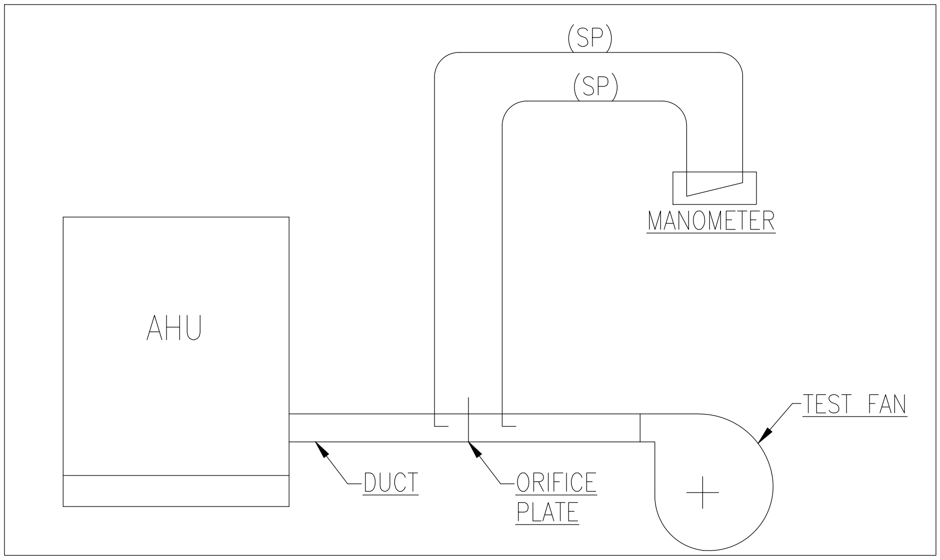
BUFFALO AIR HANDLING

DRAWING NO. (REF. JO#): ES-8204

REV.: -

ES-8206

TEST ARRANGEMENT



REV. A	1/22/10
1. CHANGED TITLE BLOCK LOGO.	

REFERENCE: –

TITLE: AHU LEAKAGE TEST POSITIVE PRESSURE – CALIBRATED ORIFICE

DRAWING STATUS	DESIGNER:	APPROVED BY:
–	E.W.	D.M.
BUFFALO AIR HANDLING	DATE: 1/19/01	PAGE: 1 of 1
	DRAWING NO. (REF. JO#) ES-8206	REV. A

Factory Leakage Test Procedure for a Negative Pressure Unit

Introduction

This report outlines the leakage test of a production air handling unit with negative pressure. The test shall be conducted at the Buffalo Air Handling Company factory, Amherst Virginia. This test forms a basis for product qualification and/or acceptance.

Scope

A completed air handling unit will be set up for a negative pressure leakage test. All openings (inlet and discharge) will be closed off using plywood or sheet metal and sealed around the edges. The inlet side of a test fan will be connected to the air handling unit with ductwork containing a calibrated orifice. See Figure 1.

The air handling unit shall be tested with a negative pressure equal to 1.25 times its operating pressure.

The operating pressure is defined as the maximum pressure an individual air handling unit section experiences under normal operating conditions. The operating pressure for an air handling unit is the summation of the upstream negative external static pressure and the internal pressure loss of components within the unit upstream of the fan such as coils, dampers, filters, and/or other appurtenance losses that may be assigned to that section may be assigned to the negative pressure section.

The difference between operating static pressure and other referenced pressures is as follows:

1. Design pressure is the pressure for which the unit has been designed. It would not occur during normal operation of the unit.
2. Fan static pressure is the rated pressure of the air handling unit fan. It incorporates both positive and negative internal and external pressures. These pressures are not applicable to all sections of an air handling unit during normal operation.
3. Fan peak pressure or shut off pressure are attributes of fan performance outside the operating pressure of the fan. These pressures would not occur during normal operation of the unit.

A negative pressure leak test may conducted on an air handling unit with both positive and negative sections as long as the negative sections comprise at least three fourths of the unit. The test pressure shall be 1.25 times the greater operating pressure. An example would be a draw through unit with a return fan and economizer sections. The return air section (negative) and economizer exhaust section (positive) shall be incorporated into the negative pressure test of the draw through unit.

REFERENCE:

TITLE: Factory Leakage Test, Negative Pressure			
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK	
BUFFALO AIR HANDLING	DATE: 6/18/09	PAGE: 1 of 4	
	DRAWING NO. (REF. JO#): ES-8111		REV.: B

Test Procedure

A manometer is connected to the air handling unit to monitor the test pressure. The test fan is energized and throttled by means of a discharge damper or throttle plate until the test pressure is achieved. The static pressure drop across each calibrated orifice plate is recorded. Airflow through the orifices are determined from the calibrated orifice chart specific to its size. Airflow passing through the orifice is equal to the airflow entering the air handling unit. Density of the air is assumed to be 0.075 lb/cuft since the ambient conditions within the factory remain fairly constant throughout the year.

Acceptance Criteria

The tested air handling unit is deemed acceptable if the measured leakage is equal to or below one percent (1%) or 50 CMF, which ever is greater, of the unit capacity. (It is not practical to utilize a one percent minimum leakage for air handling units below 5000 CFM. Casing surface areas are small yet component penetrations and number of access doors is high.)Buffalo Air Handling must approve leakage criteria in addition to or exceeding that stated above.

Test Report

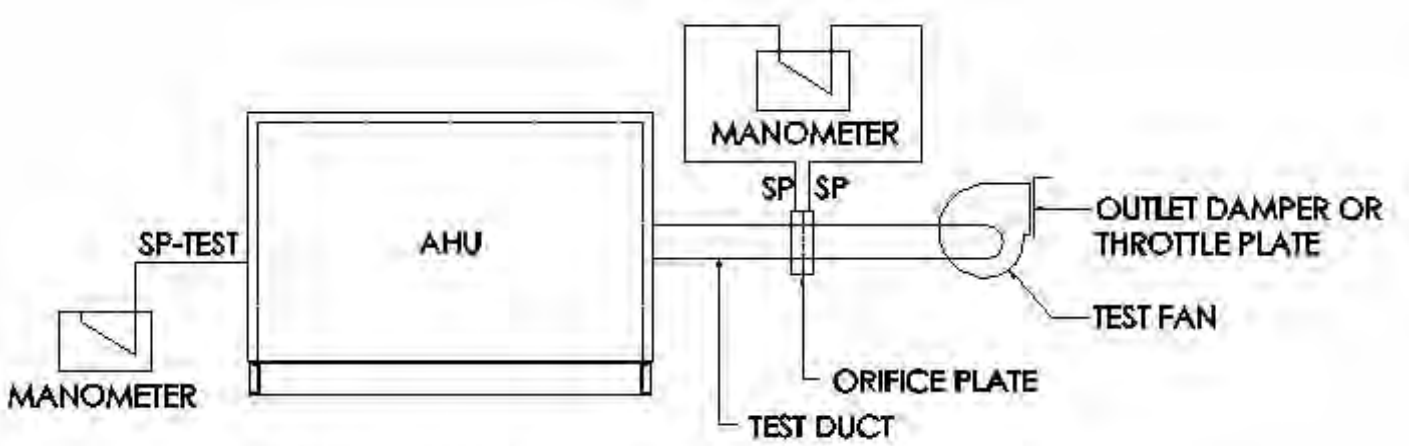
Upon completion of the test a report shall be forwarded to all parties designated in the specification.

REV.		
A	1. REVISED ENTIRE ES.	
B	1. CHANGED TITLE BLOCK LOGO.	1/22/10

REFERENCE:

BUFFALO AIR HANDLING

TITLE: Factory Leakage Test, Negative Pressure			
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK	
	DATE: 6/18/09	PAGE: 2 of 4	
	DRAWING NO. (REF. JO#): ES-8111		REV.: B



NEGATIVE PRESSURE LEAKAGE TEST ARRANGEMENT

FIGURE 1

REV.		
A	1. REVISED ENTIRE ES.	
B	1. CHANGED TITLE BLOCK LOGO.	1/22/10

REFERENCE:

TITLE: Factory Leakage Test, Negative Pressure

DRAWING STATUS: Complete

DESIGNER: D.M. /T.R.K.

APPROVED BY: TRK

DATE: 6/18/09

PAGE: 3 of 4

BUFFALO AIR HANDLING

DRAWING NO. (REF. JO#): ES-8111

REV.: B

ES-8111

BUFFALO AIR HANDLING

Buffalo Air Handling

Factory Leakage Test Report - Negative & Postive Pressure Test

Shop Order No.: _____
Job Order No.: _____
Customer: _____
End User: _____
Engineer: _____
Mark No.: _____

Negative Presure: _____
Negative Leakage: _____
DP Orifice = _____
Positive Pressure: _____
Postive Leakage: _____
DP Orifice = _____
Total Leakage: _____
Total Leakage Allowed: _____

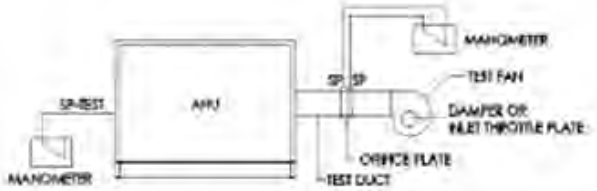


FIGURE 1

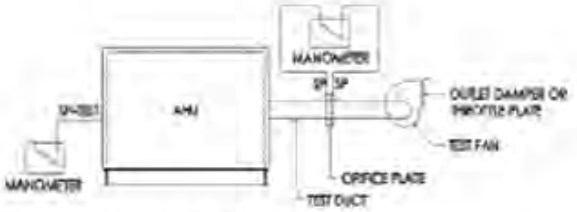


FIGURE 2

Calibrated Orifice Performance Chart: 4" Pipe with 2" orifice

Delta Pressure	Leakage CFM	Delta Pressure	Leakage CFM	Delta Pressure	Leakage CFM	Delta Pressure	Leakage CFM	Delta Pressure	Leakage CFM
0.1	18	1.3	62	2.5	84	3.7	101	4.9	118
0.2	23	1.4	64	2.6	86	3.8	102	5.0	119
0.3	28	1.5	67	2.7	87	3.9	104	5.1	120
0.4	33	1.6	69	2.8	89	4.0	105	5.2	122
0.5	37	1.7	71	2.9	90	4.1	107	5.3	123
0.6	41	1.8	73	3.0	91	4.2	108	5.4	124
0.7	44	1.9	75	3.1	93	4.3	110	5.5	125
0.8	48	2.0	76	3.2	94	4.4	111	5.6	126
0.9	51	2.1	78	3.3	96	4.5	112	5.7	127
1.0	54	2.2	80	3.4	97	4.6	114	5.8	128
1.1	57	2.3	81	3.5	98	4.7	115	5.9	129
1.2	59	2.4	83	3.6	100	4.8	116	6.0	129

_____
(Technician Signature: witness test) (Date)

_____
(Witness Signature) (Date)

_____
(Engineering Manager Signature) (Date)

Certified to be Correct

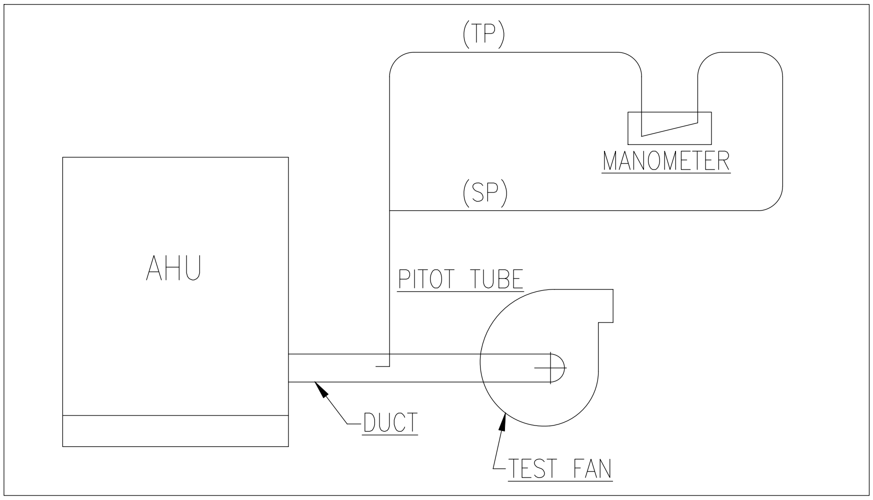
REV.	
A	1. REVISED ENTIRE ES.
B	1. CHANGED TITLE BLOCK LOGO. 1/22/10

REFERENCE:

TITLE: Factory Leakage Test, Negative Pressure			
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK	
BUFFALO AIR HANDLING	DATE: 6/18/09	PAGE: 4 of 4	
	DRAWING NO. (REF. JO#): ES-8111	REV.: B	

ES-8203

TEST ARRANGEMENT



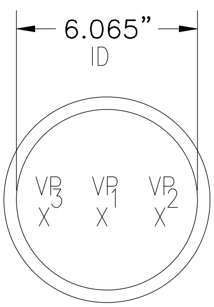
VELOCITY PRESSURE

VP_1 (CENTERLINE) @ $\frac{ID}{2}$

$VP_{2,3}$ @ $\frac{ID}{4}$

$$VP_{AVG} = \left[VP_1 + \frac{VP_2 + VP_3}{2} \right] \div 2$$

6" DUCT

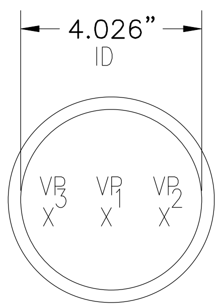


6" SCHEDULE 40 PVC DUCT

$$A = \frac{\left(\frac{6.065}{2}\right)^2 \pi}{144}$$

A= .201 FT^2

4" DUCT

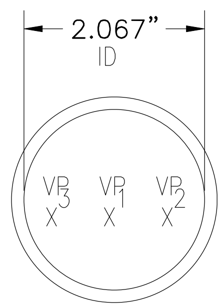


4" SCHEDULE 40 PVC DUCT

$$A = \frac{\left(\frac{4.026}{2}\right)^2 \pi}{144}$$

A= .088 FT^2

2" DUCT



2" SCHEDULE 40 PVC DUCT

$$A = \frac{\left(\frac{2.067}{2}\right)^2 \pi}{144}$$

A= .023 FT^2

LEAKAGE RATE

$$Q(CFM) = (1096)(A)\left(\frac{VP_{AVG}}{d}\right)^{1/2}$$

SP = STATIC PRESSURE (IN. W.G.)
VP = VELOCITY PRESSURE (IN. W.G.)
TP = TOTAL PRESSURE (IN. W.G.)
A = AREA (FT^2)
Q = CAPACITY (CFM)
d = AIR DENSITY (.075 lb/ft^3)
ID = INSIDE DIAMETER (IN.)

REV. A	1/22/10	1. CHANGED TITLE BLOCK LOGO.

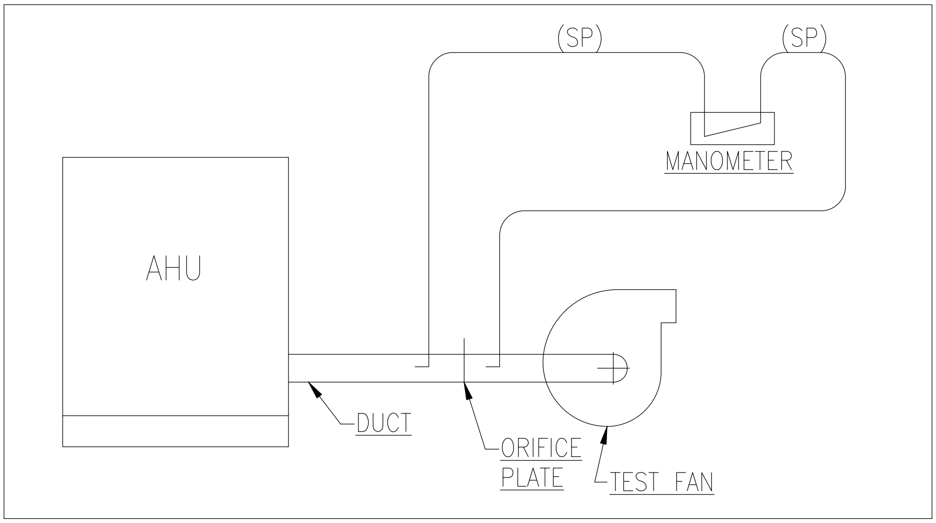
REFERENCE: –

TITLE AHU LEAKAGE TEST NEGATIVE PRESSURE

DRAWING STATUS	DESIGNER:	APPROVED BY:
–	T.PIGG	–
BUFFALO AIR HANDLING	DATE: 5/31/95	PAGE: 1 of 1
	DRAWING NO. (REF. JO#) ES-8203	REV. A

ES-8207

TEST ARRANGEMENT



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DRAWING STATUS –	DESIGNER: E.W.	APPROVED BY: D.M.
BUFFALO AIR HANDLING	DATE: 1/19/01	PAGE: 1 of 1
	DRAWING NO. (REF. JO#) ES-8207	REV. A

Factory Leakage Test Procedure for a Positive Pressure Unit

Introduction

This report outlines the leakage test of a production air handling unit with positive pressure. The test shall be conducted at the Buffalo Air Handling Company factory, Amherst, Virginia. This test forms a basis for product qualification and/or acceptance.

Scope

A completed air handling unit will be set up for a positive pressure leakage test. All openings (inlet and discharge) will be closed off using plywood or sheet metal and sealed around the edges. The discharge of a test fan will be connected to the air handling unit with ductwork containing a calibrated orifice. See Figure 1.

The air handling unit shall be tested with a positive pressure equal to 1.25 times its operating pressure.

The operating pressure is defined as the maximum pressure an individual air handling unit section experiences under normal operating conditions. The operating pressure for an air handling unit is the summation of the downstream external static pressure and the internal pressure losses of components contained in the unit downstream of the fan such as coils, dampers, filters, and any other appurtenance loss that may be assigned to the positive pressure section.

The difference between operating static pressure and other referenced pressures is as follows:

1. Design pressure is the pressure for which the unit has been designed. It would not occur during normal operation of the unit.
2. Fan static pressure is the rated pressure of the air handling unit fan. It incorporates both positive and negative internal and external pressures. These pressures are not applicable to all sections of an air handling unit during normal operation.
3. Fan peak pressure or shut off pressure are attributes of fan curve away from the operating pressure. These pressures would not occur during normal operation of the unit.

Test Procedure

A manometer is connected to the air handling unit to monitor the test pressure. The test fan is energized and throttled by means of an inlet damper or throttle plate until the test pressure is achieved. The static pressure drop across each calibrated orifice plate is recorded. Airflow through the orifices are determined from the calibrated orifice chart specific to its size. Airflow passing through the orifice is equal to the airflow leaving the air handling unit. Density of the air is assumed to be 0.075 lb/cuft since the ambient conditions within the factory remain fairly constant throughout the year.

REV.		
A	1. REVISED ENTIRE ES.	
B	1. CHANGED TITLE BLOCK LOGO.	1/22/10

REFERENCE:

TITLE: Factory Leakage Test, Positive Pressure			
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BUFFALO AIR HANDLING	DATE: 6/18/09	PAGE: 1 of 4	
	DRAWING NO. (REF. JO#): ES-8112		REV.: B

Acceptance Criteria

The tested air handling unit is deemed acceptable if the measured leakage is equal to or below one percent (1%) or 50 CMF, which ever is greater, of the unit capacity. (It is not practical to utilize a one percent minimum leakage for air handling units below 5000 CFM. Casing surface areas are small yet component penetrations and number of access doors is high.) Buffalo Air Handling must approve leakage criteria in addition to or exceeding that stated above.

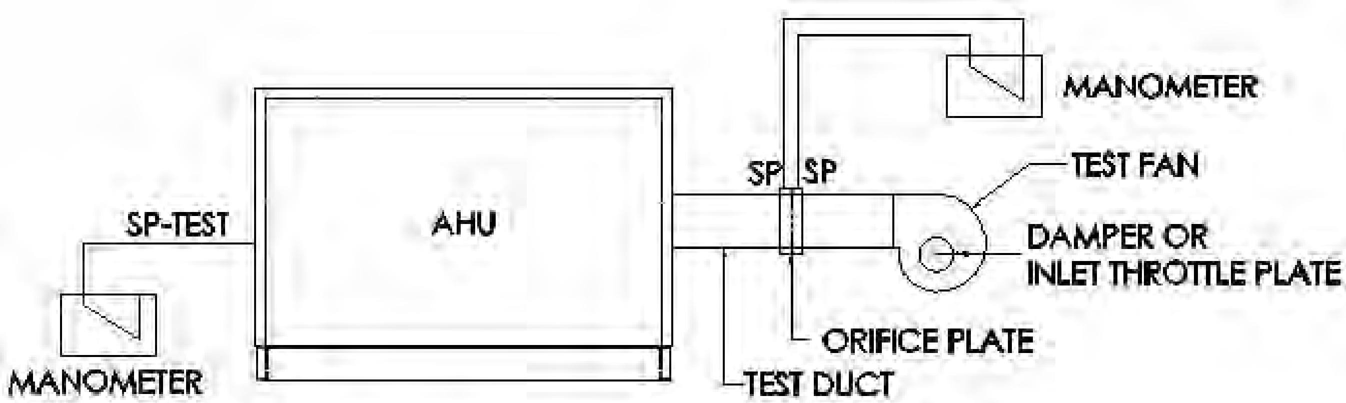
.

Test Report

Upon completion of the test a report shall be forwarded to all parties designated in the specification.

REFERENCE:

TITLE: Factory Leakage Test, Positive Pressure			
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK	
BUFFALO AIR HANDLING	DATE: 6/18/09	PAGE: 2 of 4	
	DRAWING NO. (REF. JO#): ES-8112		REV.: B



POSITIVE PRESSURE LEAKAGE TEST ARRANGEMENT

FIGURE 1

REV. A 1. REVISED ENTIRE ES.
REV. B 1/22/10 1. CHANGED TITLE BLOCK LOGO.

REFERENCE:

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BUFFALO AIR HANDLING	DATE: 6/18/09	PAGE: 3 of 4
	DRAWING NO. (REF. JO#) ES-8112	REV. B

ES-8112

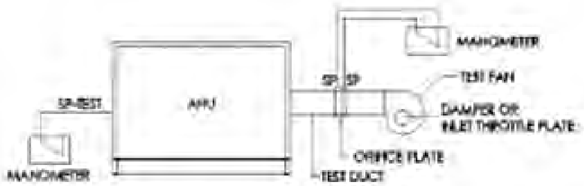
Buffalo Air Handling

Factory Leakage Test Report - Negative & Postive Pressure Test

BUFFALO AIR HANDLING

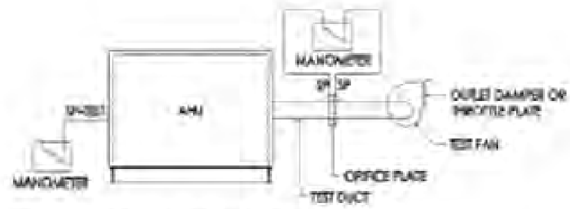
Negative Presure: ___________
Negative Leakage: ___________
DP Orifice = ___________
Positive Pressure: ___________
Postive Leakage: ___________
DP Orifice = ___________
Total Leakage: ___________
Total Leakage Allowed: ___________

Shop Order No.: ___________
Job Order No.: ___________
Customer: ___________
End User: ___________
Engineer: ___________
Mark No.: ___________



POSITIVE PRESSURE LEAKAGE TEST ARRANGEMENT

FIGURE 1



NEGATIVE PRESSURE LEAKAGE TEST ARRANGEMENT

FIGURE 2

Calibrated Orifice Performance Chart: 4" Pipe with 2" orifice

Delta Pressure	Leakage CFM	Delta Pressure	Leakage CFM	Delta Pressure	Leakage CFM	Delta Pressure	Leakage CFM	Delta Pressure	Leakage CFM
0.1	18	1.3	62	2.5	84	3.7	101	4.9	118
0.2	23	1.4	64	2.6	86	3.8	102	5.0	119
0.3	28	1.5	67	2.7	87	3.9	104	5.1	120
0.4	33	1.6	69	2.8	89	4.0	105	5.2	122
0.5	37	1.7	71	2.9	90	4.1	107	5.3	123
0.6	41	1.8	73	3.0	91	4.2	108	5.4	124
0.7	44	1.9	75	3.1	93	4.3	110	5.5	125
0.8	48	2.0	76	3.2	94	4.4	111	5.6	126
0.9	51	2.1	78	3.3	96	4.5	112	5.7	127
1.0	54	2.2	80	3.4	97	4.6	114	5.8	128
1.1	57	2.3	81	3.5	98	4.7	115	5.9	129
1.2	59	2.4	83	3.6	100	4.8	116	6.0	129

____
(Technician Signature, witness test) (Date)

____
(Engineering Manager Signature) (Date)

Certified to be Correct

____
(Witness Signature) (Date)

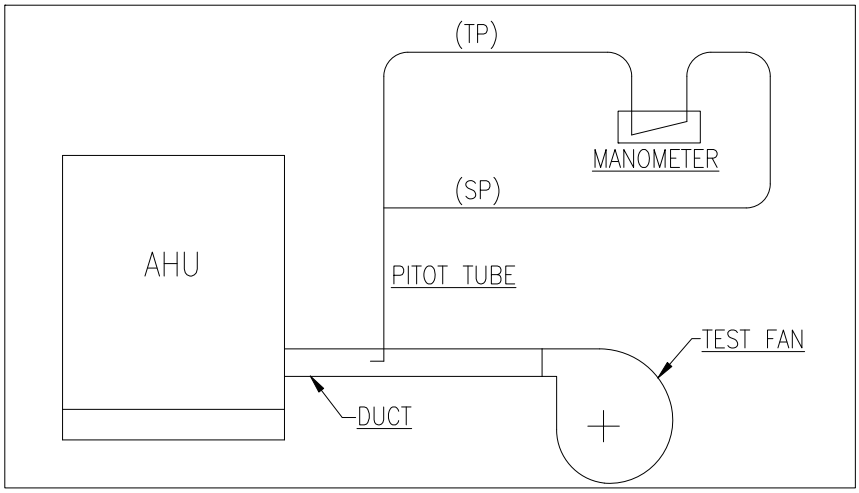
REV. A 1. REVISED ENTIRE ES.
REV. B 1/22/10 1. CHANGED TITLE BLOCK LOGO.

REFERENCE:

TITLE	Factory Leakage Test, Positive Pressure	
DRAWING STATUS: Complete	DESIGNER: D.M. /T.R.K.	APPROVED BY: TRK
BUFFALO AIR HANDLING	DATE: 6/18/09	PAGE: 4 of 4
	DRAWING NO. (REF. JO#): ES-8112	REV.: B

ES-8204

TEST ARRANGEMENT



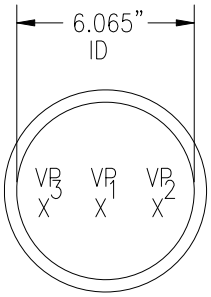
VELOCITY PRESSURE

VP_1 (CENTERLINE) @ $\frac{ID}{2}$

$VP_{2,3}$ @ $\frac{ID}{4}$

$$VP_{AVG} = \left[VP_1 + \frac{VP_2 + VP_3}{2} \right] \div 2$$

6" DUCT

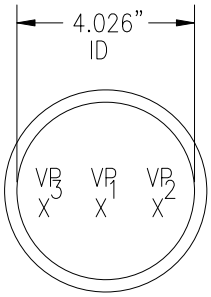


6" SCHEDULE 40 PVC DUCT

$$A = \frac{\left(\frac{6.065}{2}\right)^2 \pi}{144}$$

$A = .201\ FT^2$

4" DUCT

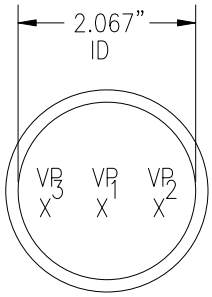


4" SCHEDULE 40 PVC DUCT

$$A = \frac{\left(\frac{4.026}{2}\right)^2 \pi}{144}$$

$A = .088\ FT^2$

2" DUCT



2" SCHEDULE 40 PVC DUCT

$$A = \frac{\left(\frac{2.067}{2}\right)^2 \pi}{144}$$

$A = .023\ FT^2$

LEAKAGE RATE

$$Q(CFM) = (1096)(A)\left(\frac{VP_{AVG}}{d}\right)^{1/2}$$

SP = STATIC PRESSURE (IN. W.G.)
VP = VELOCITY PRESSURE (IN. W.G.)
TP = TOTAL PRESSURE (IN. W.G.)
A = AREA (FT^2)
Q = CAPACITY (CFM)
d = AIR DENSITY (.075 lb/ft^3)
ID = INSIDE DIAMETER (IN.)

REV. A 1/22/10
1. CHANGED TITLE BLOCK LOGO.

REFERENCE: –

TITLE: AHU LEAKAGE TEST POSITIVE PRESSURE

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–	T. PIGG	–
	DATE: 5/31/95	PAGE: 1 of 1

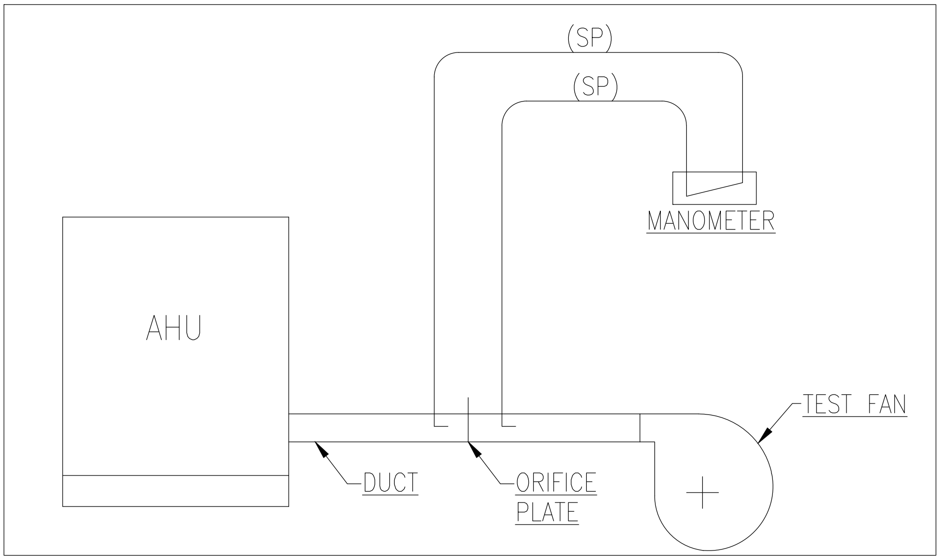
BUFFALO AIR HANDLING

DRAWING NO. (REF. JO#): ES-8204

REV.: -

ES-8206

TEST ARRANGEMENT



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–	E.W.	D.M.
BUFFALO AIR HANDLING	DATE: 1/19/01	PAGE: 1 of 1
	DRAWING NO. (REF. JO#) ES-8206	REV. A

8
Special Projects

Buffalo Air Handling

Hospital/Healthcare

The hospital/healthcare market demands long-lasting, **reliable equipment** to assure the best in patient care and research. One size does not fit all applications. General ventilation, laboratories, patient care areas and operating rooms have varying design parameters. Buffalo Air Handling understands these criteria and works with owners and engineers to meet the particular needs and requirements for each unique project. With over 100 years of air handling experience, Buffalo Air Handling offers a history of being there for our customers.

Buffalo Air Handling units are fabricated of 2", 3" or 4" galvanized, aluminum, or stainless steel panels, dependent on the environment. Inner walls are smooth, with no gaps, or crevices and may be solid, or perforated. When perforated inner walls are specified, we recommend that aluminum be used, as perforated galvanized leaves exposed steel that can rust. A tedlar, or mylar, liner should be installed so the insulation is not exposed to the air stream. Either fiberglass or foam insulation is available.

Reliability is a necessity for the hospital/healthcare market. Buffalo Air Handling supplies components that are AMCA, ARI, or UL rated and certified. Additionally, Buffalo Air Handling carries ETL certification and an ETL label on our air handling units.

Critical hospital applications, such as operating rooms and surgery suites, require **redundancy** to avoid any downtime. Buffalo Air Handling can

incorporate redundancy within the air handling unit by providing two, or three, fans operating in parallel. If one fan does have a failure, there is back-up, so that critical surgeries are not delayed.

Indoor air quality (IAQ) and **energy efficiency** are two more key factors when considering the right unit for the application. By providing an IAQ, triple sloped drain pan in cooling coil sections, Buffalo Air Handling takes care to minimize the possibility of excess moisture, mildew, or bacterial growth. As further protection against mold build-up in the coils and drain pans that can result in increased static pressure loss, increased horsepower consumption and pose a health risk, we can provide ultraviolet (UV) lighting downstream of the coils to eliminate biological contaminants. UV lights may also be utilized in air handling units that service tuberculosis wards.

Fumes from nearby helipads, or loading docks, can reach occupied areas if not addressed. Buffalo Air Handling can furnish carbon/charcoal filters, or chemical **filtration** in addition to standard ASHRAE and HEPA filters.

In hospital/healthcare applications, filters are often the last component and are often located downstream of a cooling coil. To avoid **"wetted" filters**, Buffalo Air Handling can provide a reheat coil built into the cooling coil to take the leaving air off the saturation line and prevent this "wetting".

Energy efficient units can save untold dollars in utility costs. This requires selecting the ideal fan for the required flow and pressure, sizing the coil to the exact design parameters and using premium efficiency motors and variable frequency drives (VFD's). Though the initial cost may be greater than a "standard" unit, the savings in energy usage over the life of the custom designed unit far outweigh any first cost differential. Moreover, the guaranteed maximum 1% leakage rate assures that the supply air meets specifications, thus eliminating the concern for unfiltered and unconditioned air being introduced into critical spaces.

Various **heat recovery** options can be incorporated. Buffalo Air Handling can work with you to determine whether a run around coil system, heat recovery wheel, air-to-air heat exchanger, or heat pipe is the best option for the application.

Performance issues can delay **commissioning**. Buffalo Air Handling vibration tests each fan mounted within the air handling unit. Additionally, factory performance, sound and leakage tests are available. These factory tests will reduce commissioning time by ensuring the units are functioning properly before shipment, which eliminates variables should field issues arise.

Many projects in the hospital/healthcare industry are **renovations**. Space can be tight. With the capability to provide units in knockdown (KD) construction, Buffalo Air Handling allows you to purchase a factory built unit manufactured by people who do it everyday and accept **single source responsibility**. Our servicemen are available to supervise assembly and assure a proper installation.

Buffalo Air Handling: The right choice for all your air handling needs.

BUFFALO
AIR HANDLING

Sales Engineers in cities
throughout North America.
For the nearest office, call:

Telephone: (434) 946-7455
Telefax: (434) 946-7941

www.buffaloair.com
sales@buffaloair.com

Bulletin C7200
January 2005

Buffalo Air Handling

Pharmaceutical

Buffalo Air Handling incorporates over 100 years of air handling experience with today's latest technology to produce the best air handing unit possible for the pharmaceutical industry. Buffalo Air Handling recognizes the specific needs of the industry and excels at meeting and exceeding these requirements. We offer a combination of durability, flexibility and reliability in our air handling units.

Utilizing galvanized steel, stainless steel, or aluminum, formed C-panels create a rigid, durable casing in a range of thicknesses. Our bases and floors are welded construction to form an air and water tight unit. Our perimeter shipping split angles and factory alignment of each section assure low leakage rates.

Flexibility of construction is standard in Buffalo Air Handling units. When space is at a premium, our units are designed to fit within your allotted area. From low profile to double stacked, all types of configurations can be provided to meet your needs. Even notching the unit to accommodate existing structural obstructions can be provided.

For reliable units you must have reliable components. Buffalo Air Handling uses only AMCA, ARI, and UL listed components to meet your performance requirements and specifications. Component options include a variety of fan and motor arrangements. Coils are precisely selected to meet your exact performance criteria with stainless steel casings and coil rack options. Other options can include humidification, dehumidification, attenuators, blenders, dampers, and louvers.

A pharmaceutical facility has special air handling design and construction requirements. High indoor air quality is an important prerequisite. Buffalo Air Handling provides an indoor air quality (IAQ) drain pan with the best possible condensate drainage. This special design inhibits the likelihood of excess moisture, mildew or bacterial growth by

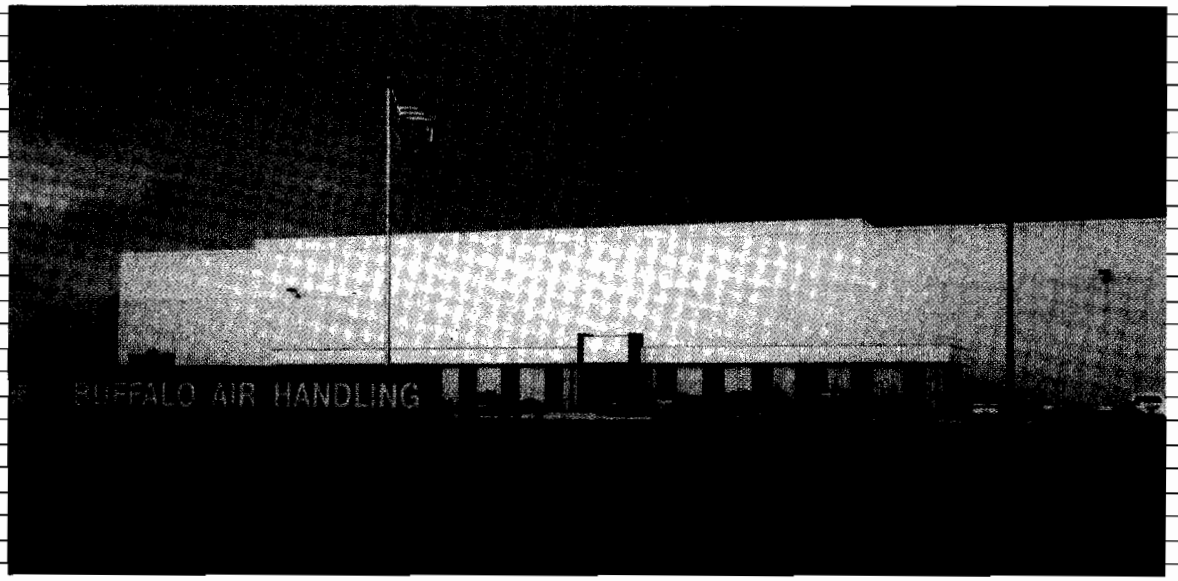
providing a positively (double or triple) sloped pan. Buffalo Air Handling's units have filtration to meet your needs; from standard ASHRAE type to carbon filters or HEPA filters. Buffalo Air Handling thoroughly cleans all units prior to shipment to eliminate construction residue that may accumulate during manufacturing. Coupled with double shrink wrapping prior to shipment to protect the unit from road dirt and grime, time is saved during installation and commissioning of the complete system.

Lower energy costs are a concern for any owner and can be accomplished utilizing our full width, full height diffuser. The incorporation of the diffuser in the fan section decreases your overall unit pressure by as much as 0.4" static pressure allowing for a reduction in the required fan and motor horsepower. Combined with properly installed fans and premium efficiency motors, this results in cost savings for you.

Our Buffalo Air Handling units are built to stand the most stringent requirements. Vibration and balance testing of all units is standard operating procedure. Leakage rates below 1%, up to 10" water gauge operating static pressure can be achieved. Factory leakage testing, as well as, performance and sound testing are available on all units. Test reports are provided to assist in the validation of pharmaceutical facilities.

Remember Buffalo Air Handling's continued strength in the industry when you are considering the purchase of a new air handling unit or upgrading your existing systems. Whether you need a standard design or custom built unit, Buffalo Air Handling has the ability to design precisely what you need with construction features that will make the equipment last. ***Buffalo Air Handling: The right choice for all your air handling needs.***

Buffalo
Air Handling



Buffalo
Air Handling

Sales Engineers in cities throughout North America. For the nearest office, call: *Telephone (804) 946-7455*
Telefax (804) 946-7941

9
Additional Information

BUFFALO
AIR HANDLING

Fan Selection Issues

- Efficiency
- Sound
- Initial Cost
- Operating Cost
- Maintenance Cost
- Installed Cost
- Replacement Cost
- Space
- Stability
- Volume Control
- Corrosion

BUFFALO
AIR HANDLING

Fan Type Comparisons

	AF-SW	*AF-DW*	*PLENUM*	*FC*	*RADIAL*	*AXIAL*
15,000 CFM 3" SP						
BHP	9.2 (9.92)	9.78	11.56	12.99	12.54	10.1
RPM	855	1144	1096	819	554	1750
DIA	36 (33)	27	33	22	49	33
30,000 CFM 3" SP						
BHP	19.3	18.2	22.08	22.74	22.53	20.1
RPM	664	731	706	475	330	1170
DIA	49	36	49	36.5	77	48
50,000 CFM 3" SP						
BHP	33.1	30.9	36.55	37.9	45	34.9
RPM	565	534	596	393	336	1170
DIA	60	54	60	44.5	84	60
15,000 CFM 6" SP						
BHP	17.9	19.2	22.3	N/A	21.46	20.7
RPM	1269	1700	1385	N/A	709	3500
DIA	33	24.5	33	N/A	49	29
30,000 CFM 6" SP						
BHP	35.5	36.6	45.2	N/A	41.24	42.1
RPM	830	1091	927	N/A	435	1750
DIA	49	36.5	49	N/A	77	43
50,000 CFM 6" SP						
BHP	58.7	58.6	72.68	N/A	74	67.7
RPM	694	919	765	N/A	428	1750
DIA	60	49	60	N/A	84	48

BUFFALO
AIR HANDLING

Fan Type Comparisons

Plenum Fan Compared to Airfoil DWDI Centrifugal Fan

DIAMETER	*TYPE*	*CFM*	*SP*	*RPM*	*BHP*	*OV*
24-1/2”	AFD	12,400	6”	1622	15.8	2000
22-1/4”	AFD	12,400	6”	1911	15.8	2422
30”	AFP	12,400	6”	1524	18.4	
33”	AFD	23,000	6”	1208	27.3	2040
30”	AFD	23,000	6”	1383	27.8	2471
36-1/2”	AFP	23,000	6”	1324	33.3	
36-1/2”	AFD	32,000	6”	1120	38.4	2321
40-1/4”	AFD	32,000	6”	968	38.1	1909
49”	AFP	32,000	6”	932	47.2	
44”	AFD	44,000	6”	883	51.3	2148
40-1/4”	AFD	44,000	6”	1027	52.8	2625
54”	AFP	44,000	6”	858	63.9	

BUFFALO
AIR HANDLING

Fan Type Capabilities

TYPE	*CFM*	*SP*	*WHEEL DIAMETER*
AF-SW	200,000	12”	109”
AF-DW	400,000	12”	109”
Plenum	95,000	10”	73”
FC	120,000	4”	60”
Axial	200,000	8”	84”
Mixed	35,000	10”	49”

10
Service/Seminars

BUFFALO
AIR HANDLING

BUFFALO AIR HANDLING UNIT SERVICE MANUAL

WARNING

IMPROPERLY INSTALLED OR OPERATED EQUIPMENT CAN BE DANGEROUS AND MAY CAUSE INJURY. IT IS YOUR RESPONSIBILITY TO FAMILIARIZE YOURSELF WITH THE CONTENTS OF THIS MANUAL AS WELL AS OTHER WRITTEN MATERIAL SHIPPED WITH THIS FAN BEFORE IT IS OPERATED. KEEP UNAUTHORIZED PERSONNEL AWAY FROM THE FAN.

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1.0 INTRODUCTION

This manual provides information necessary to install, operate, and service Buffalo Air Handling units. Maintenance guidelines and procedures are set so that your equipment will continue to efficiently and safely operate with minimum repair or replacement.

An assembly drawing containing all pertinent data and dimensions for your particular equipment has been supplied with your order.

You may find it helpful to have the catalog pertaining to your particular air handling unit. These may be obtained through your nearest Buffalo sales representative or by writing directly to the factory.

IT IS STRONGLY ADVISED THAT AN EXPERIENCED ERECTOR SUPERVISE THE INSTALLATION OF THE EQUIPMENT.

Servicemen are available by arrangement through any Buffalo sales representative. Products must be used in accordance with the information specified in this manual and cabinet assembly drawings.

Regular inspections must be made to warrant safe equipment operation. Strict compliance with all safety and maintenance procedures are the responsibility of the user and are necessary for safe and efficient operation. Failure to follow these installation operating and maintenance procedures can result in accidents endangering personnel or equipment.

2.0 CONTACT / EQUIPMENT INFORMATION

2.1 REPRESENTATIVE INFORMATION

It is recommended that the following information be recorded for future inquiries regarding your air handling equipment.

Buffalo Air Handling
Sales Representative _____

Address _____

Telephone (_____)_____

Fax (_____)_____

2.2 EQUIPMENT INFORMATION

When contacting your Buffalo sales representative, please have your assembly drawing and data sheets readily available for possible questions that he or she may have. The following information should be recorded in this manual for quick referral if the assembly drawing or data sheets are not available. This information can be found on a nameplate mounted on the outside of the air handling unit.

Buffalo Air Handling
Shop Order Number _____

Size _____

V-Belt Drive Type _____ Qty. & Size of Belts_____

Motor Sheave Size _____ Bore _____Kwy_____

Fan Sheave Size_____ Bore _____Kwy_____

NOTES

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.....
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.....
.....
.....

START-UP PROCEDURES
BUFFALO AIR HANDLING UNITS
PRE-START UP CHECKLIST AND SERVICE REQUEST

Use this form to check for proper installation of Buffalo Air Handling units. If prepaid start-up service was ordered as part of the Air Handling order, return this completed form to your local Buffalo Air Handling Sales Representative to schedule start-up. If start-up service was not ordered, but is desired, contact your local Buffalo Air Handling Sales Representative for a quotation and then return this completed form with purchase order to schedule the start-up. Please allow 3 – 4 weeks for start-up service.

Job Name _____ Installing Contractor _____

Street _____ Contractor Contact _____

City _____ Phone _____

PRE-START UP CHECKLIST

Before attempting to start-up the Air Handling Unit, confirm that the following actions have been completed (or will be completed prior to scheduled start-up). Refer to Buffalo Air Handling Service Manual G-875-G.

		YES	NO
1.	Unit installed on Support structure, leveled and shimmed.	☐	☐
2.	Proper assembly of unit and proper sealing of all shipping splits (welded or bolted)	☐	☐
3.	If units supplied with inertia bases, has concrete been poured in base?	☐	☐
4.	Release all shipping hold down devices.	☐	☐
5.	Has ductwork been installed so fan can be run?	☐	☐
6.	Check for proper clearance of all rotating components and adjust as required.	☐	☐
7.	Check bearings for proper lubrication, cleanliness, moisture, alignment locking and clearances.	☐	☐
8.	Align all drive components.	☐	☐
9.	Check motor rotation.	☐	☐
10.	Has power been brought to unit (fan, lights, etc.)?	☐	☐
11.	Have filters been installed in units.	☐	☐
12.	Are the VIV's and damper operators operational?	☐	☐
13.	Have VFD's been started, checked and parameters set. Air balance and control done?	☐	☐
14.	Has unit been cleaned out including coils and drain pans?	☐	☐

Note: In the event service is purchased from Buffalo Air Handling, customer can disregard items 6, 7, and 8. These will be done by Buffalo Air Handling service technician.

REQUEST FOR SERVICE TECHNICIAN

I acknowledge that all of the above items have been completed. I understand that if upon job inspection these requirements are not met, no start-up work will be performed and travel time and expenses will be charged at current hourly rates.

Name: _____ Company _____ Date _____

3.0 SHIPPING & RECEIVING

Standard terms of sale shipments are F.O.B. factory with shipping and handling allowed or not allowed as stated in the proposal. Therefore, it is to the interest of the buyer to carefully inspect all shipments before they are accepted from the carrier. Upon delivery, be sure that all items listed on the bill have been received. (Partial shipments are often made.)

Even though all equipment is carefully inspected and prepared for shipment at the factory, rough handling en route may cause damage to the fan and drive parts.

Any shortage, breakage, or damage noticed at time of delivery must be indicated on the carrier's freight bill and signed by the driver or carrier's representative.

4.0 HANDLING

When lifting our air handling units with a hook at a single point, a lifting rig with spreader bars, shown in Figure 1, are required. This rig must be furnished by contractor.

SPREADER BARS ARE ESSENTIAL TO PREVENT CRUSHING OF THE UNIT'S SIDES.

Air handling units must be lifted vertically, on a level plane, to prevent distortion and stress on the components.

Maximum shipping dimensions may necessitate the substitution of removable lifting lugs (optional). Lugs and hardware will be shipped loose for field installation. Lugs may be removed after lifting unit into position.

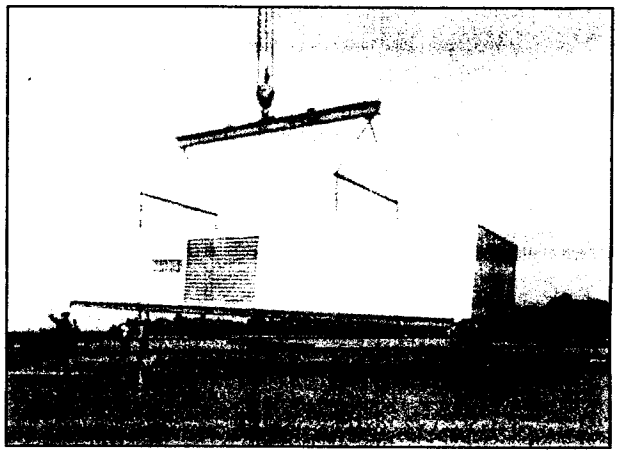


Figure 1. Proper Rigging.

5.0 STORAGE

STORE AIR HANDLING UNIT IN A DRY AND PROTECTED AREA, TO ENSURE THAT THE FAN COMPONENT'S SHAFT, BEARINGS, AND WHEEL ARE SHIELDED AGAINST DUST AND CORROSION.

If it is necessary to store outdoors, special care must be taken to prevent moisture, corrosion, dust, or dirt accumulation. Coat the fan shaft with grease or rust preventive compound. Cover and seal bearings to prevent entrance of contaminants. The fan and motor shafts must be rotated every two weeks. Flexible plastic is suggested for covering. Use tarp or weatherproof paper to cover the exterior of the cabinet.

WARNING: EXTRA CAUTION MUST BE TAKEN TO PREVENT INTERNAL MOISTURE DAMAGE TO THE BEARINGS. IF AIR HANDLING UNITS ARE TO BE IN STORAGE OUTSIDE, THE FAN BEARINGS SHOULD BE COMPLETELY FILLED WITH GREASE. AFTER REMOVAL FROM STORAGE THE EXCESS GREASE MUST BE REMOVED AND PROPERLY RE-GREASED (Refer to Sections 11.3 and 11.6).

Also, care should be taken in the treatment of cooling and/or heating coils. Condensate or rain water moisture may lead to freezing, resulting in damage to the coils. If storage is required, coils should be charged with nitrogen (optional).

6.0 FOUNDATIONS

A rigid level foundation is a must for every air handling unit. It assures permanent alignment of fan and driving equipment and freedom from excessive vibration, minimizing maintenance costs.

1. Floor mounted units, regardless of unit type or arrangement, are to be mounted on a level concrete floor pad. Pad to be sufficient height to allow for P-trap removal of condensate from unit drain pan. (Refer to Section 7.8).
2. Ceiling Mounted Units - *Small size units* can be suspended from structural supports using hanger rods supplied by others. *Larger size units* can only be suspended using a structural platform. For this type of installation, the platform must be rigid and level to assure permanent alignment of fan and coil section. It must be designed to carry the weight of the equipment with minimum deflection, plus the load imposed by the centrifugal forces set up by the rotating element.

3. Vibration Isolation - Rubber in shear or spring isolators (See Figure 2) may be provided to separate the vibration of rotating elements from the structure. Isolators for ceiling mounted units should be located between hanger rods and the air handling unit. Floor/platform mounted units may have internal (fan mounted on isolators in the unit) or external (below unit base) vibration isolators. When external vibration isolation is used, sheet metal, piping, and electrical flexible connectors must be installed by the installer. Internally isolated fans are secured for shipment with tie down bolts and shims.

SHIPPING TIE DOWN BOLTS AND SHIMS MUST BE REMOVED BEFORE START-UP.

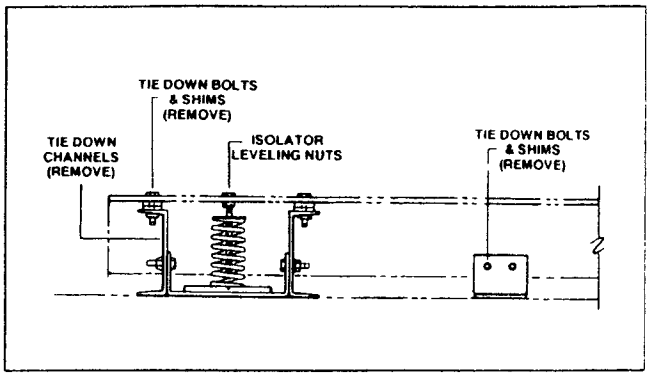


Figure 2. Tie-Down Bolts and Shims. (typical)

7.0 INSTALLATION

7.1 GENERAL

All air handling units are assembled with a test run at the factory. Units are shipped in either full, modular, or knocked down (special order) assemblies. Adjoining parts are numbered or lettered for easy field assembly. Gaskets, caulking, or sealers are furnished for use at the field assembly of joints. Omission of gasketing will cause leakage and improper alignment of the cabinet.

7.2 UNIT ASSEMBLY

Figure 3 on the following page illustrates a typical double-wall cabinet construction with a shipping split. The following assembly procedure is recommended:

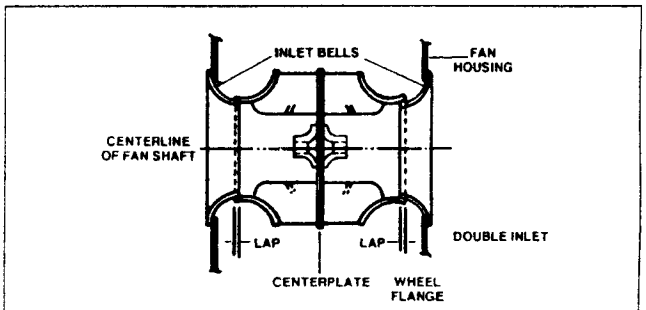
1. Before removing shipping protection, complete unit should be moved into its proper location.
2. Blower section's motor and drive, if not factory mounted, should be mounted in place. Final alignment and adjustment of drive will be required before start-up. (Refer to Sections 10.0 and 11.0).
3. Coil Sections should be handled with care to prevent damage to the finned surface and piping connection. Internally piped units may have pipe supports that require removal prior to its installation.
4. Accessory sections, such as filter, damper, access, and humidifier sections may require field joining.

7.3 FAN ALIGNMENT

Fan has been aligned and balanced, at the factory.

ALIGNMENT MUST BE CHECKED BECAUSE SHIPPING CAN ALTER FACTORY ALIGNMENT.

To check alignment after shipment, spin wheel slowly by hand to see if fan wheel clears the fan inlets. It may be necessary to loosen wheel hub set screws and shift the wheel on the shaft to locate the wheel properly with the inlets. In most cases, the lip of the inlet bell or inlet cone should be even with or slightly extended into the wheel inlet. Generally, wheel-inlet bells are fitted for 70°F air as shown in Figure 4. However, consult with your Buffalo sales representative for proper lip alignment. (Refer to Section 8.1).



WHEEL FLANGES SHOULD OVERLAP EACH INLET BELL EQUALLY

NOTE: Refer to unit white print for wheel diameter.	
Wheel Diameter	**Lap (Inches)**
12¼-27"	⅛
30"	9/32
33-44½"	⅜
49-54½"	¼
60-66"	⅜

Figure 4. General Wheel-Inlet Bell Fits. (typical)

7.4 WATER COILS

Connection of the water coils to the unit system is by others. Refer to the unit drawing and instructions on the cabinet for correct orientation of the external piping.

7.5 DIRECT EXPANSION COILS

Connection of the direct expansion coils to the unit system is by others. Refer to the unit drawing and the instruction on the cabinet for correct orientation of the external piping.

Direct expansion coils require an expansion valve to be provided by others. Coil distributor has a factory sized orifice mounted on the coil.

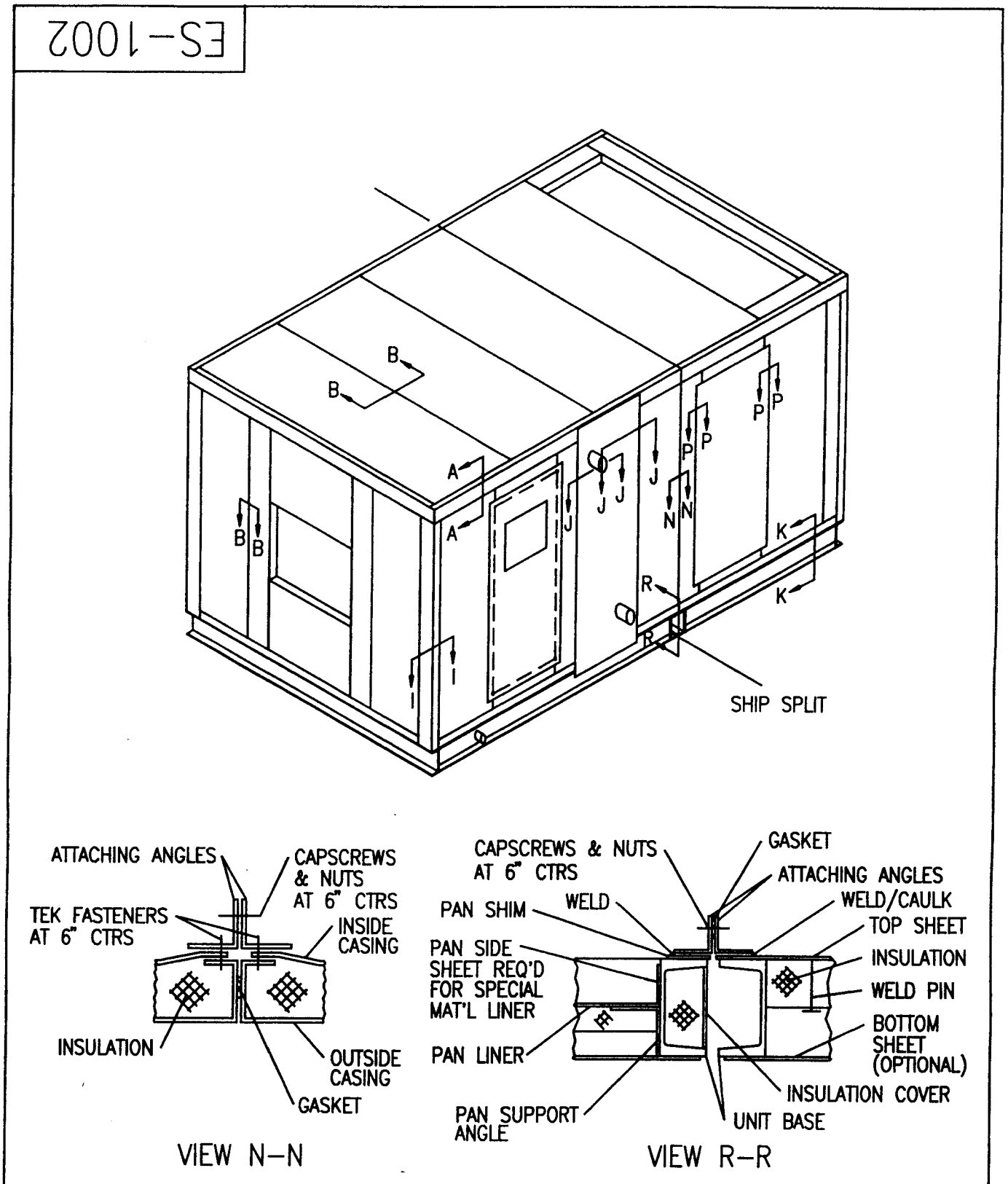


Figure 3. Air Handling Unit with Shipping Split.

7.6 STEAM COILS

Connection of steam coils to the steam system is by others. Refer to ASHRAE Fundamentals Guide for piping procedures. These general precautions are:

1. Make the supply pipe size and return pipe size the same as the coil connections.
2. Condensate should not be raised above coil return into overhead main or drain into mains under pressure except in step 3.
3. A pump and receiver or boiler return trap should be installed between coil condensate traps and overhead & return mains under pressure.
4. Provide all coils with proper air vents to eliminate non-condensate gases.
5. Steam piping should not be supported from steam coil. Both mains and coil should be supported separately.
6. Be sure piping is pitched to facilitate drainage of the coil.

7.7 ELECTRIC HEATING COILS

Electric coils are specifically designed to heat the air per customers specifications.

1. Full air flow over the electric coil must be continuously maintained without blockage of any part of the heating elements.
2. Do not operate below the design velocity.
3. The coil must be electrically interlocked with the fan to ensure that the fan is operating before the coil is energized.
4. For safe operation, make sure that no condensate or spray water is carried onto the electric coil.
5. The electric coil is installed similarly to the steam coil except for the extension of the terminal box from the unit side. Slide the electric coil into the unit so that the back of the terminal box is in contact with the unit side as shown in Figure 5. Attach the back of the terminal box to the unit side with sheet metal screws. Consult the unit drawings for details.

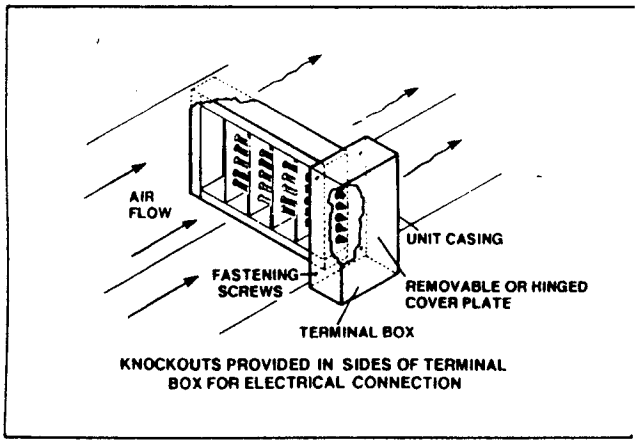


Figure 5. Electric Coil Installation.

7.8 CONDENSATE DRAIN CONNECTION AT PANS

External piping, including a trap for condensate, is required and furnished by others. To insure proper operation of an air handling cabinet and prevent property damage to a building, condensation from cooling coils must be collected in a drain pan and then carried away through the drain line. Improper sizing, trapping, or pitch are common causes of property damage. Refer to Figure 6 and 7 for correct drainage of condensate water.

Unit may require elevation on house keeping pad, roof curb, or structural steel.

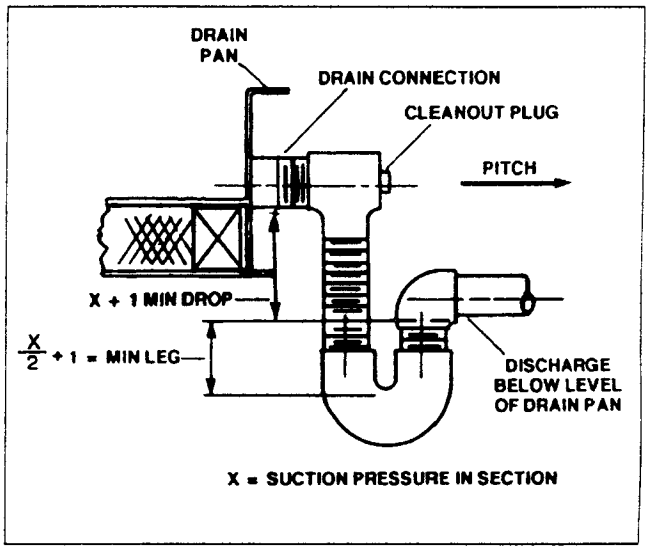


Figure 6. Condensate Drainage (negative internal SP) for Draw-Through Unit.

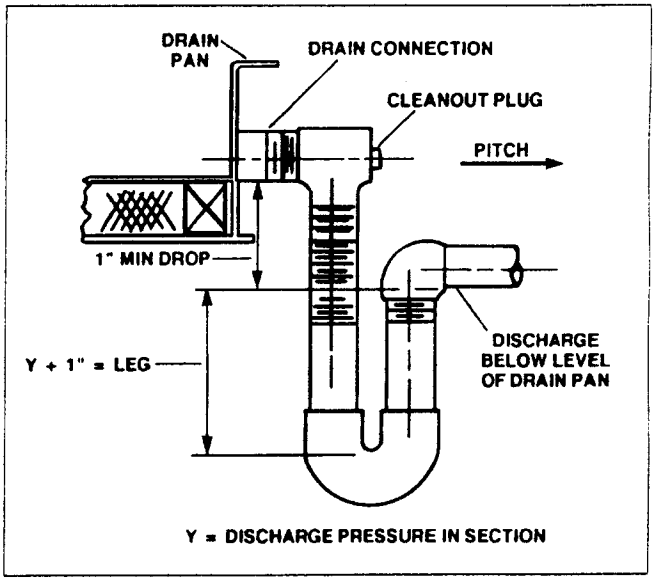


Figure 7. Condensate Drainage (positive internal SP) for Blow-Through Unit.

7.9 DAMPERS

Dampers are factory mounted and shipped as an integral part of the air handling unit. Damper motors are normally furnished by the temperature control contractor. However, in some cases, the damper motor may be supplied by the manufacturer.

1. When damper motors are furnished by the manufacturer, they are mounted on a rigid base and damper linkage is installed.

   FINAL ADJUSTMENT OF LINKAGE IS TO BE DONE BY TEMPERATURE CONTROL CONTRACTOR

2. Damper motors, furnished by others, should be mounted on a rigid base. Do not mount on sheet metal that is not reinforced. Final adjustment of the damper linkage is to be performed by a temperature control contractor.

7.10 FILTER BOX AND FILTER CELLS

Filter boxes are manufactured in the factory to receive the filters. Filters are furnished when specified. When filters are specified, the filters, filter media, and hardware are packaged and shipped separately.

On side service panel filter boxes, it may be necessary to make a slight adjustment to the blank-off sheet. Filter service door will have a filter installation diagram.

7.11 FLEXIBLE CONNECTIONS

All equipment mounted on vibration isolators requires flexible connections. Internally isolated fans will have a factory mounted fan discharge flexible connection. Externally isolated sections require field mounted flexible connections into and out of the section. External flexible connections are furnished by others and are to be field fitted and mounted.

7.12 OPTIONAL ACCESSORIES

Optional accessories may include: humidifiers, roll filters, blenders, heat wheels, heat pipes, face & by-pass steam coils, motor starters, electrical controls, terminal boxes, junction boxes, internal lights, external lights, access platforms, railing, etc.

8.0 SAFETY AND OPERATION

8.1 BEFORE START-UP

Improperly installed or operated air handling unit is a hazard to both people and property. They must be installed by trained and experienced personnel. Installation must meet all pertinent state and local safety codes and Occupational Safety and Health Act (OSHA).

1. ***FASTENINGS, ALL BOLTS, WHEEL HUB SET SCREWS, AND BEARING LOCKING COLLARS MUST BE CHECKED FOR TIGHTNESS.***
2. Bearings must be checked for alignment and make certain they are properly lubricated. Refer to sections 11.0 and 14.0.
3. Fan Wheel should be turned over by hand to see that it runs free and does not strike fan housing. If wheel strikes housing, the wheel may have to be moved on the shaft or the bearing pillow blocks moved and re-shimmed. Check location of wheel in relation to fan inlets. Be sure fan housing is not distorted. (Refer to Sections 7.2 and 7.3).
4. Fan Motor and wiring should be inspected.
5. V-belt Drive must be in alignment with belts at proper tension. Use a tension tester. Refer to Section 9.0.
6. All duct joints should be sealed to prevent air leaks. All debris should be removed from duct work, fan, and cabinet. Where feasible, access doors should be provided in the inlet and outlet ducts of the unit for servicing.
7. Dampers and VIV's should operate freely and blades closed tightly. Adjust linkage to close any open blades. VIV's should be partially closed during starting periods to reduce power requirements.

   NEVER CLOSE AN INLET DAMPER WHEN THE FAN IS RUNNING.

8. Coil and Accessory Sections require functional testing of mixing boxes, dampers, filters, drain, spray nozzles, piping, and pumping apparatus.
9. Access doors must be secured.
10. When required by unit operation and maintenance procedures, belt guards, shaft guards, and inlet screens are available from the factory. Insure that all guards are in place.

8.2 START-UP

1. Bump the fan motor to check for proper wheel rotation. The drive should be started in accordance with the manufacturer's recommendations.
2. The fan may now be brought up to speed. Watch for anything unusual, such as vibration, over-heating of bearings, motors, etc. Multi-speed motors should be started at the lowest speed and run at a high speed only after satisfactory slow speed operation. Check fan speed on V-belt driven units.

   DO NOT EXCEED RPM SHOWN ON THE EQUIPMENT SUBMITTAL DATA SHEETS.

3. At first indication of trouble or excessive vibration, shut down the fan and check for the source of the problem. (Refer to AMCA Standard 204-96, table 6.4, for guidance).

8.3 VARIABLE INLET VANES

Variable inlet vanes, VIV, regulate fan capacity through moveable vanes in the fan inlet. A linkage joins all vanes together, causing them to operate in unison when moving the control lever. The VIV is completely assembled and adjusted for proper operation at the factory. When the VIV is installed at the job site, make sure that the vanes will spin the air in the same direction as the wheel rotates.

Operate the control lever to ensure that the vanes move easily from open to closed positions. VIVs operated manually have a wing nut which locks the control lever in position on the quadrant. Automatic operation is accomplished by connecting a suitable control device to the VIV control lever.

On some fans, in order to limit the horsepower, a stop is used to control the maximum open position.
Do not remove this stop. Figure 8 illustrates a typical VIV. VIV's are serviced by removing the entire assembly.

8.4 ADJUSTABLE MOTOR BASE

Adjustable motor base facilitates tension adjustment of V-belt drive. Tension in V-belt drive should be checked before operation and periodically after initial operation.

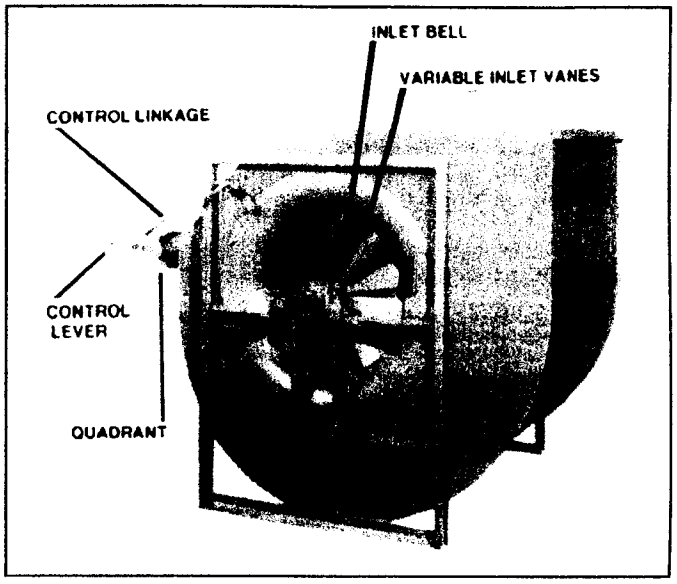


Figure 8. VIV Assembly.

9.0 MOTORS

After the motor has been mounted, aligned, and bolted down, wire to power supply through a disconnect switch, short circuit protection, and suitable magnetic starter with overload protection. All motors should be connected as shown on nameplate. Install all wiring and fusing in accordance with the National Electric Code and local requirements. Ensure that the power supply (voltage, frequency, and current carrying capacity of wires) is in accordance with the motor nameplate. Motors are received with bearings lubricated and require infrequent lubrication. Refer to the motor manufacturer, for lubrication.

9.1 TO REVERSE DIRECTION OF ROTATION

9.1.1 Single Phase Motors

Capacitor motors are reversed in rotation by interchanging connections to supply either the main or auxiliary winding.

9.1.2 Three Phase Motors

For three phase motors, interchange any two line leads. Normal operation of motors results in temperature rises according to motor insulation. The total motor operating temperature includes ambient temperature plus motor rise. The motor rise includes nameplate temperature rise, service factor allowance, and hot-spot allowance. The motor nameplate indicates the insulation class. The following is the maximum total operating temperature for each insulation class:

Insulation Class	°Fahrenheit	°Centigrade
A	221	105
B	266	130
F	311	155
H	356	180

9.2 MOTOR TROUBLESHOOTING

Various motor troubles can be caused by:

1. Low or high voltage.
2. Overload - high temperature - high amperage.
3. Armature unbalance - vibration and noise.
4. Worn bearings - armature rubs against stator.
5. Too much or not enough lubricant in bearings.
6. Commutator brushes on d-c motor worn or not seated under proper tension.
7. Loose hold down bolts - vibration and noise.
8. Dirt in windings - high temperature.
9. Low insulation resistance due to moisture - check resistance with megohm meter ("Megger") or similar instrument employing a 500 volt d-c potential. Resistance should read at least 1 megohm. If it is less, remove motor from service and send to a qualified motor repair shop.

10.0 V-BELT DRIVES

The V-belt drive is aligned at the factory before the cabinet is shipped. However, alignment must be rechecked prior to its operation.

V-belt drive assembly can be mounted as follows:

1. Clean the motor and fan shafts. Clean the bore of the sheaves and coat with a lubricant for ease of shaft entry.
2. Place fan sheave on the fan shaft and motor sheave on its shaft. Do not force the sheaves as this may damage bearings. Tighten the sheaves in place.
3. Move the motor on its slide base so the belts can be placed in the grooves of both sheaves without forcing. Do not roll belts or use a tool to force belts over the grooves.
4. Align the fan and motor shafts so they are parallel. The belts should be at right angles to the shafts. A straight edge or taut cord will aid in alignment.
5. Tighten the belts by sliding the motor on its base. Excessive tension causes undue bearing load.
6. Bump the fan and check motor rotation.
7. Start the fan and run at full speed.
8. Adjust the belt tension until only a slight bow appears on the slack side of the belts. If slippage occurs, an excessive squeal will be heard at start-up.
9. ***GIVE BELTS A FEW DAYS RUNNING TIME TO BECOME SEATED IN SHEAVE GROOVES - THEN READJUST BELT TENSION.***

NOTE: Belt tension on an adjustable pitch drive is obtained by moving the motor, not by changing the pitch diameter of the adjustable sheave.

11.0 BEARINGS

The fitting locations illustrated in Figure 9 are for air handling cabinets with centrifugal fans.

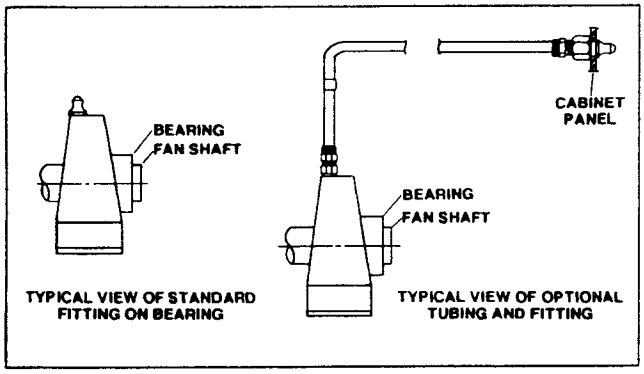


Figure 9. Cabinet Grease Fitting Locations.

11.1 CLEANING OF BEARINGS

Bearings removed from their shafts should be placed in a suitable container with a clean petroleum solvent and allowed to soak. Revolve each bearing by hand to help dislodge any dirt particles. All of the old grease and oil must be removed from bearing pillow block. A solvent may be used to clean. Sealed bearings cannot be cleaned and must be replaced if required.

11.2 BEARING LUBRICATION

TO ENSURE SAFETY DURING RE-LUBRICATION, BE SURE THE DRIVE IS LOCKED OFF OR POWER IS DISCONNECTED FROM THE FAN MOTOR

IMPORTANT: It is recommended that only qualified personnel and proper equipment are used.

A good grade of lubricant is very important. Also, it is imperative to use the same product when re-lubricating the bearings because all greases are not chemically compatible.

Therefore, for the bearing lubricant used, refer to instructions on the fan housing label or fan manufacturer service manual. If neither can be located, contact your local Buffalo sales representative for the lubricant used.

Prior to the re-lubrication with a grease gun (adding of new grease), the fan should be in operation for at least two (2) hours to assure appropriate bearing and lubricant temperature.

NOTE: Just because a grease manufacturer states that a lubricant is good to a temperature (perhaps 350°F) does not mean the lubricant is suitable for bearing use. Bearings often require a SUS value of 70-100 at the operating temperature. Heaters can be used to raise the low temperatures into the correct operating range for a given lubricant.

NOTE: Motor bearings will often use a different lubricant than the fan. Refer to the motor manufacturer for recommendations.

11.3 GREASING PROCEDURE

Be careful to prevent any dirt from entering the bearing. Use a low-pressure gun. Fill the lower half housing with 1/3 to 1/2 full as well as packing the ring assembly housing the bearings with grease. Note that an excess amount of grease can cause bearings to overheat.

11.4 FREQUENCY OF RE-LUBRICATION

How often to re-lubricate can only be determined from your operating conditions. Determine the proper re-lubricant interval for your unit by setting up a schedule and visually examining the purged lubricant. If the lubricant is clean, lengthen the period between re-lubrications; if it is contaminated, shorten the interval. Refer to Table 2 for the recommended re-lubrication intervals.

Table 2. Bearing Re-lubrication Intervals.

Operating Condition		Operating Temperature	Grease Intervals
Dirt	Moisture	Degrees Fahrenheit	
Fairly Clean	None	35 to 120	6 to 12 Months
		120 to 160	1 to 12 Months
		160 to 200	1 to 4 Weeks
Moderate to Extremely Dirty	None	32 to 160	1 to 4 Weeks
		160 to 200	1 Week
Fairly Clean	Heavy Moisture & Direct Water Splash	32 to 200	1 Week

11.5 BEARING REPLACEMENT

1. Bearings should be inspected and thoroughly cleaned if necessary. If the bearing is disassembled, mark each part in relation to one another to avoid any error in re-assembly.
2. Note type of pillow block and location of the bearing.
3. Mount bearings in position on the shaft in accordance with the particular type of bearing furnished.
4. The shaft should be clean and free from burrs and other irregularities. Be sure bearing is not seated on worn flat sections.

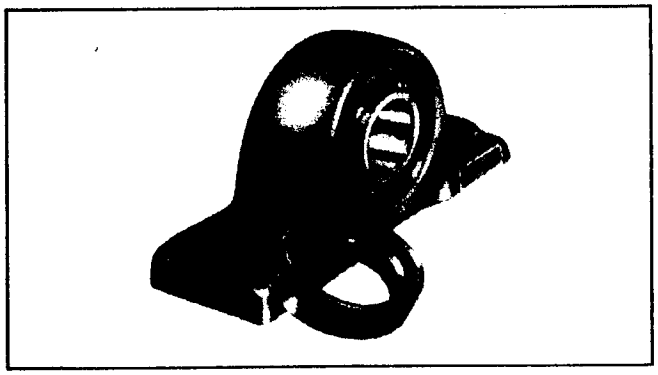


Figure 10. Ball Bearing.

11.5.1 Ball Bearing (See Figure 10)

1. This type of bearing is shipped assembled and ready for installation.
2. Slip each bearing pillow block and locking collar into position on the shaft.
3. Bolt pillow blocks in position on their mounting surfaces after shimming and aligning. They should be mounted so the fan wheel and shaft clear the fan housing.
4. Slide locking collar against end of inner ring. Turn collar in the direction of the shaft rotation until it grips the shaft and inner ring. Tighten the collar with a drift pin. Tighten all set screws or screws in collar.
5. To dismantle, reverse this procedure. Be sure to remove burr on shaft caused by set screw before removing pillow block from shaft. A honing stone will remove burr.

11.5.2 Spherical Roller Bearing (See Figure 11)

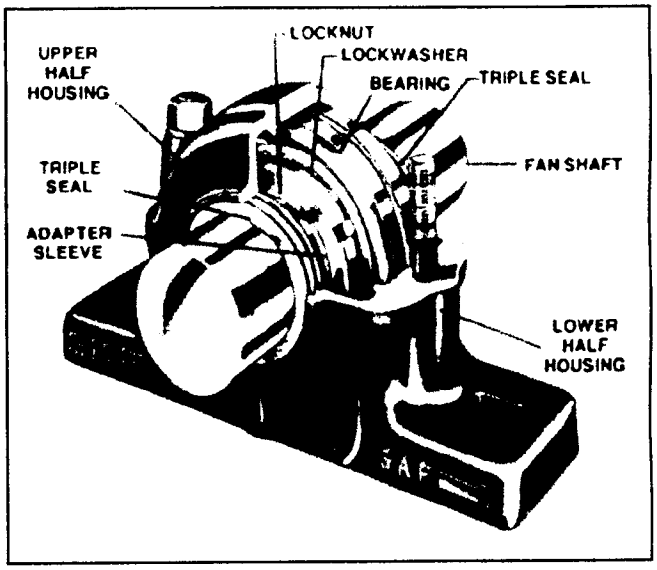


Figure 11. Spherical Roller Bearing.

The replacement of this type of bearing must be carefully installed per SKF procedures in order to obtain the correct bearing tolerances for proper operation. Contact your local Buffalo sales representative for this information.

11.6 Storage of Assembled Bearings

Equipment which is idle must be set in motion periodically in order to spread the lubricant over all bearing surfaces. Suitable intervals depend on ambient conditions. For storage of assembled bearings, they should be cleaned and packed full with petroleum or other suitable anti-rust agents.

STORAGE GREASE MUST BE REMOVED THOROUGHLY AND THE PROPER AMOUNT OF A SUITABLE LUBRICANT APPLIED BEFORE OPERATION (Refer to Section 11.3).

12.0 COILS

12.1 HEATING AND COOLING COIL REMOVAL

Coils for the Air Handling Cabinet are mounted in cabinet section for horizontal air flow. When two or more coils are furnished, the larger coil is stacked on the bottom. To remove coil follow these steps:

1. Drain coil thoroughly and remove piping insulation adjacent to coils at side of cabinet.
2. Break threaded supply and return connections. Disconnect vent and drain fittings if present. For direct expansion coils, the inlet, and outlet connections are soldered or brazed.
3. Each coil bank has a separate removable side panel. Remove all fasteners and gaskets from the side panel. Remove any fasteners from internal cutoff sheets that would prevent coil removal.
4. Remove coil through the open side of cabinet. Do not lift or pull from the headers as damage may occur. Attach clamps or sling to the coil casing to remove coil.
5. When replacing coils reverse the above procedure.
6. Replace the gasket and reseal adjacent panels as required.

12.2 ELECTRIC COIL REMOVAL

Electric coils for Air Handling Cabinets are mounted in the cabinet section for horizontal air flow. The following steps should be followed Refer to Figure 12 and the following steps for the removal of this coil:

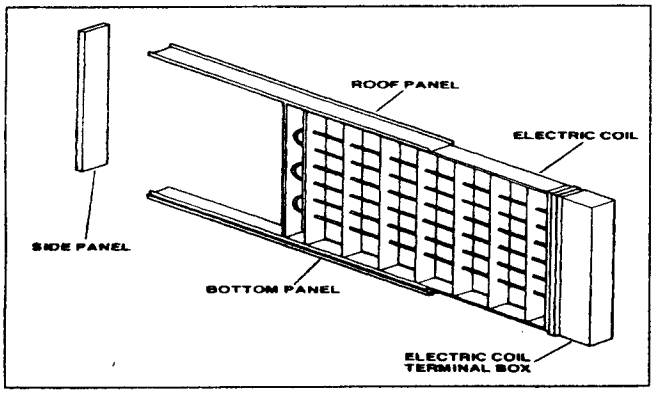


Figure 12. Electric Coil Removal.

1. Disconnect power to the unit from a remote location.
2. Remove the terminal box cover.
3. Remove all fasteners securing terminal box to unit side.
4. Remove all fasteners from internal cutoff sheets that would prevent coil removal.
5. Remove coil. Attach clamps or sling to the coil casing to remove coil.
6. When replacing the coil, reverse the above procedure.
7. Replace gasket. Reseal adjacent panels as required.

12.3 WATER COIL FLUSHING AND FREEZING PREVENTION

Water coils subject to freezing conditions, with the unit shut down, must be protected. There are three generally accepted methods of protection; blow all water from coil, flush coil with antifreeze, or use an antifreeze solution in the coil.

12.3.1 Equipment Required for Blowing Out Coils with Air

The blower recommended for this operation is the portable electric type commonly used on vacuum cleaners. The blower should supply 150 cfm at a static pressure of 45 inches of water. Do not use compressed air.

12.3.2 Procedure Using Air to Blow Down Coils

1. Shutoff the water supply.
2. Drain the coil, using vent and drain cocks provided. In Figure 13 and 14., this step would require opening of supply header vent or removing the plug from the supply header tee, and opening all drains.

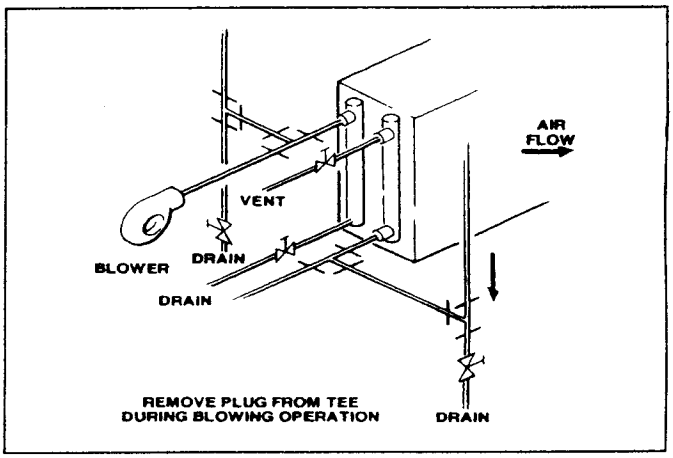


Figure 13. Horizontal Air Flow Coil (Blower Connected).

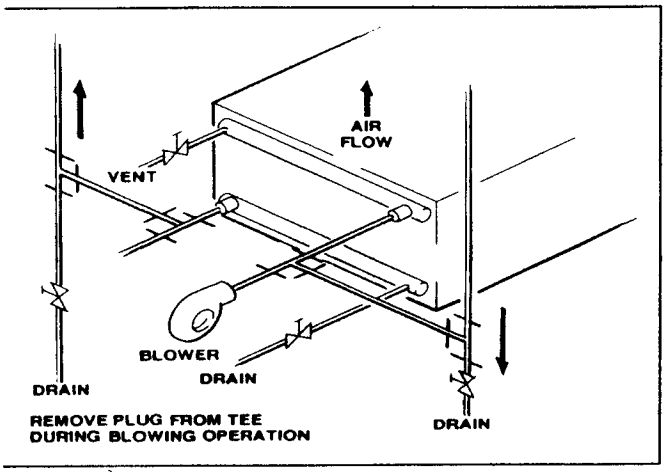


Figure 14. Vertical Air Flow Coil (Blower Connected).

3. Connect the blower to the coil supply or return header at a point where there will be no reduction in pipe size for the blower to the coil. In Figure 13, the blower is shown connected to the return header. Figure 14 shows the blower connected to the supply headers. Do not attempt to blow the coil by connecting the blower to the air vent.
4. Close all outlets on the header to which the blower is connected and remove the plug from the other header.
5. Operate the blower for one-half hour and then check coil for dryness.
6. Jar the coil slightly during the blowing operation. This will free any water which may be trapped and may also dislodge the dirt or scale which is trapping the water. Do not damage the coil in this process.
7. Allow the coil to stand for a few minutes after it is blown down to give the moisture that adhered to the walls of the tube a chance to accumulate. Blow it down again, and if any water comes out, repeat the blowing operation.
8. Leave all drains open.

12.3.3 Equipment Required to Flush Coils with Antifreeze

The required portable equipment consists of a one-inch centrifugal pump operating at a speed of approximately 3500 rpm and having a capacity of 25 gpm at a 35 ft. head.

There are several antifreeze solutions that can be used, the best of which are relatively expensive. Alcohol must not be used due to fumes and the hazard of fire.

12.3.4 Ethylene Glycol Coils

The use of an antifreeze/water solution as the circulating coolant should be incorporated at the equipment design phase. Coil performance is modified by the use of such a solution. The level of freeze protection is the responsibility of the system design engineer.

13.0 FILTERS AND DAMPERS

13.1 FILTERS

Replace or clean panel, cube, cartridge, or roll-type filters periodically as prescribed by the manufacturer.

13.2 DAMPERS

1. Dampers must be kept free of dirt or other foreign matter that may impede normal free movement. Linkage pivot points should be lubricated regularly. Axles rotate in sleeve bearings, which should not require any lubrication. It is recommended that all linkage joints be inspected periodically to insure tightness of set screws.
2. On multi-zone units, periodic checks should be made of bearings and axles to insure proper operation. Do not overlook the center bearings and axles (Refer to Figure 15).

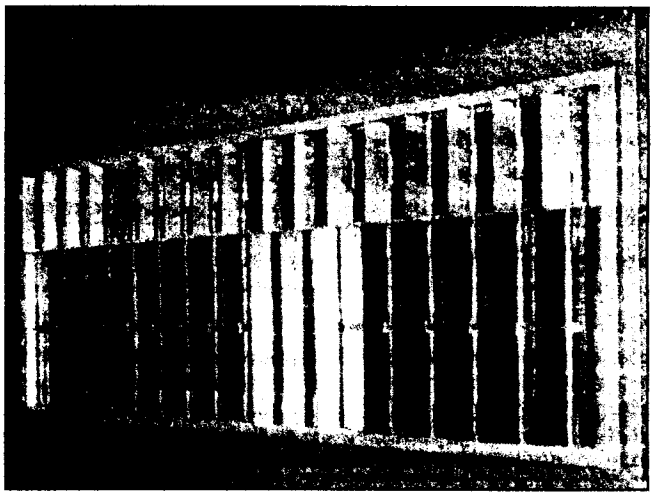


Figure 15. Damper Center Bearing & Axle Locations.

14.0 PREVENTATIVE MAINTENANCE AND LUBRICATION

14.1 GENERAL

Maintenance instructions will accompany the shipment of each air handling unit. All instructions and unit drawing should be kept for future reference. The following items are recommended to help maintain proper operation of the air handling unit:

1. A definite time schedule for inspecting all rotating parts should be established. The frequency of inspection depends on the severity of operation and the location of the equipment.
2. Fan bearing alignment should be checked at regular intervals. Misalignment can cause overheating, bearing failure and unbalance.

3. The fan bearing must be lubricated at regular intervals. Periodic inspections will be necessary. Refer to Section 11.4.

4. Bearings on high speed fans tend to run hot. Ball or roller bearing pillow blocks can have total temperatures of 180°F.

5. Foundation bolts and all set screws should be inspected for tightness.

6. Fans should be inspected for wear and dirt periodically. The wheel might have to be cleaned. A wash down with steam or water jet is usually sufficient. Cover the bearings so water won't enter the pillow block. Dirt accumulation in the housing should be removed. Fan wheels having worn blades should be replaced.

7. Check V-belt drives for belt wear, alignment and proper belt tension. Replace belts when worn with complete matched set.

8. Never run fan at higher speed that it was designed.

9. Lubricate motor bearings to the manufacturer's recommendations.

10. Eliminator plates should be washed annually.

11. Inspect the condition of the cabinet insulation and repair or replace as necessary.

14.2 INTEGRAL HORSEPOWER BALL BEARING MOTORS

1. Motors having pipe plugs or grease fittings should be re-lubricated while warm and at stand still.

2. Use a grease suitable for 15°F to 130°F temperatures.

3. Re-lubrication intervals must be selected to match your operating conditions. Table 3 provides a general guide for re-lubrication.

Table 3. Motor Re-lubrication Intervals.

HP Range	Standard Duty 8 Hrs. Per Day	Severe Duty 24 Hrs. Per Day Dirty, Dusty	Extreme Duty Very Dirty High Ambients
1.5 - 7.5	5 Years	3 Years	9 Months
10 - 40	3 Years	1 Year	4 Months
50 - 150	1 Year	9 Months	4 Months

14.3 FAN TROUBLES AND CORRECTIONS

The most common difficulties are listed below. These points should be checked in order to prevent needless delay and expense.

1. Capacity or pressure below rating
   a. Total resistance of system higher than anticipated.
   b. Speed too low.
   c. Dampers or VIV's not properly adjusted.
   d. Poor unit inlet or outlet conditions.
   e. Air leaks in system.
   f. Damaged wheel.
   g. Incorrect direction of rotation.
   h. Dirty filters.

2. Vibration and Noise
   a. Misalignment of bearings, wheel or V-belt drive.
   b. Unstable foundation.
   c. Foreign material in fan causing unbalance.
   d. Damaged wheel or motor.
   e. Broken or loose bolts and set screws.
   f. Bent shaft.
   g. Worn coupling.
   h. Fan wheel or driver unbalanced.
   I. Loose dampers or VIV's.
   j. Speed too high or fan rotating in wrong direction.
   k. Vibration transmitted to unit from some other source.

3. Overheated Bearings
   a. Too much grease.
   b. Damaged wheel or driver.
   c. Dirt in bearings.
   d. Excessive belt tension.

4. Overload on Driver
   a. Speed too high.
   b. Discharging over capacity due to existing system resistance being lower than original rating.
   c. Wrong direction of rotation.
   d. Electrical source - low voltage.
   e. Motor improperly wired.

14.4 REMOVAL OF FAN WHEEL AND SHAFT

Removal of fan wheels and shaft should be made through the inlet of the fan housing (Refer to Figure 16). To remove the wheel and shaft, the following must first be disassembled:

1. Belt guard (furnished only when specified)
2. V-belt drive
3. Bearings
4. Bearing supports
5. VIV linkage (if furnished)
6. Inlet bells or VIV's

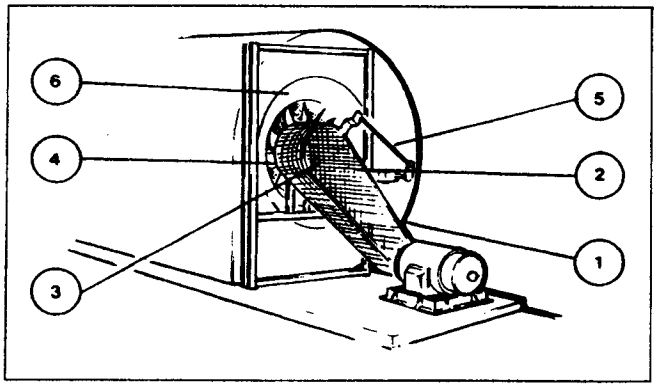


Figure 16. General Fan Wheel Assembly.

Units designed for wheel removal have been provided with adequate access. Other units require field modification.

Wheel should then be removed from the shaft. Ensure that all set screws are backed off before attempting to remove the wheel.

14.5 INSTALLATION OF NEW FAN WHEEL & SHAFT

New wheel and shaft are received disassembled. Follow these steps to install in the fan housing.

1. Remove the protective coating on shaft.
2. Remove keys from the shaft.
3. Carefully clean the inside of the wheel hub with solvent and lubricate bore for ease of shaft entrance.
4. Be sure that the set screws in the wheel hub are turned out to prevent possible scratching of the shaft. If three set screw holes appear in the hub, use only two - one over the key and the other leading key in direction of rotation.
5. Wheel and shaft are now ready for installation into the fan housing.
   a. Wheel should be placed into the fan housing, making sure the rotation arrow on the wheel agrees with the rotation arrow on the fan housing.
   b. After the wheel has been placed in the housing, they are blocked so that the wheel is centered in the fan inlet, with relation to the shaft center line.
   c. Slide the shaft into the wheel and tap key into the key way. Tighten the set screw over the key with only enough pressure to hold the wheel in position while placing the remaining parts in position.
   d. Slide the inlet bell/VIV into position and bolt to the housing.
   e. Mount the bearing supports in fan inlet.
   f. Mount the bearings on their supports, align the wheel with the inlet bell/VIV, align the bearings, shim pillow blocks where necessary, and tighten the nuts on all bolts.
   g. Tighten the set screws in the wheel hub over the key after final alignment. Then, tighten the set screw leading key in direction of air flow.
   h. If the fan has VIVs, assemble the main control shaft and mechanism per assembly drawing. Check its operating movement.
   i. Field balance **must** be anticipated any time a fan is disassembled for maintenance.

14.6 FAN BALANCING

Fan wheels are statically and dynamically balanced by the factory. The final balance of the fan is dependent on its installation and foundation.

Shut down the fan before personnel enters the air handling unit to place vibration pickups in place.

WARNING: Operation of any fan above alarm levels for a prolonged period of time or operation above shut down for **any** period of time, may cause equipment failure and extensive damage, as well as endangerment to personnel.

Refer to AMCA Standard 204-96, table 6.4, for guidance.

15.0 ORDERING SPARE PARTS

Contact your local Buffalo sales representative and supply the following information:

1. Shop order number stamped on the unit nameplate.
2. Size and type of unit, also stamped on nameplate.
3. Fan arrangement.
4. Description of the part required.
5. Special paints, coatings, or materials.

A bill of materials on the assembly drawing and a set of data sheets on your air handling unit was supplied before the unit was delivered. This information will be helpful when ordering spares.

RECOMMENDED SPARES

1. V-belts
2. Bearings
3. Filters

BEARINGS

1. State whether ball or roller
2. Manufacturer
3. Size and number
4. Fixed or floating
5. Parts required

16.0 WARRANTY

Seller warrants for a period not in excess of 18 months from date of shipment or 12 months from date of installation, whichever is earlier, the design, construction and materials of Seller's products to be free from defects in materials and workmanship. Seller's sole obligation and Buyer's exclusive remedy under this Warranty is limited to the repair or replacement without charge, F.O.B. Seller's factory, of any defective parts. Seller will not be responsible for damages of any nature, resulting from breach of the above stated Warranty or from any defect in Seller's products, either in materials, design or construction, or arising from the use of such products. Seller does not guarantee against abrasion, corrosion or erosion.

THE ABOVE STATED WARRANTY CONSTITUTES THE ONLY WARRANTY MADE BY SELLER AND IS GIVEN EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Warranties on equipment not of Seller's manufacture are limited to the terms of any warranties furnished by seller's suppliers to the extent they may be made available to buyer.

Do not attempt to make any repair on fan equipment during its warranty period without the prior written approval of seller or its representatives; otherwise the warranty will be voided.

Seller shall not be liable for any injury to persons or property resulting from improper operation, installation, repair, or maintenance of equipment by customers or third parties. Experienced Service Representatives are available to supervise installation, or check over installation prior to start-up at reasonable charges. Arrangements can be made through your nearest Buffalo sales representative, or by phoning direct to the factory.

WARNING

Products must be used in accordance with the information specified in this manual and the manufactured-prepared fan assembly drawings. Regular inspections must be made to assure safe equipment operation. Strict compliance with all safety and maintenance procedures is the responsibility of the user and is necessary for safe and efficient operation of the fan. Failure to follow these fan installation, operation and maintenance procedures can result in accidents endangering personnel or equipment.

17.0 CLEANLINESS

Units **MUST** be inspected every three (3) months for cleanliness. Areas where dust or dirt can collect **MUST** be cleaned with an appropriate cleaning agent.

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Bulletin G875-G
January 2004

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