# d. Application

- (1) Fans and Air Handling Units; Mount on structural steel base with all base members secured together. Construct bases to avoid excessive motion or tilting. Bases or isolators may be equipped with limit stops for this purpose but shall be unrestrained during operation. Utility sets and units with motors mounted on casings may be isolated by unit isolators.
  - (a) Utility sets and air handling units with wheel diameters less than 27" and all fans on grade floor shall be mounted on rubber-in-shear units or bases not in resonance with fan speed.
  - (b) Fan units and air handling units, (except utility sets, fans with wheels under 27" and all equipment supported from grade) shall be mounted on Type A spring units on bases and isolated as follows:
    - Up to 450 RPM\_\_\_75% efficiency 3½ max.defl.) 450 RPM to 850 RPM 90% 850 RPM and over\_\_\_95%
- (2) Pumps Unless otherwise indicated mount on structural steel rails running the full length of the bed plates or, in the case of close coupled pumps, extend under the overhang to remove the cantilever effect. Rails shall have built-in double deflection rubber-in-shear isolators with 1/4" minimum deflection under operating load.
- (3) <u>Centrifugal Compressors</u> Mount on Type B spring isolators selected for 0.6" minimum deflection.
- (4) Cooling Tower Mount on unit or rail type isolators with required efficiencies and deflections same as for fans, Provide built-in snubbers to prevent upward movement when tower is drained.
- (5) Horizontal Pipe Runs Within 30 feet measured horizontally from equipment, all pipe hangers supporting lines connected to rotating or reciprocating equipment shall have rubber-in- 25. INSTRUMENTS shear isolators.

#### 22. SLEEVES AND ESCUTCHEONS

#### a. <u>General</u>

- (1) Provide sleeves around all pipes passing through walls, floors, ceilings, partitions, structural members or other building parts in time to permit construction progress as scheduled.
- (2) Provide chrome plated brass escutcheons for pipes at walls, floors and ceilings in finished areas unless otherwise noted.

#### b. Material and Application

- (1) Galvanized steel pipe, schedule 40, sleeves through concrete and masonry walls, and for exposed pipes passing through floors.
- (2) Galvanized steel sheet, 20 gauge, sleeves through stud partitions, suspended ceilings and floors where pipes will be concealed.
- (3) Escutcheons Type as required, manufactured by Ritter Pattern and Casting Co., Beaton and Cadwell or as approved.

# c. <u>Installation</u>

- (1) Internal diameter of sleeves shall be 1/2" greater than pipe or covering diameter and concentric with pipe.
- (2) Wall sleeves in solidly at required elevation.
- (3) Ends of sleeves shall be flush with finished wall surfaces.
- (4) Sleeves through floors for exposed pipes shall extend 3/4" above finish floor unless otherwise noted.
- (5) Pack annular space between pipe or insulation and sleeve with jute and white lead.
- (6) Grout or caulk all floor sleeves into building structure to make joints watertight.
- (7) Escutcheons shall fit around insulation or around pipe when not insulated; outside diameter shall cover sleeve; and where sleeve extends above finished floor, escutcheon shall cover sleeve extension.

# d. <u>Duct Sleeves</u>

- (1) Provide 20 gauge galvanized sleeves for air ducts passing through walls, ceilings or floors of mechanical equipment rooms.
- (2) Reinforce to preserve accurate shape without distortion. Size sleeve and insert spacers to leave a 3/8" space around duct or insulation.
- (3) Floor sleeves to have turned edge 3" above floor of equipment room. Seal sleeve to structure.
- (4) Pack both ends of space between sleeve and duct with jute and white lead.

# 23. ACCESS PANELS

a. <u>General</u>

(1) Provide access panels or doors that are indicated or required for access to concealed mechanical and electrical devices which may require future inspection, repair or adjustment; and where required by applicable codes.

- (2) In suspended metal pan ceilings, use pan as access door. Attach a one inch diameter aluminum tag with plain stamped numberals to pan. Coordinate identification with Article "Indentification".
- (3) Doors in walls or ceilings of 2 hour fire resistive construction, as in stairwells, pipe or duct shafts, shall bear Underwriters Laboratory "B" Label.

### b. Material and Application

- (1) Steel, prime coated, Flush screwdriver operated cam action lock.
- (2) Minimum size 12" x 16" except as otherwise specified. In acoustical tile ceilings, size to fit full tiles but minimum size 12" x 24"; panels shall conform to architectural panel pattern.
- (3) Unplastered surfaces, fit frame with anchor lugs for fastening to construction. Door, solid flush steel.
- (4) Plastered surfaces, fit frame with 2 inch wide metal lath plastor bond. Door, solid flush steel.
- c. Approved Manufacturer Milcor, Knapp, Walsh, Zurn equal to Milcor Styles A, B, K, L, M and "B" Label.

#### 24. FLASHING

#### a. General

Flash sleeves, pipes, and conduits projecting through roof with four pound sheet lead.

#### b. Application

- (1) Extend flashing 12" into roofing felts. Make watertight.
- (2) Provide counterflashing at duct and equipment curbs.

#### a. Thermometers

- (1) Location Temperature control points except individual room thermostats; water entering and leaving condensers, chillers, converters, and heaters; outdoor and supply air at air conditioning and ventilating units and elsewhere as indicated.
- (2) Remote Locations Where indicating points cannot be conveniently read or temperature correctly sensed provide a protected capillary tube for remote mounting.
- Ranges For media temperatures not exceeding 100°F: 25° to 125°F except - 40° to 120° for outdoor air. For media temperatures above 100°, but not exceeding 220°: 30°- 240°F.
- (4) Types For direct mounting 5" dial, externally calibrated standard industrial bimetal, with stainless steel stems and cases equal to Weston Model 4500 and 4510
- (5) Piping Install with separable brass wells with insulation extension where required.
- (6) <u>Ductwork</u> Install with flanges and separable brass bushings with insulation extension where required.
- (7) Approved Manufacturers Weston, Marsh, Rochester, Moeller, and Trerice.

# b. Pressure Gauges

- (1) Locations Pressure control points, water service entrance, pump suction and discharge except domestic hot water circulator, cooling tower spray manifold top of standpipe and elsewhere as indicated.
- (2) Type General purpose bronze bourdon tube, bronze bushed movement mounted on socket independent of case, 4-1/2" white face equal to Ashcroft "Quality" type catalog number 1010 or 1014.
- (3) Ranges Approximately twice the maximum operating pressure. Use compound gauges wherever negative pressures can occur.
- (4) Installation Install with gauge cocks, and for steam, brass siphon tubes. For pump and compressor suction and discharge install porous core snubbers.
- (5) Approved Manufacturers Ashcroft, Marsh, Trerice, U.S. Gauge or Weksler.
- c. Connections for Testing Install brass thermometer wells with screw cap and chain and gauge cocks where indicated for testing.

# d. Flow Meters

- (1) For all heating coils, chilled water coils, condenser water system and all radiation systems.
  - (a) Type Bell and Gossett Thermoflo Indicator or Taco or Rinco flow metering system consisting of flow indicator fittings in pipes and one portable meter furnished to Owner.

# 26. PROTECTION

- a. Protect mechanical and electrical material and equipment from the elements or other injury as soon as delivered on premises. Protect fixtures as soon as they are set. Board over water closets and post notices prohibiting their use:
- b. Properly cap or plug openings in equipment, piping, duct, and conduit systems to exclude dirt and other foreign material, Rags, wool, cotton, paper, waste or similar materials shall not be used for plugging.

## 27. CLEANING OF SYSTEMS

- a. After satisfactory completion of pressure tests and before permanently connecting fixtures, equipment, traps, strainers and other accessory items, thoroughly clean all systems. Blew out and flush piping until interiors are free of foreign matter.
- b. Clean strainers and dirt pockets as often as necessary to quarantee no system stoppage.
- c. Clean fans, ductwork, enclosures, flues, registers, grilles and diffusers of rubbish and plaster at completion of work.
- d. Should any system be stopped with refuse after acceptance, pay for all labor and materials required to locate and remove the obstruction and replace and repair work disturbed.
- f. Remove ruse and thoroughly clean surfaces to be insulated or
- g. Leave all systems clean, and in complete running order.

#### 28. ADJUSTING

#### a. <u>General</u>

- (1) After cleaning, put systems into normal operating condition.
- (2) Balance air terminals, inlets, water coils, and heat exchangers for specified flows.
- (3) Adjust dampers and valves at mixing points and bypasses for indicated flow proportions.
- (4) Calibrate instruments and adjust for proper operation.
- (5) Submit recorded data in triplicate for approval on forms furnished by Engineer. Request forms prior to balancing procedure.

### b. Air Balance

- (1) Measurements of air flow at outlets and inlets shall be performed according to the manufacturer's recommendations.
- (2) Measurements of air flow in ducts shall be made by Pitot tube traverse as detailed in the 1963 ASHRAE Guide.
- (3) Record the following data after final adjustments.
  - (a) Velocity or pressure readings and calculated air quantities for all supply, return and exhaust air terminals.
  - (b) Air flow through main supply ducts to establish fan air quantity.
  - (c) Fan speed, motor current and voltage, static pressure at inlet and discharge for all fan systems.
  - (d) Positions of outdoor and return dampers for cooling cycle, vortex dampers and bypass dampers.
  - (e) Recorded temperature charts, if requested by Engineer.
- (4) Operate fans at slowest speed that will deliver indicated air quantities.
- (5) Adjust outlet directional control for draft free air distribution; install sectorizing baffles to overcome drafts caused by flow interference of obstructions.
- (6) Adjust duct volume dampers to minimize outlet damper
- throttling.

  (7) Adjust R-1 controlling R.A. Fan vortex dampers based on air flow measurement of three conditions of supply and return air flow to obtain flow Water Balance

  Water Balance
- (1) Measurement of flow shall be based upon flow meter, pressure differentials across heat exchangers or pumps, or heat balance.
- (2) Measurement of pressure differentials shall be made with standard or differential gauge with scale not greater than 20 times design differential or mercury manometer.
- (3) Record readings indicating flow and pump motor current and voltage after final adjustment.
- d. Operating Tests Demonstrate to Engineer the specified performance of all systems and components.

# e. <u>Testing Personnel</u>

- (1) Procure the services of an independent balancing and testing agency to perform the adjustment and balancing of all air and water flows in the heating, ventilating and air conditioning systems. Agency shall directly oversee all work performed by it employing a competent supervisor subject to the approval of the Engineer. Add dampers and valves required for correct balance as recommended by the agency at no additional cost to the Owner. Submit such additions for Engineer approval.
- (2) Approved Agencies: Air Technicians, Eastern Air Balance Co., Weisman, Inc.

# 29. IDENTIFICATION

# a. <u>General</u>

- (1) Regardless of the Section under which material and equipment is furnished, its identification is included in the work of the Section under which it is installed.
- (2) Surfaces shall be cleaned and painted if specified before applying markings.
- (3) Place markings so that they are visible from the floor.

- (4) Protect finished identification to insure that markings are clear and legible when project is turned over to Owner.
- (5) Stencilling: Stencilled letters one inch high and colored to contrast with background.
- (6) Name Plates: Laminated phenolic plates, 1/8" thick, with beveled edges and engraved white letters on a black background. Secure nameplate with screws to devices or adjacent surface.
- (7) Tags: Polished, lacquered, 1-1/2" diameter brass tags with stamped letters or numerals 1/2" high, filled with black paint and fastened with brass "S" hooks or chains.
- (8) Wire Markers: Self sticking W. H. Brady Co. Perma Code wire

#### b. Piping and Ductwork

(1) Stencil identification on mains and principal branches of piping and ductwork. Mark each type of service every 50 feet with a minimum of one marking per room. Stencil arrows to indicate direction of flow. Identify as follows:

#### Sanitary Vent Storm Water Rain Leader

General Exhaust

Cold Water Hot Water Hot Water Recirculating Fire Line Hot water Heating Supply\_\_\_\_ Hot Water Heating Return Zone Chilled Water Supply Chilled Water Return

Condenser Supply Condenser Return Condensate drain Air Conditioning Supply\_\_\_\_ Air Conditioning Return Zone

#### c. <u>Equipment</u>

- (1) Identify as to nature, services, system number or other designation by stencilling. Designate with items are main of standby.
- Equipment requiring identification

Boilers Air Handling Units Chillers Pumps Cooling Towers Filters Fans

#### d. <u>Valves</u>, Etc.

- (1) Identify valves, controls, dampers and similar items, with tags. Valves adjacent to equipment they serve need not be tagged.
- (2) Where tagged items are above removable metal pan ceilings place the same number on tag secured to the pan which provides access to the item. Coordinate with Artical "Access Panels".

# e. Electrical Items, Instruments, Etc.

- (1) Identify disconnect switches, starting devices, controls, control switches, push button stations with name plates.
- (2) Identify ends of all feeder and control wires with wire markers. Similarly identify feeder wires at all junction

# f. Chart, Diagrams

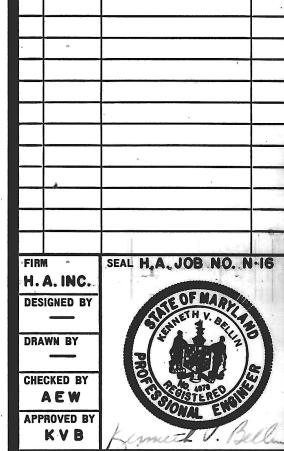
- (1) Provide charts and diagrams of size and type as approved, designating number, service or function, and location of each item.
- (2) Include outline plan of building indicating location and number of each riser, with its control valve.
- (3) Frames charts and diagrams in approved wood or metal frames with clear glass front, secure to walls in location as directed.
- (4) Bind one copy of this information in the Operating and Maintenance Manual.

# 30. PAINTING

- a. Concealed spaces Apply one heavy coat of Rust-Oleum paint to all pipes, hangers, and miscellaneous iron work, which are not copper, galvanized or insulated.
- b. Elsewhere remove grease, scale, rust, and dirt from work and leave clean and ready for painting.
- c. Equipment painted at factory. Touch up scratches and marred places.

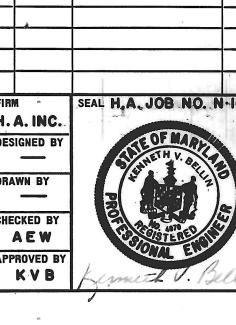
# 31. OPERATING AND MAINTENANCE MANUAL

- a. Furnish manual bound and indexed containing:
  - (1) Brief description of each system and components.
  - (2) Starting and stopping procedures. (3) Day-night changeover.
  - (4) Seasonal changeover.
  - (5) Special operating instructions. (6) Routine maintenance procedures.
  - (7) Schedule for periodic servicing and lubrication.
- (3) Manufacturers' printed operating and maintenance instructions, parts lists, illustrations and diagrams.
- (9) Manufacturers' data report form U-1 certifying code compliance for equipment specified to be constructed in accordance with ASME Code for Unfired Pressure Vessels.



REVISIONS

IO. DATE ITEM



22 <mark>4. P</mark>ennsylvania Av Towson, Maryland 2120 CHRISTIE, 1047 31st Street, N.W ANDREWS Washington.D.C. 2000

ARCHITECTS

OFFICE BUILDING

FOR NOTTINGHAM

FARMS INC.

NILES

102 W. PENNSYLVANIA AVE. TOWSON. MARYLAND 21204

**SPECIFICATIONS** 

6522 JOB NO. SCALE \_\_\_\_ SEPT. 27, 1966 LAST REV.

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