Instaduct® Specifications

1. MATERIALS

1.1 PVC Composed: The PVC used will possess minimum property values equivalent to that designated by ASTM-D-1784-81.

1.2 Rigid Sheets: Rigid PVC sheets used in the fabrication of ductwork and accessories, shall be manufactured from the basic compounds as specified in paragraph 1.1. The manufactured sheet products shall be equivalent to the requirements of ASTMD1927-81

1.3 Extruded ducts and Shapes - Extruded material, where used, shall be manufactured from the basic compounds as specified in paragraph 1.1

2. DUCT SIZES AND TOLERANCES

2.1 Wall Thickness: The minimum nominal wall thickness shall be as specified. The allowable tolerance on the minimum thickness of the duct wall shall be minimum 15% of the specified nominal thickness.

2.2 Round Duct: a.) Extruded round duct up to 24" diameter shall be determined by the nominal inside diameter and wall thickness are indicated herein. Tolerances on extruded duct including out of roundness shall generally be governed by the requirements of ASTMS1785-83 but in any event tolerance will allow for proper joint fitment and cementing.

b.) Fabricated ducts larger than 24" in diameter shall be determined by the nominal inside diameter. The tolerance including out of roundness shall be the greater of 1% of the diameter or 3/16 of an inch.

2.3 Fittings: Wall thickness of mitered fittings shall be at least of duct of the same size.

2.4 Squareness of Ends: Individual sections and fittings shall maintain suitable tolerances such that field erection can be accomplished in a neat and workmanship like manner, and such as to maintain essentially airtight construction and structural integrity.

3. SOLVENT CEMENTING

Solvent cementing may be used as a method of joining PVC ducting. (This process joins the O.D. of the duct to the I.D. of the fitting). The solvents in the cement produce a surface reaction that dissolves the PVC. As the surfaces are places in contact with each other, the solvents evaporate, the reaction stops and the PVC hardens to its original state. (This method is suitable only for applications where adequate surface-to-surface contact area exists.)

INSTADUCT is closely fitted to ensure uniform contact of the mating surface. When used with larger sizes of duct (over 12 inches diameter or width) particular care shall be exercised to insure that the solvent does not set up in any area prior to mating of the parts.

When performing solvent welding, care must be taken to follow FABCO's instructions precisely with respect to preparing the material to be joined, applying the cement and placing the materials into contact with each other.

4. LONGITUDINAL SEAMS

Thermally formed large diameter round duct sections shall be machine fusion welding the length of duct.

5. ELBOWS, ROUND DUCT

Unless otherwise specified in the design documentation, the centerline radius for standard elbows shall be 1 times the diameter.

6. OFFSETS

Unless otherwise specified in the design documentation, the centerline radii for standard offset shall be the same as for elbows.

7. TRANSITIONS AND REDUCERS

Minimum wall thickness and reinforcement of transitions shall be that required for the larger diameter or width of transition piece.

8. BRANCHES ENTERING MAIN

Branch ducts shall enter the main duct near the large end of the transitions, at an angle not exceeding 45° wherever possible. Branches shall not be positioned directly opposite one another on a main or a sub-main. The intersection of branches with mains and sub-mains shall be continuously welded.

9. TRANSVERSE JOINTS

Hand welded butt joints may be used for connections wherever desirable. For field connections, however, it is recommended that a bell and spigot or flexible connection be used.

10. BUTT JOINTS

A hand-welded butt joint shall have a tensile strength at last equal to 75% of the duct itself.

11. BELL AND SPIGOT INSTADUCT

Bell and spigot joints, are made by thermal forming of the end of round duct. The straight duct shall be inserted into the bell end a minimum of 2".

12. INSTADUCT COUPLING JOINT

The coupling joint is thermally formed of a thickness equivalent to or greater than that of the duct. The coupling is cemented to the duct section.

13. FLEXIBLE CONNECTIONS

Flexible connections shall be provided to form an anti-vibration barrier at the locations indicated on the design drawings and shall be fabricated from the flexible plasticized PVC material (not less than 3/32 inch thick) having corrosion resistance and temperature compatibility suitable for the environment. Longitudinal seams shall be sealed by machine fusion welding.

14. DUCT HANGER AND SUPPORTS

All horizontal ducts shall be supported. Duct shall also be supported independently at other locations and on both sides of an expansion or flexible joint. Hangers and supports shall be securely fastened to the building or structure. Care shall be taken to avoid creating conditions of stress on the finished material. Hanger materials and hardware shall be stainless steel or plastisol coated steel for corrosion resistance as necessary. Otherwise, mild steel or equal may be used.

15. FUME HOODS

Fume hoods will be properly designed and fabricated to suit the installations parameters.

16. VOLUME DAMPERS

Volume dampers shall be installed at the locations indicated on the project drawing for balancing and adjustment of the system. Volume dampers shall be constructed of PVC material and provided with suitable corrosion proof

attachments for permanently setting dampers in a fixed position after balancing.

17. DRAINS

The drains shall be full sized half couplings, preferably 2" in diameter and suitable for receiving standard IPS pipe connections. The fittings shall be continuously welded and trimmed flush with the interior surface of the duct.

18. AUXILIARY EQUIPMENT

Fans, scrubbers, filters, eliminators, sound traps and other such auxiliary equipment, can be incorporated into the system.

POLYVINYL CHLORIDE (PVC)

Whenever the term PVC resins and PVC compounds are used, they are generally understood to refer to materials made from one of the following:

a) polyvinyl chloride
b) chlorinated polyvinyl chloride
c) polyvinyl chloride copolymers

The resin portion of the compound should contain at least 80 percent vinyl chloride according to ASTM D-1784-81. The compounding ingredients may consist of lubricants, stabilizers, non- poly (vinyl chloride) resin modifiers, and pigments essential for processing, property control and colouring.

PVC has the ability to be compounded for a wide range of applications. Use of PVC in air ventilating systems however, is primarily limited to the rigid material. The material in addition to being used for duct is also used for structures such as hoods, exhaust fans, and fume scrubbers.

PVC Solvent Cements - these cements are compounded with PVC resins or copolymers, a solvent, and an evaporation retardant. While clear amber cements can be produced, most commercial cements are colored grey with inert pigments. There are two grades of solvent pipe cement. One is designed for DWV; the other is of heavier consistency for Schedule 40, 80, and 120 m pipes. When cementing is applicable, the latter is suggested for structural fabrication. Cements are available from FABCO. Instaduct up to 24" diameter can be cemented following proper solvent cementing procedures. Duct and fittings over 24" diameter must be hand welded.

CORROSIVE RESISTANCE

Performance rating based solely on advertising data from the reference material, can be made meaningless by the presence of a contaminant. It is essential that close coordination with the manufacturer be maintained to ensure applicability. Corrosion attack is primarily the penetration of the corrosive environment into the surface of the plastic materials. This results in a weight gain of the PVC. Penetration of the corrosive environment onto the plastic proper also changes the physical properties. The degree of the weight gain, penetration and change in physical properties is the manner whereby thermoplastic corrosion is measured. Penetration either occurs relatively rapidly or does not occur at all. A 30-day immersion test is usually satisfactory to determine whether or not a thermoplastic material will handle the corrosive environment intended. Weight gain greater than 7% suggests unsuitability.

Borderline environments in liquid service are usually satisfactory for fume exhaust systems, where condensation does not occur. Exhaust ducts with adequate drainage can be satisfactory where limited condensation occurs. Further, design of fume exhaust systems usually incorporates 9 to 12 parts of room air to one of fume, thereby diluting the fume concentration and reducing corrosive attack.
Changes in physical property occur with corrosion attack and are measured in terms of tensile strength, impact strength, and flexural strength. The degree of attack with organic solvents increases in order with the following common solvents: Alcohol, ketones, ester, aromatic and chlorinated solvents. A very distinct softening of the specimens and some solution occurs in most instances because of corrosive attack. Stress cracking can occur with some plastics. However, Type 1, Grade 1, rigid polyvinyl chloride has rather rare instance of stress cracking.

Higher temperature applications in corrosive environments will result in substantial increases in penetration and become apparent as temperatures approach the heat distortion point. The decreased corrosion resistance, as well as the upper physical operating temperatures compared to working stress, occur simultaneously.

FLAMMABILITY

Polyvinyl chloride (PVC), contains approximately 56% chlorine by weight, and in its rigid, unplasticized form, it is selfextinguishing when tested per ASTM-635. (Generally, the threshold for vinyl resin to be self-extinguishing is approximately 30% chlorine.) Some PVC ductwork is required to be furnished with internal sprinklers while systems without sprinklers are acceptable as long as the PVC does not exceed ¼" wall thickness, (thin walled PVC collapses from the heat of fire and interrupts flames spread by shutting off air flow) and does not contain other combustible deposits.

CONSTRUCTION OF PVC DUCT SYSTEMS

Designed systems normally include the following:

A) Equipment list and system layout.

B) Duct sizing information (diameter or width and height) for all ducts.

C) Total system design CFM and all terminal CFM requirements.

D) Frequency and/or location of access doors and test holes.

E) Location and type of regulating dampers.

F) Location and type of all fire and smoke protection devices and equipment as may be desired, or required by local codes and regulations.

G) Location of flexible connections.

H) Location of all expansion joints.

I) Type of PVC material from which the duct is to be manufactured, and details of the duct to special requirements not in accordance with the reference manual.

J) Pressure Classification: (positive or negative) to which each duct system (or each portion of a duct system where applicable) is to be constructed.

K) Location and type of drain connections when required.

L) Details and location of any acoustical treatment.