

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Common Work Results for HVAC Section 23 05 00

1.2 PRODUCT OPTIONS AND SUBSTITUTIONS

- .1 Refer to **Division 01** for requirements pertaining to product options and substitutions.

1.3 SHOP DRAWINGS

- .1 Comply with requirements of Section 01 33 10.
- .2 Submit an insulation schedule to define the scope of duct insulation and include the following information:
- .1 Material
 - .2 "k" value
 - .3 Thickness
 - .4 Finish

1.4 DEFINITIONS

- .1 For the purposes of this section, the following definitions apply:
- .1 "k" Value: thermal conductivity of insulating material per unit of thickness (W/m. °C).
 - .2 Hot Duct: ductwork conveying air used for heating whose average temperature is greater than 38°C.
 - .3 Cold Duct: ductwork conveying air used for air conditioning whose average temperature is less than 15°C.

1.5 FLAME/SMOKE DEVELOPMENT RATINGS

- .1 Duct insulation, vapour barrier facings, tapes and adhesives shall have maximum flame spread ratings less than or equal to 25 and maximum smoke developed less than or equal to 50, when tested in accordance with CAN/ULC-S102, NFPA 255 or ASTM E84.
- .2 Insulating materials and accessories must withstand service temperatures without smouldering, glowing, smoking or flaming when tested in accordance with ASTM C411.

Part 2 Products

2.1 ACCEPTABLE MANUFACTURERS AND PRODUCTS

- .1 Fiberglas, Manson, Owens Corning, Knauf, Certainteed Corp., 3M

2.2 INSULATION MATERIALS

- .1 Mineral Fibre Insulation for Hot Ducts:
 - .1 Material: flexible mineral fibre blanket insulation to CAN/CGSB-51.11 and CGSB 51-GP-52.
 - .2 "k" Value: maximum 0.038 W/m. °C at 24°C.
 - .3 Service Temperature - 40°C to 65°C.
 - .4 Jacket: factory applied reinforced aluminum foil vapour barrier to CGSB 51-GP-52M.
- .2 Mineral Fibreboard Insulation for Acoustic Lined Ducts:
 - .1 Material: rigid mineral fibreboard to CAN/CGSB-51.10.
 - .2 "k" Value: maximum 0.035 W/m. °C at 24°C.
 - .3 Service Temperature: -40°C to 65°C.
 - .4 Surface Finish: coated to prevent fibre erosion on all exposed surfaces. Roughness not to exceed 0.58 mm.
 - .5 Acoustic Attenuation: Noise reduction coefficient (NRC) of 0.8 for 25 mm thickness using ASTM CA23 test method with F-25 mounting.

2.3 ACCESSORIES

- .1 FSK Joint Tape: 100 mm wide with vapour barrier with laminated aluminum foil, glass fibre scrim and paper with pressure sensitive self adhesive.
- .2 ASJ Tape: vapour resistant tape with all service jacket material and pressure sensitive self-adhesive.
- .3 Contact Adhesive: quick setting, adhesive to adhere mineral fibre/fibreboard insulation to ducts.
- .4 Lap Seal Adhesive: quick setting adhesive for joints and lap sealing of vapour barriers.
- .5 Canvas Adhesive: washable adhesive for cementing canvas jacket to duct insulation.

- .6 Pins: welding pins 4 mm diameter shaft with 35 mm diameter head for installation through the insulation. Length to suit thickness of insulation with 32 mm square nylon retaining clips.

2.4 RECOVERY MATERIALS

- .1 Canvas: 220 g/m² plain weave cotton fabric with dilute fire retardant lagging adhesive, ULC listed.
- .2 Aluminum Jacket: to CSA HA Series M-1980, 0.5 mm thick with aluminum alloy butt straps, secured with mechanical fastener.

Part 3 Execution

3.1 GENERAL

- .1 Dimensions shown on drawings are clear inside measurement regardless of insulation placement. Fabricate ducts accordingly.
- .2 Apply insulation after required duct system tests have been completed and approved by the Departmental Representative.
- .3 Apply insulating materials only to duct surfaces that are clean and dry.
- .4 Install insulation continuous on ductwork through walls and floors, except where required for fire separations.
- .5 Install insulation continuous over full length of duct and fittings without penetration of hangers, standing duct seams and without interruption at sleeves.
- .6 Locate longitudinal seams in the least visible location.
- .7 Install insulation at ambient temperatures within acceptable ratings for tapes, sealants and adhesives.
- .8 Recover exposed insulated duct work with canvas.
- .9 Provide perforated lever overtop of all acoustic lining where the internal air velocity exceeds the requirements set forth by SMACNA.

3.2 DUCT INSULATION SCHEDULE

- .1 ***Insulate supply ductwork in its entirety*** on all air systems with 38 mm thick insulation unless specified otherwise.
- .2 Provide 75 mm thick, foil backed thermal insulation on all concealed exhaust air ducts and outside air ducts from an exterior wall penetration up to a motorized or barometric damper.

3.3 INSTALLATION

- .1 Adhere flexible Mineral Fibre insulation to ductwork with contact adhesive applied in 150 mm wide strips on 400 mm centers. Band on outside until adhesive has set, then remove bands.
- .2 Butt and seal joints with lap seal adhesive; cover joint with tape; use FSK tape for cold ducts.
- .3 Acoustic Lining:
 - .1 Secure rigid Mineral Fibreboard Insulation for Acoustic Lined Ducts with 50% of area coverage using contact adhesive, impale on pins located 400 mm on centers, secure in place with retaining clips. Remove excess length of pins and cover with brush coat of lap seal adhesive.
 - .2 Bevel corners at joints and butt together. Brush coat all cut edges with lap seal adhesive. Install acoustic gauze over all cut corners and joints and brush coat with lap seal adhesive.
 - .3 Secure acoustic lining on medium and high velocity ductwork and ducts with galvanized perforated metal where air velocities exceed 10 m/s.

END OF SECTION