SECTION 8: SPECIFICATION CONCEPTS AND EXAMPLES - COMMERCIAL INSULATION

SECTION 8

SPECIFICATION CONCEPTS AND EXAMPLES

OVERVIEW: SPECIFICATIONS

This section reviews the standards related to specifications, and provides examples of how to use this TIAC Mechanical insulation best practices guide in specifications.

MasterFormat 2004

Mechanical insulation specifications are organized according to the MasterFormat numbering standard (master list of section titles and numbers), jointly published by Construction Specifications Canada (CSC – in Canada) and Construction Specifications Institute (CSI – in the USA).

MasterFormat 2004 is the newest edition, and was radically changed to accommodate a variety of needs. Six-digit numbers are introduced (from the former 5-digit standard), and many new Divisions were added. Mechanical sections were expanded from the old Division 15 - Mechanical into new Divisions 21 - Fire Suppression, 22 - Plumbing, and 23 - Heating, Ventilating and Air Conditioning. Within these Divisions, insulation was given a major heading, and types of insulation given sub-headings.

MasterFormat 2004 Insulation Classes:

21 07 00 - Fire Suppression Insulation

21 07 16 - Fire Suppression Equipment Insulation

21 07 19 - Fire Suppression Piping Insulation

22 07 00 - Plumbing Insulation

21 07 16 - Plumbing Equipment Insulation

21 07 19 - Plumbing Piping Insulation

23 07 00 - HVAC Insulation

21 07 13 - Duct Insulation

21 07 16 - HVAC Equipment Insulation

21 07 19 - HVAC Piping Insulation

When writing a specification for insulation, specifiers have three alternatives:

- Write detailed insulation sections in each Division, one for each type in each application (the 13, 16, and 19 level).

- Write a single specification section at the "00" level, which contains text that applies to all applications within that Division.

- Write a single insulation section for all types and all applications. If this method is chosen, the specifier must choose a number from Division 21, 22, or 23. This section may then be referenced from other Divisions.

In all cases, it is the specifier's responsibility to ensure that appropriate references to the insulation section(s) are contained in other sections.

OmniClass

OmniClass is a classification system for all kinds and varieties of design and construction information. MasterFormat can be used within OmniClass, as Table 22 - Work Results. Where MasterFormat is used to classify “work result” specification sections, OmniClass is used to classify information for all other uses, such as the management of product libraries, cost estimating, human resources, scheduling, project management, etc.

A summary of OmniClass tables is provided, along with a short description of its application to the insulation industry. Complete descriptions of the contents of these tables can be found in the OmniClass 2004 standard.

- Table 11 - Construction Entities by Function
- Table 12 - Construction Entities by Form
- Table 13 - Spaces by Function
- Table 14 - Spaces by Form
- Table 21 - Elements (Including Designed Elements): Insulation is represented here in a generic context as a medium for containing heat transfer.
- Table 22 - Work Results: Insulation is represented here in “work result” specification sections, organized to MasterFormat 2004 numbering.
- Table 23 - Products: Insulation is represented here as single manufactured products, some of which may have multiple uses.
- Table 31 - Phases
- Table 32 - Services: This table provides a place for the services (labour) required to install insulation for mechanical ducts and piping.
- Table 33 - Disciplines: Mechanical contractors will have a place in this table, or more specifically, insulation contractors as a sub-type of mechanical.
- Table 34 - Organizational Roles
- Table 35 - Process Aids
- Table 41 - Information
- Table 42 - Materials: This table includes generic material types, which may be referenced by other tables. For the insulation industry, "mineral fibre " is an example of an "insulating" material. Materials are normally used in the construction of items found in the "Products" table (such as insulation).
- Table 49 - Properties: Properties are ways to quantify items in any of the other tables. For example, "thermal resistivity" and "thickness" are both properties of insulation.

SPECIFYING WITH TIAC MECHANICAL INSULATION BEST PRACTICES GUIDE

The use of the TIAC Mechanical insulation best practices guide specification code numbers implies acceptance of the best practices covered by such numbers in the guidee and any required additions, deletions or modifications to these Mechanical insulation best practices must be clearly stated in the project specification by the specifier.

Where required to state the insulation type in the specification, only the material code number and generic term heading as listed in the Mechanical insulation best practices guide Manual need be stated. The Contractor will have the option to use any one of the approved products listed in the TIAC Mechanical insulation best practices guide under a particular insulation heading. If the specifier wishes to use one particular product from those listed in the Mechanical insulation best practices guide, then the product name must be stated in lieu of the generic insulation type.

It is recommended that the suggested examples be used with the generic insulation type only being stated, as all manufacturers products listed have been accepted by TIAC as suitable for the intended application, within the limits established in the Mechanical insulation best practices guide. This option applies also to all other listed products in the Mechanical insulation best practices guide and unless noted otherwise in the project specification, any one of the listed products for the intended application or finish may be used by the Contractor.

SPECIFICATION EXAMPLES

The following specification examples are divided into three types to correspond to the three types of these Mechanical insulation best practices guide, i.e. Piping, Ductwork and Plenum, and Equipment.

It is recommended that the three types of specifications be incorporated into the project specifications as recommended in this manual. If required, each type may be incorporated individually into the applicable section of the project specifications, i.e. Plumbing, or Heating, Ventilating and Air Conditioning (HVAC), or Equipment. However, the Quality Assurance clause must be included with each type if used within separate sections of the project specifications. Examples of complete master specification sections have been included in Section 15 of this manual.

It should be noted that only representative examples have been included under the headings in each of the three types of specification examples. All additional items required to be insulated in a particular project, together with the necessary insulation thicknesses, must be included under the appropriate heading by the specifier.

8.1 QUALITY ASSURANCE - STANDARD SPECIFICATIONS.

1 The Thermal Insulation Association of Canada (TIAC) Mechanical Insulation best practices guide, together with authorized additions and amendments, shall be used as a reference standard and shall form part of this project specification.

2 The Contractor responsible for mechanical insulation installation work shall keep a copy of the above Mechanical insulation best practices guide available for reference.

3 Specification code numbers quoted shall be taken to refer to that particular specification in the TIAC guide, with exceptions only as specified herein.

4 Where modifications to the TIAC Mechanical insulation best practices guide are included in the project specification, then such modifications shall govern in case of conflict.

8.2 INSULATION - PIPING

Provide and apply piping insulation in accordance with TIAC Mechanical insulation best practices guide Specification 1501, Piping, as hereinafter specified and/or modified.

Scope - Hot Piping

- Hot Water Heating: A.1 - Mineral Fibre (low and medium temperature), 25mm thick. (**EXAMPLE ONLY**)
- Domestic Hot Water, Including Recirculation: [_____] (No.and type), [_____] mm thick.
- Steam Piping: [_____] (No. and type), [_____] mm thick.

- Condensate Piping: [_____] (No. and type), [_____] mm thick.

- [_____]:[_____] (No. and type), [_____] mm thick

Spec. Note: State insulation type required for each scope item, from Group A on Page 1 and 2 of Section 4 - Products. Insert insulation thickness required for each scope item. Add other scope items as required. If closed cell insulation is selected for any of the above scope items then, because of different k factors, state also the specific trade name of the product required.

Scope - Cold Piping

- Primary Chilled Water Piping: - Mineral Fibre (low and medium temperature), 25mm thick. **(EXAMPLE ONLY)**

- Secondary Chilled Water Piping: [_____] (No. and type), [_____] mm thick

- Domestic Cold Water Piping: [_____] (No. and type), [_____] mm thick.

- Interior Rainwater Leaders: [_____] (No. and type), [_____] mm thick

- [_____]:[_____] (No. and type), [_____] mm thick.

- For induction unit run-outs use TIAC Specification 1501-CA with flexible foamed elastomeric insulation, _____ mm thick.

Spec. Note: State insulation number and type required for each scope item, from Group A on Page 1 and 2 of Section 4 - Products. Insert insulation thickness required for each scope item. Add other scope items as required. If closed cell insulation is selected for any of the above scope items then, because of different k factors, state also the specific trade name of the product required.

Scope - Underground Piping Insulation

- Underground piping insulation to be [_____]. Install in accordance with manufacturer's directions.

Spec. Note: State exact product trade name required, from Group B, Page 2 of Section 4 - Products.

Application - Hot Piping

Apply insulation to hot piping in accordance with TIAC Specification 1501-H (1501-HA).

Spec Note: Delete 1501-HA if not applicable.

Include insulation on valve bodies, strainers and flanges in accordance with TIAC Specification 1501-H.

Spec. Note: Include in project specification only if required.

Application - Cold Piping

Apply insulation to cold piping in accordance with TIAC Specification 1501-C (1501-CA)

Spec. Note: Delete 1501-CA if not applicable.

Include insulation on valve bodies, valve bonnets, strainers and flanges in accordance with TIAC Specification 1501-C.

Spec. Note: Include in project specification only if required.

Finishes

- Concealed Piping: No further finish required.

- Exposed Piping: Apply finishes as follows:

    - Hot Water Heating: TIAC CPF/1 Indoor **(EXAMPLE ONLY)**

    - Domestic Hot Water: [_____] finish

    - Steam Piping: [_____] finish

    - Condensate Piping: [_____] finish

    - [_____]: [_____] finish

    - Primary Chilled Water: TIAC CPF/1 Indoor **(EXAMPLE ONLY)**

    - Secondary Chilled Water: [_____] finish

    - Domestic Cold Water: [_____] finish

    - Interior Rainwater: [_____] finish

    - [_____]: [_____] finish

Spec Note: Select finish from TIAC CPF/1 to CPF/5 as listed on Page CP-5 and CP-6. Include finish for each scope item as required. Add other scope items as required.

8.3 INSULATION - DUCTWORK AND PLENUM

Provide and apply insulation to ductwork and plenums in accordance with TIAC Mechanical insulation best practices guide Specification 1502, Ductwork and Plenum, as hereinafter specified and/or modified.

Scope - Externally Applied

- Outside Air Ductwork (Intake to Mixing Plenum): [_____] mm thick, - rigid insulation (with vapour retarder)

- Sheet Metal Air Conditioning Supply Air Ductwork: [_____] mm thick,

    - [_____] mm thick, rigid insulation (with vapour retarder) where exposed.

    - [_____] mm thick, - flexible insulation (with vapour retarder) where concealed.

- [_____]

Spec Note: Insert required thickness. Add other scope items as required.

Scope - Internally Applied

- Rigid Duct Liner: Mixed air plenum [_____] mm thick.

- Rigid Duct Liner: Filter/Coil plenum [_____] mm thick

- Rigid Duct Liner: Fan plenum [_____] mm thick.

- [_____]

Spec. Note: Insert required thickness for each scope item. Add other scope items as required.

- Acoustic lining, where indicated or denoted as such on the drawings, use [_____] mm thick flexible duct liner.

Spec Note: Delete if not applicable. Insert thickness required.

Application - Rigid External (Duct and Plenum)

- Hot: Apply insulation in accordance with TIAC Specification CER/1.

- Cold: Apply insulation in accordance with TIAC Specification CER/2.

Spec Note: Delete item not applicable.

Application - Flexible External (Duct and Plenum)

- Hot: Apply insulation in accordance with TIAC Specification CEF/1.

- Cold: Apply insulation in accordance with TIAC Specification CEF/2.

Spec Note: Delete item not applicable.

Application - Liner Internal (Duct)

- Rigid: Apply insulation in accordance with TIAC Specification CIR/1.

- Flexible: Apply insulation in accordance with TIAC Specification CIF/1.

Spec Note: Delete items not applicable.

Finishes - Rectangular Ducts

- Concealed Ducts: No further finish required.

- Exposed Ducts: Apply TIAC CRF/1 - Indoor (CRF/2 - Indoor) (CRF/3 - Outdoor) (CRF/4 - Outdoor)

Spec Note: Select finish required. Delete finishes not applicable. Include finish for additional scope items as required.

Finishes - Round Ducts

- Concealed Ducts: No further finish required.

- Exposed Ducts: Apply TIAC CRD/1 - Indoor (CRD/2 - Indoor) (CRD/3 - Indoor) (CRD/4 - Outdoor) (CRD/5 - Outdoor).

Spec. Note: Select finish required. Delete finishes not applicable. Include finish for additional scope items as required.

8.4 INSULATION - EQUIPMENT

Provide and apply insulation to equipment in accordance with TIAC Mechanical insulation best practices guide Specification 1503, Equipment, as hereinafter specified and/or modified.

Scope - Hot Tanks and Equipment

- Breeching: - Calcium Silicate (high temperature), 50 mm thick, (**EXAMPLE ONLY**)
- Heating Converters: [_____] (No. and type), [_____] mm thick.
- Domestic Hot Water Storage Tanks: [_____] (No. and type), [_____] mm thick.
- Condensate Receivers: [_____] (No. and type), [_____] mm thick.
- [_____]: [_____] (No. and type), [_____] mm thick.

Spec Note: State insulation type required for each scope item, from Group A or B, Page 1 of Section 4 - Products. Insert insulation thickness required for each scope item. Add other scope items as required. If closed cell insulation is selected for any of the above scope items then, because of different k factors, state also the specific trade name of the product required.

Scope - Cold Tanks and Equipment

- Chilled Water Expansion Tanks: - Flexible Foamed Elastomeric, 25mm thick. (**EXAMPLE ONLY**)
- Chilled Water Pumps: [_____] (No. and type), [_____] mm thick.
- Absorption Chillers: [_____] (No. and type), [_____] mm thick.
- [_____]: [_____] (No. and type), [_____] mm thick.

Spec Note: State insulation number and type required for each scope item, from Group A on Page 1 of Section 4 - Products. Insert insulation thickness required for each scope item. Add other scope items as required. If closed cell insulation is selected for any of the above scope items then, because of different k factors, state also the specific trade name of the product required.

Application - Tanks, Breechings and Equipment

- Hot: Apply insulation in accordance with TIAC Specification1503-H.
- Cold: Apply insulation in accordance with TIAC Specification 1503-C.

Spec. Note: Delete item not applicable.

- Chillers shall be insulated in accordance with manufacturer's directions.

Spec Note: Delete if not applicable.

Finishes

- Breeching: TIAC CEF/1 Indoor (EXAMPLE ONLY)
- Heating Convertors: [_____] finish
- Domestic Hot Water: [_____] finish

- Storage Tanks: [_____] finish
- [_____]: [_____] finish

Spec Note: Select finish from TIAC CEF/1 to CEF/3 as listed on Page CE-2. Include finish for each scope item as required. Add other scope items as required.