1. General

1.1. Summary

1.1.1. This Section includes requirements for supply and application of intumescent coatings used for fire protection of structural steel meeting the requirements of applicable building codes, referenced testing organizations and authorities having jurisdiction.

1.2. Related Requirements

1.2.1. Section 05 05 13 – Shop Applied Coatings for Metal: [Contact Quantum Chemical for list of tested and approved shop applied primers that are compatible with intumescent fire protection system specified in this section]

2. *Spec Note: Coordinate weight and section profile of structural steel components with the structural Engineer, Increasing the weight of steel members can decrease the thickness of intumescent coatings.*

2.1.1. Section 05 12 00 – Structural Steel Framing: Coordinate with structural requiring fire protective intumescent coatings.

3. *SPEC NOTE: Delete requirement for Section 09 90 00 listed below when there is no requirement for site priming or finish painting.*

3.1.1. Section 09 90 00 – Painting and Coating: [Contact Quantum Chemical for list of tested and approved site applied primers and top-coats]

3.2. Reference Standards

4. *Select ASTM E84 and ASTM E119 for products specified in the United States of America* ***–OR–*** *CAN/ULC S101 and CAN/ULC S102 for products specified in Canada.*

4.1.1. American Society for Testing and Materials (ASTM International):

4.1.1.1. [ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials]

4.1.1.2. [ASTM E119, Standard Test Methods for Fire Tests of Building Construction Materials]

4.1.1.3. ASTM D4541, Standard Test Method for Pull Off Strength of Coatings Using Portable Adhesion Testers.

4.1.1.4. ASTM D4060, Standard Test Method for Abrasion Resistance of Organic Coatings by Taber Abraser

4.1.1.5. ASTM D2240, Standard Test Method for Rubbery Property – Durometer Hardness

4.1.1.6. ASTM D2794, Standard Test Method for Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)

4.1.1.7. ASTM D3359, Standard Test Methods for Measuring Adhesion by Tape Test

4.1.2. Association of the Wall and Ceiling Industry (AWCI):

4.1.2.1. Technical Manual 12-B, Third Edition; Standard Practice for the Testing and Inspection of Field Applied Thin Film Intumescent Fire-Resistive Materials

4.1.3. Underwriter Laboratories of Canada (ULC):

4.1.3.1. [CAN/ULC S101, Standard Test Methods for Fire Endurance Tests of Building Construction and Materials]

4.1.3.2. [CAN/ULC S102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies]

4.2. Administrative Requirements

4.2.1. Pre-Construction Meetings: Arrange for a preconstruction meeting to confirm application methods and materials in accordance with [Section 01 31 39 – Project Meetings]. Attended by [Constructor], application [Subcontractor], Consultant and Owner to discuss:

4.2.1.1. Surface preparation;

4.2.1.2. Installation conditions;

4.2.1.3. Products being applied and protection of adjacent surfaces; and

4.2.1.4. Coordination with steel fabricator.

4.2.2. Coordination: Coordinate with [Section 05 05 13] for surface preparation and priming requirements applied by structural steel fabricator.

4.2.3. Sequencing: Schedule and sequence application of intumescent coatings with associated work specified in other sections to account for the following:

4.2.3.1. Application of intumescent coatings to prevent deterioration arising from exposure to detrimental environmental conditions.

4.2.3.2. Protection of completed intumescent coating to prevent damage arising from abrasion and impact during remainder construction operations.

4.2.4. Scheduling: Schedule application of intumescent with other trades to minimize the need to cut or remove intumescent coatings and to account for the following:

4.2.4.1. Installation of piping, ducts, conduit, or other suspended equipment to account for patching of intumescent coatings as Work progresses.

4.2.4.2. Installation of intumescent coatings to account for time required for inspection, testing, and correction of deficiencies.

4.3. Submittals

4.3.1. Provide required information in accordance with [Section 01 33 00 – Submittal Procedures].

4.3.2. Action Submittals: Provide the following submittals before starting any work of this Section:

4.3.2.1. Product Data: Submit copies of Manufacturer's product literature indicating specified materials, including listing of accessory materials required for complete application and Manufacturer's written instructions.

4.3.3. Informational Submittals: Provide the following submittals [when requested by the Consultant] [with required product data]:

4.3.3.1. Certification: Manufacturer's certification indicating testing results showing compliance with listed performance standards.

4.3.3.2. Source Quality Control Submittals: Schedule of calculations required to achieve scheduled fire ratings.

4.4. Quality Assurance

4.4.1. Testing Agency Quality Control Program: Provide intumescent coatings listed with and manufactured under the follow-up service program offered by UL/ULC, Intertek, or Guardian certified testing laboratories.

4.4.2. Installation: Verify surface preparation and priming for steel members are in accordance with Manufacturer's written instructions.

4.4.3. Product Identification: Label packages with Manufacturer name, product name, expiration date, and testing agency label mark.

4.4.4. Required Mock-Ups: Provide required Mock-Ups in accordance with [Section 01 45 00 – Quality Control] before starting work of this Section as follows:

4.4.4.1. Install Mock-Ups for each different intumescent coating system required for the project to verify selections and demonstrate quality of materials and application.

4.4.4.2. Locate Mock-Ups on site at locations appropriate to intumescent coating system application conditions as agreed upon between the [Constructor], [Subcontractor] and Consultant during the Pre-Construction Meeting.

4.4.4.3. Protect acceptable Mock-Ups during construction, Mock-Ups will be used as a standard for judging completeness and acceptance of work performed by this Section.

4.4.4.4. Acceptance of Mock-Ups: Accepted Mock-Ups will form a part of final construction provided they are undisturbed at time of Substantial Performance.

4.5. Delivery, Storage, and Handling

4.5.1. Delivery and Acceptance Requirements: Deliver materials to site in Manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and Manufacturer.

4.5.2. Storage and Handling Requirements: Store materials in a clean, dry area in accordance with Manufacturer's written instructions; protect intumescent coatings from freezing, protect materials during handling and application to prevent damage or contamination.

4.6. Site Conditions

4.6.1. Temperature: Maintain temperature of steel substrates and ambient air to a minimum of 10 degrees C (50 degrees F) during application and for 72 hours after application in accordance with Manufacturer's written instructions.

4.6.2. Ventilation: Provide a minimum of 4 air changes per hour during application and drying of intumescent coatings.

4.6.3. Relative Humidity: Limit relative humidity to a maximum of 85% RH during application and drying of intumescent coatings.

5. Products

5.1. Manufacturers

5.1.1. Acceptable Intumescent Coating Product Manufacturer: Quantum Chemical, (780) 458-3355, 15 Riel Drive, St. Albert, Alberta, Canada, T8N 3Z2, [no substitutions.] [substitutions accepted as follows:]

5.1.1.1. [Consultant may consider additional Manufacturers provided they submit requests for substitution in accordance with [Section 01 25 00 – Substitution Procedures] before starting any work of this Section.]

5.1.1.2. [Do not use substitute materials to establish Bid Price.]

5.1.1.3. [Substitutions that appear as a part of the project without review and acceptance by the Consultant will be rejected, and replaced with specified materials.]

5.2. Performance Requirements

5.2.1. Primer: Use primer approved by intumescent coating Manufacturer.

5.2.2. Intumescent Coating:

5.2.2.1. Provide intumescent coatings that are tested in accordance with ASTM E119 or CAN/ULC S101 and reported and listed with Intertek, UL/ULC or Guardian.

5.2.2.2. Product Properties: Provide intumescent coatings to achieve specified fire protection ratings and the following performance criteria:

5.2.2.2.1. Hardness: ASTM D2240, 70 to 75 Shore D

5.2.2.2.2. Abrasion: ASTM D4060, 376 mg loss using CS 17 Wheel, 1000 cycles, 1000 g weight.

5.2.2.2.3. Adhesion: ASTM D4541, 2.4 MPa (350 PSI).

5.2.2.2.4. Surface Burning [ASTM E84] [CAN/ULC S102]: Flame Spread 0 and Smoke Developed 25

5.2.2.3. Basis of Design Product: Quantum Chemical: SafeCoat® Steel.

6. Spec Note: Use of a finish coat to provide a coloured finish is at the Specifier's discretion when intumescent coatings are applied in a publicly accessible space.

6.1.1. Finish Coat: Use a single coat of latex-based paint approved by the Intumescent Coating Manufacturer.

7. Execution

7.1. Examination

7.1.1. Verification of Compatibility: Confirm compatibility of surfaces to receive intumescent coating as follows:

7.1.1.1. Verify that steel surfaces are primed with a primer approved by the intumescent coating Manufacturer.

7.1.1.2. Verify that objects penetrating intumescent coatings are securely attached to the substrate.

7.1.1.3. Verify that substrates are not obstructed by ducts, piping, equipment, or other construction that interfere with application of intumescent coatings; notify [Constructor] when obstructions are evident to have responsible trade remove obstruction until intumescent coatings application is completed in the area.

7.1.2. Surface Adhesion Testing: Apply intumescent coatings to a patch of prepared and primed steel in accordance with Manufacturer's written instructions and perform adhesion test in accordance with ASTM D3359 to achieve a passing grade of 4A.

7.1.3. Acceptable Conditions: Proceed with application of intumescent coatings after unsatisfactory conditions are corrected.

7.2. Preparation

7.2.1. Protection of Adjacent Surfaces: Provide drop cloths, masking, and other protective coverings for surfaces that are not scheduled to receive intumescent coatings to prevent damage from overspray:

7.2.1.1. Install barriers to prevent contact with freshly applied intumescent coatings until material dries.

7.2.1.2. Protect finished surfaces subject to overspray that are permanently exposed in final construction.

7.2.2. Surface Cleaning: Clean substrates of oil and grease; loose mill scale, dirt, and dust; and other materials that have potential to impair bond of Products specified in this Section.

7.2.3. Primer Repair: Repair shop applied primers using materials compatible with shop primer in accordance with Manufacturer's written instructions.

7.3. Installation

7.3.1. Application: Apply intumescent coatings in accordance with Manufacturer's written instruction and as follows:

7.3.1.1. Use Manufacturer's recommended application equipment.

7.3.1.2. Apply intumescent coatings when primers and repair materials are cured.

7.3.1.3. Install intumescent coatings in dry film thickness required to achieve specified Fire Resistance Ratings.

7.3.1.4. Provide a uniform finish matching system description submitted with Product Data and matching site applied mock-ups accepted by Consultant.

7.4. Site Quality Control

7.4.1. Site Quality Control Reporting: Submit a signed "Quality Control Report for SafeCoat® Products" available from Quantum Chemical, or a signed project summary report on the Quantum QA App available from Quantum Chemical.

7.4.2. [Inspection and Testing Agency: Coordinate application of intumescent coatings with owner's independent inspection and testing agency, and as follows:]

7.4.2.1. [Perform site review and testing in accordance with AWCI TM 12-B.]

7.4.2.2. [Distribute inspection notes and testing results to Owner, Consultant, [Constructor] and application Subcontractor at completion of each area.]

7.4.3. [Finish Coats: Apply finish coat after acceptance of intumescent coating site quality control report [and inspection agency's observations] by Consultant.

7.4.4. Repairs: Deficient intumescent coatings will be repaired or replaced as follows:

7.4.4.1. Remove and replace deficient intumescent coatings when test results indicate non-compliance with Manufacturer's written instructions for tested adhesion;

7.4.4.2. Apply additional thickness of intumescent coatings when tested thickness indicates non-compliance with Manufacturer's written instructions.

7.4.5. Additional Testing: Retest repaired and replaced intumescent coatings to confirm compliance with Manufacturer's written instructions.

7.5. Closeout Activities

7.5.1. Protection: Protect applied intumescent coatings against damage from Work installed after completion of work of this Section:

7.5.1.1. Maintain protection of applied intumescent coatings until completion of the Work.

7.5.1.2. Repair applied intumescent coatings are damaged or removed by successive Work.

7.5.2. Patching: Patch damaged intumescent coatings using original applicator and as follows:

7.5.2.1. Costs associated with patching will be paid for by the [Subcontractor] responsible for damage as determined by the [Constructor].

7.5.2.2. Patch to restore intumescent coating performance in accordance with Manufacturer's written instructions.

8. End of Section