

# 1708 – BRIDGE BACKWALL PROTECTION SYSTEM

## SECTION 1708

### BRIDGE BACKWALL PROTECTION SYSTEM

#### 1708.1 DESCRIPTION

This specification covers waterproofing protection systems to be applied to the face of a concrete abutment against which a backfill will be placed. Requirements for the systems other than the coal-tar membrane are performance oriented, and not limited to any single methodology to accomplish the desired results.

#### 1708.2 REQUIREMENTS

**a. Coal-Tar Membrane.** A coal-tar membrane protective coat complying with the requirements below is an acceptable bridge backwall protective system without further prequalification as long as environmental regulations do not prohibit use of the material.

(1) Penetrating Primer. Use a cationic, highly penetrating, bituminous solution that is compatible with coal-tar emulsion and formulated to neutralize portland cement concrete.

(2) Fiber Glass Fabric. Use fiberglass fabric that complies with ASTM D 1668, Type II, and Coal Tar Pitch-Treated.

(3) Coal-Tar Emulsion.

(a) General. Coal-tar emulsion is compounded of heavy, closed ring hydrocarbons dispersed in water by means of a combination of irreversible colloidal clays. It contains no sulphite pitches, asphalt, bentonite, coal dust, soluble soaps or sulphonic acid.

(b) Physical Properties. The emulsion is homogeneous and shows no separation or coagulation of components that can not be readily overcome by moderate stirring.

The thixotropic properties are such that at normal working temperatures, the material may be temporarily reduced with agitation to a state of liquidity where, without the addition of adulterants, it may be easily spread or sprayed on the surface. After application by the above methods, it becomes set in place.

When spread to a thin film with a spatula, the emulsion shows a uniformly smooth, non-granular consistency, free from coarse particles which are either apparent or cause voids in the film as the material is drawn out to a smear.

(c) Comply with **TABLE 1708-1**.

| <b>Property</b>                                   | <b>Requirement</b> |
|---|--------------------|
| Residue by evaporation,(minimum)                  | 48%                |
| Heat loss of residue by evaporation,(maximum)     | 15%                |
| Ash content of residue by evaporation             | 30-40%             |
| Setting time,(maximum)                            | 4 hours            |
| Resistance to kerosine and water                  | pass               |
| Resistance to Impact after Accelerated Weathering | pass               |

**b. Other types of bridge backwall protection systems.** Make all systems of permanent non-biodegradable materials possessing the waterproofing protection qualities outlined below. All materials incorporated into a system must be environmentally acceptable, and not prohibited by any regulatory body. Handle, store and install bridge backwall protection systems in strict compliance with the manufacturer's recommendations. Specific requirements are as follows:

(1) The system provides an impermeable layer that adheres to the concrete surface. Such adherence may require the presence of water to activate the system. The activated system prevents lateral movement of water at the interface between the concrete and the impermeable layer.

(2) The system is self healing when punctured by sharp objects. It has the capability to flex and bridge over, or move into and seal any cracks which may develop in the concrete.

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(3) Acceptable bentonite based systems contain a minimum of 9 lb of evenly distributed bentonite per square yard of system surface area.

### 1708.3 TEST METHODS

Coal-Tar Emulsion.

- (1) Residue by Evaporation. ASTM D 2939, Section 8.
- (2) Heat Loss of Residue by Evaporation. Place the specimen from Residue by Evaporation in a cool muffle furnace and heat to 520°F for 30 minutes. Remove and place in a desiccator until cool. Weigh to determine the loss in mass.
- (3) Ash Content of Residue by Evaporation. ASTM D 2939, Section 10.
- (4) Setting Time. ASTM D 2939, Section 13, except the evaluation of setting time is made after four hours.
- (5) Resistance to Kerosine. ASTM D 2939, Section 25.
- (6) Resistance to Water. ASTM D2939, Section 15.
- (7) Resistance to Impact after Accelerated Weathering. ASTM D2939, Section 27.  
Use Test Method D 4798, Cycle B., Xenon Arc Exposure.

### 1708.4 PREQUALIFICATION

a. Bridge backwall protection systems other than coal-tar membrane that are intended for use under this specification must be prequalified. Submit a written request to the Bureau Chief of Materials and Research, with the following information for each type and brand name being offered:

- (1) Name, address and telephone number of the manufacturer. Include the name of the preferred contact person.
- (2) Brand name of the system.
- (3) Complete technical information on the system, including test reports addressing requirements cited above. Include small sales samples of the system. Larger samples will be requested if further testing is necessary.
- (4) Information regarding recommended usage and application instructions. Specifically identify any concrete surface or system curing requirements.
- (5) Material Safety Data Sheets.

b. The information will be reviewed by the Bureau Chief of Materials and Research, and the manufacturer will be advised as to whether or not the product is prequalified.

c. The Bureau of Materials and Research will maintain a list of prequalified bridge backwall protection systems. Products will remain prequalified as long as the formulation and manufacturing processes remain unchanged, and field experience indicates that the material functions appropriately. Changes in formulation or manufacturing processes will require a new prequalification review.

### 1708.5 BASIS OF ACCEPTANCE

#### a. Coal-Tar Membrane.

- (1) Receipt and approval of a Type D certification as specified in **DIVISION 2600** for each of the following components:
  - (a) Penetrating Primer
  - (b) Fiber Glass Fabric
  - (c) Coal-Tar Emulsion
- (2) Satisfactory application in the field.

#### b. Other types of bridge backwall protection systems.

- (1) Prequalification as specified in **subsection 1708.4**.
- (2) Receipt and approval of a Type C certification as specified in **DIVISION 2600**.
- (3) Visual inspection at destination for condition and compliance with dimensional and other requirements.