MATERIAL INTENDED FOR ARCHITECTURAL DETAIL

Note: It is the responsibility of the end user to ensure that any and all structural uses of these suspender ropes meet national and/or local building requirements, and/or engineering testing requirements, appropriate for the intended use.

Strands of History accepts custom fabrication projects intended for structural use if they have been reviewed by a licensed engineer. All project descriptions and specifications must bear the stamp or seal, and signature, of a licensed engineer certifying the integrity of the design for the intended use.

1 GENERAL

1.1 Submittals

1.1.1 Data Sheet for Sherwin-Williams Direct to Metal Paint
Attachment 1

1.1.2 Reference Drawings for Golden Gate Bridge Suspender Ropes and Fittings
Attachment 2

1.2 Regulatory Requirements

1.2.1 California Proposition 65 Statement

The Golden Gate Bridge original suspender ropes do not require any declarations under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (also known as Prop 65 statement).

1.2.2 Lead Exposure

The Golden Gate Bridge original suspender ropes were painted with a shop coat of red lead. Prior to initiating any work on the suspender ropes, Strands of History removes any residual corrosion, paint, or other debris by sandblasting. The suspender ropes are then washed with denatured alcohol and/or acetone. Periodic sampling does not detect the presence of lead.

1.3 Field Samples

Upon request, a sample of the Golden Gate Bridge original suspender ropes can be provided.

2 DELIVERY, STORAGE, AND HANDLING

All designs fabricated from the Golden Gate Bridge original suspender ropes should be delivered, stored, protected, and handled to site under provisions provided.

Fabricated designs should be stored and protected in accordance with Strands of History’s instructions.

Protect from weather. Provide adequate ventilation to prevent condensation.
3  PROJECT ACCEPTANCE

Acceptance of the fabricated designs, and any accessories, can either be made prior to shipment to site or on site in manufacturer's packaging. Inspection for damage should take place upon delivery.

Verify that all measurements and specifications are as shown on drawings or renderings.

4  PRODUCT

4.1  Manufacturer of Suspender Rope

John A. Roebling's Sons Company
Trenton, NJ

Date of Manufacture: October 1935

4.2  Supplier of Fabricated Designs Incorporating Suspender Rope

Strands of History, LLC
PO Box 6505
Tahoe City, CA 96145
(530) 583-1552

4.3  Forge Welding of Suspender Rope

Bushey Ironworks, Inc.
8619 Speckled Ave
Kings Beach, CA 96143
(530) 448-4300

4.4  Description of Material

Galvanized steel suspender ropes from the Golden Gate Bridge. Authenticity is determined by the unique size and orientation of the individual wires that comprise the ropes.

4.4.1  Image of Unpainted 12” Section of Suspender Rope

![Image of Unpainted 12” Section of Suspender Rope](image_url)
4.4.2 Image of Painted 12” Section of Suspender Rope

4.4.3 Type of Wire Rope Lay

<table>
<thead>
<tr>
<th>Strand</th>
<th>Wire Rope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Regular Lay</td>
<td>Left Hand Lay</td>
</tr>
<tr>
<td></td>
<td>Right Hand Lay</td>
</tr>
</tbody>
</table>

4.4.4 Type of Strand

<table>
<thead>
<tr>
<th>Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Wire Rope Core Seale Warrington/ Outer Strand Seale Warrington Seale</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cross Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire composition</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Carbon</th>
<th>Manganese</th>
<th>Phosphorus</th>
<th>Sulfur</th>
<th>Silicon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specified</td>
<td>0.935</td>
<td>-</td>
<td>0.05</td>
<td>0.05</td>
<td>-</td>
</tr>
<tr>
<td>Max.</td>
<td>0.89</td>
<td>0.76</td>
<td>0.041</td>
<td>0.035</td>
<td>0.27</td>
</tr>
<tr>
<td>Ave.</td>
<td>0.82</td>
<td>0.66</td>
<td>0.025</td>
<td>0.030</td>
<td>0.22</td>
</tr>
<tr>
<td>Min</td>
<td>0.76</td>
<td>0.56</td>
<td>0.019</td>
<td>0.024</td>
<td>0.16</td>
</tr>
</tbody>
</table>

1. Data presented on the check, not ladle. Check-analyses results for the steel wire were derived from top and bottom samples of ingot suspected of being separated (i.e., worse case scenario)
4.4.6 Dimensions

<table>
<thead>
<tr>
<th>Diameter: 2 11/16”</th>
<th>Center Strand Lay: 7 3/16”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Outer Strand Lay: 9 1/2”</td>
</tr>
<tr>
<td></td>
<td>Rope Lay: 23 1/2”</td>
</tr>
<tr>
<td></td>
<td>Length: 11 feet (see splicing)</td>
</tr>
</tbody>
</table>

4.4.7 Weight

Approximately 1 pound per inch

4.4.8 Flexure

Arc radius of unaltered suspender rope: 30 inch radius as reported in the Report of the Chief Engineer, 1937. In practice, the suspender ropes lay across the main cable of the Golden Gate Bridge with an arc radius of 36 inches.

4.4.9 Finish

Direct-to-Metal Alkyd Enamel manufactured by Sherwin-Williams is a high-build alkyd coating with rust-inhibitive properties for application directly to bare steel. Color is customized to match actual Golden Gate Bridge. Formulation provided by Golden Gate Transportation District. Data sheet included in this specification.

4.4.10 Splicing

Rope lengths are 11 feet. Longer linear runs are available using forged couplers. Individual wire splicing, or rope splicing, is not currently available.

5 EXAMINATION

5.1 Preparation for Installation

Due to the weight of this material, all architectural installation specifications will be provided to Strands of History by a licensed engineer or architect.

5.2 Common Safety Factors

5.2.1 General

The original Golden Gate Bridge suspender ropes weigh approximately one pound per inch. They should be handled carefully. Strands of History assumes no responsibility for any property damage, personal injury, death, or injury to pets or animals due to the mishandling of these suspender ropes.

5.2.2 Cutting or Disabling End Crimps or Structural Attachments

**Do not attempt to cut the stainless steel bands for any reason.** The 229 individual wires in these ropes are under strong torsional tension and will rapidly unwind if the stainless steel bands are cut, potentially causing serious injury or death. The bands are crimped around the rope bundles with 7000 pounds per square inch of pressure. Never attempt to remove the stainless steel bands.
by any means, including but not limited to, by force, pounding, hammering, crowbars and similar tools.

6 PRIOR TESTING

The original specifications for the suspender ropes required chemical analysis, physical tests, and the Preece testing. During the 1973/1974 testing, the Preece Test results disclosed that thin and bare spots existed in a majority of the wires tested, regardless of their specific location. The number of samples where the wire failed to withstand even a single immersion in the copper sulfate solution averaged 47 percent of all wires tested. Results of the other testing is presented below.

Average Tensile Strength

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Tests</td>
<td>Tensile Strength PSI</td>
<td>Number of Tests</td>
</tr>
<tr>
<td>0.203</td>
<td>14</td>
<td>232,500</td>
<td>15</td>
</tr>
<tr>
<td>0.179</td>
<td>94</td>
<td>243,500</td>
<td>30</td>
</tr>
<tr>
<td>0.154</td>
<td>230</td>
<td>250,500</td>
<td>90</td>
</tr>
<tr>
<td>0.153</td>
<td>64</td>
<td>252,200</td>
<td>30</td>
</tr>
<tr>
<td>0.136</td>
<td>570</td>
<td>232,500</td>
<td>180</td>
</tr>
<tr>
<td>0.131</td>
<td>324</td>
<td>237,500</td>
<td>90</td>
</tr>
<tr>
<td>0.117</td>
<td>288</td>
<td>249,500</td>
<td>90</td>
</tr>
<tr>
<td>0.114</td>
<td>76</td>
<td>234,800</td>
<td>30</td>
</tr>
<tr>
<td>0.103</td>
<td>70</td>
<td>246,000</td>
<td>30</td>
</tr>
<tr>
<td>0.098</td>
<td>48</td>
<td>255,800</td>
<td>45</td>
</tr>
</tbody>
</table>

1. Conducted in accordance with standard procedures of the American Society for Testing and Materials

Full-size Suspender Rope Breaking Load

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Breaking Load Pounds</td>
<td>Sample Number</td>
<td>Breaking Load Pounds</td>
</tr>
<tr>
<td>Minimum specified 606,000</td>
<td>A-1 597,000</td>
<td>7'EUI 569,000</td>
</tr>
<tr>
<td>Maximum 738,800</td>
<td>B-4 624,000</td>
<td>19'EUI 660,000</td>
</tr>
<tr>
<td>Minimum 656,200</td>
<td>C-1 621,000</td>
<td>35'WLO 570,000</td>
</tr>
<tr>
<td>Average of 33 tests 702,900</td>
<td>D-4 654,000</td>
<td>55'WUI 585,000</td>
</tr>
<tr>
<td></td>
<td>F-2 683,000</td>
<td>71'EUI 595,000</td>
</tr>
<tr>
<td></td>
<td>F-4 636,000</td>
<td>95'WUO 579,000</td>
</tr>
<tr>
<td></td>
<td>Average 636,000</td>
<td>Average 593,000</td>
</tr>
</tbody>
</table>

1. Conducted in accordance with standard procedures of the American Society for Testing and Materials
Attachment 1 Data Sheet for Sherwin-Williams Direct to Metal Paint
**DIRECT-TO-METAL ALKYD ENAMEL**

**SEMI-GLOSS**

B55W00101 PURE WHITE  
B55W00113 DEEP BASE  
B55T00104 ULTRADEEP BASE

---

**SPECIFICATIONS**

**Color:**  
Pure White, Deep Base and Ultradeep Base

**Recommended Spread Rate per coat:**  
*Pure White B55W00101* (varies by base)  
*Wet mils:* 7.0 – 13.0  
*Dry mils:* 3.0 – 5.6  
*Coverage:* 230-125 sq ft/gal approximate

**Theoretical coverage:**  
689 sq ft/gal @ 1 mil dry

**Drying Schedule @ 7.0 mils wet, 50% RH:**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Time Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>To touch:</td>
<td>1-3 hours</td>
</tr>
<tr>
<td>To handle:</td>
<td>4-6 hours</td>
</tr>
<tr>
<td>To recoat:</td>
<td>18 hours</td>
</tr>
</tbody>
</table>

*Drying and recoat times are temperature, humidity, and film thickness dependent.*

---

**CHARACTERISTICS**

**DIRECT-TO-METAL ALKYD ENAMEL** is a high-build alkyd coating with rust-inhibitive properties for application directly to bare steel.

**Features:**

- Good gloss and color retention
- Corrosion resistance and finish coat protection in one product
- Excellent application properties
- Suitable for use in USDA inspected facilities

**For use on properly prepared:**

- Structural Steel
- Previously painted
- Primed aluminum & galvanized steel

**Recommended for use in:**

- Interior / exterior
- New construction
- Railings
- Machinery
- Structural steel
- Steel doors
- Steel decking

**Tinting with BAC:**

<table>
<thead>
<tr>
<th>Base</th>
<th>oz/gal</th>
<th>Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure White</td>
<td>0-5</td>
<td>SherColor</td>
</tr>
<tr>
<td>Deep Base</td>
<td>4-11</td>
<td>SherColor</td>
</tr>
<tr>
<td>Ultradeep Base</td>
<td>10-11</td>
<td>SherColor</td>
</tr>
</tbody>
</table>

Check color before using. Five minutes minimum mixing on a mechanical shaker is required for complete mixing of color.

**Shelf Life:**  
36 months, unopened

**Finish:**  
50-60°@60° Semi-Gloss

**VOC (less exempt solvents):**  
441 g/L - 3.68lb/gal
(as per CFR 59.406 and SOR 2009-264, s. 12)

**Volume Solids:**  
43 ± 2%

**Weight Solids:**  
59 ± 2%

**Weight per Gallon:**  
9.08 lb/gal ± 0.2 lb

**Flash Point:**  
101°F TCC

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**SHEARWAN 07/2017 www.sherwin-williams.com continued on back**
SURFACE PREPARATION

WARNING! Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.

Iron & Steel
Minimum surface preparation is Hand Tool Clean per SSPC-SP2. Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. For better performance, use Commercial Blast Cleaning per SSPC-SP6/NACE 3, blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2 mils). Prime any bare steel within 8 hours or before flash rusting occurs.

Previously Painted Surfaces
If in sound condition, clean the surface of all foreign material. Smooth, hard or glossy coatings and surfaces should be dulled by abrading the surface. Apply a test area, allowing paint to dry one week before testing adhesion. If adhesion is poor, additional abrasion of the surface and/or removal of the previous coating may be necessary. Retest surface for adhesion. If paint is peeling or badly weathered, clean surface to sound substrate and treat as a new surface as above. Recognize that any surface preparation short of total removal of the old coating may compromise the service length of the system.

Aluminum
Remove all oil, grease, dirt, oxide and other foreign material by Solvent Cleaning per SSPC-SP1. Primer required.

Galvanized Steel
Remove all oil, grease, dirt, oxide and other foreign material by Solvent Cleaning per SSPC-SP1. When the surface has been treated with chromates or silicates, first Solvent Clean per SSPC-SP1 and apply a test patch. Allow paint to dry at least one week before testing adhesion. If adhesion is poor, brush blasting per SSPC-SP16 is necessary to remove these treatments. Rusty galvanizing requires a minimum of Hand Tool Cleaning per SSPC-SP2, prime the area the same day as cleaned. Primer required.

APPLICATION PROCEDURES

Apply paint at the recommended film thickness and spreading rate as indicated on front page. Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance. Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness, or porosity of the surface, skill, and technique of the applicator, method of application, various surface irregularities, material lost during mixing, spillage, over thinning, climatic conditions, and excessive film build.

SAFETY PRECAUTIONS

Refer to the SDS sheets before use. FOR PROFESSIONAL USE ONLY
Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

PERFORMANCE TIPS

Mix paint thoroughly to a uniform consistency with slow speed power agitation prior to use. Stripe coat crevices, welds, and sharp angles to prevent early failure in these areas. When using spray application, use a 50% overlap with each pass of the gun to avoid holidays, bare areas, and pinholes. If necessary, cross spray at a right angle. During the early stages of drying, the coating is sensitive to rain, dew, high humidity and moisture condensation. Plan painting schedules to avoid these influences during the first 16-24 hours of curing. Do not use colorants formulated for interior use only.

APPLICATION

Refer to the SDS sheet before use
Temperature: 40°F minimum
120°F maximum
(Air, surface, and material)
At least 5°F above dew point
Relative humidity: 85% maximum

The following is a guide. Changes in pressures and tip sizes may be needed for proper spray characteristics. Always purge spray equipment before use with listed reducer. Any reduction must be compatible with the existing environmental and application conditions.

Reducer Not recommended
Clean Up Compliant solvent
Airesless Spray
Pressure 2400 psi
Hose 3/8” ID
Tip 0.19”

Conventional Spray
Gun Binks 95
Fluid Nozzle 63B
Air Nozzle 63PB
Atomization Pressure 50 PSI
Fluid Pressure 20-25 PSI

Brush Natural Bristle
Roll 3/8” woven with solvent resistant core

In order to avoid blockage of spray equipment, clean equipment before use or before periods of extended downtime with compliant solvent.

CLEANUP INFORMATION

Clean spills, spatters & tools with compliant cleanup solvent. After cleaning, flush spray equipment with compliant cleanup solvent to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using solvents.

DANGER: Rags, steel wool, other waste soaked with this product, and sanding residue may spontaneously catch fire if improperly discarded. Immediately place rags, steel wool, other waste soaked with this product, and sanding residue in a sealed, water-filled, metal container. Dispose of in accordance with local fire regulations.

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative or visit www.paintdocs.com to obtain the most current version of the PDS and/or an SDS.
Attachment 2 Reference Drawings for Golden Gate Bridge Suspender Ropes and Fittings