

## SSPC: The Society for Protective Coatings

# PAINT SPECIFICATION NO. 21

### White or Colored Silicone Alkyd Paint Type I, High Gloss Type II, Medium Gloss

#### 1. Scope

**1.1** This specification covers white or colored silicone alkyd paint suitable for the finish coat on primed structural steel.

**1.2 INTENDED USE:** The specification covers a high grade air dry silicone alkyd type copolymer gloss and medium gloss enamels intended for use on primed metal but particularly on smooth exterior metal. It is highly weather resistant and is characterized by excellent color and gloss retention. This coating is primarily intended for spray application, but may also be applied by brush or roller. It is to be applied in accordance with SSPC-PA 1, "Shop, Field and Maintenance Painting of Steel."

**1.3** The color of the enamel specified in the procurement documents shall match that of the standard color chip in FED-STD 595 or other colors agreed upon.

#### 2. Description

**2.1** Two types of paint are available under this specification: Type I covers high gloss and Type II covers medium gloss silicone alkyd white or colored paints. Twelve colors are described under each type in this specification (see Tables 1 and 2).

**2.2** This paint contains a minimum of 60 to 67% by volume of nonvolatile film-forming solids (pigment and binder). The minimum theoretical spreading rate for a 1.5 mil (38 micrometers) dry film thickness is 640 to 720 square feet/U.S. gallon (15.7 to 17.6 square meters/liter). Actual spreading rates can be significantly lower.

#### 3. Referenced Standards

**3.1** The latest issue, revision, or amendment of the referenced standards in effect on the date of invitation to bid shall govern, unless otherwise specified. Standards marked with an asterisk (\*) are referenced only in the Notes, which are not requirements of this specification.

**3.2** If there is a conflict between the requirements of any of the cited referenced standards and this specification, the requirements of this specification shall prevail

#### 3.3 SSPC STANDARDS:

|                      |                                                                                                       |
|----------------------|-------------------------------------------------------------------------------------------------------|
| <b>SSPC Guide 13</b> | Guide for the Identification and Use of Industrial Coating Material in Computerized Product Databases |
| <b>PA 1</b>          | Shop, Field, and Maintenance Painting of Steel                                                        |

#### 3.4 ASTM INTERNATIONAL STANDARDS:

|               |                                                                                                                    |
|---------------|--------------------------------------------------------------------------------------------------------------------|
| <b>D 93</b>   | Test Methods for Flash Point by Pensky-Martens Closed Cup Tester                                                   |
| <b>D 95</b>   | Test Method for Water in Petroleum Products and Bituminous Materials by Distillation                               |
| <b>D 185</b>  | Test Method for Coarse Particles in Pigments, Pastes, and Paints                                                   |
| <b>D 235</b>  | Specification for Mineral Spirits (Petroleum Spirits) (Hydrocarbon Dry Cleaning Solvent)                           |
| <b>D 476</b>  | Classification for Dry Pigmentary Titanium Dioxide Products                                                        |
| <b>D 523</b>  | Test Method for Specular Gloss                                                                                     |
| <b>D 562</b>  | Test Method for Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer-type Viscometer          |
| <b>D 600</b>  | Specification for Liquid Paint Dryers                                                                              |
| <b>D 1210</b> | Test Methods for Fineness of Dispersion of Pigment-Vehicle Systems by Hegman-type Gage                             |
| <b>D 1296</b> | Test Method for Odor of Volatile Solvents and Diluents                                                             |
| <b>D 1306</b> | Test Method for Phthalic Anhydride Content of Alkyd Resins and Esters Containing Other Dibasic Acids (Gravimetric) |
| <b>D 1398</b> | Test Method for Fatty Acid Content of Alkyd Resins and Alkyd Resin Solutions                                       |
| <b>D 1640</b> | Test Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature                         |
| <b>D 1729</b> | Practice for Visual Evaluation of Color Differences of Diffusely-Illuminated Opaque Materials                      |
| <b>D 1849</b> | Test Method for Package Stability of Paint                                                                         |
| <b>D 2244</b> | Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates                    |



- D 2369** Test Method for Volatile Content of Coatings  
**D 2371** Test Method for Pigment Content of Solvent-Reducible Paints  
**D 2698** Test Method for the Determination of Pigment Content of Solvent Reducible Paints by High Speed Centrifuging  
**D 2800** Test Method for Preparation of Methyl Esters from Oils for Determination of Fatty Acid Composition by Gas-Liquid Chromatography  
**D 2805** Test Method for Hiding Power of Paints by Reflectometry  
**D 3335** Test Method for Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy  
**D 5486** Specification for Pressure-Sensitive Tape for Packaging, Box Closure, and Sealing  
**E 97** (Withdrawn, replaced by E 1347) Test Method for Directional Reflectance Factor, 45°-0° of Opaque Specimens by Broad-Band Filter Reflectometry

### 3.5 FEDERAL STANDARDS:

- TT-E-1593** (canceled) Enamel, Silicone Alkyd Copolymer, Gloss (for Exterior and Interior Use)

**FED-STD-141:** Paint, Varnish, Lacquer, and Related Materials: Methods of Inspection, Sampling, and Testing

**Section 9** Routine and Referee Testing Conditions

**Method 2011** Preparation of Steel Panels

**Method 3021.1** (canceled) Condition in Container

**Method 4061** Skinning (Partially Filled Container)

**Method 4092** (canceled) Coarse Particles and Skins in Synthetic Vehicle Enamels, Lacquers, and Dopes (use ASTM D 185)

**Method 4203.2** Reducibility and Dilution Stability

**Method 4321** Brushing Properties

**Method 4331** Spraying Properties

**Method 6221** (canceled) Flexibility

**Method 7014** (canceled) Analysis of Unsaponifiable Matter, Oil Acids, and Phthalic Anhydride in Alkyd Vehicles

**FED-STD-595:** Colors Used in Government Procurement

### 3.6 AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) STANDARD:

**Z129.1** Hazardous Industrial Chemicals – Precautionary Labeling

**TABLE 1**  
**PIGMENTATION (TYPE I)**

| <b>FED-STD-595</b>        | <b>COLOR DESIGNATION</b> | <b>PIGMENTATION</b>                                                                                 |
|---------------------------|--------------------------|-----------------------------------------------------------------------------------------------------|
| 10045                     | Dark Brown               | Titanium dioxide, red iron oxide, yellow iron oxide carbon or lampblack                             |
| 10049                     | Maroon                   | Titanium dioxide, red iron oxide, yellow iron oxide, carbon or lampblack                            |
| 10324                     | Light Brown              | Titanium dioxide, red iron oxide, yellow iron oxide, carbon or lampblack                            |
| 11105                     | Red <sup>1</sup>         | Quinacridone violet, light stable molybdate orange                                                  |
| 12197                     | Int. Orange <sup>1</sup> | Light stable molybdate orange                                                                       |
| 13538                     | Yellow <sup>1</sup>      | Titanium dioxide, light stable chrome yellow                                                        |
| 14110                     | Dark Green               | Chrome oxide green, phthalocyanine green, yellow iron oxide                                         |
| 14325                     | Light Green              | Titanium dioxide, phthalocyanine green                                                              |
| 15177                     | Light Blue               | Titanium dioxide, phthalocyanine blue, red iron oxide, carbon black or lampblack                    |
| 16187                     | Medium Gray <sup>1</sup> | Titanium dioxide, yellow iron oxide, chrome yellow, phthalocyanine blue, carbon black, or lampblack |
| 17038                     | Black                    | Carbon black, iron blue                                                                             |
| 17886                     | White                    | Titanium dioxide                                                                                    |
| Other Colors <sup>2</sup> |                          |                                                                                                     |

<sup>1</sup> These enamels may contain lead when analyzed in accordance with ASTM D 3335. Such enamels shall not be used in dwellings, household equipment, toys, etc. The supplier shall furnish proper labeling and description of intended use for such enamels on every container.

<sup>2</sup> For additional colors refer to TT-E-1593.

## 4. Composition

**4.1** The pigments listed in Table 1 (or Type I) or Table 2 (or Type II), or any combination thereof, shall make up the basic pigmentation for the color specified. Extender pigments, shading pigments, and titanium dioxide conforming to ASTM D 476, Type IV, may be used when necessary to match the color specified, provided the enamel complies with the requirements of this specification.

**4.2** The vehicle shall consist of silicone-modified medium oil soya alkyd copolymer of the air-drying type, together with suitable thinners, driers, anti-skinning agents, wetting agents, dispersing agents, and stabilizers combined, producing a material conforming to all requirements specified herein. The silicone intermediate used in the preparation of the copolymerized resin shall be hydroxy functional. The vehicle shall conform to the composition (analysis) requirements of Table 3.

**4.3 SOLVENT:** Shall be mineral spirits conforming to ASTM D 235.

**4.4 DRIERS:** Shall conform to ASTM D 600.

**4.6** The paint shall conform to the composition (analysis) requirements of Table 4 (or Type I) or Table 5 (or Type II).

## 5. Properties

**5.1** The paint shall meet the requirements of Table 6 and Sections 5.2 through 5.12.

**5.2 ODOR:** Shall be normal for the materials permitted (ASTM D 1296). The odor of the wet enamel and of the film at any interval of drying shall not be obnoxious or objectionable.

**5.3 COLOR:** Draw down a coat of enamel on a white opaque glass panel using a doctor blade with a 6 mil (150 micrometer) gap clearance designed to deposit a wet film thickness of approximately 3 mils (76 micrometers). After 48 hours drying, at 70 to 75 °F (21 to 24 °C) and 50% relative humidity, compare the dried film with the standard chip (FED-STD-595) or other color agreed upon in accordance with ASTM D 1729 for compliance. If doubt exists as to the color match, an instrumental referee method may be used (ASTM D 2244).

**5.4 DILUTION STABILITY:** There shall be no evidence of incompatibility of any of the ingredients of the paint when one volume of the paint is slowly mixed with one volume of the mineral spirits (FED-STD-141, Method 4203). However, slight pigment settling shall be permitted.

**5.5 BRUSHING PROPERTIES:** The enamel, as packaged, shall be easily applied when tested in accordance

**TABLE 2**  
**PIGMENTATION (TYPE II)**

| FED-STD-595 | COLOR<br>DESIGNATION | PIGMENTATION                                                                                 |
|-------------|----------------------|----------------------------------------------------------------------------------------------|
| 27886       | White                | Titanium dioxide                                                                             |
| 26270       | Gray                 | Titanium dioxide, lampblack, or carbon black                                                 |
| 27038       | Black                | Carbon black or lampblack                                                                    |
| 20313       | Light Brown          | Titanium dioxide, yellow iron oxide, and red iron oxide                                      |
| 20045       | Dark Brown           | Red iron oxide, yellow iron oxide, lampblack, or carbon black                                |
| 20062       | Maroon               | Red iron oxide and lampblack or carbon black                                                 |
| 23655       | Yellow               | Sun Yellow N                                                                                 |
| 22246       | Orange <sup>1</sup>  | Molybdate orange                                                                             |
| 21105       | Red <sup>1</sup>     | Molybdate red or a blend of monastral violet and molybdate orange                            |
| 24325       | Aqua                 | Titanium dioxide, copper phthalocyanine green, yellow iron oxide, carbon black, or lampblack |
| 25177       | Blue                 | Titanium dioxide, copper phthalocyanine blue, lampblack, or carbon black                     |
| 24108       | Dark Green           | Chrome oxide green, copper phthalocyanine green                                              |

<sup>1</sup> These enamels may contain lead when analyzed in accordance with ASTM D 3335. Such enamels shall not be used in dwellings, household equipment, toys, etc. The supplier shall furnish proper labeling and description of intended use for such enamels on every container.