

SSPC: The Society for Protective Coatings

TECHNOLOGY GUIDE NO. 24

Soluble Salt Testing Frequency and Locations on New Steel Surfaces

1. Scope

1.1 This guide is intended to assist owners and specifiers to determine the location of test sites and frequency of testing for measuring the amount of soluble salt on:

- Uncoated steel surfaces prior to the first application of a protective coating.
- Shop coated steel (primer, pre-construction primer) that will subsequently receive additional coats to complete a coating system.

1.2 Maintenance coating projects or surfaces with a complete manufactured coating system installed are outside the scope of this guide. The guide does not replace nor endorse any of the various test kits/methods commercially available for the measurement of soluble salts (see SSPC-Guide 15). It is not intended for use when determining acceptance criteria for test values of soluble salt contamination.

1.3 Units of Measure: This standard provides both U.S. Customary units and IEEE/ASTM SI 10⁽¹⁾, "American National Standard for Metric Practice" International System Units (SI) units. The measurements are not exact equivalents; therefore, each system must be used independently of the other, without combining in any way. This guide uses U.S. Customary units and provides the SI conversions shown in parentheses for information only.

2. Definitions

Component: A distinct individual item such as a length of pipe, a fabricated pipe spool, or a structural steel shape (e.g. plates, angles, channels, beams, columns, etc.)

New Steel: Steel that has never been placed in service.

Structure: A unit composed of one or more connected steel members comprising a bridge, tank, ship, etc. It is possible for a single steel shape (beam, angle, tee, pipe, channel, etc.) to be considered a structure.

Unit: For new construction, a "unit" is considered to be a batch of individual lengths of pipe, a batch of structural components, a batch of plate, or a series of identical fabricated structures such as joists or built-up columns, as defined by the owner.

3. Establishing Baseline [Background] Measurement

A test extraction and analysis should be performed to establish any contribution to actual test values that the testing procedures, techniques, and/or extraction fluid might have on the results. This baseline value should be subtracted from the actual test results to determine the level of contamination on the surface tested.

The baseline extraction should be performed on a smooth surface, such as a plate of unmarred glass, thoroughly washed with distilled water and dried immediately before performing the extraction. The baseline extraction and analysis should be performed using the same extraction and analysis procedures, equipment, and materials intended for the actual inspection, including the following:

- A representative sample of the extraction fluid that will be used for testing
- All test equipment that comes into contact with the extraction fluid
- The prescribed extraction and measurement procedures and techniques

A baseline value should be determined:

- At the start of work
- Whenever there is a change in the extraction process
- Whenever there is a change in the extraction fluid or equipment
- Whenever a new batch of consumables that contact the extraction fluid (patches, swabs, syringes, vials, etc.) are used
- Whenever repeated washing fails to reduce values below established acceptance criteria
- Whenever test values exceed the established acceptance criteria and the test itself is in question.

4. Considerations for Determining the Location of Measurements and Test Frequencies

4.1 GENERAL

4.1.1 Salt contamination is normally not uniformly distributed over all surfaces of a component, structure or unit for the following reasons:

- The initial contamination may be limited to surfaces directly exposed to the contamination source while other surfaces are shielded from the source of contamination.

⁽¹⁾ ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, phone int+1-610-832-9500. For referenced ASTM standards, visit the ASTM website <<http://www.astm.org>>

This guide, developed by the SSPC C.2.12, Salt Testing Location Committee, was first issued in March, 2018.

- Contamination initially deposited in one location can be diluted and/or transferred to other surfaces by subsequent exposure to rain or condensation.
- Water running or dripping from a contaminated surface can collect or pool at points where salts may accumulate and concentrate as the water evaporates.

4.1.2 The number of tests performed and their locations should be sufficient to identify portions of a component, unit, or structure that are contaminated, and to establish the extent of the contaminated area. The location of test areas and the minimum number of tests required should take the following into consideration:

- Configuration/complexity of the structure or component, including:
 - Surfaces readily exposed to contamination.
 - Surfaces shielded from contamination.
 - Surfaces readily flushed by rain or washing.
 - Surfaces possibly contaminated but not readily flushed by rain or washing
- Locations where water can collect, puddle, and concentrate contamination.
- Pronounced localized differences in condition of the surface of a component or structure including texture (rough areas) and the degree of corrosion (areas more heavily corroded).
- Environments encountered during shipping, storage and erection
- Changes in orientation that may occur during shipping, transportation, storage and lay down, and erection/installation.

4.2 LOCATION AND NUMBER OF TEST SITES: The descriptions and diagrams that follow establish the location and number of tests that should be performed on individual components of differing shape and complexity. Additional tests should be made at areas exhibiting greater amounts of corrosion or a rougher surface finish than is typical for the batch of components.

4.2.1 Straight Pipe Lengths and Other Tubular Components: A minimum of four tests should be conducted

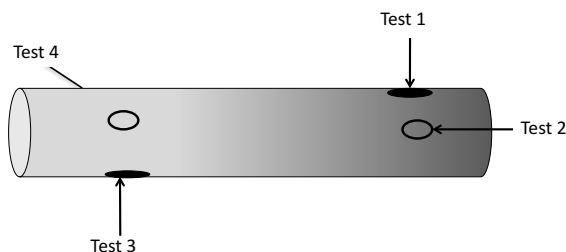


Figure 1. Location of test sites on exterior of pipe. Hollow oval indicates site located on the back exterior of the pipe as viewed from this perspective.

on each selected tubular component at the locations indicated. Two tests should be performed approximately [~] 30 cm (~ 1 ft) from each end of the pipe or tubular component as shown in Figure 1.

- On one end, tests should be made at 0 and 90 degrees (i.e. Test 1 and 2 of Figure 1).
- On the other end, tests should be made at 180 and 270 degrees (i.e. Tests 3 and 4 of Figure 1).

4.2.2 Structural Steel Unit Components (UC)

4.2.2.1 “I-Shaped” Components: A minimum of eight tests should be conducted on a set of two individual “I-shaped” structural steel components, four tests on each individual piece. Test the first piece at locations on the inside of flanges ~ 30 cm (~ 1 ft) from each end of the structural member (Figure 2A, Tests 1, 2, 5, and 6). Test the second piece of the set at locations on the center of the outside flange surfaces and in the center of the web (Figure 2B, locations 3, 4, 7, and 8).

On one end of the structural steel component shown in Figure 2A, test areas should be located on the upper left side of the top of the bottom flange (Test 1) and on the lower right side of the top flange (Test 6). At the opposite end of the beam, test areas should be located on the upper left side of the bottom flange (Test 2) and on the lower right side of the top flange (Test 5). Test areas should be located as close to the intersection of flange and the web as is practical for the test method being used.

At the middle of the structural steel component shown in Figure 2B, test areas should be located on each side of the web (Tests 7 & 8), on the top of the top flange (Test 3) and on the bottom of the bottom flange (Test 4).

4.2.2.2 Other Shapes: A minimum of four tests should be conducted on other structural shapes (angles, channels). Two tests should be performed ~ 30 cm (~1 ft) from each end of the structural shape, alternating sides on either end so that all four sides of the channel or angle are tested once. The extraction area should be as close to an inside corner or joint as practical for the test method used.

4.2.3 Tanks, Vessels and Equipment (TVE)

4.2.3.1 A minimum of six tests should be conducted on tanks, vessels and equipment as follows:

- One exposed surface on the top of the structure (Test 1);
- One location on the bottom of the structure or on the top of a horizontal flange surface of a skirt, saddle, or leg (Test 2)

4.2.3.2 To the extent possible, tests should be performed at locations indicating the following anomalous conditions:

- On or near welds (Test 3)