RECOMMENDED PRACTICE
FOR HOLD DOWN STRAP ISOLATION

R891

REVISED
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1.0 SPECIAL NOTES

1.1 This recommended practice is available for general use by those interested. Every effort has been made to ensure that the information contained in this practice is accurate and reliable. However, the Steel Tank Institute shall not be responsible or liable in any way for loss or damage resulting from such use or for the violation of any federal, state or municipal regulation with which it may conflict.

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2.0 INTRODUCTION

2.1 Frequently, hold down measures are specified to prevent cathodically protected steel underground storage tanks from “floating out” due to high water tables or floods. These hold down measures normally include the installation of a reinforced concrete pad or precast reinforced concrete “deadman” anchors below the tank. The tank is then anchored to this concrete ballast using steel straps with the capability of tensioning the straps using a threaded connection or turnbuckle. When the straps are attached to the pad connections, continuity is made between the straps and the reinforcing steel in the concrete ballast. This creates an undesirable additional, and generally unknown, demand on the cathodic protection system for the tank. Therefore, the hold down straps must be isolated from the tank to ensure the proper operation of the tank’s cathodic protection system. If the hold-down straps are constructed of a non-metallic material, isolation material is not required.

Hold-down straps and isolation materials may also be used on tanks such as ACT-100® and Permatank®. Isolation materials used on such composite tanks can protect the fiberglass-reinforced plastic (FRP) laminate.

2.2 This recommended practice is based upon its application in cathodic protection systems where the maximum driving potential is 3 volts. In situations where the driving potential exceeds 3 volts, the minimum electrical resistance criteria should be adjusted as determined by the applied potential and current levels.

3.0 ISOLATION MATERIAL SPECIFICATION

3.1 PHYSICAL DIMENSIONS

3.1.1 The isolation material shall be designed and manufactured in such a way as to either completely encapsulate the hold down strap or be at least one inch wider than the width of the strap.

3.1.2 The isolation material shall be at least one foot longer than one half the total outer circumference of the tank. The total outer circumference of the tank is calculated by multiplying the outer diameter of the tank by 3.14159.
3.1.3 The thickness of the isolation material shall be as determined by the performance criteria stated in the following section, but shall not be less than 1/8" minimum.

3.2 PERFORMANCE CRITERIA

3.2.1 These criteria were developed to place measurable performance quantities on the materials. The tests listed below may not be required based upon the material being used. The general requirements for the material are that it creates a high resistance connection between the tank and the strap, especially under load. It shall be resistant to compression set and maintain its flexibility throughout its design life. And, it shall be resistant to the groundwater and any possible spill of the product being stored in the tank.

3.2.2 The isolation material shall exhibit a measured resistance across its thickness, both free standing and under a 100 psi compressive load, of at least 1 megohm. This test shall be performed measuring the resistance between two clean steel surfaces at least 3 inches square with a 4 inch square sample of isolation material sandwiched in between.

3.2.3 The isolation material shall resist compression set and cold flow to a 60% maximum change in thickness after load is removed.

3.2.4 The isolation material shall exhibit general resistance to oils, lubricants, fuels, and/or the product to be stored in the tank, to such a degree that the electrical resistance and compression set characteristics will not be affected by immersion of the material prior to testing for 70 hours at 70 °F (23 °C).

3.2.5 The isolation material shall be resistant to water to such a degree that the electrical resistance characteristics will not be affected by full immersion of the isolating material prior to resistance testing for 70 hours at 70 °F (23 °C).

3.2.6 The isolation material shall be formulated so that the performance criteria stated above will not be affected by the maximum operating temperature of the tank. All testing temperatures should be adjusted for the specific applications when dealing with heated tanks.

4.0 ISOLATION MATERIAL INSTALLATION

4.1 The isolation material shall be installed between the hold down strap and tank surface so that the excess material is evenly distributed (width wise) on both sides of the strap and (lengthwise) on both sides of the tank.

4.2 The surface of the tank and hold down strap should be free of any debris or spurs which may cut through or damage the isolation material when placed under compressive load.
4.3 Proper isolation should be verified using a high impedance voltmeter set in the millivolt range, by contacting the steel hold down strap with one lead and the steel tank with the other. A zero reading is sufficient verification of proper isolation. Make sure proper electrical contact is made with both steel surfaces to ensure a valid measurement.

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