

1. Inspection of Rubber Lining Before and After Curing

1.1 Inspection before curing

Upon completion of lining operations, the vessel, should be given a visual inspection with special attention to the following areas:

- a) The lining should be checked against the blueprints to see that all areas conform to the details of the specification.
- b) The lining should be examined for visual imperfections such as blisters, poor adhesion, loose joints, etc.
- c) The lining should be examined for continuity and freedom from pinholes by passing a spark tester over the surface of the lining. The rubber surface must be free of moisture and foreign matter before the test is started. Spark leaks are apparent when the spark of the electrode becomes bright and is conducted directly to the defective area in a concentrated pattern. There will also be a diminishing of the corona discharge and an increase in the frequency of crackling noises as the spark is conducted to the defect point. See section 13 for further information on spark testing.

1.2 Inspection after curing

After completion of the curing operation, the rubber lining should be given a visual inspection with special attention to the following areas:

- a) The lining should be examined for visual imperfections such as blisters, poor adhesion and loose joints, etc.
- b) The lining should be examined for continuity and freedom from pinholes by passing a spark tester over the surface of the lining.
- c) The lining should be checked with a Durometer in accordance with ASTM D-2240 to determine the surface hardness. Durometer readings should be made after the cured rubber has cooled and normalized to the temperature.
- d) All dimensions, etc., specified on the blueprint should be given a final check before shipment.

2. Inspection of In-Service Rubber Lined Vessels

Periodic inspections of in-service rubber lined vessels should be completed. After vessels have been cleaned and allowed to dry, visual inspection and spark testing should be conducted.

Inspection guidelines:

- a) The total surface of the lining should be spark tested.
- b) The surface of the lining should be inspected for visual defects. These defects can be related to mechanical damages, blisters, adhesion failures or loose seams.
- c) The rubber lining should be inspected for chemical attack. Special attention should be given to any swelling or softening that may be caused by organics or oils.
- d) The rubber lining should be inspected for wear patterns that may have been caused by abrasion.
- e) The defects that are found should be repaired by a qualified applicator.

INSPECTION REPORT

INSTALLED RUBBER LINING (PAGE 1 OF 4)

Applicator: _____ Location: _____

Contact: _____ Phone No: _____

Customer: _____ Type of Lining: _____

Roll No: _____ When Applied: _____

How long has lining been in service?

Description of tank or equipment lined.

Complete service conditions, including concentrations and temperatures.

Description of the problem:

Adhesion: Is adhesion poor throughout all panels and laps? _____

Is poor adhesion isolated to specific panels? _____

Is blistering and disbondment present? _____

Is adhesion poor at metal interface? _____

Is primer disbonded from metal? _____

Other notations and comments _____

INSPECTION REPORT

INSTALLED RUBBER LINING (PAGE 2 OF 4)

Blistering: Are blisters filled with water? _____

Are blisters dry and/or separated between coats of cements? _____

Are blisters between plies of the lining? _____ If so, describe

Are blisters filled with expanded air after cure? _____

Are the blisters at heat sink? _____

Are the blisters at metal interface in weld areas? _____

Other notations and comments. _____

Cracking: What is the nature of the cracks? Location: _____

Depth: _____ Direction: _____ Width of Cracks: _____

Are cracks running parallel to laps and/or in corners or on brackets? _____

Was the tank allowed to stand empty? _____

Was the tank subject to thermal shock? _____

Other notations and comments: _____

Swelling/Softening of Lining:

Are organic solvents present? _____

Is there an aromatic (sweet) odor present? _____

Is there a petroleum odor present? _____

Are defoamers being used in the process? _____

Is the problem in the vapor areas? _____ or liquid areas? _____

Other notations and comments _____

INSPECTION REPORT

INSTALLED RUBBER LINING (PAGE 3 OF 4)

Abrasion: If abrasion is a problem, describe in detail the wear areas and patterns

Surface sloughing and spalling:

Is the surface of the lining flaking? _____ Crumbling? _____ Softening? _____

Describe the surface _____

Other notations and comments _____

Mechanical abuse:

Is there cutting and tearing of the lining at point of impact? _____

Is the lining porous and/or degrading? _____

Is there loss of adhesion? _____

Is there cavitation cutting and spalling in high impact sections of the equipment?

Other notations and comments _____

INSPECTION REPORT

INSTALLED RUBBER LINING (PAGE 4 OF 4)

Flange failures:

Is the lining bulging and cracking at the knuckle radius of the flange?

Has the lining on the flanges been over compressed? _____

What torque figures do they use? _____

What is the flange construction?

Lined full face? _____

Lined to bolt holes? _____

Gaskets? _____

Other notations and comments: _____

Collect necessary samples of lining being inspected and store in sealed plastic bags for evaluation and testing.

Signed

Date

Copies of all reports to:

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