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:
Polycorp Ltd.
33 York Street
Elora, Ontario, Canada N0B 1S0