

### SCOPE

- I 1.1 This practice covers the material selection, design, application and inspection of rubber linings.
- I 1.2 **An asterisk (\*)** indicates that a decision by the Purchaser is required or that additional information is furnished by the Purchaser.

### SUMMARY OF ADDITIONAL REQUIREMENTS

- I 2.1 **Table 1** lists the specifications and standards which shall be used with this practice.

**TABLE 1**

| SPECIFICATIONS AND STANDARDS |                                                                                                              |
|------------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>SSPC Specifications</b>   |                                                                                                              |
| SSPC-SP 5                    | White Metal Blast Cleaning                                                                                   |
| SSPC-VIS-1                   | Visual Standards for Abrasive Blast Cleaned Steel                                                            |
| <b>ASTM Standards</b>        |                                                                                                              |
| D429                         | Rubber Property - Adhesion to Rigid Substrates                                                               |
| D2240                        | Rubber Property - Durometer Hardness                                                                         |
| D3486                        | Installation of Vulcanizable Rubber Tank Linings and Pipe Linings                                            |
| D3491                        | Standard Test Method for Vulcanizable Rubber and Pipe Lining                                                 |
| <b>NACE Standards</b>        |                                                                                                              |
| NACE RP-0178                 | Design, Fabrication and Surface Finish of Metal Tanks and Vessels to be Lined for Chemical Immersion Service |
| NACE RP-0287                 | Field Measurement of Surface Profile of Abrasive Blast Cleaned Steel Surfaces Using Replica Tape             |
| <b>British Standard</b>      |                                                                                                              |
| BS 6374                      | Part 5: Lining of Equipment - Part 5 Specification for Lining with Rubbers                                   |

- R \* 2.2 The procedures outlined in ASTM D3486 or BS 6374 Part 5 shall be used for linings applied to vessels, and piping.

### DOCUMENTATION

- O \* 3.1 Temperature and service conditions shall be supplied by the Purchaser.
- R 3.2 **Applicator qualification.** Lining installation shall be undertaken only by applicators approved by the lining vendor.
- R \* 3.3 **Proposal information.** The following data shall be submitted for approval by the Owner's Engineer:
- Product specifications including lining material data, thicknesses, MSDS sheets and application specifications.
  - Verification that the lining proposed is suitable for the service conditions. Laboratory test data per **ASTM D3491** may be submitted when service experience is limited.
  - Repair procedures for damaged areas to be used: before curing and after curing.
  - Inspection and testing procedures and name and qualification of applicator's inspector.
  - Procedures and protective measures to ensure protection of the lined equipment during shipment and storage at the lining location and plant site.

### DESIGN

#### SURFACE PREPARATION

- R 4.1 Unless otherwise specified, surface treatment of components to be lined shall be per NACE RP-0178.
- R 4.2 Metal surfaces shall be blast cleaned to white metal per SSPC-SP5 with a minimum anchor pattern of 2.0 mils (.05 mm).

### APPLICATION

- R 5.1 Application shall be according to the lining vendor's instructions and the referenced specifications.

|                  |            |                                             |                                                                                   |
|------------------|------------|---------------------------------------------|-----------------------------------------------------------------------------------|
| <b>IP 19-4-2</b> |            | <b>Natural and Synthetic Rubber Linings</b> |  |
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| Rev. 1           | March 1998 |                                             |                                                                                   |

(This practice is appropriate for attachment to Inquiry or Purchase Document)

## INSPECTION AND TESTING

- R 6.1 **The term "Inspector"**, used in this practice, refers to the Owner's Representative. The **Inspector shall be a qualified** National Association of Corrosion Engineers Coating Inspector.
- R 6.2 **Reference samples prepared by the applicator**, and meeting all quality requirements, shall be supplied to the Purchaser prior to execution of the work. Samples shall be 6 x 6 in. (150 x 150 mm) and at least two samples shall be prepared.

## SURFACE PREPARATION

- R,M 6.3 **Surface preparation** shall be evaluated according to SSPC VIS-1 pictorial standards and SSPC written descriptions. Anchor pattern shall be measured by NACE RPO-287.

## VISUAL EXAMINATION

- R 6.4 **Visual examination of linings** for defects shall be made before and after curing.

## HARDNESS CHECK

- R 6.5 **Hardness shall be determined after curing and** made per ASTM D2240. The hardness shall be at least equal to the hardness readings made on the reference sample, and that specified by the lining manufacturer. A minimum of one reading shall be made for each sheet of lining installed, and for each opening (nozzle, manhole).

## SPARK TEST

- R 6.6 **The entire lining shall be tested prior to curing and after curing** using a high voltage / high frequency **spark tester**. The test voltage shall be determined from the referenced samples.

## ADHESION TEST

- R 6.7 **Adhesion tests** shall be made per **ASTM D429** Method B on test strips 1 in. (25 mm) wide.
- R 6.8 **Adhesion tests** will be carried out on production samples prepared by the applicator during the course of lining.
- R 6.9 **Hard rubber linings**. In lieu of adhesion tests, samples of hard rubber linings shall be "**chisel tested**."

## ADDITIONAL REQUIREMENTS FOR VACUUM SERVICE

- R 6.10 **A vacuum test** shall be conducted after curing. A vacuum equal to that expected in service shall be held for 4 hours.
- R 6.11 **The entire lining** shall be visually inspected and **spark tested** after completion of the vacuum test.

## LIMITS OF REPAIR

- R 6.12 **Acceptability of repairs** and the need for replacement shall be at the discretion of the Inspector.

### Revision Memo

6/76 Original Issue of Basic Practice  
 1/77 Revision 1  
 6/82 Revision 2  
 3/90 Revision 3

6/96 Revision 0 - Original Issue of International Practice

### Revision 1

Complete technical and editorial revision to rationalize this practice with the referenced standards and other IPs. Revised **Par. 2.1** to update **Table 1** Standards and Specification. Reduced Section on Design to surface preparation only. Reduced Section on Application to referenced industry specifications. Reduced Inspection and Testing to referenced industry specifications only.

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