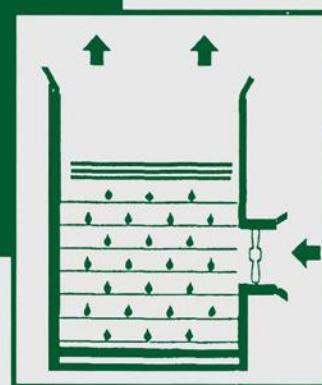
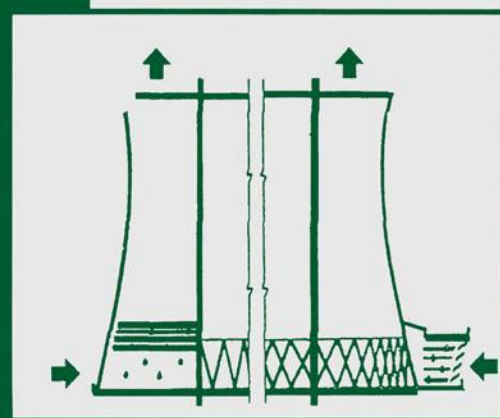
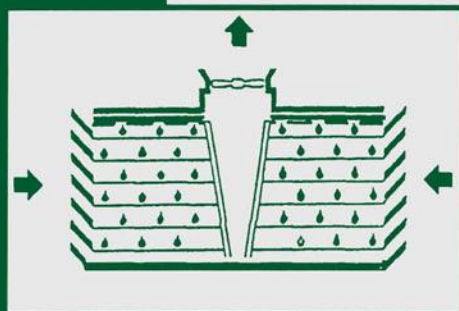


MANUAL ON

# *Coating and Lining Methods for Cooling Water Systems in Power Plants*



John C. Monday,  
Timothy B. Shugart, and  
Joseph A. Tamayo

# **Manual on Coating and Lining Methods for Cooling Water Systems in Power Plants**

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NOTE: This manual does not purport to address (all of) the safety problems associated with its use. It is the responsibility of the user of this manual to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

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# Foreword

The ASTM Manual on Coating and Lining Methods for Cooling Water Systems in Power Plants (MNL 28) is sponsored by ASTM Committee D-33 on Protective Coating and Lining Work for Power Generation Facilities. This manual was prepared by ASTM Sub-Committee D-33.12 on Service and Circulating Cooling Water Systems. John C. Monday, Timothy B. Shugart, and Joseph A. Tamayo served as the editors of this publication.

## CITED ASTM STANDARDS

B-117	Test Method of Salt Spray (Fog) Testing
C-868	Test Method for Chemical Resistance of Protective Linings
D-256	Test Method for Determining the Pendulum Impact Resistance of Notched Specimens of Plastics
D-412	Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers--Tension
D-429	Test Methods for Rubber Property--Adhesion to Rigid Substrates
D-610	Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces
D-624	Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer
D-638	Test Method for Tensile Properties of Plastics
D-695	Test Method for Compressive Properties of Rigid Plastics
D-696	Test Method for Coefficient of Linear Thermal Expansion of Plastics
D-790	Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
D-968	Test Method for Abrasion Resistance of organic Coatings by Falling Abrasive
D-1002	Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal)
D-1242	Test Methods for Resistance of Plastic Materials to Abrasion
D-1653	Test Method for Water Vapor Transmission of Organic Coating Films
D-2240	Test Method for Rubber Property--Durometer Hardness
D-2305	Test Methods for Polymeric Films Used for Electrical Insulation
D-3843	Practice for Quality Assurance for Protective Coatings Applied to Nuclear Facilities

D-3912	Test Method for Chemical Resistance of Coatings Used in Light-Water Nuclear Power Plants
D-4060	Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser
D-4263	Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
D-4285	Method for Indicating Oil or Water in Compressed Air
D-4541	Method for Pull-Off Strength of Coatings Using Portable Adhesion-Testers
E-96	Test Methods for Water Vapor Transmission of Materials
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## INTRODUCTION

**PURPOSE OF THIS MANUAL** : The purpose of this manual is to provide background information on cooling water systems for power generation facilities, to familiarize the reader with various corrosion control treatments and procedures as they relate to protective coating and linings. In addition, it will assist the specifier in the selection of coating and lining systems which are suitable for the environmental conditions that components of cooling water systems are subjected to.

**FOR WHOM IS THIS MANUAL INTENDED** : This manual is written to provide guidance to engineers, inspectors, applicators, technicians, maintenance and management personnel, and others who have an interest in protective coatings and linings for power plant cooling water systems.

**INSTRUCTIONS FOR USE OF THIS MANUAL** : This manual is not intended to provide exact information, specifications, or details for specific jobs, but rather to provide general background information. Each job will have certain conditions and design specifics which require special consideration. Below are step-by-step instructions for use of this manual.

1. Identify the specific cooling water system component(s) of interest. Although there are many possible flow designs for power plant cooling water systems, a fairly standard design is shown schematically in Fig. 1, Ch. 1, and can provide assistance in identifying the major components.
2. Turn to the appropriate chapter which discusses the specific component of interest. Chapters 2 through 8 are devoted to specific cooling water system components, and offer useful information regarding protective coatings for that particular component. The format for Chapter 2 through Chapter 8 is as follows :
  - I : **FUNCTION AND MATERIALS OF CONSTRUCTION**
    - a. Description and function of the component
    - b. Listing of common materials of construction
  - II : **SERVICE CONDITIONS**
    - a. Discussion on typical service conditions
  - III : **COATING SELECTION**
    - a. Reference to Appendix I, a suggested checklist of key questions related to service environment, surface conditions, application conditions, etc., which can assist in general evaluation of service conditions for specific projects, as they relate to protective coatings
    - b. Reference to Chart, Appendix II, which lists different types of protective coatings (identified generically) which are typically used and may be considered for protection of the various cooling water system components. NOTE : Coating performance may vary, depending on service and design conditions.
    - c. Reference To Appendix III, which offers suggested test methods for evaluation and comparison of specific coating products.
    - d. Coating Application : Special Conditions
  - IV : **SPECIAL CONSIDERATIONS**
    - a. Surface Preparation
    - b. Inspection and Testing

**HEALTH, SAFETY, ENVIRONMENTAL REGULATIONS AND TREATMENT OF HAZARDOUS WASTE** : All coating work requires strict compliance with applicable health, occupational, safety, and environmental regulations. The Owner or Utility is responsible for the handling and proper disposal of any hazardous waste materials, including those which may be generated during coating application. The Owner may make arrangements for the Contractor to perform this function, however, the Owner may not shed responsibility. **These subjects are not covered in this Manual.** It is vitally important that all parties involved become informed regarding all applicable federal, state, local and in-house regulations, precautions, limits, etc.

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*This manual covers procedures which may involve hazardous materials, operations and equipment. This manual does not purport to address the safety problems which may be associated with these procedures. It is the responsibility of the user of this manual to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*



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