

An interactive technical seminar

To be held at Metal Coating Process Corporation - Charlotte, NC

**THIS IS YOUR INVITATION TO ATTEND**

**THE NEXT ELECTROPOLISHING SEMINAR**

**TO BE HELD AT**

**METAL COATING PROCESS CORPORATION**

**6101 IDLEWILD ROAD, SUITE 134**

**CHARLOTTE, NORTH CAROLINA**

**28212**

**REGISTER TODAY!**

Call the MCP HotLine at 1-800-548-9889 today between the hours of 8 a.m. and 5 p.m. Eastern Time

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## Overview of Seminar

Electropolishing has become one of the premier methods of finishing stainless steel for all medical, dental, pharmaceutical, semi-conductor and related applications requiring a clean, sanitary surface. The process is capable of producing a technically superior surface, essentially featureless, with enhanced corrosion resistance.

The finish produced is unlike that obtained by mechanical finishing methods. Iron and nickel are preferentially removed, leaving a surface film consisting essentially of chromium oxide.

The electropolishing process has been available for more than fifty years, but emerging applications require constant improvements in the product, in the processing methods for maximizing product performance, and in quality control systems designed to meet the most demanding international standards.

The MCP seminar addresses these important concepts, providing a compact forum for presentation and discussion of electropolishing methods. Emphasis is placed on a basic understanding of the nature of the process, the properties of the product, and the manufacturing and quality methods required to maximize the benefits of the process.

## What is Electropolishing?

Electropolishing is an electrochemical method of smoothing and brightening a metal surface. The part to be polished is connected to the positive terminal of a DC electrical system and is submerged in an electrolytic bath. The flow of current causes burrs and other surface imperfections to dissolve in the bath, producing simultaneous removal of the work-hardened surface and regeneration of an impervious oxide layer.

## Course Objectives

1. To recognize and to fully understand the advantages and disadvantages of electropolishing as a surface finishing method for stainless steel.
2. To grasp the theory of the process and to study its application to industrial problems.
3. To understand the mechanism by which the phenomenon proceeds.
4. To develop a knowledge of the equipment needed for top quality electropolished finishes and for peripheral operations such as waste water treatment and ventilation.
5. To understand the preparatory methods for production of top quality electropolished surfaces.
6. To develop a basic understanding of the racking principles for electropolishing parts.
7. To learn the interaction of the basic control parameters governing the performance of the bath and the quality of the product.
8. To review new methods of determining product quality.
9. To understand the principles of ISO 9000 standards and their application to an electropolishing process.
10. To learn the use of troubleshooting techniques in the operation of an electropolishing system.
11. To understand the types of electrolyte for polishing stainless steel, and to learn optimum control methods for each type of bath.
12. To review a variety of industrial applications and to develop a broad understanding of the benefits of electropolishing.

## Who should attend

The MCP Seminar will be beneficial to all employees responsible for any aspects of company activity related to electropolishing, whether their functions are Process or Product Engineering, Manufacturing, Quality Control, Purchasing, Sales, or Management. Manufacturing supervisors will appreciate the insights into the new technology of the process. Engineers responsible for product design or for specifying the performance and properties of an electropolished surface will develop an understanding of the functional nature of the finish. Purchasing personnel responsible for buying finished parts or job services will develop new tools for specifying and monitoring supplier performance. Quality control personnel will learn how to relate ISO and Total Quality Management techniques to the electropolishing process. Corporate managers will learn the capabilities of the system and will be provided with tools for planning or re-designing process facilities. Plant engineering managers will learn cost effective methods of dealing with new environmental regulations. Sales and marketing personnel will develop an appreciation for the technical characteristics of the electropolished finish and will gain new insights into marketing techniques to maximize sales.

## Special Topics

Seminars can be tailored to include special topics related to tube and tank polishing applications. Electropolishing by induction may also be of interest in certain cases.

While the general seminar format requires one day, special arrangements may be made for an additional half-day session, before or after the seminar, for consultation on problem situations. Topics often include trouble-shooting of current manufacturing problems, new system design, and waste handling techniques.

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## Course Outline

### OVERVIEW

What is electropolishing?  
How is electropolishing done?  
What equipment is needed?  
Micropolishing & macropolishing  
Basic chemistry of electropolishing

### PRACTICAL APPLICATIONS

Decorative  
Functional  
Hi-Technology

### EQUIPMENT FOR ELECTRO-POLISHING

Parts on racks  
Barrel processing  
Tube methods  
Internal Cathodes  
Inductive Polishing  
Vessel Polishing  
Hand-held tools for electro-polishing

### PRETREATMENT FOR ELECTROPOLISHING

Alkaline cleaning  
Rinsing  
Deoxidizing  
Vapor degreasing

### POST-TREATMENT

Nitric acid rinsing  
Removal of residual salts  
Deionized water rinses  
Drying  
Heat treatment after electropolishing

### SELECTION OF ALLOYS FOR ELECTROPOLISHING

Effect of occluded impurities  
Electroslag remelt  
Vacuum arc remelt  
Vacuum induction melt  
VIMVAR stainless steels

### MECHANICAL PREPARATION

Machining techniques  
Surface grinding  
Buffing/Polishing  
Lapping  
Surface evaluation

### FUNDAMENTALS OF ELECTROPOLISHING

History of electropolishing  
The Bielby Layer  
Metal matrix reactions  
The anodic film (the gold layer)  
The characterization curve  
The operating range  
Voltage-amperage relationships  
Material Balances  
Battelle electrolytes  
Troubleshooting  
Rules of Thumb  
Types of rectifiers  
Rectifier selection  
Ripple factor  
Rectifier control packages

### QUALITY CONTROL CONSIDERATIONS

System Characterization  
Key Process Variables  
Statistical Process Control  
Oxide layer characteristics  
Ratio of chromium to iron  
ESCA profiles as a measure of product quality  
Auger analysis as a measure of product quality  
Electropolishing and ISO registration  
Electropolishing and FDA validation

### WASTE TREATMENT OF ELECTROPOLISHING STREAMS

Electrolyte Recovery  
Rinse Water Recovery  
Waste Water Minimization  
Chemical waste destruction  
Solid waste disposal

### COURSE MATERIALS

Each registrant will receive a personal copy of the following MCP publications:

- The MCP Electropolishing Process - An Overview
- General Process Steps
- Installation and Operations Guide
- Fundamentals of Electropolishing
- Process Control for Electropolishing
- Surface Analytical Techniques
- Selected Literature

### COST OF THE SEMINAR

The charge for the seminar is \$500 per participant. The fee includes all group sessions, group luncheon, light refreshments during coffee breaks, and course materials for each participant. A special discount can be arranged for groups of five or more. Private sessions to be attended by personnel from a single company may also be arranged.

Registration fees must be paid by check seven days prior to the scheduled date of each seminar. Attendance at each session is limited intentionally to permit maximum participation of all members of the group, and only those with guaranteed reservations can be admitted.

### REGISTRANT INFORMATION

Seminar sessions are intended to be informal and are designed to encourage participation by those in attendance. Casual dress is suggested.

Each session includes lunch for the participants. Coffee and light refreshments are available throughout the program.

Our conference room is a non-smoking environment.

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