



**Birchwood Laboratories, Inc.**  
7900 Fuller Road  
Eden Prairie, MN 55344

952 937-7900  
Fax: 952 937-7979

**Metal Finishing Systems**  
Direct Dial Number:  
952 937-7931

**MICROLOK® AO METAL COATING PROCESS**  
**For Iron & Steel**  
**(Patent Pending)**

**Operating Instructions**

**DESCRIPTION**

The MICROLOK® AO Coating Process is a new and totally unique metal coating option for iron & steel components. This immersion tank process operates at 140-150° F and forms a non-toxic aluminum oxide conversion coating that is 0.000040" (1 micron) thick, silver-black in color, and tightly bonded to the substrate. When sealed with an appropriate rust preventive compound, the MICROLOK AO finish has excellent corrosion resistance and can serve as a direct replacement for functional phosphate finishes, such as zinc phosphate or manganese phosphate, or other finishes. Because of its high absorbency, the MICROLOK AO coating effectively anchors paint finishes, and also holds oils, stearates or other compounds, thereby serving as an effective break-in or stamping lubricant.

**THE MICROLOK AO COATING SYSTEM OFFERS THESE KEY BENEFITS:**

1. **MODERATE TEMPERATURE AND SAFE OPERATION** - At 140-150° F, the MICROLOK AO working bath temperature is equivalent to that of a standard zinc phosphate, and well below the 200 degree temperature required for most manganese phosphates. More importantly, the working solution has a low acid content (pH = 4-5), making it far milder than conventional zinc phosphate baths (pH 1-2). Low acidity makes the MICROLOK AO process safer to operate and eliminates the risk of hydrogen embrittlement of sensitive alloys.
2. **NO EPA REGULATED METAL CONTENT** – The MICROLOK AO process contains NO EPA Regulated metals, so the rinsewaters are normally sewerable as non-hazardous discharge. (The solution does contain aluminum and iron – both classified as non-hazardous by EPA and RCRA).

3. NO SCALING OF TANKS & HEATERS - Process line maintenance is easy because the bath generates only a light floc precipitate, with no scale build-up on tanks and immersion heaters.

4. FINE-GRAINED COATING - The MICROLOK AO finish is a smooth, silver-black deposit that enhances the sales appeal of any surface that does not require a black finish, but does need an attractive appearance and robust corrosion protection.

5. SHORT PROCESS/LOW OPERATING COST – For most parts, the MICROLOK AO process line requires only five steps and about 16 minutes, as outlined below. Capital costs are low because no waste treatment equipment is needed. And chemical operating costs are also quite low – competitive with phosphates, in most cases.

6. HIGH HEAT STABILITY, HIGH ABSORBENCY – The MICROLOK AO coating serves as an excellent absorbent base for paint finishes or stamping lubricants and is stable to temperatures as high as 1400° F (phosphates decompose at 500° F).

### OPERATING CONDITIONS

|                               |   |
|-------------------------------|---|
| Bath Make-up                  | 10% by volume, then adjust pH to 4-5                              |
| Operating Temperature         | 140-150° F  |
| Equipment Construction        | Tank: Polypro or 304 Stainless<br>Heater: 304 stainless or Quartz |
| General or Direct Ventilation | Desirable, but not required                                       |
| Solution Filtration           | Desirable. Use 50-100 micron element.                             |

### PROCESSING PROCEDURES

For most parts, the MICROLOK AO process utilizes the following sequence:

1. **CLEAN** the parts for 5 minutes in SAFE SCRUB® ST biodegradable liquid cleaner, mixed at 20% by volume; 150° F.
2. **RINSE** thoroughly in clean tap water; 20 seconds.
3. **APPLY MICROLOK AO COATING** by immersing parts for 10-20 minutes in MICROLOK AO working bath at 140-150° F.
4. **RINSE** thoroughly in clean tap water; 20 seconds.
5. **SEAL** in appropriate rust preventive, such as SHEATH® RB1 water-displacing oil, or in DRI TOUCH® PLUS IRP3 non-tacky rust preventive. Allow to dry.  
OR, force dry, apply paint finish and cure as required.  
OR, apply stearate or other stamping lubricant.

Your BIRCHWOOD CASEY representative can suggest the optimum process cycle for your particular component parts, work volume and production circumstances.

## **PROCESSING TIPS**

**Parts Handling:** Because of the relatively short immersion times, it is recommended that parts be processed in a manner that avoids “flat against flat” contact. Larger parts can be individually racked or carried in a wire basket (constructed of polypropylene, mild steel or stainless steel). Smaller parts can be bulk processed in a basket or a rotating barrel constructed of polypropylene or stainless steel, turning at 1-2 rpm.

**Solution Agitation:** The MICROLOK AO working bath operates most effectively when the entire bath is at a uniform temperature. During the initial heat-up and operation, some stratification of warm and cooler layers of solution may occur, due to the location of the heating element and thermocouple. If this occurs, the speed of the reaction can be affected. The bath can be circulated by means of a pump or impeller made of plastic or stainless steel.

**Ventilation:** During normal operation, the bath does generate a small amount of water vapor that can be vented out of the area by means of an overhead or tank mounted hood. Push/pull ventilation is especially effective. The vapors do not contain any toxic or corrosive chemicals – only water.

**Segregation of Scaly and Non-Scaly parts:** Some parts may carry oxides on the surface in the form of mill-scale, heat treat scale or rust. If this is the case, the parts will require descaling prior to coating with MICROLOK AO. This can be accomplished by abrasive cleaning methods such as bead blasting or shot blasting, or by chemical means such as BIRCHWOOD CASEY DRY ACID DESCALER. Non-scaly parts generally do not require any descaling or acid prep. Please ask your BIRCHWOOD CASEY representative for guidance in this area.

## **BATH MAINTENANCE**

As the process bath operates, its ingredients will be consumed and the pH will gradually rise. There will also be some water loss due to evaporation. To keep the bath operating properly, these losses must be replaced by regular additions of tap water and replenishment with fresh concentrate.

It is common to see the solution level of the bath drop by a few inches during the course of the work shift, due to water evaporation. The recommended maintenance procedure calls for periodic addition of tap water, with stirring, to restore normal operating levels.

Once the normal operating level is restored, the pH can be measured and fresh concentrate added as necessary to bring the pH back down to 4.0-5.0.

## **PACKAGING AND STORAGE**

Available in 5-gallon and 55-gallon plastic, non-returnable containers. Store indoors in closed containers.

## **CAUTION**

The MICROLOK AO concentrate contains a mild acid and is a skin and eye irritant. Wear rubber gloves and face shield when handling the liquid. In case of skin contact, flush the affected area generously with clean water.

## **READ MATERIAL SAFETY DATA SHEET BEFORE USING THIS PRODUCT**

## **NOTE**

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