



# CATAPOSIT™ PM-959 CATALYST

For Industrial Finishing Applications

## DESCRIPTION

Cataposit PM-959 Catalyst has been specifically formulated for plating on plastics. Cataposit PM-959 Catalyst has been proven to work successfully on ABS, Noryl, and ABS/Polycarbonate blends in the existing Rohm and Haas Electronic Materials CROWNPLATE™ and PM systems. High yields and total compatibility with established Rohm and Haas Electronic Materials plating on plastic systems result in high economy of operation.

## ADVANTAGES

- Zero bath growth—stable to 57°C (135°F)
- Economical operation
- High chromium tolerance—high tin to palladium ratio
- High production yield—complete part coverage with maximum control of rack and stop-off plating

## BATH MAKE-UP

Add materials in order listed:

### PRE-DIP

Cataprep™ 505	100 gal.	% Volume
Deionized water	85.0 gal.	85% (b.v.)
Concentrated Hydrochloric acid	8.0 gal.	8% (b.v.)
Cataprep 505 (mix thoroughly)	2.0 gal.	2% (b.v.)
Sodium chloride* (mix until dissolved and filter)	150 lb.	1.5 lb./gal.

### CATALYST

Cataposit PM-959 Catalyst	100 gal.	% Volume
Deionized water	78.0 gal.	78% (b.v.)
Concentrated Hydrochloric acid	10.0 gal.	10% (b.v.)
Cataprep 505 (mix thoroughly)	2.0 gal.	2% (b.v.)
Sodium chloride* (mix until dissolved and filter)	150 lb.	1.5 lb./gal.
Cataposit PM-959 Catalyst (mix thoroughly)—for electroless copper	1.0 gal.	1% (b.v.)
Cataposit 449 Replenisher	0.4 gal.	0.4% (b.v.)

\*IMPORTANT: The grade of sodium chloride used is very important. Commercial grades of sodium chloride may contain ingredients, such as anti-caking agents and/or other halides, which are detrimental to bath stability and performance. For your convenience, Rohm and Haas Electronic Materials supplies sodium chloride of suitable quality.

## BATH OPERATION

Bath Operation		
	PM-959 Catalyst	Cataprep 505
Temperature	38–57°C (100–135°F)	38–54°C (100–130°F)
Time	2–4 minutes	1–3 minutes
Normality	1.12–1.40N	0.8–1.00N
Loading	As preferred	As preferred
Agitation	Use work agitation and filtration; do not aerate	Aerate the bath vigorously with clean air; work agitation and filtration

## FILTRATION

Filtration of the Cataposit PM-959 Catalyst bath is recommended. Use filters of polypropylene or Dynel (5 micron porosity). The filtration system should have a pumping rate of 3–5 turnovers per shift to prevent the introduction of air into the system. The flow should be adequate to keep the bottom of the tank clean.

Optimum quality finishes are best achieved when the Cataposit PM-959 Catalyst concentrate is injected directly into the inlet side of the production bath filter.

Rohm and Haas Electronic Materials' SE-471 Catalyst Controller provides automatic replenishment and a consistent, economical method of control. Consult your Technical Representative for details. Refer to the Controller Manual for operating instructions.

## BATH MAINTENANCE AND REPLENISHMENT

### Pre-dip

Cataprep 505 pre-dip is maintained by normality and specific gravity. To measure normality, reference the Total Acid Normality Control Procedure. For replenishment, see the Cataprep 505 Replenishment Schedule table.

## CATAPOSIT PM-959 CATALYST

### Cataprep 505 Replenishment Schedule

N	Cataprep 505	HCl (conc.)	Degrees Baumé	sp. gr. at 20/20°C	NaCl
1.02	None	None	16.23	1.126	None
0.93	800 ml	3,200 ml	14.96	1.115	15 lbs.
0.83	1,600 ml	6,400 ml	13.42	1.102	30 lbs.
0.72	2,400 ml	9,600 ml	11.73	1.088	45 lbs.

### Catalyst

Palladium concentration in the working bath should be checked routinely using the listed procedure. Maintain Cataposit PM-959 Catalyst between 80–100% bath strength. Lower strength baths operate more economically, but require closer stannous chloride control to assure bath stability. For replenishment, see the Cataposit PM-959 Catalyst Bath Strength table.

**Note:** When the bath is operated at low strength, has been idle or when work loads are light, analysis of the bath for stannous chloride content is required.

### Cataposit PM-959 Catalyst Bath Strength

Bath Strength	Pd conc. (ppm)	Additions per 100 gal. bath Cataposit PM-959 Catalyst
110%	53	None
100%	48	None
90%	43	380 ml
80%	38	760 ml
70%	34	1,140 ml
60%	29	1,520 ml

## CATAPOSIT PM-959 CATALYST BATH STRENGTH CONTROL PROCEDURE

### I. Principle

Catalyst bath strength is determined spectrophotometrically by measuring absorbance at 425 nm.

### II. Equipment

- Bausch & Lomb Spec 20 or equivalent UV/Vis Spectrophotometer cuvettes
- 30 ml transfer pipette
- 10 ml graduated pipette
- 50 ml volumetric flask

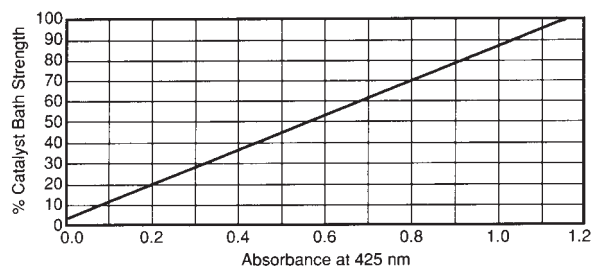
### III. Reagents

- Cataprep 505 solution
- Nitric acid, 50% v/v

### IV. Procedure

- Turn on the spectrophotometer and allow it to stabilize for 15 minutes.
- Add approximately 10 ml of Cataprep 505 working bath to a 50 ml volumetric flask.
- Pipette 30 ml of Cataposit PM-959 Catalyst working bath into the flask and mix thoroughly.
- Dilute to the mark with Cataprep 505 working bath, stopper and mix thoroughly.
- Using a fresh Cataprep 505 working bath as a blank, adjust the absorbance to zero at 425 nm.
- Rinse and fill the cuvette with the diluted catalyst sample prepared in step d. Measure the absorbance of the sample at 425 nm.
- Read catalyst bath strength from the graph below.

### Catalyst Bath Strength vs. Absorbance @ 425 nm



- Clean cuvette in 50% nitric acid solution after each analysis.

## STANNOUS CHLORIDE

Stannous chloride is maintained using Cataposit 449 Replenisher. Stannous chloride should be analyzed regularly using the listed procedure and replenishment schedule table.

## CATAPOSIT PM-959 CATALYST

### Cataposit PM-959 Catalyst Bath—Sodium Chloride

Stannous Chloride (g/l)	Additions per 100 gal. bath Cataposit 449 Replenisher
4.0	None
3.5	None
3.0	None
2.5	540 ml
2.0	1,080 ml
1.5	1,620 ml

### CATAPOSIT PM-959 CATALYST BATH STANNOUS CHLORIDE CONTROL PROCEDURE

#### I. Principle

The stannous chloride in the bath is titrated with iodine using starch indicator.

#### II. Equipment

- 25 ml transfer pipette
- 25 ml graduated pipette
- 250 ml Erlenmeyer flask

#### III. Reagents

- Hydrochloric acid, approximately 6N
- Starch indicator solution

#### IV. Titrant

- Iodine, 0.10N

#### V. Procedure

- Pipette 25 ml of Cataposit PM-959 Catalyst working bath into a 250 ml Erlenmeyer flask.
- Add 20 ml of hydrochloric acid (approx. 6N) and dilute to approximately 100 ml with distilled water.
- Add starch indicator solution.
- Titrate with 0.10N iodine to a blue-black end point.

#### VI. Calculation

Stannous Chloride g/l =  
ml titrant x normality x 3.792

### NORMALITY

Solution normality should be analyzed regularly and adjusted according to the Cataposit PM-959 Catalyst Bath Normality or the Cataprep 505 Replenishment Schedule tables.

### Cataposit PM-959 Catalyst Bath Normality

Normality	Additions per 100 gallons	
	Hydrochloric Acid	Cataprep 505
1.40	None	None
1.26	3,800 ml	760 ml
1.12	7,600 ml	1,520 ml
0.98	11,400 ml	2,280 ml
0.84	15,200 ml	3,040 ml

### CATAPOSIT PM-959 CATALYST OR CATAPREP 505 PRE-DIP BATH TOTAL ACID NORMALITY CONTROL PROCEDURE

#### I. Principle

A sample of the bath is titrated with sodium hydroxide to pH 3.0.

#### II. Equipment

- 5 ml transfer pipette
- 250 ml beaker
- Burette

#### III. Titrant

- Sodium hydroxide, 1.0N

#### IV. Procedure

- Pipette 5 ml of Cataposit PM-959 Catalyst working bath or Cataprep 505 pre-dip bath into a 250 ml beaker.
- Dilute to 50 ml with deionized water and mix thoroughly.
- Titrate with 1.0N sodium hydroxide to pH 3.0.

#### V. Calculation

Normality = ml titrant x normality of titrant x 0.2

### SPECIFIC GRAVITY

The specific gravity of the Cataposit PM-959 Catalyst bath should be maintained using sodium chloride. For adjustments, follow the Cataposit PM-959 Catalyst Bath Specific Gravity table.

## CATAPOSIT PM-959 CATALYST

Cataposit PM-959 Catalyst Bath—Specific Gravity

S.G. (°Be)	S.G. (g/cm <sup>3</sup> )	Sodium Chloride per 100 liters (100 gal.) of bath
18.14	1.143	None
16.57	1.129	6.8 liters (15 lbs.)
14.96	1.115	13.6 liters (30 lbs.)
13.30	1.101	20.4 liters (45 lbs.)
11.61	1.087	27.2 liters (60 lbs.)

\***Note:** Thoroughly dissolve sodium chloride before addition and add through filter system.

### PRODUCT DATA (TYPICAL PROPERTIES)

#### Cataposit PM-959 Catalyst

Appearance: Dark brown  
 Specific Gravity: 1.20  
 pH: >1.00

#### Cataprep 505

Appearance: Pale yellow  
 Specific Gravity: 1.18  
 pH: >1.00

#### Cataposit 449 Replenisher

Appearance: Dark brown  
 Specific Gravity: 1.30  
 pH: >1.00

### EQUIPMENT

Tanks: Polypropylene, polyethylene or PVC  
 Heaters: Steam or hot water coils; tantalum, Teflon or Teflon coated  
 Racks: 304 or 316 stainless steel, polypropylene, polyethylene, PVC, titanium or teflon coated wire

**IMPORTANT:** DO NOT use racks of iron, steel, aluminum, magnesium, lead, zinc or cadmium.

### HANDLING PRECAUTIONS

Before using this product, consult the Material Safety Data Sheet for details on product hazards, recommended handling precautions and product storage.

**CAUTION!** Keep combustible and/or flammable products and their vapors away from heat, sparks, flames and other sources of ignition including static discharge. Processing or operating at temperatures near or above product flashpoint may pose a fire hazard. Use appropriate grounding and bonding techniques to manage static discharge hazards.

### STORAGE

Store products in tightly closed original containers at temperatures recommended on the product label.

### DISPOSAL CONSIDERATIONS

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

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