

13 STEPS MAGNESIUM ETCHING PROCEDURE

1. STORAGE

Store magnesium photoplates in a cool, dry place.

2. ARTWORK

Inspect negative carefully and opaque pinholes in the black areas. Pinholes result in pimply etching if not opaqued.

3. EXPOSURE

Expose using a Stouffer 21-Step Sensitivity Guide. Expose Hydro-Coat to a step 8-10. **Expose Red Top to a step 6-8.** Overexposure causes excessive shadow-dot plugging and does not increase etching resistance of coating. Underexposure causes wash-off in development and etching failure.

4. DEVELOPING

Mix one part of Heated or Cold Hydro-Coat Developer with five parts water. Heated Hydro-Coat Developer should be used at 105°-115°F (41°-46°C). Cold Hydro-Coat Developer can be used at room temperature 70°-85°F (21°-29°C).

After developing in Magnesium developer, rinse Red Top plates with a spray of water until image appears glossy. Dry plate thoroughly using clean compressed air or by blotting dry with a clean absorbent cloth. DO NOT wipe or rub plate while wet. In case of evaporation loss when using Hydro-Coat Developer, water alone should be added back to developer solution. DO NOT add back concentrate Hydro-Coat Developer to compensate for evaporation loss. Heated Hydro-Coat Developer should be changed when developing times exceed 90 seconds. Cold Hydro-Coat Developer used in trays should be changed daily.

5. POST DEVELOP - HYDRO-COAT

Hydro-Coat plates should be post developed to enhance screen and fine line reproduction. Scrub horizontally and vertically using a wet litho pad. Follow with a clean water rinse and dry plate thoroughly using clean compressed air or by blotting dry with a clean absorbent cloth.

BURN IN RED TOP (optional)

Heat Red Top plates prior to etching to set Red Top coating and prevent it from breaking down. Burn in up to 10 minutes at 250°F / 121°C.

6. TOUCH UP

Examine plate for flaws in the image areas retained on the plate and touch up as needed with Retouch Solution.

7. WEIGH

Record initial plate weight on your etching log prior to etching. Scale must be capable of weighing to the nearest 1/4 ounce.

8. DESCUM

Red Top plates must be descummed using a litho pad to remove residual chemical film. Failure to descum Red Top plates can cause erratic etching, pimples and scummy areas. Red Top Acid Descum Solution: 7% solution of 42°Bé nitric acid with water. Hydro-Coatplates should be descummed in a 3 - 5% 42°Bé nitric acid to water solution.

9. RINSE

Rinse plates thoroughly with water after descumming.

10. PLATE PROTECTOR

An application of Express Guard Plate Protector is recommended prior to etching to enhance performance of etching bath by preventing oxidation which can cause pimples.

11. ETCH

Prepare bath according to additive instructions. Refer to charts on last page. Follow manufacturer's instructions for etching machine operation. When etching is complete, remove plate, clean thoroughly to remove etch residue and dry.

12. REPLENISH BATH

Record plate weight after etching to determine proper acid replenishment. Replenish acid at a rate of 200 milliliters of 42°Bé nitric acid per ounce of magnesium dissolved into bath (6,7 milliliters of acid per gram). Refer to acid addition chart on last page. Use the following formula to calculate replenishment:

Initial plate weight - Post etching plate weight = amount of Mg dissolved

Example: 16.90 - 15.40 = 1.5 ozs. magnesium dissolved. Acid addition = 300 mls of acid are added to bath.

Check dip gauge and restore proper level in bath by adding water or draining excess.

13. TOP REMOVAL (optional)

Use Hydro-Coat Top Remover II according to directions on label. **Red Top plates - Remove top using a pumice and rotary brush or with various chemicals.**



**RECOMMENDED for
STANDARD ETCHING**

OPEN AREAS CAN BE ETCHED OUT WITHOUT PAINTING DEAD METAL, ELIMINATING ROUTING.

FORMULA

NITRIC ACID* (42°Bé) 20% BY VOLUME REV-FLEX OR X-FLEX 5% BY VOLUME WATER 75% BY VOLUME.

REPLENISH NITRIC ACID* 42°Bé AT A RATE OF 200 MILLILITERS PER OUNCE OF ETCHED MAGNESIUM.

TEMPERATURE

HEAVY GAUGE (.250"/7MM) 95°F/35°C.
NORMAL GAUGE (.064"/1.6MM) 92°F/33°C.

PADDLE SPEED

MULTIPLE PADDLE MACHINES 500 TO 600 RPM.

*** CAUTION: DO NOT ADD WATER TO ACID.
ALWAYS ADD ACID SLOWLY TO WATER TO
AVOID A HAZARDOUS EXPLOSION.**

ACID ADDITION CHART

°BÉ @ 21.1	FACTOR
6.6°C - 44.0°F	0.83
6.4°C - 43.5°F	0.88
6.1°C - 43.0°F	0.92
5.8°C - 42.5°F	0.94
5.5°C - 42.0°F	0.97
5.3°C - 41.5°F	1.00
5.0°C - 41.0°F	1.02
4.7°C - 40.5°F	1.05
4.4°C - 40.0°F	1.08
4.1°C - 39.5°F	1.11
3.8°C - 39.0°F	1.14
3.6°C - 38.5°F	1.17
3.3°C - 38.0°F	1.20

NOMINAL 42°Bé TECHNICAL GRADE NITRIC ACID TYPICALLY MEASURES 41.5° Bé AT 21.11°C. (THE NOMINAL 42°Bé DESIGNATION DERIVES FROM MEASUREMENT AT 15.55°C). IF THE Bé MEASUREMENT VARIES GREATLY FROM THIS FIGURE, MULTIPLY THE VOLUME OF ACID CALLED FOR BY THE ABOVE FACTORS (CORRESPONDING TO THE MEASURED Bé AT 21.11°C) TO OBTAIN THE CORRECTED ACID VOLUME MEASUREMENT.

**TEMPERATURE VOLUME
CORRECTION FACTORS**

TEMPERATURE **FACTOR**

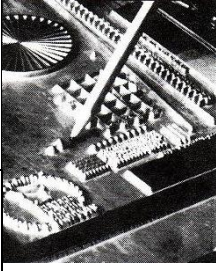

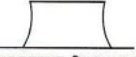



43.3°C - 110°F	1.130
40.5°C - 105°F	1.105
37.7°C - 100°F	1.090
35.0°C - 95°F	1.075
32.2°C - 90°F	1.060
29.4°C - 85°F	1.045
26.6°C - 80°F	1.030
23.8°C - 75°F	1.015
21.1°C - 70°F	1.000
18.3°C - 65°F	0.985
15.5°C - 60°F	0.970
12.7°C - 55°F	0.955
10.0°C - 50°F	0.940
7.2°C - 45°F	0.924
4.4°C - 40°F	0.910

IF THE TEMPERATURE OF THE ACID OR ETCHING ADDITIVE VARIES GREATLY FROM 21.1°C, MULTIPLY THE VOLUME OF ACID CALLED FOR BY THE ABOVE FACTORS (CORRESPONDING TO THE MEASURED TEMPERATURE OF THE ACID OR ETCHING ADDITIVE) TO OBTAIN THE CORRECT VOLUME MEASUREMENT.

ACID ADDITION CHART

MAGNESIUM DISSOLVED		42° BÉ ACID ADDITION		MAGNESIUM DISSOLVED		42° BÉ ACID ADDITION	
(OZS.)	(GRAMS)	(MILLILITERS)	(OZS.)	(GRAMS)	(MILLILITERS)	(OZS.)	(MILLILITERS)
1	30	200	11	330	2200		
1.5	45	300	11.5	345	2300		
2	60	400	12	360	2400		
2.5	75	500	12.5	375	2500		
3	90	600	13	390	2600		
3.5	105	700	13.5	405	2700		
4	120	800	14	420	2800		
4.5	135	900	14.5	435	2900		
5	150	1000	15	450	3000		
5.5	165	1100	15.5	495	3100		
6	180	1200	16	480	3200		
6.5	195	1300	16.5	495	3300		
7	210	1400	17	510	3400		
7.5	225	1500	17.5	525	3500		
8	240	1600	18	540	3600		
8.5	255	1700	18.5	555	3700		
9	270	1800	19	570	3800		
9.5	285	1900	19.5	585	3900		
10	300	2000	20	600	4000		
10.5	315	2100					

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSES	PROBLEM	POSSIBLE CAUSES	
PIMPLES	<ul style="list-style-type: none"> PINHOLES IN NEGATIVES IMPROPER DESCUMMING POOR BATH CIRCULATION DIRTY EQUIPMENT HIGH BATH TEMPERATURE CONTAMINATED ACID PADDLE SPEED TOO LOW EXPRESS GUARD PLATE PROTECTOR NOT USED 	UNDERCUTTING OR TIGHT SHOULDERS	<ul style="list-style-type: none"> PADDLE SPEED TOO HIGH TOO MUCH PADDLE DIP LOW BATH TEMPERATURE FROZEN OR SEPARATED ADDITIVE ACID CONTENT TOO HIGH CONTAMINATED ACID NOT ENOUGH ADDITIVE (REV-FLEX, X-FLEX, X5K) 	
UNEVEN SHOULDERS & DEPTH	<ul style="list-style-type: none"> MACHINE NOT LEVEL TOO MUCH ACID LOOSE HEAD MOTION ROTATION OF THE TURNTABLE NOT IN ORDER 	SHORT BATH LIFE	<ul style="list-style-type: none"> IMPROPER ADDITIVE ADDITIONS IMPROPER ACID ADDITIONS EXCESSIVE EXHAUST 	
ROUGH SHOULDERS	<ul style="list-style-type: none"> BATH TEMPERATURE TOO LOW TOO MUCH ACID EXCESSIVE EXHAUST CONTAMINATED ACID LOW ADDITIVE CONCENTRATION 	DIRTY BOTTOM AROUND SHOULDERS	<ul style="list-style-type: none"> SPENT ETCHING BATH CONTAMINATED ETCHING BATH CONTAMINATED ACID 	<p>PIMPLES</p>  <p>NORMAL SHOULDER</p>
WIDE SHOULDERS	<ul style="list-style-type: none"> LOW PADDLE SPEED HIGH BATH TEMPERATURE TOO MUCH ADDITIVE LOW ACID CONCENTRATION 	EXCESSIVE COLOR LOSS	<ul style="list-style-type: none"> EXCESSIVE DESCUMMING NOT DESCUMMED AS PRESCRIBED SPENT ETCHING BATH HIGH BATH TEMPERATURE 	 <p>UNDERCUT SHOULDER</p>
PINHOLES	<ul style="list-style-type: none"> EXPOSURE TOO LOW OVERDEVELOPED PLATE PINHOLES IN NEGATIVE DIRTY GLASS IN VACUUM FRAME 	STEPS IN SIDEWALL	<ul style="list-style-type: none"> SLOW ROTATION OF THE PLATEHOLDER 	 <p>WIDE SHOULDER</p>
<p>VARIABLES IN BATH OPERATION</p> <p>TEMPERATURE INCREASED BATH TEMPERATURE INCREASES ETCH RATE AND TENDS TO WIDEN SHOULDER AND DECREASE TONE DEPTH. REDUCED BATH TEMPERATURE HAS THE OPPOSITE EFFECT.</p> <p>PADDLE SPEED INCREASED PADDLE SPEED INCREASES ETCH RATE AND TENDS TO TIGHTEN SHOULDERS INCREASING TONE DEPTH. DECREASED PADDLE SPEED HAS THE OPPOSITE EFFECT.</p> <p>ACID CONCENTRATION INCREASED ACID CONCENTRATION INCREASES ETCH RATE AND TENDS TO TIGHTEN SHOULDERS. DECREASING ACID CONCENTRATION HAS THE OPPOSITE EFFECT.</p>				 <p>UNEVEN SHOULDER</p>
				 <p>DIRTY BOTTOM AROUND SHOULDER</p>

