

MILLENNIUM SIGNATURES MARKING SYSTEMS, INC.
Electro-Chemical Etching
Electrolyte Chart

ALLOY: *ALUMINUM*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **A-10**
CURRENT SETTING: **DC**
VOLTAGE SETTING: **C, 11 VOLTS or D, 14 VOLTS**
DWELL TIME: **2 – 3 SECONDS**
COMMENTS: **ALLOW A FEW SECONDS AFTER MARKING FOR DEVELOPING BEFORE NEUTRALIZING. THIS WILL HELP SET THE MARK.**

ALLOY: *ALUMINUM*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **#353**
CURRENT SETTING: **DC**
VOLTAGE SETTING: **F, 20 VOLTS**
DWELL TIME: **2 – 3 SECONDS**
COMMENTS:

ALLOY: *ALUMINUM*
TYPE OF MARK: **WHITE**
PREFERRED ELECTROLYTE: **B-20**
CURRENT SETTING: **DC**
VOLTAGE SETTING: **B, 8 VOLTS**
DWELL TIME: **2 – 3 SECONDS**
COMMENTS:

ALLOY: *ALUMINUM*
TYPE OF MARK: **WHITE**
PREFERRED ELECTROLYTE: **MSC#32**
CURRENT SETTING: **DC**
VOLTAGE SETTING: **C, 11 VOLTS**
DWELL TIME: **3 OR 4 ONE-SECOND DWELLS**
COMMENTS:

ALLOY: *ALUMINUM*
TYPE OF MARK: **DARK GRAY**
PREFERRED ELECTROLYTE: **MSC#1**
CURRENT SETTING: **DC**
VOLTAGE SETTING: **C – HIGH POWER, 22 VOLTS**
DWELL TIME: **3 OR 4 ONE-SECOND DWELLS**
COMMENTS: **USE DEEP ETCHING POWER UNIT
FOR ETCHING UP TO .003**

ALLOY: *ALUMINUM, ARMY GREEN CAD PLATED*
TYPE OF MARK: **WHITE**
PREFERRED ELECTROLYTE: **MSC#32**
CURRENT SETTING: **DC**
VOLTAGE SETTING: **F, 20 VOLTS**
DWELL TIME: **2 – 3 SECONDS**
COMMENTS:

ALLOY: *ALUMINUM, ELECTRO-POLISHED*
TYPE OF MARK: **GRAY**
PREFERRED ELECTROLYTE: **F-30**
CURRENT SETTING: **DC**
VOLTAGE SETTING: **F, 20 VOLTS**
DWELL TIME: **2 DWELLS, THREE SECONDS EACH**
COMMENTS: **DOUBLE UP ON DEEP-ETCH MONOPADS**

ALLOY: *ALUMINUM BRONZE, ALUMINUM SILICONE BRONZE*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **B-10**
CURRENT SETTING: **AC**
VOLTAGE SETTING: **D, 14 VOLTS**
DWELL TIME: **2 – 3 DWELLS, TWO SECONDS EACH**
COMMENTS: **80-90 COPPER, IRON AND TIN**

ALLOY: *ARMALLOY COATING*
TYPE OF MARK: **WHITE**
PREFERRED ELECTROLYTE: **B-20**
CURRENT SETTING: **DC**
VOLTAGE SETTING: **F, 20 VOLTS**
DWELL TIME: **4 THREE-SECOND PULSES**
COMMENTS: **HAND MARKING WITH A DEEP-ETCH
STENCIL RECOMMENDED**

ALLOY: *BLACK OXIDE*
TYPE OF MARK: WHITE OR SILVER
PREFERRED ELECTROLYTE: D-12
CURRENT SETTING: DC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: 3 – 4 DWELLS, THREE SECONDS EACH
COMMENTS: USE DEEP-ETCH MONOPADS, BRISKLY RUB THE MARKED AREA WITH YOUR FINGER, A NEUTRALIZED CLOTH OR A PENCIL ERASER TO REMOVE ALL LOOSE OXIDES AND BRIGHTEN UP THE MARK. THIS WILL CHANGE THE BROWN MARK TO A SILVER MARK. THE BROWN MARK IS SIMPLY LOOSE OXIDES.

ALLOY: *BLACK OXIDE*
TYPE OF MARK: WHITE OR SILVER
PREFERRED ELECTROLYTE: MSC#3, MSC#5, MSC#1, B-5, B-60, F-30
CURRENT SETTING: DC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: 3 – 4 DWELLS, THREE SECONDS EACH
COMMENTS: WITH B-60, AC OR DC WILL WORK

ALLOY: *BLACK OXIDE, HEAVY COATING STEAM HOMO*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: B-70
CURRENT SETTING: AC
VOLTAGE SETTING: E, 17 VOLTS or F, 20 VOLTS
DWELL TIME: 3 – 4 SECONDS
COMMENTS:

ALLOY: *BLACK OXIDE,SS HEAT TREATED, MIL SPEC C13924*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: B-70
CURRENT SETTING: AC
VOLTAGE SETTING: F, 20 VOLTS
DWELL TIME: 5 DWELLS, THREE SECONDS EACH
COMMENTS:

ALLOY: *BLACK STEAM COATING*
TYPE OF MARK: WHITE
PREFERRED ELECTROLYTE: B-70
CURRENT SETTING: DC OR AC
VOLTAGE SETTING: E, 17 VOLTS or F, 20 VOLTS
DWELL TIME: 3 – 4 SECONDS
COMMENTS:

ALLOY: *BRASS*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **B-10, B-5 OR B-20**
CURRENT SETTING: **AC**
VOLTAGE SETTING: **C, 11 VOLTS or D, 14 VOLTS**
DWELL TIME: **1 – 2 SECOND DWELL TIME**
COMMENTS:

ALLOY: *BRONZE*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **B-10, B-5, B-20 OR F-60**
CURRENT SETTING: **AC**
VOLTAGE SETTING: **C, 11 VOLTS OR D, 14 VOLTS**
DWELL TIME: **1 – 2 SECOND DWELL TIME**
COMMENTS:

ALLOY: *CAD PLATING*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **F-10**
CURRENT SETTING: **AC**
VOLTAGE SETTING: **F, 20 VOLTS**
DWELL TIME: **2 – 3 SECOND DWELL TIME**
COMMENTS: **MAKES GOOD BLACK MARK ON BLACK SURFACE**

ALLOY: *CAD PLATING*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **#353**
CURRENT SETTING: **AC**
VOLTAGE SETTING: **F, 20 VOLTS**
DWELL TIME: **2 – 3 SECOND DWELL TIME**
COMMENTS: **GOOD RESULTS**

ALLOY: *CAD PLATING*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **MSC#5**
CURRENT SETTING: **AC**
VOLTAGE SETTING: **F, 20 VOLTS**
DWELL TIME: **2 DWELLS, 2 SECONDS EACH**
COMMENTS:

ALLOY: *CAD PLATING – GOLD APPEARANCE*
TYPE OF MARK: GOLD
PREFERRED ELECTROLYTE: B-20
CURRENT SETTING: AC
VOLTAGE SETTING: F, 20 VOLTS
DWELL TIME: SHORT DWELLS (4-5 SECONDS) 3 SECOND
MINIMUM, 5 SECOND MAXIMUM

COMMENTS:

ALLOY: *CAD PLATING – GOLD APPEARANCE*
TYPE OF MARK: GOLD, BLACK MARK
PREFERRED ELECTROLYTE: MSC#32
CURRENT SETTING: AC
VOLTAGE SETTING: F, 20 VOLTS
DWELL TIME: 3 SECOND DWELLS FOR 15 SECONDS
COMMENTS: GOOD BLACK MARK, SHORTER MARKING
TIME THAN B-20, LONGER STENCIL LIFE.

ALLOY: *CAD PLATING – SILVER APPEARANCE*
TYPE OF MARK: SILVER
PREFERRED ELECTROLYTE: B-20
CURRENT SETTING: AC
VOLTAGE SETTING: E, 17 VOLTS
DWELL TIME: 3 DWELLS, 3 SECONDS EACH
COMMENTS: DOUBLE UP ON MONOPADS

ALLOY: *CARBIDE*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: C-30
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: 2 SECONDS
COMMENTS: DO NOT NEUTRALIZE. DIP IN COLD
WATER TO SET MARK.

ALLOY: *CARBIDE*
TYPE OF MARK: WHITE
PREFERRED ELECTROLYTE: MSC#3
CURRENT SETTING: DC
VOLTAGE SETTING: F, 20 VOLTS
DWELL TIME: TWO DWELLS, 2-3 SECONDS EACH
COMMENTS: CUTS BACK ON STAINING

ALLOY: *CARBIDE*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: F-30, MSC#41, MSC#42, F-40
CURRENT SETTING: AC
VOLTAGE SETTING: C, 11 VOLTS or D, 14 VOLTS
DWELL TIME: 2 – 3 SECOND DWELL TIMES
COMMENTS: THESE ARE ACCEPTABLE, BUT NOT PREFERRED ELECTROLYTES

ALLOY: *CARBIDE – GOLD COATED*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: F-40
CURRENT SETTING: AC
VOLTAGE SETTING: C, 11 VOLTS
DWELL TIME: TWO DWELLS, 2-3 SECONDS EACH
COMMENTS: EXCELLENT BLACK MARK

ALLOY: *CASEN BLUE*
TYPE OF MARK: WHITE
PREFERRED ELECTROLYTE: MSC#5 OR B-70
CURRENT SETTING: DC
VOLTAGE SETTING: E, 17 VOLTS
DWELL TIME: THREE DWELLS, 2 SECONDS EACH
COMMENTS: USE SHARP-FACE CHARACTERS ON STENCILS.

ALLOY: *CAST IRON*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: F-60, #353
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: 2 – 3 SECOND DWELL TIME
COMMENTS:

ALLOY: *CAST IRON*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: MSC#1, MSC#4 or F-10
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: 2 – 3 SECOND DWELL TIME
COMMENTS: WITHOUT A MACHINED FINISH, USE DURA-LIFE STENCILS WITH WIDE CHARACTERS.

ALLOY: *CHROMATED CAD AND ZINC*
TYPE OF MARK: GOLD
PREFERRED ELECTROLYTE: B-20, MSC#5
CURRENT SETTING: AC
VOLTAGE SETTING: E, 17 VOLTS OR F, 20 VOLTS
DWELL TIME: EIGHT DWELLS, 3 SECONDS EACH
COMMENTS:

ALLOY: *CHROMATED CAD AND ZINC*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: F-20, B-5, B-10, GR-11
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS or E, 17 VOLTS
DWELL TIME: 2 – 3 SECOND DWELL TIME
COMMENTS:

ALLOY: *CHROME, DECORATIVE*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: D-12
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: TWO DWELLS, 3 SECONDS EACH
COMMENTS: GREAT BLACK MARK

ALLOY: *CHROME, DECORATIVE*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: #91NR
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: TWO DWELLS, 3 SECONDS EACH
COMMENTS:

ALLOY: *CHROME, DECORATIVE*
TYPE OF MARK: GOLD
PREFERRED ELECTROLYTE: F-20
CURRENT SETTING: DC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: 3 SECOND DWELL TIME
COMMENTS:

ALLOY: *CHROME, DECORATIVE*
TYPE OF MARK: CLEAR
PREFERRED ELECTROLYTE: MSC#120
CURRENT SETTING: DC
VOLTAGE SETTING: D, 14 VOLTS or E, 17 VOLTS
DWELL TIME: 3 – 4 SECOND DWELL TIME
COMMENTS:

ALLOY: *CHROME, DECORATIVE*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: MSC#7, MSC#120, MSC#9, MSC#1, MSC#14
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: 2 – 3 SECOND DWELL TIME
COMMENTS: THESE ELECTROLYTES ARE SUFFICIENT,
BUT NOT PREFERRED.

ALLOY: *CHROME, HARD*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: #91NR, #30NR, MSC#130, MSC#120
CURRENT SETTING: AC
VOLTAGE SETTING: F, 20 VOLTS
DWELL TIME: FOUR DWELLS, 3 SECONDS EACH
COMMENTS:

ALLOY: *CHROME, HARD*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: MSC#32
CURRENT SETTING: DC
VOLTAGE SETTING: E, 17 VOLTS
DWELL TIME: 8 – 10 SECONDS OF SHORT DWELLS (3-4
SECONDS EACH)
COMMENTS: DOUBLE UP ON MONOPADS

ALLOY: *CHROME, HARD*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: C-30, MSC#9, B-10, B-5
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS or E, 17 VOLTS
DWELL TIME: 2 – 3 SECOND DWELL TIME
COMMENTS: THESE ELECTROLYTES ARE
SUFFICIENT TO ACHIEVE BLACK MARKS

ALLOY: *CHROME, HARD*
TYPE OF MARK: WHITE
PREFERRED ELECTROLYTE: B-20
CURRENT SETTING: DC
VOLTAGE SETTING: F, 20 VOLTS
DWELL TIME: 2 – 3 SECOND DWELL TIME
COMMENTS: GOOD WHITE MARK

ALLOY: *CHROMIUM (ALUMINUM OXIDE & CHLORIDE)*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: MSC#1
CURRENT SETTING: DC
VOLTAGE SETTING: F, 20 VOLTS
DWELL TIME: FOUR SHORT DWELLS
COMMENTS: USE AMPLE ELECTROLYTE. WAIT APPROXIMATELY 30 SECONDS BEFORE NEUTRALIZING.

ALLOY: *COBALT ALLOY - STELLITE*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: F-10 or F-30
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: 3 – 4 SECOND DWELL TIME
COMMENTS: SAND BLASTED SURFACES SHOULD HAVE LIGHT OIL FILM REMOVED BEFORE MARKING. THIS WILL IMPROVE STENCIL LIFE.

ALLOY: *COPPER ALLOY/NICKEL PHOSPHORUS PLATING*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: F-30
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: 2 – 3 SECOND DWELL TIME
COMMENTS:

ALLOY: *COPPER NICKEL ZINC ALLOY*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: F-20
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: 2 – 3 SECOND DWELL TIME
COMMENTS:

ALLOY: *COPPER*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **B-20**
CURRENT SETTING: **AC**
VOLTAGE SETTING: **D, 14 VOLTS or E, 17 VOLTS**
DWELL TIME: **2 – 3 SECOND DWELL TIME**
COMMENTS:

ALLOY: *COPPER ON STEEL*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **F-60, B-10 or B-20**
CURRENT SETTING: **AC**
VOLTAGE SETTING: **D, 14 VOLTS**
DWELL TIME: **3 – 4 SECOND DWELL TIME**
COMMENTS:

ALLOY: *COROBAN – 18% ZINC-NICKEL*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **MSC#1, MSC#5 or MSC#41**
CURRENT SETTING: **DC**
VOLTAGE SETTING: **D, 14 VOLTS**
DWELL TIME: **2 – 3 SECOND DWELL TIME**
COMMENTS:

ALLOY: *DICHROMATE & DICHROMATE GOLD*
TYPE OF MARK: **CLEAR**
PREFERRED ELECTROLYTE: **MSC#1, MSC#5**
CURRENT SETTING: **AC**
VOLTAGE SETTING: **F, 20 VOLTS**
DWELL TIME: **TWO SECOND DWELL TIME**
COMMENTS: **THIS MARKS VERY QUICKLY. DO NOT OVER DWELL. CLEAR MARK WILL RUB OFF.**

ALLOY: *DICHROMATE PHOSPHORUS*
TYPE OF MARK: **SILVER**
PREFERRED ELECTROLYTE: **MSC#5**
CURRENT SETTING: **DC**
VOLTAGE SETTING: **E, 17 VOLTS**
DWELL TIME: **2 – 3 SECOND DWELL TIME**
COMMENTS:

ALLOY: *DICHROMATE ZINC*
TYPE OF MARK: WHITE
PREFERRED ELECTROLYTE: B-10
CURRENT SETTING: DC
VOLTAGE SETTING: F, 20 VOLTS
DWELL TIME: 3 SECOND DWELL TIME
COMMENTS:

ALLOY: *ENDURACOAT (BEARING INDUSTRY)*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: MSC#130
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: TWO DWELLS, 4 SECONDS EACH
COMMENTS: USE DIE-IMPRESS STENCIL PAPER

ALLOY: *ENDURACOAT (BEARING INDUSTRY)*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: MSC#32
CURRENT SETTING: AC
VOLTAGE SETTING: E, 17 VOLTS or F, 20 VOLTS
DWELL TIME: THREE DWELLS, 4 SECONDS EACH
COMMENTS: BE SURE TO NEUTRALIZE THOROUGHLY.

ALLOY: *GOLD ALLOYS*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: F-10, C-10
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: 2 – 3 SECOND DWELL TIME
COMMENTS:

ALLOY: *GOLD ALLOYS*
TYPE OF MARK: WHITE
PREFERRED ELECTROLYTE: F-10, C-10
CURRENT SETTING: DC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: 2 – 3 SECOND DWELL TIME
COMMENTS:

ALLOY: *GALVANIZED TOOL STEEL*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: MSC#22
CURRENT SETTING: AC
VOLTAGE SETTING: E, 17 VOLTS
DWELL TIME: 2 – 3 SECOND DWELL TIME
COMMENTS: MARK HOLDS

ALLOY: *HASTELLOYS*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: F-20, F-10
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: 2 – 3 SECOND DWELL TIME
COMMENTS:

ALLOY: *HEAT TREATED (DARK SURFACES)*
TYPE OF MARK: WHITE
PREFERRED ELECTROLYTE: F-10
CURRENT SETTING: AC
VOLTAGE SETTING: F, 20 VOLTS
DWELL TIME: 2 – 3 SECOND DWELL TIME
COMMENTS:

ALLOY: *INCONEL*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: #59CL, MSC#4, F-10 or C-10
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS or E, 17 VOLTS
DWELL TIME: TWO DWELLS, 3 SECONDS EACH
COMMENTS:

ALLOY: *KALIDE (COATING)*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: MSC#1
CURRENT SETTING: DC
VOLTAGE SETTING: D, 14 VOLTS or E, 17 VOLTS
DWELL TIME: FOUR DWELLS, 8 SECONDS EACH
COMMENTS: BE SURE TO MAKE SHORT DWELLS,
APPROXIMATELY ½ SECOND EACH

ALLOY: *KALIDE (COATING)*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: B-70
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: SHORT DWELLS, 1-1/2 – 2 SECONDS EACH
COMMENTS:

ALLOY: *MONEL METALS*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: MSC#4, MSC#1, C-10, D-12, #91NR, MSC#22
CURRENT SETTING: AC FOR BLACK MARK, DC FOR CLEAR MARK
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: 2 – 3 SECOND DWELL TIME
COMMENTS:

ALLOY: *NICKEL ALLOYS*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: MSC#32, MSC#7, MSC#1, C-10, MSC#4, MSC#17
CURRENT SETTING: AC FOR BLACK MARK, DC FOR CLEAR MARK
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: 2 – 3 SECOND DWELL TIME
COMMENTS: THE PLATING PROCESS CAN CAUSE SOME NICKEL PLATING TO MARK WELL, OTHERS TO MARK VERY POORLY. ON THE DIFFICULT PLATING, TRY DC, B, 8 VOLTS FOR 1 SECOND.

ALLOY: *NICKEL PLATING*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: MSC#2 (GRID MARKING: F-40)
CURRENT SETTING: AC
VOLTAGE SETTING: E, 17 VOLTS
DWELL TIME: THREE DWELLS, 3 SECONDS EACH
COMMENTS: LEAVES A BEAUTIFUL BLACK MARK

ALLOY: *NICKEL PLATING*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: MSC#6
CURRENT SETTING: AC
VOLTAGE SETTING: E, 17 VOLTS
DWELL TIME: FIVE DWELLS, 3 SECONDS EACH
COMMENTS: THIS ELECTROLYTE MAKES THE BEST BLACK MARK ON NICKEL PLATING. BE SURE NOT TO GO ANY HIGHER ON THE VOLTAGE, AS THIS CREATES TOO MUCH HEAT AND CAUSES THE MARK TO BLUR.

ALLOY: *NITRITE*
TYPE OF MARK: CLEAR
PREFERRED ELECTROLYTE: D-12
CURRENT SETTING: DC
VOLTAGE SETTING: E, 17 VOLTS
DWELL TIME: 1 DWELL, 15 SECONDS
COMMENTS:

ALLOY: *NITRITE*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: #353
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: 1 DWELL, 3 SECONDS
COMMENTS: LEAVES A GOOD BLACK MARK.

ALLOY: *NITRITE*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: B-5, MSC#1
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: TWO DWELLS, 3 SECONDS EACH
COMMENTS:

ALLOY: *PHOSPHATE BLACK*
TYPE OF MARK: WHITE
PREFERRED ELECTROLYTE: F-40
CURRENT SETTING: DC
VOLTAGE SETTING: E, 17 VOLTS
DWELL TIME: ONE DWELL, 30 SECONDS
COMMENTS: RUB MARK BRISKLY AFTER ETCHING TO REMOVE OXIDES. LEAVES A VERY GOOD WHITE MARK.

ALLOY: *SILVER PLATING*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: B-10, B-20 or MSC#8
CURRENT SETTING: AC
VOLTAGE SETTING: E, 17 VOLTS
DWELL TIME: TWO DWELLS, 2 SECONDS EACH
COMMENTS: LEAVES A GOOD BLACK MARK. BY SWITCHING THE POWER UNIT TO DC RATHER THAN AC, YOU CAN ACHIEVE A WHITE MARK.

ALLOY: *STAINLESS STEEL – 300 SERIES*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: MSC#41, MSC#42, MSC#40, D-12, C-10, MSC#1, MSC#7, #91NR
CURRENT SETTING: AC
VOLTAGE SETTING: C, 11 VOLTS or D, 14 VOLTS
DWELL TIME: ONE OR TWO 2 SECOND DWELLS
COMMENTS: ALL OF THESE ELECTROLYTES WILL MAKE A NICE BLACK MARK. D-12 IS A MORE AGGRESSIVE ELECTROLYTE AND CAN BE USED ON BLACK OXIDE, HELPING TO REDUCE ELECTROLYTE INVENTORY. #91NR'S Ph IS VERY HIGH, 8.5, SO THIS HELPS TO PREVENT RUST.

ALLOY: *STAINLESS STEEL – 400 SERIES*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: MSC#40, MSC#41, MSC#42, MSC#4, MSC#1, MSC#7, C-10, D-12, #353, F-30, F-60
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: TWO 2-SECOND DWELLS
COMMENTS: BY SWITCHING THE POWER UNIT TO DC, YOU CAN ACHIEVE A CLEAR MARK.

ALLOY: *STEEL, TOOL – HIGH ALLOY*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: MSC#41, MSC#42, MSC#40, MSC#2, MSC#4, MSC#1, F-30, F-10, D-12, F-50
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: 3 – 4 SECOND DWELL TIME
COMMENTS: ALL OF THE ABOVE ELECTROLYTES WILL PRODUCE GOOD QUALITY BLACK MARKS. HOWEVER, F-10 MAY HELP PREVENT STENCILS FROM CLOGGING SO QUICKLY.

ALLOY: *STEEL, HARDENED D-2 (BORON CARBIDE NITRATE)*
TYPE OF MARK: BLACK
PREFERRED ELECTROLYTE: MSC#4
CURRENT SETTING: DC
VOLTAGE SETTING: F, 20 VOLTS
DWELL TIME: TWO 3-SECOND DWELLS
COMMENTS:

ALLOY: *STEEL, MILD AND LOW CARBON*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **MSC#41, MSC#42, MSC#2, F-10, F-20, F-50**
CURRENT SETTING: **AC**
VOLTAGE SETTING: **D, 14 VOLTS**
DWELL TIME: **2 – 3 SECOND DWELL TIME**
COMMENTS:

ALLOY: *STELLITE*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **F-40, D-12**
CURRENT SETTING: **AC**
VOLTAGE SETTING: **F, 20 VOLTS**
DWELL TIME: **4 SECOND DWELL TIME**
COMMENTS:

ALLOY: *TOOL STEEL*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **D-12**
CURRENT SETTING: **AC**
VOLTAGE SETTING: **C, 11 VOLTS or D, 14 VOLTS**
DWELL TIME: **2 – 3 SECOND DWELL TIME**
COMMENTS: **MAKES A VERY GOOD BLACK MARK. IF VOLTAGE IS SET HIGHER THAN 14 VOLTS, MARKS MAY BLUR AS THIS IS AN AGGRESSIVE ELECTROLYTE AND MARKS QUICKLY.**

ALLOY: *TOOL STEEL – CARBON SAW STEEL*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **B-20, MSC#8, B-10**
CURRENT SETTING: **AC**
VOLTAGE SETTING: **D, 14 VOLTS**
DWELL TIME: **TWO 2-SECOND DWELLS**
COMMENTS: **DEPRESSING THE DC BUTTON WILL PRODUCE A CLEAR MARK. BE SURE TO NEUTRALIZE WELL AND USE A RUST INHIBITOR AFTER THE NEUTRALIZER HAS HAD TIME TO DRY. THIS ALLOY TENDS TO RUST EASILY IF NOT NEUTRALIZED PROPERLY.**

ALLOY: *TOOL STEEL WITH TUFF DRIVE COATING TFHV800*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **MSC#5**
CURRENT SETTING: **AC**
VOLTAGE SETTING: **D, 14 VOLTS**
DWELL TIME: **SIX 4-SECOND DWELLS**
COMMENTS: **STENCILS TEND TO CLOG EASILY WHEN MARKING THIS ALLOY. BE SURE TO CHANGE PADS AND STENCILS FREQUENTLY. BECAUSE OF THE TIME INVOLVED TO MARK THIS ALLOY, WE SUGGEST NOT AUTOMATING THE MARKING OF THIS ALLOY THROUGH ELECTRO-CHEMICAL ETCHING. THIS MUST REMAIN A MANUAL MARKING PROCESS.**

ALLOY: *TIN ALLOY*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **D-12, B-20, F-10**
CURRENT SETTING: **AC**
VOLTAGE SETTING: **D, 14 VOLTS**
DWELL TIME: **TWO 2-SECOND DWELLS**
COMMENTS: **DEPRESSING THE DC BUTTON WILL PRODUCE A CLEAR MARK.**

ALLOY: *TIN ELECTROPLATE OR HOT DIP*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **D-12, MSC#22, MSC#5, F-20, B-10**
CURRENT SETTING: **AC**
VOLTAGE SETTING: **D, 14 VOLTS**
DWELL TIME: **TWO 2-SECOND DWELLS**
COMMENTS: **DEPRESSING THE DC BUTON WILL PRODUCE A CLEAR MARK.**

ALLOY: *TITANIUM COATING*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: **F-40, MSC#41, MSC#42, D-12, MSC#32**
CURRENT SETTING: **AC**
VOLTAGE SETTING: **D, 14 VOLTS**
DWELL TIME: **TWO 1 – 2 SECOND DWELLS**
COMMENTS:

ALLOY: *TITANIUM ALLOYS*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: T-10, C-10, D-12, B-10, #59CL, MSC#22, MSC#4
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: 2 – 3 SECOND DWELL
COMMENTS: DEPRESSING THE DC BUTTON WILL PRODUCE A CLEAR MARK.

ALLOY: *TITANIUM GOLD COAT*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: MSC#2, D-12
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: TWO 4-SECOND DWELLS
COMMENTS:

ALLOY: *TITANIUM NITRITE*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: F-10
CURRENT SETTING: AC
VOLTAGE SETTING: E, 17 VOLTS
DWELL TIME: TWO 2 – 3 SECOND DWELLS
COMMENTS:

ALLOY: *VAPOR BLAST OR SAND BLAST*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: F-50
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: TWO 3 SECOND DWELLS
COMMENTS: IT IS ADVISED TO USE DURA-FAB STENCILS WHEN MARKING. USE RPO OIL PRIOR TO MARKING.

ALLOY: *ZINC ELECTROPLATE*
TYPE OF MARK: **BLACK**
PREFERRED ELECTROLYTE: MSC#5, A-10, B-10, F-20, MSC#22
CURRENT SETTING: AC
VOLTAGE SETTING: D, 14 VOLTS
DWELL TIME: TWO TO THREE 2 SECOND DWELLS
COMMENTS:

ALLOY:	ZINC ELECTROPLATE
TYPE OF MARK:	BLACK
PREFERRED ELECTROLYTE:	F-40
CURRENT SETTING:	AC
VOLTAGE SETTING:	E, 17 VOLTS
DWELL TIME:	TWO TO THREE 2 SECOND DWELLS
COMMENTS:	