



Complete Advanced Holographic WIDE WEB ELECTROFORMING SYSTEM

**HOLOPRESS
EFS 2452**



Holographic Electroforming System for Embossing Shims up to 60" x 40" (1524 mm x 1016 mm) and an embossing size from 42" x 24" to 52" x 24"

Equipment Description and Function

This System has been designed especially for the computerized replication of holographic wide web nickel shims by means of an electroforming process.

The Purpose of this system is to generate a first metal master from a photoresist hologram and to subsequently provide a constant supply of the necessary quantity of precision holographic shims for rotary wide web embossing. PC program control of the nickel deposition process shall guarantee consistent production of high quality shims replicated precisely to the required specifications.

Optional metallizing, activating / passivating and cleaning equipment shall be provided. This equipment shall be suitable to metallize holographic master plates, prior to the electroforming.



The replicating process is based on the electro deposition and replication of a metal (nickel) copy from a suitable holographic master plate, capable of conducting electric current. When the deposition is completed, the new nickel copy (mother), which is an exact negative, can easily be separated from the master and can be used for the subsequent replication of further production shims (daughters).

This nickel-sulfamate electroforming process is especially developed for transferring holographic structures or other micro- and nanostructures from recombined plates (father) or other conductive master plates and for growing from this father a family of positive / negative replications in order to receive a mother from which the continuous supply of embossing shims (daughters) for wide web production is copied by means of a further electroplating process.

Shim size: Deposition size up to 60 x 40 inch (1524 mm x 1016 mm) for an embossing size from 42" (wide) x 24" (repeat length) (1067 mm x 610 mm), up to 52" (wide) x 24" (repeat length) (1321 mm x 610 mm)

Shim thickness: programmable (recommended 80 µm – 100µm)

Shim hardness: variable according to electrolyte chemistry and additives.

Process feature

- Computerized, programmable cycle to:
 - obtain Nickel Master from silvered photoresist
 - obtain Nickel Copy from master.
- Each cycle is automatic

Process Time:

- approx. 120 / 200 min. for nickel copy
- approx 16 hours for master.

Production output:

- continuous replication of up to 8 (2 x 4) nickel shims of 80µm per day or 8 hour shift. (one tank unit can produce 2 shims at the same time).

Control and Services

Electrolyte bath temperature:

- computer controlled

Inlet Ampere regulation for shim thickness and deposition speed:

- computer controlled



Bath level: ● computer monitored
Services: ● 380 Volt, 60 Hz

Electronic board: ● Computerized Control Panel

General configuration of the electroforming system shall consist of the following equipment.

1. Electroforming unit with dual tank suitable for producing two shims independently in one tank. A electrical control rack. Electroclean station for photoresist removal as well as anodic passivation and general cleaning. Quality and process control equipment.
2. Optional: Metallizing equipment, such as spray booth, wash-down sink and required accessories.

1. Electroforming System EFS 2452

System Configuration

- 1.1. Electroforming unit
- 1.2. Control rack
- 1.3. Electroclean station
- 1.4. Quality and process control equipment (Ultrasonic thickness gauge, lab ware and chemical analysis set)

1.1. Electroforming Unit

1.1.1. Features

The electroforming unit shall provide means for precise control systems to regulate all critical parameters, such as:

1. temperature,
2. flow and
3. current density
4. current ramp time
5. current slope

This shall be achieved by a user friendly, MS Windows based, software interface.



1.1.2. Component Specifications

Electroforming Equipment

1. Hologram Tank HT 2452
 - Material: High Grade PP
 - Titanium Anode Baskets
 - Two Plating Cells
 - Two Pumps for High Flow Rate
 - Teflon Coated Heaters
 - Dual Stage Filtration System
 - Temperature Control +/-1C
 - Shim: 60"x40" (1524 x 1016 mm)

Tank enclosure shall be made of polypropylene (PP), high grade to insure chemical compatibility. Anode baskets shall be made of titanium for corrosion resistance and process compatibility.

Bus bar and associated hardware shall be made of stainless steel (316) to prevent corrosion of critical components. Two (2) one (1) hp Pumps shall provide the necessary high flow rate to maintain process efficiency.

Pumps shall be made of polypropylene or CPVC in order to insure chemical compatibility.

Heaters shall be incorporated to maintain temperature for the process (max. 60 degrees C) (6 KW min.). The heaters shall be Teflon coated to insure chemical compatibility. The temperature control system shall be user settable, and shall regulate the temperature of the bath to within +/- 1 degree C.

Dual stage filter housings shall be incorporated to insure purity of the chemistry. These housings shall be made of CPVC in order to insure chemical compatibility.

1.1.3 Dimensions

Width 2388 mm (94")
Depth 2057 mm (81")
Height 2159 mm (85")

1.2. Electrical Control Rack

1.2.1. Features

Electrical control rack shall be separated from the electroforming baths. It shall offer the possibility to control up to 6 independent plating cells as well as one electroclean station.



The control rack shall house the

1. high current rectifiers,
2. the industrial grade PC-control unit,
3. monitor,
4. mouse and
5. keyboard.

This shall guarantee the user safety and system reliability in a humid and chemically corrosive environment.

1.2.2 Specifications

The rectifiers shall be fully controllable by the user defined program from 0 to 250 amps, 0 to 10 volts.

The PC shall be a Pentium III (or better) 660 MHz (or higher) industrial PC with 128 MB RAM (or higher) and 10.2 GB HD (or higher)

1.2.3. Dimensions

Width 610 mm (24")
Depth 610 mm (24")
Height 229 mm (90")

1.3. Electroclean Station

1.3.1. Features

Specially designed electro cleaning bath for removal of the photoresist and for passivation of the resulted metal master. The later function is required to make a family series.

1.3.2 Specifications

The tanks shall be made of high grade polypropylene (pp) for chemical compatibility. The bus bar, electrode and associated metal hardware shall be made of stainless steel (316) for corrosion resistance and chemical compatibility.

Two (2) $\frac{3}{4}$ hp pumps shall provide the necessary flow to maintain the process.

The pumps shall be made of CPVC or polypropylene for chemical compatibility.

Heaters (6 KW min) shall be incorporated to maintain temperature (60 degrees C max) for the process.

The heaters shall be Teflon coated for chemical compatibility.

A temperature controller shall be incorporated to maintain temperature to within +/- 1 degree C, set point user defined.



1.3.3. Dimensions

Width 2337 mm (92")
Depth 889 mm (35")
Height 1753 mm (69")

1.4 Quality and Process Control Equipment

Consists of

1. Ultrasonic Thickness Gauge
2. Lab ware and Chemical Analysis Kit

1.4.1. Ultrasonic Thickness Gauge

For thickness measurement of the shim. The precision should be +/- 1 micrometer or better. Measurement should be non-destructive. Measurement should be taken at any point at the shim.

1.4.2. Lab ware and Chemical Analysis Kit

Analyzing kit and tools to analyze the content of nickel, boric acid, PH-level, hardener and other necessary bath additives.

2. Optional: Metallization Equipment

The metallization equipment is required to produce a layer of conductive material, here silver, onto of the master substrate. This set of equipment has to be suitable to handle master substrates with up to a size of 45" x 45".

System Configuration

1. Metallizing Spray Booth
2. Holographic Rinse Sink
3. Metallizing Kit

2.1. Metallizing Spray Booth

2.1.1. Features

Substrate can be lifted into the spray booth easily. The spray booth shall come with an exhaust outlet. Drainage hose for a waste chemical collection container provided.

2.1.2. Specifications

The housing shall be made of stainless steel to ensure long lifetime of the equipment.



2.2. Holographic Rinse Sink

2.2.1. Features

In the holographic rinse sink residual metallizer will be washed off, to avoid contamination of the electroforming bath. Substrate can be lifted into the spray booth easily. Drainage hose for a waste chemical collection container provided.

2.2.2. Specifications

The housing shall be made of stainless steel to ensure long lifetime of the equipment.

2.3. Metallizing Kit

2.3.1. Features

This kit shall include all necessary equipment for metallizing, such as spray gun, hoses and to the gas container.

Price:	Complete System Including chemicals, supplies and nickel pallets, Installation / Set-up / Training, 15 days	upon request
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Also recommended:

2.4. Precision Wide Web Shim Cutter WSC 3065	upon request
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Precision shim cutter with digital readout system (inch + metric), Pre-Set and automatic adjustment of cutting position. Two parallel rotary cutting heads. Maximum cutting area: 30" x 65" (76 cm x 165 cm)

Terms:	50 % down, 50 % by irrevocable L/C payable at sellers bank upon signature of Certificate of Acceptance at sellers factory.
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Remarks:	Flight, local transportation and accommodation is to be paid by the buyer.
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Delivery Time:	Approx. 12 –16 weeks
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