December 20, 2018

Quotation No. QF18-1132 Rev C

Prepared for:

Atlas Die LLC

60” Dual Chamber Fine Line Etch Process System

Horizontal and Vertical Process Equipment for the Electronic and Microelectronic Industries
2183 W Park Ave Cedar City , Utah 84720 (435) 586-1188 (435) 867-0815
Email:mbrask@sisna.com www.ips-vcm.com

QF18-1132 Rev D 12/20/2018

Atlas Die LLC
2000 Middlebury Street
Elkhart, IN 46516-5521

Attn: Kevin Deckard

Re: Fine Line Conveyor Spray Etching System

As per your request, we are pleased to offer the following proposal for an In-Line Chemical Milling Fine Line Spray Etch System. The system is designed to be used with Ferric Chloride Etch as follows:

General Module Descriptions & Specification

Item 1: In-Line Chemical Milling Fine Line Spray Etch System

General: The DYNAMIL INTERSYSTEMS horizontal conveyor Spray processing system is made up of the following modules:

1) LIM : Lead-In Module
2,3) ISM : Ferric Chloride Spray Etch Module(s) (Two Each)
4) SRM : Spray Rinse Module
5) LOM : Lead Out Module

The system comes complete and ready to operate including:

1) Materials of construction:

   a) Euro-Beige or White ½" & ¾", 1" Polypropylene construction. Tempered Glass and PVC Clear tops and side covers.
   b) PVC and CPVC SCH 80 piping (used on heated spray bars) systems
   c) Heavy Duty True Union Ball Valve flow control system with Oil Dampened Pressure Indicators for fine line control.
   d) Slide out style manifolds with quick change nozzles for main etcher
   d) Titanium hardware
   e) Pre-plumbed and water inlet and cooling water lines made of PVC & Unistrut
   f) UL designed remote electrical panel

2) Thin/ Rigid Board Bevel Gear Drive System

- 2” Wagon Wheel rigid transport wheels
- Overlapping arrangement of wheels for thinner materials
- DC Motor precision motor drive system
- Designed to handle materials between 3 Mil - .125"

3) Operations & maintenance manuals and drawings

4) Detail of modules as listed below

Item 2: Options

a) Touch-screen and PLC to replace switches and lights
b) Variable Frequency Drives for Pumps
c) Rinse Section Options (Fresh Water)
d) Material Handling Cart
e) Interface with customer supplied regeneration system

Item 3: On-Site Installation oversight and training

1 Technician for a period of up to 3-4 Days to:

a) Oversee rigging of line into location (Rigging and Fork Lift are responsibility of Customer)
b) Interconnection of Modules, Plumbing, Electrical
c) Debug and Testing as defined below in addition to the initial installation
   i) IPS will provide on site Process support thru the qualification process as required to qualify and debug the machine estimated 2 weeks
   ii) IPS will provide on site Service support thru the qualification process as required to qualify and debug the machine estimated 1 week

Item 4: Sales Tax

Sales tax shall be paid by the customer based on local franchise tax board Rates to the local authorities. (IPS will collect no sales tax)

Item 5: Transportation Costs

(1) One dedicated van shall be required to transport the system between Cedar City, Utah and Elkhart, In.

Prices	FOB IPS Factory (Cedar City, Utah)
Payment Terms	40% With Order 40% on Shipment from IPS factory 10% Net 30 days from date of shipment 10% on final acceptance (Not to exceed 60 Days)
Delivery	22-24 Weeks from date of deposit to point of shipment
Terms and Conditions	Refer to IPS standard “Terms and Conditions” As listed below

Pricing Summary

Item 1: In-Line Etch System

Cost for 60" Actual Width Conveyor Line Model C-21F-60
as outlined above. $262,600.00

Item 2: Options

a) Touch Screen/ PLC Controller $6,500.00
b) Variable Frequency Drives for etch pumps $5,400.00

Provides ramp up and ramp down of motors to save on wear and tear. Also provides a slower speed of operation of pumps.

1) Touch screen operator settings (when touch-screen is ordered)
2) Calibration screen

c) Rinse Section Options:
e-1 Fresh Water Rinse Module. $17,500.00
(Two upper and Two Lower Spray Bars)
d) Regeneration System:

IPS will interface with customer supplied
regeneration system. . . . .$Included

Item 3: On-Site 3-4 Days Installation oversight and training

a) On Site Technicians Labor. $2,720.00
b) On Site Process Support Labor. $2,720.00
c) Airfare – Las Vegas to Chicago, Ill. .$1,200.00
d) Car Rental. $480.00
e) Hotel. $1,050.00
f) Per Diem. $670.00
g) Travel Time. $850.00

Total costs for installation . . . ……. .$9,690.00*

***Actual costs billed as accrued.**

Item 4: Sales Tax

Sales tax shall be paid by the customer to the local franchise tax board

Item 5: Transportation Costs

Cost for one dedicated padded van. . . . . .$3,700.00 *
(*Not to Exceed, actual costs will be invoiced)

Item 6: Spare Parts

One each spare parts kit including one of each process pump to be held on consignment thru the warranty period on site at Atlas. Atlas and IPS will agree on what parts should be included in the kit so the value doesn't exceed the $20,000.00 estimate. Any items used during the warranty period will be sent to IPS for replacement so the inventory is maintained. Upon completion of the warranty period, the parts will be purchased for inventory at Atlas.

Cost for spare parts package…….….$20,000.00

IPS will extend to Atlas a discount of 15% on all spare parts purchased for the machine for the first 2 years after the warranty.

Sub-Total Price including Item 1,2,3,5,6…….$325,390.00

5% Discount for Items 1,2,6……....…<$15,600.00>

Final Net Price to Atlas Die……..…….$309,790.00

Respectfully submitted,

Mike Brask
President

Chemical Milling Process Line Equipment Specifications

Proposal Drawing Reference	: QF18-1132
Conveyor Type	: Single Main Drive; 2” Wheels; Bevel Gear Driven with non-overlapping wheels
Components	: Polypropylene, PVC, Titanium
Process	: Die Etching with Ferric Chloride Chemistry
Conveyor Capacity	: Designed to handle parts as follows: a. Min pnl size 6” x 6” b. Max pnl size 54” x Infinite c. Min pnl Thickness 3-4 Mils d. Max thickness .125” (Thicker On Request)
Conveyor Operating Speed	: 6-120 in/ Minute (10 in/min Nominal)
Number of Panels / Hour	: Depends on thickness of metal etched
Heating Type	: Electric Immersion Heaters (with safety protection)
Heat Up Time From Ambient To Operating Temperature	: 2-3 Hours or less
Overall Dimensions of Line	: 265.50” Long x 109.1875” Wide (With Spray Rinse)
Facility Requirements:	
a) Electrical	: 480 3 Phase 60 Hz. (208-240 Available)
b) Water Required	: 2-3 GPM
c) Exhaust Required	: 600 CFM at 2200 FPM
d) Cooling Water Required	: 1 Places requiring 3-5 GPM Each of 65 Degree (3/4") chilled water. (1/2 Ton Required)
e) Water Drains	: 1 Each - 1"
f) Overflow Stand Pipe	: 1 Each - 1 1/2”
g) Chemical Drain	: None

Item 1: Fine Line Etch System Details

1.0 Materials of construction:

- Main Body and Support Panels: ¼" and ½", 1"PP High density, stress relieved Euro-Beige or white polypropylene.

- System uses dado construction to interlock the plastic sheets prior to inert gas triple bead welding. This applies to all modules.

- Top inspection covers: Clear tempered glass & PVC, fully supported where necessary.

- Front inspection covers: Clear tempered glass and PVC covers create a leak proof front access to lower nozzles and gear drive.

- The front covers provide double solution / barrier is created that controls leakage and fuming. Excess leakage goes into drain gutter around window, not onto floor.

- Plumbing: All PVC heavy body schedule 80 on all modules.

- Hardware: Titamium and other corrosion resistant materials where exposed to chemicals.

- ¼" Bung for a cabinet cooler

- AB Controls with panel view 800 display

- 3ea lead in sensors for water saver

2.0 Conveyor Drive System:

- The system is designed for 0 (Min) - 12 (Max.) feet per minute conveyor transport speed as driven through DC gear motors. A single drive shaft powers all conveyor rollers through a common potentiometer setting with digital readout. A Direct Drive right angle motor will be used for this system.

2.1 Specification of Drive System:

1) Gear Type : Bevel Gears front driven
2) Layout of Wheels : Non Overlapping
3) Material of Gears : PVDF
4) Wheel Type: 2" Rigid Wagon Wheels

5) Main Drive
   Shaft : ½" x ½" Titanium
6) Conveyor
   Shafting : Carbon Fiber rod
7) Conveyor
   Pitch : 2 1/8"
8) Size of Conveyor
   Rods : 1/2"
9) Method of
   Driving Upper
   Roller : Spur Gears made of glass reinforced polypropylene

2.2 Method Of Controlling Drag-out Between Sections

- Conveyor sections are independent from module to module to minimize solution drag-out between modules

- Rubberized weighted squeeze rollers keep water separated from chemistry

- Rollers sit in drag-out control trays designed to drain the chemistry back to

- Bulk head U-strips are provided to minimize leakage between module connections.

2.3 Central Driven front accessed drive shaft

- A common drive shaft propels all of the modules with a consistently smooth and accurate motion.

- Each main drive shaft does not exceed 5 feet overall & is made of a Titanium. Gears are spaced on the removable drive shaft by use of plastic spacers

3.0 Operations and Maintenance Manuals:

An operations and maintenance manual is provided with detailed parts listings, component literature, wiring schematics, general layout drawings, operations and maintenance instructions. Specific instructions are included for installation.

electronic versions are included:

4.0 MODULE DETAIL AND DESCRIPTIONS

DESCRIPTION OF PROCESS

Ferric Chloride Etch Line

1) Lead-In

A) Total Chamber Length 61 3/4”
B) Optical Sensor for panel count (if touch-screen is ordered) and operation of water saving device (Solenoid / Timer system)
C) Solid driven Rolls on 3 “ centers

2,3) Etching Chamber Module

A) Chamber Length:

Overall : 111 1/4”
Effective : 93 1/2”

B) Height 52"
E) Sump Size (Gallons) 500
F) Pump System

a) Purpose : Spray
b) Brand : IPS/ Baldor
c) Type : In-Tank Centrifugal
d) H.P. Rating : 10 H.P.
e) Capacity : 140 GPM
f) Pressure : 25-30 PSI
g) Quantity : 4 Total

G) Heating System/ Cooling Coil

A) KW Of Heater : 36 KW Total
B) Cooling Coil
Material : Titanium with corrosion resistant solenoid & bypass

H) Fluid Delivery System

This chamber features 15 sets of upper and 15 sets of lower spray manifolds designed for “zone” adjustment of spray pressures in order to insure even etching across the panel. Each “zone” has its own independent spray pressure adjustment valve and respective liquid filled spray pressure gauge, 3 bars are controlled per zone.

a) Nozzle Type/ Material :

Top Spray Nozzles : 1/4" VV 5008/ Poly propylene
Bottom Spray Nozzles: 1/4" VV 5008/ Poly propylene

b) Number of Spray Bars :

Single Chamber : 11 Upper/ 11 Lower Running the length of the chamber
Split between two pumps

c) Material of Spray Bars : CPVC
d) Nozzle Pressure : Max. 35 Min 0
e) Flow @ 30 PSI : .6 GPM
f) Quantity of Nozzles : 496 Total
g) No. of Pressure Gauges & Rating : 10 - 0-60 PSI
h) Method Of Pressure Adjustment : Ball Valve

I) Material of Main Body : 1" Poly propylene
J) Hardware Material : Titanium
K) Drain Size : 1 1/2” NPT
L) Chemical Make-up Size : 1/2" NPT
M) Filtration System

a) Type : Bag Filter Mesh Screen Element on discharge of pump
b) Mesh : 300
c) Material : Poly propylene
d) Quantity : 4 Total

N) Misc. Items:

a) Side Door Panels : Poly propylene
b) Spec of Top Cover : Single
c) Material of Top Cover : Tempered Glass
d) Exhaust Plenums : Poly propylene
e) 3ea spare sampling ports added to back deck of the machine for future use.

4) SRM - Spray Rinse Module (1 Stage; 1 Fresh water). Note: The system comes with a hand held Teflon spray gun to rinse off panels as a standard. This allows for collection of rinse water for use in the water evaporation make-up in the etcher.

A) Chamber Length

Overall : 18 3/4”

B) Fluid Delivery System

a) Nozzle Type/ Material:

Fresh Water Sections : .25 GPM @ 110 Degrees - Vee-Jet/ PVC

b) Number of Fresh Water Spray-Bars : 2 Total :

c) Material of Spray Bars : PVC

d) Flow @ 20 PSI : ..2 GPM (Recirculation nozzles)

e) Quantity of Nozzles : (30 are fresh water)

f) No. of Pressure Gauges & Rating : 2 - 0-60 PSI

g) Method Of Pressure Adjustment : Ball Valve

C) Material of Main Body : 1/2"

D) Hardware Material : Titanium

E) Drain Size : 1 1/2" NPT

F) Rinse Water Inlet Size : 1/2" NPT 4-6 GPM Flow Rate)

G) Misc. Items:

a) Side Door Panels : Poly propylene

b) Spec of Top Cover : Single

c) Material of Top Cover : Tempered Glass

d) Drag-out Covers : Clear PVC

5) Lead Out

A) Exit Length 61 3/4”

B) Spray Rinse Gun With Polyethylene collection bucket

C) Solid driven Rolls on 3 “ centers

Equipment Performance Specifications

1) Transport

a. Speed

1. 6-120 inches per minute without jamming, overlapping or drifting more than 1" in any direction. System can operate up to 10’ per minute.

b. Product: Spring or Stainless Steel

1. **Minimum**: 4 mil 316SS
2. **Maximum**: 125 MIL overall thickness (Thicker panels can be handled on request)

c. Loading & Movement

1. Board Shift:
   +- 1" From Side to Side

Prevention Method:

A) All sections are completely leveled.
B) Adjustment of spray pressures from top to bottom
C) Use of upper driven rollers
D) Speed calibration from drive system to drive system

A 2" Spacing or gap between each panel or greater is required

2. After machine is leveled maximum drift of up to 1" out of Square can occur

d. Gear, Bushing & Bearing Wear

1. Gears - One Year Warranty
2. Bushings - One Year Warranty
3. Bearings - 6 Months Warranty
4. Motors - One Year Warranty or as per the manufacturers warranty

2) Materials of Construction

a. Warranty

All materials specified and designed on the equipment are warranted not to corrode, bow, twist, craze, crack, leak

or rust as long as the chemistries used are as specified and temperature limits are maintained.

b. Exclusions

Includes O.E.M. materials that are covered under **Separate Warranty.** This would include items such as Electronic Components such as pump motors, temperature controls, switches, etc. that may fail under proper operating conditions & specifications.

c. Mechanical Specifications

Includes a 24Hr response, or as agreed with customer to any defects in workmanship or reliability found during the warranty period

3) Heat Up Time

a. The machine is designed and guaranteed to heat-up to operating temperature within 2-3 hours from ambient temperature (70F/ 22C).

Note: Heat up from temps as cold as 40 F will require significant increase in KW required and a increased cost for heaters. IPS recommends using the built in 7 day timer for these occasions which should be significantly reduced in frequency by introducing regeneration of ferric chloride.

4) Interlocks

a. The processor will be designed with safety switches to protect from chemical contact with the operator, high & low solution levels, heater & material of construction overheat & ground fault. Warranty will be voided if damage occurs to any of the equipment due to by-passing of any of the Safety Devices.

5) Company Experience

The above proposed system shall operate in accordance with this equipment specification within a reasonable period of start-up based on companies 30 plus years of experience. References on request.

6) Ground Connection

System is provided with a ground as a standard feature. A ground is required to be connected from the facility

Integrated Process Systems Standard Terms & Conditions:

1. Prices quoted herein are firm for a period not to exceed 60 days from date of quotation and then may be subject to change without notice.

   Prices quotes are the most favored offered to all customers

2. Delivery dates quoted are based upon factory loads at the time of quote and will be confirmed at time of order. Unless specifically included as part of the accepted purchase order, IPS assumes no other responsibility for delivery penalties imposed by the customer.

3. All products quoted herein are warranted to be free from defects in workmanship and materials within the framework of the standard IPS warranty. Products manufactured by others are warranted under the original manufacturer's warranty.

   IPS is solely a seller and or manufacturer of this Equipment and is responsible or the quality of the specified materials and/or equipment as identified on the purchase order in accordance with mutually agreed to quality criteria and standards.

4. Terms are subject to reexamination and/or approval of seller's credit department at any time prior to shipment of goods,

5. Any taxes imposed by federal, state, municipality, or other governmental authorities (domestic or foreign) on the manufacture, use or resale of items covered by this quotation are not included and shall be charged to the customer, if IPS is so charged.

6. Cancellation of orders prior to delivery and/or shipment are subject to cancellation charges as may be determined by IPS and will be based upon degree of labor and materials expended to date of cancellation but not less than 25% of the purchase price.

7. Any legal fees incurred as a result of litigation for cancellation, payment collection or other related matters are chargeable to the buyer. All delinquent payments beyond the terms established are subject to a late charge of 1½ per month on the unpaid balance.

8. Equipment remains the property of IPS until full and complete Payment has been received. IPS holds the right to insist that A UCC-1 filing form be completed on request.

9. Stenographic and clerical errors are subject to correction.