Hong Kong, 3rd of December 2000

QUOTATION NO. EQ P8-7201/R11

We have pleasure in quoting you for the supply and delivery of the following:-

RACK ALKALINE ZINC PLATING LINE

ITEM ONE

Automatic / Manual program controlled equipment in accordance with the attached description and specification and comprising:-

1/ Program control equipment – Manit system with random loading, data monitoring system and Koyo PLC direct control.
2/ 2 - Heavy duty transporters with drip trays capable of lifting 1,500lb. (Double flight bar pickup)
3/ Epoxy coated steel baseframe and structure with SS transporter rails.
4/ Hot water coils and thermocontrollers.
5/ Service pipework in US schedule 40.
6/ Process tanks and fittings - see description.
7/ 30 - Flight bars.
8/ 5 – Off-line sump tank for zinc plate, 2 electro-clean, cleaner spray and soak clean solution.
9/ 12 – Sets of recirculation pumps and 5 - sets of filter chambers.
10/ Auto lids for all heated tanks.
11/ 1 - Gas fired dryer oven with lids.
12/ 6 – Sets of off-line water storage tanks with 5 section and 4 counter-flow partitions, each section with circulation pump, pipe work, solenoid valves, level to spray rinse manifolds, and one circulation pump for refill to other tank.
13/ Rectifiers supplied by Spartan.
14/ Commissioning Cost.
15/ Packing and freight charges.

OPTIONAL ITEMS: -

ITEM TWO

Additional heavy duty transporter with double flight-bar fixed pitch pickup and position control by Spectra Precision unit.

ITEM THREE

Mefiag filteration units/Oil Separator for Soak Clean and Cleaner Spray.

ITEM FOUR

Installation Cost

PRICES	:	Prices are C.I.F. US port.
DELIVERY	:	14 weeks from date of order.
VALIDITY	:	Prices quoted are valid for 60 days from the date of this quotation.
PAYMENT TERMS	:	Equipment:- -30% with order; -30% on final test prior to shipment; -30% on arrival at site; -5% on completion of mechanical and electrical installation; -5% on final acceptance.
DUTIES	:	All customs or other duties payable are the responsibility of the customer. All handling and storage charges from shipside to site are the responsibility of the customer.
CONDITIONS	:	Goods are offered for sale in accordance with PAL Condition of Sales. Copies may be provided on request.

Yours faithfully
PROCESS AUTOMATION INT'L LTD

International Marketing Manager

PROGRAM CONTROLLED TRANSPORTER OPERATED SURFACE FINISHING LINE

SPECIFICATION

Proposal Drawing No.	:	P8-7201
Plant Type	:	2 - Gate type transporters with dual pickup and fixed pitch double pick up.
Components	:	Steel
Process	:	Akaline Zinc
Rack envelope	:	72" x 132" x 8" (DOT)
Flight Bar Loading	:	15 racks x 2
Machine Cycle	:	8 mins * for 15 flight/hr output
Heating Medium	:	Hot Water (chromate, warm spray rinse & zinc plating) Fire Tube (soak clean and electro-clean)
Heating-Up Time from Ambient to Operating Temperature	:	4 hours
Electricity Supply	:	480V 3ph 60H_z
Approx. Overall Dimensions of Machine	:	Length : Width : See Drawing Height :

* Machine cycle is based on 3 plating tanks with 22 mins plating time.

EQUIPMENT DESCRIPTION:-

1. Transporter

   - Constructed from 304 stainless steel with epoxy coating. Traverse and lift/lower motors controlled by variable frequency drives. Lift motor to have dynamic braking unit.
   - Double flight bar pick-up with maximum lift capability of 1,500lb.
   - Position control by Spectra Precision (new model) unit.
   - Drip trays to drain into side channel.
   - Stabilizers to prevent rack sway in up position.
   - Transporter A with dual pickup, transporter B with fixed pitch pickup

2. Load/Unload Stage (Stage 1a – 2b)

   - Positions at 10 feet apart with space for operation access.

3. Soak Clean Tank (Stage 10)

- Tank dimensions: 52” x 144” x 87” (2,600 gal).
- Tank material: 304SS with insulation.
- 4” weir between flight bar positions discharging to sump tank located in the pit.
- Vertical pump circulates solution from sump tank in the pit through oil separator and into sump tank on the mezzanine where solution is being heated by “Firetube” (supplied by Spartan). Solution then returns back to main process tank by gravity. Flow recirculation is also diverted to a sparge system fitted with eductors.

- Water inlet with manually operated ball valve.
- Drain outlet with manually operated ball valve.
- Pneumatically operated tank covers with interlock to prevent flight bar lowering when in closed position.
- Pull ventilation system operated only when auto lids are opened.

4. Electroclean Tank (Stage 12 and 16)

- Tank dimensions: 60” x 144” x 87” (3,000 gal).
- Tank material: 304SS with insulation.
- 4” weir between flight bar positions discharging to off-line sump tank. Eductors located underneath.
- Vertical pump circulates solution from sump tank in the pit through filter chamber and into sump tank on the mezzanine where solution is being heated by “Firetube” (supplied by Spartan). Solution then returns back to main process tank by gravity. Flow recirculation is also diverted to a sparge system fitted with eductors.

- Water inlet with manually – operated ball valve.
- Drain outlet with manually operated ball valve.
- 2 - sets of removable copper anode / cathode rails capable of carrying 7,500A each, fitted with corrugated SS anodes / cathodes. Power connection to the rectifier is the customer’s responsibility while PAL is required to complete the control wiring to the rectifier.
- Pneumatically operated tank covers with interlock to prevent flight bar lowering when in closed position.
- Pull ventilation system operated only when auto lids are opened.

5. Cleaner Spray (Stage 9)
- Tank Dimension: 60” x 144” x 87”
- Tank Material: 25mm polypropylene
- 1 – set of scanning spray system for double flight bar.
- Sump tank dimension: 44” x 44” x 48” (Depth)
- Oil Separator

6. Spray Rinse System (Stage 6, 11, 13, 15, 17 and 18)

- Tank dimensions: 60” x 144” x 87”.
- Tank material: 25mm polypropylene.
- 1 – set of scanning spray system for doulbe fligt bar.
- Off-line water storage tank with 5 sections and 4 counter-flow partitions, each section with a 140gpm circulation pump, pipework and valving to spray rinse manifolds.
- Storage tank dimensions 3.5’ x 4’ x 5’3” (Depth).
- Bottom drain with valving to 5 separate water storage sections.
- See pipework schematic for details.

7. Acid Pickle Tank (Stage 14)

- Tank dimensions 52” x 144” x 87” (2,600 gal).
- Tank material polypropylene.
- 1 – Recirculation pump with return to sparger system with eductors.
- Water inlet with manually operated ball valves.
- Pneumatically operated tank covers with interlock to prevent flight bar lowering when in closed position.
- Pull ventilation system operated only when auto lids are opened.

8. Zinc Plate Tank (Stage 19 - 21)

- Tank dimensions 60” x 144” x 87” (3,000 gal).
- Tank material 25mm polypropylene.
- 4 – sets removable copper anode rails bussed for 3,750A each. Power connection to the rectifier is the customer’s responsibility while PAL is required to complete the control wiring to the rectifier.
- 1 - Recirculation pump on zinc generator with connection returning solution to process tank via filter chamber.
- 1 - Recirculation pump with connections returning solution to zinc generator and to a sparger system with eductors in the process tank.
- Water inlet with manually operated ball valve.

9. Chromate (Stage 7)

- Tank dimensions 52” x 144” x 87” (2,600 gal).
- Tank material 25mm polypropylene.
- Pneumatically operated tank covers with interlock to prevent flight bar lowering when in closed position.
- Pull ventilation system operated only when auto lids are opened.
- 1 - Recirculation pump with connection returning solution to a sparger system with eductors in process tank.

10. Predip (Stage 13)

- Tank dimensions 52” x 144” x 87” (2,600 gal).
- Tank material 25mm polypropylene.
- Pneumatically operated tank covers with interlock to prevent flight bar lowering when in closed position.
- Pull ventilation system operated only when auto lids are opened.

PROCESS SEQUENCE

RACK ALKALINE ZINC PLATING LINE

Transfer	**Stage**	**Process**	**Approx. Immersion Time (Mins.)**
0	1a – 2b	Load	-
1	9	Cleaner Spray	6
2	10	Soak Clean	6
3	11	Spray Rinse	4.5
4	12	Electro Clean	6
5	13	Spray Rinse	4.5
6	14	Acid Pickle (H2SO4)	6
7	15	Spray Rinse	4.5
8	16	E-clean	6
9	17	Spray Rinse	4.5
10	19 - 21	Zinc Plate	22
11	18	Spray Rinse	4.5
12	8	Predip	1-2
13	7	Chromate	1
14	6	Warm Spray Rinse	4.5
15	5	Dry	Max.
16	1a – 2b	Unload	-