

A. STS Automatic Plating Line and Rack Strip Line

Manufactured by Le Surface Treatment Systems (STS) Lausanne, Switzerland

NOTE: Line originally for tin/lead on lead frames. With minimal modifications, line can be used for other applications requiring higher output production.

General Description:

The STS system is a completely self-contained plating unit consisting of freestanding stainless steel structure, chemical and rinse tanks with associated equipment; three (3) automated hoists and computer control system, seven (7) filter chambers with motors, eight (8) Kraft-Dynatronix rectifiers. Its modular design allows rapid installation and permits quick and inexpensive additions to the existing system. Overall dimensions: 756" Long x 105" Front to Back x 115" High

Control of the hoists consists of an automatic, semiautomatic and manual selector switch plus a hoist direction-operating switch.

Manual hoist operation is controlled by console mounted push buttons. The hoist motion corresponds with the push-button pressed.

Program Control:

The computer control is designed for ease of understanding and maximum flexibility, simplicity and safety. The design of the control system enables easy expansion or change as necessitated by present or future requirements.

Programmable functions include lift speed and dwell time in and above the process station. The controller is capable of monitoring process variables: the temperature of process tanks, liquid level DI water make-up, and DI spray duration.

Process Description:

The equipment is totally enclosed creating a positive airflow environment around the equipment.

| Station No | Process Description | <u>Tank Inside Dimensions</u> (L-R x F-B x Deep) | <u>Tank Overall Dimensions</u> (L-R x F-B x High) |
|------------|---------------------|---|--|
| 1 | Load/Unload | | |
| 2 | Load/Unload | | |
| 3 | Load/Unload | | |
| 4 | Load/Unload | | |
| 5 | Load/Unload | | |
| 6 | Load/Unload | | |
| 7 | Load/Unload | | |
| 8 | Load/Unload | | |
| 9 | Load/Unload | | 126" x 48" x 39" |
| 10 | Air Dryer | | |
| 11 | Air Dryer | 26-3/4"x44-1/2"x36" | 38-1/2"x57"x36" |
| 12 | Hot Water Rinse | 13-1/4"x45"x35" | 19-1/2"x52-3/4"x35 1/4" |
| 13 | DCF Rinse | 13-1/4"x45"x35" | |
| 14 | DCF Rinse | 13-1/4"x45"x35" | 34-1/4"x52-3/4"x36" |
| 15 | Alkaline Clean | 13-1/2"x45"x35" | 19-3/4"x52-1/2"x36" |
| 16 | Alkaline Clean | 13-1/2"x45"x35" | 19-3/4"x52-1/2"x36" |

| | | | |
|----|------------------|------------------|---------------------|
| 17 | DCF Rinse | 13-1/4"x45"x35" | |
| 18 | DCF Rinse | 13-1/4"x45"x35" | 34-1/4"x52-3/4"x36" |
| 19 | Acid Dip | 13-1/2"x45"x35" | 19-1/2"x52-3/4"x36" |
| 20 | DCF Rinse | 13-1/4"x45"x35" | |
| 21 | DCF Rinse | 13-1/4"x45"x35" | 34-1/4"x52-3/4"x36" |
| 22 | Acid Dip | 13-1/2"x45"x35" | 19-1/2"x52-3/4"x36" |
| 23 | DCF Rinse | 13-1/4"x45"x35" | |
| 24 | DCF Rinse | 13-1/4"x45"x35" | 34-1/4"x52-3/4"x36" |
| 25 | Acid Dip | 10" x 45" x 35" | 16-1/4"x52-3/4"x36" |
| 26 | DCF Rinse | 13-1/4"x45"x35" | |
| 27 | DCF Rinse | 13-1/4"x45"x35" | 34-1/4"x52-3/4"x36" |
| 28 | Process Tank | 26-3/4"x45"x35" | 33"x53"x36" |
| 29 | Process Tank | 26-3/4"x45"x35" | 33"x53"x36" |
| 30 | Process Tank | 26-3/4"x45"x35" | |
| 31 | Process Tank | 26-3/4"x45" x35" | 59-1/4"x52"x36" |
| 32 | Process Tank | 26-3/4"x45"x35" | |
| 33 | Process Tank | 26-3/4"x45" x35" | 59-1/4"x52"x36" |
| 34 | Process Tank | 26-3/4"x45"x35" | |
| 35 | Process Tank | 26-3/4"x45" x35" | 59-1/4"x52"x36" |
| 36 | Anode Clean Area | 48"x34"x36" | |

Individual Station Description:

| <u>Station number</u> | <u>Description</u> | <u>Size (L/RxF/BxD)</u> |
|-----------------------|---|-------------------------|
| 1-9 | Load/Unload | |
| | <ol style="list-style-type: none"> 1. Stainless Steel Frame 2. Eighteen (18) polypropylene saddles | 126" x 48" x 39" |
| 10, 11 | Air Dryer | 38-1/2"x57"x36" |
| | <ol style="list-style-type: none"> 1. The station is constructed of 316 stainless steel 2. Computer-controlled temperature control of heaters 3. Four (4) Polypropylene saddles | |
| 12 | Hot Water Rinse | 13-1/4"x45"x35" |
| | <ol style="list-style-type: none"> 1. The tank is constructed of fusion welded, stress relieved natural polypropylene 2. Bottom drain 3. DI Water fill line 4. Air agitation spargers 5. Left and Right spray bars with eleven (11) spray nozzles on each side 6. Liquid low level switch 7. Three (3) Process Technology stainless steel heaters 4 Kw each 8. Computer controlled temperature control of heaters 9. Two (2) polypropylene saddles 10. Lateral exhaust arms | |
| 13, 14 | Double Counterflow Rinse | 13-1/4"x45"x35" |
| | <ol style="list-style-type: none"> 1. The tank is constructed of fusion welded, stress relieved natural polypropylene 2. Bottom drain | |

3. DI Water fill line
4. Air agitation spargers
5. Four (4) polypropylene saddles

- | | | |
|--------|---|-----------------|
| 15, 16 | Alkaline Clean | 13-1/2"x45"x35" |
| | <ol style="list-style-type: none"> 1. The tanks are constructed of 304 stainless steel material 2. Both tanks are connected to a one-cartridge 20" long filter chamber with pump. <p>Each tank is equipped with:</p> <ol style="list-style-type: none"> 1. Four (4) Process Technology stainless steel heaters, 4 Kw each 2. Air agitation spargers 3. Liquid agitation spargers 4. DI water fill line 5. Low liquid level switch 6. Bottom drain 7. Two (2) polypropylene saddles 8. Computer controlled temperature control of heaters 9. Lateral exhaust arms | |
| 17, 18 | Double Counterflow Rinse | 13-1/4"x45"x35" |
| | <ol style="list-style-type: none"> 1. The tank is constructed of fusion welded, stress relieved natural polypropylene 2. Bottom drain 3. DI Water fill line 4. Air agitation spargers 5. Four (4) polypropylene saddles | |
| 19 | Acid Dip | 13-1/2"x45"x35" |
| | <ol style="list-style-type: none"> 1. The tank is fabricated of PVC material for chemical resistance 2. Bottom drain 3. Water fill line 4. Air agitation spargers 5. Cooling coil 6. Computer-controlled temperature of the bath 7. Two (2) polypropylene saddles 8. Lateral exhaust arms | |
| 20, 21 | Double Counterflow Rinse | 13-1/4"x45"x35" |
| | <ol style="list-style-type: none"> 1. The tank is constructed of fusion welded, stress relieved natural polypropylene 2. Bottom drain 3. DI Water fill line 4. Air agitation spargers 5. Four (4) polypropylene saddles | |
| 22 | Acid Dip | 13-1/2"x45"x35" |
| | <ol style="list-style-type: none"> 1. The tank is fabricated of PVC material for chemical resistance 2. Bottom drain 3. Water fill line 4. Air agitation spargers 5. Cooling coil 6. Computer-controlled temperature of the bath | |

7. Two (2) polypropylene saddles
8. Lateral exhaust arms

| | | |
|--------|--|-----------------|
| 23,24 | Double Counterflow Rinse | 13-1/4"x45"x35" |
| | <ol style="list-style-type: none"> 1. The tank is constructed of fusion welded, stress relieved natural polypropylene 2. Bottom drain 3. DI Water fill line 4. Air agitation spargers 5. Four (4) polypropylene saddles | |
| 25 | Acid Dip | 10"x45"x35" |
| | <ol style="list-style-type: none"> 1. The tank is constructed of PVC material for chemical resistance 2. Bottom drain 3. DI Water fill line 4. Air agitation spargers 5. Two (2) polypropylene saddles 6. Lateral exhaust arms | |
| 26, 27 | Double Counterflow Rinse | 13-1/4"x45"x35" |
| | <ol style="list-style-type: none"> 1. The tank is constructed of fusion welded, stress relieved natural polypropylene 2. Bottom drain 3. DI Water fill line 4. Air agitation spargers 5. Four (4) polypropylene saddles | |
| 28, 29 | Process Tank | 33"x53"x36" |
| | <ol style="list-style-type: none"> 1. The tanks are constructed of fusion welded, stress relieved natural polypropylene <p>Each tank is equipped with:</p> <ol style="list-style-type: none"> 1. Two (2) Anode bars 2. Bottom drain 3. Two (2) polypropylene cooling coils 4. Computer-controlled temperature of the bath 5. One (1) filter chamber with one (1) 10" long cartridge 6. Bottom mounted liquid spargers 7. Lateral exhaust arms 8. Two (2) bronze saddles 9. One (1) Kraft DC power supply, type SWITCH-Kraft, 200A 6 VDC output 10. DI water fill line | |
| 30, 31 | Process Tank | 33"x53"x36" |
| | <ol style="list-style-type: none"> 1. The tank is constructed of fusion welded, stress relieved natural polypropylene <p>The tank is equipped with:</p> <ol style="list-style-type: none"> 1. Four (4) Anode bars 2. Bottom drain 3. Two (2) polypropylene cooling coils 4. One (1) filter chamber with one (1) 20" long cartridge 5. Bottom mounted liquid spargers | |

6. Lateral exhaust arms
7. Four (4) bronze saddles
8. Two (2) Kraft DC power supplies, type SWITCH-Kraft, 200A 6 VDC output
9. DI water fill line

32,33 Process Tank 33"x53"x36"

1. The tank is constructed of fusion welded, stress relieved natural polypropylene

The tank is equipped with:

1. Four (4) Anode bars
2. Bottom drain
3. Two (2) polypropylene cooling coils
4. One (1) filter chamber with one (1) 20" long cartridge
5. Bottom mounted liquid spargers
6. Lateral exhaust arms
7. Four (4) bronze saddles
8. Two (2) Kraft DC power supplies, type SWITCH-Kraft, 200A 6 VDC output
9. DI water fill line

34, 35 Process Tank 33"x53"x36"

1. The tank is constructed of fusion welded, stress relieved natural polypropylene

The tank is equipped with:

1. Four (4) Anode bars
2. Bottom drain
3. Two (2) polypropylene cooling coils
4. Computer-controlled temperature of the bath
5. One (1) filter chamber with one (1) 20" long cartridge
6. Bottom mounted liquid spargers
7. Lateral exhaust arms
8. Four (4) bronze saddles
9. Two (2) Kraft DC power supplies, type SWITCH-Kraft, 200A 6 VDC output
10. DI water fill line

36 Anode Clean Area 48"x34"x36"

Items included:

1. Single plenum PVC tank ventilation system located in the rear.
2. Computer-controlled temperature control of heaters.
3. Liquid level sensors on all heated tanks.
4. Three (3) complete programmable hoist with manual, automatic and semiautomatic operational capabilities and independent usage at any time.
5. Drip shields between the stations.
6. All plumbing, filtration systems are serviceable from the front and rear of the line.
7. Complete stainless steel enclosure of equipment around all

- stations.
8. A main control panel is included that allows programming of the hoist system for automatic, semiautomatic and manual operation, as well as automatic or manual control for the rectifiers.
 9. One (1) CPU CPS .35 cabinet.
 10. One (1) PC Computer.
 11. Twenty-two (22) flight bars.
 12. Plating Racks.
 13. Fiber-optic cables between the line and control panels.
 14. All tanks requiring ventilation are sized for at least 100 CFM. Ventilation is located next to the longest side of the tank.
 15. Mechanical agitation.

2. Rack Strip Line:

NOTE: This line was originally designed for rack stripping. With minimum modifications, this line can be used for other applications regarding high output production, or can be used in connection with the STS plating line.

General Description:

The STS system is a completely self-contained plating unit consisting of freestanding stainless steel structure, chemical and rinse tanks with associated equipment; one (1) automated hoist and computer control system. Its modular design allows rapid installation and permits quick and inexpensive additions to existing system.

Control of the hoist consists of an automatic, semiautomatic and manual selector switch and carrier direction-operating switch.

Manual hoist operation is controlled by console mounted push buttons. The carrier motion corresponds with the push-button pressed.

Program Control:

The computer control is designed for ease of understanding and maximum flexibility, simplicity and safety. The design of the control system enables easy expansion or change as necessitated by present or future requirements.

Programmable functions include lift speed and dwell time in and above the process station.

Process Description:

The equipment is totally enclosed creating a positive airflow environment around the equipment.

| Station No | Process Description | Tank Inside Dimensions (L-R x F-B x Deep) | Tank Overall Dimensions (L-R x F-B x High) |
|------------|---------------------|--|---|
| 1 | Rack Strip | 17-1/2"x45-1/4"x35" | 24"x52-3/4"x36 |
| 2 | Rack Strip | 17-1/2"x45-1/4"x35" | 24"x52-3/4"x36 |
| 3,4 | DCF hot water rinse | 12"x45-1/4"x35" each | 32"x52-3/4"x36" |
| 5 | Air dryer | 12-1/2"x46-1/4"x35" | 24-1/4"x59"x36" |

| Station number | Description | Size (L/RxF/BxD) |
|----------------|--|---------------------|
| 1 | Rack Strip | 17-1/2"x45-1/4"x35" |
| | <ol style="list-style-type: none"> 1. The tank is constructed of fusion-welded, stress relieved polypropylene with PVC liner for chemical resistance 2. Bottom drain 3. DI Water fill line 4. Air agitation spargers 5. Two (2) polypropylene saddles 6. Lateral exhaust arms | |
| 2 | Rack Strip | 17-1/2"x45-1/4"x35" |
| | <ol style="list-style-type: none"> 1. The tank is constructed of fusion-welded, stress relieved polypropylene with PVC liner for chemical resistance 2. Bottom drain 3. DI Water fill line 4. Air agitation spargers 5. Two (2) polypropylene saddles 6. Lateral exhaust arms | |
| 3, 4 | Hot Water Rinse | 12"x45-1/4"x35" |
| | <ol style="list-style-type: none"> 1. The tank is constructed of fusion welded, stress relieved natural polypropylene 2. Bottom drain 3. DI Water fill line 4. Air agitation spargers 5. Liquid low level switch 6. Two (2) Process Technology stainless steel heaters 4 Kw each 7. Computer controlled temperature control of heaters 8. Two (2) polypropylene saddles 9. Lateral exhaust arms | |
| 5 | Air Dryer | 12-1/2"x46-1/4"x35" |
| | <ol style="list-style-type: none"> 1. The station is constructed of 316 stainless steel 2. Computer-controlled temperature control of heaters 3. Two (2) Polypropylene saddles | |

Items included:

1. Computer-controlled temperature control of heaters.
2. Liquid level sensors on all heated tanks.
3. One (1) complete programmable hoist with manual, automatic and semiautomatic operational capabilities and independent usage at any time.
4. Drip shields between the stations.
5. All plumbing, are serviceable from the front and rear of the line.
6. Complete stainless steel enclosure of equipment around all stations.
7. A main control panel is included that allows programming of the hoist system for automatic, semiautomatic and manual operation.
8. One (1) PC computer.
9. Fiber optic cables between the line and control panel.
10. Mechanical agitation.