SCUBBEX SHD

Two basic models are available: SCRUBBEX-SHD Model 2B with one upper and one lower brush
SCRUBBBX-SHD Model 4B with two upper and two lower brushes
These solid and compact units can be employed for any surface treatment involving the use of abrasive brushes such as scrubbing, deoxidizing, deburring, preparation of solder to fusing, hot-air levelling and solder mask application. Precise adjustment, fast replacement and oscillation of the brushes allow to use any type of abrasive wheel (compact or of abrasive-impregnated bristles) thus ensuring the highest versatility.

FEATURES

- Very solid stainless steel construction,
- Various sequences of brushing/washing steps available
- Quick and precise adjustment and control of brush height and pressure.
- Constant surface speed of brushes irrespective of wear,
- Caliper for quick adjustment of upper back-up rollers.
- Very efficient drying at machine outlet (see leaflet "SHD DRYING").

OPTIONAL EXTRAS:

- Through-hole washing with high pressure water.
- CUPREX, copper separator/water recovery system.
- Fully automatic regulation of brush pressure.
- Fast brush replacement.
- Board alternator
- Board centering device
Brushing machine for printed circuits (see DWG 05076 and 05080).

**General Characteristics:**

* Conveyor width: 660 mm
* Max board thickness: 3.2 mm
* Min. board thickness: 0.3 mm
* Min. board length: 170 mm

**Conveyor system:**
Rubber wheel rollers in the entry conveyor, full rubber rollers in the brushing section, stainless steel rollers with rubber sleeves in all other sections (no cotton sleeves).
Conveyor speed control with D.C. drive motor, potentiometer and digital display.
The machine has a self supporting structure totally constructed in stainless steel.

**Description of working stations (see DWG 05076):**

A. Input conveyor
   - Distance between conveyor rollers: 85 mm
   - Diameter of rollers: 42 mm
   - Board sensor

B. **Brushing chamber**

**One upper oscillating brush with lower back-up roller.**
**One lower oscillating brush with lower back-up roller.**
**Brush rotation with constant peripheral speed of the brushes of 13 m/sec. approximately.**
**Brush oscillation is not synchronous but 180° out of phase in order to avoid stress on the machine.**
**Structure**
**Frequency of oscillation: 280 per minute.**
**Oscillation width: +/- 3 mm (see OPTIONALS for Automatic Brush Pressure Regulation).**
C. First rinsing chamber
The drain of this chamber is shared with the brush section. This water is greatly contaminated with copper and can be greatly decontaminated and totally recirculated with the use of a copper separator "Cuprex" (see OPTIONALS).

D. Second rinsing chamber
This chamber has a separate drain and it is possible to use either city water (at a pressure of 28 - 42 psi) or the High pressure rinse system in partial recirculation (see OPTIONALS).

E. Third rinsing chamber
This chamber has a separate drain. In this section it is also possible to use de-ionized water for a final rinse if required. This water may be recirculated with the Booster Pump and Sump option (see OPTIONALS).

F. One pair of squeegee rollers.

SHD/A DRYING SECTION

Main features:

- High throughput (see relative table for drying capacity with different sample boards)
- High capacity ring blowers
- Lint-free drying (no cotton)
  The drying air is totally filtered before coming into contact with the board surface
- The drier body is totally sealed so that no foreign particles or dust can accumulate inside
  All rollers are rubber sheathed or consist of rubber wheels: no PVA sponge, no cotton sheathings.

G. Two ring blowers 2.2 kW each, with filter at air intake, provide a large amount of air, which is forced through the holes of the board, thoroughly removing all water. The air is heated by friction as it passes through the blowers: the temperature of the air is approximately 90°C.
  This section is equipped with an air exhaust duct with butterfly valve. No blower for exhaust is included.
  Air exhaust: 300 - 500 m3/hour approximately.

H. Final drying with two squirrel-cage blowers and air heated by means of thermostatically controlled heaters.
**I - Board alternator:** this staggers the boards across the entire machine width thereby ensuring even brush wear.

**L - Board** centering device and conveyor to center the boards on machine exit.

**M - Cuprex** - Copper separator/Water recovery system, Centrifuge for the extraction of copper and brush particles. The rinsing water is almost entirely recirculated: consumption is reduced to about 300 l/hour. This small amount of water is filtered through a 50 microns cartridge filter before evacuation. The COPREX requires **virtually no maintenance** which is limited to cleaning.  
- Speed of the centrifuge: 2800 r.p.m.  
- Copper load: 6000 cc  
- Automatic warning for copper load removal  
- Automatic level control  
- Filtration capacity: 80 l/min.  
- Capacity of tank: 70 litres  
- Power supply: 4 kW

### TECHNICAL DATA

<table>
<thead>
<tr>
<th></th>
<th>MODEL 2B</th>
<th>MODEL 4B</th>
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<tbody>
<tr>
<td>Conveyor width:</td>
<td>610 mm (24&quot;)</td>
<td>610 mm (24&quot;)</td>
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<tr>
<td>Conveyor speed: stepless adjustment from</td>
<td>0.1 - 4.5 m/min.</td>
<td>0.1 - 4.5 m/min.</td>
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<tr>
<td>Smallest board length:</td>
<td>170 mm</td>
<td>170 mm</td>
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<tr>
<td>Minimum thickness of boards:</td>
<td>0.2 mm depending on type of brush</td>
<td>0.2 mm depending on type of brush</td>
</tr>
<tr>
<td>Maximum thickness of boards:</td>
<td>4 mm</td>
<td>4 mm</td>
</tr>
<tr>
<td>Noise level (including drying):</td>
<td>below 75 dBA</td>
<td>below 75 dBA</td>
</tr>
<tr>
<td>Water consumption:</td>
<td>50 l/min.</td>
<td>50 l/min.</td>
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<tr>
<td>Water consumption with Cuprex:</td>
<td>300 l/hour</td>
<td>300 l/hour</td>
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<tr>
<td>Power supply:</td>
<td>11 kW</td>
<td>14.5 kW</td>
</tr>
<tr>
<td>Size of machine:</td>
<td>250x150x120 cm</td>
<td>300x150x120 cm</td>
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<tr>
<td>Net weight:</td>
<td>830 kg</td>
<td>1230 kg</td>
</tr>
<tr>
<td>Gross weight:</td>
<td>1100 kg</td>
<td>1500 kg</td>
</tr>
<tr>
<td>Packing dimensions:</td>
<td>280x175x150 cm</td>
<td>325x175x150 cm</td>
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</table>
DESCRIPTION OF STANDARD STATIONS

A - Input conveyor
Consisting of stainless steel rods with rubber wheels. Length: 610 mm.

B - Scrubbing section
The boards are firmly transported by pairs of rollers (2) consisting of a one-piece stainless steel shaft, covered with rubber. Lower backup roller (6) and transport rollers (20) are mounted at a fixed level to give a firm support to the boards.
Upper rollers are spring-loaded while upper backup roller (5) is easily and finely adjustable in height by means of a built-in caliper for compensating different board thicknesses.
A board is used as a gauge, so that its thickness is mechanically transmitted to the back-up roller and no further adjustment or control is necessary. Each brush always works parallel to the workpiece while digital gauges as well as wattmeters provide for easy adjustment and control of brush height and pressure.
Constant surface speed of brushes of about 11 m/sec (42 feet/sec) is ensured by individual motors and automatic compensation during brush wear. Brushes are oscillating at about 260 strokes/min. Stroke width: 6 mm.
Oscillation of upper and lower brush is not synchronous but 180° out of phase in order to avoid undue stress on machine structure.
The unique, oversized, solid and steady brush support assembly combined with a special interlock system between rotation and oscillation movements, avoid any damage to the strong roller bearings and special bushings ensuring their longest life.
Brush shafts are 50 mm (2") in diameter so that all brushes with core 50 mm up and overall diameter up to 125 mm (5") can be mounted.
The well-known three-piece shaft with inner fastening rod makes brush replacement a question of minutes.
Back-up rollers are replaced in the same simple way.
Each brush is sprayed with fan shaped jets on a bar which can be easily removed for maintenance and mounted on either side of the brush so as to allow its rotation in either direction.

C - Rinse section
The transport system in this section consists of heavy stainless steel rollers covered with a rubber sheathing.
The rollers can be easily lifted out of the machine and the sheathings replaced, thus ensuring periodical thorough cleaning and reducing the problem of transfer and impregnation of abrasive copper and rubber particles on to the boards.
This section is divided in three chambers with one spray bar each and fan-shaped nozzles. The boards are squeezed between one chamber and the next while the inclination of the jets to the board surface creates a lateral water flow thus channelling and removing dirt and foreign particles efficiently in each chamber. This ensures an increasing degree of cleanliness from one chamber to the next.

D - Drying section
Very efficient drying of the SHD type (see leaflet "SHD DRYING" for further details). The boards are squeezed by solid rollers covered with absorbing material, water is ejected from the holes by the strong mechanical action of two pairs of "push-pull" air knives with two ring blowers. Final drying is achieved in a further section consisting of pairs of heavy squeegee rollers which are kept warm and dry by a flow of warm air. One squirrel-cage, transversal blower recirculates and heats the air.

OPTIONAL EXTRAS

E - Exit conveyor,
F - High pressure rinse including recirculation tank (16), with overflow (15), high-pressure diaphragma pump (17), 10 HP motor (18), large capacity bag filter on pump intake and special fan-shaped "high-impact" nozzles (19), in staggered position.
This system allows for 1/4 water saving as well as perfect through-hole washing.
Highly recommended when using the SCRUBBEX-SHD for deburring after drilling: the 25 bar (360 p.s.i.) 70 l/min (18 g.p.m-) water jets remove all dust and residues of copper, fiberglass and brush material from surfaces and holes.

G - Automatic brush pressure regulation
Each brush has its own individual motor reduction unit connected to a torque limitation device with which correct working height is established.
The exact working pressure of the brush is obtained by the elaboration of two data: board width and brush motor absorption.
The operator must preset the width of the pieces to be processed and the desired working pressure.
Sensors on the input conveyor detect the arrival of each board and an encoder monitors their position throughout the machine.
As the leading edge of a board reaches a brush, a Programmable Logic Control automatically adjusts brush height to the preset pressure. As soon as the board exits, brush height is maintained, thereby ensuring no Contact with the billy roller. Brush height is altered only in the presence of boards to correct any variation in the preset values and maintain constant pressure irrespective of brush wear and thickness of boards.