Soldering Machine Capacity

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Although the conveyorspeed can be set to 3 m/min., this is in most cases a speed which is much too high for good soldering results.

The throughput of a soldering machine depends on several points.

First of all we need a good solder quality. This is very much depending on the type of board e.g. single sided, double sided or multi-layer board. Also it depends on the lay-out configuration.

Densely mounted boards or boards with SMD's on the solder side, need a lower speed due to the more critical solder drainage at the wave exit. A too high speed may give skipped joints on SMD's and/or solder bridges.

Sometimes the combination between flux and the necessary preheating can limit the conveyor speed. In the Maxi machines we have an extended preheating zone as option available to increase the preheat capacity if required.

A practical setting of the transport speed is in-between 1 - 1.8 m/min. where depending on the board type and lay-out a good solder quality can be obtained. We have also found cases where speeds over 2 m/min. were used, but this is not standard.

Also the maximum amount of boards on the machine conveyor can be a limiting factor. For a Galaxy the tracking system will function with up to 15 boards in the machine. For the other Maxi and Midi machines this amount is limited up to 13 boards. With the necessary minimum board length of 150 mm this is in practice no limiting factor.

The minimum distance between the boards may be zero. In case the wave heights are switched at different settings in the program (e.g. stand-by -work position), the minimum distance must either be zero or larger then 25 mm for single and double wave e.g. larger then 50 mm for the Smart Wave.

Note: If the boards are at zero distance the tracking system sees this as one board. After a throughput of 250 meter of such a "board", there must be a space to reset the tracking system.

The machine throughput can be expressed by the number of boards per hour (N). This depends on the board length (L). The space between the boards (W) and the conveyor speed (v).

This gives $N = 60 \times v : (L+W)$.

The theoretical dwell time(t) depends on the contact length (l) and the conveyor speed (v).

This gives $t = 60 \times l:v$ (seconds). In the formulas l, L and W are expressed in meters and v in meters/minute.

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Example:

The required dwell time is 2 seconds, the length L = 200 mm and the spacing W = 50 mm.

The contact length l = 50 mm. This gives a conveyor speed setting of 60 x 0.05 : 2 = 1.5 m/min.

At this speed 60 x 1.5 : 0.25 = 360 boards per hour can be soldered.

Note: Although the amount of separated boards in the machine is limited, this gives in practice no production limitation. Since in most cases the board length L plus the gap W will exceed 230 mm, since L must be at least 150 mm due to the machine specification.