

Key Parameters for THP-100 DX1 on MASS Hole Plugging Equipment

Critical Parameters

Head Pressure: Adjustment for the amount of force (in PSI) used to compress the O-ring and seal the heads to the panel. The greater the head pressure, the less squeeze out of paste.

Paste Pressure: Pressure (in PSI) which controls the amount of force used to push the paste to the head and through the panel; the higher the Paste Pressure, the greater the fill.

Traverse Speed: This is the speed (in %) which the head moves down the panel. The slower the traverse, the longer the head is over any given group of holes and greater the fill.

Delay Time to Fill: This is the time (in seconds) which the paste pump will pump before the heads begin to move down the panel. Makes sure head is pushing paste through the panel before the head begins to traverse downward.

Vacuum Chamber ON: Value used (in PSI) to turn the vacuum pump on.

Vacuum Pump OFF: Value used (in PSI) to turn the vacuum pump off. Vacuum is usually used only when filling Blind Vias.

Typical Starting Values

Head Pressure	Paste Pressure	Traverse Speed	Delay for Fill	Vacuum ON	Vacuum OFF
5 psi	25 psi	15%	4 seconds	7 psi	10 psi

- Head Pressure is usually set to almost 2x the Paste Pressure to control the amount of paste which can escape around the head while filling panels. Too much Head Pressure will cause the O-Rings to wear faster.
- Paste Pressure has greatest impact on filling holes. Adjust in 5 psi increments. Use in conjunction with Traverse Speed to make sure all holes are filled. Increasing Paste Pressure will waste more material but on some high aspect ratio jobs, it is the only way to insure complete fill.



- **Traverse Speed** – Adjust in 5% increments. The slower the % speed, the longer the head is over the holes and pushing the paste through. Can negatively affect throughput, but will insure increased fill with less paste use. If very high aspect ratio holes or debris is present in some holes causing partial blockages, you will need to increase Paste Pressure as well as reduce Traverse Speed.
- **Delay for Fill** – Adjust in 1 second increments. This is the amount of time the paste pump is pumping paste through the top edge of the panel, before the print head begins to traverse down. If you see the majority of incomplete filled holes along the top edge of the panel, start increasing the delay. Some older machines can only delay up to 5 seconds.

Fill Head:

You have the option to fill from either the front or rear head. The two heads are offset to each other so the O-Rings do not line up front to back. Fill from the rear head if you have good planarization equipment. Filling from the rear head will allow the paste to come out of the front side of the panel after the O-Ring has moved over the holes and eliminate the possibility of dishing the paste out of the holes with the front O-Ring. Most shops fill with the rear head. Filling from the front head will allow the rear O-Ring to scrape more paste from the surface of the panel, making it easier to hand sand. Filling from the front head can cause dish downs, especially if the panels are not button plated.

Steps to get complete hole fill:

1. Use typical start values above.
2. Make sure air is out of the lines before running first panel. Inspect for complete fill.
3. If majority of under filled holes are along the top of the panel, increase Delay Time to Fill using 1 second increments until leading edge holes are filled, or you reach the maximum delay for the machine.
4. If under filled holes are throughout the panel, reduce Traverse Speed in 5% increments until holes are completely filled or you reach 5% Traverse Speed.
5. If under filled holes remain, increase Paste Pressure in 5 psi increments. This will have the greatest impact on complete fill but will also waste more material. You can reduce the paste squeeze out by increasing Head Pressure.

Thermal Cure:

Step Cure versus 1 Step Cure. Many shops are set up already to do a step cure with at least one bake around 45 minutes at 130°C before ramping up to 150°C for 60 minutes. However, as shops begin to plug larger via holes (.035" and above), we have found the need to eliminate the pre-cure bake and go directly to the 150°C cycle to keep the paste from running out of the large holes. If skipping the first bake, increase dwell time of the 150°C bake by at least 30 minutes