

Precision Devices, Inc. RoHS Compliance

The European Commission has proposed the Restriction of Hazardous Substances (RoHS) Directive, limiting certain hazardous substances in electrical and electronic products sold in Europe after July 1, 2006.

Precision Devices, Inc. (PDI) maintains a design and manufacturing control program for the output of "Lead-Free" (Pb-Free) products. The program is in accordance with European Union (EU) Legislation: Restrictions on Hazardous Substances (RoHS) banning the use of lead (Pb) after July 1, 2006.

Presently Precision Devices, Inc. supports both lead-based (SnPb) and lead-free (Pb-free) product requirements.

Products applicable to this declaration include and are not limited to crystal products in custom and SMD packages including Quartz Crystals, Crystal Filters and Crystal Oscillators (Clock Oscillators, VCO, VCXO, TCXO, OCXO etc.)

All lead-free (Pb-free) design and manufacturing guidelines utilize Pb-Free technology per J-Std-006 (JEDEC/IPC): 0.1w percent. PDI procures raw materials which withstand lead-free soldering and elevated reflow temperatures. This includes internal components that are assembled with lead-free solder, lead-free pads and terminations. The Pb-Free solder alloy used in design and manufacturing consists of 96.5Sn/3.0Ag/0.5Cu (tin, copper, silver). A solder liquidous melting range of 215-218° C (419-424° F) is required. Figure 1 outlines the desired temperature reflow profile for proper utilization.

Figure 1. Pb-Free Solder Reflow Profile.

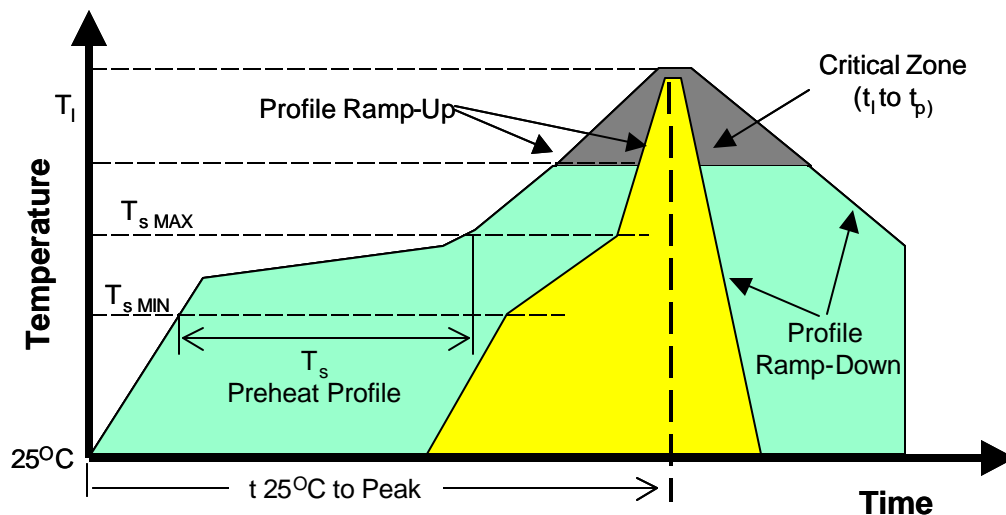


Table 1. Reflow Profile Legend.




Symbol	Description	
$T_{s\ MIN}$	Minimum Temperature	 Preheat Zone Temperature
$T_{s\ MAX}$	Maximum Temperature	 Alloy Liquidous Zone
T_s	Time From Minimum to Maximurr	 Part Temperature
T_l	Temperature At Liquid State	
T_p	Preheat Temperature	
t_p	Ramp-Down Temperature	
t_l	Time Above Liquid State	

Table 2 has been extracted from the JEDEC standard (IPC/JEDEC-STD-020B), and is used as a design and manufacturing guideline for product compliance. All major product families have been tested and verified in accordance with the specified Pb-free solder reflow assembly profiles.

Table 2. Precision Devices, Inc. Pb-Free Reflow Compliance Table.

Pb-FREE REFLOW PROFILES (Pb-Free Product Compliance Table)		
Feature	Large Body	Small Body
Avg. ramp-up rate (Tl to Tp)	3C/sec. max.	3C/sec. max.
Preheat:		
Temperature Min. (T _{smin})	150C	150C
Temperature Max. (T _{smax})	200C	200C
Time (min to max) (T _s)	60-180sec.	60-180sec.
T_{smax} to Tl:		
Ramp-up rate	3C/sec. max	3C/sec. max
Time above:		
Temperature (Tl)	217C	217C
Time (tl)	60-150 sec.	60-150 sec.
Pre Temperature (Tp)	245 (-5) C	250 (-5) C
Time within 5C of actual Peak	10-30 sec.	20-40 sec.
Temperature (tp)		
Ramp-down Rate	6C/sec. max.	6C/sec. max.
Time 25C to Peak Temperature	8 minutes max.	8 minutes max.

Precision Devices, Inc. does not maintain a separate part number listing for designate Pb-Free products. Upon order placement, products will be designated for Pb-Free production as appropriate and packaged accordingly. All applicable Pb-Free product packages are marked with a small "Pb" within a circle with a slash indicating RoHS compliance (see figure 2).

Figure 2. RoHS Compliance Label Used by Precision Devices, Inc.



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