RPI — Reflow Process Index

KIC®
RPI™

Production Details

Product Name	:pcb assembly-1
Production LotID	:KIC 002 XYZ
Board Count	:7
Oven Name	:Line B
Process Window	:Lead free paste 2
Production Start Date	:14/10/2011 16:24
Production End Date	:In Progress

♦ Process traceability for each PCB
♦ Management data for reflow quality and throughput
♦ Reduced production cost
♦ Measuring process quality — independent of equipment, personnel and location
♦ Automated continuous profiling
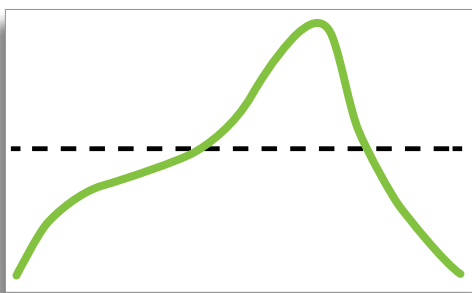
Managing the Ultimate Reflow Oven Output

A reflow oven is a very busy machine striving to control multiple variables while heating and cooling PCBs. The purpose of the oven, however, is very simple.

A.   To create a specific PCB profile
B.   To maintain required throughput.

The KIC RPI optimizes both of these outputs while sharing the data on a continuous basis with the authorized personnel.

Features

- The RPI utilizes embedded sensors for heat and conveyor speed to automatically measure and display the following information:
- PCB profile
- Profile's "fit" to the process window
- Continuously displayed production details
  - ♦ #PCBs produced
  - ♦ Product name and lot ID
  - ♦ Production date and time stamp
  - ♦ Oven name
- PCB process traceability
- SPC & Cpk charts
- Statistics of defects and process yields
- Pareto chart on out of spec occurrences

The RPI features include:
- Profile optimization software
- Barcode reading software
- Remote Process Monitoring software
- Alarm Relay
- Light Bar

Fail-Safe Operation

- There are numerous opportunities for mistakes and defects to occur in the reflow process. Human errors include loading the wrong oven program or loading the wrong PCBs. The RPI's bar code capability prevents such mismatch.
- Another common defect occurs when the process drifts out of spec or out of control. The RPI will immediately alert the responsible personnel of such occurrences and can shut down the infeed conveyor if desirable.
- SPC charts will alert the engineer of upcoming trouble, typically when the reflow oven is still operating within spec.

Bottom Line

The RPI indexes the single most important output of a reflow oven, namely how well the profile conforms to the required spec. This index is independent of type of oven, PCB type, personnel, and even geographical location. The profile index along with yield and production data is shared with the responsible personnel in such a way that the production ovens can maintain an efficient operation. The RPI is designed to improve production quality by ensuring that each and every PCB is processed in spec. The RPI will reduce cost through improved uptime, reduced scrap and rework, and minimize labor input.

KIC ON BOARD

KIC® *Innovation That Works*™

CALCULATING FORMULAS

Calculating Opportunities, DPMO and Yield

Total Opportunities
Number of Boards × Number of TC Points × Number of Profile Specs = Total Opportunities
(2 × 5 × 5 = 50)

DPMO
Number of Total Errors ÷ Total Opportunities × 1,000,000
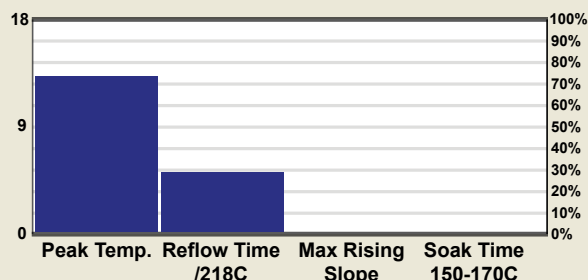(4 ÷ 50 × 1,000,000 = 80,000)

Yield
100 ÷ Number of Boards × Number of Boards with Errors = % of Error. 100% - % of Error = Yield

■ **Index Results**

Reflow DPMO	**=**	**10714**
Reflow Yield	**=**	**95.71%**
Reflow Cpk	**=**	**-0.11**

■ **Defects Pareto Chart**

Peak Temp. /218C | Reflow Time | Max Rising Slope | Soak Time 150-170C

■ **Index Details**

Number Of Boards Processed	**=**	**70**
Number Of TC Used	**=**	**6**
Number Of Profile Specification	**=**	**4**
Total Error Of Opportunity	**=**	**1680**
Number Of Statistic Error	**=**	**18**
Number Of Boards With Error	**=**	**3**

Data acquisition unit/Probes

Accuracy: ....±1.2°C
Readings/second:...................13
Thermocouples:......................Type K
Temperature Range: ....-150°C to 450°C
Dimensions:
    Data acquisition unit (LxWxH):
    308.6mm x 173.5mm x 35.8mm
    Probes:............................length and thermocouple spacing is customized to each oven
Communications:...................Ethernet, RJ-45 connector
Computer Capability: ....PC
Power Requirements:.............12V DC @ 300mA

RISK-FREE GUARANTEE

All KIC products are designed to give maximum value and fast payback by streamlining your thermal process. Investment in a KIC product is a step toward total process control and quality management. All KIC products come with a no questions asked, 30-day money back guarantee.

RPI SYSTEM

System Components

Two (2) thermocouple probes (each probe has 15 thermocouples)
1 ea. data acquisition unit
1 ea. speed encoder
1 ea. board sensor
1 ea. alarm relay
1 ea. light tower
1 ea. KIC RPI software with software protection dongle

Note: The RPI requires a KIC profiler.

■ **PWI & Cpk Chart**

COMPUTER CONFIGURATION

Minimum System Requirements

Dual Core / 1 GHz Processor PC with 2 GB RAM
2 GB available storage
Video 1024 x 768 resolution / 16-bit
1 available USB port (for data download)
1 available USB port (for software key)
1 available Ethernet port or 1 available USB port with Ethernet to USB

Visit our website at http://kicthermal.com/support-download/os-compatibility-chart for product compatibility with Windows operating systems.

**Note: 2 additional powered USB ports may be needed for optional accessories

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