

Pioneer



Pioneer
sound. vision. soul

PIONEER TECHNOLOGY PORTUGAL, SA

CONTENT:



- Company Profile
- Products
- Environmental System
- Lead Free Solder +
Low VOC Flux

Company Profile

- Foundation Date: 28 June 1995
- Main Activity: Car Stereo Manufacturing
- Production Qty/Year: 804 000



PARQUE INDUSTRIAL DO SEIXAL

- Employees = 447
 - 73 % 
 - 27 % 
- Average Age = 29

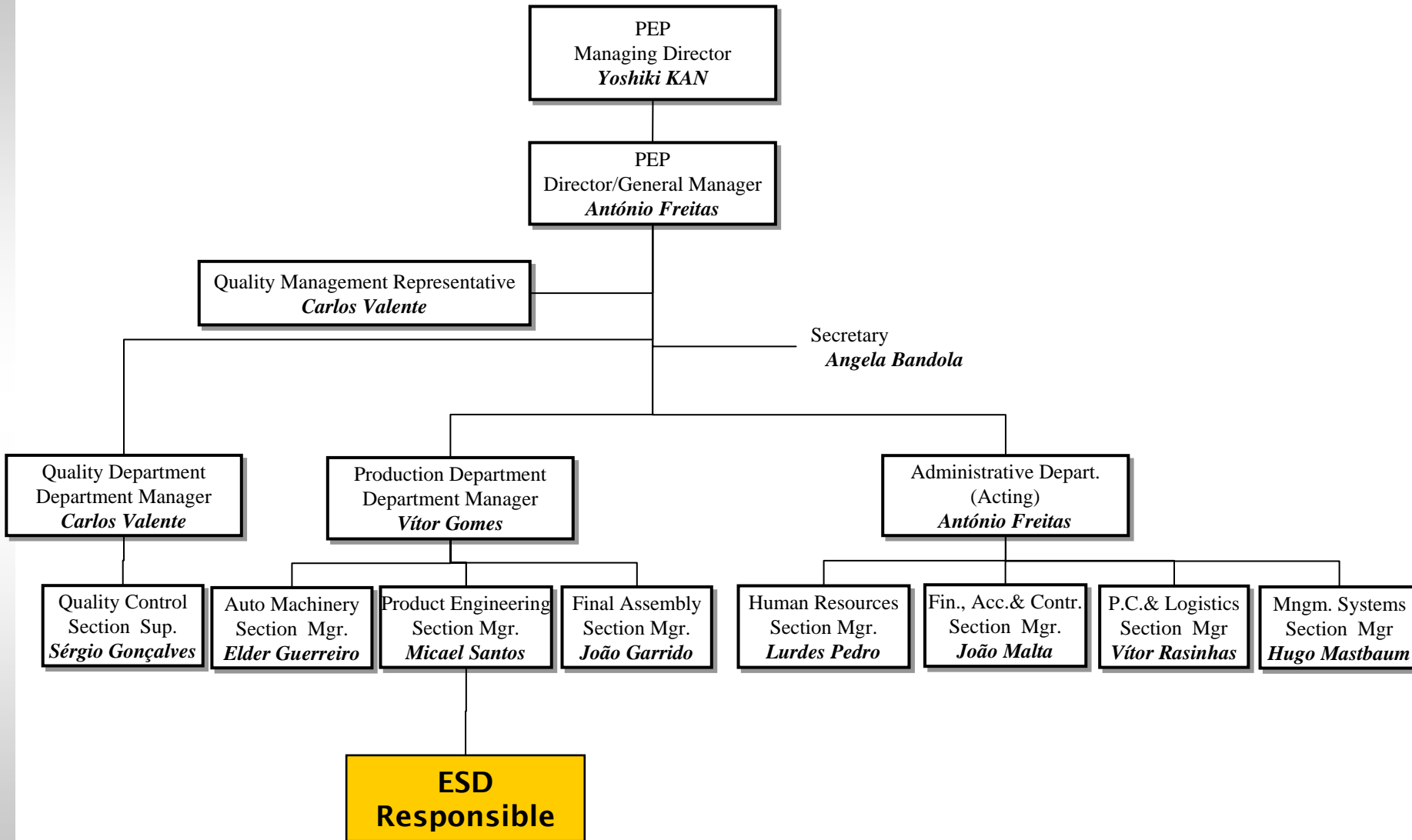
⌘ Company FOUNDATION	JUNE 28, 95
⌘ CONSTRUCTION start-up	NOVEMBER 2, 95
⌘ CAR STEREO PRODUCTION start-up & ramp-up to 360 K/year in 2 shifts operation	APRIL 3, 96 ~ SEPTEMBER, 96
⌘ S6 CD MECHA Inspection & Test start-up	MAY 22, 96
⌘ ASSY LINE 2 installation, and move to 1 shift operation	MARCH 31, 97
⌘ CAR STEREO Production EXPANSION up to 760K/year, and ASSY LINE 3 installation	APRIL 1, 98 ~ MAY 4, 98
⌘ S7 CD MECHA After Market / OEM PRODUCTION start-up	MAY 25, 98 / SEPTEMBER 1, 98
⌘ CAR STEREO Production REDUCTION (2 ASSY LINES shut-down)	FEBRUARY 18, 99 / AUGUST 28, 99
⌘ S7 CD MECHA produced in Japan INSPECTION (re)start and TUNER X298 PRODUCTION start-up	SEPTEMBER 99
⌘ Introduction of FLEX CELLS	APRIL, 00
⌘ CAR STEREO OEM MASS PRODUCTION start-up	SEPTEMBER, 00
⌘ ESD Protection Project (75V->50V)	APRIL, 01 ~ MARCH, 03
⌘ (Short) ASSY LINE 6 installation	MAY, 01
⌘ 3rd PARTY BUSINESS start-up	JANUARY, 02
⌘ LEAD-FREE SOLDER introduction	SEPTEMBER, 02
⌘ LOW VOC FLUX introduction	SEPTEMBER, 02
⌘ Expansion from 700k to 1.5M CD Mecha/Yr	MARCH, 04
⌘ Full change from CT to Cell lines	MARCH, 04 ~ OCTOBER, 04



QUALITY Milestones

⌘ <u>ISO 9002 CERTIFICATION</u>	DECEMBER, 97
⌘ <u>ISO 14001 CERTIFICATION</u>	NOVEMBER, 99
⌘ <u>QS 9000 CERTIFICATION</u>	JULY, 00
⌘ Ready <u>ISO TS 16949</u> (Ref.ISO 9000:1994)	JULY, 01
⌘ <u>OHSAS 18001 CERTIFICATION</u>	APRIL, 02
⌘ <u>CS MANAGEMENT AWARD</u>	MAY, 02
⌘ <u>ISO TS 16949:2002 COMPLIANCE</u>	SEPTEMBER, 02
⌘ <u>Global ISO TS 16949:2002 CERTIFICATION</u>	DECEMBER, 02
⌘ <u>"LIFE" MANAGEMENT AWARD</u>	MAY, 03
⌘ <u>"LIFE" MANAGEMENT AWARD (PEM/PEP)</u>	MAY, 04

(Line Management)

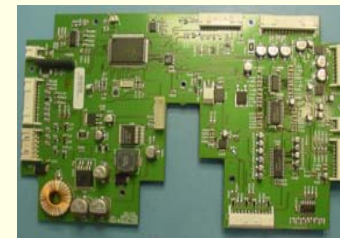
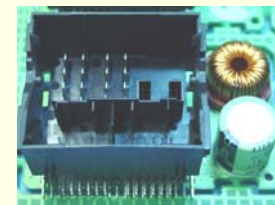
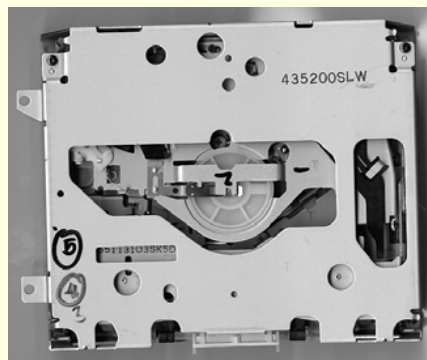


Products

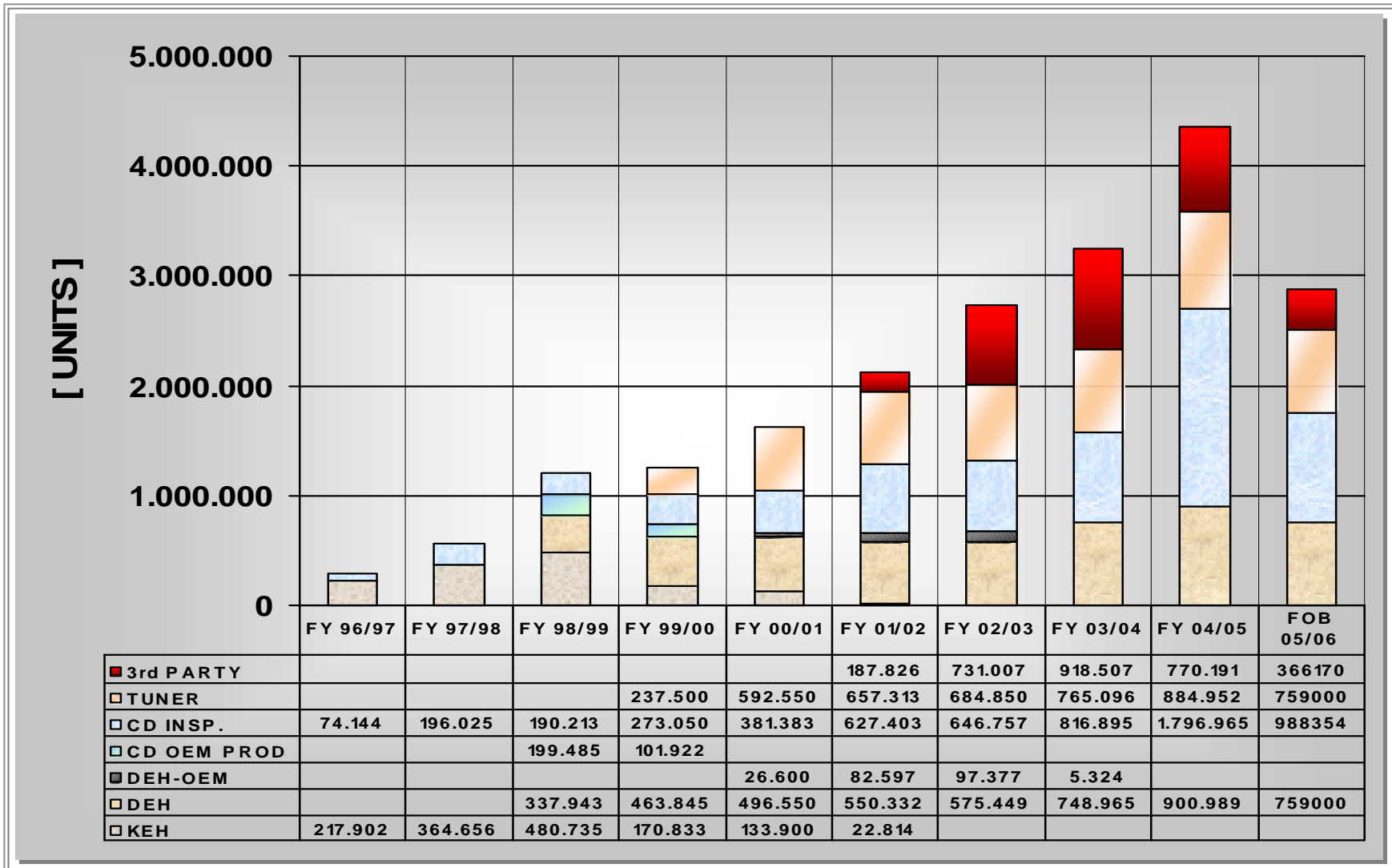
AFTM



OEM



PRODUCTS & LOAD



Environmental System

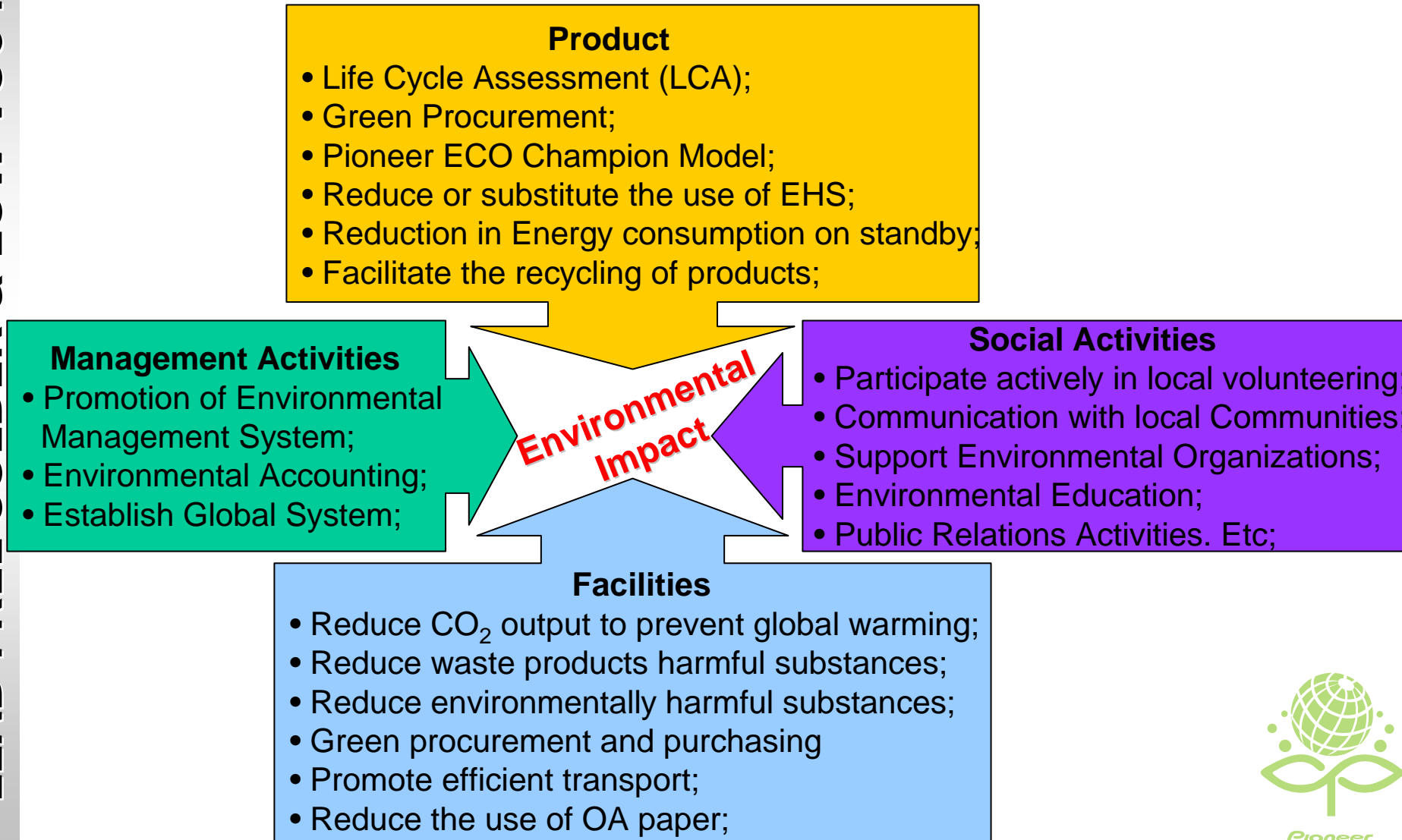


Basic Policies of Environmental Preservation

- 1. Compliance with Laws and Regulations;**
- 2. Preservation of Environment;**
- 3. Development of Environment-Friendly Products;**
- 4. Management by Goals;**
- 5. System Promoting Environment Protection;**
- 6. Training;**
- 7. Continuous Improvement;**
- 8. Disclosure and Communications;**



Pioneer's Focus for Environmental Preservation



Introduction Lead Free Solder (2004) - Pioneer Products



Plasma Display

97 %



Car Stereo

86 %



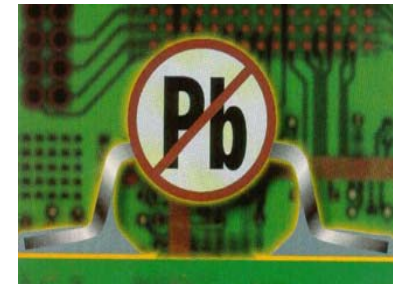
Cordless Phone
Answering Machine

85 %



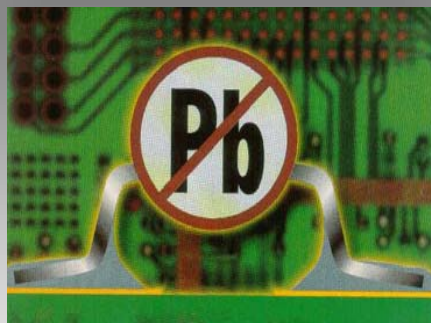
DVD / CD Writer

100 %





LEAD FREE INTRODUCTION



LEAD FREE SOLDER + LOW VOC FLUX

Solder Alloy -- Sn 3.0Ag 0.5Cu



NEW SOLDER MACHINE



PEP INTRODUCTION - AFTER MARKET

- | | |
|-----------|----------------|
| Machine 1 | - September 02 |
| Machine 2 | - November 02 |
| Machine 3 | - January 03 |
| Machine 4 | - May 03 |

Investment - 75000 Euros / Machine



PRODUCTION IMPACT – NEW PROCESS

↪ LEAD FREE: POSITIVE

- Solder compounds are stronger – Lead was removed;
- Toxicity decreases;

NEGATIVE

- Cost price – Silver & Copper are more expensive;
- Melting temperature is higher – components specification constrains;
- Behaviour of solder is different – solder joints formation is more difficult;
- Outlook difference – more granular surface instead of glittering surface
- Special Tools, Titanium Bolts and synthetic anti-warping board jig due to lead free solder density – lighter;



Visual Inspection Standard – Pb Solder



Visual Inspection Standard – Pb Free Solder



Anti-Warping Jig



Special Screws – Solder Wave



PROCESS CONTROL

↪ Solder Analysis:

* 4 Times / Year: YTD Results
Trend Analysis

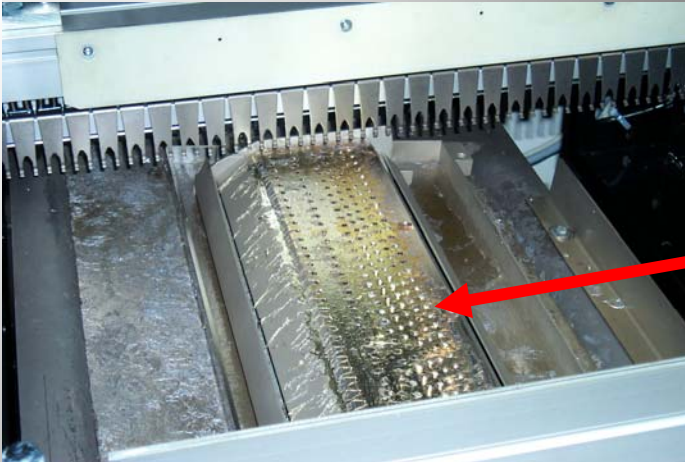
* Critical Elements

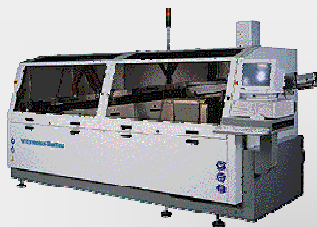
- Pb → Soldering Quality / Legislation
- Fe → Eroding of Solder Machine parts
- Cu → Soldering Quality



OXIDES LEVEL

↪ Usage of Combined Wave in order to avoid Nitrogen application regarding Oxides reduction – Dross formation;





Lead Free Alloy on Wave Soldering Machines



↪ No direct (short term) impact for damage (corrosion) of the solder pot or vital components.



Solder Pot



Solder Wave



Pump Impeler

The parts of the solder pot are covered with hard resin (colophonium), coming from the flux.

This resin forms a hard to remove layer on the walls & the other parts of the wave

Positive effect : Protective layer for protection of the solder pot;

Negative effect : Forms a thermal barrier between solder & heating elements positioned at the outside of the solder bath;



PRODUCTION IMPACT – NEW PROCESS



↪ LOW VOC FLUX:

POSITIVE

- Solvent emissions in the environment decreases;
- Fire risk decreases;
- Storage & transportation becomes easier;
- Less flux consumption;
- Density control operation avoided;

NEGATIVE

- More energy to evaporate water compared with alcohol;
- Corrosion level higher on Boards / Components leads;
- Process window smaller – sensitive components;
- Process control of flux become more complex;
- Process Change – Foam to Spray application;



PRODUCTION IMPACT – NEW PROCESS



↪ **HAND SOLDERING:**

POSITIVE

- Toxicity decreases;



**Solder Bit – 20000 op.
SnPb Solder**



**Solder Bit – 10000 op.
Pb Free Solder**

NEGATIVE

- Cost price – Silver & Copper are more expensive;
- Melting temperature is higher – components specification constrains / New Solder Station (80 Watts) and Solder Bit size required – Heat Transfer;
- Behaviour of solder is different – solder joints formation is more difficult – Additional Training for certified operators;
- Outlook difference – more granular surface instead of glittering surface;
- Life time of Solder Bit is shorter with lead free alloy due to tin eroding function on other metals;



LEAD FREE SOLDER PASTE



NEW REFLOW OVEN



PEP INTRODUCTION - AFTER MARKET

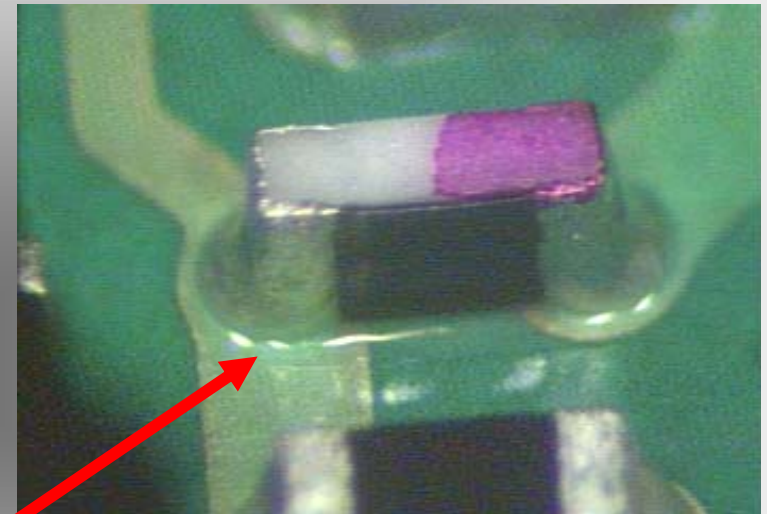
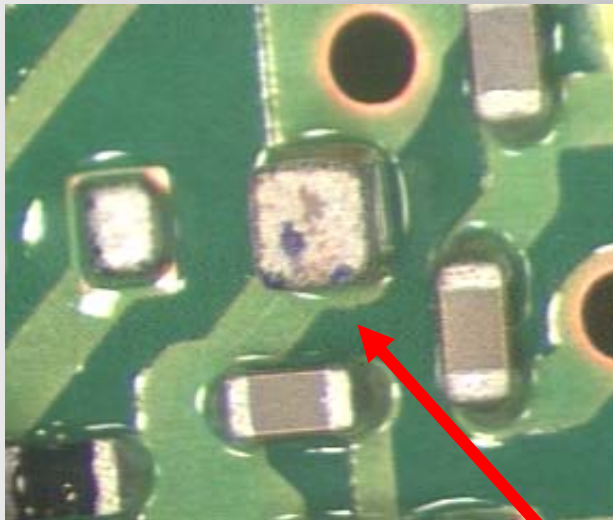
- | | |
|------------|---------------|
| SMT Line1 | - January 04 |
| SMT Line 2 | - January 04 |
| SMT Line 3 | - November 04 |





PRODUCTION IMPACT – NEW PROCESS

↪ Soldering Quality:



Tombstoning Effect

Tombstoning Defects on 1608 / 1005 components due to placement misalignment – Machine coordinates adjustment under new temperature profile;





PRODUCTION IMPACT – NEW PROCESS

↪ Layout Constrain – SMT Line – Reflow Oven:



New Reflow Oven is bigger than previous machine – Additional 2 Heating Zones → Layout modification in order to fit complete SMT Line on the production process;





PRODUCTION IMPACT – NEW PROCESS

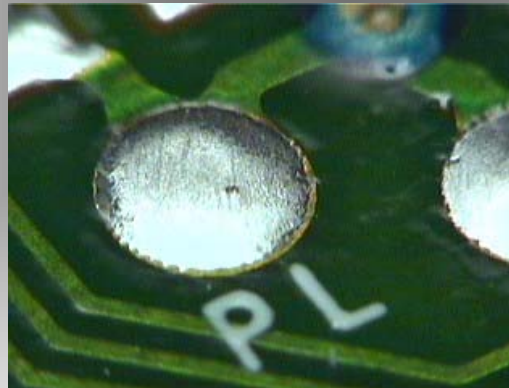
↪ GENERAL – ICT Test Stage:

NEGATIVE

- The impression in the lead containing alloy is much deeper than the lead free ally due to stronger solder connection;
- Measurements of low voltage components (jumpers, coils and resistors smaller than 10 Ohm);
- False defects due to reduced contact surface between test needle and contact point;



SnPb Alloy



SnAgCu Alloy



Crown Test Pin



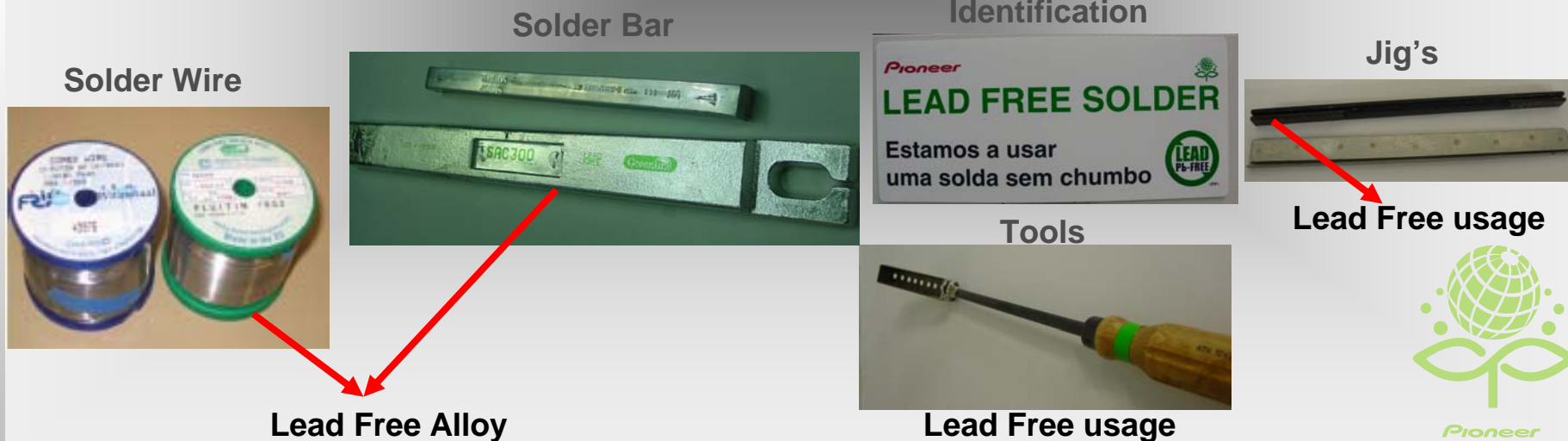
PRODUCTION IMPACT – NEW PROCESS

↪ Co-existing Lead Free & Lead Contained Solder



In order to avoid Solder Bath Contamination:

- Give exclusive use of Tools, Jig's, Equipment and Inspection devices;
- Assure clear identification above mentioned facilities;
- Identification of Products on Repair Stage;
- Give necessary training to the involved staff;
- Develop a verification system to monitor the production process;



RESOURCES / TIMING FOR LEAD FREE START UP



WAVE SOLDERING

- 1999 Data Collection – Alloy's and Process Impact;
- 2000 Study Technical / Financial Impacts;
- 2001 Negotiations with possible Suppliers / Tryout's
- 2002 Design of Experiments / Reliability Test / Flux and Solder Alloy Approval / Project Implementation

Resources: 4500 man hours



REFLOW SOLDERING

- 2003 Tryout Approved Solder Paste
- 2004 Design of Experiments / Reliability Test / Project Implementation

Resources: 1500 man hours



Pioneer

Thank you.