

Lead Free

Soldering

Situation in Spain

Objectives of the study

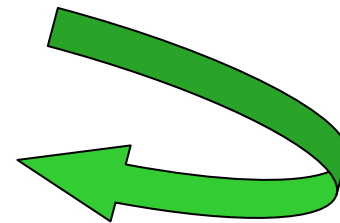
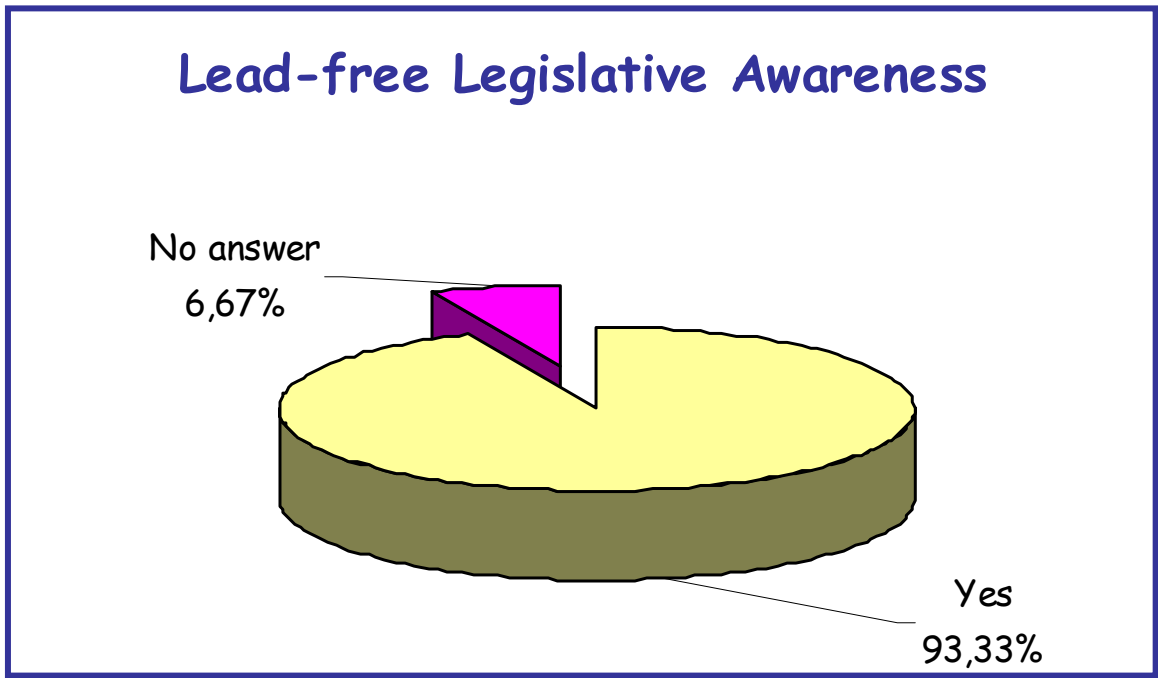
- To determine of the awareness level of Spanish SMEs on the legislative changes
- To determine the concerns of Spanish SMEs on the requirements for changeover to LFS
- To identify the soldering needs of Spanish SMEs to allow them to comply with the legislation.

Methodology

- Questionnaire of 6 main questions about technical and environmental aspects in LFS implementation.
- AETIC (Spanish Association of Industries of Electronics & Telecommunication) has distributed the questionnaire to their associated members (electronic components, assemblers, etc).
- Responses were collected between Dec. 2004 to Feb 2005
- A total of 30 companies participated in the study, all of them SME's.
- Questionnaire was sent to the associated companies via e-mail or FAX.

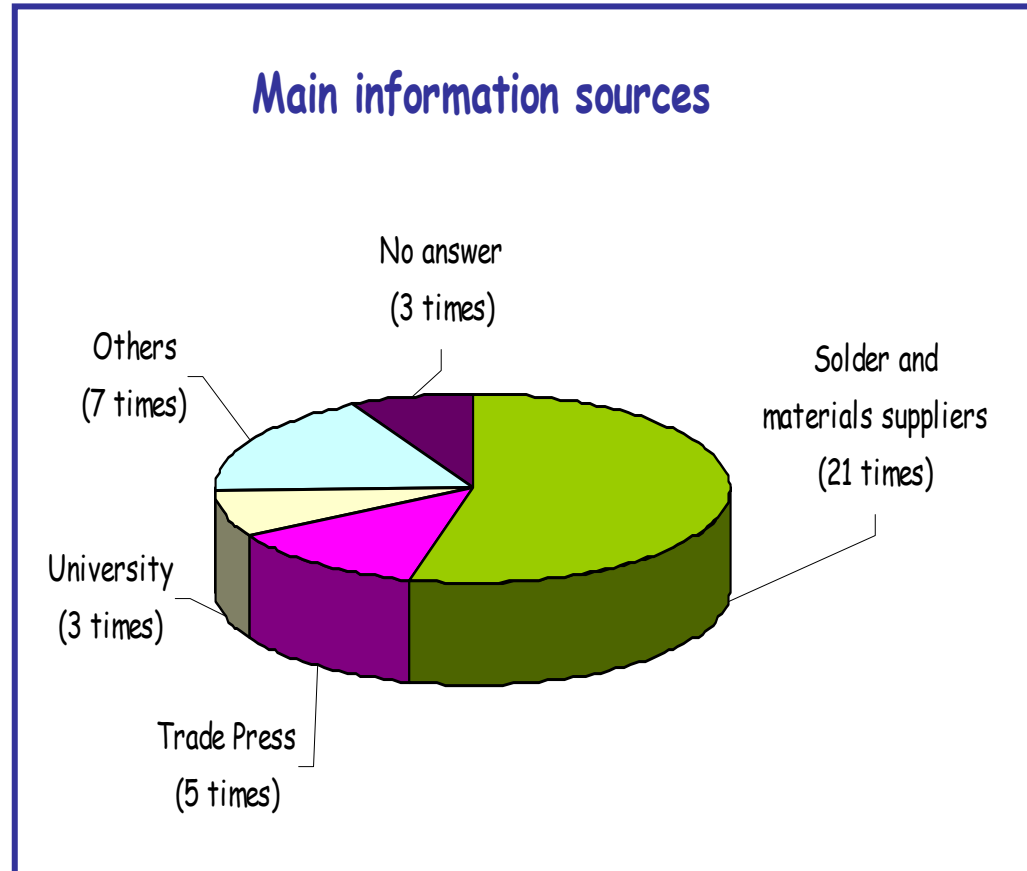
1. Legislation Awareness

A great majority of the SMEs (93%) are well informed of the RoHS legislative requirement.



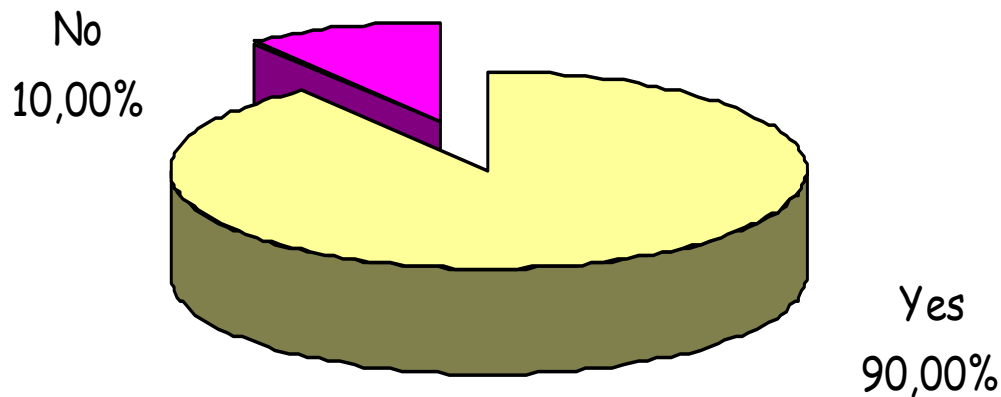
2. Main information sources of RoHS - LFS

- 70% of the companies know about lead free from their solder and material suppliers,
- 16% get this information from Trade Press and 10% from Universities.
- 23% choose “others” as information sources: other companies, customers, internet, workshops and seminars and fairs and shows,...
- 10% did not answer.



3. Implementation of LFS

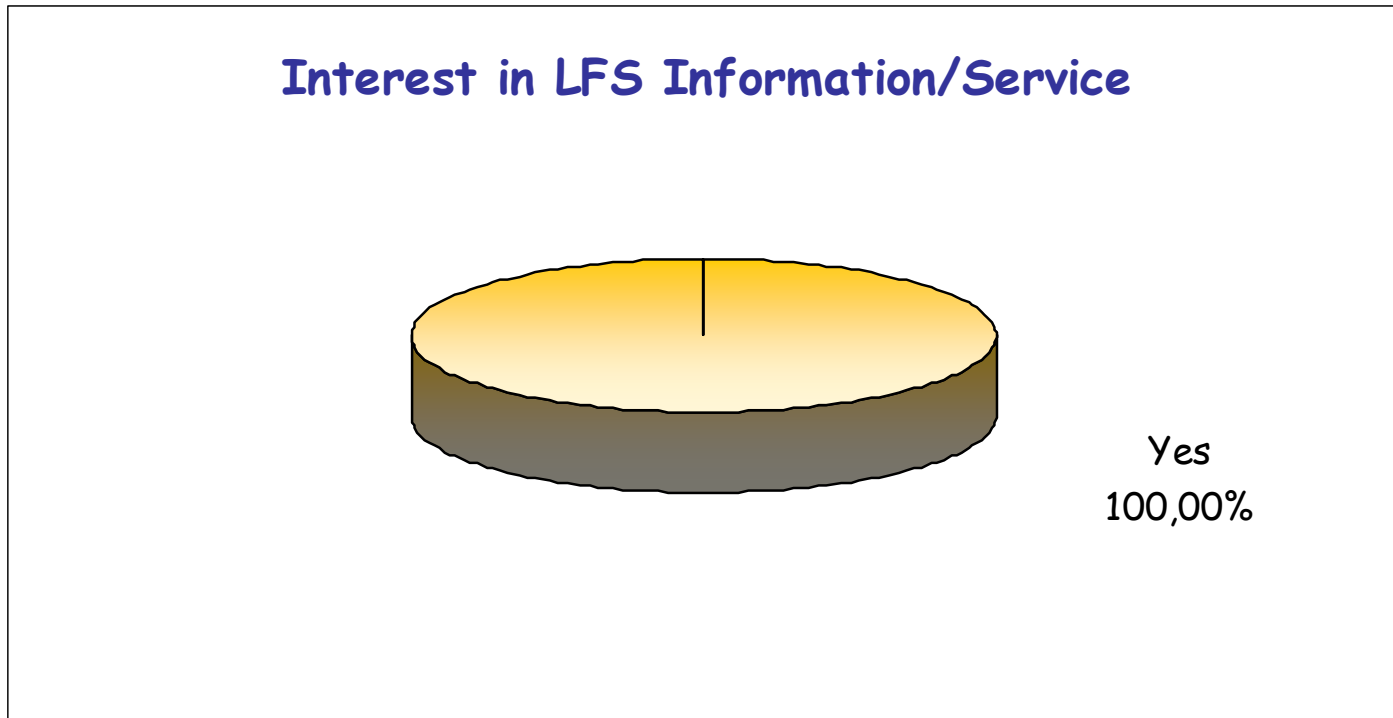
Stage of LFS Implementation



- 27 companies (90%) started to implement lead free soldering processing.
- 3 still didn't (10%)

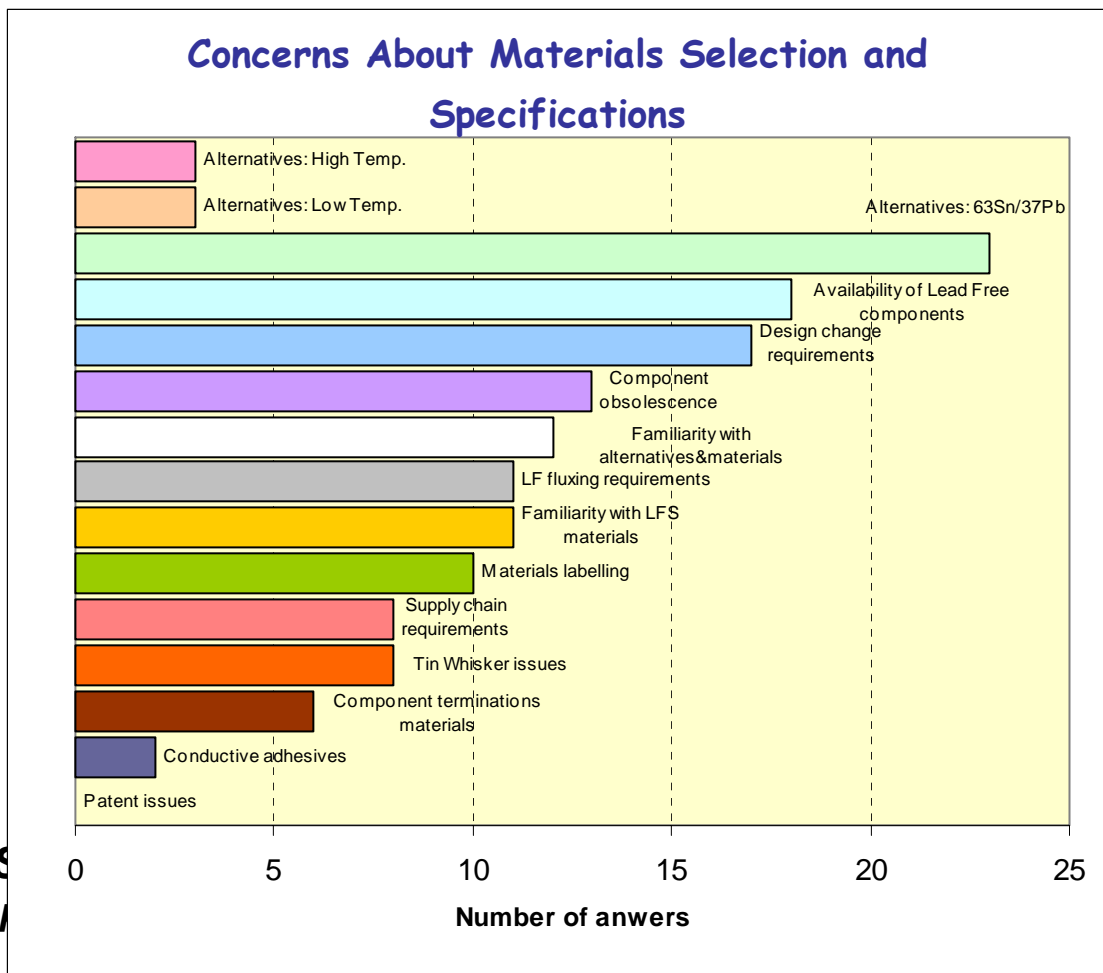
4. Interest in LFS Information/Service

100% of companies answered "yes"



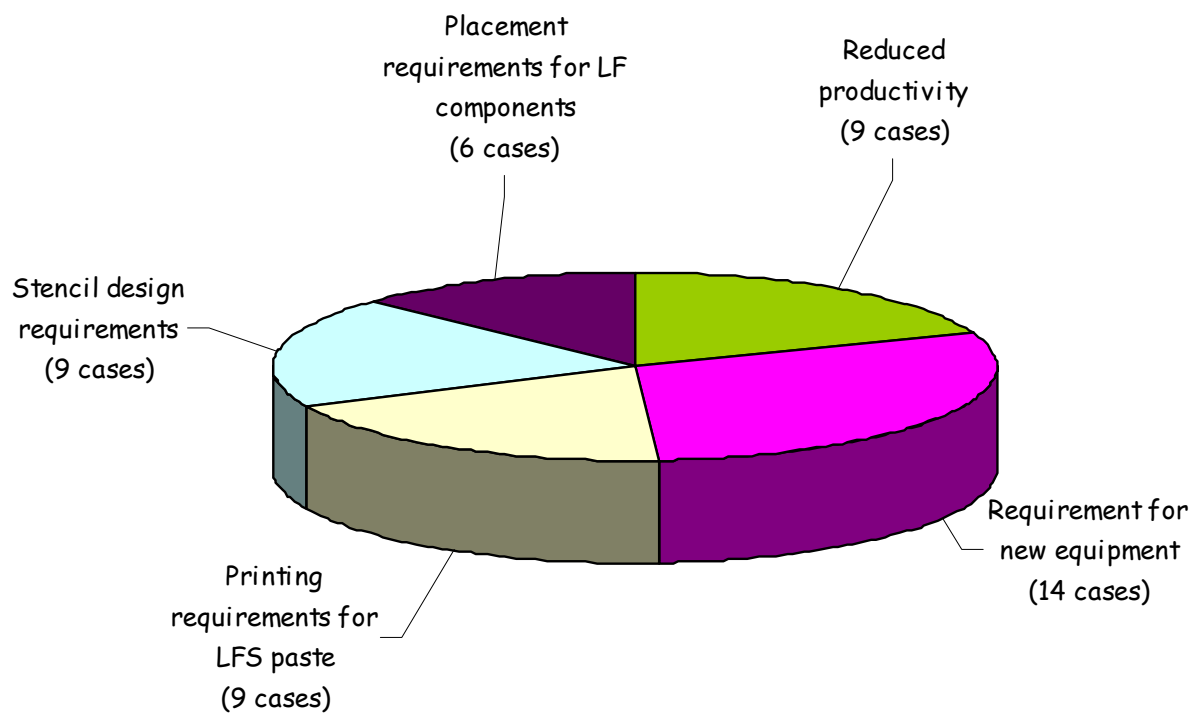
5. Materials Selection & Specification Concerns

- 23 companies (76%) stressed on **“alternatives for 63Sn/37 Pb”**
- 18 firms marked **“availability of lead free components”** (60%)
- 17 marked **“design change requirements”** (56%)
- 13 stressed on **“Component obsolescence”** (43%)
- 12 marked **“familiarity with alternatives and materials selection process”** (40%)
- 11 ticks for **“Familiarity with lead free soldering materials”** (36%)
- 11 ticks for **“lead free fluxing requirements”** (36%)
- 10 stressed on **“materials labelling”** (33%)
- 8 marked on **“tin whisker issues”** (27%)
- 8 companies marked **“supply chain requirements”** (27%)
- 6 marked on **“component terminations materials”** (20%)



6. Concerns about Equipment Issues

Concerns About Equipment Issues

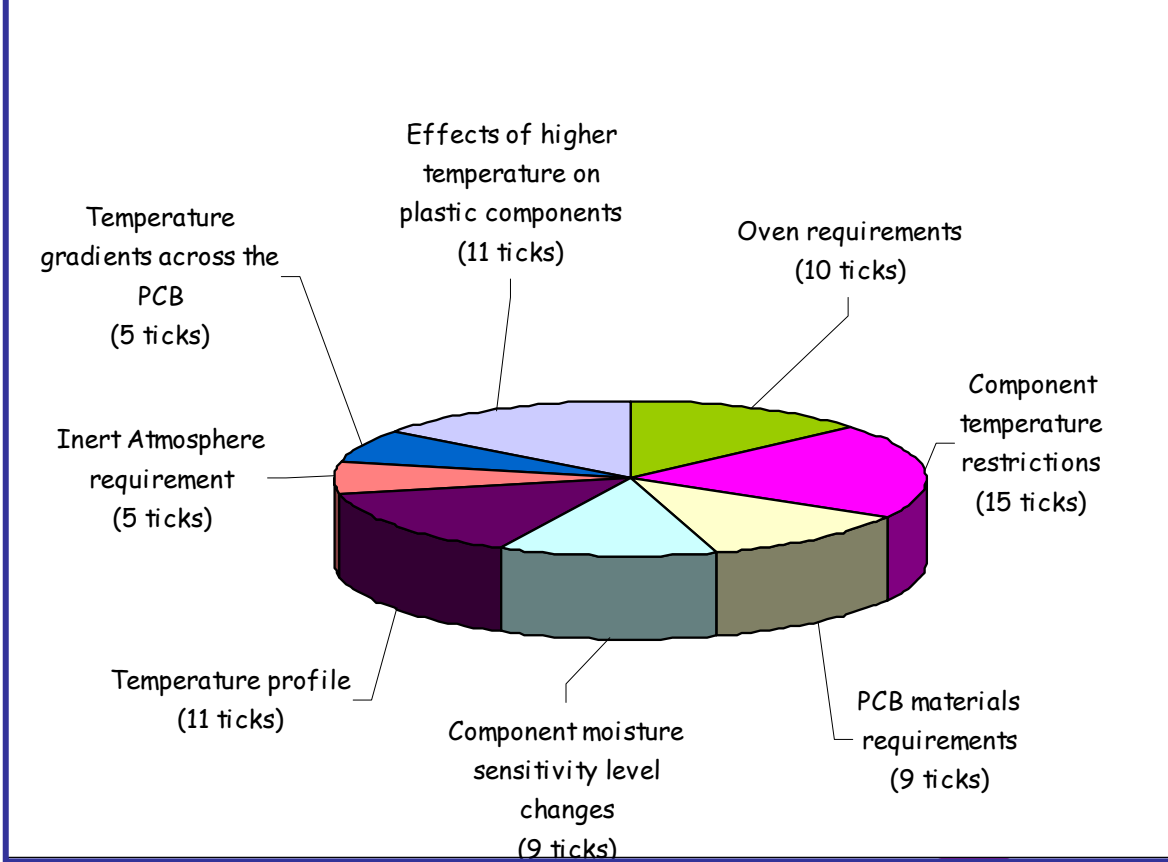


- 47% of companies stressed on "Requirement for new equipment",
- 30% marked "reduced productivity",
- 30% marked "Printing requirements for lead-free solder paste",
- 30% stressed "stencil design requirements",
- 20% marked on "Placement requirements for lead free components".

7. Concerns about Reflow process requirements

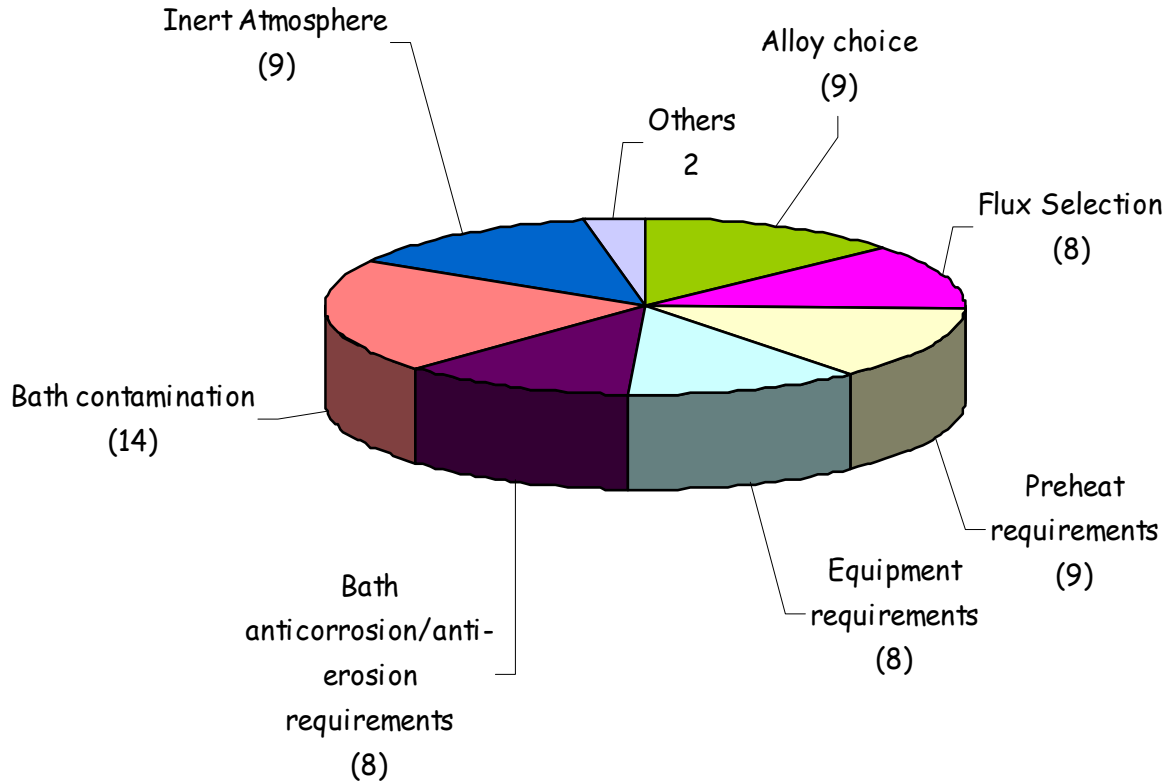
- 50% of the companies marked "component temperature restrictions"
- 37% marked "temperature profile"
- 37% stressed on "effects of higher temperatures on plastic components"
- 33% marked "oven requirements"
- 30% stressed on "PCB materials requirements",
- 30% marked "component moisture sensitivity level changes".
- 17% marked "inert atmosphere requirement"
- 17% also marked "Temperature gradients across the PCB"

Concerns About Reflow Process Requirements



8. Concerns about Wave soldering issues

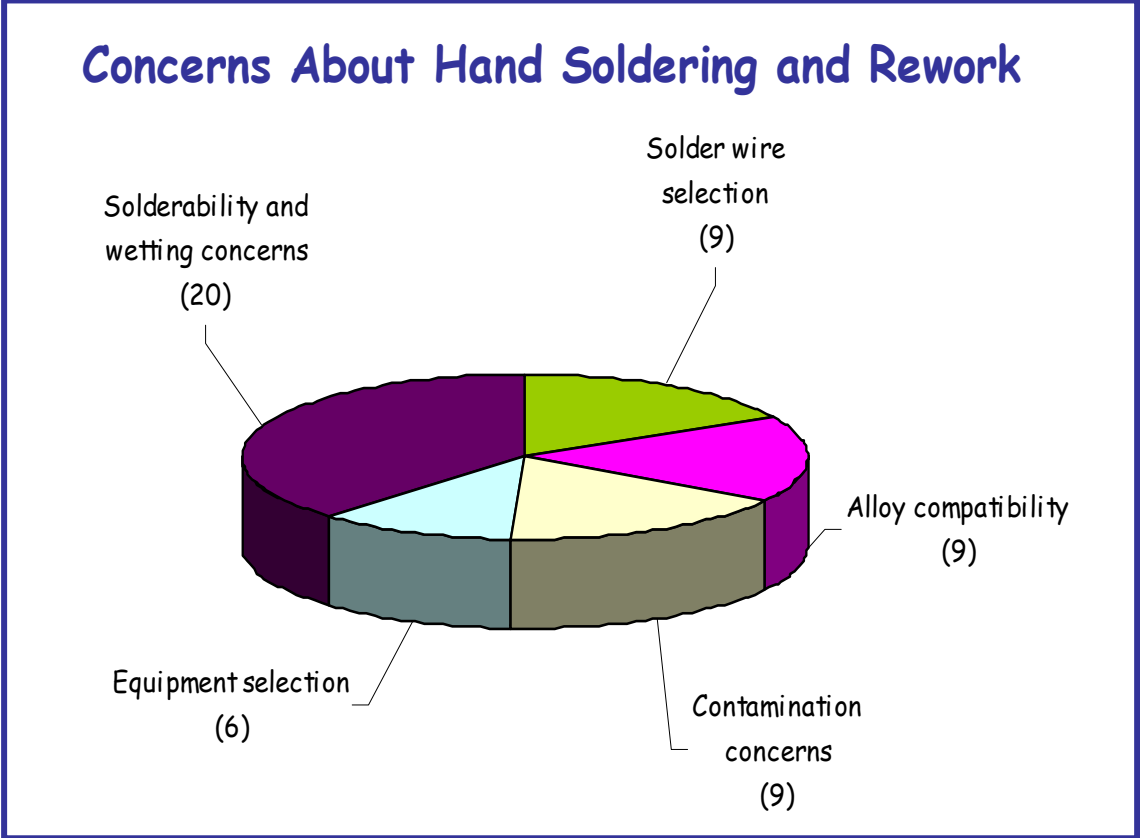
Concerns About Wave Soldering Issues



- "Bath contamination" was stressed by 47% of the SME's
- 30% for "Alloy Choice"
- 30% "preheat requirements" was marked as well as "Inert atmosphere" (30%).
- 27% for "flux selection"
- "Equipment requirements" was marked by 27% of SME's,
- 27% also for "Bath anti-corrosion/erosion requirements".
- 7% marked "others"

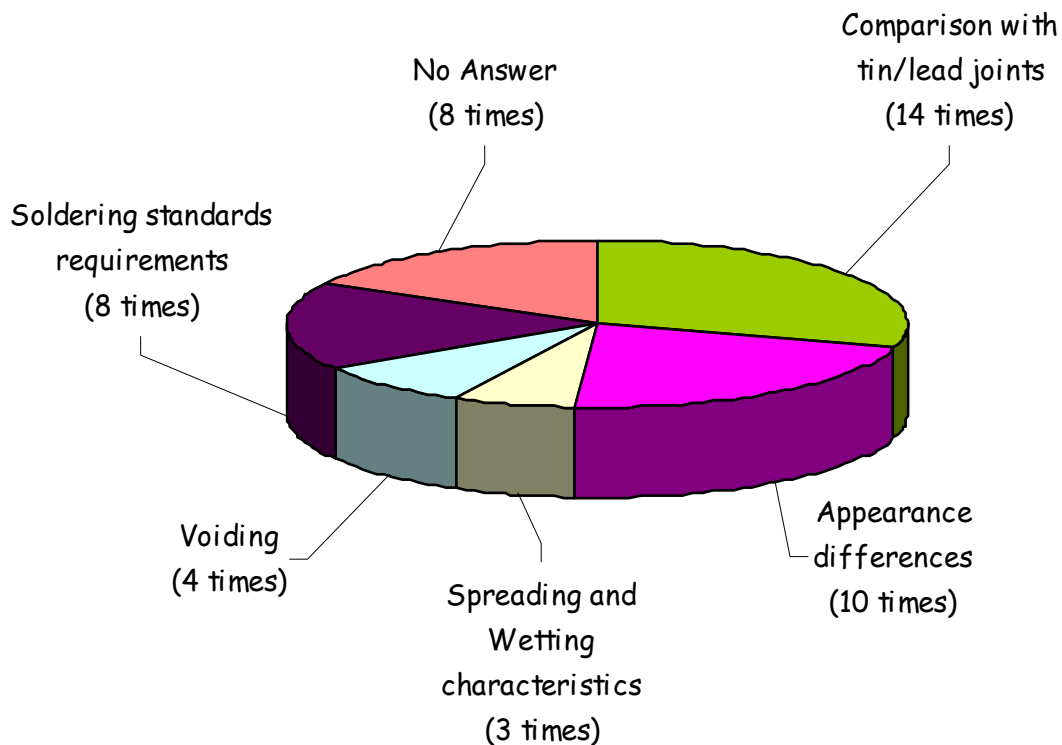
9. Concerns about Hand soldering and Rework

- 67% stressed "solderability and wetting concerns".
- "Solder wire selection" was marked by 30% of the SME's
- "Alloy compatibility" was also marked 30%
- "Contamination concerns" was ticked by 30% .
- 20% marked "equipment selection"



10. Concerns about Joints Inspection

Concerns About Joints Inspection



➤ 47% of the SME's marked the option "comparison with tin/lead joints"

➤ 33% marked "appearance differences"

➤ 27% marked "soldering standards requirements"

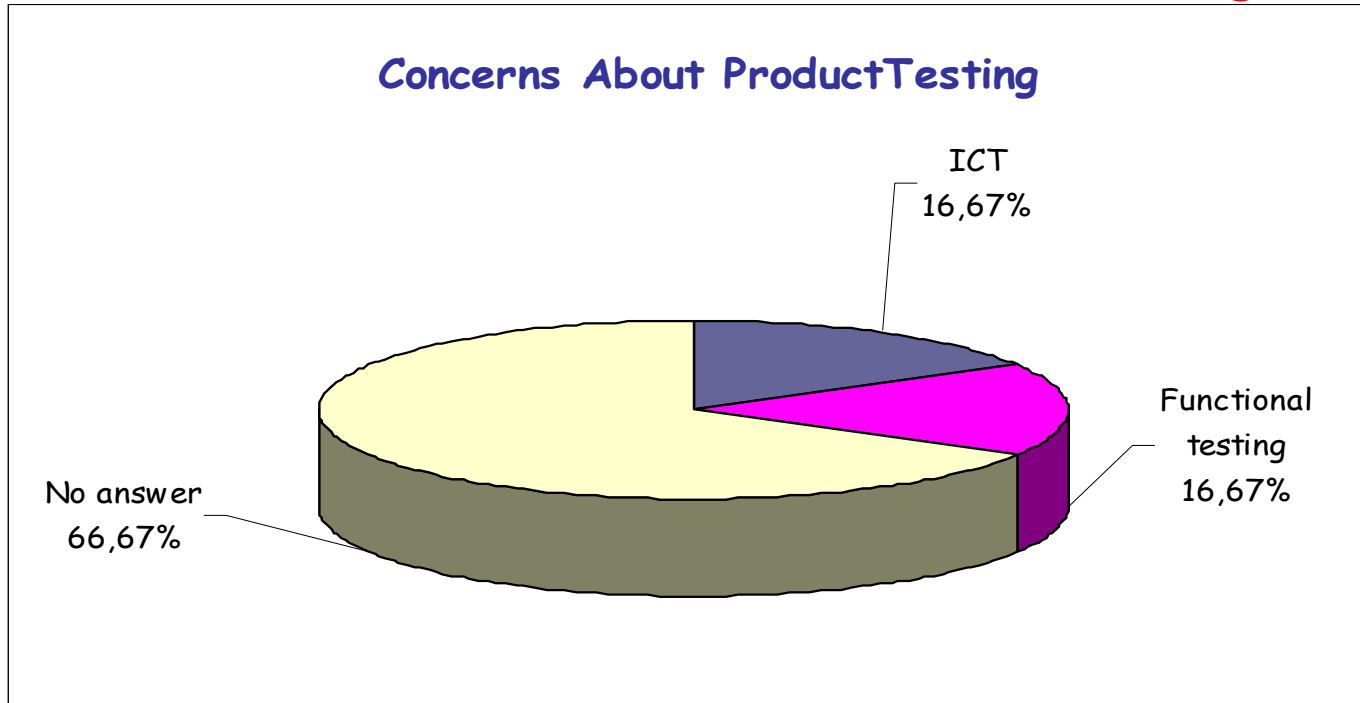
➤ 27% didn't answer

➤ 13% marked "voiding"

➤ 10% stressed on "spreading and wetting characteristics"

➤ no one chose "others".

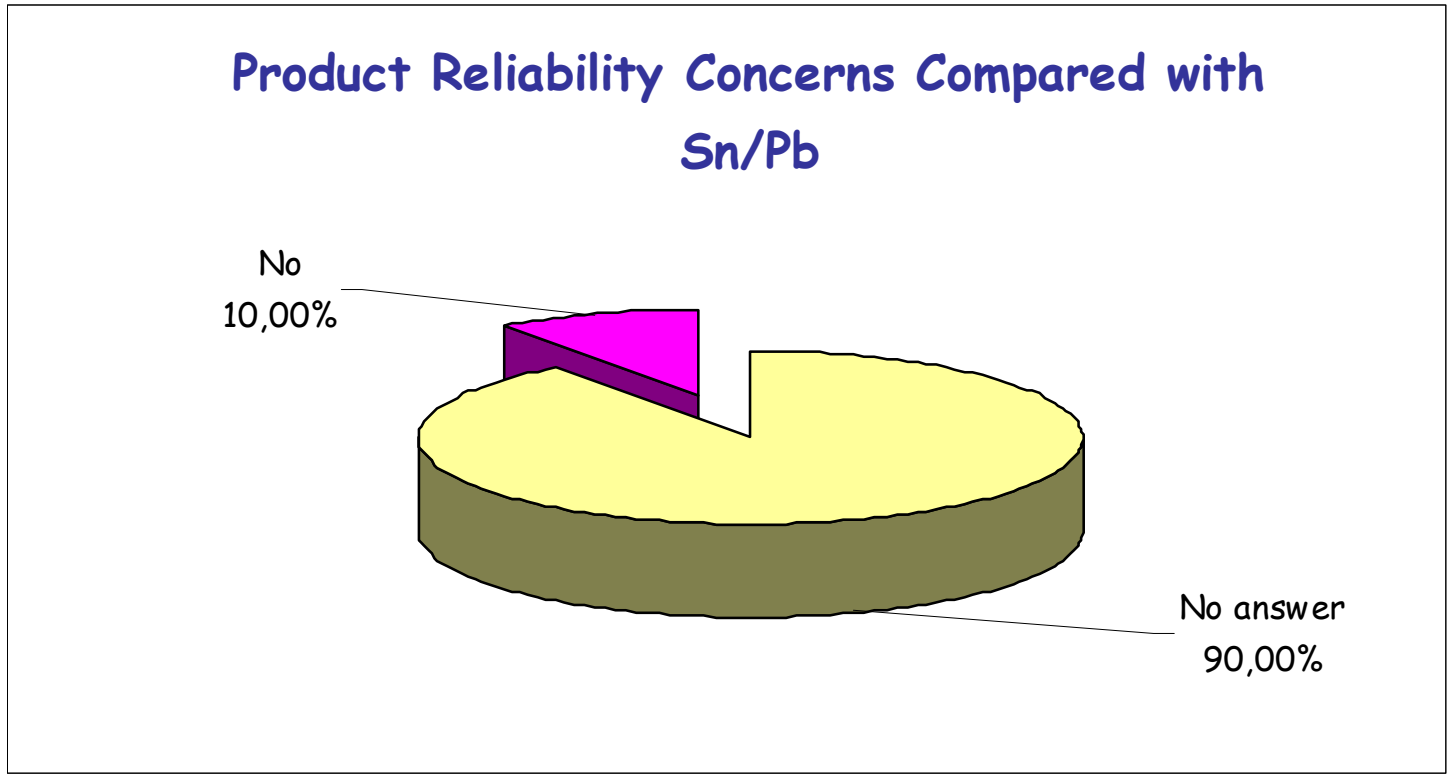
11. Concerns about Product Testing



- "ICT" and "Functional testing" were marked by 17% each.
- 66% of companies didn't answer

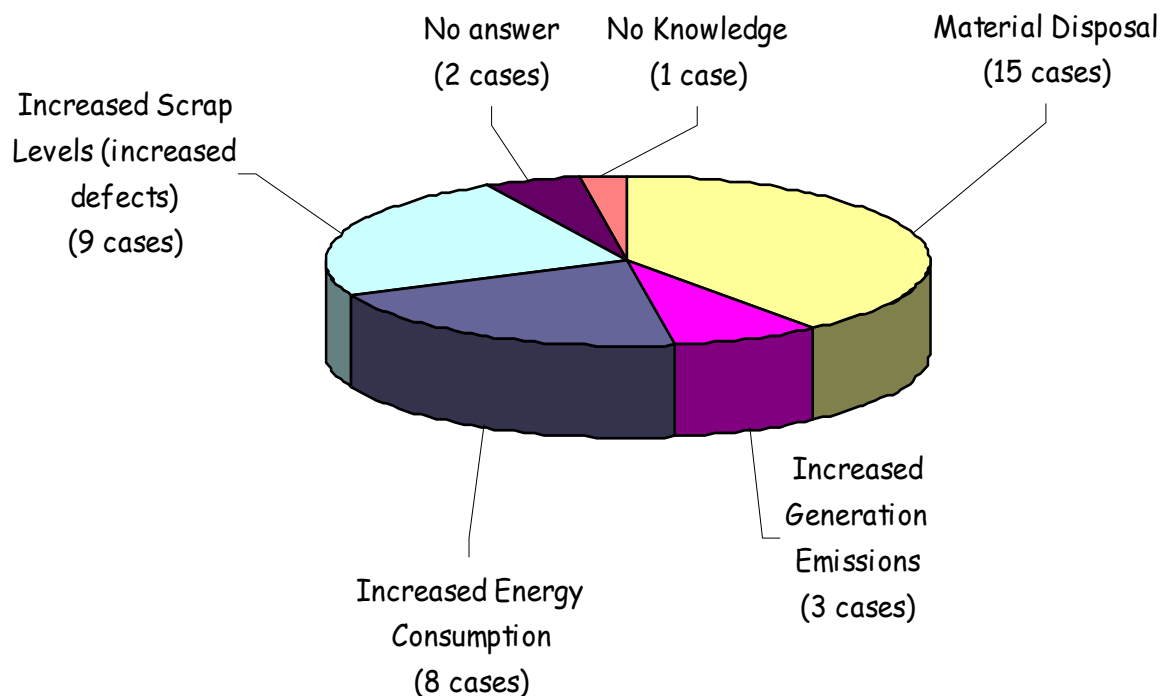
12. Product reliability of LFS soldered assemblies

Just **10%** tell not to have concern about product reliability vs Sn/Pb



13. Environmental Concerns

Environmental Concerns of Main Interest



- 50% of SME's marked "Material disposal" as main Environmental concern
- "Increased scrap levels (increased defects)" was marked by 30%
- 27% stressed for "Increased energy consumption"
- 10% ticked "increased generation emissions"
- 7% of companies didn't answer.
- 3% didn't have knowledge about environmental issues



14. Conclusions (I)

1. More than 90% of SMEs surveyed had good awareness of the RoHS
2. The main sources of information on LFS were obtained through their suppliers of solder and materials, from trade press and Universities.
3. Near to 90% of SMEs had started LFS implementation according to the answers received. However there was still a clear need for the knowledge dissemination and services availability on LFS.
4. Related to materials selection and specifications:
 - ✓ "LFS alloy alternatives for Sn/Pb" was singled out as the major concern.
 - ✓ Others concerns were "Design requirements" and "Component availability".
5. "Requirement for new equipment" was the biggest worry in LFS process.
6. Main concerns for LFS reflow were:
 - ✓ "Temperature restriction on the components"
 - ✓ "Temperature profile in the reflow oven".
 - ✓ "Effect of higher temperature on plastic components".



14. Conclusions (II)

7. In Wave Soldering process:

- ✓ "All the factors remained important concerns to the SMEs but bath contamination was the most stressed point.

8. For Hand Soldering & Rework:

- ✓ "Solderability and Wetting Characteristics" were the greatest concerns.

9. SMEs highlighted LFS "Inspection concern" were in comparison with Sn/Pb joint, soldering standards and appearance difference

10. Just 10% of the SME's shown a concern on "Product reliability in LFS"

11. "Environmental concerns" were linked to cost-related issues:

- ✓ Predominantly in "Material disposal" and Increased defect levels"
- ✓ About one third of the SMEs were concerned with ecological and energy issues.