



TECHNICAL REPORT



**Environmental testing –
Part 3-15: Supporting documentation and guidance – Vacuum-assisted reflow
soldering**

INTERNATIONAL
ELECTROTECHNICAL
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CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	7
4 Voids in solder joints	7
4.1 Type of voids	7
4.2 Reasons for voids	8
4.3 Influence of voiding on solder joint performance	9
5 Vacuum-assisted soldering processes	9
5.1 Purpose	9
5.2 Combination of soldering process with vacuum	9
5.3 Typical temperature-pressure-time curves	10
5.3.1 Convection soldering with vacuum	10
5.3.2 Vapour phase soldering with vacuum.....	11
5.3.3 Contact soldering with vacuum	12
6 Effect of vacuum when reflow soldering.....	13
6.1 General.....	13
6.1.1 General description	13
6.1.2 Physical basics.....	13
6.1.3 Vacuum parameters.....	14
6.1.4 Vapour phase vacuum reflow soldering.....	14
6.2 Components in the vacuum reflow soldering process	15
6.2.1 Influence of pressure differences	15
6.2.2 Influence of temperature, time, and vacuum	18
7 Vacuum equipment restrictions	18
7.1 General.....	18
7.2 Chamber size.....	18
7.3 Time to reach vacuum level	19
7.4 Cycle time.....	19
7.5 Summary	19
8 Typical defects after vacuum-assisted reflow soldering.....	20
8.1 Typical defect modes occurring at components	20
8.2 Component defect modes – summary	24
8.3 Soldering defect modes	24
8.3.1 Dropping of components	24
8.3.2 Bridging.....	25
8.3.3 Splattering.....	25
Bibliography.....	27
Figure 1 – X-Ray examples of voids in solder joints in different SMD-Components	8
Figure 2 – Reduction of voids with low flux soldering & preforms	8
Figure 3 – Example of a product for vacuum-assisted soldering processes	10
Figure 4 – Typical profile – vacuum-assisted convection soldering.....	11
Figure 5 – Typical profile – vacuum-assisted vapour phase soldering	12

Figure 6 – Typical profile – vacuum-assisted contact soldering 13

Figure 7 – Vapour pressure curve of Galden® 15

Figure 8 – Pressures to be considered 16

Figure 9 – Vapour pressure curve of water 17

Figure 10 – Blow Hole Void in/out of metallization 20

Figure 11 – Gas bubbles at metallization interface 20

Figure 12 – Gas bubble caused by residues in metallization defect 21

Figure 13 – Blow out void in solder meniscus 21

Figure 14 – Aluminium electrolytic capacitors with non-solid electrolyte, bulged 22

Figure 15 – Composite housing bursts in case of overpressure 22

Figure 16 – Housing mainly made of plastic bursts in case of overpressure 23

Figure 17 – Relay lock (polymer dot) blown off 23

Figure 18 – Housing with adhesive joint bursts in case of overpressure 24

Figure 19 – An example of bridging on BGA during vacuum assisted soldering 25

Figure 20 – Optimization with stepwise applying of vacuum to reduce bridging 25

Figure 21 – Splattering due to explosive outgassing from the solder joint 26

Table 1 – Combination of soldering processes with vacuum 10

Table 2 – Molar mass 17

Table 3 – Combination of soldering processes with vacuum 19

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ENVIRONMENTAL TESTING –

**Part 3-15: Supporting documentation and guidance –
Vacuum-assisted reflow soldering**

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Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 60068 series, published under the general title *Environmental testing*, can be found on the IEC website.

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INTRODUCTION

As defined in ISO 857-2, reflow soldering is a joining process using an additional metal (solder) with a liquidus temperature of 450 °C or less, in which solder paste or preforms are reflowed.

Reflow soldering can be carried out with the technical processes of convection (air or nitrogen), condensation (vapour phase), radiation (e.g. infrared) or contact heat.

Sometimes it is not possible to achieve the required void level for an assembly only with methods listed above despite the use of all technical possibilities.

Regarding void-induced asymmetrical stress constellations, a reduction of voiding can lead to a mitigated stress condition within the solder joints.

Various technical requirements only tolerate very small void dimensions. To achieve these requirements, vacuum-assisted soldering can be applied with the above mentioned reflow soldering processes.

In some product applications, a hermetic seal is required. The reliable fulfilment of this requirement is very demanding to the process technology especially complex assemblies. Vacuum-assisted soldering creates significantly more consistency in the results here.

Further benefits of vacuum-assisted soldering are improved thermal management or high frequency performance (contour adaptation, mitigation of blow holes).

Vacuum-assisted soldering, however, requires a different equipment with more complex structure and process control. Since the vacuum process has an impact on the process time, the suitability of the components and solder paste that are used need to be checked.

ENVIRONMENTAL TESTING –

Part 3-15: Supporting documentation and guidance – Vacuum-assisted reflow soldering

1 Scope

This part of IEC 60068 describes vacuum-assisted soldering considering the thermal profiling, soldering methods, suitability of the components and vacuum features of soldering systems. It is based on practical experiences from manufacturers, component, material, and soldering systems suppliers. It supports manufacturers by providing information about the functionality of vacuum and effect of vacuum on components performance.

2 Normative references

There are no normative references in this document.