



IEC 62899-202-10

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# INTERNATIONAL STANDARD



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**Printed electronics –  
Part 202-10: Materials – Resistance measurement method for thermoformable  
conducting layer**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references .....	7
3 Terms and definitions .....	7
4 In-situ resistance measurement method.....	9
4.1 Measured value .....	9
4.2 Test specimen .....	9
4.2.1 Ink stack.....	9
4.2.2 Size and shape.....	10
4.2.3 Conductive layer layout .....	10
4.3 Measurement apparatus .....	11
4.3.1 General .....	11
4.3.2 Elongation equipment.....	11
4.3.3 Resistance measurement equipment .....	12
4.4 Measurement parameters .....	13
4.4.1 Elongation .....	13
4.4.2 Elongation speed.....	13
4.4.3 Elongation temperature .....	13
4.5 Measurement procedure .....	13
4.6 Measuring conductive line elongation.....	14
4.7 Data analysis .....	14
4.7.1 General .....	14
4.7.2 Calculating results .....	14
4.7.3 Excluding outliers in data analysis .....	15
4.8 Measurement report.....	16
5 Pre-and post-elongation resistance measurement method.....	16
5.1 Measured value .....	16
5.2 Test specimen .....	16
5.3 Measurement apparatus .....	16
5.3.1 Elongation equipment.....	16
5.3.2 Resistance measurement equipment .....	17
5.4 Measurement parameters .....	17
5.5 Measurement procedure .....	17
5.6 Measuring conductive line elongation.....	17
5.7 Data analysis .....	17
5.7.1 General .....	17
5.7.2 Calculating results .....	17
5.7.3 Excluding outliers in data analysis .....	18
5.8 Measurement report.....	18
Annex A (informative) Example report for pre- and post-elongation resistance measurement.....	19
A.1 Test specimen information .....	19
A.2 Elongation parameters .....	19
A.3 Results .....	19
A.3.1 Measured line elongation range and elongation at electric break .....	19

A.3.2	Analysis of potential outliers .....	20
A.3.3	Average resistance changes .....	20
A.4	Date of the measurements .....	21
Annex B (informative)	Guidelines for test specimen shape and conductive layer layout.....	22
B.1	Test specimen shape and dimensions .....	22
B.2	Conductive layer layout.....	23
B.3	General guidelines for specimen shapes and conductive layer layout.....	24
Bibliography	.....	26
Figure 1	– Substrate with ink stack in 2D (top) and 3D (bottom) shape .....	6
Figure 2	– Example of test specimen shape .....	10
Figure 3	– Example of conductive layer layout .....	11
Figure 4	– Example of elongation equipment.....	12
Figure 5	– Example of test specimen holder.....	12
Figure 6	– Example of measuring conductive line elongation .....	14
Figure 7	– Example of conductive line resistance increase (%) as a function of elongation time (s) .....	15
Figure A.1	– Conductive layer layout.....	19
Figure A.2	– Boxplot of resistance change before outlier analysis .....	20
Figure A.3	– Boxplot of conductive line resistance changes .....	21
Figure B.1	– Example of the test specimen shape .....	22
Figure B.2	– Example of conductive layer layout .....	24
Table 1	– Test specimen ink stack .....	10
Table A.1	– Conductive lines that had electric break during elongation .....	20
Table A.2	– Resistance changes according to line elongation ranges.....	21

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## PRINTED ELECTRONICS –

**Part 202-10: Materials – Resistance measurement  
method for thermoformable conducting layer**

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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 International Standard is English.

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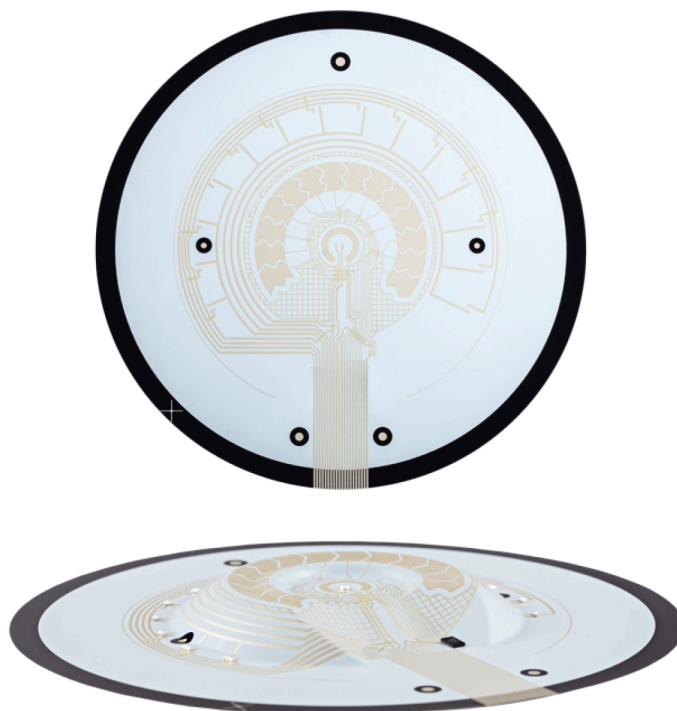
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## INTRODUCTION

In-mould-electronics (IME) manufacturing can include thermoforming during which two-dimensional electric films with conducting layers are thermoformed into three-dimensional shapes. During thermoforming, the substrate and printed layers will experience plastic strain leading to elongation (see Figure 1). The conductive layer's resistance increases as a function of plastic strain. Designers of electric circuitry should know how much the resistance changes. Using a standardized measurement method ensures comparability of the results.



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NOTE 1 The top image shows a 2D substrate and ink stack after printing and cure.

NOTE 2 The bottom image shows a substrate and ink stack after thermoforming into a 3D shape. The ink layers have been elongated.

**Figure 1 – Substrate with ink stack in 2D (top) and 3D (bottom) shape**

## PRINTED ELECTRONICS –

### Part 202-10: Materials – Resistance measurement method for thermoformable conducting layer

#### 1 Scope

This part of IEC 62899 defines terminology and measurement methods for the resistance change of conductive ink layer(s) as a function of thermoplastic elongation. The method measures resistance changes in-situ or post-elongation.

This document is applicable to thermoformable substrates with conductive ink layers. The thermoformable substrates can have printed graphic ink as well and cover insulation layers.

#### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62899-202, *Printed electronics – Part 202: Materials – Conductive ink*