

# ISO/IEC 29158:2025-03 (E)

## Automatic identification and data capture techniques - Bar code symbol quality test specification - Direct part mark (DPM)

---

### Contents

Page

- Foreword ..... v
- Introduction ..... vi
- 1 Scope ..... 1
- 2 Normative references ..... 1
- 3 Terms and definitions ..... 1
- 4 Symbols and abbreviated terms ..... 2
  - 4.1 Symbols ..... 2
  - 4.2 Abbreviated terms ..... 3
- 5 Overview of methodology ..... 3
  - 5.1 Process differences from ISO/IEC 15415 ..... 3
  - 5.2 Lighting ..... 3
  - 5.3 Tilted coaxial lighting and camera position ..... 4
- 6 Obtaining the image ..... 5
  - 6.1 Camera position and symbol orientation ..... 5
    - 6.1.1 Symbol placement ..... 5
    - 6.1.2 Camera position in a 90° camera angle set up ..... 5
    - 6.1.3 TCL setup ..... 5
  - 6.2 Lighting environments ..... 5
    - 6.2.1 General ..... 5
    - 6.2.2 Perpendicular coaxial (“90”) ..... 5
    - 6.2.3 Diffuse off-axis (“D”) ..... 5
    - 6.2.4 Four direction (“Q”) ..... 6
    - 6.2.5 Two direction (“T”) ..... 6
    - 6.2.6 One direction (“S”) ..... 6
    - 6.2.7 TCL setup ..... 6
  - 6.3 Image focus ..... 7
  - 6.4 Depth of field ..... 7
  - 6.5 System response adjustment and reflectance calibration ..... 7
- 7 Verifying a symbol ..... 7
  - 7.1 Initial image reflectance ..... 7
    - 7.1.1 General ..... 7
    - 7.1.2 Initializing the aperture size ..... 7
    - 7.1.3 Creating an initial histogram ..... 7
    - 7.1.4 Computing the mean ..... 7
    - 7.1.5 Optimizing an image ..... 8
  - 7.2 Obtaining the test image ..... 8
    - 7.2.1 Matrix symbologies ..... 8
    - 7.2.2 Binarizing the image ..... 8
  - 7.3 Applying a reference decode algorithm ..... 8
    - 7.3.1 General ..... 8
    - 7.3.2 Repeating if necessary ..... 8
    - 7.3.3 Continuing until the end ..... 8
  - 7.4 Final image adjustment ..... 8
    - 7.4.1 General ..... 8
    - 7.4.2 Determining the grid-centre point reflectance with two apertures ..... 9
    - 7.4.3 Creating a grid-centre point histogram ..... 9
    - 7.4.4 Measuring the mean light ..... 9

7.4.5	Recording parameters.....	9
7.4.6	Creating binarized images for the symbology reference decode.....	9
7.4.7	Decoding.....	9
<b>8</b>	<b>Determining the contrast parameters.....</b>	<b>9</b>
8.1	Initializing the aperture size.....	9
8.2	Calculating cell contrast.....	9
8.3	Calculating the cell module modulation.....	10
8.4	Calculating the minimum reflectance.....	10
<b>9</b>	<b>Grading.....</b>	<b>10</b>
9.1	Cell contrast.....	10
9.2	Minimum reflectance.....	11
9.3	Cell modulation.....	11
9.4	Fixed pattern damage.....	12
9.5	Final grade.....	12
<b>10</b>	<b>Communicating grade requirements and results.....</b>	<b>12</b>
10.1	General.....	12
10.2	Communication of application requirements.....	12
10.3	Communicating from verifier to application.....	13
10.4	Communicating the use of a proprietary decode.....	13
	<b>Annex A (normative) Threshold determination method.....</b>	<b>14</b>
	<b>Annex B (informative) Evaluation of image at virtual 90° camera position from real tilted camera position.....</b>	<b>18</b>
	<b>Annex C (normative) Dot connecting algorithm.....</b>	<b>21</b>
	<b>Annex D (informative) Communicating the grade.....</b>	<b>23</b>
	<b>Annex E (informative) Cross-reference comparison to ISO/IEC 15415.....</b>	<b>26</b>
	<b>Bibliography.....</b>	<b>27</b>