AutoVISION™ Verification Reports

Quick Reference

What is Verification/Grading?

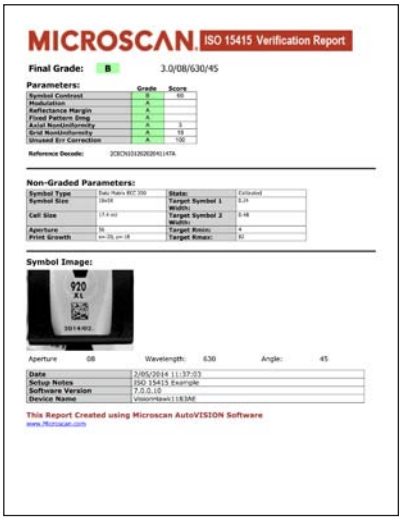
Verification, sometimes referred to as grading, is the measurement of the quality of a 1D (linear) barcode or a 2D symbol such as Data Matrix, according to a standardized methodology. The purpose of verification is to ensure that barcodes can be subsequently read with the intended reading equipment.

International Quality Standards

There are two principal standards for 2D Data Matrix symbols. ISO 15415 is most applicable to high contrast printed symbols, while the AIM DPM 2006 guidelines and ISO 29158 standard are designed for direct part marked (DPM) symbols. ISO 15416 (formally ANSI X3.182-1990) is a standard that applies to 1D barcodes such as Code 128, ITF, and UPC, and is the standard referenced in the GS1 General Specification.

AutoVISION Verification Reporting

AutoVISION software produces detailed verification reports based on three quality standards: **ISO 15415, ISO 15416, or AIM DPM/ISO 29158**. Reports can be saved in either PDF or text format. This guide explains how to interpret the specific information listed in the report, using a 2D Data Matrix symbol and ISO 15415 as an example.



ISO 15415 Verification Report

The Final Grade is the overall quality of the symbol. For ISO 15415 it is defined as the lowest grade received for any measured parameter.

This data shows the grade reported per the ISO 15415 standard. In this example, the final grade in numeric form is 3 (B), the selected aperture is 8, the illumination wavelength is 630 nm, and a 45 degree perpendicular light source is used.

Final Grade:	B	3.0/08/630/45

Parameters:	Grade	Score
Symbol Contrast	B	66
Modulation	A	
Reflectance Margin	A	
Fixed Pattern Dmg	A	
Axial NonUniformity	A	3
Grid NonUniformity	A	18
Unused Err Correction	A	100

Symbol Contrast is the maximum difference in light reflectance between the light and dark regions of the symbol. 100 is the highest possible score.

Fixed Pattern Damage tests for missing elements or distortions in the symbol's quiet zone, finder pattern, or clock pattern.

Axial Non-Uniformity is the amount of deviation along the symbol's major axes. A result of 3 indicates very little axial non uniformity is present in the symbol.

Reference Decode:	2C8CN10120202041147A

Reference Decode uses the decode algorithm prescribed in the ISO 15415 standard. When the reference decode fails, the symbol cannot be evaluated. The encoded data is also displayed.

Reflectance Margin measures how well each element of the symbol is correctly distinguishable as light or dark in comparison to the global threshold.

Modulation refers to the reflectance uniformity of a symbol's light and dark elements.

Grid Non-Uniformity refers to the cell deviation from the theoretical or "ideal" grid intersections to those that are determined by the reference decode algorithm. It measures the maximum vector deviation from that ideal grid.

Unused Error Correction Capacity indicates the amount of error correcting capability remaining in the symbol. A score of 100 is ideal and indicates no damage is present.

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Non-Graded Parameters:

Symbol Type	Data Matrix ECC 200	**State:**	Calibrated
Symbol Size	18x18	**Target Symbol 1 Width:**	0.24
Cell Size	17.4 mil	**Target Symbol 2 Width:**	0.48
Aperture	56	**Target Rmin:**	4
Print Growth	x=-20, y=-18	**Target Rmax:**	82

Print Growth refers to the deviation (larger or smaller) of actual element size from intended element size due to printing problems. Negative numbers indicate black cells are printed slightly smaller than nominal.

Aperture states the size of the synthetic aperture used in the verification process. The aperture is expressed in mils (1/1000 inch) for a calibrated system, or in pixels for a non-calibrated system.

The **Cell Size** is measured in pixels. A symbol must have a minimum of 10 **Pixels per Element** (PPE) for consistent and reliable verification. On calibrated systems, the size is shown in mils (1/1000 inch) or mm.

Symbol Size is measured in elements. 22 x 22 represents a size of 22 elements by 22 elements.

Symbol Type states the type of symbol used. For ISO 15415 this is always Data Matrix ECC 200.

Target R Maximum shows the maximum reflectance of the symbol used for calibration. This corresponds to the reflectance of the white cells.

Target R Minimum shows the minimum reflectance of the symbol used for calibration. This corresponds to the reflectance of the black cells.

Width of Target Symbol 2 states the width of the widest symbol on the calibration card.

Width of Target Symbol 1 states the width of the smallest symbol on the calibration card.

State indicates whether or not the system is calibrated.

Symbol Image:

The image capture that is used in verifying the symbol is shown below the Parameters sections and above the supplementary information.

Supplementary Information

The first items beneath the image capture are Aperture, Wavelength, and Angle. **Aperture** is stated again, this time in pixels. **Wavelength** refers to the illumination LED output in nanometers. **Angle** states the angle of the illumination LEDs used in the application. The **Date** and Time of the verification report are included, as well as any **Setup Notes** added by the operator. The **Software Version** identifies the version of AutoVISION software used at the time the report was created. The **Device Name** of the smart camera, gigE camera, or emulator is also included.

Aperture 08 Wavelength: 630 Angle: 45

Date	2/05/2014 11:37:03
Setup Notes	ISO 15415 Example
Software Version	7.0.0.10
Device Name	VisionHawk1183AE

Note: Please refer to additional resources such as Microscan's verification white papers and the AutoVISION User Manual for information on other quality standards, parameters, and AutoVISION Verification Reports.

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