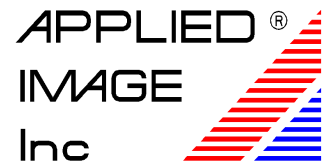


1653 East Main Street
Rochester, NY 14609 USA
Voice: 585.482.0300
FAX: 585.288.5989
imaging@appliedimage.com

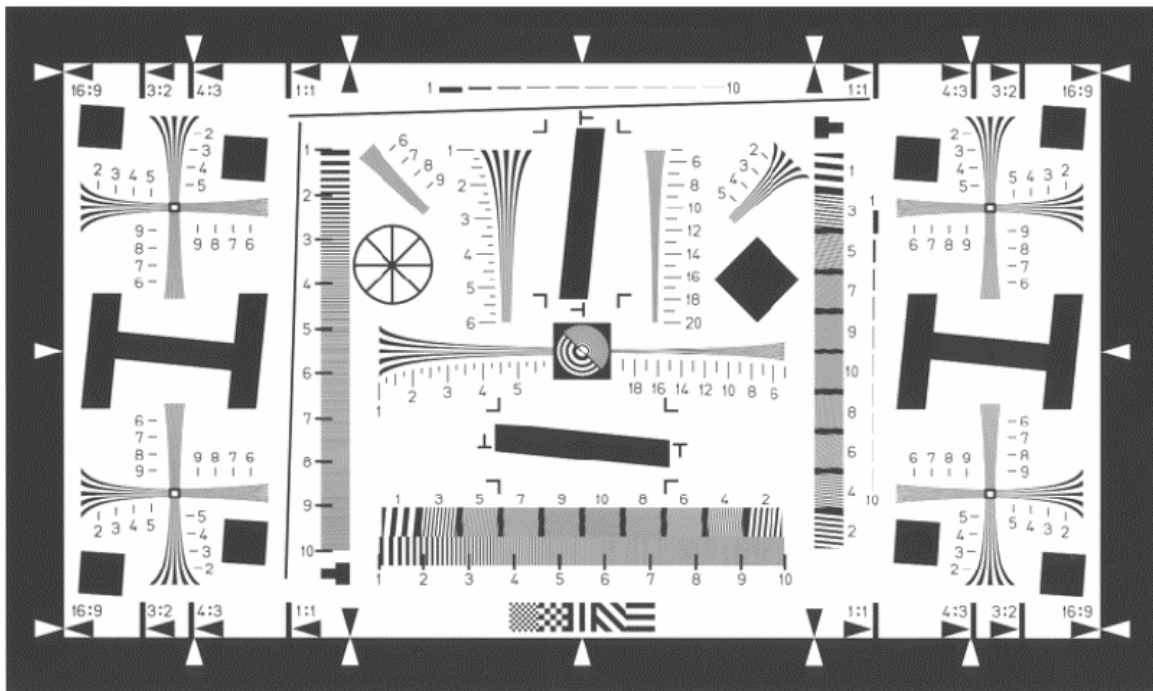
QA-72
Electronic Still Picture
Camera Resolution Test
Chart (ISO-12233)
Product Specifications



- Catalog Part No: **QA-72-P-RM** (1x size – image on photographic paper)
QA-72-1-P-CG (1/10x size – image on chrome on glass)
QA-72-1-P-OP (1/10x size – image on chrome on white opal glass)
QA-72-2-P-RM (1/2x size – image on photographic paper)
QA-72-2-P-OP (1/2x size – image on chrome on white opal glass)
QA-72-3-P-RM (2x size – image on photographic paper)
QA-72-4-P-RM (4x size – image on photographic paper)

Product Name: **Digital Still-Camera Resolution Chart (ISO-12233)**


Drawing / Photo of part:



The above image is an approximate representation of the actual product.
Specifications are subject to change without notice.

Description:

This test pattern is an image evaluation tool for determination of resolving power, limiting resolution and spatial frequency response (SFR) of electronic still-picture cameras.

1653 East Main Street Rochester, NY 14609 USA Voice: 585.482.0300 FAX: 585.288.5989 imaging@appliedimage.com	QA-72 Electronic Still Picture Camera Resolution Test Chart (ISO-12233) Product Specifications	
--	---	---

Sizes and Image Forming Material:

<i>Part Number</i>	<i>Size</i>	<i>Substrate Size (mm)</i>	<i>Active Image Area (mm)</i>	<i>Substrate Type</i>	<i>Image Forming Material</i>
QA-72-P-RM	1X	240 x 395	200 x 356	Photographic paper	Photographic emulsion
QA-72-1-P-CG	0.1X	50 x 50	20 x 35.6	Glass	Chrome
QA-72-1-P-OP	0.1X	50 x 50	20 x 35.6	White opal glass	Chrome
QA-72-2-P-RM	0.5X	127 x 203	100 x 178	Photographic paper	Photographic emulsion
QA-72-2-P-OP	0.5X	127 x 203	100 x 178	White opal glass	Chrome
QA-72-3-P-RM	2X	480 x 791	400 x 711	Photographic paper	Photographic emulsion
QA-72-4-P-RM	4X	980 x 1630	800 x 1422	Photographic paper	Photographic emulsion


Image Description:

The ***Digital Still-Camera Resolution Chart*** contains a variety of test pattern elements. Users are advised to refer to International Standard ISO-12233 for a detailed explanation of the target's features and their use. The following is a summary list of image features.

- Framing arrows, which define 1:1, 4:3, 3:2 and 16:9 aspect ratios, assist in framing the target's active area.
- A central dual-frequency zone plate on a black square can be used to set focus.
- Central hyperbolic wedges measure resolving power from 100 to 2000 line widths per picture height (lw/ph). Corner wedges measure from 100 to 1000 lw/ph. Horizontal, vertical and diagonal oriented wedges are included for comparison of resolving power at various locations.
- Slightly slanted and black bars (approximately 5°) and diagonal black squares (45°) provide spatial frequency response (SFR) at multiple locations.
- Horizontal and vertical tiled square wave bursts (approximately 5°) and square wave sweeps measure aliasing ratios and resolution in a range from 100 to 1000 lw/ph.
- Other features provide checks for scan linearity, stair-stepping compression artifacts.

Polarity: Positive image features

Image Contrast: 40:1 typical

1653 East Main Street Rochester, NY 14609 USA Voice: 585.482.0300 FAX: 585.288.5989 imaging@appliedimage.com	QA-72 Electronic Still Picture Camera Resolution Test Chart (ISO-12233) Product Specifications	APPLIED [®] IMAGE Inc 
--	--	--


Terms:

- *Aliasing* – The appearance of image artifacts due to limited or diminished resolution.
- *Aliasing ratio* – The quantity of image distortion due to aliasing expressed as the ratio of maximum minus minimum response to the average response within a burst pattern (a series of line and space features at a slight angle to the image sensor).
- *Image aspect ratio* – The ratio of image width to image height.
- *Line widths per picture height (lw/ph)*; resolution features on this chart are labeled in line widths x 100 per picture height. Note that each line transition is counted. 2000 lw/ph is equivalent to 1000 line pairs per picture height (lp/ph).
- *Resolution* – The measure of a camera or imaging component to convey detail.
- *SFR (Spatial Frequency Response)* – The amplitude response of an imaging system as a function of relative spatial frequency.
- *Spectrally neutral* – Spectral power distributions of equal value.

Guidelines for Usage:

This document is not intended to replace the International Standard Document ISO-12233. However, the following guidelines will aid the first use of this chart.

- The chart should be illuminated uniformly ($\pm 10\%$ of center luminance) against a surround of low reflectance and with a minimum of flare light. The illuminant should be effectively neutral with respect to either daylight or tungsten illuminants (ISO-7589). Camera white balance should be adjusted to provide equal red, green and blue signal levels.
- The camera should be positioned to provide centered, full-frame-height rendering of the chart's active area. Use the chart's framing arrows and horizontal edges to aid positioning. The camera to test chart distance should be noted.
- Use the chart's central zone plate feature to set good focus.
- Set camera lens aperture and exposure time to provide maximum signal from white areas while avoiding any signal clipping.


1653 East Main Street Rochester, NY 14609 USA Voice: 585.482.0300 FAX: 585.288.5989 imaging@appliedimage.com	QA-72 Electronic Still Picture Camera Resolution Test Chart (ISO-12233) Product Specifications	APPLIED [®] IMAGE Inc 
--	--	--

- Where possible, image compression features should be disabled.
- Camera output signal should be linearized using the standard reflection camera OECF (Opto-Electronic Conversion Function) test chart, Applied Image part number ST-52-RM.
- Line width features can be viewed with any file viewer for an indication of the visual resolution limits of the device. International Standard Document ISO-12233 contains instruction regarding a quantitative determination of resolution limits. Visual and limiting resolution values should be reported in values of lw/ph.
- Slant-edge features can be analyzed using SFR software freely available through www.i3a.org. This topic is also described in greater detail in the International Standard Document ISO-12233.
- Aliasing level is determined using the slanted burst patterns. It is quantified for each frequency by the ratio of the maximum minus minimum responses divided by the difference of average maximum minus average minimum within each frequency burst.

Related Information:

- International Standard Document ISO-7589, *Illuminants for sensitometry – Specifications for daylight and incandescent tungsten*
- International Standard Document ISO-12233, *Electronic still-picture cameras – Resolution measurements*
- International Standard Document ISO-14524, *Electronic still-picture cameras – Methods for measuring opto-electronic conversion functions (OECFs)*
- Slant Edge Analysis Tool can be found at,

www.i3a.org/downloads_iso_tools.html

1653 East Main Street Rochester, NY 14609 USA Voice: 585.482.0300 FAX: 585.288.5989 imaging@appliedimage.com	<p style="text-align: center;">QA-72</p> <p style="text-align: center;">Electronic Still Picture Camera Resolution Test Chart (ISO-12233) Product Specifications</p>	<p style="text-align: center;">APPLIED[®] IMAGE Inc</p> 
--	---	--

Related Applied Image Products:

- M-13-60; Sinusoidal Array. Sinusoidal test images evaluated for MTF (Modulation Transfer Function) are the classic means of imaging quality evaluation. (MTF is comparable to SFR evaluation.)
- QA-61; Reflective Scanner Test Chart (ISO-16067-1). Designed for scanners, this chart contains a slanted edge feature for SFR evaluation. Additional features are included for resolution, aliasing ratio and OECF testing.
- QA-62; Slant Edge Target. Designed for scanners, this chart contains a slanted edge feature for SFR evaluation along with an OECF grayscale in a single target.
- QA-76; Digital CINE Resolution Chart. Based on the ISO-12233 chart, the QA-76 has extended width for devices having higher aspect ratios.
- QA-77; Enhanced Digital Camera Resolution Chart. This target is based on the ISO-12233 chart but allows determination of resolution limits as high as 4000 lw/ph. Lower contrast slant edge features provide more accurate SFR analysis.