

Overview

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|--------------|---|
| Product name | TE253 9x |
| Principle | Test chart to determine the resolution of a digital camera based on sinusoidal Siemens stars, slanted edges and noise pattern. The Siemens stars and slanted edges comply to ISO 12233. |

Features

Siemens stars

| | | |
|-----------------------------|--|------------------------|
| Type of pattern | 9 sinusoidal Siemens stars, each with 16 surrounding gray patches | |
| Modulation | H | ~91% |
| | S/L | ~94% |
| | D35 | ~98% (batch-dependent) |
| Cycles | H/S/D35 | 144 |
| | L | 72 |
| Diameter stars | A1066 H | 240 mm |
| | A1066 S/L | 220 mm |
| | A460 H/L | 105 mm |
| | D35 | 6.5 mm |
| Diameter registration marks | H | 5 mm |
| | S/L | 12 mm |
| | D35 | 0.4 mm |
| Gray steps | The contrast of the gray scale complies to the contrast of the Siemens star. Please refer to Acceptance protocol for exact reflectance of each step. | |
| Reference data | Individually measured on center star Production tolerance: allowed variation of linearity of gray patches of 15% (remission) max. | |



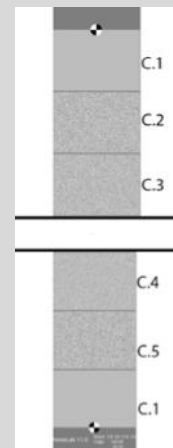
| Sample rate* [MP] | | minimum | maximum | |
|-------------------|---------|---------|---------|---------------|
| | A1066 H | 8 | 180 | (> 8K)** |
| | A1066 S | 2 | 30 | (HDTV - 8K)** |
| | A1066 L | VGA | 2 | (HDTV)** |
| | A460 H | 2 | 35 | (HDTV - 8K)** |
| | A460 L | VGA | 2 | (HDTV)** |
| | D35 | 2 | 10 | (HDTV - 4K)** |

Slanted edges

| Type/s of pattern | 2 subcharts of slanted edges, each consisting of 4 slanted edges with different modulation and accompanied by a set of 10 gray patches | | | |
|-------------------|--|---------|---------|---------------|
| Modulation | 40, 60, 80, 100 % | | | |
| Sample rate* [MP] | | minimum | maximum | |
| | A1066 H | ---*** | 180 | (> 8K)** |
| | A1066 S | ---*** | 30 | (HDTV - 8K)** |
| | A1066 L | ---*** | 2 | (HDTV)* |
| | A460 H | ---*** | 35 | (HDTV - 8K)** |
| | A460 L | ---*** | 2 | (HDTV)** |
| | D35 | ---*** | 10 | (HDTV - 4K)** |

Noise patches

| Type/s of pattern | 4 subcharts, each with 2 gaussian white noise patches with different variances and a flat patch without noise | | |
|-------------------|--|--|--|
| Variance | C.1: no noise, OD****=0.5 C.2: gaussian white noise, $\sigma=1/4$, ODmean=0.5 C.3: gaussian white noise, $\sigma=1/8$, ODmean=0.5 C.4: gaussian white noise, $\sigma=1/16$, ODmean=0.5 C.5: gaussian white noise, $\sigma=1/2$, ODmean=0.5 | | |
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General description hardware

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|------------------------|--|----------|--------|--------|--------|
| Type | Reflective (A) Transmissive (D) | | | | |
| Aspect ratio | 4:3 or 16:9 variable (3 panels) | | | | |
| Chart size [W x H x D] | | W [mm] | H [mm] | D [mm] | |
| | A1066 | variable | 835 | 3.2 | |
| | A460 | 600 | 500 | 3.2 | |
| | D35 | 50 | 50 | 2.6 | |
| Picture size | | 4:3 | | 16:9 | |
| | | W [mm] | H [mm] | W [mm] | H [mm] |
| | A1066 S | variable | 810 | - | - |
| | A1066 H | Variable | 780 | - | - |
| | A460 | 460 | 345 | 460 | 303.75 |
| | D35 | 32 | 24 | - | - |
| Material | H: Photographic paper, matt finishing, resolution 9-10 LP/mm S: Specific matt paper, resolution 3-4 LP/mm D35: Photographic film | | | | |
| Mounting | aluminum composite panel (A1066) aluminum (A460) Slide frame (D35) | | | | |
| Edge protection | none (A1066, D35) fabric tape (A460) | | | | |
| Chart size tolerances | Up to +/- 0.5 mm as they are handmade in-house and no edge protection is used (A1066) Up to +/- 2 mm as they are handmade in-house and fabric tape is used (A460) | | | | |
| Service life | All types 3 years | | | | |
| Storage | Dark, dry, and free from harmful gas (e.g., formaldehyde or ozone). 20 °C and 25 °C with a humidity of 60% – 65% and no direct sunlight at any time. | | | | |
| Scope of delivery | test chart, cardboard box (except A1066), acceptance protocol | | | | |

Miscellaneous

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|------------------------------|---|
| Evaluation / Assessment | supported by iQ-Analyzer |
| Reference data iQ-Analyzer-X | Not applicable |
| Measurement device | X-Rite eXact (reflective charts) https://www.image-engineering.de/content/products/charts/IE_reference_data_accuracy.pdf |
| Standards | ISO 12233 Resolution and special frequency responses |
| Terms & Conditions | image-engineering.de/terms-and-conditions |

* if chart fills the image height the chart can be used with a camera of minimum/maximum sample rate, stated in mega pixel (MP)

** HDTV ~ 2.1 MP, 4K ~ 8.3 MP, 8K ~ 33 MP

*** no lower limit for Slanted Edges, small ROI increases variance, min. 100-pixel ROI required

**** OD = optical density