



# CD DISC TESTING BY MEDIA SCIENCES



CD-ROM and recorded CD-R discs are fully evaluated by electrical parameter and error testing using a stable 1X single beam test drive. Accurate, objective electrical test results, together with additional visual, mechanical, and logical tests, verify conformance to standards and specifications that assure interchange and longevity.

## RECOMMENDED TESTS

TEST TYPE	NUMBER OF DISCS TESTED (1)		
	VENDOR EVALUATION	TROUBLE-SHOOTING	QUALITY EVALUATION
<i>All discs serialized</i>			
All Frames	5	1	1
Quick Scan	0	0	4 (2)
<b>REPORTS PROVIDED</b>			
Summary Report	✓	✓	
Variance Report	✓	✓	
Evaluation Report	✓	✓	✓
Test Values	✓	✓	✓
Test Data Graphs	✓	✓	All Frames Only

(1) Samples recorded to full capacity are preferable.

(2) Quick Scan uses 5 second data samples every 60 seconds of Atime.

**Vendor evaluation** tests define product quality based on comprehensive test data, and provide information that can be used for vendor selection or process capability studies.

**Troubleshooting** pinpoints defects for corrective action. Key performance tests identify and help to correct *mysterious* problems that appear and disappear.

**Quality evaluation** is recommended for lot acceptance or for regular quality monitoring of approved vendors.

## STANDARD CD DISC QUALITY TESTS OF MEDIA SCIENCES

**Reflectance** tests the reflectivity of the metallic coating by measuring the top, or highest value, of the data signal.

**Radial Tracking**, or push-pull, measures the slope, or sensitivity, of the low frequency tracking signal. **Radial Noise** evaluates high frequency fluctuations of this signal.

**HF** measures the ratio of peak-to-peak data signal to the top. It is measured at the highest data frequency, time interval 3T, and at the lowest data frequency, time interval 11T.

**Asymmetry** compares positive data signal excursions with respect to the decision level to negative data signal excursions with respect to the same decision level.

**Cross Talk** is the ratio of off-track HF signal amplitude to the on-track amplitude of the beam.

**Format** tests evaluate conformance of the media volume and file structure to ISO 9660 and its applicable extensions.

**Burst** errors indicate that seven or more successive frames contain two or more error bytes at the first level of correction.

**BLER** measures the frame error rate at the input to the error correction circuitry.

**E11, E21, and E31** give error rates for one, two, or more errors per frame at the first level of error correction. **E12, E22, and E32** provide error rates for one, two, or more errors per frame at the second level of error correction.

**Jitter and Length Deviation** evaluate instantaneous and average variations in the time position of the channel bits.

**Mechanical Tests** evaluate center hole and outside rim burrs and diameters, radial eccentricity, outer rim concentricity, axial deflection, thickness, radial and tangential tilt, weight, and static unbalance. **Visual Inspection** detects defects or damage that can interfere with interchange.

*Our extensive experience enables us to provide standard CD tests or to tailor a test plan to fit your needs.*

### MEDIA SCIENCES, INC.

221 Boston Post Road East, Suite 470, Marlborough, MA 01752-3527 U.S.A.

<http://www.msscience.com/> [jhartke@mscience.com](mailto:jhartke@mscience.com) tel: +508-480-9338 fax: +508-480-9544

# CD DISC TEST PLANS AND REPORTS

Media Sciences conducts tests in accordance with appropriate ISO Standards or generally accepted industry practices using carefully calibrated test equipment, and follows a **TEST PLAN** that defines tests to be performed, number of samples for each test, defect limits for each test, and accept/reject criteria for the lot under test. Clients may submit a **TEST PLAN**, or may request that Media Sciences prepare the plan. In the absence of a **TEST PLAN**, Media Sciences will reject the lot under test upon the occurrence of one or more test samples containing critical defects or two or more samples having major defects.

QUALITY EVALUATION REPORT		
Variable	No. Accepted	No. of Defects
Reflectance		
Radial Tracking		
Radial Noise		
HF, I3/I <sub>top</sub>		
HF, I11/I <sub>top</sub>		<b>TEST</b>
Asymmetry		
Cross Talk		
Burst (Peak 10 s total)		
BLER (10 s disc avg.)		
BLER (Peak 1 s avg.)		
E11 (Peak 10 s avg.)		
E21 (Peak 10 s avg.)		<b>RESULTS</b>
E31 (Peak 10 s avg.)		
E12 (Peak 10 s avg.)		
E22 (Peak 10 s avg.)		
E32 (Peak 10 s total)		
Jitter		
Length Deviation		
Mechanical		
Visual		
Post-Gap		

QUALITY EVALUATION TEST RESULTS		
Variable	Unit	Serial Number
Reflectance	%	
Radial Tracking	—	
Radial Noise	μm	
HF, I3/I <sub>top</sub>	—	
HF, I11/I <sub>top</sub>	—	<b>TEST</b>
Asymmetry	%	
Cross Talk	%	
Burst (Peak 10 s total)	—	
BLER (10 s disc avg.)	per sec.	
BLER (Peak 1 s avg.)	per sec.	
E11 (Peak 10 s avg.)	per sec.	
E21 (Peak 10 s avg.)	per sec.	<b>RESULTS</b>
E31 (Peak 10 s avg.)	per sec.	
E12 (Peak 10 s avg.)	per sec.	
E22 (Peak 10 s avg.)	per sec.	
E32 (Peak 10 s total)	—	
Jitter	ns	
Length Deviation	ns	
Mechanical	—	
Visual	—	
Post-Gap	—	

VARIANCE REPORT	
Major Positive Variances	Test results that clearly indicate above average performance.
Minor Positive Variances	Observations or test results that are above average and may result in above average performance.
Major Negative Variances	Test results that clearly indicate unacceptable performance.
Minor Negative Variances	Observations or test results that are below average and may result in below average performance.

MECHANICAL & VISUAL RESULTS		
Variable	Unit	Serial Number
Center Hole Diameter	mm	
Center Hole Burr	—	
Outside Rim Diameter	mm	
Outside Rim Burr	—	
Radial Eccentricity	μm	<b>TEST</b>
Rim Concentricity	mm	
Axial Deflection	mm	
Thickness	mm	
Radial and Tangential Tilt	deg.	
Bubble	—	
Black Spot	—	
Scratch	—	
Spot or Stain	—	<b>RESULTS</b>
Label	—	
Identification Band	—	
Weight	gm	
Static Unbalance	gm•mm	

Test results exceeding limits may be ranked as **CRITICAL**, **MAJOR**, or **MINOR** defects. **CRITICAL DEFECTS** are expected to cause unpredictable interchange failures. Upon their occurrence, use of the product should be discontinued until effective corrective action has been confirmed. Product recall may also be necessary. **MAJOR DEFECTS** reflect significant interchange risks. Either enhanced quality monitoring should be used while prompt corrective action is taken, or product usage should be halted. **MINOR DEFECTS** indicate significant, but marginal flaws. Product usage may continue while corrective action is taken by the manufacturer.