



DVD-ROM REPLICA TESTING BY MEDIA SCIENCES



Replicated DVD-ROM discs are fully evaluated by electrical parameter and error testing using a stable 1X test drive. Accurate, objective electrical test results, together with additional visual and mechanical tests, verify conformance to standards and specifications, and provide a high level of confidence in interchange and longevity.

RECOMMENDED TESTS

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

(1) Samples recorded to full capacity are preferable.

(2) Quick Scan uses 0.1 mm data samples every 1 mm of radius.

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 DVD 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.

Differential Phase Tracking and **Tangential Push-Pull** evaluate low frequency radial tracking signal quality. **Radial Noise** evaluates high frequency fluctuations of this signal.

Residual Radial and Axial Errors measure low frequency radial and axial mistracking.

HF Tests evaluate the quality of the data signal at the highest and lowest signal frequencies, time intervals 3T and 14T.

Cross-Track is the difference between off-track and on-track average HF signal amplitude divided by the off-track value.

Jitter is the standard deviation of time variations of bit positions relative to the channel bit clock.

Information Diameters define start lead-in and end lead-out.

Data Diameters define end lead-in and start lead-out.

PI Errors measure the number of PI rows in eight ECC blocks that each contain one or more errors. **PI Fails** count the number of uncorrectable PI rows in one ECC block. **PO Fails** occur when one ECC block contains uncorrectable errors.

Large Defect Length and Count measure the total length and number of defects, each larger than 30 μm , over a distance of 80 mm along the track.

Mechanical Inspection evaluates center hole and outside rim diameters, absence of center hole burrs, radial eccentricity, outer rim concentricity, axial deflection, thickness, radial and tangential tilt, weight, and static unbalance.

Visual Inspection identifies defects such as bubbles, black spots or pinholes, scratches, spots, stains, cloudiness, or debris that can adversely affect performance, causing interchange failure in some drives but not in others.

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

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DVD-ROM REPLICA 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, I14H		
Delta I14H		
Differential Phase Tracking Amplitude		
Differential Phase Tracking Asymmetry		
Tangential Push-Pull		
Radial Noise		TEST
Residual Radial Error		
Residual Axial Error		
HF Amplitude, I14/I14H		
HF Resolution, I3/I14		
HF Asymmetry		
Cross-Track		
PI Errors		RESULTS
PI Fails		
PO Fails		
Large Defect Count		
Large Defect Length		
Jitter		
Average Track Pitch		
Scanning Velocity		
Start and End Information Diameters		
Start and End Data Diameters		

QUALITY EVALUATION TEST RESULTS

Variable	Unit	Serial Number
Reflectance, I14H	%	
Delta I14H	—	
Diff. Phase Track. Ampl.	—	
Diff. Phase Track. Asym.	—	
Tangential Push-Pull	—	
Radial Noise	nm rms	TEST
Residual Radial Error	nm	
Residual Axial Error	μm	
HF Amplitude, I14/I14H	—	
HF Resolution, I3/I14	—	
HF Asymmetry	—	
Cross-Track	—	
PI Errors	—	RESULTS
PI Fails	—	
PO Fails	—	
Large Defect Count	—	
Large Defect Length	μm	
Jitter	%	
Average Track Pitch	μm	
Scanning Velocity	m/s	
Start/End Info. Diam.	mm	
Start/End Data Diam.	mm	

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	
Radial Eccentricity	μm	
Rim Concentricity	mm	TEST
Axial Deflection	mm	
Thickness	mm	
Radial and Tangential Tilt	deg.	
Bubble	—	
Black Spot	—	
Scratch	—	
Spot or Stain	—	RESULTS
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.