

Specifications for MAM-A DVD-R Media

This document contains the media specifications for DVD-R supplied from MAM-A.

1. Application

This specification is applied to the 120 mm diameter DVD-R disc that is produced by MAM-A. The items not described here are subject to DVD Specification for Recordable Disc for General (DVD-R for General) version 2.0.

2. Product Summary

This product can be recorded once in DVD format and played.

3. Environmental Conditions

1) Environmental conditions for use	Temperature: -25° C to 70° C Relative humidity: 3% to 95% Absolute humidity: 0.5 to 60 g/m ³ Temperature variation: 15° C /h max. Relative humidity variation: 10% /h max. (There shall be no condensation of moisture on the disc.)
2) Environmental conditions during recording	Temperature: -5° C to 55° C Relative humidity: 3% to 95% Absolute humidity: 0.5 to 30 g/m ³
3) Storage conditions	Temperature: -20° C to 50° C Relative humidity: 5% to 90% Absolute humidity: 1 to 30 g/m ³ Atmospheric pressure: 75 to 105 kPa Temperature variation: 15° C /h max. Relative humidity variation: 10% /h max.

4. Measuring Conditions

1) Environmental conditions	Temperature: 15° C to 35° C 23 ± 2° C (for dim. measurement) Relative humidity: 45% to 75% 50 ± 5% (for dim. measurement) Atmospheric pressure: 86 to 106 kPa
2) Measuring conditions (PUH) Unrecorded disc	Wavelength: 650 ± 10/ -5 nm Polarization: Circularly polarized light Numerical aperture (NA): 0.60 ± 0.01 Light intensity at the rim of the pupil of the objective lens: Over 40% of the maximum intensity level in the radial direction and over 50% of the maximum intensity level in the tangential direction.
3) Measuring conditions (PUH) Recorded disc	Wavelength: 650 ± 10/ -5 nm Polarization: Circularly polarized light Numerical aperture (NA): 0.60 ± 0.01 Light intensity at the rim of the pupil of the objective lens: 60% to 70% of the maximum intensity level in the radial direction and over 90% of the maximum intensity level in the tangential direction.
4) Measuring scanning velocity	3.49 ± 0.03 m/sec.
5) Clamping	Clamping force: 2.0 ± 0.5 N

5. Mechanical Parameters

Items	Requirements	Measuring methods or conditions
Outer diameter:	120.00 ± 0.30 mm	
Maximum rotation run out of outer edge:	0.30 mm max. (peak to peak)	
Center hole diameter (one side of disc):	15.00 + 0.15/ -0.00 mm	

Center hole diameter (both sides put together):	15.00 mm min.	
Thickness of a disc:	1.20 + 0.30/ -0.06 mm	Includes adhesive layer
Inner diameter of the clamping area:	22.0 mm max.	
Outer diameter of the clamping area:	33.0 mm max.	
Thickness of a disc in the clamping area:	1.20 + 0.20/ -0.10 mm	
Mass of a disc:	13g to 20g	

6. Optical Parameters

Items	Requirements	Measuring methods or conditions
Thickness of a transparent substrate:	0.6 + 0.020/ -0.025 mm	
Refractive index (RI):	1.55 ± 0.10	
Birefringence of transparent substrate:	100 nm max.	Double pass
Limits for the angular deviation of the reflected beam		
Radial deviation:	± 0.80°	
Tangential deviation:	± 0.30°	
Reflectivity:	45% to 85%	PUH with PBS
Polarity of modulation:	High to low	
Outer diameter of the clamping area:	33.0 mm max.	
Recording sensitivity fluctuation over the surface:	Po ± 0.05 Po	

7. Recorded Parameters

Items	Requirements	Measuring methods or conditions
Sense of disc rotation as seen from readout side:	Counterclockwise	
Limit for the velocity variation for the laser beam recorder:	0.5% max. (peak to peak)	
Channel bit length averaged over whole disc:	133.3 ± 1.4 nm	
Track pitch:	Continuous spiral from inside to outside	
Starting diameter of the lead-in area:	45.2 mm max.	
Starting diameter of the data area:	48.0 + 0.0/ -0.4 mm	
Maximum outer diameter of the data area:	116.0 mm	
Outer diameter of the information area:	70.0 mm min.	
	Outer diameter of data area: + 2.0 mm min. 117 mm min.	
Inner diameter of the lead out area:	Outer diameter of the data area	
Outer diameter of the lead out area:	Outer diameter of the information area	
Track pitch		
Average track pitch:	0.74 ± 0.01 micron	
Maximum deviation of track pitch:	0.74 ± 0.03 micron	
Limits of the radial deviation from the recorded layer perpendicular to the reference plane		
Deviation from nominal value below the rotational frequency determined by scanning velocity:	± 0.3 mm	
Limits of the radial deviation from the track		
Radial run out of the tracks determined by the scanning velocity:	70 microns (peak to peak)	

8. Operational Signals (Recorded Disc)

Items	Requirements	Measuring methods or conditions
Jitter	<8%	Recorded by optimum write strategy.
Modulated amplitude		
I14/I14H:	0.60 min.	
I3/I14:	0.15 min.	
(I14Hmax. -I14Hmin.) /I14Hmax.:		
Within one read out surface of a disc:	0.33 max.	
Within one revolution:	0.15 max.	
Signal asymmetry:	-0.05 to 0.15	
Track crossing signal:	0.10 min.	
Differential phase tracking error signal (DPD)		
Amplitude:	0.5 to 1.1	At 0.1 micron radial offset
Asymmetry:	0.2 max.	
Tangential push-pull signal:	0.9 max.	
Read conditions		
Power of the read spot:	1.0 mW	

9. Operational Signals (Unrecorded Disc)

Items	Requirements	Measuring methods or conditions
Radial push-pull tracking error signal (PPb)		
PPb signal amplitude:	$0.22 < PPb < 0.44$	
Variation in PPb signal (ΔPPb):	$\Delta PPb < 15\%$	
Push-pull ratio (PPr):	$0.5 < PPr < 1.0$	
Recording conditions general		
recording strategy	In groove	
Optimum recording power range:	6.0 Po 12.0 mW	
Bios Power:	Pb 0.7 mW	
Recording power window:	Po \pm 0.25 mW	

10. Addressing Signals

Items	Requirements	Measuring methods or conditions
Land Pre-pit signal		
Signal amplitude before recording (LPPb):	$0.18 < LPPb < 0.28$	
Aperture ratio after recording (AR):	AR > 10%	
Block error ratio of LPPb:	BLERb < 3%	
Groove wobble signal		
Locking frequency for the groove wobble:	Sync frame frequency x 8	
CNR of wobble before:	> 35 dB	RBW = 1 kHz
CNR of wobble after:	> 31 dB	RBW = 1 kHz
Normalized wobble signal (NOW):	$0.06 < NOW < 0.10$	
PWP:	$90 \pm 10^\circ$	

11. Defects

Items	Requirements	Measuring methods or conditions
Random error (PI error):	<280	In 8 ECC block
Local defects		
Air bubble (in the substrate):	< 100 microns in diameter	
Black spot:	< 200 microns in diameter	
Black spot that causes no birefringence:	< 300 microns in diameter	