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1. Scope
 

This document is applicable to 120mm BD Recordable disc which product no. is described on the cover page of this document. Unless otherwise specified in this document, the products conform to the "System Description Blu-ray Disc Recordable Format Part1 Basic Format Specifications Version 1.2".
2. General parameters
 

User data capacity	: 25 Gbytes
Wavelength of laser diode	: 405 nm
Numerical aperture of objective lens	: 0.85
Track pitch	: 0.32 $\mu\text{m}$
Disc diameter	: 120 mm
Disk thickness	: 1.2 mm
Data area inner radius	: 24 mm
Data area outer radius	: 58 mm
3. Environmental conditions
  - 3.1 Operating environment
 

Temperature	: 5 to 55 $^{\circ}\text{C}$
Relative humidity	: 3 to 90 %
Absolute humidity	: 0.5 to 30 $\text{g}/\text{m}^3$
  - 3.2 Storage environment
 

Temperature	: -10 to 55 $^{\circ}\text{C}$
Relative humidity	: 5 to 90 %
Absolute humidity	: 1 to 30 $\text{g}/\text{m}^3$
Atmospheric pressure	: 60 to 106 kPa
Temperature variation	: 15 $^{\circ}\text{C}/\text{h}$ max.
Relative humidity variation	: 10 %/h max.
4. Measuring conditions
  - 4.1 Environmental conditions
 

Ambient temperature	: $23 \pm 2$ $^{\circ}\text{C}$
Relative humidity	: 45 to 55 %
Atmospheric pressure	: 86 to 106 kPa
  - 4.2 Pick Up Head
 

Wavelength	: $405 \pm 5$ nm
Polarization	: circularly polarized light
Numerical aperture	: $0.85 \pm 0.01$
  - 4.3 Measuring scanning velocity
 

	: 4.92 m/s (1x-speed)
	: 9.83 m/s (2x-speed)
	: 19.66m/s (4x-speed)

5. Read and recording conditions
- 5.1 Read conditions
- a. Power of the read spot : 0.3 mW typical
- 5.2 Recording conditions
- a. Recording position : on groove
- b. Optimum recording power (Pwo) & optimum space power (Pso) : determined by OPC & Disc Information
- c. Optimum recording power range :  $3.0 \leq Pwo \leq 6.0$  mW (1x-speed)  
:  $3.0 \leq Pwo \leq 7.0$  mW (2x-speed)  
:  $4.0 \leq Pwo \leq 10.5$  mW (4x-speed)
- d. Optimum space power range :  $0.3 \leq Pso \leq 4.0$  mW (1x-speed)  
:  $0.3 \leq Pso \leq 5.4$  mW (2x-speed)  
:  $0.3 \leq Pso \leq 5.4$  mW (4x-speed)
- e. Bias Power :  $0.1 \leq Pbwo \leq 4.0$  mW(1x-speed)  
:  $0.1 \leq Pbwo \leq 7.0$  mW(2x-speed)
- f. Optimum middle power(CA only) :  $1.50 \leq Pmo \leq 7.0$  mW(2x-speed)  
:  $2.0 \leq Pmo \leq 10.5$  mW(4x-speed)
6. Mechanical parameters
- 6.1 Outer diameter and run-out of outer edge
- Outer diameter :  $120.0 \pm 0.3$  mm
- Run-out of outer edge : 0.30 mm p-p max.
- 6.2 Center hole
- Center hole diameter :  $15.00 +0.10/-0.00$  mm
- Edge shape : no burr on the edge of the center hole  
at the read-out side
- 6.3 Maximum thickness of the disc : 1.40 mm
- 6.4 Mass of the disc
- Mass of the disc : 12 to 17 g
- Moment of inertia :  $0.032$  g·m<sup>2</sup> max.
- Dynamic imbalance : 2.5 g·mm max.
- 6.5 Clamping area
- Inner diameter of the clamping area : 23.0 mm max.
- Outer diameter of the clamping area : 33.0 mm min.
- Thickness of the disc within the clamping area :  $1.20 +0.10/-0.05$  mm
- 6.6 Information area
- Starting diameter of the PIC : 44.0 to 44.4 mm
- Starting diameter of the data area :  $48.0 +0.0/-0.2$  mm
- Maximum outer diameter of the data area :  $116.0 +0.2/-0.0$  mm
- 6.7 Axial run-out
- a. The distance between each Recording Layer and the reference plane at a scanning velocity 4.917m/s over the entire disc :  $\pm 0.30$  mm max.  
within one revolution :  $\pm 0.10$  mm max.
- b. The residual axial tracking error below 3.2kHz measured using the reference servo. : 80 nm max.
- c. The axial r.m.s. noise between 3.2kHz to 20 kHz measured using the reference servo. : 32 nm max.
- 6.8 Radial run-out

- a. The radial run-out of the tracks at a scanning velocity 4.917m/s  
: 75  $\mu\text{m}$  p-p max.
  - b. The residual radial tracking error below 3.6kHz measured using the reference servo.  
: 20 nm max.
  - c. The radial r.m.s. noise between 3.6kHz to 20 kHz measured using the reference servo.  
: 9.2 nm max.
7. Optical parameters
- 7.1 Thickness of the Cover Layer
    - reference thickness : 95 to 105  $\mu\text{m}$  ( refractive index = 1.6 )
    - maximum deviation of the thickness from the reference :  $\pm 2$   $\mu\text{m}$  max.
  - 7.2 Refractive index of the Cover Layer : 1.45 to 1.70
  - 7.3 Limits for the angular deviation of the reflected beam
    - a. Radial deviation :  $\pm 0.60^\circ$  max.
    - b. Tangential deviation :  $\pm 0.30^\circ$  max.
  - 7.4 Reflectivity of the recorded disc : 11 to 24 %
  - 7.5 Polarity of modulation : high to low
8. Track geometry
- 8.1 Direction of the disc rotation as seen from the read-out side : counter-clockwise
  - 8.2 Track pitch
    - a. Average track pitch
      - in the embossed HFM disc area: :  $0.350 \pm 0.003$   $\mu\text{m}$
      - in the Recordable disc area: :  $0.320 \pm 0.003$   $\mu\text{m}$
    - b. Maximum deviation of track pitch
      - in the embossed HFM disc area: :  $0.350 \pm 0.010$   $\mu\text{m}$
      - in the Recordable disc area: :  $0.320 \pm 0.010$   $\mu\text{m}$
  - 8.3 Location of the BCA : between 21.3 -0.3/+0.0 mm and 22.0 -0.0/+0.2 mm
9. Operational signals
- 9.1 High Frequency signal (recorded disc)
    - a. Jitter
      - multi-track writing: : less than 7.0 %
    - b. Modulated amplitude
      - I8PP / I8H : 0.40 min.
      - I3PP / I8H : 0.25 min.
      - I8PP / I8H max
        - within one disc : 0.33 max.
        - within one revolution : 0.15 max.
    - c. Signal asymmetry
      - $[(I8H + I8L) - (I2H + I2L)]/2(I8H - I8L)$  : -0.10 to 0.15
  - 9.2 Servo signal
    - 9.2.1 HFM Area
      - a. Push Pull Signal : 0.26 to 0.52
    - 9.2.2 Data Area
      - a. Push Pull Signal : 0.21 to 0.45
      - b. Push Pull variation
        - within 150trk : 0.15 max

	within one layer	: 0.25 max
	c. Push Pull Ratio	: 0.75 to 1.25
9.3	Wobble signals	
9.3.1	HFM Area	
	a. NHWSmin	: 0.30 to 0.60
	b. NHWSmax / NHWSmin	: 3.0 max
	c. HFM Jitter	: 4.5% max
9.3.2	Data Area	
	a. NWS	: 0.20 to 0.55
	b. NWSmax / NWSmin	: 3.0 max
	c. Wobble CNR	: > 26 dB
9.4	Symbol Error Rate	
	Random Symbol Error Rate	: $\leq 2.0e-4$
9.5	BCA signal	
	a) $I_{dc\_LPF} / I_{s\_LPF}$	: 2.0 min
	b) Distance between the leading edge of nT	: $n*5.8 \pm 1.3$ us
	c) Distance between the trailing edge of nT	: $n*5.8 \pm 1.3$ us
	d) Pulse width	: 0.9 to 3.9 us
10.	Reliability	
10.1	Read stability	: > 1,000,000 times ( Pr 0.4 mW at 25 °C)