TANDBERG DLT7000

REFERENCE MANUAL

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Publ. No.	Part No.	Title
9120	43 18 88	Tandberg DLT7000 Installation Guide
9121	43 18 92	Tandberg DLT7000 SCSI Interface - Functional Specifications

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1. Technical Specifications

1.1. About This Manual

This manual, the Tandberg DLT7000 Reference Manual contains specifications for the Tandberg DLT7000 tape drive, including:

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2. Physical Descriptions

2.1. Tandberg DLT7000 Drive Physical Specifications

Key physical specifications of the Tandberg DLT7000 tape drive:

Description	Drive 5 1/4 inch FH (modified depth)	Table Top
Height	82.5 mm (3.25 in) without bezel 86.3 mm (3.4 in) with bezel	124 mm (4.87 in)
Width	144.91 mm (5.705 in) behind bezel 149.1 mm (5.87 in) with bezel	229 mm (9.0 in)
Length	228.6 mm (9.0 in) measured from back of front bezel 243.8 mm (9.6 in) including the bezel	325 mm (12.75 in)
Weight	2.9 kg (6 lb, 7 oz)	6.63 kg (14 lb, 9 oz)
Shipping Weight	3.86 kg (8 lb, 8 oz) depending on configuration	10.01 kg (22 lb, 0.4 oz) depending on configuration
Environmental temperature		
Operating	10°C to 40°C (50°F to 104°F)	10°C to 40°C (50°F to 104°F)
Nonoperating	-40°C to 66°C (-40°F to 150.8°F)	-40°C to 66°C (-40°F to 150.8°F)
Humidity		
Operating	20% to 80% noncondensing	20% to 80% noncondensing
Nonoperating	10% to 95%	10% to 95%
Certifications		
EMI	Meets CEmark Class A, VCCi Class 1, CISPR 22 Class A, FCC Class A devices	Meets CEmark Class B, VCCi Class 2, CISPR 22 Class B, FCC Class B devices
Safety	Meets UL, CSA, TUV, "BG" MARK and IEC standards	Meets UL, CSA, TUV, "BG" MARK and IEC standards
Airflow		
Operating Air Velocity	125 LFM average air velocity measured directly in front of the bezel	125 LFM average air velocity measured directly in front of the bezel
Electrical rating (Auto ranging)	N/A D.C.	100 to 240 Vac, A.C.
Power Requirements	37 W steady state; 47 W, maximum	44 W; 0.67 A @ 110 Vac.
Power Consumption		
+5 (±5%)* Volt Bus	3.6 A steady state; 3.8 A maximum	N/A
+12 (±5%)* Volt Bus	1.6 A steady state; 2.6 A maximum	N/A

NOTE: Maximum values are for 300 ms duration's, approximately.

Communication interface	SCSI-2 bus 16 bits fast wide (single-ended or differential)	SCSI-2 bus 16 bits fast wide (single-ended or differential).
MTBF	200,000 hours	200,000 hours

*Voltage measured at the power bus connector pins.

Table 2-1 Tandberg DLT7000 Physical Specifications

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3. Tandberg DLT7000 Drive Functional Specifications

3.1. Key Functional Specifications

Table 3-1 lists the key functional specifications of the Tandberg DLT7000 tape drive.

Functional	Specifications
DLTtape IV Cartridge	
Capacity/formatted native	35.0 GB (extended 1778 ft. tape) user data
Capacity/formatted compressed 2:1[1]	70.0 GB (extended 1778 ft. tape) user data
DLTtape IIIxt Cartridge	
Capacity/formatted native	15.0 GB (extended 1778 ft. tape) user data
Capacity/formatted compressed 2:1[1]	35.0 GB (extended 1778 ft. tape) user data
DLTtape III Cartridge	
Capacity/formatted native	10.0 GB (standard 1167 ft. tape) user data
Capacity/formatted compressed 2:1[1]	20.0 GB (standard 1167 ft. tape) user data
Interface	16 bit fast wide SCSI-2, single ended or differential
Drive Type	DLT, streaming, 35.0/70.0 GB-16 bit, single end or differential (optional)
Recording Type	2-7 RLL code with DLT2000 drive, DLT2000xt drive, DLT4000 drive or DLT7000 drive format, MFM with 2.6 GB/6.0 GB format
Form Factor	5-¼ inch, F.H. modified depth
Transfer Rate, Raw Native	6.8 MBytes/second[2]
Transfer Rate, User Native Uncompressed	5.2 MBytes/second
Transfer Rate, User Compressed[1]	Up to 10 MB/sec
Error Rate (Recoverable)	1 in 10^{17}
Error Rate (Undetectable)	1 in 10^{27}
Tracks	208; 52 quads
Linear Bit Density	85,937 bpi/per track (extended 1778 ft. tape)

1 Nominal compression ratio. Actual compression is data dependent.

2 Included format data, user data, post amble, and so forth for extended tape.

Table 3-1 Tandberg DLT7000 Functional Specifications

3.2. Identifying the Correct AC Power Cord

WARNING!
Do not attempt to modify or use an external 100 - 115 VAC power cord for 220 - 240 VAC input power. Modifying the power cord can cause personal injury and severe equipment damage.

An AC power cord was supplied with your unit. Carefully inspect it and make sure that it is the correct one for your country or region based on the criteria listed below. If you feel the supplied AC power cord is not correct, contact your authorized Tandberg Data service representative.

The AC power cord used with this equipment must meet the following criteria:

1. UL and CSA Certified cordage rated for use at 250 VAC with a current rating that is at least 125% of the current rating of the product. In Europe, the cordage must have the <HAR> mark.

2. The AC plug must be terminated in a grounding-type male plug designed for use in your country. It must also have marks showing certification by an agency acceptable in the country.

3. The connector at the product end must be an IEC type CEE-22 female connector.

4. The cord must be no longer than 14.5 feet (4.5 meters).

NOTE:
The power cord should be a minimum of 18/3 AWG, 60°C, Type SJT or SVT.

Figure 3-1 shows the different AC power cord plug configurations for 115V and 220V/240V usage.

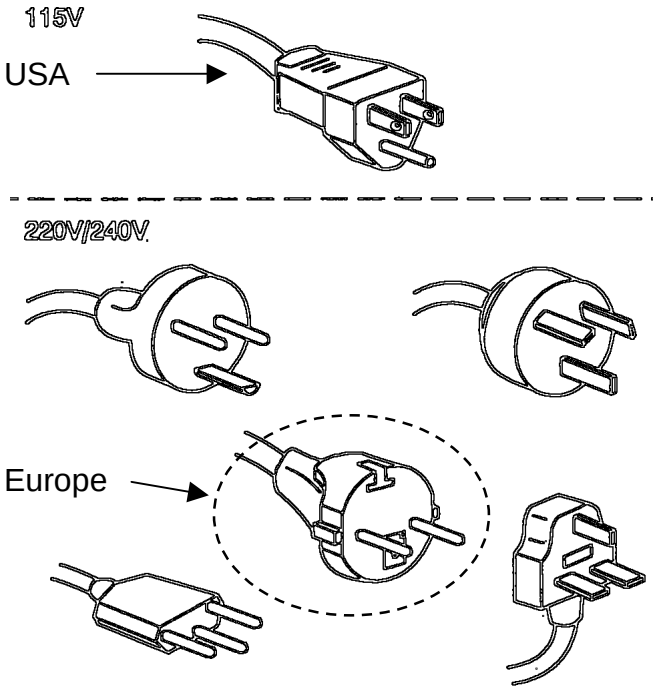

Figure 3-1 Power Cords

3.3. Tandberg DLT7000 Tape Drive Mounting Hole Descriptions

Figure 3-2 shows the mounting holes and dimensions in a top view of the Tandberg DLT7000 drive.

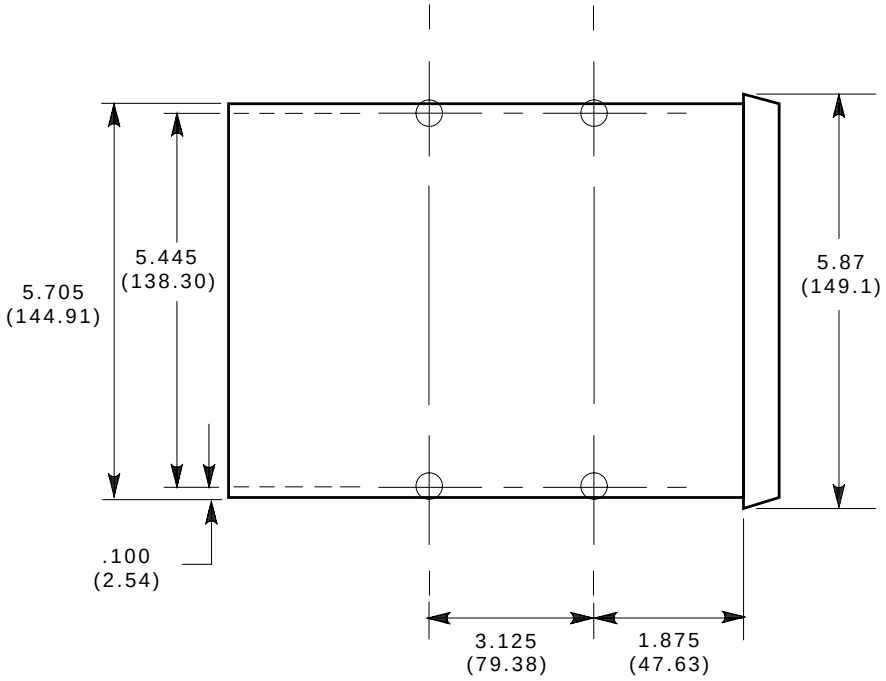

Figure 3-2 Mounting Hole Dimensions (Top View)

Tape drive width and height are standard 5-1/4 inch disk drive form factor measurements. Both dimensions hold tolerances of ± 0.020 inches. Depth dimensions have tolerances of +00, -0.040 in. Mounting holes are threaded 6-32 UNC.

Figure 3-3 shows the mounting holes and dimensions in a side view of the Tandberg DLT7000 drive.

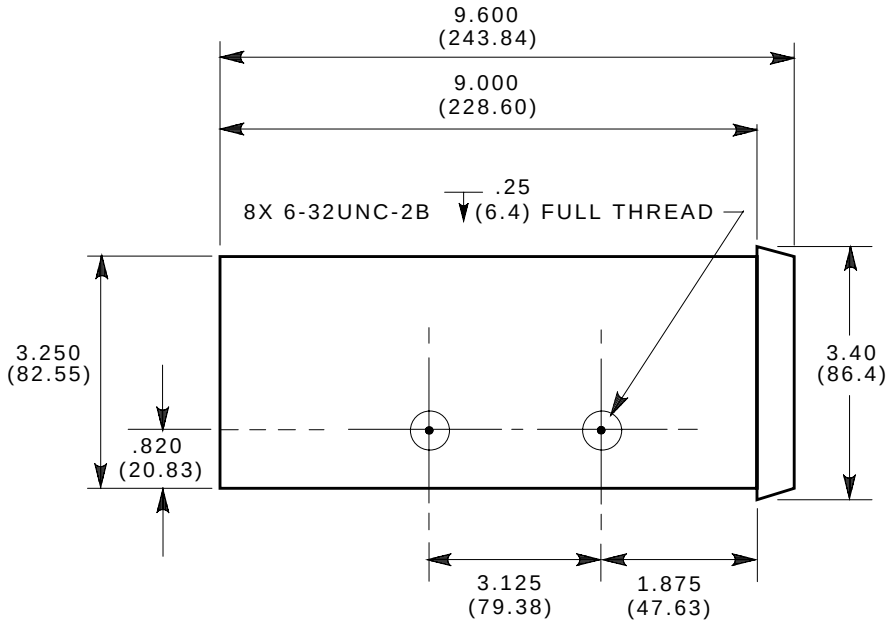

Figure 3-3 Mounting Hole Dimensions (Side View)

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4. Performance Specifications

Chapter 4 describes performance specifications including:

4.1. Nominal Tape Tension

Nominal tape tension is:

- 3.0 ± 1 oz when stationary
- 4.7 ± 1 oz at operating speed

4.2. Tandberg DLT7000 Timing Characteristics

Table 4-1 lists timing characteristics of the Tandberg DLT7000 tape drive:

Read/Write Tape Speed	160 in/sec
Rewind Tape Speed	175 in/sec
Linear Search Tape Speed	175 in/sec
Average rewind time	60 sec
Maximum rewind time	120 sec
Average access time (from BOT)	60 sec
Maximum access time (from BOT)	120 sec
Load to BOT—previously written	37 sec; if using a blank tape, time is slightly longer.
Unload from BOT	17 sec

Table 4-1 Tandberg DLT7000 Timing Characteristics

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5. Environmental Specifications

Chapter 5 describes environmental specifications including:

The tape drive conforms to an environment that includes general offices and workspaces with:

- Conditioned and marginally-conditioned areas with central or remote air-conditioning
- Complete temperature and humidity controls
- Moderate control tolerances
- Systems capable of maintaining comfort levels (for example, typical offices and general work areas)

The tape drive does not conform to environments that consist of:

- Marginal heating or cooling apparatus
- No humidity conditioning
- Uncontrolled tolerances
- Systems inadequate to maintain constant comfort levels (for example, marginal offices and work spaces)

5.1. Temperature and Humidity

Table 5-1 lists the operating temperature and humidity ranges.

Dry Bulb Temperature Range	10 to 40°C
Wet Bulb Temperature	25°C
Temperature Gradient	11°C/h (across the range)
Temperature Shock	10°C (over two minutes)
Relative Humidity	20 to 80% noncondensing
Humidity Gradient	10%/h

Table 5-1 Operating Ranges

Table 5-2 lists the power-on ranges.

Dry bulb temperature	10 to 40°C
Wet bulb temperature	25°C
Temperature gradient	15°C/h (across the range)
Temperature shock	15°C (over two minutes)
Relative humidity	10 to 90%
Humidity gradient	10%/h

Table 5-2 Power-on Ranges—No Tape Loaded (Unpacked - 72 hours)

Table 5-3 lists the storage ranges.

Dry bulb temperature	-40 to 66°C
Wet bulb temperature	46°C
Temperature gradient	20°C/h with 5° margin (across the range)
Temperature shock	15°C with 5° margin (over two minutes)
Relative humidity	10 to 95% noncondensing
Humidity gradient	10%/h

Table 5-3 Storage Ranges (Unpacked or Packed)

Table 5-4 lists the shipment ranges:

Dry bulb temperature	-40 to 66°C
Wet bulb temperature	46°C
Temperature gradient	25°C/h with 5° margin (across the range)
Temperature shock	15°C with 5° margin (over two minutes)
Relative humidity	10 to 95% noncondensing
Humidity gradient	10%/h

Table 5-4 Shipment Ranges

5.2. Altitude

The tape drive operates in normal pressures from -500 to 30,000 feet.

6. Vibration and Shock Specifications

Chapter 6 describes environmental specifications:

Topic	Section
◆ Operating Vibration and Shock	6.1
◆ Nonoperating Vibration and Shock	6.2.

6.1. Operating Vibration and Shock

Table 6-1 lists operating vibration specifications and Table 6-2 lists operating shock specifications.

Vibration type	Sine	Sweep
Frequency range	5–500–5 Hz	Upward and downward sweep
Acceleration level	0.25 G	Between 22 and 500 Hz
	0.010" DA	Between 5 and 22 Hz (crossover)
Application	X, Y, and Z axes	Sweep rate; 1 octave per minute
Overstress		
Vibration type	Sine	Sweep
Frequency range	1–500–10 Hz	Upward and downward sweep
Acceleration level	0.50 G	Between 26.1 and 500 Hz
	0.010" DA	Between 5 and 26.1 Hz (crossover)
Application	Vertical axis (top/bottom)	Sweep rate; 1 octave per minute

Table 6-1 Operating Vibration Specifications

Pulse shape	1/2 sine pulse
Peak acceleration	10 G
Duration	10 ms
Application	X, Y, and Z axes, once in each axis

Table 6-2 Operating Shock Specifications, All Products

6.2. Nonoperating Shock and Vibration

Table 6-3 lists Nonoperating shock (bench handling) specifications for the tabletop product without its shipping packaging.

Test Type	Bench handling; pivot drop
Description	Pivot edge to a height of 4 in above table and release
Application	Four shocks total; once each edge

Table 6-3 Nonoperating Shock "Overstress" (Bench Handling - Unpackaged) Specifications

Tables 6-4, 6-5, 6-6, 6-7 and 6-8 list Nonoperating vibration and Nonoperating shock specifications for the product in its shipping packaging.

Vibration type	Random vibration
Frequency range	5 to 300 Hz, vertical (z); 5 to 200 Hz horizontal (x and y)
Vibration levels	1.0 GRAMS in x, y, and z axes

Table 6-4 Nonoperating (Packaged) Vibration Specifications

Excitation type	Synchronous vertical motion; 1 inch excursion
Shock (bounce) cycles	14,200 total
Application	Half cycles each in x and y orientations; 7100 cycles in the x orientation, 7100 cycles in the y orientation

Table 6-5 Nonoperating (Packaged) Repetitive Shock Specifications

Test type	Drop shock
Drop height	30 in - items < 20.9 lbs
	24 in - 21 < items < 40.9 lbs
	18 in - 41 < items < 60.9 lbs
	12 in - 61 < items < 100 lbs
Application	10 drops total; 1 each side, 3 edges, 1 corner

Table 6-6 Nonoperating (Packaged) Shock (Drop) Specifications

Vibration type	Sine	Sweep
Frequency range	1–500–10 Hz	Upward and downward sweep
Acceleration level	1 G	10-500-10 Hz
Application	X, Y, and Z axes	Sweep rate; 1/2 octave per minute
Vibration type	Random	Sweep
Frequency range	5–500 Hz	Upward and downward sweep
Acceleration level	2 G	
PSD envelope		0.008 G^2/Hz.
Application	X, Y, and Z axes	Sweep rate: 60 min/axis

Table 6-7 Nonoperating (Unpackaged) Vibration Specifications

Pulse shape	Square wave
Peak acceleration	40 G, 180 in/sec velocity changing
Duration	10 ms
Application	X, Y, and Z axes, twice in each axis, total of 6 shocks
Pulse shape	1/2 sine pulse
Peak acceleration	140 G
Duration	2 ms
Application	X, Y, and Z axes, twice in each axis, total of 6 shocks

Table 6-8 Nonoperating (Unpackaged) Shock Specifications Nonoperating (Unpackaged)

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7. Electromagnetic Interference (EMI) Susceptibility

Chapter 7 describes environmental specifications including:

7.1. Electromagnetic Emissions

Electromagnetic emissions include:

- CSA 108.8
- EEC Directive 89/336

EN55022 and National standards are based on:

- BS6527 (UK)
- NEN55022 (Netherlands)
- VDE 0871 Class B (Germany)
- CE Mark
- Cispr22 Class B:
  - FCC Rules Part 15B
  - Class B certified

7.2. Conducted Emissions

Limits for Class B equipment are in the frequency range from 0.15 to 30 MHz. The limit decreases linearly with the logarithm of the frequency in the range from 0.15 to 0.50 MHz.

Table 7-1 list the conducted emission limits.

Frequency Range (MHz)	Limits dB	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46
0.50 to 5	56	46
5 to 30	60	50

*The limit decreases with the logarithm of the frequency.

Table 7-1 Conducted Emissions

7.3. Radiated Emissions

Limits of radiated interference field strength, in the frequency range from 30 MHz to 30 GHz at a test distance of 3 and 10 meters, for Class B equipment are:

Frequency range (MHz)	Quasi-peak limit dB (µV/m)	
	@ 10 m	@ 3 m
30 to 230	30	40
230 to 1000	37	46
Above 1000	N/A	54

Table 7-2 Radiated Emissions, 30 MHz to 30 GHz

7.4. Magnetic Radiated Susceptibility

Table 7-3 lists the magnetic radiated susceptibility limits.

100 dB (pt) @ 10 KHz declining to 80 dB (pt) @ 1 MHz	No errors, no screen distortion

Table 7-3 Low Frequency, Magnetic Fields, 10 to 3000 KHz

7.5. Radiated Susceptibility

Table 7-4 lists the radiated susceptibility limits:

3 V/m (rms) 80% modulated 1 KHz	No errors, no screen distortion S/W recoverable errors No hardware failure

Table 7-4 High Frequency, Electric Fields, 1 to 1000 MHz

7.6. Conducted Susceptibility

The transient voltage is the actual peak voltage above the normal ac voltage from the power source.

Table 7-5 lists the voltage limits for power and data cables:

2 kV	S/W recoverable errors No hardware failures

Table 7-5 Fast Transient (Bursts) for Power and Data Cables

Table 7-6 lists power cable voltage limits:

1.2 kV	No errors
2.5 kV	S/W recoverable errors No hardware failure

Table 7-6 High Energy Transient Voltage for Power Cables

NOTE:
Maximum energy in a single pulse from the transient generator must be limited to 2.5 W.

Table 7-7 lists the low-level conducted interference voltage limits:

3 V(rms) 80% modulated 1 KHz	No errors S/W recoverable errors No hardware failure

Table 7-7 Low-level Conducted Interference

7.7. ESD Failure Level Limits

Table 7-8 lists the ESD failure level limits for normal operator access areas.

Failure Type	Equipment	Failure Level	Allowable Errors
Hard	Office	1 to 12 kV	No operator intervention (soft recoverable allowed)
Hardware	Office	Up to 15 kV	No component damage - operator intervention allowed (soft/hard errors allowed)

Table 7-8 ESD Failure Level Limits

7.8. Acoustic Noise Emissions

The following lists the acoustic noise emission levels:

Acoustics - Declared values per DEC STD 102.4/ISO 9296/ISO 7779/EN27779/ECMA 74 (CLAUSES 6 & 7)				
	Sound Power Level		Sound Pressure Level	
	LwA, B		LpAm, dBA (bystander positions)	
Product	Idle	Operate	Idle	Operate
TH6BA-ZZ	4.8	5.1	38 (@ 1m)	41 (@ 1m)
TH6AA-ZZ		5.3		43

Acoustics - Declared values per ISO 9296 and ISO 7779/EN27779				
	Sound Power Level		Sound Pressure Level	
	LwA, B		LpAm, dBA (bystander positions)	
Product	Idle	Operate	Idle	Operate
TH6BA-ZZ	5.2	5.5	39	41
TH6AA-ZZ		5.6		43

[Current values for specific configurations are available from Tandberg Data representatives. 1 B = 10 dBA.]

Table 7-9 Acoustic Noise Emissions, Nominal

Schallemissionswerte - Werteangaben nach ISO 9296 und ISO 7779/DIN EN27779:				
	Schalleistungspegel		Schalldruckpegel	
	LwAd, B		LpAm, dBA (Zuschauerpositionen)	
Gerät	Leerlauf	Betrieb	Leerlauf	Betrieb
TH6BA-ZZ	5,2	5,6	39	41
TH6AA-ZZ		5,6		43

[Aktuelle Werte für spezielle Ausrüstungsstufen sind über die Tandberg Data Equipment Vertretungen erhältlich. 1 B = 10 dBA]

Table 7-10 Acoustic Noise Declaration for German Noise Declaration Law

Generic Product Option Numbers	Description
TH6xx	Tandberg DLT7000 drive
TH6Bx	Tandberg DLT7000 table top drive

Table 7-11 Acoustic Noise Declaration for German Noise Declaration Law

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8. Regulatory Requirements

Regulatory requirements include:

- Safety
- Electromagnetic emissions

8.1. Safety Requirements

Safety requirements include:

- UL1950 - Information Technology Including Electrical Business Equipment
- CSA C22.2 #220 - Information Technology Including Electrical Business Equipment
- TUV EN60950 - Information Technology Including Electrical Business Equipment

8.2. Electromagnetic Emission Requirements

Electromagnetic emission requirements include:

- FCC, Part 15, Class A, Class B
- EN55022/B
- EN55082/B
- CISPR22/A and B
- VCCi/ Class 1 and 2
- CEmark Class A and B

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9. Drive Reliability Factors

Table 9-1 lists the reliability factors:

Head life	30,000 tape motion hours	Continuous operation.
MTBF	200,000 hours	Tandberg Data does not warrant that predicted MTBF is representative of any particular unit installed for customer use. Actual figures vary from unit to unit.
Tape life	1,000,000 passes	

Table 9-1 Reliability Factors

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10. DLTtape Recording Media Specifications

Table 10-1 lists the media characteristics:

DLTtape III Media	
Description	**Quantity**
Width	0.5 in metal particle
Length	1200 ft
Cartridge Dimensions	4.1 in x 4.1 in x 1.0 in
Shelf Life	30 years min. @ 20°C & 40% RH (non-condensing)
Usage	1,000,000 passes

DLTtape IIIxt Media	
Description	**Quantity**
Width	0.5 in metal particle
Length	1800 ft
Cartridge Dimensions	4.1 in x 4.1 in x 1.0 in
Shelf Life	30 years min. @ 20°C & 40% RH (non-condensing)
Usage	1,000,000 passes

DLTtape IV Media	
Description	**Quantity**
Width	0.5 in metal particle
Length	1800 ft
Cartridge Dimensions	4.1 in x 4.1 in x 1.0 in
Shelf Life	30 years min. @ 20°C & 40% RH (non-condensing)
Usage	1,000,000 passes

Table 10-1 DLTtape Recording Media Specifications

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