



Tandberg 310 Stereo Cassette Deck

- Complies with DIN standard 45500.
- Dolby® noise reduction system.
- 3 motors, hysteresis synchronous drive motor.
- Dual capstan closed loop tape drive system.
- Minimum wow and flutter.
- Electronic controls.
- Linear motion potentiometers for input levels.
- Two illuminated peak reading

equalized recording and playback instruments.

- Low Noise/CrO₂ tape switch.
- High quality heads make full use of the latest tapes.
- Automatic end and emergency stop.
- The ideal companion for Tandberg amplifying systems.
- Can be used in a vertical position.
- Teak or rosewood cabinet.

* The word Dolby is trademark of Dolby Laboratories Inc.

- 3-motor cassette deck in the Hi-Fi class

The Tandberg TCD 310 Stereo is a further development of the already famous Tandberg TCD 300, a success on markets throughout the world. Several tests in Hi-Fi magazines have ranked TCD 300 as a top model.

The TCD 310 Stereo fully meets the DIN standards. Great attention has been paid to robustness so that the deck will continue to work perfectly and within the specification after years of regular hard use. This demands amongst other things that the number of moving parts is reduced to a minimum, and this is made possible principally by the 3 motor tape drive system. At the same time all parts must be solid and produced with great precision.

The TCD 310 is designed and produced in Norway by Tandbergs Radiofabrikk A/S with the same high regard for quality as all Tandberg products.

THE TAPE DRIVE SYSTEM

The dual capstan closed-loop tape-drive system employs 2 capstans with a precision made fly-wheel and 2 pinch-rollers. This combination ensures stable tape handling with minimum wow and flutter and eliminates the effect of irregularities in the cassettes. The wow and flutter specification will be maintained after years of use, because the mechanism has been designed to be really solid. The tape tension is kept constant and sideways movement has been reduced to a minimum in front of the heads. This prevents variations in the sound output from the tape caused by the pressure pad in the cassette. The tape drive system is of very simple construction to avoid complicated mechanisms that can cause wear and tear, irregular operation and poor performance.

3 MOTORS

The Tandberg TCD 310 has 3 motors; one synchronous hysteresis motor giving a constant tape speed for recording and playback, and 2 servo DC motors for fast winding. The two winding motors have direct contact with the spindle to avoid complicated clutch systems that gradually wear out and result in irregular operation. The winding motors provide a very fast smooth winding action (approx. 40 seconds for a C60 cassette).

AUTOMATIC STOP

During record/playback and fast winding functions the driving mechanism is automatically released at the end of the tape or if the cassette sticks. The motors turn off automatically and the pinch rollers disengage the tape. This reduces the risk of spoiling the tape.

THE RECORD/REPLAY HEADS

These are of the highest standard and chosen for optimum compromise between top quality recording/playback and maximum life.

DOLBY SYSTEM

The Tandberg TCD 310 Stereo features a built-in Dolby noise reduction system. This system reduces the tape noise by about 10 dB compared with conventional systems. The Dolby system has special advantages for a cassette machine, because the tape noise is relatively high owing to the narrow tape, thin magnetic coating and low tape speed. The Dolby system can be switched on or off. (See also special explanation of the Dolby system.)

PEAK READING METERS

The TCD 310 is equipped with 2 large peak-reading meters. A peak-reading indication is especially useful when monitoring recordings — most of all music. The input volume is set by slide potentiometers. The meters show correct recording volume for all frequencies and have precision scales with a range extending up to + 5 dB to suit the most modern tapes. The meters also show the output playback signal.

TAPE SELECTOR

The magnetic heads and electronic circuits have been designed to exploit the properties of the newest tapes. The tape selector can be set in two positions, either to suit low noise, high output tape, or to give optimum results with chromium dioxide (CrO₂) tape.

TECHNICAL SPECIFICATION

Subject to improvement without notice.

Dimensions: Breath 16 1/2" (43.5 cm), height 4 1/8" (10.5 cm), depth 9 1/4" (23 cm).

Weight: 14.5 lb (6.5 kg).

Power requirements: 230/115 V, 50 or 60 Hz optional.

Power consumption: 34 watts.

Tape speed: 1 7/8 ips.

Speed tolerance with nominal mains voltage and normal operating temperature: $\pm 1\%$.

Wow and flutter, max.: DIN 45511 peak value better than 0.2%. Weighted RMS better than 0.15%.

Playback correction: For low noise, high output tape:

1590 + 120 μ s. For CrO₂ tape: 1590 + 70 μ s.

Frequency response: LH tape

DIN 45511: 30 to 13,000 Hz 30 to 14,000 Hz

± 2 dB : 40 to 12,500 Hz 40 to 13,500 Hz

Amplifier mode

± 2 dB : 30 to 16,000 Hz 30 to 16,000 Hz

Signal/tape noise ratio:

	NORMAL		DOLBY	
	LH	CrO ₂	LH	CrO ₂
IEC, A curve, 3% distortion	51 dB	54 dB	59 dB	63 dB
IEC, unweighted RMS, 3% distortion	48 dB	50 dB	52 dB	52 dB
DIN 45511, weighted	46 dB	49 dB	55 dB	58 dB
DIN 45511, unweighted	46 dB	48 dB	50 dB	50 dB

Crosstalk attenuation at 1000 Hz: From side 1 to side 2: more than 60 dB. From track 1 to track 2: more than 35 dB.

Distortion, max.: From record amplifier at 0 dB: 0.5%.

From playback amplifier: 0.3% at 0.75 V. From tape at 0 dB record level: 3%.

Inputs

MIC: Suitable for dynamic microphone with impedance less than 700 ohms. Sensitivity 0.13 mV. Maximum voltage 130 mV.

LINE: Input impedance 220 k ohms. Sensitivity 40 mV.

Maximum voltage 4 V.

RADIO: Input impedance 47 k ohms. Sensitivity 8 mV.

Maximum voltage 0.8 V.

Output

RADIO/LINE: Minimum load impedance 10 k ohms. Output voltage 0.775 V each channel.

Transistors: 49. 2 pcs. FET.

Motors: 1 hysteresis synchronous motor 115 V, 50/60 Hz.

2 DC winding motors, 14 V.

HOW THE DOLBY SYSTEM REDUCES TAPE NOISE

The Dolby noise reduction system is used in the most advanced reel-to-reel and cassette machines. The system reduces the tape noise essentially without reducing the quality of the programme being recorded. This is a great advantage in comparison with a **filter**, because the filter reduces **both** the tape noise and high frequencies in the music.

The Dolby system is based on the fact that tape hiss is mostly heard in the weak passages in the music. When you record, weak passages in the middle and higher frequency range receive extra amplification before being recorded. Therefore an **absolute** improvement in the signal-to-noise ratio is achieved for these weak passages. The weaker the passages, the stronger the amplification. In playback the volume of the high frequencies is damped to the original level. The hiss from the tape is reduced in the same way, and in the total reproduced programme all frequencies have their correct levels and the tape hiss is well damped in the weak passages of the music.

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