

Studio Master SM 912



- 1/4 inch standard bias studio tape with black backcoating,
Derived from SM 911 for use in broadcasting
Designed specifically for
- low speed recording (7,5 and 3,75 ips),
- Offering
- wide dynamic range,
 - high level uniformity up to the highest frequencies
 - good winding properties.

Audio Studio

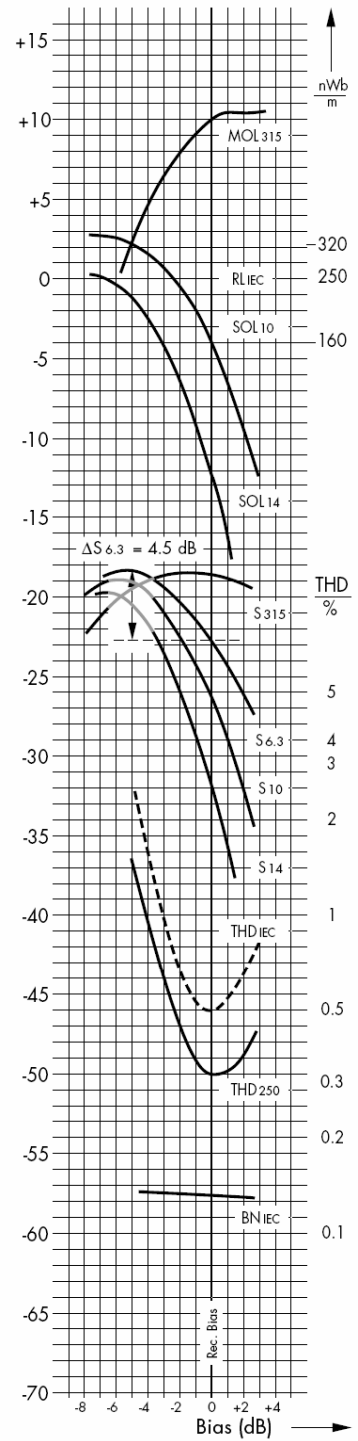
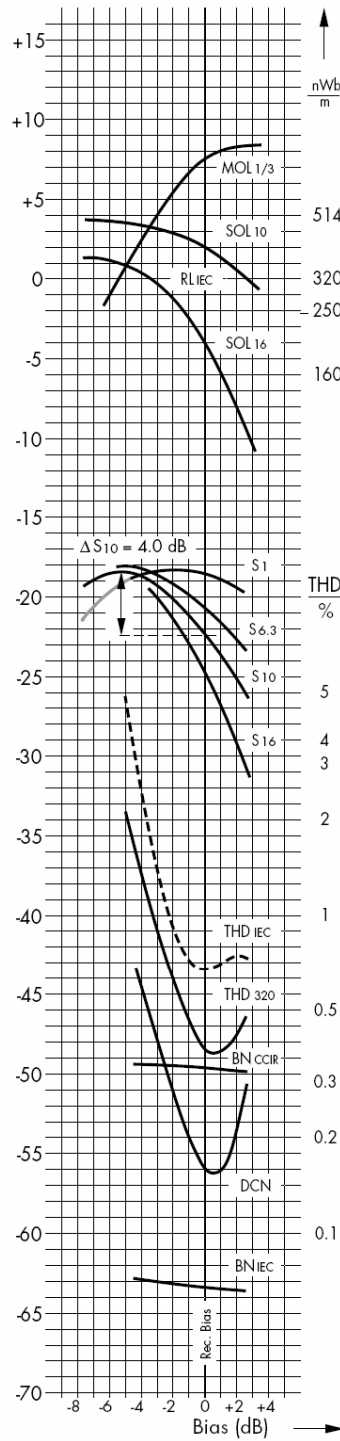
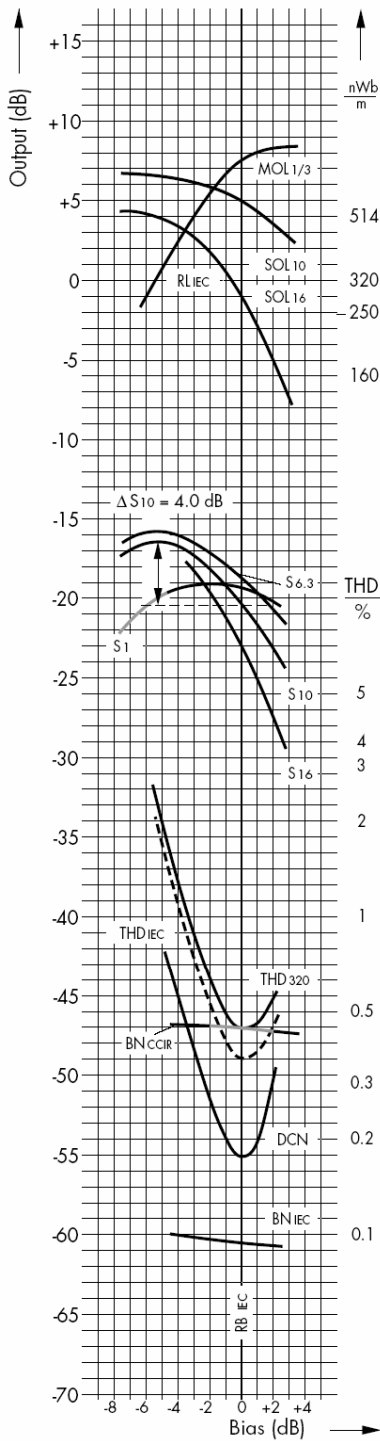


1. Recording Performance Specifications (depending on bias settings)

Tape speed 19.05 cm/s
 Recording head gap length 7.0 μm
 Playback head gap length 3.0 μm
 Equalisation 70 μs
 Reference level 320 nWb/m

Tape speed 19.05 cm/s
 Recording head gap length 7.0 μm
 Playback head gap length 3.0 μm
 Equalisation 50 + 3180 μs
 Reference level 320 nWb/m

Tape speed 9.53 cm/s
 Recording head gap length 7.0 μm
 Playback head gap length 3.0 μm
 Equalisation 90 + 3180 μs
 Reference level 250 nWb/m



2. Measurement conditions

Tape speed		19.05 cm/s 7.5 in/s	19.05 cm/s 7.5 in/s	9.53 cm/s 3.75 in/s	
Recording head					ref.
	Gap length	7.0 µm	7.0 µm	7.0 µm	1.1
	Track width	6.3 mm	6.3 mm	6.3 mm	
Playback head					
	Gap length	3.0 µm	3.0 µm	3.0 µm	1.1
	Track width	2.575 mm	2.575 mm	2.575 mm	
Playback equalisation		70 µs	50+3180 µs	90+3180 µs	1.2
RL _{IEC}	Reference level (315 kHz)			250 nWb/m	1.3
RL _{IEC}	Reference level (1 kHz)	320 nWb/m	320 nWb/m		1.3
	IEC reference tape: batch	A 342 D	C 264 Z	C 264 Z	
	Reference tape bias definition	Min. THD320	Min. THD320	Min. THD250	1.4
RB _{IEC}	IEC reference bias	0.0 dB			1.5
Rec. Bias	Recommended bias setting	0.0 dB	0.0 dB	0.0 dB	
$\Delta S_{6,3}$	Sensitivity drop for recommended bias setting			4.5 dB	1.6
ΔS_{10}	Sensitivity drop for recommended bias setting	4.0 dB	4.0 dB		1.6

3. Recording performance specifications

The table below presents the main parameters in the recommended bias setting. All figures given represent nominal values.

MOL _{315/3}	Maximum output level at 315 Hz			+10.0 dB	2.1
MOL _{1/3}	Maximum output level at 1 kHz	+7.5 dB	+7.5 dB		2.1
SOL ₁₀	Saturation output level at 10 kHz	+5.0 dB	+2.0 dB	-4.0 dB	2.2
SOL ₁₄	Saturation output level at 14 kHz			-12.5 dB	2.2
SOL ₁₆	Saturation output level at 16 kHz	-1.0 dB	-4.0 dB		2.2
S ₃₁₅	Relative tape sensitivity at 315 Hz			+1.5 dB	2.3
S ₁	Relative tape sensitivity at 1 kHz	+1.0 dB	+1.5 dB		2.3
S _{6,3}	Relative tape sensitivity at 6,3 kHz	+1.5 dB	+2.0 dB	+1.0 dB	2.3
S ₁₀	Relative tape sensitivity at 10 kHz	+1.0 dB	+1.0 dB	+1.0 dB	2.3
S ₁₄	Relative tape sensitivity at 14 kHz			+1.5 dB	2.3
S ₁₆	Relative tape sensitivity at 16 kHz	+1.0 dB	+1.0 dB		2.3
THD ₂₅₀	Third harmonic distortion level at 250 nWb/m			-50.0 dB	2.4
THD ₂₅₀	Third harmonic distortion factor at 250 nWb/m			0.32 %	2.4
THD ₃₂₀	Third harmonic distortion level at 320 nWb/m	-47.0 dB	-48.5 dB		2.4
THD ₃₂₀	Third harmonic distortion factor at 320 nWb/m	0.44 %	0.40 %		2.4
DCN	DC noise, weighted, rel. RL _{IEC}	-55.0 dB	-56.0 dB		2.5
BN _{IEC}	Bias noise level (IEC 94; A curve)	-60.5 dB	-63.5 dB	-57.5 dB	2.6
BN _{CCIR}	Bias noise level (CCIR 468-3)	-47.0 dB	-50.0 dB		2.6
MOL/BN _{IEC}	Signal to bias noise at 1 kHz	68.0 dB	71.0 dB	67.5 dB	2.7
MOL/BN _{CCIR}	Signal to bias noise at 1 kHz	54.5 dB	57.5 dB		2.7
P	Print-through	57.0 dB	57.0 dB	56.5 dB	2.8

4. Magnetic properties

				ref.
HC	Coercivity	25.5 kA/m	320 Oe	3.0
BRS	Retentivity	165 mT	1650 G	3.2
ØRS	Saturation flux	1800 nWb/m	180 mM/mm	3.3

5. Physical properties

Base material	Polyester			
Tape width	6.3 mm	1/4 inch		
Tolerances of tape width	+0/-0.06 mm	+0/-2,4 mil		
Base thickness	30.0 µm	0.78 mil	4.1	
Coating thickness	11.0 µm	0.43 mil	4.1	
Backcoating	black			
Total thickness	45.0 µm	1.77 mil	4.1	
Surface resistance of magnetic coating	≤ 50,000 MΩ	≤ 50 GΩ	4.2	
Surface resistance of matt back	≤ 100 kΩ			
Load for elongation of 3% (F ₃)	≥ 20 N	≥ 61 MPa	4.3	
Breaking tensile strength (6.3 mm tape width)	≥ 30 N	≥ 91 MPa	4.4	

6. References

Data in this publication are based on test methods of IEC Publication 94, Part 5. In as far as any test method is not part of this publication, reference has been made.

1.1 Measurement method according to IEC 94, using the IEC standard reference heads for professional application. For this purpose, recording heads with a gap length of 7 µm are recommended. These magnetic heads have been used for domestic recording type measurements, since appropriate heads are still under discussion.

1.2 Playback equalization on the tape testing equipment is adjusted to provide a flat frequency response of the output voltage when compared with the frequency response section of the appropriate IEC calibration tape (time constants $t_1 = 70 \mu s$ or $t_1 + t_2 = 50 + 3180 \mu s$ resp. at tape speed 19.05 cm/s, $t_1 + t_2 = 90 + 3180 \mu s$ at tape speed 9.53 cm/s).

1.3 RL_{IEC} (Reference Level): The reference level 320 nWb/m or 250 nWb/m resp. corresponds with the reference level section of the IEC calibration tape used.

1.4 Reference tape bias definition: Using the relevant IEC calibration tape and the standard reference heads, the bias current providing the minimum third harmonic distortion level at the reference level (signal frequency 1 kHz) is the reference bias setting. - IEC reference bias definition for domestic recording, using reference tape C 264 Z, is still under discussion. Appropriately, the bias current providing the minimum third harmonic distortion level at the reference level (signal frequency 315 Hz) is the reference bias setting.

1.5 RB_{IEC} (IEC Reference Bias): This data represents the bias ratio of the relevant IEC reference tape and the tape under test at 19.05 cm/s.

1.6 $\Delta S_{6.3}$, ΔS_{10} (Sensitivity drop for recommended bias setting): Operationally, the recommended bias is set with an input signal of 10 kHz (19.05 cm/s) or 6.3 kHz (9.53 cm/s) at -20 dB. Based on the sensitivity curve's $\Delta S_{6.3}$ or S_{10} resp. peak, the bias is increased until the playback level is reduced by the given value $\Delta S_{6.3}$ or ΔS_{10} resp. (see graph).

2.1 $MOL_{315/3}$, $MOL_{1/3}$ (Maximum Output Level): Output level at 315 Hz (9.53 cm/s) or 1 kHz (19.05 cm/s) relative to reference level RL_{IEC} , with a third harmonic distortion factor of 3 % or THD = -30.5 dB.

2.2 SOL_{10} , SOL_{14} , SOL_{16} (Saturation Output Level): Output level at 10 kHz, 14 kHz or 16 kHz respectively, at which saturation occurs, relative to reference level RL_{IEC} .

2.3 S_{315} , S_1 , $S_{6.3}$, S_{10} , S_{14} , S_{16} (Sensitivity): The sensitivity curves were recorded using a constant current with no equalisation. The magnetic tape's 1 kHz (19.05 cm/s) or 315 Hz (9.53 cm/s) input signal is approximately 20 dB below the reference level RL_{IEC} . In accordance with IEC publication 94 the values for relative tape sensitivity refer to those of the relevant reference tape (batch A 342 D or C 264 Z resp.) at its own reference bias. - The distance between the sensitivity curves S_{315} or S_1 and $S_{6.3}$, S_{10} , S_{14} and S_{16} resp. reflects the recording equalisation necessary to achieve a flat frequency response.

2.4 THD₂₅₀, THD₃₂₀ (Third Harmonic Distortion level): The diagram shows the third harmonic distortion ratio and the third harmonic distortion factor (of a 315 Hz or 1 kHz signal) at a constant magnetisation of 250 nWb/m or 320 nWb/m resp.

2.5 DCN (DC Noise level): According to IEC 94 a direct current is recorded which is equal to the RMS value of the signal current that is required to produce IEC reference level RL IEC at 1 kHz. Measurement of DC noise level is made using an RMS meter and a weighting filter network according to IEC 94, part 5, appendix 4.

2.6 BN_{IEC}, BN_{CCIR} (Bias Noise level): The bias noise level is measured after operational erasure and HF biasing have been applied and compared to the reference level RLIEC. BNIEC is measured after weighting with an A filter in accordance with IEC 651. BNCCIR is given as a quasi peak reading following filter weighting in accordance with CCIR 468-3 (as in IEC 94, part 5, point 3.4).

2.7 MOL/BN_{IEC}, MOL/BN_{CCIR} (Dynamic): The signal to bias noise ratio MOL/BN_{IEC} results from the addition of the maximum output level at 315 Hz MOL_{315/3} or at 1 kHz MOL_{1/3} and the bias noise level BN_{IEC}. In the same manner, MOL/BN_{CCIR} is the result of adding MOL_{1/3} at 1 kHz and BN_{CCIR}.

2.8 P (Print-through): Print-through is the ratio of a reference level recording to the highest signal level transferred to the next tape layer after storage at 20°C for 24 hours.

3.0 The measurements are made by means of a magnetic field having a strength of 100 kA/m (equal to 1,250 Oe).

3.1 H_c (Coercivity): The coercitive field strength is the magnetic field strength that saturated magnetic material exerts in a magnetically neutral situation.

3.2 B_{RS} (Retentivity): The remanent saturation flux is the remaining tape flux after the magnetic material has been subjected to saturation magnetisation.

3.3 Ø_{RS} (Residual Saturation Flux): The remanent saturation flux per meter track width is the remanent saturation multiplied by the coating cross-section of a one meter wide track.

4.1 Thicknesses: Values given are mean averages.

4.2 Surface resistance: According to IEC 94, part 4, the magnetic tape's side to be measured is placed over two measuring devices separated by the width of the tape. The resistance of the measured segment is given in megohms.

4.3 Yield strength (F₃ or F₅ value resp.): According to IEC 94-4, the force necessary to produce 3% or 5% elongation is evaluated using a sample test length of 200 mm and an elongation rate of 100 mm/min.

4.6 Breaking tensile strength is the force to get the breaking point of a tape sample, according to IEC 94-4. All data given in the specification are subject to change without prior notice due to technical progress.

7. Ordering Information

RMGI Product Code	Tape Width		Tape Length		Reel Diameter		Reel Type or Pancake	Hub Type	Box Type	Tapes/ Carton
	Inch	mm	ft	m	Inch	mm				pcs
SM 912										
34150	0,25	6,3	600	183	5	130	Plastic Reel	Trident	Hinged	20
34151	0,25	6,3	1.200	366	7	180	Plastic Reel	Trident	Hinged	20
34152	0,25	6,3	2.500	762	10,5	265	Plastic Reel	Trident	ECO Pack	10

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