Fe Plus 60 Fe Plus 100

The Fe Plus range has been formulated in order to meet the high quality demands in high speed duplication. Fe Plus 100 provides a playing time of up to 100 minutes in cassette, making it the ideal product for all kinds of music and voice recording.

The tapes continue to uphold our manufacturing tradition of combining good quality performance and consistency.



Audio Duplication



Technical Data

Fe Plus 60 / Fe Plus 100

Environmental conditions	1. Test Co	nditions					see note	
Recording head EC Reference Head Gap length Track width 0.6 mm 1.1	Environmental		20 5 °C, 60 ± 15 % r.h.					
Track width 0.6 mm			Capilo		4,76 cm/s			
Reference level R 723 DG (BASF) Bias definition IEC I reference bias 0,0 dB = MOL 4,3 dB 1.4	Recording nead	т тес кетегенсе неай		0	•		1.1	
Reference tape Batch Blas definition IEC I reference bias R 723 DG (BASF) O,0 dB = MOL 4,3 dB 1.4 Blas setting IEC I reference bias Recommended bias 0,0 dB AS6,3 S,0								
Bias setting IEC I reference bias 0,0 dB MOL 4,3 dB 1.4				R			1.3	
Recommended bias −1,0 dB ΔS6,3 3,0 dB 1.5 2. Recording Performance Specifications The table below presents the main parameters both in the IEC-I and the recommended bias settings. Bias setting 0,0 dB −1,0 dB MOL ₃₁₅ Solution of Maximum output level at 315 Hz A				` ,			1.4	
Recommended bias −1,0 dB ΔS6,3 3,0 dB 1.5 2. Recording Performance Specifications The table below presents the main parameters both in the IEC-I and the recommended bias settings. Bias setting 0,0 dB −1,0 dB MOL ₃₁₅ Solution of Maximum output level at 1315 Hz Albit Distriction output level at 10 kHz Albit Distriction output level at 10 kHz Albit Distriction output level at 14 kHz Albit Distriction output level at 14 kHz Albit Distriction Distriction output level at 1315 Hz Albit Distriction D	Bias setting IF	C. L reference bias		0.0 dB	AS6.3	5.0 dB		
Bias setting							1.5	
Bias setting	2. Recordi	ng Performance Specif	ication	s				
Maximum output level at 315 Hz	The table below presents the main parameters both in the IEC-I and the recommended bias settings.							
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Bias setting			0,0 dB		– 1,0 dB		
SOL _{1ak} Saturation output level at 14 kHz − 15,0 dB − 12,0 dB 2.2 S ₃₁₅ Relative tape sensitivity at 315 Hz Max. deviations from batch to batch S _{3,15k} − 0,2 dB 0,0 dB 0,2 dB 0,2 dB 0,5 dB 2.3 S _{3,15k} Relative tape sensitivity at 1,3 kHz 0,0 dB 0,5 dB 0,5 dB 2.3 S _{10k} Relative tape sensitivity at 10 kHz 0,6 dB 1,0 dB 1,0 dB 1,0 dB S _{10k} Relative tape sensitivity at 10 kHz 0,6 dB 1,0 dB 1,5 dB 2.3 THD ₂₅₀ Third harmonic distortion ratio at 250 nWb/m 0,6 % 0,7 % 2.4 BN _{1cC} Bias noise level (A-curve, RMS) − 55,0 dB 2.5 2.6 MOL ₃₁₅ /BN _{1cC} Signal to bias noise ratio at 315 Hz 59,0 dB 0,5 dB 2.7 P Print through Fe 60 57,0 dB 2.8 3. Magnetic Properties H _C Coercivity 30 kA/m 380 Oe 3.1 B _{1s} Saturation retentivity 165 mT 165 mT 1650 G 3.2 A _{Pks}	MOL ₃₁₅	Maximum output level at 315	Hz	4,0 dB		4,0 dB	2.1	
S ₃₁₅ Relative tape sensitivity at 315 Hz							2.0	
Max. deviations from batch to batch ± 0,5 dB S _{3,15k} Relative tape sensitivity at 3,15 kHz 0,0 dB 0,2 dB S _{6,3k} Relative tape sensitivity at 10 kHz 0,6 dB 1,0 dB S _{10k} Relative tape sensitivity at 10 kHz 0,6 dB 1,0 dB S _{14k} Relative tape sensitivity at 14 kHz 1,0 dB 1,5 dB Third harmonic distortion ratio at 250 nWb/m 0,6 % 0,7 % 2.4 BN _{1EC} Bias noise level (A-curve, RMS) -55,0 dB 2.5 MOL ₃₁₅ /BN _{1EC} Signal to bias noise ratio at 315 Hz 59,0 dB 2.5 Signal to bias noise ratio at 10 kHz 48,5 dB 0,5 dB 2.7 Print through Fe 60 57,0 dB 55,0 dB 2.8 3. Magnetic Properties Hc Coercivity 30 kA/m 380 Oe 3.1 B _{RS} Saturation retentivity 740 nWb/m 74 mM/mm 3.2 4. Physical Properties Fe Plus 60 Fe Plus 100 Base material Tape width <td colspa<="" td=""><td>SUL_{14k}</td><td>Saturation output level at 14 i</td><td>KHZ</td><td>- 15,0 dB</td><td></td><td>- 12,0 dB</td><td>2.2</td></td>	<td>SUL_{14k}</td> <td>Saturation output level at 14 i</td> <td>KHZ</td> <td>- 15,0 dB</td> <td></td> <td>- 12,0 dB</td> <td>2.2</td>	SUL _{14k}	Saturation output level at 14 i	KHZ	- 15,0 dB		- 12,0 dB	2.2
S _{0.3k} Relative tape sensitivity at 10 kHz 0,3 dB 0,5 dB 1,0 dB S _{10k} Relative tape sensitivity at 10 kHz 0,6 dB 1,0 dB 1,0 dB S _{14k} Relative tape sensitivity at 14 kHz 1,0 dB ± 1,0 dB 1,5 dB THD ₂₅₀ Third harmonic distortion ratio at 250 nWb/m 0,6 % 0,7 % 2.4 BN _{1EC} Bias noise level (A-curve, RMS) − 55,0 dB 2.5 MOL ₃₁₅ /BN _{1EC} Signal to bias noise ratio at 315 Hz 59,0 dB 2.6 SOL _{10k} /BN _{1EC} S ignal to bias noise ratio at 10 kHz 48,5 dB 0,5 dB 2.7 P Print through Fe 60 fe 0 57,0 dB fe 100 55,0 dB 2.8 3. Magnetic Properties H _C Coercivity 30 kA/m 380 Oe 3.1 3.1 B _{RS} Saturation retentivity 165 mT 1650 G 3.2 3.2 Φ _{RS} Remanent saturation flux 740 nWb/m 74 mM/mm 3.3 4. Physical Properties Fe Plus 60 Fe Plus 100 Base material Tape width 9 kg 11,5 μm 4.1	S ₃₁₅			- 0,2 dB	± 0,5 dB	0,0 dB		
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$\begin{array}{c ccccccccccccccccccccccccccccccccccc$							2.3	
THD $_{250}$ Third harmonic distortion ratio at 250 nWb/m 0,6 % 0,7 % 2.4 BN $_{IEC}$ Bias noise level (A-curve, RMS) -55,0 dB Signal to bias noise ratio at 315 Hz 59,0 dB 2.6 SOL $_{10K}$ /BN $_{IEC}$ Signal to bias noise ratio at 10 kHz 48,5 dB 0,5 dB 2.7 P Print through Fe 60 57,0 dB Fe 100 55,0 dB 2.8 Saturation retentivity 165 mT 1650 G Remanent saturation flux 740 nWb/m 74 mM/mm 3.3 4. Physical Properties Fe Plus 60 Fe Plus 100 Base material Tape width 3,81 mm Tolerances of tape width 4,5 μ m 7 Total thickness 4,5 μ m Total thickness 16,0 μ m 11,5 μ m 7 Total thickness 16,0 μ m 11,5 μ m 7 Total thickness 16,0 μ m 11,5 μ m 7 Feaking strength μ 16,0 μ m 11,5 μ m 4.1 Spreaking strength μ 16,0 μ m 11,5 μ m 4.1 Spreaking strength		Max. deviations from batch to	batch		± 1,0 dB			
distortion ratio at 250 nWb/m 0,6 % 0,7 % 2.4	S _{14k}	Relative tape sensitivity at 14	kHz	1,0 dB		1,5 dB		
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$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		distortion ratio at 250 nWb/m		0,6 %		0,7 %	2.4	
SOL_{10k}/BN _{IEC} S ignal to bias noise ratio at 10 kHz 48,5 dB 0,5 dB 2.7 Print through Fe 60 57,0 dB Fe 100 55,0 dB 2.8 3. Magnetic Properties Hc Coercivity 30 kA/m 380 Oe BRS Saturation retentivity 165 mT 1650 G 3.2 Remanent saturation flux 740 nWb/m 74 mM/mm 3.3 4. Physical Properties Fe Plus 60 Fe Plus 100 Base material Polyester 3,81 mm Tolerances of tape width 3,81 mm Tolerances of tape width 4,5 μ m Total thickness 16,0 μ m 11,5 μ m 4.1 Yield strength (F3) \leq 5 N \leq 9 N 4.3								
Print through Fe 60 57,0 dB Fe 100 55,0 dB 2.8 3. Magnetic Properties Hc Coercivity 30 kA/m 380 Oe 3.1 BRs Saturation retentivity 165 mT 1650 G 740 nWb/m 74 mM/mm 3.3 $\frac{1}{1}$ Remanent saturation flux 740 nWb/m 74 mM/mm 3.3 $\frac{1}{1}$ Remanent Saturation flux 740 nWb/m 74 mM/mm 4.1 Tolerances of tape width 3,81 mm Tolerances of tape width 4,5 $\frac{1}{1}$ Total thickness 4,5 $\frac{1}{1}$ Total thickness 16,0 $\frac{1}{1}$ Total thickness				18 5 dB	59,0 dB	0 5 dB		
		_	KIIZ	40,5 db		0,5 db	2.7	
3. Magnetic Properties H _C Coercivity 30 kA/m 380 Oe 3.1 B _{RS} Saturation retentivity 165 mT 1650 G 7.4 mM/mm 3.3 2×4 . Physical Properties Fe Plus 60 Base material Polyester 3,81 mm Tolerances of tape width 4,5 μ m Total thickness 7 16,0 μ m 11,5 μ m 7.1 Yield strength (F3) $\geq 5 \text{ N}$ Reaking strength $\geq 9 \text{ N}$ 4.3	Р	Print through					20	
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Φ_{RS} Remanent saturation flux740 nWb/m74 mM/mm3.34. Physical PropertiesFe Plus 60Fe Plus 100Base material Tape width Tolerances of tape width Coating thickness Total thickness Yield strength (F3) Breaking strengthPolyester 3,81 mm +0,00/-0,05 mm 4,5 μ m11,5 μ m16,0 μ m \$\frac{1}{2}5 \text{ N}\$ \$\frac{1}{2}5 \text{ N}\$ \$\frac{1}{2}9 \text{ N}\$4.1 4.2 4.3	_							
4. Physical Properties Fe Plus 60 Fe Plus 100 Base material Polyester 3,81 mm Tolerances of tape width $+0,00/-0,05$ mm Coating thickness $+0,00/-0,05$ mm Total thickness $+0,00/-0,05$ mm Total thickness $+0,00/-0,05$ mm Yield strength (F3) $+0,00/-0,05$ mm	_		7					
Base material Polyester Tape width 3,81 mm Tolerances of tape width $+0,00/-0,05$ mm Coating thickness $4,5$ µm Total thickness $16,0$ µm $11,5$ µm 4.1 Yield strength (F3) ≥ 5 N 4.2 Breaking strength					7			
Tape width 3,81 mm Tolerances of tape width $+0,00/-0,05$ mm Coating thickness $4,5$ μ m Total thickness $16,0$ μ m $11,5$ μ m 4.1 Yield strength (F3) ≥ 5 N 4.2 Breaking strength ≥ 9 N 4.3	4. Physical Properties			Plus 60		Fe Plus 100		
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Coating thickness4,5 μmTotal thickness16,0 μm11,5 μmYield strength (F3) $≥$ 5 N4.2Breaking strength $≥$ 9 N4.3	•	ape width						
Yield strength (F3) \geq 5 N4.2Breaking strength \geq 9 N4.3	Coating thickne	ess						
Breaking strength ≥9 N 4.3				16,0 µm	>5 N	11,5 µm		
	Electrical resistance of magnetic coating				≤4 GΩ			

All data represent nominal values and are subject of change without prior notice due to technical progress.

References

Audio Duplicator Tape

The data in this publication are based on test methods of IEC Publication 94, part 4 and 5.

- 1.1 Measurement method according to IEC 94, using the IEC Reference Heads.
- 1.2 Playback equalization on the tape testing equipment is aligned to provide a flat frequency response of the output voltage when playing back the frequency response section of the IEC I Calibration Tape 4,76 cm/s, time constants 120+3180 µs.
- 1.3 The reference level 250nWb/m corresponds to the reference level section of the IEC I Calibration Tape.
- 1.4 IEC I reference bias definition: Using the IEC Reference Heads and the IEC I Reference Tape, the reference bias is defined as that bias, at which the maximum output level at 315 Hz and 3 % third harmonic distortion (MOL₃₁₅) equals 4,3 dB relative to reference level (Ref. 1.3).
- 1.5 Bias setting by means of a recommended sensitivity drop is common practice. Setting the recording level to about 20 dB below reference level (using a signal frequency of 6,3 kHz) the bias current is raised to such an extent that the playback level is reduced to the given value relative to maximum sensitivity.
- 2.1 MOL_{315} : Maximum output level at 315 Hz relative to reference level (Ref. 1.3), characte-rized by a third harmonic distortion of 3 %.
- $2.2~SOL_{10k}$, SOL_{14k} : Output level at 10 kHz or 14 kHz respectively, at which saturation occurs, relative to reference level (Ref. 1.3).
- 2.3 S_{315} , $S_{3,15k}$, $S_{6,3k}$, S_{10k} , S_{14k} : Relative tape sensitivities are compared to those of the reference tape. All sensitivities are measured with an audio current, which at 315 Hz produces an output of about 20 dB below reference level (Ref. 1.3).

- $2.4\ THD_{250}$: Third harmonic distortion ratio of a 315 Hz signal at reference level (Ref. 1.3).
- 2.5 BN_{IEC}: The bias noise level is measured after operational erasure and biasing have been applied. Measurement of BNIEC is made using a RMS meter and a weighting network according to curve "A" of IEC Publication 651.
- $2.6~MOL_{315}/BN_{IEC}$: The signal to bias noise ratio results from the addition of the maximum output level at 315 Hz (Ref. 2.1) and the bias noise level BNIEC (Ref. 2.5).
- $2.7\ SOL_{10k}/BN_{IEC}\colon$ The signal to bias noise ratio results from the addition of the saturation output level at 10 kHz (Ref. 2.2) and the bias noise level (Ref. 2.5).
- 2.8 P: Print through is the highest signal level transferred from a reference level recording to an adjacent tape layer after 24 h storage at 20 °C.
- $3.1~H_{\rm c}$: Coercivity is that strength of a magnetic field under whose influence the magnetization of a tape is reduced to zero after the sample has been magnetised to saturation.
- 3.2 $B_{\text{RS}}\!\!:$ Saturation retentivity specifies the remanent magnetic flux, after the tape has been subjected to saturation magnetisation.
- 3.3 $\emptyset_{\text{RS}}:$ Remanent saturation flux is the retentivity multiplied by the coating thickness.
- 4.1 Thickness: Values given are mean value.4.2 Yield strength (F3) is defined according to IEC Publication 735 as that force which is necessary to stretch the tape by 3 %.
- 4.3 Breaking tensile strength is the force to get the breaking point of a tape sample, according to IEC Publication 735.

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