

Onderwerp:  <u>Worst-case capacity calculation</u> <u>X 1210.</u>	Datum	Pag. Nr.	Reg. Nr.
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Worst-case capacity calculation X 1210.  
 (16 sectors with 210 data words)

1. In case of a very simple control unit, reading and writing of the data into the sectors must rely entirely on the sector pulse timing. The following gives a calculation of the required tolerance in the time c.g. position relationship between the recording heads and sector-unit of a X 1210. It must be clear that for data-interchangeability no X 1210 may find itself outside the calculated tolerance-range over the entire specified temperature range.

2. The calculation is made for 16 sectors and a highest recording density of 37 bits/mm.  $\leftarrow 2200 \text{ bpi}$   
 Purpose of the calculation is to find the worst-case shortest duration of the sector and the related minimum available storage capacity.

Tolerance of sector duration is determined by :

- a. motor rotational speed  $\pm 2\%$
  - b. manufacturing tolerance pulley  $\pm 0,1\%$
  - c. manufacturing tolerance spindle  $\pm 0,3\%$
  - d. manufacturing tolerance intersector slot  $\pm 0,3\%$
  - e. *freq tol: 0,3%*
- tot 3,0%*

Cumulative tolerance on sector duration is therefore  $\pm 2,7\%$ .

The shortest possible sector duration is for 800 rpm and 16 sectors :  
 $4687,5/\mu \text{ sec} - 2,7\% = 4560/\mu \text{ sec}.$

The lowest admissable write frequency is  $833.333 \text{ bits/sec} - 0,3\%$   
 $= 830.833 \text{ bits/sec}$ , which gives the minimum available storage capacity per sector as 3788 bits.  
 $\rightarrow = 236 \text{ words} + 12 \text{ bits}$

3. The minimum available capacity may be used with the following record format (16-bit words) :

preamble	14	$\rightarrow 2,34 \text{ mm on inner track}$
sync	1	
data	210	
checkword	1	
postamble	1	
repeat postamble	7	(erase only, no writing)

234 words or 3744 bits

It is suggested to use the remaining  $3788 - 3744 = 44$  bits as a safety margin.

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