MTBF calculation method

MTBF (Mean Time Between Failures) is calculated using method presented in MIL-HDBK-338B. Method is based on utilizing field failure data for obtaining the MTBF figure.

$MTBF_{week}$ for a set of drives manufactured during certain week is calculated as:

$$MTBF_{week} = \frac{T(t)}{r}$$

$T(t) = \textit{total operating time}$

$r = \textit{number of failed units}$

Operating time is calculated to be the time from the manufacturing date to the observation date after substracting

a) freight delay from manufacturing plant to central stock (12 weeks) AND
b) stocking and commissioning delay (26 weeks).

Total operating time *T(t)* is obtained by multiplying operating time with the number of units manufactured. Maximum operating time is limited due to units under warranty.

Number of failed units (*r*) is based on warranty statistics – all failure cases including those caused by wrong usage or environmental problems are included in the figure. MTBF is calculated only for units under warranty, since reliable failure data for units beyond warranty does not exist.

MTBF is calculated from weekly values $MTBF_{week}$ as a weighted average by using the number of manufactured units as weighting factor:

$$MTBF_{ave} = \frac{1}{W}\sum_{i=1}^{n} w_i x_i$$

$W = \textit{total number of produced units}$

$w_i = \textit{number of produced units weekly}$

$x_i = MTBF_{week}$

MTBF calculation result

Product family	MTBF
ACS55	> 50 years
ACS150	> 50 years
ACS350	> 50 years
ACS550	> 50 years

Calculations are based on data available on week 26, 2009

Note1 Limiting MTBF calculation only to units under warranty possibly decreases MTBF value due to limiting the maximum operating time.
Note2 Calculating MTBF value for new products possibly gives too pessimistic values due to by nature limited operating time. Also calculation time is limited due to this.
Note3 MTBF values have been updated in rev B (9.6.2008) due to changed calculation methods in manufacturing quantities.
Note4 Production of ACS50 has stopped in March of 2008. MTBF value is now calculated for its successor ACS55