of these media, the linear laws assumed for the use of pure thermal resistances no longer apply. In such cases the forced cooling ratio is also a function of the power dissipated in the capacitor itself. If such cooling measures are to be used, the maximum possible thermal load must be calculated. This is not necessary if only heat sinks and forced convection are used.

If the base of a screw terminal high-voltage capacitor is cooled to keep it at constant temperature, the correspondingly higher rated current $I_{\sim R}$ (B) for base cooling has to be used instead of the rated current $I_{\sim R}$ for natural cooling. To determine useful life, enter capacitor base temperature T_B in the diagrams of the data sheets instead of the ambient temperature T_A. See also 5.3.

5.3 Calculation of useful life

The tables in the individual data sheets list the rated ripple current for the upper category temperature (UCT = + 85 °C, + 105 °C or +125 °C) and for a frequency of 100 Hz (in some cases 20 kHz). The useful life for known ripple current loads and ambient temperatures is determined on the basis of the useful life graphs as follows:

Determine the quotient $\frac{I_{\sim}}{I_{\sim R,\,UC}}$ of the required ripple current at the given ambient temperature and the rated ripple current at the upper category temperature. The corresponding useful life value is given by the curve passing through the respective ambient temperature and the current quotient coordinates, or it can be interpolated if none of the useful life curves passes directly through these coordinates.

The frequency dependence of the ripple current has not been taken into account in the procedure described above. This must be introduced into the calculation in the form of an additional factor. The following table provides guide values for such factors. For more precise values, consult the characteristic curves shown in the individual data sheets.

Frequency f (Hz)	50	100	400	800	1000	≥ 2000
Conversion factor (guide value)	0,8	1,0	1,2	1,3	1,35	1,4

The following examples illustrate the calculation procedure, using the data of a capacitor of the B43550/B43570 series. For this type series, the upper category temperature is + 105 °C. As an example, a capacitor with the following ratings has been selected from the data sheets:

U_R	C_R	Case dimensions $d \times l$	$R_{ESR,max}$ 100 Hz 20 °C	Z_{max} 10 kHz 20°C	$I_{\sim max}$ 100 Hz 40 °C	$I_{\sim max}$ 100 Hz 85 °C	$I_{\sim R}$ 100 Hz 105°C	$I_{\sim R}$ (B) 100 Hz 105°C	Ordering code
V–	µF	mm	mΩ	mΩ	A	A	A	A	Short code
400	3300	91 × 144,5	52	45	43	26	13	22	-L338-Q

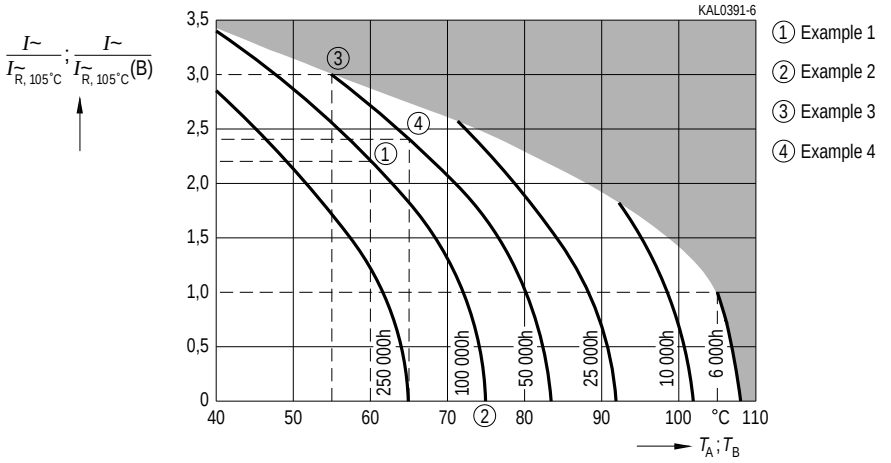

Figure 18 Useful life versus ambient temperature T_A for natural cooling and base temperature T_B for base cooling (types B43550/B43570).