ALUMINUM ELECTROLYTIC CAPACITORS

TECHNICAL NOTE

Where L_0: Life at the maximum guaranteed temperature with the rated ripple current (h)
$\triangle T_0$: Temperature increase at capacitor core, at the maximum guaranteed temperature (deg.)
(3) The life equation considering the ambient temperature and the ripple current will be a conversion of the above equation (5), as below:

$$L=L_0 \times 2^{\left(\frac{T_0-T}{10}\right)} \times K^{\left[1-\left(\frac{I}{I_0}\right)^2\right] \times \frac{\triangle T_0}{10}} \quad \text{---------(6)}$$

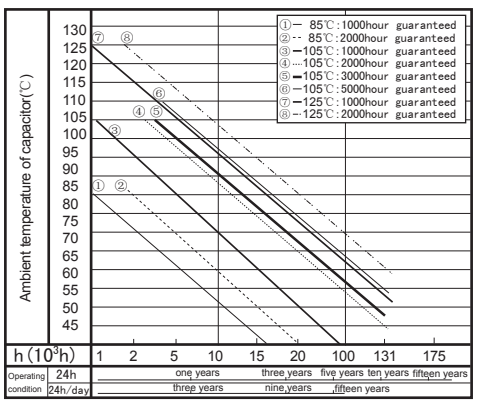
Where in I_0: Rated ripple current at the maximum guaranteed temperature (Arms)
I: Applied ripple current (Arms)
Since it is actually difficult to measure the temperature increase at the capacitor core, the following table is provided for conversion from the surface temperature increase to the core temperature increase.

Table 2-1

Case diameter	~10	12.5~16	18	22	25	30	35
Core/Surface	1.1	1.2	1.25	1.3	1.4	1.6	1.65

The life expectancy formula shall in principle be applied to the temperature range between the ambient temperature of +40℃ and maximum allowable working temperature. The expected life time shall be about fifteen years at maximum as a guide in terms of deterioration of the sealant.

(Fig 2-1Life Expectancy Chart)



其中，L_0：工作在额定纹波电流和最高工作温度下的寿命（h）
$\triangle T_0$：最高工作温度下的电容器中心容许温升。

（3）考虑纹波电流，环境温度时可由（5）式得到下式：

$$L=L_0 \times 2^{\left(\frac{T_0-T}{10}\right)} \times K^{\left[1-\left(\frac{I}{I_0}\right)^2\right] \times \frac{\triangle T_0}{10}} \quad \text{---------(6)}$$

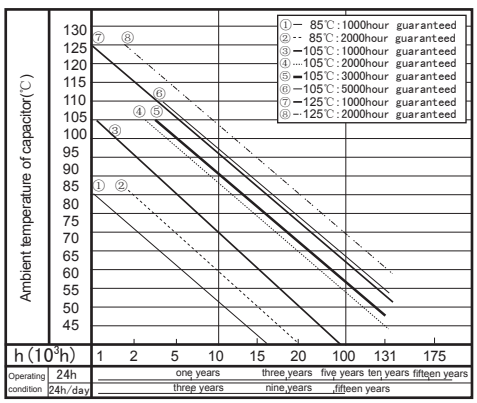
其中，I_0：最高工作温度下的额定纹波电流（Arms）
I：叠加的纹波电流（Arms）
由于直接测量电容器的内部温升存在着困难，下表列出了表面温度和内部核心温度的换算关系。

表 2-1

直径	~10	12.5~16	18	22	25	30	35
中心 /表面	1.1	1.2	1.25	1.3	1.4	1.6	1.65

寿命的推算公式，原则上适用于周围环境温度为+40℃到最高工作温度范围内，但由于封口材料的老化等因素，实际的推算寿命时间一般最大为15年。

（图2-1 寿命推算曲线）



3 To calculate Balance when connecting in series
3-1 Circuit layout
Circuit for connecting two capacitors (C_1, C_2) in series and equivalent circuit can be illustrated as below figure. Formula to calculate a balance resistance R_B of below figure is shown as follows.

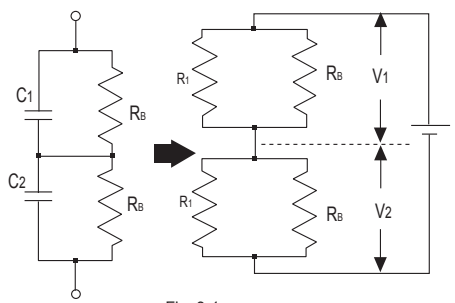


Fig. 3-1

Following are the preconditions of the circuit.
① V_2 shall be the rated voltage (=V_0).
② V shall be a times V_0x2, $V=2aV_0$ (a<1)
③ R_2 shall equal R_1xb (b>1) (1)

3-2 Formulas to calculate [RB]
3-2-1 Following formula can be established from balanced condition

3 电容器的串联均衡电阻的计算：
3-1 回路展开图
两个电容器（C_1，C_2）相串联，等效电路可用下图来表示，均衡电阻R_B的计算公式可表示如下

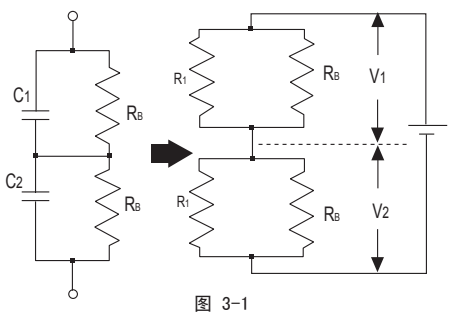


图 3-1

以下是回路的有关已知条件：
① $V_2= V_0(V_1<V_2)$
② $V=2aV_0$ (a<1)
③ $R_2=R_1xb$ (b>1) (1)

3-2 推导[R_B]的公式
3-2-1根据电桥平衡可推算出下列的式子：