Table 17-3 Manual Calculation of Lethality Value

Time (min)	Temp (°C)	Lethal value [$10^{(T-T_0)/z}$]
5	94	0.0017
6	100	0.0100
7	106	0.0359
8	111	0.0880
9	114	0.1668
10	118	0.2615
11	118.5	0.3831
12	119	0.4948
13	119.5	0.5995
14	120	0.6813
15	120.2	0.7743
16	120.5	0.8254
17	120.6	0.8799
18	120.7	0.9031
19	120.8	0.9353
20	120.9	0.9504
21	119	0.5275
22	97	0.0036

relationship among actual temperature, reference temperature (121°C), and a Z value of 10°C, called lethality value. Adding the lethality values [$\sum 10^{(T-T_0)/Z}$] gives a total of 8.522 minutes. Since Δt is one minute then the F value for this particular cycle is 8.522. Figure 17-4 compares the actual temperature versus time data during a sterilization cycle and the calculated exponential term at a given time interval. This final F value result is actually the area under the time–temperature curve (darkened area).

The earlier method of calculating F values is a physical approach where data required are time and temperature data. F values may also be calculated by what is called a biological equation:

$$F_T = (\text{Log}N_0 - \log N_T) \times D_T \qquad \text{(Equation 2)}$$

The biological F value calculation is used to determine what F value is required to obtain the appropriate spore log reduction value (Log N_0 – log N_T) as a function of the D value of the specific spore. For example, if the D value is known to be two minutes and a 12-log reduction in that spore indicator organism is required for sterilization validation, then the minimum F value required is 24 minutes. To obtain this F value of 24, the physical F value equation is used to

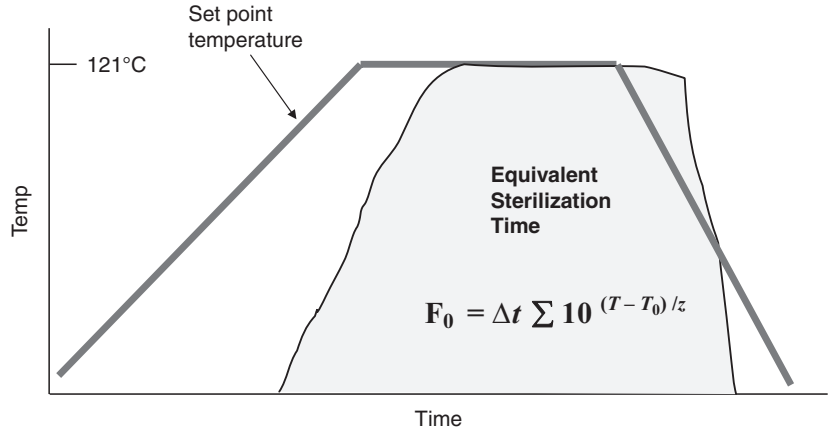

Figure 17-4 Comparison of sterilizer temperature–time curve and equivalent sterilization time.