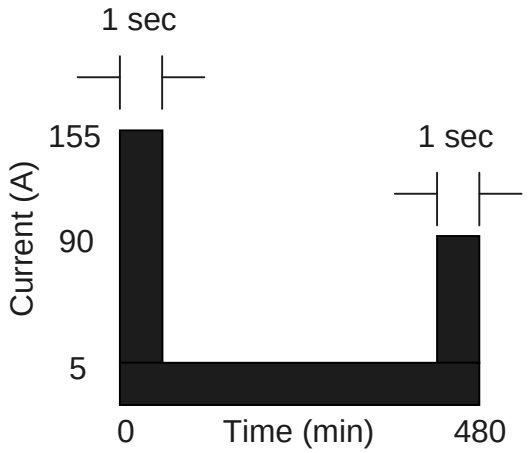
IEEE 1115 battery sizing example

Battery sizing parameters

- Voltage window
  Minimum system voltage: 105V
  Maximum system voltage: 150V

- Load profile



- Average temperature
  T = 25°C (77°F)

- Design margin: 1.00

- Aging factor: 1.15

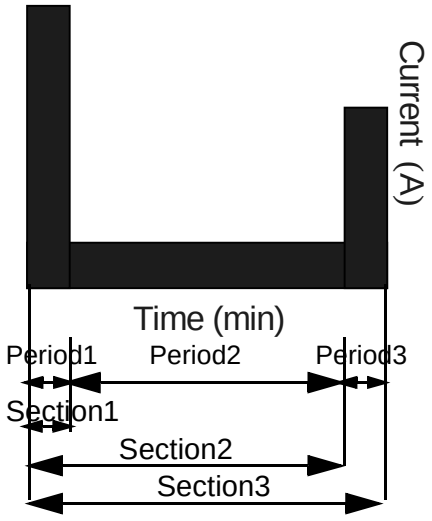
IEEE battery sizing

- Number of cell = 150 / 1.43 =105

- Final voltage = 105/105 = 1.00 volts/cell

- Load profile

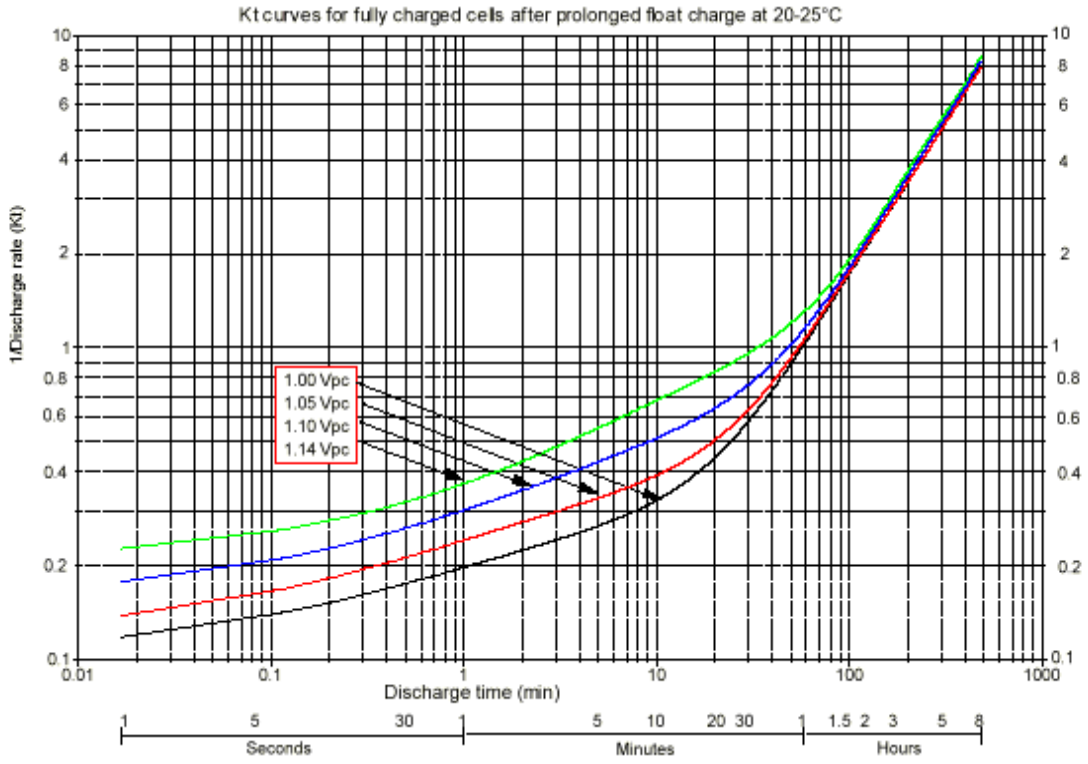
Current	Time
A_1: 155A	M_1: 1 sec
A_2: 5A	M_2: 479,9 min
A_3: 90A	M_3: 1sec



- Capacity rating factor K_t

For this type of load profile in this battery sizing, the H type is chosen. However, in some cases the choice of cell range is not obvious and it is necessary to perform the calculation for different ranges in order to find the most cost effective solution.

For this example, the K_t factor is determined from curves.



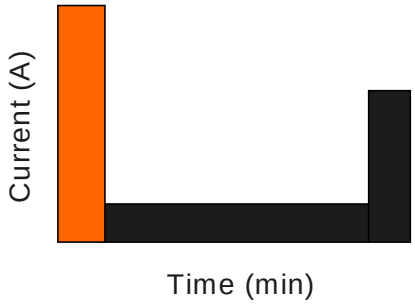
Final voltage: 1.00 Volts/cell

- K_t (1 second) = 0.12

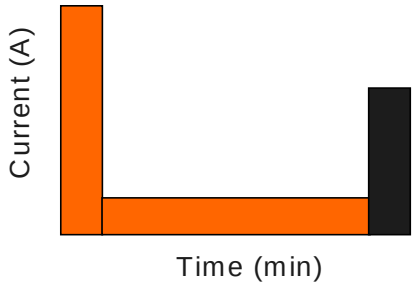
- K_t (8 Hours) = 8

- Battery calculation worksheet

- Section1



- Section2

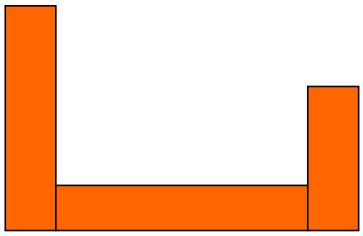


A_3 is larger than A_2, so Section2 is omitted.

- Section3

Step1 Step2 Step3

Overall



- IEEE1115 calculation worksheet

(1) Period	(2) Load (ampe-res)	(3) Change in Load (amperes)	(4) Duration of Period (minutes)	(5) End of Section (minutes)	(6) K_t Factor	(7) Temperature Derating Factor (T_f)	(9) Required Section Size (3)*(6)*(7)
Section1 - First 1 Periods Only - if $A_2 > A_1$, go to Section 2- **No**							
1	A_1=**155**	A_1-0=**155**	M_1=**0.02**	t=M_1=**0.02**	**0.12**	**1.00**	**18.6**
						Total	**18.6**
Section2 - First 2 Periods Only - if $A_3 > A_2$, go to Section 3- **Yes**							
Section3 - First 3 Periods Only - if $A_4 > A_3$, go to Section 4- **No**							
1	A_1=**155**	A_1-0=**155**	M_1=**0.02**	t=M_1+M_2+ M_3=**480**	**8**	**1.00**	**1240**
2	A_2=**5**	A_2-A_1=**-150**	M_2=**479.97**	t=M_2+M_3= **479.98**	**8**	**1.00**	**-1200**
3	A_3=**90**	A_3-A_2=**85**	M_3=**0.02**	t=M_3=**0.02**	**0.12**	**1.00**	**10.2**
						Total	**50.2**
Random Equipment Load Only (if needed)							
R	A_R	A_R-0=	M_R	t=M_R			**0**

Maximum Section Size(9) **50.2** + Random Section Size **0.00** = Uncorrected Size **50.2**
Uncorrected Size **50.2** * Design Margin **1.00 *** Aging factor **1.15 = (**15**) 57.73**
when the cell size (15) is greater than a standard size. The next larger size cell is requirerd.
Required cell size **57.73** Ampere hours. Therefore cell **SBH59** is required.