

Formula for the Estimation of Duty Cycle other than rated outputs*:

$$T_a = \left(\frac{I}{I_a} \right)^2 \times T$$

- T_a = Required Duty Cycle [%]
 I = Rated Current at the required Duty Cycle [A]
 I_a = Maximum Current at the required Duty Cycle [A]
 T = Rated Duty Cycle [%]

Example*:

200 Ampere Power Source rated at 60% Duty Cycle and operated at 250 Ampere (as far as permitted):

$$T_a = \left(\frac{200}{250} \right)^2 \times 60 = (0.8)^2 \times 0.6 = 38\% = \text{Required Duty Cycle}$$

This means that the power source has to be operated maximum 3.8 minutes with a current of 250 Ampere (according to the 10 minute cycle).

Formula for the Estimation others than rated output currents at a specified Duty Cycle*:

$$I_a = I \times \left(\frac{T}{T_a} \right)^{1/2}$$

- I_a = Maximum Current at the required Duty Cycle [A]
 I = Rated Current at the required Duty Cycle [A]
 T = Rated Duty Cycle [%]
 T_a = Required Duty Cycle [%]

Example*:

The maximum output current at a duty cycle of 100% (according to 10 minutes duty cycle) can be calculated by:

$$I_a = 200 \times \left(\frac{60}{100} \right)^{1/2} = 200 \times 0.775 = 155A$$

* Source: AWS Welding Handbook 9th Edition** - Welding Processes Part 1 Volume 2.

** Very recommendable