Ticket #1255

Ticket Status:	Closed	**Name:**	Philip Piper
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Create Date:	03/11/2016 10:33 pm	**Phone:**	(713) 501-2744
Field of Study:	Electrical Engineering		

Subject: **Yale University**
03/11/2016 10:33 pm Philip Piper

Is the following discharge resistor satisfactory for EV4.9.3? We are running 300V with a motor controller capacitance of 1600uF. We plan to use a resistance of 1kOhm, therefore the peak discharge current is 0.3A. 0.3^2*1000 = 90W. Therefore our resistor has to be able to handle 90W for 15s according to EV4.9.3.

We want to use three Ohmite 20 series 3kOhm 10W resistors in parallel to meet this requirement. They have an overload rating of 100W for 5 seconds. Is this considered comparable to 90W for 15s?

Thanks!

Phil

03/11/2016 11:16 pm

They will be acceptable, although we would like you to provide an explanation as to why.

You could test them and ensure that their temperature during their operation doesn't exceed spec, or run a quick calculation as to the energy absorbed in 15s at 90W vs 5s at 100W (distributed across three resistors.)

Its very simple work and we will rubber stamp it at competition as long as you have made an effort to show the equivalence, we just want your work on file. You may also submit the document to this ticket and then cite the ticket if you are questioned over the resistors at competition.

03/11/2016 11:25 pm

They will be acceptable, although we would like you to provide an explanation as to why.

You could test them and ensure that their temperature during their operation doesn't exceed spec, or run a quick calculation as to the energy absorbed in 15s at 90W vs 5s at 100W (distributed across three resistors.)

Its very simple work and we will rubber stamp it at competition as long as you have made an effort to show the equivalence, we just want your work on file. You may also submit the document to this ticket and then cite the ticket if you are questioned over the resistors at competition.

03/13/2016 4:59 pm Philip Piper

After searching around a bit I found an Ohmite application note with an "On-time..." vs. "Percent of Continuous-duty Wattage Rating" graph for the resistors I plan to use. I have attached it to this response.

As I said before we need to dissipate 90W for 15s according to our accumulator setup (0.3A pre-charge through 1000Ohm resistor). The graph shows that Ohmite 10 & 50W vitreous enamel resistors can handle 725% of their rating for a 15s overload. That comes out to 72.5W for our 10W resistors. Therefore the three resistor setup I mentioned before is good up to 217.5W for 15s.

I plan to switch to two 2kOhm Ohmite 10W resistors in parallel (rather than three 3kOhm) because that still satisfies EV4.11.4 according to Ohmite's chart. This configuration will be good up to 145W for 15s.

Let me know if I missed anything. Thanks!

Phil
EV4.9.3 Ohmite Graph.jpg*(129.4 kb)*

03/14/2016 10:59 am

Looks like you're all set, good work.

Please Wait!

Please wait... it will take a second!