



Excellence in electron and ion optics

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Product Change Notification
November 11, 2016

Dear Kimball Physics Customer,

This letter is to inform you of changes being implemented to the ES-423E Lanthanum Hexaboride Cathode.

Affected Products: ES-423E LaB₆ Cathodes

Description of Change: Resistivity range of graphite used in the graphite heater assembly is increasing. This results in an increase in the upper end of the room temperature resistance range of the cathode assembly. The old range was 1.7 ohms to 2.3 ohms. The new range will be 1.7 ohms to 3.1 ohms. The grade of the graphite, with specifications including grain size, density, strength and hardness, remains unchanged.

Reason for Change: Supplier's graphite manufacturing processes result in wider resistivity range than in the past.

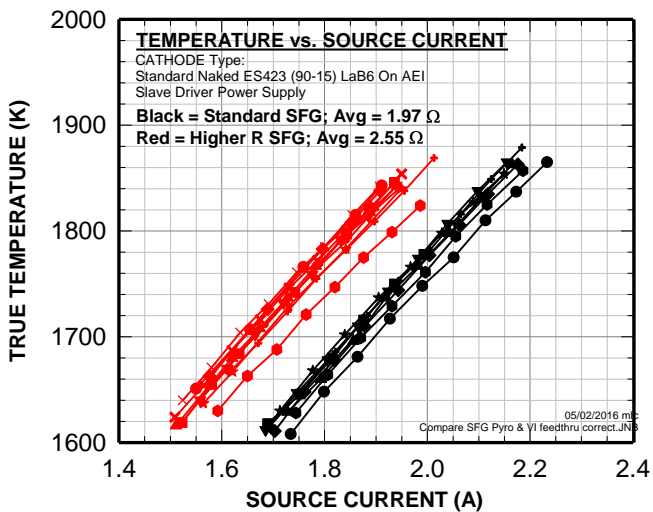
Impact on Cathodes: Higher resistivity graphite affects cathode heating characteristic in the following ways:

- Heater power remains about the same, or rises very slightly; 30% increase in room temperature resistance results in less than 4% increase in heating power.
- Heater current goes down with resistivity increase; 30% increase in room temperature resistance results in about 10% heating current decrease.
- Heater voltage goes up with resistivity increase; 30% increase in room temperature resistance results in about 15% heating voltage increase.
- When room temperature resistance is ~2.6 ohms, heater voltage averages about 2.25 V as measured close to the cathode. Heater current measures about 1.85 A.
- Higher resistivity has no impact on the LaB₆ emitter itself. Emission characteristics (J_{em} vs T) remain the same.
- Graphs showing cathode heating characteristics are shown in Figure 1.

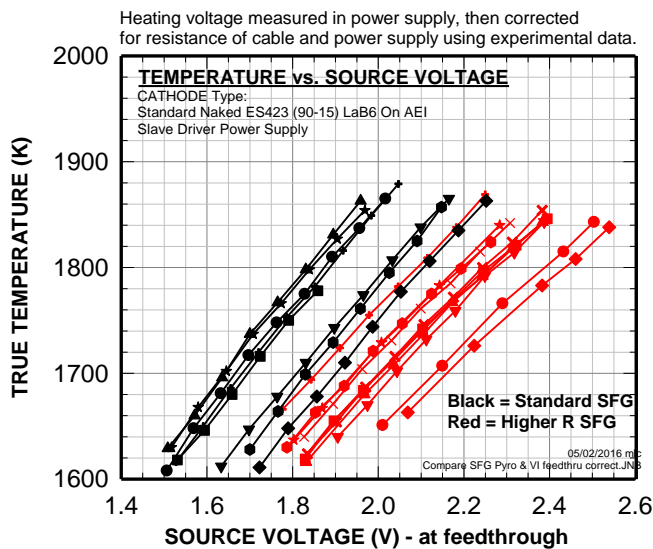
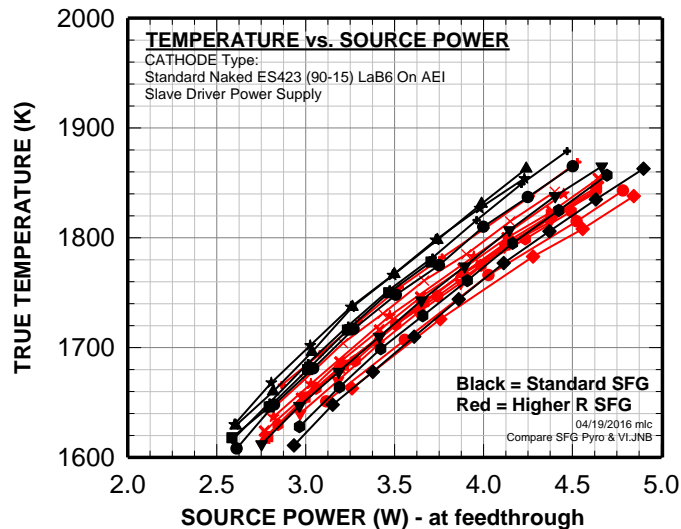
Expected Date: Cathodes with higher resistivity graphite heaters will begin shipping January 1, 2017.

Whom to Contact
at KPI with Questions: Kimball Physics is committed to providing excellent and reliable ES-423 cathodes. We are interested in your concerns or comments. If you have questions, please contact Margaret Charpentier (pcharpentier@kimphys.com).

Figure 1: Test data comparing original and higher resistivity graphite heaters for the ES-423:



- ▲ C13894
- ▼ C13895
- C13896
- ★ C13897
- C13898
- ◆ C13899
- C13900
- + C13901
- × C13903
- ◇ C13904
- × C13905
- ▲ C12035
- ▲ C12744
- C12745
- ▲ C12746
- ▲ C12747
- C13340
- C13341
- C13342



HR SFG	RTR (Ω)
C13894	2.6092
C13895	2.4944
C13896	2.6111
C13897	2.5395
C13898	2.5095
C13899	2.5919
C13900	2.5015
C13901	2.5045
C13903	2.5455
C13904	2.5512
C13905	2.6454
Std SFG	RTR (Ω)
C12035	1.9875
C12744	1.9927
C12745	1.9761
C12746	1.9646
C12747	1.9667
C13340	1.9792
C13341	1.9701
C13342	1.9250

