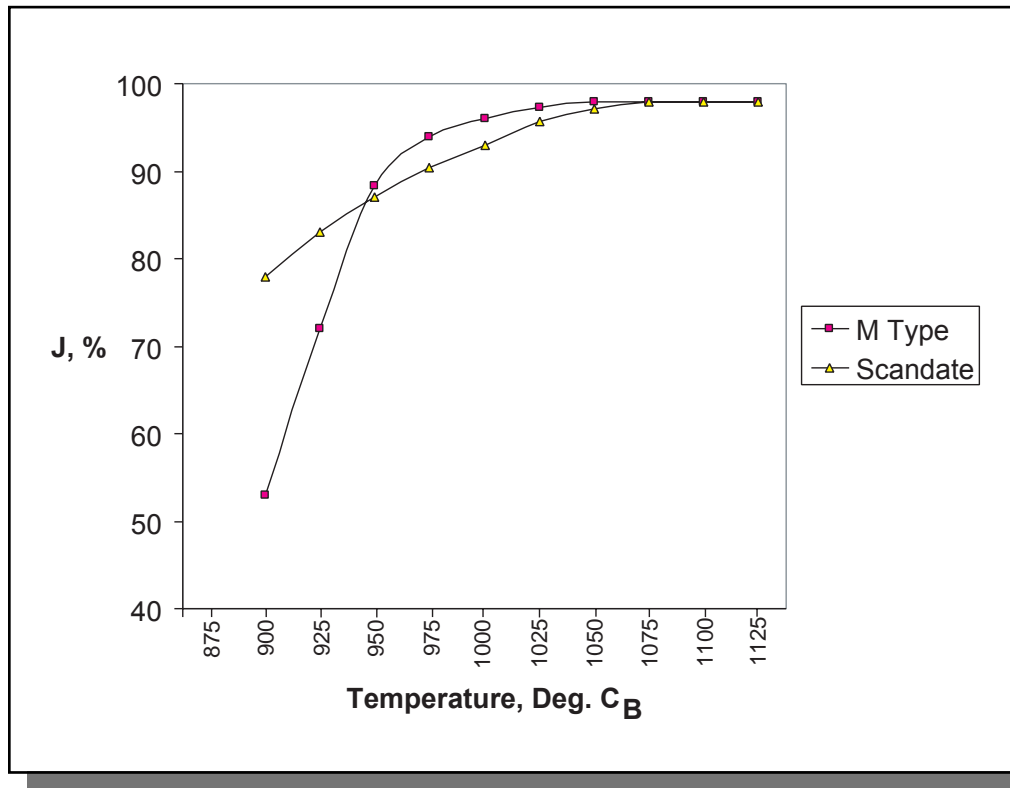


Emission Characteristics For Scandium Type Dispenser Cathodes

Performance Characteristics of the Barium Scandate Cathode.

The Barium Scandate cathode is an improved version of the familiar Tungsten impregnated cathode (Reference TB-198, TB-176 and TB-186), employing Scandium oxide (Sc_2O_3) to lower the work function of the emissive surface. As a result, this emitter may be operated at lower temperatures than the standard dispenser cathode for the same current density.

Since the Barium Scandate mix is homogeneous throughout the Tungsten matrix, it is free of many of the problems associated with thin film coated emitters. One distinct advantage over thin film types such as the "M" cathode (see TB-117), is the ability of the Barium Scandate cathode to withstand much greater levels of ion bombardment before surface sputtering becomes a problem. Other advantages of the Barium Scandate cathode include excellent resistance to possible surface abrasions encountered during inspection, packaging, jiggling and general handling as well as increased resistance to exposure to moisture.



The Barium Scandate cathode is capable of high emission current at low operating temperatures and reduced evaporation rates. Low operating temperatures will result in long life, reduced grid emission problems and lower noise. Further, the Barium Scandate cathode can be operated at higher temperatures (1050-1200°C_B) if high emission density is desired. The life of the "M" cathode is somewhat reduced by operating above 1050°C_B. The emission characteristics are nearly the same as the "M" cathode at higher temperatures and well exceed the "M" performance at lower temperatures. See Figure 1 for a comparison between the emission characteristics of a typical "M" cathode and a Barium Scandate cathode. (With the performance of the Barium Scandate cathode being somewhat TL (Temperature Limited) at lower temperatures, the benefit of higher emission than the "M" cathode is not suitable for all applications.)

The Barium Scandate cathode is available in mix ratios of 532, 311, 612 and 411, the same configurations as the standard dispenser cathode, and are designated as 531X, 311X, 612X and 411X. Handling and activation procedures are the same as for the standard dispenser cathodes.

Reprinted courtesy of Spectra-Mat, Inc.

Rev. Date 5/24/01