

## Battery Study – Freakin’ Beacon

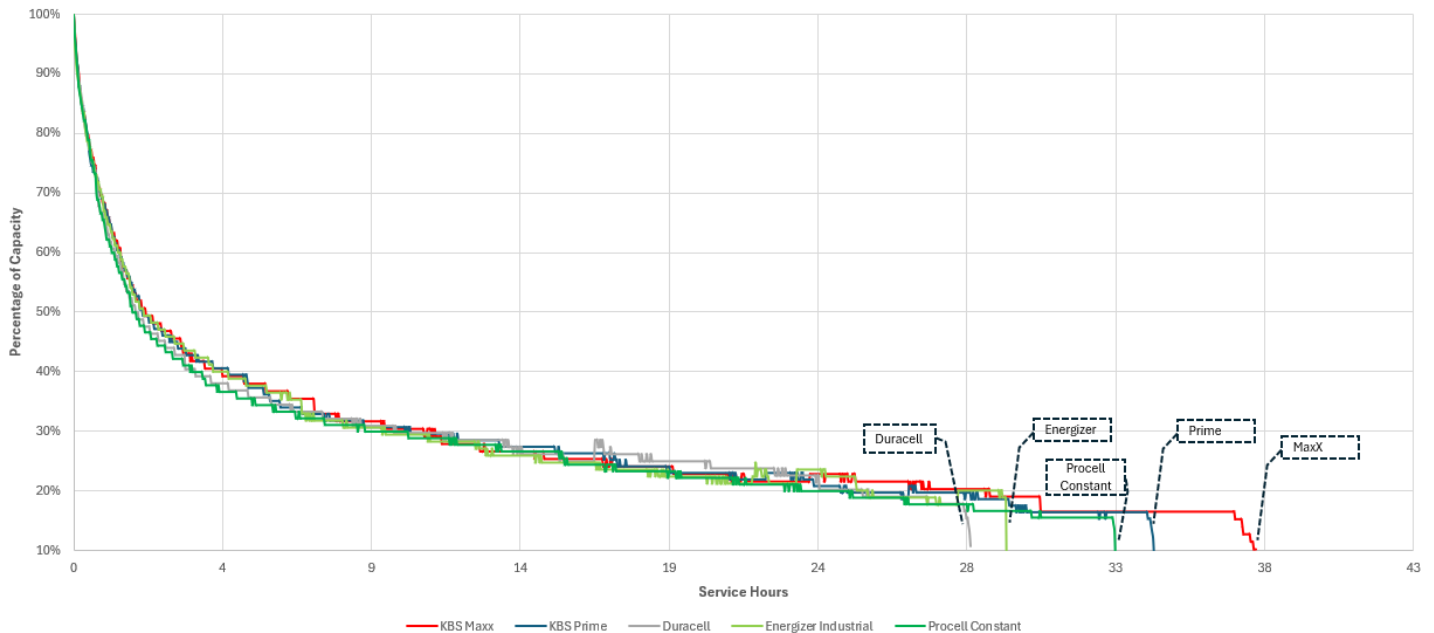
**Purpose:** The purpose of this study is to determine which batteries perform best in the Koehler Freakin’ Beacon. The key performance metric evaluated to make determination is runtime.

**Process:** LEDs are known to have variations in voltage required to operate, which in turn leads to variation in amount of power consumed to operate. For this reason, runtime can vary from unit to unit. For this study, the same Freakin’ Beacon unit was used for all tests, to control for LED variation. LED output was recorded every 2 minutes to determine runtime value.

### Results:

	Freakin' Beacon (Green)
	Runtime (hh:mm:ss)
KBS Power Solutions MaxX	38:06:00
KBS Power Solutions Prime	34:50:00
Procell Constant	33:36:00
Energizer Industrial	30:06:00
Duracell Copper Top	28:54:00

Freakin' Beacon Runtime



**Results Summarized:** All batteries followed similar discharge curve but showed considerable differences in runtime. KBS Power Solutions MaxX was the longest running battery, at 38:06. Next longest was KBS Power Solutions Prime at 34:50, followed by Procell Constant at 33:36. Next was Energizer Industrial at 30:06 with Duracell Copper Top as the shortest running battery at 28:54.

**Additional Battery Considerations:** The Freakin’ Beacon is an intrinsically safe device, approved for use in gaseous mines by MSHA and approved for use in other hazardous locations by SGS. In order for any device to be intrinsically safe, the batteries used must also be certified for use in the product and pass required 3<sup>rd</sup> party tests. Use of non-approved batteries voids the intrinsically safe certification of the product. This is an industry wide requirement, and applies to all intrinsically safe products. Products are to be marked with approved battery types where possible, or approved battery types must be listed as condition of use in user manual.

**Approved Battery Types:** KBS Power Solutions MaxX KA1200, KBS Power Solutions Prime KA1100 and Energizer E92. These approved battery types are also marked on rear of product, and highlighted below.

 U.S. Department of Labor <b>MSHA</b> Mine Safety & Health Administration	Koehler-Bright Star, LLC Permissible Koehler Helmet Flasher Accessory	<b>APPROVAL</b> <b>No. 18-A200001-0</b>
<b>TESTED FOR INTRINSIC SAFETY IN METHANE-AIR MIXTURES ONLY</b>		
<b>WARNINGS:</b>		
1. MSHA approved for use with two AAA KBS Power Solutions Prime (KA1100), KBS Power Solutions MaxX (KA1200), and Energizer (E92) batteries only.		
2. Replace the batteries in fresh air only and replace all batteries at the same time. Do not mix batteries from different manufacturers or of different types.		
3. The Koehler Helmet Flasher Accessory must not be opened in areas where permissibility is required.		
Class I, II, III Div 1&2 Groups A-D, F, G T4 See instruction manual for complete warnings 		COMMONWEALTH OF PENNSYLVANIA APPROVAL No. BFE 13-20

**Koehler Freakin’ Beacon Approval Markings**

The above approval marking have been in use since December 2023. Previously, Duracell MN2400 and Procell PC2400 were listed as approved battery types, however due to changes in product chemistry and construction, testing has found these cells in their current state would not meet the requirements for use in intrinsically safe devices and as such these products are no longer certified as approved battery types. **PROCELL CONSTANT AND DURACELL COPPER TOP ARE NOT APPROVED FOR USE WITH MSHA APPROVED FREAKIN’ BEACON.** Use of these batteries would void the intrinsically safe certification, which relies on use of only certified batteries within the product.