

ABSTRACT

A variety of flash powders were tested under weak confinement to determine the sound pressure levels and tonal quality produced. In these tests it was found that: the sound output from mixtures prepared with potassium perchlorate from four manufacturers are essentially equivalent; there are significant differences in the level of sound output as a result of using six different common aluminum powders; the addition of either of two common flow or bulking agents have essentially no effect on the sound produced; the substitution of potassium chlorate for potassium perchlorate in a common flash powder has essentially no effect on the sound produced; and the addition of antimony sulfide or sulfur reduces the duration of positive phase without increasing the level of the sound produced. In short it was found that nothing surpassed the level of sound produced by a 70:30 mixture of reasonably high quality potassium perchlorate and a high quality flake aluminum powder. This is significant because the use of potassium chlorate, antimony sulfide, and sulfur, can seriously increase the sensitiveness of flash powders to accidental ignition.

Manufacturer - Product Number	Description ^(a) [Morphology]	Average Particle Size ^(b) (μ)
Obron - 5413	German Dark [Flake]	8 ^(c)
Obron - 10890	American Dark [Flake]	15 ^(c)
Alcan - 7100	American Dark [Flake]	13
Reynolds - 400	Atomized [Spheroidal]	6
US Aluminum - 809	American Dark [Flake]	30 ^(c)
Alcan - 2000	Bright [Flake]	36

Table 9. Average Results from Different Potassium Perchlorates.

Potassium Perchlorate Type	Sound Pressure Level (dB)	Relative Loudness
Swedish	186.5	≅ 1.00
US	186.6	1.00
Chinese	186.2	0.97
Italian	186.7	1.01

Table 10. Average Results from Different Aluminums.

Aluminum Types	Sound Pressure Level (dB)	Relative Loudness
Obron 5413	186.6	≅ 1.00
Obron 10890	186.0	0.96
Alcan 7100	185.5	0.93
Reynolds 400	179.7	0.62
US Aluminum 809	178.9	0.59
R. 400 + A. 2000	178.0	0.54
Alcan 2000	174.1	0.42

There are a number of inferences that can be drawn from the above data sets; however, these must only be made within the context of these measurements. It is possible that other conclusions would be reached for other experimental conditions. Nonetheless, these data imply:

- The sound output from mixtures prepared with common sources of potassium perchlorate from four manufacturers are essentially equivalent.
- There are significant differences in the level of sound output as a result of using six different common aluminum powders.
- The addition of either of two common flow or bulking agents have essentially no effect on the sound produced.
- The substitution of potassium chlorate for potassium perchlorate in a common flash powder has essentially no effect on the sound produced.
- The addition of antimony sulfide or sulfur reduces the duration of positive phase without increasing the level of the sound produced.

In short nothing surpassed the level of sound produced by a 70:30 mixture of reasonably high quality potassium perchlorate and a high quality flake aluminum powder. This is significant because the use of potassium chlorate, antimony sulfide, and sulfur can seriously increase the sensitiveness of flash powders to accidental ignition.

The 50/50 Magnesium/Aluminum is For STARS ONLY

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Reference only

Flash Powder Output Testing:
Weak Confinement