Accurate Energetic Systems, LLC

ACCURATE ENERGETIC SYSTEMS, LLC
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LINEAR SHAPED CHARGE

DESCRIPTION

AES Linear Shaped Charge (LSC) is an explosive enclosed in a seamless metal sheath and fabricated in continuous lengths shaped in the form of an inverted “V”. When detonated, the V-shaped metal liner with explosive core produces a uniform linear cutting action. This cutting action, known as the “Monroe effect”, can be accentuated by controlling the LSC dimensions and configuration, explosive type and load, liner thickness and continuity. At detonation, the focusing of the explosive high pressure wave as it becomes incident to the side wall causes the metal liner of the LSC to collapse–creating the cutting force. If the standoff distance is optimum, collapse of the liner will be complete before it reaches the target as a plasma jet. This high velocity jet impacts the target with pressures exceeding the target’s yield strength and literally pushes the target material to either side of the path of the jet.

PERFORMANCE

The cutting ability of LSC is affected by a number of variables, including the detonation rate of the explosive core load, the characteristics of the metal liners and the density of the material being cut. There is, however, a general scaling guide which may be used to determine the penetration as related to core load, in that penetration of a given material is essentially proportional to the square root of the core load. The liner may be formed using any malleable metal, but is typically copper, aluminum, lead or silver. Copper is generally used with most large core loads, but for some applications, Aluminum is recommended to provide structural integrity. For small core loads where flexibility is required, Lead is preferred, while Silver is reserved primarily for use with thermally-resistant explosive core loads. The explosive core loads commonly used in AES LSC are RDX, HMX, PETN and HNS.

The detonation rates are as follows:

RDX:	8,200 m/s @ 1.65 g/cc.
HMX:	9,100 m/s @ 1.84 g/cc.
PETN:	8,300 m/s @ 1.7 g/cc.
HNS:	6,900 m/s @ 1.6 g/cc.

The formula is as follows:

$T_1 = T_2 \sqrt{\frac{W_1}{W_2}}$

T_1 = unknown penetration depth
T_2 = recorded penetration by W_2 core load
W_1 = select core load
W_2 = recorded core load

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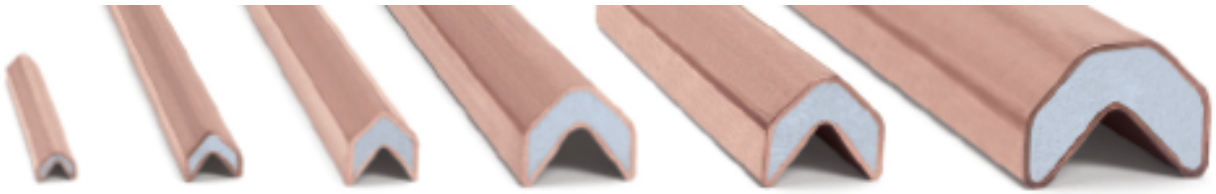

LINEAR SHAPED CHARGE

COPPER LINEAR SHAPED CHARGE

Core Load Grains/Foot*	Width** (In.)	Height** (In.)	Approx. Gross Weight (Lbs/Ft.)	Approx. Standoff (In.)	Penetration at Optimum Standoff (In.)
125	.37	.27	.14	.20	.20
250	.46	.38	.22	.35	.40
400	.48	.51	.31	.37	.50
600	.68	.61	.51	.60	.70
900	.72	.69	.70	.66	.85
1,200	.95	.90	.96	.70	1.00
2,000	1.175	1.07	1.31	.75	1.50
3,200	1.43	1.23	1.66	1.00	1.70
4,000	1.55	1.38	2.25	1.15	2.00
10,500	2.23	1.87	4.30	2.50	3.00

CAST LINEAR SHAPED CHARGE

In addition to formed Linear Shaped Charge, AES offers a Cast LSC in various lengths and explosive weights. Lengths and configurations can bemanufactured to meet most needs. Popular applications for cast charges included oil well control situations and for cutting heavy-walled steel structures. Cast LSC can be manufactured with either steel or aluminum housings, and can be poured with a variety of explosives to include Octol, Composition B and Hexolite.

LSC with core loads down to .20 grains/foot are available on request.

**Explosive Core Loading tolerance is ± 10%.*

***Dimensional tolerance is ± .03.*

†Performance shown is for RDX explosive into 1018 mild steel.

Call AES for special circular bends and corner cuts.

FL – Y 0 0 0 0

- 0 — Product Type: 2-Linear Shaped Charge (LSC)
- 0 — Sheath Material: 0-Lead, 1-Silver, 2-Aluminum, 3-Copper
- 0 — Core Material: 0-RDX, 1-PETN, 2-CH-6, 3-HNS, 4-HMX, 8-PBXN-5, 4-Pewter
- 0 — Grain Load Per Foot (XXXX)

Example: FL-Y2300200 is a Linear Shaped Charge with a copper sheath and 200 grains/foot of RDX core.

01/23