Bilaga 1

- **SK Rifle Match**

BALLISTIC DATA

Product Nro. 420108
Weight 2,59 g / 40 gr
Test barrel length 660 mm / 26 in

METRIC

Velocity [m/s] (Note barrel length) **Energy** [J] **Wind drift** [mm] (Sidewind 4 m/s)				
0 m	2,5 m	10 m	50 m	100 m
327 138 0	326 137 0	322 134 1	304 120 24	284 104 98

- **Lapua Center-X**

Velocity [m/s][fps]
Energy [J][ft.-lbs.]
Crosswind drift [mm]Crosswind drift [in] (sidewind 4 m/s)(sidewind 13 fps)

Metric chart

0 m
327
138
0

- **Lapua Polar Biathlon**

Velocity [m/s][fps]
Energy [J][ft.-lbs.]
Crosswind drift [mm]Crosswind drift [in] (sidewind 4 m/s)(sidewind 13 fps)

Metric chart

0 m
337
147
0

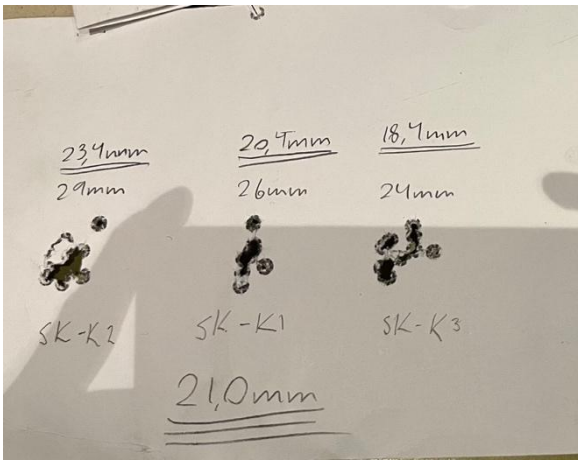
- **Norma Biathlon Match-22**

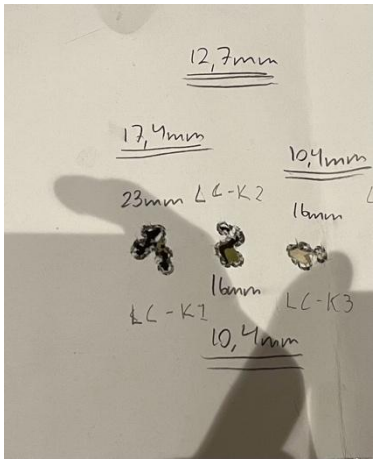
- **Norma Biathlon Sport-22**

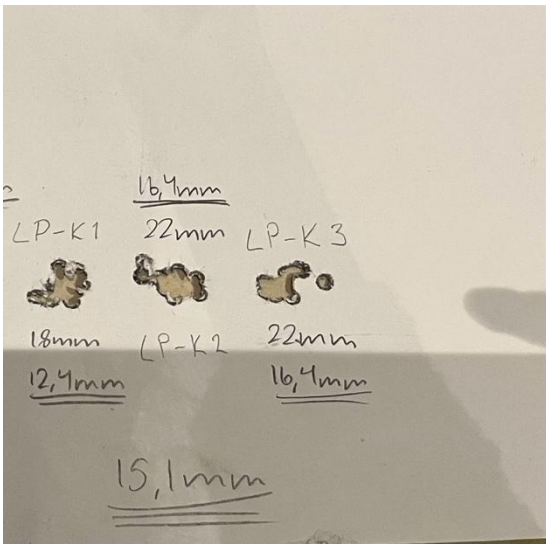
- **ELEY Tenex Biathlon**

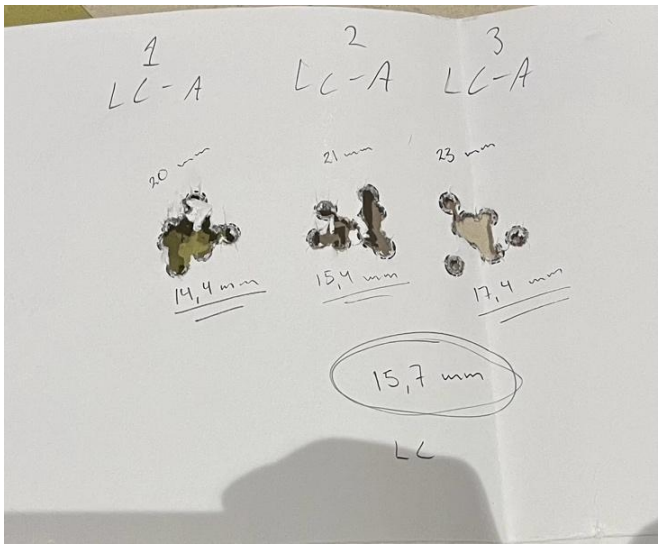
Bullet Profile	Bullet Weight	Mean Velocity m/s
Flat-nose	2.59 grams / 40 grains	335m/s-354m/s

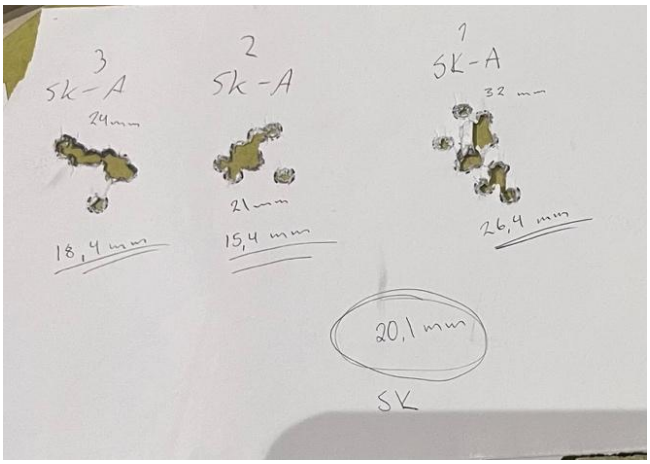
Bilaga 2

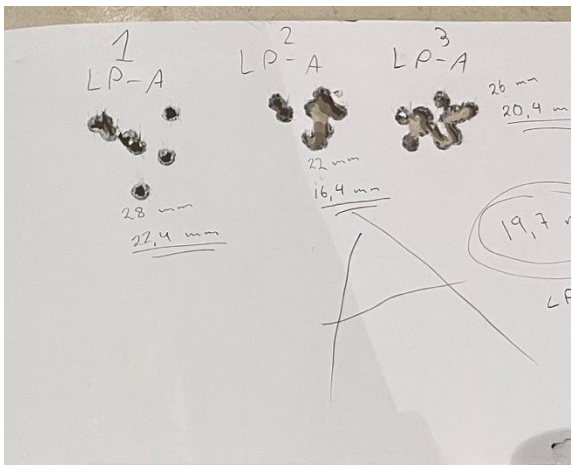

23,4mm
29mm
20,4mm
26mm
18,4mm
24mm
SK-K2
SK-K1
SK-K3
21,0mm

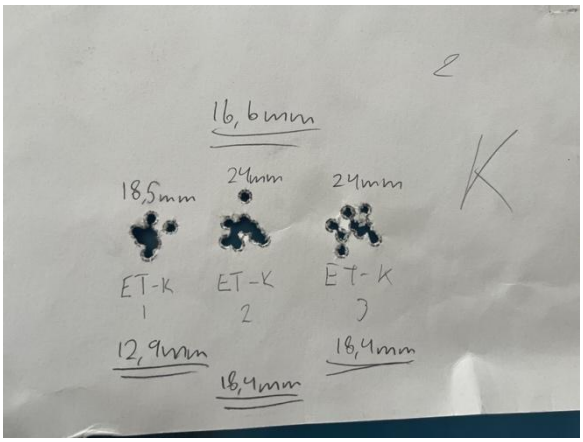

12,7mm
17,4mm
10,4mm
23mm
LC-K2
16mm
16mm
LC-K1
LC-K3
10,4mm

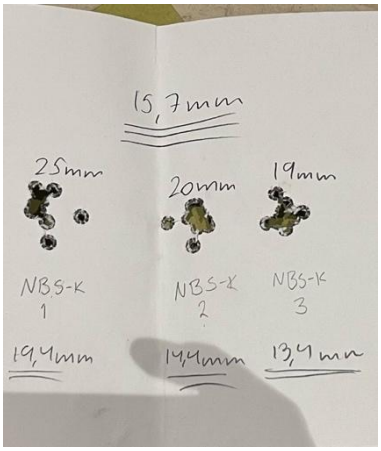

16,4mm
LP-K1
22mm
LP-K3
18mm
LP-K2
22mm
12,4mm
16,4mm
15,1mm

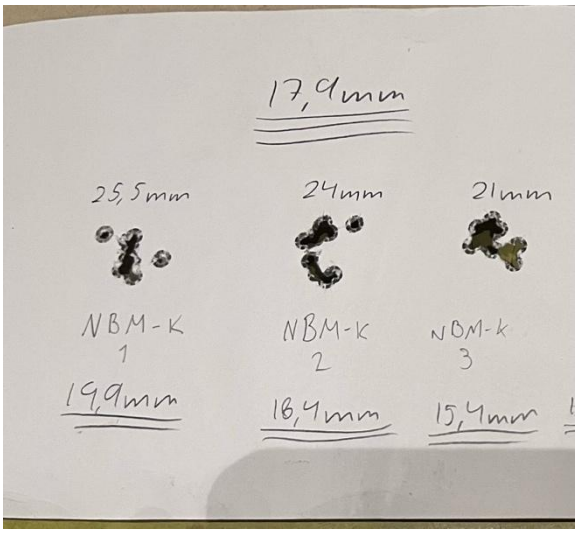

1
LC-A
2
LC-A
3
LC-A
20 mm
21 mm
23 mm
14,4 mm
15,4 mm
17,4 mm
15,7 mm
LC

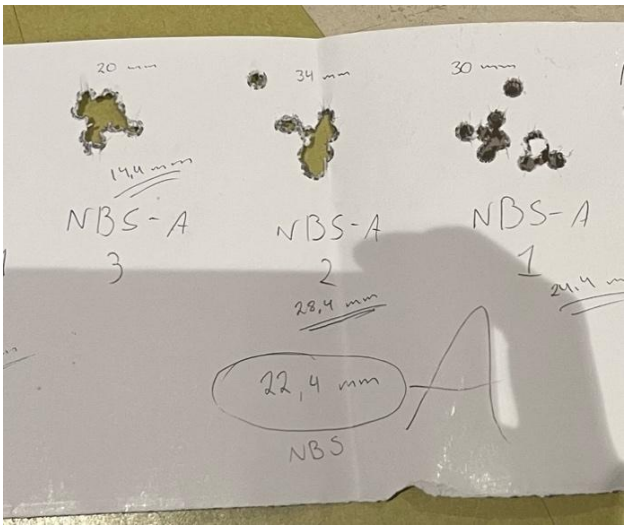

3
Sk-A
24mm
18,4 mm
2
Sk-A
21mm
15,4 mm
1
SK-A
32 mm
26,4 mm
20,1 mm
SK

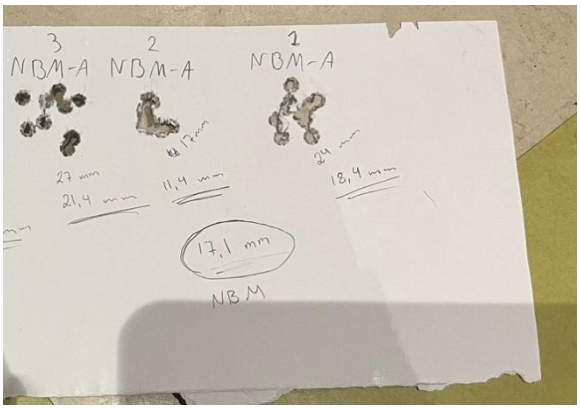

1
LP-A
2
LP-A
3
LP-A
26 mm
20,4 m
22 mm
16,4 mm
28 mm
22,4 mm
19,7

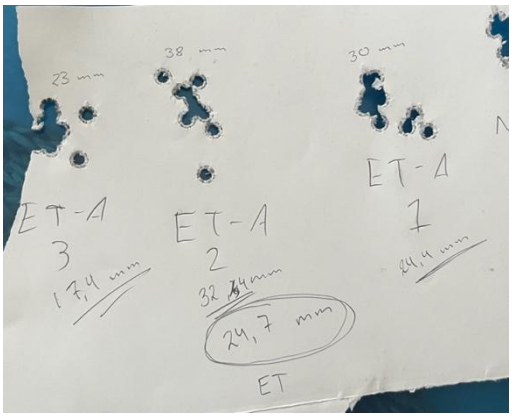

2
16,6mm
18,5mm
24mm
24mm
K
ET-K
1
ET-K
2
ET-K
3
12,9mm
18,4mm
18,4mm


15,7mm
25mm
20mm
19mm
NBS-K
1
NBS-K
2
NBS-K
3
19,4mm
14,4mm
13,4mm


17,9mm
25,5mm
24mm
21mm
NBM-K
1
NBM-K
2
NBM-K
3
19,9mm
18,4mm
15,4mm


20 mm
34 mm
30 mm
14,4 mm
NBS-A
3
NBS-A
2
NBS-A
1
28,4 mm
22,4 mm
NBS


3
NBM-A
2
NBM-A
1
NBM-A
27 mm
21,4 mm
11,4 mm
18,4 mm
17,1 mm
NBM


23 mm
38 mm
30 mm
ET-A
3
ET-A
2
ET-A
1
17,4 mm
24,7 mm
ET

Bilaga 3

WhatsApp konversation

Hej Thomas! Hope you’re doing well🤗 Me and my friend is doing a school project about ammunition and I was wondering if you could help me with you’re experience. What is your opinion on the impact of ammunition on shot accuracy? Which ammunition do you think works the best for most athletes? Hälsningar Anine😀

Tjena Anine. I'm good ! I wish you well and that your preparation goes well 😊

For me, the quality of the bullets affects the accuracy of your shot. Poor-quality bullets will not allow you to achieve good bullet grouping. And vice versa. But each barrel reacts differently. This means that you can have the same brand of bullet but get a different grouping. That's why, at the start of the season, shooting coaches go into a tunnel with very cold temperatures (to replicate winter temperatures) to try out different brands of bullets in order to find the ones that work best for their athletes' barrels.

For me, the good ammunition brands are "Lapua" and "Eley". But of course there are many.

I hope I've answered well to your questions. If not, tell me 😉
See you !

Bilaga 4

From: Karl-Axel Utterström <karlaxel.utterstrom@gmail.com>
Sent: tiistai 9. syyskuuta 2025 10.50
To: Seikkula, Erkki <Erkki.Seikkula@nammo.com>
Subject: School project

Dear Erkki,

Thank you for your response,

We have noticed a couple of differences between Polar biathlon and outer brands cartridges. For example we have observed that your bullet is more greasy than others. Why is that? Does the shape make a big difference while being fired or while it's in the air? Does the shape make the bullet less affected by external factors? One last thing we've noticed is that, when fired, it makes a louder bang compared to other ammunition. Why is that? Does in contain more powder?

We would be grateful for any response

Greetings from Anine Karlsson and Karl-Axel Utterström

Från: "Seikkula, Erkki" <Erkki.Seikkula@nammo.com>
Datum: 10 september 2025 11:57:10 CEST
Till: Karl-Axel Utterström <karlaxel.utterstrom@gmail.com>
Ämne: RE: School project

Karl-Axel/Anine,

It is a bit difficult for me to comment what other manufacturers have done wrong with their ammo designing, but we have place such a correct amount of lubrication on the surface of bullet that we see it is necessary.
That is also tested many ways but also the composition of that lubrication is selected after multiple testings.

The shape of .22 LR Polar Biathlon bullet is developed at Lapua on 1970´s. That time our R&D engineers made a lot of wind tunnel testings and designed the bullet according to the results of those test shooting.
According to my understanding no other manufacturer has done similar wind tunnel testings for their bullets.
...and yes, the shape of bullet but also the velocity has the effect for the external conditions like the wind.
According to our understanding that shape is the best for grosswind.

In order that rimfire ammo/bullet is accurate, it must leave the muzzle under speed of sound. Our .22 LR X-Act, .22 LR Midas+, .22 LR Center-X etc. are loaded to muzzle velocity of V2,5=325 m/s. That gives the best accuracy for them in normal (warm) conditions
The .22 LR Polar Biathlon is loaded for the higher muzzle velocity (V2,5=335 m/s) at 20Co, which explain that louder bang when shooting.
But the powder is functioning with the temperature and when temperature goes down the bullet is loosing its velocity. When biathletes are training and racing in the temperature -5 - -15Co then Polar Biathlon has lost a bit in muzzle velocity and bullet leaves the muzzle around that 325 m/s which gives the best accuracy out in cold conditions.

So, if you are training or racing (roller ski) on warm/summer conditions then it makes much more to use ammo like .22 LR Center-X. That is why because its nominal muzzle velocity is that 325 m/s and then it is performing it best accuracy out.
When winter comes and temperatures goes under 0C, then you should use for .22 LR Polar Biathlon, because in such conditions the velosity of .22 LR Center-X is already too slow, but the PB is giving the such avelocity out which is just under the speed of sound.

Does it make any sense with my explanations?

Regards,

Erkki Seikkula
Sales & Marketing Manager
Nammo Commercial Ammunition