

IDV Safety arrow mechanical test results.

Definitions

IDV – New German safety arrow, unmodified

CF – Homemade traditional style arrow head on a carbon shaft.

AKG – Arrowkaster fibreglass-shaft arrow, unmodified.

AKW – Arrowkaster wood-shaft arrow, unmodified

Block Impact test (25J@5Kg, average over 10 tests)

Lower numbers are better.

IDV 68.28

CF 151.19

AKG 237.23

AKW 251.72

Conclusion. IDV and CF arrows transferred far less impact energy than the Arrowkaster ones, with IDV out-performing CF. Meaning softer hits from IDV. These results are on a parabolic scale; AKG and AKW do not transfer four or five times the energy of IDV, it's more like 25% more.

104 Free-Swing Impact test (average over 10 tests)

Lower numbers are better.

IDV 112.25

CF 112.10

AKG 112.15

AKW 111.75

Conclusion. All the arrows absorbed roughly the same amount of kinetic energy (to within 0.5%).

Drop tests (single measurement only, they're often destructive tests)

Arrow	450N Lateral		40N Axial	40N Lateral	8N Axial
IDV	Safe Fail	Fail	Safe Fail	Pass	
CF	Pass	Fail	Pass	Borderline Pass	
AKG	Fail	Fail	Pass	Borderline Pass	
AKW	Fail	Fail	Pass	Borderline Pass	

Conclusion. Drop tests are fairly extreme. The only unexpected results here are the CF 450N pass, and the IDF 40N Lateral fail.

Safe Fail, arrow was damaged so that it would not pass a weaponcheck, but in a self-contained low-risk way.

Fail, arrow damaged in such a way that it would not pass weaponcheck **and** was dangerous to recover.

Borderline Passes, arrow damaged, but not so severely that it would fail weaponcheck.

Field Performance tests

Ricochet (%difference from total average over 10 shots).

Arrow	@5m	@10m	@20m
IDV	-0.4	15.3	26.7
CF	2.8	-20.8	-24.2
AKG	2.0	5.6	2.9
AKW	-0.4	3.9	-1.4

Ricochet (average distance over 10 shots)

Arrow	@5m	@10m	@20m
IDV	6.30	6.5	5.8
CF	6.45	4.5	3.5
AKG	6.40	6.0	4.7
AKW	6.35	5.9	4.5

Conclusion. Ricochets were tested by firing the arrow directly into a brick wall. The IDV arrows do not drop off in speed as quickly as the AKG, AKW or CF, so the ricochet distance stayed roughly constant. By contrast, the homemade arrows dropped in speed rapidly, so ricocheted less.

Range (launched at 45 degrees, average over 10 shots)

Arrow	into wind	with wind	average
IDV	43.65m	44.3m	43.98m
CF	23.70m	33.35m	28.63m
AKG	27.10m	34.60m	30.85m
AKW	26.20m	31.85m	29.03m

Conclusion. Increase in range from IDV arrows is significant, and they are less affected by the wind. Homemade CF arrows (which have a slightly larger head than the Arrowkaster ones) are more affected by wind, and have a shorter average range.

Brutality

I fired the IDV arrows along tarmac. They survived with mild scuffs to the foam and flights. I fired them into walls and various floors at a variety of angles. Again, they suffered only mild scuffing. None of the ground shots cartwheeled any more than the traditional design. I fired them directly up. None parachuted, in fact they turned over quicker than the traditional designs I tested them alongside, although the IDV's increased ricochet was apparent once they hit the floor.

Overall conclusions and notes

I was going to run tensile, shear and co-axial tests, but dropped them since they are shaft tests, and the IDV arrows are mounted on standard Easton Trooper arrow shafts, which are commercially available and the same ones that Arrowkaster uses on their fibreglass arrows.

The IDV arrows met or exceeded the field and mechanical performance of the more traditional design in every test I made, with the exception of the lateral drop tests (this simulates falling or treading on the arrow while it is on the ground), and one breakage on the point-blank ricochet. These failures do not necessarily indicate a lower safety limit (since neither the shaft, point nor any debris penetrated the front face from the inside), more that the arrows will need replacing more often.

I destroyed four IDV arrows during all these tests, three in drop tests, and one went during the ricochet testing. They all failed in a contained manner, with no exposed sharp edges or shaft. I killed five traditional arrows, only three of which failed in a contained manner.

My overall conclusion is that these arrows are as safe, if not safer, than the traditional design, although they are not quite as robust.

This lack of overall toughness could be alleviated if the design was upgraded so that the plastic cup insert was made of a slightly more flexible plastic or a hard rubber.

I would further recommend that players be made aware that these arrows are not as resilient to ground damage, and that archers do not carry mixed quivers of IDV and traditional arrows.