

Weapons & Sensors



Per G. Arvidsson

Chairman

Weapons & Sensors Working Group

Land Capability Group 1 - Dismounted Soldier

NATO Army Armaments Group

Tel: +46-8-782 4181, Fax: +46-8-782 6412

E-mail: per.arvidsson@fmv.se

Web-site: www.fmv.se



Agenda

- History of the two NATO rifle calibers.
- NATO Nominated Weapons.
- STANAG 4694 “NATO Accessory Rail”.
- National programs.
- Small arms lethality.

History of 7.62 NATO

- In WWII the Allies learned that ammunition supply was a nightmare.
- After NATO was founded in 1949, it was therefore decided to standardize calibers.
- USA proposed that the new rifle caliber should be the US developed .30 Light Rifle (7.62x51mm), which was a shortened .30-'06.
- GBR proposed the British 7.1x43mm intermediate caliber.
- In 1953 NATO standardized 7.62x51mm as the new rifle caliber.



History of 5.56 NATO

- In 1970 NATO decided to try to standardize a common rifle and a second rifle caliber.
- During 1977-1980 they therefore performed mutual tests with rifles and ammunition.
- The calibers tested were:
 - 5.56mm rounds with increased penetration from BEL and USA.
 - GBR 4.85mm round.
 - DEU 4.7mm caseless round.



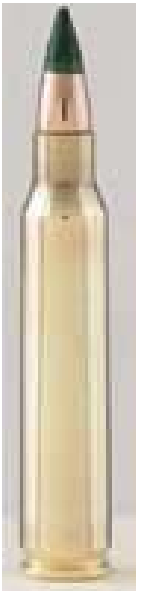
NATO rifle and ammunition trials 1977-1980



Country	Weapon	Caliber (mm)	Ammunition
Germany	G11	4.7	4.7 caseless
United Kingdom	4.85 IW	4.85	4.85
Belgium	FNC	5.56	SS109
Netherlands	MN 1 (Stoner 63)	5.56	M193
United States	M16A1	5.56	XM777
France	FAMAS	5.56	F1 brass and steel cased (M193 type)
United States (control)	M16A1	5.56	M193
Germany (control)	G3	7.62	7.62 NATO

The results

- No weapon could be agreed upon.
- Some were in their prototype status.
- The BEL SS109 round was found to be the best, and was standardized as NATO's second rifle caliber in 1980.



There is no NATO rifle!

- During the tests the US M16A1 was a control weapon.
- You can often see reference to:
 - NATO/STANAG magazine.
 - NATO/STANAG flash hider.
 - NATO/STANAG bayonet.
- There is currently no such thing!





NATO Nominated Weapons

- NNW's are used as reference when new ammunition is standardized.
- As of 2009 the 5.56mm rifles are:
 - FNC, Belgium
 - G36, Germany
 - AR70/90, Italy
 - L85A2, United Kingdom
 - M16A2, USA
- A new NNW must work with all qualified 5.56mm ammunition designs.



5.56mm NATO Ball Qualified Designs

NATO Design Number	Sponsoring Country	Head Stamp Initials	Publication Date	Manufacturer
AC/225-111A	USA	LC	30/06/1987	GOCO, Lake City, USA
		WCC		Olin Winchester USA
		TAA		205th Arsenal, Taiwan
AC/116-112A	BEL	FNB	14/11/1989	Fabrique Nationale, Belgium
AC/225-113A	ITA	SMI	12/04/1990	Europa Metalli, Italy
AC/225-114A	GBR	RG	14/08/1995	Royal Ordnance, United Kingdom
AC/225-116A	BEL	FNB	16/11/1995	Giat Industrie, France
AC/225-117A	NLD	HP	15/05/1996	Hirtenberger, Austria
AC/225-118A	CAN	MI	17/01/1997	GD-OTS, Canada
AC/225-120A	PRT	FNM	31/08/1998	Indep, Portugal
AC/225-122A	ITA	GFL	11/01/1999	Fiocchi, Italy
AC/225-124A	GBR	RG	24/02/1999	Royal Ordnance, United Kingdom
AC/225-125A	DEU	DAG	10/03/2000	RUAG, Germany
		MEN		MEN, Germany
AC/225-126A	BEL, FRA	IMI	10/03/2000	IMI, Israel
AC/225-127A	SPA	SB	26/09/2000	Santa Barbara, Spain
AC/225-128A	NOR	CG	6/07/2004	NAMMO, Sweden
AC/225-130A	LIT	GGG	26/05/2005	GGG, Lithuania
AC/225-132A	GBR	RG	27/01/2006	BAE Systems Radway Green, United Kingdom
AC/225-133A	GBR	RG	30/01/2006	BAE Systems Radway Green, United Kingdom



W&S STANAG's

- We are currently updating STANAG's that were created during the cold war to better reflect current and future operation:
 - STANAG 4512 Dismounted Personnel Targets
 - STANAG 4513 Incapacitation & Suppression
 - STANAG 4498 Unarmoured Vehicles, Helicopters & Field Fortification Targets
 - STANAG 4536 Representative Building Targets
- STANAG 2129 - Identification of land forces on the battlefield and in an area of operation.
- STANAG 4694 NATO Accessory Rail.

NATO RTO study

- Ten Nations have under the umbrella of the NATO Research and Technology Organization (RTO) formed a team with the objective to standardize a NATO rail.
- Industry has been heavily involved.



Aimpoint

 BERETTA



STANAG 4694 “NATO Accessory Rail”

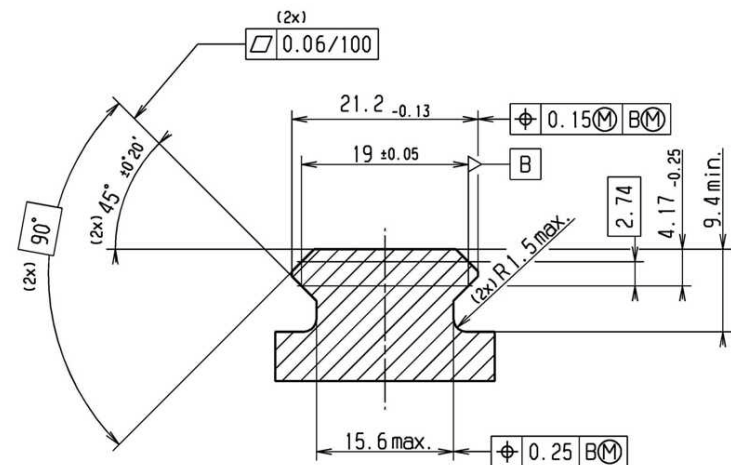
- Approved by NATO on May 8.
- The NATO Accessory Rail has full backwards compatibility with MIL-STD-1913 rail grabbers/mounts.
- Recommendation on how to attach rail grabbers/mounts to the NATO Accessory Rail.



MIL-STD-1913 / STANAG 4694

The differences between MIL-STD-1913 and STANAG 4694 are:

- Metric drawing.
- Added some new necessary measurements and tolerances.
- Adjustment of some measurements.
- Reduction of straightness tolerances with approx 50%.

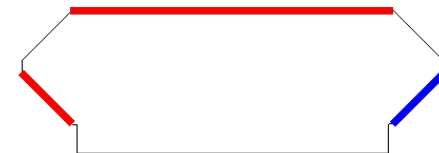


Recommendations

- On a typical Mil-Std-1913 rail the grabber is clamping the rail on the v-angles.
- Our tests have shown that this does not provide good repeatability.
- We recommend instead that the top surface is used as a reference and alignment of the grabbers.
- Our tests have shown that this provides excellent repeatability.



Typical US MIL-STD-1913
Rail/Grabber Interface



NATO Rail/Grabber
Interface

National programs

- Information exchange is an important issue.
- This has shown that there are many similar programs among the nations:
 - Upgrade of rifles.
 - Procurement of the same type of accessories (sights, laser pointers and magnification devices).
 - Studies of light weight fire control systems.
 - Studies of suppressors.



Assault rifle development



1942
MKB 42 (H)



2009
FN Mk 16 (SCAR-L)

What has happened in the last 67 years?

- Reduced caliber
- Rails
- Foldable and adjustable butt stock
- Reduced weight

Accessories that were not available 30 years ago

- Good electro-optic day and night sights.
- Laser pointers
- Overhead weapon stations
- Compact fire control systems
- LED flash lights



Aimpoint CompM4



ITT AN/PVS-14



Raytheon AN/PVS-13 TWS

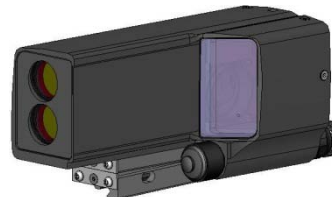


Laser Devices DBAL-A2



Rheinmetall LLM 01

Kongsberg Protector



Aimpoint FCS BR8



Streamlight TLR-1



IT AN/PAQ-4C

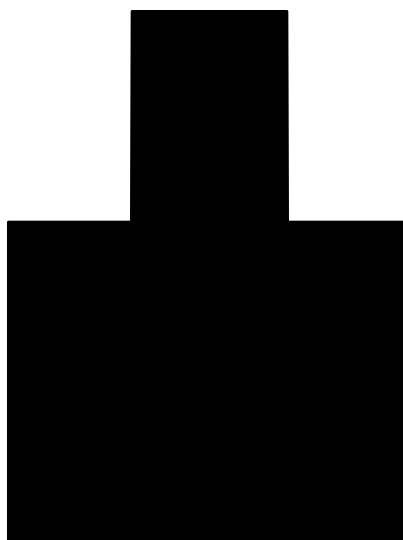


Small Arms Lethality

- There has previously been many discussions about small arms lethality.
- GBR therefore hosted a two day "Workshop on Small Arms Lethality" on February 18-19 at the Defence Academy of the United Kingdom in Shrivenham.
- The group agrees that shot placement is the most important parameter.
- This is achieved through good and realistic training.
- We have included this topic in our agenda.

Modification of Swedish pop-up target

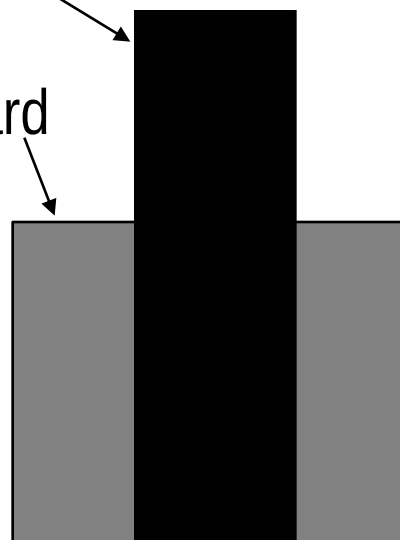
Sheet
metal



Original
target

Sheet metal
(w=120mm)

Cardboard



Modified target





Questions?

