TESTING REPORT

Gemtech R&D

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SUBJECT: **NEW Ported DI Bolt**

Two versions of the bolt were tested: one for the M4/M16 platform and one for the SR25 type 7.62mm platform. In 5.56mm, two weapons were used: a standard M4 (14.5 inch barrel) and a MK-18 (10.5 inch barrel). All weapons were direct impingement gas operated.

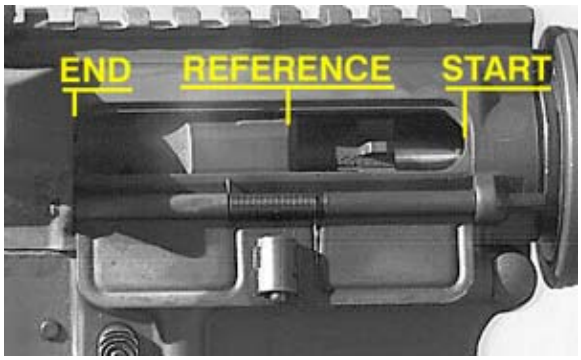
The high speed video camera was an Olympus iSpeed FS camera with an f-1.4 Nikon lens. Filming was done at 5,000 frames/second with a shutter speed of 15 microseconds. Because the 5.56 NATO weapon was capable of fully automatic fire, a 3-round burst was recorded. The 7.62 NATO rifle was semi-automatic function only, and a single round was fired.

For the 5.56 NATO weapon, rate of fire was calculated by counting frames from the beginning of bolt opening on the first round to beginning of bolt opening of the third round. This gave two complete cycles. The formula for calculating rate of fire is:

ROF = (60) * (number of shots) * (frame rate) ÷ (number of frames)

For two complete cycles, this simplifies to: ROF = (60)*(2)*(5000) ÷(# of frames)

For each of the rounds (three in the case of the 5.56NATO weapons), the frames were counted for bolt opening only. The starting point was when the front of the bolt carrier just started to move rearward from front margin of the ejection point and the stopping position was when the front of the bolt carrier just cleared the rear of the ejection port. The port is known to be 77.7mm in length. With the known frame rate, the actual opening time (in milliseconds) is easily calculated and the results of the three rounds averaged. With the known distance (ejection port length), rate in mm/sec is also easily calculated.



M4 Carbine (14.5” barrel), M855 (62gr) ball ammunition:

AVI File	Bolt and Configuration	Suppressor	Av # Frames (Opening)	Av. Opening time (ms)	Av. Opening Vel. (mm/sec)	Rate of Fire
NEW-NS	Factory	None	88	17.6	4,409	723
NEW-01	Factory	TREK	67.5	13.5	5,741	873
NEW-02	NEW, Suppress	TREK	95.5	19.1	4,061	703
NEW-03	NEW, Non-Supr	TREK	72	14.4	5,397	830
NEW-04	NEW, Non-Supr	None	98.5	19.7	3,951	625

MK-18 Carbine (10.5" barrel), M855 (62gr) 5.56NATO ball ammunition:

AVI File	Bolt and Configuration	Suppressor	Av # Frames (Opening)	Av. Opening time (ms)	Av. Opening Vel. (mm/sec)	Rate of Fire
NEW-05	Factory	TREK	53.5	10.7	7,239	943
NEW-06	NEW, Suppress	TREK	72.5	14.5	5,346	796

Interestingly, non-suppressed and with the NEW bolt set for no suppressor, the rearward bolt velocity is over 11% less than with the factory bolt. Suppressed, the NEW bolt with the setting for non-suppressed use has a rearward bolt velocity 6% less than the factory bolt.

Using the TREK suppressor, the suppressed setting of the NEW bolt makes a dramatic reduction in rearward bolt velocity and cyclic rate as compared to the factory bolt and these parameters are significantly reduced compared to a non-suppressed factory weapon.

SR25 Pattern rifle (16 inch barrel), M80 7.62NATO ball ammunition:

As before, the frames were counted for bolt opening only. The starting point was when the front of the bolt carrier just started to move rearward from front margin of the ejection point and the stopping position was when the front of the bolt carrier just cleared the rear of the ejection port. The port is known to be 83.5mm in length. With the known frame rate, the actual opening time (in milliseconds) is easily calculated. With the known distance (ejection port length), rate in mm/sec is also easily calculated.

Rate of fire could not be measured, but by frame counting, we calculated an estimatre of cycle time. The starting point was as the bolt carrier just started its rearward movement after ignition and the endpoint of the cycle was arbitrarily decided as the point at which the front of the bolt carrier returned to the front of the ejection port.

AVI File	Bolt and Configuration	Suppressor	# Frames (Opening)	Opening time (ms)	Opening Vel. (mm/sec)	Cycle time (ms)
NEW-07	Factory	None	74	14.8	5,642	75.2
NEW-08	Factory	SANDSTORM	58	11.6	7,198	59.8
NEW-09	NEW, Suppress	SANDSTORM	76	15.2	5,493	70.6

The NEW bolt set for "suppressor" reduces opening velocity to approximately 3% less than the non-suppressed weapon using the factory bolt.