



Test Report T11763-01-2 Issue 1  
STANAG 2920 (Edition 2)  
3M  
Securefit 600 SGAF Spectacles  
14 July 2017



Approved by:

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Date: 14 July 2017  
Report: T11763-01-2  
Issue: 1  
Page: 1 of 6

**Objective:**

Contract testing to STANAG 2920 (Edition 2) “Ballistic Test Method for Personal Armour Materials and Combat Clothing”; 31 July 2003. 3.600mm, 0.325gram Fragment Simulating Projectile (FSP).

**Samples:**

Securefit 600 SGAF Spectacles

Part Number	Lot #	Lens	Quantity	Sample ID
SF601SGAF, SF601SGAF-TAC, SF601SGAF-EU	17069	Clear	40	3A
SF602SGAF, SF602SGAF-TAC, SF602SGAF-EU	17048	Gray	40	3B
SF603SGAF, SF603SGAF-TAC, SF603SGAF-EU	17069	Amber	40	3C

Date(s) submitted: 14 June 2017

**Assessment Summary:**

Date(s) tested: 06 July 2017

The  $V_{50}$  results are as follows:

Lens	$V_{50}$ (m/s)		
	Chronograph Set 1	Chronograph Set 2	Average
Clear	227	227	227
Gray	234	234	234
Amber	237	236	237

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Date: 14 July 2017  
Report: T11763-01-2  
Issue: 1  
Page: 2 of 6

**Equipment:**

1. Pneumatic Air Gun.
2. Nitrogen Propelled.
3. Fragment Simulating Projectile, 3.600mm, 0.325gram, 4340 steel, Hardness 30+/-2 Rockwell C..
4. Oehler Research Precision Ballistic Chronographs, two sets of screens with 1' spacing between start and stop. (Set 1: stop screen ~16.0" from sample, Set 2: stop screen ~ 12.5" from sample)
5. Ballistic Alderson 50<sup>th</sup> percentile headform with 0.002 inch witness sheet, nominally 2" behind sample.

**Procedures:**

Testing protocols in accord with good laboratory practice were employed for all tests.

All tests were conducted in a standard laboratory atmosphere unless otherwise specified.

Testing procedures as specified within STANAG 2920 were followed with the following exceptions: Electronic velocity detection devices (light beam) was used to determine the velocity of the projectiles. Compressed nitrogen was used for propulsion of the projectile. The eyewear was mounted on an Alderson 50th percentile male head form in the as-worn position.

Samples were conditioned for a minimum of 24 hours at 20 +/- 2°C, 65+/- 5%RH and impacted within 30minutes of conditioning.

Samples were mounted on the headform and impacted normal to their visual centers (a point centered on the horizontal center line and 32mm from the vertical center line).

Upon completion of each impact, samples and witness plate were observed. Any damage to witness plate or eyewear was recorded.

V<sub>50</sub> was calculated by taking the average of the 4 highest velocities which resulted in partial penetration and the 4 lowest velocities which resulted in complete penetration.

-Complete Penetration defined as when the impacting projectile or any fragment thereof, or any fragment of the test specimen perforates the witness plate.

-Partial Penetration defined as any impact which is not a complete penetration.

Unacceptable yaw (projectile tumble) was determined by the number of corners of the fragment chisel point visible in the impact site. If less than 3 corners were visible the shot was considered invalid and another sample tested.

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 USA

Date: 14 July 2017  
 Report: T11763-01-2  
 Issue: 1  
 Page: 3 of 6

**Clear Results:**

Sample ID	Location	Velocity (m/s)		Observation	Used for V <sub>50</sub>	V <sub>50</sub> (m/s)		
		Set 1	Set 2			Set 1	Set 2	Average
3A-21	Left	236	235	CP	227	227	227	
3A-22		219	217	PT				
3A-23		218	217	PP				
3A-24		228	227	PT				
3A-25		226	225	PP				X
3A-26		229	228	CP				X
3A-27		226	226	PT				
3A-28		226	225	PT				
3A-29		226	225	PT				
3A-30		227	226	PP				X
3A-21	Right	229	228	PT	227	227	227	
3A-22		227	226	PT				
3A-23		227	227	CP				X
3A-24		228	228	PP				X
3A-25		230	229	CP				
3A-26		227	227	CP				X
3A-27		228	227	CP				X
3A-28		224	223	PP				
3A-29		226	225	PP				X
3A-30		226	226	PT				

(CP) Complete Penetration, (PP) Partial Penetration, (PT) Projectile Tumbled

Issued to: 3M  
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Date: 14 July 2017  
 Report: T11763-01-2  
 Issue: 1  
 Page: 4 of 6

**Gray Results:**

Sample ID	Location	Velocity (m/s)		Observation	Used for V <sub>50</sub>	V <sub>50</sub> (m/s)		
		Set 1	Set 2			Set 1	Set 2	Average
3B-21	Left	227	226	PP		234	234	234
3B-22		231	230	CP	X			
3B-23		229	228	PP				
3B-24		231	230	PP				
3B-25		231	230	CP	X			
3B-26		232	231	CP	X			
3B-27		230	229	PP				
3B-28		230	230	PP				
3B-29		231	230	PP				
3B-30		233	232	PP	X			
3B-21	Right	234	234	PP	X	234	234	234
3B-22		237	236	PT				
3B-23		237	236	PP	X			
3B-24		243	241	CP				
3B-25		239	238	PP	X			
3B-26		240	238	CP				
3B-27		239	238	CP				
3B-28		238	237	CP	X			
3B-29		235	234	PT				
3B-30		235	234	PT				

(CP) Complete Penetration, (PP) Partial Penetration, (PT) Projectile Tumbled

Issued to: 3M  
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Date: 14 July 2017  
 Report: T11763-01-2  
 Issue: 1  
 Page: 5 of 6

**Amber Results:**

Sample ID	Location	Velocity (m/s)		Observation	Used for V <sub>50</sub>	V <sub>50</sub> (m/s)		
		Set 1	Set 2			Set 1	Set 2	Average
3C-21	Left	235	234	PT		237	236	237
3C-22		232	231	PP				
3C-23		237	236	PP	X			
3C-24		242	241	CP				
3C-25		241	240	CP	X			
3C-26		239	238	CP	X			
3C-27		235	234	PP	X			
3C-28		239	238	CP	X			
3C-29		235	234	PT				
3C-30		235	234	PP	X			
3C-21	Right	235	235	PT				
3C-22		235	234	CP	X			
3C-23		233	232	PP				
3C-24		234	234	PT				
3C-25		236	235	PP	X			

(CP) Complete Penetration, (PP) Partial Penetration, (PT) Projectile Tumbled

Issued to: 3M  
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Date: 14 July 2017  
Report: T11763-01-2  
Issue: 1  
Page: 6 of 6

**Sample Photographs:**



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