



Protective spectacles testing: so that nothing gets in your eyes

All members of the Swiss Armed Forces are equipped with spectacles as protection against fragments from projectiles or missiles. Minute fragments in particular can quickly enter the eyes and cause irreparable damage. S+T was commissioned by armasuisse's P+C Competence Sector to draw up an appropriate test method for protective spectacles as there were to date no adequate guidelines for the Armed Forces' needs.

Fragment simulating projectiles (FSP) are used for the testing (Figure 1). Owing to the risk of retained missiles (where the bullet literally remains lodged in the barrel) at the required low test speed of 215 meters per second, the fragments are powered not with gunpowder but with nitrogen or helium. In reality, fragments are not spin stabilized, i.e. they do not fly in a stable, linear way. For this reason, smoothbore barrels (without spin) are sourced and integrated into the test equipment (Figure 2). Although the distance in the test between the muzzle and the test object is short, the fragments show a very high degree of tumble when leaving the barrel. S+T developed a guide system to minimize this tumble. The repeat precision of the results is thus guaranteed. The protective spectacles being tested are attached to a model head (Figure 3). Because standard commercially available model heads are not suitable for the test method developed, S+T – in cooperation with the proof-house in Mellrichstadt (Germany) and the Scientific Research Service of Zurich City Police – developed its own model head made of polyurethane. The new test method is recognized by the Association of Testing Institutes for Attack-Protection Materials (VPAM) and has already been adapted as a guideline.

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Figure 1: Fragment simulating projectiles FSP weighing 0.325g



Figure 2: Test equipment for acceleration of minute fragments



Figure 3: Model head made of polyurethane