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Filter Testing with Tear Gas

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Riot control agents are used worldwide and appear in vapour and aerosol form in terms of their physical properties. When dispersed by munitions, both forms of the material are present, with aerosol predominating in the case of CS. We discuss filter performance testing towards riot control agents and the necessary precise control of test conditions, from vapour generation to dynamic presentation of the material to the filter under test. Currently there are few standards published for testing with tear gas, the most common being those from NIOSH (RCT-APR-STP-0037, CN, and RCT-APR-STP-0050, CS). The NIOSH methods do not provide real time monitoring capability for vapour but rather require air sampling with adsorbent tubes, and do not measure the test temperature at the filter inlet. We present details of a controlled procedure for dynamic generation of test atmospheres containing tear gas at different humidity levels, and a real-time monitoring process to measure challenge and breakthrough of tear gas vapour. We also discuss the correlation of testing performed with CN to that with CS, and propose use of CN as a “representative test agent”. The paper will present tear gas vapour calibration results and test data from several filters in current use.