

HM50 Design & Development Story – The Challenges of Achieving Integrated Respiratory & Head Protection.

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ABSTRACT

In February 2011 the German Police institute issued a standard for a system level integration of a protective helmet, full-face mask & communications system (Technical Directive For a Modular System Protective Helmet, Communication System, Respirator Mask). Essentially the standard called for a system enabling a full face mask to be rapidly donned, eliminating the need to remove the helmet (as is necessary with a typical head harness of a full face respirator), and thus keeping the users head protected during a riot / crowd control situation.

Avon Protection embarked on a collaborative project with Schuberth GmbH to develop a system integrating a full-face mask with Schuberth's P100N Police helmet. Avon Protection chose their popular C50 architecture as a starting point and what followed was a challenging roller coaster of success, failures & breakthroughs. This paper details the story of the design & development of the HM50, focusing on the major technical hurdles which had to be overcome to arrive at the final production ready design. For example, the system requirement to meet the stringent German Police Technical Directive flame test required strategic use of fire hardened materials. The key challenge lay in providing protection factor capability in the dual wear modes. Extensive prototypes, trials and testing went in to achieving this capability across a wide anthropometric user range to allow the modular system to function effectively across 11 helmet sizes & 3 mask sizes.



FIG.1 – HM50 standard wear mode configuration



FIG.2 – HMK150, helmet wear mode configuration