

AVON'S RESPONSE TO INFORMATION PRESENTED AT THE CBRN PUBLIC MEETING IN PITTSBURGH, JUNE 18 AND 19 2002

1. FILTER TEST REQUIREMENTS

Laboratory Test Conditions and Filter "Concept of Use"

During the meeting it was implied by NIOSH that the filter concept of use would be based on a "One Attack Scenario". Avon deduced this from the fact that NIOSH stated that new filters would be removed from their "As-Stored-Ready-for-Use" condition and attached to a mask just prior to entering the warm zone. NIOSH indicated that laboratory filter certification tests would be conducted on filters in the "as received" condition, simulating the performance of these newly unpacked filters. Avon endorses this method of testing filters, because it represents the concept of use, but urges NIOSH to make clear to first responders how the filters were intended to be used. There appeared to be some confusion at the meeting.

Filter Test Challenge Concentrations and Breakthrough Times

At the meeting NIOSH stated that the chemical vapor challenge concentrations were derived from a 'Formula', rather than being derived from a threat analysis, as had been indicated previously by NIOSH that they would be. Also, definitive values for the test breakthrough times were not available. The times of 15 minutes for "short duration" use respirators and 60 minutes for "long duration" use respirators were annotated as being 'for illustration only'. Thus at the current time, respirator manufacturers are not able to assess the filter capacity required of their respirators to meet CBRN requirements. This information is required at the earliest possible time to allow respirator manufacturers to develop filters necessary to comply with CBRN requirements.

Filter Capacity expressed as CT (Concentration x Time)

Filter capacity may be expressed as 'CT', or challenge concentration x gas breakthrough time. This mathematical device allows the capacity of a filter needed to survive a terrorist incident (where the concentration – time profile of a gas cloud is uneven) to be translated into test parameters that can be used to define a laboratory filter test. 'CT' is used to define the capacity of military filters.

Working back from the information provided by NIOSH at the meeting, it is possible to calculate CT values in $\text{mg}\cdot\text{min}\cdot\text{m}^{-3}$ for each of the test gases.

The challenge concentration 'Formula' was given as:

$$TLV \times 50 \text{ (the full facemask APF) } \times \text{Safety Factor.}$$

Thus the CT for the filters using the NIOSH "illustration only" breakthrough times is

$$\text{"Formula"} \times 60 \text{ or "Formula"} \times 15, \text{ depending on type of filter}$$

Applying this to the "long duration" (60 minutes) filter leads to the situation where the NIOSH CT for CK is greater than the CT given in the performance specification for the U.S. Military filter for JSGPM. It must be assumed that the military specification for CK has been set such that the filter will survive at least one attack by an aggressor where the aim is to kill warfighters. To set a CT for a first responder's filter intended for single use in a "Warm Zone" higher than the CT for a warfighter in a "Killing Zone", seems to be a gross over-specification of the filter.

Set Filter Capacity from a Threat Analysis, not a Formula

Avon requests that NIOSH set the filter capacity for each gas from an analysis of threat in the warm zone during a "One Attack Scenario". If expressed as a CT for each of the gases, the laboratory certification test may be established by choosing appropriate challenge concentrations and breakthrough times that equate to the CT.

The Laboratory Test Time is not the Filter Wear Time

Avon urges NIOSH to make it clear that the laboratory certification test is merely a means of ensuring that the designated CT of the filter is met, and that it does not signify how long a user may wear the filter. Wear time can only be determined from knowledge of the actual hazard concentration at a given incident.

Organic Vapor test gases are "Representative of a Class", not Threat Chemicals

A reinforcement of the need to establish the CT for each gas comes from examining the requirement set out at the meeting for the organic vapor group of threat chemicals. Carbon tetrachloride or cyclohexane were chosen. These test gases are simply a representation of the category of compounds and neither is considered as a terrorist threat. Using the 'Formula' approach, the challenge concentrations specified at the meeting were based arbitrarily on the TLV levels of these particular chemicals. This bears no relationship to the CT of a representative organic vapor "threat" chemical that might be experienced at an incident. Avon requests NIOSH to estimate a representative organic vapor threat CT from the threat analysis studies and then set a certification test using carbon tetrachloride or cyclohexane accordingly.

2. SPECIFICATION OF MECHANICAL P100 FILTER

Avon considers that NIOSH should avoid specifying the type of filter media that is to be used to achieve the P100 classification. Such a requirement is design restrictive and stifles innovation. In the light of recent developments and experience with the JSGPM program, Avon also considers it unnecessary. Avon urges NIOSH to use performance - based requirements and allow manufacturers the freedom to meet those performance specifications in a manner of their own choosing.

3. FIELD OF VIEW

Avon cautions NIOSH that the adoption of the field of view requirements specified in the European industrial respirator standard EN136 may have the undesired effect of eliminating military style respirators that are designed with a single visor from CBRN certification. Most military style masks have twin eyepieces, and according to EN 136 need only meet an overlapped field of view measurement of 20%. However the overlapped field of view requirement for a single visor is 80%. This value is reasonable for an industrial product with a large visor, set far away from the eyes, but not so for a military style mask where the need for compatibility with weapon sights dictates that eye relief shall be small.

AVON does not believe that it was NIOSH's intention to exclude military style masks from CBRN use on the basis field of view requirements. Avon recommends that NIOSH reject the wholesale adoption of the field of view requirements in EN136 in favor of requirements more suited to the 'pseudo-military' role of first responders and law enforcement organizations that will be involved in counter-terrorist activities.