



**DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 311TH HUMAN SYSTEMS WING (AFMC)  
BROOKS AIR FORCE BASE TEXAS**

14 Nov 02

MEMORANDUM FOR NIOSH Docket Office  
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FROM: AFIERA/RSHI  
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SUBJECT: Comments on the Draft National Institute for Occupational Safety and Health (NIOSH) Standard for Certification of Air Purifying Respirators (APRs) for Chemical, Biological, Radiological, and Nuclear (CBRN) Agents

Attached are comments on the Draft NIOSH Standard for Certification of APRs for CBRN Agents. Please call me at 210-536-6143 if you have any questions.

//signed//  
JOSEPH COSTANTINO, Major, USAF, BSC  
ACC/AMC Industrial Hygiene Consultant

Attachment:  
Comments

<b>Draft Standard Paragraph</b>	<b>Comment</b>	<b>Recommendation</b>
2	<p>There is not a cartridge currently available that can protect against all of the agents identified. Whenever an incident occurs, responders should wear supplied air until the agent is identified and quantified. Existing cartridges that provide protection against many of the agents (such as the C2A1) should be given approval for those agents it does adequately protect against. Otherwise, NIOSH is mandating a specification that cannot be met today. There is no time for canister research and development. Responders will be in a position that there are NO approved respirators/cartridges until this issue is resolved.</p>	<p>Approve existing canisters for use with a condition on the agents the canister will protect against.</p>
4.3.1	<p>Meeting this specification does not improve the performance of the respirator. The purpose of this requirement is to ensure a certified CBRN mask is interoperable. Interoperability is something manufacturers should consider when designing their CBRN masks, but this should not be a NIOSH requirement. Although interoperability does provide a solution to potential supply problems in emergency response situations, it does not enhance a mask's effectiveness to adequately protect an individual exposed to CBRN agents.</p>	<p>This requirement should be optional or removed.</p>
4.3.2	<p>These gasket specifications are not related to the performance characteristics of the respirator; rather, they are made to ensure the respirator will be interoperable. There is no evidence supporting that these specifications will yield an "ideal" CBRN gasket; thus specifying the gasket in this manner limits potential design improvements. Again, interoperability is a possible solution to supply problems, but it is not related to the performance of a respirator when exposed to CBRN agents.</p>	<p>This requirement should be optional or removed.</p>
4.3.3	<p>The breathing resistance for the mask without a canister is unimportant when dealing with CBRN responses. When operating in a CBRN environment, the user will always wear their mask with a canister. This requirement is likely important to interoperability, but is not critical to a mask's performance when exposed to CBRN agents.</p>	<p>This requirement should be optional or removed.</p>

<b>Draft Standard Paragraph</b>	<b>Comment</b>	<b>Recommendation</b>
4.3.4	Although there are practical limits to canister sizes, the limits for canister dimensions and weight presented in this section seem to have been chosen arbitrarily. Since the canister is a critical component for protection against CBRN agents, restricting the size of canisters in this manner limits potential design improvements. Canister dimensions are likely important for interoperability, but a mask that use a larger canister should be designed appropriately.	<ol style="list-style-type: none"> <li>1. NIOSH should provide their rationale for canister size limits.</li> <li>2. It is proposed that this requirement is either made optional or removed.</li> </ol>
4.3.5	Air Force personnel are a younger and more physically fit population than the general working population. Therefore, holding an Air Force mask to a breathing resistance standard intended for the general working population seems inappropriate. When considering the age, fitness level, and the required CBRN protection needed for Air Force personnel, it seems reasonable to allow for higher breathing resistance levels, especially when marginally higher breathing resistances result in much larger increases in CBRN protection levels.	It is recommended that an exception be made for CBRN masks used by the military.
4.3.7	It does not seem appropriate to hold an APR to the same lens abrasion standard developed for SCBAs used by firefighters. In a real-world response, APRs will be worn by decontamination teams and during the later stages of a response. For decontamination teams, the possibility of damaging lenses is very low. For responders entering a site when a APR is appropriate, the risk for damage is lower and any damage is much less likely to be mission critical at that point in the response.	It is recommended that NIOSH reevaluate the appropriateness of this lens abrasion requirement.
4.3.10	The specific details in this item are only appropriate if the mask is designed for interoperability. As discussed above, interoperability has no relationship to the mask's performance in a CBRN environment.	This requirement should be optional or removed.
4.3.11	The specific details in this item are only appropriate if the mask is designed for interoperability. As discussed above, interoperability has no relationship to the mask's performance in a CBRN environment.	<ol style="list-style-type: none"> <li>1. NIOSH should provide their rationale for the 2000 LRPL value.</li> <li>2. This requirement should be optional or removed.</li> </ol>

Draft Standard Paragraph	Comment	Recommendation
<p>4.4.1</p>	<p>At the 16-17 Oct 02 NIOSH public meeting for this standard, NIOSH presented data that was gathered after exposing five different “commercially available” cartridges to these challenge agents. Although the exact draft test concentrations were not used in the data presented, the data indicated that cyclohexane, sulfur dioxide, and ammonia challenge agents were the likely key agents for determining a cartridge’s service life.</p> <p>Determining a cartridge’s service life using this type of broad testing does not seem appropriate. In a real-world response, before responders downgrade their respiratory protection the CBRN agent will be identified and quantified – as this standard expects. Once an agent has been identified and quantified, it seems much more appropriate to apply our knowledge on that agent to respiratory protection selection, rather than limit ourselves to an all-purpose CBRN response respirator/cartridge combination. Using this standard, it is very possible that the cartridge change out schedule will be much earlier than needed because the limiting agent from the service life evaluation is not the agent present at the response or the actual agent at the response has been poorly modeled by a very conservative representative challenge agent. Obviously, having an artificially short service life for respirator cartridges may have an adverse effect on the actual emergency response that is taking place.</p> <p>Following this same argument, it also seems the challenge concentration levels are inappropriate for a real-world response. The challenge agent concentration levels are based on worst-case scenarios for an indoor environment. Although it may be reasonable that an indoor environment could achieve these concentrations, it is not reasonable to assume that these are the levels a responder will be faced with when the respiratory protection has been downgraded to APRs. Additionally, the explanation that this is to ensure the responder is protected from possible pockets of accumulated agent does not seem reasonable. Responder safety procedures are a better method for protecting workers from this type of hazard.</p>	<p>NIOSH should reevaluate their proposed concentrations for challenge agent testing. It seems that the draft challenge agent concentrations would be appropriate for 5-minute “crisis” use, but a lower challenge agent concentration is needed for “warm use” testing.</p>