

## PROTECTION - SCIENCE AND TECHNOLOGY ADVANCES FOR CHEMICAL AND BIOLOGICAL PROTECTION

### Filter Performance And The Counter Intuitive Nature Of Ct Requirements

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Chemical, biological, and radiological (CBR) filter requirements are defined by a number that is a challenge concentration multiplied by an exposure duration or time. In medical terms this would be called a “dosage,” while in collective protection test and evaluation communities this is referred to as a “CT requirement.” There are several advantages of defining a requirement this way. One, you can compare data from different developmental and operational test and evaluation events that challenge filters with different concentrations. This is accomplished by adjusting the time and comparing the filter performance in the different tests at the same dosage. Second, laboratories can test at high concentrations and low times to get results in faster or reasonable time periods. Third, meaningful field testing can be done at lower concentrations to accommodate environmental regulations and weather conditions. However, there is an implicit assumption build into the logic behind CT requirements; that all combinations of concentrations and time represent an equal threat. If an individual does not believe this assumption, then it is often assumed that the highest concentration and shortest time duration is the worst case scenario, which is how almost all laboratory testing is performed. Analysis using toxic dosage data and filter modeling done at Naval Surface Warfare Center Indian Head Division shows that neither of these assumptions is true. The results of our analysis can be used to improve the quality of future filter test and evaluation.