

IS Will environmental authorities ban or restrict fluorine in fire fighting foam? The question has some foam manufacturers positioning themselves to market fluorine-free foam comparable to AFFF. Other companies remain staunchly loyal to their existing product lines, fluorine or not.

Texas based Chemguard is one of the companies preparing for a fluorine diminished future. Dr. Kirtland Clark, Chemguard's Vice President of research and development, will present the company's new fluorine-free foam, ECOGUARD 3% F3, at the Industrial Fire World Conference and Exposition, April 14-17 in Houston.

"It's an innovative, patentable technology," Clark said. "It is based on proprietary products developed and commercialized in-house that allow us to formulate a foam that works without any fluorochemical. To my knowledge, it is the first 3% non-

FLUORINE FINISHED?



Chemguard Introduces No-Fluorine Fire Foam

protein based concentrate to work on Class B fires." UL 162 testing was successfully completed for topside heptane at both 0.04 (AFFF rate) and 0.06 gpm/ft² in fresh and sea water during the first week of March and demonstrated low fuel pickup (no flashovers) and excellent burnback properties. In addition, the product passed sprinkler testing at 0.10 gpm/ft² (AFFF rate) on heptane, with no flashover observed during burnback. The approval is expected by early summer, Clark said.

Clark explained that since this product has a negative spreading coefficient and does not form a film, it works by stabilizing the foam bubble to the flames and hot solvent. Having no fluorosurfactant base, it falls within the "synthetic" foam concentrate UL definition. As such, it can initially only be listed at the synthetic use rate (0.06 gpm/ft²); a new category must be created to allow listing at the lower AFFF use rate (0.04 gpm/ft²).

Clark expects positive results from a full bank of environmental tests already underway, since "the concentrate does not contain fluorine, alkyl phenol ethoxylates, polysaccharide thickeners or added glycol ethers as do many foam concentrates." Not having polysaccharide thickeners means that this product has a viscosity less than 50 centipoise and can expect a shelf life equivalent to that of AFFF agents or greater than 20 years.

"Chemguard does not plan to sell fluorine-free ECOGUARD 3% F3 as a replacement for AFFF agents, since AFFF agents are the strongest products available to the fire protection market," said Clark, "and must remain available for the toughest fires." "Certainly, ECOGUARD 3% F3 should be perfect for municipal markets where environmental issues are paramount and training foams based on this technology would eliminate fluorine concerns while allowing better fire fighter training" he said. Because of the excellent fuel shedding properties, testing in the LASTFIRE program is being considered.

Dr. Clark believes, at this time, that a 3% polar type foam concentrate cannot be formulated with the fluorine-free technology. "However, in January 2003, Chemguard completed UL testing of a new fluorosurfactant-free product, ECOGUARD 3/3 AR, which readily met all AR-AFFF fire performance requirements on UL 162 Class B fuel at 0.04 gpm/ft² application rate (heptane) and 0.15 gpm/ft² application rate on isopropyl alcohol. In addition, ECOGUARD 3/3 AR passed the topside heptane test at the synthetic rate of 0.06 gpm/ft² requiring a 15 minute burnback waiting period," said Clark.

"Unfortunately," Clark noted, "because ECOGUARD 3/3 AR is again considered a synthetic foam concentrate (not having fluorosurfactant base), it is necessary to define a UL category before UL approval may be obtained at the AFFF use rate, while the higher synthetic rate can be immediately approved." Clark explained that ECOGUARD 3/3 AR is based on a technology for which a patent was applied in 2001 and includes the use of a high molecular weight polymer having pendent perfluorinated chains on the backbone. The polymer stabilizes the foam bubble to attack by both polar (water soluble) and non-polar (water insoluble) fuels allowing the product to perform equivalent to other premium AR-AFFF agents.

Clark noted that there are many benefits obtained by replacing fluorosurfactants with a high molecular weight fluorinated polymer, including: lower fish toxicity, lower oral and GI toxicity, and lower loss to waterways or aquifers due to rapid adsorption to solid surfaces such as soil.

The fluorine-free trend is only the latest fallout from the May 2000 decision by 3M to discontinue manufacturing AFFF. Specifically, 3M had grown concerned about the persistent nature of perfluorooctanyl sulfonate (PFOS), a

