

# NFPA 412 IS GOING GREENER

THE NFPA 412 COMMITTEE RECENTLY GAVE NEAR-UNANIMOUS SUPPORT TO AN ARFF VEHICLE PROPOSAL THAT WILL ELIMINATE MOST OF THE ENVIRONMENTAL ISSUES RELATED TO FOAM TESTING, WRITES KAARE HOLM.



**W**ith an overwhelming 27 to 1 vote, the committee approved a novel testing approach which allows testing of the proportioner without using actual foam concentrate, and this approach will now become part of the new NFPA 412 standard, when the 2013 revision is published in June this year. So what exactly does this mean, and how does it become a game changer? To better explain the fundamental novelty of the testing approach, the standard is now referring to the 'old' testing methods as 'output-based testing', meaning that you 'output' foam, then collect and analyse the percentage mix, using a refractometer or a conductivity meter. In contrast, the standard is referring to the new testing method as 'input based testing', meaning that the operator measures how much foam concentrate and tank water will be put into the proportioner. The assumption here is that what has been put in is what comes out, so if the flow rate of the foam concentrate is 3.2% of the total output (water flow plus concentrate flow), then the foam that comes out of the nozzle is going to be 3.2% – and now it is no longer necessary to collect and analyze a sample to find out what percentage this is.

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Now, because there is no need to analyze the foam, there is also no requirement to use actual foam concentrate to perform the test, since all you are measuring is the gallons per minute – and here is where it gets interesting. If the foam tank is closed off and instead plain water is run through the foam concentrate supply pipes, the operator can test the entire foam system, without depositing a layer of foam on the ground – just water mixed with water. And that changes everything. Do the mental math – how much of your foam usage comes from testing and training, and how much of it comes from actual aircraft emergencies?

Sounds good, but does it actually work? Well, the technology has actually been tested in the field for several years. Under the initiative of the US Navy, the first implementation of this approach was developed and beta-tested in a couple of DoD airports. Today, the approach is made available through NoFoam Systems, which has become a market leader for ARFF foam system testing equipment. Civil airports have been reluctant to adopt the system in the past, simply because the approach was not approved by the NFPA 412, but military airports across the world have embraced it already. A number of DoD airports in the USA and Asia are using it; the Australian Department of Defence acquired it for all their airports; and last year the system was installed in seven countries in Europe. Currently, over 200 ARFF vehicles across more than 50 airports have installed the system.

There are three main reasons that the system has gained so much traction. The first reason is financial – you can actually save big on 'being green'. In locations where you are required to collect and destroy foam waste water, each vehicle test will save you thousands of dollars. In Australia, the government has documented that they will save nearly one million dollars per year in clean-up costs by using the NoFoam System, making it their best project payback across any initiative. If you are allowed to let the wastewater into the sewer, then the payback period will be longer, but the system will still pay for itself over time through savings in foam concentrate replenishment.

The second reason is to overcome external pressure for



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better environmental stewardship – some airports are being told directly that they simply cannot use foam for testing, others are being advised more indirectly to align their approach with the overall green initiatives of the airport for the community. Each country, and sometimes each state or county, has its own set of regulations, varying from no oversight to complete prohibition. In either case, the trend is clear – being environmentally aware is no longer optional.

The third reason is safety and preparedness. The more you test, the less you risk having the equipment malfunction in that critical moment when you need it. Many fire chiefs will agree that they would like to test more frequently, but they have to limit their tests due to environmental and financial concerns. Imagine if suddenly testing could be carried out with no environmental impact, and essentially at no extra cost. Not only would the equipment be in better shape, junior team members would actually be allowed to operate the foam button, without having to use a computer simulator. The system has other advantages, which relate to the difference of testing the full flow in real time, as opposed to testing a small sample taken from a specific place and at a specific point in time. For example, because it is possible to read the flow rates in real time, the user will know when to do so – but when a sample is taken, some may collect a sample too early before the flow rates are stable, and it is very likely that it will not be identical to a sample taken once the flow rates are stable – this usually takes about 30 seconds of flowing.

Using the system requires a minor modification to the ARFF vehicle – each vehicle is designed differently, so the modification kit is specific to the vehicle, but in general terms it involves a 2-3 hour installation of a manual foam tank shut-off valve and an external access point to the foam concentrate pipe. During testing, the foam tank is closed, and the flow rate is measured from an external NoFoam trailer connected to the access point. The trailer uses a benign dye in the water tank, which supplies the water that is used instead of foam concentrate – that way the operator can see when the 'foam substitute' is shooting out.

So, let's be clear – the change to the standard only relates to how you test the foam solution percentage. The rest of the standard is unchanged. In fact, users still have to test the draining properties of the foam once a year in order to pass the inspection, and for that a small amount of foam has to be released. The reason for needing to shoot a minimal amount of foam once a year is that the equipment may be in perfect order, but the properties of the mixed foam also depend on

the quality of the foam concentrate, and for that reason you need to shoot actual foam and observe its physical properties, but this amount is marginal compared to doing a full vehicle test of all outlets each month or each quarter.

Back to the discussion about the various foam technologies – how does this relate to the discussion about environmental foams and foam performance? A quick review of the many messages and opinions stated by the presenters during the recent Fifth International Fire Fighting Foam Conference – co-organised by *Fire and Rescue* – left a couple of impressions: several presenters stated that all foams are harmful to the environment, although the overall consensus seems to be that many of the new foams are 'greener' than AFFF, to some degree. The other impression was that many 'greener' foams argue a trade-off between environmental impact and fire fighting performance (although some claim you can 'have it all' with the newer foams). We all hope that industry will develop a foam product that is good for the environment, excellent for fighting all types of fire, and preferably inexpensive. The question is: what if we don't have to use foam, except in actual emergencies? Would that change how we look at the environmental issues altogether? If all foams are a concern, then why use them other than to save lives and property? If foam use is cut back to emergencies, then why argue that trade-offs are necessary? Perhaps this change in the NFPA 412 standard is going to empower the fire chief to use the foam he prefers, to test his vehicles as often as he would like, and to align his objectives with those of the environmental agencies that oversee his operations.

## ABOUT THE AUTHOR

Kaare Holm is the proposer and original author of the new changes to the NFPA 412 standard. He is the founder of NoFoam Systems, a market leader in environmentally

responsible compliance testing for ARFF vehicles, having previously founded several start-ups, mentored dozens of technology based start-up companies, and chaired a standard committee working group for a vehicle safety device.

