

## Questions/Discussions Concerning SFD Use of Novacool Foam

***Does your department use the Novacool on Class B incidents or do you carry another Class B product for those types of spills/fire?***

The Seattle Fire Department uses only Novacool UEF (Universal Extinguishing Foam): at 0.4% for Class A/D/K, at 0.5% for Class B/Polar Solvents, at 0.1% for overhaul on all its Engines and Fireboats.

***If you do use it on Class B spills/fire what percentage do you apply at?***

The U.L. label on the container states 0.5% for Class B, but... When we first did live fire testing with the product at the Grant County Airport burn prop in 2004, we discovered by accident that even using the Novacool at 0.175%, it was just as good as the 3% alcohol resistant film forming foams (ARFFF) in knocking down pool fires & controlling 3-D spray fires on the landing gear/brake fire prop. This happened because of eductor problems that we were having; by counting the containers/amount used we realized that we had run several comparison tests with the Novacool at approximately 0.175%, rather than 0.4%.

However, when we ironed-out our eductor problems and used the foam at 0.4%, we were IMPRESSED! The Novacool was clearly superior to the 3% ARFFF. This video link from YouTube shows our final burn – a 3-D spray fire in an engine nacelle with a 2-D spill/pool fire below. The first part of the video is 3% AFFF, the second is Novacool UEF 0.4%. The hose team/nozzle person is the same during both evolutions, to maintain testing consistency (the second hoseline that you see spraying intermittently is protecting the pumper apparatus in the background from the radiant heat, since the wind shifted between evolutions). <https://www.youtube.com/watch?v=WpvkjdeN5K8>

**NOTE:** The engine nacelle steel temperature after knockdown/fuel shutoff was +300 deg. F for several minutes when using the 3% ARFFF (using a TIC to monitor fire temperatures). Following knockdown with Novacool, the steel was IMMEDIATELY at the ambient temperature of approximately 75 deg. F (I saw it myself. BC Schultz and I both confirmed the TIC readings). Our Seattle Fire Dept. Marine Team joke has always been that ***“It sends the heat to hell!”***

On the same day of testing, we also extinguished fire in: several tires piled together, magnesium shavings and small magnesium engine block.

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A couple of years later, prior to the final decision from the administration to switch to Novacool as our foam product, we did some additional head-to-head live fire product testing at the Washington State Fire Training Academy. There were reps from Cold Fire, Novacool and an additional one (can't remember the product). Our SFD personnel agreed that Novacool performed the best on the different tests.

When Baums Castorine was having the U.L. fire certification testing done, the Novacool UEF passed Polar Solvent fire testing at 0.45% (Hydrocarbon was 0.4%). However, U.L. would not certify the UEF for Polar Solvents at 0.45% since no industry foam equipment was rated to proportion foam below the 0.X% range. So, they certified it for Class B/Polar Solvents at 0.5%.

***If it's a spill what reapplication frequency do you use to maintain the foam blanket on a spill?***

My feeling is that since municipal Firefighters work in a 3-D fire world, we shouldn't be too worried about “foam blankets”. While ARFF foams are good at developing a foam blanket on 2-D spills/pools, they aren't rated to stop 3-D fires: boiling, cascading, spraying fuels (any gas tanker or train incidents

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with a spill fire are 3-dimensional incidents, with fuel cascading & running over various three dimensional surfaces: pavement, dirt, railroad ballast, etc.). We plan on using the in-place foam systems & ARFF foams at the tank farms in our city, but Novacool is compatible with the ARFF foams (in finished form, not the concentrates) so we won't hesitate to utilize our equipment for exposure protection or firefighting at the same time.

Our protocol for polar solvent incidents, with any pooled product, is to continually conduct air monitoring for vapors while being prepared to continually reapply foam if necessary. Again, if it is at an industrial site where a large area polar solvent spill/pool is present, we would utilize the facility's ARFF foam for a vapor blanket, since it works better to control vapor releases. The Novacool, however, extinguishes polar solvent fires and is extremely good at cooling exposures.

**Do you use it on E85 gasoline fires??** Yep, lots of incidents to date- usually secondary to car fires when fuel tanks fail.

**For Class A fires what application percentage do you use?** Our protocol is 0.4% for Class A fires; 0.1% for overhaul.

**Does your department have a policy to apply foam on fire attack or is left up to the Officer in charge to decide?** Our last Policy/Operating Guideline update (about six months ago) changed from "... may use foam at a fire incident" to "Foam will be used at fire incidents unless there is a specific reason to not do so".

**Has the product been cost effective for your department?** It is one-third to one-fourth the cost of ARFF foam for Class B application out-of-the-nozzle. Average cost for the typical room-fire is estimated for us to be approximately \$8.00 per incident.

**What type of foam system do you use to apply it?** Engines use FoamPro proportioners, as do some of the Fireboats. Our Hose Wagon/Foam units (two modified Engines) use a Hale around-the-pump proportioner for higher volume foam flows. One of our Fireboats uses balanced-pressure proportioners. All Engines carry foam eductors for back-up purposes.

**How much supply do you carry on your apparatus?** The FoamPro Engines have a 10-gallon supply tank and carry four 5-gallon spare containers of Novacool. That makes for 30 gallons total onboard. Our spare (older) Engines without FoamPro systems carry six 5-gallon containers with an eductor. The Hose Wagons have 250-gallon foam tanks.

**Do you have a plan in place to bring large quantities of foam to a scene case of a large spill/fire?** In addition to the Hose Wagons, our Commissary can load up a flatbed with some totes to get additional bulk foam to the scene. Fireboat Leschi can pump off pure foam concentrate if needed, and all the Fireboats can pump at least a 1000 gpm supply line with 0.4% Novacool mixed-in (we haven't used that at an incident yet, but it's in the bag-of-tricks).

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Here are some answers, but feel free to call my cellphone if you need any clarification:

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**1. When you adopted Novacool did you have any push back from the suppression personnel? If so, how did you handle it? Our people don't have a lot of practical foam experience, but that doesn't stop them from commenting about things.**

A lot of our personnel recognized that use of foam was widespread in the fire service, beyond just Class B applications: Wildland/Class A, structural firefighting/Class A, compressed air foam systems, etc. Also, it was widely recognized that our system of using eductors and carrying 3% AR-AFFF did not work smoothly or provide for sustained foam attacks. Additionally, we had no way to utilize foam for structural FF benefits. Many people were aware of the Los Angeles County Fire Department foam study, "Bubbles Beat Water" (Fire Chief Magazine, July 2001 [https://fireresearch.com/foampro-lit/articles/FSG\\_867%20Bubbles%20ad\\_LR.pdf](https://fireresearch.com/foampro-lit/articles/FSG_867%20Bubbles%20ad_LR.pdf) ) and they wanted our department to catch-up with the technology that would benefit firefighters during an interior structural attack.

We were getting some new Fireboats during the time that we started (2002) looking at Novacool and other similar new foam products. In addition to contacting other departments to validate our thoughts about the product, we read an article in *Maritime Reporter and Engineering News* that mentioned the world's largest salvage/FF company trying a new foam product to fight a tanker fire in the Bosphorus Straits, Turkey. <https://www.youtube.com/watch?v=tm9ucBc8G7g>

The Novacool intrigued us, but it sounded too good to be true (*It was marketed as Pyrocool at that time, prior to a nasty court fight related to an attorney/investor partner. However, Paul Berger, PhD Chemist, Baum's Castorine Inc., has always held the patent/formula. After the court fight, the attorney/investor won the right to the Pyrocool name, but Paul Berger knew the formula/production secrets- he then worked with his partner, the product rep we know, to market the same formula as Novacool*). So, we started doing some live fire testing, and the administration approved placing Novacool on the new Fireboat(s). It was also realized that by going to a 0.4% Class A/D/K, 0.5% Class B/Polar Solvent foam product, we would have six times more foam capacity than with the 3% AR-AFFF.

Members of our Apparatus Committee convinced the Administration to add foam proportioners to our standard rig specifications. When the administration made the decision to switch to Novacool, we created a Foam Training PowerPoint (I'll try sending you the video segments that go with it), and we updated our Foam Training Guide and Policy/Operating Guidelines. Each engine received containers of Novacool and a new foam eductor that would work at 0.5%. So, as we purchased new rigs, they were used around the city, everyone got used to them, and eventually all first line rigs (32 Engines) were equipped with FoamPro proportioners- allowing for rapid deployment of foam on attack lines.

**2. Do you have a local supplier for Novacool? I have had a couple of emails with the corporate guy and he indicated that we would buy it direct from him. I have asked about this product of our local suppliers but they either don't seem to be very familiar with it or they flat out don't recommend using it in place of AR-AFFF.**

Novacool is purchased directly from Baum's. Local distributor in Yakima, WA, but product is sourced

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from New York.

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The contact in Yakima is Jacek Kobiesa. 509-380-4106. I have known Jacek for over 10 years. Jacek is a dad, a PhD Mechanical Engineer (Stanford), a long-time glider pilot, a black belt in Judo (goes to Tokyo to study), is working on his second PhD, designs FF pumping/foam systems, and loves firefighting technology (a cousin of his was killed firefighting at a refinery in Poland). I have talked once or twice with Paul Berger (Baum's Castorine), but since I am not a PhD/chemist, I didn't have any in-depth conversations. Jacek was present at all our live fire product testing, and he was at the U.L. labs when Novacool was going through its certification testing.

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John,

We have used Novacool at numerous live fire tests, at vehicle fires (with Class A/B/D burning), at a helicopter crash, to extinguish a bin of scrap metals on fire, and at innumerable trash/grass/structure fires. Concerning the reps who suggest that you stick with standard 3% AR-AFFF, just look at the Nassia ship fire video that Smit Tak responded to. If the world's premiere Marine Salvage company used the product, you're in good company.

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**Hope you are having a good holiday. Thank you! for the videos and all the information you have shared. I will make this my last email as I appreciate all you have shared. So far, I have buy in with my apparatus committee and Chief on testing Novacool. Now I am curious on your foam equipment.**

**1. What FoamPro system are you putting on your rigs, 1600, 2002? We just bought two this last year and put the 2001 Foam Pro system on them with 20 gal tanks, but we are slated to order 2 to 3 more, after discussions with our Apparatus salesman he suggested getting the Foampro 1600 system.**

So, I guess it depends on what fire/foam flows you want to achieve. With the 1600 model, I think you will get a maximum of 425 gpm at 0.4% foam- that's plenty of foam flow for residential attack, vehicle fires, brush incidents, etc.

We have the 2002 model of the FoamPro; that allows us to pump approximately 850 gpm of foam solution via our foam-capable, LDH discharge on our Engines (due to plumbing design that is about our max. flow from our left rear, foam-capable, LDH discharge ports). We typically supply a tri-gated wye via LDH and take 2.5" or 1.75" hoselines off that- we use that hose layout at Marina Fires (long docks), at Ship Fires (to get a water supply up onto the main deck, or at our entry point into the ship), at Haz-Mat incidents, and at commercial buildings.

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Our Engines' crosslay beds (1.75") are also plumbed for Foam, facilitating fire attack at houses/duplexes, vehicle fires, brush fires, etc.

### **2. Which portable educator do you buy for your rigs? Most of ours would be need to be replaced for Novacool as they are older units that only go down to 1%. Do you have any thoughts are buying a 250 GPM portable educator?**

We use the Elkhart 241-125; it is just there as a back-up, in case the FoamPro fails. However, it is the only foam production tool on some of our older spare rigs. I like the idea of the 250 gpm eductors, but with eductors you need the nozzle fully-opened to get the proper flow, for proper eductor operation. Seattle chose the 125 gpm eductors since it seemed more likely to be used by our crews for vehicle fire and small haz-mat incidents (larger incidents will have multiple Engines responding, and there should be multiple FoamPro equipped rigs on scene).

The Fireboats also use this one for handlines, as a back-up to their engineered systems – they just stick the pick-up hose into their foam tank fill port <http://www.chiefsupply.com/pok-ultra-light-foam-eductors-w-by-pass-0-4-1-3-and-6-metering-devices-1-1-2.html>

**3. On your Foam unit. How do you have that equipped for foam equipment?** The Hose Wagon/Foam Units are just being placed in-service. There was a lot of tweaking required to get the Hale around-the-pump foam proportioner to work properly; the intake pressure can only be a max. of 1/3 the discharge pressure. Most of our industrial area/sea level hydrants are in the 100+ psi range, and 300 psi foam solution discharge pressures wouldn't be OK for any applications. There is a supply-side pressure reducing manifold that must be deployed in order to get low enough supply pressures (over pressure from relay pumping is also a concern).

The foam units have:

- 275-gallon foam tanks and a 275-gallon water tank; I don't know why they wanted a water tank which essentially reduces the foam capacity for a rig that will only be deployed at large incidents requiring large foam flows (tanker, tank-farm, plane crash, oil trains, etc.)
- Hale around-the-pump foam proportioner, with high-flow foam capabilities in the 1500 gpm plus range.
- 500-2000 gpm apparatus deck gun, with low expansion nozzle attachment; since the reach on these foam deck gun nozzles isn't that great, and since the Hose Wagon/Foam Unit will usually arrive later or on the second-alarm, I question whether or not the rig will be able to get close enough to the fire to utilize its foam deck gun (they aren't ARFF rigs).
- 250 gpm foam eductors; foam pick-up tubes/hoses; 12-volt foam pump/hose for offloading barrels & totes of foam concentrate; cap wrenches for 5-gallon foam container lids; etc.
- 3000' of LDH for overcoming water supply problems (e.g. Earthquake damage)

**4. The last question I have is about the Novacool shelf life. Novacool says 10 + years, do you do anything with that or are you going through it at a fast-enough pace it is a non-issue? Because I noticed your foam unit has a tank so I assume it is like Class B and it starts to degrade once it's out of its container.**

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Jacek, our foam rep, told me that if the foam containers are stored out of sunlight, and the caps are properly closed/sealed, the product should have an indefinite shelf storage life. He based that on testing that he and Paul Berger did on some of the oldest Novacool containers that they had. The issue is water evaporation from the product- properly capped containers will not evaporate.

For bulk foam units, NFPA requires annual testing of the foam in the bulk storage tank to ensure that it is good (Fireboats, Hose Wagon/Foam Units, etc.). We haven't had any issues with the Novacool stored in bulk tanks.

On our Engines, SFD practice is to check the foam storage tank lid gasket for integrity each month. The pressure equalizing vent on the foam storage lids is not an evaporation concern, per Jacek.

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**Station #6**

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