



FIRESTOPPER[®]

"Bringing Firefighting Into The 21st Century"SM

"A QUANTUM CHEMISTRY TECHNOLOGY PRODUCT LINE"SM

**Marketing Department:
A Technical Bulletin**

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**FIRESTOPPER[®]
Industrial - Commercial
Government**

INTRODUCTION

FireStopper® International Limited, a transnational Registered Company, is the developer of the world's most advanced and powerful firefighting, anti-explosion and other life supporting applications Technology; a "**Proprietary Technology**", within the meaning of the *Uniform Trade Secret Act* ("UTSA") *Cal. Civ. Code Sec. 3426*, Common law, *Business and Profession §17200* and all other applicable U.S. and International statutes, which also produce environmental remediation and other supporting applications.

FireStopper® initially devoted the first 25-years of its existence to R&D both in perfecting its Technology, development of products and market testing. Based upon this extensive work, **FireStopper®** has received never possible certifications over all competitors in this space as issued by the most recognized and respected testing facilities in the World.

Along the way, this unique **Quantum Chemistry¹ Technology** has rendered the only available "**All Fire Class**" effective and "**Anti-Explosive**" products, which are all **Non-Toxic, Non-Irritant, Environmentally Safe and Non-Hazardous**. These stand-alone achievements, as granted per the most demanding environmental and life exposure testing and certification, make the **FireStopper® "Brand"** the undisputed *best* over all other existing and available products in the explosion/fire and safety channel of business.

In pursuit of stability and reliability, **FireStopper®** has secured supply lines for its raw material needs to meet its current production capacity of 1-Mil gallons per month and 50k units/month in the handheld portables' product line. As for delivering its portable systems and fixed systems, **FireStopper® International Limited** is dedicated to meet or exceed the client expectations at every juncture.

Because of the Company's dedication to the highest standards in business, **FireStopper®** liquids and concentrates are fully recognized as the only all fire class and subclass effective liquid suppressants. Moreover, PFE-FR FFC, the exclusive suppressant to **FireStopper®** Trademarked systems, in addition to being the most efficient over all applications product who's freeze resistance of -73.3°C (-100° F) without employing hazardous glycols, embody performance obviating the need for multiple extinguishers to fulfill overall safety needs. Due to this innovation, the **FireStopper®** line of portable extinguisher systems can be deployed in all environments on the planet.

OVERVIEW:

Today in the business world successful introduction of innovation is generally reserved for the giant transnational corporations. These oligopolies generally control commercial entry by manipulating the system by which "Certifications"² and regulations are granted and employed among other schemes.

¹ Quantum chemistry is a branch of chemistry whose primary focus is the application of quantum mechanics in physical models and experiments of chemical systems.

² U.S. Milspec: MIL-PRF-24385F w/Amd 2; EN1568; FAA; ICAO; IMO; U.S. Coast Guard; MED; DEFSTAN 4242, UK; UL162; 16 CFR 1500
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This process is generated and facilitated through industry organizations set up as nonprofit entities, managed and supported by the same oligopolies, and political influencing who feed the structure, control the development of Standards and create the environment for favorable regulations to the industry leaders, which ultimately are written by said nonprofit. The intent, substance and final direction of said Standards is manipulated and designed to maintain the status quo since ratification of a Standard is guided and controlled by said industry membership.

Although the idea for creating a body whose task is to guard the best interest of the public through the creation of Standards designed to test the efficacy of products and technology, is a good intentions project. The fact remains that inevitably the good intentions are lost within the functionality of said organizations. There exist a proprietary attitude and behavior taken by the powerful interests that support said institutions. Thus, said support is given through membership contributions, advertising (if the nonprofit derives income from a publication) and other activities related to the Membership.

Most of these organizations write the skeleton of a proposed Standard and the focus groups, mostly made up by the major industry players, fill-in the gaps. They propose procedures in the testing process supporting exclusively the existing technology and derived product, which allow the special interest to draft the final version usually favoring the status quo; clearly excluding innovation, which by definition must adhere to the Standard in order to enter the market; Catch 22.

Factual Industry Certification Structure:

When submitting new firefighting foams for certification, said product(s) must successfully meet the only standard available for testing and certification in the US, NFPA 11; aka: UL162, which is the standard for AFFF applicable used in hydrocarbon fire incidents. When a new technology wants to enter the market in the US, it must then meet the requirements called out by said standard (the same is applicable worldwide under the appropriate AFFF standard in each territory or country).

Within the above principal FireStopper® at its beginning recognized that in order for it to be able to proliferate its Technology and subsequent products, it had to pursue a fertile opportunity out of the sight of the influential and powerful competitors. In 1996, FireStopper® was invited to participate in a head-to-head competition with all the major fire suppression liquid manufacturers. By midmorning the first day, FireStopper® performance eliminated all others and won the unique opportunity to spend the next four years in joint training and testing with the UK MoD. At the end of the experience the MoD reviewed its current Standard 42-40 and based on FireStopper®'s extraordinary performance, the MoD wrote a new *Defense Standard: 4242*, which FireStopper® still is the only Technology product to meet said Standard.

This opportunity provided FireStopper® an unfettered environment to expand its Technology's first product **AB 4002 FFC** into the multiplicity of products it offers to the world today. All have certified to the most recognized, world-class Standards while performing above and beyond all others in all application categories (*please note, FireStopper® has employed traits into its Technology providing the ability to meet the AFFF physical requirements for testing*). Subsequently, the FireStopper® Technology advancements now produce the highest rated fire protection products, explosion amelioration systems, environmental remediation and related medical applications products. By comparison to all other available AFFFs' and related foam products, which generally have one use application and rarely save the flammable in question; in the respective channel of business, they all pale against FireStopper®.

Since 2012, FireStopper® Products acquired ratings and certifications from the most respected testing organizations in the world such as Southwest Research Institute, USA; Loss Prevention Council (LPC), UK; Lloyds Registry, UK; CNPP, France; MPA Dresden, Germany; UL, and USA .

In the environmental arena, FireStopper® Concentrates³ and premix liquids hold the honor of being the only firefighting concentrates and premix to achieve a “GREEN” Certification⁴ to the demands of HOCNF/OSPAR criteria as tested by Opus, UK; NAMSA, USA; Associated Laboratories, California, and others. Said results are confirmed through bodies such as Bellona of Norway, (The Bellona Foundation is an independent non-profit organization that aims to meet and fight the climate challenges, through identifying and implementing sustainable environmental solutions).

In the anti-explosion⁵ application, FireStopper® Products are investigated by entities such as Gexcon, AS (Gexcon AS is a world-leading company in the field of safety and risk management and advanced dispersion, explosion, and fire modelling). For over 21-years, Gexcon and the energy industry were engaged in identifying a product that would suppress hydrogen/methane explosions. In 2013, Gexcon ran an experiment using the then unnamed anti-explosion product, now known as **FireStopper® EXP FFC**, which for the first time in the pursuit of an effective product against explosions, produced uncontroverted results crowning FireStopper®’s achievement in this field (*please see Test Reports below*).

At its inception, **AB 40002 FFC**⁶ demonstrated the technology’s anti explosion properties and capabilities during the year 1999 demonstration, sponsored by the UK MoD, at the request of the South African Defense Force where the product suppressed a direct hit to the turret of a Centurion Tank.

THE HYPOTHESIS

1. ***“A water-based technology that is effective and reliable in the extinguishment of every class of flammable”***
2. ***“That can also produce greatly reliable anti-explosion results”***
3. ***“That will also, leave the treated flammable surface nonflammable”***
4. ***“That while rendering its service, it will not harm life and the environment according to and meeting said recognized third-party independent testing”***
5. ***“That its efficacy can extend to remedial physiological burn events”***
6. ***“That additionally it can provide freeze protection products for harsh cold environments”***
7. ***“That it will also produce reliable environmental bio-remediation products”***
8. ***Effective on nuclear/fissionable materials”***
9. ***Pursuant to the above, “Demonstrated transmutation on zircaloy fire extinguishment”***

³ AB 40002 FFC, XL FFC, XL “PLUS” FFC, EnviroSafe® EBC

⁴ OSPAR/HOCNF

⁵*In 1999 FireStopper® demonstrated its anti-explosive properties in a Military demonstration of an explosion event in a South African Defense Force, Centurion Tank

⁶ Listed: EN1568, UL162, ULC

THE PROOF:

This extraordinary and proven “Technology” recently demonstrated its wide range application on a never before extinguishable fire hazard, a Zircaloy⁷ fire. Said demonstration was conducted at the behest of the Columbia Nuclear Energy Plant in South Carolina. The product of choice was **PFE-FR FFC**, which is only available through FireStopper® Trademarked products. The “challenge”: extinguishment through a hand-held FireStopper® extinguisher of a never before possible event in the *Nuclear Energy Industry*. The result: extinguishment in record time (under 3-seconds) with an added result of rendering this material unignitable, even when re-ignition was attempted minutes after extinguishment and 24-hours later (please see **Fig. 1** below).

Fig. 1:



The sequence of photos represented above addressed the product demonstration:

1. Full ignition of zirconium alloy
2. At approx. 7000°F: extinguisher is activated
 - Full extinguishment is achieved in <3-secs
3. Ignition is attempted minutes after put out; 2-hours after extinguishment and 24-hours later; **NO RE-IGNITION OF THE FLAMMABLE METAL WAS ACHIEVED**



Transmutation of flammable metal: if not transmutation then what? A water-based technology product that is sprayed onto a fully ignited, substantial load of the flammable metal, which is flash extinguished and cannot be reignited. We stand by our assumption that this act clearly transmuted the material from flammable to non-flammable by way of unexplainable process other than Transmutation.

The Nuclear Energy Industry worldwide has many hazards built-in and inherent, which are in existence since the 1940s'. One such hazard is related to the cladding employed to hold the fuel nuclear materials as a finished product to fuel the reactor.

⁷ Zirconium alloys are [solid solutions](#) of [zirconium](#) or other [metals](#), a common subgroup having the trade mark Zircaloy
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Additional Nuclear Energy Applications:

The unique versatility this Technology offers and demonstrates by the creation of products that represent quantum leaps in every category of commercial applications.

Not yet commercially available, FireStopper® has developed a replacement for spent fuel rod containment cooling pool water. We have designated this product line as **X Products**, which currently are candidates for confirming experiments prior to release commercially.

These Products are designed to maintain the nuclear waste materials, which FireStopper® contends that it may not require the need of recycling pumps in order to maintain environmental temperature control. This would obviate potential Chernobyl/Fukushima events if said experiments confirm our hypothesis, that the FireStopper® Technology may have a profound effect on half-life.

Moreover, since FireStopper® does not have access to fissionable materials, we can only rely on empirical calculations based on extreme performances on very high temperatures without loss of efficacy.

Additional Temperature and Environmental Applications

Within the astounding flexibility of this Technology, FireStopper® has developed a highly efficient de-icing product, IceStopper®, which is tasked with being a viable replacement for the highly corrosive and environmentally unfriendly road salt application for winterizing roads and bridges among other applications.

In comparison, the capabilities of this Technology through reliability, safety and economy of the total product lines, dwarf the competition’s applicable products throughout the Industry in general.

For example in the Concentrates, **FireStopper® XL “PLUS” FFC** has fractured the current path of the fire and safety business by achieving and offering what no other AFFF concentrate is capable:

Fig. 2

FireStopper® FFC CONCENTRATES	AFFF (ALL BRANDS)
<i>Certified Usable In Multiple Percentage For Class B Fire Application</i>	No
<i>Effective On All Classes Of Fire (ABCDK And Subclasses)</i>	No
<i>Tested/Rated Certified To Global Standards (EN, NFPA, IMO, ICAO, CE, MED, Lloyds Registry, NFPA11/UL, Etc.) In Multiple Percentage Application</i>	No
<i>Non-Toxic, Non-Irritant, Environmentally Safe “GREEN”</i>	No
<i>Non-Hazardous (Does Not Gum Up)</i>	No
<i>Can Be Batch Mix For Long Periods</i>	No
<i>Greater Retardant Capabilities With No Re-Ignition</i>	No
<i>Massive Temperature Reduction (Endothermic)</i>	No
<i>Low Temperature Resistance Without Anti-Freeze</i>	No
<i>More Economic By Use And Application</i>	No
<i>Usable Through All Applicable Equipment (No Special Equipment Necessary) Equipment Failure Proof</i>	No

Based on the recent performance while submitting for QPL Listing under **MIL-PRF-24385F w/AMD 2 Qualification Testing**, FireStopper® demonstrated its superiority over all others who have ever qualified in the past. The result for this exercise is represented below in a factual extract of the NRL Report. FireStopper® fire testing by the NRL produced successful extinguishment of all fires in the protocol while posting record time extinguishment according to the oral representation by the NRL person conducting said fire testing. In addition, FireStopper® XL “PLUS” FFC, demonstrated and met fire performance requirements under said military specification as a single concentrate usable at 3% and 6%, which no others listed have.

Notwithstanding the above, FireStopper® XL “PLUS” FFC was not granted Listing into the Navy’s QPL due to the non-compliance in the limited category testing as follows:

1. Viscosity @ 5° C tested at 6% marked as a failure but not tested at 3%.
2. Corrosion rate on Cu-Ni alloy: did not meet the requirement however, FireStopper® appealed the misconception of corrosion by explaining the technology’s function of creating a patina to stop corrosion...said explanation was summarily denied
3. Corrosion rate on Bronze: did not meet the requirement; same appeal...denied
4. Precipitation using aged saltwater premix: did not meet the requirement; notwithstanding the fact that the aged, premixed product displayed superior performance on the aged salt water application fire test, which in our opinion made said limiting requirement not applicable with respect to this technology’s product (the precipitance of surfactant did not stratify). Again, our appeal was denied...the QPL’s Standard “owner’s” reasoning for denial was that it does not recognize FireStopper® as a different technology and would not grant an exception. Below please see the total testing results produced by NRL:

Fig. 3

QPL TEST RESULTS

(Paragraphs denoted below refer to the applicable section of MIL-PRF-24385F w/Amd 2)

Paragraph 3.3 Chemical and Physical Requirements for Concentrates:

Property:	Type 6 Criteria	Type 6 Value	Pass/Fail	Type 3 Criteria	Type 3 Value	Pass/Fail
Viscosity @ 25 °C cSt	≥ 2	9.84	Pass	≥2	9.84	Pass
Viscosity @ 5 °C cSt	≤10	14.99*	Fail*	≤20	14.99	Pass
Hydrogen Ion (pH)	7-8.5	7.8	Pass	7-8.5	7.8	Pass
Spreading Coefficient on cyclohexane (dynes/cm)	≥3.0	7.61	Pass	≥3.0	5.94	Pass
Index of refraction	≥1.3580	1.4173	Pass	≥1.3630	1.4173	Pass
Foamability (average of two measurements for each condition):						
Fresh Water Expansion Ratio	≥5.0	7.5	Pass	≥5.0	7.0	Pass
Fresh Water Drain Time (minutes)	≥2:30	6:28	Pass	≥2:30	5:57	Pass
Salt Water Expansion Ratio	≥5.0	7.1	Pass	≥5.0	6.5	Pass
Salt Water Drain Time (minutes)	≥2:30	5:45	Pass	≥2:30	3:40	Pass
Film Formation:						
Full Strength Fresh	No ignition	No ignition	Pass	No ignition	No ignition	Pass
Full Strength Salt	No ignition	No ignition	Pass	No ignition	No ignition	Pass
Corrosion Rate:						
Steel (10 ⁻³ inches/yr)	≤1.5	0.92	Pass	≤1.5	0.92	Pass
Cu-Ni (10 ⁻³ inches/yr)	≤1.0	1.81**	Fail**	≤1.0	1.81**	Fail**
Ni-Cu (10 ⁻³ inches/yr)	≤1.0	0.44	Pass	≤1.0	0.44	Pass
Bronze (mg)	≤100	110	Fail	≤100	110	Fail
Localized pitting (Corrosion-resistant steel)	No Pits	No Pits	Pass	No Pits	No Pits	Pass
PFOA and PFOS Content:						
PFOA (ppb)	≤800	ND	Pass	≤800	ND	Pass
PFOS (ppb)	≤800	ND	Pass	≤800	ND	Pass

Dry Chemical Compatibility:						
Burn Back time (s)	≥360	983	Pass	≥360	723	Pass
Environmental Impact:						
Toxicity (LC ₅₀) mg/L	≥1000	≤2000	Pass	≥500	≤2000***	Pass
COD (g O ₂ /L)	≤500	420	Pass	≤1000	420	Pass
BOD ₂₀ /COD	≥0.65	1.67	Pass	≥0.65	1.67	Pass

* Note should be taken that the FireStopper® Technology is NOT AFFF; it is the FFC (Firefighting Foaming Catalyst) and as such viscosity under low temperature, not employing anti-freeze additives represent a new level of additional superior properties over AFFFs'. Notwithstanding, the higher viscosity does NOT affect the intended performance; equipment can easily be modified to comply with the FFCs' spec.

** NRL/NAVSEA failed to understand, equate and inquire about the differences between the Old AFFF technology and the new and very advanced FireStopper® Technology. The fact remains that the lab personnel and the QPL Owner do not recognize this advanced intelligent technology at work. The FFC, when exposed to some copper alloys naturally build a patina stopping the corrosion process; no pitting, no corrosion

*** At the tested concentration NO FISH FATALITY related to the product was observed (100% survival); for a more acute view of the environmental safety this Technology's Product delivers, please see the HOCNF Study below:

Paragraph 3.3.2 Stability:

Property	Type 6 Criteria	Type 6 Value	Pass/ Fail	Type 3 Criteria	Type 3 Value	Pass/ Fail
Spreading Coefficient on cyclohexane (dynes/cm):						
Using aged concentrate mixed with fresh water	≥3.0	5.61	Pass	≥3.0	5.94	Pass
Using aged premix fresh water	≥3.0	6.37	Pass	≥3.0	5.67	Pass
Using aged premix salt water	≥3.0	6.33	Pass	≥3.0	5.76	Pass
Foamability using aged concentrate (average of two measurements):						
Fresh Water Expansion Ratio	≥5.0	7.3	Pass	≥5.0	6.9	Pass
Fresh Water Drain Time (minutes)	≥2:30	4:11	Pass	≥2:30	4:20	Pass
Salt Water Expansion Ratio	≥5.0	6.8	Pass	≥5.0	6.8	Pass
Salt Water Drain Time (minutes)	≥2:30	5:11	Pass	≥2:30	5:11	Pass
Foamability using aged premix (average of two measurements):						
Fresh Water Expansion Ratio	≥5.0	7.29	Pass	≥5.0	6.4	Pass
Fresh Water Drain Time (minutes)	≥2:30	5:39	Pass	≥2:30	4:35	Pass
Salt Water Expansion Ratio	≥5.0	6.8	Pass	≥5.0	6.5	Pass
Salt Water Drain Time (minutes)	≥2:30	6:02	Pass	≥2:30	3:36	Pass
Film Formation:						
From aged concentrate, full strength, fresh water	No ignition	No ignition	Pass	No ignition	No Ignition	Pass
From aged concentrate, full strength, salt water	No ignition	No ignition	Pass	No ignition	No Ignition	Pass
From aged premix, full strength, fresh water	No ignition	No ignition	Pass	No ignition	No Ignition	Pass
From aged premix, full strength, salt water	No ignition	No ignition	Pass	No ignition	No Ignition	Pass
Fire Performance:						
Aged Concentrate, ½ strength, fresh						
Extinguishment time (s)	≤45	19	Pass	≤45	33	Pass
Burn back time (s)	≥300	572	Pass	≥300	500	Pass
Aged Concentrate, ½ strength, salt						
Extinguishment time (s)	≤45	23	Pass	≤45	30	Pass
Burn back time (s)	≥300	634	Pass	≥300	597	Pass
Aged Concentrate, full strength, Fresh						
Extinguishment time (s)	≤30	23	Pass	≤30	19	Pass
Burn Back time (s)	≥360	735	Pass	≥360	592	Pass
Aged Concentrate, full strength, Salt						
Extinguishment time (s)	≤30	20	Pass	≤30	20	Pass
Burn Back time (s)	≥360	736	Pass	≥360	736	Pass
Aged Premix, full strength, fresh						
Extinguishment time (s)	≤30	28	Pass	≤30	24	Pass
Burn back time (s)	≥360	697	Pass	≥360	478	Pass
Aged Premix, full strength, salt						
Extinguishment time (s)	≤30	27	Pass	≤30	28	Pass
Burn back time (s)	≥360	643	Pass	≥360	636	Pass
Aged Premix, ½ strength, fresh						

Extinguishment time (s)	≤45	31	Pass	≤45	38	Pass
Burn back time (s)	≥300	569	Pass	≥300	478	Pass
Aged Premix, ½ strength, salt						
Extinguishment time (s)	≤45	23	Pass	≤45	42	Pass
Burn back time (s)	≥300	603	Pass	≥300	595	Pass

Property	Type 6 Criteria	Type 6 Value	Pass/Fail	Type 3 Criteria	Type 3 Value	Pass/Fail
Stratification:						
Using aged concentrate mixed with fresh water	N.O.*	N.O.	Pass	N.O.*	N.O.	Pass
Using aged premix with fresh water	N.O.*	N.O.	Pass	N.O.*	N.O.	Pass
Using aged premix with salt water	N.O.*	N.O.	Pass	N.O.*	N.O.	Pass
Precipitation (vol. %):						
Using aged concentrate mixed with fresh water	≤0.05 mL	N.O.	Pass	≤0.05	N.O.	Pass
Using aged premix with fresh water	≤0.05 mL	N.O.	Pass	≤0.05	N.O.	Pass
Using aged premix with salt water	≤0.05 mL	0.43**	Fail**	≤0.05	0.23**	Fail**

N.O.* = None Observed

** Again, without seeking information about performance/observation, a *Fail* for this test is without merit since the reason for the so-called precipitation is that once aged premix is employed, the intelligent technology makes room for the excess salt in the media by releasing a small amount of surfactant to accommodate. The proof of this non-effect is that once the reader of this paper reviews the fire performance above while in the instant condition (aged premix) the performance was stellar in both Types; the perceived precipitant was an evenly distributed change in clarity of the premix with no effect on the intended performance. Again, the Mil Spec does not contemplate a superior Technology being presented and may be designed to prevent innovations

Paragraph 3.3.3 Compatibility:

Mixture: FireStopper XL “PLUS” FFC⁸/ Solberg Arctic 3%⁹ (50/50) Type 3

Requirement	Criteria	Value	Pass/Fail
Using Aged Concentrate	N.O.*	N.O.*	Pass
Using Aged Concentrate	≤0.05	N.O.*	Pass
Fresh Water Expansion Ratio	≥5.0	7.4	Pass
Fresh Water Drain Time (minutes)	≥2:30	4:57	Pass
Saltwater Expansion Ratio	≥5.0	6.9	Pass
Saltwater Drain Time (minutes)	≥2:30	4:45	Pass
From Aged Concentrate, Full Strength, fresh water	No ignition	No ignition	Pass
From Aged Concentrate, Full Strength, salt water	No ignition	No ignition	Pass
Extinguishment time (s)	≤30	30	Pass
Burn back time (s)	≥360	505	Pass
Extinguishment time (s)	≤30	24	Pass
Burn back time (s)	≥360	630	Pass

Mixture: FireStopper XL “PLUS” FFC / National 3EM-C6¹⁰ (50/50) Type 3

Requirement	Criteria	Value	Pass/Fail
Stratification:			
Using Aged Concentrate	N.O.*	N.O.*	Pass
Precipitation (vol. %):			
Using Aged Concentrate	≤0.05	N.O.*	Pass
Foamability using aged concentrate (average of two measurements):			
Fresh Water Expansion Ratio	≥5.0	7.2	Pass
Fresh Water Drain Time (minutes)	≥2:30	5:03	Pass

⁸ FireStopper XL “PLUS” FFC Batch Number 82687, Date 2018

⁹ Solberg Arctic 3% Lot Number AA15002, Date 2/23/15

¹⁰ National 3% Lot Number L15311, Date 11/2015

Saltwater Expansion Ratio	≥5.0	6.9	Pass
Saltwater Drain Time (minutes)	≥2:30	4:55	Pass
Film Formation:			
From Aged Concentrate, Full Strength, fresh water	No ignition	No ignition	Pass
From Aged Concentrate, Full Strength, salt water	No ignition	No ignition	Pass
Fire Performance:			
Aged Concentrate, fresh water			
Extinguishment time (s)	≤30	29	Pass
Burn back time (s)	≥360	719	Pass
Aged Concentrate, salt water			
Extinguishment time (s)	≤30	28	Pass
Burn back time (s)	≥360	669	Pass

*N.O. = None Observed.

Mixture: FireStopper XL “PLUS” FFC / FOMTEC 3% M¹¹ (50/50) Type 3

Requirement	Criteria	Value	Pass/ Fail
Stratification:			
Using Aged Concentrate	N.O.*	N.O.*	Pass
Precipitation (vol. %):			
Using Aged Concentrate	≤0.05	N.O.*	Pass
Foamability using aged concentrate (average of two measurements):			
Fresh Water Expansion Ratio	≥5.0	7.6	Pass
Fresh Water Drain Time (minutes)	≥2:30	5:45	Pass
Saltwater Expansion Ratio	≥5.0	7.6	Pass
Saltwater Drain Time (minutes)	≥2:30	5:33	Pass
Film Formation:			
From Aged Concentrate, Full Strength, fresh water	No ignition	No ignition	Pass
From Aged Concentrate, Full Strength, salt water	No ignition	No ignition	Pass
Fire Performance:			
Aged Concentrate, fresh water			
Extinguishment time (s)	≤30	26	Pass
Burn back time (s)	≥360	510	Pass
Aged Concentrate, salt water			
Extinguishment time (s)	≤30	27	Pass
Burn back time (s)	≥360	647	Pass

Mixture: ¼ FireStopper XL “PLUS” FFC/Solberg/National/Fomtec Type 3

Requirement	Criteria	Value	Pass/ Fail
Stratification:			
Using Aged Concentrate	N.O.*	N.O.*	Pass
Precipitation (vol. %):			
Using Aged Concentrate	≤0.05	N.O.*	Pass
Foamability using aged concentrate (average of two measurements):			
Fresh Water Expansion Ratio	≥5.0	7.6	Pass
Fresh Water Drain Time (minutes)	≥2:30	5:20	Pass
Saltwater Expansion Ratio	≥5.0	7.3	Pass
Saltwater Drain Time (minutes)	≥2:30	5:11	Pass
Film Formation:			
From Aged Concentrate, Full Strength, fresh water	No ignition	No ignition	Pass
From Aged Concentrate, Full Strength, salt water	No ignition	No ignition	Pass
Fire Performance:			
Aged Concentrate, fresh water			
Extinguishment time (s)	≤30	29	Pass
Burn back time (s)	≥360	495	Pass
Aged Concentrate, salt water			
Extinguishment time (s)	≤30	20	Pass
Burn back time (s)	≥360	777	Pass

*N.O. = None Observed.

Mixture: FireStopper XL “PLUS” FFC¹² / Solberg Arctic 6%¹³ (50/50) Type 6

Requirement	Criteria	Value	Pass/ Fail
Stratification:			
Using Aged Concentrate	N.O.*	N.O.*	Pass
Precipitation (vol. %):			
Using Aged Concentrate	≤0.05	N.O.*	Pass
Foamability using aged concentrate (average of two measurements):			
Fresh Water Expansion Ratio	≥5.0	7.5	Pass
Fresh Water Drain Time (minutes)	≥2:30	5:55	Pass
Saltwater Expansion Ratio	≥5.0	7.2	Pass
Saltwater Drain Time (minutes)	≥2:30	6:00	Pass
Film Formation:			
From Aged Concentrate, Full Strength, fresh water	No ignition	No ignition	Pass
From Aged Concentrate, Full Strength, salt water	No ignition	No ignition	Pass
Fire Performance:			
Aged Concentrate, fresh water			
Extinguishment time (s)	≤30	26	Pass
Burn back time (s)	≥360	565	Pass
Aged Concentrate, salt water			
Extinguishment time (s)	≤30	30	Pass
Burn back time (s)	≥360	672	Pass

Mixture: FireStopper XL “PLUS” FFC / National 6EM-C6 6%¹⁴ (50/50) Type 6

Requirement	Criteria	Value	Pass/ Fail
Stratification:			
Using Aged Concentrate	N.O.*	N.O.*	Pass
Precipitation (vol. %):			
Using Aged Concentrate	≤0.05	N.O.*	Pass
Foamability using aged concentrate (average of two measurements):			
Fresh Water Expansion Ratio	≥5.0	8.0	Pass
Fresh Water Drain Time (minutes)	≥2:30	5:25	Pass
Saltwater Expansion Ratio	≥5.0	6.8	Pass
Saltwater Drain Time (minutes)	≥2:30	5:56	Pass
Film Formation:			
From Aged Concentrate, Full Strength, fresh water	No ignition	No ignition	Pass
From Aged Concentrate, Full Strength, salt water	No ignition	No ignition	Pass
Fire Performance:			
Aged Concentrate, fresh water			
Extinguishment time (s)	≤30	29	Pass
Burn back time (s)	≥360	622	Pass
Aged Concentrate, salt water			
Extinguishment time (s)	≤30	30	Pass
Burn back time (s)	≥360	570	Pass

*N.O. = None Observed.

Mixture: FireStopper XL “PLUS” FFC / Phos-Chek 6%¹⁵ (50/50) Type 6

Requirement	Criteria	Value	Pass/ Fail
Stratification:			
Using Aged Concentrate	N.O.*	N.O.*	Pass
Precipitation (vol. %):			
Using Aged Concentrate	≤0.05	N.O.*	Pass
Foamability using aged concentrate (average of two measurements):			
Fresh Water Expansion Ratio	≥5.0	7.9	Pass
Fresh Water Drain Time (minutes)	≥2:30	5:26	Pass
Saltwater Expansion Ratio	≥5.0	7.6	Pass
Saltwater Drain Time (minutes)	≥2:30	6:00	Pass
Film Formation:			

¹² FireStopper XL “PLUS” FFC Batch Number 82687, Date 2018

¹³ Solberg Arctic 6% Lot Number AB1500137, Date 06/22/2015

¹⁴ National Foam 6% Lot Number L14181, Date 10/2014

¹⁵ Phos-Chek 6% Lot Number 270170301, Date 03/2017

From Aged Concentrate, Full Strength, fresh water	No ignition	No ignition	Pass
From Aged Concentrate, Full Strength, salt water	No ignition	No ignition	Pass
Fire Performance:			
Aged Concentrate, fresh water			
Extinguishment time (s)	≤30	20	Pass
Burn back time (s)	≥360	583	Pass
Aged Concentrate, salt water			
Extinguishment time (s)	≤30	24	Pass
Burn back time (s)	≥360	643	Pass

Type Mixture: ¼ FireStopper XL “PLUS” FFC/Solberg/National/Phos-Chek 6

Requirement	Criteria	Value	Pass/Fail
Stratification:			
Using Aged Concentrate	N.O.*	N.O.*	Pass
Precipitation (vol. %):			
Using Aged Concentrate	≤0.05	N.O.*	Pass
Foamability using aged concentrate (average of two measurements):			
Fresh Water Expansion Ratio	≥5.0	7.5	Pass
Fresh Water Drain Time (minutes)	≥2:30	5:30	Pass
Saltwater Expansion Ratio	≥5.0	7.3	Pass
Saltwater Drain Time (minutes)	≥2:30	5:55	Pass
Film Formation:			
From Aged Concentrate, Full Strength, fresh water	No ignition	No ignition	Pass
From Aged Concentrate, Full Strength, salt water	No ignition	No ignition	Pass
Fire Performance:			
Aged Concentrate, fresh water			
Extinguishment time (s)	≤30	29	Pass
Burn back time (s)	≥360	529	Pass
Aged Concentrate, salt water			
Extinguishment time (s)	≤30	25	Pass
Burn back time (s)	≥360	627	Pass

*N.O. = None Observed.

Paragraph 3.4

Fire Performance:

Fire Test	Type 6 Criteria	Type 6 Value	Pass/Fail	Type 3 Criteria	Type 3 Value	Pass/Fail
28 ft² Extinguishment Time (s):						
Fresh Water ½ strength	≤45	22	Pass	≤45	44	Pass
Fresh Water full strength	≤30	19	Pass	≤30	22	Pass
Salt Water ½ strength	≤45	22	Pass	≤45	41	Pass
Salt Water full strength	≤30	23	Pass	≤30	22	Pass
Salt Water Quintuple Strength	≤55	22	Pass	≤55	25	Pass
Salt Water Full Strength PKP	≤30	27	Pass	≤30	22	Pass
Burn Back Time (s):						
Fresh Water ½ strength	≥300	626	Pass	≥300	564	Pass
Fresh Water full strength	≥360	757	Pass	≥360	626	Pass
Salt Water ½ strength	≥300	614	Pass	≥300	630	Pass
Salt Water full strength	≥360	650	Pass	≥360	614	Pass
Salt Water Quintuple Strength	≥200	615	Pass	≥200	742	Pass
50 ft² Fire Test (Salt Water):						
Extinguishment time (s)	≤50	19	Pass	≤50	29	Pass
Burn back time (s)	≥360	487	Pass	≥360	459	Pass
40 second summation	≥320	384	Pass	≥320	360	Pass

Additional Measurements:

(1) Container cap torque test results: FireStopper XL “PLUS” FFC – 40 in/lbs.

It is in our opinion that NAVSEA’s QPL scheme is designed to prevent the implementation of new technology by maintaining a narrow scope on the Listing requirement. This myopic view

propounded will only continue to negatively expose the public, the service personnel and the environment to the limitations and negative properties of AFFF.

FFC TECHNOLOGY ADVANCEMENT OVER AFFF
(AFFF is designed exclusively for class “B”, hydrocarbon flammable materials)

“In contrast with the overused AFFF technology, all FFCs’, whether premix or concentrates, unanimously are effective on all classes of fire, extinguish all flammables, are anti-explosives and are safe to life and the environment.” (FireStopper® is tested, certified and proven by world-class, recognized, testing and certifying laboratories to the most demanding and stringent Standards)

Class A Fire Examples:

- In 1998 FireStopper® was invited to demonstrate its concentrate AB 40002 FFC by the Los Angeles County Fire Services during their county wide training exercise in San Bernardino County where a very large complex of condemned duplex units were donated for said exercise:
 1. In 2-identical spaces, LA County fire prepared a head-to-head demonstration between FireStopper® and their standard applied protocol using water
 2. FireStopper® was applied to a pallet fire inside the living room space in the duplex unit, temperature monitored. At 1500°F, FireStopper® was deployed using one 1 ½-inch line @ the standard GPM through an exterior application protocol¹⁶
 3. AB 40002 FFC extinguished the fire in 54-sec & reduced the temperature to ambient temperature
- The LA County standard firefighting protocol using water produced the following results:
 1. The exterior attack on the identical fire in the adjacent identical unit was fought for 20-min with little or no effect, causing the 3-man fire crew to enter the unit and tear up the rafter since the fire had grown through the eaves into the roof...this was a total loss.

(Please note: this event took place at a time when FireStopper® was in its early stage of development and was firmly entrenched in R&D with the UK Ministry of Defense and the only product it had developed was AB40002 FFC)
- During the same year, FireStopper® working with Loss Prevention Council (UK) (LPCB Approved Products & Services) rated and had approved the highest-class A fire rating to date on a 9-liter extinguisher premixing @ 20% AB 40002 FFC (achieving a 43A rating (a 4.3-meter long pine wood crib according to EN3-4) further

¹⁶ Los Angeles County represented that the SOP for a structure exterior attack is deployed through a crew of 3-men; one at the nozzle and 2-on the line

proving the superior class A capability of this new Technology and type of foam concentrate

- In addition, Gloria GmbH, a Kidde company, commercially made available a line of specialized class “A” extinguishers distributed throughout the world employing our concentrate further supporting the stand alone position of FireStopper®.

- **Class “B” Flammables (AFFF via water is the choice application by fire services):**

1. Basics - in the past years many lawsuits¹⁷ are on record to remediate the toxic effects caused by the used/application of AFFF foam requiring **mass water use**:
 - a. AFFFs’ are not biodegradable and are eye and skin irritants opening the Municipality to justified injury claims from fire personnel
 - b. Non-Fluorinated replacements are a new source of potential major claims against the Municipality for potentially more egregious claims
 - c. Private citizens and community groups who have filed lawsuits for injury claims due to the residue of AFFF in their water systems and the surrounding ground where the contamination originated from its use
2. The water treatment plants have to enhance their ability to recover and clean the water that contains the foam contaminants and the additional massive amounts of contaminants carried away by the burnt byproducts created in the fire and contained in the runoff. The fact remains that there are other costly considerations born out of the blind principal use of water in firefighting.

“We propose that a proven powerful technology exist that will massively reduce the overall use of water, thus greatly reducing and/or eliminating most of the above liabilities. In this paper we offer the following fix when FireStopper® is implemented:”

- Based on 1-min @ 90/GPM/1000-ft² real world application and performance¹⁸, FireStopper® will reduce water usage in such a dramatic way that cost savings will be realized immediately (*please see Fig. 3 below*).

(Please note: FireStopper® Concentrates are the only firefighting concentrates in the World designed to certify in multiple percentages and perform their efficacy equally in any of the certified percentages of use; thus reducing and/or eliminating the need for costly specialized equipment as an added cost saving bonus)

Below please find **Fig. 3**, a real-world analysis and comparison chart representing a demonstrable and duplicable event, clearly denoting a conservative economic comparison. We prefer that the end user who undertakes training with our products, revert to us the greater real-world savings the implementation of our products into use shall offer.

¹⁷ As of this writing, over 3000 law suits are filed to date and additional numbers are expected to be filed in the coming months in the USA and throughout the World

¹⁸ Fig. 1 below is derived from real world applications and world-class demonstrations of **FireStopper® XL “PLUS FFC, XL FFC & AB 40002 FFC** concentrates

Fig. 3

ECONOMICS OF ACTUAL USE & APPLICATION
COMPETITIVE COMPARISON WITH ALL AFFF

FireStopper® PRODUCTS	TESTED & CERTIFIED USAGE	APPLICATION RATE/ APPROX. AREA	APPROX. EXTINGUISHMENT TIME	AFFF	APPLICATION RATE/ APPROX. AREA	APPROX. EXTINGUISHMENT TIME
AB 40002 FFC	6%	90/GPM/1000-ft²	<15-secs	6%	90/GPM/1000-ft²	4 to 6-min
XL FFC	3%; 6%	90/GPM/1000-ft²	<10-secs	3%	90/GPM/1000-ft²	4 to 6-min
XL “PLUS” FFC	1%; 3%; 6%	90/GPM/1000-ft²	<5-secs	1%	90/GPM/1000-ft²	4 to 6-min

Fig. 4

VERIFIABLE ECONOMIC COMPARISON

PRODUCT**	ACTUAL COST BY USAGE/APPLICATION	AFFF (Chemguard)	ACTUAL COST BY USAGE
AB 40002 FFC	1-min @ 90/GPM/1000-ft² @ \$60.95/gal=\$329, 13÷4= \$82.28	6%	1-min@90/GPM/1000-ft² @ \$20.95*/gal=\$113.13x4= \$452.52
XL FFC	1-min@90/GPM/1000-ft² @ \$74.95/gal=\$374, 75÷6= \$62.45	3%	1-min@90/GPM/1000-ft² @ \$32.99*/gal=\$171.54x4= \$686.19
XL “PLUS” FFC	1-min@90/GPM/1000-ft² @ \$97.50/gal=\$487, 50÷6= \$40.62	1%	1-min@90/GPM/1000-ft² @ \$44.20*/gal=\$229.84x4= \$919.36

**ALL CHEMGUARD FOAM UNIT PRICING ACQUIRED FROM AMAZON.COM and extended cost calculations favor the best performance of AFFF*

*** FireStopper International Limited is keenly focused on providing Government, industry, and the public the most advanced products its Technology has to offer*

Class C Fire Efficacy:

- Likewise, this technology was put to task, using the same extinguishers as represented above, to pass the “C” (E in the UK) testing and rating
- Pursuant to ANSI/UL7-11/ULC, conducted at Southwest Research Institute, FireStopper® Extinguishers passed 100kv testing employing PFE-FR FFC and pursuant to EN3-7/10 met EN conductivity testing at 35kv

Class D Fire Efficacy:

- While working with the UK MoD, FireStopper® demonstrated the additional class D capability of its Technology product AB 40002 FFC on various type of magnesium and aluminum fires

(When employing any of the FireStopper® Concentrates on class D and class K events, FireStopper® recommends that said Concentrate be deployed at full strength, through handheld portables)

- Likewise, during the EN and US portable handheld extinguisher testing, and rating as stated above, FireStopper® passed the class “D” requirements on Lithium, Sodium and magnesium flammable testing (please view the full uncut videos of the wide range of accomplished confirmation videos of efficacy (<http://www.firestopperus.com>)).

In addition to the above, the FireStopper® Line of Extinguisher provide the end user with never before available true first response full spectrum capabilities embodied in small packaging (400-ml) which have achieved never before seen ratings under both NFPA10/ANSI-UL/ULC and EN3-7/10. This achievement for the extinguisher line translates to Global/Planetary usability.

- Today, we have fully demonstrated the stand-alone efficacy of all the **FireStopper®** products against all flammable metals including nuclear related. **FireStopper International Limited** is the only company in the world to provide a firefighting product that will extinguish all flammable materials in the planet

Third-Party Environmental Testing & Certifications:

NAMSA: is leading contract research organization (CRO), and the world’s only medical research organization (**MRO**), providing expert regulatory, laboratory, clinical, and compliance services to medical device and healthcare product manufacturers. At every stage of the product development process, we provide strategic guidance and tactical support to help clients commercialize medical products in the major markets of the world.

With respect to this innovative Technology’s Medical application, early in its development it was accidentally discovered that the original formulation had impressive effects on burnt human flesh. This discovery triggered additional research and development of a direct application of a new FireStopper® product that will promote healing of burnt flesh while instantly reducing the potential damage usually attributed to the progression of the burn effect due to the natural course of the heat penetration through the tissue.

Below: Testing Protocols (Skin Irritation)

Summary

The test article, FireStopper FR (FFC), Batch: 0001, was evaluated for skin irritation in accordance with the guidelines of the Federal Hazardous Substances Act (FHSA) Regulations, 16 CFR 1500. A 0.5 ml portion of the test article was topically applied to the intact and abraded skin of six rabbits and left in place for 24 hours. Test sites were graded for erythema and edema at 24 and 72 hours after the single sample application.

Under the conditions of this study, irritation was observed on the skin of the rabbits. The primary irritation index was calculated to be 1.38. The test article would not be considered a primary irritant to the skin since the empirical score was less than 5.00.

Study and Supervisory

Personnel: Colleen M. Stevenson, A.A.
Nicole R. Chvala, B.I.S.
Shelli L. Snyder
Jessica L. Peters
Deedee M. Shoe, B.A.
LaNette A. Hacker, A.A.

Testing Protocols (Eye Irritation)

Summary

The test article, FireStopper FR (FFC), Batch: 0001, was evaluated for ocular irritation in accordance with the guidelines of the Federal Hazardous Substances Act (FHSA) Regulations, 16 CFR 1500. A single 0.1 ml dose of the test article was placed in one eye each of six rabbits. Ocular reactions were evaluated at 24, 48, and 72 hours after sample instillation.

Under the conditions of this study, no significant irritation was observed in the treated eyes as compared to the untreated control eyes of the animals. The test article would not be considered an irritant to the ocular tissue of the rabbit.

Study and Supervisory

Personnel: Shelli L. Snyder
Nicole R. Chvala, B.I.S.
Jessica L. Peters
Colleen M. Stevenson, A.A.
Debra S. Dunn

Testing Protocols (Oral Toxicity)

Summary

The test article, FireStopper FR (FFC), Batch: 0001, was evaluated for oral toxicity in accordance with the guidelines of the Federal Hazardous Substances Act (FHSA) Regulations, 16 CFR 1500. A single dose of 5 g/kg body weight was gavaged to 10 rats. The animals were then observed for up to 14 days for any signs of toxicity.

Under the conditions of this study, there was no mortality or significant evidence of toxicity observed in the rats. The test article would not be considered toxic at a dose of 5 g/kg by the oral route in the rat.

Study and Supervisory

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Natasha N. Norris
Debra S. Dunn



















Opus:

“Increased environmental efficiency is a key concern for our clients, who care about our shared environment. Our considerable experience in chemical testing and regulatory support has led to the development of innovative products and services that combine the best environmental standards with optimum performance. Our environmental services include”:

- Ecotoxicology
- Whole Effluent Assessment (WEA)
- BAT/BEP
- Environmental Services

In the economy of time and presentation space format (over 30-additional pages), all supporting OSPAR/Harmonized Offshore Chemical Notification Format Testing (HOCNF) and other independent test results shall be made available upon request.

CHEMICAL HAZARD CATEGORY

Hazard category	Health	Environment	Safety	Requirements prior to purchase
5 Severe	 R26 R27 R28 R39  R45 R46 R49 R60 R61  R42	 R50+R53 R59 "BLACK" HOCNF-chemicals*	 R1 R2 R3 R4 R5 R6 R19 R44	Purchase denied. Application for exemption dispensation necessary. Application must include documentation of substitution attempt. <u>Environment:</u> Chemicals tagged with R50, R53 and not required for HOCNF* can be approved for purchase.
4 Serious	 R23 R24 R25 R48  R35  R40 R62 R63 R68  R43 R33	 R50 R51+R53 R54 R55 R57 R58 "RED" HOCNF-chemicals*	 R12 (except from hand held products, gas under pressure)  R6 R7 R8 R14 R16	Purchase denied. Substitution shall be assessed and documented for all chemicals in category 4, and documented for R40 R62 R63 R68 HOCNF-chemicals* Substitute shall not be in category 4/5 for health/safety without an overall assessment. Risk assessment required prior to handling.
3 Moderate	 R34  R20 R21 R22 R65  R41  R41	R52 R52/53 R53 "YELLOW" HOCNF-chemicals*	 R11 R15 R17 R30 (except from gas under pressure)	Purchase accepted.
2 Small	 R36 R37 R38 R66 R67 S22-25 S36-39 S51 S52	Product not classified hazardous to the environment but contains chemicals substances that are classified as environmental harmful.	Fire hazard R7 R10 R18 (except from gas under pressure)	Course risk assessment shall be considered. Chemicals shall be handled and stored according to MSDS.
1 Insignificant	Not classified. Subjective symptoms.	Not classified as environmentally harmful.	"GREEN" HOCNF-chemicals* (PLONOR)	Not classified.

*Harmonised Offshore Chemical Notification Format

To further illustrate the enormous positive impact that the FireStopper® Technology and its subsequent products offer, FireStopper® submitted all its relevant products to test to *HOCNF* protocols.

Based upon our research and experience garnered while submitting to safety testing, we have deduced that HOCNF is the most demanding protocols. Notwithstanding, to date FireStopper® is the only product, that based upon the test results on all the individual submissions, is deemed and fall under the “Green” color scheme set forth by the OSPAR Commission.

Bio Remedial Products

Rounding out the lineup of Products this novel FireStopper® Technology offers we present several additional products that fall under the *EnviroSafe® Technology (a derivative of the FireStopper® Quantum Chemistry Technology)*. These novel products are designed to deliver efficiently bio-remediate oil spills both onshore and offshore. In addition, we have developed products in concert with the established and proven pillars of the FireStopper® Technology, non-toxicity, non-irritant, environmentally safe, and non-aggressiveness for oil exploration replacing drilling muds and Fracking chemicals and fluids, which are clearly designated as harmful to the environment among other negative connotations and in the road deicing channel of business.

Conclusion

Government, neither Industry nor the private Citizen are being afforded the deserved safety to life, assets, or environment. The status quo/quid pro quo environment that prevails is hindering any innovation as demonstrated above.

It is the Public Trust in Government that will suffer most should the current business as usual practice is allowed to persist.

Therefore, based upon the undisputable content of this paper, serious consideration should be given and provided to this superior Technology embodying superior products in all aspects and applications.

“FireStopper® continues to enhance the desirability of its Technology and subsequent Products in global applications far exceeding the competition or any available Technology or product line”