Dafo Fomtec AB

Transition to fluorine free foams

Riga, October 15th 2026

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Fire Fighting Foams & Equipment

Performance - Trust - Sustainability

Opening Remarks

- Appreciation and thanks
- Schedule 11.00 → 11.20 (QA session at the end of presentation)
- Language
- Safety briefing
- Telephones

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Company presentation
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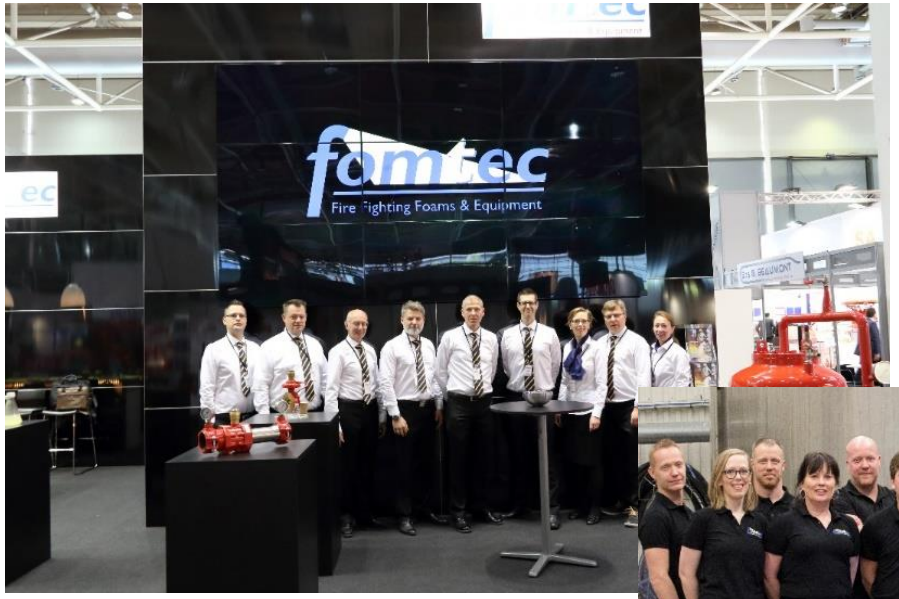
Dafo Fomtec AB locations

• Head office	Stockholm, Sweden
• Production – Foam Concentrates	Helsingborg, Sweden *(outsourced/contract manufacturing in the US, Middle East and South Africa)*
• Production – Foam Equipment	Gothenburg. Sweden
• Sales offices	Helsingborg, Sweden Stockholm, Sweden Sandefjord, Norway Manchester, UK South London, UK

Fomtec team



Fomtec sales and marketing team

John-Olav Ottesen
Owner and CEO

Carl Rydén
Regional Sales Manager

Fomtec production and management team

Company presentation

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Fomtec tested and certified firefighting foam concentrates

- Fluorine free foams (SFFF) – Enviro programme
- Multipurpose foams
- High expansion foams
- Class A & Class F foam

- AFFF
- Alcohol resistant AFFF
- Protein-based foams (P, FP & FFFP)

enviro
by fomtec

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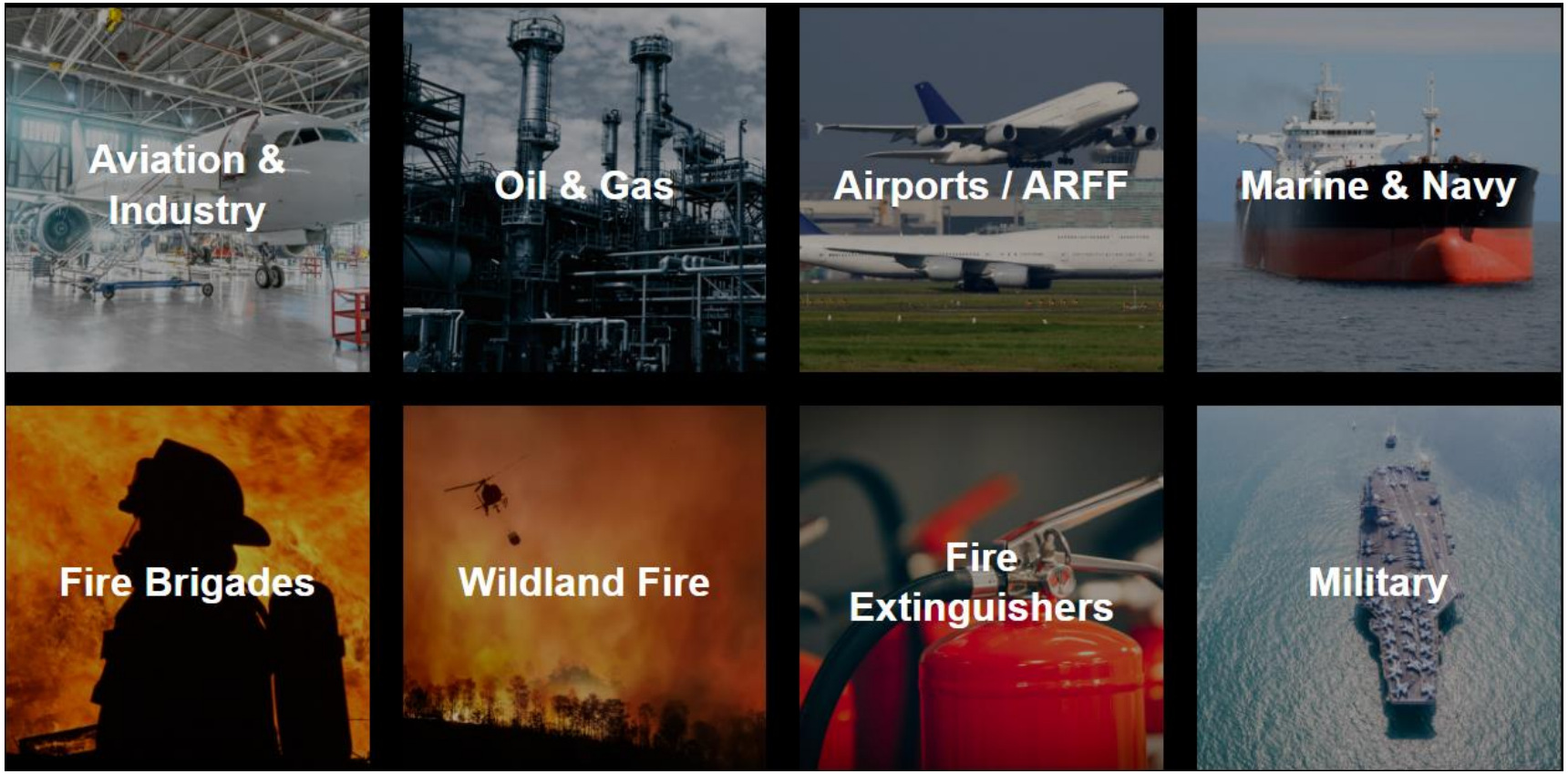
Fomtec market segments



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Some users of Fomtec products

Swedish Army – Sweden
Adnoc – United Arab Emirates
Modec FPSO - Global
US Air Force – USA
Nynäs refinery – Sweden
Maritime Safety Training Center – Finland
Stolt Tanker – Global
Exxon Mobile – France, Germany
Pernod Richard/Absolute distillery – Sweden
Chevron – USA, Thailand, Khazakstan
Swedish Navy – Sweden
BP – UK, Azerbaijan
NRC, NRC, SOC – Iraq
Qatar Petroleum – Qatar
Jordan Petroleum – Jordan
Sonatrac – Algeria
Azzawiya Oil Refining Company – Libya

Petrojarl FPSO – Norway
Finnish fire brigades – Finland
Thun Tankers – Global
DuPont – USA, Taiwan, Japan
Finnish Navy – Finland
Emergency Service College – Finland
Bio-Venta – Latvia
3M – USA
Intel – USA, Malaysia
Bayer – Germany
Pfizer – UK, Spain, Asia
Merck – Germany
Astra Zeneca – Sweden
Jotun Paint – Global
Airbus – France, Spain
Dassault Aviation – France
Mercedes AG – Germany

Baltic Oil Terminal – Estonia
Maersk – Denmark
Total/FINA/ELF – France, UK, Fiji, Togo
Conoco Phillips – USA
Saudi Aramco offshore – Saudi Arabia
DHMI – Turkey
Nobel – Norway
Royal Vopak – Holland, UAE, Singapore
RIMI – Estonia
Amreya Petroleum Co – Egypt
Civil defence – Lithuania
SBM FPSO – Global
VW – Germany
Sherwin-Williams – USA
Liwathon/VOPAK – Estonia

..and many more.

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SFFF transition –
Foam 101 and
“PFAS” regulations
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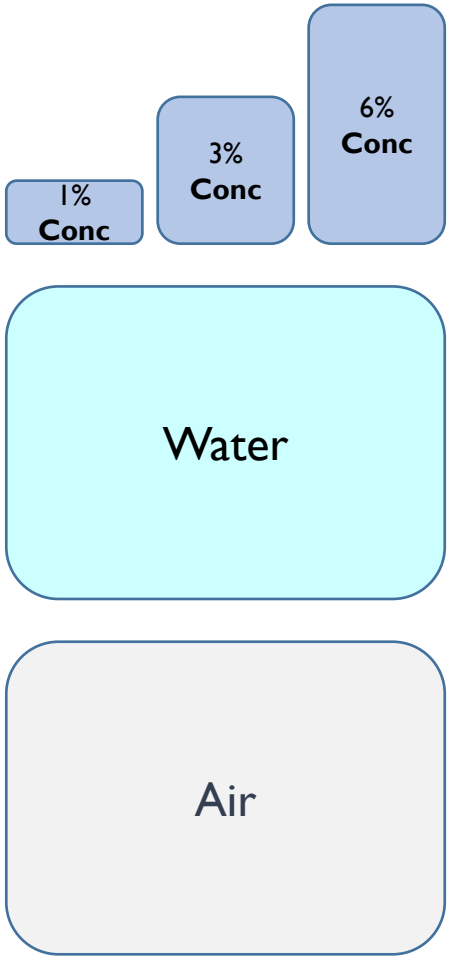
SFFF transition – foam basics



SFFF transition – foam basics

What is in a firefighting foam concentrate?

Fluoro-surfactants

Detergents and cleaning agents

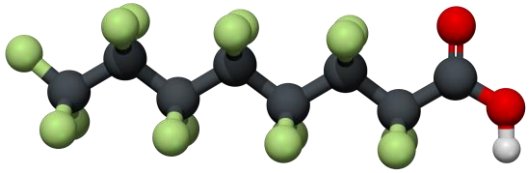
Glycols

SFFF transition – PFAS regulations

- Fluorinated surfactant regulations require replacing millions of litres of Class B foam globally over the next years.
- More organisations have switched to fluorine-free foams or are planning to.
- The transition covers fixed-head foam systems, emergency response and municipal fire brigades.
- Over 4,000 fire tests in the Fomtec Enviro Programme have delivered a range of tested and approved SFFF products.

SFFF transition – terms

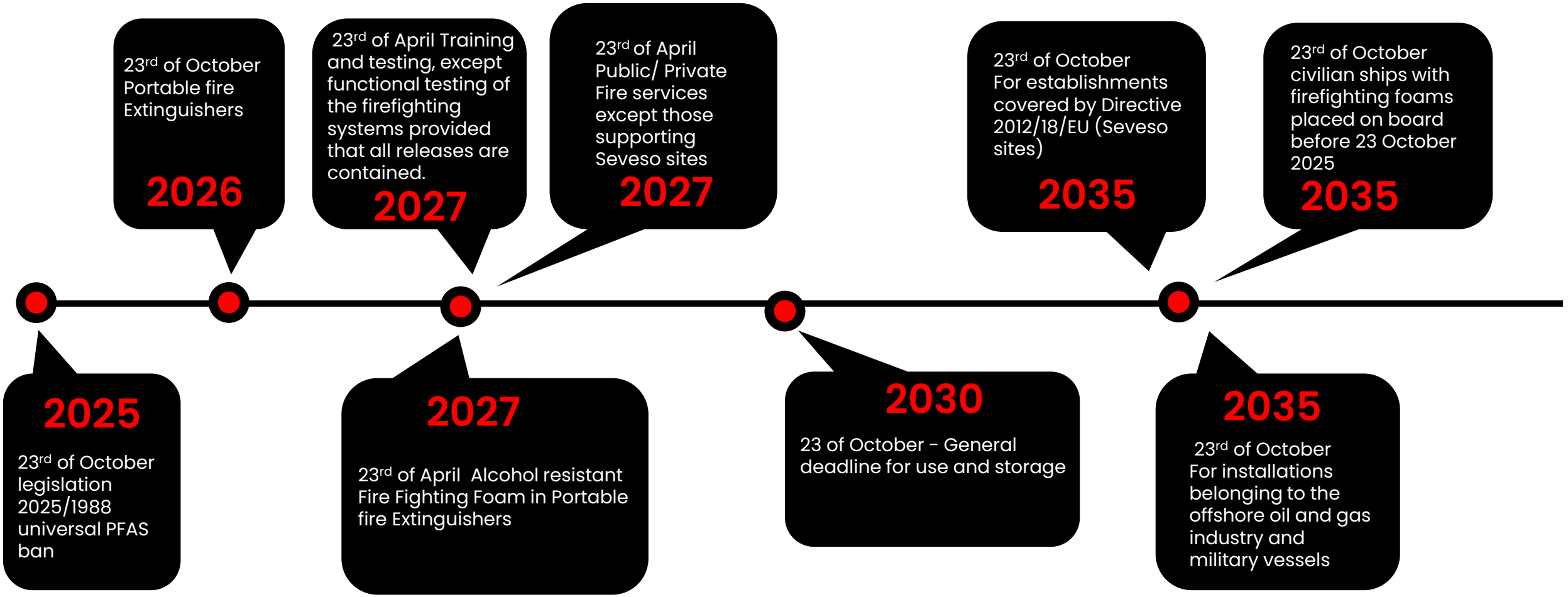
- SFFF = Synthetic fluorine free foams. The term is used by NFPA and the foam industry for all "new" generation of high-performance fluorine free foams.
- Film forming foams = AFFF/AFFF ARC/FFFP/FP type foams contain fluorine surfactant – often referred to as "PFAS" foams
- "PFAS" = umbrella name for all fluorine surfactant = carbon (C) + fluorine chains/molecules of different length/strength and characteristics
- PFOS = long chain molecule part of fluorine surfactant manufactured with ECF (electrochemical fluorination) method used by 3M in their "Lightwater" products
- PFOA = fluorine surfactant 8 carbon atoms = "C8 fluorine"

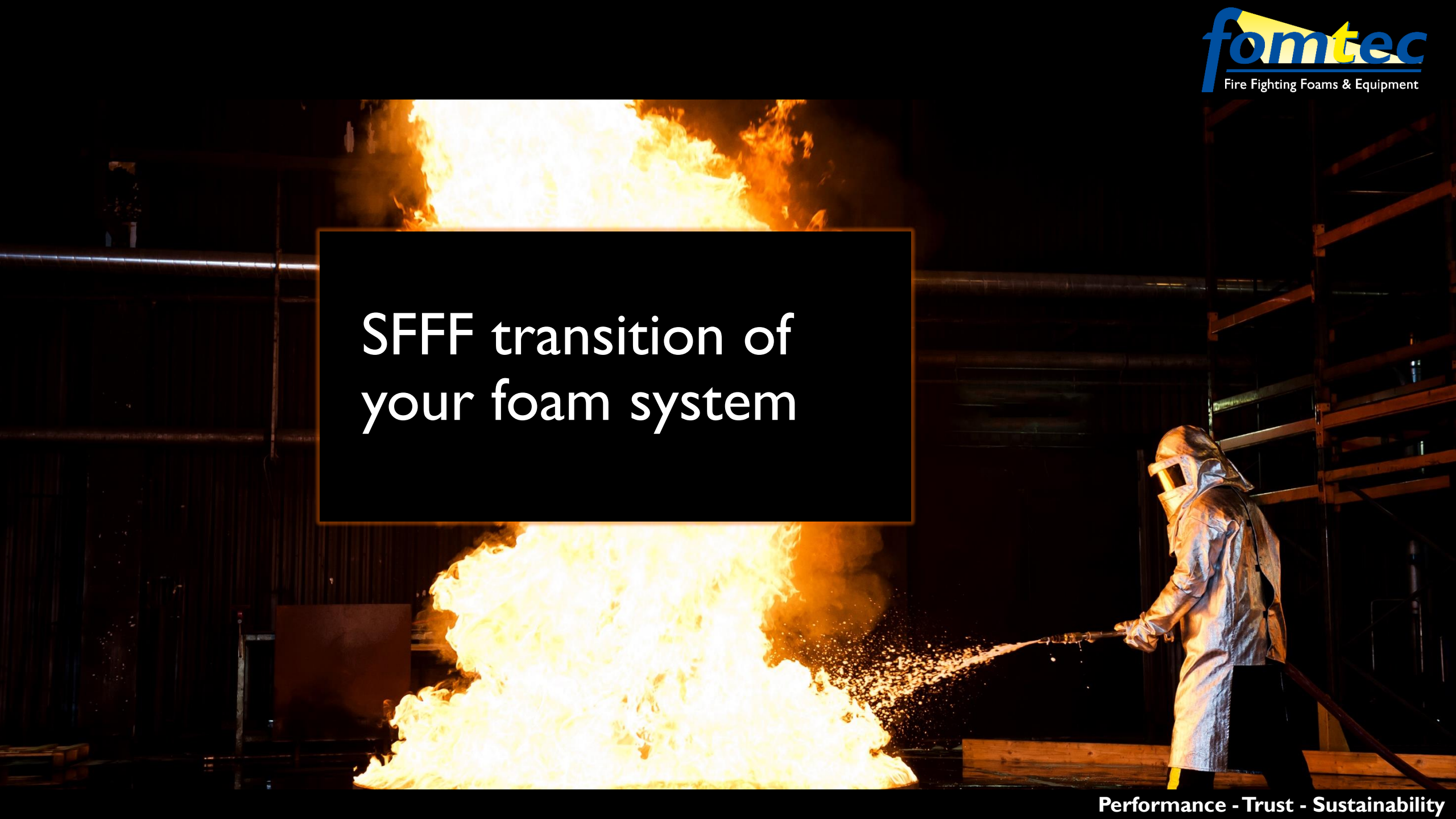


- PFHxA = 6 carbon atoms, as pure as can be (minimum C8/PFOA contamination) = "C6 pure fluorine"

EU regulations – PFAS total ban timeline

EU directive 2025/1988 applicable for all use and storage of firefighting foams with fluorine surfactants (”PFAS”)

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SFFF transition of your foam system
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SFFF transition – back to basics

The foam concentrate is **one part** of the complete foam system.

Fire safety and system performance do not depend only on the foam concentrate – **and it never did in the past**!

SFFF foam quality and fire performance

- Without fluorinated surfactants, SFFF cannot rely on film formation, high heat resistance or low fuel pickup.
- A thick foam layer puts out the fire and prevents re-ignition. It needs good expansion, slow drainage and strong bubbles.
- Foam quality depends on the discharge device and is critical to fire performance.
- SFFF can match or outperform AFFF/AFFF ARC, but some cases need higher application rates, longer application or different methods and tactics.
- SFFF is generally more sensitive to application method and the fuel or chemical involved.

Assess the whole system for new installations and SFFF transitions. Paper results alone are not enough.

SFFF transition - General recommendations

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Reminders!

- Foam system performance depends on the complete system – not only the SFFF.
- SFFF concentrates are not drop-in replacement for PFAS-based products.
- SFFF concentrates may not be compatible with existing proportioning and discharge devices.
- SFFF concentrates – regardless of manufacturer – are not interchangeable, mixable or compatible.
- SFFF performance fluctuate heavily depending on fuel/chemical, application methods and application rates.

SFFF transition - General recommendations

SFFF transition ”check list” – system inventory for end users

- Type of installation – oil terminal, chemical tanker, municipal fire brigade, aircraft hangar, recycling center
- Current design standard and approval requirements
- Type of system – sprinkler, high-expansion, bund protection, bilge protection, large scale mobile monitors etc
- Type of foam mixing system – foam pump proportioner, bladdertank, foam inductor etc
- Type of discharge device – aspirating or non-aspirating, hi-ex generators, medium expansion etc
- Type of material, fuel or chemical – with CAS numbers
- Current product – test for banned substances at accredited laboratory

..then contact your foam partner for a safe solution – not a product supply!

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Selecting your SFFF transition partner
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Selecting your foam partner

Supply performance – Fomtec & FN Serviss partnership

- Fomtec and FN Serviss are privately owned companies operating according Swedish and Latvian environmental and work labour laws
- Fomtec and FN Serviss operating according to EU environmental regulations
- FN Serviss have +20 years' experience of the fire industry, sales and customer support
- Fomtec have more than 15 years of R&D of "new" high performance SFFF:s
- Fomtec documented and tested foam concentrates for all applications
- Fomtec have performed more than 4000 fire tests
- Fomtec foam manufacturing located in Helsingborg, Sweden with 60000 liter per day production capacity, short lead times from order to delivery, product stock in Sweden
- FN Serviss have Latvian-speaking sales and technical team available
- FN Serviss have key products on stock for immediate supply
- FN Serviss have know-how on local regulations
- Market leaders in product and system solution – FM approved and UL listed foam systems with manufacturer

Selecting your foam partner

Available for download at www.fomtec.com

- TDS
- SDS (Latvian language version)
- Product approval certificates
- FTA (Fomtec Technical Advises)

Other documentation available on request

- Warranty and shelf-life statements (project specific)
- Environmental declarations (simplified OECD test data)
- PFOS/PFOA statements
- Hidden gum statements
- Order codes for "PFAS" analysis from EUROFINS laboratory

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Selecting SFFF product and “hidden gum” issue
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Selecting SFFF product – "hidden gum"

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Why do we need high viscosity polymer gum-based SFFF foams?

To compensate for the absence of fluorine surfactants the fluorine free products needs boosting

Adding natural water-soluble polymers (Polysaccharides or Gums) improves fire performance **dramatically** compared to Newtonian fluorine free products

All high-performance SFFF:s are based on **polymer gum** in the chemical formulation.

The polymer gum will protect the foam layer (expanded foam) when applied on the fuel or chemical surface.

The more gum added the better fire performance!

Selecting SFFF product – "hidden gum"

Drawbacks with partially hydrated polymer gum

There is a limit how much polymer gum can be **fully hydrated** (absorbed/blended) in a firefighting foam concentrate chemical formulation.

A foam concentrate based on **partially hydrated polymer gum** "hidden gum" technology will – in theory – encapsulate additional polymer gum to release it when the concentrate is mixed with water (foam premix solution).

Huge amounts of gum can be added without resulting in high viscosity and is virtually stable – a **metastable** formulation.

It is extremely difficult to adjust and balance a formulation to maintain the hidden gum in suspension during storage

The gum is kept in a **metastable state** but is at risk of changing due to for example:

- Increased temperature
- Addition of water

Selecting SFFF product – "hidden gum"

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Drawbacks with partially hydrated polymer gum

"Hidden gum" technology in firefighting foam concentrates is a shortcut to high rating in EN, UL, FM approval standards – at a lower cost!

"Hidden gum" technology is **not stated or tested for** in the certification process to recognized standards such as EN, UL, FM, ICAO, IMO, GESIP or LASTFIRE protocol.

"Hidden gum" technology is **not stated** in product TDS by the manufacturers.

Selecting SFFF product – "hidden gum"

Risks with "hidden gum" products – **viscosity increase**

All foam concentrates storage tanks are connected to a water source.

Water ingress is not unlikely!

- In foam systems it is difficult to remove all residue (cleaning) water before refilling with new foam concentrate or flush water after commissioning test, training or annual system function control
- In foam systems it is difficult to avoid water leakage – due to a check valve in a mobile foam system (fire truck, marine vessel etc) or from a pressure peak in the water delivery system

Dramatically increased viscosity or formation of solid lumps!

- Blockage in orifices in foam concentrate suction piping, pumps, proportioning devices, strainers
- Incorrect or complete cease of mixing in a proportioning device or system
- Failure in annual quality control

Selecting SFFF product – “hidden gum”

SFFF product based on partially or non-hydrated polymer gum, before (left) and after (right) water ingress test

Selecting SFFF product – “hidden gum”

Risks with “hidden gum” products – **phase separation**

Firefighting foam concentrates based on formulations using partially hydrated polymers are “metastable”.

Small changes in ambient conditions such as temperature fluctuations can easily offset this delicate balance, resulting in gum drop-out and phase separation.

Selecting SFFF product – “hidden gum”

Owning the risk using a “hidden gum” firefighting foam concentrate

The risk is real, and reports of phase separation and viscosity issues in real-world systems are surfacing.

If you are offered two products with the same approvals, the same listings, the same fire performance on paper:

One carries a known, built-in instability. The other is engineered to avoid it completely.

Which risk would **you choose to own**?

Selecting SFFF product – “hidden gum”

How to verify your product for “hidden gum”?

By adding 10-15% water – a simple water ingress test - to the concentrate a “hidden gum” product can be detected as the viscosity will **increase** heavily instead of **decrease** as expected.

Fomtec have an instruction for **simple table-top test** available.

Selecting SFFF product – Fomtec foams

No Fomtec product use “hidden gum” technology

Our industry is about safety! Dormant systems that need to work when there is a fire!

15 years ago, Fomtec decided against taking this shortcut to performance, against the use of partially hydrated polymer gum.

In the Enviro program we have done more than 4000 fire tests resulting in products such as:

- Fomtec Enviro Plus (2011)
- Enviro 3x3 Ultra (2013)
- Enviro USP (2016, worlds first SFFF approved to UL and FM for sprinkler)
- Enviro ARK (2021)
- Enviro 3x3 NEO (2025)

Fluorine free products for fire brigades

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Product	Foam type	Main application	Certification	Mixing ratio	Viscosity
Fomtec Class A	Class A	Forest fires Domestic and car fires	US Forest Service QPL listed NFPA 18 & 1150	0,1-3%	Newtonian
Fomtec Class A Super	Class A	Domestic and car fires CAFS		0,1-1%	Newtonian
Fomtec MB -20	Class A & B	Domestic and car fires Hydrocarbon fuel spill High expansion	EN1568-1 & 2 & 3	3%	Newtonian
Fomtec Enviro 3x3 Plus	Class B & B AR	Polar solvent fuels and chemical spill	EN 1568-1 & 3 & 4	3%	Pseudoplastic
Fomtec Enviro 3x3 Ultra	Class B & B AR	Polar solvent fuels in depth and chemical spill	EN 1568-3 & 4 GESIP & LASTFIRE	3%	Pseudoplastic
Fomtec Enviro 3x3 NEO	Class B & B AR	Polar solvent fuels in depth and chemical spill	UL listed EN 1568-3 & 4 GESIP & LASTFIRE	3%	Pseudoplastic

Complete product documentation available at www.fomtec.com:
Technical datasheet, material safety datasheet (incl. all EU language versions) and approval certificates
Detailed technical documentation (shear rate viscosity curve etc) available on request

Fluorine free marine approved products

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Product	IMO & MED certified	Main application	Hydrocarbon fuels	Polar solvent fuels	Viscosity	Foam pump type
Fomtec Enviro SEA	Yes	Deck foam & Engine room	1%, 3% or 6% version	N/A	Newtonian	Centrifugal
Fomtec P 3%	Yes	Deck foam & Engine room	3%	N/A	Newtonian	Centrifugal
Fomtec P 6%	Yes	Deck foam & Engine room	6%	N/A	Newtonian	Centrifugal
Fomtec Enviro 3x3 Ultra	Yes	Deck foam & Engine room	3%	3%	Pseudoplastic	Gear pump
Fomtec P 3% AR	Yes	Deck foam & Engine room	3%	3%	Pseudoplastic	Gear pump
Fomtec Enviro USP	Yes	Deck foam & Engine room	6%	6%	Pseudoplastic	Gear pump
Fomtec LS xMax	Yes (IMO 670 hi-ex)	High expansion foam systems	2%	N/A	Newtonian	Centrifugal

Complete product documentation available at www.fomtec.com:
Technical datasheet, material safety datasheet (incl. all EU language versions) and approval certificates
Detailed technical documentation (shear rate viscosity curve etc) available on request

Fluorine free airport approved products

Product	ICAO level B certified	Main application	Mixing ratio	Viscosity	Foam pump type
Fomtec Enviro AIR	Yes	ARFF	3%	Newtonian	Centrifugal
Fomtec Enviro 3% ICAO	Yes	ARFF	3%	Pseudoplastic	Gear pump
Fomtec Enviro USP	Yes	ARFF, hangar protection, storage tank protection	2%	Pseudoplastic	Gear pump

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Technical datasheet, material safety datasheet (incl. all EU language versions) and approval certificates
Detailed technical documentation (shear rate viscosity curve etc) available on request

Fluorine free industry approved products

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Product	Foam type	Main application	Certification	Mixing ratio	Viscosity
Fomtec Enviro USP	Class B	Sprinkler system Tank protection Bund protection	UL 162 FM 5130 EN 1568-3	2-3%	Pseudoplastic
Fomtec Enviro ARK	Class B & B AR	Sprinkler system Tank protection Bund protection for polar solvent fuels and chemical spill	UL 162 FM 5130 EN 1568-3 & 4	3%	Pseudoplastic
Fomtec Enviro 3x3 Ultra	Class B & B AR	Emergency response Tank protection Bund protection for polar solvent fuels and chemical spill	GESIP LASTFIRE protocol EN1568-3 & 4	3%	Pseudoplastic
Fomtec LS xMax	Class A & B	High expansion foam system	UL 139 CNPP T12 EN1568-1 & 2 & 3	3%	Newtonian
Fomtec LS EXP	Class A & B	High expansion inside air foam system	EN1568-2	2,4%	Newtonian
Fomtec LS eMax	Class A & B & B AR	High expansion foam system for polar solvent fuels and chemical spill	CNPP T12 EN1568-2 & 3 % 4	3%	Pseudoplastic

Complete product documentation available at www.fomtec.com:
Technical datasheet, material safety datasheet (incl. all EU language versions) and approval certificates
Detailed technical documentation (shear rate viscosity curve etc) available on request

Fluorine free products for sprinkler systems

Product	Foam type	Main application	Certification	Mixing ratio	Viscosity
Fomtec Enviro USP	Class B	Sprinkler systems	UL 162 FM 5130	3%	Pseudoplastic
Fomtec Enviro ARK	Class A & B AR	Sprinkler systems	UL 162 FM 5130	3%	Pseudoplastic
Fomtec Enviro NEO	Class A & B AR	Sprinkler systems	UL 162	3%	Pseudoplastic
Fomtec Enviro SPX 1%	Plastics	Sprinkler systems	VdS 3896	1%	Newtonian

Complete product documentation available at www.fomtec.com:
Technical datasheet, material safety datasheet (incl. all EU language versions) and approval certificates

Thank you.

Questions?

- Presentation will be shared by FN Serviss
- I am available for questions at the Fomtec table
- Brochures and giveaways are available at Fomtec table
- You are invited to see the table-top ”hidden gum” test at 12.00 and at 14.00